APPENDIX A

SUPPORTING DOCUMENTS

- **Table A-1: EAW – EA Reference**
- **Minnesota Environmental Assessment Worksheet (EAW) Form**
- **Table A-2: Township, Range, and Sections**
- **Level 1, 2 and 3 Studies Description**

Table A.1. Minnesota EAW – FRA EA Reference

Minnesota EAW Form Item	EA Section
1. Project Title	Cover
2. Proposer	Cover, 1.0
3. RGU	Cover, 1.0
4. Reason for EAW preparation	1.0
5. Project location	2.1, Appendix A
6. Description	2.2, 3.2
7. Project magnitude data	3.2
8. Permits and approvals required	2.6
9. Land Use	4.1
10. Cover types	4.3
11. Fish, wildlife and ecologically sensitive resources	4.3
12. Physical impacts on water resources	4.4, 4.5
13. Water use	4.5
14. Water-related land use management district	4.5
15. Water surface use	4.5
16. Erosion and sedimentation	4.5
17. Water quality: surface water runoff	4.5
18. Water quality: wastewater	4.5
19. Geological hazards and soil conditions	4.10
20. Solid wastes, hazardous wastes, storage tanks	4.8
21. Traffic	4.2
22. Vehicle-related air emissions.	4.6
23. Stationary source air emissions.	NA
24. Odors, noise and dust.	4.7
25a. Archeological, historical or architectural resources	4.9
25b. Prime or unique farmlands	4.10
25c. Designated parks, recreation areas or trails	4.11
25d. Scenic views and vistas	4.12
25e. Other unique resources	NA
26. Visual impacts	4.12
27. Compatibility with plans and land use regulations.	4.1
28. Impact on infrastructure and public service.	4.2, 4.13
29. Cumulative potential effects.	4.16
30. Other potential environmental impacts.	NA
31. Summary of issues	Executive Summary

Version 8/08rev

ENVIRONMENTAL ASSESSMENT WORKSHEET

Note to preparers: This form and EAW Guidelines are available at the Environmental Quality Board's website at: http://www.eqb.state.mn.us/EnvRevGuidanceDocuments.htm. The Environmental Assessment Worksheet provides information about a project that may have the potential for significant environmental effects. The EAW is prepared by the Responsible Governmental Unit or its agents to determine whether an Environmental Impact Statement should be prepared. The project proposer must supply any reasonably accessible data for — but should not complete — the final worksheet. If a complete answer does not fit in the space allotted, attach additional sheets as necessary.
The complete question as well as the answer must be included if the EAW is prepared electronically.
Note to reviewers: Comments must be submitted to the RGU during the 30-day comment period following notice of the EAW in the *EQB Monitor*. Comments should address the accuracy and completeness of information, potential impacts that warrant further investigation and the need for an EIS.

1. **Project title**

2. **Proposer**
   Contact person
   Title
   Address
   City, state, ZIP
   Phone
   Fax
   E-mail

3. **RGU**
   Contact person
   Title
   Address
   City, state, ZIP
   Phone
   Fax
   E-mail

4. **Reason for EAW preparation** (check one)
   ___EIS scoping ___ Mandatory EAW ___Citizen petition ___ RGU discretion ___Proposer volunteered

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

5. **Project location** County City/Township

   ¼ ¼ Section Township Range

   GPS Coordinates N **W**
   Tax Parcel Number

   Attach each of the following to the EAW:
   - County map showing the general location of the project;
   - U.S. Geological Survey 7.5 minute, 1:24,000 scale map indicating project boundaries (photocopy acceptable);
   - Site plan showing all significant project and natural features.

6. **Description**
   a. Provide a project summary of 50 words or less to be published in the *EQB Monitor*.

   b. Give a complete description of the proposed project and related new construction. Attach additional sheets as necessary. Emphasize construction, operation methods and features that will cause physical manipulation of the environment or will produce wastes. Include modifications to existing equipment or industrial processes and significant demolition, removal or remodeling of existing structures. Indicate the timing and duration of construction activities.

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

d. Are future stages of this development including development on any other property planned or likely to happen? __Yes __No
If yes, briefly describe future stages, relationship to present project, timeline and plans for environmental review.

e. Is this project a subsequent stage of an earlier project? __Yes __No
If yes, briefly describe the past development, timeline and any past environmental review.

7. **Project magnitude data**
Total project acreage
Number of residential units: unattached attached maximum units per building
Commercial, industrial or institutional building area (gross floor space): total square feet
Indicate areas of specific uses (in square feet):

Office	Manufacturing
Retail	Other industrial
Warehouse	Institutional
Light industrial	Agricultural
Other commercial (specify)	

Building height If over 2 stories, compare to heights of nearby buildings

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

Unit of government	Type of application	Status

9. **Land use.** Describe current and recent past land use and development on the site and on adjacent lands. Discuss project compatibility with adjacent and nearby land uses. Indicate whether any potential conflicts involve environmental matters. Identify any potential environmental hazards due to past site uses, such as soil contamination or abandoned storage tanks, or proximity to nearby hazardous liquid or gas pipelines.

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

	Before	**After**		**Before**	**After**
Types 1-8 wetlands			Lawn/landscaping		
Wooded/forest			Impervious surfaces		
Brush/Grassland			Stormwater Pond		
Cropland			Other (describe)		
TOTAL					

If **Before** and **After** totals are not equal, explain why:

11. **Fish, wildlife and ecologically sensitive resources**
a. Identify fish and wildlife resources and habitats on or near the site and describe how they would be affected by the project. Describe any measures to be taken to minimize or avoid impacts.

b. Are any state-listed (endangered, threatened or special concern) species, rare plant communities or other sensitive ecological resources on or near the site? __Yes __No
If yes, describe the resource and how it would be affected by the project. Describe any measures that will be taken to minimize or avoid adverse impacts. Provide the license agreement number (LA-______) and/or Division of Ecological Resources contact number (ERDB ___________) from which the data were obtained and attach the response letter from the DNR Division of Ecological Resources . Indicate if any additional survey work has been conducted within the site and describe the results.

12. **Physical impacts on water resources.** Will the project involve the physical or hydrologic alteration — dredging, filling, stream diversion, outfall structure, diking, and impoundment — of any surface waters such as a lake, pond, wetland, stream or drainage ditch? __Yes __No
If yes, identify water resource affected and give the DNR Public Waters Inventory number(s) if the water resources affected are on the PWI: Describe alternatives considered and proposed mitigation measures to minimize impacts.

13. **Water use.** Will the project involve installation or abandonment of any water wells, connection to or changes in any public water supply or appropriation of any ground or surface water (including dewatering)? __Yes __No
If yes, as applicable, give location and purpose of any new wells; public supply affected, changes to be made, and water quantities to be used; the source, duration, quantity and purpose of any appropriations; and unique well numbers and DNR appropriation permit numbers, if known. Identify any existing and new wells on the site map. If there are no wells known on site, explain methodology used to determine.

14. **Water-related land use management district.** Does any part of the project involve a shoreland zoning district, a delineated 100-year flood plain, or a state or federally designated wild or scenic river land use district? __Yes __No
If yes, identify the district and discuss project compatibility with district land use restrictions.

15. **Water surface use.** Will the project change the number or type of watercraft on any water body? __Yes __No
If yes, indicate the current and projected watercraft usage and discuss any potential overcrowding or conflicts with other uses.

16. **Erosion and sedimentation.** Give the acreage to be graded or excavated and the cubic yards of soil to be moved: acres ; cubic yards. Describe any steep slopes or highly erodible soils and identify them on the site map. Describe any erosion and sedimentation control measures to be used during and after project construction.

17. **Water quality: surface water runoff**
a. Compare the quantity and quality of site runoff before and after the project. Describe permanent controls to manage or treat runoff. Describe any stormwater pollution prevention plans.

b. Identify routes and receiving water bodies for runoff from the site; include major downstream water bodies as well as the immediate receiving waters. Estimate impact runoff on the quality of receiving waters.

18. **Water quality: wastewaters**

a. Describe sources, composition and quantities of all sanitary, municipal and industrial wastewater produced or treated at the site.

b. Describe waste treatment methods or pollution prevention efforts and give estimates of composition after treatment. Identify receiving waters, including major downstream water bodies (identifying any impaired waters), and estimate the discharge impact on the quality of receiving waters. If the project involves on-site sewage systems, discuss the suitability of site conditions for such systems.

c. If wastes will be discharged into a publicly owned treatment facility, identify the facility, describe any pretreatment provisions and discuss the facility's ability to handle the volume and composition of wastes, identifying any improvements necessary.

19. **Geologic hazards and soil conditions**

a. Approximate depth (in feet) to ground water: minimum average;
to bedrock: minimum average.
Describe any of the following geologic site hazards to ground water and also identify them on the site map: sinkholes, shallow limestone formations or karst conditions. Describe measures to avoid or minimize environmental problems due to any of these hazards.

b. Describe the soils on the site, giving NRCS (SCS) classifications, if known. Discuss soil texture and potential for groundwater contamination from wastes or chemicals spread or spilled onto the soils. Discuss any mitigation measures to prevent such contamination.

20. **Solid wastes, hazardous wastes, storage tanks**

a. Describe types, amounts and compositions of solid or hazardous wastes, including solid animal manure, sludge and ash, produced during construction and operation. Identify method and location of disposal. For projects generating municipal solid waste, indicate if there is a source separation plan; describe how the project will be modified for recycling. If hazardous waste is generated, indicate if there is a hazardous waste minimization plan and routine hazardous waste reduction assessments.

b. Identify any toxic or hazardous materials to be used or present at the site and identify measures to be used to prevent them from contaminating groundwater. If the use of toxic or hazardous materials will lead to a regulated waste, discharge or emission, discuss any alternatives considered to minimize or eliminate the waste, discharge or emission.

c. Indicate the number, location, size and use of any above or below ground tanks to store petroleum products or other materials, except water. Describe any emergency response containment plans.

21. **Traffic.** Parking spaces added:
Existing spaces (if project involves expansion):
Estimated total average daily traffic generated:
Estimated maximum peak hour traffic generated and time of occurrence:
Indicate source of trip generation rates used in the estimates.
If the peak hour traffic generated exceeds 250 vehicles or the total daily trips exceeds 2,500, a traffic impact study must be prepared as part of the EAW. Using the format and procedures described in the Minnesota Department of Transportation's Traffic Impact Study Guidance *(available at: http://www.oim.dot.state.mn.us/access/pdfs/Chapter%205.pdf)* or a similar local guidance, provide an estimate of the impact on traffic congestion on affected roads and describe any traffic improvements necessary. The analysis must discuss the project's impact on the regional transportation system.

22. **Vehicle-related air emissions.** Estimate the effect of the project's traffic generation on air quality, including carbon monoxide levels. Discuss the effect of traffic improvements or other mitigation measures on air quality impacts.

23. **Stationary source air emissions.** Describe the type, sources, quantities and compositions of any emissions from stationary sources of air emissions such as boilers, exhaust stacks or fugitive dust sources. Include any hazardous air pollutants (consult *EAW Guidelines* for a listing) and any greenhouse gases (such as carbon dioxide, methane, nitrous oxide) and ozone-depleting chemicals (chloro-fluorocarbons, hydrofluorocarbons, perfluorocarbons or sulfur hexafluoride). Also describe any proposed pollution prevention techniques and proposed air pollution control devices. Describe the impacts on air quality.

24. **Odors, noise and dust.** Will the project generate odors, noise or dust during construction or during operation? __Yes __No
If yes, describe sources, characteristics, duration, quantities or intensity and any proposed measures to mitigate adverse impacts. Also identify locations of nearby sensitive receptors and estimate impacts on them. Discuss potential impacts on human health or quality of life. (Note: fugitive dust generated by operations may be discussed at item 23 instead of here.)

25. **Nearby resources.** Are any of the following resources on or in proximity to the site?
Archaeological, historical or architectural resources? __Yes __No
Prime or unique farmlands or land within an agricultural preserve? __Yes __No
Designated parks, recreation areas or trails? __Yes __No
Scenic views and vistas? __Yes __No
Other unique resources? __Yes __No
If yes, describe the resource and identify any project-related impacts on the resource. Describe any measures to minimize or avoid adverse impacts.

26. **Visual impacts.** Will the project create adverse visual impacts during construction or operation? Such as glare from intense lights, lights visible in wilderness areas and large visible plumes from cooling towers or exhaust stacks? __Yes __No
If yes, explain.

27. **Compatibility with plans and land use regulations.** Is the project subject to an adopted local comprehensive plan, land use plan or regulation, or other applicable land use, water, or resource management plan of a local, regional, state or federal agency? __Yes __No.
If yes, describe the plan, discuss its compatibility with the project and explain how any conflicts will be resolved. If no, explain.

28. **Impact on infrastructure and public services.** Will new or expanded utilities, roads, other infrastructure or public services be required to serve the project? __Yes __No.
If yes, describe the new or additional infrastructure or services needed. (Note: any infrastructure that is a connected action with respect to the project must be assessed in the EAW; see *EAW Guidelines* for details.)

29. **Cumulative potential effects.** Minnesota Rule part 4410.1700, subpart 7, item B requires that the RGU consider the "cumulative potential effects of related or anticipated future projects" when determining the need for an environmental impact statement.
Identify any past, present or reasonably foreseeable future projects that may interact with the project described in this EAW in such a way as to cause cumulative potential effects. (Such future projects would be those that are actually planned or for which a basis of expectation has been laid.)
Describe the nature of the cumulative potential effects and summarize any other available information relevant to determining whether there is potential for significant environmental effects due to these cumulative effects *(or discuss each cumulative potential effect under appropriate item(s) elsewhere on this form).*

30. **Other potential environmental impacts.** If the project may cause any adverse environmental impacts not addressed by items 1 to 28, identify and discuss them here, along with any proposed mitigation.

31. **Summary of issues.** *Do not complete this section if the EAW is being done for EIS scoping; instead, address relevant issues in the draft Scoping Decision document, which must accompany the EAW.* List any impacts and issues identified above that may require further investigation before the project is begun. Discuss any alternatives or mitigative measures that have been or may be considered for these impacts and issues, including those that have been or may be ordered as permit conditions.

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

I hereby certify that:

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

Signature   Date

Title

Environmental Assessment Worksheet was prepared by the staff of the Environmental Quality Board at the Minnesota Department of Administration, Office of Geographic and Demographic Analysis. For additional information, worksheets or for *EAW Guidelines*, contact: Environmental Quality Board, 658 Cedar St., St. Paul, MN 55155, 651-757-2873, or http://www.eqb.state.mn.us.

Table A.2. Township, Range, Sections within the NLX Corridor

Minnesota	
Township (N), Range (W)	**Sections**
29,24	02, 03, 11, 13, 14, 22, 23
30, 24	03, 10, 15, 22, 27, 34
31, 24	02, 11, 14, 23, 26, 35, 36
32, 24	02, 11, 14, 23, 26, 35
33, 24	01, 12, 13, 23, 24, 26, 35
34, 23	06, 07, 18, 19, 30
34, 24	25, 36
35, 23	05, 08, 17, 20, 29, 30, 31
36, 23	03, 10, 15, 16, 21, 28, 32, 33
37, 23	02, 11, 14, 22, 23, 27, 34
38, 22	06, 07
38, 23	12, 13, 24, 25, 26, 35
39, 22	05, 08, 17, 19, 20, 30, 31
40, 21	06,
40, 22	01, 11, 12, 14, 15, 21, 22, 28, 32, 33
41, 20	05, 06, 07, 18
41, 21	13, 24, 25, 26, 27, 32, 33, 34
42, 20	01, 02, 09, 10, 11, 16, 20, 21, 29, 32
43, 19	02, 03, 09, 10, 16, 17, 19, 20, 30, 31
43, 20	36,
44, 18	03, 09, 10, 16, 17, 19, 20, 30
44, 19	25, 35, 36
45, 17	04, 05, 08,17, 18,19
45, 18	24, 25, 26, 34, 35
46, 15	06,
46, 16	10, 11, 12, 15, 16, 17, 18, 19
46, 17	24, 25, 26, 27, 33, 34
49, 14	04, 05, 07, 08, 17, 18, 27, 33, 34
Wisconsin	
Township (N), Range (W)	**Sections**
46, 15	4, 6
47, 14	4, 8 ,9, 17, 19, 20
47, 15	23, 24, 26, 27, 32, 33, 34
48, 14	03, 10, 15, 22, 27, 28, 33
49, 14	08, 15, 16, 17, 22, 27, 34

NLX: Alternative Development Studies

- *Northern Lights Express High Speed Rail Corridor Assessment Report, Level 1 Screening Report (Steps 1, 2 and 3)*, dated December 29, 2009, Revised June 2010. Level 1 is an initial screening of rail alternatives, addressing operational characteristics, investment requirements, and environmental constraints at a broad conceptual level.
- *Northern Lights Express Technical Memorandum: Functional Analysis of Routes 9, 11 and 11A (Level 2 Analysis)*, dated December 2010. Level 2 assesses the functional characteristics (capital improvements, travel time, ridership, revenue and benefit-cost) to determine if alternatives still under consideration following the Level 1 screen could be further narrowed before proceeding into detailed environmental analysis for the Environmental Assessment.
- *Northern Lights Express Passenger Rail Project Concept-Level Engineering Report, Level 3 Analysis, Routes 9, 11 and 11a*, dated April 2011, revised June 2011. Level 3 analysis includes development of conceptual engineering of Routes 9, 11 and 11a and includes a more detailed capital cost estimate based on this concept engineering.

APPENDIX B

ALTERNATIVES ANALYSIS

- **Alternatives Analysis**
- **NLX Level 1 Analysis – Track Segment Descriptions**
- **FRA and MnDOT Correspondence**

Alternatives Analysis

Introduction

In accordance with FRA guidance, a three-level evaluation methodology was utilized to conduct an alternative analysis of potential rail corridors connecting Minneapolis and Duluth. Level 1 is an initial screening of rail alternatives, addressing operational characteristics, investment requirements, and environmental constraints at a broad conceptual level. Level 1 results in a reduced set of viable rail alternatives that are subjected to a more detailed process in Levels 2 and 3. Level 2 examines ridership and operations in more detail, done only when Level 1 screening identifies more than one reasonable rail alternative. Level 3 is a detailed evaluation of the rail alternatives surviving Levels 1 and 2 screening, and addresses operational and environmental issues as compared with other transportation modes such as intercity bus as well as the No Build alternative.

The three-level alternatives analysis process was initially carried out by the project team in consultation with agency stakeholders in fall of 2009. Consultation with FRA staff in early 2010 resulted in the purpose and need statement being revised and additional alternatives being identified for analysis. The routes were added because the Purpose and Need of the project was revised to indicate terminal station in Minneapolis. Since Minneapolis was chosen as the terminal, routes were added to provide service to St. Paul Union Depot. This is noted below, where relevant.

Level 1

The Level 1 screening for alternatives includes three steps.

In Step 1 a universe of route alternatives for passenger rail service between Minneapolis and Duluth were identified. 17 passenger rail routes extending as far west as Staples, Minnesota and as far east as Trego, Wisconsin, were identified. Four others were identified during the fall of 2009 process (Routes 10A, 11A, 12A, and 13A); two were added following FRA consultation in early 2010 (Routes 11 and 11A). See Figure X in Appendix A.

In Step 2, each of the seventeen route alternatives were screened according to the three criteria:

1. Route distance – from end point to end point.
2. Population and population centers – route corridor populations (2000 Census data; within a 20-mile band of each route (10 mile each side), and within a 20-mile radius of each of terminal stations in Minneapolis and Duluth) were compiled and used as an estimate of potential ridership.
3. The presence of route defects – conditions that would make the construction or operation of a passenger rail particularly costly or difficult. Any defects that would effectively prohibit rail line construction or operation and could not be mitigation were considered “untenable defects” and eliminated a route from further screening.

Based on the analysis, each route was assessed as either “comparable” or “unfavorable” with respect to each of the criteria. The comparable/unfavorable assessments were tallied for each route, and nine routes were eliminated from consideration (Routes 1, 2, 3, 4, 5, 6, 7, 13, and 13A). None of the routes added in early 2010 were eliminated as a result of Step 2 analysis.

In Step 3, the eight surviving routes (Routes 8, 9, 10, 10A, 11, 11A, 12 and 12A) underwent a more thorough quantitative screening and evaluation process. Step 3 included both a technical evaluation as well as a prioritization of evaluation criteria and scoring of alternatives conducted at a screening workshop. The process is detailed in the *Northern Lights Express High Speed Rail: Corridor Assessment Report* and is summarized here.

The technical evaluation consisted of an analysis of potential environmental impacts and cost and operational concerns. The environmental analysis was intended to determine what environmental factors would render a corridor infeasible or imprudent due to environmental concerns, or discriminate further between the five routes and assist in further screening the remaining corridor alternatives. Given the overall length and distribution of the corridors to be assessed as well as the number of corridors, the methodology for the environmental scan was based on readily available data that could be easily assessed for potential significance, and addresses federal requirements for avoidance, or secondarily, mitigation, for specific resources including historic and archaeological sites, parks and wildlife refuges, wetlands, threatened and endangered species, floodplains, and federally-designated wild and scenic rivers. In addition, the potential for cost and liability concerns resulting from impacts to EPA-listed “superfund” sites was addressed.

The analysis concluded that the only environmental factor that discriminated among the eight candidate routes at this phase of the project development was the presence of state trails within the corridor. Numerous and comparable historic and archaeological sites and wetlands were present at each of the candidate corridors and detailed comparisons of impacts to these resources could not be assessed at this stage of project development. Potential impacts to state parks, major rivers crossings and superfund sites were anticipated to be low, or had potential to be avoided or mitigation through project design. However, construction of a rail facility in state trail corridors was determined to be difficult for the project as the corridors had been fully abandoned without reversionary clauses, and further, to have a significant impact on these valued public facilities as relocation or mitigation within the existing corridor would be extremely difficult.

The operational and cost analysis addressed speed profiles and route travel times, the locations of existing and potential intermodal stations along each route, ridership potential based on route populations, and cost of improvements.

3.1.3 Level 2/3

<u>Screening Workshop</u>

Twenty-five stakeholders representing the Steering Committee and agencies participated in an interactive workshop on November 23, 2009 to select the one or more reasonable alternatives that would be subjected to the next level screening. Details of the screening workshop are presented in the *Northern Lights Express High Speed Rail: Corridor Assessment Report*. The workshop included review of the draft purpose and need statement, presentation of the Step 1 and Step 2 findings (as had been developed to date, not including routes 10A, 11A, and 12A), development of evaluation criteria (and weights based on importance) for the remaining routes, scoring of the routes against these criteria, and selection of routes for Level 2/3 evaluation. The evaluation included:

- Travel Time – the estimated route travel time between end points
- Proximity to Markets (Ridership) – population within 20 miles of the route and the terminal stations
- Conflicts with Freight or Future Rail Purposes – ability for high speed passenger rail to coexist successfully with freight rail
- Conflicts with Existing Ownership – transfer of corridor ownership to another entity with no reversionary clause
- System Connectivity – intermodal connections such as Amtrak, bus, commuter rail, Light Rail Transit, air, and intra-state connectivity (i.e. connections to Rochester, Eau Claire, Mankato)
- Capital Costs -- rough estimate for comparing routes against each other
- Political/Public Support - the perceived level of political/public support, either for or against, that a route has or would have should it be selected

The scoring matrix detailing the evaluation criteria and criteria weights is shown in Table B-1.

The scoring results are shown in Table B-2 (1=very poor, 2=poor, 3=good, 4=very good and 5=excellent). Route 9 was the highest scoring route with an average weighted score of 4.15, with Route 11 the second highest with a score of 3.51. Routes 8, 10, and 12 scored significantly lower.

Table B-1- Final Route Alternatives Scoring Matrix

Evaluation Criteria	Criteria Weight	Route 8		Route 9		Route 10		Route 11		Route 12	
Travel time	9	3.4	30.6	5	45.0	2.2	19.8	4	36.0	2	18.0
Proximity to Markets / Ridership	9	4	36.0	3.8	34.2	4	36.0	4	36.0	2.4	21.6
Conflict w/Freight, Future Rail Use	5.4	2.8	15.1	2.2	11.9	4.2	22.7	3.2	17.3	4.2	22.7
Conflict w/Existing Ownership	7.6	1.4	10.6	4.2	31.9	1.2	9.1	3.2	24.3	1.4	10.6
System Connectivity	6.6	4	26.4	3.8	25.1	3.2	21.1	3.2	21.1	2	13.2
Capital Cost	8.8	2.4	21.1	5	44.0	1.2	10.6	3	26.4	1.2	10.6
Political and Public Support	6.4	1.8	11.5	4.2	26.9	1.8	11.5	3.8	24.3	1.4	9.0
Total			**151.4**		**219.0**		**130.8**		**185.4**		**105.6**
Weighted Average			***2.87***		***4.15***		***2.48***		***3.51***		***2.00***

The participants agreed that Routes 8, 10, and 12 did not score high enough to warrant further consideration. One participant questioned whether either Route 8 or Route 10 would be scored higher if these routes continued along the Munger Trail into Duluth. It was agreed that, although the newly identified route segment would not likely increase the score such that either Routes 8 or 10 were one of the two highest scoring routes, this new segment should be analyzed in order to thoroughly evaluate all alternatives.[NOTE: This resulted in Munger Trail Analysis memo from the Corridor Assessment Report.]

As noted, four more routes were added to the analysis: Routes 10A, 11A, 12A, and 13A after the workshop and survived the Step 2 analysis.

Since these additional routes were not evaluated in the workshop, a Step 3 scoring analysis was performed on Routes 10A, 11A, and 12A by the project team.

The results of the scoring for Routes 9, 10A, 11, 11A, and 12A are shown in Table B-2.

Table B-2 - Summary Scoring Table

Routes 10A, 11A, and 12A vs. Two Highest-Scoring Route Alternatives

		Route 9		***Route 10A***		Route 11		***Route 11A***		***Route 12A***	
Criteria	Criteria Weight	Raw Score	Weighted Score	Raw Score	Weighted Score	Raw Score	Weighted Score	Raw Score	Weighted Score	Raw Score	Weighted Score
Travel Time	9	5	45	**1.4**	12.6	4	36	***2.9***	26.1	**1.4**	12.6
Proximity to Markets (Population)	9	3.8	34.2	**4.2**	37.8	4	36	**4.2**	37.8	**2.6**	23.4
System Connectivity	6.6	3.8	25.08	**4**	26.4	3.2	21.12	**4**	26.4	**4**	26.4
Conflicts w future rail purposes	5.4	2.2	11.88	**3.5**	18.9	3.2	17.28	**2.8**	15.12	**3.5**	18.9
Conflict w Existing Ownership[1]	7.6	4.2	31.92	**1.2**	9.12	3.2	24.32	**3.2**	24.32	**1.4**	10.64
Capital Costs	8.8	5	44	**1.2**	10.56	3	26.4	**2.4**	21.12	**1.2**	10.56
Political/Public Support	6.4	4.2	26.88	**4.2**	26.88	3.8	24.32	***4.2***	26.88	**4.2**	26.88
Total Score		*218.96*		***142.26***		*185.44*		***177.74***		***129.88***	
Weighted Average Score		***4.15***		***2.81***		***3.51***		***3.38***		***2.68***	
Weighted Average Difference vs. Highest Score		-		***-1.34***		*-0.64*		***-0.77***		***-1.47***	

[1] Please note that this score reflects environmental impacts resulting from necessary location of recreational trails built on fully abandoned right of way.

Table B-3 summarizes the screening steps used for the screening of the NLX.

Table B-3 – Summary of Level 1 Screening Steps

Screening Step	Screening Tasks	Description and Results
Step 1	Alternative Routes Identification	Identification of all route alternatives *Result:* Thirteen Potential Route Alternatives Identified
Step 2	Preliminary Analysis of Rail Routes	Preliminary Analysis of route alternatives *Result*: Five of Thirteen Route Alternatives Survive Screening Step 2
Step 3	Quantitative Analysis	Analysis of route alternatives surviving Step 2, including speed profiles, travel times, ridership, intermodal stations, capital costs, and environmental issues *Result:* Analysis and documentation developed for use in Level 1 Screening Workshop
Level 1 Screening Workshop	NLX Stakeholder Workshop	Evaluation and scoring of route alternatives by stakeholders *Result:* Quantitative route evaluations
Level 1 Screening Report	Summary of Alternatives Analysis Level 1 Screening	Summary and Results of Screening Process *Result*: Recommendation of route alternative for next level of screening
Functional Analysis of Routes 9, 11, and 11A	Supplement to Level 1 Screening Report	Assesses the functional characteristics (capital improvements, travel time, ridership, revenue, and benefit/cost) of Routes 9, 11, and 11A *Result:* Recommendation of Route 9 as the locally preferred alternative

Of the eight routes evaluated in Step 3, the top three scoring routes included Route 9 with a weighted average score of 4.15, Route 11 with a score of 3.51 and Route 11A with a score of 3.38. While a stop at St. Paul Union Depot augments Routes 11 and 11A in terms of access to markets and future connectivity and results in a lower potential for freight rail conflicts, significant differences in travel time, capital investment, and potential environmental impacts result in a significantly higher score for Route 9.

In terms of the capital cost criterion, these scores reflect a significant qualitative difference between Route 9 and 11 - the maturity of the right of way for build-out for a high speed rail system. Route 9 possesses greater “maturity” in that existing rail service exists within the right-of-way allowing a passenger rail system to be developed using the infrastructure already in place for freight operation. In contrast, Route 11 requires reconstruction of this infrastructure for a significant portion of the corridor south of Hinckley, as that infrastructure has been removed. Furthermore, the purpose and need identified cost constraints as a definite consideration in project development. The NLX Alliance Board and Steering Committee anticipate that this project will be fiscally constrained. Therefore, the ability of the project route to provide sufficient design flexibility necessary to reduce construction costs when needed while fulfilling project objective will be imperative to project implementation.

Route 9 provides opportunities for further cost reduction by reducing maximum operational speeds in some segments to 90 mph, eliminating the need for a parallel track, and significantly reducing capital investments. Route 11 does not provide such opportunities for cost reduction since the segments designated for 110 mph operations are a complete reconstruction of abandoned rights of way requiring a fixed level of improvements, regardless of passenger rail operational speeds. In addition, from an environmental perspective, the social and community impacts associated with reconstructing a rail system through a corridor which has not seen rail operations for several decades would be substantial.

Regarding the number of corridors brought forward for additional analysis, the Route 9 score of 4.15 is considerably higher than the score of Route 11 which received a score of 3.51. The difference of 0.64 points on a five-point scale is significant. This difference, in combination with the discussion of maturity, flexibility in the amount of capital investment required, and environmental impacts suggests that Route 9 is the only prudent route to move forward at this time.

Additional analysis was conducted to assess the functional characteristics of Routes 9, 11, and 11A to determine if the group of alternatives should be narrowed before proceeding into the environmental document.

A higher level of capital investment is needed for Routes 11 and 11A than Route 9 ($1.36 billion and $1.49 billion versus $0.82 billion respectively) due to corridor condition and level of improvements necessary to accommodate moves between segments and achieve reasonable operating speeds.

Ridership is higher for Route 11A due to the additional stop provided in St. Paul (981,000 year 2020 trips for Route 11A versus 938,000 and 834,000 trips for Routes 9 and 11 respectively). However, revenue is diminished for Route 11A ($26.86 million versus $27.66 million for Route 9 and $26.34 million for Route 11) as the route configuration and overall travel times encourages shorter trips between Minneapolis and St. Paul and discourages longer trips throughout the remainder of the corridor.

The benefit-cost analysis found that only Route 9 yields a benefit-cost ratio greater than 1.0, with a ratio of 1.5 for the three percent discount rate and 1.03 for the seven percent discount rate. Routes 11 and 11A fail to meet the 1.0 ratio, scoring 0.98 and 0.9 respectively for the three percent discount rate and 0.65 and 0.6 respectively for the seven percent discount rate. Only route 9 achieves operating ratios greater than 1.0 in both 2025 and 2040 (1.02 and 1.14 respectively). Routes 11 and 11A achieve only 0.82 and 0.80 operating ratios in 2025 and 0.92

and 0.90 ratios in 2040.

There was subsequent refinement to concept engineering (Level 3) which served to confirm the rationale for selection of Route 9 as the Preferred Alternative.

NLX LEVEL 1 ANALYSIS - TRACK SEGMENT DESCRIPTIONS

TABLE 1

Northern Lights Express - Track Segment Descriptions

Track Segment	Approximate Limits	Owner(s)	No. of Existing Track(s)	Note
A	Bald Eagle, MN to Ambridge, WI	Canadian National; Canadian Pacific; Abandoned	1/None	Canadian Pacific owned (1 existing track) from Bald Eagle to Withrow; Canadian National owned (1 existing track) from Withrow, MN to New Richmond, WI. Abandoned C&NW line north of New Richmond, WI. Approximately 6 of the 130+ miles on the abandoned segment owned by the Wisconsin Great Northern RR
B	Bald Eagle, MN to Boylston, WI	Canadian National; Canadian Pacific; Abandoned	1/None	Canadian Pacific owned (1 existing track) from Bald Eagle to Withrow, WI. Canadian National owned (1 existing track) from Withrow, MN to Dresser, WI. Abandoned north of Dresser.
C	Bald Eagle, MN to Hinckley, MN	Minnesota Commercial; St. Croix Valley; Abandoned	1/None	Existing 'Rush Line' corridor. 1 existing track owned by Minnesota Commercial between Bald Eagle and Hugo; no existing track between Hugo and North Branch, MN; 1 existing track owned by St. Croix Valley north of North Branch, MN
D	Hinckley, MN to Boylston, WI	BNSF	1	Segment was studied in the 2007 report 'Minneapolis-Duluth/Superior Restoration of Intercity Passenger Rail Service Comprehensive Feasibility Study and Business Plan' by TEMS Inc.
E	Coon Creek, MN to Brook Park, MN	BNSF	1	Segment was studied in the 2007 report 'Minneapolis-Duluth/Superior Restoration of Intercity Passenger Rail Service Comprehensive Feasibility Study and Business Plan' by TEMS Inc.
F	Brook Park, MN to Hinckley, MN	BNSF	1	Segment was studied in the 2007 report 'Minneapolis-Duluth/Superior Restoration of Intercity Passenger Rail Service Comprehensive Feasibility Study and Business Plan' by TEMS Inc.
G	Hinckley, MN to Moose Lake, MN	Abandoned	None	Formerly owned by Northern Pacific Railroad; now the Willard Munger Trail
H	Minneapolis, MN to St. Cloud, MN	BNSF	2	Minneapolis-Coon Creek subsegment was studied in the 2007 report 'Minneapolis-Duluth/Superior Restoration of Intercity Passenger Rail Service Comprehensive Feasibility Study and Business Plan' by TEMS Inc.
I	Elk River, MN to Milaca, MN	Abandoned	None	Formerly owned by Great Northern Railroad

Track Segment	Approximate Limits	Owner(s)	No. of Existing Track(s)	Note
J	St. Cloud, MN to Milaca, MN	Abandoned	None	Formerly owned by Soo Line
K	Royalton, MN - Moose Lake, MN	Abandoned	None	Formerly owned by Soo Line
L	Little Falls, MN to Brainerd, MN	BNSF/Abandoned	1/None	1 existing track owned by BNSF between Little Falls and Camp Ripley; no existing track between Camp Ripley, MN and Brainerd, MN
M	Brainerd, MN to Boylston, WI	BNSF	1	
N	Moose Lake, MN to Boylston, WI	Abandoned	None	Formerly owned by Soo Line
O	Little Falls, MN to Staples, MN	BNSF	2	
P	Staples, MN to Brainerd, MN	BNSF	1	
Q	Milaca, MN to Brook Park, MN	St. Croix Valley/ Abandoned	1/None	1 existing track owned by St. Croix Valley between Mora, MN and Brook Park, MN; no existing track between Milaca, MN and Mora, MN
R	St. Cloud, MN to Royalton, MN	BNSF	2	
S	Royalton, MN to Little Falls, MN	BNSF	2	

TABLE 2

Northern Lights Express Route Alternatives

Route No.	Track Segments	Cities Served	Track Owner(s)
1	H-R-S-O-P-M	Minneapolis/St. Paul, MN St. Cloud, MN Little Falls, MN Staples, MN Brainerd, MN Aitkin, MN Superior, WI Duluth,MN	BNSF
2	H-R-S-L-M	Minneapolis/St. Paul, MN St. Cloud, MN Little Falls, MN Brainerd, MN Aitkin, MN Superior, WI Duluth, MN	BNSF; Abandoned
3	H-R-K-N	Minneapolis/St. Paul, MN St. Cloud, MN Genola, MN Moose Lake, MN Superior, WI Duluth, MN	BNSF; Abandoned
4	H-J-Q-F-G-N	Minneapolis/St. Paul, MN St. Cloud, MN Hinckley, MN Moose Lake, MN Superior, WI Duluth, MN	BNSF; St. Croix Valley; Abandoned
5	H-J-Q-F-D	Minneapolis/St. Paul, MN St. Cloud, MN Hinckley, MN Superior, WI Duluth, MN	BNSF; St. Croix Valley; Abandoned
6	H-I-Q-F-G-N	Minneapolis/St. Paul, MN Elk River, MN Milaca, MN Hinckley, MN Moose Lake, MN Superior, WI Duluth, MN	BNSF; St. Croix Valley; Abandoned
7	H-I-Q-F-D	Minneapolis/St. Paul, MN Elk River, MN Milaca, MN Hinckley, MN Superior, WI Duluth, MN	BNSF; St. Croix Valley; Abandoned

Route No.	Track Segments	Cities Served	Track Owner(s)
8	E-F-G-N	Minneapolis/St. Paul, MN Cambridge, MN Hinckley, MN Moose Lake, MN Superior, WI Duluth, MN	BNSF; Abandoned
9	E-F-D	Minneapolis/St. Paul, MN Cambridge, MN Hinckley, MN Superior, WI Duluth, MN	BNSF
10	C-G-N	Minneapolis/St. Paul, MN Rush City, MN Hinckley, MN Moose Lake, MN Superior, WI Duluth, MN	Minnesota Commercial; St. Croix Valley; Abandoned
11	C-D	Minneapolis/St. Paul, MN Rush City, MN Hinckley, MN Superior, WI Duluth, MN	Minnesota Commercial; St. Croix Valley; BNSF; Abandoned
12	B	Minneapolis/St. Paul, MN Dresser, WI Superior, WI Duluth, MN	Canadian National; Canadian Pacific; Abandoned
13	A	Minneapolis/St. Paul, MN New Richmond, MN Turtle Lake, WI Spooner, WI Superior, WI Duluth, MN	Canadian Pacific; Canadian National; Wisconsin Great – Northern; Abandoned

Minnesota Department of Transportation
395 John Ireland Boulevard
Saint Paul, MN 55155

June 28, 2011

Ms. Colleen Vaughn
Federal Railroad Administration
Office of Railroad Policy and Development
1200 New Jersey Avenue SE, MS-20
Washington DC, 20590

RE: Northern Lights Express Environmental Assessment Process

Dear Ms. Vaughn:

The Minnesota Department of Transportation (MnDOT) in consultation with the Wisconsin Department of Transportation (WisDOT) and the Northern Lights Express (NLX) Alliance has been working with you and other representatives from the Federal Railroad Administration (FRA) regarding the purpose and need, Level 1 Corridor Assessment, Functional Analysis Report and most recently the Concept Level Engineering Report for the proposed NLX project in Minnesota and Wisconsin.

On behalf of MnDOT, I want to thank you and others at FRA for the time and commitment made on the project; most notably the collaborative and productive project meeting that took place in Washington DC on May 5/6, 2011 to address and resolve the comments provided by the FRA on project related submittals.

As you are aware, Quandel Consultants, one of the firms under contract for the NLX project; submitted directly to you the revised Concept Engineering Report (Level 3 Analysis) for Routes 9, 11 and 11A on June 10, 2011; along with the referenced Appendices to that document. These documents reflect the direction/actions agreed upon at the project meeting held in May. Following the submittal on June 10, 2011, Mr. Quandel and Dave Christianson of MnDOT had further conversations/input from FRA and other members of the NLX Steering Committee regarding the content of the NLX Concept Engineering Report. On June 23, 2011 Quandel Consultants, at the request of MnDOT submitted revisions to the NLX Concept Engineering Report for Routes 9, 11 and 11A. Additionally, a document titled "Description of Changes Made between April 26, 2011 and June 23, 2011 to the Concept Engineering report (Level 3 Analysis) routes 9, 11 and 11 A was submitted to facilitate your review.

With the resolution of comments provided by the FRA on the above noted documents submitted to date for the NLX project; we respectfully request FRA's written concurrence that Route 9 is the preferred passenger rail alternative and that the Minnesota Department of Transportation is authorized to proceed with detailed environmental evaluation of Route 9 and the No-Build alternative in the Environmental Assessment for the NLX project.

We look forward to your written response to the above noted concurrence request. Please let me know if you have any questions. I can be reached directly at 651-366-3602.

Sincerely,

Frank Pafko
Director
MnDOT Office of Environmental Stewardship

cc: Ramon Munoz-Raskin
Dan Krom, Director, MnDOT Passenger Rail Office
Tim Henkel, Director, MnDOT Modal Planning & Program Management Division
Dave Christianson, MnDOT
Bob Manzoline, NLX Alliance
Tom Beckman, WisDOT
Beth Bartz, SRF Consulting Group
Jeanne Witzig, Kimley-Horn and Associates

U.S. Department
of Transportation

**Federal Railroad
Administration**

1200 New Jersey Avenue, SE
Washington, DC 20590

JUL 29 2011

Mr. Frank Pafko, Director
Office of Environmental Services
Minnesota Department of Transportation
395 John Ireland Boulevard, MS 620
St. Paul, MN 55155-1899

Re: Northern Lights Express High Speed Passenger Rail Environmental Assessment: Environmental Assessment Process

Dear Mr. Pafko:

Thank you for your letter dated June 28, 2011, in which you request Federal Railroad Administration (FRA) concurrence on the determination of Route 9 as the Preferred Build Alternative to be carried forward in the Environmental Assessment (EA). FRA staff have had the opportunity to review both the "Revised Concept Engineering Report for Routes 9, 11 and 11A" and the "Description of Changes made between April 26, 2011 and June 23, 2011 to the Concept Engineering Report (Level 3 Analysis) Routes 9, 11, and 11A". We appreciate the time and effort taken by the Minnesota Department of Transportation (MnDOT) to address FRA comments on the draft documents. At this time FRA agrees that routes 9, 11, and 11A have been evaluated to the extent that routes 11 and 11A can be eliminated and concurs with the request by MnDOT that Route 9 be carried forward as the preferred build alternative. MNDOT may proceed with the environmental evaluation of Route 9 and the No-Build Alternative, culminating in an Environmental document for FRA review and approval. We look forward to continued collaboration on this study.

Please contact Colleen Vaughn at 202-493-6096 or by email at colleen.vaughn@dot.gov if you have any questions.

Sincerely,

David Valenstein
Chief, Environment & Systems Planning Division

CC: Wynne Davis, FRA
Dan Krom, MnDOT
Dave Christianson, MnDOT
Julie Carr, MNDOT
Tom Beckman, Wisconsin DOT
Bob Manzoline, NLX Alliance

APPENDIX C-1

CORRIDOR ASSESSMENT
LEVEL 1 SCREENING REPORT

NORTHERN LIGHTS EXPRESS
PASSENGER RAIL PROJECT

LEVEL 1 SCREENING - FINAL REPORT

Alternatives Analysis Of
Rail Lines within Intercity Rail Corridor

MINNEAPOLIS/ST. PAUL, MN to DULUTH, MN

In Accordance with
FEDERAL RAILROAD ADMINISTRATION
RAIL CORRIDOR TRANSPORTATION PLANS
A Guidance Manual, Section II

Prepared By
Quandel Consultants, LLC
For SRF Consulting Group, Inc.

December 31, 2009

REPORT CONTENTS

LEVEL 1 SCREENING SUMMARY

Quandel Consultants, LLC
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Technical Report

Subject:	**Minnesota Northern Lights Express Project** **Level 1 Screening Final Report**
Prepared For:	**SRF Consulting Group, Inc.**
Prepared By:	**Quandel Consultants, LLC**
CC:	
Date:	**December 29, 2009**

Introduction

This report summarizes the evaluation process and the results of the Northern Lights Express Level 1 screening. The Northern Lights Express will provide passenger rail service between the metropolitan areas of Minneapolis/St. Paul and Duluth/Superior. The Level 1 screening employs proprietary software developed by Quandel Consultants, LLC to identify the alternative rail routes for further evaluation in the Northern Lights Express Environmental Assessment (NLX Project).

Background

In 2007, members of several regional rail authorities and local, county, and state government officials from the states of Minnesota and Wisconsin, joined together to form the NLX Alliance. The Alliance was formed to explore options for restoring high-speed intercity rail service between Minneapolis/St Paul, MN and Duluth, MN/Superior, WI. The Alliance commissioned Transportation Economics & Management Systems, Inc. (TEMS) to perform a feasibility study and prepare a business plan for implementing this service.

The TEMS Feasibility Study, officially titled the 'Minneapolis-Duluth/Superior Restoration of Intercity Passenger Rail Service Comprehensive Feasibility Study and Business Plan', investigated the implementation of service along the 155-mile Burlington Northern Santa Fe owned freight rail route between downtown Minneapolis and downtown Duluth. The TEMS study concluded that the implementation of a passenger rail system within the BNSF right of way would enhance mobility in the region, reduce auto congestion and emissions, and stimulate economic growth in towns along the corridor. It also concluded that intercity rail service would meet the need for a competitive alternative to automotive travel with respect to travel time, pricing, and travel experience.

Environmental Review

In 2009, the NLX Alliance retained SRF Consulting Group, Inc., in association with Quandel Consultants, LLC and TEMS, to provide complete environmental review and documentation for NLX service implementation. The environmental documentation process ensures compliance with the National Environmental Protection Act and National Historic Preservation Act needed to meet FRA requirements for the startup of passenger rail service. The initial phase of the environmental process defines the purpose and need of the project. The Purpose and Need of the NLX project has been defined to offer passenger rail service between Minneapolis/St. Paul and Duluth/Superior that will:

- Meet Corridor Travel Demand
- Provide a Competitive Travel Alternative vs. Auto Travel
- Be Safe and Reliable
- Provide Travel Amenities that provide Quality and Comfort
- Provide System Continuity

Environmental documentation process tasks also include alternatives analysis of existing or abandoned rail routes between the metropolitan areas and performing conceptual engineering on routes surviving the Level 1 screening.

The purpose of the Alternatives Analysis is to work through a systematic evaluation process that leads to the identification of a preferred alternative(s) that meets the project Purpose and Need. This preferred alternative(s) is then more formally studied in an Environmental Assessment, or an Environmental Impact Statement.

LEVEL 1 SCREENING SUMMARY AND DOCUMENTATION

Level 1 screening is an initial screening of rail alternatives according to criteria defined in Section II of the Federal Railroad Administration's (FRA) Rail Corridor Transportation Plan. The results of the Level 1 screening are a reduced set of viable rail alternatives that are subjected to a more detailed process in Levels 2 and 3.

Level 2 will be undertaken in the event that the Level 1 screening identifies another promising rail alternative(s) in addition to the BNSF route described above. The Level 2 screening is similar to the process used in the "Minneapolis-Duluth/Superior – Restoration of Intercity passenger Rail Service Comprehensive Feasibility Study and Business Plan".

Level 3 screening is a detailed alternative analysis evaluation of the rail alternatives surviving Levels 1 and 2 screening with other transportation modes such as intercity bus and the No Build alternative.

Table 1 lists the screening steps used for Level 1 Screening of the NLX.

Table 1 – Summary of Level 1 Screening Steps

Screening Step	Screening Tasks	Description and Results	Documentation
Step 1	Alternative Routes Identification	Identification of all route alternatives *Result:* Thirteen Potential Route Alternatives Identified	Technical Memorandum 1 October 9, 2009
Step 2	Preliminary Analysis of Rail Routes	Preliminary Analysis of route alternatives *Result*: Five of Thirteen Route Alternatives Survive Screening Step 2	Technical Memorandum 2 November 6, 2009
Step 3	Quantitative Analysis	Analysis of route alternatives surviving Step 2, including speed profiles, travel times, ridership, intermodal stations, and capital costs *Result:* analysis and documentation developed for use in Level 1 Screening Workshop	Technical Memorandum 3 Technical Memorandum 4 Technical Memorandum 5 Technical Memorandum 6 November 6, 2009
Level 1 Screening Workshop	NLX Stakeholder Workshop	Evaluation and scoring of route alternatives by stakeholders *Result:* Quantitative route evaluations	Level 1 Screening Report December 14, 2009
Level 1 Screening Report	Summary of Alternatives Analysis Level 1 Screening	Summary and Results of Screening Process *Result*: recommendation of route alternative for next level of screening	Level 1 Screening Report December 14, 2009

LEVEL 1 SCREENING WORKSHOP

Twenty-five stakeholders participated in a Level 1 Screening workshop on November 23rd, 2009 at the offices of SRF Consulting Group in Plymouth, MN. The purpose of the workshop was to select the one or more alternatives that would be subjected to the next level screening. Prior to the meeting Technical Memoranda 3, 4, 5, and 6, which detail the quantitative analysis performed in Step 3, were distributed to the workshop participants. The agenda for the workshop is attached as Appendix A and the list of the participants is attached as Appendix B to this report.

Introduction

The workshop was facilitated by Charles Quandel of Quandel Consultants, LLC. The workshop began by discussing the reason for the workshop, and the need for the route alternatives analysis. The current draft purpose and need of the NLX project was stated, which is to:

- Meet Corridor Travel Demand
- Provide a Competitive Travel Alternative vs. Auto
- Provide Safe and Reliable Rail Service
- Provide Travel Amenities that provide Quality and Comfort
- Provide System Connectivity

The stakeholders were asked if any of the needs should be modified, or if any additional needs should be added. No changes or additions were suggested.

Step 1 and Step 2 Screening

The group reviewed a map of the thirteen route alternatives that resulted from the Step 1 screening process. In Step 1, thirteen rail route alternatives between Minneapolis/St. Paul and Duluth were identified. Rail route alternatives were comprised of various segments, which included existing tracks currently owned by private freight railroads, and abandoned rail rights-of-way. The entire Step 1 process and its results are described in Technical Memorandum 1.

The Step 2 process was presented and discussed with the participants. The entire Step 2 process and its results are described in Technical Memorandum 2. Step 2 is a preliminary route analysis of the routes identified in Step 1, and screens those routes not suitable for passenger service, thus removing them from the more detailed analysis in Step 3. In Step 2, each of the thirteen route alternatives were screened according to four criteria:

1. *Route distance (and travel time)* – distances were measured using mapping software, and used as a proxy for travel times. Travel times were calculated using the average estimated running speeds of five proposed routes in the Midwest Regional Rail System. The five MWRRS corridors are proposed to run at maximum speeds of 110 mph, as is the NLX.

2. *Population and population centers* – route corridor populations were compiled and used as an estimate of potential ridership. Corridor populations were calculated using GIS software from the year 2000, and included populations within a 20-mile band of each route (10-mile each side), and within a 20-mile radius of each of the terminal stations in Minneapolis and Duluth.
3. *The presence of route defects* – conditions that would make the construction or operation of a passenger rail particularly costly or difficult were identified as route defects. Any defects that would effectively prohibit rail line construction or operation and could not be mitigated were considered 'untenable defects' and eliminated a route from further screening.
4. *Order of magnitude capital costs* –In the early stages of a project, costs to plan, design, and construct rail transportation infrastructure are difficult to estimate, since project features and site conditions are not well understood. In this case, 'Order of Magnitude' capital costs were employed based on costs in previous similar projects or historical unit costs. Order of magnitude capital costs were estimated based on the existing track and freight traffic conditions.

Based on the analysis, each route was assessed as either 'comparable' or 'unfavorable' with respect to each of the criteria. The comparable/unfavorable assessments were tallied for each route, and a recommendation was made that five routes be evaluated further in Level 3 screening. A map of the routes recommended for Level 3 screening is shown in Appendix C.

The workshop participants reviewed a map showing the five remaining routes: Routes 8, 9, 10, 11, and 12. For ease of discussion during the workshop, the routes were given the names shown in Table 2. Though these names correspond with the route's primary right-of-way owner(s), names were used only for reference purposes at the meeting.

Table 2

Route Names Used in Level 1 Screening Workshop

Route	Route Name
8	BNSF/Munger
9	BNSF
10	St. Croix Valley/Munger
11	St. Croix Valley/BNSF
12	Gandy Dancer

<u>Step 3 Analysis</u>

Step 3 analysis provides more detailed route information that is used to evaluate the five remaining route alternatives, and select one or more routes that will advance to the next level of screening in Level 2 or Level 3.

Slides of the Step 3 analysis were presented to the participants. Copies of memorandum detailing the analysis were also distributed and discussed. Step 3 analysis presents information on the following:

- *Speed Profiles and Route Travel Times* - Travel times and speed profiles were developed using a spreadsheet-based train performance calculator. Data input into the TPC includes track curvature, number of tracks, grades, acceleration and deceleration speeds, using information obtained from railroad track charts and typical modern passenger train performance characteristics. Graphs depicting route speed profiles and travel times, freight density, curvature, and the number of tracks on each route are also included as part of this analysis. Speed profile and travel time analysis are presented in Technical Memorandum 3.
- *Intermodal Stations* – the locations of existing and potential intermodal stations along each route. Intermodal stations are discussed in Technical Memorandum 4.
- *Ridership Potential* – route populations were calculated using GIS software from the year 2000, and included populations within a 20-mile band of each route, and within a 20-mile radius of each of the terminal stations in Minneapolis and Duluth. Ridership potential is presented in Technical Memorandum 5.
- *Cost of Improvements* – cost estimates were developed based on unit costs used in the Midwest Regional Rail Initiative. Costs were estimated specifically for each route using existing track conditions, track geometry, and bridge and crossing data. The estimated cost of Improvements is presented in Technical Memorandum 6.

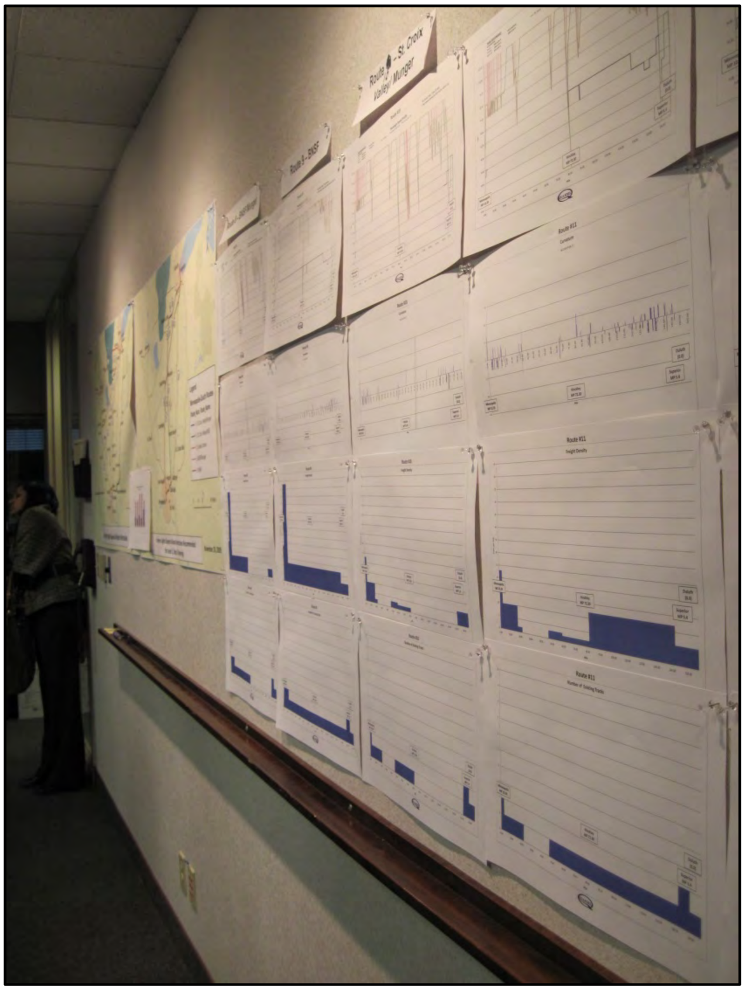
The information presented in Step 3 was used as the basis for developing route evaluation criteria. The participants score the routes with respect to each evaluation criteria, and then scores are totaled to select the best route alternative(s).

The workshop participants discussed and debated which criteria should be used, and ultimately decided on the following criteria for evaluating the five route alternatives:

- *Travel time* – the estimated route travel time between end points, which included time for one intermediate station stop. Travel times and speed profiles were available from the Step 3 analysis presented in Technical Memorandum 3.
- *Proximity to Markets (Ridership)* – maps and tables depicting route population information is presented Technical Memorandum 5.
- *Conflicts with Freight or Future Rail Purposes* – existing freight traffic data is provided Technical Memorandum 3.
- *Conflicts with Existing Ownership* – this is the potential for future conflicts with existing right-of-way owners

- *System Connectivity* – system connectivity refers to intermodal connections such as Amtrak, bus, commuter rail, Light Rail Transit, air, and intra-state connectivity (i.e. connections to Rochester, Eau Claire, Mankato)
- *Capital Costs* – Estimated cost of improvement are provided in Technical Memorandum 6.
- *Political/Public Support* - the perceived level of political/public support, either for or against, that a route has or would have should it be selected.

The photograph below shows one wall of information containing travel times, speed profiles, location of multiple tracks, freight capacity information, and maps that were utilized by the workshop participant in evaluating and scoring the 5 alternative rail routes .



To facilitate route scoring, the twenty-five participants were divided into five teams. Each team developed a weighting factor for each of the seven criteria. The weighting scale ranges from 1 to 10, with higher weighting factors indicating criteria of higher importance. Weighting factors were averaged across all teams, and were entered into a scoring matrix. The scoring matrix showing route criteria and criteria weights is shown in Table 3.

Evaluation Criteria	Criteria Weight	Route 8 BNSF/ Munger		Route 9 BNSF		Route 10 St. Croix Valley Munger		Route 11 St. Croix Valley BNSF		Route 12 Gandy Dancer	
Travel time	9										
Proximity to Markets / Ridership	9										
Conflict w/Freight, Future Rail Use	5.4										
Conflict w/Existing Ownership	7.6										
System Connectivity	6.6										
Capital Cost	8.8										
Political and Public Support	6.4										
Totals											
Weighted Average											

Table 3
Route Alternatives Criteria Weight

<u>Pre-Scoring Discussion</u>

1. State or County Owned Recreational Trails

   The workshop participants discussed whether any routes located on state recreational trails possess legal rights or clauses that make them more or less favorable for passenger rail service. This information helped to score the route criteria *Conflicts with Existing Ownership*. Three route alternatives have route segments located on public recreational trails. Routes 8 and 10 are on a segment of the Willard Munger State Trail in Minnesota; Route 12 is located on the Gandy Dancer Trail in Wisconsin.

WisDOT representatives stated that some segments of Route 13 are publicly held in fee title by the State of Wisconsin with rail banking rights, while other segments on Route 13 are privately held. Some stakeholders suggested that Route 12 may be similarly owned. The group did not have any relevant information regarding the legal status of the state-owned Willard Munger State Trail in Minnesota.

The environmental and legal issues involved with the potential future rail usage on a publicly managed recreational trail can be complex. The federal government and some states, including Minnesota and Wisconsin, have rail banking programs. Rail banking preserves railroad rights-of-way for possible future rail use after a rail line has been deactivated. In the interim, the rights-of-way are often converted to trails for recreational use. Thus there are primarily three types of trail ownership:

1. *Fee title publicly held*
2. *Fee title publicly held, rail banked*
3. *Fee title privately held*

According to information obtained from WisDOT and the WisDOT website, the Gandy Dancer State Trail, which occupies a large segment of Route 12, is publicly held in fee title, and does not belong to a state or federal rail bank program. The Minnesota DOT website also publishes a list of Minnesota state rail banked corridors. Neither the Munger Trail nor the Soo Line Trail state recreational trails, both of which occupy segments of Routes 8 and 10, are listed as state rail banked corridors on the Minnesota DOT website.

Since this information does not favorably support rail service on either Routes 8, 10, or 12, it would not have improved the overall scores had it been known by the participants at the time of the Workshop. As described below, Routes 8, 10, and 12 received the lowest three of the five scores in the evaluation.

Route Scoring and Results

The teams comparatively scored each route on a scale from 1 to 5 against each criterion. Scores were characterized as: 1=very poor, 2=poor, 3=good, 4=very good and 5=excellent. Scores were collected from each team, averaged, and tallied in the scoring matrix.

Total scores were then tallied for each of the five routes. The scoring results are shown in Table 4. Route 9 was the highest scoring route with an average weighted score of 4.15, with Route 11 the second highest with a score of 3.51. Routes 8, 10, and 12 scored significantly lower.

Evaluation Criteria	Criteria Weight	Route 8 BNSF/Munger		Route 9 BNSF		Route 10 St. Croix Valley/Munger		Route 11 St. Croix Valley/BNSF		Route 12 Gandy Dancer	
Travel time	9	3.4	30.6	5	45.0	2.2	19.8	4	36.0	2	18.0
Proximity to Markets / Ridership	9	4	36.0	3.8	34.2	4	36.0	4	36.0	2.4	21.6
Conflict w/Freight, Future Rail Use	5.4	2.8	15.1	2.2	11.9	4.2	22.7	3.2	17.3	4.2	22.7
Conflict w/Existing Ownership	7.6	1.4	10.6	4.2	31.9	1.2	9.1	3.2	24.3	1.4	10.6
System Connectivity	6.6	4	26.4	3.8	25.1	3.2	21.1	3.2	21.1	2	13.2
Capital Cost	8.8	2.4	21.1	5	44.0	1.2	10.6	3	26.4	1.2	10.6
Political and Public Support	6.4	1.8	11.5	4.2	26.9	1.8	11.5	3.8	24.3	1.4	9.0
Total			**151.4**		**219.0**		**130.8**		**185.4**		**105.6**
Weighted Average			***2.87***		***4.15***		***2.48***		***3.51***		***2.00***

Table 4

Final Route Alternatives Scoring Matrix

The participants agreed that Routes 8, 10, and 12 did not score high enough to warrant further consideration. One participant questioned whether either Route 8 or Route 10 would be scored higher if these routes continued along the Munger Trail into Duluth. It was agreed that, although the newly identified route segment would not likely increase the score such that either Routes 8 or 10 were one of the two highest scoring routes, this new segment should be analyzed in order to thoroughly evaluate all alternatives. This analysis is documented in Appendix D.

Since routes 8, 10, and 12 were no longer to be considered, the participants were asked if they were satisfied with the scoring results of routes 9 and 11, and if not satisfied what changes or considerations should be made. The participants discussed issues related to the scoring of routes 9 and 11. Specifically, the participants focused on the scoring for two of the criteria: *System Connectivity* and *Proximity to Markets (Ridership)*. These two criteria were further subjected to a sensitivity analysis.

Sensitivity Analysis

a. Terminal Station Locations and criterion *System Connectivity*

   As discussed in Technical Memoranda 2-6, one assumption used throughout Level 1 screening is that the Minneapolis/St. Paul and Duluth/Superior metro areas are each considered one location that will have one terminal station. These station locations have not yet been determined. However, specific terminal locations were chosen so that analysis could be performed in Steps 2 and 3 of Level 1 Analysis. For example, in order to calculate route distances, an end point must be selected at each end of the corridor. The terminal locations used in the analysis were the Minneapolis Downtown Intermodal Station and the Duluth Union Depot.

   Some workshop participants stated that the scoring process was complicated by the fact that the locations of terminal stations within the Minneapolis/St. Paul and Duluth/Superior regions were not to be considered during route scoring, despite the fact that terminal stations were previously identified for analysis purposes in Step 2 and Step 3 analysis. Some participants also suggested that the location of terminal stations within the metropolitan regions needed to be considered for proper scoring and comparison.

   One argument presented during the workshop discussion was that if specific terminal locations in the Minneapolis/St. Paul region were not to be considered, the scores for *System Connectivity* should be similar for Routes 9 and 11. This is because, as described in Technical Memorandum 3, most of the potential for intermodal system connectivity is within the Minneapolis/St. Paul region.

To allow for possible inconsistencies in scoring, a sensitivity analysis was performed to see what impact the inconsistencies can have. Under each of these scenarios, *System Connectivity* scores are adjusted by doing the following:

1) increase all *System Connectivity* scores up to the highest score received
2) decrease all *System Connectivity* scores down to the lowest score received
3) give a score of 5 to the second-highest scoring route (Route 11)

The results of the sensitivity analysis scoring are shown in Exhibits 1, 2, and 3 in Appendix E. The scores show that, even when allowances are made to account for possible inconsistencies in scoring *System Connectivity*, under each scenario Route 9's total score is higher than Route 11.

b. Proximity to Markets

The participants discussed the effect the issue of 'Terminal Station Locations and criterion *System Connectivity*' (discussed above) has on the scoring of criteria *Proximity to Markets*. Each team was asked to discuss within their team whether considering the location at either the Minneapolis Downtown Intermodal Station or at St Paul Depot would alter their previous scoring of this criterion. Each team stated that they would not alter their original score. As a result, the score for the criteria *Proximity to Markets (Ridership)* was accepted as final.

CONCLUSION AND RECOMMENDATION

The workshop participants scored each of the five routes based on all the route evidence presented in Step 3, and have given Route 9 the highest route score. Route 9's score of 4.15 is considerably higher than the score of the second-highest score of 3.51 received by Route 11. The difference of .64 points on a five-point scale is significant. This difference is not materially impacted by the sensitivity analysis. Therefore Route 9 is recommended for the next step of screening in Level 3 since Level 2 is needed only when more than one alternative route survives Level 1 screening.

Appendix A

Agenda: NLX Alternatives Analysis Level 1 Screening Workshop

November 23, 2009

AGENDA

NLX ALTERNATIVES ANALYSIS LEVEL 1 SCREENING WORKSHOP

NOVEMBER 23, 2009

SRF Consulting Group, Inc.

One Carlson Parkway North, Suite 150

Minneapolis, MN 55447-4443

Purpose of Level 1 Screening Task:

The purpose of this task is to undertake a preliminary analysis of rail routes within the corridor between Minneapolis/St Paul and Duluth/Superior as called for in the FRA Railroad Corridor Transportation Plans (RCTP); A Guidance Manual, Section II.

Purpose of Workshop:

To select one or more routes between the greater metropolitan area of Minneapolis/St Paul and Duluth/Superior on which a high speed passenger rail system will be constructed This workshop will not select the terminal within the Minneapolis/St Paul and Duluth/Superior or the routes within that will be used to serve the terminals.

1. Introduction
2. Description of Workshop Process
3. Project Description
4. Identification of Key Stakeholders
5. Review of Purpose and Needs
6. Speculation of Additional Needs and Desires of Project
7. Presentation of Route Alternatives (Level 1, Step 1 – Tech Memo #1)
8. Presentation of Level 1, Step 2 Analysis Results (Tech Memo #2)
9. Presentation of Step 3 Analysis of Routes Surviving Step 2
    - 9.1 Speed Profiles and Route Travel Times (Tech Memo #3)
    - 9.2 Intermodal Stations (Tech Memo #4)
    - 9.3 Ridership Potential (Tech Memo #5)
    - 9.4 Cost of Improvements (Tech Memo #6)
10. Evaluation Phase
    - 10.1 Establish criteria for evaluation of alternatives
    - 10.2 Weight Criteria
    - 10.3 Evaluate Routes
    - 10.4 Review Evaluation Results
11. Next Steps
    - 11.1 Documentation of Evaluation Process
    - 11.2 Preparation of Summary Alternatives Analysis Report
    - 11.3 Meeting with the Federal Railroad Administration

Appendix B

List of Participants

Northern Lights Express Environmental Assessment: "Down Select" Workshop

10:00 AM– 3:00 PM, Tuesday, November 23, 2009

SRF Consulting Group offices, 1 Carlson Pkwy, Plymouth

Participant Name	**Affiliation**
Bob Manzoline	NLX Alliance
Jeanne Witzig,	Kimley Horn
Dan Krom	Mn/DOT
Praveena Pidaparthi	Mn/DOT
Dave Christianson	Mn/DOT
Jennie Ross	Mn/DOT
Frank Pafko	Mn/DOT
Tom Beekman	WisDOT
Jeff Abboud	WisDOT
Jon Olson	Anoka County
Kate Garwood	Anoka County
Joe Gladke	Hennepin County
Mike Rogers	Ramsey County
John Onargo	St. Louis County
Ann Pung-Terwedo	Washington County
Ron Chicka	Duluth-Superior MIC
Beth Bartz	SRF
Chuck Gonderinger	SRF
Kelcie Young	SRF
Charlie Quandel	Quandel Consultants
Jim Jennings	Quandel Consultants
Rich Ojard	Krech & Ojard
Dave Moore	Krech & Ojard

Appendix C

Routes Recommended for Level 1 Screening, Step 3

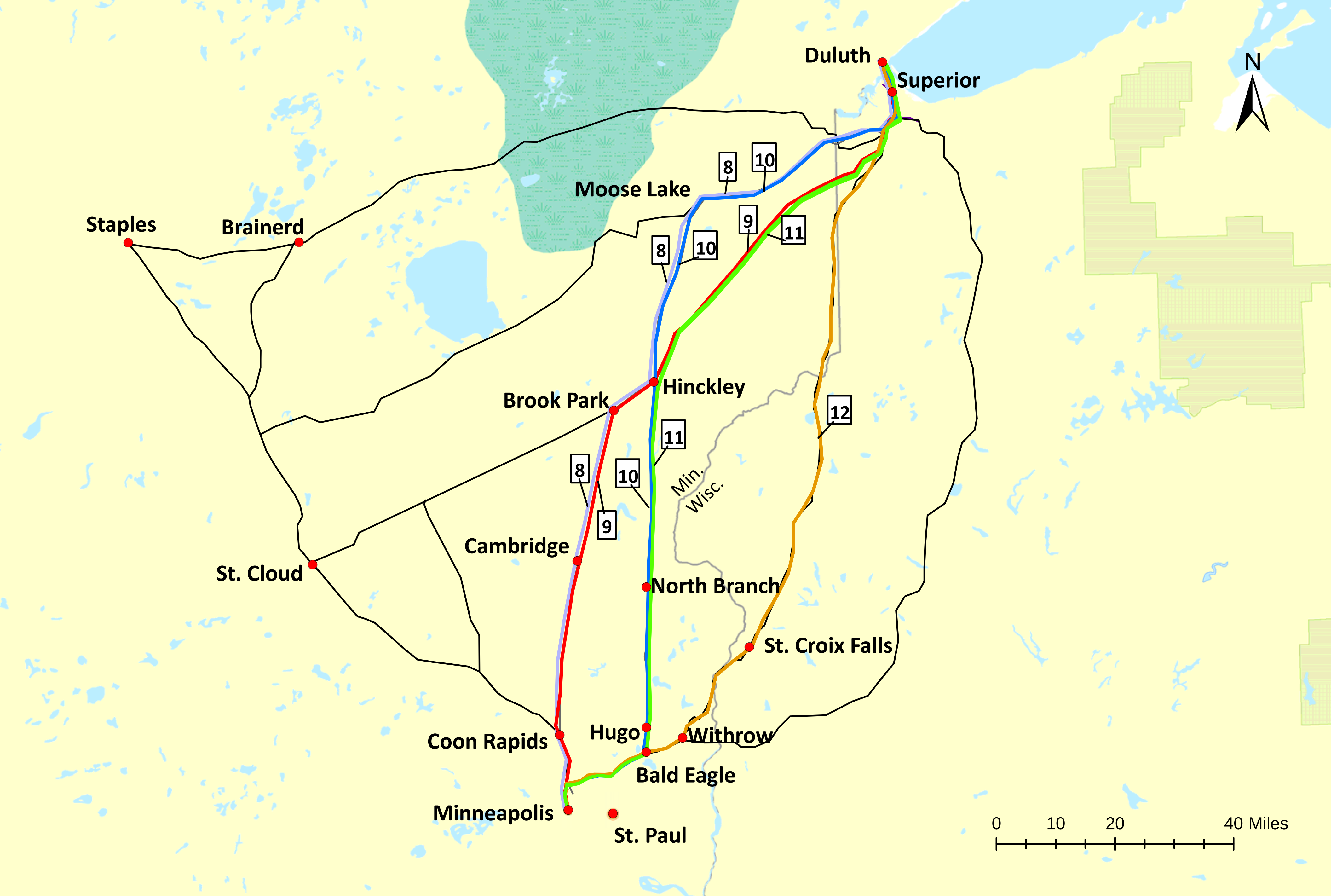


Figure 1
Northern Lights Express Route Alternatives Recommended for Level 1, Step 3 Screening

November 20, 2009

Appendix D

New Route Segment Analysis

Munger Trail

A newly identified route segment is the Munger State Trail between Moose Lake, MN and Duluth, MN. This new route segment creates two new route alternatives, Routes 8A and 10A. As shown in the table below, these new routes share 72% of their total length in common with Routes 8 and 10. North of Moose Lake, MN Routes 8 and 10 continue into Duluth, MN via Superior, WI along the Soo Line Trail.

Comparison of Routes 8 and 10 Including New Munger Trail Segment

Route	***8***	***Route 8A (Route 8 using new Munger Trail segment)***	***10***	***Route 10A (Route 10 using new Munger Trail segment)***
Route Distance (miles)	*161.7*	*152.2*	*162.4*	*152.9*
Common Distance	*109.7*	*109.7*	*110.4*	*110.4*
Common Distance as Percentage of Route Total	*68%*	*72%*	*68%*	*72%*

The segments that distinguish Routes 8 and 10 from Route 8A and 10A are both state-owned recreational trails, with the new Munger Trail segment into Duluth on Routes 8A and 10A being 9.5 miles shorter than the Soo Line Trail into Duluth on Routes 8 and 10.

Since the new Munger Trail segment is shorter than the Soo Line Trail segment, one presumption is that Routes 8A and 10A could have shorter travel times than Routes 8 and 10. Other than route distance, the routes are similar. It is reasonable to expect that scores for Routes 8A and 10A would be similar to the scores for Routes 8 and 10 for all criteria other than travel time.

A hypothetical scoring scenario is created to assess the impacts of the new routes. Using a conservative approach to assess the scoring impact, Routes 8A and 10A are given the highest score of 5 for the criteria Travel Time. As Figure 3 shows, the higher travel time scores do not change the rankings of the route alternatives. Routes 9 and 11 still have the highest scores. The hypothetical scoring is shown in the table below.

New Segment Analysis

Munger Trail from Moose Lake, MN to Duluth, MN

Hypothetical Scoring of Routes 8A and 10A

		Route 8		Route 8A		Route 9		Route 10		Route 10A		Route 11		Route 12	
Criteria	Criteria Weight	Raw Score	Weighted Score	Raw Score	Weighted Score	Raw Score	Weighted Score	Raw Score	Weighted Score	Raw Score	Weighted Score	Raw Score	Weighted Score	Raw Score	Weighted Score
Travel Time	9	3.4	30.6	**5**	45	5	45	2.2	19.8	**5**	45	4	36	2	18
Proximity to Markets (Population)	9	4	36	4	36	3.8	34.2	4	36	4	36	4	36	2.4	21.6
Conflicts w future rail purposes	5.4	2.8	15.12	2.8	15.12	2.2	11.88	4.2	22.68	4.2	22.68	3.2	17.28	4.2	22.68
Conflict w Existing Ownership	7.6	1.4	10.64	1.4	10.64	4.2	31.92	1.2	9.12	1.2	9.12	3.2	24.32	1.4	10.64
System Connectivity	6.6	4	26.4	4	26.4	3.8	25.08	3.2	21.12	3.2	21.12	3.2	21.12	2	13.2
Capital Costs	8.8	2.4	21.12	2.4	21.12	5	44	1.2	10.56	1.2	10.56	3	26.4	1.2	10.56
Political/Public Support	6.4	1.8	11.52	1.8	11.52	4.2	26.88	1.8	11.52	1.8	11.52	3.8	24.32	1.4	8.96
Total Score		*151.40*		***165.80***		*218.96*		*130.80*		***156.00***		*185.44*		*105.64*	
Weighted Average Score		***2.87***		***3.14***		***4.15***		***2.48***		***2.95***		***3.51***		***2.00***	

Appendix E

Sensitivity Analysis

		Route 9		Route 11	
Criteria	Criteria Weight	Raw Score	Weighted Score	Raw Score	Weighted Score
Travel Time	9	5	45	4	36
Proximity to Markets (Population)	9	3.8	34.2	4	36
Conflicts w future rail purposes	5.4	2.2	11.88	3.2	17.28
Conflict w Existing Ownership	7.6	4.2	31.92	3.2	24.32
System Connectivity	6.6	**4**	26.4	**4**	26.4
Capital Costs	8.8	5	44	3	26.4
Political/Public Support	6.4	4.2	26.88	3.8	24.32
Total Score		***220.28***		***190.72***	
Weighted Average Score		***4.17***		***3.61***	
Original Difference vs. Highest Score		-		*-0.63*	
New Difference vs. Highest Score		-		***-0.56***	

<u>Exhibit 1</u>

Sensitivity Analysis Scoring of Routes 9 and 11

Increase System Connectivity Score to Highest Score

		Route 9		Route 11	
Criteria	Criteria Weight	Raw Score	Weighted Score	Raw Score	Weighted Score
Travel Time	9	5	45	4	36
Proximity to Markets (Population)	9	3.8	34.2	4	36
Conflicts w future rail purposes	5.4	2.2	11.88	3.2	17.28
Conflict w Existing Ownership	7.6	4.2	31.92	3.2	24.32
System Connectivity	6.6	**2**	13.2	**2**	13.2
Capital Costs	8.8	5	44	3	26.4
Political/Public Support	6.4	4.2	26.88	3.8	24.32
Total Score		*207.08*		*177.52*	
Weighted Average Score		**3.92**		**3.36**	
Original Difference vs. Highest Score		**-**		-0.63	
New Difference vs. Highest Score		**-**		**-0.56**	

Exhibit 2

Sensitivity Analysis Scoring of Routes 9 and 11

Decrease System Connectivity Score to Lowest Score

		Route 9		Route 11	
Criteria	Criteria Weight	Raw Score	Weighted Score	Raw Score	Weighted Score
Travel Time	9	5	45	4	36
Proximity to Markets (Population)	9	3.8	34.2	4	36
Conflicts w future rail purposes	5.4	2.2	11.88	3.2	17.28
Conflict w Existing Ownership	7.6	4.2	31.92	3.2	24.32
System Connectivity	6.6	3.8	25.08	**5**	33
Capital Costs	8.8	5	44	3	26.4
Political/Public Support	6.4	4.2	26.88	3.8	24.32
Total Score		*218.96*		***197.32***	
Weighted Average Score		***4.15***		***3.74***	
Original Difference vs. Highest Score		-		*-0.63*	
New Difference vs. Highest Score		-		***-0.41***	

<u>Exhibit 3</u>

Sensitivity Analysis Scoring of Routes 9 and 11

Give Score of 5 to Second-Highest Scoring Route (Route 11)

Appendix F

Purpose and Need Statement

Purpose and Need Statement

Sept. 25, 2009

1.0 Proposed Action

The Northern Lights Express Passenger Rail Alliance, in cooperation with the Federal Railway Administration (FRA) and the Minnesota Department of Transportation, proposes to construct and operate a high speed passenger rail service between Minneapolis/ St. Paul and Duluth, Minnesota. FRA will serve as the lead federal agency for the project.

The existing transportation system in this corridor include highway (auto and bus) and air modes. Limited passenger rail service had previous served this corridor, but was discontinued in 1985.

2.0 Project Purpose

The purpose of the Northern Lights Express project and the proposed action is provide a means to meet future transportation needs through the creation of a passenger rail service between Minneapolis/St. Paul and Duluth. The proposed action offers an opportunity to provide reliable and competitive passenger rail service as a viable alternative to vehicular travel by:

- Decreasing travel times;
- Providing safe and reliable transit service; and
- Providing amenities to improve passenger travel quality and comfort.

In addition, the project can provide:

- An alternative to vehicular travel
- Improved overall system continuity in the regional transportation network (wording from statewide transportation plan)
- Opportunities for Transit Oriented Development – land use patterns that encourage more efficient development of land in combination with more efficient use of transportation facilities; while
- Provide an impetus for station-area joint development, downtown redevelopment and conomic development for growth in travel and tourism in all the communities along the reroute, contributing to the viability and vitality of the region.

ALTERNATIVES ANALYSIS LEVEL 1 SCREENING

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Technical Memorandum

Subject:	**Minnesota Northern Lights Express (NLX) Project** **Technical Memorandum 1 – Alternative Routes Depiction**
Prepared For:	**SRF Consulting Group, Inc.**
Prepared By:	**Quandel Consultants, LLC**
CC:	
Date:	**October 9, 2009**

Summary

This technical memorandum summarizes the findings from the development of the rail route alternatives that could potentially serve the Minneapolis-Duluth/Superior NLX corridor. The development of these route alternatives is Step 1 of the Level 1 screening of the project Alternatives Analysis, and is consistent with the guidelines for implementing high-speed intercity rail service set forth in Section II of the Federal Railroad Administration's (FRA) Rail Corridor Transportation Plan.

As shown in Figure 2 and Table 2, thirteen different route alternatives have been identified. These routes will next undergo a preliminary analysis in Step 2 of Level 1 screening. Step 2 will screen each route on the basis of its population centers served, route distance, estimated travel time, order of magnitude capital cost, and the presence of untenable defects. Based on the results of Step 2, routes that are not suitable for passenger rail service, and are not consistent with the defined purpose and need of the NLX Corridor project, will not be considered for further study.

Background

In 2007, members of several regional rail authorities and local, county, and state government officials from the states of Minnesota and Wisconsin, joined together to form the NLX Alliance. The Alliance was formed to explore options for restoring high-speed intercity rail service between Minneapolis, MN and Duluth, MN/Superior, WI. That same year the Alliance hired Transportation Economics & Management Systems, Inc. (TEMS) to perform a feasibility study for implementing this service.

The TEMS Feasibility Study, officially titled the 'Minneapolis-Duluth/Superior Restoration of Intercity Passenger Rail Service Comprehensive Feasibility Study and Business Plan', investigated the implementation of service along the 155-mile Burlington Northern Santa Fe owned single track corridor between downtown Minneapolis and downtown Duluth, also known as the BNSF Hinckley subdivision. The Hinckley subdivision route has many practical advantages, including a direct route between the cities and well-maintained track, and thus was a logical choice for consideration in the study. The study concluded that a passenger rail system would enhance mobility in the region, reduce auto congestion and emissions, and stimulate economic growth in towns along the corridor. It also concluded that intercity rail service would meet the need for a competitive alternative to automotive travel with respect to travel time, pricing, and travel experience.

Environmental Review and Alternatives Analysis

In 2009, the NLX Alliance retained SRF Consulting Group, Inc. to provide complete environmental review and documentation for NLX service implementation. The environmental documentation process will ensure compliance with the National Environmental Protection Act, National Historic Preservation Act, and several others needed to meet FRA requirements for the startup of passenger rail service. This environmental documentation process also includes tasks such as defining the project purpose and need, considering alternatives routes, and performing conceptual engineering. The draft Purpose and Need of the NLX project is to offer a viable alternative to vehicular travel by providing reliable and competitive passenger rail service between Minneapolis/St. Paul and Duluth that offers:

- Corridor travel times competitive with automobile travel
- Safe and reliable rail service
- Amenities that improve passenger travel quality and comfort

The purpose of the Alternatives Analysis is to work through a systematic evaluation process that leads to the identification of a preferred alternative that meets the project Purpose and Need. This preferred alternative is then more formally studied in an Environmental Assessment, or an Environmental Impact Statement. The Alternative Analysis first identifies alternative rail routes that could serve the NLX corridor, and then evaluates these routes for their ability to support the purpose and need of the NLX project. The complete set of alternatives includes the new routes indentified in this memorandum, the BNSF Hinckley Subdivision route, and the no-action/no build alternative.

Development of Route Alternatives

The route alternatives were developed by first identifying track 'segments'. For the purpose of this memorandum, a segment is a track defined by logical end points, junctions, or population centers. The track segments include existing tracks currently owned by private freight railroads, or abandoned rail rights-of-way with or without existing track.

Information was gathered using Railway Station Productions 'North American Railroad Map' software, which provides current and historic railroad and rail map information compiled from the Bureau of Transportation Statistics National Rail Network, the Federal Railroad Administration, the US Geological Survey, and the North American Transportation Atlas. The TEMS Feasibility Study was also used as a reference. Information was then verified using internet searches. These project segments are shown and described in Figure 1 and Table 1, respectively. These segments were then analyzed to develop all possible route alternatives for the project. These route alternatives are described in Table 2 and shown in Figure 2. All routes previously identified for inclusion in this study, including the St. Croix Valley, Canadian Pacific (Soo Line), Canadian National (WC), and the BNSF Hinckley Subdivision, are included in Table 2.

TABLE 1

Northern Lights Express - Track Segment Descriptions

Track Segment	Approximate Limits	Owner(s)	No. of Existing Track(s)	Note
A	Bald Eagle, MN to Ambridge, WI	Canadian National; Canadian Pacific; Abandoned	1/None	Canadian Pacific owned (1 existing track) from Bald Eagle to Withrow; Canadian National owned (1 existing track) from Withrow, MN to New Richmond, WI. Abandoned C&NW line north of New Richmond, WI. Approximately 6 of the 130+ miles on the abandoned segment owned by the Wisconsin Great Northern RR
B	Bald Eagle, MN to Boylston, WI	Canadian National; Canadian Pacific; Abandoned	1/None	Canadian Pacific owned (1 existing track) from Bald Eagle to Withrow, WI. Canadian National owned (1 existing track) from Withrow, MN to Dresser, WI. Abandoned north of Dresser.
C	Bald Eagle, MN to Hinckley, MN	Minnesota Commercial; St. Croix Valley; Abandoned	1/None	Existing 'Rush Line' corridor. 1 existing track owned by Minnesota Commercial between Bald Eagle and Hugo; no existing track between Hugo and North Branch, MN; 1 existing track owned by St. Croix Valley north of North Branch, MN
D	Hinckley, MN to Boylston, WI	BNSF	1	Segment was studied in the 2007 report 'Minneapolis-Duluth/Superior Restoration of Intercity Passenger Rail Service Comprehensive Feasibility Study and Business Plan' by TEMS Inc.
E	Coon Creek, MN to Brook Park, MN	BNSF	1	Segment was studied in the 2007 report 'Minneapolis-Duluth/Superior Restoration of Intercity Passenger Rail Service Comprehensive Feasibility Study and Business Plan' by TEMS Inc.
F	Brook Park, MN to Hinckley, MN	BNSF	1	Segment was studied in the 2007 report 'Minneapolis-Duluth/Superior Restoration of Intercity Passenger Rail Service Comprehensive Feasibility Study and Business Plan' by TEMS Inc.
G	Hinckley, MN to Moose Lake, MN	Abandoned	None	Formerly owned by Northern Pacific Railroad; now the Willard Munger Trail
H	Minneapolis, MN to St. Cloud, MN	BNSF	2	Minneapolis-Coon Creek subsegment was studied in the 2007 report 'Minneapolis-Duluth/Superior Restoration of Intercity Passenger Rail Service Comprehensive Feasibility Study and Business Plan' by TEMS Inc.
I	Elk River, MN to Milaca, MN	Abandoned	None	Formerly owned by Great Northern Railroad

Track Segment	Approximate Limits	Owner(s)	No. of Existing Track(s)	Note
J	St. Cloud, MN to Milaca, MN	Abandoned	None	Formerly owned by Soo Line
K	Royalton, MN - Moose Lake, MN	Abandoned	None	Formerly owned by Soo Line
L	Little Falls, MN to Brainerd, MN	BNSF/Abandoned	1/None	1 existing track owned by BNSF between Little Falls and Camp Ripley; no existing track between Camp Ripley, MN and Brainerd, MN
M	Brainerd, MN to Boylston, WI	BNSF	1	
N	Moose Lake, MN to Boylston, WI	Abandoned	None	Formerly owned by Soo Line
O	Little Falls, MN to Staples, MN	BNSF	2	
P	Staples, MN to Brainerd, MN	BNSF	1	
Q	Milaca, MN to Brook Park, MN	St. Croix Valley/ Abandoned	1/None	1 existing track owned by St. Croix Valley between Mora, MN and Brook Park, MN; no existing track between Milaca, MN and Mora, MN
R	St. Cloud, MN to Royalton, MN	BNSF	2	
S	Royalton, MN to Little Falls, MN	BNSF	2	

TABLE 2

Northern Lights Express Route Alternatives

Route No.	Track Segments	Cities Served	Track Owner(s)
1	H-R-S-O-P-M	Minneapolis/St. Paul, MN St. Cloud, MN Little Falls, MN Staples, MN Brainerd, MN Aitkin, MN Superior, WI Duluth,MN	BNSF
2	H-R-S-L-M	Minneapolis/St. Paul, MN St. Cloud, MN Little Falls, MN Brainerd, MN Aitkin, MN Superior, WI Duluth, MN	BNSF; Abandoned
3	H-R-K-N	Minneapolis/St. Paul, MN St. Cloud, MN Genola, MN Moose Lake, MN Superior, WI Duluth, MN	BNSF; Abandoned
4	H-J-Q-F-G-N	Minneapolis/St. Paul, MN St. Cloud, MN Hinckley, MN Moose Lake, MN Superior, WI Duluth, MN	BNSF; St. Croix Valley; Abandoned
5	H-J-Q-F-D	Minneapolis/St. Paul, MN St. Cloud, MN Hinckley, MN Superior, WI Duluth, MN	BNSF; St. Croix Valley; Abandoned
6	H-I-Q-F-G-N	Minneapolis/St. Paul, MN Elk River, MN Milaca, MN Hinckley, MN Moose Lake, MN Superior, WI Duluth, MN	BNSF; St. Croix Valley; Abandoned
7	H-I-Q-F-D	Minneapolis/St. Paul, MN Elk River, MN Milaca, MN Hinckley, MN Superior, WI Duluth, MN	BNSF; St. Croix Valley; Abandoned

Route No.	Track Segments	Cities Served	Track Owner(s)
8	E-F-G-N	Minneapolis/St. Paul, MN Cambridge, MN Hinckley, MN Moose Lake, MN Superior, WI Duluth, MN	BNSF; Abandoned
9	E-F-D	Minneapolis/St. Paul, MN Cambridge, MN Hinckley, MN Superior, WI Duluth, MN	BNSF
10	C-G-N	Minneapolis/St. Paul, MN Rush City, MN Hinckley, MN Moose Lake, MN Superior, WI Duluth, MN	Minnesota Commercial; St. Croix Valley; Abandoned
11	C-D	Minneapolis/St. Paul, MN Rush City, MN Hinckley, MN Superior, WI Duluth, MN	Minnesota Commercial; St. Croix Valley; BNSF; Abandoned
12	B	Minneapolis/St. Paul, MN Dresser, WI Superior, WI Duluth, MN	Canadian National; Canadian Pacific; Abandoned
13	A	Minneapolis/St. Paul, MN New Richmond, MN Turtle Lake, WI Spooner, WI Superior, WI Duluth, MN	Canadian Pacific; Canadian National; Wisconsin Great – Northern; Abandoned

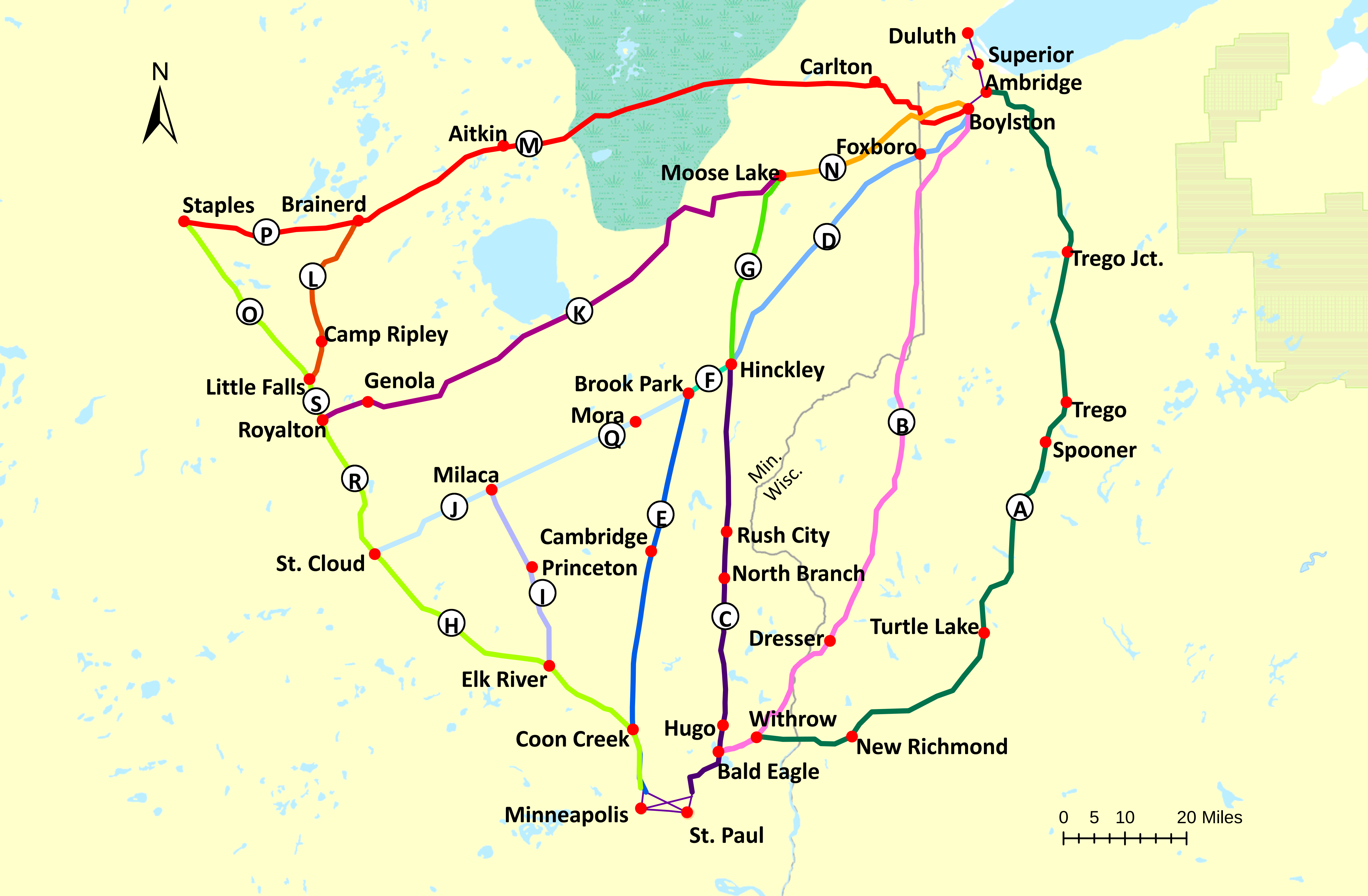

Figure 1

Northern Lights Express Track Segments

October 9, 2009

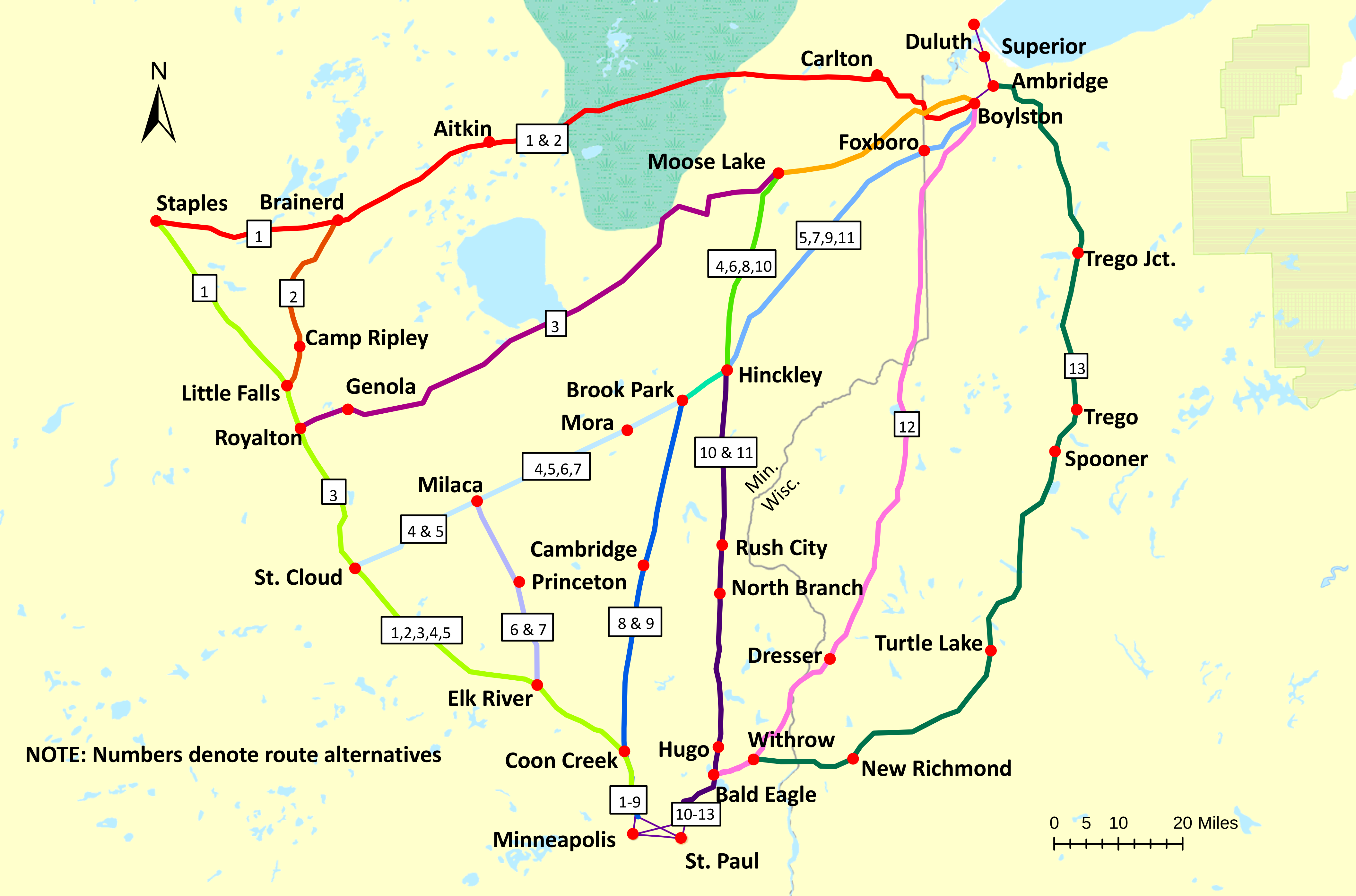

Figure 2

Northern Lights Express Route Alternatives

October 9, 2009

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Technical Memorandum

Subject:	**Minnesota Northern Lights Express Project** **Technical Memorandum 2 - Preliminary Analysis**
Prepared For:	**SRF Consulting Group, Inc.**
Prepared By:	**Quandel Consultants, LLC**
CC:	
Date:	**November 20, 2009**

Purpose of Technical Memorandum

This technical memorandum summarizes the findings from Step 2 of the Level 1 screening of the route alternatives that have been identified for the Minneapolis-Duluth/Superior Northern Lights Express (NLX) corridor. These route alternatives were screened for basic suitability for high-speed passenger rail service and for the ability of each route to meet the purpose and need of the NLX project.

Background and Assumptions

The draft Purpose and Need of the NLX project is to provide passenger rail service between Minneapolis/St. Paul and Duluth that offers:

- Corridor travel times competitive with automobile travel
- Safe and reliable rail service
- Amenities that improve passenger travel quality and comfort
- System continuity with the existing and planned transportation network

Step 2 uses several assumptions as the basis for route screening. These assumptions are taken from the 2007 TEMS Inc. report 'Minneapolis-Duluth/Superior Restoration of Intercity Passenger Rail Service' (the 'TEMS Feasibility Study'), and include:

- Maximum operating speeds of 110 mph
- 8 round-trips per day
- A southern terminal station at the Minneapolis downtown Intermodal Station
- A northern terminal station at the Duluth Union Depot

The TEMS Feasibility Study also describes terminal stations and feasible routes within the Minneapolis/St. Paul and Duluth/Superior regions. The terminals described in the Feasibility Study are used in this report for the preliminary analysis. In Minneapolis/St. Paul, the Minneapolis downtown Intermodal Station near Target Field is the southern terminus. All routes initially proceed northeast out of the Intermodal Station to Minneapolis Junction, and then proceed north on the BNSF Midway Subdivision. North of University Avenue, the routes begin to diverge, with Routes 1-9 proceeding north on the BNSF Hinckley subdivision, and Routes 10-13 proceeding north on the Canadian Pacific Withrow Subdivision. In the Duluth area, all routes use 'Alternate 1' as described in the Feasibility Study, entering Duluth via Superior, WI, and terminating at the Duluth Union Depot. A graphical depiction of the routes in the corridor is shown in Figure 1.

The route studied in the TEMS Feasibility Study is along the entire length of the BNSF Hinckley Subdivision, and is the same route as Route 9 in this report. Because Route 9 is the shortest and most direct route, and because it was cited in the Feasibility Study, Route 9 is used as a baseline for comparison and evaluation of the routes within the corridor.

Step 2 Process

The screening process of identifying the preferred alternative for the Northern Lights Express project builds upon the Technical Memorandum 1 'Alternative Routes Depiction', dated October 9, 2009. In Technical Memorandum 1, Step 1 of the screening process identifies all the rail route alternatives that could potentially serve the NLX passenger rail corridor. Step 2 is a preliminary analysis of the route alternatives that screens routes not suitable for passenger service, thus removing them from the more detailed step 3 analysis.

Both Step 1 and Step 2 are parts of the Alternatives Analysis, a systematic evaluation process that leads to the identification of a preferred alternative that meets the Purpose and Need of the NLX Project. This process of identifying the preferred alternative follows the guidelines for implementing high-speed intercity passenger rail service set forth in Section II of the FRA's July 8, 2005 publication, "Rail Corridor Transportation Plans: A Guidance Manual".

In Step 2, each of the route alternatives from Step 1 is assessed according to four simple criteria:

1. route distance (and travel time)
2. population and population centers
3. the presence of route defects
4. order of magnitude capital costs

Each proposed route is analyzed based on these criteria and compared to a pre-selected baseline route. The route is then assessed as 'comparable' to other routes, or 'unfavorable' in comparison to other routes. The route criteria screenings are then summarized in Table 5. This comparison and evaluation of the routes enables the screening of the weakest alternatives in a systematic and well documented, but cost effective manner.

Screening Criteria 1: Route Distance (and Travel Time)

As the travel time between any two points is directly proportional to the distance between the points, the route distances can be used to develop estimates of travel times for comparative purposes. In order for a route to serve the purpose and need of the project, an NLX route must be able to offer travel times competitive with automobile travel between the Minneapolis/St. Paul and Duluth, estimated at two hours and 27 minutes by auto on I-35 via direct route from downtown Minneapolis to downtown Duluth using an average speed of 64 mph over the 156 mile trip distance.

Rail route distances were calculated from the Minneapolis downtown Intermodal Station to Duluth Union Depot using "North American Railroad Map" software, published by Railway Station Productions, LLC. The travel time for each rail alternative route is calculated by dividing the route distance by 74 mph, which is the average passenger speed of five 110 MPH corridors in the Midwest Regional Rail System. The average speed is defined as the total trip time, including station stops, divided by the total trip distance.

Table 1 summarizes the distances and travel times for each of the route alternatives and compares the route distance and travel time against the baseline. The shortest routes 9, 11, and 12 are the most direct routes from Minneapolis to Duluth, with distances just over 150 miles. Route Nos. 1, 2, 3, 4, 5, 6, and 13 each has a route distance greater than 180 miles long, which results in travel times greater than both automobile travel and Baseline Route 9. In addition to having greater travel times, longer distance routes will also have greater operating and maintenance costs than the more direct route alternatives.

Table 1 – Route Distances and Travel Times

Route	**Route Distance (Miles)**	**Increase/ (Decrease) vs. Auto (Miles)**	**Increase/ (Decrease) vs. Baseline (Miles)**	**Travel Time**	**Increase/ (Decrease) vs. Auto**	**Increase/ (Decrease) vs. Baseline**	***Assessment -- Comparable or Unfavorable***
Auto	*156.0*	-	-	*2 hrs 27 min*	-	-	-
Baseline (Route 9)	*151.2*	-	-	*2 hrs 2 min*	-	-	-
1	283.0	127.0	131.8	3 hrs 48 min	1 hr 21 min	1 hr 46 min	**Unfavorable**
2	249.5	93.5	98.3	3 hrs 21 min	54 min	1 hr 19 min	**Unfavorable**
3	224.0	68.0	72.8	3 hrs 0 min	33 min	58 min	**Unfavorable**
4	217.2	61.2	66.0	2 hrs 55 min	28 min	53 min	**Unfavorable**
5	206.7	50.7	55.5	2 hrs 46 min	19 min	44 min	**Unfavorable**
6	186.5	30.5	35.3	2 hrs 30 min	3 min	28 min	**Unfavorable**
7	176.0	20.0	24.8	2 hrs 22 min	(5 min)	20 min	**Unfavorable**
8	161.7	5.7	10.5	2 hrs 10 min	(17 min)	8 min	Comparable
9	151.2	(4.8)	-	2 hrs 2 min	(25 min)	-	-
10	162.4	6.4	11.2	2 hrs 11 min	(16 min)	9 min	Comparable
11	151.9	(4.1)	0.7	2 hrs 2 min	(25 min)	0 min	Comparable
12	151.2	(4.8)	0.0	2 hrs 2 min	(25 min)	0 min	Comparable
13	185.7	29.7	34.5	2 hrs 30 min	3 min	28 min	**Unfavorable**

Screening Criteria 1 Conclusion: As shown in Table 1 above, Routes 1, 2, 3, 4, 5, 6, and 13 each have a travel time that is longer than both the travel time for auto travel and the Baseline Route 9 travel time. These routes would not offer competitive travel times between Minneapolis and Duluth due to longer route distances, and are assessed as 'unfavorable' with respect to route distance and travel time.

Route 7 is approximately 25 miles longer than the baseline. The estimated travel time for Route 7 is only 5 minutes shorter than estimated travel time for auto traffic, and is 20 minutes longer than the baseline. Because of this significant difference with the baseline, Route 7 is characterized as 'unfavorable' with respect to route distance.

Screening Criteria 2: Population and Population Centers

A reasonable assumption for estimating ridership is that potential ridership in a passenger rail corridor is directly related to the population within the service area. Based on this assumption, route populations were calculated for each route alternative using GIS software and US census data from the year 2000. The route populations for each route include cities and towns within a 20-mile band of each route, and within a 20 mile radius of each of the terminal stations in Minneapolis and Duluth. Maps depicting these population bands for each of these route alternatives are shown in Appendix A.

As noted in the background section of this technical memorandum, the terminals identified in the TEMS Feasibility Report are used in this preliminary analysis. Therefore, each of the route alternatives serves both the Minneapolis/St. Paul and the Duluth/Superior regions. Each of the routes can access either Minneapolis or St. Paul directly or indirectly via the BNSF St Paul subdivision that runs between the two cities. In addition, the 20-mile radius area surrounding the Minneapolis downtown Intermodal includes the entire city limits of St. Paul. For these reasons it is assumed that Minneapolis/St. Paul is one population center served by one terminal. The Superior/Duluth region is similar, where each of the routes is able to serve both the adjacent cities of Superior, WI, and Duluth, MN. This type of preliminary analysis does not allow selection of a terminal or end point within the termini locations.

Table 2 shows a summary of the population screening results. Route 1 serves roughly 2.86 million people, and is the most populous route due mainly to the inclusion of the populations along the I-94 corridor toward St. Cloud, and in the greater Brainerd area. The least populous route, Route No. 12 serves only approximately 2.64 million people. However, with a combined population of 2.53 million people, the greater Minneapolis/St. Paul and Duluth regions contribute the majority of each route's total population, ranging from 88% of the total population of Route 1, up to almost 96% of the population of Route 12.

Table 2 – Route Populations

Route	Population	Increase/(Decrease) vs. Baseline	*Assessment – Comparable or Unfavorable*
Baseline (Route 9)	*2,642,111*	-	-
1	2,860,394	218,283	Comparable
2	2,848,001	205,890	Comparable
3	2,810,262	168,151	Comparable
4	2,817,626	175,515	Comparable
5	2,812,083	169,972	Comparable
6	2,694,543	52,432	Comparable
7	2,686,167	44,056	Comparable
8	2,647,166	5,055	Comparable
9	2,642,111	-	-
10	2,653,959	11,848	Comparable
11	2,646,352	4,241	Comparable
12	2,641,686	(425)	Comparable
13	2,662,720	20,609	Comparable

Screening Criteria 2 Conclusion: Each of the route alternatives serves the greater Minneapolis/St. Paul and Duluth/Superior regions, which have the highest populations of any of the towns or regions in the corridor, and make up between 88% and 96% of the total population of each route. Since the Purpose and Need does not identify any other cities or towns as required stops in the Minneapolis-Duluth corridor, no routes can be eliminated from further consideration in Step 3, and no routes can be assessed as 'unfavorable' based on the estimated populations served.

Screening Criteria 3: Route Defects

Site conditions that make the construction and operation of a passenger rail line particularly costly or difficult may be considered route defects. When these conditions effectively prohibit rail line construction or operation and cannot be mitigated, these defects are considered 'untenable defects', and would eliminate the route from further screening.

The defects that were found among the 13 identified routes are shown in Table 3. On several routes, private dwellings and/or commercial property would need to be purchased in order to implement rail service where existing buildings are now present on abandoned track rights-of-way. These are considered route defects because of the additional purchasing costs, and the potential disruption to the existing environment. However, at this screening stage these defects are not considered untenable, and do not preclude the routes from further analysis.

Table 3 –Route Defects

Route No.	Defects	*Assessment – Comparable or Unfavorable*
1	None Identified	Comparable
2	None Identified	Comparable
3	Abandoned Track right-of-way has been sold or is under long-term lease in the town of Onamia, MN south of Main St. between Elm and Rte 169; and in the town of Isle, MN, south of Isle St. between 3rd Ave. and 5th Ave. Residential and/or commercial properties are located in the abandoned track right-of-way at these locations.	**Unfavorable**
4	Abandoned track right-of-way has been sold or is under long-term lease in the town of Foley, MN. Dozens of residential dwellings and commercial properties are located in the abandoned track right-of-way along Grand and Main Streets, between Norman Ave. and Holdridge St.	**Unfavorable**
5	Abandoned track right-of-way has been sold or is under long-term lease in the town of Foley, MN. Dozens of residential dwellings and commercial properties are located in the abandoned track right-of-way along Grand and Main Streets, between Norman Ave. and Holdridge St.	**Unfavorable**
6	Abandoned track right-of-way has been sold or is under long-term lease in the town of Princeton, MN. Dozens of residential dwellings are located in the abandoned track right-of-way west of 10th Avenue between 3rd St. and Branch St.	**Unfavorable**
7	Abandoned track right-of-way has been sold or is under long-term lease in the town of Princeton, MN. Dozens of residential dwellings are located in the abandoned track right-of-way west of 10th Avenue between 3rd St. and Branch St.	**Unfavorable**
8	None Identified	Comparable
9	None Identified	-
10	None Identified	Comparable
11	None Identified	Comparable
12	None Identified	Comparable
13	In several locations along this route, the abandoned track right-of-way has been sold or is under long-term lease. Several residential dwellings and businesses are now located in the track right-of-way in the Wisconsin towns of Clear Lake (between Deposition Dr. and 5th St), Turtle Lake (South of Martin Ave between Elm St, and Willow St.), and Cumberland (west of 1st Ave between 4th Ave and Marshall St.)	**Unfavorable**

Screening Criteria 3 Conclusion: None of the thirteen routes has an untenable defect that would eliminate it from further screening. Routes 3, 4, 5, 6, 7 and 13 each have unfavorable route defects in the form of private property located on the track right-of-way.

Screening Criteria 4: Order of Magnitude Capital Costs

Costs to plan, design and construct rail transportation infrastructure and rolling stock are considered capital costs. Such costs are estimated by engineers throughout the development of a project. During the early stages, when the project features are not well defined and site conditions are not well understood, it is difficult to estimate the capital cost accurately. However, engineers may employ "order of magnitude" capital costs which are based on previous costs in similar projects, or historical unit costs, rates and quantities for common construction elements that can be assembled to meet the requirements of the project.

Order of magnitude capital costs are estimated based on the existing track and freight traffic conditions along each of the thirteen identified routes, and the upgrades needed to provide 110mph and 8 round-trips per day as described in the TEMS Feasibility Study. The order of magnitude capital cost range is estimated at between $5 million and $10 million per mile to construct a new track within an existing railroad right of way to support high speed passenger service. Thus each of the routes shown in Table 4 below has a low-end and high-end estimate. These costs do not reflect the cost of stations, maintenance and layover facilities, property procurement, and rolling stock. Routes 9 and 12, with the shortest route distances, are shown to have the lowest estimated costs.

Screening Criteria 4 Conclusion: Routes 1, 2, 3, 4, 5, 6, 7, and 13 are considered 'unfavorable' with respect to order of magnitude capital cost. These routes are estimated to be 16% greater or more than the baseline estimate, which translates to an increase in capital costs of between $125 and $250 million more than the baseline estimate. Routes 8, 9, 10, 11, and 12 have costs that are considered 'comparable', and are all within 7% of the baseline estimate.

Table 4 – Order of Magnitude Capital Costs

Route	Order of Magnitude Capital Cost Range (millions) Low Estimate	Order of Magnitude Capital Cost Range (millions) High Estimate	Difference Vs. Baseline Cost (millions) Increase/ (Decrease) vs. Baseline	Difference Vs. Baseline Cost (millions) Increase/ (Decrease) vs. Baseline	Increase Over Baseline	*Assessment – Comparable or Unfavorable*
Baseline (Route 9)	*756*	*1,512*	-	-	-	-
1	1,415	2,830	659	1,318	87%	**Unfavorable**
2	1,248	2,495	492	983	65%	**Unfavorable**
3	1,120	2,240	364	728	48%	**Unfavorable**
4	1,086	2,172	330	660	44%	**Unfavorable**
5	1,034	2,067	278	555	37%	**Unfavorable**
6	933	1,865	177	353	23%	**Unfavorable**
7	880	1,760	124	248	16%	**Unfavorable**
8	809	1,617	53	105	7%	Comparable
9	756	1,512	-	-	-	-
10	812	1,624	56	112	7%	Comparable
11	760	1,519	3	7	0%	Comparable
12	756	1,512	0	0	0%	Comparable
13	929	1,857	173	345	23%	**Unfavorable**

Summary of Findings

The summary of results from the four screening criteria is shown below in Table 5. The key finding of this preliminary analysis is that five of the thirteen identified routes – Route Nos. 8, 9, 10, 11, and 12 – are recommended for further analysis in Step 3 of Level 1 screening. These routes are shown in Figure 2.

Table 5 – Summary of Route Alternative Screening, Step 2

	Screening Criteria				
Route	**Distance and Travel Time**	**Route Population**	**Route Defects**	**Order of Magnitude Capital Costs**	**Recommendation**
1	**Unfavorable**	Comparable	Comparable	**Unfavorable**	**Eliminate**
2	**Unfavorable**	Comparable	Comparable	**Unfavorable**	**Eliminate**
3	**Unfavorable**	Comparable	**Unfavorable**	**Unfavorable**	**Eliminate**
4	**Unfavorable**	Comparable	**Unfavorable**	**Unfavorable**	**Eliminate**
5	**Unfavorable**	Comparable	**Unfavorable**	**Unfavorable**	**Eliminate**
6	**Unfavorable**	Comparable	**Unfavorable**	**Unfavorable**	**Eliminate**
7	**Unfavorable**	Comparable	**Unfavorable**	**Unfavorable**	**Eliminate**
8	Comparable	Comparable	Comparable	Comparable	Level 3 Screening
9	-	-	-	-	Level 3 Screening
10	Comparable	Comparable	Comparable	Comparable	Level 3 Screening
11	Comparable	Comparable	Comparable	Comparable	Level 3 Screening
12	Comparable	Comparable	Comparable	Comparable	Level 3 Screening
13	**Unfavorable**	Comparable	**Unfavorable**	**Unfavorable**	**Eliminate**

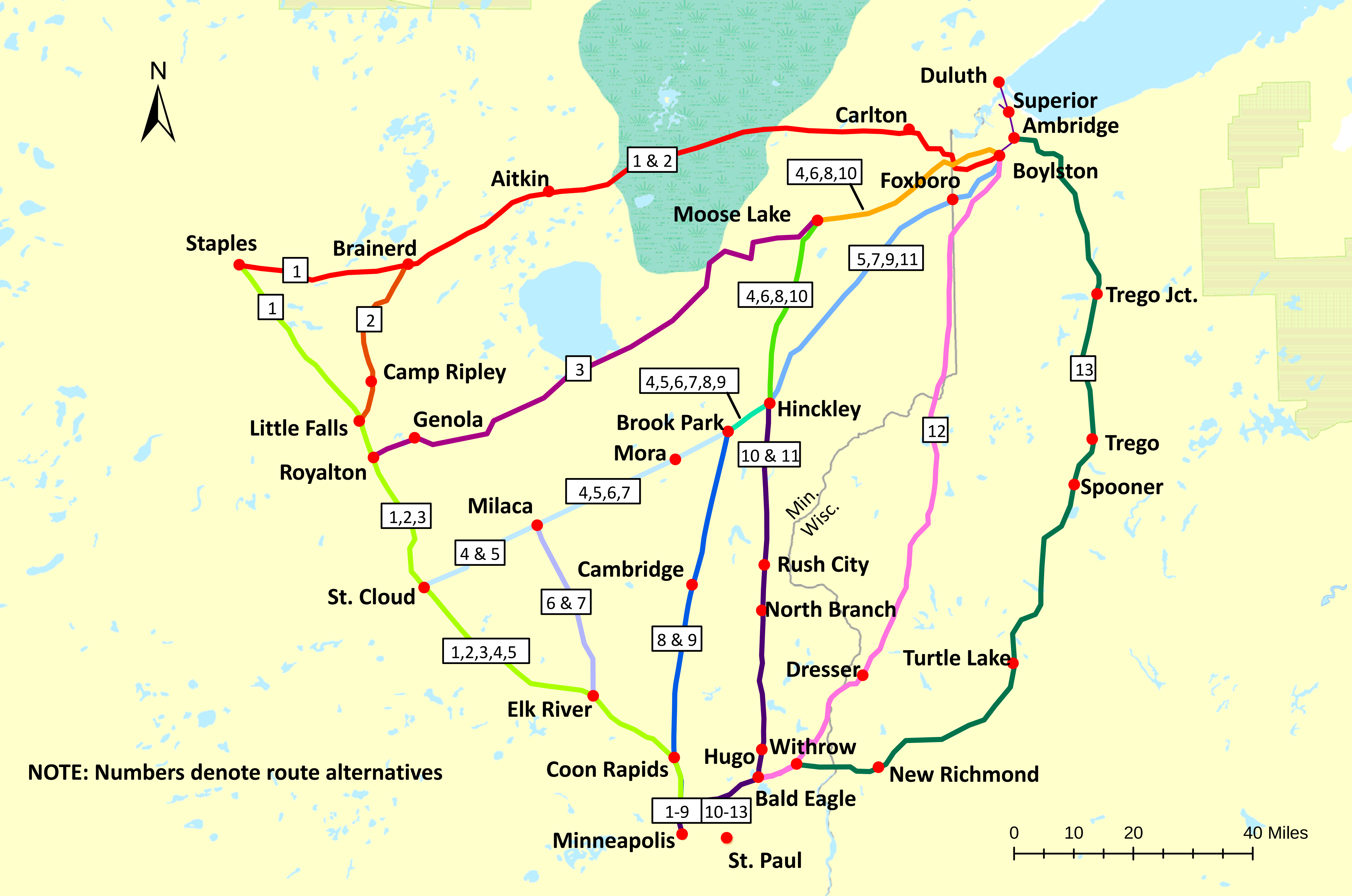


Figure 1
Northern Lights Express Route Alternatives

November 20, 2009

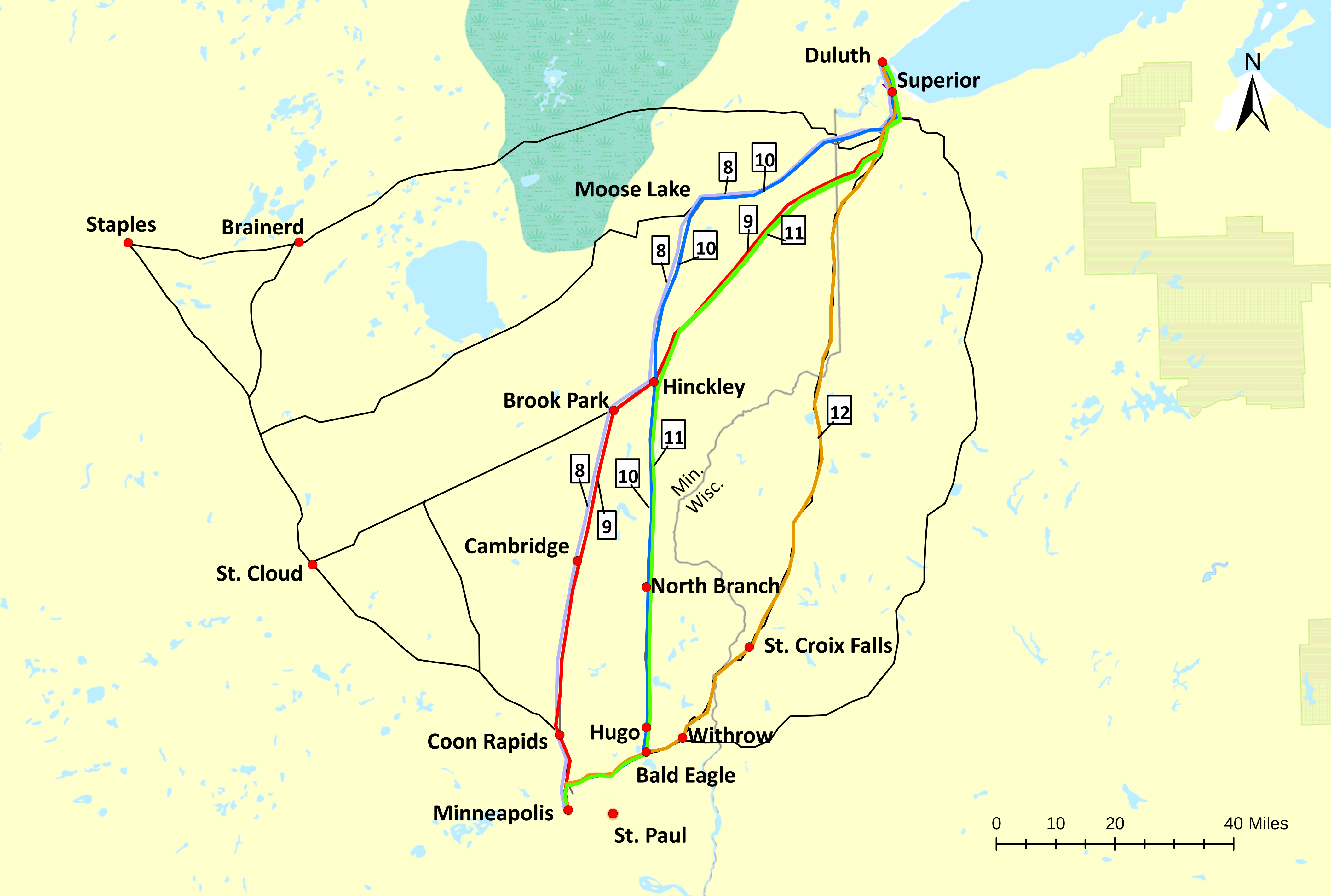
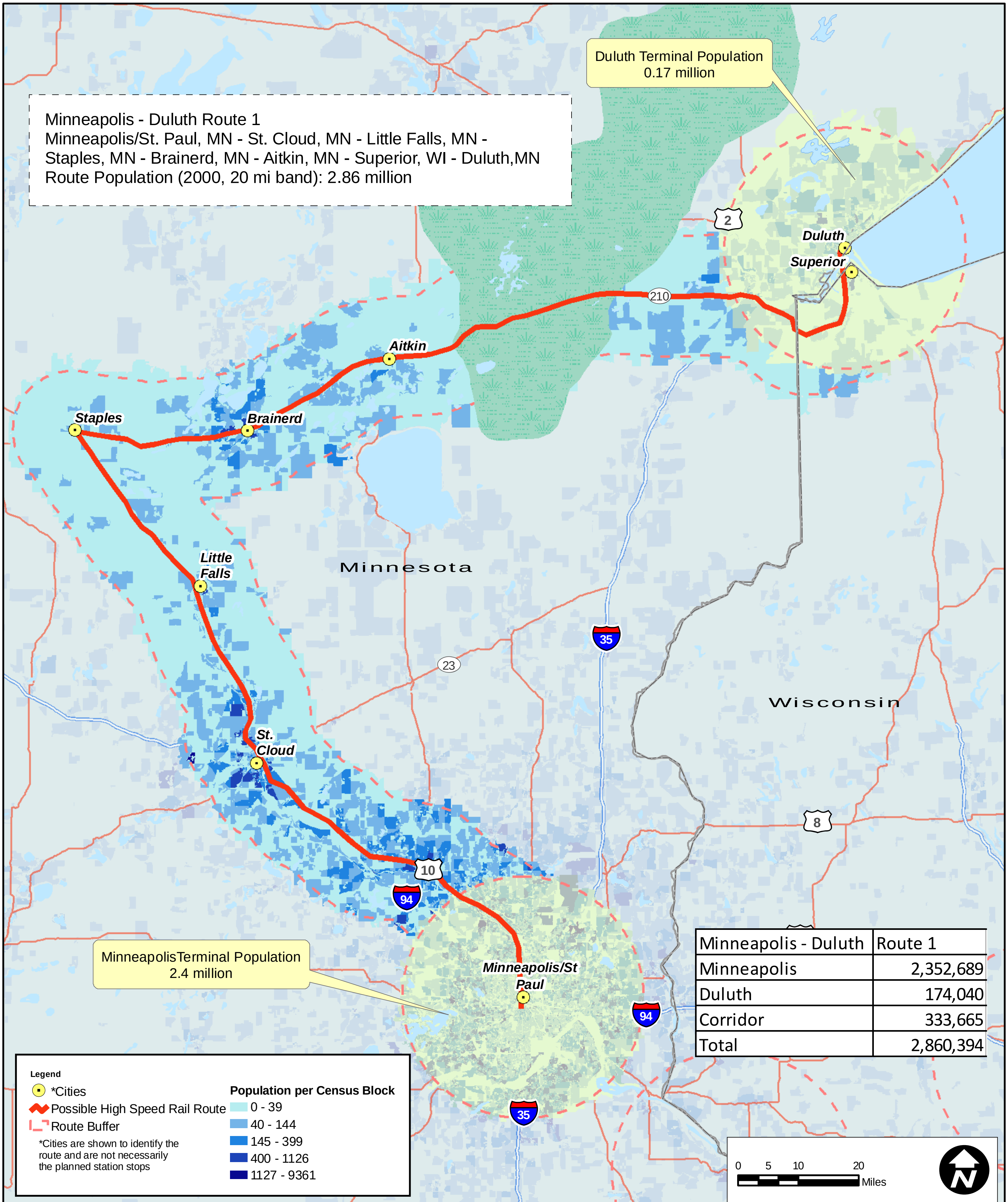


Figure 2
Northern Lights Express Route Alternatives Recommended for Level 1, Step 3 Screening

November 20, 2009

Appendix A

Corridor Populations of Route Alternatives

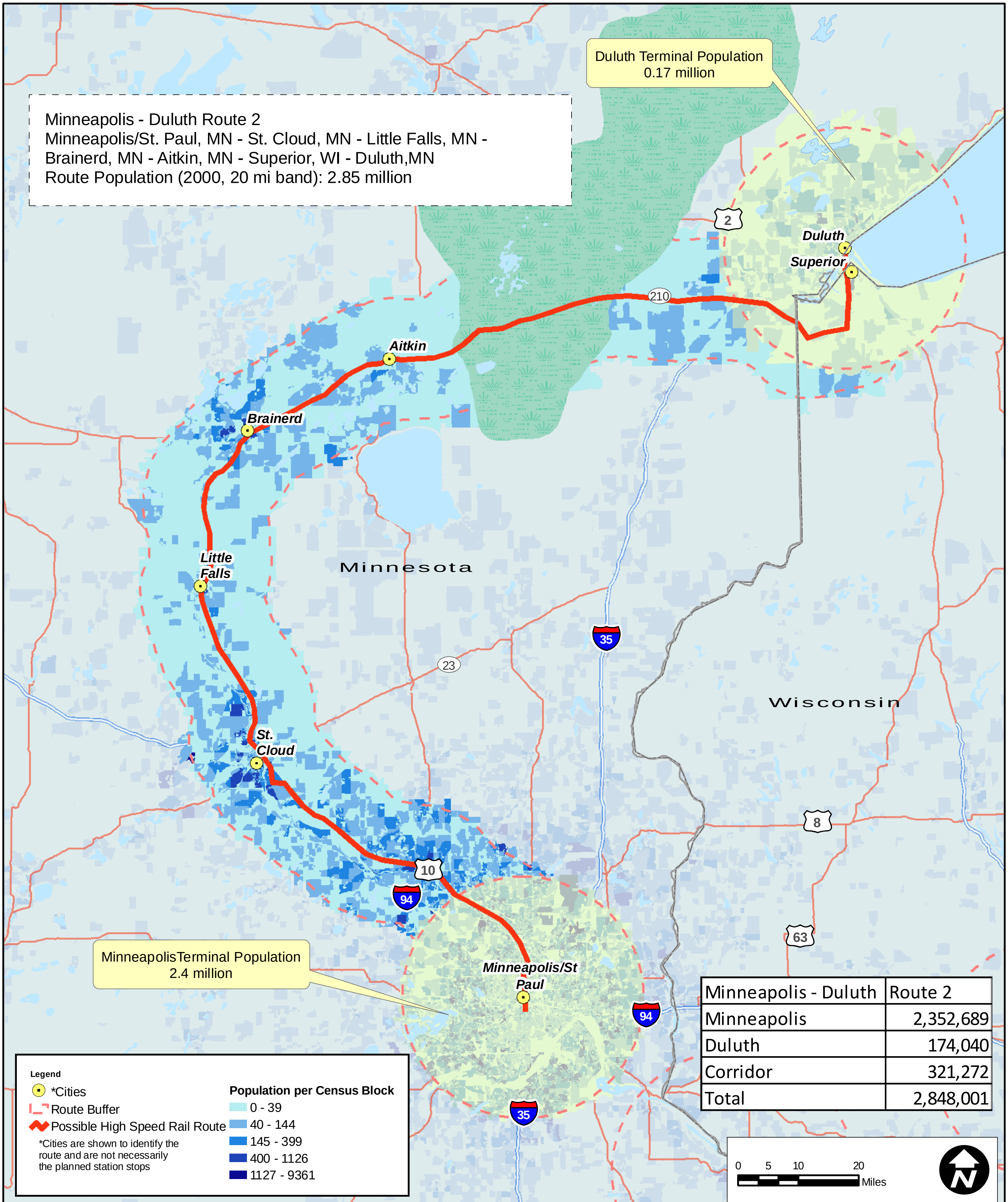


Minneapolis - Duluth	Route 1
Minneapolis	2,352,689
Duluth	174,040
Corridor	333,665
Total	2,860,394

QUANDEL

Northern Light Express
Alternatives Analysis

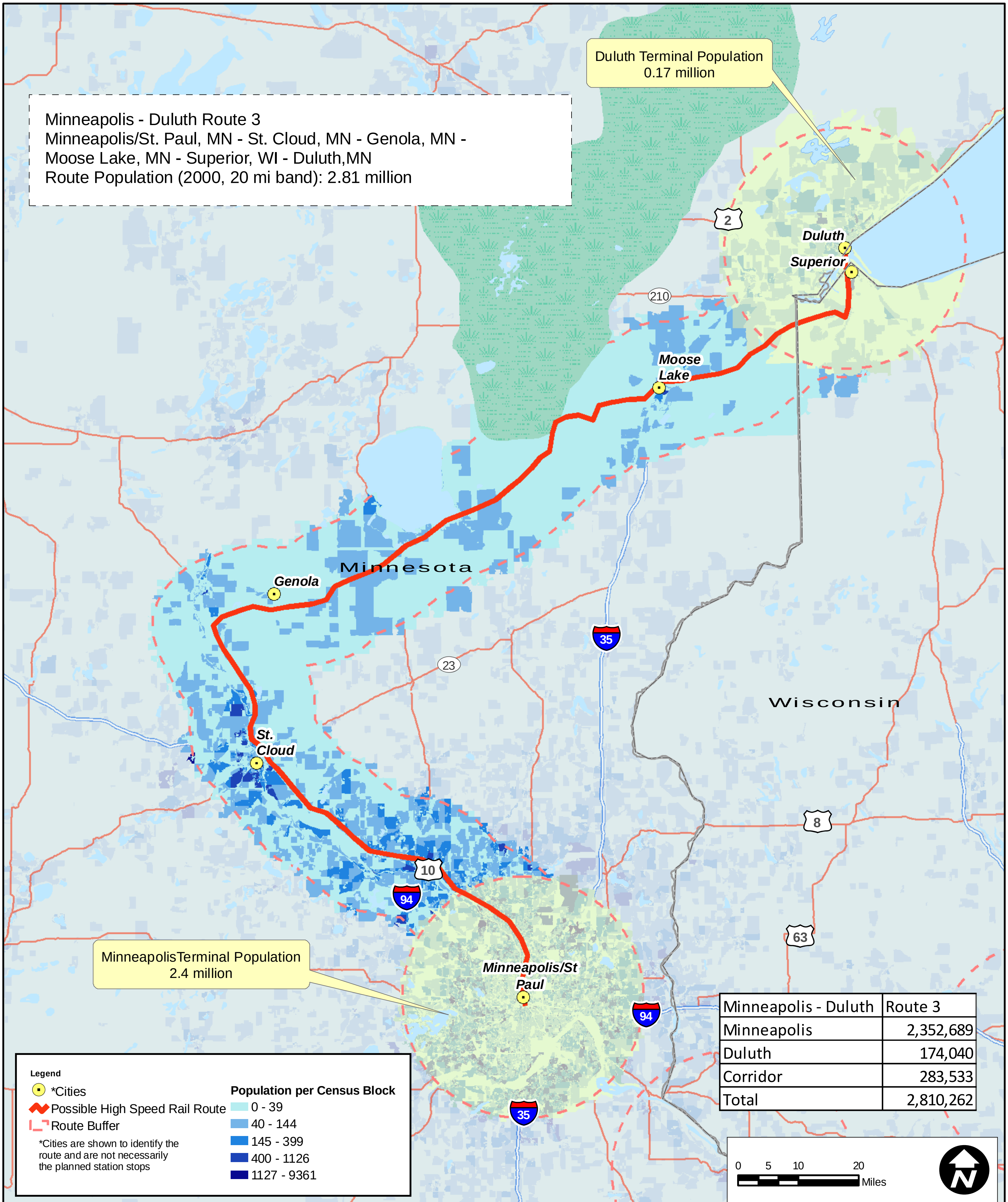
Data Sources
2000 US Census Data - census blocks
2000 ESRI Census Data (SF1) - population
2009 ESRI Data & Maps - base data



QUANDEL

Northern Light Express
Alternatives Analysis

Data Sources
2000 US Census Data - census blocks
2000 ESRI Census Data (SF1) - population
2009 ESRI Data & Maps - base data



Minneapolis - Duluth	Route 3
Minneapolis	2,352,689
Duluth	174,040
Corridor	283,533
Total	2,810,262

QUANDEL

Northern Light Express
Alternatives Analysis

Data Sources
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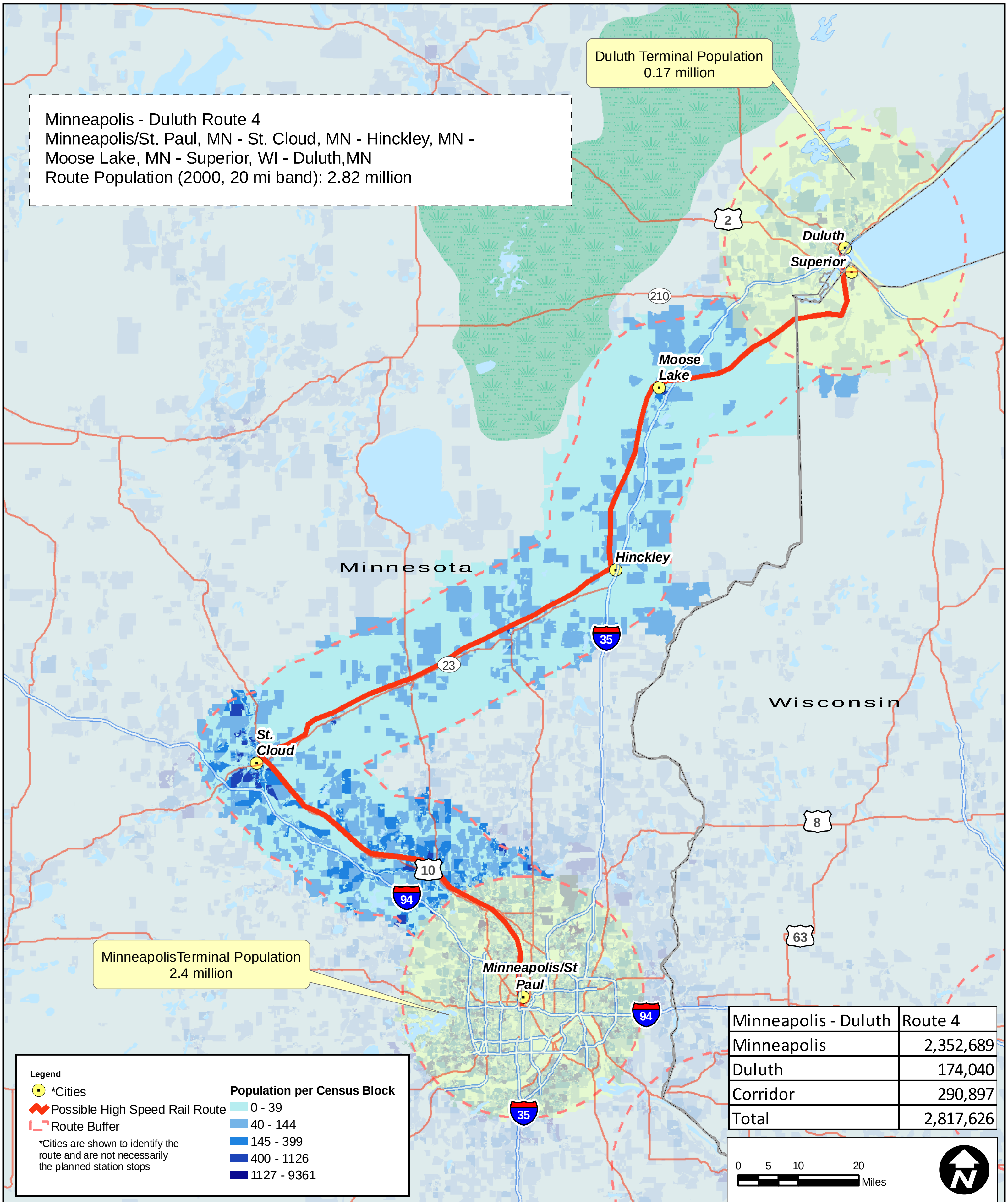
2000 ESRI Census Data (SF1) - population
2009 ESRI Data & Maps - base data



Minneapolis - Duluth	Route 4
Minneapolis	2,352,689
Duluth	174,040
Corridor	290,897
Total	2,817,626

QUANDEL

Northern Light Express
Alternatives Analysis

Data Sources
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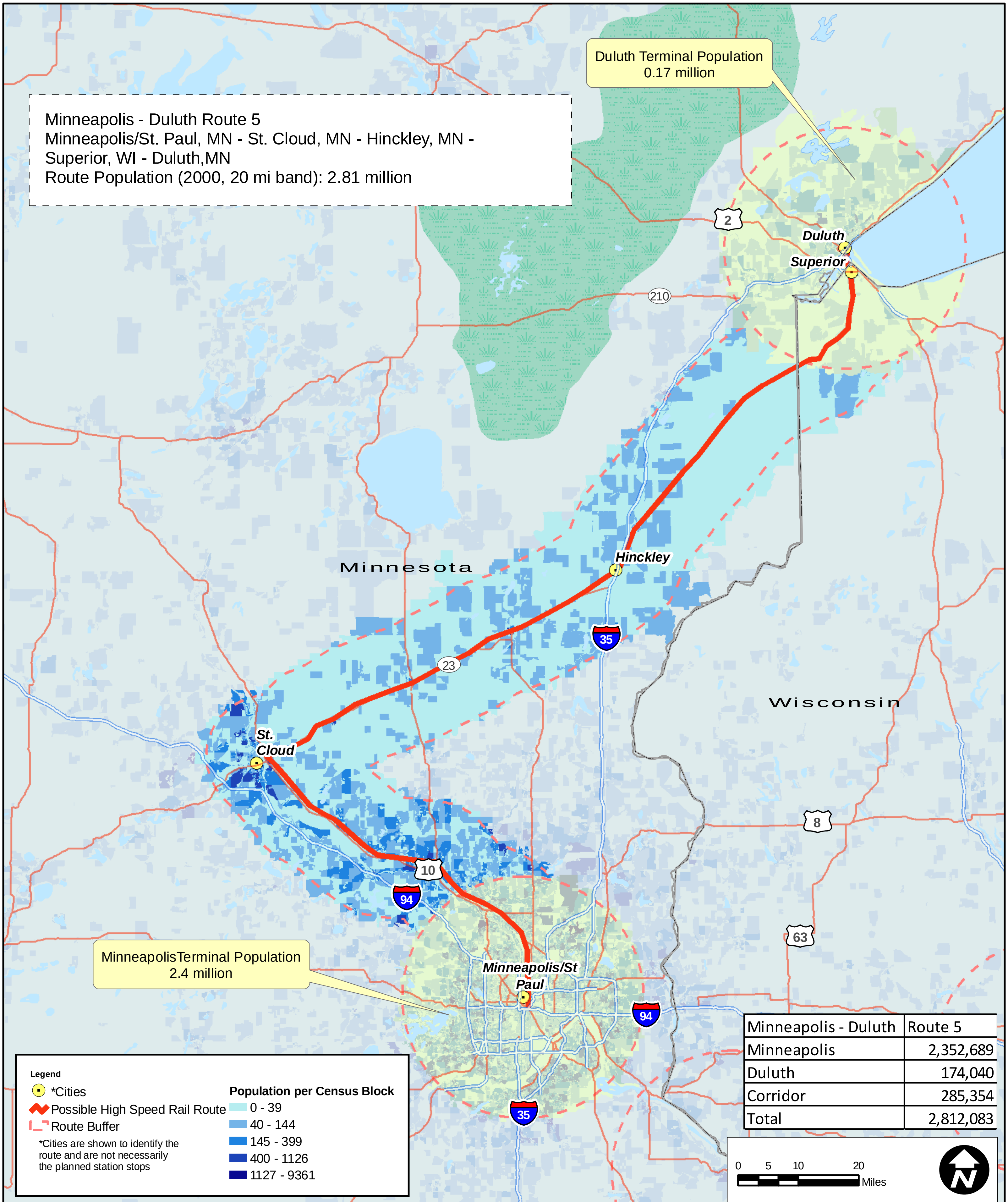
2000 ESRI Census Data (SF1) - population
2009 ESRI Data & Maps - base data



Minneapolis - Duluth	Route 5
Minneapolis	2,352,689
Duluth	174,040
Corridor	285,354
Total	2,812,083

QUANDEL

Northern Light Express
Alternatives Analysis

Data Sources
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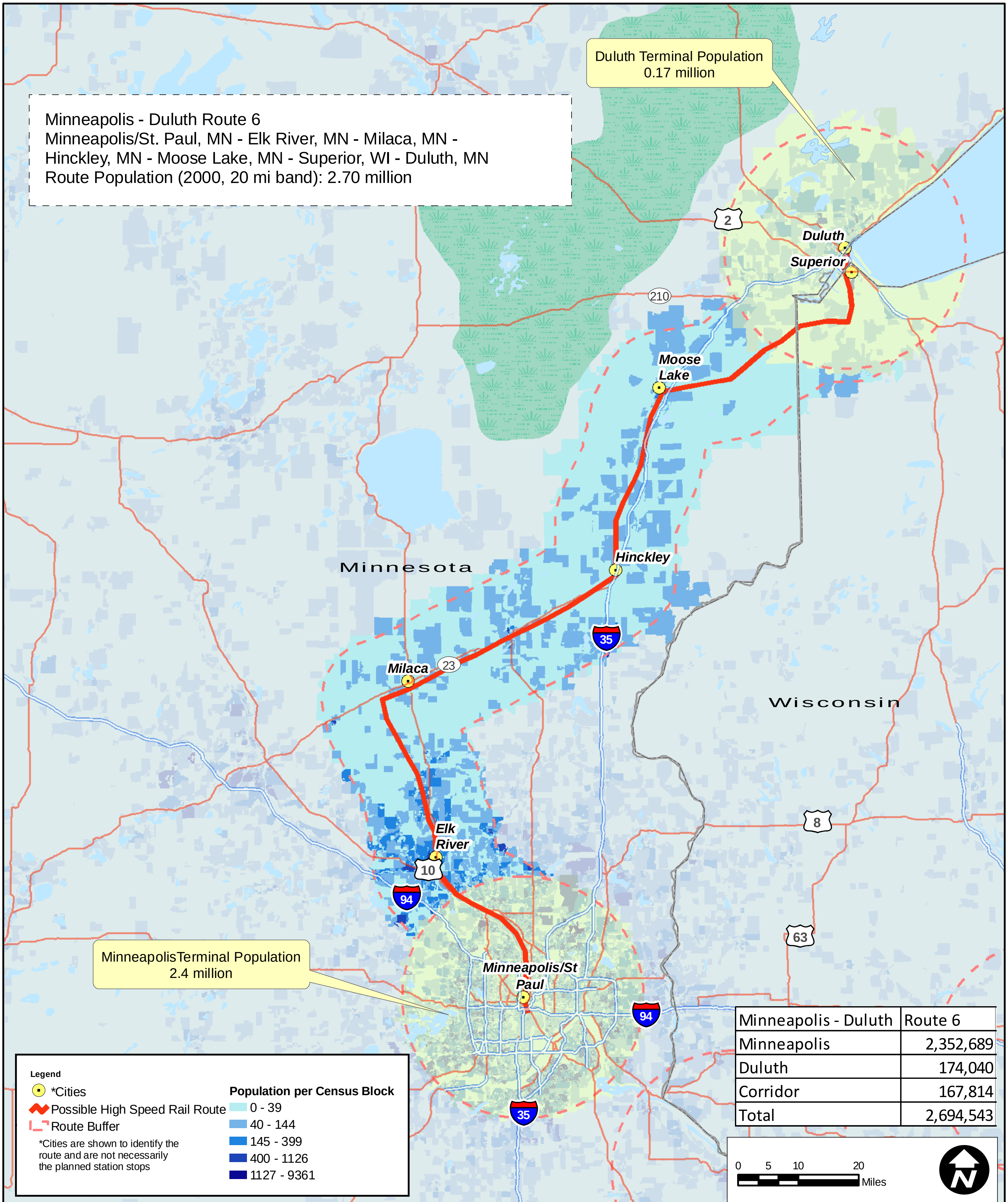
2000 ESRI Census Data (SF1) - population
2009 ESRI Data & Maps - base data



Minneapolis - Duluth	Route 6
Minneapolis	2,352,689
Duluth	174,040
Corridor	167,814
Total	2,694,543

QUANDEL

Northern Light Express
Alternatives Analysis

Data Sources
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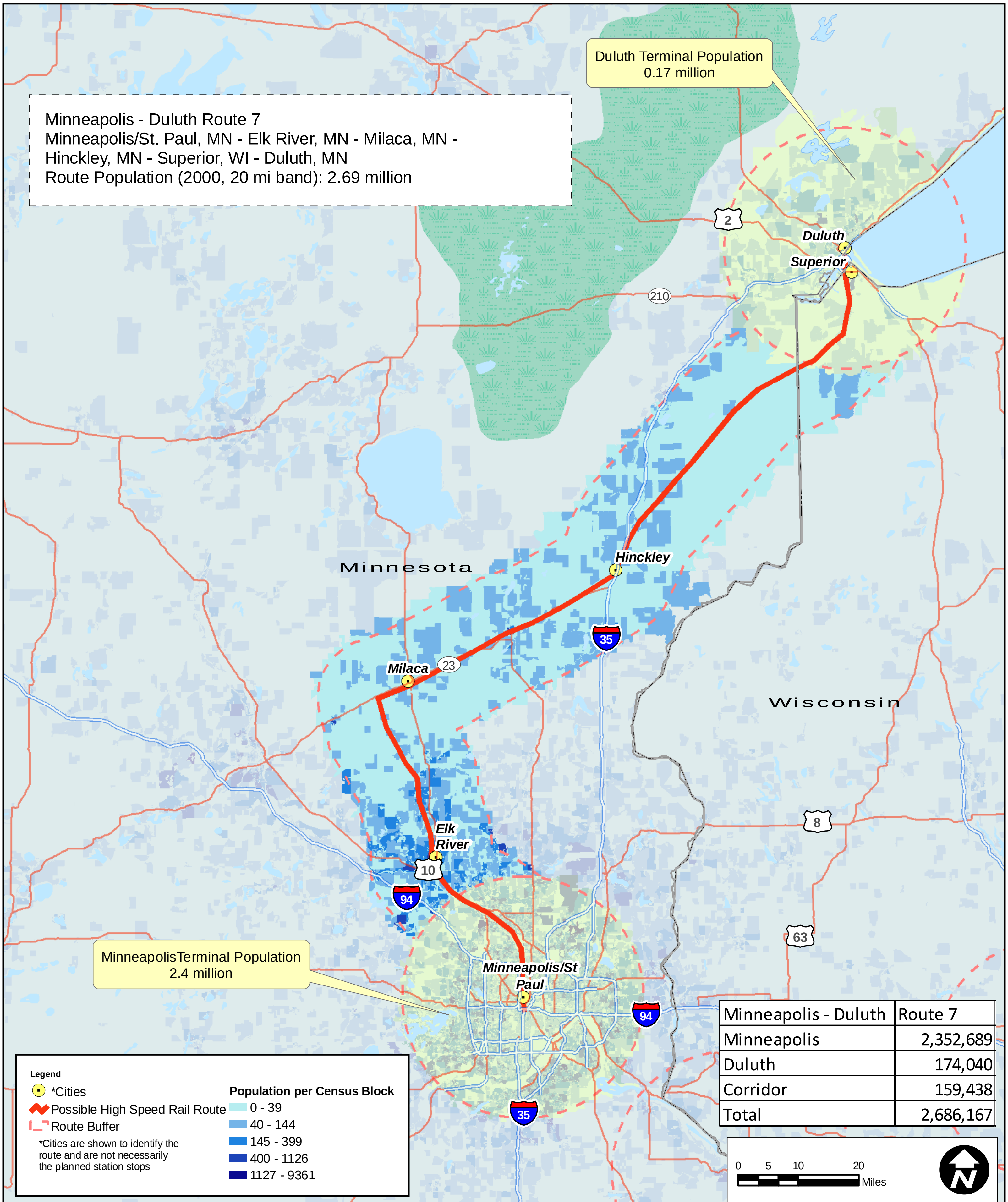
2000 ESRI Census Data (SF1) - population
2009 ESRI Data & Maps - base data



Minneapolis - Duluth	Route 7
Minneapolis	2,352,689
Duluth	174,040
Corridor	159,438
Total	2,686,167

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Northern Light Express
Alternatives Analysis

Data Sources
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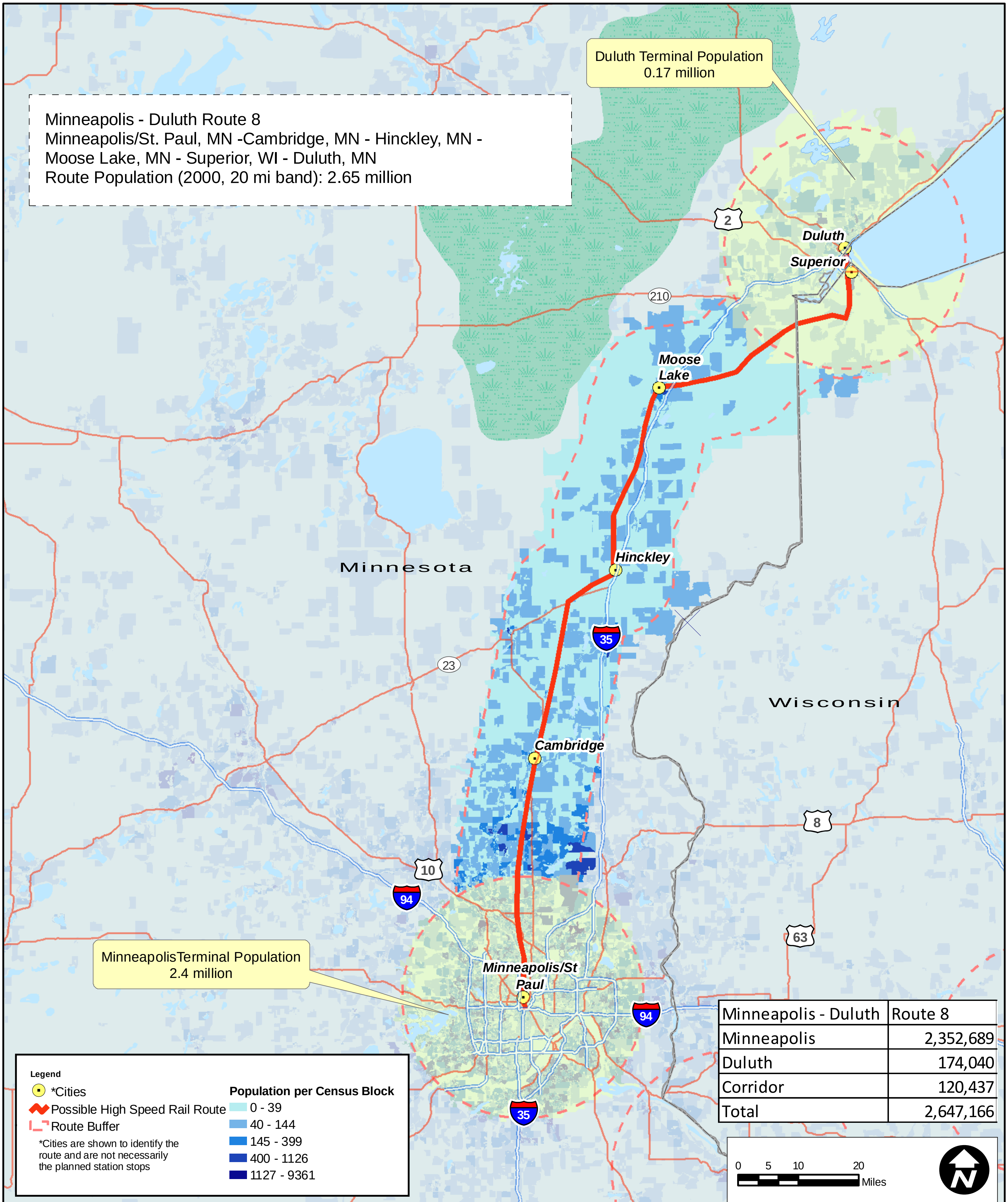
2000 ESRI Census Data (SF1) - population
2009 ESRI Data & Maps - base data



Minneapolis - Duluth	Route 8
Minneapolis	2,352,689
Duluth	174,040
Corridor	120,437
Total	2,647,166

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Northern Light Express
Alternatives Analysis

Data Sources
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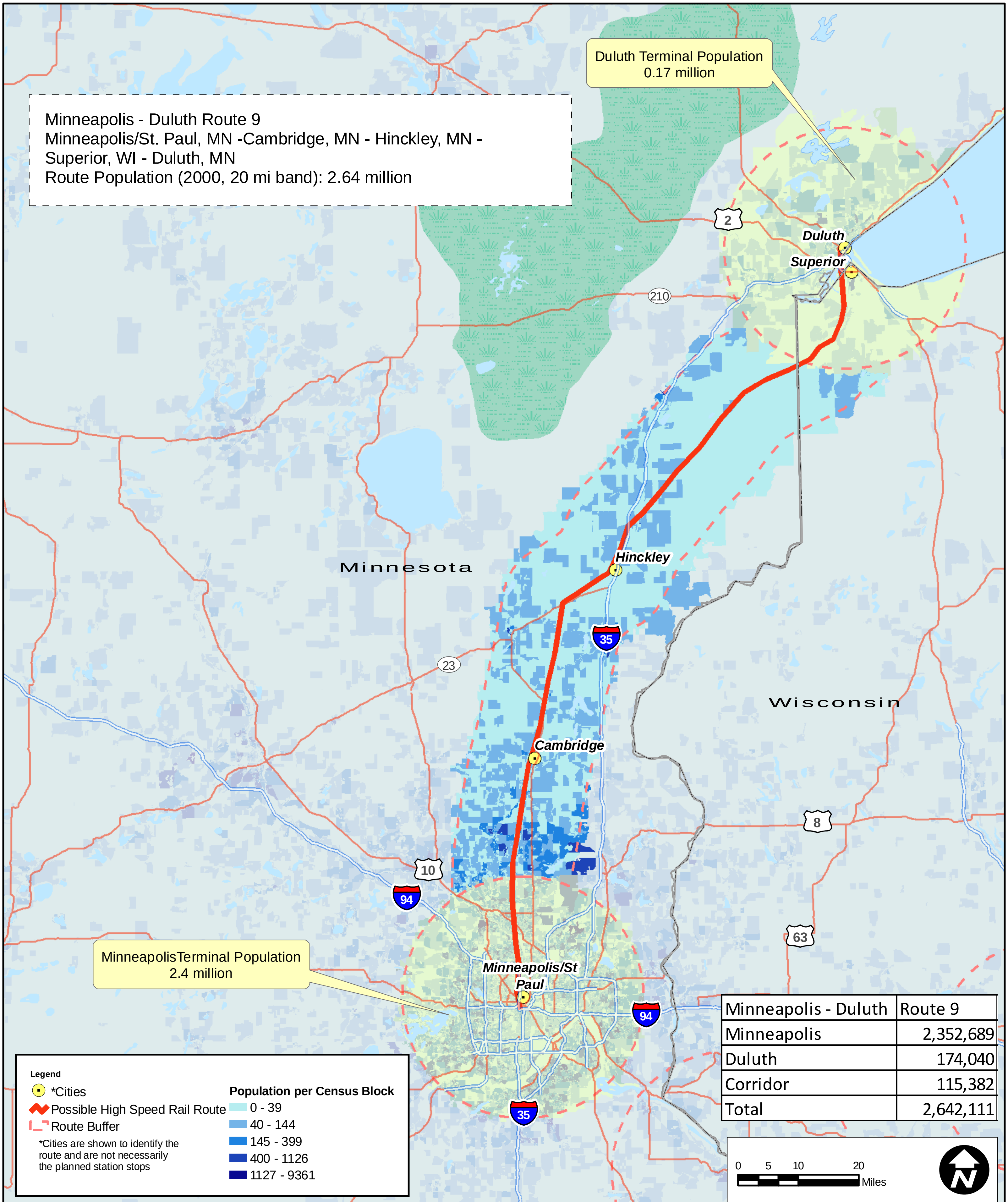
2000 ESRI Census Data (SF1) - population
2009 ESRI Data & Maps - base data



Minneapolis - Duluth	Route 9
Minneapolis	2,352,689
Duluth	174,040
Corridor	115,382
Total	2,642,111

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Northern Light Express
Alternatives Analysis

Data Sources
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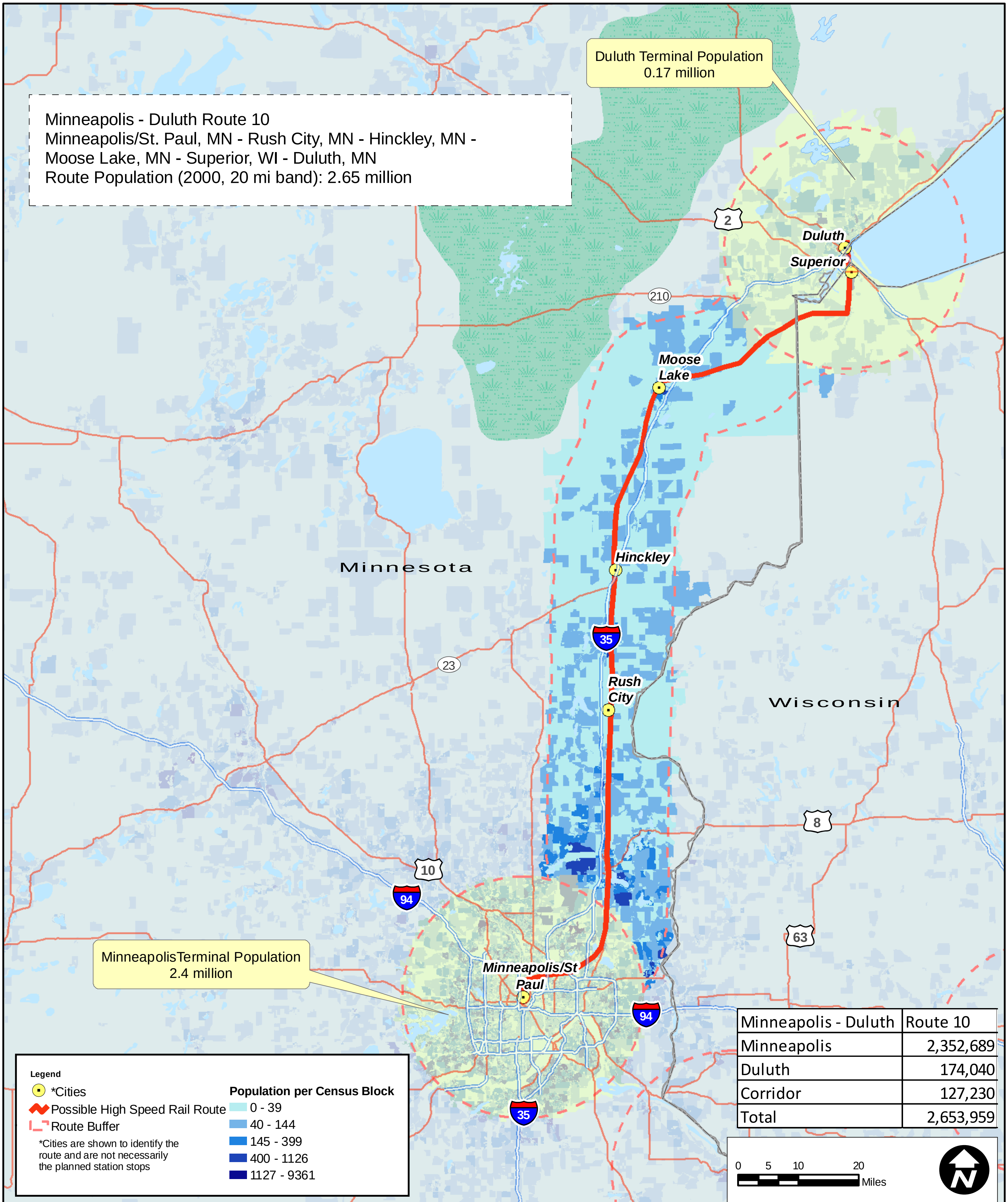
2000 ESRI Census Data (SF1) - population
2009 ESRI Data & Maps - base data



Minneapolis - Duluth	Route 10
Minneapolis	2,352,689
Duluth	174,040
Corridor	127,230
Total	2,653,959

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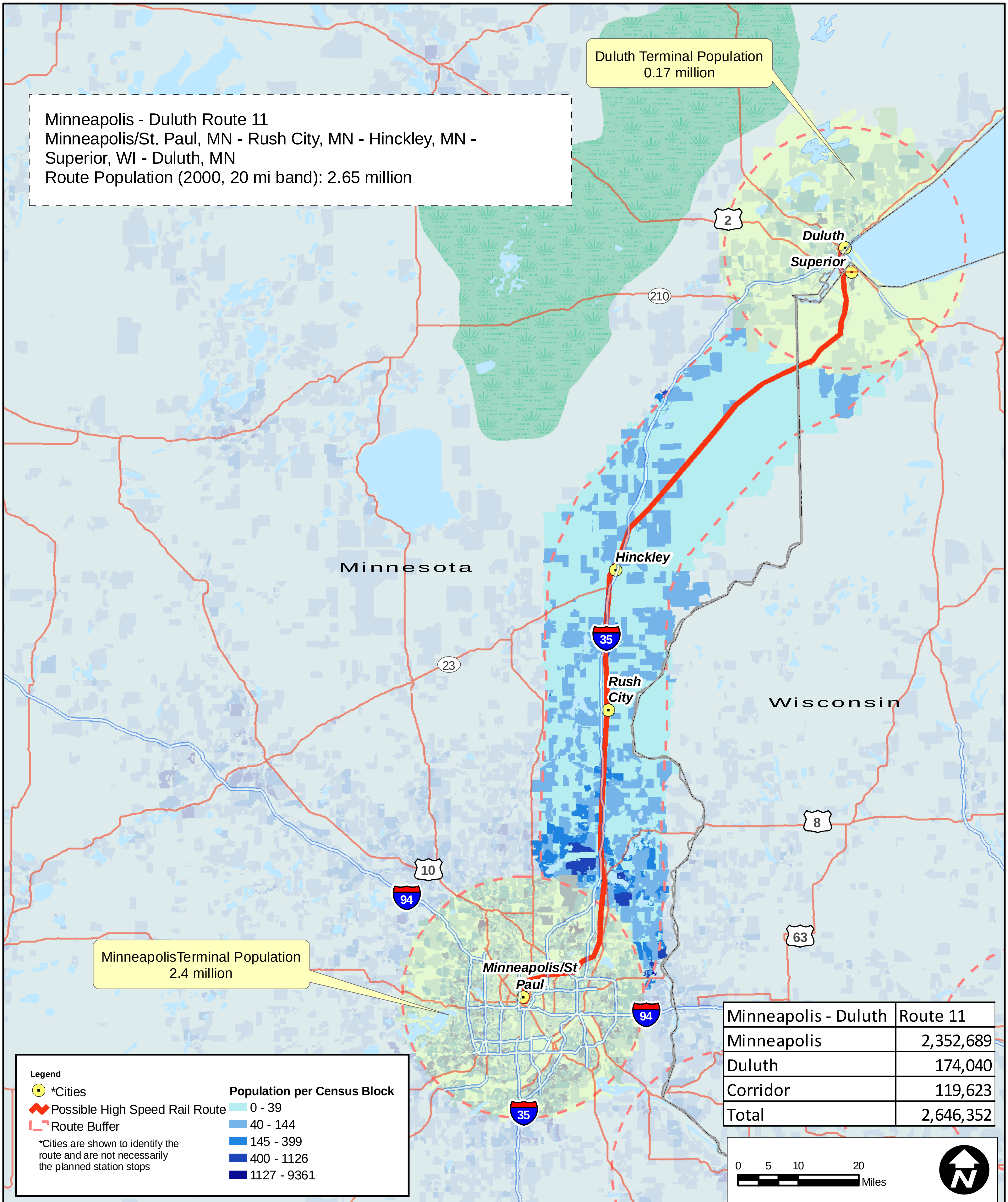
Northern Light Express Alternatives Analysis

Data Sources
2000 US Census Data - census blocks
2000 ESRI Census Data (SF1) - population
2009 ESRI Data & Maps - base data



Minneapolis - Duluth	Route 11
Minneapolis	2,352,689
Duluth	174,040
Corridor	119,623
Total	2,646,352

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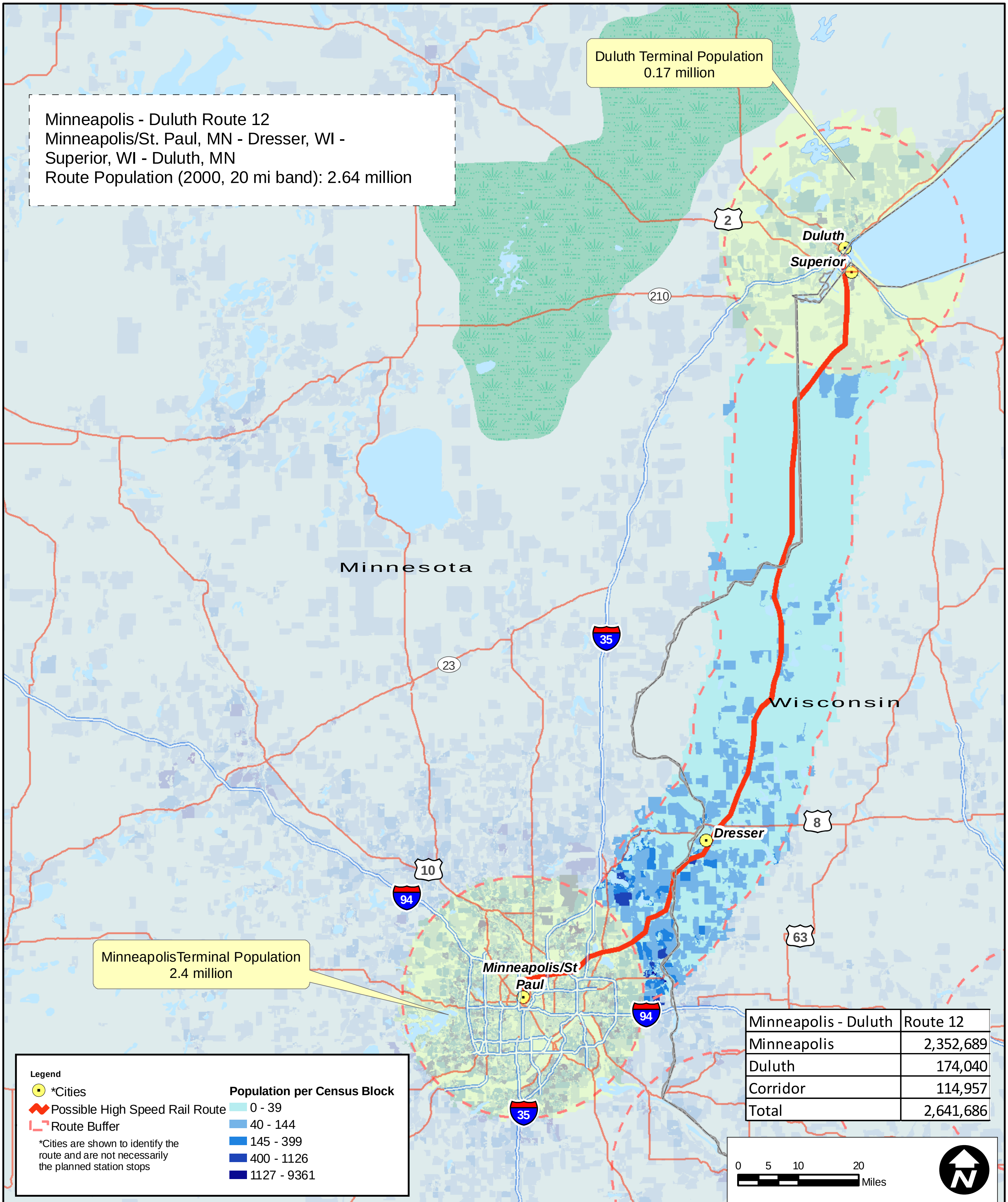
Northern Light Express
Alternatives Analysis

Data Sources
2000 US Census Data - census blocks
2000 ESRI Census Data (SF1) - population
2009 ESRI Data & Maps - base data

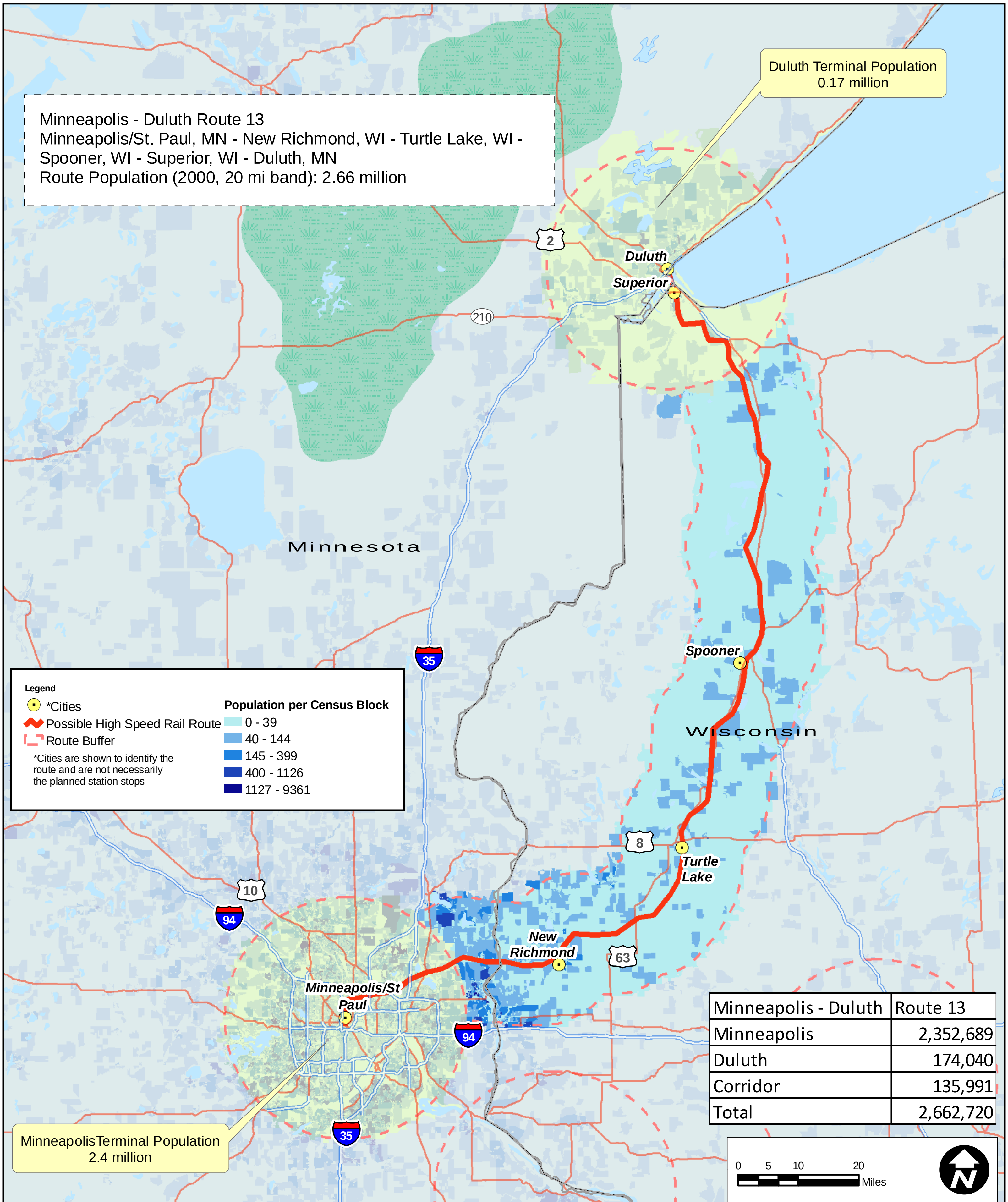


Minneapolis - Duluth	Route 12
Minneapolis	2,352,689
Duluth	174,040
Corridor	114,957
Total	2,641,686

QUANDEL

Northern Light Express
Alternatives Analysis

Data Sources
2000 US Census Data - census blocks
2000 ESRI Census Data (SF1) - population
2009 ESRI Data & Maps - base data



Minneapolis - Duluth	Route 13
Minneapolis	2,352,689
Duluth	174,040
Corridor	135,991
Total	2,662,720

QUANDEL

Northern Light Express
Alternatives Analysis

Data Sources
2000 US Census Data - census blocks
2000 ESRI Census Data (SF1) - population
2009 ESRI Data & Maps - base data

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Technical Memorandum

Subject:	**Technical Memorandum 3 – Speed Profiles and Route Travel Times** **Minnesota Northern Lights Express Project** **Alternatives Analysis – Level 1, Step 3 Screening**
Prepared For:	**SRF Consulting Group, Inc.**
Prepared By:	**Quandel Consultants, LLC**
CC:	
Date:	**November 20, 2009**

Purpose

This technical memorandum presents the passenger rail speed profiles and travel time comparison for the five routes being considered in the Level 1 Step 3 screening of route alternatives in the Northern Lights Express passenger rail corridor. The screening results are presented here to help select the best passenger rail route from Minneapolis/St. Paul to Duluth for further study.

Background

The draft Purpose and Need of the NLX project is to provide passenger rail service between Minneapolis/St. Paul and Duluth that offers:

- Corridor travel times competitive with automobile travel
- Safe and reliable rail service
- Amenities that improve passenger travel quality and comfort
- System continuity with the existing and planned transportation network

The five remaining route alternatives are screened for their ability to best meet the project Purpose and Need. Whereas Step 2 compared all thirteen of the route alternatives, Step 3 only considers the five routes - Routes 8, 9, 10, 11, and 12 - that survived Step 2 screening. These routes are shown in Figure 1.

Methodology

A simple spreadsheet based train performance calculator is used to determine the best theoretical travel time along each route for comparison. The train performance calculator employs the following parameters and assumptions. These assumptions are likely to prove aggressive in actual implementation, as speeds may be further restricted for operational and safety considerations.

- Typical modern passenger train performance characteristics are modeled including:
  - Acceleration allowing 0-110 mph in 4.6 miles
  - Deceleration at 1 mile per hour per second from 110-0 mph
- Passenger equipment will tilt, allowing operations at 6 inches total unbalance
- Enhanced superelevation (not exceeding 4.0 inches) is employed in curves on all tracks used by passenger trains
- Municipal speed restrictions are eliminated, as the corridor will be "sealed" with 4 quadrant gates at public crossings in high speed territory
- Passenger speed on the BNSF from Minneapolis to Coon Creek is limited to 79 mph, except as restricted by curvature.
- Passenger speed on the CP from Minneapolis to Hugo and Withrow is limited to 79 mph, except as restricted by curvature.
- Passenger speed between Superior and Duluth is limited to 30 and 60 mph.
- All other route segments allow a maximum passenger speed of 110 mph, except as limited by curvature
- Possible degradation in performance due to grades is not considered
- Travel times are calculated including a schedule pad as recommended by the FRA. Typically, the pad ranges from 7% for a double track alignment to approximately 15-20% for a single track with passing sidings.
- The speed profiles and travel times are computed with no freight interference. Sufficient freight infrastructure must be constructed to allow relatively independent operations.

Railroad track charts have been used to identify the track geometric features including tangent segments, grades and curves. The track charts provide the approximate location, length and magnitude of each. This data has been loaded into a spreadsheet for use in computing theoretical passenger train travel times under the assumptions noted above. Where track charts could not be obtained, such as for abandoned railroad rights-of-way, curvature was measured using aerial photography and geometric calculations in CAD software, while grades are assumed to be less than 1%.

Theoretical travel times (including pad) are calculated for each route between Minneapolis and Duluth with 2 minute station stops at Hinkley/Danbury and Superior. Additional intermediate station stops will increase travel times.

The specific routing for each of the five route alternatives is shown in Figures 1-3. For the purpose of comparing route travel times, each of the routes has its terminal station at the Minneapolis downtown Intermodal Station, and at the Duluth Union Depot. The use of these terminals for comparing route alternatives is consistent throughout Level 3 screening.

Graphical Presentation of Data

Track characteristics and train performance data including Curvature, Number of Existing Tracks, Freight Density, Passenger Speed Profile and Grade Crossing Quantity are presented for each route in Appendix A.

Curvature is a key parameter in determining the suitability of a rail alignment for high speed passenger service. The maximum permissible speed is primarily a function of the track curvature, installed superelevation and permissible unbalance of the operating equipment. Curvature up to approximately 1.0 degrees will permit the maximum speed of 110 mph for tilting passenger equipment. Greater curvature will serve to restrict the speeds and increase the travel times. Due to the existence of natural features such as waterways, wetlands and mountains and man-made structures, it is often difficult to realign railroads to reduce curvature. The actual curvature of the alternative routes is presented in the Curvature graphs. By inspection, the location, length and magnitude of speed restricting curves can be determined and compared among the route alternatives.

A rough determination of the route capacity can be determined by considering the Number of Existing Tracks and the existing Freight Density (in trains per day), each of which is plotted for the alternative routes. The MnDOT Office of Freight and Commercial Vehicle Operations publishes freight traffic data along many routes within the state. Freight density data shown in these charts is as of May, 2009.

The FRA tabulates Grade Crossing data in a national database. Grade crossings present both a safety and cost issue. The FRA has recommended mitigating the risk posed by grade crossings by employing active warning systems including gates and flashers. A sealed corridor concept is recommended for 110 mph high speed rail service, which generally includes four quadrant gates (or other similar measures) at public crossings and two quadrant gates at private crossings. The quantities of private and public crossings are tabulated for each route, allowing a simple comparison.

Steep grades may impact the acceleration and braking performance of trains, as trains typically employ relatively low power to weight rations as compared to other modes of transportation. Freight train routes seek to employ grades not exceeding 1% so as to enable the movement of large loads with relatively few locomotives. Since passenger trains are relatively light compared to freight trains and employ relatively powerful locomotives to achieve high speeds, grades less than 1% do not significantly impact travel times. The grades found along the selected route alternatives are generally less than 1%, so are not considered in this analysis.

Passenger Speed Profiles and Travel Times (including pad) have been developed for modern passenger equipment operating on each of the route alternatives. The graphs depict the theoretical speeds achieved as a passenger train moves from Minneapolis to Duluth subject to geometric throughout the system and imposed speed limits in the vicinity of Minneapolis and Superior/Duluth as noted in the assumptions above. For ease in determining where speed limits are proposed to be increased, the existing timetable speeds are also depicted in graphs.

Summary results of TPC travel times are shown below in Table 1. The frequency and magnitude of curvature along Route 12 between Minneapolis and Danbury decreases speeds in this segment, and results in Route 12 having the longest travel time relative to the baseline Route 9. This is despite Route 12 being the shortest of all five routes.

Table 1 – Train Performance Calculator (TPC) Travel Time Comparison

Route	**Route Distance (Miles)**	**TPC Travel Time**	**Increase/ (Decrease) vs. Baseline TPC Travel Time**
Baseline (Route 9)	*151.2*		-
8	161.7	2 hr 8 min	12 min
9	151.2	1 hr 56 min	-
10	162.4	2 hr 15 min	19 min
11	151.9	2 hr 4 min	8 min
12	151.2	2 hr 16 min	20 min

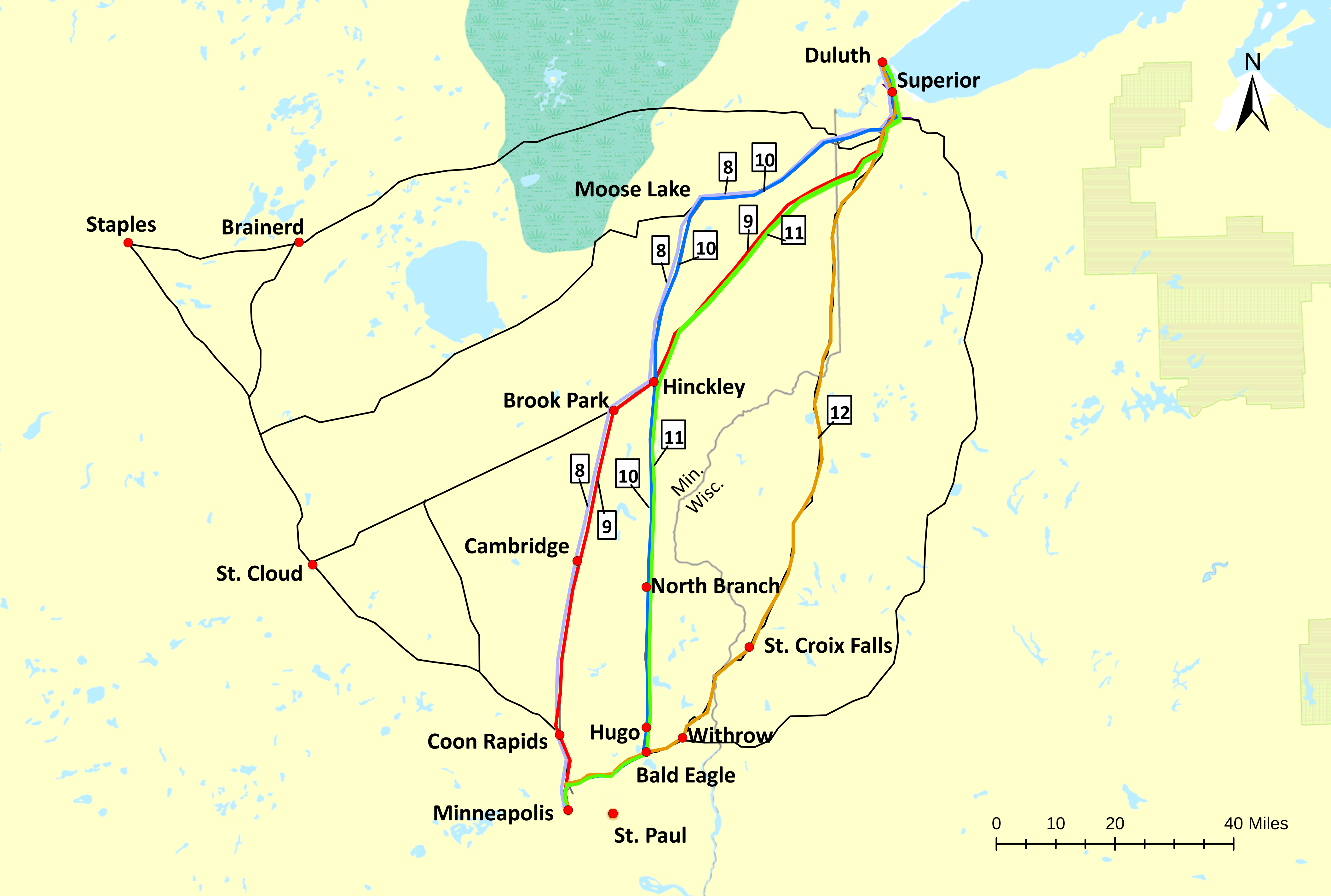
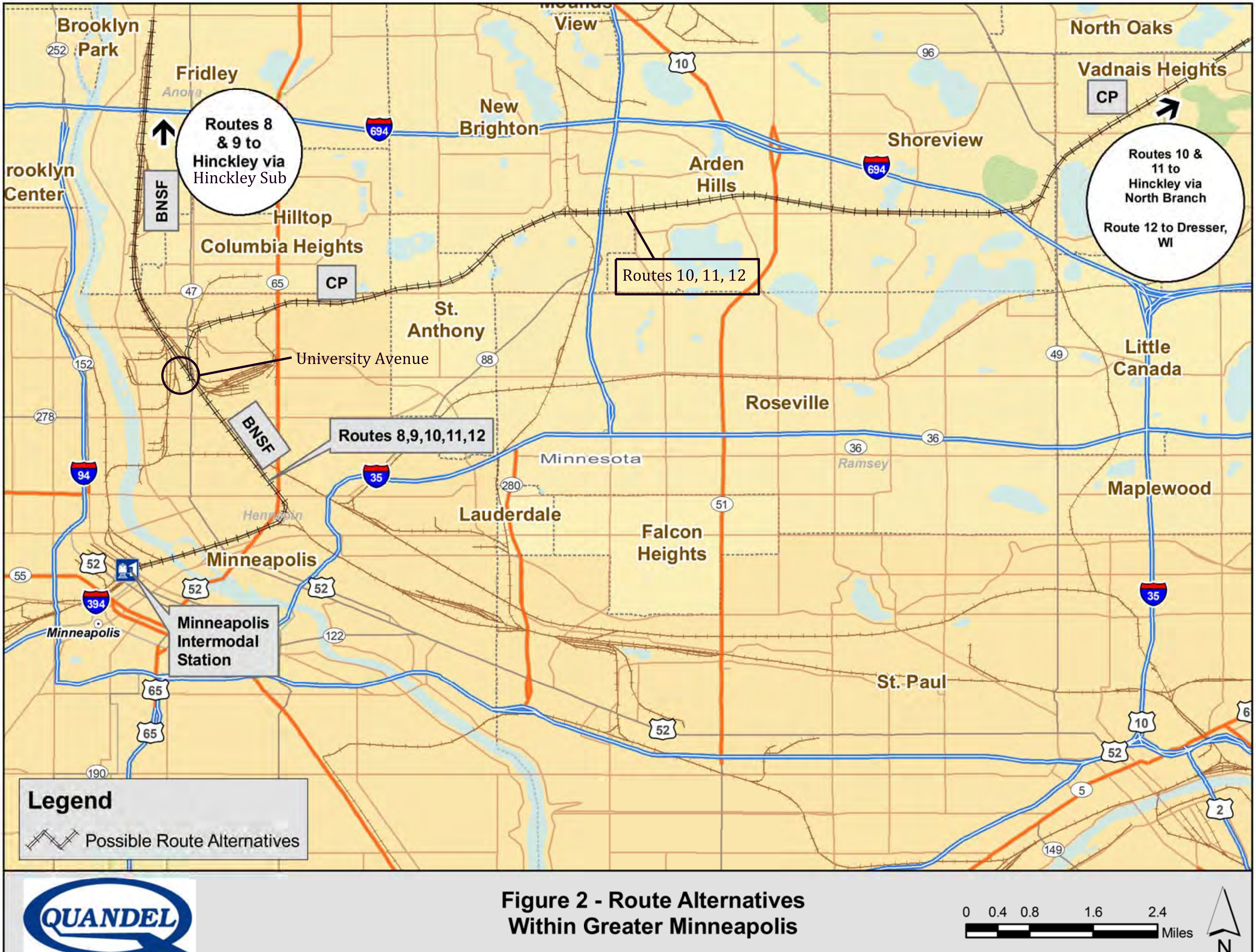


Figure 1
Northern Lights Express Route Alternatives Recommended for Level 1, Step 3 Screening

November 20, 2009



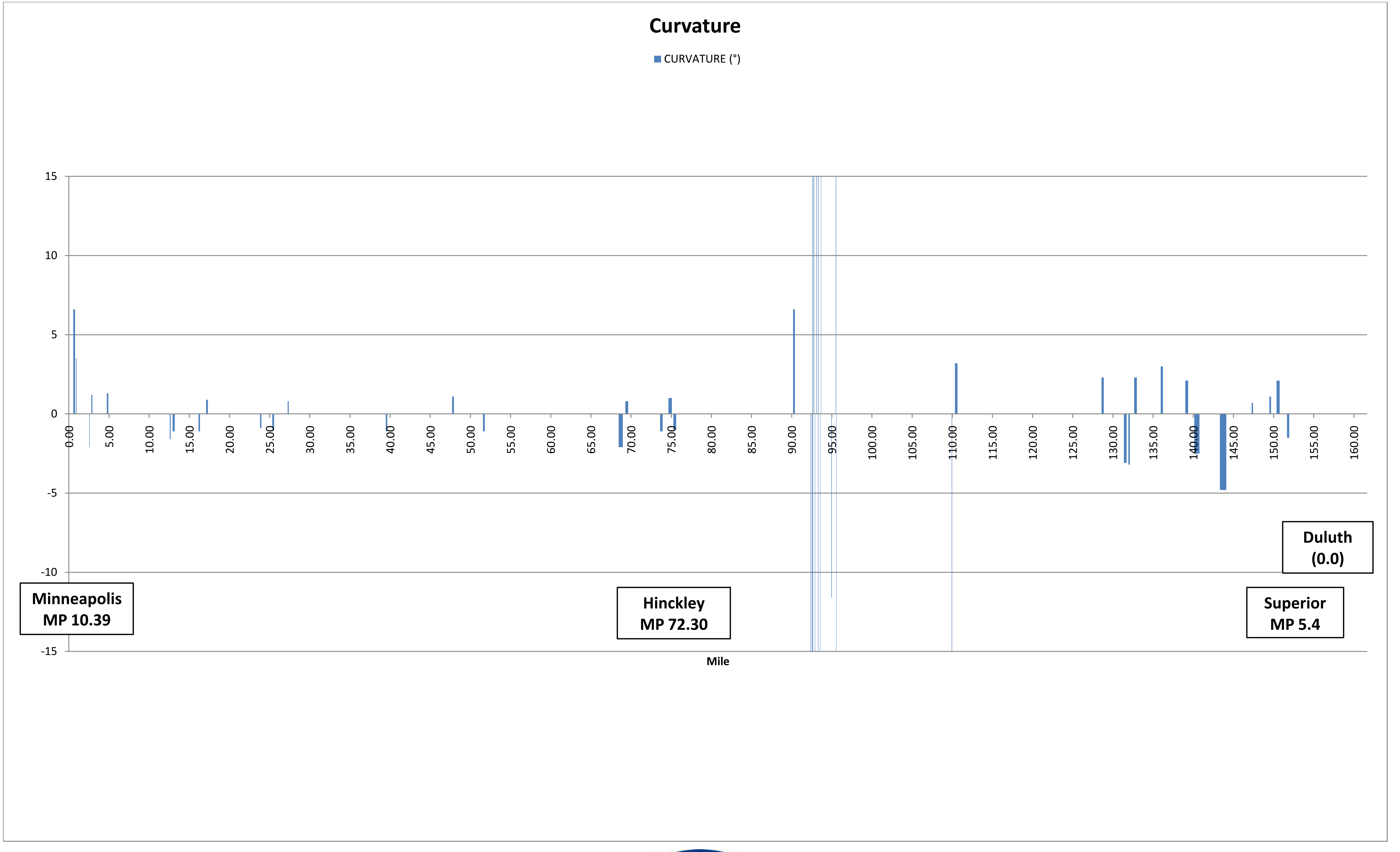
QUANDEL

Figure 2 - Route Alternatives Within Greater Minneapolis

Figure 3 - Route Alternatives Within Greater Duluth

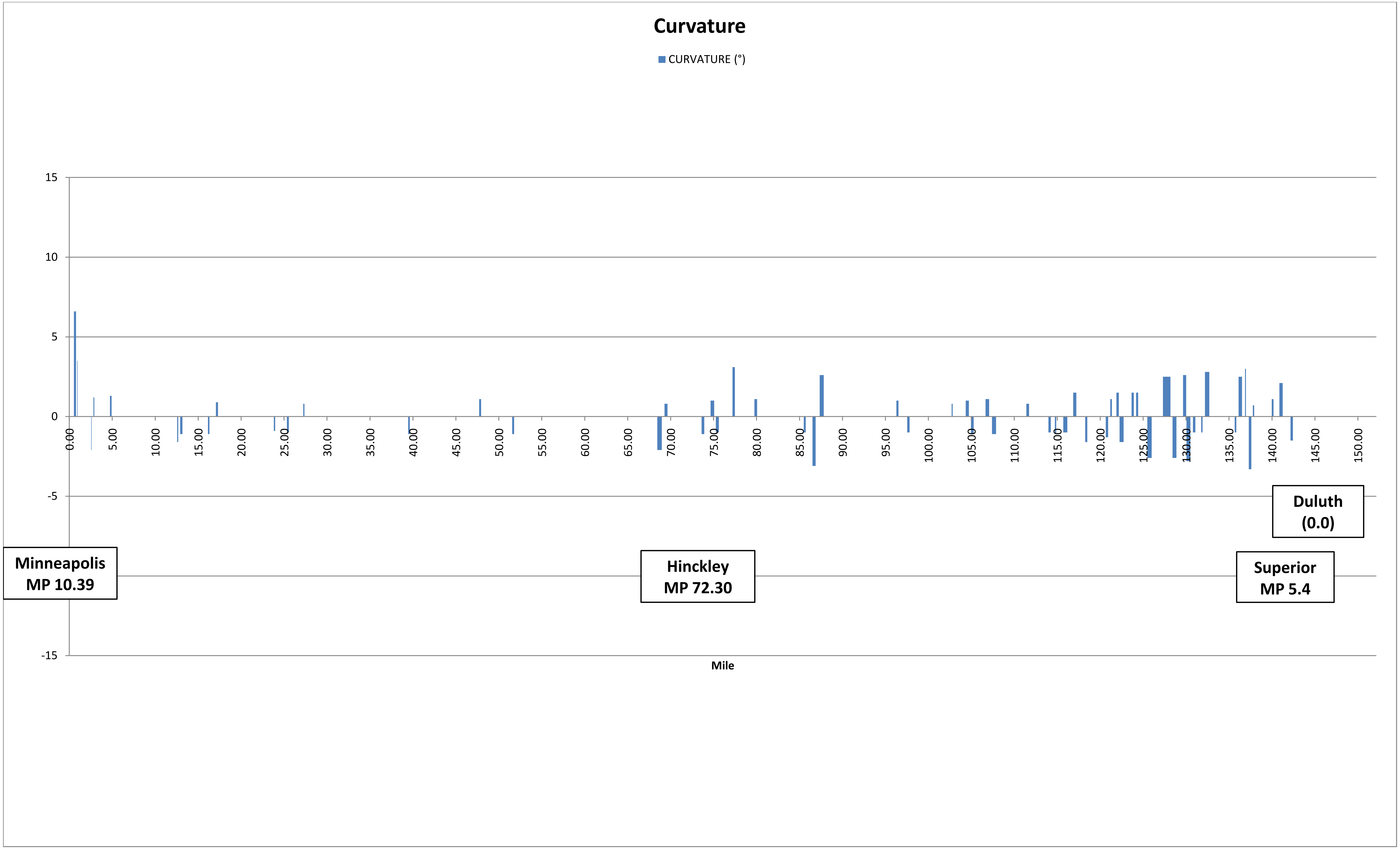
Appendix A
Route Alternatives Speed Profiles

Route #8



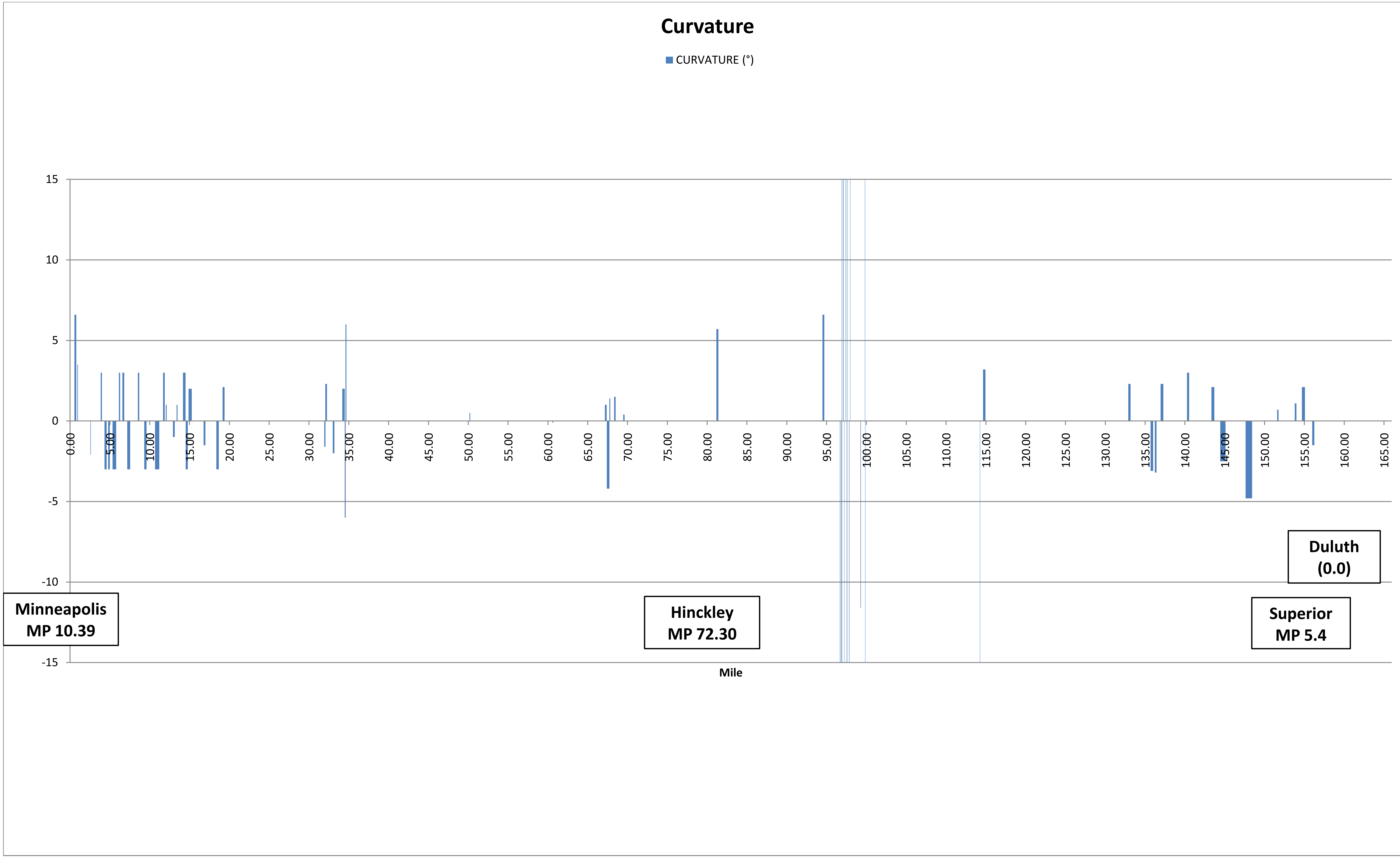
Curvature
CURVATURE (°)
15
10
5
0
-5
-10
-15
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
45.00
50.00
55.00
60.00
65.00
70.00
75.00
80.00
85.00
90.00
95.00
100.00
105.00
110.00
115.00
120.00
125.00
130.00
135.00
140.00
145.00
150.00
155.00
160.00
Mile
Minneapolis
MP 10.39
Hinckley
MP 72.30
Duluth
(0.0)
Superior
MP 5.4

Route #9



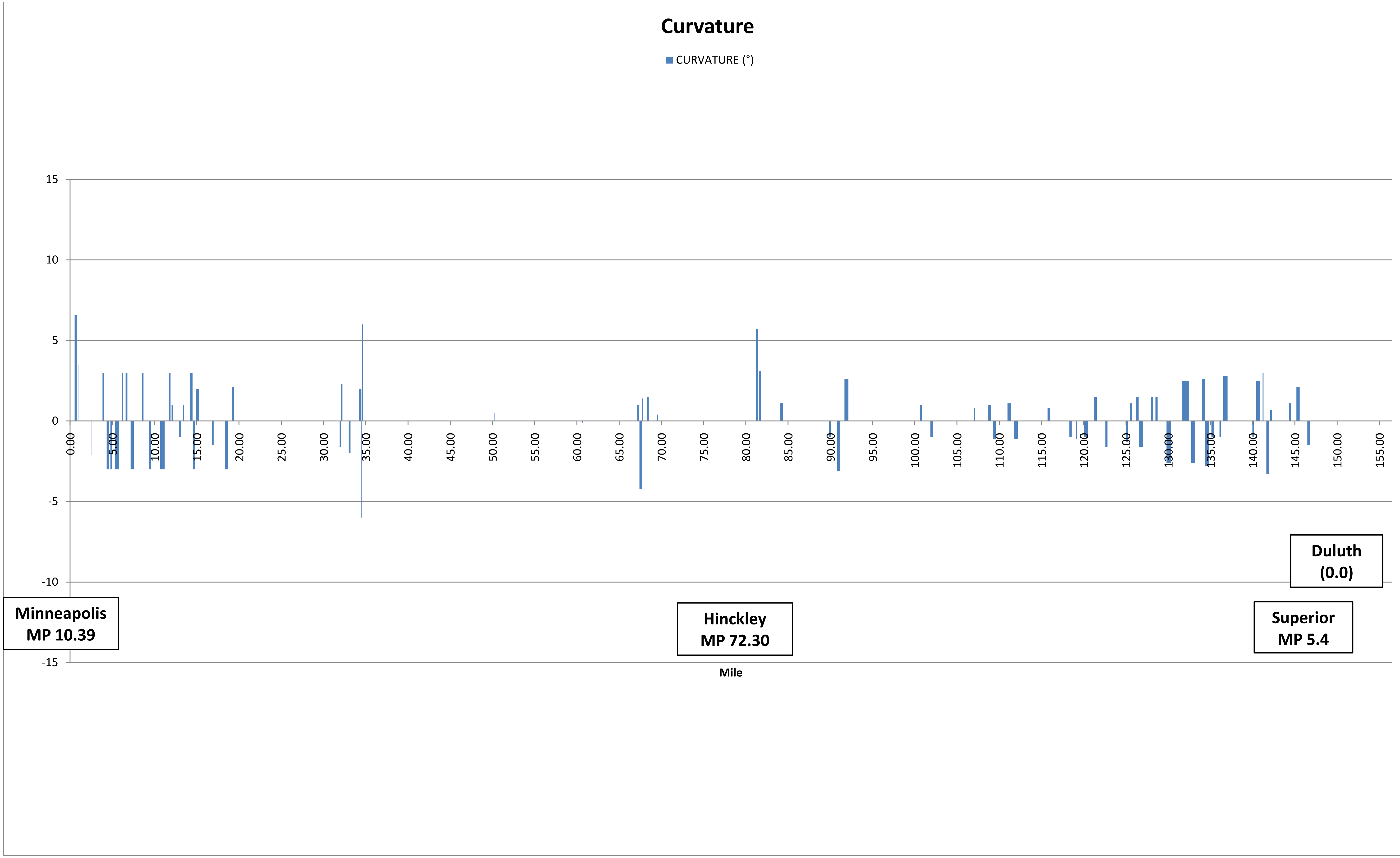
QUANDEL

Route #10

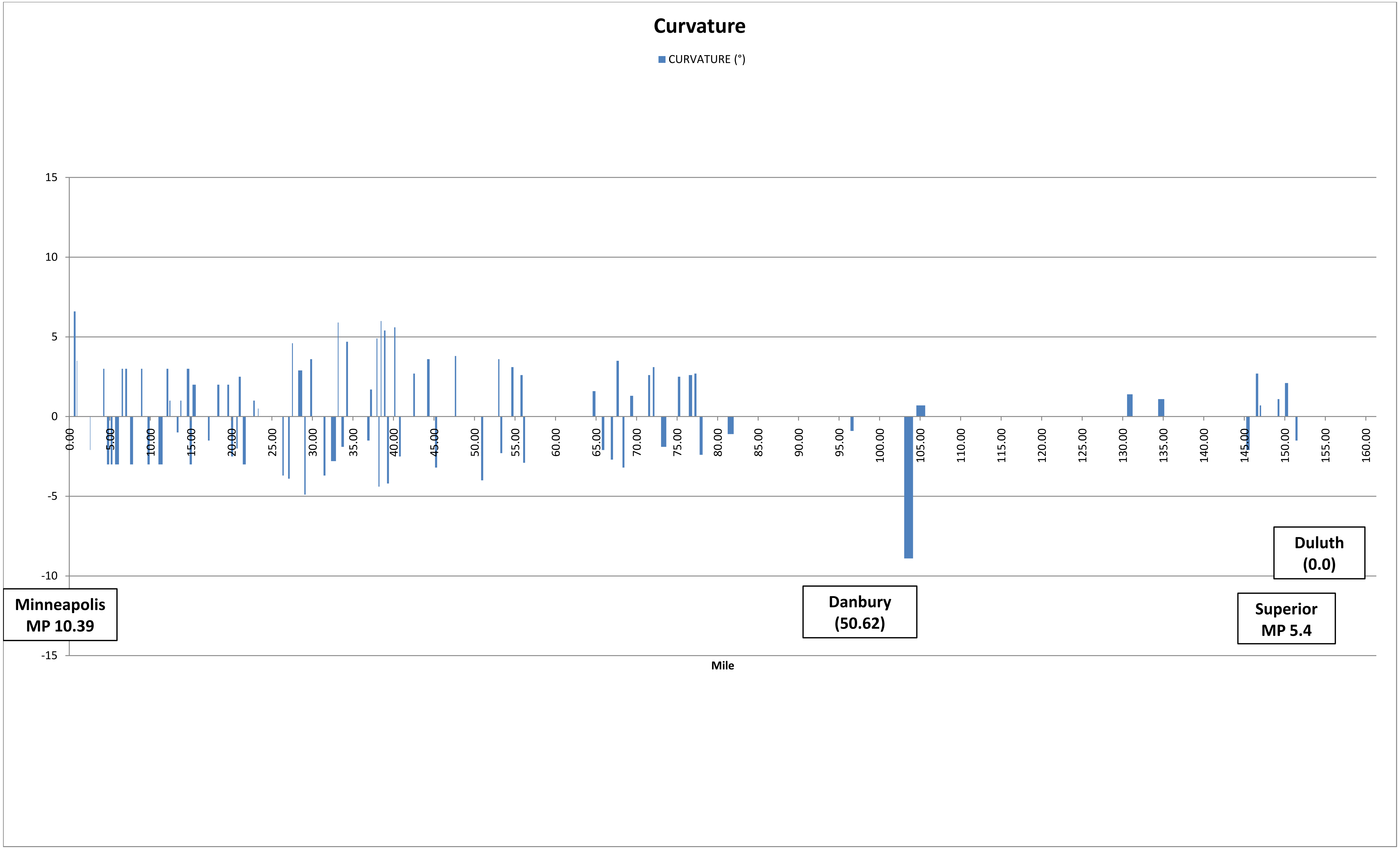


Curvature
CURVATURE (°)
15
10
5
0
-5
-10
-15
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
45.00
50.00
55.00
60.00
65.00
70.00
75.00
80.00
85.00
90.00
95.00
100.00
105.00
110.00
115.00
120.00
125.00
130.00
135.00
140.00
145.00
150.00
155.00
160.00
165.00
Mile
Minneapolis MP 10.39
Hinckley MP 72.30
Duluth (0.0)
Superior MP 5.4

Route #11

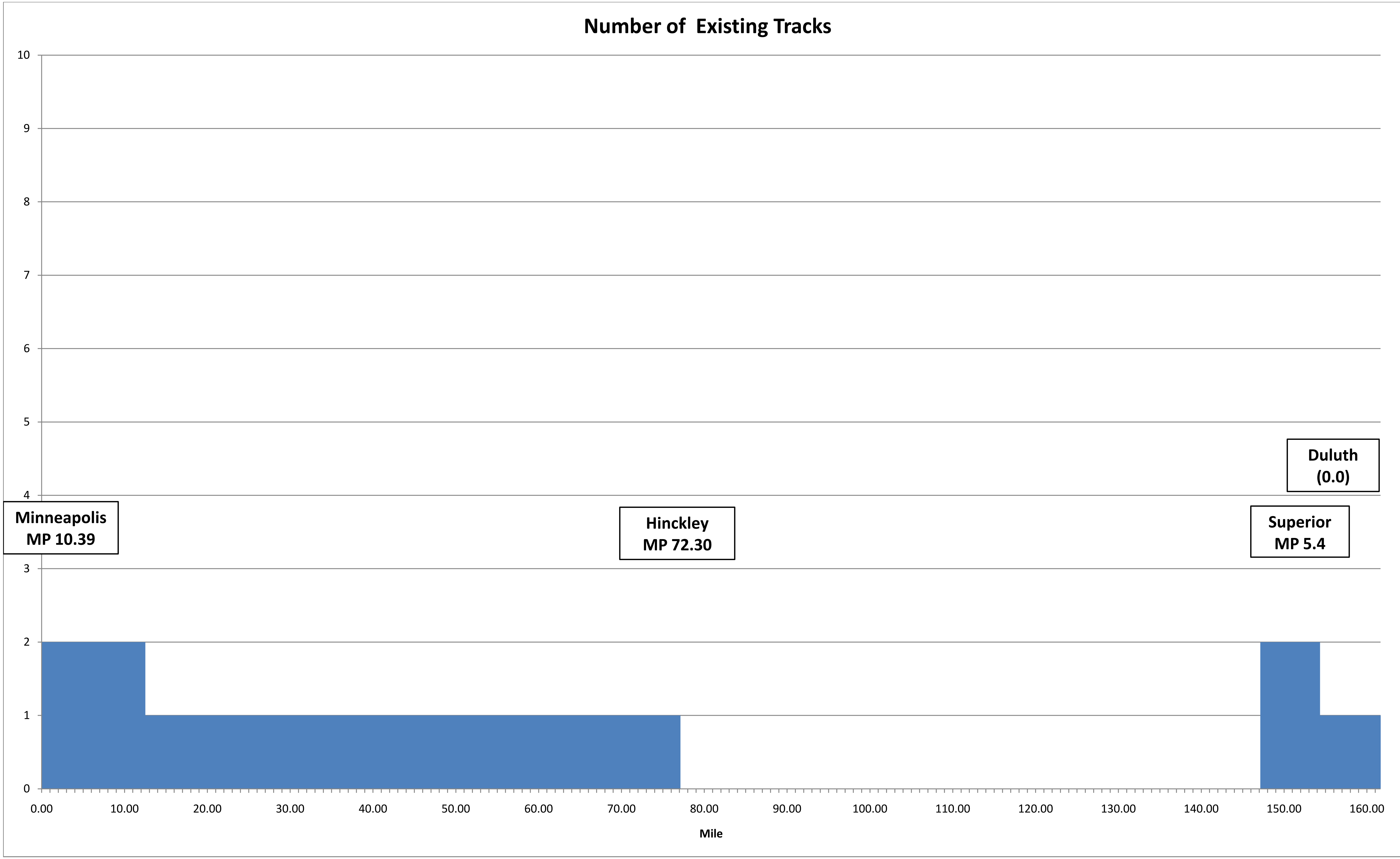

Curvature
CURVATURE (°)
15
10
5
0
-5
-10
-15
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
45.00
50.00
55.00
60.00
65.00
70.00
75.00
80.00
85.00
90.00
95.00
100.00
105.00
110.00
115.00
120.00
125.00
130.00
135.00
140.00
145.00
150.00
155.00
Mile
Minneapolis
MP 10.39
Hinckley
MP 72.30
Duluth
(0.0)
Superior
MP 5.4

Route #12



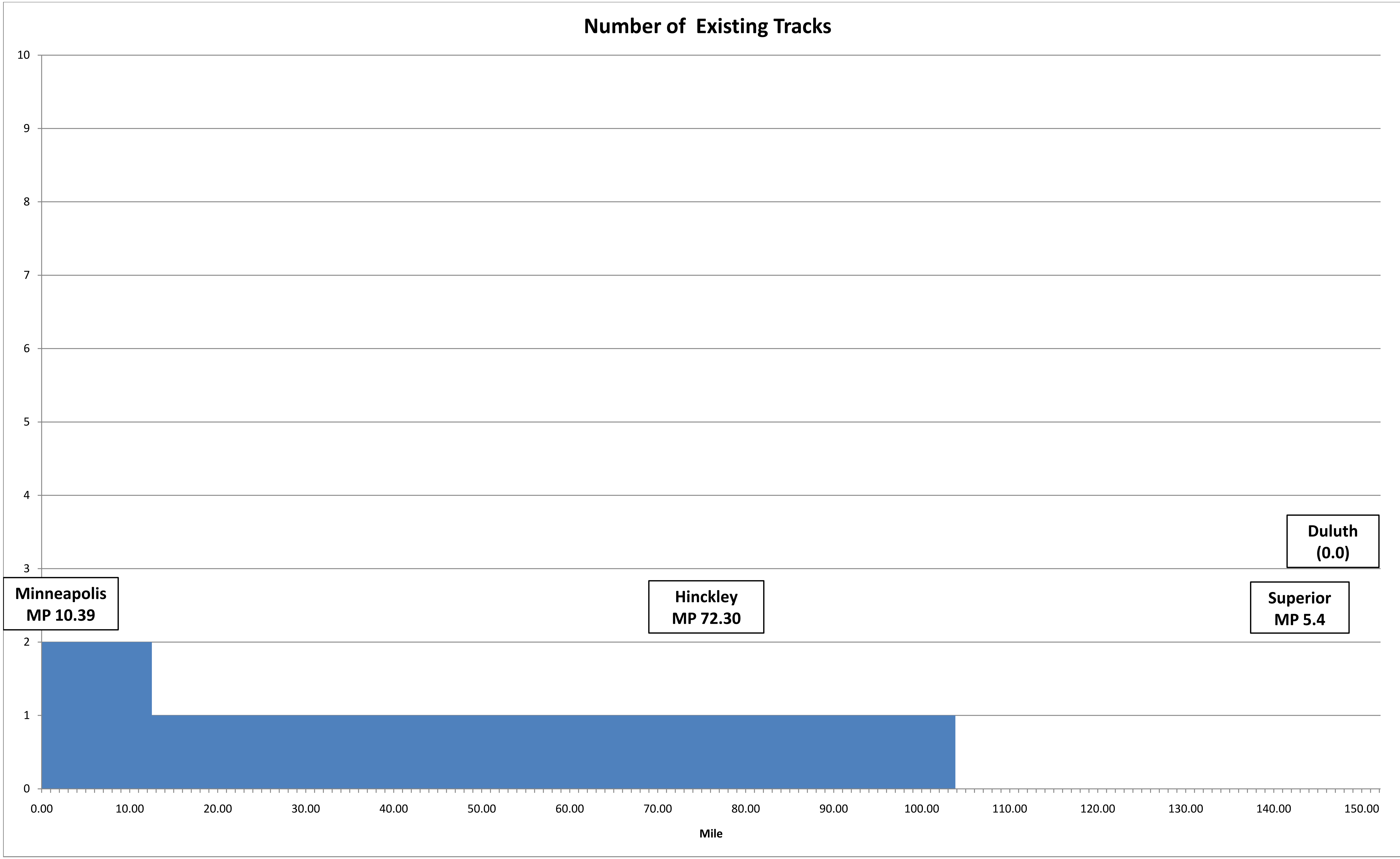
Curvature
CURVATURE (°)
15
10
5
0
-5
-10
-15
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
45.00
50.00
55.00
60.00
65.00
70.00
75.00
80.00
85.00
90.00
95.00
100.00
105.00
110.00
115.00
120.00
125.00
130.00
135.00
140.00
145.00
150.00
155.00
160.00
Mile
Minneapolis
MP 10.39
Danbury
(50.62)
Duluth
(0.0)
Superior
MP 5.4

Route #8



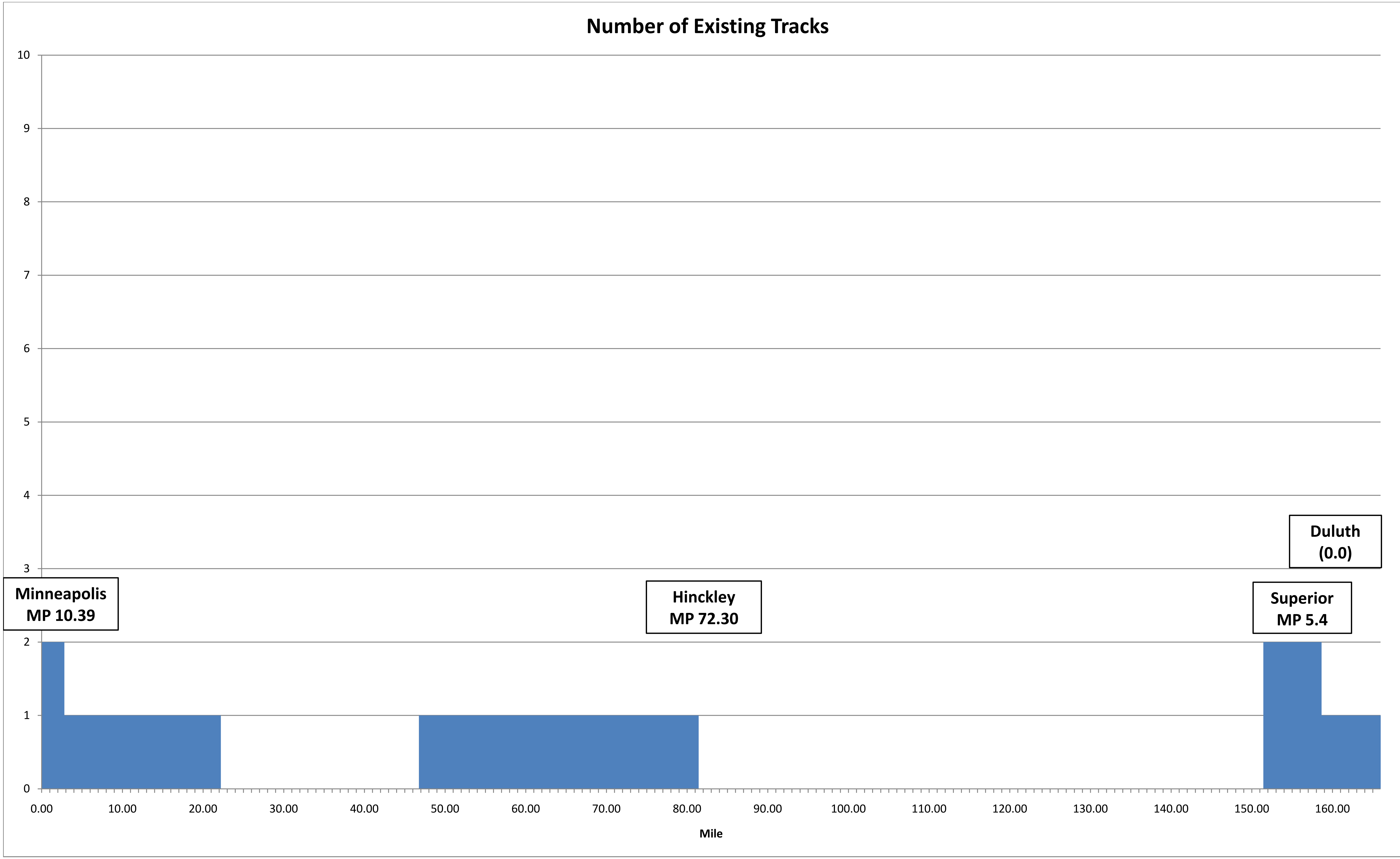
Number of Existing Tracks
10
9
8
7
6
5
4
3
2
1
0
Minneapolis
MP 10.39
Hinckley
MP 72.30
Superior
MP 5.4
Duluth
(0.0)
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
100.00
110.00
120.00
130.00
140.00
150.00
160.00
Mile

Route #9



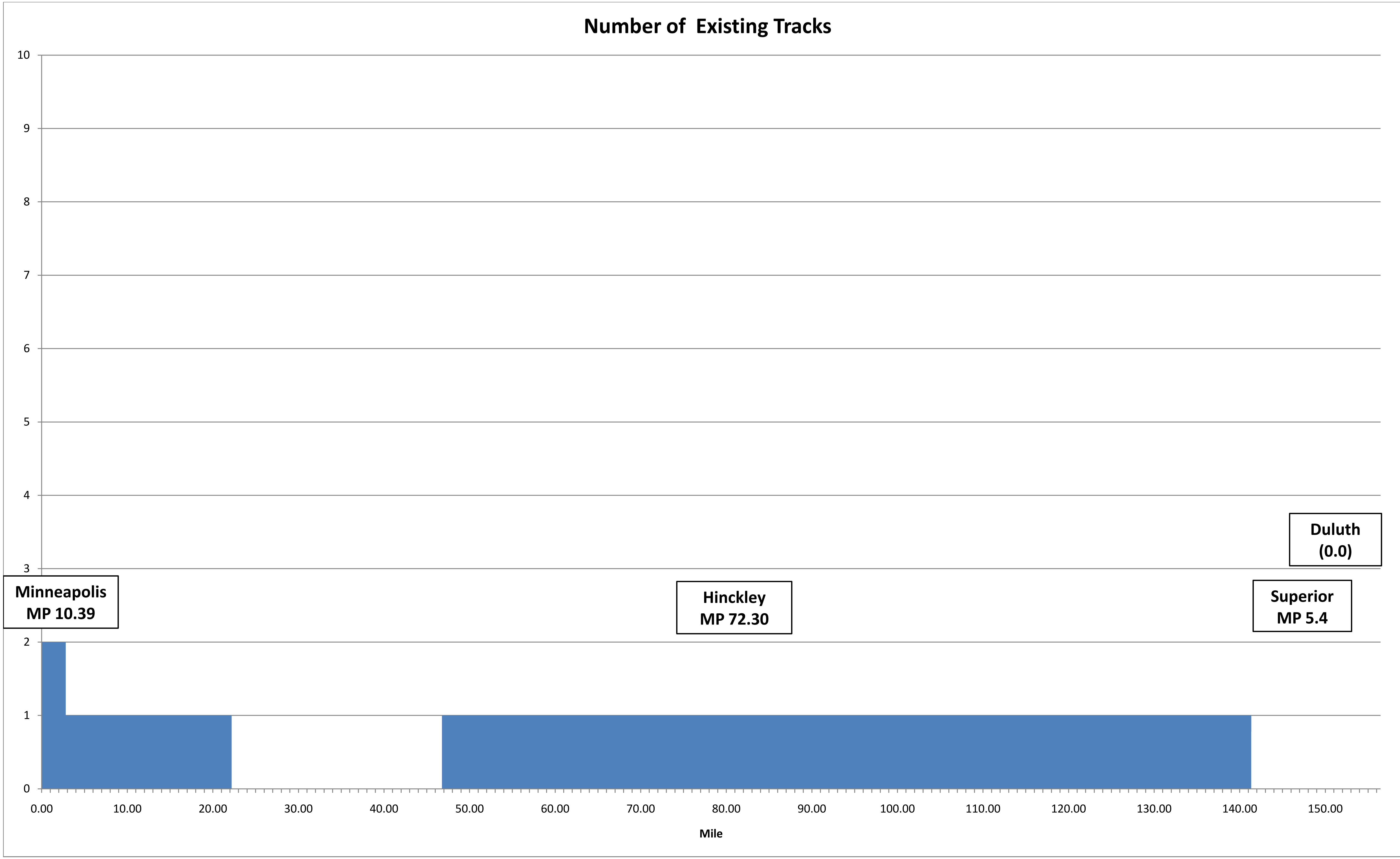
Number of Existing Tracks
10
9
8
7
6
5
4
3
2
1
0
Minneapolis
MP 10.39
Hinckley
MP 72.30
Superior
MP 5.4
Duluth
(0.0)
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
100.00
110.00
120.00
130.00
140.00
150.00
Mile

Route #10

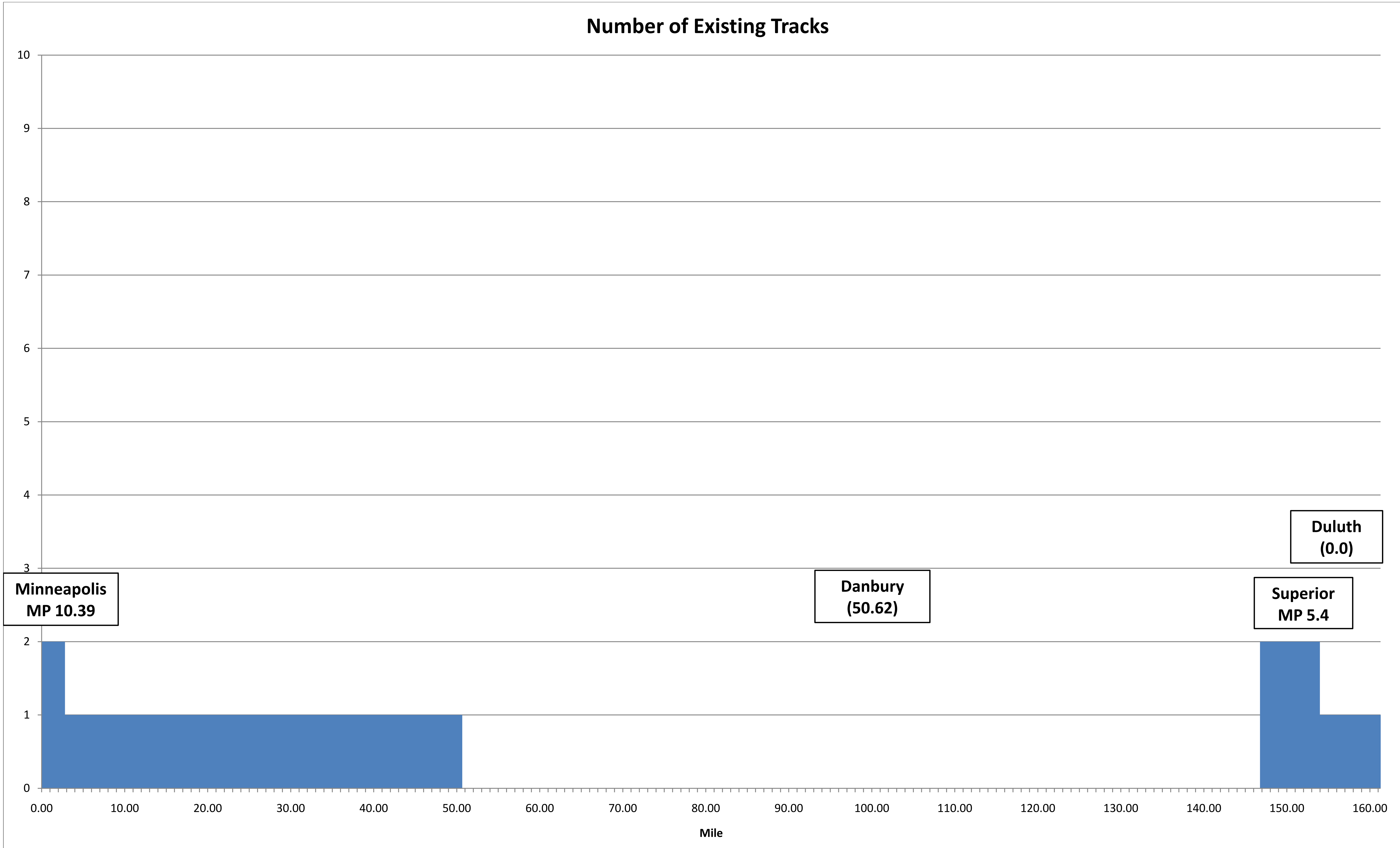


Number of Existing Tracks
10
9
8
7
6
5
4
3
2
1
0
Minneapolis
MP 10.39
Hinckley
MP 72.30
Superior
MP 5.4
Duluth
(0.0)
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
100.00
110.00
120.00
130.00
140.00
150.00
160.00
Mile

Route #11

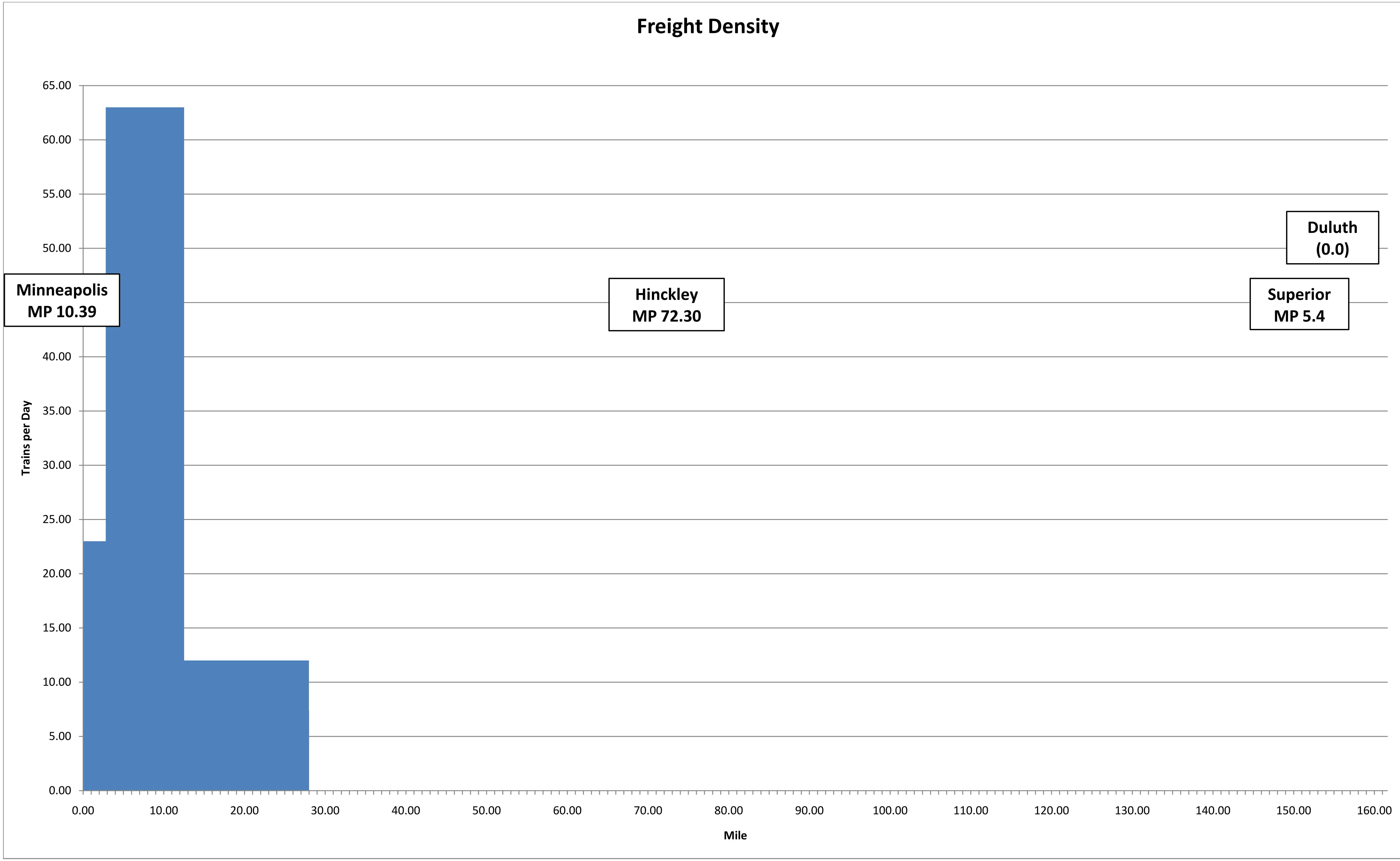

Number of Existing Tracks
10
9
8
7
6
5
4
3
2
1
0
Minneapolis
MP 10.39
Hinckley
MP 72.30
Superior
MP 5.4
Duluth
(0.0)
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
100.00
110.00
120.00
130.00
140.00
150.00
Mile

Route #12



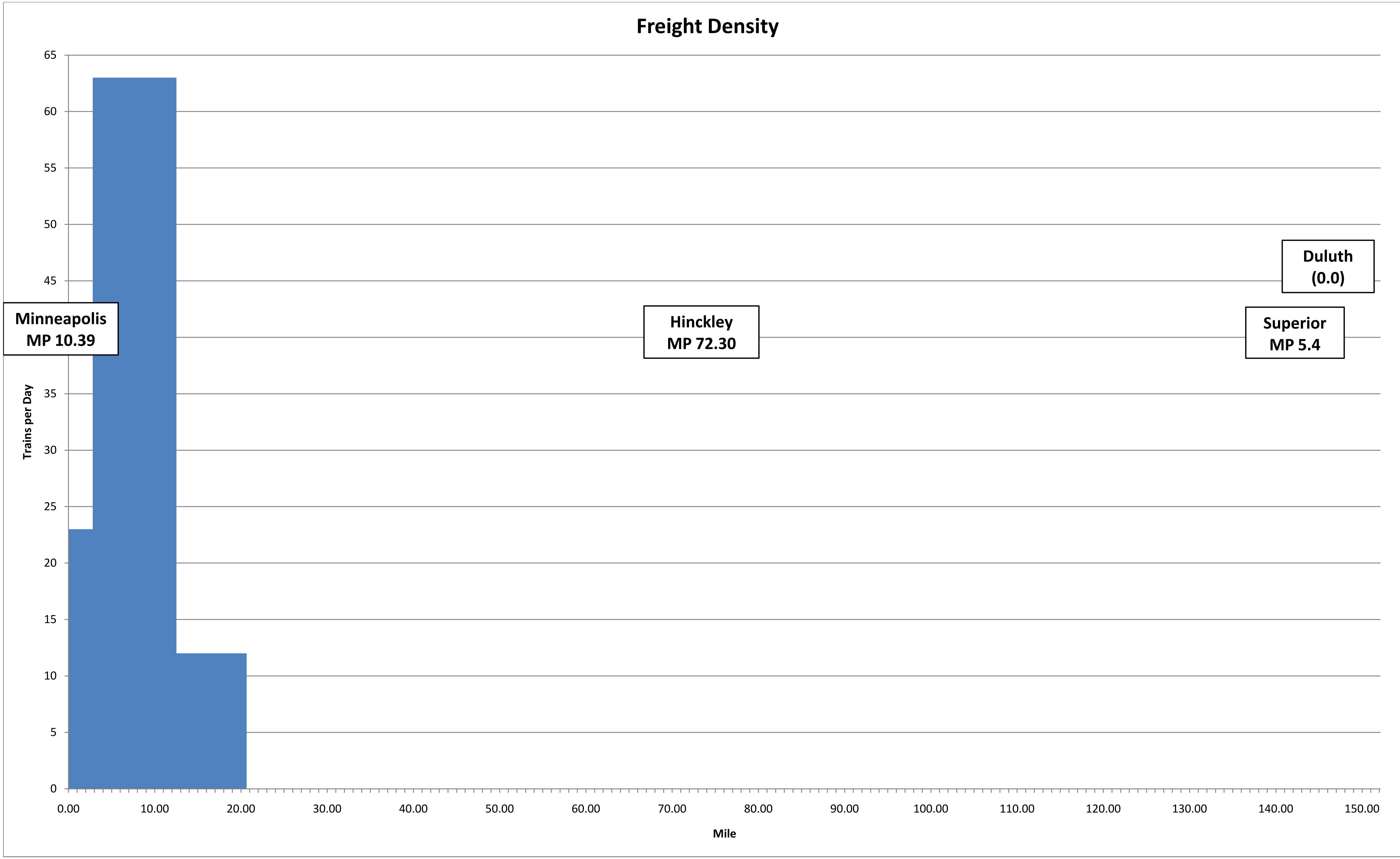
Number of Existing Tracks
10
9
8
7
6
5
4
3
2
1
0
Minneapolis
MP 10.39
Danbury
(50.62)
Duluth
(0.0)
Superior
MP 5.4
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
100.00
110.00
120.00
130.00
140.00
150.00
160.00
Mile

Route #8



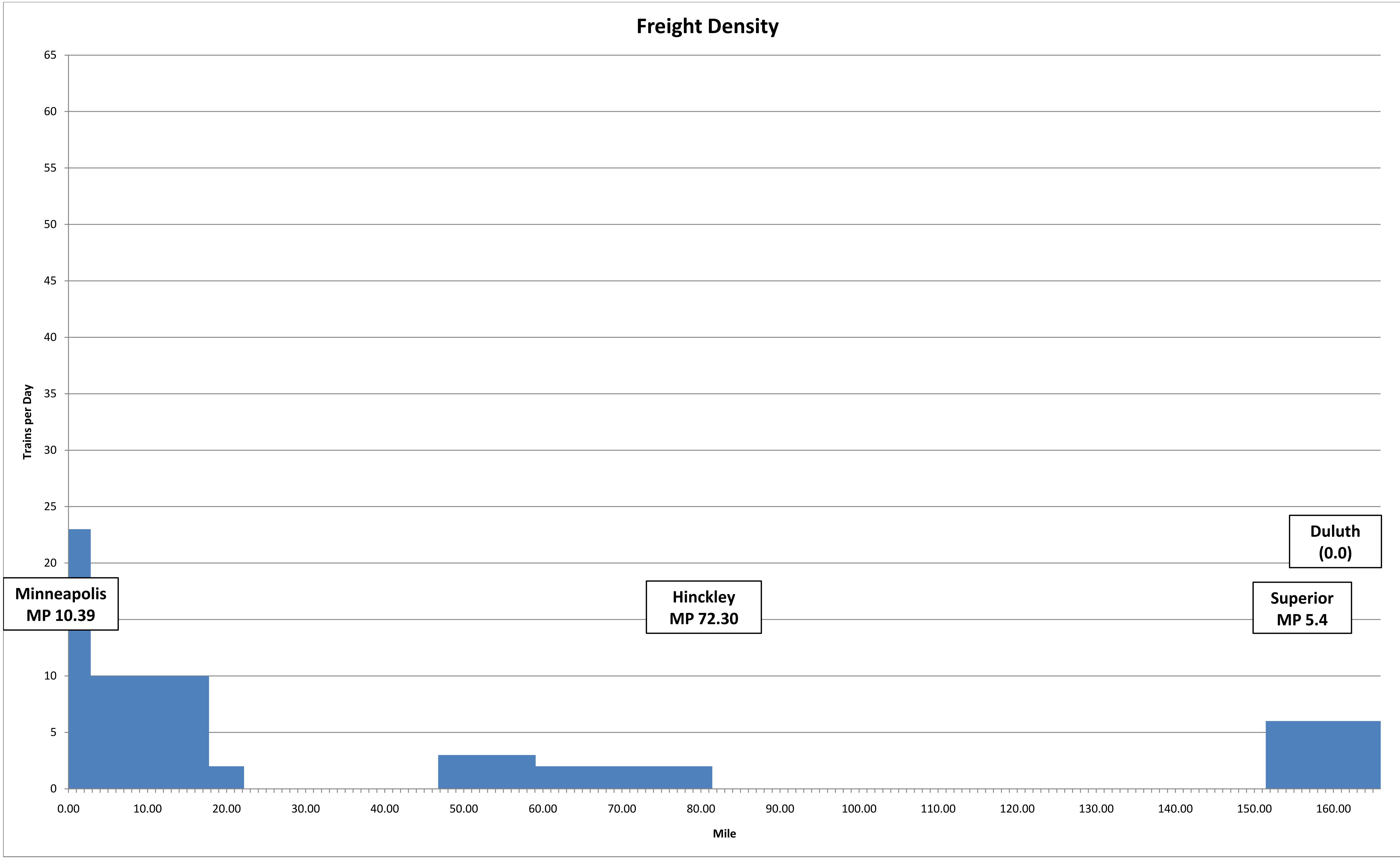
Freight Density
Minneapolis
MP 10.39
Hinckley
MP 72.30
Superior
MP 5.4
Duluth
(0.0)
Trains per Day
Mile
65.00
60.00
55.00
50.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
100.00
110.00
120.00
130.00
140.00
150.00
160.00

Route #9



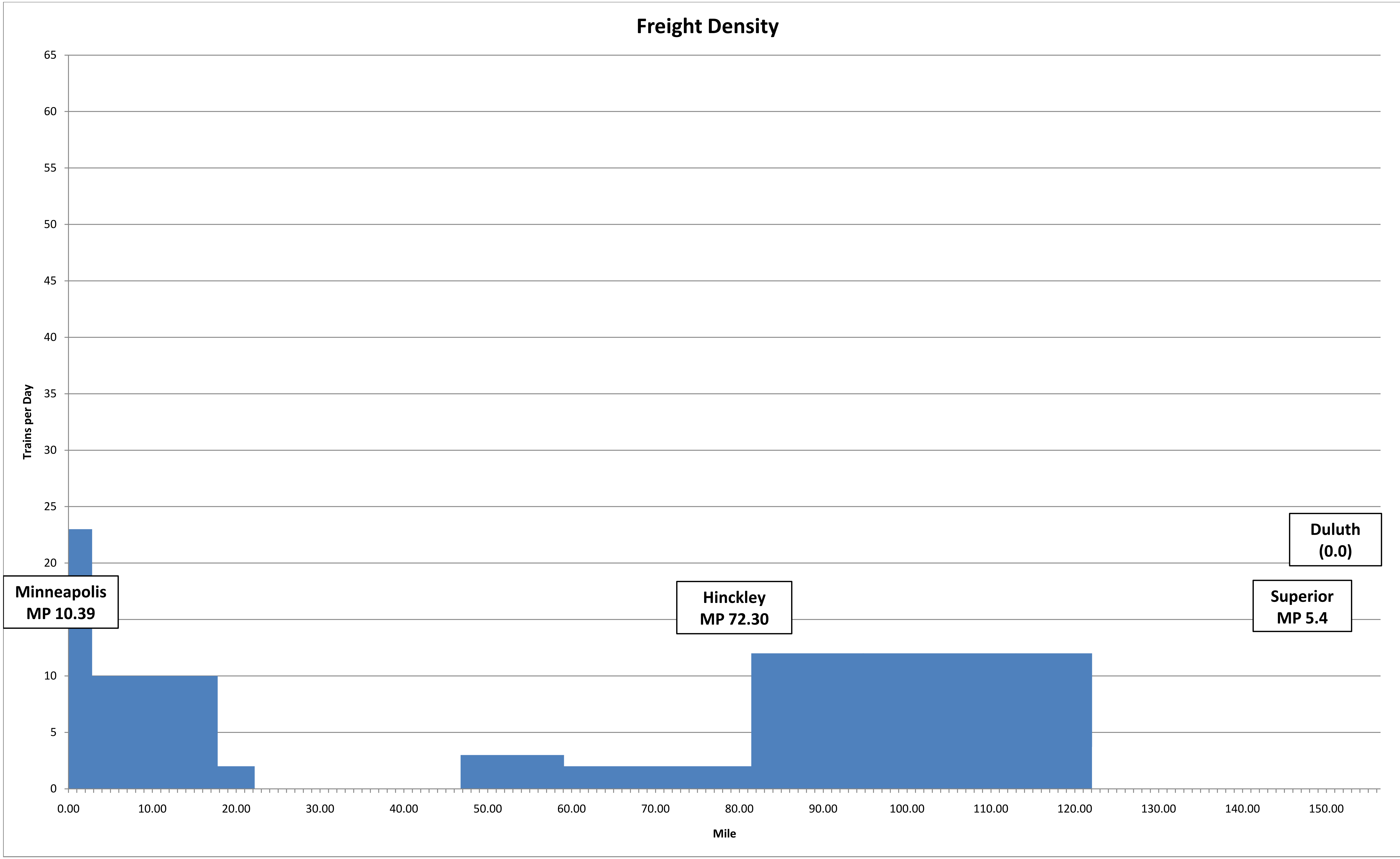
Freight Density
Trains per Day
Mile
Minneapolis
MP 10.39
Hinckley
MP 72.30
Superior
MP 5.4
Duluth
(0.0)
0 5 10 15 20 25 30 35 45 50 55 60 65
0.00 10.00 20.00 30.00 40.00 50.00 60.00 70.00 80.00 90.00 100.00 110.00 120.00 130.00 140.00 150.00

Route #10



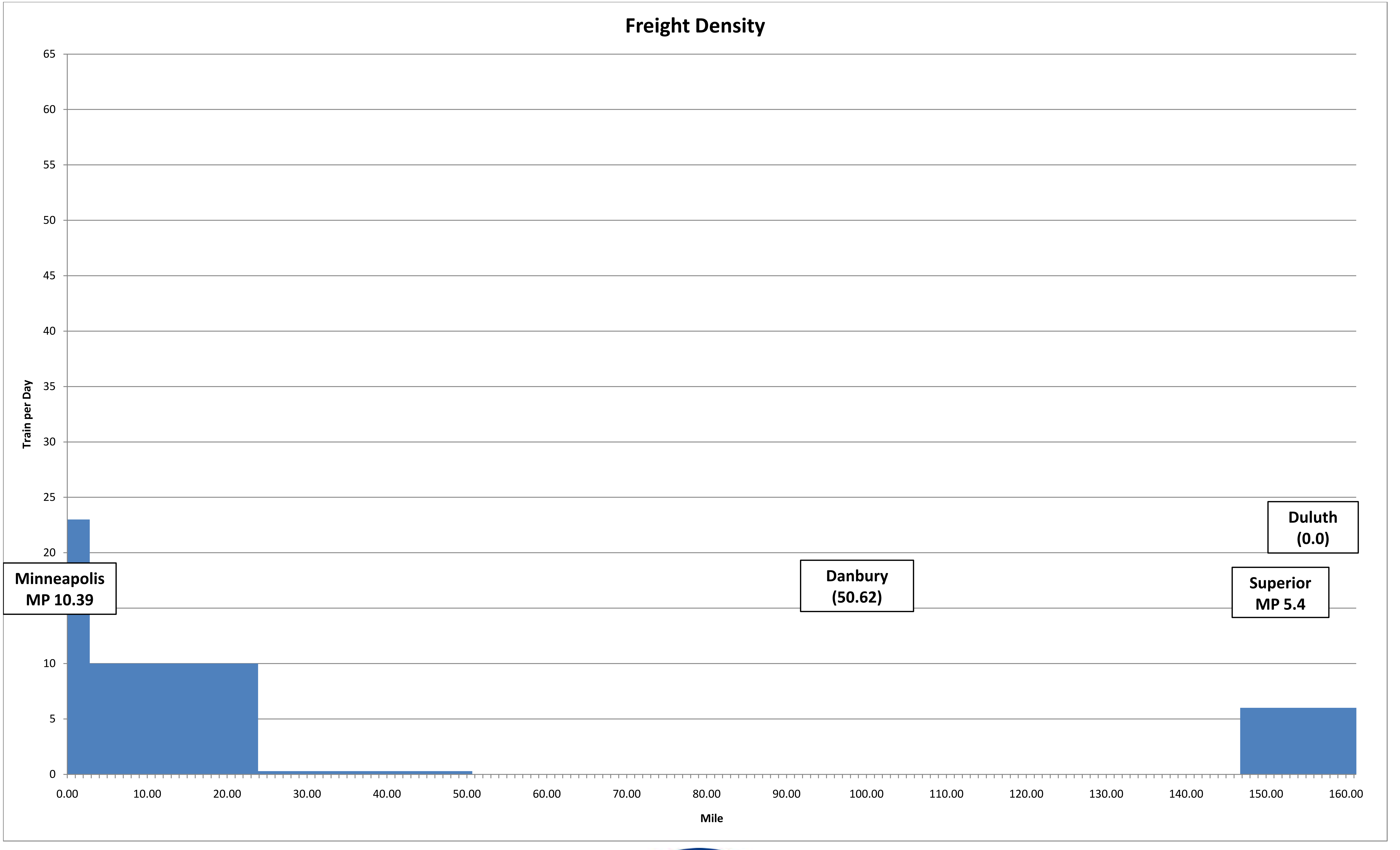
Freight Density
Trains per Day
65
60
55
50
45
40
35
30
25
20
10
5
0
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
100.00
110.00
120.00
130.00
140.00
150.00
160.00
Mile
Minneapolis MP 10.39
Hinckley MP 72.30
Duluth (0.0)
Superior MP 5.4

Route #11



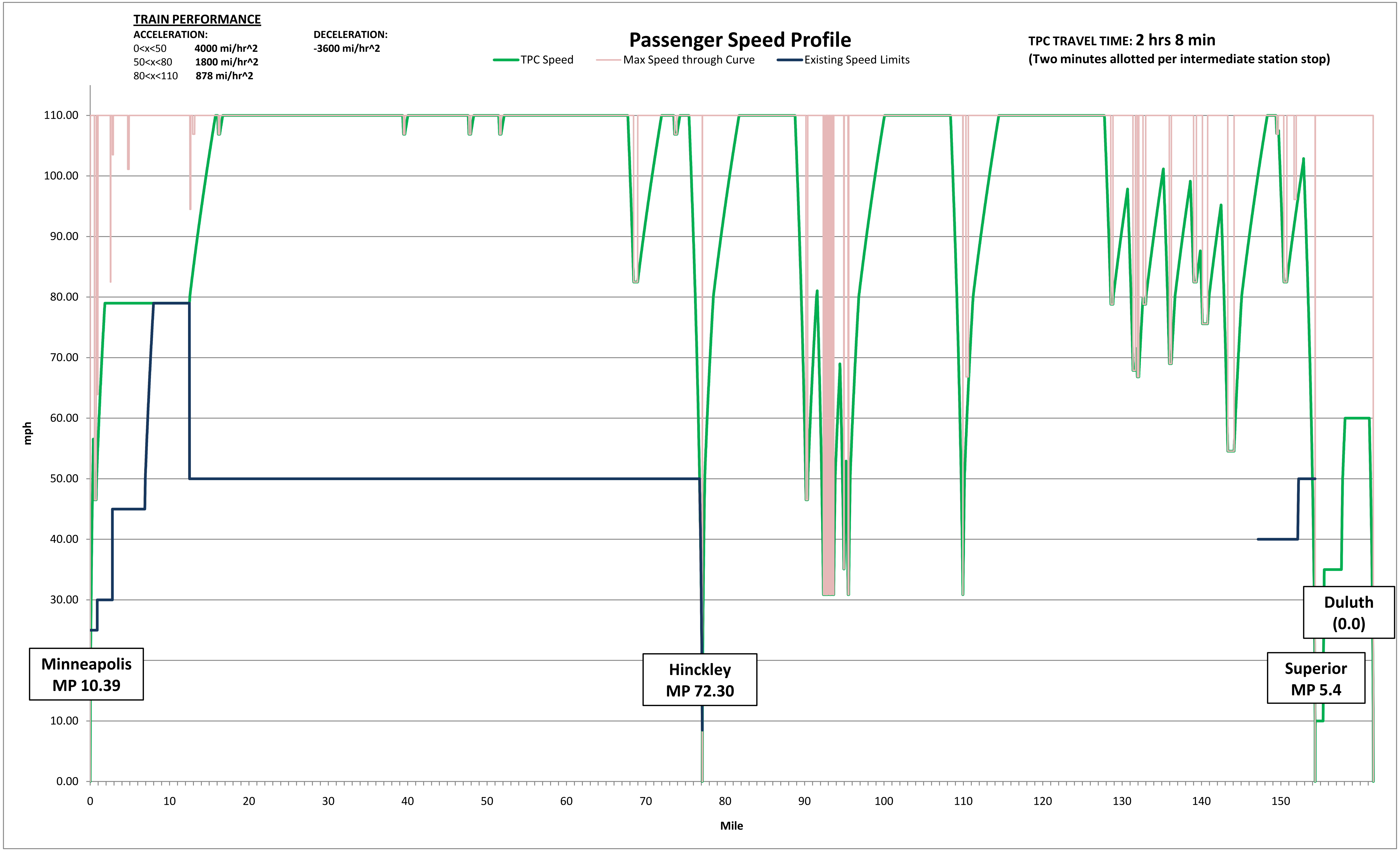
Freight Density
Trains per Day
65
60
55
50
45
40
35
30
25
20
10
5
0
Duluth
(0.0)
Minneapolis
MP 10.39
Hinckley
MP 72.30
Superior
MP 5.4
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
100.00
110.00
120.00
130.00
140.00
150.00
Mile

Route #12



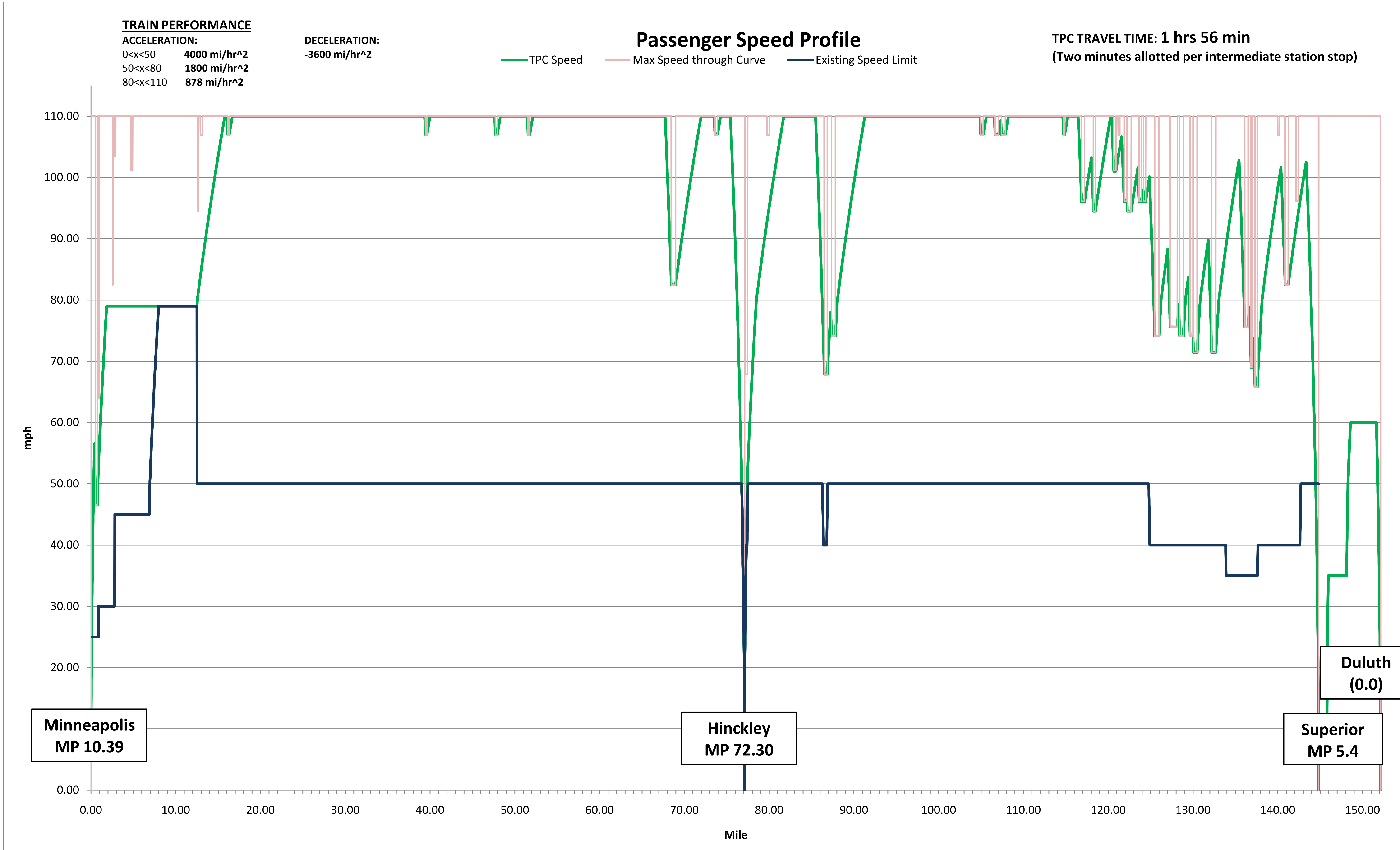
Freight Density
Train per Day
65
60
55
50
45
40
35
30
25
20
10
5
0
Minneapolis
MP 10.39
Danbury
(50.62)
Duluth
(0.0)
Superior
MP 5.4
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
100.00
110.00
120.00
130.00
140.00
150.00
160.00
Mile

Route #8



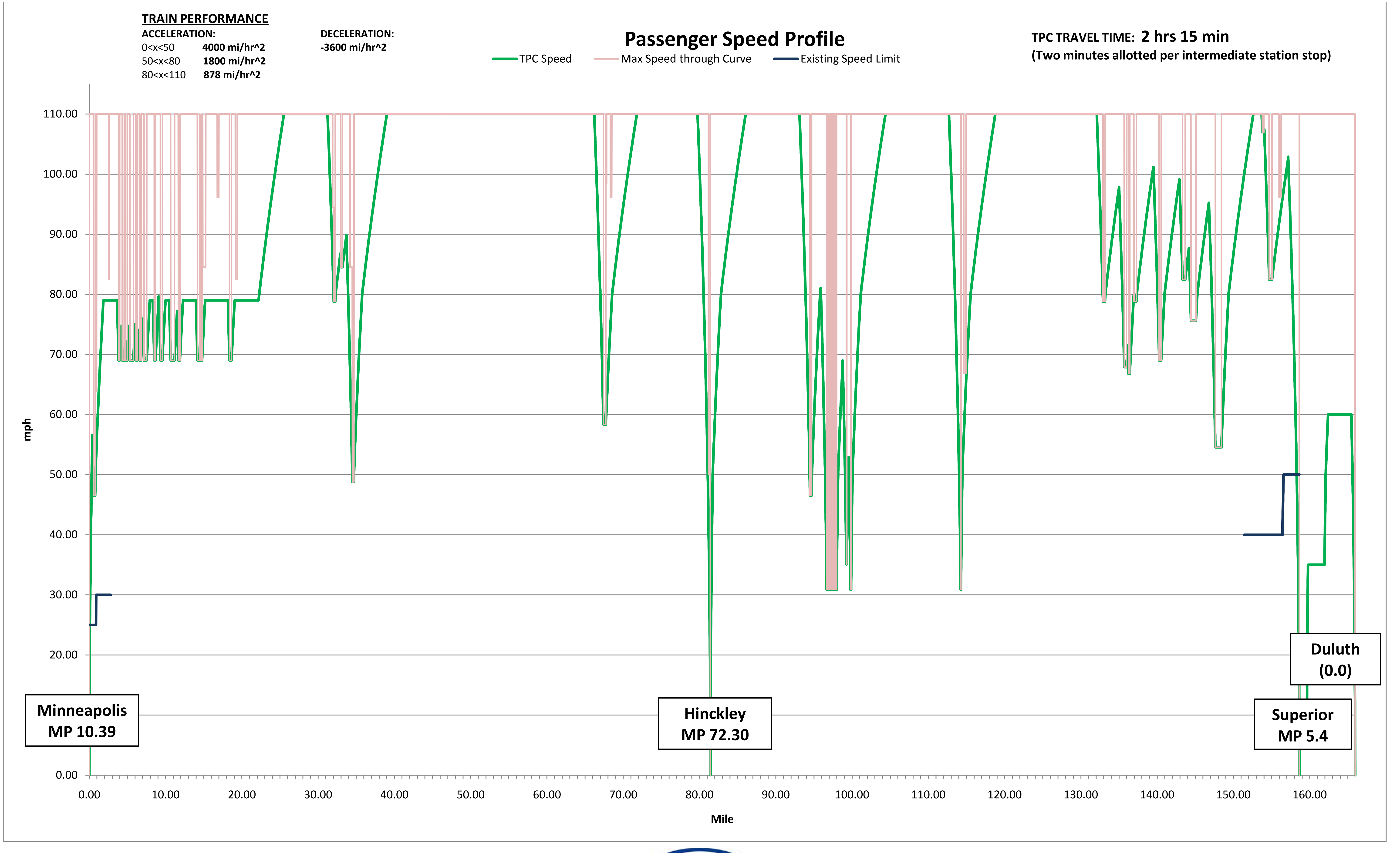
TRAIN PERFORMANCE
ACCELERATION:
0<x<50 4000 mi/hr^2
50<x<80 1800 mi/hr^2
80<x<110 878 mi/hr^2
DECELERATION:
-3600 mi/hr^2
Passenger Speed Profile
TPC Speed
Max Speed through Curve
Existing Speed Limits
TPC TRAVEL TIME: 2 hrs 8 min
(Two minutes allotted per intermediate station stop)
mph
0.00
10.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
100.00
110.00
Minneapolis MP 10.39
Hinckley MP 72.30
Superior MP 5.4
Duluth (0.0)
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
Mile

Route #9



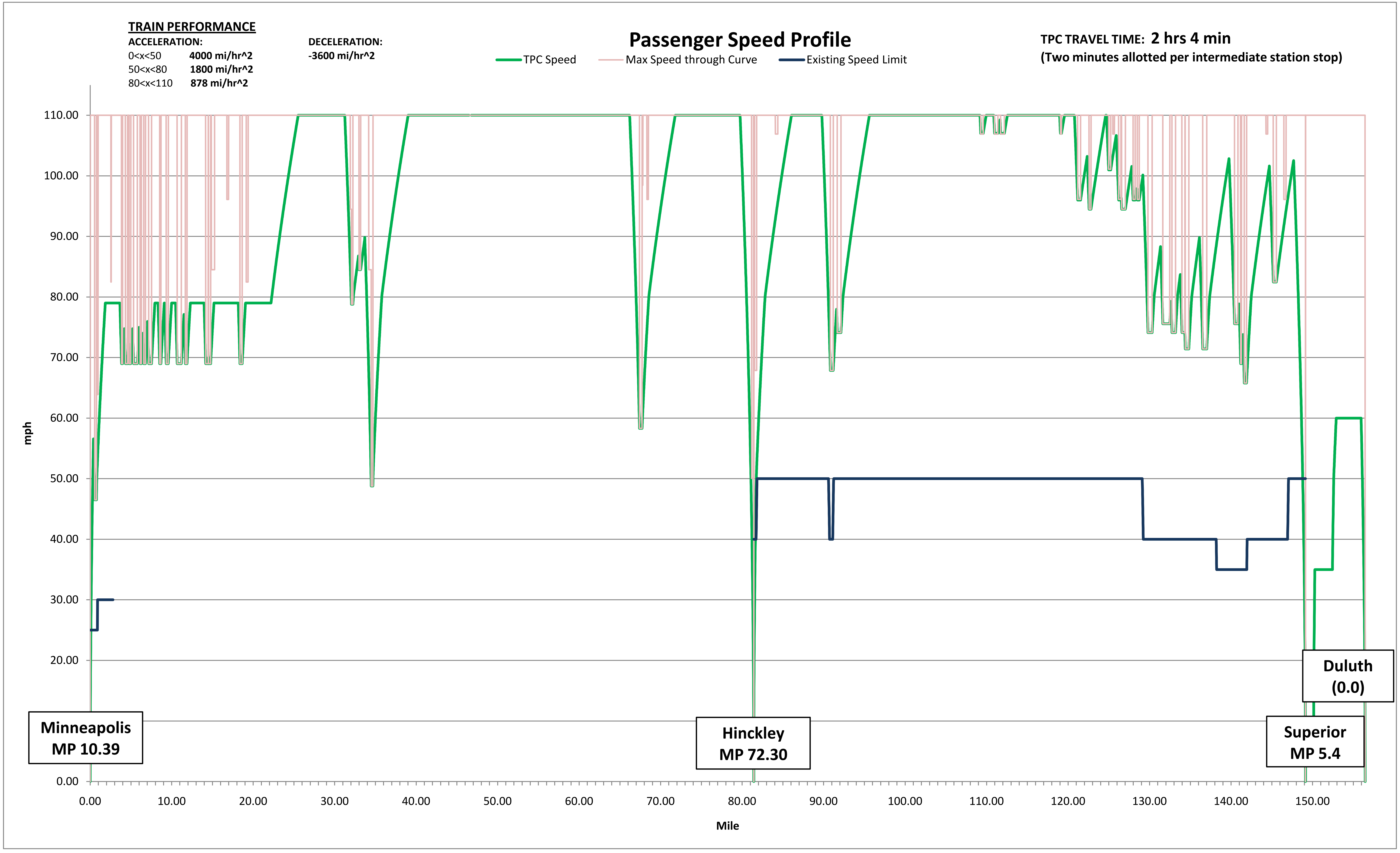
TRAIN PERFORMANCE
ACCELERATION:
0<x<50 4000 mi/hr^2
50<x<80 1800 mi/hr^2
80<x<110 878 mi/hr^2
DECELERATION:
-3600 mi/hr^2
Passenger Speed Profile
TPC Speed
Max Speed through Curve
Existing Speed Limit
TPC TRAVEL TIME: 1 hrs 56 min
(Two minutes allotted per intermediate station stop)
mph
Mile
Minneapolis MP 10.39
Hinckley MP 72.30
Superior MP 5.4
Duluth (0.0)

Route #10



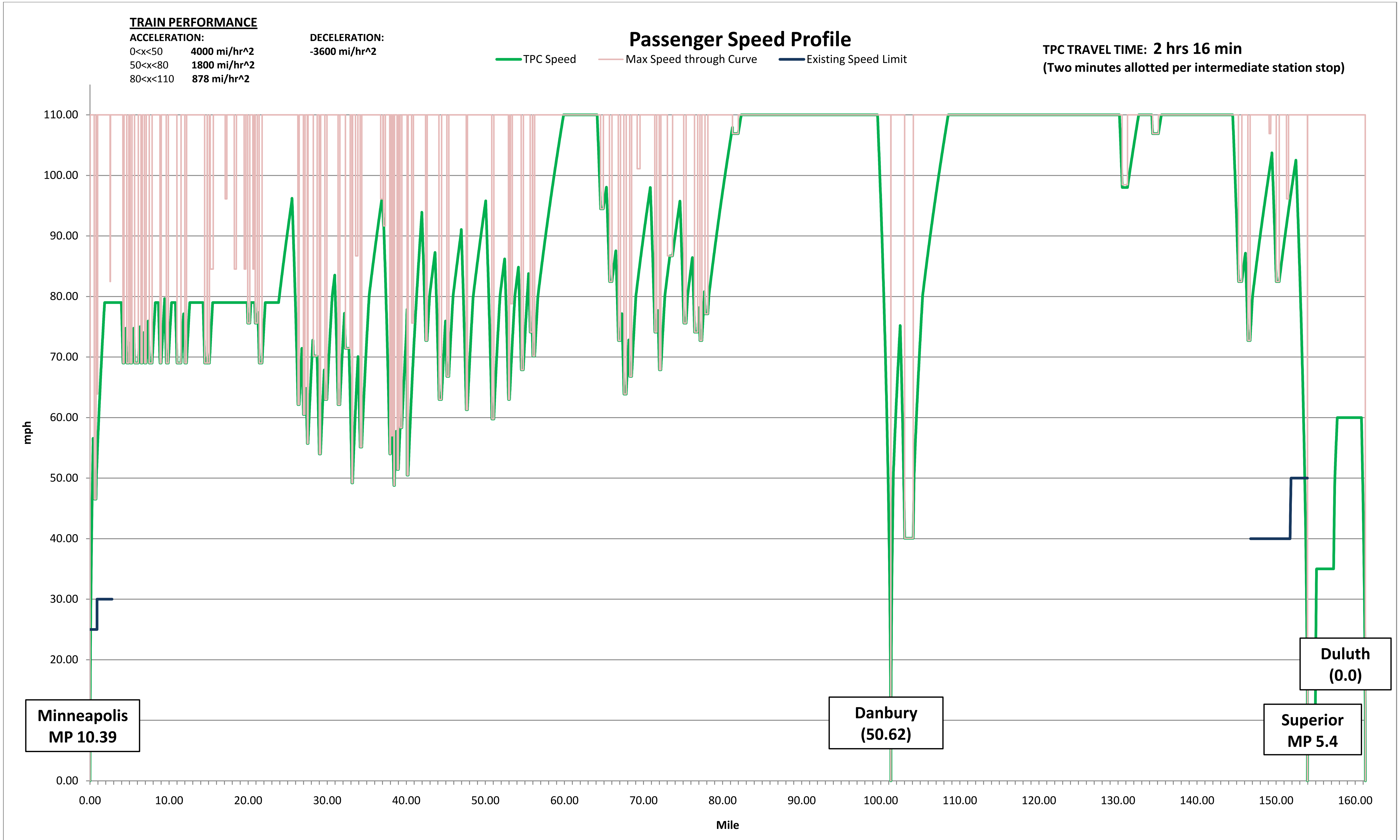
TRAIN PERFORMANCE
ACCELERATION:
0<x<50 4000 mi/hr^2
50<x<80 1800 mi/hr^2
80<x<110 878 mi/hr^2
DECELERATION:
-3600 mi/hr^2
Passenger Speed Profile
TPC Speed
Max Speed through Curve
Existing Speed Limit
TPC TRAVEL TIME: 2 hrs 15 min
(Two minutes allotted per intermediate station stop)
mph
Mile
Minneapolis MP 10.39
Hinckley MP 72.30
Superior MP 5.4
Duluth (0.0)

Route #11



TRAIN PERFORMANCE
ACCELERATION:
0<x<50 4000 mi/hr^2
50<x<80 1800 mi/hr^2
80<x<110 878 mi/hr^2
DECELERATION:
-3600 mi/hr^2
Passenger Speed Profile
TPC Speed
Max Speed through Curve
Existing Speed Limit
TPC TRAVEL TIME: 2 hrs 4 min
(Two minutes allotted per intermediate station stop)
mph
110.00
100.00
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
0.00
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
100.00
110.00
120.00
130.00
140.00
150.00
Mile
Minneapolis MP 10.39
Hinckley MP 72.30
Superior MP 5.4
Duluth (0.0)

Route #12



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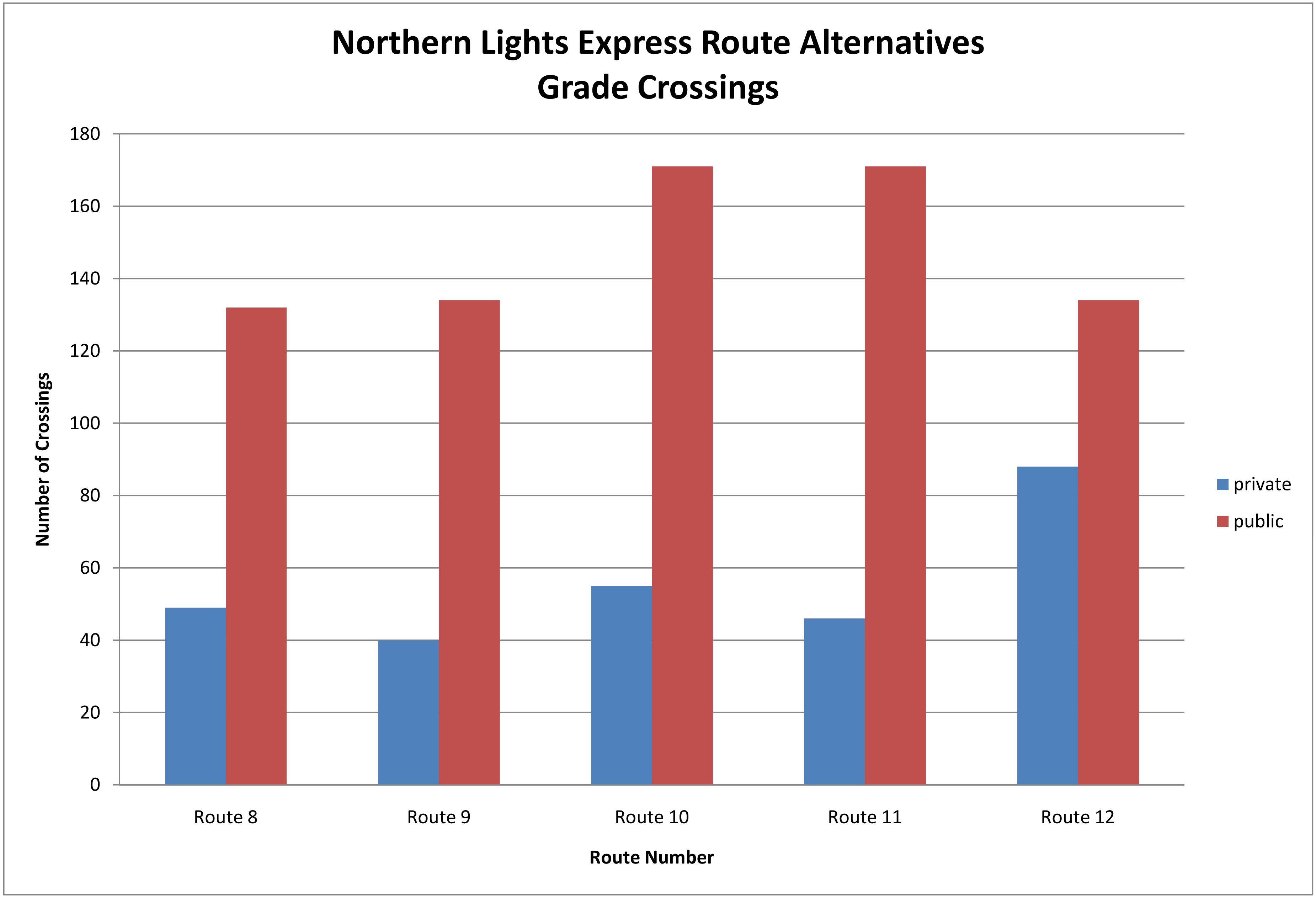
Northern Lights Express Route Alternatives
Grade Crossings
Number of Crossings
180
160
140
120
100
80
60
40
20
0
Route 8
Route 9
Route 10
Route 11
Route 12
Route Number
private
public

Quandel Consultants, LLC
Engineering Services
203 North LaSalle Street, Suite 2100
Chicago, IL 60601
(312) 558-1345
Fax: (312) 346-9603
E-Mail: cquandel@quandelconsultants.com
www.quandel.com

Technical Memorandum

Subject:	**Minnesota Northern Lights Express Project** **Alternatives Analysis – Level 1, Step 3 Screening** **Technical Memorandum 4 – Intermodal Stations**
Prepared For:	**SRF Consulting Group, Inc.**
Prepared By:	**Quandel Consultants, LLC**
CC:	
Date:	**November 20, 2009**

Purpose

This technical memorandum provides information to the participants of the engineering planning charrette or interactive workshop on intermodal terminal/station opportunities for the five routes that remain in the Minneapolis-Duluth/Superior Northern Lights Express (NLX) Alternatives Analysis.

Intermodal Stations

1. *Minneapolis/St. Paul Region*

Two sites in the cities of Minneapolis and St. Paul region are identified as possible intermodal sites that could serve the NLX.

1.1 Minneapolis Downtown Intermodal Station

A new intermodal station is planned in downtown Minneapolis near the new Target Field. This future multimodal transit station will be located adjacent and just north of the new Twins Target Field ball park on 5th St. between 3rd Avenue and 5th Avenue and is planned to accommodate other modes of transportation, including taxi, pedestrian, bicycle, and integration of the nearby bus network.
Currently this location is near the confluence of several transit lines operated by Twin Cities Metro Transit, including:

- *The Northstar Commuter Rail line* – the Northstar commuter rail line extends from its southern terminus in downtown Minneapolis forty miles north/northwest toward Big Lake, MN. The Northstar is scheduled to begin service in November 2009, and will make six weekday trips per day in each direction[1].
- *The Hiawatha Light Rail Line* - The Hiawatha line extends south from downtown Minneapolis, with seventeen stops between downtown and the Mall of America, including both the Lindbergh and the Humphrey terminals at Minneapolis St Paul International Airport. A recent northern extension moves the northern terminus of the Hiawatha to a new station near the Minneapolis Downtown Intermodal Station, adjacent to the Northstar commuter rail line station[2].
- *Twin Cities Metro Transit Bus Service* - The existing Ramp B/5th Street transit center is located less than two blocks from the Intermodal Station, and provides bus service as part of the overall Metro Transit Bus Service. Additional bus service is also planned as part of the future build-out of the station[2].

Each of the five remaining routes has direct access to this intermodal station via the double-track BNSF Wayzata Subdivision. The Wayzata Subdivision connects to the BNSF Midway subdivision via a wye track at Minneapolis Junction, approximately 1.5 miles west of the Intermodal Station. At Minneapolis Junction, all five routes proceed north on the Midway subdivision, sharing the same track right-of-way as the North Star.

The TEMS Feasibility Study and a 2008 downtown intermodal station study by Hennepin County discussed the use of the Minneapolis downtown Intermodal Station as the southern terminal of the NLX.

1.2 St. Paul's Union Depot

The Ramsey County Regional Rail Authority is planning to develop a multimodal transit hub at the existing St. Paul Union Depot in downtown St. Paul. As described on the county's website, Union Depot would serve as a stop on the future Rush Line and the Red Rock commuter rail lines, and on the future Central Corridor light rail line that will connect downtown Minneapolis and St. Paul. The Eastern end of the Central Corridor line will share stations with the Hiawatha line's five stations on its western end, which includes the Minneapolis downtown Intermodal Station.

Plans call for the use of Union Depot as an Amtrak stop on Amtrak's Empire Builder service that runs daily service between Chicago and Seattle. Union Depot is also used as the endpoint on the Chicago-Madison-St. Paul route as part of the Midwest Regional Rail System. Union Depot also proposes to service Greyhound and Jefferson Lines intercity buses, and Metro Transit regional buses.

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[1] http://www.northstartrain.org/
[2] http://metrotransit.org/

The five remaining routes under consideration can connect to the St Paul Union Depot.

1.3 Metropolitan Airports

Minneapolis-St. Paul International Airport (MSP) is located approximately 12 miles south of downtown St. Paul. Intermodal connections to and from Minneapolis-St. Paul International Airport (MSP) are provided by private ground transportation. Light rail transit via the Hiawatha line provides service to downtown Minneapolis. No existing freight track or track right-of-way connects the airport with downtown Minneapolis or St. Paul.

The Metropolitan Airports Commission (MAC), a public corporation of the state of Minnesota, also operates six 'reliever' airports in the Minneapolis-St. Paul metro area to help relieve congestion at MSP. Of these, only the St. Paul Downtown Holman Field airport had more than 500 enplanements in 2008[3]. Holman Field is located east of downtown St. Paul on the south bank of the Mississippi River, and does not have any direct access to existing rail lines.

2. *Minneapolis/St. Paul – Duluth Corridor*

No major intermodal facilities currently exist in the corridor. Amtrak and Greyhound service several towns in the Minneapolis/St. Paul - Duluth corridor, including North Branch, Rush City, Pine City, Hinckley, Moose Lake, Sandstone, and Cloquet. All these cities and towns are located adjacent to Interstate 35 that connects Minneapolis/St. Paul with Duluth.

Amtrak provides shuttle service from the St. Paul Midway Station to Duluth as an extension of its Empire Builder service, with intermediate stops in Cloquet, MN and Sandstone, MN. Other than service between Minneapolis/St. Paul and Duluth within the I-35 corridor, no other transportation providers provide frequent transit service that connects transit riders to destinations outside of the corridor.

Routes 10 and 11 parallel I-35 to the west between St. Paul and Hinckley, adjacent to the west by approximately 1 mile. North of Hinckley into Duluth, Routes 9 and 11 parallel I-35 to the west, adjacent by approximately 2-3 miles. Cities and towns located along the I-35 corridor are the only likely candidates outside the Minneapolis/St. Paul and Duluth metropolitan areas that could serve new multimodal transit stations that would complement a passenger rail line.

3. *Duluth/Superior Region*

No major passenger intermodal stations existing in Duluth metropolitan area. Transit Service in the region is provided by the Duluth Transit Authority, which provides bus service within Duluth and the surrounding area, including Superior, WI. A majority of these bus routes run through the downtown

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[3] http://www.faa.gov/

Duluth Central Business District, where the Duluth Union Depot is located. Greyhound and Amtrak shuttle bus service serve Duluth/Superior with one station stop 3.5 miles south of the downtown Duluth Central Business District.

All five of the Step 3 route alternatives enter the Duluth/Superior region from the south via BNSF tracks into Superior. For each of these routes, access into Duluth is via the BNSF and Canadian National lines that parallel St. Louis Bay to the north and proceed into downtown. The Duluth International Airport needs to be studied as a potential intermodal connection to the high speed rail system. The selection of the routing of high speed passenger rail service into the Duluth-Superior area will be undertaken in subsequent tasks.

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Technical Memorandum

Subject:	**Technical Memorandum 5 – Ridership Potential** **Minnesota Northern Lights Express Project** **Alternatives Analysis – Level 1, Step 3 Screening**
Prepared For:	**SRF Consulting Group, Inc.**
Prepared By:	**Quandel Consultants, LLC**
CC:	
Date:	**November 20, 2009**

Purpose

This technical memorandum provides population information to the participants of the engineering planning charrette or interactive workshop for the five routes that remain in the Minneapolis-Duluth/Superior Northern Lights Express (NLX) Alternatives Analysis.

Population and Ridership Potential

A reasonable assumption for estimating ridership is that potential ridership in a passenger rail corridor is directly related to the population within the service area. Based on this assumption, route populations were calculated for each route alternative using GIS software and US census data from the year 2000. The route populations for each route include cities and towns within a 20-mile band of each route, and within a 20 mile radius of each of the terminal stations in Minneapolis and Duluth. As described in Technical Memorandum 2, the terminal stations used for this analysis are the Minneapolis downtown Intermodal Station, and the Duluth Union Depot. These terminal stations were identified in the 2007 TEMS Inc. report 'Minneapolis-Duluth/Superior Restoration of Intercity Passenger Rail Service' (the 'TEMS Feasibility Study'). Maps depicting these population bands for each of these route alternatives are shown in Appendix A.

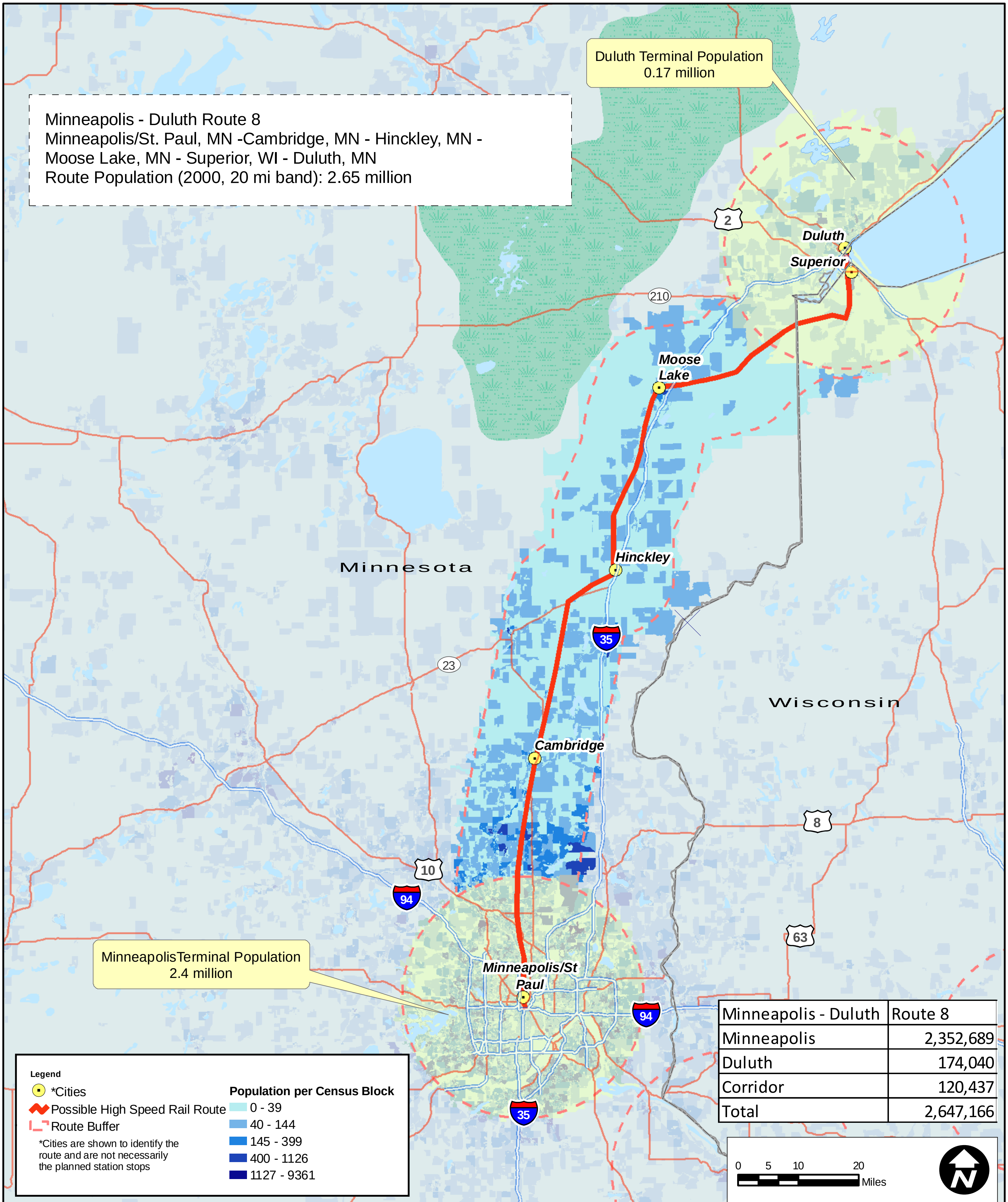
As shown in Table 1, the populations in the Greater Minneapolis/St. Paul and Duluth regions make up more the 95% of the corridor populations of each of the five remaining route alternatives. Population differences among each of the corridors are relatively small. The difference between the most and least populous routes is 12,273, which represents less than 1% of any route total.

Table 1 – Population Breakdown of Route Alternatives

	Route 8	Route 9	Route 10	Route 11	Route 12
Greater Minneapolis/St. Paul Population	2,352,689	2,352,689	2,352,689	2,352,689	2,352,689
Greater Duluth Population	174,040	174,040	174,040	174,040	174,040
Corridor Population	120,437	115,382	127,230	119,623	114,957
Corridor Population as Percentage of Route Total	4.55%	4.37%	4.79%	4.52%	4.35%
Minneapolis/St. Paul and Duluth Regions as Percentage of Route Total	95.45%	95.63%	95.21%	95.48%	95.65%

Appendix A

Corridor Populations of Route Alternatives

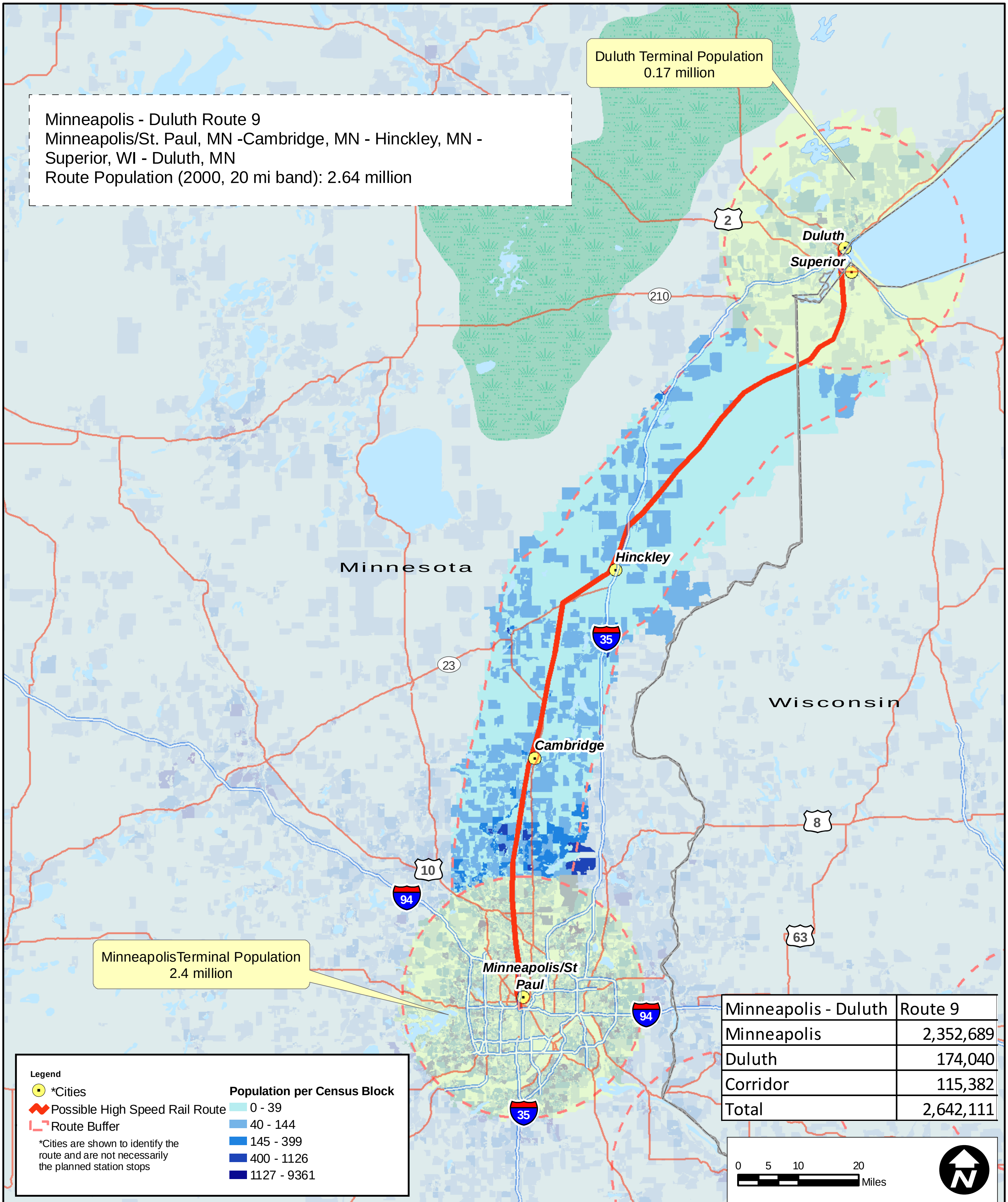


Minneapolis - Duluth	Route 8
Minneapolis	2,352,689
Duluth	174,040
Corridor	120,437
Total	2,647,166

QUANDEL

Northern Light Express
Alternatives Analysis

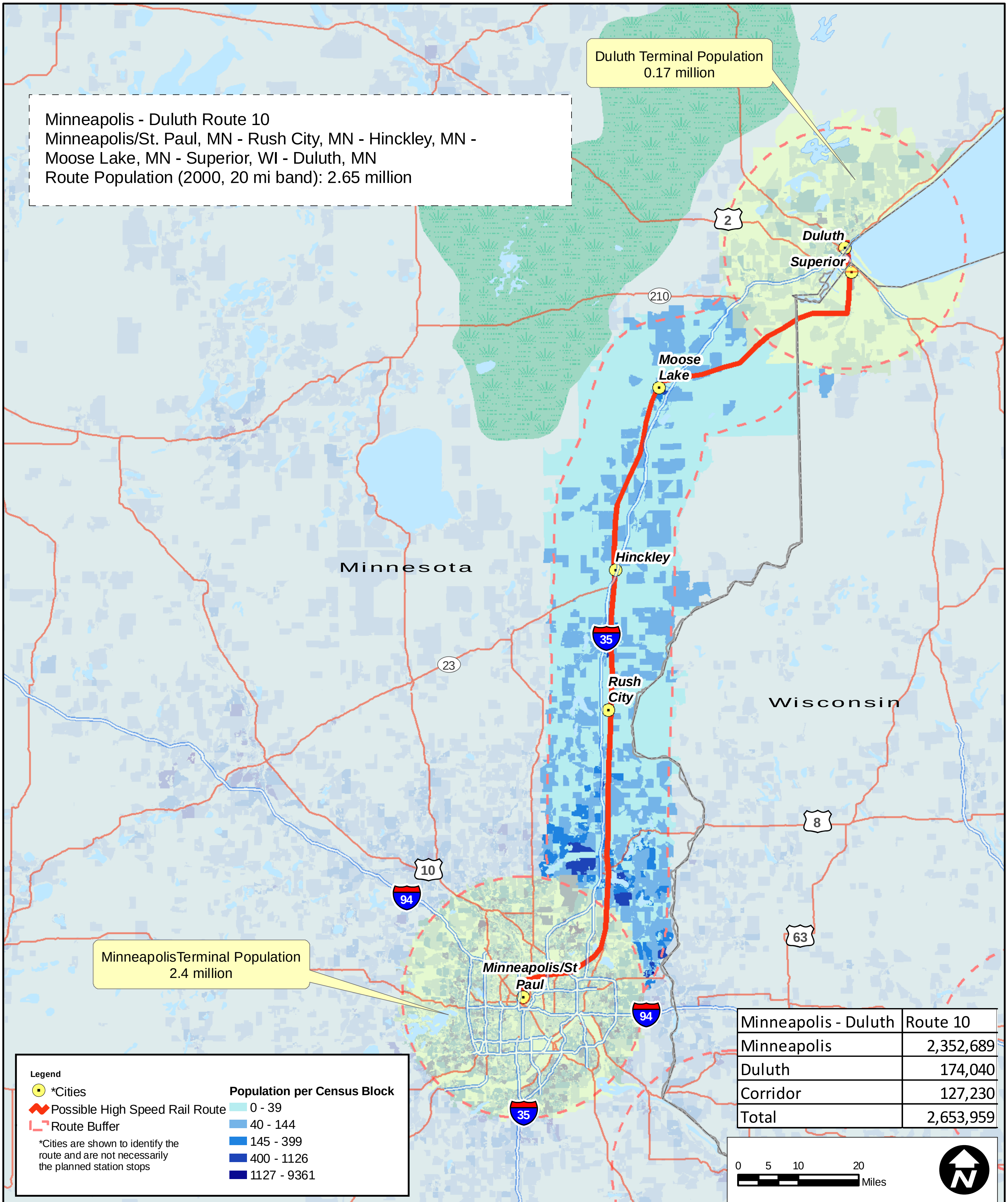
Data Sources
2000 US Census Data - census blocks
2000 ESRI Census Data (SF1) - population
2009 ESRI Data & Maps - base data



Minneapolis - Duluth	Route 9
Minneapolis	2,352,689
Duluth	174,040
Corridor	115,382
Total	2,642,111

Northern Light Express
Alternatives Analysis

Data Sources
2000 US Census Data - census blocks
2000 ESRI Census Data (SF1) - population
2009 ESRI Data & Maps - base data

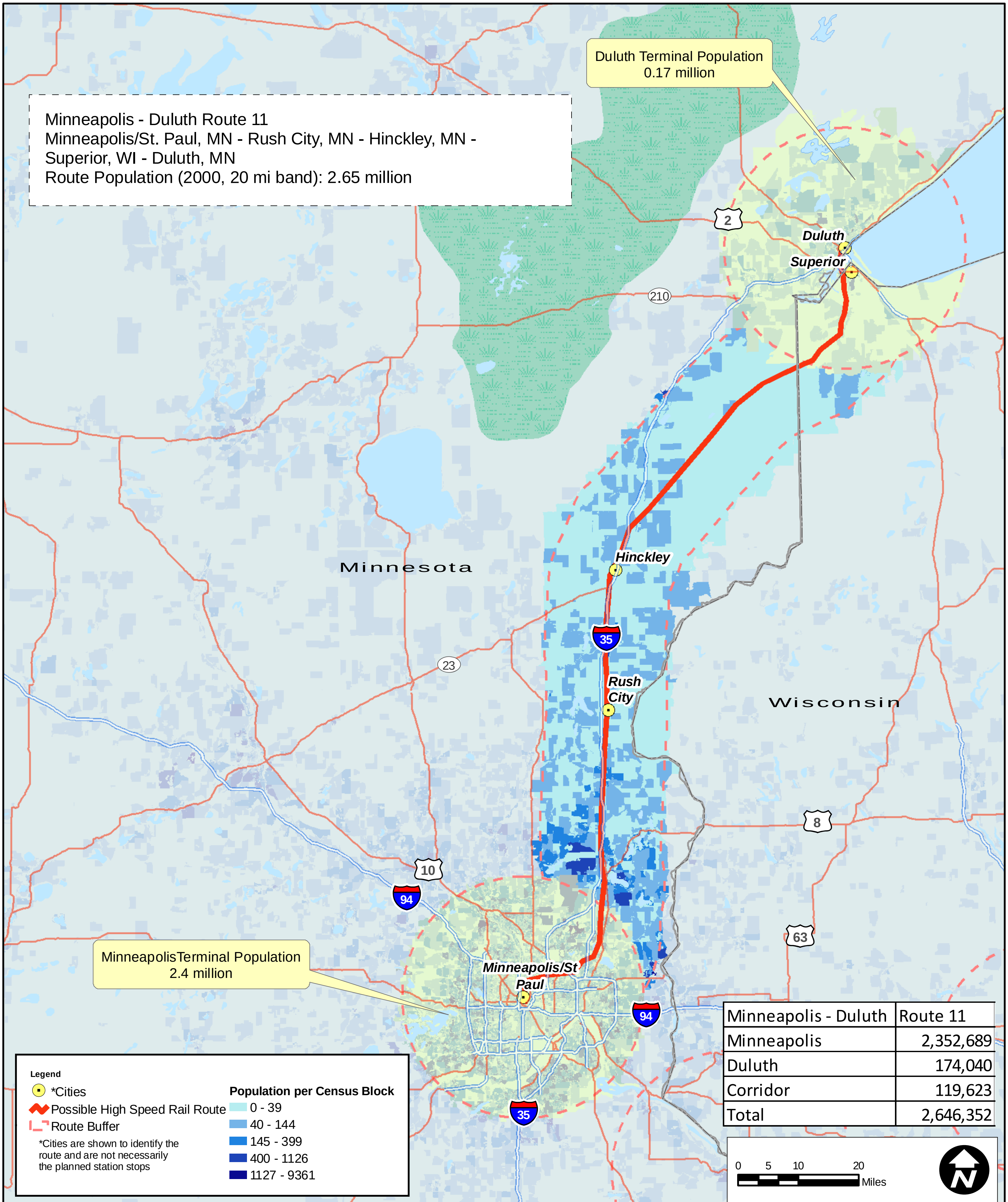


Minneapolis - Duluth	Route 10
Minneapolis	2,352,689
Duluth	174,040
Corridor	127,230
Total	2,653,959

QUANDEL

Northern Light Express
Alternatives Analysis

Data Sources
2000 US Census Data - census blocks
2000 ESRI Census Data (SF1) - population
2009 ESRI Data & Maps - base data

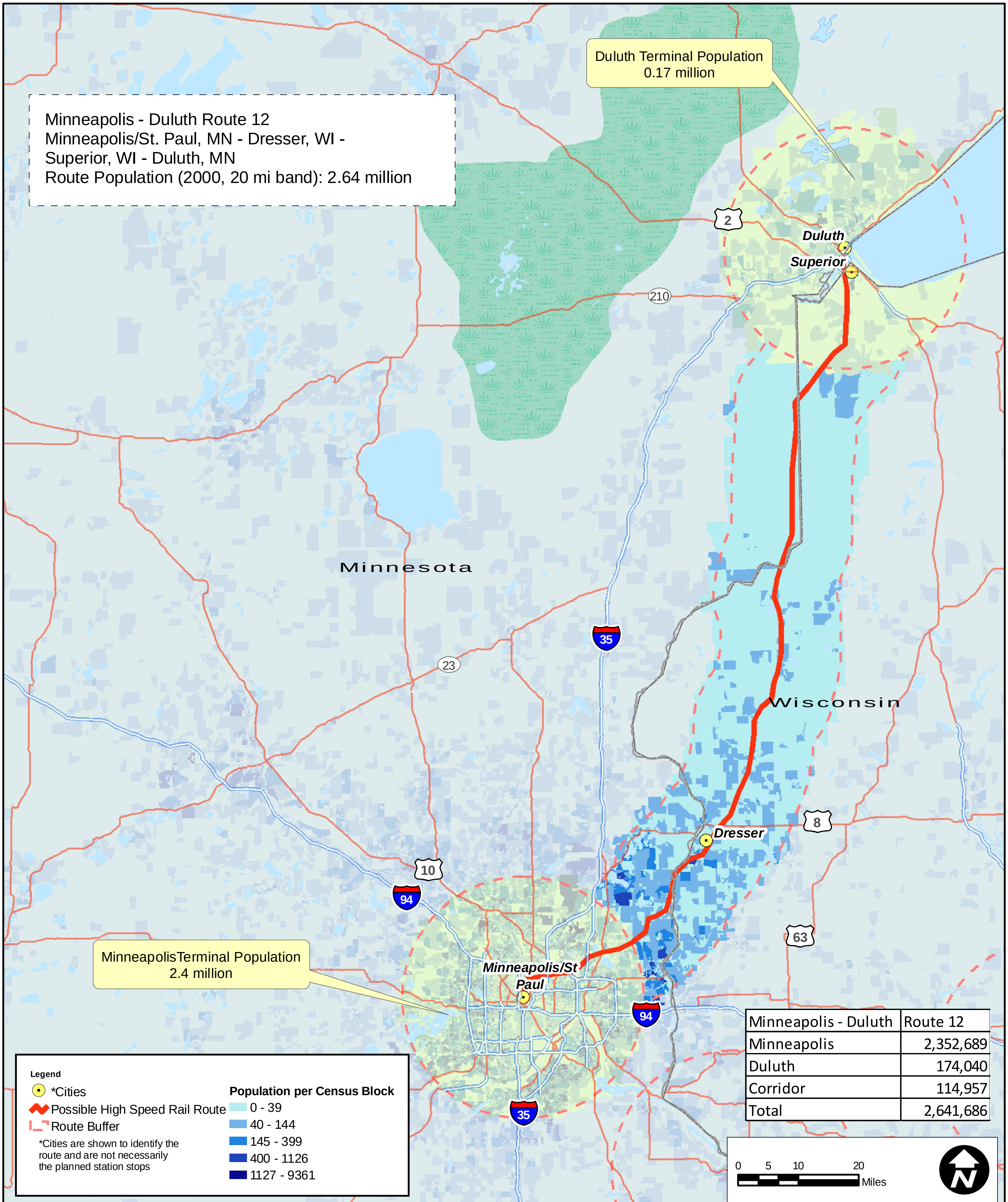


Minneapolis - Duluth	Route 11
Minneapolis	2,352,689
Duluth	174,040
Corridor	119,623
Total	2,646,352

QUANDEL

Northern Light Express
Alternatives Analysis

Data Sources
2000 US Census Data - census blocks
2000 ESRI Census Data (SF1) - population
2009 ESRI Data & Maps - base data



Minneapolis - Duluth	Route 12
Minneapolis	2,352,689
Duluth	174,040
Corridor	114,957
Total	2,641,686

QUANDEL

Northern Light Express
Alternatives Analysis

Data Sources
2000 US Census Data - census blocks
2000 ESRI Census Data (SF1) - population
2009 ESRI Data & Maps - base data

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Technical Memorandum

Subject:	**Technical Memorandum 6 – Cost of Improvements** **Minnesota Northern Lights Express Project** **Alternatives Analysis – Level 1, Step 3 Screening**
Prepared For:	**SRF Consulting Group, Inc.**
Prepared By:	**Quandel Consultants, LLC**
CC:	
Date:	**November 20, 2009**

Purpose

This technical memorandum provides information to the participants of the engineering planning charrette or interactive workshop on improvement costs for the five routes that remain in the Minneapolis-Duluth/Superior Northern Lights Express (NLX) Alternatives Analysis.

Cost of Improvements

This technical memorandum presents the cost of improvements for the five remaining route alternatives identified in Technical Memorandum 2 as follows:

Route 8 – BNSF/Munger Trail
Route 9 – BNSF
Route 10 – St Croix valley/Munger trail
Route 11 – St. croix valley/BNSF
Route 12 – Gandy Dancer Trail

The cost estimates were based on the unit costs developed for the Midwest Regional Rail Initiative in 2002. These costs were updated to 2009 dollars using the inflation factors listed in the Producer Price Index PCUBHVY 'PPI Inputs for Other Heavy Construction', which increased unit costs from 2002 by a factor of 1.47. Quantities for each pay item were calculated specifically for each route using existing track conditions, track geometry, and bridge and crossing data.

The cost estimates are presented in table 1 below and display the difference in cost of each route from the baseline.

Table 1 – Route Alternatives Level 1, Step 3
Cost of Improvements Screening Summary

Route Number	Increase Vs. Baseline Cost
8	63%
9	-
10	108%
11	45%
12	106%

APPENDIX C-2

FUNCTIONAL ANALYSIS OF ROUTES 9, 11 AND 11A
LEVEL 2 ANALYSIS

PREPARED FOR

Northern Lights Express Alliance
Minnesota Department of Transportation
Wisconsin Department of Transportation

NORTHERN LIGHTS EXPRESS

DRAFT

Northern Lights Express Technical Memorandum: Functional Analysis of Routes 9, 11 and 11A (Level 2 Analysis)

High-Speed Rail Environmental Assessment (Minneapolis – Duluth, Minnesota)

December 2010

PREPARED BY

Transportation Economics & Management Systems, Inc.
in cooperation with
SRF Consulting Group and Quandel Consultants, LLC

TABLE OF CONTENTS

1 OVERVIEW

1.1 INTRODUCTION

The purpose of this report is to provide additional information regarding capital cost estimates, ridership forecasts, operational costs, and resulting benefit-cost analysis for three routes (9, 11, and 11A, shown in Exhibit 1-1) that are currently under consideration for high speed passenger rail service between Minneapolis and Duluth, Minnesota. This information will be used to determine which of the three routes exhibit sufficient economic characteristics to be carried into detailed environmental analysis in the Environmental Assessment.

Exhibit 1-1: Minneapolis to Duluth – Routes under Consideration

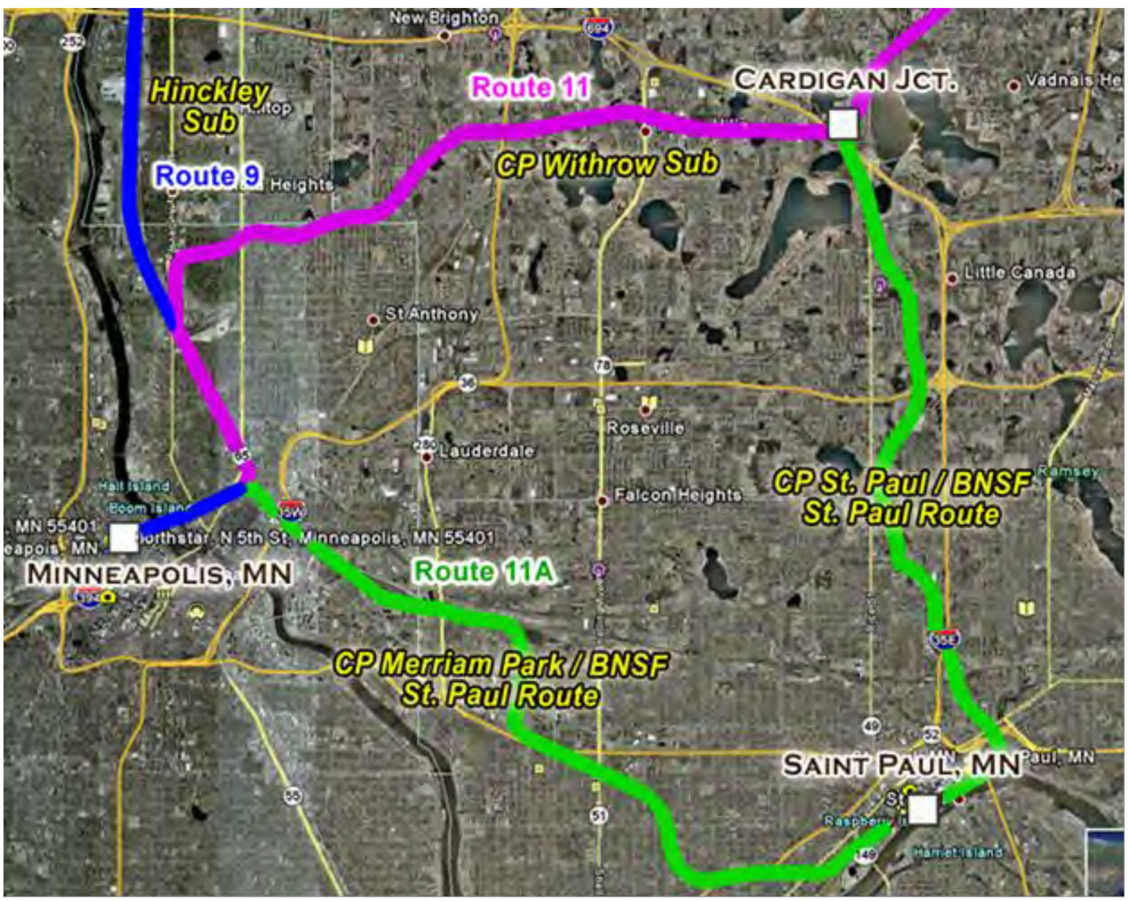
Route 9 shown in Exhibit 1-1 consists of the BNSF rail corridor that was evaluated in the original December 2007 feasibility study. The results of this study showed a strong potential for the Northern Lights Express (NLX) passenger rail service between Minneapolis and Duluth. Using the BNSF Hinckley Subdivision the line connects Minneapolis Northstar Station, with Foley Boulevard in Anoka County, Cambridge in Isanti County, Hinckley in Pine County, Superior in Douglas County (Wisconsin), and Duluth in St. Louis County.

In subsequent discussion with USDOT Federal Railroad Administration it was recommended that two additional routes utilizing the Rush Line, that parallels the Hinckley subdivision along a more easterly route, should also be assessed:

- **Route 11** – As shown in Exhibit 1-1, Route 11 begins in Duluth and follows the same BNSF route as far as Hinckley. South of Hinckley this route, as shown in Exhibit 1-2, uses the Rush Line as far as Cardigan Junction where it connects with the CP Withrow Subdivision. It links up with the BNSF route at University Avenue, from where it goes directly to Minneapolis along the Route 9 connections. As such, it goes directly to Minneapolis and does not go to St. Paul.
- **Route 11A** – As shown in Exhibit 1-1, this route follows Route 11 from Duluth to Hinckley to Cardigan Junction. At Cardigan Junction it continues south to St. Paul using the CP St. Paul subdivision (See Exhibit 1-2). From St. Paul it uses the CP Merriam Park/BNSF St. Paul Route to make the connection to Minneapolis.

  All options begin in Minneapolis; connect to Hinckley, and then Superior and Duluth. The different in the routes is how they connect from Hinckley south to Minneapolis, and the station connections they make in the exurban, suburban, and urban areas of Twin Cities.

Exhibit 1-2: Route 9, 11, and 11A within the Twin Cities



1.2 BACKGROUND

The NLX Passenger Rail Alliance was formed as a joint powers board to explore options for renewing passenger rail service in the 155-mile corridor between Duluth and Minneapolis. Members include the regional rail authorities of Hennepin, Anoka, Isanti, Pine, and St. Louis and Lake Counties in Minnesota, Douglas County (ex-officio) in Wisconsin, plus the Cities of Duluth and Minneapolis. A recent addition to the Alliance is the Mille Lacs Band of Ojibwe. The Alliance Board meets on a monthly basis, and is open to the public.

The Alliance commissioned Transportation Economics & Management Systems, Inc. (TEMS) in 2007 to examine the operational and fiscal feasibility of renewing this service.

The TEMS Feasibility Study, officially titled the 'Minneapolis-Duluth/Superior Restoration of Intercity Passenger Rail Service Comprehensive Feasibility Study and Business Plan, December 2007', investigated the implementation of service along the 155-mile Burlington Northern Santa Fe owned freight rail route between downtown Minneapolis and downtown Duluth. The TEMS study concluded that the implementation of a passenger rail system within the BNSF right of way would enhance mobility in the region, reduce auto congestion and emissions, and stimulate economic growth in towns along the corridor. It also concluded that intercity rail service would meet the need for a competitive alternative to automotive travel with respect to travel time, pricing, and travel experience.

Concept Engineering and Environmental Review
In 2009, the NLX Alliance, in consultation with the Minnesota and Wisconsin Departments of Transportation (Mn/DOT and WisDOT respectively), retained SRF Consulting Group, Inc., in association with Quandel Consultants, LLC and TEMS, to further project development by providing concept engineering and completing project-level environmental review for NLX service implementation under both the National Environmental Protection Act (NEPA) and Minnesota Environmental Policy Act (MEPA)/Minnesota Statutes 116D. In addition to NEPA and MEPA, this environmental documentation process will ensure compliance with other federal requirements including the National Historic Preservation Act (Section 106), and Transportation Act of 1966 (Section 4(f)) and the Clean Water Act (Section 404). Mn/DOT has agreed to take the lead role of the two state Departments of Transportation and accordingly has signed a Cooperative Agreement with Wis/DOT outlining each department's respective roles in the review process.

NLX Steering Committee
A Steering Committee comprised of staff from the NLX Alliance, Mn/DOT, WisDOT, Anoka County, Hennepin County and the Duluth -Superior Metropolitan Interstate Council (MPO) has been formed to guide consultant work and to provide technical assistance to the project development process. Participation in the Steering Committee is open to all NLX Alliance members. Members of the Steering Committee provide a vast knowledge of existing transportation services including roadway, trail, bus, Bus Rapid Transit (BRT), Light Rail Transit (LRT) and commuter rail services as well as other developing high speed rail routes.

Corridor Assessment
As described in the Northern Lights Express High Speed Rail Corridor Assessment Report: Level 1 Final Screening Report (December 29, 2009 and Revised June 2010), a three-level evaluation methodology is being utilized to conduct an alternative analysis of rail routes within the NLX corridor. Level 1 was an initial screening of rail alternatives comprised of an assessment of operation

characteristics (e.g. travel time and ridership), investment requirements, and environmental constraints at a broad conceptual level using a workshop approach. The Level 1 Screening resulted in one route scoring significantly higher than the others, leading to a local recommendation that only this route be carried forward into the environmental analysis. FRA review determined that the screening analysis was insufficiently robust to select a single alternative and requested a more detailed comparison of the top three scoring routes:

- **Route 9:** Minneapolis to Duluth via Coon Rapids, Cambridge, Hinckley and Superior
- **Route 11:** Minneapolis to Duluth via North Branch, Hinckley and Superior
- **Route 11A:** Minneapolis to Duluth via St. Paul, North Branch, Hinckley and Superior

The intent of this Level 2 analysis is to provide a more detailed examination of ridership and operations to determine if any of these routes should be eliminated before proceeding to Level 3. This additional level of functional analysis – including ridership modeling, development of revenue projections, assessment of operations and maintenance costs and the next level of capital costs culminating in a benefit-cost analysis – will be used to determine which of the alternatives are technically and financially feasible using FRA public-private partnership criteria.

1.3 STUDY APPROACH

For a “Level 2” analysis, the aim of the study is to subject each route 9, 11 and 11A to a full feasibility level financial and economic analysis, comparable to but updating the analysis that was earlier developed for Route 9 in the feasibility study “Restoration of Intercity Passenger Rail Service in the Minneapolis-Duluth/Superior Corridor” and subsequent updates and refinements. For conducting this analysis, it was essential to make sure each route was treated in exactly the same way in the evaluation process using the same underlying set of models, cost and operating assumptions, and that the same evaluation criteria and metrics were applied. Key steps for ensuring comparison of routes on an equitable basis included:

1. Identifying appropriate stations for Routes 11 and 11A
2. Ensuring that access and egress was treated equally for each route by developing an appropriate zone system, and transportation links and networks for modeling travel demand and forecasting ridership and revenue.
3. Application of consistent train performance criteria across all three routes to identify appropriate train times and schedules.
4. Application of a set of consistent engineering assumptions and unit costs to each route.
5. Application of the FRA Commercial Feasibility criteria[1] in the financial and economic evaluation framework used on all three routes.

This framework allows each route to be treated equally in a feasibility, Level 2 analysis.

The analysis will be updated to a 2010 base year for each route, and evaluate the routes finances and economics over 30 years from a proposed 2015 build out year. The cash flow of financial and economic benefit/revenues and costs will be discounted using U.S. Office of Management and Budget (OMB) 3 and 7 percent social discount rates.

[1] USDOT FRA, *High-Speed Ground Transportation for America*, September 1997

Capital Costs were assessed by segment and then as a summary cost. The Unit Capital Costs used have been peer reviewed and bench marked against other current studies.

Operating Costs are based on train miles, passenger miles, and fixed costs needed to operate the service on each route. The operating unit costs are benchmarked against current Amtrak Midwest costs.

Passenger ridership and revenue are derived from the COMPASS™ model that has been recalibrated using a 2010 database. This includes updated O/D data, new socioeconomic data, and the latest air, bus, and auto traffic volumes available from state and national sources.

Financial and economic evaluations are based on the FRA "public-private" partnership guidelines as defined in the 1997 *Commercial Feasibility Study* and OMB requirements[2], which provide guiding principles for conducting intercity passenger rail financial and economic studies. Key financial and economic criteria include –

- Operating Ratio: $\dfrac{\text{Present Value (PV) of Operating Cost}}{\text{Present Value (PV) of Revenues}}$

- Cost Benefit Ratio: $\dfrac{\text{Present Value (PV) of Revenue} + \text{Present Value (PV) of Benefits}}{\text{Present Value (PV) Operating Cost} + \text{Present Value (PV) Capital Cost}}$

1.4 REPORT STRUCTURE

This report is intended to provide a detailed review of the costs, benefits, and financial implications of Routes 9, 11 and 11A. The report is structured as follows –

Chapter 1 – Overview
Chapter 2 – Description of Routes Analyzed
Chapter 3 – Current Market
Chapter 4 – Ridership and Revenue
Chapter 5 – Capital Investment Needs
Chapter 6 – Operations
Chapter 7 – Operating Costs
Chapter 8 – Financial and Economic Viability
Chapter 9 – Conclusion

Appendices
Appendix A – Socioeconomic Data
Appendix B – COMPASS™ Model & Calibration

[2] OMB Circular A-4, see: http://www.whitehouse.gov/omb/circulars_a004_a-4/

2 DESCRIPTION OF ROUTES ANALYZED

2.1 STATION ANALYSIS

A critical issue for a feasibility analysis is the selection of stations. For Route 9, the original feasibility study assessed a number of station options but selected Minneapolis, Foley Boulevard, Cambridge, Hinckley, Superior, and Duluth as the best stations for the route. For Routes 11 and 11A, a careful assessment needed to be made for optimizing the selection of station locations. Exhibit 1-1 shows the list of candidate station locations that were considered. The Minneapolis, Hinckley, Superior and Duluth stations do not depend on the selection of the route and were considered fixed for all alternatives. Similarly, the St Paul Union Depot was specified for Route 11A so the location for a downtown St Paul station did not have to be assessed.

As a result, the assessment focused on the need to develop alternative Route 11 or 11A stations for replacing two intermediate Route 9 stations: Foley Boulevard and Cambridge. Three sites were considered as alternatives to Foley Boulevard and two sites as alternatives to Cambridge.

Alternative to Foley Boulevard Station: Foley Boulevard provides a very attractive suburban station location for Route 9. For Route 11 and 11A several alternatives can be considered. These include Cardigan Junction, White Bear Lake, and Forest Lake. In comparison with Foley Boulevard any selection would result in a smaller area population, as the Northeast side of Twin Cities is far less populated than Northwest Twin Cities. For example, White Bear Lake has only 54 percent of the population within 15 minutes' drive time as Foley Boulevard and Forest Lake is even smaller. See Exhibits 2-1 and 2-2.

Exhibit 2-1: Foley Blvd. vs. White Bear Lake (15 minute drive time)

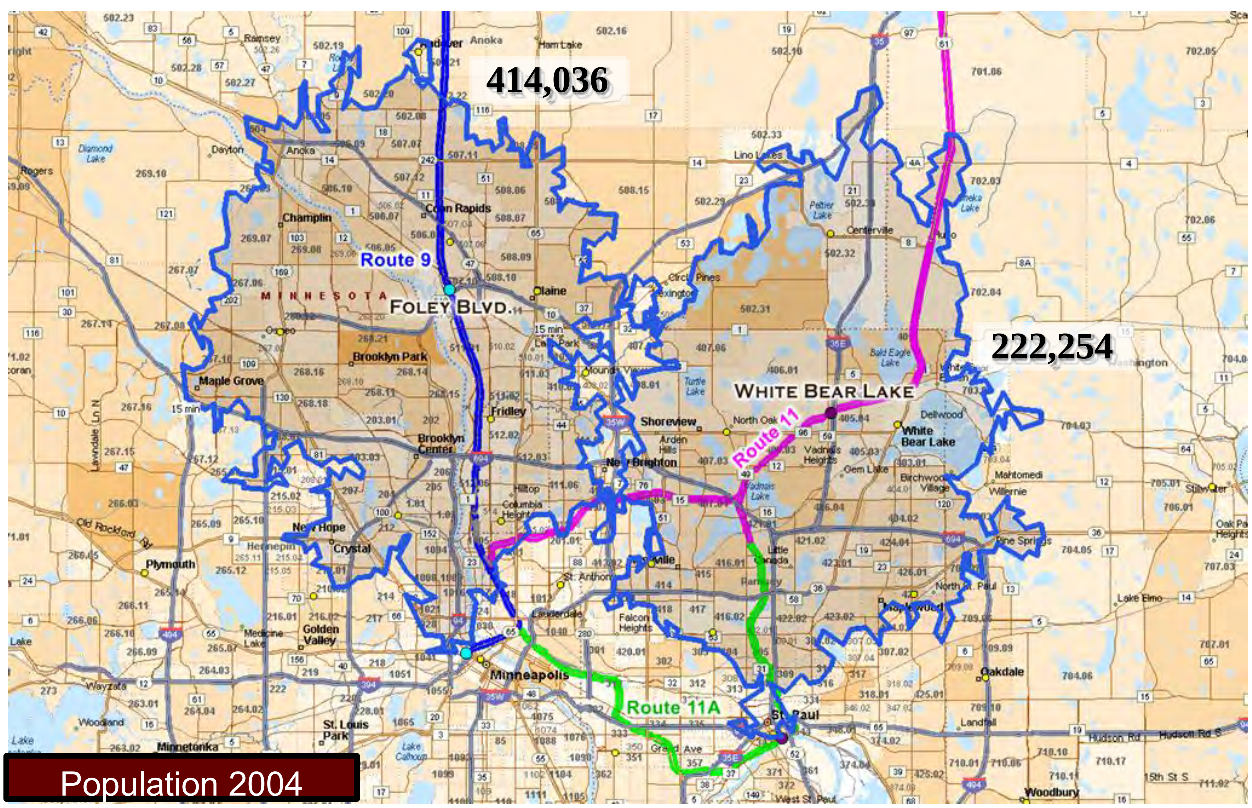


Exhibit 2-2: White Bear Lake vs. Forest Lake
(15 minute Drive-time)

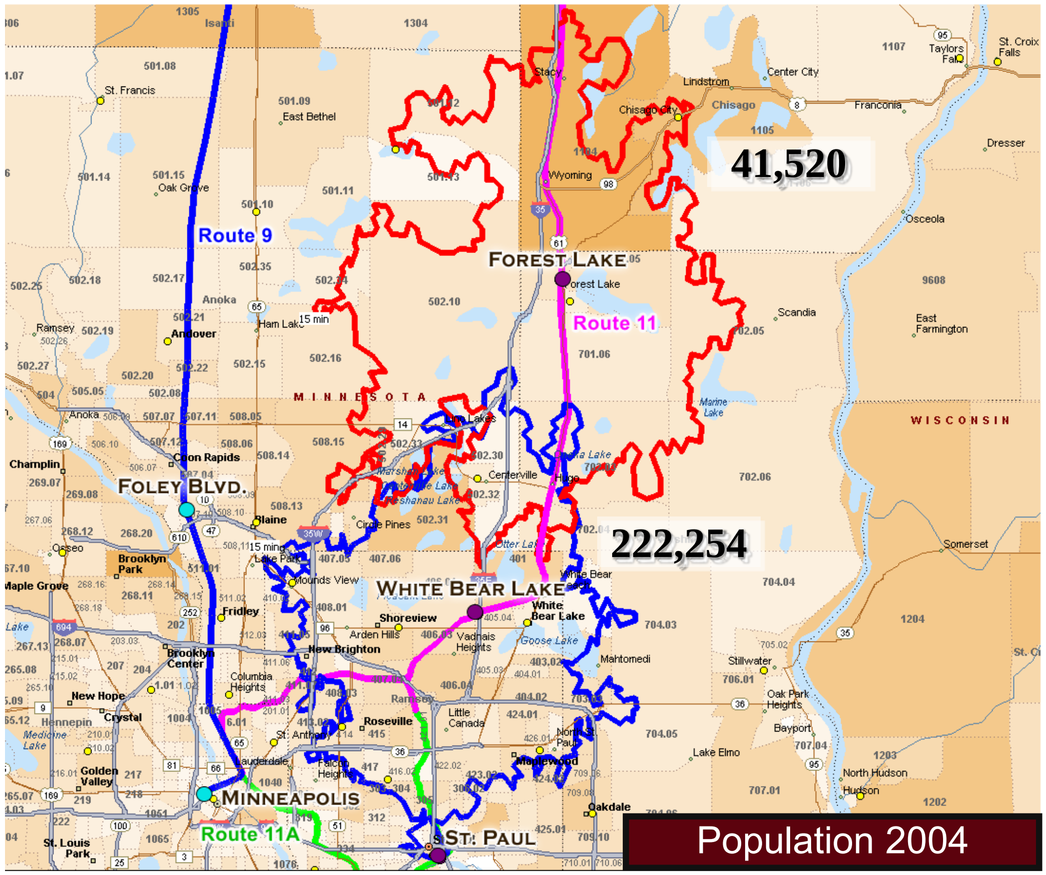
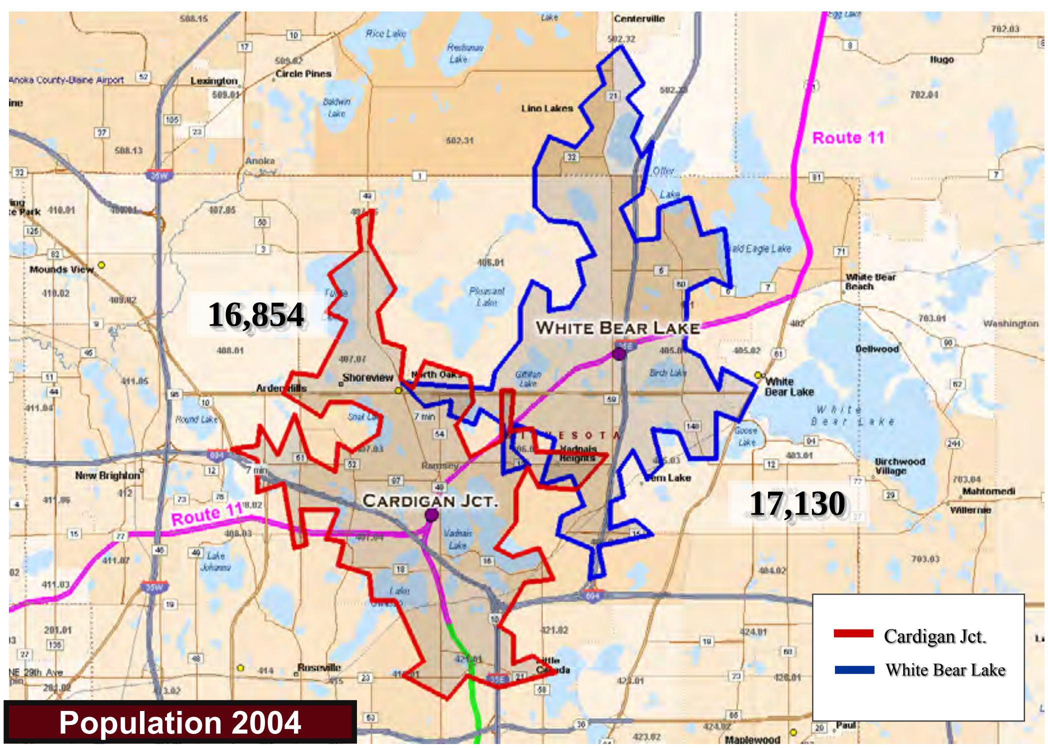


Exhibit 2-3: Cardigan Jct. vs. White Bear Lake
(7 minute Drive-time)



When comparing White Bear Lake to Forest Lake, White Bear Lake is bigger than Forest Lake in terms of station area population as seen in Exhibit 2-2 within 15 minutes' drive time. Either White Bear Lake or Forest Lake could provide good station sites with easy access to I-35. However, White Bear Lake was selected as it has a higher population than Forest Lake.

When comparing White Bear Lake to Cardigan Junction, they are very close to one another. In order to reduce the overlap between them, 7 minutes' drive time was selected. These produce approximately equivalent station area populations as seen in Exhibit 2-3. Cardigan Junction, however, suffers from being a poor location for a multimodal station due to the lack of sufficient land for a good station site near the railroad at that location, and difficult Interstate highway access. Therefore, White Bear Lake was selected over Cardigan Junction.

White Bear Lake is most similar to Foley Boulevard in terms of distance 15 miles compared to 12 miles to Twin Cities. *Thus, Foley Boulevard was selected for Route 9 and White Bear Lake for Routes 11 and 11A.*

Alternative to Cambridge Station: For Routes 11 and 11A, there are two possible alternatives to Route 9's Cambridge Station: North Branch and Rush City. As can be seen in Exhibits 2-4 and 2-5, North Branch has a bigger population than Rush City and is more comparable in terms of travel distance to the Twin Cities. Since the Hinckley Subdivision and Rush Line are beginning to converge the selection of North Branch would provide Cambridge inhabitants a 15 to 20 minute drive alternative. Rush City has no such comparable "Twin City". *As such, North Branch was selected as the best alternative to Cambridge.* Again, it has a smaller population than Cambridge.

Exhibit 2-4: Cambridge vs. North Branch (15 minute drive time)

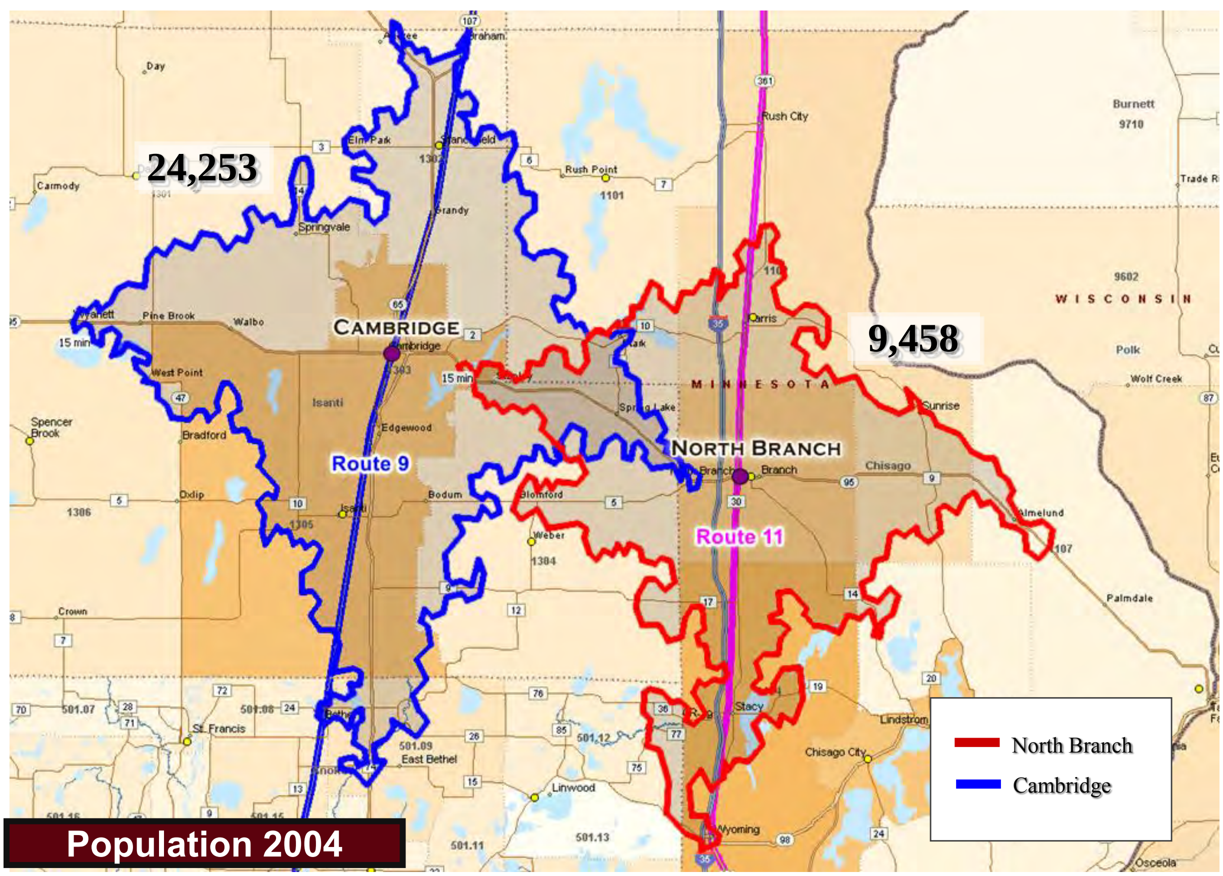
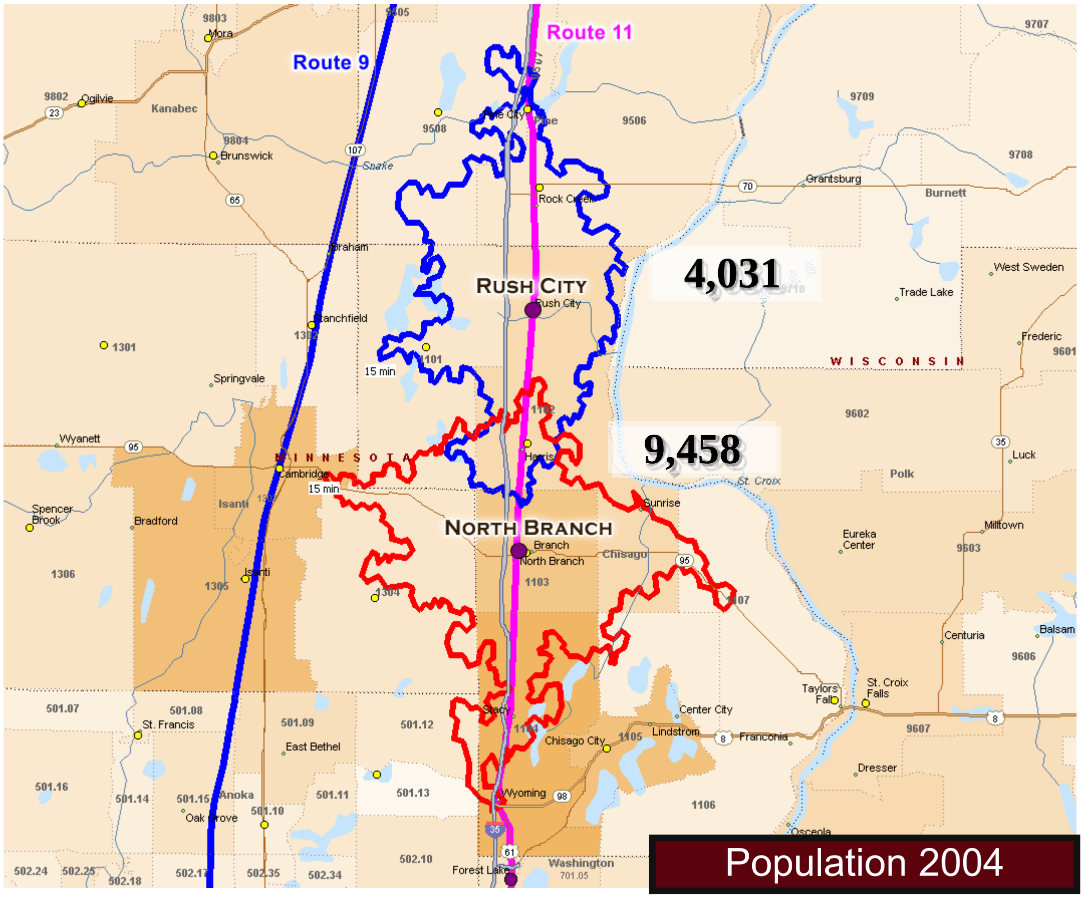


Exhibit 2-5: North Branch vs. Rush City (15 minute drive time)



Overall Comparison: The following table (Exhibit 2-6) shows the overall station area population of the routes based on 15 minute driving. It can be seen that Route 9 has a higher station area population based on 15 minutes driving time from stations, than Route 11. However, Route 11A serves the most people as it includes both the St. Paul and Minneapolis stations.

Exhibit 2-6: Overall Route Population Comparisons

Comparison of Station Area Populations Route 9 and Routes 11/11A (15 min drive time)					
Route 9		Route 11		Route 11A	
Minneapolis	677,005	Minneapolis	677,005	Minneapolis	677,005
Foley Blvd.	414,036	White Bear Lake	222,254	St. Paul	512,592
Cambridge	24,253	North Branch	9,458	White Bear Lake	222,254
–		–		North Branch	9,458
Totals	**1,115,294**		**908,717**		**1,421,309**

Exhibit 2-7 summarizes the analysis used to select Route 11 and 11A station locations.

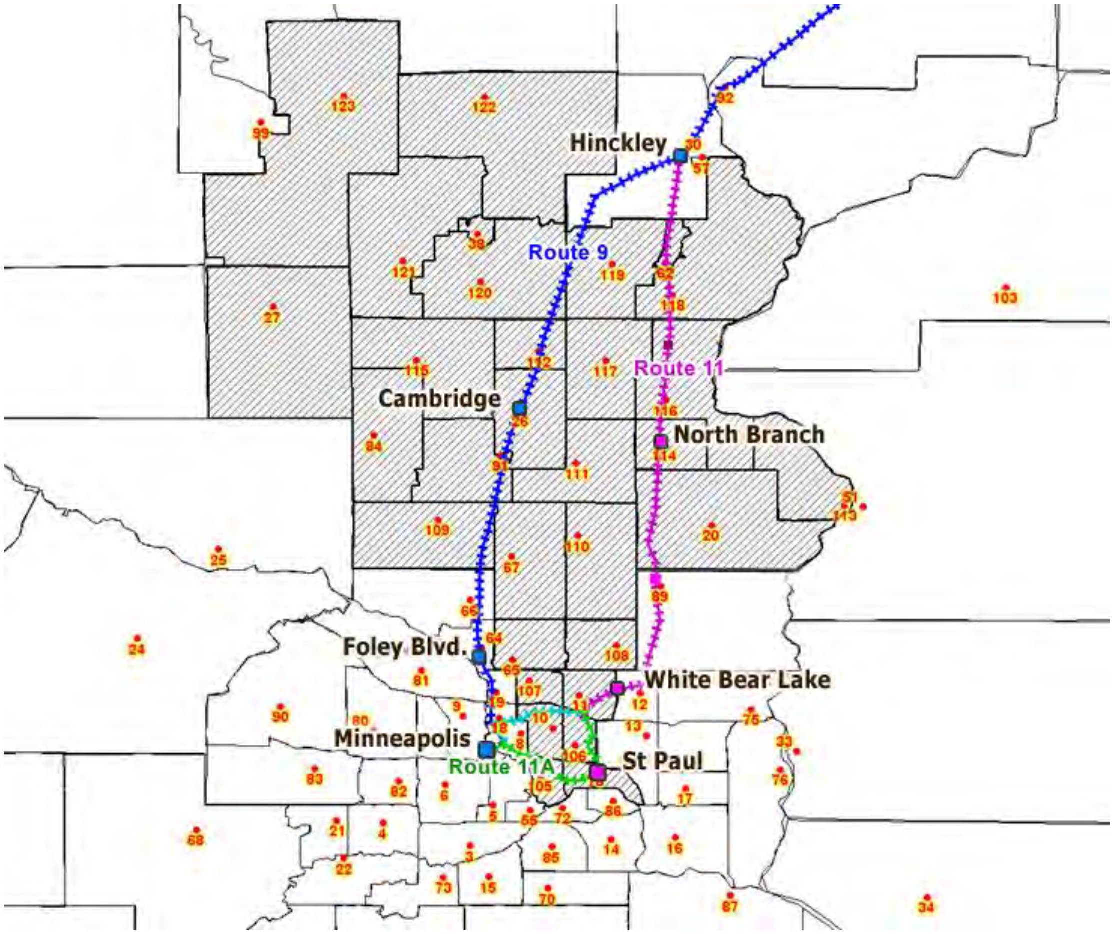
Exhibit 2-7: Routes and Stations
Discriminating Factors of Potential Station Sites

	White Bear Lake vs Cardigan Jct.	White Bear Lake vs Forest Lake	North Branch vs Rush City
Population	White Bear Lake is slightly larger within 7 minutes drive.	White Bear Lake is larger within 15 minutes drive.	North Branch larger within 15 minutes drive.
Trip Length to St. Paul or Minneapolis	White Bear Lake has longer Trip length.	Forest Lake has longer trip length but both more than 15 miles to St. Paul and White Bear Lake is similar to Foley Blvd which is 12 miles to Minneapolis.	Rush City has longer trip length but both more than 40 miles and North Branch is similar to Cambridge.
Quality of Station Site	Cardigan Jct. Problematic	Both have good potential	Both have good potential
Access to Highways	Both have Interstate Highway access. Cardigan Jct has east/west access in I 694, White Bear Lake has good north/south access in I 35E.	Both have good north/south Interstate Highway access - I 35. White Bear Lake also has good east/west access in Route 96 to West Ramsey County.	Both have good north/south Interstate Highway access - I 35. North Branch also has good east/west access in Route 95 to Cambridge.
Compatibility with Route 9 Option	Cardigan Jct only 8 miles from St. Paul, White Bear Lake is 12 miles from St. Paul & Foley Blvd. is 12 miles from Minneapolis.	Foley Blvd is 12 miles from Minneapolis which is comparable with White Bear Lake at 15 miles to St. Paul while Forest Lake is 26 miles.	Cambridge is 45 miles from Minneapolis which is comparable with North Branch at 42 miles from St. Paul while Rush City is 55 miles.
RECOMMENDATION	**Use White Bear Lake**	**Use White Bear Lake**	**Use North Branch**

2.2 ZONE SYSTEM

In the analysis of Routes 9, 11 and 11A, a critical element is the representation of travel between origins and destinations along the respective corridors. The original zone system for the Minneapolis- Duluth/Superior corridor was focused on Route 9 stations. To ensure a fair assessment of Route 11 and 11A, the zone system was revised. The revised zone system included a finer zone system along both the 11 and 11A corridors, and a finer accounting of access and egress to selected Route 11 and 11A stations. As a result, the original zone system was expanded from 100 internal zones to 123 internal zones, which together with 322 zones of the other MWRRI states makes up the basis for the analysis of the travel potential of the Route 9, 11, and 11A corridors. See Exhibit 2-8.

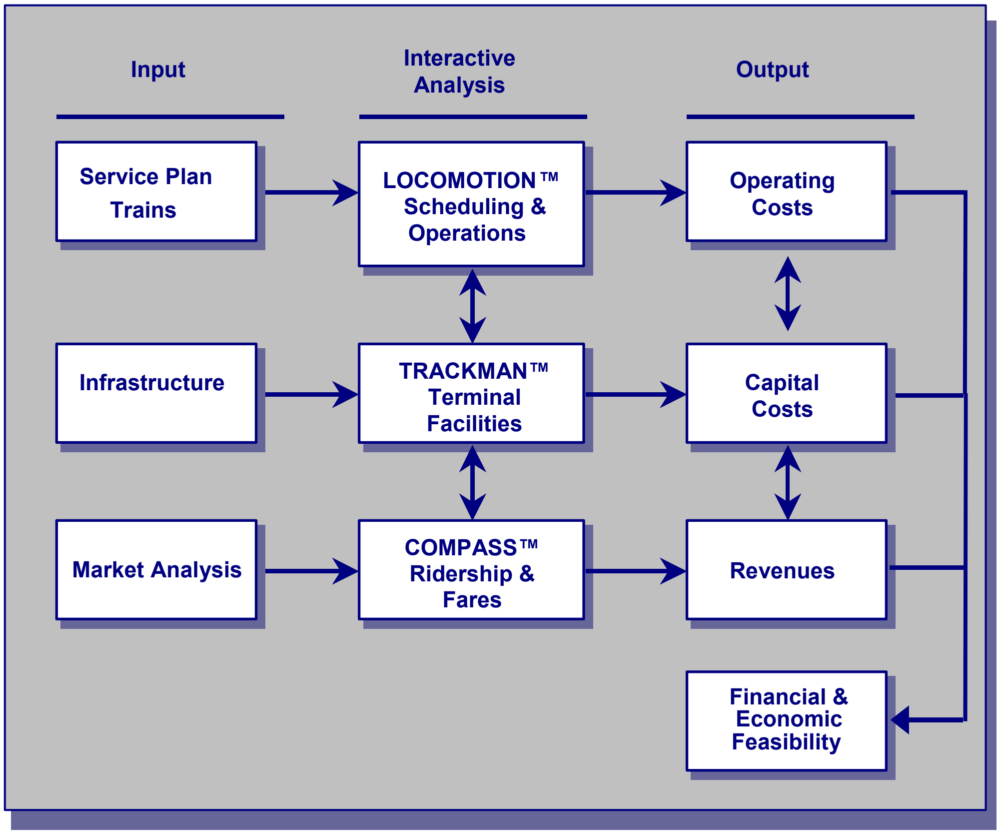
Exhibit 2-8: Modified Duluth Zone System



2.3 RAIL SERVICE ANALYSIS

The Rail Service Analysis for Routes 11 and 11A was completed using the same analysis process as used in the development of Route 9. An interactive analysis was used to compare train times, operating costs and capital costs for infrastructure. See Exhibit 2-9. For each Interactive Analysis assessed, which route infrastructure should be added given a recognition of the constraints of the corridor and the value of any speed improvement on Train Performance (i.e., train time saved per capital dollar expended).

Exhibit 2-9: Interactive Analysis



3 CURRENT MARKET

3.1 OVERVIEW

The Duluth-Minneapolis corridor is an important corridor of Minnesota, which serves the cities of Minneapolis and Duluth, and St. Louis, Hennepin, Anoka, Isanti, Pine, and Douglas counties. This corridor has a population of 3.7 million in 2010 which is about 70% of the total state population. The existing intercity transportation modes of this corridor include air, bus and auto. Today the corridor has 22 million intercity trips per year. The vast majority of travel in the corridor is by auto, which has about 95% of current market share.

To evaluate the potential for rail services in the Duluth-Minneapolis Corridor, it is important to assess the total travel market in the corridor under the study, and how well a new rail service might perform in that market. For the purpose of this study, this assessment was accomplished using the following process:

1. Gather information on the total market and travel patterns in the corridor for auto, air, bus and rail travel.
2. Identify and quantify factors that influence travel choices, including current and forecast socioeconomic characteristics and future gas price.
3. Build and calibrate a model to test different travel choice scenarios; in particular, identify the likely modal shares under each scenario.
4. Forecast travel, including total demand and modal shares.

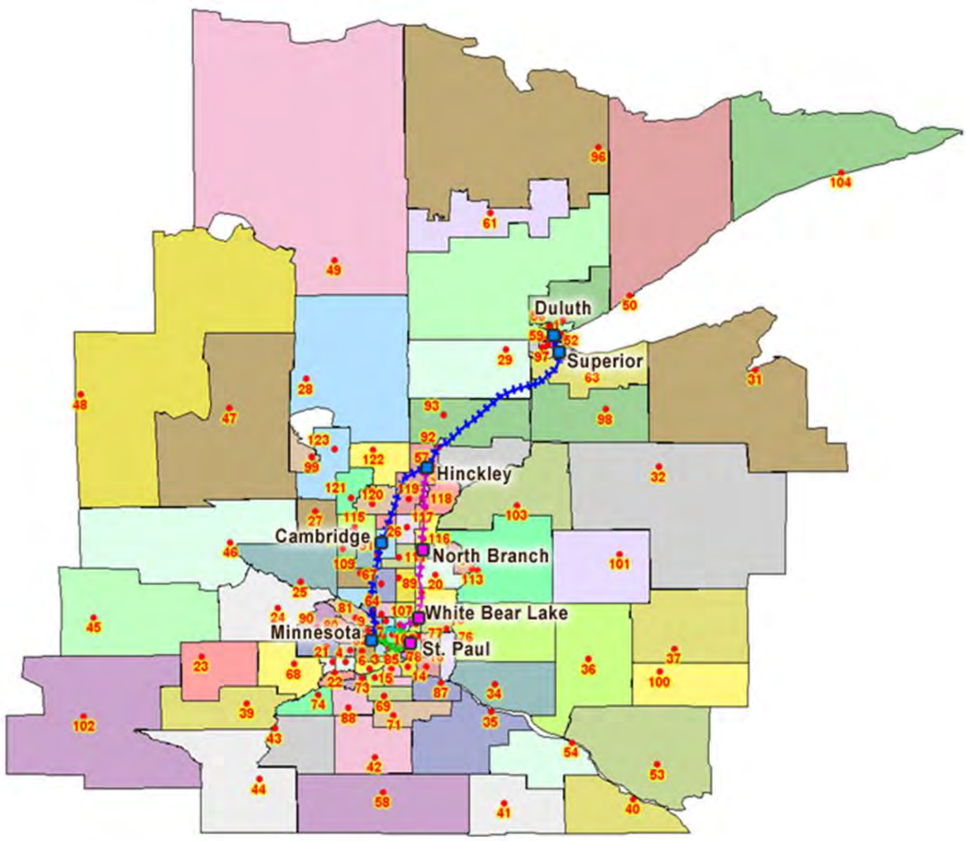
This chapter documents the analysis undertaken to establish the base year socioeconomic and travel market.

3.2 ZONE DEFINITION

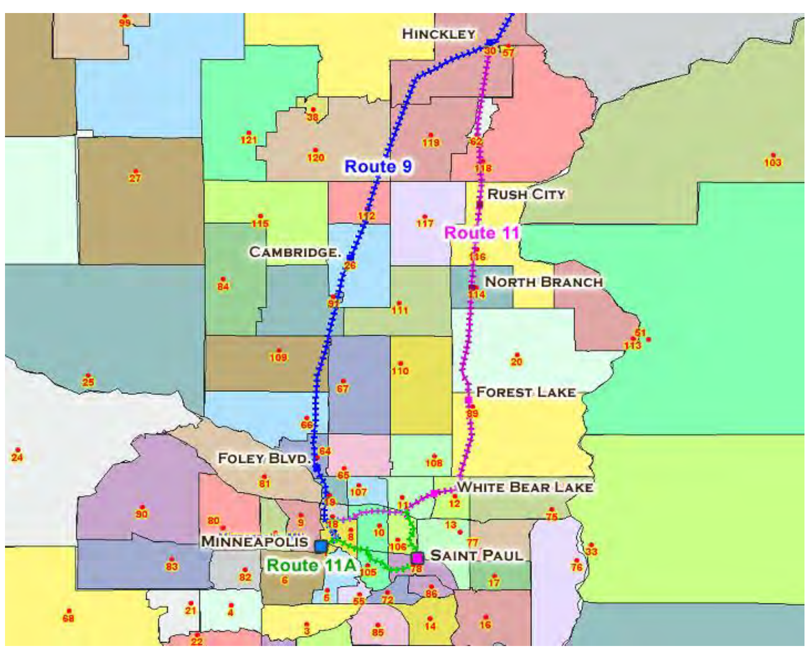
To develop a study database (network, socioeconomic and trip origin-destination), the fundamental unit of analysis, a zone system needs to be constructed. The zone system is predominately county-based in rural areas, and TAZ (traffic analysis zones) based in urban areas as shown in Exhibit 3-1. County-based zones are compatible with the socioeconomic baseline and forecast data derived from the Bureau of Economic Analysis (BEA), which are also county-based. Zones are defined relative to the proposed rail network. As zones move outward from stations, their size transitions from small to larger.

The networks and a zone system containing 123 zones developed for the Duluth - Minneapolis corridor are enhanced with finer zone detail in urban areas of Minneapolis and St. Paul. In order to evaluate the different route options, finer zones are added to the areas to be affected by Cambridge station, Foley Blvd. station, North Branch station, and White Bear Lake station as shown in the zoom-in map of the Exhibit 3-1. Some zones are based on TAZ, which has been developed by local urban planning agencies such as the Metropolitan Council, which is regional planning agency serving the Twin Cities seven-county metropolitan area.

Exhibit 3-1: Study Area Zone System



Routes 9, 11 and 11A Zoom-In



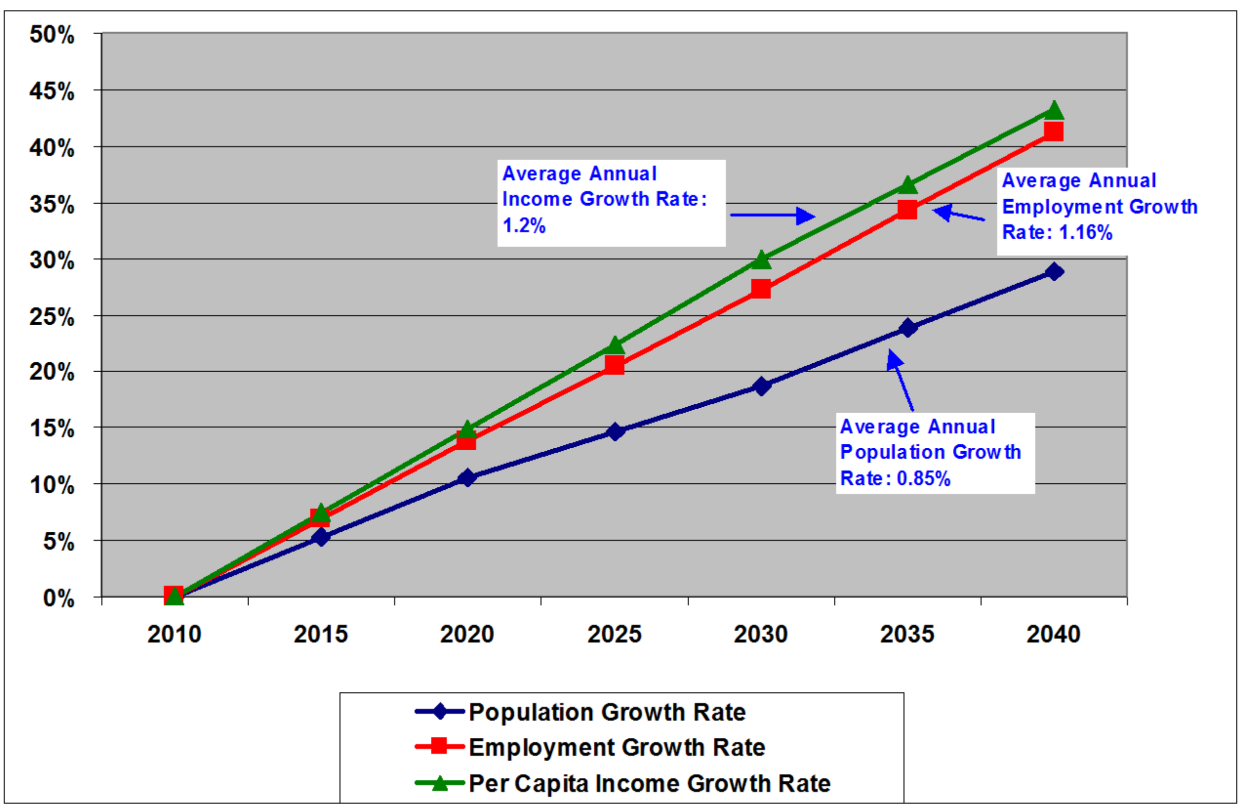
3.3 SOCIOECONOMIC BASELINE AND PROJECTIONS

For each zone in the study area, base year socioeconomic data and forecast growth rate percentages were derived from various sources, as follows:

- Metropolitan Council
- Minnesota Planning State Demographic Center
- Minnesota Department of Employment and Economic Development
- St. Louis County Planning Department
- Minneapolis-St. Paul International Airport
- Wisconsin Department of Administration
- Wisconsin Department of Workforce Development
- Bureau of Economic Analysis
- U.S. Census Bureau
- U.S. Department of Labor
- Woods & Poole Economics

Using these sources, each zone was treated as an independent unit in the income, population and employment forecast. In 2010, the total population in the corridor area is 3.7 million, the employment is 2.2 million, and the average per capita income is $49,169. From 2010 to 2040, the projected average annual growth rate of population is 0.85%, the annual growth rate of employment is 1.16%, and the average annual growth rate of per capita income is 1.2%. Exhibit 3-2 shows the population, employment, and per capita income central case growth projections from 2010 to 2040.

Exhibit 3-2: Study Area Socioeconomic Variables Growth Rates



The exhibit shows that there is higher growth of employment and per-capita income than population. However, travel increases are historically strongly correlated to increases in employment and per capita income, in addition to changes in population. Therefore, travel in the corridor is likely to continue to increase faster than the population growth rates, as changes in employment and per capita income outpace population growth, and stimulate more travel.

The exhibit shows the aggregate socioeconomic projection for the whole study area. It should be noted that in applying socioeconomic projections to the model, separate projections were made for each of the individual 123 zones using the data from the listed sources. Therefore, the socioeconomic projections for different zones are likely to be different and thus may lead to different future travel sub-market projections. A full description of socioeconomic data of each zone can be found in the Appendix B.

3.4 EXISTING TRAVEL MARKETS

In transportation analysis, travel desirability is measured in terms of cost and travel time. These variables are incorporated into the basic transportation network elements. Correct representation of the existing and proposed travel services is vital for accurate travel forecasting. Basic network elements are called nodes and links. Each travel mode consists of a database comprised of zones, stations or nodes, and existing connections or links between them in the study area. Each node and link is assigned a set of attributes. The network data assembled for the study included the following attributes for all the zone pairs.

For public travel modes (air, rail, bus):

- Access/egress times and costs (e.g., travel time to a station, time/cost of parking, time walking from a station, etc.)
- Waiting at terminal and delay times
- In-vehicle travel times
- Number of interchanges and connection times
- Fares
- On-time performance
- Frequency of service

For private mode (auto):

- Travel time, including rest time
- Travel cost (vehicle operating cost)
- Tolls
- Vehicle occupancy

The transportation service data of different modes available in the study corridor were obtained from a variety of sources and coded into the networks as inputs to the demand model.

3.4.1 HIGHWAY TRAVEL

The highway network was developed to reflect the major highway segments within the study area. The sources for building the highway networks in the study area include the Metropolitan Council, Minnesota Department of Transportation, and highway information from Microsoft MapPoint 2006. The Internal Revenue Service (IRS) Standard Mileage Rate was used to develop the auto network cost data. The values provided by the IRS consist of an average cost of 50 cents per mile for Business travel and 15 cents per mile for Other travelers. The Business figure reflects the IRS estimate of the full cost of operating a vehicle because a business is required to pay the full cost for the use of a vehicle. The covered routes include major Interstate such as I35 and I94 and some US routes such as US12 and US52.

3.4.2 AIR TRAVEL

Air network attributes contain a range of variables that include time and distance between airports, airfares, on-time performance measures and connection times. Travel times, frequencies and fares were derived from official airport websites and websites of the major airlines serving airports in the study area. For travel distances, the study team obtained the non-stop, shortest-path distance between airports. On-time performance measures were derived from the 2009 airport on-time performance statistics from the Bureau of Transportation Statistics (BTS) website.

Delta and Continental Airlines currently provide most of the passenger air travel service for Duluth International Airport. Delta Airlines travels to Minneapolis, MN and Detroit, MI. while Continental Airlines provides air travel to Chicago, IL. The Exhibit 3-3 shows the some flights connected with Duluth airport.

Exhibit 3-3: Average Annual Nonstop Air Travel Attributes Between Duluth and Other Airports 2010

From	To	Distance (miles)	Time (minutes)	Daily Frequency	Fare Cost ($)
Duluth(DLH)	Minneapolis (MSP)	144	60	7	224
Duluth (DLH)	Detroit (DTW)	542	111	2	625
Duluth (DLH)	Chicago (CHI)	402	87	2	150

3.4.3 RAIL TRAVEL

Amtrak has not provided passenger service between Minneapolis and Duluth/Superior since 1985.Therefore, the base-line forecast for the corridor was derived, based on a trip generation rates for Amtrak service in other corridors in the Midwest that have similar socioeconomic and trip-making characteristics. The base-line rail service assumed Amtrak 79-mph service with a frequency of 2 trains per day, a three hour running time from Minneapolis to Duluth, and 22 cents per mile fare. The base-line rail service is summarized in Exhibit 3-4.

Exhibit 3-4: Base Case Level of Rail Service

Train	Highest Speed (mph)	Frequency(train/day)	Time (minutes)	Fare Cost ($/mile)
Amtrak P42	79	2	170	0.22

3.4.4 BUS TRAVEL

Bus network attribute data, such as travel time, fares and frequencies, were obtained from official Internet websites (e.g., Greyhound) and 2008 Greyhound System Time Table. Fares were cross-referenced with fares obtained directly from Greyhound on selected routes within the study area.

Greyhound Lines Inc. and Jefferson Lines provide intercity bus services from Twin Cities to Duluth. Greyhound offers one express bus service daily, while Jefferson Lines offers three bus services daily, which stops at twelve intermediate stops. Additional buses might be put into use to accommodate passengers beyond the seating capacity of a single bus. The entire trip time for Greyhound bus is 2 hours 40 minutes, while the entire trip time for Jefferson Lines is 4 hours and 15 minutes. The fare for Greyhound bus is $18, while the fare for Jefferson Lines is $25.

3.5 ORIGIN-DESTINATION TRIP INFORMATION

TEMS extracted, aggregated and validated data from a number of sources in order to estimate base travel between origin-destination pairs in the study area. The travel demand forecast model requires the base trip information for all modes between each zone pair, in some cases this can be achieved directly from the data sources, while in other cases, the data providers only have origin-destination trip information of more aggregate level (e.g., station-to-station trip volume), if that is the case, a data enhancement process of trip simulation and access/egress simulation need to be conducted to estimate the zone-to-zone trip volume. The data sources and data enhancement requirements for each travel mode available in the study area are shown in Exhibit 3-5.

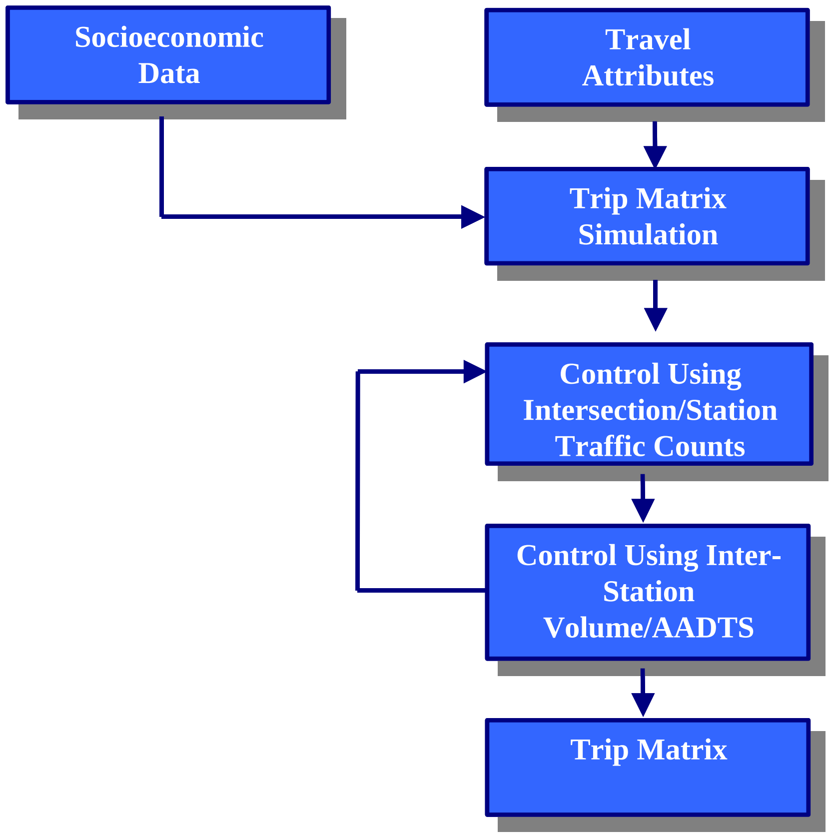
Exhibit 3-5: Sources of Total Travel Data by Mode

Mode	Data Source	Data Enhancement Required
Auto	The Metropolitan Council 2008 Trip Data The Minnesota DOT AADT count Restoration of Intercity Passenger Rail Service in the Minneapolis-Duluth/Superior Corridor 2008	Trip Simulation for Auto Flows Movement and AADT Counts
Rail	Amtrak Station Data Restoration of Intercity Passenger Rail Service in the Minneapolis-Duluth/Superior Corridor 2008	Access/Egress Simulation
Bus	Bus Schedules Estimated Bus Loading Factors	Access/Egress Simulation
Air	Bureau of Transportation Statistics 10% Ticket Sample Flight Schedules	Access/Egress Simulation

Access/egress simulation refers to the need to identify origin and destination zones for trips via passenger rail, air and bus. Otherwise, all non-auto trips would appear to begin at the bus or passenger rail terminal or airport zones. Distribution of access and egress trips to zones was accomplished using socioeconomic data and access/egress travel time and cost data. The flowchart of origin-destination trip estimation is shown in Exhibit 3-6.

For auto mode, the quality of the origin-destination trip data was assured by comparing it to the actual traffic counts such as AADT and adjustments have been made when necessary. For public travel modes, the origin-destination trip data was validated by examining station volumes and segment loadings. For trip data collected before 2010, historical and projected ridership data were used together with socioeconomic data to factor the trips to 2010 level.

Exhibit 3-6: Origin-Destination Trip Matrix Generation and Validation



The total estimated person trip volume within the corridor in 2010 is 22.16 million as shown in Exhibit 3-7.

Exhibit 3-7: Base 2010 Origin-Destination Trip Summary (millions)

Business	Commuter	Other (include Casino)	Total
3.17	7.57	11.42	22.16
14.31%	34.16%	51.53%	100.00%

4 RIDERSHIP AND REVENUE

4.1 INTRODUCTION

This chapter presents the passenger rail ridership and revenue forecast results obtained for Routes 9, 11 and 11A for the Duluth-Minneapolis corridor. It should be noted that the model databases do not include special events (e.g., concerts or sporting events) and therefore, reflect conservative estimates of the ridership potential based only on regular, daily city interactions.

4.2 BASIC STRUCTURE OF THE COMPASS™ MODEL

The *COMPASS*™ Multimodal Demand Forecasting Model is a flexible demand forecasting tool used to compare and evaluate alternative passenger rail network and service scenarios. It is particularly useful in assessing the introduction or expansion of public transportation modes such as air, rail or bus into new markets. Exhibit 4-1 shows the structure and working process of *COMPASS*™ Model. As shown in Exhibit 4-1, the inputs to the *COMPASS*™ Model are base and proposed transportation networks, base and projected socioeconomic data, value of time and value of frequency from MWRRI Stated Preference surveys, and base year trip data obtained from MPO, Transit and State DOT sources. All the data has been brought up to a 2010 base.

The *COMPASS*™ Model structure incorporates two principal models: a Total Demand Model and a Hierarchical Modal Split Model. These two models are calibrated separately. In each case, the models are calibrated for origin-destination trip making in the study area. The Total Demand Model provides a mechanism for replicating and forecasting the total travel market. The total number of trips between any two zones for all modes of travel is a function of (1) the socioeconomic characteristics of the two zones and (2) the travel opportunities provided by the overall transportation system that exists (or will exist) between the two zones. Typical socioeconomic variables include income, employment, and population. The quality of the transportation system is measured in terms of total travel time and travel cost by all modes.

The role of the *COMPASS*™ Modal Split Model is to estimate relative modal shares of travel given the estimation of the total market by the Total Demand Model. The relative modal shares are derived by comparing the relative levels of service offered by each of the travel modes. Three levels of binary choice were calibrated for the Duluth-Minneapolis corridor (see Exhibit 4-2). The third level of the hierarchy separates private auto travel, with its perceived spontaneous frequency, low access/egress times, and highly personalized characteristics, from public modes (i.e., bus, rail and air). The second structure level separates air, the most expensive but quickest public mode, from rail and bus surface modes. It should be noted that air travel is today much slower than prior to 9/11 because of increased security. The first level separates rail, the fast ground transportation technology from the slow bus services. The model forecasts changes in riders, revenue and market share based on changes travel time, frequency and cost for each mode.

Exhibit 4-1: Structure of the COMPASS™ Model

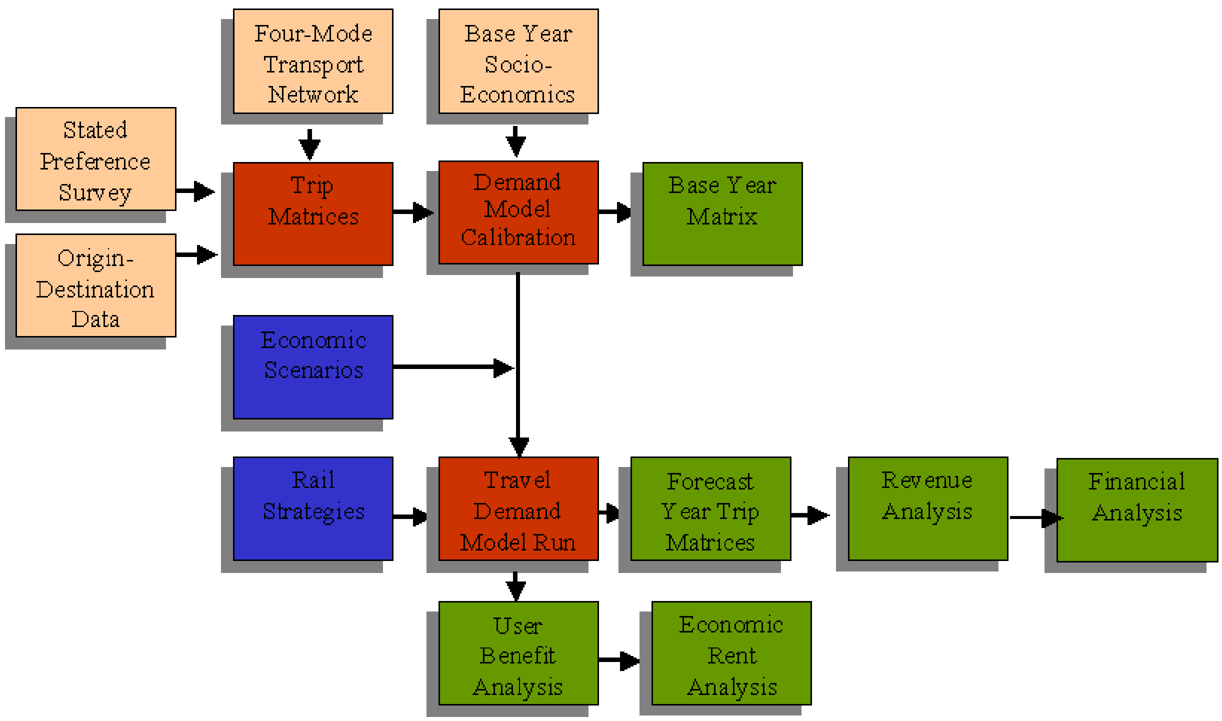
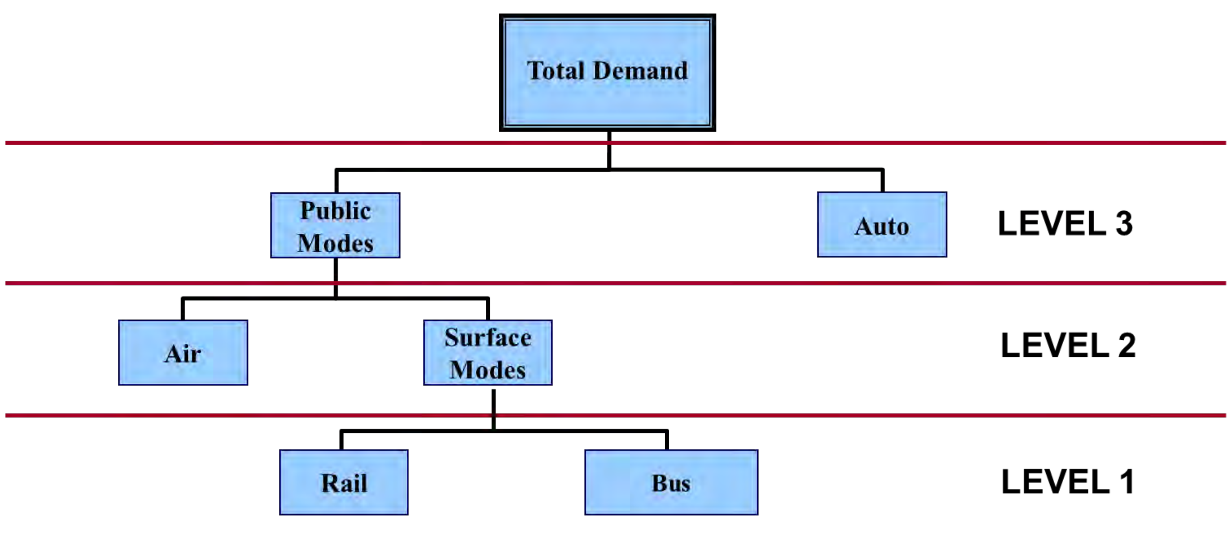


Exhibit 4-2: Hierarchical Structure of the Modal Split Model



A full description of the model and its calibration is given in Appendix A.

4.3 FUTURE TRAVEL MARKET STRATEGIES

4.3.1 FUEL PRICE FORECASTS

A crucial factor in the future attractiveness of the high speed rail is the price of gas. Forecasts of oil prices from the Energy Information Agency suggest that oil price will return at least to $100 per barrel in the next five years and will remain at that level in real terms to 2030 and beyond. See Exhibit 4-3. The implication of this is a central case gas price of 4 dollars per gallon with a high case price of $5 per gallon and a low case price of $3 per gallon. Since gas is currently at least $2.80 a gallon in a weak economic environment, $4 per gallon once the economy starts to grow again seems very realistic. Exhibit 4-4 shows the relationship of gas prices to oil acquisition cost from 1993 to 2010. It shows that gas prices rise directly with oil prices. As a result, gas prices are likely to rise as shown in Exhibit 4-5. This gives high, low and central scenarios for gas price to use in the travel demand forecast.

Exhibit 4-3: U.S. Crude Oil Composite Acquisition (Wholesale) Cost by Refiners – Historical Data and EIA Forecasts[1]

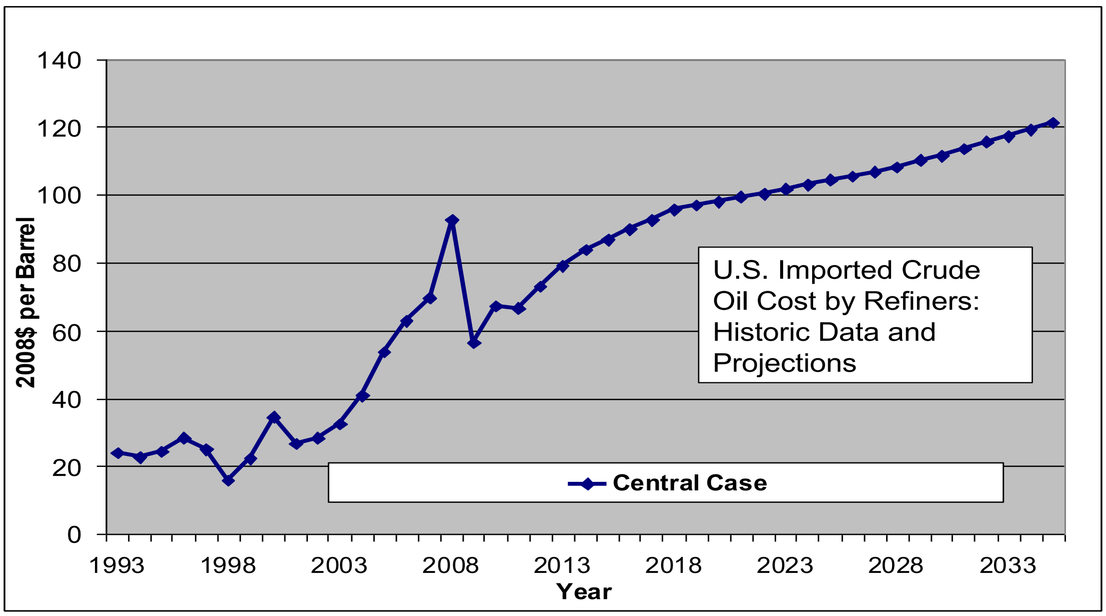


Exhibit 4-4: U.S. Retail Gasoline Prices as a Function of Crude Oil Prices (1993-2010) [2]

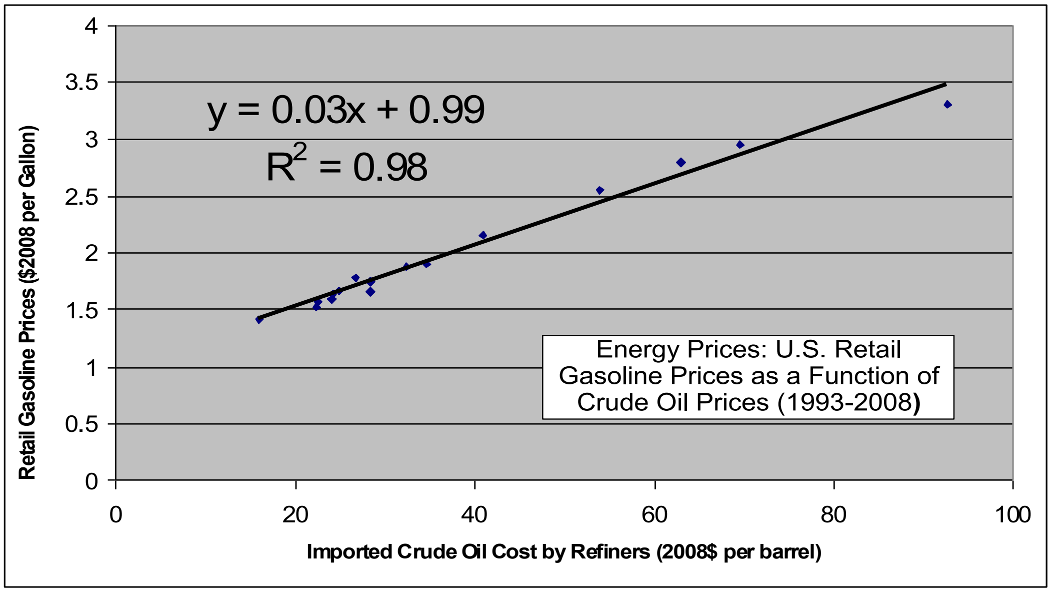
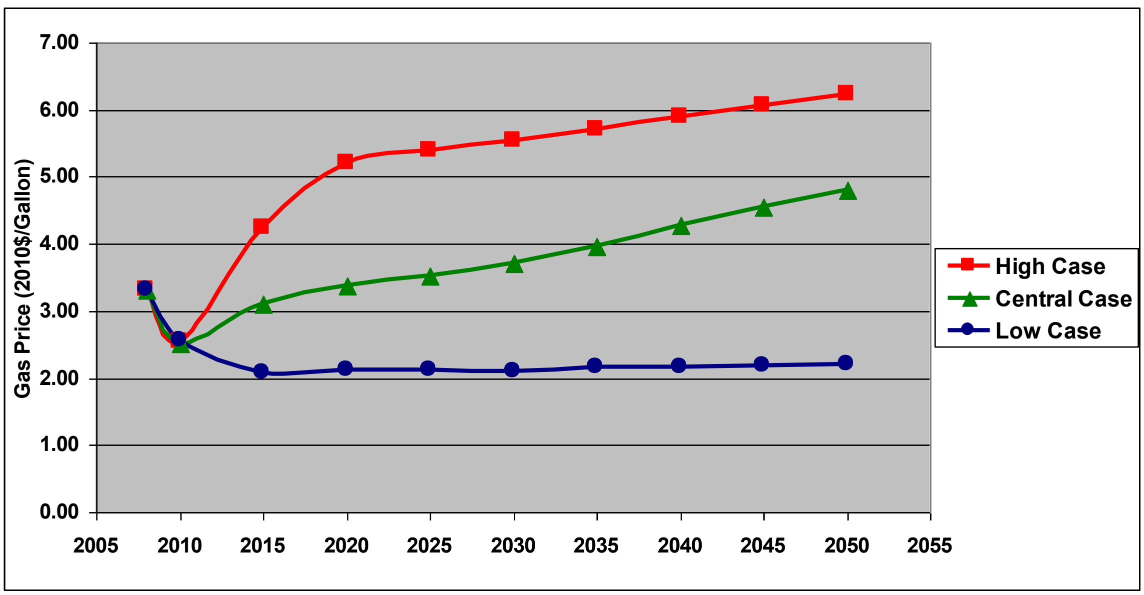


Exhibit 4-5: U.S. Retail Gasoline Prices – Historic Data and the Forecast



[1] Sources: EIA - http://www.eia.doe.gov/oiaf/aeo/aeoref_tab.html and http://www.eia.doe.gov/dnav/pet/pet_pri_rac2_dcu_nus_a.htm

[2] Analysis developed by TEMS, Inc. for MARAD US DOT. Sources: http://tonto.eia.doe.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=mg_tt_us&f=a and http://www.eia.doe.gov/dnav/pet/pet_pri_rac2_dcu_nus_a.htm

4.3.2 HIGHWAY TRAFFIC CONGESTION

The level of service of auto and bus travel incorporates the MPO congestion scenarios to ensure that the automobile traveling impedances are properly reflected. The average highway travel time in the Duluth-Minneapolis corridor is estimated to have an average annual growth rate of 0.5% due to increased travel demand and congestion. This means that the auto travel time from Duluth to Minneapolis will increase from a current average 2 hours and 26 minutes to 2 hours and 49 minutes in 2040, which is a 16% increase.

As a result, high speed rail offers an increasing time advantage over auto and bus travel markets that rely upon highway infrastructure and are affected by increasing congestion and travel times. The time advantage will have greater impact on business and commuter travel purposes which have higher values of time and which makes the high speed rail more competitive with these travelers.

4.4 RIDERSHIP AND REVENUE FORECAST RESULTS FOR DIFFERENT ROUTES

Exhibit 4-8 presents the rail ridership forecasts for the Duluth-Minneapolis corridor for years 2020 and 2040. For Route 9, the system generates 938 thousand annual riders in 2020 growing to 1302 thousand annual riders in 2040. (A trip is defined as a passenger making a one-way trip. A round trip generates two one way trips). For Route 11, the annual riders are 834 thousand in 2020 growing to 1158 thousand in 2040. Route 11A has the longest route length and many commuter trips between Minneapolis and St. Paul are diverted to this service. In 2020, Route 11A has 981 thousand annual riders, and it grows to 1391 thousand in 2040.

Exhibit 4-8: 2020 and 2040 Forecast Ridership (Thousand)

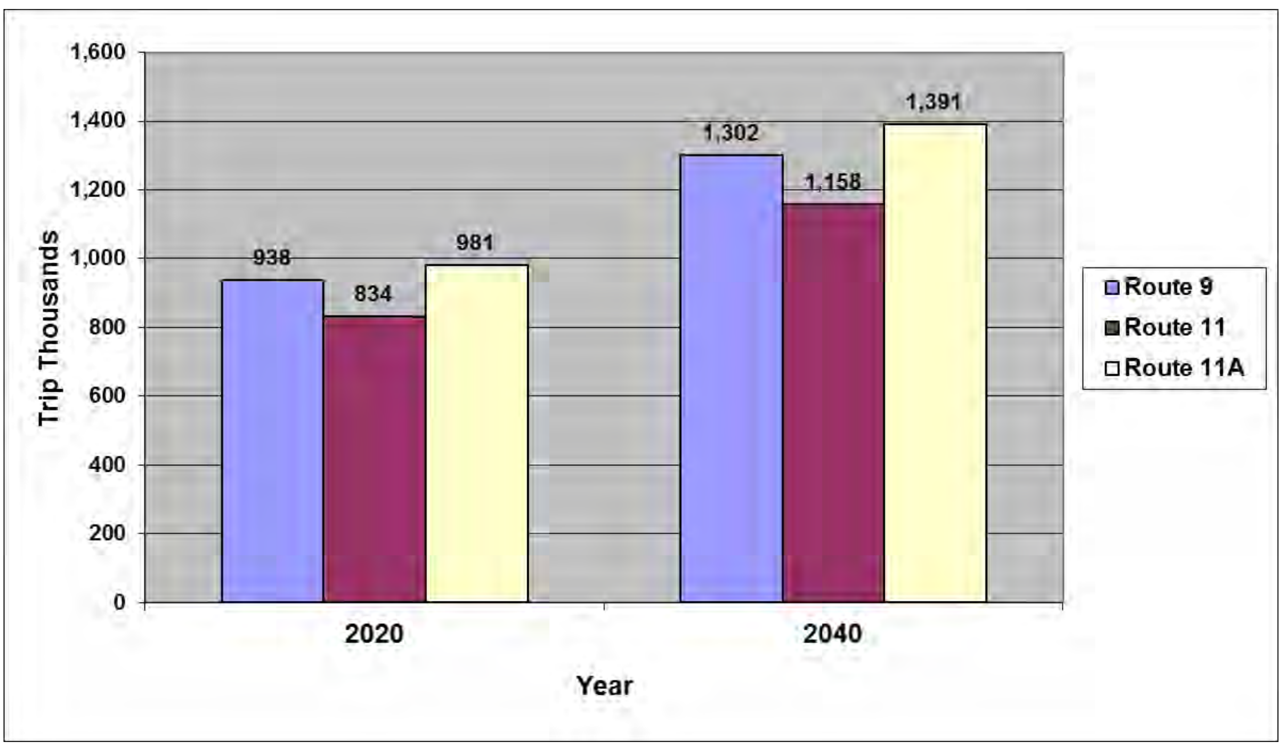


Exhibit 4-9 shows the annual passenger miles associated with trips made in 2020 and 2040. It can be seen that Route 9 has the greatest passenger miles, even though Route 11A has the greatest volume of passengers. This is because Route 11A attracts a large number of short distance trips between St. Paul and Minneapolis. The circuitous of Route 11A produces a slower train time and as a result, loses longer-distance trips from White Bear north.

Exhibit 4-9: 2020 and 2040 Passenger Mile Forecasts (Millions)

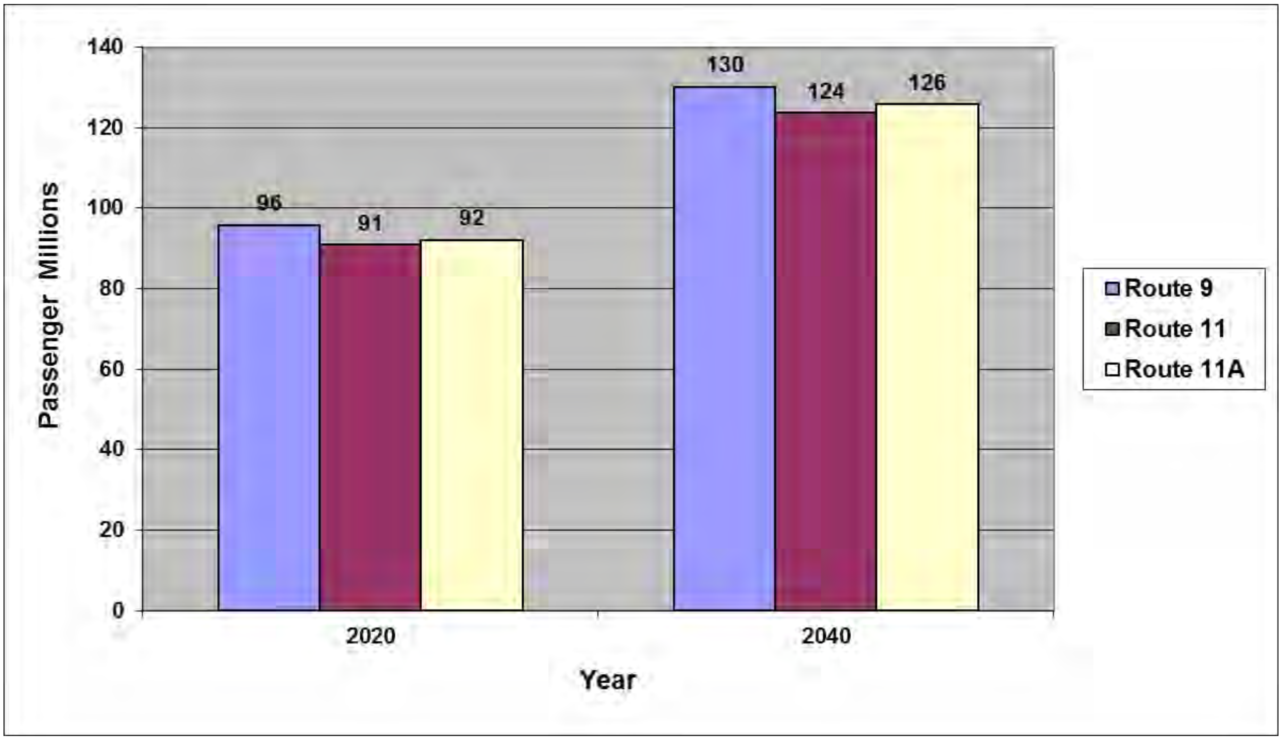
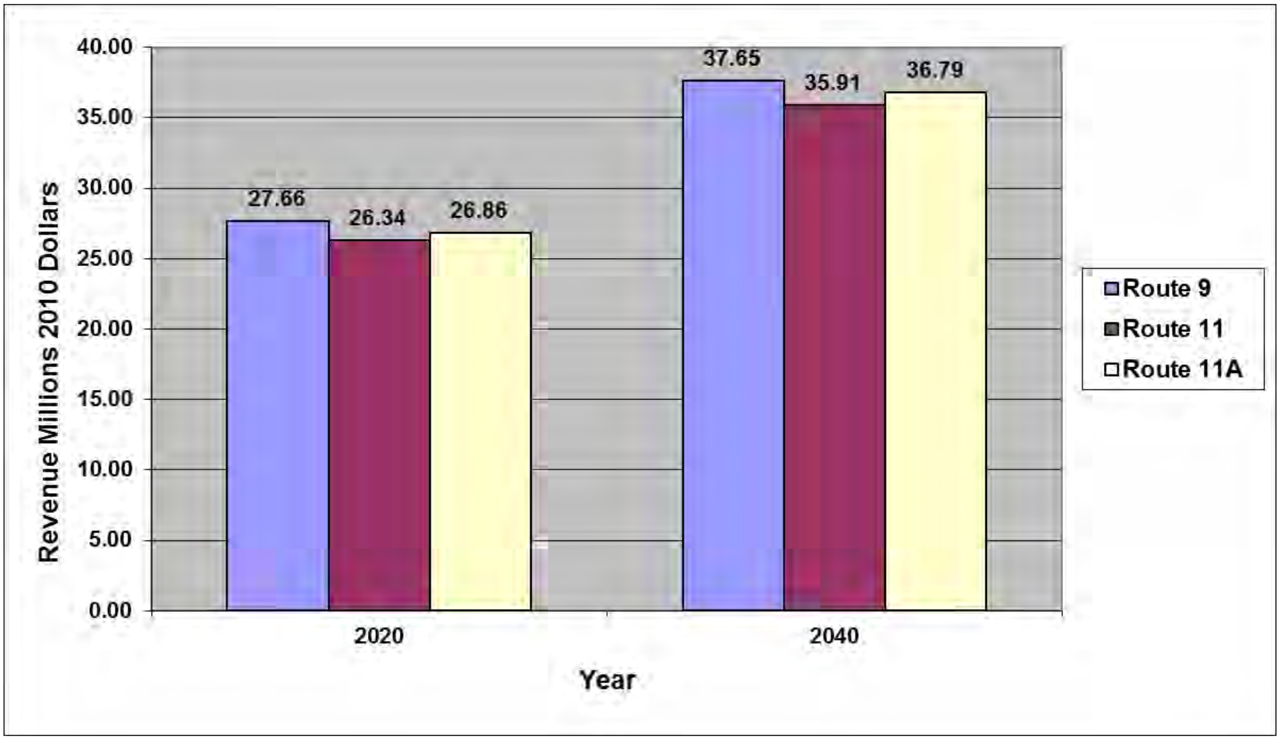


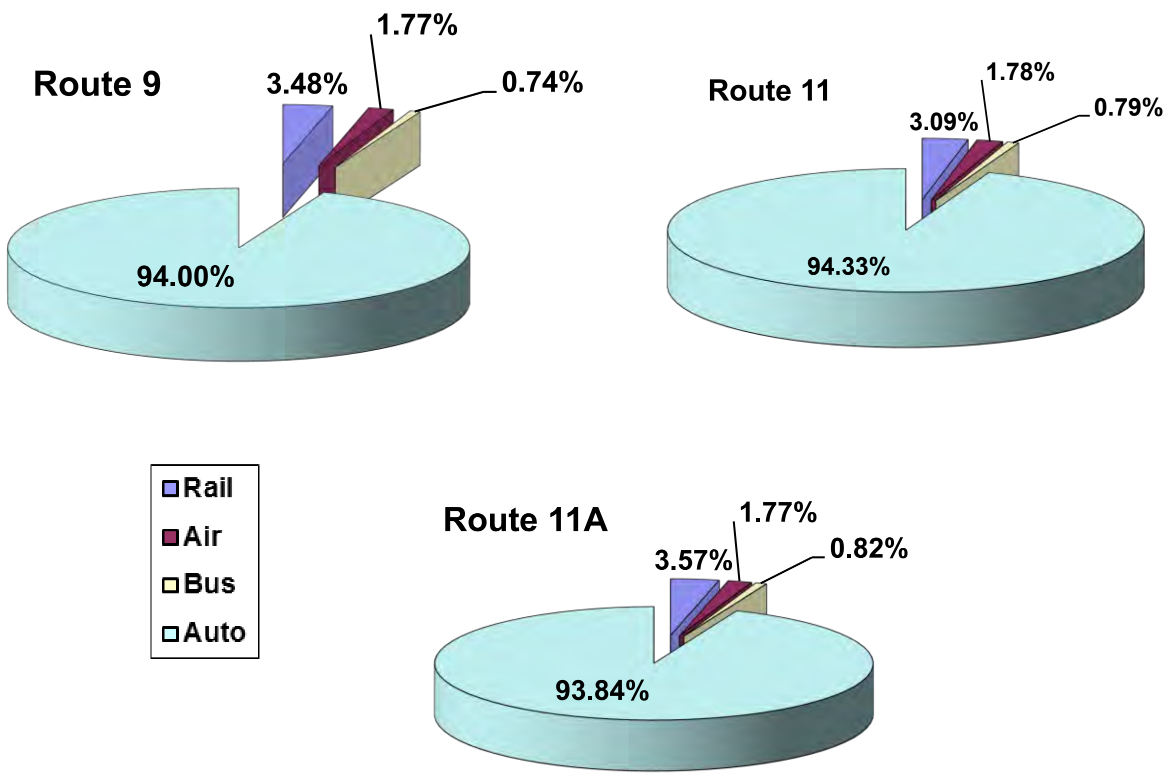
Exhibit 4-10 shows the annual fare-box revenue for years 2020 and 2040. It can be seen that the annual revenue of Route 9 in 2020 is $27.66 million increasing to $37.65 million in 2040. The revenue of Route 11 is $26.34 million in 2020 and $35.91 million in 2040. Route 11A produces $26.86 million annual revenue in 2020 and $36.79 in 2040. The reason that Route 11A has a lower revenue than Route 9 is that it captures extra ridership from St. Paul to Minneapolis who pay only for the short trip, but loses longer distance travellers to Minneapolis from places like Duluth, Superior, North Branch and White Bear Lake due to the circuitry and slowness of the trip to Minneapolis.

Exhibit 4-10: 2010 and 2020 Forecast Revenue (Million 2010 dollars)



The 2020 ridership mode split shares for these three routes is shown in Exhibit 4-11. Auto mode continues to demonstrate its dominance in the corridor for all routes, while rail has 3 to 4 percent market share. However, this is bigger than both air and bus. Among the routes, 11A has higher rail market share than the other two routes, because this route captures extra local trips between St. Paul and Minneapolis. Without the extension to Minneapolis from St. Paul, the volume of trips on Route 11A would be less than that of Route 9.

Exhibit 4-11: 2020 Travel Market Shares



The purpose split of the rail ridership as illustrated in Exhibit 4-12 shows that percentage of each trip purposes are very similar for all three routes. The Other purpose accounts for about 68% of the overall ridership, the Business purpose accounts for about 19%, and the casino accounts for 9%-12%. Route 11A has more commuters than others because it has many short distance commuter trips between Minneapolis and St. Paul.

Exhibit 4-12: 2020 Rail Trip Purpose Breakdown

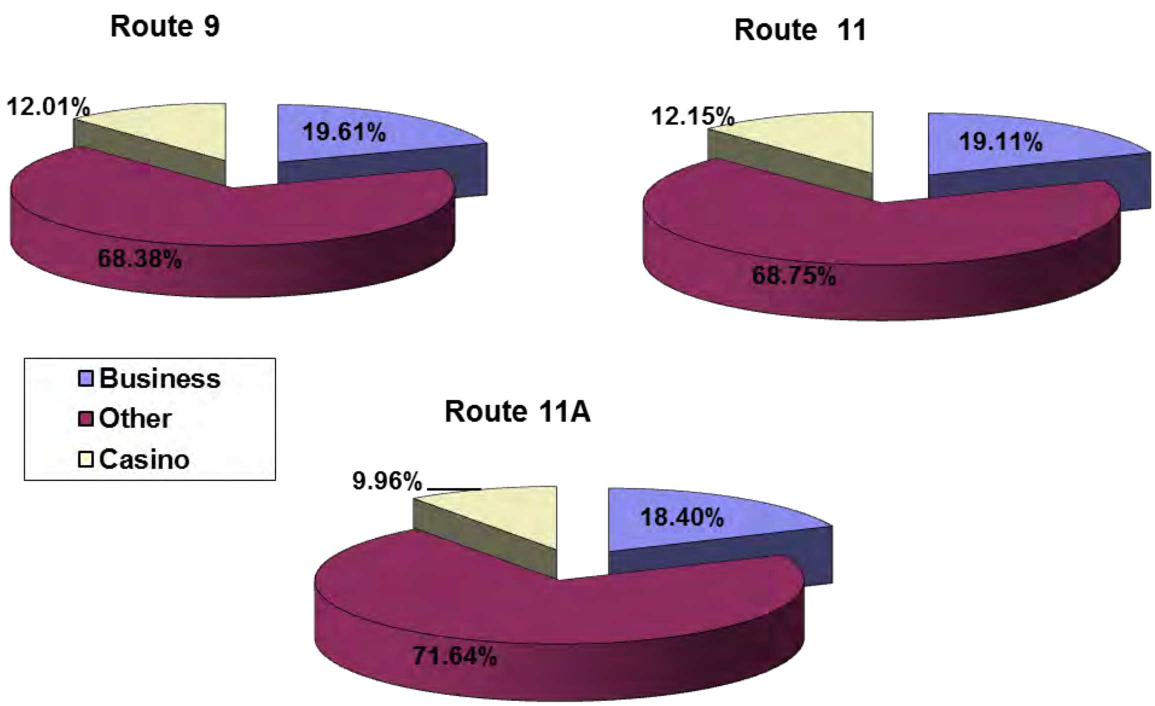
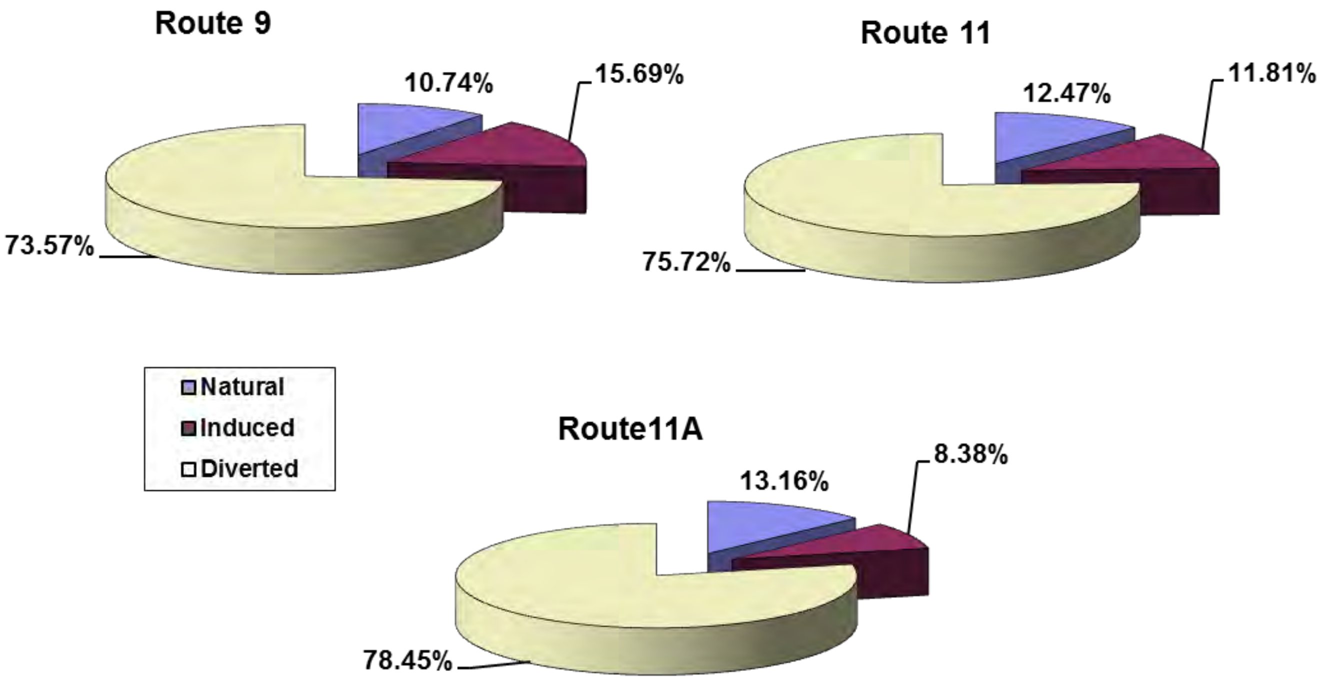


Exhibit 4-13 illustrates the sources of the rail trips of 2020 for three routes. The trips diverted from other modes are the most important source of rail trips, which account for about 75% of overall rail trips. Given the time saving, reasonable choice of station locations and other convenience, Route 9 is for, people living in the corridor, and more attractive than other routes, so it has the highest induced trips. Natural growth accounts for 10-13% percent of the three routes, which is in line with the results of other studies.

Exhibit 4-13: 2020 Sources of Rail Trips

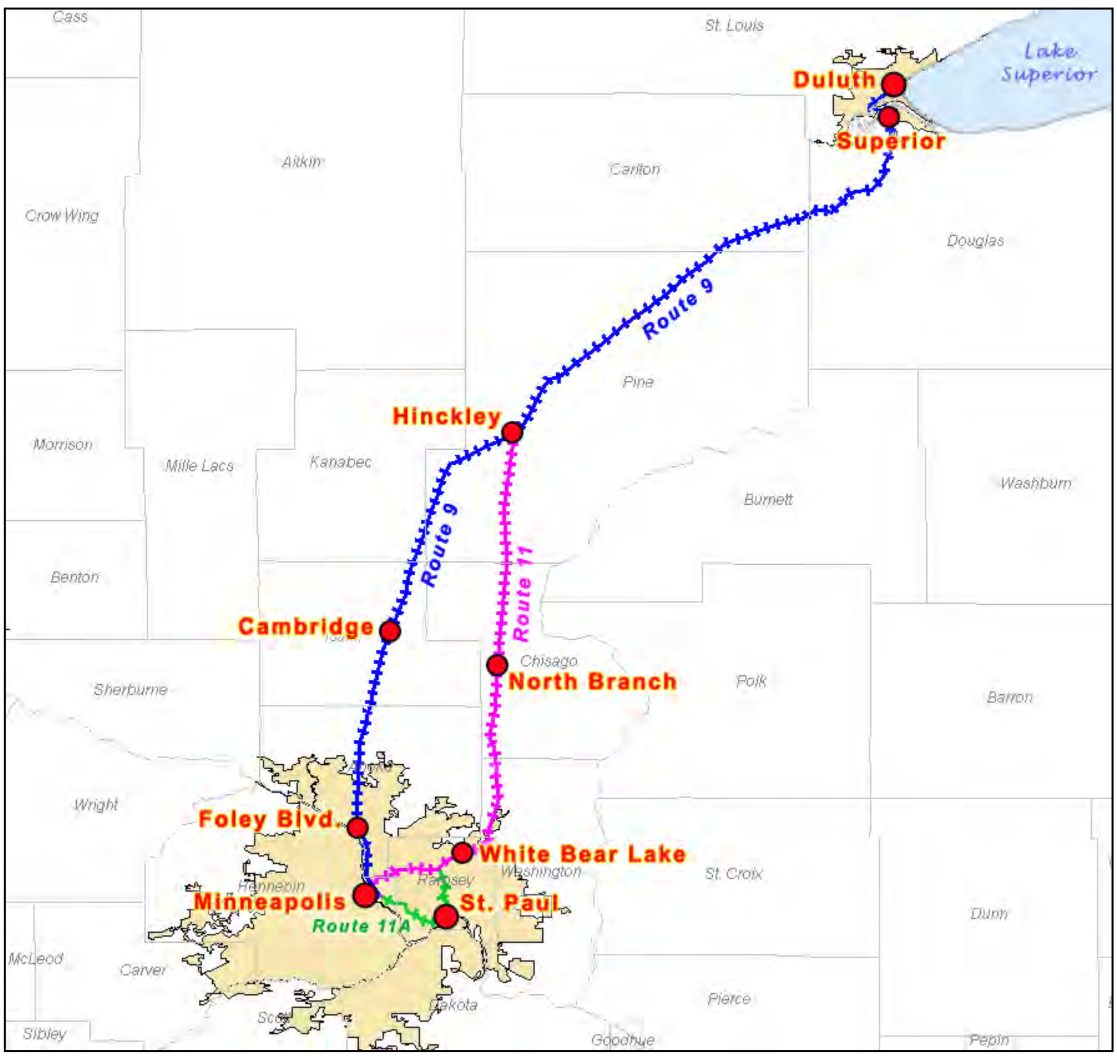


5 CAPITAL INVESTMENT NEEDS

5.1 INTRODUCTION

The study corridor extends from downtown Minneapolis, MN, to Downtown Duluth, MN. The three routes evaluated between the Twin Cities and the Twin Ports includes some multiple track, heavily utilized mainlines and pass several complex junctions as well as major freight marshaling yards, which impact the capital costs of some of the routes. This chapter compares the capital costs of three routes, as shown in Exhibit 5-1. Route 9 (152.9 miles) uses the existing single track BNSF rail line following the Hinckley subdivision the whole way. It is the most direct route. Route 11 (158.1 miles) utilizes an alternative route more closely paralleling I-35 called the “Rush Line”. Route 11A (166.2 miles) loops south through St. Paul Union Depot, then follows the Rush Line corridor north to Hinckley. The northern part of the route from Hinckley to Duluth follows the Hinckley subdivision, and is the same for all three routes.

Exhibit 5-1: Minneapolis-Duluth/Superior Rail Corridors



All costs were developed on a consistent basis using 30% Contingency and 24% Soft Costs rates. The same rates were applied to all corridors for comparative purposes, although because of previous studies, more engineering data exists for the Route 9 corridor than for the other two alternatives. As a result, the 30% Contingency rate could possibly be reduced in the future, but this was not reflected in the current analysis.

Details of the field inspection and engineering assessment of the three routes will be described in a report under separate cover. This chapter only presents the summary results that were used as the basis of the Economic Analysis and FRA Cost Benefit screening of the three route alternatives.

All costs were developed on a line segment basis, and then added together to develop the total costs for each route. The segments shown in Exhibit 5-2 were used as the basis for developing the costs:

Exhibit 5-2: Minneapolis-Duluth/Superior Costing Segments

Segment Number	Segment Limits	Segment Length (miles)	Owner
1	Target Field to Minneapolis Junction	1.9	BNSF
2	Minneapolis Junction to University Avenue	1.9	BNSF
3	University Ave to Coon Creek Junction	9.2	BNSF
4	Coon Creek Junction to Isanti	23.6	BNSF
5	Isanti to Cambridge	6.1	BNSF
6	Cambridge to Hinckley	34.9	BNSF
7	University Ave. to Cardigan Junction	8.6	CP
8	Cardigan Junction to Bald Eagle	6.7	CP
9	Bald Eagle to Hugo	4.2	Minnesota Commercial Railway
10	Hugo to North Branch	24.0	Public
11	North Branch to Hinckley	35.5	St. Croix Valley Railway
12	Minneapolis Junction to MN Transfer	3.2	BNSF
13	MN Transfer to Fordson Junction	5.6	Minnesota Commercial Railway / CP
14	Fordson Junction to St. Paul Union Depot	1.5	CP
15	St. Paul Union Depot to Soo Junction	3.0	BNSF
16	Soo Junction to Cardigan Junction	5.3	CP
17	Hinckley to Boylston	60.5	BNSF
18	Boylston to Superior	8.5	BNSF
19	Superior to Duluth	6.3	BNSF

5.2 ROUTE 9 CAPITAL COST EVALUATION

Route 9 follows the existing BNSF route all the way from Minneapolis to Duluth, and consists of segments 1, 2, 3, 4, 5, 6, 17, 18, and 19. Exhibit 5-3 gives a map of the route, and Exhibit 5-4 gives the segment costs, including contingency and soft costs.

Exhibit 5-3: Route 9 Segment Map

Exhibit 5-4: Route 9 Costs by Segment

Segment Number	Segment Limits	Segment Length (miles)	Owner	Segment Cost (1000's)	Cost Per Mile (1000's)
1	Target Field to Minneapolis Junction	1.9	BNSF	$8,221	$4,350
2	Minneapolis Junction to University Avenue	1.9	BNSF	$11,943	$6,319
3	University Ave to Coon Creek Junction	9.2	BNSF	$67,909	$7,357
4	Coon Creek Junction to Isanti	23.6	BNSF	$48,542	$2,059
5	Isanti to Cambridge	6.1	BNSF	$52,156	$8,607
6	Cambridge to Hinckley	34.9	BNSF	$289,338	$8,283
17	Hinckley to Boylston	60.5	BNSF	$190,702	$3,154
18	Boylston to Superior	8.5	BNSF	$68,022	$7,974
19	Superior to Duluth	6.3	BNSF	$84,654	$13,480
Total		**152.9**		**$821,487**	**$5,372.71**

5.3 ROUTE 11 CAPITAL COST EVALUATION

Route 11 follows the BNSF from Minneapolis to University Avenue, CP from University Avenue to Bald Eagle, former Rush Line (segments of which are abandoned) from Bald Eagle to Hinckley, then BNSF the rest of the way into Duluth. It consists of segments 1, 2, 7, 8, 9, 10, 11, 17, 18, and 19. Exhibit 5-5 gives a map of the route, and Exhibit 5-6 gives the segment costs.

Exhibit 5-5: Route 11 Segment Map

Exhibit 5-6: Route 11 Costs by Segment

Segment Number	Segment Limits	Segment Length (miles)	Owner	Segment Cost (1000's)	Cost Per Mile (1000's)
1	Target Field to Minneapolis Junction	1.9	BNSF	$8,221	$4,350
2	Minneapolis Junction to University Avenue	1.9	BNSF	$11,943	$6,319
7	University Ave. to Cardigan Junction	8.6	CP	$224,373	$26,090
8	Cardigan Junction to Bald Eagle	6.7	CP	$66,876	$10,057
9	Bald Eagle to Hugo	4.2	Minnesota Commercial Railway	$208,280	$49,709
10	Hugo to North Branch	24	Public	$217,138	$9,036
11	North Branch to Hinckley	35.5	St. Croix Valley Railway	$282,144	$7,950
17	Hinckley to Boylston	60.5	BNSF	$190,702	$3,154
18	Boylston to Superior	8.5	BNSF	$68,022	$7,974
19	Superior to Duluth	6.3	BNSF	$84,654	$13,480
Total		**158.1**		**$1,362,353**	**$8,617.03**

Route 11A follows the BNSF from Minneapolis to Midway, Minnesota Commercial and CP from Midway to St Paul Union Station, BNSF and CP from Union Station to Bald Eagle, former Rush Line (segments of which are abandoned) from Bald Eagle to Hinckley, then BNSF the rest of the way into Duluth. It consists of segments 1, 12, 13, 14, 15, 16, 8, 9, 10, 11, 17, 18, and 19. Exhibit 5-7 gives a map of the route, and Exhibit 5-8 gives the segment costs.

Exhibit 5-7: Route 11A Segment Map

Exhibit 5-8: Route 11A Costs by Segment

Segment Number	Segment Limits	Segment Length (miles)	Owner	Segment Cost (1000's)	Cost Per Mile (1000's)
1	Target Field to Minneapolis Junction	1.9	BNSF	$8,221	$4,350
12	Minneapolis Junction to Minnesota Transfer	3.2	BNSF	$24,694	$7,717
13	Minnesota Transfer to Fordson Junction	5.6	Minnesota Commercial Railway / CP	$90,486	$16,101
14	Fordson Junction to St. Paul Union Depot	1.5	CP	$47,939	$31,130
15	St. Paul Union Depot to Soo Junction	3.0	BNSF	$90,976	$30,325
16	Soo Junction to Cardigan Junction	5.3	CP	$112,828	$21,450
8	Cardigan Junction to Bald Eagle	6.7	CP	$66,876	$10,057
9	Bald Eagle to Hugo	4.2	Minnesota Commercial Railway	$208,280	$49,709
10	Hugo to North Branch	24.0	Public	$217,138	$9,036
11	North Branch to Hinckley	35.5	St. Croix Valley Railway	$282,144	$7,950
17	Hinckley to Boylston	60.5	BNSF	$190,702	$3,154
18	Boylston to Superior	8.5	BNSF	$68,022	$7,974
19	Superior to Duluth	6.3	BNSF	$84,654	$13,480
Total		**166.2**		**$1,492,960**	**$8,982.91**

5.4 OVERALL CAPITAL COSTS

The infrastructure cost assessment was performed by Quandel Consultants and included only the cost for basic route infrastructure (track, signals, grade crossings, right of way, etc.)

Additional cost for stations was estimated by TEMS to cover the cost for platforms and basic minimal passenger facilities only. Equipment costs for four 200-seat Diesel Multiple Unit trains and a small maintenance support base were also estimated and added to the total. This resulted in a total capital cost for each route alternative as shown in Exhibit 5-9. These overall capital costs were carried forward into the Economic assessment performed in Chapter 8.

Exhibit 5-9: Overall Capital Cost by Route Alternative

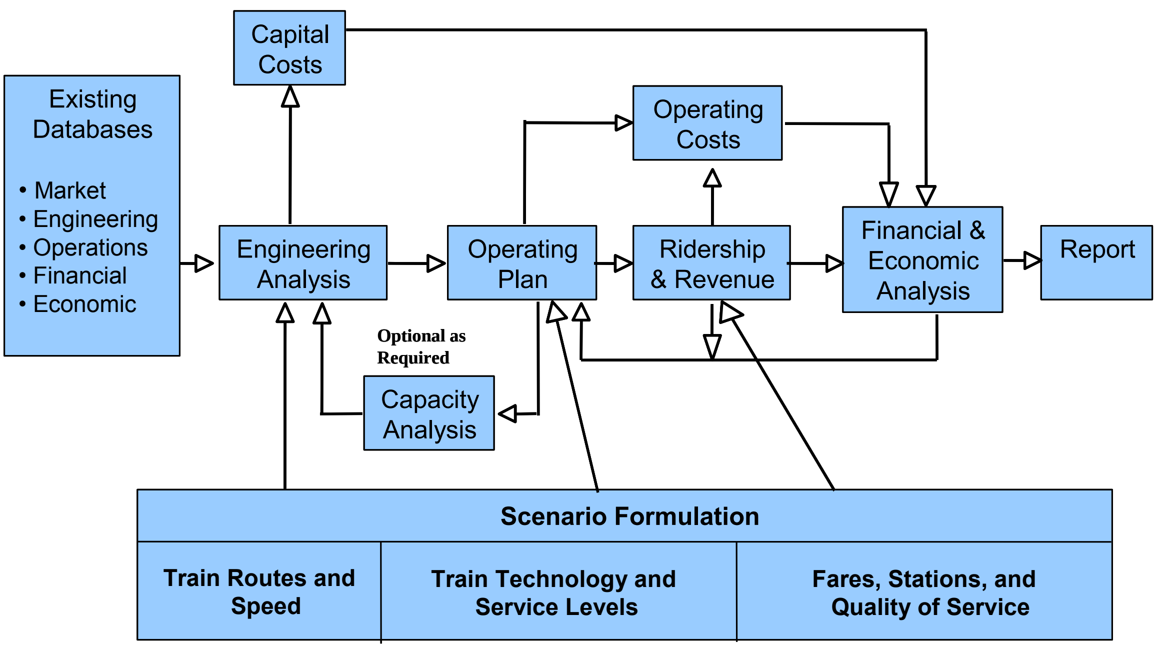
Route	Route Length (miles)	Capital Cost Infrastructure	Stations	Equipment	Total Capital Cost
9	152.9	$821,487	$9,766	$108,100	$939,356
11	158.1	$1,362,353	$9,766	$108,100	$1,480,216
11A	166.2	$1,492,960	$11,271	$108,100	$1,612,331

6 OPERATIONS

6.1 INTRODUCTION

This section describes the key assumptions used to develop the passenger rail service scenarios and operating plans; it identifies potential station locations and provides an assessment of equipment technologies and fleet requirements. The TRACKMAN™, LOCOMOTION™ and COMPASS™ software programs (components of the RightTrack™ software system) are used in an interactive analysis to calculate train travel times, build corridor train schedules, and to recommend train technology and rail system operating strategies. As Exhibit 6-1 shows, the business plan is the final result of an iterative process that requires progressive fine-tuning of the operating strategy, in order to accommodate the specific requirements of travel demand in the study corridor. A key requirement for the analysis is to adjust the train size and frequency levels to appropriately match demand, providing enough capacity while still producing acceptable load factors, and respecting the financial constraints on the operation of the system (e.g., the requirement to produce a positive operating ratio.) The results of the interactive analysis are then used to identify the system operating costs.

Exhibit 6-1: Business Planning Process – Interactive Analysis



6.2 TRAIN SERVICE AND OPERATING ASSUMPTIONS

The objective of the study is to assess the impact of the Route 9, 11 or 11A route alternatives on the economic viability of the proposed Minneapolis-Duluth/Superior Corridor.

Previous studies (in 2000, 2007 and 2009) assessed a whole range of Route 9 speed options from 50-mph up to 125-mph, using rail equipment appropriate for each speed. More recent evaluations included the impact of BNSF Railway requirements for dedicated track for speeds above 90-mph. It was found that the economic performance of the Route 9 corridor was optimized by installing dedicated 110-mph track only from Cambridge/Isanti to Hinckley, shown in Exhibit 6-2, while operating the remainder of the line north of Coon Creek at 90-mph.

This assumption was used as the basis of the current Route 9 evaluation. In addition to providing a speed benefit, this track configuration also optimizes the operational flexibility and capacity of the corridor by locating a high speed double track passing area close to the geographical center of the corridor. As a result, the proposed investment supports both speed and capacity objectives for investment in the corridor.

Exhibit 6-2: Route 9 110-mph/90-mph Evaluated Option

FRA Tier-I Compliant tilting trains as shown in Exhibit 6-3 were assumed. Examples of such trains may include the Midwest Regional Rail System "generic 110-mph train" which was characterized as a Talgo T-21, a locomotive-hauled train, or an equivalent DMU option, characterized as the ICE TD. It should be noted that the earlier MWRRS equipment assessment had already demonstrated that a tilting DMU could exceed the acceleration and braking performance of the T-21. As a result, using the T-21 as a representative generic 110-mph train would develop a conservative schedule.

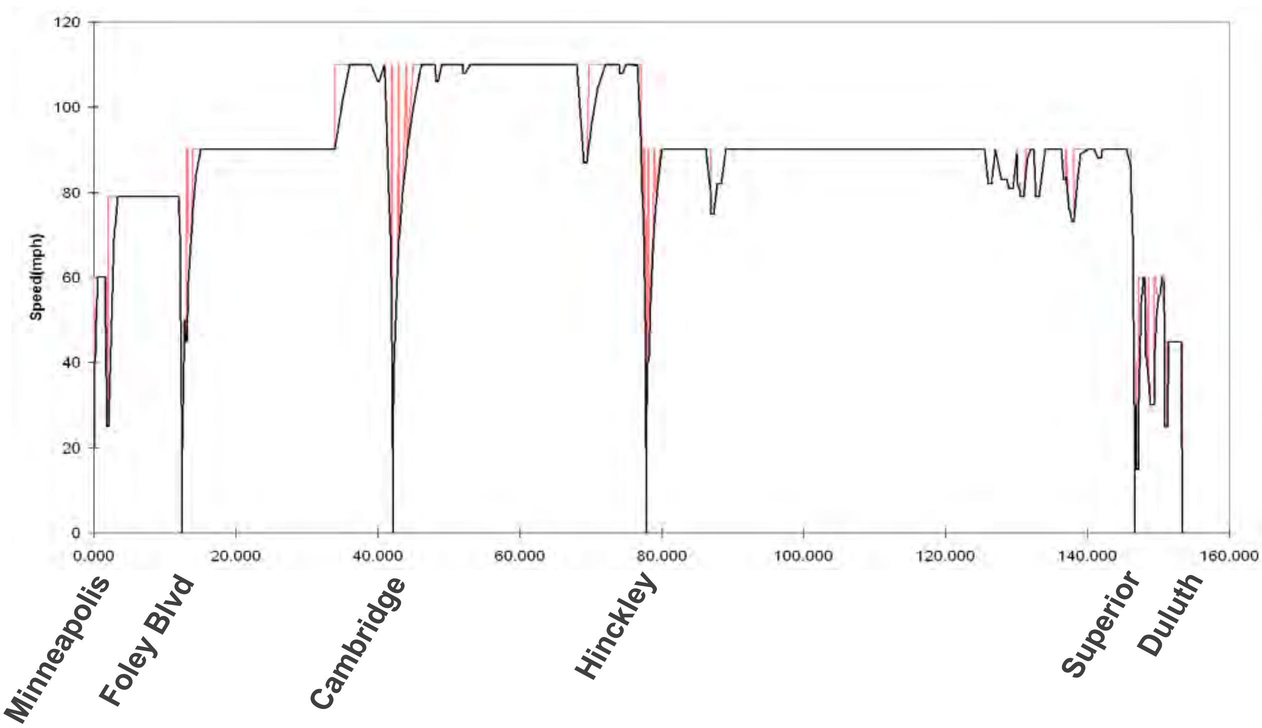
Exhibit 6-3: "Generic 110-mph Train Options" Represented by Talgo T-21 and Tilting DMU

Talgo T21

ICE TD / ACE 3

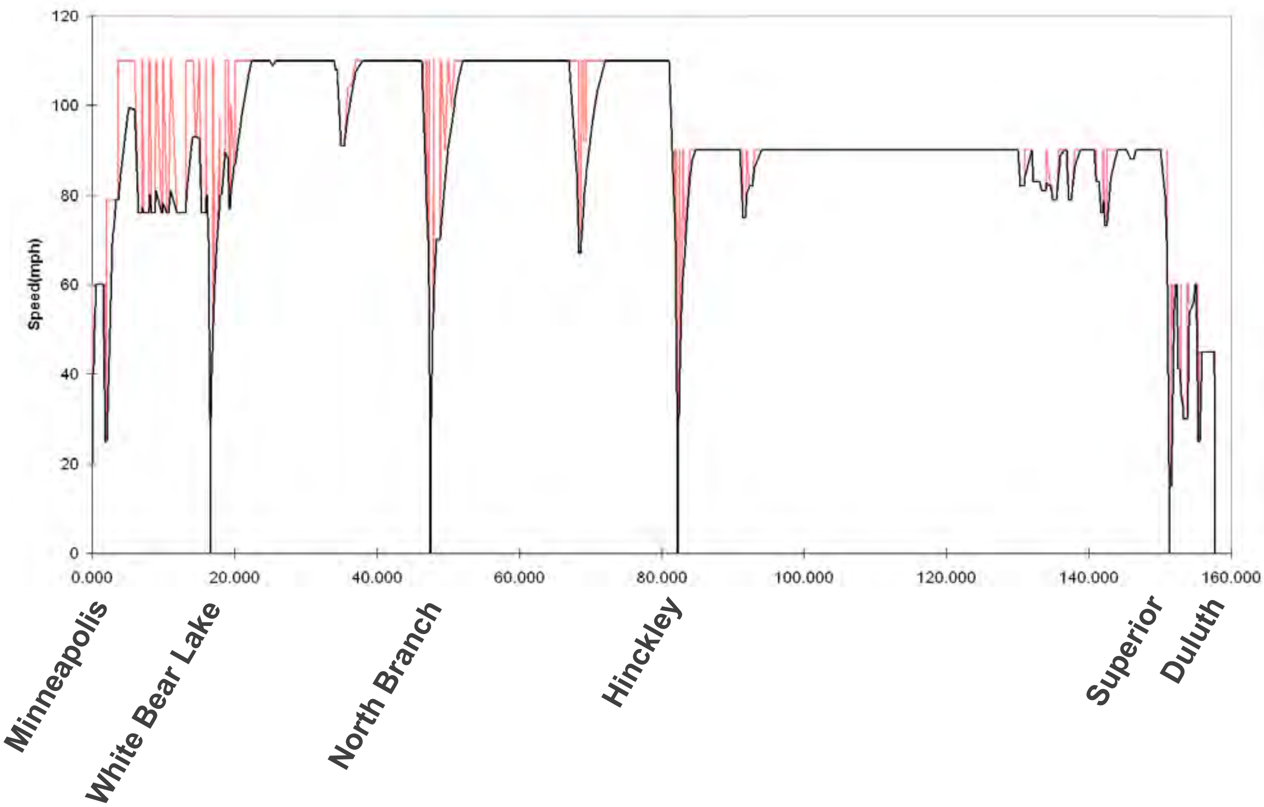
The proposed track configuration for Route 9 as shown in Exhibit 6-2 results in a 2 hour 17 minute timetable, as opposed to an even 2 hour timetable that could be achieved by maximizing the use of 110-mph speeds. The 17 minutes difference is a result of both added running time and added schedule slack time, due to the higher degree of comingling with freight trains that was envisioned under this new scenario. The proposed revised passenger train schedules were submitted to BNSF Railway for the purpose of capacity evaluation, which is still ongoing. The speed profile for the evaluated Route 9 option is shown in Exhibit 6-4.

Exhibit 6-4: Speed Profile – Route 9 – 2:17 Schedule



By comparison, Route 11 that uses the Rush Line, even though the route is a little longer, has the same schedule because a greater distance can be operated at 110-mph speeds, all the way from Bald Eagle Junction all the way north to Hinckley. Since the track has to be rebuilt anyway and there are only a few local freight trains, there is little advantage to limiting the train speed to 90-mph. It was assumed that this route would operate at 110-mph north of Bald Eagle Junction. The speed profile for Route 11, also resulting in a 2:17 schedule, is shown in Exhibit 6-5.

Exhibit 6-5: Speed Profile - Route 11 - 2:17 Schedule



Route 11 has the same number of station stops as does Route 9. White Bear Lake replaces Foley Boulevard, and North Branch replaces the Cambridge stop. With two stations, the Route 11 schedule is the same as the Route 9 schedule. This treatment optimizes the economic performance of both Routes 9 and 11 given the current ridership forecast (that does not include the Hinckley casino.) However:

- It is unlikely that the Route 11 timetable could be further improved because all tracks that are geometrically able to support 110-mph speeds are being operated at that speed.
- In contrast, the Route 9 timetable could be further reduced by adding more dedicated track. As a result the Route 9 timetable in the current assessment does not reflect the ultimate technical potential of the route, but still leaves room for improvements in the future.

Exhibit 6-6 shows that including St Paul Union Depot adds considerable circuity to the Minneapolis-Duluth routing. Route 11A via St Paul is 8 miles longer than Route 11, and 13 miles longer than Route 9, which provides the most direct routing option between the two cities. In addition, Route 11A segments are owned by multiple railroads, so the operation of this route will be challenging because of the need for multiple dispatching handoffs, geometric constraints limiting speeds, and freight train congestion in St Paul (particularly around Hoffman Avenue interlocking and from St Paul up to Cardigan Junction.) The speed profile for Route 11A is shown in Exhibit 6-7 and results in a 2:41 schedule. Route 11A suffers a time penalty not only from the added distance but from the added station stop. Running Minneapolis trains to Duluth via St Paul extends the schedule to the point where the end-to-end service is no longer auto time-competitive.

Exhibit 6-6: Rail Alignment Routes in the Twin Cities

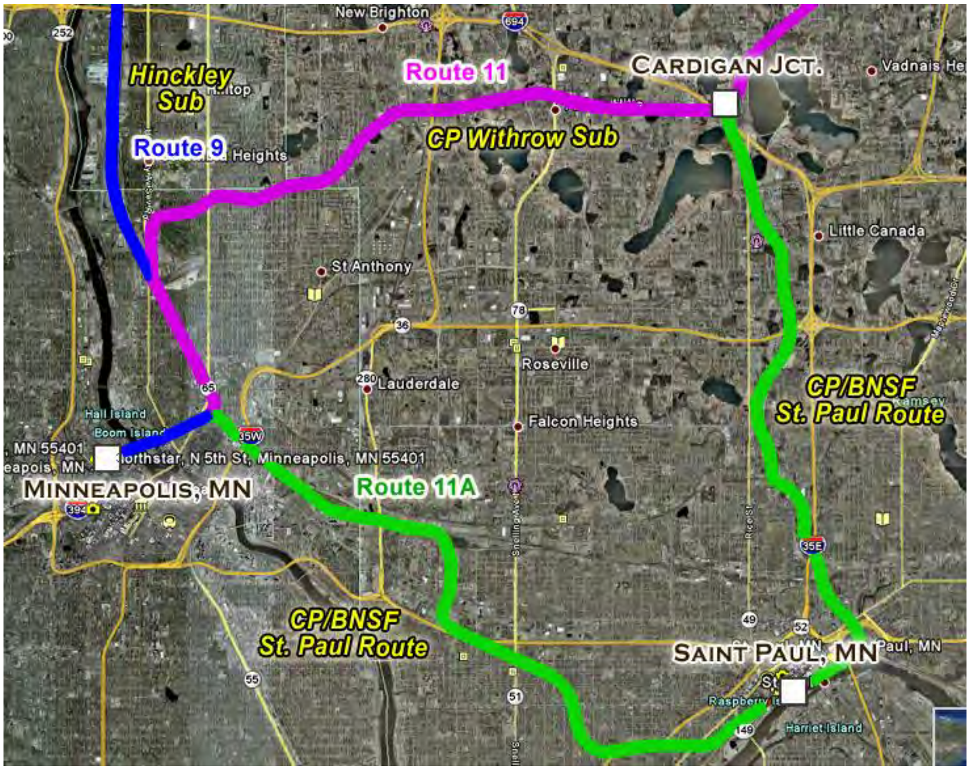
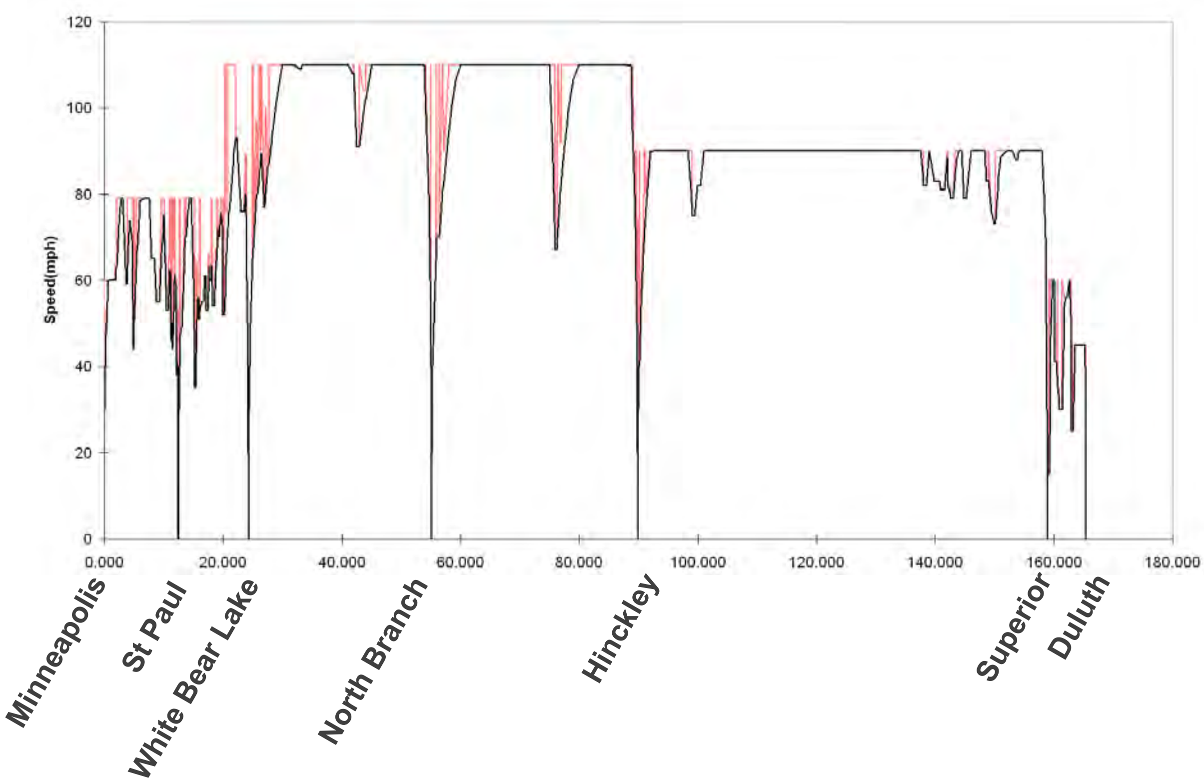


Exhibit 6-7: Speed Profile – Route 11A – 2:41 Schedule

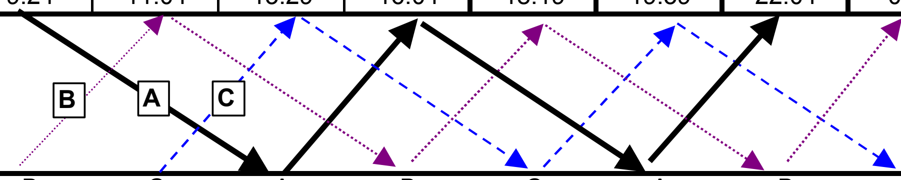


6.3 TRAIN SCHEDULING AND FLEET REQUIREMENTS

Detailed train schedules have been developed and submitted to the BNSF Railway for inclusion in their capacity assessment of the Route 9 corridor. These are shown in Exhibit 6-8 and a time distance diagram is shown in Exhibit 6-9. Equivalent schedules for Route 11 and 11A are shown in Exhibits 6-10 and 6-11. Most train meets are centered in the long double track segment between Cambridge and Hinckley; but many passenger train meets also need to occur in the double track areas just south of Superior and around Foley Boulevard. As a result, there are three areas where passenger train meets need to occur, two of them in existing double track sections and one utilizing the proposed new dedicated double track section. The schedules were developed using a three-train active fleet rotation (a fourth train held for equipment protections and maintenance reserve) with train meets only in double track areas (not in freight sidings) and also avoiding North Star commuter train slots.

Exhibit 6-8: Route 9 – Proposed Timetable

Trainset	A	B	C	A	B	C	A	B
Northbound	***#7000***	***#7002***	***#7004***	***#7006***	***#7008***	***#7010***	***#7012***	***#7014***
MTI	7:05	8:45	11:10	13:35	16:00	17:20	19:45	22:10
Foley Blvd	7:20	9:00	11:25	13:50	16:15	17:35	20:00	22:25
Cambridge	7:46	9:26	11:51	14:16	16:41	18:01	20:26	22:51
Hinckley	8:12	9:52	12:17	14:42	17:07	18:27	20:52	23:17
Sandstone	-	-	-	-	-	-	-	-
Superior	9:11	10:51	13:16	15:51	18:06	19:26	21:51	0:16
Duluth Depot	9:24	11:04	13:29	16:04	18:19	19:39	22:04	0:29



Trainset	B	C	A	B	C	A	B	C
Southbound	***#7003***	***#7005***	***#7007***	***#7009***	***#7011***	***#7013***	***#7015***	***#7017***
Duluth Depot	5:10	6:30	10:35	13:00	14:00	16:35	19:10	21:35
Superior	5:25	6:45	10:50	13:15	14:15	16:50	19:25	21:50
Sandstone	-	-	-	-	-	-	-	-
Hinckley	6:23	7:43	11:48	14:13	15:13	17:58	20:23	22:48
Cambridge	6:51	8:11	12:16	14:41	15:41	18:26	20:51	23:16
Foley Blvd	7:17	8:37	12:42	15:07	16:07	18:52	21:17	23:42
MTI	7:30	8:50	12:55	15:20	16:20	19:05	21:30	23:55

Equipment Rotations:
Train A: 7000,7007,7006,7013,7012 Starts at MTI, Ends at Duluth
Train B: 7003,7002,7009,7008,7015,7014 Starts at Duluth, Ends at Duluth
Train C: 7005,7004,7011,7010,7017 Starts at Duluth, Ends at MTI

1) #7011 need to get equipment back into Minneapolis as quickly as possible for evening rush, this is a lightly used midday departure so meet opposing train #7006 (delaying #7006) in freight siding north of Sandstone.
2) #7008 is advanced to meet peak hour capacity requirement must meet opposing #7013 in freight sidings north of Sandstone; delay opposing #7013 which will be less heavily loaded
3) Schedules of #7003 and #7010 have to be slotted in between Northstar Commuter Trains

Schedule Locked due to Northstar Slot

Meet Point with opposing NLX Train

Exhibit 6-9: Route 9 – Time Distance Diagram

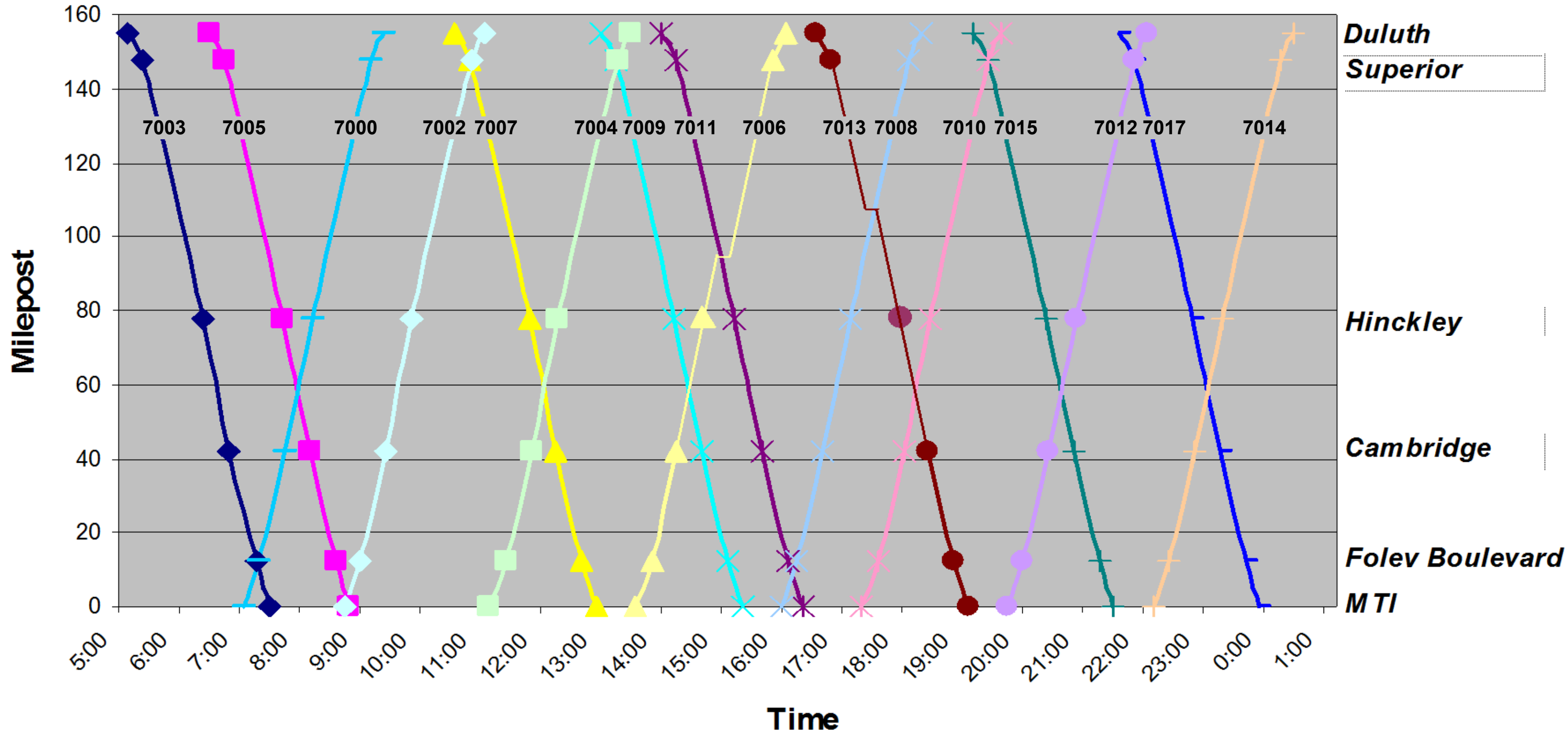


Exhibit 6-10: Route 11 – Proposed Timetable

Trainset								
Northbound	***#7000***	***#7002***	***#7004***	***#7006***	***#7008***	***#7010***	***#7012***	***#7014***
MTI	7:05	8:45	11:10	13:35	16:00	17:20	19:45	22:10
White Bear	7:20	9:00	11:25	13:50	16:15	17:35	20:00	22:25
North Branch	7:46	9:26	11:51	14:16	16:41	18:01	20:26	22:51
Hinckley	8:12	9:52	12:17	14:42	17:07	18:27	20:52	23:17
Sandstone	-	-	-	-	-	-	-	-
Superior	9:11	10:51	13:16	15:51	18:06	19:26	21:51	0:16
Duluth Depot	9:24	11:04	13:29	16:04	18:19	19:39	22:04	0:29

Trainset								
Southbound	***#7003***	***#7005***	***#7007***	***#7009***	***#7011***	***#7013***	***#7015***	***#7017***
Duluth Depot	5:10	6:30	10:35	13:00	14:00	16:35	19:10	21:35
Superior	5:25	6:45	10:50	13:15	14:15	16:50	19:25	21:50
Sandstone	-	-	-	-	-	-	-	-
Hinckley	6:23	7:43	11:48	14:13	15:13	17:58	20:23	22:48
North Branch	6:51	8:11	12:16	14:41	15:41	18:26	20:51	23:16
White Bear	7:17	8:37	12:42	15:07	16:07	18:52	21:17	23:42
MTI	7:30	8:50	12:55	15:20	16:20	19:05	21:30	23:55

Exhibit 6-11: Route 11A – Proposed Timetable

Trainset								
Northbound	***#7000***	***#7002***	***#7004***	***#7006***	***#7008***	***#7010***	***#7012***	***#7014***
MTI	6:42	8:22	10:47	13:12	15:37	16:57	19:22	21:47
St. Paul	7:01	8:41	11:06	13:31	15:56	17:16	19:41	22:06
White Bear	7:20	9:00	11:25	13:50	16:15	17:35	20:00	22:25
North Branch	7:46	9:26	11:51	14:16	16:41	18:01	20:26	22:51
Hinckley	8:12	9:52	12:17	14:42	17:07	18:27	20:52	23:17
Sandstone	-	-	-	-	-	-	-	-
Superior	9:11	10:51	13:16	15:51	18:06	19:26	21:51	0:16
Duluth Depot	9:24	11:04	13:29	16:04	18:19	19:39	22:04	0:29

Trainset								
Southbound	***#7003***	***#7005***	***#7007***	***#7009***	***#7011***	***#7013***	***#7015***	***#7017***
Duluth Depot	5:10	6:30	10:35	13:00	14:00	16:35	19:10	21:35
Superior	5:25	6:45	10:50	13:15	14:15	16:50	19:25	21:50
Sandstone	-	-	-	-	-	-	-	-
Hinckley	6:23	7:43	11:48	14:13	15:13	17:58	20:23	22:48
North Branch	6:51	8:11	12:16	14:41	15:41	18:26	20:51	23:16
White Bear	7:17	8:37	12:42	15:07	16:07	18:52	21:17	23:42
St. Paul	7:36	8:56	13:01	15:26	16:26	19:11	21:36	0:01
MTI	7:55	9:15	13:20	15:45	16:45	19:30	21:55	0:20

In terms of a requirement for Route 11 or 11A infrastructure, it is clear that there would be a need for constructing passing areas to mirror the equivalent facilities on the Route 9 side, in particular, two 10-mile double track zones:

- A northern passing area between North Branch and Hinckley would replace the passing capability provided by the Cambridge/Isanti to Hinckley dedicated track, but would not need to be as long;
- A southern passing area between Hugo and Cardigan Junction would accommodate train meets that would otherwise occur in the Foley Boulevard areas.

This assumes that the ability to meet passenger trains in the double track area south of the Superior station would not be changed.

The requirement for these two passing areas for passenger train meets was included in the development of cost estimates for Routes 11 and 11A. The ability to meet passenger trains would be further enhanced by the proposed double tracking of the CP Withrow Subdivision (for Route 11) and of the Minneapolis Junction to St Paul Union Depot line (for Route 11A.) Although these double tracked areas could be used for occasional passenger train meets, because those capacity enhancements were primarily intended to protect freight train needs, no passenger train meets have been intentionally scheduled to occur in these areas.

In should be noted that Routes 11 and 11A need extensive 110-mph dedicated track from Bald Eagle Junction to Hinckley, including not only the mainline mileage, but also 20 additional miles of high-speed double track for allowing running meets between passenger trains. The maintenance responsibility for this track will be the sole responsibility of passenger service.

It contrast, Route 9 primarily co-mingles with BNSF freight trains at 90-mph. Passenger trains will have to bear the full responsibility for the difference in cost for raising the track class to FRA Class V, but gets to share the base track maintenance cost with the freight trains. On Route 9, passenger service has to pay only for the single dedicated track added between Cambridge/Isanti and Hinckley, not for the full length of the route. As a result it can be seen that the track maintenance cost will be much lower for Route 9 than for the Route 11 or 11A alternatives. The approach to track maintenance costing will be discussed again in more detail in the Operating Costs chapter.

7 OPERATING COSTS

This chapter describes the various costs associated with operating a Minneapolis to Duluth passenger rail service. Operating costs are categorized as variable or fixed:

- **Variable or Direct costs** change with the volume of activity and are directly dependent on ridership, passenger miles or train miles. For each variable cost, a principal cost driver is identified and used to determine the total cost of that operating variable. An increase or decrease in any of these will directly drive operating costs higher or lower.
- **Fixed costs** are generally predetermined, but may be influenced by external factors, such as the volume of freight tonnage or may include a relatively small component of activity-driven costs. As a rule, costs identified as fixed should remain stable across a broad range of service intensities. Within fixed costs are two sub-categories:
  - **Route** costs such as track maintenance and station expense that, although fixed, can still be clearly identified at the route level.
  - **Overhead or System** costs such as headquarters management, call center, accounting, legal, and other corporate fixed costs that are shared across routes or even nationally. A portion of overhead cost (such as direct line supervision) may be directly identifiable but most of the cost is fixed. Accordingly, assignment of such costs becomes an allocation issue that raises equity concerns. These kinds of fixed costs are handled separately.

Operating costs were developed based on the following premises:

- Results of recent studies, a variety of sources including suppliers, current operators' histories, testing programs and prior internal analysis from other passenger corridors were used to develop the cost data. However, as the rail service is implemented, actual costs will be subject to negotiation between the passenger rail authority and the contract rail operator(s).
- Freight railroads will maintain the track and right-of-way, but ultimately, the actual cost of track maintenance will be resolved through negotiations with the railroads. For this study a track maintenance cost model was used that reflects actual freight railroad cost data.
- Maintenance of train equipment will be contracted out to the equipment supplier.
- Train operating practices follow existing work rules for crew staffing and hours of service. Operating expenses for train operations, crews, management and supervision were developed through a bottoms-up staffing approach based on typical passenger rail organizational needs.

The costing approach originally developed for the Midwest Regional Rail System (MWRRS) was adapted for use in this study. Following the MWRRS methodology, nine specific cost areas were applicable to this study.[1] As shown in Exhibit 7-1, variable costs include equipment maintenance, energy and fuel, train and onboard (OBS) service crews, and insurance liability. Ridership influences marketing, sales and station costs. Fixed costs include administrative costs, and track and right-of-way maintenance costs. The MWRRS cost model was updated to reflect current 2010 costs.

[1] This corridor has no planned feeder bus services for which the rail service is financially responsible, and the treatment of operator profit will be discussed in parallel to Service Administration.

Exhibit 7-1: Cost Categories and Primary Drivers

Drivers	Cost Categories
Train Miles	*Equipment Maintenance* *Energy and Fuel* *Train and Engine Crews* *Onboard Service Crews*
Passenger Miles	*Insurance Liability*
Ridership and Revenue	*Sales and Marketing* *Ridership*
Fixed Cost	*Service Administration* *Track and ROW Maintenance* *Station Costs*

The MWRRS costing framework was developed in conjunction with nine states that comprised the MWRRS steering committee and with Amtrak. In addition, freight railroads, equipment manufacturers and others provided input to the development of the costs. The original concept for the MWRRS was for development of a new service based on operating methods directly modeled after state-of-the-art European rail operating practice. Along with anticipated economies of scale, modern train technology could reduce operating costs when compared to existing Amtrak practice. In the original 2000 MWRRS Plan, European equipment costs were measured at 40 percent of Amtrak's costs. However, in the final MWRRS plan that was released in 2004, train-operating costs were significantly increased to a level that is more consistent with Amtrak's current cost structure. However, adopting an Amtrak cost structure for Minneapolis to Duluth financial planning does not suggest that Amtrak would actually be selected for the corridor operation. Rather, this selection increases the flexibility for choosing an operator without excluding Amtrak, because multiple operators and vendors will be able to meet the broader performance parameters provided by this conservative approach.

The analysis was conducted using 2010 constant dollars.

7.1 MINNEAPOLIS-DULUTH/SUPERIOR CORRIDOR – VARIABLE OR DIRECT COSTS

7.1.1 TRAIN EQUIPMENT MAINTENANCE

Equipment maintenance costs include all costs for spare parts, labor and materials needed to keep equipment safe and reliable. The costs include periodical overhauls in addition to running maintenance. It also assumes that facilities for servicing and maintaining equipment are designed specifically to accommodate the selected train technology. This arrangement supports more efficient and cost-effective maintenance practices. Acquiring a large fleet of trains with identical features and components, allows for substantial savings in parts inventory and other economies of scale. In particular, commonality of rolling stock and other equipment will standardize maintenance training, enhance efficiencies and foster broad expertise in train and system repair.

The MWRRS study developed a cost of $9.87 per train mile for a 300-seat train in 2002 dollars, or applying an 18% inflation cost adjustment, $11.67 in 2010 dollars. Before this figure could be used for the Duluth corridor, however, it must be adjusted to reflect the smaller 200-seat train that will be used in the early years of the system. Data provided by equipment manufacturers at the original MWRRI 1999 equipment symposium was used to calculate these adjustments. The smaller (locomotive hauled) 200-seat train was estimated to cost $8.95 per train mile in 2002 dollars, or $10.58 in 2010 dollars.

The available evidence suggests that the maintenance cost for a 300-seat DMU would be about the same as for a Talgo T21, but for smaller trains DMU costs scale more directly to seating capacity. Accordingly the DMU maintenance cost for a 200-seat train was estimated as two-thirds of the cost for a 300-seat train. With the economies of scale, inflation and train size adjustments, this would come to $7.78 per train mile in 2010 dollars for a DMU, as compared to $10.58 for a locomotive hauled train. The DMU cost was used in this assessment. It can be seen that the DMU is substantially more cost effective for smaller trains, and because of its greater flexibility, it allows closer matching of seating capacity to travel demand.

7.1.2 TRAIN AND ENGINE CREW COSTS

Crew costs are those costs incurred by the onboard train operating crew. The operating crew consists of an engineer, a conductor and an assistant conductor and is subject to federal Hours of Service regulations. Costs for the crew include salary, fringe benefits, training, overtime and additional pay for split shifts and high mileage runs. An overtime allowance is included as well as scheduled time-off, unscheduled absences and time required for operating, safety and passenger handling training. Fringe benefits include health and welfare, FICA and pensions. The cost of employee injury claims under FELA is also treated as a fringe benefit for this analysis. The overall fringe benefit rate was calculated as 55 percent. In addition, an allowance was built in for spare/reserve crews on the extra board. The costing of train crews was based on Amtrak's 1999 labor agreement, adjusted for inflation to 2010.

Crew costs depend upon the level of train crew utilization, which is largely influenced by the structure of crew bases and any prior agreements on staffing locations. Train frequency strongly influences the amount of held-away-from-home-terminal time, which occurs if train crews have to stay overnight in a hotel away from their home base. Since train schedules have continued to evolve throughout the lifetime of this study and a broad range of service frequencies and speeds have been evaluated, a parametric approach was needed to develop a system average per train mile rate for crew costs. Such an average rate necessarily involves some approximation, but to avoid having to reconfigure a detailed crew-staffing plan whenever the train schedules change, an average rate is necessary and appropriate for a planning-level study.

In the previous Ohio Hub study, crew costs varied from $3.42 per train mile for efficient round trips with no need for overnight accommodations, up to $3.94 per train mile if some overnight layovers are required (consistent with the MWRRS result) and rising to $6.60 per train mile because of extremely poor crew utilization in some of the start-up scenarios. For this study, an intermediate value inflated to 2010 of $4.66 per train mile was chosen.

7.1.3 FUEL AND ENERGY

A consumption rate of 2.42 gallons/mile was estimated for a 110-mph 300-seat train, based upon nominal usage rates of all three technologies considered in Phase 3 of the MWRRS Study. In the MWRRS plan, a diesel fuel cost of $0.96 per gallon led to a train mile rate of $2.32 per train mile for a 110-mph 300-seat train (in 2002 dollars). For each scenario, fuel costs were raised to reflect the fuel cost increases described in the Department of Energies' Central Case Fuel Projections. However, for smaller trains, DMU fuel costs scale down more proportionately than they do for locomotive-hauled trains so the fuel cost per train mile would be $1.56 (in 2002 dollars). A cost of $2.63 per train mile was used in this analysis, reflecting a roughly 68% increase in the cost of fuel.

7.1.4 ONBOARD SERVICES (OBS)

Onboard service (OBS) costs are those expenses for providing food service onboard the trains. OBS adds costs in three different areas: equipment, labor and cost of goods sold. Equipment capital and operating cost is built into the cost of the trains and is not attributed to food catering specifically. However, the Duluth corridor study assumes none of the small 200-seat trains will have a dedicated dining or bistro car. Instead, an OBS employee or food service vendor would move through the train with a trolley cart, offering food and beverages for sale to the passengers. In the future, larger 300-seat trains may be able to provide as an enhancement a small walk-up café area where the attendant works when not passing through the train with the trolley cart.

The goal of the OBS franchising should be to ensure a reasonable profit for the provider of on-board services, while maintaining a reasonable and affordable price structure for passengers. The key to attaining OBS profitability is selling enough products to recover the train mile related labor costs. If small 200-seat trains are used for start-up, given the assumed OBS cost structure, even with a trolley cart service the OBS operator will be challenged to attain profitability. However, the expanded customer base on larger 300-seat trains can provide a slight positive operating margin for OBS service.

In practice, it is difficult for a bistro-only service to sell enough food to recover its costs. Bistro-only service may cover its costs in Amtrak's northeast corridor that operates very large trains, but it will be difficult to scale down this business model to the Duluth corridor that will, by necessity, operate much smaller 200 to 300-seat trains. While only a limited menu can be offered from a cart, the ready availability of food and beverages at the customer's seat is a proven strategy for increasing sales. Many customers appreciate the convenience of a trolley cart service and are willing to purchase food items that are brought directly to them. While some customers prefer stretching their legs and walking to a bistro car, other customers will not bother to make the trip.

The cost of goods sold is estimated as 50 percent of OBS revenue, based on Amtrak's route profitability reports. Labor costs, including the cost of commissary support and OBS supervision, have been estimated at $1.81 per train mile. This cost is consistent with Amtrak's level of wages and staffing approach for conventional bistro car services. However, this Business Plan recommends that an experienced food service vendor provide food services and use a trolley cart approach.

A key technical requirement for providing trolley service is to ensure the doors and vestibules between cars are designed to allow a cart to easily pass through. Since trolley service is a standard feature on most European railways, most European rolling stock is designed to accommodate the carts. Although convenient passageways often have not been provided on U.S. equipment, the ability to support trolley carts is an important equipment design requirement for the planned service.

7.1.5 INSURANCE COSTS

Liability costs were estimated at 1.3¢ per passenger-mile, the same rate that was assumed in the earlier MWRRS study brought to 2010 dollars. In 2025, for example, insurance is projected to cost nearly $1.35 million a year, and this expense continues to go up as ridership rises. Federal Employees Liability Act (FELA) costs are not included in this category but are applied as an overhead to labor costs.

The Amtrak Reform and Accountability Act of 1997 (§161) provides for a limit of $200 million on passenger liability claims. Amtrak carries that level of excess liability insurance, which allows Amtrak to fully indemnify the freight railroads in the event of a rail accident. This insurance protection has been a key element in Amtrak's ability to secure freight railroad cooperation. In addition, freight railroads perceive that the full faith and credit of the United States Government is behind Amtrak, while this may not be true of other potential passenger operators. A General Accounting Office (GAO) review[2] has concluded that this $200 million liability cap applies to commuter railroads as well as to Amtrak. If the GAO's interpretation is correct, the liability cap may also apply to potential Duluth corridor franchisees. If this liability limitation were in fact available to potential franchisees, it would be much easier for any operator to obtain insurance that could fully indemnify a freight railroad at a reasonable cost.

7.2 MINNEAPOLIS-DULUTH/SUPERIOR CORRIDOR - ROUTE FIXED COSTS

7.2.1 TRACK AND RIGHT-OF-WAY COSTS

Currently, it is industry practice for passenger train operators providing service on freight-owned rights-of-way to pay for track access, dispatching and track maintenance. The rates for all of these activities will ultimately be based upon a determination of the appropriate costs that result from negotiations between the parties. The purpose here is to provide estimates based on the best available information; however, it is important to recognize that this Study is a feasibility-level analysis and that as the project moves forward, additional study and discussions with the railroads will be needed to further refine these costs. Both capital and operating costs will be estimated.

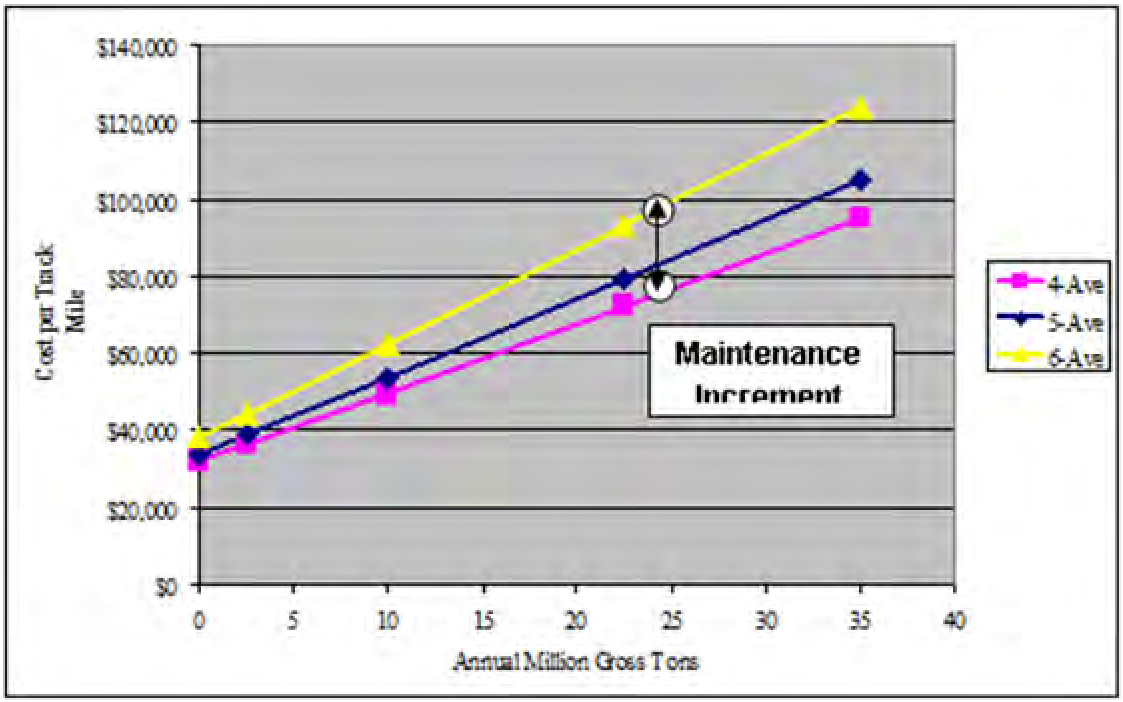
To accommodate passenger trains on the Minneapolis to Duluth rail line, the corridor requires a substantial increase in capacity. Once constructed, these improvements will need to be maintained to FRA standards required for reliable and safe operations. The costing basis assumed in this report is that of *incremental* or *avoidable* costs. Avoidable costs are those that are eliminated or saved if an activity is discontinued. The term *incremental* is used to reference the change in costs that results from a management action that increases volume, whereas *avoidable* defines the change in costs that results from a management action that reduces volume. Following the same standard that was established for the MWRRS, the following cost components were included within the Track and Right-of-Way category:

- **Track Maintenance Costs.** Costs for track maintenance were estimated based on Zeta-Tech's January 2004 draft technical monograph *Estimating Maintenance Costs for Mixed High-Speed Passenger and Freight Rail Corridors*.[3] However, Zeta-Tech's costs are conceptual and are still subject to negotiation with the freight railroads.
- **Dispatching Costs and Out-of-Pocket Reimbursement.** Passenger service must also reimburse a freight railroad's added costs for dispatching its line, providing employee efficiency tests and for performing other services on behalf of the passenger operator. These costs are included as an additive to Track and Right-of-Way Maintenance costs.
- **Costs for Access to Track and Right-of-Way.** Access fees, particularly train mile fees incurred as an operating expense, are specifically excluded from this calculation. Any such payments would have to be calculated and negotiated on a route-specific and railroad-specific basis. Such a calculation would have to consider the value of the infrastructure improvements made to the corridor for balancing up-front capital with ongoing operating payments.[4]

[2] See: http://www.gao.gov/highlights/d04240high.pdf
[3] Zeta-Tech, a subsidiary of Harsco (a supplier of track maintenance machinery) is a rail consulting firm who specializes in development of track maintenance strategies, costs and related engineering economics.
[4] For 110-mph service, the level of infrastructure improvements to the corridor called for in this study should provide enough capacity to allow superior on-time performance for both freight and passenger operations. It is believed that the capacity improvements proposed in the Engineering evaluation provide a reasonable planning basis for establishing costs for this study; but needs to be confirmed by a detailed capacity analysis. The recommended strategy for 110-mph service is to provide enough up-front capital improvement to mitigate not only freight delays, but also the need for providing additional operating incentives that could adversely affect the passenger system's ability to attain a positive operating ratio.

Exhibit 7-2 shows the conceptual relationship between track maintenance cost and total tonnage that was calibrated from the earlier Zeta Tech study. It shows a strong relationship between tonnage and maintenance cost. At low tonnage, the cost differential for maintaining a higher track class is not very large, but as tonnage grows, so too does the added cost. If freight needs only Class 4 track, the passenger service would have to pay the difference, called the "maintenance increment", which for a 25 MGT line as shown in Exhibit 7-2, came to about $25,000 per mile per year. The required payment to reimburse BNSF for its added track cost would be less for lower freight tonnage, more for higher freight tonnage.

Exhibit 7-2: Track Maintenance Cost Function



Following the Zeta Tech methodology, a "maintenance increment" is calculated based on *freight tonnage only*, since a flat rate of $1.56 per train mile (in 2002 dollars) as used in the Zeta-Tech report was added to reflect the direct cost of added passenger tonnage regardless of track class. This cost, which was developed by Zeta-Tech's TrackShare® model, includes not only directly variable costs, *but also an allocation of a freight railroad's fixed cost*. Accordingly, it complies with the Surface Transportation Board's definition of "avoidable cost."

Because passenger trains don't add much tonnage, the added cost for maintaining 110-mph track is largely independent of the number of passenger trains operated. Once the track is built there is an incentive to operate as many trains as possible, for reducing the average unit cost. However, if fewer than eight trains are operated, the average cost goes up since this fixed cost must be spread across a smaller base of passenger train miles.

In addition to an *operating* component of track maintenance cost (which is shown in Exhibit 7-3) the track cost methodology also identifies *a cyclic capital* cost component. For track maintenance:

- **Operating costs** cover expenses needed to keep existing assets in service and include both surfacing and a regimen of facility inspections.
- **Cyclic Capital** costs are those related to the physical replacement of the assets that wear out. They include expenditures such as for replacement of rail and ties, but these costs are not incurred until many years after construction. In addition, the regular maintenance of a smooth surface by reducing dynamic loads actually helps extend the life of the underlying rail and tie assets. Therefore, capital maintenance costs are gradually introduced using a table of ramp-up factors provided by Zeta-Tech (Exhibit 7-3). A normalized capital maintenance level is not reached until 20 years after completion of the rail upgrade program.

Exhibit 7-3: Ramp Up Factors for Cyclic Capital Maintenance Cost

Year	% of Capital Maintenance	Year	% of Capital Maintenance
0	0%	11	50%
1	0%	12	50%
2	0%	13	50%
3	0%	14	50%
4	20%	15	75%
5	20%	16	75%
6	20%	17	75%
7	35%	18	75%
8	35%	19	75%
9	35%	20	100%
10	50%		

For development of the Business Plan, only the operating component of track maintenance cost is treated as a direct operating expense. Capital maintenance costs are incorporated into the Financial Plan and into the Benefit Cost analysis. Because these capital costs do not start occurring until rather late in the project life, usually they have a very minor effect on the Benefit Cost calculation. These costs can be financed using direct capital grants or from surplus operating cash flow. The latter option has been assumed in this study. Accordingly, maintenance capital expenses only reduce the net cash flow generated from operations; they do not affect the operating ratio calculations.

7.2.2 STATION OPERATIONS

A simplified fare structure, heavy reliance upon electronic ticketing and avoidance of a reservation system will minimize station personnel requirements. Station costs include personnel, ticket machines and station operating expenses.

- Staffed stations were assumed at the route endpoints of Duluth and Minneapolis for Routes 9. Additional unstaffed stations for Route 9 were assumed at Foley Blvd, Cambridge, Hinckley, and Superior. All stations were assumed open for two shifts. The cost for the staffed stations includes eight positions at each new location.

- Staffed stations were assumed at the route endpoints of Duluth and Minneapolis for Route 11. Additional unstaffed stations for Route 11 were assumed at North Branch, White Bear Lake, Hinckley and Superior. All stations were assumed open for two shifts. The cost for the staffed stations includes eight positions at each new location.
- For Route 11A staffed stations were assumed at Duluth, St. Paul and Minneapolis. Additional unstaffed stations for Route 11A were assumed at North Branch, White Bear Lake, Hinckley and Superior. All stations were assumed open for two shifts. The cost for the staffed stations includes eight positions at each new location.
- The cost for unstaffed stations covers the cost of utilities, ticket machines, cleaning and basic facility maintenance, which is also included in the staffed station cost. Volunteer personnel such as Traveler's Aid, if desired could staff these stations.

The total annual operating cost for stations in Route 9 and 11 individually comes to $1.4 million, while Route 11A station cost comes to $1.99 million due to its additional major station. Stations cost is practically independent of the number of trains operated or their speed, so running the largest number of trains at the highest speed possible generates the best economies of scale.

7.2.3 MINNEAPOLIS-DULUTH/SUPERIOR CORRIDOR – SYSTEM OVERHEAD COSTS

Previous studies have developed an institutional management structure that would be capable of running a passenger corridor service. The MWRRI study developed, in conjunction with Amtrak, a hypothetical stand-alone management organization, including a President, Operations supervision, Finance and Marketing structure, including a dedicated call center.

Later however, the Ohio Hub[5] study further refined the organizational structure proposed by the MWRRS to convert some of the administrative cost, primarily staff and field supervisory positions, into a variable cost based on train miles. The result was development of a Fixed + Variable cost framework for the implementation of a stand-alone management structure, which had a fixed cost of $8.9 million plus $1.43 per train-mile (in 2002 dollars) for added staff requirements as the system grew. Inflated to 2010 dollars, this became $10.5 million plus $1.69 per train mile. However, the Sales and Marketing category also had a substantial fixed cost component for advertising and call center expense, adding another $2.5 million per year fixed cost, plus variable call center expenses of 57¢ per rider (in 2002 dollars.)[6] Finally, credit card and travel agency commissions were all variable: 1.8 percent and 1 percent of revenue, respectively.

The issue of a reasonable allocation of system overheads or fixed management cost to the Duluth corridor was extensively discussed in the 2007 feasibility study. From benchmarking to other corridors it was estimated that a $5.00 per train-mile contribution to fixed cost, plus full coverage of all variable administrative cost ($1.69 per train mile, plus 67¢ per rider and 2.8% of revenue) would comprise a reasonable contribution that a relatively small corridor like Duluth could make to the overhead costs of a larger entity, like Amtrak.

[5] The Ohio Hub is a proposed 1,244 mile intercity passenger rail system that would serve over 22 million people in five states and southern Ontario, Canada. Seven rail corridors with 44 stations would connect twelve major metropolitan areas, and many smaller cities and towns. For more information see: http://www.ohiohub.com

[6] In the MWRRS cost model, call center costs were built up directly from ridership, assuming 40 percent of all riders call for information, and that the average information call will take 5 minutes for each round trip. Call center costs, therefore, are variable by rider and not by train-mile. Assuming some flexibility for assigning personnel to accommodate peaks in volume and a 20 percent staffing contingency, variable costs came to 57¢ per rider. These were inflated to 67¢ per rider in 2010 dollars.

7.3 MINNEAPOLIS-DULUTH/SUPERIOR CORRIDOR – COST RESULTS

Exhibit 7-4 summarizes the average cost per train mile results from the variety of scenarios that were evaluated for the Minneapolis-Duluth/Superior Corridor. For Route 9 the costs per train mile were assessed as $41.18, the Route 11 costs per train mile as $42.18 and the 11A costs per train mile as $42.75 in 2010 dollars, based on 2020 traffic levels. These results reflect the economies from spreading route-level fixed costs over a broader base as the number of train-miles are increased, but assume a fixed allocation of $5 per train-mile as each route's contribution towards fixed overhead administrative costs. All three routes have similar costs, with most of the divergence coming from the additional station in Route 11A and the higher costs associated with Dedicated Track and increased train-miles on Routes 11 and 11A.

Exhibit 7-4: Percentage Breakdown of Route 9 Costs (Year 2025)

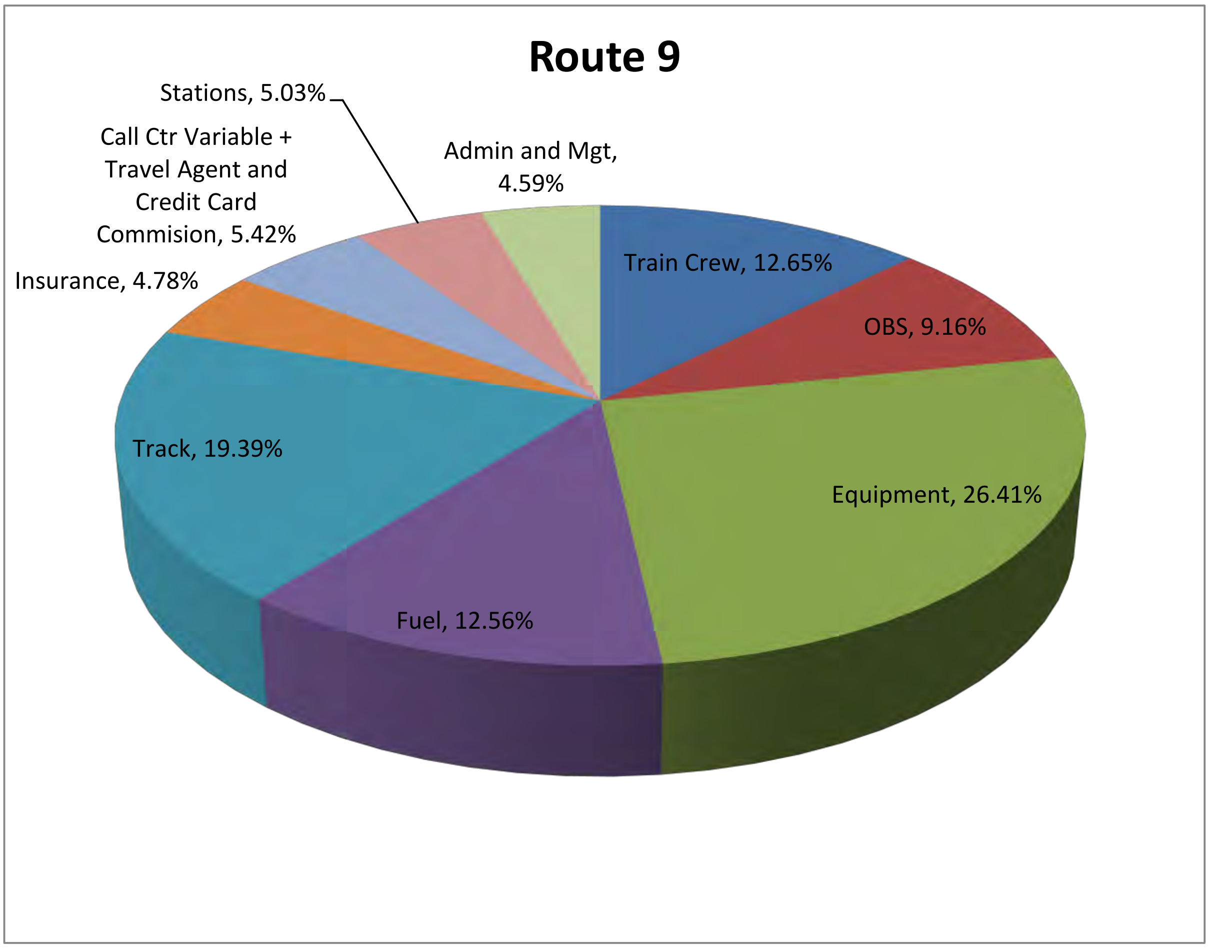


Exhibit 7-5: 2020 Operating Costs by Route

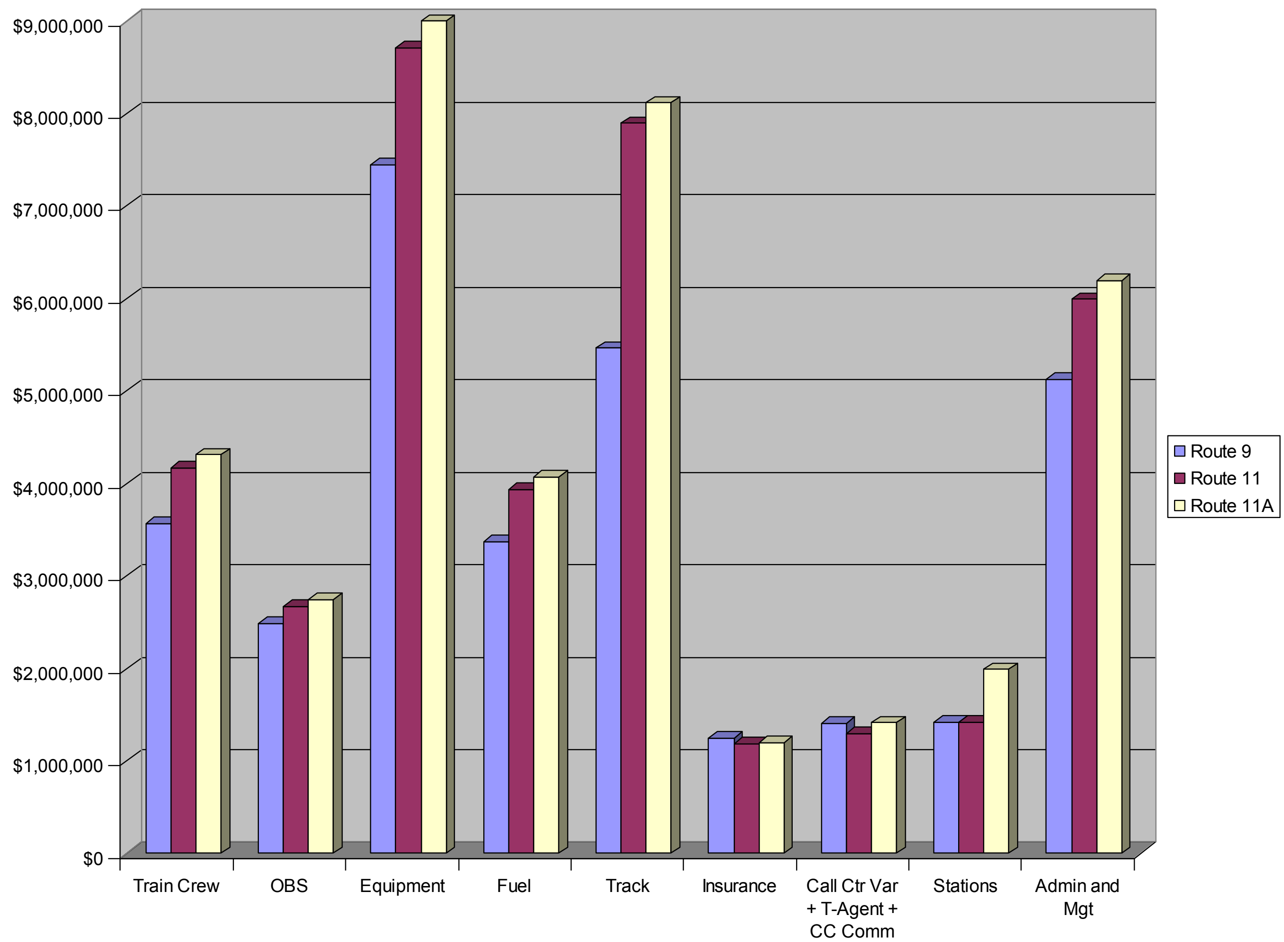


Exhibit 7-6 summarizes the costing basis that was used for each of the three routes.

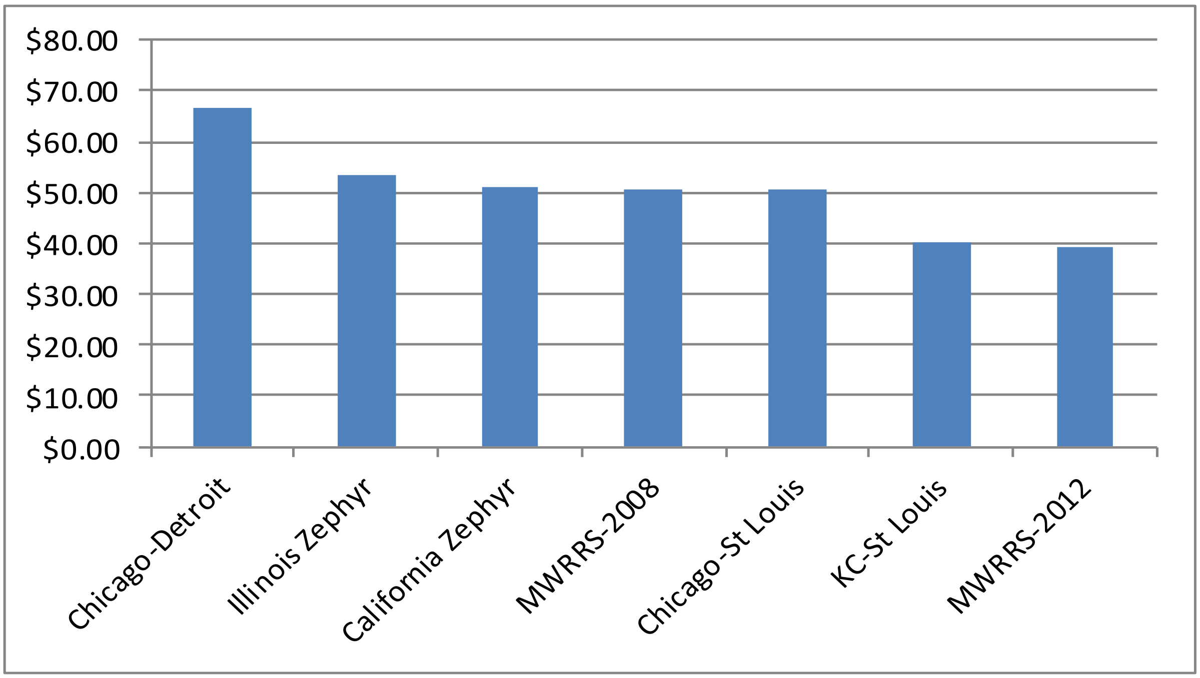
Exhibit 7-6: Operating Cost Summary by Expense Type (in 2010 dollars)

Category	Basis	Type	Route 9 Cost	Route 11 Cost	Route 11A Cost
Train Crew	Train Miles	Variable	$4.66		
OBS	Train Miles + OBS Revenue	Variable	$1.81 (labor) + 50% OBS Revenue		
Equipment Maintenance	Train Miles	Variable	$7.78 for 200-seat DMU		
Energy/Fuel	Train miles	Variable	$2.63 for a 200-seat DMU		
Track/ROW	Train Miles	Fixed	$5,464,338	$7,895,190	$8,114,456
Station Costs	Passenger	Fixed	$1.4 million		$1.99 million, Higher due to St Paul station
Insurance	Pass-miles	Variable	$0.013		
Sales/Mktg/Admin	Passenger + Ticket Revenue	Both Fixed and Variable	Allocation of $5 fixed per train mile, plus $1.69 variable per train mile, 67¢ per rider and 2.8% of revenue		

7.4 VALIDATION OF COST RESULTS

This study uses a well-established costing framework that traces its roots back to a number of previous rail studies. However, the current form of the costing model was mainly established as a result of the extensive work that was performed for the Midwest Regional Rail Initiative, with the active support and participation of Amtrak, freight railroads, and a consortium of nine Midwestern States. The MWRRS costing framework was extensively validated at the time when it was first developed. Exhibit 10-22 (updated to 2010 dollars) from the MWRRS report (Exhibit 7-7 below) compared model-projected MWRRS costs to Amtrak's fully allocated RPS costs.[7] Since then, the costing framework has been continuously updated and enhanced as a result of subsequent rail planning projects in Ohio and Florida.

Exhibit 7-7: Comparison: Projected MWRRS vs. Amtrak RPS Costs (in 2010 dollars)



As can be seen in Exhibit 7-7, the model-predicted costs were in the same range as actual Amtrak experience - in fact, projected average cost for the "MWRRS 2008" start-up service of $50.72 (in 2010 dollars) came in slightly higher than Amtrak's fully-allocated RPS cost for the Chicago-St. Louis corridor at the time. Amtrak's costs for the Chicago-Detroit corridor were higher because of the high cost of maintaining dedicated passenger track, spread over the relatively few train miles operated.

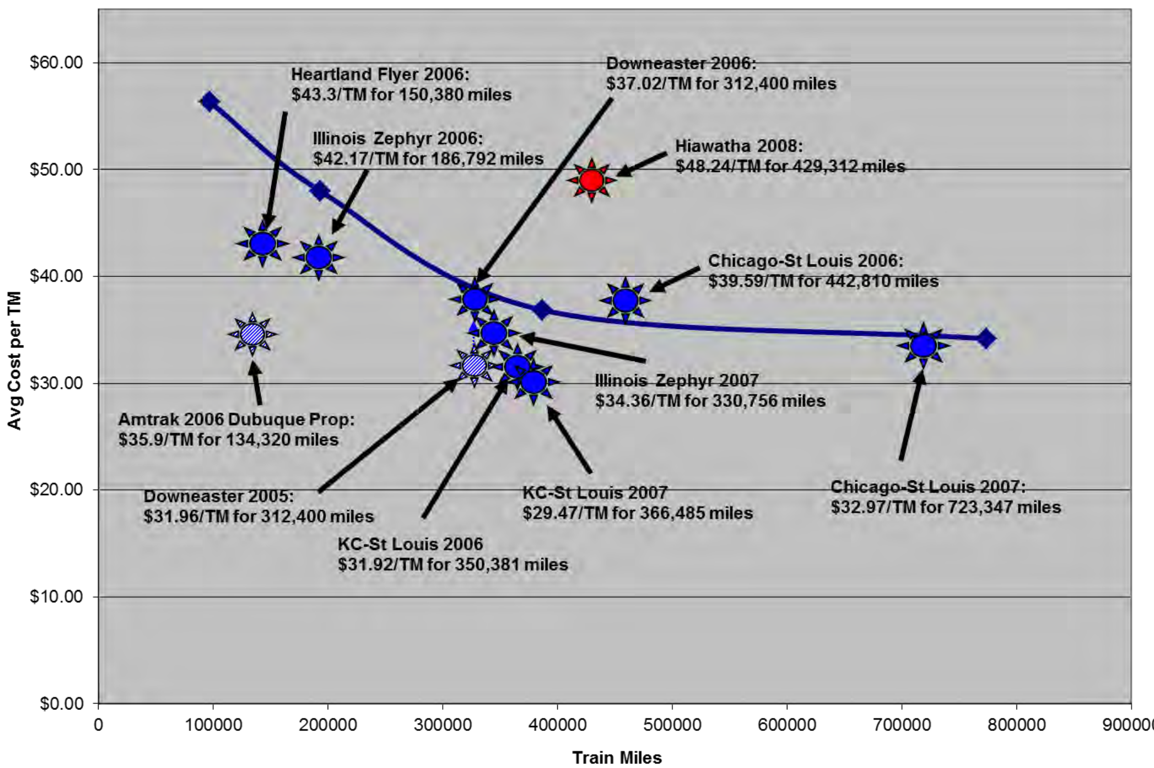
[7] 1997 Amtrak costs adjusted for inflation to 2010, excluding depreciation. Source*: Intercity Passenger Rail: Financial Performance of Amtrak's routes*, U.S. General Accounting Office, May 1998. This validation chart was included in the MWRRS report that was published in 2004.

The results of the 79-mph costing were then further validated against a number of current Amtrak operations. A combination of RPS data furnished by Amtrak along with published information on the financial performance of other state-supported services was used to establish the benchmark data. Several comparable services were included in the benchmark:

- Downeaster
- Illinois Zephyr
- St Louis to Chicago
- St Louis to Kansas City
- Heartland Flyer
- Rockford, Il (Proposed)

These results, as compared to the cost function calculated for the 79-mph Minneapolis to Duluth service, are summarized in Exhibit 7-8, which has been adjusted to reflect current 2010 dollars.

Exhibit 7-8: Benchmark Comparisons of Duluth Projection vs. Actual (in 2010 dollars)



It should also be noted that most of the Amtrak routes are running trains that are larger than the 200-seat trains currently proposed for the Duluth corridor, although those costs were developed for 79-mph services and so do not have much dedicated track maintenance expense. With 8 round trips per day the NLX would be operating over 760,000 train miles per year and would be running in the upper (rightmost) range of the graph, where average costs are lower. With a benchmark cost comparison of $33 per train-mile for Chicago to St Louis service, the current projection of costs in the $41-43 range per train mile certainly seems reasonable and even conservative, considering the added costs of the dedicated track that is included in the cost structure for the Minneapolis-Duluth/Superior corridor.

8 FINANCIAL AND ECONOMIC VIABILITY

This Chapter describes the application of USDOT FRA financial and economic analysis to provide comparative financial statistics and to develop Cost Benefit and Net Present Value assessments at the OMB approved Discount Rate of 3 and7 percent.

The analysis uses the same criteria and structure as the 1997 FRA *Commercial Feasibility Study*.[1] The study set out criteria for establishing a public-private partnership between the federal government, state and local communities, and the private sector for intercity rail projects. The study described two conditions that were considered essential for receiving federal funding support for proposed intercity passenger rail projects:

- An operating cost ratio of at least 1.0, defined as a pre-condition for an effective public/private partnership, so that once the system has been constructed, a private operator could operate the system on a day-to-day without requiring an operating subsidy[2], and

- A benefits/cost ratio greater than 1.0, to ensure that the project makes an overall positive contribution to the economy, at both the regional and national levels.

The Commercial Feasibility Study makes it clear that *"federal consideration of specific High-Speed Ground Transportation project proposals could apply additional criteria that could differ from, and be much more stringent than, this report's threshold indicators for partnership potential."*

This chapter discusses both the operating performance and economic performance of Routes 9, 11 and 11A and presents the financial and economic analysis of the system's construction and operation. This analysis integrates operating and maintenance costs with revenue projections for the year-by-year calculation of operating ratios. User benefits, externalities, and other mode benefits such as reduced highway congestion, time savings, fuel savings and emissions reduction are assessed against capital and operating costs for calculation of Benefit Cost ratios over the lifetime of the project.

8.1 FINANCIAL ANALYSIS

Financial performance was evaluated by analyzing the operating cash flows for each Route. The ratio of operating revenues to operating costs (i.e., operating cost ratio) provides a key indicator of the financial viability of the Minneapolis-Duluth Corridor. The key elements of the financial analysis conducted for this study are listed in Exhibit 8-1 and further discussed below.

Exhibit 8-1: Key Elements of the Financial Analysis

Types of Benefits	Types of Costs	Financial Performance Measures
Revenues	Operating Cost and Maintenance Cost	Operating Ratio Net Present Value

[1] U.S. Federal Railroad Administration, *High-Speed Ground Transportation for America*, pp. 3-7 and 3-8, September 1997
[2] As defined in the Commercial Feasibility Study, a positive operating ratio does not imply that a passenger service can attain "commercial profitability." Since "operating ratio" as defined here does not include any capital-related costs, this report shows that the proposed Ohio Hub network meets the requirements of the Commercial Feasibility Study by covering at least its direct operating costs and producing a cash operating surplus.

The financial analysis integrates the operating and maintenance costs along with the revenue projections for 30 years and addresses financing alternatives. The analysis was based on the following components:

- Operating and implementation plans for the Minneapolis-Duluth/Superior passenger rail service
- Cost estimates for operations and maintenance of the system, including cyclical costs
- Ridership and revenue estimates based on projected travel demand and assumptions regarding fare levels and other services
- Cash flow analysis that includes statements of revenues and expenses as well as sources and uses of funds, including the impact of the financing alternatives

Two measures of financial benefit were used to evaluate the Routes 9, 11 and 11A: net present value (NPV) and operating ratio, which are defined as follows,

Net Present Value = Present Value of Total Benefits – Present Values of Total Costs

The operating ratio is calculated as follows:

$$\text{Operating Ratio} = \frac{\text{Total Annual Revenue}}{\text{Total Annual Operating Cost}}$$

8.2 ECONOMIC BENEFITS

The Minneapolis-Duluth/Superior corridor will provide a wide range of benefits that contribute to economic growth and strengthen the region's manufacturing, service and tourism industries. It will improve mobility and connectivity between regional centers and smaller urban areas, and will create a new passenger travel alternative. This will stimulate further economic growth within corridors. These economic benefits were evaluated using TEMS' *RENTS*™ Model.

The methodology used to estimate economic benefits and costs is based on the approach the Federal Railroad Administration (FRA)[3] used in its analysis of the feasibility of implementing high-speed passenger rail service in selected travel corridors throughout the country. In that study, revenues and benefits were quantified in terms of passenger rail system revenues, other-mode user benefits and resources benefits. The key elements of the economic benefits analysis conducted for this study are listed in Exhibit 8-2 and further discussed below.

Exhibit 8-2: Key Elements of the Economic Benefits Analysis

Types of Benefits	Types of Costs	Measures of Economic Benefits
Consumer surplus System revenues Benefits for users of other modes Resource benefits	Capital investment needs Operations and maintenance expenses	Benefit-cost ratio Net Present Value

[3] U.S. Federal Railroad Administration, *High-Speed Ground Transportation for America*, pp. 3-7 and 3-8, September 1997

Two measures of economic benefit were used to evaluate the Routes 9, 11 and 11A: net present value (NPV) and cost/benefit ratio, which are defined as follows,

Net Present Value = Present Value of Total Benefits – Present Values of Total Costs

Cost Benefit Ratio = $\frac{\text{Present Value of Benefits}}{\text{Present Value of Costs}}$

Present values are calculated using the standard financial discounting formula:

$$PV = \sum C_t / (l + r)^t$$

Where:

PV	=	Present value of the project benefits or costs (e.g., revenue)
C_t	=	Cash flow for t years
r	=	Interest Rate reflecting opportunity cost of capital
t	=	Time

For this analysis, revenues and cost cash flows were discounted to the 2010 base year using two discount rates: 3 percent and 7 percent[4]. The 3 percent discount rate reflects the real cost of money in the market as reflected by the long term bond markets, and the 7 percent discount rate reflects the federal government's desire to establish a benchmark comparison by discounting long term benefits at a greater rate than the market for public securities.

8.3 ESTIMATE OF ECONOMIC BENEFITS

A transportation improvement is seen as providing economic benefits in terms of time and cost savings, as well as convenience, comfort and reliability. Benefits are expected to include the following:

- **Users** of the system enjoy a consumer surplus benefit that reflects the additional fare value that the individual would be willing to pay for riding the train, as a result not only of time savings, but other aspects of the service (quality, frequency, reliability) as measured by the Generalized Cost framework.

- **Non-user** benefits are for people who continue to drive their cars, but who benefit from reduced congestion and improved air quality as a result of diversion from the highway to rail. The analysis measures benefits to the motoring public from decongestion that is a product of travelers diverted from the highway to the rail mode, and benefits to society as a whole resulting from reduction of air pollution from reduced emissions.

Revenues, operating costs and capital costs have already been described in the financial analysis. This section describes the calculation of additional non-cash benefits, and merges the results of these calculations together with the cash benefits to develop an overall Cost Benefit assessment. Following OMB guidelines the results are aggregated over a 30-year system life using net present values at real interest rates of 3% and 7%.

[4] The discount rate used in this Study is based on *Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs*, Circular N. A-94, issued by the Office of Management and Budget.

8.3.1 USER BENEFITS

The analysis of user benefits is based on the measurement of *generalized cost* of travel, which includes both time and money. Time is converted into money by the use of a Values of Time calculation. The Values of Time (VOT) used in this Study were derived from stated preference surveys conducted in previous study phases and used in the *COMPASS*™ multimodal demand model for developing ridership and revenue forecasts. These VOTs are consistent with previous academic and empirical research, and other transportation studies conducted by TEMS.

Benefits to users of the rail system are measured by the sum of *system revenues* and *consumer surplus*, which is defined as the additional benefit, or *surplus* individuals receive from the purchase of a commodity or service. Consumer surplus is used to measure the demand side impact of a transportation improvement on users of the service. It is defined as the additional benefit consumers (users of the service) receive from the purchase of a commodity or service (travel), above the price actually paid for that commodity or service.

Consumer surpluses exist because there are always consumers, who are willing to pay a higher price than that actually charged for the commodity or service, (i.e., these consumers receive more benefit than is reflected by the system revenues alone).

Revenues are included in the measure of consumer surplus as a proxy measure for the consumer surplus foregone because the price of rail service is not zero. This is an equity decision made by the FRA to compensate for the fact that highway users pay zero for use of the road system (the only exception being the use of toll roads). The benefits apply to existing rail travelers as well as new travelers who are induced (those who previously did not make a trip) or diverted (those who previously used a different mode) to the new passenger rail system.

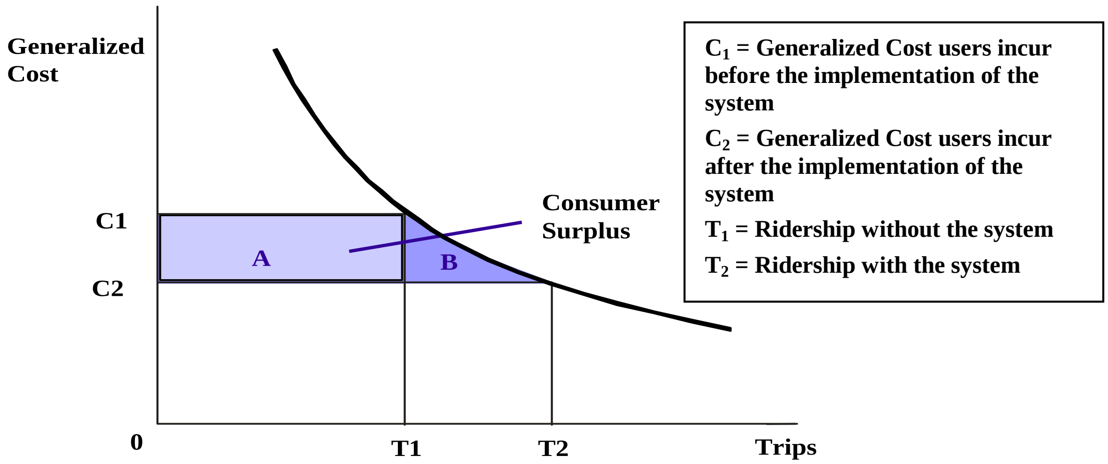
User benefits incorporate both the measured consumer surplus and the system revenues, since the revenues are user benefits transferred from the rail user to the rail operator.

8.3.2 CONSUMER SURPLUS

In consumer surplus analysis, improvements in service (for all modes of transportation in the corridor) are measured by improvements in generalized cost (combination of time spent and fares paid by users to take a trip). In some cases, individuals (for example, current bus and rail users) may pay higher fares to use an improved mode of travel, but other aspects of the improvement will likely compensate for the increased fare. A transportation improvement that leads to improved mobility reduces the generalized cost of travel, which in turn leads to an increase in consumer surplus.

To calculate consumer surplus, the number of trips and generalized cost of travel without the system were compared to the number of trips and generalized cost of after the Minneapolis-Duluth/Superior rail service were implemented. In Exhibit 8-3, the shaded area under a typical demand curve represents improvements in the generalized cost of travel for induced and/or diverted users (the consumer surplus). The shaded area is defined by the points $(0, C_1)$, $(0, C_2)$, (T_1, C_1), and (T_2, C_2). The equation assumes that Area B is a triangle and the arc of the demand curve is a straight line. Equation 1, which follows the exhibit, measures consumer surplus.

Exhibit 8-3: Consumer Surplus Graphically Displayed



Equation 1: CS = $[(C_1 - C_2)\ T_1] + [(C_1 - C_2)(T_2 - T_1)(0.5)]$

Where:

CS = Consumer Surplus
Rectangle A = $(C_1 - C_2)\ T_1$
Triangle B = $(C_1 - C_2)(T_2 - T_1)(0.5)$

The formula for consumer surplus is as follows:

Consumer Surplus = $(C_1 - C_2)*T_1 + ((C_1 - C_2)*(T_2 - T_1))/2$

Where:
C_1 = Generalized Cost users incur before the implementation of the system
C_2 = Generalized Cost users incur after the implementation of the system
T_1 = Number of trips before operation of the system
T_2 = Number of trips during operation of the system

TEMS' *COMPASS*™ demand forecasting model estimates consumer surplus by calculating the increase in regional mobility (i.e., induced travel) and traffic diverted to the system (Area B in Exhibit 8-3), and the reduction in travel costs, measured in terms of generalized cost, for existing system users (Area A). The reduction in generalized cost generates the increase in users' benefits. Consumer surplus consists of the additional benefits derived from savings in time, fares and other utility improvements.

8.3.3 PASSENGER REVENUES

Passenger revenues provide another measure of system benefit. A comprehensive travel demand model was developed using the latest socioeconomic, traffic volumes (air, bus, auto, and rail) and updated network data (e.g., gas prices) to test likely ridership response to service improvements over time. The ridership and revenue demand estimates, developed using the *COMPASS*™ demand modeling system, are sensitive to trip purpose, service frequencies, travel times, fares, fuel prices, congestion and other trip attributes.

A revenue yield assessment has been completed to optimize the fare systems and train frequencies for the final service plan. For each service, the market data and the service plan has been used to derive revenue and ridership estimates that reflect the supply and demand conditions that will exist.

These fares and frequencies, when applied to the market, provide the key input to financial models for basic traffic and the ancillary revenues of the incremental rail services.

8.4 BENEFITS TO USERS OF OTHER MODES

In addition to rail-user benefits, travelers using other modes will also benefit from the rail system because it will contribute to highway congestion relief and reduce travel times for users of other modes. Two major categories of highway Non-User benefits were assessed: Emission savings and Congestion reduction. These are described in the next two subsections.

8.4.1 EMISSION REDUCTION

These were estimated from the vehicle miles traveled (VMT) reductions derived from the ridership model. The assumption is that a reduction in VMT is directly proportional to the reduction in emissions. Several critical pollutants were included for evaluation in estimating the potential highway emission saving value. The dollar amounts applied for the reduced pollutant volume resulting from the VMT reduction were obtained from the Commercial Feasibility study[5] and were inflated to a 2010 number to obtain an estimated monetary value for the pollutants. Exhibit 8-4 shows the current unit values in 2010 dollars for the anticipated VMT reduction and the estimated pollutant tonnage reduction.

Consistent with the approach used by the FRA, the number of vehicle-miles saved was calculated by multiplying the number of diverted auto trips, times average trip length, divided by an average vehicle occupancy factor. The net emission reduction is obtained by subtracting locomotive emissions produced by the trains from the highway emissions saved. Locomotive emissions were calculated using the Tier 4 Line-Haul locomotive emissions standards[6].

Exhibit 8-4: Emissions Reduction Current 2010 Dollar Values

Pollutant	Dollars per Ton (2010 dollars)	Average Emission per Mile (gram)
CO	$ 510.33	25
NOx	$39,658.09	1.3
VOC	$28,393.09	1.05
PM	$ 8,560.89	0.09
CO_2	$ 22.74	607

8.4.2 HIGHWAY CONGESTION TIME SAVINGS AND FUEL

The highway congestion delay savings consists of two components, one to reflect the time savings to the remaining highway users that results from diversion of auto users to the rail mode and the second to reflect the reduction in excess fuel expenditure that results from the reduction in overall congestion on the highway system. The excess fuel component is used instead of actual fuel consumed component because the base fuel cost is already included in the generalized cost components and is embedded in the consumer surplus results. As such, only the excess congestion fuel over and above the normally consumed fuel levels for a trip can be considered an added benefit

[5] High-Speed Ground Transportation for America, Federal Railroad Administration, September 1997
[6] US Code of Federal Regulations, 40 CFR Parts 85, 89 and 92.

of the system. The excess fuel consumed refers to the fuel consumed while sitting in traffic congestion and is unrelated to the actual fuel consumed by each traveler.

The assumption is that less congestion leads to improved operating speeds for the remaining road users, which results in shorter overall travel times and less fuel consumption. Applying an average regional value of time, which was derived from surveys, to the remaining highway automobile occupants, monetizes the time saving. Due to diverted auto trips to rail and improved highway conditions, the remaining auto users benefit from the fuel savings.

8.5 TYPE OF COSTS

Costs are the other side of the equation in the cost/benefit analysis. Costs include up-front capital costs, as well as ongoing operating and maintenance expenses.

Capital Investment Needs: The capital investment needs for each route were calculated using input from the Engineering Assessment outlined in Chapter 5. The capital investment estimates include both infrastructure and rail equipment needs and also include capital for fleet expansion, equipment refurbishment and cyclic track maintenance.

Operating and Maintenance Expenses: The operating and maintenance expenses for each alternative were calculated using the output of the operating cost analysis set forth in Chapter 7. A capital track maintenance component was separately calculated for the High-Speed Scenario. Since the need for infrastructure replacement does not occur for some years into the future, this cost has minimal impact on the cost/benefit ratio calculation, but has been included for completeness.

8.6 FINANCIAL ANALYSIS RESULTS

For Routes 9, 11 and 11A, Exhibit 8-5 compares the forecast revenue and operating cost NPV at 3 percent discount rate in 2010 constant dollars, to develop operating surplus and also show operating ratios for year 2025 and 2040 for the three Routes. Exhibit 8-6 shows the operating ratio of each Route for year 2025 and 2040 and shows that Route 9 has positive operating ratio and thus, meets the FRA criteria.

Further, it can be seen that the Operating Ratios progressively improve from 1.02 in 2025 to 1.14 in 2040 reflecting ridership and revenue gains over the years. This results in a strong positive cash flow leading to the ability for Route 9 to cover its operating costs out of the farebox and make a substantial contribution towards capital cost.

Exhibits 8-6 and 8-7 show that Routes 11 and 11A will require ongoing subsidy whereas Route 9 can return an operating surplus.

Exhibit 8-5: Financial Analysis Results (Present Value in 2010 dollars - 3% discount rate)

Financial Analysis	Route 9	Route 11	Route 11A
Revenue	$590.59	$562.75	$575.19
Operating Cost	$568.75	$669.54	$700.77
Operating Surplus	$21.84	($106.79)	$(125.58)
Operating Ratio	**Route 9**	**Route 11**	**Route 11A**
2025 Operating Ratio	1.02	0.82	0.80
2040 Operating Ratio	1.14	0.92	0.90

Exhibit 8-6: Operating Ratios: Route 9, Route 11 and Route 11A

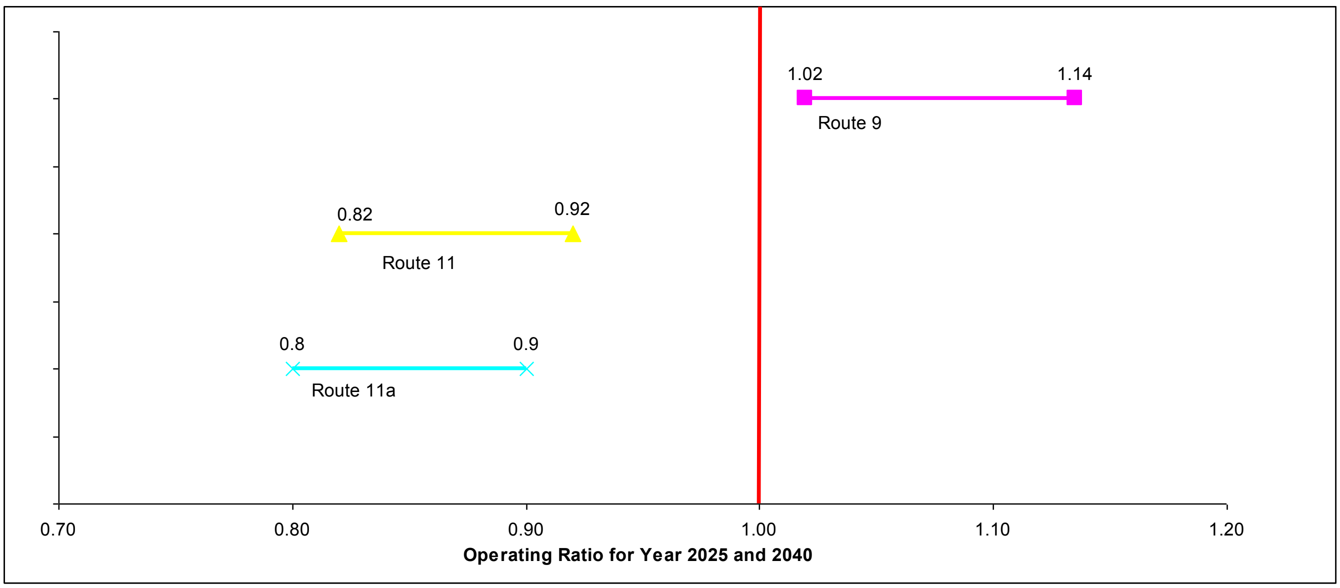
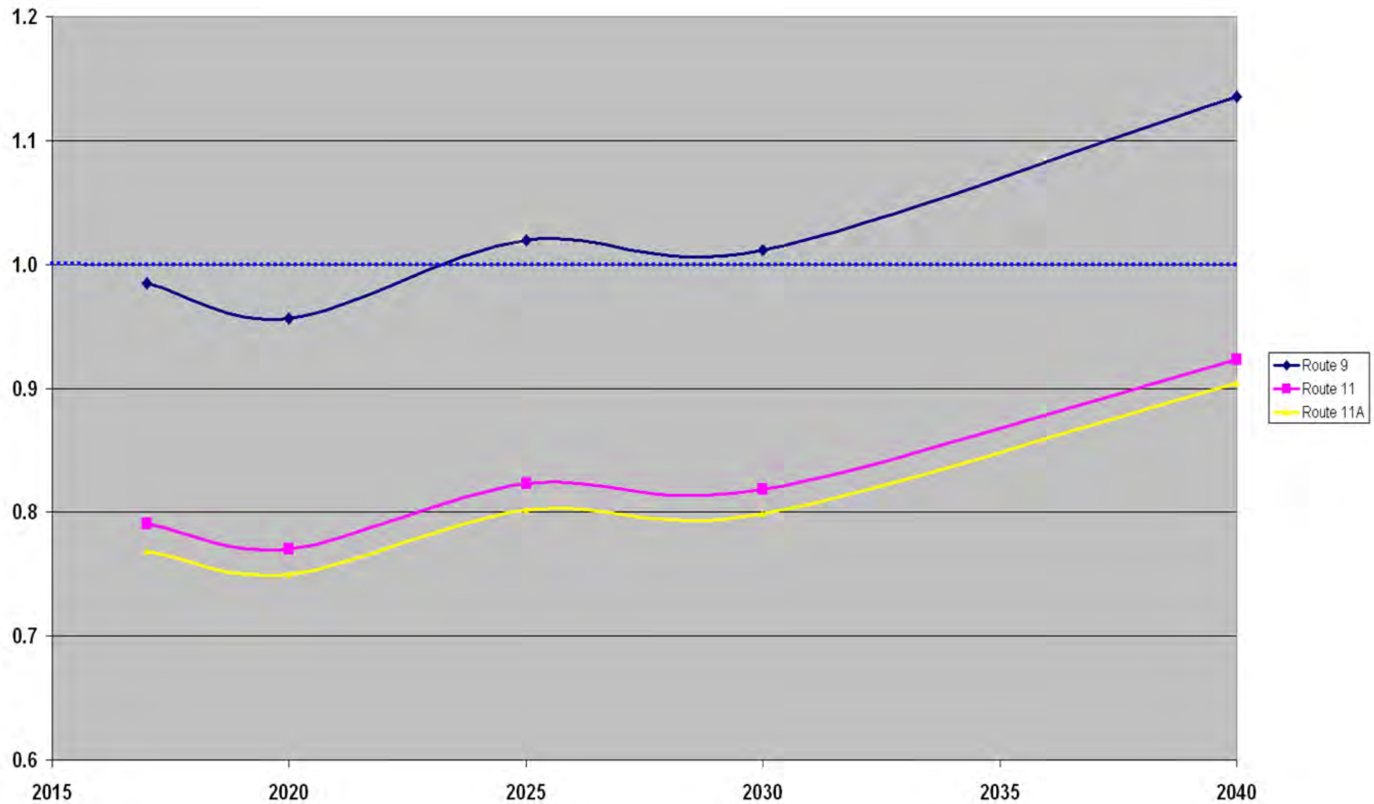


Exhibit 8-7: Operating Ratios: Route 9, Route 11 and Route 11A



8.7 COST BENEFIT ANALYSIS

A preliminary Cost Benefit analysis was conducted using the methodology for estimating costs and benefits as described in the report "High-Speed Ground Transportation for America" (HSGT), Federal Railroad Administration (FRA), 1997. The analysis incorporated the project capital and operating costs, as well as the updated ridership and revenue estimate.

The key inputs for this analysis included System Passenger Revenues, Ancillary Revenues, OBS revenues, Consumer Surplus, Highway Congestion Delay Savings, Highway Fuel Savings, Reduced Emissions, Capital Costs, and Operating and Maintenance (O&M) Costs for the system.

In order to calculate the Cost Benefit Ratio, an analysis of the project economic benefit and cost cash flows were discounted to the 2010 base year using two discount rates: 3 percent and 7 percent as shown in Exhibits 8-8 and 8-9. The 3 percent discount rate reflects the real cost of money in the market as reflected by the long term bond markets, and the 7 percent discount rate reflects the federal government's desire to establish a benchmark comparison by discounting long term benefits at a greater rate than the market for public securities.

The results for the Routes 9, 11 and 11 A show that only Route 9 meets the FRA criteria at 3 and 7 percent, whereas Routes 11 and 11A have a cost benefit ratio below 1.0 at 3 and 7 percent market rate. See Exhibits 8-8 and 8-9. Using the 3 percent market rate, Route 9 produces a Cost Benefit Ratio of 1.5 and net benefits over $2.2 Billion Net Present Value as seen in Exhibit 8-8. At the 7 percent rate, Route 9 produces a Cost Benefit Ratio of 1.03 and net benefits over $1.0 Billion Net Present Value as seen in Exhibit 8-9.

Exhibit 8-8: Cost Benefit Evaluation of Routes at 3% Discount Rate (Millions 2010 dollars)

	Route 9	Route 11	Route 11A
Benefits to User	**(Present Value Discount at 3%)**		
System Passenger Revenues	$541.82	$516.28	$527.70
Advertising Revenues	$5.42	$5.16	$5.28
OBS Revenue	$43.35	$41.30	$42.22
Total Operating Revenues	**$590.59**	**$562.75**	**$575.19**
Users Consumer Surplus	$718.71	$650.59	$600.15
Total User Benefits	**$1,309.29**	**$1,213.33**	**$1,175.34**
Benefits to Public at Large			
Highway Congestion Delay Savings	$590.22	$533.64	$540.85
Highway Reduced Emissions	$46.28	$36.46	$51.56
Highway Fuel Savings	$210.47	$190.29	$192.84
Total Public at Large Benefits	**$846.98**	**$760.39**	**$785.25**
Total Benefits	**$2,156.28**	**$1,973.72**	**$1,960.59**
Capital Cost	$810.53	$1,277.22	$1,389.92
Operating Cost	$568.75	$669.54	$700.77
Cyclic Maintenance	$30.38	$44.50	$45.67
Fleet Expansion	$32.44	$32.44	$32.44
Total Costs	**$1,442.11**	**$2,023.70**	**$2,168.80**
Benefits Less Costs	**$714.17**	**($49.98)**	**($208.21)**
Project Benefit/Cost Ratio	**1.5**	**0.98**	**0.9**

Exhibit 8-9: Cost Benefit Evaluation of Routes at 7% Discount Rate (Millions 2010 dollars)

	Route 9	Route 11	Route 11A
Benefits to User	**(Present Value Discount at 7%)**		
System Passenger Revenues	$258.47	$246.23	$251.49
Advertising Revenues	$2.58	$2.46	$2.51
OBS Revenue	$20.68	$19.70	$20.12
Total Operating Revenues	**$281.73**	**$268.39**	**$274.13**
Users Consumer Surplus	$342.43	$309.90	$285.67
Total User Benefits	**$624.16**	**$578.29**	**$559.80**
Benefits to Public at Large			
Highway Congestion Delay Savings	$266.77	$241.22	$244.54
Highway Reduced Emissions	$22.26	$17.46	$24.75
Highway Fuel Savings	$91.48	$82.71	$83.85
Total Public at Large Benefits	**$380.50**	**$341.40**	**$353.13**
Total Benefits	**$1,004.67**	**$919.69**	**$912.93**
Capital Cost	$670.77	$1,056.98	$1,150.25
Operating Cost	$278.21	$327.91	$343.22
Cyclic Maintenance	$11.85	$17.35	$17.81
Fleet Expansion	$19.17	$19.17	$19.17
Total Costs	**$980.00**	**$1,421.42**	**$1,530.45**
Benefits Less Costs	**$24.67**	**($501.73)**	**($617.52)**
Project Benefit/Cost Ratio	**1.03**	**0.65**	**0.6**

8.8 SUMMARY

- **Route 9** with a capital cost of $939.4 million and a positive cost benefit and operating ratio, meets the FRA criteria. This option has a break even by 2023 with surplus increasing to $7 million a year by 2040.
- **Route 11** with a negative cost benefit and operating ratio, fails the FRA criteria. It needs an annual subsidy of $7-10 million a year, at least to 2030.
- **Route 11A** with a negative cost benefit and operating ratio, fails the FRA criteria. It needs an annual subsidy of $7-10 million a year, at least to 2030.

These results show a strong case for Route 9 for Minneapolis-Duluth/Superior Corridor with the key issue being the value placed on long-term benefits to the consumer.

9 CONCLUSION

1. Comparing the performance of Routes 9, 11, and 11A using the Commercial Feasibility criteria established in FRA's September 1997 report, *High-Speed Ground Transportation for America*, only Route 9 has a positive Operating Ratio and a positive Benefit Cost ratio.

2. The lower capital costs of Route 9 -- $939 million versus $1,480 million for Route 11, and $1,612 million for Route 11A -- enables Route 9 to have a positive Benefit Cost ratio. The higher capital costs of Routes 11 and 11A cause these routes to return a negative Benefit Cost ratio (< 1.0.)

3. While Route 9 produces an operating surplus resulting in a positive Operating Ratio, Routes 11 and 11A generate operating losses that will require an annual subsidy of $7-12 million at least to the year 2030. The operating costs for Routes 11 and 11A are higher than those for Route 9 because of the need for running more train-miles over a longer route, and for maintaining more dedicated track.

4. The ridership for Route 9 is lower than that for Route 11A due to the heavy use of the system by short-haul riders between St. Paul and Minneapolis. However, the passenger miles are greater for Route 9 and the overall revenue is highest for Route 9 reflecting the strong intermediate stations at Cambridge and Foley Boulevard that help boost the ridership of this route.

5. The revenues for Route 11 are lower than those for Route 9, primarily because of the weaker population demographics associated with the Route 11 stations. (White Bear Lake vs. Foley, and North Branch vs. Cambridge).

6. Adding a loop through St. Paul Union Station in Route 11A adds more than 20 minutes to the end-to-end Minneapolis to Duluth travel time. As a result, the route loses more in long-haul traffic than it gains in short-haul potential.

7. The overall result of the analysis is that Route 9 meets the economic criteria established by the FRA Commercial Feasibility Study, while Routes 11 and 11A fail these criteria.

APPENDIX A: SOCIOECONOMIC DATA

The study corridor is divided into 123 zones. The following table shows the base year socioeconomic data for each zone.

Zone	Centroid Name	County	State	2010 Population	2010 Employment	2010 Per Capita Income
1	Duluth Downtown	St. Louis	MN	19,299	15,159	$34,436
2	Duluth Heights	St. Louis	MN	34,324	15,940	$38,680
3	Bloomington	Hennepin	MN	82,512	108,592	$62,706
4	Eden Prairie	Hennepin	MN	57,863	60,974	$81,135
5	Richfield	Hennepin	MN	189,526	76,604	$42,074
6	St. Louis Park - Edina	Hennepin	MN	166,628	142,410	$72,792
7	Minneapolis Downtown	Hennepin	MN	24,137	153,619	$63,234
8	N. Minneapolis - St. Anthony	Hennepin	MN	71,554	78,373	$40,579
9	Brooklyn Center-Robinsdale	Hennepin	MN	107,867	42,612	$41,717
10	Roseville	Ramsey	MN	58,676	74,052	$42,793
11	Shoreview - North Oaks	Ramsey	MN	35,160	11,232	$66,250
12	White Bear Lake	Ramsey	MN	36,477	22,376	$50,674
13	Maplewood - North St. Paul	Ramsey	MN	137,837	66,503	$37,653
14	Inner Grove Heights	Dakota	MN	34,790	18,100	$48,972
15	Burnsville	Dakota	MN	71,856	48,023	$53,336
16	Cottage Grove	Washington	MN	54,501	13,764	$44,557
17	Woodbury	Washington	MN	46,773	24,944	$58,602
18	Columbia Heights	Anoka	MN	23,620	14,299	$38,186
19	Fridley	Anoka	MN	29,235	30,985	$39,650
20	Chisago	Chisago	MN	27,699	15,241	$43,460
21	Chanhassen	Carver	MN	33,350	16,655	$68,152
22	Shakopee	Scott	MN	44,672	20,931	$40,106
23	Hutchinson	Mcleod	MN	38,930	21,344	$36,078
24	Buffalo	Wright	MN	136,110	41,214	$37,215
25	Big Lake	Sherburne	MN	101,560	26,847	$34,318
26	Cambridge	Isanti	MN	10,958	16,697	$42,789

Zone	Centroid Name	County	State	2010 Population	2010 Employment	2010 Per Capita Income
27	Milaca	Mille Lacs	MN	17,224	6,557	$33,372
28	Aitkin	Aitkin	MN	17,050	4,627	$29,527
29	Cloquest-Scanlon	Carlton	MN	36,950	14,782	$31,663
30	City of Hinckley	Pine	MN	5,114	1,427	$25,478
31	Ashland	Ashaland, Bayfield	WI	16,114	4,658	$30,091
32	Hayward	Rusk, Sawyer, Washburn	WI	51,230	21,929	$28,501
33	Hudson	St. Croix	WI	87,123	32,788	$40,661
34	Ellsworth	Pierce	WI	41,695	11,923	$34,589
35	Red Wing	Goodhue	MN	48,030	25,388	$39,003
36	Menomonie	Dunn, Pepin	WI	52,336	22,821	$29,650
37	Chippewa Falls	Chippewa	WI	63,413	26,120	$32,679
38	Mora	Kanabec	MN	4,084	4,994	$33,282
39	Arlington	Sibley	MN	15,370	4,331	$29,973
40	Winona	Winona	MN	49,430	29,474	$33,855
41	Rochester	Olmsted	MN	148,130	101,339	$46,170
42	Fairbault	Rice	MN	66,420	27,334	$32,746
43	Le Sueur	Le Sueur	MN	29,910	9,772	$35,295
44	Mankato	Blue Earth, Nicollet	MN	100,420	58,632	$35,878
45	Willmar	Kandiyohi, Meeker	MN	66,470	34,194	$34,935
46	St. Cloud	Benton, Sterns	MN	43,730	18,465	$34,102
47	Brainerd	Crow Wing, Morrison	MN	99,700	45,835	$31,697
48	Wadena	Cass, Todd, Wadena	MN	70,350	26,053	$30,193
49	Grand Rapids	Itasca, Koochiching	MN	59,300	24,435	$31,462
50	Two Harbors	Lake	MN	11,480	4,600	$35,673
51	St. Croix Falls	Polk	MN	31,850	14,532	$30,806
52	Superior	Douglas	WI	25,754	14,881	$29,651
53	Arcadia	Buffalo, Trempealeau	WI	43,126	21,069	$33,627
54	Wabasha	Wabasha	MN	22,940	8,309	$36,893
55	Min-St. Paul Int. Airport	Hennepin	MN	1,175	42,250	$41,430
56	Duluth International Airport	St. Louis	MN	72	2,748	$36,094

Zone	Centroid Name	County	State	2010 Population	2010 Employment	2010 Per Capita Income
57	Grand Casino Hinckley	Pine	MN	52	1,902	$25,478
58	Owatonna	Dodge, Steele, Waseca	MN	79,810	39,134	$35,667
59	Duluth West	St. Louis	MN	29,231	12,299	$34,368
60	Hermantown	St. Louis	MN	23,419	5,299	$39,265
61	Virginia - Giants Ridge Ski Resort	St. Louis	MN	51,542	29,431	$34,787
62	Pine City	Pine	MN	4,126	1,099	$31,949
63	Crossing Rd. 2 & Rd. 53	Douglas	WI	13,364	2,744	$29,254
64	Coon Rapids	Anoka	MN	54,466	22,962	$39,716
65	Blaine	Anoka	MN	60,576	23,980	$45,766
66	Andover	Anoka	MN	89,764	29,914	$44,367
67	Crossing Rd. 65 & Rd. 22	Anoka	MN	29,729	5,050	$47,788
68	Waconia	Carver	MN	67,480	21,898	$47,196
69	Lakeville	Dakota	MN	79,879	21,332	$49,009
70	Apple Valley-Rosemont	Dakota	MN	77,873	22,195	$48,652
71	Castle Rock	Dakota	MN	8,829	1,934	$41,480
72	Mendota Heights	Dakota	MN	13,172	11,047	$75,291
73	Savage	Scott	MN	61,666	17,387	$48,788
74	Jordan	Scott	MN	25,783	7,659	$33,030
75	Stillwater	Washington	MN	41,128	21,007	$58,769
76	Lakeland Shores	Washington	MN	15,461	3,050	$54,740
77	Oakdale	Washington	MN	36,074	11,670	$46,891
78	St. Paul Downtown	Ramsey	MN	77,182	98,880	$32,416
79	Crystal-New Hope-Golden Valley	Hennepin	MN	58,494	47,248	$50,880
80	Plymouth	Hennepin	MN	106,015	81,752	$72,905
81	Brooklyn Park-Maple Grove-Champlin	Hennepin	MN	143,476	78,622	$50,187
82	Minnetonka-Hopkins	Hennepin	MN	52,235	50,635	$78,012
83	Long Lake-Minnetonka Beach	Hennepin	MN	53,393	20,511	$92,945
84	Spencer Brook	Isanti	MN	4,783	594	$40,830
85	Eagan	Dakota	MN	60,922	46,498	$55,717
86	Southwest St. Paul	Dakota	MN	37,923	22,186	$41,510

Zone	Centroid Name	County	State	2010 Population	2010 Employment	2010 Per Capita Income
87	Hastings	Dakota	MN	28,876	13,140	$42,112
88	Cedar Lake	Scott	MN	22,389	1,331	$50,084
89	Forest Lake	Washington	MN	47,053	10,953	$49,901
90	Loretto	Hennepin	MN	34,415	19,739	$62,636
91	Isanti - draw boundaries	Isanti	MN	12,145	1,508	$37,203
92	Sandstone	Pine	MN	5,154	1,624	$29,076
93	Willow River	Pine	MN	8,636	1,624	$27,923
94	Fond-Du-Lutheran Casino	St. Louis	MN	1,739	14,694	$18,281
95	Arnold-Lakewood	St. Louis	MN	17,604	2,273	$39,584
96	Ely	St. Louis	MN	19,023	6,764	$36,793
97	Spirit Mountain Ski Resort	St. Louis	MN	1,757	380	$32,470
98	Solon Springs	Douglas	WI	5,396	967	$31,147
99	Grand Casino Mille Lacs (Onamia)	Mille Lacs	MN	3,719	2,462	$23,085
100	Eau Claire	Eau Claire	WI	101,148	64,838	$34,146
101	Rice Lake	Barron	WI	48,399	25,436	$31,693
102	Redwood Falls	Redwood, Renville, Brown	MN	59,120	31,191	$33,541
103	Siren	Burnett	WI	17,098	5,559	$29,130
104	Grand Marais	Cook	MN	5,570	3,203	$37,917
105	Macalester - Groveland	Ramsey	MN	73,188	80,572	$47,264
106	Roseville East	Ramsey	MN	58,512	26,174	$38,807
107	Mounds View	Ramsey	MN	29,503	20,216	$48,159
108	Centerville	Anoka	MN	27,661	3,470	$47,738
109	St. Francis	Anoka	MN	20,219	2,810	$42,646
110	Linwood	Anoka	MN	9,839	1,240	$49,287
111	Weber	Isanti	MN	4,349	540	$39,747
112	Stanfield	Isanti	MN	3,560	442	$36,921
113	Taylors Falls	Chisago	MN	3,108	1,710	$37,220
114	North branch	Chisago	MN	11,710	6,443	$40,203
115	Dalbo	Isanti	MN	4,159	517	$37,621
116	Harris	Chisago	MN	7,140	3,929	$33,300

Zone	Centroid Name	County	State	2010 Population	2010 Employment	2010 Per Capita Income
117	Rush Point	Chisago	MN	4,452	2,450	$40,642
118	Rock Creek	Pine	MN	3,850	1,026	$35,780
119	Pine City (West)	Pine	MN	3,887	1,036	$35,886
120	Brunswick	Kanabec	MN	5,411	6,617	$33,905
121	Ogilvie	Kanabec	MN	4,234	5,177	$34,034
122	Woodland	Kanabec	MN	3,727	4,557	$30,927
123	Wahkon	Mille Lacs	MN	6,318	2,405	$32,360

APPENDIX B: COMPASS™ MODEL AND CALIBRATION

The *COMPASS™* Model System is a flexible multimodal demand-forecasting tool that provides comparative evaluations of alternative socioeconomic and network scenarios. It also allows input variables to be modified to test the sensitivity of demand to various parameters such as elasticities, values of time, and values of frequency. This section describes in detail the model methodology and process using in the Duluth-Minneapolis Corridor Study.

B.1 DESCRIPTION OF THE *COMPASS™* SYSTEM

The *COMPASS™* model is structured on two principal models: Total Demand Model and Hierarchical Modal Split Model. For this study, these two models were calibrated separately for four trip purposes, i.e., *Business*, *Commuter*, *Casino*, and *Other*. Moreover, since the behavior of short-distance trip making is significantly different from long-distance trip making, the database was segmented by distance, and independent models were calibrated for both long and short-distance trips. For each market segment, the models were calibrated on origin-destination trip data, network characteristics and base year socioeconomic data.

The models were calibrated on the base year data. In applying the models for forecasting, an incremental approach known as the "pivot point" method was used. By applying model growth rates to the base data observations, the "pivot point" method is able to preserve the unique travel flows present in the base data that are not captured by the model variables. Details on how this method is implemented are described below.

B.2 TOTAL DEMAND MODEL

The Total Demand Model, shown in Equation 1, provides a mechanism for assessing overall growth in the travel market.

Equation 1:

$$T_{ijp} = e^{\beta_{0p}}(SE_{ijp})^{\beta_{1p}} e^{\beta_{2p} U_{ijp}}$$

Where,

T_{ijp}	=	Number of trips between zones *i* and *j* for trip purpose *p*
SE_{ijp}	=	Socioeconomic variables for zones *i* and *j* for trip purpose *p*
U_{ijp}	=	Total utility of the transportation system for zones *i* to *j* for trip purpose *p*
$\beta_{0p}, \beta_{1p}, \beta_{2p}$	=	Coefficients for trip purpose *p*

As shown in Equation 1, the total number of trips between any two zones for all modes of travel, segmented by trip purpose, is a function of the socioeconomic characteristics of the zones and the total utility of the transportation system that exists between the two zones. For this study, trip purposes include *Business, Commuter,* Casino, and *Other*. Socioeconomic characteristics consist of population, employment and per capita income. The utility function provides a logical and intuitively sound method of assigning a value to the travel opportunities provided by the overall transportation system.

In the Total Demand Model, the utility function provides a measure of the quality of the transportation system in terms of the times, costs, reliability and level of service provided by all modes for a given trip purpose. The Total Demand Model equation may be interpreted as meaning that travel between zones will increase as socioeconomic factors such as population and income rise or as the utility (or quality) of the transportation system is improved by providing new facilities and services that reduce travel times and costs. The Total Demand Model can therefore be used to evaluate the effect of changes in both socioeconomic and travel characteristics on the total demand for travel.

B.2.1 SOCIOECONOMIC VARIABLES

The socioeconomic variables in the Total Demand Model show the impact of economic growth on travel demand. The *COMPASS™* Model System, in line with most intercity modeling systems, uses three variables (population, employment and per capita income) to represent the socioeconomic characteristics of a zone. Different combinations were tested in the calibration process and it was found, as is typically found elsewhere, that the most reasonable and stable relationships consists of the following formulations:

Trip Purpose	***Socioeconomic Variable***
Business	$E_iE_j(I_i + I_j) / 2$
Commuter	$(P_iE_j+P_jE_i) / 2 (I_i+I_j) / 2$
Other,Casino	$P_iP_j(I_i + I_j) / 2$

The Business formulation consists of a product of employment in the origin zone, employment in the destination zone, and the average per capita income of the two zones. Since business trips are usually made between places of work, the presence of employment in the formulation is reasonable. The Commuter formulation consists of all socioeconomic factors; this is because commuter trips are between homes and places of work, which are closely related to population and employment. The formulation for Casino and Other consists of a product of population in the origin zone, population in the destination zone and the average per capita income of the two zones. Casino and Other trips encompass many types of trips, but the majority is home-based and thus, greater volumes of trips are expected from zones from higher population and income

B.2.2 TRAVEL UTILITY

Estimates of travel utility for a transportation network are generated as a function of generalized cost (GC), as shown in Equation 2:

Equation 2:

$$U_{ijp} = f(GC_{ijp})$$

Where,

GC_{ijp} = Generalized Cost of travel between zones *i* and *j* for trip purpose *p*

Because the generalized cost variable is used to estimate the impact of improvements in the transportation system on the overall level of trip making, it needs to incorporate all the key modal attributes that affect an individual's decision to make trips. For the public modes (i.e., rail, bus and air), the generalized cost of travel includes all aspects of travel time (access, egress, in-vehicle times), travel cost (fares, tolls, parking charges), schedule convenience (frequency of service, convenience of arrival/departure times) and reliability.

The generalized cost of travel is typically defined in travel time (*i*.e., minutes) rather than dollars. Costs are converted to time by applying appropriate conversion factors, as shown in Equation 3. The generalized cost (GC) of travel between zones *i* and *j* for mode m and trip purpose *p* is calculated as follows:

Equation 3:

$$GC_{ijmp} = TT_{ijm} + \frac{TC_{ijmp}}{VOT_{mp}} + \frac{VOF_{mp}OH}{VOT_{mp}F_{ijm}C_{ijm}} + \frac{VOR_{mp}\exp(-OTP_{ijm})}{VOT_{mp}}$$

Where,

TT_{ijm}	=	Travel Time between zones *i* and *j* for mode *m* (in-vehicle time + station wait time + connection wait time + access/egress time + interchange penalty), with waiting, connect and access/egress time multiplied by a factor (greater than 1) to account for the additional disutility felt by travelers for these activities
TC_{ijmp}	=	Travel Cost between zones *i* and *j* for mode *m* and trip purpose *p* (fare + access/egress cost for public modes, operating costs for auto)
VOT_{mp}	=	Value of Time for mode *m* and trip purpose *p*
VOF_{mp}	=	Value of Frequency for mode *m* and trip purpose *p*
VOR_{mp}	=	Value of Reliability for mode *m* and trip purpose *p*
F_{ijm}	=	Frequency in departures per week between zones *i* and *j* for mode *m*
C_{ijm}	=	Convenience factor of schedule times for travel between zones *i* and *j* for mode *m*
OTP_{ijm}	=	On-time performance for travel between zones *i* and *j* for mode *m*
OH	=	Operating hours per week

Station wait time is the time spent at the station before departure and after arrival. Air travel generally has higher wait times because of security procedures at the airport, baggage checking, and the difficulties of loading a plane. Air trips were assigned wait times of 45 minutes while rail trips were assigned wait times of 30 minutes and bus trips were assigned wait times of 20 minutes. On trips with connections, there would be additional wait times incurred at the connecting station. Wait times are weighted higher than in-vehicle time in the generalized cost formula to reflect their higher disutility as found from previous studies. Wait times are weighted 70 percent higher than in-vehicle time for *Business* trips and 90 percent higher for *Commuter*, *Casino* and *Other* trips.

Similarly, access/egress time has a higher disutility than in-vehicle time. Access time tends to be more stressful for the traveler than in-vehicle time because of the uncertainty created by trying to catch the flight or train. Based on previous work, access time is weighted 30 percent higher than in-vehicle time for air travel and 80 percent higher for rail and bus travel.

TEMS has found from past studies that the physical act of transferring trains (or buses or planes) has a negative impact beyond the times involved. To account for this disutility, interchanges are penalized time equivalents. For both air and rail travel, each interchange for a trip results in 40 minutes being added to the *Business* generalized cost and 30 minutes being added to the *Commuter, Casino and Other* generalized cost. For bus travel, the interchange penalties are 20 minutes and 15 minutes for *Business* and *Other*, respectively.

The third term in the generalized cost function converts the frequency attribute into time units. Operating hours divided by frequency is a measure of the headway or time between departures. Tradeoffs are made in the stated preference surveys resulting in the value of frequencies on this measure. Although there may appear to some double counting because the station wait time in the first term of the generalized cost function is included in this headway measure, it is not the headway time itself that is being added to the generalized cost. The third term represents the impact of perceived frequency valuations on generalized cost. TEMS has found it very convenient to measure this impact as a function of the headway.

The fourth term of the generalized cost function is a measure of the value placed on reliability of the mode. Reliability statistics in the form of on-time performance (i.e., the fraction of trips considered to be on time) were obtained for the rail and air modes only. The negative exponential form of the reliability term implies that improvements from low levels of reliability have slightly higher impacts than similar improvements from higher levels of reliability.

B.2.3 CALIBRATION OF THE TOTAL DEMAND MODEL

In order to calibrate the Total Demand Model, the coefficients are estimated using linear regression techniques. Equation 1, the equation for the Total Demand Model, is transformed by taking the natural logarithm of both sides, as shown in Equation 4:

Equation 4:

$$\log(T_{ijp}) = \beta_{0p} + \beta_{1p}\log(SE_{ijp}) + \beta_{2p}(U_{ijp})$$

Equation 4 provides the linear specification of the model necessary for regression analysis.

The segmentation of the database by trip purpose and trip length resulted in four sets of models. Trips that would cover more than 170 miles are considered long-distance trips. Some previous studies show the traveler’s behaviors are different, but in this study, as shown in the following exhibits, the difference of long distance trips and short distance trips are small. The t-test of the long distance and short distance model also shows the coefficients are not significantly different. However, two models calibrated for long and short distance are more accurate to describe the relationship between trips and socioeconomic variables and utilities than one model without distance differentiation does. It should be noted that most of trips in our study area fall into the short distance range since the distance between Minneapolis and Duluth is only about 150 miles. The long distance trips to casino are less than 1 percent of total casino trips, so only the short distance casino trips model are calibrated. The results of the calibration for the Total Demand Models are displayed in Exhibit B-1.

Exhibit B-1: Total Demand Model Coefficients [1]

Long-Distance Trips (trip length greater than 170 miles)

Business	$\log(T_{ij})$ =	-25.17+	1.08 U_{ij} + (45)	1.12 $\log(SE_{ij})$ (132)	R^2=0.94

where $U_{ij} = Log(e^{2.59+0.89*U_{Public}} + e^{-0.01*GC_{Auto}})$ for Business

Commuter	$\log(T_{ij})$ =	-18.59+	0.99 U_{ij} + (127)	0.75 $\log(SE_{ij})$ (75)	R^2=0.93

where $U_{ij} = Log(e^{1.46+0.99*U_{Public}} + e^{-0.02*GC_{Auto}})$ for Commuter

Other	$\log(T_{ij})$ =	- 17.45 +	1.02 U_{ij} + (104)	0.83 $\log(SE_{ij})$ (91)	R^2=0.94

where $U_{ij} = Log(e^{-5.24+0.97*U_{Public}} + e^{-0.01*GC_{Auto}})$

Short-Distance Trips (trip length less than 170 miles)

Business	$\log(T_{ij})$ =	-27.75+	1.17 U_{ij} + (30)	1.15 $\log(SE_{ij})$ (60)	R^2=0.70

where $U_{ij} = Log(e^{1.56+0.93*U_{Public}} + e^{-0.01*GC_{Auto}})$ for Business

Commuter	$\log(T_{ij})$ =	-10.67+	0.99 U_{ij} + (57)	0.53 $\log(SE_{ij})$ (26)	R^2=0.65

where $U_{ij} = Log(e^{-1.57+0.98*U_{Public}} + e^{-0.03*GC_{Auto}})$ for Commuter

Casino	$\log(T_{ij})$ =	0.68+	1.07 U_{ij} + (402)	0.57 $\log(SE_{ij})$ (129)	R^2=0.94

where $U_{ij} = Log(e^{-2.32+0.88*U_{Public}} + e^{-0.04*GC_{Auto}})$ for Casino

Other	$\log(T_{ij})$ =	- 20.52 +	1.15 U_{ij} + (37)	0.54 $\log(SE_{ij})$ (29)	R^2=0.55

where $U_{Total} = Log(e^{-7.07+0.95*U_{Public}} + e^{-0.02*GC_{Auto}})$ for Other

[1] *t-statistics are given in parentheses.*

In evaluating the validity of a statistical calibration, there are two key statistical measures: *t*-statistics and R^2. The *t*-statistics are a measure of the significance of the model's coefficients; values of 2 and above are considered "good" and imply that the variable has significant explanatory power in estimating the level of trips. The R^2 is a statistical measure of the "goodness of fit" of the model to the data; any data point that deviates from the model will reduce this measure. It has a range from 0 to a perfect 1, with 0.4 and above considered "good" for large data sets.

Based on these two measures, the total demand calibrations are good. The *t*-statistics are very high, aided by the large size of the Duluth-Minneapolis data set. The R^2 values imply very good fits of the equations to the data.

As shown in Exhibit 1, the average socioeconomic elasticity values for the Total Demand Model is 0.69 for short distance trips and 0.90 for long distance trips, meaning that each one percent growth in the socioeconomic term generates approximately a 0.69 percent growth in short distance trips and a 0.90 percent growth in long distance trips.

The coefficient on the utility term is not exactly elasticity, but it can be used as an approximation. Thus, the average utility elasticity of the transportation system or network is almost same for short-distance trips and long-distance trips, with each one percent improvement in network utility or quality as measured by generalized cost (i.e., travel times or costs) generating approximately a 1.03 percent increase for long-distance trips and a 1.10 percent increase for short trips. The slightly higher elasticity on short trips is partly a result of the scale of the generalized costs. For short trips, a 30-minute improvement would be more meaningful than the same time improvement on long-distance trips, reflecting in the higher elasticity on the short-distance model.

The positive intercepts for casino trips means as a special generator zone, the trips to Hinckley casino cannot be fully explained by socioeconomic and network utilities. That is to say with the similar level of population, income or employment and similar transportation costs; Hinckley will generate more trips than common zones. This is also why Hinckley and casino should be treated differently than other zones in this study.

B.2.4 INCREMENTAL FORM OF THE TOTAL DEMAND MODEL

The calibrated Total Demand Models could be used to estimate the total travel market for any zone pair using the population, employment, per capita income, and the total utility of all the modes. However, there would be significant differences between estimated and observed levels of trip making for many zone pairs despite the good fit of the models to the data. To preserve the unique travel patterns contained in the base data, the incremental approach or "pivot point" method is used for forecasting. In the incremental approach, the base travel data assembled in the database are used as pivot points, and forecasts are made by applying trends to the base data. The total demand equation as described in Equation 1 can be rewritten into the following incremental form that can be used for forecasting (Equation 5):

Equation 5:

$$\frac{T_{ijp}{}^{f}}{T_{ijp}{}^{b}} = \left(\frac{SE_{ijp}{}^{f}}{SE_{ijp}{}^{b}}\right)^{\beta_{1p}} \exp(\beta_{2p}\,(U_{ijp}{}^{f} - U_{ijp}{}^{b}))$$

Where,

T^{f}_{ijp} = Number of Trips between zones *i* and *j* for trip purpose *p* in forecast year *f*

T^{f}_{ijp} = Number of Trips between zones *i* and *j* for trip purpose *p* in base year *b*

SE^{f}_{ijp} = Socioeconomic variables for zones *i* and *j* for trip purpose *p* in forecast year *f*

SE^{b}_{ijp} = Socioeconomic variables for zones *i* and *j* for trip purpose *p* in base year *b*

U^{f}_{ijp} = Total utility of the transportation system for zones *i* to *j* for trip purpose *p* in forecast year *f*

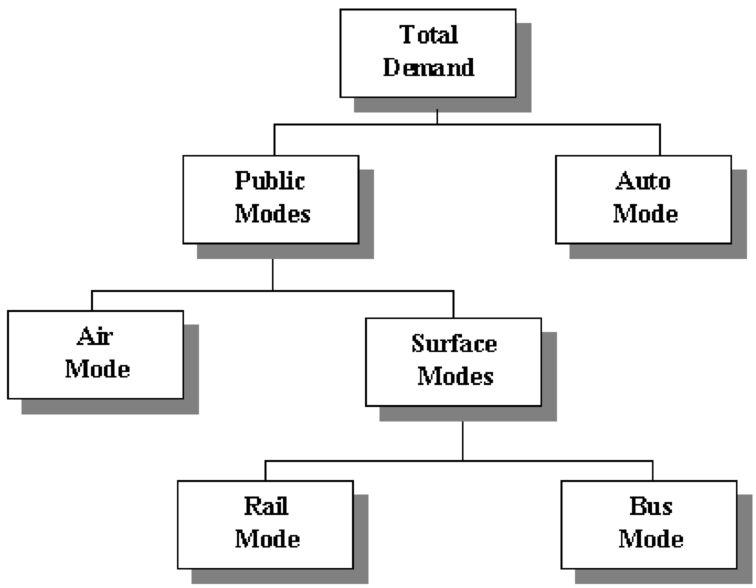
U^{b}_{ijp} = Total utility of the transportation system for zones *i* to *j* for trip purpose *p* in base year *b*

In the incremental form, the constant term disappears and only the elasticities are important.

B.3 HIERARCHICAL MODAL SPLIT MODEL

The role of the Hierarchical Modal Split Model is to estimate relative modal shares, given the Total Demand Model estimate of the total market. The relative modal shares are derived by comparing the relative levels of service offered by each of the travel modes. The *COMPASS™* Hierarchical Modal Split Model uses a nested logit structure, which has been adapted to model the intercity modal choices available in the study area. As shown in Exhibit B-2, three levels of binary choice are calibrated.

Exhibit B-2: Hierarchical Structure of the Modal Split Model

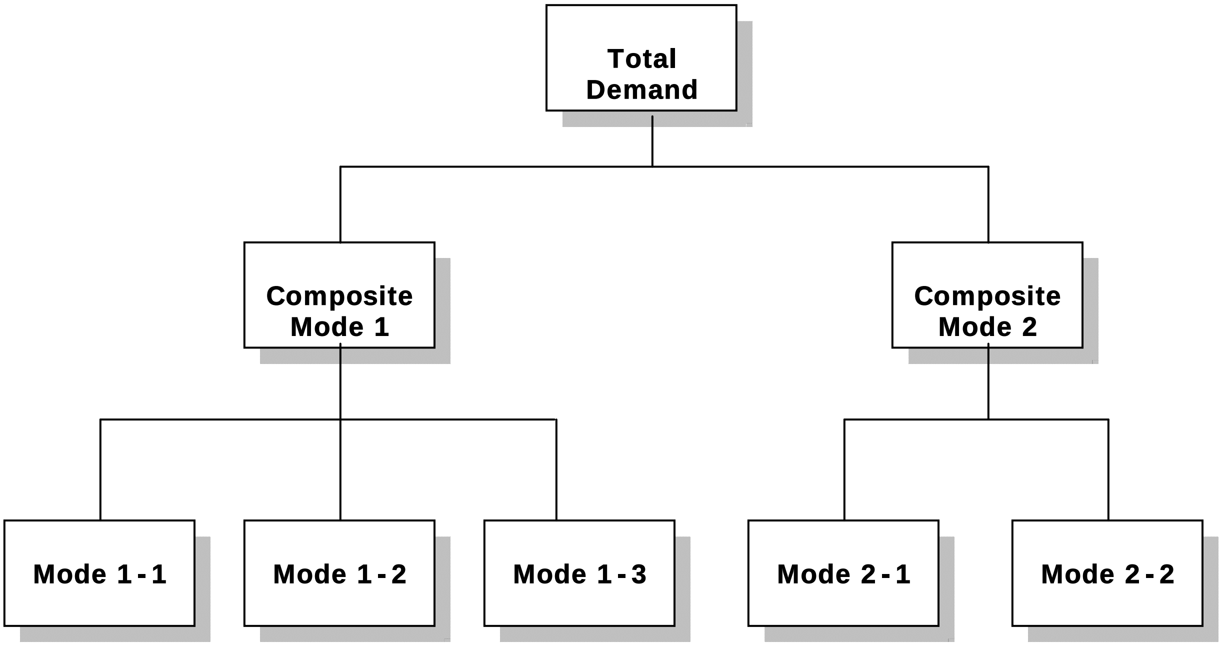


The main feature of the Hierarchical Modal Split Model structure is the increasing commonality of travel characteristics as the structure descends. The first level of the hierarchy separates private auto travel – with its spontaneous frequency, low access/egress times, low costs and highly personalized characteristics – from the public modes. The second level of the structure separates air – the fastest, most expensive and perhaps most frequent and comfortable public mode – from the rail and bus surface modes. The lowest level of the hierarchy separates rail, a potentially faster, more reliable, and more comfortable mode, from the bus mode.

B.3.1 FORM OF THE HIERARCHICAL MODAL SPLIT MODEL

The modal split models used by TEMS derived from the standard nested logit model. Exhibit B-3 shows a typical two-level standard nested model. In the nested model shown in Exhibit B-3, there are five travel modes that are grouped into two composite modes, namely, Composite Mode 1 and Composite Mode 2.

Exhibit B-3: A Typical Standard Nested Logit Model



Each travel mode in the above model has a utility function of U_j, j = 1, 2, 3, 4, 5. To assess modal split behavior, the logsum utility function, which is derived from travel utility theory, has been adopted for the composite modes in the model. As the modal split hierarchy ascends, the logsum utility values are derived by combining the utility of lower-level modes. The composite utility is calculated by

$$U_{N_k} = \alpha_{N_k} + \beta_{N_k} \log \sum_{i \in N_k} \exp(\rho U_i) \qquad (1)$$

where

N_k is composite mode k in the modal split model,

i is the travel mode in each nest,

U_i is the utility of each travel mode in the nest,

ρ is the nesting coefficient.

The probability that composite mode k is chosen by a traveler is given by

$$P(N_k) = \frac{\exp(U_{N_k} / \rho)}{\sum_{N_i \in N} \exp(U_{N_i} / \rho)} \qquad (2)$$

The probability of mode *i* in composite mode *k* being chosen is

$$P_{N_k}(i) = \frac{\exp(\rho U_i)}{\sum_{j \in N_k} \exp(\rho U_j)} \tag{3}$$

A key feature of these models is a use of utility. Typically in transportation modeling, the utility of travel between zones *i* and *j* by mode *m* for purpose *p* is a function of all the components of travel time, travel cost, terminal wait time and cost, parking cost, etc. This is measured by generalized cost developed for each origin-destination zone pair on a mode and purpose basis. In the model application, the utility for each mode is estimated by calibrating a utility function against the revealed base year mode choice and generalized cost.

Using logsum functions, the generalized cost is then transformed into a composite utility for the composite mode (e.g. Surface and Public in Exhibit 2). This is then used at the next level of the hierarchy to compare the next most similar mode choice (e.g. in Exhibit B-2, Surface is compared with Air mode).

B.3.2 DEGENERATE MODAL SPLIT MODEL

For the purpose of Duluth-Minneapolis Corridor Study (and other intercity high speed rail projects), TEMS has adopted a special case of the standard logit model, the degenerate nested logit model [*Louviere, et.al., 2000*]. This is because in modeling travel choice, TEMS has followed a hierarchy in which like modes are compared first, and then with gradually more disparate modes as progress is made up the hierarchy, this method provides the most robust and statistically valid structure. This means however, that there are singles modes being introduced at each level of the hierarchy and that at each level the composite utility of two modes combined at the lower level (e.g. the utility of Surface mode combined from Rail and Bus modes) is compared with the generalized cost of a single mode (e.g. Air mode). It is the fact that the utilities of the two modes being compared are measured by different scales that creates the term degenerate model. The result of this process is that the nesting coefficient is subsumed into the hierarchy and effectively cancels out in the calculation. That is why TEMS set ρ to 1 when using this form of the model in *COMPASS™*.

Take the three-level hierarchy shown in Exhibit 2 for example, the utilities for the modes of Rail and Bus in the composite Surface mode are

$$U_{Rail} = \alpha_{Rail} + \beta_{Rail} GC_{Rail} \tag{4}$$

$$U_{Bus} = \beta_{Bus} GC_{Bus} \tag{5}$$

The utility for the composite Surface mode is

$$U_{Surface} = \alpha_{Surface} + \beta_{Surface} \log[\exp(\rho U_{Rail}) + \exp(\rho U_{Bus})] \tag{6}$$

The utility for the Air mode is

$$U_{Air} = \beta_{Air} \log[\exp(\rho GC_{Air})] = \rho \beta_{Air} GC_{Air} \tag{7}$$

Then the mode choice model between Surface and Air modes are

$$P(Surface) = \frac{\exp(U_{Surface} / \rho)}{\exp(U_{Surface} / \rho) + \exp(U_{Air} / \rho)} \quad (8)$$

It can be seen in equation (7) that $U_{Air} = \rho\beta_{Air} GC_{Air}$, the term of $\exp(U_{Air} / \rho)$ in equation (8) reduces to $\exp(\beta_{Air} GC_{Air})$, thus that the nesting coefficient ρ is canceled out in the single mode nest of the hierarchy. As a result, ρ loses its statistical meaning in the nested logit hierarchy, and leads to the degenerate form of the nested logit model, where ρ is set to 1

B.3.3 CALIBRATION OF THE HIERARCHICAL MODAL SPLIT MODEL

Working from the bottom of the hierarchy up to the top, the first analysis is that of the rail mode versus the bus mode. As shown in Exhibit B-4, the model was effectively calibrated for the four (three for long distance trip) trip purposes and the two trip lengths, with reasonable parameters and R^2 and *t* values. All the coefficients have the correct signs such that demand increases or decreases in the correct direction as travel times or costs are increased or decreased, and all the coefficients appear to be reasonable in terms of the size of their impact.

Exhibit B-4: Rail versus Bus Modal Split Model Coefficients (1)

Long-Distance Trips (trip length greater than 170 miles)					
Business	log(PRail/PBus) =	2.95	- 0.01 GCRail (33)	+ 0.01GCBus (25)	R2=0.70
Commuter	log(PRail/PBus) =	4.10	- 0.02 GCRail (118)	+0.02 GCBus (88)	R2=0.93
Other	log(PRail/PBus) =	2.52	-0.01 GCRail (45)	+0.01GCBus (72)	R2=0.90
Short-Distance Trips (trip length less than 170 miles)					
Business	log(PRail/PBus) =	3.39	- 0.01 GCRail (154)	+ 0.01GCBus (83)	R2=0.92
Commuter	log(PRail/PBus) =	3.60	- 0.03 GCRail (361)	+0.04 GCBus (300)	R2=0.96
Casino	log(PRail/PBus) =	-1.41	- 0.01 GCRail (20)	+ 0.01 GCBus (22)	R2=0.88
Other	log(PRail/PBus) =	2.49	- 0.02 GCRail (286)	+ 0.03GCBus (199)	R2=0.93

(1) *t-statistics are given in parentheses.*

The constant term in each equation indicates the degree of bias towards one mode or the other. For example, if the constant term is positive, there is a bias towards rail travel that is not explained by the variables (e.g., times, costs, frequencies, reliability) used to model the modes. In considering the bias it is important to recognize that small values indicate little or no bias, and that small values have error ranges that include both positive and negative values. However, large biases may well reflect strong feelings to a modal option due to its innate character or network structure. The terms of Business Commuter and Other trips are positive in all the market segments; this means that there is a bias towards rail travel. The constant term of casino is negative. It is because, in the base rail network, the Hinckley casino is connected by a shuttle bus service and rail service (frequency is 2 trains/day and speed is 79mph) is not attractive to gambler and tourists.

For the second level of the hierarchy, the analysis is of the surface modes (i.e., rail and bus) versus air. Accordingly, the utility of the surface modes is obtained by deriving the logsum of the utilities of rail and bus. As shown in Exhibit B-5, the model calibrations for both trip purposes are all statistically significant, with good R^2 and *t* values and reasonable parameters. As indicated by the constant terms, there are biases towards the air mode for both long and short distant trips. The biases for short distant trips are relatively smaller and this is understandable since travelers for long distance trips prefer air travel to travelers for short distance trips.

Exhibit B-5: Surface versus Air Modal Split Model Coefficients (1)

Long-Distance Trips (trip length greater than 170 miles)						
Business	$\log(P_{Surf}/P_{Air})$ =	-0.30 +	$0.99U_{Surf}$ +	$0.01GC_{Air}$	$R^2=0.95$
			(2973)	(11)	
	where $U_{Surface} = Log(e^{2.95-0.01*GC_{Rail}} + e^{-0.01*GC_{Bus}})$ for Business				
Commuter	$\log(P_{Surf}/P_{Air})$ =	-8.83 +	$0.99U_{Surf}$ +	$0.01\ GC_{Air}$	$R^2=0.92$
			(101)	(44)	
	where $U_{Surface} = Log(e^{4.10-0.02*GC_{Rail}} + e^{-0.02*GC_{Bus}})$ for Commuter				
Other	$\log(P_{Surf}/P_{Air})$ =	-2.12+	$0.99\ U_{Surf}$ +	$0.03\ GC_{Air}$	$R^2=0.96$
			(5892)	(169)	
	where $U_{Surface} = Log(e^{2.52-0.01*GC_{Rail}} + e^{-0.01*GC_{Bus}})$ for Other				
Short-Distance Trips (*trip length less than 170 miles*)					
Business	$\log(P_{Surf}/P_{Air})$ =	-0.20 +	$0.98U_{Surf}$ +	$0.01\ GC_{Air}$	$R^2=0.88$
			(77)	(17)	
	where $U_{Surface} = Log(e^{3.39-0.01*GC_{Rail}} + e^{-0.01*GC_{Bus}})$ for Business				
Commuter	$\log(P_{Surf}/P_{Air})$ =	-8.23 +	$0.99U_{Surf}$ +	$0.03\ GC_{Air}$	$R^2=0.95$
			(227)	(110)	
	where $U_{Surface} = Log(e^{3.60-0.03*GC_{Rail}} + e^{-0.04*GC_{Bus}})$ for Commuter				
Casino	$\log(P_{Surf}/P_{Air})$ =	-6.23 +	$0.98U_{Surf}$ +	$0.02\ GC_{Air}$	$R^2=0.94$
			(10)	(4)	
	where $U_{Surface} = Log(e^{-1.41-0.01*GC_{Rail}} + e^{-0.01*GC_{Bus}})$ for Casino				
Other	$\log(P_{Surf}/P_{Air})$ =	-1.99 +	$0.96\ U_{Surf}$ +	$0.01\ GC_{Air}$	$R^2=0.92$
			(149)	(42)	
	where $U_{Surface} = Log(e^{2.49-0.02*GC_{Rail}} + e^{-0.03*GC_{Bus}})$ for Other				

(1) *t-statistics are given in parentheses.*

The analysis for the top level of the hierarchy is of auto versus the public modes. The utility of the public modes is obtained by deriving the logsum of the utilities of the air, rail and bus modes.

As shown in Exhibit B-6, the model calibrations for both trip purposes are all statistically significant, with good R^2 and *t* values and reasonable parameters in most cases. The constant terms show that Business, Commuter trips have a bias toward for public mode, while Casino and Other trips prefer auto mode. A reason for why the R^2 value for the short-distance model is a bit lower than in the rest of the model is due to the fact that local transit trips are not included in the public trip database, causing some of the observations to deviate significantly from the model equation.

Exhibit B-6: Public versus Auto Hierarchical Modal Split Model Coefficients (1)

Long-Distance Trips (trip length greater than 170 miles)

Business (298)	$\log(P_{Pub}/P_{Auto})$ (28)	=	2.59	+ 0.89 U_{Pub} +	0.01 GC_{Auto}	R^2=0.95

where $U_{Public} = Log(e^{-0.30+0.99*U_{Surface}} + e^{-0.01*GC_{Air}})$

Commuter (110)	$\log(P_{Pub}/P_{Auto})$ (44)	=	1.46	+ 0.99 U_{Pub} +	0.02 GC_{Auto}	R^2=0.94

where $U_{Public} = Log(e^{-8.83+0.99*U_{Surface}} + e^{-0.01*GC_{Air}})$

Other (1265)	$\log(P_{Pub}/P_{Auto})$ (47)	=	-5.24 +	0.97 U_{Pub}+	0.01 GC_{Auto}	R^2=0.96

where $U_{Public} = Log(e^{-2.12+0.99*U_{Surface}} + e^{-0.03*GC_{Air}})$

Short-Distance Trips (trip length less than 170 miles)

Business (2652)	$\log(P_{Pub}/P_{Auto})$ (32)	=	1.56+	0.93 U_{Pub} +	0.01 GC_{Auto}	R^2=0.94

where $U_{Public} = Log(e^{-0.20+0.98*U_{Surface}} + e^{-0.01*GC_{Air}})$

Commuter (119)	$\log(P_{Pub}/P_{Auto})$ (45)	=	1.57+	0.98 U_{Pub} +	0.03 GC_{Auto}	R^2=0.85

where $U_{Public} = Log(e^{-8.23+0.99*U_{Surface}} + e^{-0.03*GC_{Air}})$

Casino (303)	$\log(P_{Pub}/P_{Auto})$ (2)	=	-2.32 +	0.88 U_{Pub} +	0.04 GC_{Auto}	R^2=0.86

where $U_{Public} = Log(e^{-6.23+0.98*U_{Surface}} + e^{-0.02*GC_{Air}})$

Other (1212)	$\log(P_{Pub}/P_{Auto})$ (45)	=	-7.07 +	0.95 U_{Pub}	+ 0.02 GC_{Auto}	R^2=0.84

where $U_{Public} = Log(e^{-1.99+0.96*U_{Surface}} + e^{-0.01*GC_{Air}})$

(1) *t-statistics are given in parentheses.*

B.4 INCREMENTAL FORM OF THE MODAL SPLIT MODEL

Using the same reasoning as previously described, the modal split models are applied incrementally to the base data rather than imposing the model estimated modal shares. Different regions of the corridor may have certain biases toward one form of travel over another and these differences cannot be captured with a single model for the entire system. Using the "pivot point" method, many of these differences can be retained. To apply the modal split models incrementally, the following reformulation of the hierarchical modal split models is used (Equation 6):

Equation 6:

$$\frac{\left(\frac{P_A^f}{P_B^f}\right)}{\left(\frac{P_A^b}{P_B^b}\right)} = e^{\beta(GC_A^f - GC_B^b) + \gamma(GC_B^f - GC_B^b)}$$

For hierarchical modal split models that involve composite utilities instead of generalized costs, the composite utilities would be used in the above formula in place of generalized costs. Once again, the constant term is not used and the drivers for modal shifts are changed in generalized cost from base conditions.

Another consequence of the pivot point method is that it prevents possible extreme modal changes from current trip-making levels as a result of the calibrated modal split model, thus that avoid over- or under- estimating future demand for each mode.

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APPENDIX D

BRIDGE REHABILITATION DESCRIPTION

-

NLX High Speed Passenger Rail Project from Minneapolis to Duluth

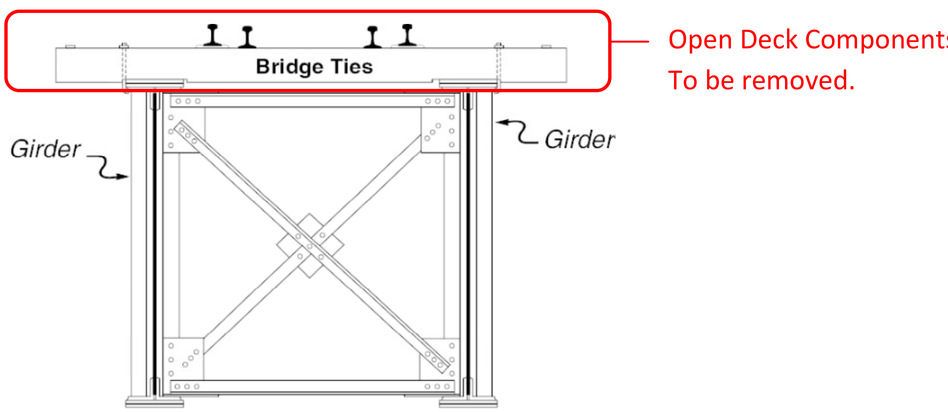
Railroad Bridge Rehabilitation: Open Deck to Ballasted Deck

Purpose:

Numerous open deck bridges are in use along this rail corridor, typically where the railroad spans waterways. Open decks are free draining and therefore are not preferred for bridges spanning roadways. The open deck bridges located along the railroad corridor for this project are programmed for rehabilitation to ballasted deck bridges. A ballasted deck bridge provides a better riding surface and improves maintenance activities by allowing a continuous path for maintenance-of-way equipment.

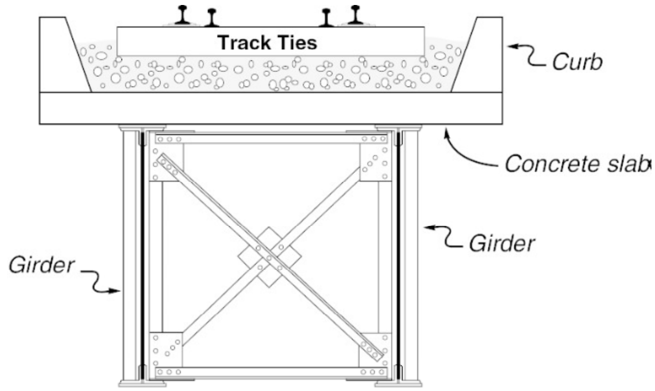
Rehabilitation Work:

The existing bridges requiring rehabilitation on this project contain open decks on steel deck plate girders or steel rolled beams. Conversion of an open deck to ballasted deck structure requires the removal of the deck components of the bridge: rail, ties, tie plates, tie fasteners, tie-girder clips. This work is typically done from above by railroad track personnel from equipment that rides along the existing rail.



Open Timber Deck

Once the existing deck is removed, the ballasted deck is placed. The ballasted deck contains a ballast retainer which can be constructed from precast concrete, cast-in-place concrete or steel. After the ballast retainer is fastened to the existing superstructure, the ballast is added followed by the ties and rail. This work is typically performed from above using track-mounted cranes and other equipment that moves along the existing rails. The open deck removal and ballasted deck replacement are often done simultaneously.



Ballast Deck

Other work that may be included with a rehabilitation project of this sort includes:

- cleaning and recoating steel structure components
- bearing replacement
- pointing of abutment and/or piers

Potential Environmental Impacts:

Open Deck Rehabilitation

The potential for environmental impact for this work is low. The work is typically completed from on top of the bridge without introducing any impacts to the waterway. Debris containment measures may be required to ensure construction materials do not fall into the waterway.

Cleaning and Painting

Potential for environmental impact is relatively high, but mitigation measures reduce the probability significantly. The contractor will be required to propose a containment plan, environmental monitoring plan, waste management plan and contingency plan in order to avoid contamination of the waterway from lead-based paint materials. Typical containment systems include tarps, negative pressure, barges/pontoons/small floats, and vacuum equipment. Staging for this work may be located below the bridge on the waterway banks or in the waterway channel. The staging may cause minor short-term impacts to the waterway flow, but no long-term impacts once work is completed.

Bearing Replacement

The potential for environmental impact is low. Bearing replacement requires jacking the existing superstructure off of the bearing surface on the substructure. If this work is performed, the staging for the jacking device will be located below the bridge on the waterway banks or potentially in the waterway channel depending on the span length. The work may cause minor short-term impacts to the waterway flow, but no long-term impacts once work is completed.

Pointing of Abutments and/or Piers

The potential for environment impact is low. Construction staging for this work may be located near the bridge site or within waterway bank slopes. This staging may have minor short-term impact to the waterway flow, but no long-term impacts once work is completed.

APPENDIX E

NLX CORRIDOR REFINEMENT
CITY OF BRAHAM, MN

Exhibit E.1 Refinement of NLX Corridor through Braham, MN

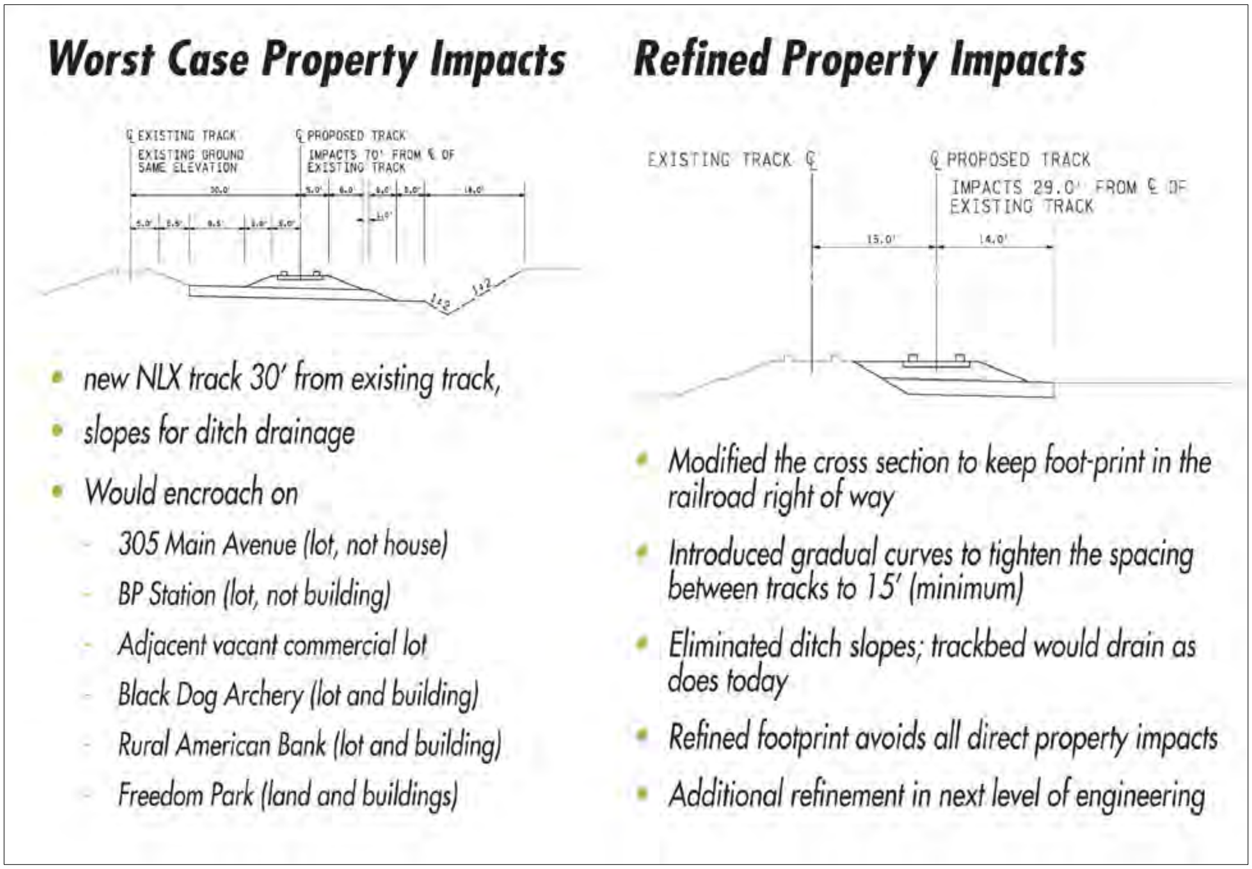


Exhibit E.2 NLX Corridor through Braham, MN

NORTHERN LIGHTS EXPRESS PROJECT

SUMMARY OF PUBLIC INFORMATION OPEN HOUSE

BRAHAM, MINNESOTA

April 23, 2012 from 7:00 p.m. to 9:00 p.m.

Introduction

A Public Information Open House for the Northern Lights Express high speed passenger rail project was held on Monday, April 23, 2012 at 7:00 p.m. at Braham High School, Braham, Minnesota.

Notice of Public Information Meeting

The City of Braham managed meeting notification via the City website, City message sign, newsletter, and posted notices at public facilities and businesses.

Attendees

The following agencies had representatives at the meeting to explain the project and answer questions:

NLX Alliance:	Bob Manzoline, NLX Exec Dir Frank Pafko, MnDOT Julie Carr, MnDOT Dave Christianson, MnDOT Jeanne Witzig, KHA
Elected Officials:	Sally Hoy, Braham City Administrator Patricia Carlson, Braham Mayor Larry Southerland, Isanti County Commissioner
***SRF Consulting*:**	Beth Bartz Nancy Frick

An attendance record sheet was prominently displayed on a table at the front door and all persons entering were asked to sign in for the record. A total of 74 people signed in.

Summary of Open House

The meeting was an informal open house and no presentation. Attendees viewed informational exhibits (presentation boards, aerial photos, and handouts) and engaged in one-on-one or small group discussions with the project staff.

Comment forms were made available to meeting attendees. Meeting attendees were encouraged to submit comments either directly at the meeting in a comment box, or by mail.

Written Comments

A total of four comments were received at the night of the Public Meeting. The comments are summarized below.

Summary of Comments

Support for project

- Support for station in Braham.
- NLX would enhance livability and economic development opportunities for Braham area. NLX would help attract residents with higher paying jobs in the Twin Cities.
- Project construction would provide jobs.
- Support for public funding of NLX.

Project Concerns

- Concerns about safety near the corridor (flying rocks, etc.), specifically children's safety noted by a day care provider adjacent to the corridor.
- Secondary property impacts due to side slopes.
- Impacts to City utilities, park, bank, and residences.
- Concerns about rail crossings.
- Request for slower speed.
- Concerns about increased ground vibration.
- Should have held a meeting with a presentation and opened the floor for questions.
- Soils inadequate to support the project safely.

APPENDIX F

THREATENED AND ENDANGERED SPECIES

- **FRA – USFWS Correspondence**
- **Table F-1: Minnesota Species List**
- **Table F-2: Wisconsin Species List**
- **Wisconsin Species Descriptions**

U.S. Department
of Transportation

Federal Railroad
Administration

APR 1 2 2012

1200 New Jersey Avenue, SE
Washington, DC 20590

Tony Sullins, Field Supervisor
U.S. Fish and Wildlife Service
Twin Cities Field Office
4101 East 80th Street
Bloomington, MN 55425

Re: Northern Lights Express (NLX) High Speed Passenger Rail Service from Minneapolis to Duluth, Minnesota and Wisconsin; Request for Concurrence – May Affect, Not Likely to Adversely Affect Determination - Canada Lynx

Dear Mr. Sullins:

The Minneapolis-Duluth-Superior Passenger Rail Alliance, in cooperation with Minnesota Department of Transportation (MnDOT), and Wisconsin Department of Transportation (WisDOT), proposes to construct the necessary infrastructure for and operate a high speed passenger rail service between Minneapolis and Duluth, Minnesota. The proposed high speed passenger rail service is known as the Northern Lights Express (NLX). FRA is providing funding to the Minnesota Department of Transportation and will serve as the lead federal agency for the project. As the lead federal agency, FRA is required to comply with Section 7 of the Endangered Species Act of 1973, as Amended (Act).

A preferred alternative has been chosen for the NLX project and approved by the FRA. The approximately 153-mile-long preferred alternative will run from Minneapolis to Duluth, Minnesota, traversing Hennepin, Anoka, Isanti, Kanabec, Pine, Carlton, and St. Louis counties in Minnesota and Douglas County in Wisconsin This route will utilize portions of existing railroad lines, which contain intact tracks that will be upgraded from a class 3 to a class 5 line. The upgrades can be accomplished through tie replacement and ballast improvements, which can be done as maintenance on the existing line utilizing tie replacement trains and ballast placement trains. All upgrade work will be performed from the existing track and will have no impacts outside the existing track bed.

Design of the proposed alignment is being further defined. Currently, the proposed preferred alignment also includes the following:

- New parallel track (e.g., new sidings, extending existing sidings, and second mainlines with both tracks operational) substantially within an existing right-of-way (ROW) however requiring up to 50 foot wide strip ROW acquisitions in some areas of parallel track and up to 120 feet wide acquisitions at a small number of at-grade road crossings;

- New bridges associated with new parallel track over:
  - Rice Creek at Fridley, Anoka County, MN
  - Mississippi Street at Fridley, Anoka County, MN
  - Coon Creek at Andover, Anoka County, MN
  - Snake River at Grasston, Kanabec County, MN
  - Pokegama Creek at Brook Park, Pine County, MN

- Box culverts, including a new box culvert near Henriette
  - Replacement of existing bridges/underpasses at:
  - Coon Creek in Andover, Anoka County, MN
  - Cedar Creek in Oak Grove, Anoka County, MN
  - 379th Avenue North of Grasston, Isanti County, MN

- Rehabilitation of existing railroad bridges over:
  - Kanabec County, MN
  - Snake River
  - Pine County, MN
  - Grindstone River
  - Kettle River
  - Big Willow River
  - Carlton County, MN
  - Net River (two bridges)
  - State Line Creek
  - Douglas County, WI
  - W. Balsam Creek
  - E. Balsam Creek
  - Hubert Creek
  - Norvell Creek
  - Black River
  - Nemadji River
  - St. Louis/Douglas Counties
  - St. Louis River (Grassy Point)
  - Railroad Bridge South of Superior, Douglas County, WI
  - 46th Avenue bridge in Duluth, St. Louis County, MN
  - 37th Avenue bridge in Duluth, St. Louis County, MN

The Federal Railroad Administration is requesting concurrence from the U.S. Fish and Wildlife Service (Service) that the above referenced action is not likely to adversely affect the Canada lynx (*Lynx canadensis*) a federally-listed threatened species.

Listed Species/Critical Habitat within the Project Area – Minnesota/Wisconsin
The County Distribution of Minnesota and Wisconsin's Federally-Listed Threatened, Endangered, Proposed, and Candidate Species list provided by the Service indicates that the following species/designated critical habitat are known to occur in the following project counties:

Minnesota				
County	Species	Listing Status	Critical Habitat	Determination
Hennepin	Higgins eye pearlymussel (*Lampsilis higginsii*)	Endangered	No	No Effect
Anoka	None	NA	No	NA
Isanti	None	NA	No	NA
Kanabec	None	NA	No	NA
Pine	Canada lynx (*Lynx canadensis*) Spectaclecase (*Cumberlandia monodonta*)	Threatened Proposed as Endangered	No No	May Affect, not Likely to Adversely Affect No Effect
Carlton County	Canada lynx (*Lynx canadensis*)	Threatened	No	May Affect, not Likely to Adversely Affect
St. Louis	Canada lynx (*Lynx canadensis*) Piping plover (*Charadrius melodus*)	Threatened Endangered	Yes – However none within the project area Yes – However, none within the project area	May Affect, not Likely to Adversely Affect No Effect
Wisconsin				
County	Species	Listing Status	Critical Habitat	Determination
Douglas	Canada lynx (*Lynx canadensis*)	Threatened Endangered	No Yes –	May Affect, not Likely to Adversely Affect No Effect

Minnesota				
County	Species	Listing Status	Critical Habitat	Determination
Hennepin	Higgins eye pearlymussel (*Lampsilis higginsii*)	Endangered	No	No Effect
Anoka	None	NA	No	NA
Isanti	None	NA	No	NA
Kanabec	None	NA	No	NA
Pine	Canada lynx (*Lynx canadensis*)	Threatened	No	May Affect, not Likely to Adversely Affect
	Spectaclecase (*Cumberlandia monodonta*)	Proposed as Endangered	No	No Effect
Carlton County	Canada lynx (*Lynx canadensis*)	Threatened	No	May Affect, not Likely to Adversely Affect
St. Louis	Canada lynx (*Lynx canadensis*)	Threatened	Yes – However none within the project area	May Affect, not Likely to Adversely Affect
	Piping plover (*Charadrius melodus*)	Endangered	Yes – However, none within the project area	No Effect
Wisconsin				
County	Species	Listing Status	Critical Habitat	Determination
Douglas	Canada lynx (*Lynx canadensis*)	Threatened	No	May Affect, not Likely to Adversely Affect
		Endangered	Yes –	No Effect

	Piping plover (*Charadrius melodus*) Kirtland's warbler (*Dendroica kirtlandii*) Fassett's locoweed (*Oxytropis campestris var. chartacea*)	Endangered Threatened	However, none within the project area No No	No Effect No Effect

Reason for Concurrence Request

As noted in the table above federally-listed species have been identified in several of the project counties. Therefore, the Service was contacted to assist in determining the appropriate consultation path in accordance with Section 7 of the Endangered Species Act of 1973, as Amended (Act). On December 29, 2011, staff from the Service, Minnesota Department of Natural Resources and the Minnesota Department of Transportation conducted a field evaluation of various locations along the project corridor with the intent of determining the potential for affect.

Determination

Based on the coordination efforts described above, the nature of the proposed activities, the federally-listed species identified and the absence of designated critical habitat within the action area, the Federal Railroad Administration has determined that the proposed action may affect, but is not likely to adversely affect the Canada lynx.

For all other federally-listed species identified we have determined that the project will have no effect. We are respectfully requesting concurrence that consultation with your office under Section 7 of the Act is complete.

If you have any questions regarding this matter, please contact Colleen Vaughn of my staff at 202-493-6096 or Colleen.Vaughn@dot.gov.

Sincerely,

David Valenstein
Chief, Environment & Systems Planning Division

cc: USFWS- Nick Rowse
MnDOT- Frank Pafko
MnDOT – Jason Alcott

Corridor Improvements
Northern Lights Express
November 1, 2011

Figure 2

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Twin Cities Field Office
4101 American Blvd E.
Bloomington, Minnesota 55425-1665

September 26, 2012

Mr. David Valenstein
Chief, Environment and Systems Planning Division
Federal Railroad Administration
U.S. Department of Transportation
1200 New Jersey Avenue, SE
Washington, D.C. 20590

RE: Request for Concurrence of Not Likely to Adversely Affect Canada Lynx for Northern Lights Express (NLX) High Speed Passenger Rail Service from Minneapolis to Duluth, Minnesota and Wisconsin

Dear Mr. Valenstein:

This letter is in response to your request for concurrence on a not likely to adversely affect determination regarding a proposal to construct the necessary infrastructure for operating a high speed passenger rail service between Minneapolis and Duluth, Minnesota. This project would upgrade an existing 153-mile railroad passing through Hennepin, Anoka, Isanti, Kanabec, Pine, Carlton, and St. Louis Counties in Minnesota and Douglas County, Wisconsin. All upgrade work will be performed from the existing track and will have no impacts outside the existing track bed. The Federal Railroad Administration (FRA) is providing funding to the Minnesota Department of Transportation (MNDOT) and is responsible for complying with Section 7 of the Endangered Species Act of 1973, as amended.

The proposed permit would authorize activities that may affect the federally threatened Canada lynx (*Lynx* canadensis). On December 29, 2011, staff from my office, accompanied by staff from the Minnesota Department of Natural Resources and the Minnesota Department of Transportation conducted a field evaluation of several sites along the proposed rail corridor. Based on this field investigation and on background information, we concur that the FRA's funding of the proposed railroad upgrade may affect, but is not likely to adversely affect Canada lynx.

This concludes formal consultation on the proposed upgrade of 153-miles of railroad line between Minneapolis and Duluth, Minnesota, upon the request of the FRA. If project plans change, additional information on listed or proposed species becomes available, or new species are listed that may be affected by the project, consultation should be reinitiated. Thank you for your cooperation in meeting our joint responsibilities under section 7 of the Endangered Species Act. If you have any further endangered species questions, please contact Nick Rowse at (612) 725-3548 x2210 or me at (612) 725-3548 x2201.

Sincerely,

R. Nicholas Rowse
Acting for
Tony Sullins
Field Supervisor

CC: Jason Alcott, Minnesota Department of Transportation, St. Paul, MN

Table F-1. Minnesota Natural Heritage Database Review of the NLX Corridor

SCIENTIFIC NAME	COMMON NAME	STATE PROTECTION STATUS
Animal Assemblage		
N/A	Bat Concentration	N/A
N/A	Colonial Waterbird Nesting Site	N/A
Invertebrate Animal		
Actinonaias ligamentina	Mucket	THR
Alasmidonta marginata	Elktoe	THR
Cicindela lepida	Little White Tiger Beetle	THR
Cyclonaias tuberculata	Purple Wartyback	THR
Elliptio dilatata	Spike	SPC
Hesperia leonardus leonardus	Leonard's Skipper	SPC
Lasmigona compressa	Creek Heelsplitter	SPC
Lasmigona costata	Fluted-shell	SPC
Ligumia recta	Black Sandshell	SPC
Obovaria olivaria	Hickorynut	SPC
Pleurobema coccineum	Round Pigtoe	THR
Vascular Plant		
Aristida tuberculosa	Sea-beach Needlegrass	SPC
Botrychium oneidense	Blunt-lobed Grapefern	END
Botrychium rugulosum	St. Lawrence Grapefern	THR
Botrychium simplex	Least Moonwort	SPC
Cypripedium arietinum	Ram's-head Lady's-slipper	THR
Fimbristylis autumnalis	Autumn Fimbristylis	SPC
Hudsonia tomentosa	Beach-heather	SPC
Hydrocotyle americana	American Water-pennywort	SPC
Juncus marginatus	Marginated Rush	SPC
Najas gracillima	Thread-like Naiad	SPC
Oenothera rhombipetala	Rhombic-petaled Evening Primrose	SPC
Poa paludigena	Bog Bluegrass	THR
Potamogeton bicupulatus	Snailseed Pondweed	END
Potamogeton vaseyi	Vasey's Pondweed	SPC
Rotala ramosior	Tooth-cup	THR
Scleria triglomerata	Tall Nut-rush	END
Solidago sciaphila	Cliff Goldenrod	SPC
Triplasis purpurea	Purple Sand-grass	SPC
Tsuga canadensis	Eastern Hemlock	SPC
Viola lanceolata	Lance-leaved Violet	THR
Vertebrate Animal		
Acipenser fulvescens	Lake Sturgeon	SPC
Clemmys insculpta	Wood Turtle	THR
Emydoidea blandingii	Blanding's Turtle	THR
Falco peregrinus	Peregrine Falcon	THR
Haliaeetus leucocephalus	Bald Eagle	SPC
Heterodon nasicus	Plains Hog-nosed Snake	SPC
Ichthyomyzon fossor	Northern Brook Lamprey	SPC
Ichthyomyzon gagei	Southern Brook Lamprey	SPC
Lanius ludovicianus	Loggerhead Shrike	THR
Myotis septentrionalis	Northern Myotis	SPC

SCIENTIFIC NAME	COMMON NAME	STATE PROTECTION STATUS
Percina evides	Gilt Darter	SPC
Perognathus flavescens	Plains Pocket Mouse	SPC
Pipistrellus subflavus	Eastern Pipistrelle	SPC
Pituophis catenifer	Gophersnake	SPC
Seiurus motacilla	Louisiana Waterthrush	SPC
Minnesota County Biological Survey (MCBS)		
MCBS site with outstanding biodiversity significance (2 Locations)		
MCBS site with high biodiversity significance (7 Locations)		
MCBS site with moderate biodiversity significance (18 Locations)		
MCBS site with below minimum biodiversity significance threshold (20 Locations)		

THR = State Threatened, END = State Endangered, SPC = State Special Concern

Table F-2. Endangered, Threatened, and Special Concern Species found in proposed NLX corridor in Douglas County, Wisconsin, January 2010

Source: Wisconsin Department of Natural Resources

The following species are known to occur in or near the corridor for the NLX Corridor. Specific list history information is given below.

Group	Scientific Name	Common Name	State Status *
Bird	*Bartramia longicauda*	Upland Sandpiper	SC
	Oporornis agilis	Connecticut Warbler	SC
	Charadrius melodus	Piping Plover	END
	Sterna caspia	Caspian Tern	END
Fish	*Acipenser fulvescens*	Lake Sturgeon	SC
	Anguilla rostrata	American Eel	SC
Mammal	*Canis lupus*	Gray Wolf	SC
	Martes Americana	American Marten	END
Plant	*Ranunculus gmelinii*	Small Yellow Water Crowfoot	END
	Ranunculus cymbalaria	Seaside Crowfoot	THR
	Parnassia palustris	Marsh Grass-of-parnassus	THR
	Caltha natans	Floating Marsh Marigold	END
	Petasites sagittatus	Arrow-leaved Sweet-coltsfoot	THR
	Eleocharis nitida	Slender Spike-rush	END
	Sparganium glomeratum	Northern Bur-reed	THR
	Juncus vaseyi	Vasey Rush	SC
	Calamagrostis stricta	Slim-stem Small-reedgrass	SC
	Carex crawei	Crawe Sedge	SC
	Carex nigra	Smooth Black Sedge	SC
	Platanthera orbiculata	Large Roundleaf Orchid	SC
	Salix planifolia	Tea-leaved Willow	THR
Reptile	*Glyptemys insculpta*	Wood Turtle	THR
Community		Emergent Marsh	
		Northern Sedge Meadow	

* SC = Special Concern (those species about which some problem of abundance or distribution is suspected but not yet proved.); THR = Threatened; END = Endangered

1. **Upland Sandpiper** (*Bartramia longicauda*) – A bird of special concern in Wisconsin. It prefers tallgrass prairies, sedge meadows, unmowed alfalfa/timothy fields and scattered woodlands. The breeding season extends from early May through late September.

2. **Connecticut Warbler** (*Oporornis agilis*) – A bird of special concern in Wisconsin. It prefers mature, multi-layered pine stands, particularly jack pine, and occasionally in tamarack-pine stands with dense hardwood understory. The breeding season extends from mid-June through mid-July.

3. **Piping Plover** (*Charadrius melodus*) – A state endangered bird that prefers large isolated cobble beaches on the shores of Lake Michigan and Superior. Breeding occurs from early May through mid-September.

4. **Caspian Tern** (*Sterna caspia*) – A state endangered bird that prefers undeveloped sand beaches and islands along the Great Lakes, typically on sandy or gravelly coastal islands. Breeding occurs from late may through mid-July.

5. **Lake Sturgeon** (*Acipenser fulvescens*) – A species of Special Concern in Wisconsin that prefers large rivers and lakes. It also lives in the shoal waters of the Great Lakes. Inland it shows a preference for the deepest mid-river areas and pools. Spawning occurs from late April through early June in cold, shallow, fast water.

6. **American Eel** (*Anguilla rostrata*) – A fish of special concern in Wisconsin. It prefers large streams, rivers and lakes with muddy bottoms and still waters. To reach these conditions the eel has to traverse a wide variety of less suitable habitat including swift-flowing waters with a wide variety of substrates. Spawning occurs in the Sargasso Sea.

7. **Gray Wolf** (*Canis lupus*) – Also referred to as the timber wolf, and is listed as special concern in Wisconsin. Wolves are social animals that live in packs, and pack sizes in Wisconsin average up to six individuals with a few packs as large as ten animals. A wolf pack's territory may cover 20-120 square miles.

8. **American Marten** (*Martes Americana*) – A state endangered mammal that lives in mature, dense conifer forests, mixed conifer-hardwood, and hardwood dominated forests. American martens prefer forests with a mixture of conifers and deciduous trees including hemlock, white pine, yellow birch, maple, fir and spruce. Marten young are born in tree dens in late March and April and are weaned when about six weeks old.

9. **Small Yellow water Crowfoot** (*Ranunculus gmelinii*) – A plant species that is endangered in Wisconsin. It is found in cold brooks and springs, shallow water and muddy shores of ditches, streams, and lakes. Blooming occurs late June through late August; fruiting occurs early July through early September. The optimal identification period for this species is late June through early September.

10. **Seaside Crowfoot** (*Ranunculus cymbalaria*) – A state threatened plant which is found in sandy or muddy shores and marshes, ditches and harbors along Lake Michigan, and salted roadsides near the City of Superior. Blooming occurs early June through late August; fruiting occurs late July through late August. The optimal identification period for this species is early June through late August.

11. **Marsh Grass-of-parnassus** (*Parnassia palustris*) – A state threatened plant found on clay bluffs on Lake Superior, cold northern fens, and gravel pits with calcareous sandy areas. Blooming occurs early August through early September; fruiting occurs throughout September. The optimal identification period for this species is throughout August.

12. **Floating Marsh Marigold** (*Caltha natans*) – A state endangered plant found in shallow water in creeks, pools, ditches, and sheltered lake margins. It typically roots in mud, silt, or clay, and spreads by rooting at the nodes. Blooming occurs throughout July; fruiting occurs throughout August. The optimal identification period for this species is early July through late August.

13. **Arrow-leaved Sweet-coltsfoot** (*Petasites sagittatus*) – A state threatened plant that is found in cold marshes and swamp openings, often forming large clones. This species hybridizes with *Petasites palmatus*. Blooming occurs throughout May; fruiting occurs throughout June. The optimal identification period for this species is late may through late August.

14. **Slender Spike-rush** (*Eleocharis nitida*) – A state endangered plant that is found on wet exposed clay in ditches and openings in alder thickets and marshes, only near Superior. Blooming occurs throughout June; fruiting occurs late June through early September. The optimal identification period for this species is late June through late August.

15. **Northern Bur-reed** (*Sparganium glomeratum*) – A state threatened plant found in cold ditches and pools in sedge meadows, willow-alder thickets, and, occasionally, tamarack stands on the Lake Superior clay plain. Blooming occurs late June through late July; fruiting occurs late July through early September. The optimal identification period for this species is early July through early September.

16. **Vasey Rush** (*Juncus vaseyi*) – A plant of special concern in Wisconsin that is found in moist old fields, ditches, and moist prairies. It has been most commonly found on the Lake Superior clay plain. Blooming occurs early July through late August; fruiting occurs early August through early September. The optimal identification period for this species is early July through late August.

17. **Slim-stem Small-reedgrass** (*Calamagrostis stricta*) – A plant of special concern in Wisconsin. It is usually found on dry to moist dunes, barren, and dolomite or sandstone ledges, mostly near the Great Lakes, as well as calcareous wetlands. Blooming occurs throughout June; fruiting occurs early July through late August. The optimal identification period for this species is early July through late August.

18. **Crawe Sedge** (*Carex crawei*) – A plant of special concern in Wisconsin. It is found in calcareous wetlands and dolomitic pavement, often near Lake Michigan. It is also found in fens and moist calcareous prairies. Blooming occurs late in April through late May; fruiting occurs late May throughout late June. The optimal identification period for this species is throughout May.

19. **Smooth Black Sedge** (*Carex nigra*) – A plant of special concern in Wisconsin. It is found mainly on the edge of dry meadows and wet/sedge meadows and shrub-carr habitats. Fruiting occurs July through August. The optimal identification period for this species is early July through late August.

20. **Large Roundleaf Orchid** (*Platanthera orbiculata*) – A plant of special concern in Wisconsin which is found in moist hardwood or mixed conifer-hardwood forests. Blooming occurs late June through late July; fruiting occurs early July through late August. The optimal identification period for this species is late June through early August.

21. **Tea-leaved Willow** (*Salix planifolia*) – A state threatened plant that is found near Lake Superior, including bedrock shorelines in the Apostle Islands. Blooming occurs throughout May; fruiting occurs throughout June. The optimal identification period for this species is early June through early September.

22. **Wood Turtle** (*Glyptemys insculpta*) – A state threatened species that prefers clean rivers and streams with moderate to fast flows, adjacent riparian wetlands, and upland deciduous forests. The wood turtle becomes active in spring as soon as the ice is gone and air temperatures reach approximately 50 degrees in March or April. They can remain active into mid-October but have been seen breeding under the ice. Wood turtles can breed at any time of the year but primarily during the spring or fall. Nesting usually begins in late May and continues through June. They usually nest in sand or gravel, and usually very close to the water.

23. **Emergent Marsh** (Community) – An open marsh, lake, riverine or estuarine community with permanent standing water. Generally dominated by emergent macrophytes, in pure stands of single species or in various mixtures. Dominants include cattails, bulrushes, bur-reeds, giant reed, pickerel-weed, water plantain, arrowhead, spikerush, and wild rice.

24. **Northern Sedge Meadow** (Community) – An open wetland community that is dominated by sedges and grasses and occurs primarily in northern Wisconsin. There are several common, fairly distinctive, subtypes: Tussock meadow; wire-leaved sedge meadow; and broad-leaved sedge meadow. Sphagnum mosses are either absent or they occur in scattered, discontinuous patches.

APPENDIX G

WETLAND ASSESSMENT METHODOLOGY

- **Wetland Assessment Methodology**
- **Figure G-1: NLX Project Area and Project Site Locations**

Wetland Assessment Methodology

Pre-Field Prepwork

An 11 X 17 flip book with match lines covering the entire rail line from Coon Rapids Junction (North Metro) to Boylston Junction (Wisconsin) was prepared. Information depicted was color aerial imagery, National Wetland Inventory (NWI) mapping, Wisconsin Wetland Inventory (WWI) mapping, hydric soils mapping (where available), roads, digitized location of existing railroad track, and 100-foot buffers to the west and east of the railroad tracks. Each page of the flip book covered an area of approximately 1 mile by ½ mile. The scale of each page of the flip book was about 1” = 440’. The resolution of the aerial imagery was approximately 1-meter per pixel.

Field Methodology

Prior to field work, SRF Wetland Scientists drafted an abbreviated field methodology for estimating wetland extent along either sides of the tracks from the southern terminus to the northern terminus of proposed double track area, approximately 126 miles of trackage. This methodology was found to be a reasonable approach after review by Tim Fell, U.S. Army Corps of Engineers (Army Corps). The methodology was intended to:

- Provide wetland data of sufficient resolution to compare the estimated wetland impacts of a scenario of “build to the east” or “build to the west” of the existing trackage. (Field work was conducted during project development to inform improvement location decisions.)
- Provide wetland data of sufficient resolution for the Route 9 technical memorandum.
- Guide decisions concerning opportunities for wetland impact avoidance and minimization.

The methodology is not intended to provide a permitting level of wetland delineation and wetland impact calculation. An abbreviated field delineation will be completed during final design based on a method agreed to by the Army Corps and members of the Technical Evaluation Panel (TEP) per the Minnesota Wetland Conservation Act (WCA).

The NWI and hydric soils mapping are useful as a guide to where wetlands may be; however, each effort has intrinsic inaccuracies. The field methodology for this project was designed to focus on landscapes in the Route 9 area where the NWI tends to fail frequently. Specifically, such landscapes are forested areas adjacent to waterways and partially drained agricultural land. In wetlands with abundant hydrology the NWI tends to be reasonably accurate because the wetness signatures are quite well defined. Wetlands on the drier side of the hydrology spectrum tend to have weak wetness signatures and are frequently overlooked by the NWI. The NWI generally doesn’t distinguish wetland forest from upland forest with much acuity in areas along streams and rivers, thus, it tends to overmap wetlands in this situation. In partially drained agricultural landscapes, the NWI may map a temporarily flooded wetland, e.g. PEMA, where one does not exist, or may not map one where it does exist.

Our field methodology pre-selected 48 study sites along the entire project area that were:

- Relatively well distributed throughout the Route 9 area (including east of and west of the existing tracks).
- Focused on forested and drained agricultural landscapes (scrub-shrub and shallow emergent marshes were well-represented in the sample).
- Focused on potential wetlands with drier hydrological regimes.
- Reasonably close to public road crossings of the tracks.

Fieldwork and Post-Field Data Processing

Fieldwork along the proposed rail improvements was conducted by two SRF Wetland Scientists on October 4-6, 2010. Cursory data collected at each Study Site included wetland type classification per Circular 39, Cowardin, and Eggers and Reed; predominant plant species observed, and a qualitative listing of the major wetland functions that each wetland expresses.

Wetland boundaries at each Study Site were estimated through a combination of sketching boundaries in the aerial imagery flip book and GPSing the edges of depressional areas dominated with hydrophytic vegetation. Sketched wetland boundaries were based on observed landscape characteristics and imagery phototones. Wetland edges sketched in the field were digitized as a shapefile. Sub-foot accurate Trimble GeoXH handheld GPS was used to record estimated edges of wetlands. GPSed points were uploaded and converted to shapefiles.

Figure G-1 shows a general map of the Route 9 area and locations of the 48 Study Sites throughout the length of the rail improvements. Table G-1 presents a summary of field data collected at each Study Site.

The wetland acreage mapped by NWI and WWI and the field-assessed acreage were tallied across all Study Sites. A ratio of the cumulative NWI and WWI-mapped wetland acreage to the cumulative field-assessed acreage was calculated, with a cumulative ratio of <1 indicating that the remotely-sensed efforts undermap actual wetlands and a cumulative ratio of >1 indicates that the remotely-sensed methods overmap actual wetlands.

The analysis indicated that the NWI/ WWI undermaps the extent of wetlands compared to field assessed wetlands. An analysis of all data (Minnesota and Wisconsin), including those Study Sites found in the field to be "Wetlands" and those found to be "Areas", i.e. non-wetlands showed the NWI/ WWI to map approximately 55 % of actual wetlands on the east side of the tracks and about 74% of actual wetlands on the west side of the tracks. It should be noted that the wetlands we assessed in the field were generally those with a hydrologic modifier (per Cowardin) on the drier end of the wetness regime (e.g. modifiers of "A", "B", and "C"). The NWI is more likely to mis-map wetlands with drier hydrology modifiers than those with very wet modifiers (e.g. "F", "G", and "H") because wetlands with relatively permanent surface waters generally have a strong aerial photography wetness signature and are more easily identifiable with a remote-sensing effort.

Based on this analysis, it was determined that actual wetland impacts might inflate NWI/WWI-based impacts by a factor of ~ 1.3. This is the factor used to produce the estimated impacts reported in the EA.

The GIS-based location of the existing railroad tracks was digitized at a relatively coarse scale. As such, in places the digitized track was some meters west of or east of the actual track. We measured and quantified this discrepancy using GIS techniques to determine whether the digital track depiction was consistently to the east or west of the actual track. If the digital depiction of the track was consistently skewed to one side of the actual track, then wetland impact estimates might also be skewed - falsely favoring a "build to the east or west" scenario.

Our GIS measurement, described in detail in the "TECHNICAL MEMORANDUM: NORTHERN LIGHTS EXPRESS (NORTHERN TWIN CITIES METRO TO DULUTH/ SUPERIOR); PRELIMINARY ANALYSIS OF WETLAND IMPACTS EAST AND WEST OF THE EXISTING TRACKAGE - DECEMBER 30, 2010", found that on average, the digital track depiction is coincident with the actual track location, i.e. off kilter to the east as much as to the west over the entire length of trackage. It was concluded that the discrepancy between digitally mapped track and actual track location would not contribute significantly to a skewed wetland impact analysis comparing impacts associated with "build to the west" or "build to the east". Nor would the discrepancy likely be of an order of magnitude so as to lead to different conclusions under the federal environmental process.

Detailed results of the above-referenced analyses are presented in a "TECHNICAL MEMORANDUM: NORTHERN LIGHTS EXPRESS (NORTHERN TWIN CITIES METRO TO DULUTH/ SUPERIOR); PRELIMINARY ANALYSIS OF WETLAND IMPACTS EAST AND WEST OF THE EXISTING TRACKAGE - DECEMBER 30, 2010".

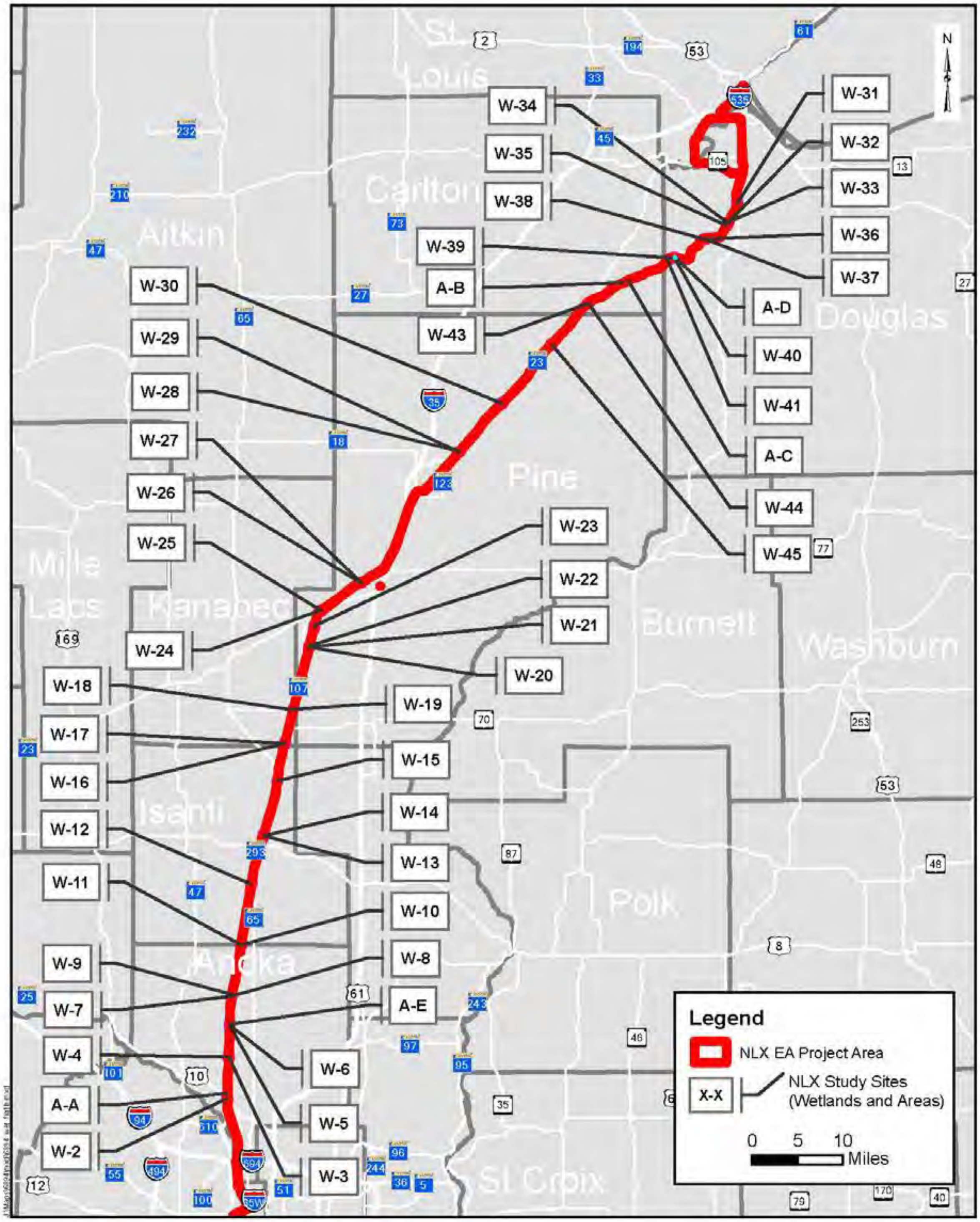
Table G-1. Summary of Field Data

Study Sites	Actual In-Field Cowardin Classification	NWI mapping per Cowardin Classification	Dominant Vegetation	Mapbook Sheet, County, Twp, Rng, Sec	Main Functions
W-2	PFO/PEM/PSS	PFO1B	*Phalaris arundinacea, Acer negundo, Urtica dioica, Cornus stolonifera*	23, Anoka, 31N, 24W, 14	Flood Storage, wildlife
W-3	PEM/PSS	PEMCd	*Phalaris arundinacea, Urtica dioica, Cannabis sativa*	29, Anoka, 32N, 24W, 26	Flood Storage, wildlife
W-4	PEM	PEMCd	*Phalaris arundinacea, Urtica dioica*	29, Anoka, 32N, 24W, 26	Flood Storage, wildlife
W-5	PEM/PSS	PEMCd	*Phalaris arundinacea*	35, Anoka, 32N, 24W, 2	Wildlife
W-6	PEM	PEMC	*Typha sp.*	35, Anoka, 32N, 24W, 2	Flood storage, wildlife, nutrient filtration
W-7	PEM/PSS	PEMC	*Phalaris arundinacea, Typha sp.*	40, Anoka, 33N, 24W, 24	Flood Storage, wildlife
W-8	PEM/PSS	PEMCd	*Phalaris arundinacea, Typha sp., Phragmites australis, Salix interior*	40, Anoka, 33N, 24W, 24	Flood Storage, wildlife
W-9	PEM	PEMC	*Typha sp., Carex lacustris, Larix laricina, Carex stricta*	40, Anoka, 33N, 24W, 24	Wildlife
W-10	PEM/PSS/PFO	PEMC/PFO1B	*Phalaris arundinacea, Typha sp., Populus tremuloides*	48, Anoka, 34N, 23W, 30	Wildlife
W-11	PEM/PFO	PEM/SS1C	*Phalaris arundinacea, Typha sp., Populus tremuloides*	48, Anoka, 34N, 23W, 30	Minimal functional value
W-12	PEM/PSS	PEMC	*Phalaris arundinacea, Populus tremuloides*	58, Isanti, 35N, 23W, 20	Minimal functional value
W-13	PSS	PEM/SS1B	*Cornus stolonifera*	67, Isanti, 36N, 23, 21	Wildlife
W-14	PEM	Not Mapped	*Typha sp.*	67, Isanti, 36N, 23, 21	Ditch conveyance
W-15	PEM/PSS	Not Mapped (PSS1/EMBgd is adjacent).	*Phalaris arundinacea, Acer negundo, Calamagrostis canadensis*	76, Isanti, 37N, 23W, 22	Flood Storage, wildlife
W-16	PEM/PSS/PFO2	PSS1/EMBg and PFO2Bg	*Phalaris arundinacea, Larix laricina*	83, Kanabec, 38N, 23W, 35	Flood Storage, wildlife

Study Sites	Actual In-Field Cowardin Classification	NWI mapping per Cowardin Classification	Dominant Vegetation	Mapbook Sheet, County, Twp, Rng, Sec	Main Functions
W-17	PEM/PSS	PSS1/EMBgd	*Phalaris arundinacea, Typha sp.*	83, Kanabec, 38N, 23W, 35	Ditch conveyance
W-18	PEMA	R2UBGH	*Phalaris arundinacea, Typha sp., Potamogeton natans*	88, Kanabec, 38N, 23W, 12	Minimal flood storage
W-19	PEM (Fringe to River)	R2UBH	*Phalaris arundinacea, Spartina pectinata*	88, Kanabec, 38N, 23W, 13	Flood Storage, wildlife, recreation, fish habitat
W-20	PEM/PSS	PEMB	*Phalaris arundinacea, Salix sp., Populus deltoides*	99, Pine, 39N, 22W, 8	Wildlife
W-21	PEM	PEMB	*Salix interior, Typha sp.*	99, Pine, 39N, 22W, 8	Wildlife
W-22	PEM	PEMB	*Phalaris arundinacea, Populus deltoides*	99, Pine, 39N, 22W, 5	Wildlife
*W-	PEM/PSS	PEMBgd	*Phalaris arundinacea, Salix sp., Phragmites australis*	103, Pine, 40N, 22W, 28	Flood Storage, wildlife
W-24	PEM/PFO	PEMB	*Phalaris arundinacea, Typha sp., Populus deltoides*	106, Pine, 40N, 22W, 21 &22	Minimal functional value
W-25	PEM/PFO (Some upland inclusions)	PEMB	*Phalaris arundinacea, Carex lacustris, Populus deltoides*	106, Pine, 40N, 22W, 21 &22	Wildlife
W-26	PEM/PSS	PEMBg	*Phalaris arundinacea, Typha sp., Salix sp.*	114, Pine, 41N, 21W, 34	Wildlife
W-27	PEM	PEMBg	*Carex lacustris, Typha sp.*	114, Pine, 41N, 21W, 34	Wildlife
W-28	PEM	Not Mapped	*Phalaris arundinacea*	142, Pine, 43N, 19W, 20	Minimal functional value
W-29	PEM/PSS	PSS1C	*Phalaris arundinacea, Carex lacustris*	142, Pine, 43N, 19W, 20	Wildlife
W-30	PEM/PSS	PEMCd	*Phalaris arundinacea, Salix sp.*	153, Pine, 44N, 18W, 19	Wildlife
W-31	PEM/PFO	T3/W0H	*Phalaris arundinacea, Acer saccharinum*	207, Douglas, 48N, 14W, 33	Flood Storage, wildlife
W-32	PEM/PSS	T3/S3K	*Calamagrostis Canadensis, Populus grandidentata, Epilobium coloratum*	204, Douglas, 47N, 14W, 8	Wildlife
W-33	PEM	T3/S3K	*Calamagrostis Canadensis, Populus grandidentata, Epilobium coloratum*	204, Douglas, 47N, 14W, 8	Wildlife
W-34	PEM/PSS	T3/S3K	*Typha sp.*	204, Douglas, 47N, 14W, 17	Wildlife
*W-	PEM/PSS	T3K	--	203, Douglas, 47N, 14W, 17	Flood Storage, wildlife
W-36	PEM/PSS/PFO	S3KR and	*Phalaris arundinacea,*	198, Douglas, 47N,	Wildlife

Study Sites	Actual In-Field Cowardin Classification	NWI mapping per Cowardin Classification	Dominant Vegetation	Mapbook Sheet, County, Twp, Rng, Sec	Main Functions
		T3/S3KR	*Salix sp., Populus sp.*	15W, 24	
W-37	PEM	U	*Phalaris arundinacea*	198, Douglas, 47N, 15W, 24	Minimal functional value
W-38	PEM	U	*Phalaris arundinacea*	198, Douglas, 47N, 15W, 24	Wildlife
W-39	PEM	U	*Carex lacustris*	192, Douglas, 47N, 15W, 33	Minimal functional value
W-40	PSS	U	*Salix sp.,*	192, Douglas, 47N, 15W, 32	Wildlife
W-41	PSS	U	*Salix sp.*	190, Douglas, 46N, 15W, 6	Minimal functional value
W-43	PEM/PSS	Not Mapped	*Carex lacustris, Phalaris arundinacea, Salix sp., Cornus stolonifera, Calamagrostis Canadensis*	175, Pine, 46N, 17W, 26 and 27	Minimal functional value
*W-	PEM/PSS	PSS1C and PEMC	*Solidago sp.*	175, Pine, 46N, 17W, 26 and 27	Wildlife
W-45	PEM/PSS	PSS1C	*Carex lacustria, Salix sp.*	166, Pine, 45N, 17W, 19 and 45N, 18W, 24	Flood Storage, wildlife
A-A	Upland	PFO1/EMB	--	23, Anoka, 31N, 24W, 14	--
A-B	Upland	Not Mapped	--	182, Pine, 46N, 16W, 16 and 17	--
A-C	Upland	Not Mapped	--	183, Pine, 46N, 16W, 16	--
A-D	Upland	T3/8Kr	--	192, Douglas, 47N, 15W, 33	--
A-E	Upland	PEMCd	--	35, Anoka, 32N, 24W, 2	--

*Wetland observed from distance.



SRF

Project Area and Study Site Locations

Northern Lights Epress Environmental Assessment

NLX Passenger Rail Alliance

Figure 1

APPENDIX H

CORRESPONDENCE

- **US Coast Guard**

- **Wisconsin Department of Natural Resources**
  (Note Wisconsin Threatened and Endangered Species Correspondence also provided in Appendix F)

- **Natural Resources Conservation Service**

U.S. Department of
Homeland Security

United States
Coast Guard

Commander
Ninth Coast Guard District

1240 E. Ninth Street, Room 2047
Cleveland, OH 44199-2060
Staff Symbol: (dpb)
Phone: (216) 902-6087
FAX: (216) 902-6088
E-mail: Scot.M.Striffler@uscg.mil

16590
April 19, 2012
B-087/sms

Ms. Nancy Frick, AICP
Senior Associate
SRF Consulting Group, Inc.
One Carlson Parkway North, Suite 150
Minneapolis, MN 55447-4443

Dear Ms. Frick:

I am responding to your letter dated March 23, 2012 addressed to Mr. Eric Washburn, Coast Guard Bridge Administrator, Eighth Coast Guard District in St. Louis, MO, regarding the Northern Lights Express High Speed Passenger Rail study. A discussion was also held between us on April 17, 2012 regarding this study.

Mr. Washburn has forwarded to me their response that the project will not affect any waterways over which his office exercises jurisdiction for bridge administration purposes. Mr. Washburn's response is enclosed with this letter.

This office reviewed the provided documentation and it appears that the only existing railroad bridge and waterway that would fall under this office's jurisdiction would be the BNSF Railroad (Grassy Point) drawbridge at mile 5.44 over St. Louis River. This bridge is listed under the heading for "Rehabilitation of Existing RR Bridges" within the study. The provided documentation also states that details for proposed bridge rehabilitations are not yet available.

Depending on the scope of rehabilitation or alteration of the bridge for this project, this office may have a federal permit requirement. Specifically, if rehabilitation or alteration affects the current permitted navigation clearances of this bridge, or if the appearance or character of the bridge is significantly affected, a Coast Guard Bridge Permit process may be required. If none of these circumstances occur, this office would need to be notified in advance of any work in the waterway in order to authorize equipment in the waterway or to coordinate navigation passages through the bridge during work. Please provide details as early as possible as the study progresses. Please contact me at (216) 902-6087 if you have additional questions or wish to discuss further.

Sincerely,

S. M. STRIFFLER
Chief, Bridge Branch
U. S. Coast Guard
By direction

SRF Consulting Group, Inc. | ENGINEERS PLANNERS DESIGNERS

Rcvd DA (dpb) 4/16/12

RECEIVED
MAR 29 2012
8TH COAST GUARD DISTRICT BRIDGE BRANCH

0323

March 23, 2012

SRF No. 0096894.006B

DWB ROUTING

	INFO	ACTION	FILE	IN
DWB				EAW
SEC				
CLERK		PS		
BR SPEC				
BR SPEC				
BR SPEC				

COMMENTS:

Mr. Eric Washburn
Commander
EIGHTH COAST GUARD DISTRICT (DWB)
1222 Spruce Street
St. Louis, MO 63103-2398

SUBJECT: NORTHERN LIGHTS EXPRESS (NLX) HIGH SPEED PASSENGER RAIL

Dear Mr. Washburn:

SRF Consulting Group, Inc., on behalf of the Minneapolis-Duluth Passenger Rail Alliance, is completing an environmental review for proposed improvements for high speed passenger rail service on the existing BNSF rail corridor between Minneapolis and Duluth, Minnesota. The corridor is approximately 153 miles long.

The attached project information sheet and figures describe the proposed improvements. The project corridor crosses four Navigable Rivers of the United States as follows:

- Snake River at Grasston, Minnesota (construction of an new railroad bridge parallel to the existing bridge and rehabilitation of the existing bridge),
- Grindstone River at Hinckley, Minnesota (existing bridge rehabilitation),
- Kettle River at Sandstone, Minnesota (existing bridge rehabilitation), and
- St. Louis River between Superior, Wisconsin and Duluth, Minnesota (existing bridge rehabilitation).

Details of new bridge construction or existing bridge rehabilitation are not yet available, however the rehabilitation is expected to involve replacement of the open deck with a ballasted deck and potential cleaning and recoating of steel structure components, bearing replacement and pointing of abutment and/or piers. See the general rehabilitation description attached.

We would like to coordinate with your office to identify projects, resources, or other issues in the area to avoid or accommodate. Please provide information about projects or resources we should consider in planning the improvements.

Please contact me directly at 763-249-6790 with any questions or if you need additional information. You can also reach me by email at nfrick@srfconsulting.com. Thank you.

Sincerely,

SRF CONSULTING GROUP, INC.

Nancy Frick

Nancy Frick, AICP
Senior Associate

NF/gjd

Enclosures: NLX Project Information
Figure 1 Project Location
Figure 2 Corridor Improvements
Railroad Bridge Rehabilitation Description

cc: Bob Manzoline, Minneapoli-Duluth Passenger Rail Alliance
Jeanne Witzig, Kimley Horn
Colleen Vaughn, Federal Railroad Administration

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Pursuant to the Coast Guard Authorization Act of 1982, it has been determined this is not a waterway over which the Coast Guard exercises jurisdiction for bridge administration purposes. A Coast Guard bridge permit is not required.

for William F. Knutson 4/5/12
ERIC A. WASHBURN (Date)
Bridge Administrator
Eighth Coast Guard District (dwb)

WISCONSIN
DEPT. OF NATURAL RESOURCES

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Jim Doyle, Governor
Scott Hassett, Secretary
John Gozdzialski, Regional Director

Northern Region Headquarters
810 W. Maple Street
Spooner, Wisconsin 54801
Telephone 715-635-2101
FAX 715-635-4105
TDD 715-635-4001

February 1, 2010

Amy Adrihan
DOT Northwest Region
1701 N. 4th St.
Superior, WI 54880-1068

RE: **I.D. # 0603-05-01**
Northern Lights Express
Douglas County

Dear Amy:

This letter is in response to an inquiry for our comments on what natural resources the above referenced proposed high speed rail project could impact. Our comments identify existing resources within 2000 feet of the existing rail line. Please keep in mind that this is a very broad overview of potential resource issues. We will conduct a more in-depth field investigation and review later in the design/review process.

<u>Surface Waters</u> – There are several surface waters that cross or run adjacent to the proposed corridor. They are as follows:

- **Nemadji River and tributaries** – A warmwater stream with a highly varied fish population which consists of muskellunge, northern pike, panfish, walleye, suckers and minnows. The Nemadji River does not contain spawning grounds for trout, but they do migrate through to reach their spawning grounds upstream in Minnesota.
- **Balsam Creek and tributaries** – A high quality trout stream that eventually flows into the Nemadji River. Balsam Creek is a Class II trout stream, and one tributary in Sec. 26 is Class I trout water, and an Outstanding Resource Water (ORW). (See reference in next section.) Both brook and brown trout inhabit the stream.
- **Little Balsam Creek** – A high quality Class I trout stream that flows north into Balsam Creek. Brook, brown, and rainbow trout inhabit the stream. Little Balsam Creek is also classified as an ORW.
- **Empire Creek** – A high gradient Class I brook trout stream that flows north into Balsam Creek. Even though the Empire Creek watershed is small, it still experiences damaging flow extremes during peak runoff periods. This stream is also classified as an ORW.
- **Miller Creek and tributaries**- The portion of Miller Creek that crosses the proposed corridor is minnow water. This stream is subject to damaging flow extremes each spring because of its steep gradient and early spring thaws.
- **Rock Creek and tributaries** – A small clear water stream that flows north into the Black River. The portion of the stream that crosses the proposed corridor is Class III

brook trout water. In addition, sculpin and minnows are also present. It has a steep gradient and unstable soil conditions so it is subject to damaging flow extremes seasonally.

- **Black River and tributaries** – A Class III brown trout stream, with some spawning runs of burbot also made during the winter months. Flow extremes, especially low summer flows resulting from extended hot and dry periods, are serious management problems.
- **Stony Brook** – A small intermittent drainage feeder to Copper Creek. The stream has little to no fish populations due to its seasonal flow of water.
- **Pokegama River** – A small, nearly intermittent drainage tributary to the St. Louis River. The stream contains mostly minnows, but other warmwater fish species from the St. Louis River probably inhabit the lower, deeper river areas. Due to the nature of the unpredictable flows of water and the watershed soil types, erosion is a serious management problem.
- **St. Louis River and tributaries** – The St. Louis River is a warmwater stream that contains a wide variety of fish species, the most common of which are northern pike, walleye, suckers and minnows.

Outstanding Resource Waters (ORW's) - Little Balsam Creek and one of its tributaries in Section 26, and Empire Creek are all considered to be Outstanding Resource Waters. ORW's are surface waters which provide valuable fisheries, hydrologically or geologically unique features, outstanding recreational opportunities, unique environmental settings, and which are not significantly impacted by human activities. The planning and design of this project should take into consideration the significance of these waterways through additional protective measures.

Wetlands - Several wetland types are found throughout the project area. Shallow open water communities, deep marshes, shallow marshes, and bogs are a few examples of the wetland types that are found throughout this corridor. Wetlands are often associated with threatened and endangered plant and bird species, as we discuss later. These areas are also very important for waterfowl production, furbearers, frogs, turtles and aquatic invertebrates, as well as providing floodwater retention and filtering of stormwater. All efforts should be made to avoid wetland impacts.

Mapped Floodplains – It appears that mapped floodplains may be associated with many of the streams that cross the proposed corridor (see attached spreadsheet). Hydraulic analysis and floodplain management must comply with NR 116.

Threatened/Endangered/Special Concern Species – Several threatened, endangered and special concern bird, animal, plant and fish species have been found within the project area. We have attached specific species information at the end of this letter.

Recreational Trails – State-owned recreational trails run through and/or adjacent to the corridor. The Gandy Dancer State Trail is a 98-mile, interstate trail that crosses into Minnesota and then back again into Wisconsin on its way from St. Croix Falls to its connection with the Saunders State Trail just south of Superior. It provides opportunities for activities such as ATV riding, snowmobiling, hiking, mountain biking, and horseback riding. It appears that the Gandy Dancer Trail crosses the proposed corridor at CTH B.

In addition, the Saunders State Trail runs adjacent to a portion of the proposed corridor. This 8.4-mile county-operated trail links with the Gandy Dancer State Trail south of the city of

Superior in Douglas County. The trail begins near the town of Saunders and passes through the communities of Boylston Junction, Boylston and Borea before continuing into Minnesota. The Saunders State Trail provides also opportunities for activities such as hiking, snowmobiling, ATV riding, horses back riding, mountain biking, and cross-country skiing.

We look forward to continued coordination on this high speed rail project. If you have any questions regarding the information in this letter, please feel free to call me at 715-635-4229.

Sincerely,

Amy Cronk

Amy Cronk
Environmental Review Coordinator

cc: Troy Stapelmann – DOT, Northwest Region – Eau Claire

NLX corridor stream crossings in Douglas County, Wisconsin
January 2010

Township/Range	Section	Stream name	ORW*	Trout	Mapped floodplain				
T46N-R15W	6	Tributary to Nemadji River							
T47N-R15W	32	Tributary to Nemadji River							
	33	Tributary to Balsam Creek (2)							
	33	Balsam Creek		Class II	x				
	34	Tributary to Balsam Creek							
	34	Tributary to Little Balsam Creek							
	34	Little Balsam Creek	x	Class I	x				
	34	Tributary to Balsam Creek							
	34	Tributary to Balsam Creek							
	26	Empire Creek	x	Class I	x				
	26	Tributary to Balsam Creek	x	Class I					
	26	Tributary to Miller Creek			x				
	24	Tributary to Miller Creek			x				
	24	Tributary to Miller Creek (2)							
T47N-R14W	19	Miller Creek			x				
	19	Tributary to Rock Creek							
	19	Tributary to Rock Creek							
	17	Rock Creek		Class III					
	17	Black River		Class III	x				
	9	Tributary to Black River							
	4	Stony Brook (no crossing)			x				
T48N-R14W	33	Nemadji River			x	Anadromous trout runs but no spawning			
	17	Pokegama River							
	15	Tributary to Pokegama River							
	7	Little Pokegama River			x				
	7	Tributary to Pokegama River							
T48N-R15W	12	Tributary to St. Louis River (2)			possible				
T49N-R14W	23	Tributary to Superior Bay			possible				
	11	St. Louis Bay			possible				
	15	Tributary to St. Louis Bay			possible				
	16	St. Louis River			possible				

* ORW - Outstanding Resource Water

Endangered Resources found within 2000 feet of proposed NLX corridor in Douglas County, Wisconsin
January 2010

Town/Range	Section	Species	Status
T44N R15W	General	American Marten	END
	6, 7, 18, 19	Gray Wolf	SC
T45N R15W	General	American Marten	END
	6, 7, 18, 19, 30	Gray Wolf	SC
T46N R15W	General	American Marten	END
	10	Arrow-leaved sweet coltsfoot	THR
	16, 17, 19, 20, 29, 30, 31	Gray Wolf	SC
T47N R14W	4	Crawe Sedge	SC
	4	Slim-stem small reedgrass	SC
	4, 5, 6, 7, 8, 9, 17, 18	Gray Wolf	SC
T47N R15W	General	Gray Wolf	SC
	1, 13, 24, 25	Western meadowlark	SC
	1, 13, 24	Upland sandpiper	SC
	13, 24, 25, 26	LeConte's sparrow	SC
	32	Floating marsh marigold	END
	35, 36	Connecticut warbler	SC
T48N R14W	2, 8, 9, 10, 11, 16, 17, 18, 22	Vasey Rush	SC
	2, 8, 16, 17	Slender spike-rush	END
	2, 3, 8, 9, 16, 17	Arrow-leaved sweet coltsfoot	THR
	2, 3	Seaside crowfoot	THR
	2, 8, 17	Small yellow water crowfoot	END
	3	Tea-leaved willow	THR
	8, 9, 15, 16, 17, 18	Northern bur-reed	THR
	17	Marsh grass of parnassus	THR
	17	Floating marsh marigold	END
	17	Northern sedge meadow (community)	
	17, 18, 21, 28, 31, 32, 33	Gray wolf	SC
	22	Wood turtle	THR
	33	Crawe Sedge	SC
	33	Slim stem small reedgrass	SC
T48N R15W	General	Gray Wolf	SC
	1, 2, 10, 11, 12	Emergent marsh (community)	
	1	American eel	SC
	10, 11, 12	Lake sturgeon	SC
	25, 36	Upland sandpiper	SC
	36	Western meadowlark	SC

Endangered Resources found within 2000 feet of proposed NLX corridor in Douglas County, Wisconsin
January 2010

T49N R14W	General	Large roundleaf orchid	SC
	General	Arrow-leaved sweet coltsfoot	THR
	General	American eel	SC
	10	Caspian tern	END
	13	Piping plover	END
	15, 21, 24, 25, 26, 27, 35, 36	Seaside crowfoot	THR
	23, 25, 26, 27, 34, 35	Vasey rush	SC
	25, 26, 27, 35	Small yellow water crowfoot	END
	26, 27, 34, 35	Northern bur-reed	THR
	26	Northern sedge meadow (community)	
	26, 27	Smooth black sedge	SC
	26, 34, 35, 36	Slender spike-rush	END
	36	Slim stem small reedgrass	SC
T49N R15W	24	American eel	SC
	25, 26, 35, 36	Arrow-leaved sweet coltsfoot	THR

Endangered, Threatened, and Special Concern Species found in proposed NLX corridor in Douglas County, Wisconsin
January 2010

The following species are known to occur in or near the corridor for the NLX Corridor. Specific list history information is given below.

Group	Scientific Name	Common Name	State Status *
Bird	*Bartramia longicauda*	Upland Sandpiper	SC
	Oporornis agilis	Connecticut Warbler	SC
	Charadrius melodus	Piping Plover	END
	Sterna caspia	Caspian Tern	END
Fish	*Acipenser fulvescens*	Lake Sturgeon	SC
	Anguilla rostrata	American Eel	SC
Mammal	*Canis lupus*	Gray Wolf	SC
	Martes Americana	American Marten	END
Plant	*Ranunculus gmelinii*	Small Yellow Water Crowfoot	END
	Ranunculus cymbalaria	Seaside Crowfoot	THR
	Parnassia palustris	Marsh Grass-of-parnassus	THR
	Caltha natans	Floating Marsh Marigold	END
	Petasites sagittatus	Arrow-leaved Sweet-coltsfoot	THR
	Eleocharis nitida	Slender Spike-rush	END
	Sparganium glomeratum	Northern Bur-reed	THR
	Juncus vaseyi	Vasey Rush	SC
	Calamagrostis stricta	Slim-stem Small-reedgrass	SC
	Carex crawei	Crawe Sedge	SC
	Carex nigra	Smooth Black Sedge	SC
	Platanthera orbiculata	Large Roundleaf Orchid	SC
	Salix planifolia	Tea-leaved Willow	THR
Reptile	*Glyptemys insculpta*	Wood Turtle	THR
Community		Emergent Marsh	
		Northern Sedge Meadow	

* SC = Special Concern (those species about which some problem of abundance or distribution is suspected but not yet proved.); THR = Threatened; END = Endangered

1. **Upland Sandpiper** (*Bartramia longicauda*) – A bird of special concern in Wisconsin. It prefers tallgrass prairies, sedge meadows, unmowed alfalfa/timothy fields and scattered woodlands. The breeding season extends from early May through late September.

2. **Connecticut Warbler** (*Oporornis agilis*) – A bird of special concern in Wisconsin. It prefers mature, multi-layered pine stands, particularly jack pine, and occasionally in tamarack-pine stands with dense hardwood understory. The breeding season extends from mid-June through mid-July.

3. **Piping Plover** (*Charadrius melodus*) – A state endangered bird that prefers large isolated cobble beaches on the shores of Lake Michigan and Superior. Breeding occurs from early May through mid-September.

4. **Caspian Tern** (*Sterna caspia*) – A state endangered bird that prefers undeveloped sand beaches and islands along the Great Lakes, typically on sandy or gravelly coastal islands. Breeding occurs from late may through mid-July.

5. **Lake Sturgeon** (*Acipenser fulvescens*) – A species of Special Concern in Wisconsin that prefers large rivers and lakes. It also lives in the shoal waters of the Great Lakes. Inland it shows a preference for the deepest mid-river areas and pools. Spawning occurs from late April through early June in cold, shallow, fast water.

6. **American Eel** (*Anguilla rostrata*) – A fish of special concern in Wisconsin. It prefers large streams, rivers and lakes with muddy bottoms and still waters. To reach these conditions the eel has to traverse a wide variety of less suitable habitat including swift-flowing waters with a wide variety of substrates. Spawning occurs in the Sargasso Sea.

7. **Gray Wolf** (*Canis lupus*) – Also referred to as the timber wolf, and is listed as special concern in Wisconsin. Wolves are social animals that live in packs, and pack sizes in Wisconsin average up to six individuals with a few packs as large as ten animals. A wolf pack's territory may cover 20-120 square miles.

8. **American Marten** (*Martes Americana*) – A state endangered mammal that lives in mature, dense conifer forests, mixed conifer-hardwood, and hardwood dominated forests. American martens prefer forests with a mixture of conifers and deciduous trees including hemlock, white pine, yellow birch, maple, fir and spruce. Marten young are born in tree dens in late March and April and are weaned when about six weeks old.

9. **Small Yellow water Crowfoot** (*Ranunculus gmelinii*) – A plant species that is endangered in Wisconsin. It is found in cold brooks and springs, shallow water and muddy shores of ditches, streams, and lakes. Blooming occurs late June through late August; fruiting occurs early July through early September. The optimal identification period for this species is late June through early September.

10. **Seaside Crowfoot** (*Ranunculus cymbalaria*) – A state threatened plant which is found in sandy or muddy shores and marshes, ditches and harbors along Lake Michigan, and salted roadsides near the City of Superior. Blooming occurs early June through late August; fruiting occurs late July through late August. The optimal identification period for this species is early June through late August.

11. **Marsh Grass-of-parnassus** (*Parnassia palustris*) – A state threatened plant found on clay bluffs on Lake Superior, cold northern fens, and gravel pits with calcareous sandy areas. Blooming occurs early August through early September; fruiting occurs throughout September. The optimal identification period for this species is throughout August.

12. **Floating Marsh Marigold** (*Caltha natans*) – A state endangered plant found in shallow water in creeks, pools, ditches, and sheltered lake margins. It typically roots in mud, silt, or clay, and spreads by rooting at the nodes. Blooming occurs throughout July; fruiting occurs throughout August. The optimal identification period for this species is early July through late August.

13. **Arrow-leaved Sweet-coltsfoot** (*Petasites sagittatus*) – A state threatened plant that is found in cold marshes and swamp openings, often forming large clones. This species hybridizes with *Petasites palmatus*. Blooming occurs throughout May; fruiting occurs throughout June. The optimal identification period for this species is late may through late August.

14. **Slender Spike-rush** (*Eleocharis nitida*) – A state endangered plant that is found on wet exposed clay in ditches and openings in alder thickets and marshes, only near Superior. Blooming occurs throughout June; fruiting occurs late June through early September. The optimal identification period for this species is late June through late August.

15. **Northern Bur-reed** (*Sparganium glomeratum*) – A state threatened plant found in cold ditches and pools in sedge meadows, willow-alder thickets, and, occasionally, tamarack stands on the Lake Superior clay plain. Blooming occurs late June through late July; fruiting occurs late July through early September. The optimal identification period for this species is early July through early September.

16. **Vasey Rush** (*Juncus vaseyi*) – A plant of special concern in Wisconsin that is found in moist old fields, ditches, and moist prairies. It has been most commonly found on the Lake Superior clay plain. Blooming occurs early July through late August; fruiting occurs early August through early September. The optimal identification period for this species is early July through late August.

17. **Slim-stem Small-reedgrass** (*Calamagrostis stricta*) – A plant of special concern in Wisconsin. It is usually found on dry to moist dunes, barren, and dolomite or sandstone ledges, mostly near the Great Lakes, as well as calcareous wetlands. Blooming occurs throughout June; fruiting occurs early July through late August. The optimal identification period for this species is early July through late August.

18. **Crawe Sedge** (*Carex crawei*) – A plant of special concern in Wisconsin. It is found in calcareous wetlands and dolomitic pavement, often near Lake Michigan. It is also found in fens and moist calcareous prairies. Blooming occurs late in April through late May; fruiting occurs late May throughout late June. The optimal identification period for this species is throughout May.

19. **Smooth Black Sedge** (*Carex nigra*) – A plant of special concern in Wisconsin. It is found mainly on the edge of dry meadows and wet/sedge meadows and shrub-carr habitats. Fruiting occurs July through August. The optimal identification period for this species is early July through late August.

20. **Large Roundleaf Orchid** (*Platanthera orbiculata*) – A plant of special concern in Wisconsin which is found in moist hardwood or mixed conifer-hardwood forests. Blooming occurs late June through late July; fruiting occurs early July through late August. The optimal identification period for this species is late June through early August.

21. **Tea-leaved Willow** (*Salix planifolia*) – A state threatened plant that is found near Lake Superior, including bedrock shorelines in the Apostle Islands. Blooming occurs throughout May; fruiting occurs throughout June. The optimal identification period for this species is early June through early September.

22. **Wood Turtle** (*Glyptemys insculpta*) – A state threatened species that prefers clean rivers and streams with moderate to fast flows, adjacent riparian wetlands, and upland deciduous forests. The wood turtle becomes active in spring as soon as the ice is gone and air temperatures reach approximately 50 degrees in March or April. They can remain active into mid-October but have been seen breeding under the ice. Wood turtles can breed at any time of the year but primarily during the spring or fall. Nesting usually begins in late May and continues through June. They usually nest in sand or gravel, and usually very close to the water.

23. **Emergent Marsh** (Community) – An open marsh, lake, riverine or estuarine community with permanent standing water. Generally dominated by emergent macrophytes, in pure stands of single species or in various mixtures. Dominants include cattails, bulrushes, bur-reeds, giant reed, pickerel-weed, water plantain, arrowhead, spikerush, and wild rice.

24. **Northern Sedge Meadow** (Community) – An open wetland community that is dominated by sedges and grasses and occurs primarily in northern Wisconsin. There are several common, fairly distinctive, subtypes: Tussock meadow; wire-leaved sedge meadow; and broad-leaved sedge meadow. Sphagnum mosses are either absent or they occur in scattered, discontinuous patches.

From:	Walczynski, Mike - Duluth, MN
To:	Cynthia Warzecha
Cc:	Schmitz, Clayton - Hinckley, MN
Subject:	RE: Prime and Unique Farmlands
Date:	Friday, October 01, 2010 9:42:11 AM

Hi Cynthia,

Pine County has only been partially soil mapped base on NRCS standards at this time. The Willow River area is digitally available on the web which would show Prime and Statewide Important farmland soils if they occur.

At this time the rest of the county cannot de defined as Prime or Statewide Important Farmlands.

If you have other questions please feel free to contact me.

Mike Walczynski
Area Resource Soil Scientist
USDA-NRCS
4915 Matterhorn Dr
Duluth MN 55811
218-720-5308 ext 113
mike.walczynski@mn.usda.gov

From: Cynthia Warzecha [mailto:cwarzecha@srfconsulting.com]
Sent: Tuesday, September 28, 2010 2:49 PM
To: Hahn, Jennifer - Duluth, MN
Subject: Prime and Unique Farmlands

Jennifer,

Our firm is working on an Environmental Assessment for the Northern Lights Express (NLX) High Speed Rail project form Minneapolis to Duluth. Part of the environmental review includes identification of prime and unique farmlands along the 155-mile corridor. It is our understanding that digital mapping of soil types is not yet available for Pine County. Could you please clarify what soil data are used to determine prime and unique farmlands for Pine County?

I have also left a phone message at the Pine County NRCS office. Just wanted to let you know so that efforts to respond are not duplicated.

Thank you!

Cynthia

Cynthia Warzecha
Senior Environmental Analyst
SRF Consulting Group

APPENDIX I

CONTAMINATED PROPERTIES/HAZARDOUS MATERIALS

- **Table I-1: Sites Identified in Minnesota**
- **Table I-2: Sites Identified in Wisconsin**
- **Description of MPCA Activities**

Table I-1. Contaminated Sites within 500 Feet of New Dedicated Track or Siding Extensions in Minnesota

Property Name	Address	City	Activity
Former Stromquist Motors	Main St	Braham	Leak Site
Cell Agricultural Mfg Co	500 S Main St	Braham	Multiple Activities
Braham Oil Co	131 W Central Dr	Braham	Multiple Activities
Braham Moose Log 1544	RR 2	Braham	Multiple Activities
Knife River Corp N Central Braham	1158 Regent St	Braham	Multiple Activities
Braham Motor Service Inc.	216 S Main St	Braham	Leak Site
Main Street Video of Braham	144 S Main PO Box 259	Braham	Tank Site
Red & White Service Station	Highway 23	Brook Park	Multiple Activities
Cambridge Bulk Plant	205 Railroad St S	Cambridge	Leak Site
Cambridge North Bulk Plant	Highway 95 & Cleveland	Cambridge	Leak Site
Fleetway Saw & Satellite	444 S Main St	Cambridge	Leak Site
Great River Energy - Cambridge	2438 349th Ave NE	Cambridge	Multiple Activities
Blue Fox Tackle Co	645 Emerson St N	Cambridge	Multiple Activities
Arrow Tank & Engineering Co	650 Emerson St N	Cambridge	Multiple Activities
Cortec Advanced Film Division	410 1st Ave E	Cambridge	Multiple Activities
Schlagel Inc	491 Emerson St N	Cambridge	Multiple Activities
Cambridge Collision Inc	205 S Railroad St	Cambridge	Multiple Activities
Property	Highway 107 & 70	Grasston	Leak Site
Grasston Dump Site	About 1 mile north of Grasston	Grasston	Unpermitted Dump Site
Holyoke Dump	½ mile south of Center Road	Holyoke	Unpermitted Dump Site
Isanti Middle School	424 N 1st Ave	Isanti	Tank Site
Landmark Bank	No address	Isanti	Leak Site
Isanti Farmers Creamery	No address	Isanti	CERCLIS Site (closed)
Former Isanti Tire & Auto	101 W. Main Street	Isanti	Leak Site
Isanti Oil Co.	Main Street and Railroad Ave.	Isanti	Leak Site
YCC Cabinets & Millwork	101 Railroad Ave	Isanti	Multiple Activities
Countryside Graphics	Main St.	Isanti	Multiple Activities
Harrison Street Property	347 Harrison St 55411	Minneapolis	Leak Site
Auto Truck Service Co	958 Central Ave NE 55413	Minneapolis	Multiple Activities
Marco Company	621 Harrison St NE 55413	Minneapolis	Multiple Activities
The Hustad Co - Central Ave	800 Central Ave NE 55413	Minneapolis	Multiple Activities
Sign Center Inc The Supermarket of Signs	945 Broadway St NE 55413	Minneapolis	Multiple Activities
Qwest Communications - Mpls Garage	339 Harrison St NE 55413	Minneapolis	Multiple Activities
Twin City Auto Techs	1034 3rd Ave NE 55413	Minneapolis	Tank Site
Harrison and Winter Site	Near Harrison St NE	Minneapolis	Voluntary Investigation & Cleanup
Dennis Farm	40376 Vickers St NE 55080	Stanchfield	Feedlot

Source: Minnesota Pollution Control Agency "What's in My Neighborhood" online database. See attached for definitions.

Table I-2. Contaminated Sites within 500 Feet of New Dedicated Track or Siding Extensions in Wisconsin

Property Name	Address	City	Impact Type
Burlington Northern Railroad	Oakes Ave	Superior	Soil Contamination
Arco Coffee	2206 B Winter Street	Superior	Soil Contamination
McKenzie, Rod	Homecroft Courts - #217	Superior	Soil Contamination
General Electric Railcar Repair Service	2105 N 58th St	Superior	Soil Contamination

Source: Wisconsin Department of Natural Resources RR Sites Map online database

The MPCA “What’s in my Neighborhood?” database includes the following MPCA activities:

Tank Site: A tank site is a place with an underground or aboveground storage tank of a certain size on the premises. One tank site may have multiple tanks, and these tanks may contain food products, petroleum products, or other substances. Tank sites include gas stations, bus companies and trucking companies, as well as factories that process sugar beets, ethanol, pulp and paper, or chemicals.

Leak Site: Leak sites are locations where a release of petroleum products has occurred from a tank system. Leak sites can occur from aboveground or underground tank systems as well as from spills at tank facilities. A leak can result from an accident or from activities that occur over a long time.

Voluntary Investigation & Cleanup (VIC) Site: The Voluntary Investigation and Cleanup (VIC) Program is a non-petroleum brownfield program. VIC provides technical assistance to buyers, sellers, developers or local governments seeking to voluntarily investigate or clean up contaminated land.

Unpermitted Dump Site: Unpermitted dump sites are landfills that never held a valid permit from the MPCA. Generally, these dumps existed prior to the permitting program established with the creation of the MPCA in 1967. These dumps are not restricted to any type of waste, but were often old farm or municipal disposal sites that accepted household waste.

Feedlots: Feedlots may be small farms or large-scale commercial livestock operations. They are places where animals are confined for feeding, breeding or holding. The MPCA and its county partners place requirements on how manure is managed at feedlots, so that it does not contaminate nearby surface water and groundwater.

Multiple Activities: These sites are locations where there are multiple MPCA activities occurring. This could be a facility with a wastewater permit and an air quality permit, a site with a registered feedlot and a tank, etc.

CERCLIS Site. Suspected hazardous waste sites throughout the United States are listed in the Comprehensive Environmental Response, Compensation and Liability Information System, or CERCLIS. This federal database contains information on preliminary assessments, potential and actual hazardous waste sites, site inspections, and cleanup activities. CERCLIS sites are candidates for addition to the federal and state Superfund lists.

APPENDIX I-1

CULTURAL RESOURCES

- **Correspondence**
- **Draft Programmatic Agreement (PA)**
- **Draft PA Attachments**
- **Area of Potential Effect (APE)**

NOV - 3 2011

U.S. Department
of Transportation

**Federal Railroad
Administration**

1200 New Jersey Avenue, SE
Washington, DC 20590

Mary Ann Heidemann
Manager, Government Programs and Compliance
State Historic Preservation Office
Minnesota Historical Society
345 Kellogg Boulevard West
St. Paul, MN 55102

Dear Ms. Heidemann:

The Minnesota Department of Transportation (MNDOT) has applied to the Federal Railroad Administration (FRA) for federal assistance in completing numerous railroad improvement projects. To facilitate timely completion of environmental reviews, the FRA has authorized MNDOT to initiate consultations with your office regarding the consistency of these projects with the National Historic Preservation Act. This authorization is in accordance with National Historic Preservation Act regulations for the protection of historic properties (36 CFR § 800.2 (a)). This authorization expires on December 31, 2012.

Should you or your staff have concerns about these projects supported by FRA and submitted to your office by MNDOT, please contact FRA's Environmental and Systems Planning Chief, Mr. David Valenstine, at (202) 493-6368 or at the above address. We appreciate your cooperation in satisfying the requirements of the National Historic Preservation Act.

Sincerely,

Mark E. Yachmetz
Associate Administrator
for Railroad Policy and Development

cc: Colleen Vaughn, FRA
Frank Pafko, MNDOT

Minnesota Department of Transportation

Office of Environmental Stewardship
Mail Stop 620
395 John Ireland Boulevard
St. Paul, MN 55155

Office Tel: (651) 366-3615
Fax: (651) 366-3603

March 1, 2012

Dr. Mary Ann Heidemann
Government Programs & Compliance Officer
State Historic Preservation Office
Minnesota Historical Society
345 Kellogg Blvd.W.
St. Paul, MN 55101

RE: Northern Lights Express (NLX) from Minneapolis to Duluth/Superior

Dear Dr. Heidemann:

The Minneapolis-Duluth/Superior Passenger Rail Alliance (Alliance) is proposing to construct a high-speed passenger railroad known as the Northern Lights Express (NLX) from the Twin Cities to the Duluth/Superior area. The proposed project is receiving funding from the Federal Railroad Administration (FRA); therefore, it must comply with the National Environmental Policy Act and Section 106 of the National Historic Preservation Act of 1966, as amended (Section 106). The project is also receiving funding from the State of Minnesota and must also comply with applicable Minnesota state mandates governing cultural resources. The FRA is the lead federal agency and the Minnesota Department of Transportation (MnDOT) is the lead state agency for the project.

FRA has authorized the MnDOT Cultural Resources Unit (CRU) to initiate consultation with your office on the NLX project on matters related to the completion of Section 106 (see attached letter).

We have scheduled a meeting to begin consultation on this project with your office on next Tuesday, March 6th, at 2:00 PM. In accordance with our advisory role, FRA has asked that we submit the Area of Potential Effect (APE) rationale to you in advance of the meeting (see attached). We have also attached a copy of the Programmatic Agreement (P.A.) that FRA has used in California in planning Section106 review of high speed rail projects in that state. We anticipate some discussion regarding agreement documents at our meeting and are sending this for your reference.

We know that this project must be completed in a very tight timeframe, so we appreciate your willingness to meet with us and anticipate working with you to manage the Section 106 process as efficiently as possible. We look forward to meeting you next week.

Sincerely,

Garneth O. Peterson

Garneth O. Peterson
Historian
Cultural Resources Unit (CRU)

Enclosures

cc: Colleen Vaughn, Federal Railroad Administration
Jeanne Witzig, Kimley-Horn
Jenny Bring, 106 Group
MnDOT CRU Files

Minnesota Historical Society

STATE HISTORIC PRESERVATION OFFICE

March 15, 2012

Ms. Garneth Peterson
MnDOT- Cultural Resources Unit
Transportation Building, MS 620
395 John Ireland Boulevard
St. Paul, MN 55155-1899

RE: Northern Lights High Speed Passenger Rail Construction
Minneapolis to Duluth, Multiple Counties
SHPO Number: 2012-1289

Dear Ms. Peterson:

Thank you for initiating consultation on behalf of the Federal Railroad Administration and the Minnesota Department of Transportation, for the above-referenced project. We have received and reviewed preliminary project materials, in addition to meeting with you at the SHPO on Tuesday, March 6, 2012. Our review and discussions occur in light of the responsibilities given to the State Historic Preservation Office under Sec. 106 of the National Historic Preservation Act and implementing regulations, 36 CFR 800.

We appreciate the background information you provided on work performed to arrive at an alignment selection **and we concur with the Area of Potential Effect** (APE) that has been established along the selected rail alignment; with the understanding that later findings may enlarge or shrink the APE in particular areas. The fact that this alignment is located along existing rail corridors will substantially limit potential adverse affects.

While survey work is already underway for potential historic properties within the APE, we understand that Sec. 106 review is unlikely to be completed before funding deadlines are arrived at later this year. Therefore, **we concur that a Programmatic Agreement is appropriate in this case**, and we look forward to working with you to arrive at an agreement that works for all parties. Although it was helpful to see the California PA example that FRA provided, I think the example is more complicated than needed for this project. Between the MnDOT CRU and Kelly Gragg-Johnson in my office, I think we can come up with more appropriate samples, and customize them for our purposes here. Feel free to work with Kelly directly on this aspect of the project.

Given the very large number of properties within the APE, survey preparation and review will be a monumental task. In light of your request to streamline and expedite Sec. 106 review, I strongly advise "batch delivery" of the survey results. If the SHPO receives all the survey information at once, our staff will be overwhelmed. So please split the submission into logical chunks and send it to us one chunk at a time, as the materials are completed. In this way we can make steady progress towards the goal of timely review.

In terms of public outreach and potential consulting parties, we suggest that invitations go out to any Heritage Preservation Commission (HPC) that has been established in cities along the route. Both Minneapolis and Duluth have very active HPCs, and there may be others. A current list of HPCs is available on our web site. Because your office is already involved in the Interchange project, I am sure you can easily coordinate the Northern Lights project with groups that have a stake in the southern terminus at The Interchange. The Preservation Alliance may also wish to participate. Finally, given the importance of this project to heritage tourism (and general tourism), you may wish to alert the state tourism agency, Explore Minnesota, to the status of the project.

We look forward to working with you on this project. Call me at 651-259-3456 if you have any questions or concerns.

Sincerely,

Mary Ann Heidemann

Mary Ann Heidemann, Manager
Government Programs and Compliance

cc: Preservation Alliance of Minnesota
Duluth HPC
Minneapolis HPC

Minnesota Department of Transportation

Office of Environmental Stewardship
Mail Stop 620
395 John Ireland Boulevard
St. Paul, MN 55155

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March 28, 2012

Ms. Kimberly Cook
Wisconsin State Historic Preservation Office
816 State Street, Rm. 306
Madison, WI 53706

RE: Northern Lights Express (NLX) from Minneapolis to Duluth/Superior

Dear Ms. Cook:

The Minneapolis-Duluth/Superior Passenger Rail Alliance (Alliance) is proposing to construct a high-speed passenger railroad known as the Northern Lights Express (NLX) from the Twin Cities through Douglas County, Wisconsin, to the Duluth/Superior area. The proposed project is receiving funding from the Federal Railroad Administration (FRA); therefore, it must comply with the National Environmental Policy Act and Section 106 of the National Historic Preservation Act of 1966, as amended (Section 106). The FRA is the lead federal agency and the Minnesota Department of Transportation (MnDOT) is the lead state agency for the project.

FRA has authorized the MnDOT Cultural Resources Unit (CRU) to initiate consultation with your office on the NLX project on matters related to the completion of Section 106. In accordance with our advisory role, FRA has asked that we submit the Area of Potential Effect (APE) rationale to you for your review and comment (see attachment).

Representatives from the Wisconsin Department of Transportation (WisDOT) have participated in meetings and conference calls with FRA and MnDOT to coordinate project planning, cultural resources investigations, and consultation efforts. Tribal consultation letters have been sent to appropriate Wisconsin tribes. Cultural resources work has proceeded and both the Phase IA archaeological survey report and Phase I architectural history survey documentation have been forwarded to Jason Kennedy, Environmental Review and Analysis Specialist at WisDOT, to begin the Section 106 review process for Wisconsin.

We look forward to receiving your comments on the enclosed APE rationale. Once comments have been received from MnDOT and WisDOT on the archaeological and architectural history surveys, FRA as the lead federal agency will formally submit those documents for review and comment to the Minnesota and Wisconsin SHPOs.

This project must be completed in a very tight timeframe, with signature of an agreement document by June 30, 2012. Because the engineering and other effects will not be identified, we intend to prepare a Programmatic Agreement (PA) to guide the review of effects. We do intend to reach agreement on eligible properties prior to the PA, and will forward a copy of a draft PA to you for review when we have it developed.

We look forward to working with you to complete the Section 106 process on this project and appreciate your assistance in this review. If you have any questions about our submittal please contact me at Garneth.Peterson@state.mn.us or by phone at 651-366-3615.

Sincerely,

Garneth O. Peterson
Historian
Minnesota Department of Transportation
Office of Environmental Stewardship, Cultural Resources Unit

Enclosures

Cc: Colleen Vaughn, Federal Railroad Administration
Mary Ann Heidemann, MnSHPO
Jason Kennedy, WisDOT
Troy Stapelmann, WisDOT
Amy Adrihan, WisDOT
Jeanne Witzig, Kimley-Horne
Jenny Bring, 106 Group
MnDOT CRU Files

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March 30, 2012

Ms. Garneth Peterson
Minnesota Department of Transportation
Office of Environmental Stewardship, Cultural Resources Unit
Mail Stop 620
395 John Ireland Boulevard
St. Paul, MN 55155

RE: Northern Lights Express (NLX) Rail Project
Minneapolis to Duluth/Superior

Dear Ms. Peterson:

The Wisconsin Department of Transportation (WisDOT) Cultural Resources Team (CRT) has reviewed the materials you recently submitted related to the Phase I Architectural History Survey Report and the Phase IA Archaeological Report for the Northern Lights Express (NLX) Rail Project. Provided below are some general comments to consider prior to submitting the documentation to the Wisconsin State Historic Preservation Office (SHPO) for their review and comment:

Survey results do not reflect the application of the survey criteria and methodology in Wisconsin as outlined in the Survey Manual (http://www.wisconsinhistory.org/hp/survey-manual/survey-manual-2011.pdf.) Several of the surveyed properties would not typically be documented due to lack of integrity and/or architectural/historical interest. WisDOT CRT is aware that the threshold for surveyed properties differs between the two states. Therefore, MnDOT may want to wait for Wisconsin SHPO comments before entering the surveyed properties into the Wisconsin Historic Preservation Database.

A number of the inventory forms are keyed to an incorrect map. For example, Field No. 1462 is keyed to Map 78 but it shows up on Map 80; Field Nos. 1671 and 1672 are not on Map 80.

WisDOT CRT suggests changing language regarding eligibility to state that the resources is "recommended as eligible" rather than "it is eligible."

Regarding the archaeological survey and report, the Wisconsin SHPO may request a Bibliography of Archaeological Report Form (BAR form http://www.wisconsinhistory.org/archaeology/archaeologists-consultants/arch-resources/barform.pdf.)

WisDOT CRT appreciates the opportunity to comment and if you have any questions, please contact me at jason1.kennedy@dot.wi.gov or (608) 267-6693.

Sincerely,

Jason Kennedy 3/30/2012

Jason Kennedy
Cultural Resources Team

Date

**PROGRAMMATIC AGREEMENT AMONG
THE FEDERAL RAILROAD ADMINISTRATION,**

**THE MINNESOTA STATE HISTORIC PRESERVATION OFFICE,
THE WISCONSIN STATE HISTORIC PRESERVATION OFFICE,**

**THE MINNESOTA DEPARTMENT OF TRANSPORTATION, AND
THE WISCONSIN DEPARTMENT OF TRANSPORTATION
REGARDING
COMPLIANCE WITH SECTION 106 OF THE NATIONAL HISTORIC PRESERVATION ACT,
AS IT PERTAINS TO THE NORTHERN LIGHTS EXPRESS HIGH SPEED RAIL PROJECT**

WHEREAS, the Minnesota Department of Transportation (MnDOT), in cooperation with the Minneapolis-Duluth-Superior Passenger Rail Alliance (Alliance) proposes to construct the Northern Lights Express High Speed Rail Project (NLX Project) between a southern terminus in Minneapolis, Minnesota and a northern terminus in Duluth, Minnesota/Superior, Wisconsin; and

WHEREAS, MnDOT has received a grant from the Federal Railroad Administration (FRA) through the Intercity Passenger Rail Program for initial planning, conceptual design, and preliminary engineering for the NLX Project; and

WHEREAS, FRA is the lead federal agency relative to this Undertaking for compliance with The National Environmental Policy Act (NEPA) and Section 106 of the National Historic Preservation Act (NHPA), codified at 16 U.S.C. 470f, and its implementing regulations at 36 CFR Part 800; and

WHEREAS, MnDOT and the Alliance, in cooperation with FRA, are preparing an Environmental Assessment (EA) in accordance with the requirements of NEPA to address the potential impact of the NLX Project on a variety of human and natural resources; and

WHEREAS, the Project's Area of Potential Effect (APE) was determined by FRA and MnDOT pursuant to 36 CFR 800.4(a)(1); and

WHEREAS, MnDOT, on behalf of FRA, has completed Phase I survey within the APE for the NLX Corridor and identified properties that are potentially eligible for listing in the National Register of Historic Places (NRHP); and

WHEREAS, MnDOT will prepare, at the direction of FRA, additional environmental documentation on subsequent phases of the NLX Corridor implementation, in accordance with NEPA, including any cultural resource studies required for Section 106; and

WHEREAS, FRA has a statutory obligation, as a Federal agency, to fulfill the requirements of Section 106; and

WHEREAS, FRA has delegated to MnDOT various actions required by Section 106, as set forth in this Programmatic Agreement (PA) and a delegation letter to the Minnesota State Historic Preservation Office (MnSHPO) dated November 3, 2011; and

WHEREAS, FRA authorizes MnDOT to initiate consultation with the Minnesota State Historic Preservation Office (MnSHPO) and the Wisconsin State Historic Preservation Office (WisSHPO) pursuant to 36 CFR § 800.14(b)(1)(iii) for the Undertaking covered by this PA; and

WHEREAS, FRA and MnDOT have initiated consultation with the Minnesota State Historic Preservation Office and the Wisconsin State Historic Preservation Office concerning the potential types of effects the NLX Project may incur on historic properties within Minnesota and Wisconsin, respectively; and

WHEREAS, MnSHPO and WisSHPO for purposes of this PA agree to consult only on historic properties within their respective states; and

WHEREAS, the WisDOT and WisSHPO have agreed that MnSHPO will have jurisdiction over the Grassy Point Bridge, which crosses into both states; and

WHEREAS, The Burlington Northern Santa Fe (BNSF) Railway, which owns the right-of-way and operates freight rail service within the NLX Corridor, wish/do not wish to participate in this PA as a Concurring Party; and

WHEREAS, FRA has consulted with the Advisory Council on Historic Preservation (ACHP) concerning this PA and they do not wish to participate in this PA as a signatory.

WHEREAS, the purpose of this PA is to provide project wide consistency in consultation procedures, documentation standards, and Federal agency oversight in compliance with Section 106 of the NHPA for NLX Project; and

WHEREAS, the NLX Project design is currently at concept-level engineering with the EA identifying broad "worst-case" impacts that would potentially result from project implementation; and

WHEREAS, following the EA, the NLX Project will enter the Preliminary Engineering phase, where greater information will be available regarding the ability to avoid, minimize or mitigate potential impacts to historic properties resulting from the NLX Corridor and future site specific projects; and

WHEREAS, FRA has determined that a phased process for compliance with Section 106, as provided for in 36 CFR § 800.4(b)(2), is appropriate for the NLX Project such that completion of the identification of historic properties, determination of effects on historic properties, and consultation concerning measures to avoid, minimize, or mitigate if needed, any adverse effects will be carried out prior to any notice to proceed to construction and site specific project implementation; and

WHEREAS, FRA has determined that the proposed NLX Project includes rail lines, associated structures, maintenance and ancillary facilities, construction easements, and staging areas, which are subject to Section 106 review and may have an effect upon historic properties included on or eligible for inclusion on the NRHP. The NLX Project includes the following stages:

- Stage 1: NLX Corridor as detailed in the EA (NLX Corridor).
- Stage 2: All other site specific project elements and facilities not analyzed in the EA (Site Specific Projects).

WHEREAS, pursuant to the requirements of NEPA, FRA and MnDOT conducted a public and agency involvement program as part of the environmental review process for the EA through which information was provided to federal, state, and local agency representatives; elected officials; property owners; interested persons; and interested organizations; and

WHEREAS, FRA and MnDOT prepared a list of Native American Tribes or groups for Section 106 consultation for the EA and initiated consultation with the identified federally-recognized Native American tribes. FRA sent letters to these tribes providing information about the proposed project alternatives and requesting information about any traditional cultural properties that could be affected by the NLX Project; and

WHEREAS, FRA and MnDOT will continue to consult with federally-recognized Native American Tribes, concerning properties of traditional religious and cultural significance; and

WHEREAS, FRA, MnDOT, WisDOT, MnSHPO and WisSHPO are signatories pursuant to 36 CFR 800.6(c)(1) and have authority to execute, amend, or terminate this PA; and

WHEREAS, BNSF owns the right-of-way and operates freight rail service within the NLX corridor and conducts routine maintenance activities that may affect historic bridges, culverts, and other historic resources along the rail line and is a concurring party to this PA; and

WHEREAS, all of the signatories to this PA agree to implement the procedure and measures described herein for the NLX Project in keeping with the following stipulations; and

NOW, THEREFORE, the signatories agree that the proposed NLX Project covered by this PA shall be implemented in accordance with the following stipulations in order to consider the effect of each element of the NLX Project on historic properties and that these stipulations shall govern compliance of the proposed NLX project with Section 106 of the NHPA until this PA expires or is terminated.

STIPULATIONS

I. APPLICABILITY

A. Unless FRA has amended or terminated this PA, this PA shall apply to the NLX Project.

B. Except as provided for in Stipulation IV below, this PA shall not apply to effects of the NLX Project that occur on or affect tribal lands as defined in Section 301(14) of the NHPA. While no use of tribal land is anticipated, if such undertakings occur, the lead Federal agency will follow appropriate tribal consultation procedures in 36 CFR Part 800 with regard to those effects.

C. In the event that MnDOT applies for additional federal funding or approvals for the undertakings from another agency that is not party to this PA and the NLX Project, as described herein, remains unchanged, such funding or approving agency may choose to comply with Section 106 by agreeing in writing to the terms of this PA and notifying and consulting with FRA, MnDOT, WisDOT, MnSHPO, and WisSHPO. Any necessary modifications will be considered in accordance with Stipulation XVII.B of this PA.

II. ROLES AND RESPONSIBILITIES

A. FRA

As the lead Federal agency, FRA has primary responsibility pursuant to 36 CFR § 800.2(a)(2) to ensure that the provisions of this PA are carried out. FRA will conduct government-to-government consultation with federally-recognized Native American tribes, execute MOAs for the NLX Corridor and each future site specific project of the NLX Project, and participate in the resolution of disputes. FRA is responsible for all determinations of eligibility and finding of Effect of the undertakings. Consistent with the requirements of 36 CFR §§ 800.2(a) and 800.2(c)(4), FRA remains legally responsible for ensuring that the terms of this PA are carried out and for all findings and determinations made pursuant to this PA.

B. MnDOT

FRA has delegated to MnDOT responsibility for the implementation of the following provisions of this PA: Consult with other consulting parties and the public; conduct Section 106 reviews in a timely manner; delineate and change the APE as needed and get FRA permission for and inform the other signatories of the change; prepare documentation for MnSHPO, WisSHPO and FRA including determinations of eligibility and effect; circulate comments from signatories; maintain documentation of the Section 106 compliance for the NLX Corridor and each site specific project within the NLX Project; develop a prototype MOA for the NLX Corridor and each site specific project within the NLX Project; invite local agencies, Native American groups, interested non-governmental organizations, and individuals to participate in the development of the NLX Corridor and each site specific project MOAs to agree upon means to avoid, minimize, and/or mitigate adverse effects to historic properties; develop and implement site specific project MOAs for the NLX Corridor and each site specific project; develop a built-environment treatment plan and an archaeological treatment plan to be used for the NLX Corridor and each site specific project; develop and implement the individual NLX Corridor and site specific project treatment plans, as provisions in the MOAs for the NLX Corridor and each site specific project; and ensure project information is available to consulting parties and the public in concert with the

NEPA process for the NLX Corridor and each site specific project. MnDOT's Cultural Resources Unit (CRU) will manage the Section 106 actions delegated to MnDOT.

C. MnSHPO and WisSHPO

1. MnSHPO and WisSHPO shall be responsible for reviewing project documentation in a timely manner and participating in consultation as set forth in this PA for the State of Minnesota and the State of Wisconsin, respectively.

2. All submittals to MnSHPO and WisSHPO shall be in paper format.

3. Pursuant to 36 CFR 800.3(c)(4), the MnSHPO and WisSHPO shall review and comment on all adequately documented project submittals within 30 calendar days of receipt

D. BNSF

BNSF is responsible for identifying routine maintenance activities within the NLX corridor that the signatories to this PA agree have no potential to affect historic properties, as specifically described in Attachment D. BNSF retains all existing responsibilities for compliance with agreed-upon mitigation actions that are determined in the Section 106 consultation process.

III. PROFESSIONAL QUALIFICATIONS STANDARDS

All actions prescribed by this PA that involve the identification, evaluation, analysis, recording, treatment, monitoring, or disposition for historic properties, or that involve reporting or documentation of such actions in the form of reports, forms, or other records, shall be carried out by or under the direct supervision of a person or persons who meet, at a minimum, the Secretary of the Interior's Professional Qualifications Standards (48 FR 44738-44739) (Appendix A to 36 CFR Part 61) in the appropriate discipline. Hereinafter, such persons shall be referred to as Principal Investigators (PIs). MnDOT shall ensure that the work outlined in this PA is conducted by staff meeting these qualifications standards. However, nothing in this stipulation may be interpreted to preclude FRA or MnDOT or any agent or contractor thereof from using the services of persons who are not PIs, as long as their activities are overseen by PIs.

IV. ON-GOING CONSULTATION WITH NATIVE AMERICAN TRIBES

A. FRA

1. As the Lead Federal agency with responsibility for Section 106 compliance, FRA is responsible for all government to government consultation with federally-recognized tribes. A list of federally-recognized Native American tribes contacted can be found in Attachment C.

2. FRA requested government-to-government consultation on the NLX Project via letters sent to all federally-recognized Native American tribes that could be affected by the undertaking

described in this PA. Federally-recognized Native American tribes were provided a 30-calendar-day opportunity to comment.

3. FRA shall ensure that on-going consultation with federally-recognized Native American tribes continues early in the project development process for the NLX Corridor and each site specific project within the NLX Project to identify cultural, confidentiality, or other concerns including those about historic properties, and to allow adequate time for consideration of such concerns whenever they may be expressed.

4. In accordance with 36 CFR § 800.2(c)(2), federally-recognized Native American tribes may be identified as consulting parties for the NLX Corridor and individual site specific projects within this NLX Project and in subsequent MOAs that are prepared for the NLX Corridor and each site specific project within the NLX Project covered by this PA as described further in Stipulation VIII.A.

5. Consultation with federally-recognized Native American tribes shall continue throughout the development of NLX Corridor and subsequent site specific projects within the NLX Project, regardless of whether such tribes responded within 30 days to the consultation letter sent by FRA attempting to initiate such consultations at the outset of this NLX Project.

6. FRA shall identify tribes who will participate in an undertaking as a consulting party and shall consider future written requests to participate as consulting parties in an undertaking.

B. MnDOT

1. MnDOT may consult informally with the federally-recognized tribes and will coordinate such consultation with FRA, as appropriate.

C. Consultation for each Undertaking

1. MnDOT may invite federally-recognized Native American tribes that attach religious and cultural significance to historic properties that may be affected by an undertaking to participate in informal informational meetings for the NLX Corridor and site specific projects, if deemed necessary by the parties involved.

2. FRA shall consult on a government-to-government basis with federally-recognized Native American tribes identified as consulting parties that attach religious and cultural significance to historic properties that may be affected by an undertaking at key milestones in the Section 106 and NEPA processes to gain input from Tribal governments. MnDOT shall consult with all other involved Native American groups. The Tribal consultation includes the following Native American consultation points:

   i. During identification of cultural or historic properties, to confirm the historic or cultural properties identified.

   ii. During assessment of adverse effects, (a) to provide requested inventory forms of historic properties adversely affected for review, (b) to determine when and where tribal monitors may be needed during ground disturbing activities in previously identified sensitive areas or known sites, and (c) to develop avoidance, minimization and treatment measures for adverse effects to both archaeological and built resources.

iii. During resolution of adverse effects, (a) to develop and finalize treatment plans for archaeology and built resources, (b) develop and execute MOAs, and (c) to determine when and where tribal monitors may be needed during treatment plan implementation or construction.

iv. During treatment plan and MOA implementation, (a) to provide for Tribal Monitors where agreed upon, (b) to review and comment on the Programmatic Agreement Annual Report, including input on the treatment plan and MOA implementation.

V. PARTICIPATION OF OTHER CONSULTING PARTIES AND THE PUBLIC

A. Public Involvement

Public involvement in planning and implementation of undertakings covered by this PA shall be governed by FRA's and MnDOT's environmental compliance procedures, as set forth by MnDOT's environmental planning methods, and any advice and guidance documents. Historic resources will be identified and effects will be disclosed to the extent allowable under 36 CFR §§ 800.2(d)(1-2), 800.3(e), and 800.11(c)(1 and 3) and Stipulation XII of this PA. Consistent with Section 106, the public and consulting parties will have an opportunity to comment and have concerns taken into account on findings identified in Section 106 survey and effects documents via attendance at public meetings where they can submit comments on the information presented, as well as access the Section 106 documents. Public meetings specific to historic properties and the effects of the project and treatment of these properties will be held in locations along the corridor and for site specific projects. Interest groups and interested individuals will be invited to comment on the treatments proposed and those with demonstrated interest in the project will be invited to participate as consulting parties to the individual section MOAs.

Public involvement and the release of information hereunder shall be consistent with 36 CFR §§ 800.2(d)(1-2), 800.3(e), and 800.11(c)(1 and 3), and the Freedom of Information Act, 5 U.S.C. § 552, and the implementing regulation applicable to the U.S. Department of Transportation, at 49 CFR Part 7.

B. Consulting Parties

Consulting parties shall participate in undertakings covered by this PA in accordance with 36 CFR §§ 800.2(c)(3) through (5) and 800.3(f). Consulting parties may include other federal, state, regional, or local agencies that may have responsibilities for historic properties and may want to review reports and findings for an undertaking within their jurisdiction.

MnDOT shall submit to MnSHPO, and WisSHPO a list of consulting parties for the NLX Corridor and each subsequent site specific project and a summary of coordination efforts and comments received. MnSHPO and WisSHPO shall submit comments, including recommendations for additional parties to MnDOT within 30 days. MnDOT shall revise and update this information as necessary based on MnSHPO's and WisSHPO's comments, and re-submit them to MnSHPO and WisSHPO as part of the reports to be prepared under Stipulation VI. MnDOT and FRA shall also consider individuals' written requests to participate as consulting parties in the development of measures to avoid, minimize, and mitigate adverse effects to historic properties. Pursuant to 36 CFR §§ 800.11(e) through (g), comments made by the public will be included in documentation of project effects to the NLX Corridor and subsequent site specific MOAs.

VI. IDENTIFICATION AND EVALUATION OF HISTORIC PROPERTIES

A. Area of Potential Effects

An APE for the NLX Corridor was developed by FRA and MnDOT pursuant to 36 CFR 800.4(a)(1) and taking into account statements by stakeholders and interested parties. The APE for each site specific project will be determined by MnDOT, on behalf of FRA, in accordance with the APE for the NLX Corridor and the APE Delineation guidelines (Attachment A). As described in Attachment A, throughout the design process, MnDOT will determine if revisions to an undertaking require modifications to the APE. If an APE requires revisions, MnDOT is responsible for informing the signatories, together with FRA or other federal agency, consulting Federally-recognized Native American tribes, and other consulting parties.

B. Identification and Evaluation of Historic Properties

1. The signatories to this PA along with the concurring tribes agree that MnDOT will have the responsibility to identify historic properties and prepare documentation in accordance with Attachment B. As appropriate, these methods may be modified for the NLX Project or site specific project specific needs in consultation with the signatories and in accordance with PI review and current professional standards. Findings shall be made by MnDOT to FRA based on NRHP criteria (36 CFR § 60.4) and evaluated in accordance with provisions of 36 CFR §800.4(c). Evaluation methods and criteria shall be consistent with the Secretary of the Interior's Standards and Guidelines for Evaluation (48 Fed. Reg. 44729-44738) (36 CFR § 63) and shall be completed by PIs qualified in the appropriate discipline: archaeology, architectural history, or history.

2. Historic properties shall be identified to the extent possible within the APE for the NLX Corridor and each of the site specific projects within the Undertaking that comprise the NLX Project and will be documented in individual Survey Reports (SR) as described in Attachment B. The content, methodology, level of effort, and documentation requirements for historic property evaluations in the SR shall follow federal and Minnesota and Wisconsin guidelines and instructions, and are provided in detail in Attachment B. The identification effort and ineligible properties shall be documented in separate technical reports for archaeological properties and historic architectural properties, the drafts of which will be submitted for review by the signatories and other consulting parties including tribal historic preservation officers (THPOs) and tribal representatives who have expressed an interest in the undertaking.

i. Archaeological properties include precontact and historic period archaeological sites, objects, and districts, and properties identified as per § 800.4. Evaluations shall be made by PIs fully qualified in the discipline of archaeology. Archaeological properties within the APE shall be documented in the SR. The content, methodology, level of effort, and documentation requirements for archaeological evaluations in the SR are provided in detail in Attachment B. Any archaeological investigations that may be required for portions of the project in Minnesota or Wisconsin on non-federal publicly owned land shall be conducted under a State Archaeologist's permit (Minnesota § 138.31-.42 and WIS. § 44.47). The goal of the investigation is to locate and identify any significant archaeological resources that could be affected by the project, well in advance of any project construction. The results of the survey will be used in consultation in order to avoid, minimize, or mitigate adverse effects to identified significant archaeological resources. This requirement shall be incorporated into all Archaeological Treatment Plans proposed for portions of the projects or project phases in Minnesota and Wisconsin.

ii. Historic architectural properties include historic buildings, structures, objects, sites, landscapes and districts. Evaluations shall be made by PIs. Historic architectural properties within the APE that are identified by PIs as historic properties shall be documented in the SR. Historic architectural properties evaluated as ineligible for the NRHP by PIs shall be documented in the SR. The content, methodology, level of effort, and documentation requirements for historic architectural evaluations in the SR are provided in detail in Attachment B.

C. Review of Documentation of Historic Properties

1. Upon review and concurrence of the findings by FRA, a Draft SR would be submitted by MnDOT to the signatories and identified consulting parties, including Native American tribes, upon request and would include documentation of all properties in the APE that are listed in the NRHP, previously determined eligible for the NRHP, found eligible for the NRHP by PIs, or that appear ineligible for the NRHP. Known archaeological properties that cannot be evaluated prior to approval of an undertaking will be presumed NRHP eligible. Where archaeological testing to determine NRHP eligibility is not feasible during the identification and evaluation phase, project-specific MOAs may include a provision for treatment plans that include archaeological testing or use of a combined archaeological testing and data recovery program.

2. MnDOT shall submit its findings in the SR to the signatories and consulting parties, including Native American tribes, identified as a result of Stipulations IV.C and V.B, who shall have 30-days to review the SR findings and provide their recommendations for changes to the findings based on National Register criteria. If no objection is made, consistent with Stipulation VI.D, within the 30-day period, the findings for those historic properties would become final.

3. Other non-eligible properties within the APE will be evaluated by PIs, documented for each undertaking in a SR, and submitted to MnSHPO or WisSHPO for review and concurrence If

MnSHPO, WisSHPO, agency reviewer, consulting Native American tribe, or other consulting party asks for additional information or a re-evaluation of a property, that property and the updated finding of eligibility or non-eligibility shall be included in the Final SR. Comments received from the MnSHPO, WisSHPO, the THPO, agency reviewer(s), consulting Native American Tribe(s), and other consulting parties will be considered and may be incorporated into a Final SR.

4 If, after the submission of the Final SR, there are changes to the APE that include additional properties not exempt from evaluation or information is received that there may be additional historic properties within the APE, a Supplemental SR will be prepared, and distributed following review by FRA, to MnSHPO, WisSHPO and all parties who received the Final SR for a review and comment period of 30 days. If no objection is made, consistent with Stipulation VI.D, within the 30-day period, the findings for those historic properties in the Supplemental SR would become final.

D. Eligibility Disagreements

Should a disagreement arise regarding the NRHP eligibility of a property in the APE for an undertaking, FRA shall forward a Determination of Eligibility documentation to the Keeper of the National Register (Keeper) for resolution in accordance with 36 CFR § 800.4(c)(2) if:

1. MnSHPO, WisSHPO or a federal agency with jurisdiction over the involved lands objects in writing within 30 days to a finding of eligibility, or

2. A Native American tribe or group that ascribes traditional religious and cultural significance to a property objects in writing within 30 days to a Finding of Eligibility regarding that property; and

3. FRA is not able to resolve that objection through consultation with the MnSHPO or WisSHPO and the objecting party as provided for in Stipulation XVII.A.

Should a member of the public disagree with any NRHP eligibility determinations, MnDOT shall inform FRA and any affected signatories and take the appropriate objection into account. MnDOT shall consult for no more than 30 days with the objecting party and, with any or all of the other signatories. MnDOT shall document such consultation efforts and submit the findings in writing to FRA for review. FRA's decision regarding resolution of the objection from a member of the public will be final.

E. Phased Identification

In accordance with 36 CFR § 800.4(b)(2), phased identification may occur in situations where identification of historic properties cannot be completed. In these cases, subsequent MOAs will provide a provision for the development and implementation of a post-review identification and evaluation effort as applicable to the NLX Project.

VII. ASSESSMENT OF ADVERSE EFFECTS

A. If historic properties are identified within the APE for NLX Project, MnDOT shall assess adverse effects in accordance with 36 CFR § 800.5 and document its assessment in the SR, providing it to FRA for review, for each undertaking where historic properties were identified within the APE. The SR shall describe the assessment of potential adverse effects to historic properties that would result from the construction or operation of the project, and identify mitigation measures that would eliminate or minimize effects to be incorporated into the design and construction documents of the NLX Project. Following FRA review and concurrence, MnDOT shall distribute the SR to the signatories, and other consulting parties, including Native American tribes, identified as a result of Stipulations IV.C and V.B, who shall have a 30-day review and comment period. MnDOT shall ensure that comments are considered prior to finalizing the SR for submission to the SHPO for final review and concurrence. The MnSHPO or WisSHPO shall have an additional 15 days for review and concurrence with the final SR.

B. FRA will notify and invite the Secretary of the Interior (represented by the National Park Service regional office's program coordinator) when any project section may adversely affect a National Historic Landmark (NHL) pursuant to 36 CFR § 800.10 and Section 110(f) of the NHPA.

C. Consistent with 36 CFR. §§ 800.5(b) and (d)(1), FRA may determine that there is no adverse effect on historic properties within the APE for an undertaking when the effects of the undertaking would not meet the Criteria of Adverse Effect at 36 CFR § 800.5(a)(1), the undertaking is modified to avoid adverse effects, or if conditions agreed upon by SHPO are imposed, such as subsequent review of plans for rehabilitation by the MnSHPO/WisSHPO/THPO to ensure consistency with the Secretary's Standards for the Treatment of Historic Properties (36 CFR Part 68) and applicable guidelines, to avoid adverse effects. Any conditions would be documented by the written concurrence of the consulting parties. MnDOT will submit all such written concurrence documents to FRA, which is responsible for ensuring compliance with all conditions to avoid adverse effects.

VIII. TREATMENT OF HISTORIC PROPERTIES

A. Memoranda of Agreement

1. A MOA will be developed by MnDOT for the NLX Corridor and each site specific project that FRA determines would have an adverse effect to historic properties or when phased identification is necessary and adverse effects could occur.

2. Each MOA will include avoidance, minimization, and protective measures for eligible properties identified in the SRs such as preservation-in-place; processes for addressing project design changes or refinements after the SRs for the NLX Corridor and each site specific project are completed, and a process for efficiently addressing unanticipated discoveries in the post-review period.

3. FRA will notify the ACHP of any findings of adverse effect and invite the ACHP to participate in the development of the MOAs pursuant to 36 CFR § 800.6(a)(1)(i)(c), as appropriate.

4. Should Native American tribes or groups decline to participate as signatories to a NLX Corridor or site specific project MOA, they will not be provided documentation regarding treatment that is called for in that NLX Corridor or site specific MOA. Native American tribes and groups will continue to receive information on the NLX Corridor or subsequent site specific project MOAs as part of the NEPA process and may request to consult at any time on an undertaking, or request additional coordination with MnDOT or FRA.

5. Pursuant to 36 CFR §§ 800.11(e) through (g), views of the public will be considered and included where appropriate in specific project MOAs.

6. Upon review, concurrence, and execution of the MOA, Section 106 review will be considered concluded for the NLX Corridor or particular site specific project, though coordination and compliance efforts would continue according to the terms of this PA and the MOA.

B. Individual Treatment Plans

1. Treatment plans will be developed by MnDOT for the NLX Corridor or each site specific project. Where National Register eligible buildings or structures may be adversely affected by the NLX Corridor or a site specific project, a Built Environment Treatment Plan will be prepared. Where National Register eligible archaeological properties may be adversely affected by the NLX Corridor or a site specific project, an Archaeological Treatment Plan will be prepared. Such Treatment Plans will include, respectively:

   i. The Built Environment Treatment Plan (BETP) will provide detailed descriptions of treatment measures for eligible buildings, structures, objects, landscapes and districts that will be affected by the undertaking. The BETP will also include descriptions of measures to be taken to protect historic properties and to avoid further adverse effects to historic properties. In accordance with 36 CFR § 800.5(a)(1), BETPs will take into account the cumulative and foreseeable effects of the NLX Project on historic architectural properties.

   ii. The Archaeological Treatment Plan (ATP) will provide detailed descriptions of protection measures for archaeological resources and resources of importance to Federally Recognized Native American Tribes or Native American groups because of cultural affinity. The ATP could include but is not limited to the establishment of archaeologically sensitive areas, use of preconstruction archaeological excavation, preservation-in-place, avoidance, minimization, monitoring during construction where appropriate, procedures to be followed when unanticipated discoveries are encountered, processes for evaluation and data recovery of discoveries, responsibilities and coordination with Federally Recognized Native American Tribes, Native American groups, Native American Graves Protection and Repatriation Act (NAGPRA), 25 U.S.C. 3001 et seq., compliance, and curation of recovered materials.

2. Each treatment plan will address historic properties adversely affected and set forth means to avoid, protect, or develop treatment measures to minimize the NLX Project's effects where MnDOT, in consultation with the appropriate agencies, MnSHPO and/or WisSHPO, and other MOA signatories, determines that adverse effects cannot be avoided. The treatment plans will conform to the principles of the Council's Treatment of Archaeological Properties: A Handbook Parts I and II, the "Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation" (48 Fed. Reg. 44716-44742 (September 29, 1983), and appropriate MnSHPO and WisSHPO Guidelines. MnDOT will take into consideration the concerns of the consulting parties in determining the measures to be implemented.

3. Each treatment plan will include, but not be limited to, the content outlined in Attachment B for treatment plans. The consultative procedure through which a treatment plan is developed will address the adverse effect of any undertaking on historic properties and indicate that the treatment plan will be incorporated into an MOA.

C. Treatment Plan Reviews

1. Signatory Review

MnDOT shall provide the treatment plans to FRA for review, prior to providing it to MOA signatories and MOA concurring parties for a 30-day review and comment period. Based on comments received, treatment plans will be revised and resubmitted for a final 30-day review. If FRA, MOA signatories and/or MOA concurring parties fail to comment within 30-days of receiving the treatment plan, MnDOT may assume concurrence of the other parties and proceed with the implementation of the treatment plan. Treatment plans may be amended by MnDOT, upon FRA review without amending the MOAs. MnDOT and FRA will make a good faith effort to identify major alterations to treatment plans that substantively affect mitigative measures and seek additional consultation with the other MOA signatories before approving revised treatment plans. Where warranted, such good faith efforts shall include submittal of the draft revised Treatment Plan to the MOA signatories a minimum of 15 calendar days prior to the anticipated approval of the revisions. Disputes will be resolved in accordance with the Dispute Resolution clause in Stipulation XVII.A.

2. Public Participation

MnDOT shall take reasonable steps to provide opportunities for members of the public to express their views on the treatment plans. Opportunities for public input may include the distribution of treatment plans consistent with 36 CFR §§ 800.2(d)(1-2), 800.3(e), and 800.11(c)(1) and (3). Where appropriate, MnDOT will hold informational meetings with the public to explain the treatment plans and obtain comment. Any public comments received will be considered and incorporated into the treatment plans as appropriate.

D. Treatment Plan Implementation

1. Upon execution of each MOA and prior to the commencement of construction activities, each related treatment plan will be implemented. Depending upon the nature of the treatment, the treatment may not be completed until after the specific project or the NLX Project is completed. Termination of the project after initiation of the treatment plans will require completion of any work in progress, and amendment of each treatment plan as described below. Amendments to the treatment plans will be incorporated by written agreement among the signatories to the MOA. Each MOA will outline appropriate reporting processes for the treatment plans.

2. Dispute Resolution

   The parties participating in the development and implementation of the treatment plans will come to agreement on the treatment prescribed in and the implementation of the treatment plan in the MOA. If the parties are unable to come to agreement on the treatment of adverse effects in the MOA, the procedures outlined in XVII.A will be followed to resolve the dispute.

IX. CHANGES IN ANCILLARY AREA/CONSTRUCTION RIGHT-OF-WAY

MnDOT will notify the MOA signatories and consulting parties of changes in the size or location of ancillary areas or the construction right-of-way that result in changes to the APE, or effects to historic properties (see Attachment A) as appropriate. If any changes result in the use of unsurveyed areas, MnDOT will ensure that these areas are surveyed in order to locate any potentially significant cultural resources and that those resources are evaluated for NRHP eligibility. MnDOT will consult with the MOA signatories and consulting parties regarding any newly identified historic properties that cannot be avoided. Protective and/or mitigation measures will be developed and the treatment plans will be amended and implemented in accordance with Stipulation VIII. All such changes will be documented in the annual Programmatic Agreement report.

X. CONSTRUCTION APPROVAL

Upon the completion of the pre-construction activities prescribed in the treatment plans and after treatment plan implementation where adverse impacts would occur, and in accordance with the provisions of the applicable MOA, or where no historic properties were identified, MnDOT may authorize construction within portions of the APE. If concurrence of the approval to proceed cannot be reached among the signatories, the dispute will be resolved in accordance with Stipulation XVII.A.

XI. DISCOVERIES, UNANTICIPATED ADVERSE EFFECTS, UNANTICIPATED DAMAGE

In accordance with 36 CFR § 800.13(a)(2), if a previously undiscovered archaeological, historical, or cultural property is encountered during construction, or previously known properties will be affected or have been affected in an unanticipated adverse manner, MnDOT will implement the following procedures:

A. MnDOT shall ensure that all operations for the portion of the undertaking with the potential to affect an historic property are immediately ceased and will contact FRA and affected MOA signatories if appropriate upon unanticipated resource discovery;

B. MnDOT shall make a preliminary determination of the National Register eligibility of the historic property and the potential for the undertaking to adversely affect the resource and shall forward that finding to FRA who will make the final eligibility determination. If adverse effects to the resource can be avoided, no consultation with MOA signatories and consulting parties is necessary. If adverse effects cannot be avoided, MnDOT will consult with the MOA signatories and propose treatment measures to minimize the effects.

C. MnDOT shall notify Federally-recognized Native American tribes of any discoveries that have the potential to adversely affect properties of religious or cultural significance to them. After being notified of such discoveries, the Native American tribes can request further consultation on the project by notifying MnDOT, in writing or other documented means within three business days. For interested Native American groups that are not Federally-recognized, MnDOT shall notify them of any discoveries that have the potential to adversely affect properties of religious or cultural significance to them. After reviewing such discoveries, such interested Native American groups can request further consultation on the project by notifying MnDOT in writing within three business days; and

D. MnDOT shall implement the avoidance, minimization, or treatment plan and advise FRA and other signatories of the satisfactory completion of the approved work. Once the approved work is completed, the activities that were halted to address the discovery of resources may resume; and

E. Any treatment to damaged properties will follow the Secretary of the Interior's Standards for the treatment of historic properties. If MnDOT determines damaged property should be repaired after construction is completed, then stabilization measures that will prevent and not cause further damage will be undertaken; and

F. If a National Historic Landmark is affected, MnDOT shall include the Secretary of the Interior represented by the National Park Service regional office's program coordinator and the ACHP in the notification process.

XII. CONFIDENTIALITY

All parties to this PA shall ensure that shared data, including data concerning the precise location and nature of historic properties and properties of religious and cultural significance are protected from public disclosure to the greatest extent permitted by law, including conformance to Section 304 of the NHPA, as amended and Section 9 of the Archaeological Resource Protection Act and Executive Order on Sacred Sites 13007 FR 61-104 dated May 24, 1996.

XIII. HUMAN REMAINS

A. Notification and Treatment

1. If human remains are inadvertently discovered during construction activities, applicable state laws and procedures will be followed. Human remains and grave goods will also be treated in accordance with the applicable project-specific treatment plan.

2. Federal agencies party to this PA will be responsible for curation of all records and other archaeological items resulting from identification and data recovery efforts on Federal lands within the agency's jurisdiction. This includes ensuring that the disposition of any human remains and associated funerary objects of Native American origin encountered on federal land during any action subject to this PA complies with § 3(c)(d) of the NAGPRA, and its implementing regulations codified at 43 CFR Part 10.

3. Any human remains and funerary objects discovered on non-federal land within the State of Minnesota during the implementation of the terms of this PA and during the implementation of the undertaking itself will be treated by MnDOT in accordance with the requirements of the Minnesota Private Cemeteries Act (Minnesota § 307.08)..

4. Any human remains and funerary objects discovered on non-federal land within the State of Wisconsin during the implementation of the terms of this PA and during the implementation of the undertaking itself will be treated by MnDOT in accordance with the requirements of the Wisconsin Burial Sites Protection law (Wisconsin § 157.70 and Wisconsin Administrative Code § HS 2.02(15), 2.04(2)).

5. All human remains shall be treated in a manner consistent with ACHP "Policy Statement regarding Treatment of Human Burial Sites, Human Remains and Funerary Objects" February 23, 2007; http//www.achp.gov/docs/hrpolicy0207.pdf

XIV. CURATION

A. Collections from Federal Lands

Federal agencies party to this PA will be responsible for curation of all records and other archeological items resulting from identification and data recovery efforts on Federal lands is completed in accordance with 36 CFR Part 79, and if the archaeological materials are determined to be of Native American origin, the agencies will follow NAGPRA regulations and procedures set forth in 43 CFR Part 10. MnDOT shall ensure that documentation of the curation of these materials is prepared and provided to the affected parties to this PA within 10 days of receiving the archaeological materials.

B. Collections from State and Private Lands

Cultural materials discovered on state lands shall belong to the respective states according to Minn. Stat. §§ 138.31 to 138.42 and Wis. Stat. § 44.77 and shall be curated in accordance with applicable laws and procedures.

Private landowners in Minnesota and Wisconsin shall be encouraged to curate archeological materials recovered from their lands, as recommended in the foregoing statutes.

XV. DOCUMENTATION STANDARDS

A. All documentation that supports the findings and determinations made under this PA shall be consistent with 36 CFR § 800.11 and shall be in accordance with MnDOT's requirements and its subsequent revisions or editions and with attachments to this PA. Documentation shall be submitted to MnDOT and prepared by PIs who, at a minimum, meet the Secretary of the Interior's Professional Qualifications Standards (48 FR 44738-44739) (Appendix A to 36 CFR Part 61). MnDOT shall review the documentation for adequacy, and transmit all documentation cited herein as stipulated by this PA.

B. All documentation prepared under this PA shall be kept on file at MnDOT and FRA and made available to the public without the inclusion of culturally sensitive information that may jeopardize confidentiality as stipulated by this PA, consistent with applicable confidentiality requirements and Federal records management requirements.

XVI. AUTHORITIES

Compliance with the provisions of this PA does not relieve FRA or other federal agencies of any other responsibilities not described in this PA to comply with other legal requirements, including those imposed by NAGPRA (25 U.S.C. Section 3001 and 43 CFR 10), the ARPA (16 U.S.C. Section 470 aa-47011), and NEPA (42 U.S.C. Section 4321-4347), and applicable Executive Orders.

XVII. ADMINISTRATIVE STIPULATIONS

A. Dispute Resolution

1. Should any signatory to this PA object within 30 days to any action proposed or any document provided for review pursuant to this PA, FRA shall consult with the objecting signatory to resolve the objection. If FRA determines that the objection cannot be resolved within 15 days, FRA shall forward all documentation relevant to the dispute, including FRA's proposed resolution, to the ACHP. FRA will also provide a copy to all signatories and consulting parties for the undertaking. ACHP shall provide FRA with its advice on the resolution of the objection within 30 days of receiving adequate documentation. Prior to reaching a final decision on the dispute, FRA shall prepare a written response that takes into account any timely advice or comments regarding the dispute from the signatories and consulting parties, including Native American tribes, and provide them with a copy of this written response. FRA will then implement any action determined by this dispute resolution process and proceed according to its final decision.

If ACHP does not provide its advice regarding the dispute within 30 days, FRA may make a final decision on the dispute and proceed accordingly. Prior to reaching such a final decision, FRA shall prepare a written response that takes into account any timely comments regarding the dispute from the signatories and consulting parties for the undertaking, and provide them and ACHP with a copy of such written response.

B. Amendment

1. The signatories to this PA may request that it be amended, whereupon the signatories will consult to consider such amendment. This PA may be amended only upon written concurrence of all signatory parties.

2. To address changes in the treatment of specific historic or archeological properties affected by the undertaking, MnDOT may propose revisions to the treatment plans or MOAs, as appropriate, rather than to this PA. Upon concurrence of the signatories, MnDOT and FRA may revise the treatment plans to incorporate the agreed upon changes without executing a formal amendment to this PA. An MOA may be amended only upon written concurrence of all signatory parties.

3. Revisions to an attachment to this PA would be implemented through consultation and include any necessary revisions to the PA itself that may result from modification of an attachment.

C. Review and Reporting

1. The signatories and consulting parties, including Native American tribes, may review activities carried out by MnDOT pursuant to this PA. MnDOT shall facilitate this review by compiling specific categories of information to document the effectiveness of this PA and by making this information available in the form of a written annual Programmatic Agreement report. Categories of information shall include, but are not limited to, a summary of actions taken under this PA, including all findings and determinations, public objections, and inadvertent effects or foreclosures. The range and type of information included by MnDOT in the written report and the manner in which this information is organized and presented must be such that it facilitates the ability of the reviewing parties to assess accurately the degree to which the PA and its manner of implementation constitute an efficient and effective program under 36 CFR Part 800.

2. MnDOT shall prepare the written report of these findings annually following execution of this PA. MnDOT shall submit the annual reports to FRA, MnSHPO, and WisSHPO, no later than three (3) months following the end of the State fiscal year until all treatment is completed. There will be a 30-day period to review and comment on the report. The Annual Programmatic Agreement Report will be finalized within 30 days of receipt of comments.

3. MnDOT shall provide that the report herein prescribed is available for public inspection. The report will be sent to signatories and consulting parties, including Native American tribes, of this PA and any subsequent MOAs, and a copy available to members of the public for comment, upon request.

D. Termination

FRA, MnSHPO, WisSHPO, MnDOT, or WisDOT may terminate this PA by providing 30 days written notice to the other signatories; the signatories shall consult during the 30-day period prior to termination to seek agreement on amendments or other actions that would avoid termination. Should such consultation result in an agreement on an alternative to termination, the signatory parties shall proceed in accordance with that agreement. Should a signatory party propose termination of this PA, they will notify the other parties in writing. If any of the signatories individually terminates their participation in the PA, then the PA may be terminated in its entirety. In the event of termination, then FRA shall either consult in accordance with 36 CFR § 800.14(b) to develop a new agreement or request the comments of the ACHP pursuant to 36 CFR Part 800. Beginning with the date of termination, FRA shall ensure that until and unless a new agreement is executed for the actions covered by this PA, such undertakings shall be reviewed individually in accordance with 36 CFR §§ 800.4-800.6.

E. Duration of this Programmatic Agreement

In the event that the terms of this PA are not carried out within 10 years, this PA shall be assessed by the signatories to determine if it still needed and working effectively, or whether it should be terminated. If the PA is effective and its duration needs to be extended, the signatories can decide to extend the duration of the PA. If the signatories determine that the PA is effective, but needs revisions, revisions will be made. In the event the signatories determine that the PA is not effective and cannot be amended to address concerns, the PA shall be considered null and void, memorialized in a letter to the signatories from FRA. If FRA or another Federal agency party to this PA chooses to continue with the undertaking, it shall re-initiate review of the undertaking in accordance with 36 CFR Part 800.

F. Execution and Implementation of the Programmatic Agreement

Execution of this PA by FRA, MnDOT, WisDOT, MnSHPO, and WisSHPO and implementation of its terms evidence that FRA has taken into account the effects of this undertaking on historic properties and afforded ACHP an opportunity to comment.

SIGNATORY PARTIES

Federal Railroad Administration

By: ________________________________ Date: ________________

Minnesota State Historic Preservation Office

By: ________________________________ Date: ________________

Wisconsin State Historic Preservation Office

By: ________________________________ Date: ________________

Commissioner Minnesota Department of Transportation

By: ________________________________ Date: ________________

Secretary Wisconsin Department of Transportation

By: ________________________________ Date: ________________

CONCURRING PARTY

Burlington Northern Santa Fe (BNSF) Railway

By: ______________________________ Date: _______________

ATTACHMENT A

AREA OF POTENTIAL EFFECTS DELINEATION

An APE for the NLX Corridor has been determined by FRA and MnDOT pursuant to 36 CFR 800.4(a)(1) and taking into account statements by stakeholders and interested parties. MnDOT, using Principal Investigators (PIs), is responsible for describing and establishing the APE in accordance with the APE defined for the corridor (see attached) and the APE delineation guidelines described below, and will sign any maps or plans that define or redefine an APE. The APE may be further refined in connection with future site specific studies.

As defined in 36 CFR 800.16(d), an APE is "the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking."

Different APEs may be established for archeological properties and historic architectural properties:

Archaeological Properties

For archeological properties, an APE is typically established based on an undertaking's potential for direct effects from ground-disturbing activities. On occasion, archeological sites may also have qualities that could be affected indirectly.

The APE for archaeological properties is the area of ground proposed to be disturbed during construction of the undertaking, including grading, cut-and-fill, easements, staging areas, utility relocation, borrow pits, and biological mitigation areas, if any.

Traditional cultural properties and cultural landscapes are more likely to be subject to indirect, as well as direct effects; thus, in order to include the potential for such effects, the APE for such properties is usually broader than the archeological APE. For instance, the first row of potential properties beyond the right-of-way may be subject to such effects and thus included in an indirect APE when warranted.

Historic Architectural Properties

The APE for historic architectural properties includes all properties that contain buildings, structures or objects more than 50 years of age at the time the intensive survey is completed by the QPIs, as follows:

1. Properties within the proposed right-of-way;
2. Properties where historic materials or associated landscape features would be demolished, moved, or altered by construction;
3. Properties near the undertaking where railroad materials, features, and activities *HAVE NOT* been part of their historic setting and where the introduction of visual or audible elements may affect the use or characteristics of those properties that would be the basis for their eligibility for listing in the National Register; and
4. Properties near the undertaking that were either used by a railroad, served by a railroad, or where railroad materials, features, and activities *HAVE* long been part of their historic setting, but only in such cases where the undertaking would result in a substantial change from the historic use, access, or noise and vibration levels that were present 50 years ago, or during the period of significance of a property, if different.

For the NLX Project, a key phrase in the APE definition in the Section 106 regulations contained within 36 CFR 800.16(d) is "may…cause alterations in the character or use of historic properties" because many of the undertakings involve the construction of additional, relocated, and/or high speed rail alongside existing railroads. In such cases, potential historic properties near the proposed undertaking historically had railroad features, materials, and activities within their setting that contributed to their character, or may even have been used by or served by the railroad. For example:

- The character and use of a historic railroad passenger or freight depot or railroad bridge *would not change* unless it would be put out of service, destroyed, altered, or moved for the undertaking;
- The character and use of an industrial building next to existing railroad tracks *would not change*, unless freight railroad service was an important association and the spur lines or loading areas would be removed by the undertaking;
- The character and use of buildings *would not change* if they would be separated from the undertaking by an existing railroad; however,
- The character of a non-railroad or non-industrial building *would likely change* if the building is visually sensitive and the proposed undertaking introduces an elevated grade separation or other large building or structure;
- The use of a non-railroad or non-industrial building *would likely change* if the building is sensitive to noise, like a school, museum or library, and the frequency of noise or vibration events from passing trains is increased over historic-era railroad events.

When delineating the APE, the PIs shall follow the identification methodology in Stipulation VI.B., which are different for archaeological properties and historic architectural properties. The PIs shall take into account the nature of the proposed undertaking and whether or not it has the potential to affect the characteristics that might qualify the property for eligibility to the NRHP. Whenever an individual phase is revised (e.g., design changes, utility relocation, or additional off-site mitigation areas), the PIs will determine if changes require modifying the APE. If an APE proves to be inadequate, MnDOT is responsible for informing consulting parties in a timely manner of needed changes. The APE should be revised commensurate with the nature and scope of the changed potential effects.

NORTHERN LIGHTS EXPRESS PROJECT
AREA OF POTENTIAL EFFECT RATIONALE

Prepared by: The 106 Group Ltd.
October 25, 2011
Updated: February 27, 2012

The Northern Lights Express (NLX) project is a proposed high-speed passenger railroad from the Twin Cities to the Duluth/Superior area. The proposed project is receiving funding from the Federal Railroad Administration (FRA); therefore, it must comply with the National Environmental Policy Act; Section 106 of the National Historic Preservation Act of 1966, as amended; and with other applicable federal and state mandates such as the Minnesota Historic Sites Act, Minnesota Private Cemeteries Act, and the Wisconsin Burial Sites Preservation Law. The purpose of this document is to conduct preliminary analysis concerning the potential effects the NLX project may have on historic resources and develop a rationale to assist the federal and state agencies in developing an appropriate area of potential effect (APE) for this project (see attached maps for current APE).

The construction and operation of the proposed NLX project will result in a variety of potential effects to historic properties; therefore, for the development of an APE, potential effects from various possible construction and operation activities were examined. A preferred alternative, Route No. 9, has been chosen for the NLX project and approved by the FRA. The route follows the existing Burlington Northern Santa Fe (BNSF) Railway from Minneapolis (MTI) northeast to Duluth (Depot). This rail line represents the only railroad connection currently in full active service between Minneapolis and Duluth/Superior. The corridor roughly parallels State Highways 65 and 23 through Hennepin, Anoka, Isanti, Pine, Carlton, Douglas (Wisconsin), and St. Louis counties and terminates in Duluth.

This route will utilize portions of six historic railroad corridors. These existing railroad lines contain intact tracks that will be upgraded from a class 3 to a class 5 line. FRA's track safety standards establish nine specific classes of track (Class 1 to Class 9). The difference between each Class of Track is based on progressively more exacting standards for track structure, geometry, and inspection frequency. Each Class of Track has a corresponding maximum allowable operating speed for both freight and passenger trains. The higher the Class of Track, the greater the allowable track speed and the more stringent track safety standards apply. The maximum allowable speed for passenger trains is 60 mph for a Class 3 track and 90 mph for a Class 5 track. The upgrades to a Class 5 line can be accomplished through tie replacement and ballast improvements, which can be done as maintenance on these line utilizing tie replacement trains and ballast placement trains. All work will be performed from the track and will have no impacts outside the existing track bed (FRA 2008).

For this project, the project area is defined as the proposed construction footprint, which can be bigger or smaller than the existing right-of-way (ROW) depending on the nature of the proposed improvements for the project. In addition, the proposed preferred alignment includes construction of new parallel track, new bridges associated with new parallel track, and improving/upgrading existing bridges. Therefore, the activities examined in developing the APE include the following:

- New track parallel to existing track (e.g., sidings and second mainlines with both tracks operational);
- New bridge associated with new parallel track;
- Replacing an existing bridge/underpass;
- Improving/upgrading an existing bridge;
- Using an existing alignment (possible replacement of existing rails, etc.); and
- Operation of the line.

Discussion of the potential effects to specific resources types are described below.

ARCHAEOLOGY

For the proposed NLX project, the APE for archaeology will include all areas of proposed construction activities or other potential ground disturbing activities associated with the project, including equipment storage areas and borrow areas. For construction of the railroad corridor itself, it is assumed that the construction footprint will not extend beyond the existing railroad ROW and that the only construction activity that may be located outside existing ROW may be borrow areas or equipment storage areas, if required; however, the location of borrow areas and storage/laydown areas is currently unknown and environmental review of these areas will be completed at a later date.

It is assumed that any modification to the existing railroad grade or to transition to a new alignment (i.e., adding new parallel track) will not extend below the existing railroad grade. Therefore, unknown archaeological sites that may be located below the existing railroad grade will not be impacted and survey of the existing railroad grade will not be required. If Native American burials are known to exist below existing grade or within the larger APE then the project will need to comply with Minnesota Private Cemeteries Act, 1975 (M.S. 307.08) or the Wisconsin Burial Sites Preservation Law (Wis. Stats. 157.70) and the specific situation will be addressed as part of consultation obligations under Section 106 of the National Historic Preservation Act.

The design of the proposed NLX project is continuing to be refined. As the design of the project progresses, if any of the assumptions above should change, then the proposed APE rationale would need to be adjusted accordingly.

ARCHITECTURAL HISTORY

For the proposed NLX project, the APE for architectural history needs to account for any physical, auditory, atmospheric, or visual impacts to historic properties. The potential effects from each component of the proposed project are different and, therefore, a different APE may be needed. The proposed project components are still being refined so the purpose of this discussion is to detail the APE associated with each component, which will then be combined into one APE based on the nature of the components proposed.

The types of effects anticipated may include direct physical and/or vibratory effects, as well as potential indirect visual, auditory, and atmospheric effects. Effects may be temporary or permanent. To aid in identifying the potential effects the proposed elements of the project may have on architectural history properties in order to define an appropriate APE for architectural history, the following was assumed based on current project information:

- Construction of the project will not exceed a time period of five years;
- Construction along the project corridor will generally be intermittent and not continuous at any one point along the corridor for the duration of construction;
- Construction activity will be limited to daytime hours, generally between 6:00 a.m. and 6:00 p.m., when higher noise levels are more acceptable;
- The construction and operation of depots (stations) and other facilities such as parking lots will be included in a separate National Environmental Policy Act (NEPA) process;
- The centerline of any new parallel track will be, at most, 30 feet (ft.) off-set from the centerline of the existing railroad track within a corridor;
- According to the *Minneapolis-Duluth/Superior Restoration of Intercity Passenger Rail Service Comprehensive Feasibility Study and Business Plan (December 2007)* by Transportation Economics & Management System, Inc. the number of freight trains that currently operate along the railroad corridors (Route No. 9) with active tracks range from 12 to 60 trains per day. A portion of one corridor also sees two intercity passenger trains per day. The maximum number of high-speed passenger trains (HSTs) that are proposed to be operated daily along the potential

railroad corridors is eight, which would increase the number of trains along the active lines (Route No. 9) by 7 to 25 percent per day. If project assumptions change, portions of this APE rationale may need to be revisited and potentially revised;

- The length of the proposed passenger trains will generally be much shorter than the freight trains that are currently operated along the proposed corridors with active tracks. According to the *Minneapolis-Duluth/Superior Restoration of Intercity Passenger Rail Service Comprehensive Feasibility Study and Business Plan* the proposed passenger trains will not exceed 600 ft. in length, whereas the freight trains that currently operate along the active corridors generally range from several hundred ft. to over one mile (mi) in length;
- The proposed passenger trains will be considerably lighter than freight trains and will therefore produce considerably less vibrations than freight trains and for shorter durations given their shorter lengths and higher speeds; and
- Except for the noise produced by the horns on the locomotives, which will be the same as freight trains, the proposed passenger trains will generally produce less noise and for shorter durations in a location compared to a freight train since they will have fewer locomotives and cars, less weight, better tracking, and will be shorter in length and operating at higher speeds.
- The proposed HSTs will travel at speeds of up to 110 miles per hour (mph), which is much faster than a freight train, so they will have a higher onset rate (approach rate due to their much higher speed) compared to freight trains that currently utilize the proposed NLX route.

The proposed project would traverse a wide array of areas, ranging from densely developed urban areas, to small towns, to open prairie and farmland, to forested areas. Similarly, the topography along the line will also vary from flatlands to rolling hills. Given the diversity of these areas and their respective conditions, the APE may need to vary, depending on the actual circumstances of a place and the activity proposed for that particular location. The following sections will describe a rationale for the development of an APE for each anticipated construction or operation activity, as detailed earlier in this document. Since the design of the project is still being refined, the discussion will generally focus on identifying the maximum limits of an APE, rather than a minimum which would need to be increased in places to address unique conditions. There may be locations where conditions may allow for a reduced APE from the maximum described below (e.g. more dense vegetation reducing visibility); however, this will be confirmed based on visual inspection of the viewshed during field survey.

New Track Parallel to an Existing Track

This action would entail laying new track(s) parallel to existing tracks within an existing railroad ROW (operation of the line is discussed under the heading: *Operation of the Line*). This alternative could potentially result in both temporary and permanent indirect and direct effects.

Temporary indirect effects would include increases in noise and dust during the construction of the new tracks. Noise associated with the construction of a new parallel track within the existing ROW would include noise from construction activities, and from increased vehicular traffic to deliver, load, and unload construction materials. While the exact dB levels associated with construction activities has not been determined, based on other similar projects, it is not anticipated that dB levels associated with construction of a new parallel track within an existing alignment will exceed acceptable levels as established by the State of Minnesota in areas more than 500 ft. on either side of the project area.

Construction of new parallel tracks would also result in temporary increases in dust and particulate matter associated with earthmoving activity, loading and unloading of materials, earth, and ballast dumping and storage. Dust levels in the air would be intermittent and would vary according to construction activity and atmospheric conditions. Any potential increase in dust associated with construction of parallel track within an existing alignment would be temporary and amounts generated would not likely be any greater than dust generated by wind storms in rural areas. In urban areas, the existing built environment (e.g. buildings and structures) would block and disrupt winds and further dissipate any dust generated during construction. Therefore, the area that could potentially be adversely affected by increases in dust should be limited to no more 500 ft. and effects, if any, would be temporary.

Permanent effects would include direct physical and/or vibratory effects and potential indirect visual effects to the corridor and other historic properties as a result of changes to the existing corridor. Direct physical effects would be limited to the project area and alterations to the existing roadbed. Vibrations associated with new track(s) parallel to existing tracks within an existing railroad ROW could include vibrations from ground disturbing activity and from trucks, heavy equipment, rail-based equipment, and from the loading and unloading of materials in the project area. Vibrations from such activities would most likely be minimal and would not likely impact an area more than 500 ft. from the project area. Therefore, an APE of 500 ft. on either side of the project area would be sufficient to address vibrations associated with the construction of new track(s) parallel to existing tracks within an existing railroad ROW.

Permanent indirect visual effects may vary; however, provided that the grades, elevations, and profiles of the parallel track are similar to the existing roadbed in the corridor, the construction of a parallel track within an existing ROW would have a relatively minor affect on the visual character of the corridor, especially in relatively flat areas where the alignment cannot be viewed from above. As a result, the area that would be visually affected would be somewhat limited. Since the track will be placed parallel to the existing track offset no more than 30 ft. from the existing, and it is assumed that the height, grades, and profile of the new parallel track are not significantly different from the existing roadbed (e.g. height of the new and rebuilt roadbed is not changed more than a 2.5 ft. from the height of the existing roadbed), based on other railroad projects in Minnesota, an APE of 500 ft. on either side of the project area would be sufficient to account for potential visual effects.

However, if grades, cuts, and fills are modified, the associated changes in these elements of the existing corridor may alter, and increase the visual prominence of the corridor and would thereby impact a larger area. If the construction of a parallel track results in height and profile differences between the existing roadbed that exceeds 5 to 10 ft., depending on the location and terrain of the area (10 ft. in hilly and/or heavily forested areas and 5 ft. in generally flat and/or open areas), a larger APE would be required to account for the increased visual effect. In these instances, an APE of 0.125 (one-eighth) mi (660 feet) is recommended to account for changes to views of the corridor and the landscape.

In summary, the APE for laying new track(s) parallel to existing tracks should include 500 ft. on either side of the project area, assuming that the grade change of the new alignment is within 2.5 ft. of the height of the existing track. If the proposed alignment will have a grade change more than 2.5 ft. from the height of the existing track, an APE of 0.125 mi around the project area is recommended.

New Bridge Associated with New Parallel Track

This action would entail the construction of a new bridge(s) associated with a new parallel track(s) located adjacent to existing bridges within an existing railroad ROW. This alternative could potentially result in both temporary and permanent indirect and direct effects.

Temporary indirect effects would include increases in noise and dust during the construction of the proposed bridge. Noise associated with bridge construction would include noise from construction activities, increased vehicular traffic bringing materials to the site, loading and unloading construction materials, and potentially pile driving. While the exact dB levels associated with construction activities has not been determined, based on other similar projects, it is not anticipated that dB levels associated with construction of a new bridge will exceed acceptable levels as established by the State of Minnesota in areas more than 0.125 mi from the project area.

Construction of a new bridge would result in temporary increases in dust and particulate matter associated with earthmoving activity, loading and unloading materials, and storage of construction materials and equipment. Dust levels in the air would be intermittent and vary according to atmospheric conditions; however, the level of dust in the air would disperse as distance from the project area increased. Therefore, the area that could potentially be adversely affected by increases in dust should be limited to no more than 0.125 mi from the project area.

Permanent effects would include potential direct effects from vibrations and indirect visual effects to the corridor and other historic properties as a result of changes to the existing corridor. Vibrations associated with new bridge construction could include vibrations from rail-based equipment, trucks and heavy equipment, and from loading and unloading materials. Vibrations from such activities would most likely be minimal and would not likely impact an area more than 500 ft. from the project area. However, pile driving associated with new bridge construction would result in greater vibrations that would have a wider area of impact.

Vibrations from pile driving can result in two types of potential effects: (a) real damage to property and (b) perception by humans (Transportation Research Board [TRB] 1997:1). For the development of an APE for architectural history properties related to the construction of the proposed NLX line, the primary consideration is real damage to historic properties as a result of vibrations, which can take the form of structural damage, including cracking and breaking of structural elements or ground settlement. Structural damage from impact driving can be minimized or eliminated by alternatives such as vibratory driving, or changing to auger cast (TRB 1997:1). However, for the development of an architectural APE for pile driving, it was assumed that the project will utilize impact driving.

A number of studies have been conducted on the impacts of vibrations and pile installations on adjacent structures, including historic buildings. Studies have been done to determine (a) the maximum safe limits of vibrations that will not result in damage to adjacent structures, including historic buildings, during construction projects, and (b) the area of influence for pile driving that falls within these maximum acceptable vibration limits. Many agencies have established maximum safe limits for vibrations as described below.

Based on its own studies, the non-extant U.S. Bureau of Mines recommended a “safe blasting limit” of 50 millimeters(mm)/second (sec) (2 inches[in]/sec) peak particle velocity (ppv) for mining activity (CTC & Associates and WisDOT RTD Program 2003:2). Given the many inherent similarities in terms of ground-borne vibrations between blasting and pile driving, over time, this maximum limit has also been commonly applied to construction vibration and is widely viewed by many engineers as being stringent enough to prevent damage to most surrounding structures, regardless of age or fragility (CTC & Associates and WisDOT RTD Program 2003:2).

While 50 mm/sec (2 in/sec) is a commonly used, a number of federal agencies and state transportation departments across the country have established significantly lower (more conservative) thresholds for projects subject to their oversight. The National Park Service (NPS) for example has set a maximum limit of 0.2 in/sec (5 mm/sec) ppv for structures that exhibit significant levels of historic architectural importance, or that are in a poor or deteriorated state of maintenance, which is one tenth of 50 mm/sec, and a slightly higher limit of 0.5 in/sec (12 mm/sec) ppv for all other historic sites (Sedovic 1984:59). The Federal Transit Administration (FTA) has established criteria for assessing potential vibration damage to structures based on the type of building construction (Table 1) (FTA 2006).

FIGURE 1. FTA CONSTRUCTION VIBRATION DAMAGE CRITERIA

Building Category	Maximum PPV
I. Reinforced-concrete, steel or timber (no plaster)	0.5 in/sec (12 mm/sec)
II. Engineered concrete and masonry (no plaster)	0.3 in/sec (7 mm/sec)

III. Non-engineered timber and masonry buildings	0.2 in/sec (5 mm/sec)
IV. Buildings extremely susceptible to vibration damage	0.12 in/sec (3 mm/sec)

A number of state departments of transportation have also established standards for projects they build or fund. For example, the California Department of Transportation (Caltrans) has set an "architectural damage risk level" for continuous vibrations (peak vertical particle velocity of 5 mm/sec (0.2 in/sec). For ruins, ancient monuments, and historical buildings and structures in poor condition, Caltrans recommends an even lower upper limit of 2 mm/sec (0.08 in/sec) for continuous vibrations (CTC & Associates and WisDOT RTD Program 2003:2).

Given the geographic area the proposed NLX line will traverse and its developmental history, it is highly probable that a significant percentage of the architectural history resources along the proposed NLX project corridor are non-engineered timber and masonry buildings that are also likely to contain plaster. Since these types of structures are more susceptible to damage from vibrations than engineered and reinforced structures, it is recommended that the APE for architectural history include all areas subject to a ppv of 5 mm/sec (0.2 in/sec) or greater as a result of vibrations related to construction activity, including pile driving to encompass the greatest range of potential vibration impacts to historic structures. This number corresponds with both (a) the NPS's recommended maximum for both deteriorated historic resources and resources with architectural significance, and (b) the FTA's standard for non-engineered timber and masonry buildings. However, in the event that the architectural history survey for the proposed project identifies extremely deteriorated, highly fragile architectural history properties that are eligible for the National Register of Historic Places, it is recommended that a vibration study be completed for these resources and attempts made to limit vibrations in these isolated locations to 3 mm/sec (0.12 in/sec).

When looking at the correlation between distance from the point of impact of pile driving and the potential for damaged to adjacent structures, according to the TRB, experience has shown that "direct damage to structures is not likely to occur at a distance from the pile of (a) more than 15 meters for piles 15 meters long or less, or (b) one pile length for piles longer than 15 meters" (TRB 1997:1). However, the TRB does note that "in few cases has there been direct damage to a structure when the pile driving was done at a distance of at least one pile length from the target (TRB 1997:43). The main exception to the one pile length distance "rule of thumb" guideline is typically related to the settlement of soils densified by vibrations, resulting in settlement that can take place at distances greater than one pile length (TRB 1997:43). To account for the potential presence of loose, clean sands in the zone of influence, the TRB recommends using a zone of influence of up to 400 meters from the pile driving. This distance translates to 1,312.34 ft., or approximately 0.25 mi.

Based on this analysis, it is recommended that an APE of 0.25 mi from the project area be used to account for all potential types of vibrations associated with bridge construction. In areas with sound soil, where a soil survey confirms there is no soil prone to settlement, the APE to account for impacts to architectural resources can be reduced to the length of the longest pile used in this particular area.

Permanent indirect visual effects may vary; however, it is assumed that if the new bridge(s) will be of a similar type, scale, height, and proportion, and constructed of similar materials as the existing parallel bridge, although the new bridge(s) may be visible from some distance, the area that would be significantly affected visually would be somewhat limited. Therefore, an APE of 0.125 mi is recommended. If the design of the new bridge(s) will be out of scale and proportion from the existing parallel bridge(s) and/or is a significantly different type, or constructed of different materials, its visual prominence would affect a larger area and a larger APE may be required.

In summary, the APE for the construction of a new bridge(s) associated with a new parallel track(s) located parallel to existing bridges within an existing railroad ROW assumes that the proposed bridge(s) would be of similar type, design, scale, height, and proportion and constructed of similar materials as the existing parallel bridge(s). Therefore, the APE should include a 0.25 mi buffer around the project area to account for all potential visual effects, as well as account for potential effects to historic properties from potential vibrations related to pile driving during construction. Specific details relating to the construction of new bridges are still being developed and if the design for a proposed new bridge(s) is not of a similar type, scale, height, and proportion, or constructed of similar materials as the existing parallel bridge, a larger APE may be required to account for potential increased indirect visual effects.

Replacing an Existing Bridge/Underpass

This action would entail removal of an existing bridge or underpass and replacing it with a newly constructed bridge or underpass. This alternative would result in both temporary and permanent direct and indirect effects.

Temporary indirect effects would include increases in noise and dust during the construction of the proposed bridge/underpass. Noise associated with bridge/underpass replacement would include noise from demolition and construction activities, increased vehicular traffic bringing materials to the site, and loading and unloading construction materials. While the exact dB levels associated with replacing an existing bridge/underpass has not been determined, based on other similar projects, it is not anticipated that dB levels associated with construction of a replacement bridge/underpass will exceed acceptable levels as established by the State of Minnesota in areas more than 0.125 mi from the project area.

The demolition of the existing bridge/underpass and the construction of a new bridge/underpass would result in temporary increases in dust and particulate matter associated with earthmoving activity, loading and unloading materials, and storage of construction materials and equipment. Dust levels in the air would be intermittent and vary according to atmospheric conditions; however, the level of dust in the air would disperse as distance from the project area increased. Therefore, the area that could potentially be adversely affected by increases in dust should be limited to no more than 0.125 mi from the project area.

Permanent effects would include direct physical effects to the existing bridge/underpass due to its removal and to the existing corridor and railroad roadbed, as well as direct vibratory effects to the corridor and other historic properties as a result of changes to the existing corridor. Vibrations associated with replacement bridge/underpass construction could include vibrations from rail-based equipment, trucks, heavy equipment, and from loading and unloading materials, which based on similar projects would be limited to an area 500 ft. from the project area. The demolition of the existing bridge/underpass would result in greater vibrations that would have a wider area of impact; an APE of 0.125 mi from the project area for this action is therefore recommended. However, as indicated in the section above for new bridges, pile driving associated with new bridge/underpass construction would result in greater vibrations that would impact a wider area; therefore, if pile driving is required for construction of the replacement bridge/underpass, an APE of 0.25 mi from the project area is recommended to account for all potential types of vibrations associated with bridge construction.

Permanent effects would also include permanent indirect visual effects; however, the area affected may vary. It is assumed that any replacement bridge will be constructed along the same alignment as the existing bridge and will be of a similar type, scale and design, and utilizes similar materials as the existing bridge and, therefore, the area that would be significantly affected visually would be somewhat limited. Based on similar projects, an APE of 0.125 mi is recommended. However, where a new design is used, its visual prominence could potentially affect a larger area and in these instances a larger APE may be required to account for potential increased indirect visual effects.

In summary, the APE for the removal and replacement of an existing bridge/underpass with a new bridge/underpass within an existing railroad ROW, provided the new bridge/underpass is of a similar type, scale and design and utilizes similar materials as the existing bridge/underpass, should include a 0.25 mi buffer around the project area to account for all potential direct and indirect effects. Specific details relating to the construction of new bridges are still being developed and if a new design is used for the replacement bridge/underpass, a larger APE may be required to account for potential additional indirect visual effects.

Improving/Upgrading an Existing Bridge

This action would entail improvements and upgrades to existing bridge(s) within a railroad corridor. This alternative could potentially result in both temporary and permanent indirect and direct effects.

Temporary indirect effects would include increases in noise and dust during the construction of the proposed project. Noise associated with bridge improvement/upgrades would include increased noise from construction activities, increased vehicular traffic bringing materials to the site, loading and unloading construction materials, and potentially pile driving. While the exact dB levels associated with construction activities has not been determined, based on other similar projects, it is not anticipated that dB levels associated with bridge improvements/upgrades will exceed acceptable levels as established by the State of Minnesota in areas more than 0.125 mi from the project area.

Improving/upgrading a bridge would also result in temporary increases in dust and particulate matter associated with earthmoving activity, loading and unloading materials, and storage of construction materials and equipment. Dust levels in the air would be intermittent and vary according to atmospheric conditions; however, the level of dust in the air would disperse as distance from the project area increased. Since the proposed improvements will not include pier adjustments or pile driving, the area that could potentially be adversely affected by increases in dust should be limited to no more than 0.125 mi from the project area.

Permanent effects would include direct physical effects to the railroad corridor and the improved/upgraded bridge(s) and potential direct vibratory and indirect visual effects to the corridor and other historic properties as a result of changes to the existing corridor. According to information provided by SRF in March 2011, physical changes to the existing bridge(s) within the corridor will not include alterations to the approaches, abutments, cuts, the bridge piers, or to the railroad roadbed. In addition, it is assumed that any changes to the bridge spans will allow the bridges to maintain their appearance and retain a similar type, scale, height, proportion, and materials. Therefore, direct physical effects would be limited to the project area. Vibrations associated with bridge improvements/upgrades could include vibrations from trucks, heavy equipment, rail-based equipment, and from the loading and unloading of materials in the project area. Vibrations from such activities would most likely be minimal and would not likely impact an area more than 500 ft. from the project area. However, if pile driving is associated with bridge improvement/upgrades, vibrations from it could potentially result in greater vibrations and impact a wider area than other construction activities. According to information provided SRF in March 2011, proposed bridge improvements would not require significant pier adjustments, if any, and no pile driving is anticipated; therefore, an APE of 500 ft. on either side of the project area is recommended to account for all vibratory effects.

Indirect visual effects may vary; however, it is assumed that the improvements/upgrades to the bridge(s) will allow the bridge to maintain its appearance and retain a similar type, scale, height, proportion, and materials. Therefore, although the improved/upgraded bridge(s) may be visible from some distance in certain locations, the area that would be significantly affected visually would be somewhat limited. In this case an APE of 0.125 mi would be recommended, assuming that the improvements/upgrades to the bridge(s) are in scale and proportion and material types to the existing bridge(s). If the proposed improvements/upgrades include replacement spans that will be of a different type, design, scale, materials, or proportions that the existing spans, a larger APE may be required.

In summary, the APE for improvements and upgrades to existing bridge(s) within a railroad corridor should include a 0.125 mi buffer around the project area, and assumes the existing spans will be improved/upgraded with in-kind materials that would be consistent with the existing bridge(s). If the proposed improvements/upgrades include replacement spans that will be of a different type, design, scale, materials, or proportions that the existing spans, a larger APE may be required.

Using an Existing Alignment

This action would entail utilizing existing tracks along an existing railroad corridor (operation of the line is discussed under the heading: *Operation of the Line*). According to information provided by SRF in March and August 2011, the existing railroad lines contain intact tracks that will be upgraded from a class 3 to a class 5 line. The upgrades can be accomplished through tie replacement and ballast improvements, which can be done as part of line maintenance, utilizing tie replacement trains and ballast placement trains. All work will be performed from the track and would have no impacts outside the existing track bed will be required. This alternative may result in both temporary and permanent direct effects.

Temporary indirect effects would include increases in noise and dust during potential replacement or improvement of existing tracks. Noise associated with potential new tracks may include noise from construction activities; however, since the upgrades will be accomplished using tie and ballast replacement trains, noise effects associated with delivering, loading, and unloading construction materials should be minimal. While the exact dB levels associated with construction activities has not been determined, based on other similar projects, it is not anticipated that dB levels associated with construction of a new tracks on an existing alignment will exceed acceptable levels as established by the State of Minnesota in areas more than 500 ft. from the project area.

The use of an existing alignment may result in temporary increases in dust and particulate matter associated with earthmoving activity, loading and unloading of materials. Dust levels in the air associated with this potential activity would be intermittent and would vary depending upon atmospheric conditions; however, the level of dust in the air would disperse as distance from the project area increased. Since the repair/replacement of existing tracks will be completed using tie and ballast replacement trains from the existing rail corridor and no changes to grade profiles is proposed, the area that could potentially be adversely affected by increases in dust should be limited to no more than 500 ft. from the project area.

According to information provided by SRF in March and August 2011, the proposed upgrade of the existing alignment will not include any changes to the existing grade or height and profile of the existing track; therefore, permanent visual effects should be relatively minimal and, based on other railroad projects in Minnesota, should be confined to an area within 500 ft. of the project area. Permanent vibratory effects associated with repair or replacement of existing tracks could include vibrations from ground disturbing activity and from rail-based equipment loading and unloading materials in the project area. Vibrations from such activities would most likely be minimal and would not likely impact an area more than 500 ft. from the project area. Given the potential range of vibrations, an APE of 500 ft. on either side of the project area would be sufficient to address vibrations associated with the repair or replacement of existing tracks.

In summary, the APE for utilizing existing tracks along an existing railroad corridor should include a 500 foot buffer on either side of the project area.

Operation of the Line

Operation of the line could potentially result in permanent direct and indirect effects to historic properties. Potential permanent direct effects associated with an increase in vibrations from the trains and associated vehicular traffic include impacts to historic properties that could potentially result in their structural degradation and compromise overtime. However, as stated in the assumptions section, the vibrations caused from the operation of high-speed passenger trains, which will have fewer cars and will be lighter in weight, will be less than the existing freight trains. While the operation of the proposed line will result in increases of train traffic and a slight increase in the frequency of train vibrations, the overall increases will be minimal.

Permanent indirect effects associated with operation of the line include noise due to increased train traffic, and increased vehicular traffic associated with the trains. Additional noise resulting from individual trains (operation and horns), and associated noise such as crossing signals may also potentially result in permanent indirect effects. Noise is typically defined as unwanted or undesirable sound, where sound is characterized by small air pressure fluctuations above and below the atmospheric pressure. The basic parameters of environmental noise that affect human response are (1) intensity or level, (2) frequency content and (3) variation with time (Johnson et al. 2011).

Several federal and state agencies have developed standards for evaluating noise impacts; however, since this project is subject to FRA approval, its criteria were used to determine an APE for noise. The FRA has established allowable noise levels for trains and train horns. The maximum allowed noise level for locomotives manufactured after December 31, 1979 and for moving trains is 90 decibels (dB) (FRA 2000). The minimum noise level for train horns is 96 dB and the maximum is 110 dB (FRA n.d.). As traditional diesel powered train sets, the HSTs will need to adhere to these standards. As noted in the assumptions section, the HSTs will be shorter, lighter and faster than the freight trains that currently utilize the line, so noise from their movement typically will not be greater than existing higher speed freight trains on the proposed line. However, a noise and vibration impact study for the proposed project prepared by Harris Miller Miller & Hanson (HMM&M) in April 2011, notes that an important characteristic of the noise from HSTs is the onset rate of the sound signature, which is the average rate of change of increasing sound pressure level in decibels per second (dB/sec) during a single noise event (Johnson et al. 2011:2). The rapid approach of an HST is accompanied by a sudden increase in noise for a receiver near the tracks. Sounds that have faster onset rates can cause more annoyance than sounds with slower variation or steady noise with the same noise level. The relationship between speed and distance defines locations where the onset rate for high-speed train operations may cause surprise or startle (Johnson et al. 2011:2-3).

According to the study, the maximum speed of the HSTs along the NLX corridor is 110 mph. Based on this speed, the area for potential for surprise or “startle” includes all areas within 22 ft. of the track centerline (Johnson et al. 2011:3).

This study also looked at overall noise impacts using the FRA’s criteria, which are “based on well-documented research on community reaction to noise and are based on change in noise exposure using a sliding scale” (Johnson et al. 2011). The FRA criteria rely on the noise sensitivity levels of different land uses to determine impacts (Table 2). FRA criteria also include two levels of impact: severe impact and moderate impact. A severe impact is when project-generated noise is expected to cause a significant percentage of people to be highly annoyed by the new noise and normally requires mitigation. A moderate impact is when the change in the cumulative noise level is noticeable to most people, but may not be sufficient to cause strong, adverse reactions from the community. In these areas mitigation may or may not be required, depending on other factors, including existing noise levels, predicted level of increase over existing noise levels, the types and numbers of noise-sensitive land uses affected, the noise sensitivity of the properties, the effectiveness of the mitigation measures, community views and the cost of mitigating noise to more acceptable levels (Johnson et al. 2011:6-7).

TABLE 1. LAND USE CATEGORIES AND METRICS FOR HST NOISE IMPACT CRITERIA

Land Use Category	Description of Land Use Category
1	Tracts of land where quiet is an essential element in their intended purpose. This category includes lands set aside for serenity and quiet, and such land uses as outdoor amphitheaters and concert pavilions, as well as National Historic Landmarks with

	significant outdoor use.
2	Residences and buildings where people normally sleep. This category includes homes, hospitals and hotels where a nighttime sensitivity to noise is assumed to be of utmost importance.
3	Institutional land uses with primarily daytime and evening use. This category includes schools, libraries and churches where it is important to avoid interference with such activities as speech, meditation and concentration on reading material. Buildings with interior spaces where quiet is important, such as medical offices, conference rooms, recording studios and concert halls fall into this category, as well as places for meditation or study associated with cemeteries, monuments and museums. Certain historical sites, parks and recreational facilities are also included.
Source: Johnson et al. 2011, from Federal Railroad Administration, 2005	

Using FRA criteria, the HMM&M study assessed the overall impacts from HST noise using a “source-path-receiver” framework where the “source” generates noise levels that depends on the type of source (e.g., HSTs) and its operating characteristics (e.g., speed), the “receiver” is the noise-sensitive land use (e.g., a house or school) exposed to noise from the source, and the “path” between the source and the receiver is where the noise is reduced by distance, intervening buildings and topography (Johnson et al. 2011). During the study representative sites in sensitive land use areas along the proposed NLX line were monitored to (a) characterize existing baseline noise conditions and (b) determine the level of impact from the proposed project. Monitoring sites ranged from 10 ft. to 474 ft. from the proposed NLX tracks (Johnson et al. 2011). While the study did not specifically look at historic properties, it identified a total of 61 severe noise impacts and 289 moderate noise impacts to sites up to 459 ft. from the proposed NLX tracks (Johnson et al. 1011). Based on this study, at a minimum, the APE should include areas within 459 ft. of the centerlines of the proposed NLX tracks. However, since this study did not specifically consider impacts to historic properties where lower noise levels may be important aspects of their significance and historic integrity, a slightly larger APE is recommended. Therefore, an APE of 500 ft. on either side of the project area is recommended to account for potential impacts from noise related to operation of HSTs to architectural history resources.

In summary, the operation of the line would be a compatible use with the historical and current function of the area and associated rail corridors. Therefore, the APE for operation of the line, separate from the associated new construction, is recommended as 500 ft. on either side of the project area.

Other Associated Features

As noted previously the construction and operation of the proposed line would necessitate the construction of additional facilities such as repair and maintenance buildings; passenger stations; ticket booths; and parking lots. The construction of these associated facilities and their potential effect(s) will be addressed through a separate NEPA process.

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ATTACHMENT B

NLX DOCUMENTATION AND FORMAT GUIDELINES

PURPOSE

The purpose of the NLX program method for evaluation of cultural resources is to describe, in greater detail, how the FRA and MnDOT will implement the Section 106 process for the NLX Corridor and each site specific project and ensure that the identification and evaluation of cultural resources is conducted in accordance with the Secretary of Interior's Standards and Guidelines for Archeology and Historic Preservation (Standards and Guidelines) (48 CFR 44716-44742) and 36 CFR 800.4. Historic Properties Surveys conducted in the State of Minnesota will adhere to professional guidance provided in MnSHPO's Manual for Archaeological Projects in Minnesota and Guidelines for History/Architecture Projects in Minnesota, and MnDOT's Cultural Resources Unit Project and Report Requirements, as appropriate. Historic Properties Surveys conducted in the State of Wisconsin will adhere to professional guidance in WisSHPO's Historical and Architectural Survey Manual and the Wisconsin Archaeological survey's Archaeological Survey Guidelines, as appropriate. Historic Properties Surveys that include archaeological investigations in Minnesota and Wisconsin on non-federal publicly owned land shall be conducted under a State Archaeologist's Permit (Minnesota § 138.31-.42 and WIS. § 44.47).

The historic properties that should be identified include any prehistoric or historic district, site, building, structure, or object included in or eligible for inclusion in the National Register of Historic Places (NRHP) maintained by the Secretary of Interior. This includes artifacts, records, and remains which are related to such district, site, building, structure, or object (16 U.S.C. Section 470(w)(5)). The term includes properties of traditional religious and cultural importance to an Indian Tribe or organization that meet the National Register criteria. Properties eligible for inclusion in the National Register can be properties that are formally determined as such in accordance with regulations of the Secretary of Interior and all other properties that meet the National Register criteria. The level of identification needed varies depending on the nature of the property or property type, the nature of the agency's authority, and the nature of the proposed undertaking's possible effects on the property.

METHODOLOGY FOR IDENTIFICATION OF HISTORIC PROPERTIES

The Area of Potential Effects (APE) would be delineated as described in Stipulation VI.A and Attachment A, using the best professional judgment of the PIs and taking into account historic property sensitivity and the effects that would occur from construction and operation of the undertaking. An APE Map showing the most current engineering available for the undertaking and the boundary delineated by PIs would be submitted to MnSHPO for projects with the potential to affect historic properties in Minnesota, and to WisSHPO for projects with the potential to affect historic properties in Wisconsin. The APE maps will be sent along with the Survey Report (SR). The APE maps would be on an aerial base at an appropriate scale and indicate whether the project is at-grade, elevated, or in tunnel configuration.
In consultation with the MnSHPO, WisSHPO and other parties to the Section 106 process, including Native American tribes, FRA and MnDOT will identify resources, determine eligibility, and treat any adverse effects, as outlined in 36 CFR Part 800 following guidance developed by the National Park Service and in conformance with the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation 1983 (48 FR 44716, as amended) as enumerated below:

- To identify known locations of historic properties within the APE, review the records for previously recorded archaeological properties and historic architectural properties at MnSHPO and WisSHPO. Review previous survey technical reports conducted within the APE for historic contexts, bibliography, and determination of significance of sites. Review historic USGS maps. Review properties listed in the National Register of Historic Places and the respective State Registers of Historic Places.

- Review survey findings conducted by local governments, historical societies, or historic preservation organizations, local historic landmark or monument designations, and any other inventories that may help identify or establish the significance of historic properties.
- Review subdivision maps, assessor maps, county/city directories, utility records, building permits, photographs, newspapers, diaries/journals, architectural drawings, Agency Records, Residential- and Commercial-Building Records, oral histories, thesis/dissertations, and preferred local and credible history studies. Research should be conducted with the appropriate agencies, knowledgeable individuals, local and regional historical societies, archives, and libraries.
- Develop relevant historic themes and contexts for the identification and evaluation efforts of historic properties within the APE. Use National Register Bulletin No. 15 for guidance.
- Employ standard archaeological inventory methods. Conduct presence/absence testing, if necessary, in areas where subsurface remains may be present. For resources that cannot be avoided conduct test excavations to determine resource significance in accordance with the research design.
- Consult with interested Native American Tribe(s) and other cultural groups to identify and evaluate any potential TCPs and cultural landscapes that could be affected by the project following the methods outlined in the National Register Bulletin 38 and the Secretary of the Interior's Standards for the Treatment of Historic Properties, respectively.
- Perform an intensive survey to identify, record, and evaluate architectural properties adjacent to the proposed alignment, stations and support facilities built within the time period identified in the plan to document and inventory all historic buildings, structures, objects, districts, and cultural landscapes in sufficient detail to permit evaluation for the NRHP (per Section 106 of the NHPA). Use field maps at an appropriate scale that have delineated parcel boundaries, APE boundaries, Assessor Parcel Numbers (APNs), street names, prominent natural and man-made features, and previously recorded sites. Documentation and evaluation efforts will follow the guidelines of National Register Bulletin No. 15. Private spaces (i.e., building interiors), suburban backyards, and restricted areas will not be surveyed. Surveys will occur from public vantage points, and if access is infeasible, then the property will be evaluated solely on available information or right-of-entry will be coordinated by MnDOT.

TECHNICAL REPORTS

- After completion of the archaeological and historic architectural research, inventories and evaluations, and tribal consultations prepare reports to document the findings and identification effort, and if any historic properties are identified for an undertaking, prepare a report to analyze the effects of the undertaking. Technical reports will be submitted to MnSHPO for undertakings with the potential to affect historic properties in the State of Minnesota. Technical Reports will be submitted to WisSHPO for undertakings with the potential to affect historic properties in the State of Wisconsin. All submittals to MnSHPO and WisSHPO shall be in paper format

ATTACHMENT C

REQUESTS FOR TRIBAL CONSULTATION

Mr. Mike Wiggins, Jr., Chairperson
Bad River Band of Lake Superior
Chippewa

Ms. Edith Leoso, THPO
Bad River Band of Lake Superior
Chippewa Indians of Wisconsin

Mr. Kevin Leecy, Chairman
Bois Forte Reservation Tribal Council

Mr. Anthony Reider, President
Flandreau Santee Sioux

Ms. Karen Diver, Chairwoman
Fond du Lac Band of Lake Superior
Chippewa

Mr. Mike Alloway, Tribal Office
Forest County Potawatomi Community
of Wisconsin

Mr. A.T. Stafne, Tribal Chair
Fort Peck Tribes

Mr. Curley Youpee, Director
Cultural Resources Department
Fort Peck Tribes

Ms. Vicky Raske, THPO
Grand Portage Band of Chippewa
Indians

Mr. Norman Des Champe, Chairman
Grand Portage Band of Chippewa
Indians

Mr. Warren Swartz, President
Keweenaw Bay Indian Community

Mr. Gordon Thayer, Chairperson
Lac Courte Oreilles Band of Lake
Superior Chippewa Indians of Wisconsin

Mr. Jerry Smith, THPO
Lac Courte Oreilles Band of Lake
Superior Chippewa Indians of
Wisconsin

Mr. Tom Maulson, President
Lac du Flambeau Band of Lake Superior
Chippewa Indians of Wisconsin

Ms. Melinda Young, THPO
Lac du Flambeau Band of Lake Superior
Chippewa Indians of Wisconsin

Ms. giiwegiizhigookway Martin, THPO
Lac Vieux Desert Band
Ketegitigaaning Ojibwe Nation

Mr. Arthur LaRose, Chairman
Leech Lake Band of Ojibwe

Mr. Gabe Prescott, Chairman
Lower Sioux Indian Community

Mr. Dave Grignon, THPO
Menominee Indian Tribe of Wisconsin

Ms. Marge Anderson, Chief Executive
Mille Lacs Band of Ojibwe

Ms. NatalieWeyaus, THPO
Mille Lacs Band of Ojibwe

Mr. Leroy Spang, Chairperson
Northern Cheyenne Tribe

Ms. Victoria Winfrey, President
Prairie Island Community Council

Mr. Steve Ortiz, Chairman
Prairie Band Potawatomi Nation

Ms. Rose Gurnoe-Soulier, Chairperson
Red Cliff Band of Lake Superior
Chippewa Indians

Mr. Larry Balber, THPO
Red Cliff Band of Lake Superior
Chippewa Indians of Wisconsin

Mr. Floyd Jourdain Jr., Chairman
Red Lake Band of Chippewa Indians

Mr. Jonathan Buffalo, NAGPRA Rep.
Sac and Fox of the Mississippi in Iowa

Ms. Jane Nioce
Sac and Fox Nation of Missouri in
Kansas and Nebraska

Ms. Sandra Massey, NAGPRA Rep.
Sac and Fox Nation of Oklahoma

Mr. Roger Trudell, Chairperson
Santee Sioux Nation

Mr. Stanley Crooks, Chairperson
Shakopee Mdewakanton Sioux
Community

Mr. Robert Shepherd, Chairperson
Sisseton-Wahpeton Oyate of the Lake
Traverse Reservation

Cultural Resource Director
Sokaogon Chippewa Community
Mole Lake Band

Mr. Garland McGeshick, Chairman
Sokaogon Chippewa Mole Lake Band

Mr. Roger Yankton, Sr., Chairperson
Spirit Lake Tribe Nation

Waste'Win Young, THPO
Standing Rock Sioux Tribe

Mr. Stuart Bearheart, Chairman
St. Croix Chippewa Indians of Wisconsin

Wanda McFaggen, THPO
St. Croix Band Chippewa Indians of Wisconsin

Tex G. Hall, Chairman
Three Affiliated Tribes

Mr. Kade Farres, THPO
Turtle Mountain Band of Chippewa

Kevin Jensvold, Chairman
Upper Sioux Indian Community

Burney Tibbetts, Director of Transportation
White Earth Band of Minnesota Chippewa

Dr. Erma Vizenor, Chairwoman
White Earth Band of Minnesota Chippewa

Tom McCauley, THPO
White Earth Band of Minnesota Chippewa

Ms. Rosemary Berens, THPO
Bois Forte Band (Nett Lake) of the MN Chippewa Tribe

Mr. James B. "JB" Weston, THPO
Flandreau Santee Sioux

Mr. LeRoy DeFoe, THPO
Fond du Lac Band of Lake Superior Chippewa

Mr. Harold “Gus” Frank, Chairman
Forest County Potawatomi Community of Wisconsin

Ms. Summer Sky Cohen, THPO
Keweenaw Bay Indian Community

Ms. Gina M. Lemon, THPO
Leech Lake Band of Ojibwe

Mr. Anthony Morse, THPO
Lower Sioux Indian Community

Mr. Conrad Fisher, THPO
Northern Cheyenne Tribe

Mr. Richard Thomas, THPO
Santee Sioux Nation

Mr. Leonard Wabasha, Director
Cultural Resources Department
Shakopee Mdewakanton Sioux Community

Ms. Dianne Desrosiers, THPO
Sisseton-Wahpeton Oyate of the Lake Traverse Reservation

Mr. Charles W. Murphy, Chairman
Standing Rock Sioux Tribe

Mr. Elgin Crowsbreast, THPO
Three Affiliated Tribes

ATTACHMENT D

EXEMPTIONS FROM REVIEW FOR ROUTINE MAINTENANCE ACTIVITIES WITHIN THE NLX CORRIDOR

PURPOSE

Section 106 regulations require a "reasonable and good faith effort" to identify historic properties (36 CFR 800.4[b][1]). The procedures in this attachment concentrate BNSF's and FRA's efforts in the review of routine maintenance activities on those actions that may reasonably be anticipated to have potential effects to historic properties. This attachment defines categories of maintenance activities that do not warrant review unless deemed otherwise in the professional judgment of PIs. Exempted properties do not require documentation:

1. Maintenance of railroad structures within a Historic District where no substantial ground disturbance is required <u>and</u> the affected structures are:

    a. Not individually listed or eligible for individual listing in the National Register of Historic Places (NRHP); or
    b. Have not been determined to be a contributing resource to a National Register listed or eligible Historic District.

2. Replacement of ties or rail where there are no changes in vertical or horizontal geometry.

3. Repointing of masonry joints in bridges, culverts, or buildings where the color, texture, aggregate of the grout and the rake of the joint matches the existing and the buildings or structures are not individually listed or eligible for listing on the NRHP and have not been determined to be a contributing resource to a listed or eligible NRHP district.

4. Replacement of existing security cameras on or adjacent to historic properties where no substantial visual alterations to the building or structure result from the replacement.

NORTHERN LIGHTS EXPRESS PROJECT
AREA OF POTENTIAL EFFECT RATIONALE

Prepared by: The 106 Group Ltd.
October 25, 2011
Updated: February 27, 2012

The Northern Lights Express (NLX) project is a proposed high-speed passenger railroad from the Twin Cities to the Duluth/Superior area. The proposed project is receiving funding from the Federal Railroad Administration (FRA); therefore, it must comply with the National Environmental Policy Act; Section 106 of the National Historic Preservation Act of 1966, as amended; and with other applicable federal and state mandates such as the Minnesota Historic Sites Act, Minnesota Private Cemeteries Act, and the Wisconsin Burial Sites Preservation Law. The purpose of this document is to conduct preliminary analysis concerning the potential effects the NLX project may have on historic resources and develop a rationale to assist the federal and state agencies in developing an appropriate area of potential effect (APE) for this project (see attached maps for current APE).

The construction and operation of the proposed NLX project will result in a variety of potential effects to historic properties; therefore, for the development of an APE, potential effects from various possible construction and operation activities were examined. A preferred alternative, Route No. 9, has been chosen for the NLX project and approved by the FRA. The route follows the existing Burlington Northern Santa Fe (BNSF) Railway from Minneapolis (MTI) northeast to Duluth (Depot). This rail line represents the only railroad connection currently in full active service between Minneapolis and Duluth/Superior. The corridor roughly parallels State Highways 65 and 23 through Hennepin, Anoka, Isanti, Pine, Carlton, Douglas (Wisconsin), and St. Louis counties and terminates in Duluth.

This route will utilize portions of six historic railroad corridors. These existing railroad lines contain intact tracks that will be upgraded from a class 3 to a class 5 line. FRA's track safety standards establish nine specific classes of track (Class 1 to Class 9). The difference between each Class of Track is based on progressively more exacting standards for track structure, geometry, and inspection frequency. Each Class of Track has a corresponding maximum allowable operating speed for both freight and passenger trains. The higher the Class of Track, the greater the allowable track speed and the more stringent track safety standards apply. The maximum allowable speed for passenger trains is 60 mph for a Class 3 track and 90 mph for a Class 5 track. The upgrades to a Class 5 line can be accomplished through tie replacement and ballast improvements, which can be done as maintenance on these line utilizing tie replacement trains and ballast placement trains. All work will be performed from the track and will have no impacts outside the existing track bed (FRA 2008).

For this project, the project area is defined as the proposed construction footprint, which can be bigger or smaller than the existing right-of-way (ROW) depending on the nature of the proposed improvements for the project. In addition, the proposed preferred alignment includes construction of new parallel track, new bridges associated with new parallel track, and improving/upgrading existing bridges. Therefore, the activities examined in developing the APE include the following:

- New track parallel to existing track (e.g., sidings and second mainlines with both tracks operational);
- New bridge associated with new parallel track;
- Replacing an existing bridge/underpass;
- Improving/upgrading an existing bridge;
- Using an existing alignment (possible replacement of existing rails, etc.); and
- Operation of the line.

Discussion of the potential effects to specific resources types are described below.

ARCHAEOLOGY

For the proposed NLX project, the APE for archaeology will include all areas of proposed construction activities or other potential ground disturbing activities associated with the project, including equipment storage areas and borrow areas. For construction of the railroad corridor itself, it is assumed that the construction footprint will not extend beyond the existing railroad ROW and that the only construction activity that may be located outside existing ROW may be borrow areas or equipment storage areas, if required; however, the location of borrow areas and storage/laydown areas is currently unknown and environmental review of these areas will be completed at a later date.

It is assumed that any modification to the existing railroad grade or to transition to a new alignment (i.e., adding new parallel track) will not extend below the existing railroad grade. Therefore, unknown archaeological sites that may be located below the existing railroad grade will not be impacted and survey of the existing railroad grade will not be required. If Native American burials are known to exist below existing grade or within the larger APE then the project will need to comply with Minnesota Private Cemeteries Act, 1975 (M.S. 307.08) or the Wisconsin Burial Sites Preservation Law (Wis. Stats. 157.70) and the specific situation will be addressed as part of consultation obligations under Section 106 of the National Historic Preservation Act.

The design of the proposed NLX project is continuing to be refined. As the design of the project progresses, if any of the assumptions above should change, then the proposed APE rationale would need to be adjusted accordingly.

ARCHITECTURAL HISTORY

For the proposed NLX project, the APE for architectural history needs to account for any physical, auditory, atmospheric, or visual impacts to historic properties. The potential effects from each component of the proposed project are different and, therefore, a different APE may be needed. The proposed project components are still being refined so the purpose of this discussion is to detail the APE associated with each component, which will then be combined into one APE based on the nature of the components proposed.

The types of effects anticipated may include direct physical and/or vibratory effects, as well as potential indirect visual, auditory, and atmospheric effects. Effects may be temporary or permanent. To aid in identifying the potential effects the proposed elements of the project may have on architectural history properties in order to define an appropriate APE for architectural history, the following was assumed based on current project information:

- Construction of the project will not exceed a time period of five years;
- Construction along the project corridor will generally be intermittent and not continuous at any one point along the corridor for the duration of construction;
- Construction activity will be limited to daytime hours, generally between 6:00 a.m. and 6:00 p.m., when higher noise levels are more acceptable;
- The construction and operation of depots (stations) and other facilities such as parking lots will be included in a separate National Environmental Policy Act (NEPA) process;
- The centerline of any new parallel track will be, at most, 30 feet (ft.) off-set from the centerline of the existing railroad track within a corridor;
- According to the *Minneapolis-Duluth/Superior Restoration of Intercity Passenger Rail Service Comprehensive Feasibility Study and Business Plan (December 2007)* by Transportation Economics & Management System, Inc. the number of freight trains that currently operate along the railroad corridors (Route No. 9) with active tracks range from 12 to 60 trains per day. A portion of one corridor also sees two intercity passenger trains per day. The maximum number of high-speed passenger trains (HSTs) that are proposed to be operated daily along the potential railroad corridors is eight, which would increase the number of trains along the active lines (Route No. 9) by 7 to 25 percent per day. If project assumptions change, portions of this APE rationale may need to be revisited and potentially revised;
- The length of the proposed passenger trains will generally be much shorter than the freight trains that are currently operated along the proposed corridors with active tracks. According to the *Minneapolis-Duluth/Superior Restoration of Intercity Passenger Rail Service Comprehensive Feasibility Study and Business Plan* the proposed passenger trains will not exceed 600 ft. in length, whereas the freight trains that currently operate along the active corridors generally range from several hundred ft. to over one mile (mi) in length;
- The proposed passenger trains will be considerably lighter than freight trains and will therefore produce considerably less vibrations than freight trains and for shorter durations given their shorter lengths and higher speeds; and
- Except for the noise produced by the horns on the locomotives, which will be the same as freight trains, the proposed passenger trains will generally produce less noise and for shorter durations in a location compared to a freight train since they will have fewer locomotives and cars, less weight, better tracking, and will be shorter in length and operating at higher speeds.
- The proposed HSTs will travel at speeds of up to 110 miles per hour (mph), which is much faster than a freight train, so they will have a higher onset rate (approach rate due to their much higher speed) compared to freight trains that currently utilize the proposed NLX route.

The proposed project would traverse a wide array of areas, ranging from densely developed urban areas, to small towns, to open prairie and farmland, to forested areas. Similarly, the topography along the line will also vary from flatlands to rolling hills. Given the diversity of these areas and their respective conditions, the APE may need to vary, depending on the actual circumstances of a place and the activity proposed for that particular location. The following sections will describe a rationale for the development of an APE for each anticipated construction or operation activity, as detailed earlier in this document. Since the design of the project is still being refined, the discussion will generally focus on identifying the maximum limits of an APE, rather than a minimum which would need to be increased in places to address unique conditions. There may be locations where conditions may allow for a reduced APE from the maximum described below (e.g. more dense vegetation reducing visibility); however, this will be confirmed based on visual inspection of the viewshed during field survey.

New Track Parallel to an Existing Track

This action would entail laying new track(s) parallel to existing tracks within an existing railroad ROW (operation of the line is discussed under the heading: *Operation of the Line*). This alternative could potentially result in both temporary and permanent indirect and direct effects.

Temporary indirect effects would include increases in noise and dust during the construction of the new tracks. Noise associated with the construction of a new parallel track within the existing ROW would include noise from construction activities, and from increased vehicular traffic to deliver, load, and unload construction materials. While the exact dB levels associated with construction activities has not been determined, based on other similar projects, it is not anticipated that dB levels associated with construction of a new parallel track within an existing alignment will exceed acceptable levels as established by the State of Minnesota in areas more than 500 ft. on either side of the project area.

Construction of new parallel tracks would also result in temporary increases in dust and particulate matter associated with earthmoving activity, loading and unloading of materials, earth, and ballast dumping and storage. Dust levels in the air would be intermittent and would vary according to construction activity and atmospheric conditions. Any potential increase in dust associated with construction of parallel track within an existing alignment would be temporary and amounts generated would not likely be any greater than dust generated by wind storms in rural areas. In urban areas, the existing built environment (e.g. buildings and structures) would block and disrupt winds and further dissipate any dust generated during construction. Therefore, the area that could potentially be adversely affected by increases in dust should be limited to no more 500 ft. and effects, if any, would be temporary.

Permanent effects would include direct physical and/or vibratory effects and potential indirect visual effects to the corridor and other historic properties as a result of changes to the existing corridor. Direct physical effects would be limited to the project area and alterations to the existing roadbed. Vibrations associated with new track(s) parallel to existing tracks within an existing railroad ROW could include vibrations from ground disturbing activity and from trucks, heavy equipment, rail-based equipment, and from the loading and unloading of materials in the project area. Vibrations from such activities would most likely be minimal and would not likely impact an area more than 500 ft. from the project area. Therefore, an APE of 500 ft. on either side of the project area would be sufficient to address vibrations associated with the construction of new track(s) parallel to existing tracks within an existing railroad ROW.

Permanent indirect visual effects may vary; however, provided that the grades, elevations, and profiles of the parallel track are similar to the existing roadbed in the corridor, the construction of a parallel track within an existing ROW would have a relatively minor affect on the visual character of the corridor, especially in relatively flat areas where the alignment cannot be viewed from above. As a result, the area that would be visually affected would be somewhat limited. Since the track will be placed parallel to the existing track offset no more than 30 ft. from the existing, and it is assumed that the height, grades, and profile of the new parallel track are not significantly different from the existing roadbed (e.g. height of the new and rebuilt roadbed is not changed more than a 2.5 ft. from the height of the existing roadbed), based on other railroad projects in Minnesota, an APE of 500 ft. on either side of the project area would be sufficient to account for potential visual effects.

However, if grades, cuts, and fills are modified, the associated changes in these elements of the existing corridor may alter, and increase the visual prominence of the corridor and would thereby impact a larger area. If the construction of a parallel track results in height and profile differences between the existing roadbed that exceeds 5 to 10 ft., depending on the location and terrain of the area (10 ft. in hilly and/or heavily forested areas and 5 ft. in generally flat and/or open areas), a larger APE would be required to account for the increased visual effect. In these instances, an APE of 0.125 (one-eighth) mi (660 feet) is recommended to account for changes to views of the corridor and the landscape.

In summary, the APE for laying new track(s) parallel to existing tracks should include 500 ft. on either side of the project area, assuming that the grade change of the new alignment is within 2.5 ft. of the height of the existing track. If the proposed alignment will have a grade change more than 2.5 ft. from the height of the existing track, an APE of 0.125 mi around the project area is recommended.

New Bridge Associated with New Parallel Track

This action would entail the construction of a new bridge(s) associated with a new parallel track(s) located adjacent to existing bridges within an existing railroad ROW. This alternative could potentially result in both temporary and permanent indirect and direct effects.

Temporary indirect effects would include increases in noise and dust during the construction of the proposed bridge. Noise associated with bridge construction would include noise from construction activities, increased vehicular traffic bringing materials to the site, loading and unloading construction materials, and potentially pile driving. While the exact dB levels associated with construction activities has not been determined, based on other similar projects, it is not anticipated that dB levels associated with construction of a new bridge will exceed acceptable levels as established by the State of Minnesota in areas more than 0.125 mi from the project area.

Construction of a new bridge would result in temporary increases in dust and particulate matter associated with earthmoving activity, loading and unloading materials, and storage of construction materials and equipment. Dust levels in the air would be intermittent and vary according to atmospheric conditions; however, the level of dust in the air would disperse as distance from the project area increased. Therefore, the area that could potentially be adversely affected by increases in dust should be limited to no more than 0.125 mi from the project area.

Permanent effects would include potential direct effects from vibrations and indirect visual effects to the corridor and other historic properties as a result of changes to the existing corridor. Vibrations associated with new bridge construction could include vibrations from rail-based equipment, trucks and heavy equipment, and from loading and unloading materials. Vibrations from such activities would most likely be minimal and would not likely impact an area more than 500 ft. from the project area. However, pile driving associated with new bridge construction would result in greater vibrations that would have a wider area of impact.

Vibrations from pile driving can result in two types of potential effects: (a) real damage to property and (b) perception by humans (Transportation Research Board [TRB] 1997:1). For the development of an APE for architectural history properties related to the construction of the proposed NLX line, the primary consideration is real damage to historic properties as a result of vibrations, which can take the form of structural damage, including cracking and breaking of structural elements or ground settlement. Structural damage from impact driving can be minimized or eliminated by alternatives such as vibratory driving, or changing to auger cast (TRB 1997:1). However, for the development of an architectural APE for pile driving, it was assumed that the project will utilize impact driving.

A number of studies have been conducted on the impacts of vibrations and pile installations on adjacent structures, including historic buildings. Studies have been done to determine (a) the maximum safe limits of vibrations that will not result in damage to adjacent structures, including historic buildings, during construction projects, and (b) the area of influence for pile driving that falls within these maximum acceptable vibration limits. Many agencies have established maximum safe limits for vibrations as described below.

Based on its own studies, the non-extant U.S. Bureau of Mines recommended a "safe blasting limit" of 50 millimeters(mm)/second (sec) (2 inches[in]/sec) peak particle velocity (ppv) for mining activity (CTC & Associates and WisDOT RTD Program 2003:2). Given the many inherent similarities in terms of ground-borne vibrations between blasting and pile driving, over time, this maximum limit has also been commonly applied to construction vibration and is widely viewed by many engineers as being stringent enough to prevent damage to most surrounding structures, regardless of age or fragility (CTC & Associates and WisDOT RTD Program 2003:2).

While 50 mm/sec (2 in/sec) is a commonly used, a number of federal agencies and state transportation departments across the country have established significantly lower (more conservative) thresholds for projects subject to their oversight. The National Park Service (NPS) for example has set a maximum limit of 0.2 in/sec (5 mm/sec) ppv for structures that exhibit significant levels of historic architectural importance, or that are in a poor or deteriorated state of maintenance, which is one tenth of 50 mm/sec, and a slightly higher limit of 0.5 in/sec (12 mm/sec) ppv for all other historic sites (Sedovic 1984:59). The Federal Transit Administration (FTA) has established criteria for assessing potential vibration damage to structures based on the type of building construction (Table 1) (FTA 2006).

FIGURE 1. FTA CONSTRUCTION VIBRATION DAMAGE CRITERIA

Building Category	Maximum PPV
I. Reinforced-concrete, steel or timber (no plaster)	0.5 in/sec (12 mm/sec)
II. Engineered concrete and masonry (no plaster)	0.3 in/sec (7 mm/sec)
III. Non-engineered timber and masonry buildings	0.2 in/sec (5 mm/sec)
IV. Buildings extremely susceptible to vibration damage	0.12 in/sec (3 mm/sec)

A number of state departments of transportation have also established standards for projects they build or fund. For example, the California Department of Transportation (Caltrans) has set an "architectural damage risk level" for continuous vibrations (peak vertical particle velocity of 5 mm/sec (0.2 in/sec). For ruins, ancient monuments, and historical buildings and structures in poor condition, Caltrans recommends an even lower upper limit of 2 mm/sec (0.08 in/sec) for continuous vibrations (CTC & Associates and WisDOT RTD Program 2003:2).

Given the geographic area the proposed NLX line will traverse and its developmental history, it is highly probable that a significant percentage of the architectural history resources along the proposed NLX project corridor are non-engineered timber and masonry buildings that are also likely to contain plaster. Since these types of structures are more susceptible to damage from vibrations than engineered and reinforced structures, it is recommended that the APE for architectural history include all areas subject to a ppv of 5 mm/sec (0.2 in/sec) or greater as a result of vibrations related to construction activity, including pile driving to encompass the greatest range of potential vibration impacts to historic structures. This number corresponds with both (a) the NPS's recommended maximum for both deteriorated historic resources and resources with architectural significance, and (b) the FTA's standard for non-engineered timber and masonry buildings. However, in the event that the architectural history survey for the proposed project identifies extremely deteriorated, highly fragile architectural history properties that are eligible for the National Register of Historic Places, it is recommended that a vibration study be completed for these resources and attempts made to limit vibrations in these isolated locations to 3 mm/sec (0.12 in/sec).

When looking at the correlation between distance from the point of impact of pile driving and the potential for damaged to adjacent structures, according to the TRB, experience has shown that "direct damage to structures is not likely to occur at a distance from the pile of (a) more than 15 meters for piles 15 meters long or less, or (b) one pile length for piles longer than 15 meters" (TRB 1997:1). However, the TRB does note that "in few cases has there been direct damage to a structure when the pile driving was done at a distance of at least one pile length from the target (TRB 1997:43). The main exception to the one pile length distance "rule of thumb" guideline is typically related to the settlement of soils densified by vibrations, resulting in settlement that can take place at distances greater than one pile length (TRB 1997:43). To account for the potential presence of loose, clean sands in the zone of influence, the TRB recommends using a zone of influence of up to 400 meters from the pile driving. This distance translates to 1,312.34 ft., or approximately 0.25 mi.

Based on this analysis, it is recommended that an APE of 0.25 mi from the project area be used to account for all potential types of vibrations associated with bridge construction. In areas with sound soil, where a soil survey confirms there is no soil prone to settlement, the APE to account for impacts to architectural resources can be reduced to the length of the longest pile used in this particular area.

Permanent indirect visual effects may vary; however, it is assumed that if the new bridge(s) will be of a similar type, scale, height, and proportion, and constructed of similar materials as the existing parallel bridge, although the new bridge(s) may be visible from some distance, the area that would be significantly affected visually would be somewhat limited. Therefore, an APE of 0.125 mi is recommended. If the design of the new bridge(s) will be out of scale and proportion from the existing parallel bridge(s) and/or is a significantly different type, or constructed of different materials, its visual prominence would affect a larger area and a larger APE may be required.

In summary, the APE for the construction of a new bridge(s) associated with a new parallel track(s) located parallel to existing bridges within an existing railroad ROW assumes that the proposed bridge(s) would be of similar type, design, scale, height, and proportion and constructed of similar materials as the existing parallel bridge(s). Therefore, the APE should include a 0.25 mi buffer around the project area to account for all potential visual effects, as well as account for potential effects to historic properties from potential vibrations related to pile driving during construction.

Specific details relating to the construction of new bridges are still being developed and if the design for a proposed new bridge(s) is not of a similar type, scale, height, and proportion, or constructed of similar materials as the existing parallel bridge, a larger APE may be required to account for potential increased indirect visual effects.

Replacing an Existing Bridge/Underpass

This action would entail removal of an existing bridge or underpass and replacing it with a newly constructed bridge or underpass. This alternative would result in both temporary and permanent direct and indirect effects.

Temporary indirect effects would include increases in noise and dust during the construction of the proposed bridge/underpass. Noise associated with bridge/underpass replacement would include noise from demolition and construction activities, increased vehicular traffic bringing materials to the site, and loading and unloading construction materials. While the exact dB levels associated with replacing an existing bridge/underpass has not been determined, based on other similar projects, it is not anticipated that dB levels associated with construction of a replacement bridge/underpass will exceed acceptable levels as established by the State of Minnesota in areas more than 0.125 mi from the project area.

The demolition of the existing bridge/underpass and the construction of a new bridge/underpass would result in temporary increases in dust and particulate matter associated with earthmoving activity, loading and unloading materials, and storage of construction materials and equipment. Dust levels in the air would be intermittent and vary according to atmospheric conditions; however, the level of dust in the air would disperse as distance from the project area increased. Therefore, the area that could potentially be adversely affected by increases in dust should be limited to no more than 0.125 mi from the project area.

Permanent effects would include direct physical effects to the existing bridge/underpass due to its removal and to the existing corridor and railroad roadbed, as well as direct vibratory effects to the corridor and other historic properties as a result of changes to the existing corridor. Vibrations associated with replacement bridge/underpass construction could include vibrations from rail-based equipment, trucks, heavy equipment, and from loading and unloading materials, which based on similar projects would be limited to an area 500 ft. from the project area. The demolition of the existing bridge/underpass would result in greater vibrations that would have a wider area of impact; an APE of 0.125 mi from the project area for this action is therefore recommended. However, as indicated in the section above for new bridges, pile driving associated with new bridge/underpass construction would result in greater vibrations that would impact a wider area; therefore, if pile driving is required for construction of the replacement bridge/underpass, an APE of 0.25 mi from the project area is recommended to account for all potential types of vibrations associated with bridge construction.

Permanent effects would also include permanent indirect visual effects; however, the area affected may vary. It is assumed that any replacement bridge will be constructed along the same alignment as the existing bridge and will be of a similar type, scale and design, and utilizes similar materials as the existing bridge and, therefore, the area that would be significantly affected visually would be somewhat limited. Based on similar projects, an APE of 0.125 mi is recommended. However, where a new design is used, its visual prominence could potentially affect a larger area and in these instances a larger APE may be required to account for potential increased indirect visual effects.

In summary, the APE for the removal and replacement of an existing bridge/underpass with a new bridge/underpass within an existing railroad ROW, provided the new bridge/underpass is of a similar type, scale and design and utilizes similar materials as the existing bridge/underpass, should include a 0.25 mi buffer around the project area to account for all potential direct and indirect effects. Specific details relating to the construction of new bridges are still being developed and if a new design is used for the replacement bridge/underpass, a larger APE may be required to account for potential additional indirect visual effects.

Improving/Upgrading an Existing Bridge

This action would entail improvements and upgrades to existing bridge(s) within a railroad corridor. This alternative could potentially result in both temporary and permanent indirect and direct effects.

Temporary indirect effects would include increases in noise and dust during the construction of the proposed project. Noise associated with bridge improvement/upgrades would include increased noise from construction activities, increased vehicular traffic bringing materials to the site, loading and unloading construction materials, and potentially pile driving. While the exact dB levels associated with construction activities has not been determined, based on other similar projects, it is not anticipated that dB levels associated with bridge improvements/upgrades will exceed acceptable levels as established by the State of Minnesota in areas more than 0.125 mi from the project area.

Improving/upgrading a bridge would also result in temporary increases in dust and particulate matter associated with earthmoving activity, loading and unloading materials, and storage of construction materials and equipment. Dust levels in the air would be intermittent and vary according to atmospheric conditions; however, the level of dust in the air would disperse as distance from the project area increased. Since the proposed improvements will not include pier adjustments or pile driving, the area that could potentially be adversely affected by increases in dust should be limited to no more than 0.125 mi from the project area.

Permanent effects would include direct physical effects to the railroad corridor and the improved/upgraded bridge(s) and potential direct vibratory and indirect visual effects to the corridor and other historic properties as a result of changes to the existing corridor. According to information provided by SRF in March 2011, physical changes to the existing bridge(s) within the corridor will not include alterations to the approaches, abutments, cuts, the bridge piers, or to the railroad roadbed. In addition, it is assumed that any changes to the bridge spans will allow the bridges to maintain their appearance and retain a similar type, scale, height, proportion, and materials. Therefore, direct physical effects would be limited to the project area. Vibrations associated with bridge improvements/upgrades could include vibrations from trucks, heavy equipment, rail-based equipment, and from the loading and unloading of materials in the project area. Vibrations from such activities would most likely be minimal and would not likely impact an area more than 500 ft. from the project area. However, if pile driving is associated with bridge improvement/upgrades, vibrations from it could potentially result in greater vibrations and impact a wider area than other construction activities. According to information provided SRF in March 2011, proposed bridge improvements would not require significant pier adjustments, if any, and no pile driving is anticipated; therefore, an APE of 500 ft. on either side of the project area is recommended to account for all vibratory effects.

Indirect visual effects may vary; however, it is assumed that the improvements/upgrades to the bridge(s) will allow the bridge to maintain its appearance and retain a similar type, scale, height, proportion, and materials. Therefore, although the improved/upgraded bridge(s) may be visible from some distance in certain locations, the area that would be significantly affected visually would be somewhat limited. In this case an APE of 0.125 mi would be recommended, assuming that the improvements/upgrades to the bridge(s) are in scale and proportion and material types to the existing bridge(s). If the proposed improvements/upgrades include replacement spans that will be of a different type, design, scale, materials, or proportions that the existing spans, a larger APE may be required.

In summary, the APE for improvements and upgrades to existing bridge(s) within a railroad corridor should include a 0.125 mi buffer around the project area, and assumes the existing spans will be improved/upgraded with in-kind materials that would be consistent with the existing bridge(s). If the proposed improvements/upgrades include replacement spans that will be of a different type, design, scale, materials, or proportions that the existing spans, a larger APE may be required.

Using an Existing Alignment

This action would entail utilizing existing tracks along an existing railroad corridor (operation of the line is discussed under the heading: *Operation of the Line*). According to information provided by SRF in March and August 2011, the existing railroad lines contain intact tracks that will be upgraded from a class 3 to a class 5 line. The upgrades can be accomplished through tie replacement and ballast improvements, which can be done as part of line maintenance, utilizing tie replacement trains and ballast placement trains. All work will be performed from the track and would have no impacts outside the existing track bed will be required. This alternative may result in both temporary and permanent direct effects.

Temporary indirect effects would include increases in noise and dust during potential replacement or improvement of existing tracks. Noise associated with potential new tracks may include noise from construction activities; however, since the upgrades will be accomplished using tie and ballast replacement trains, noise effects associated with delivering, loading, and unloading construction materials should be minimal. While the exact dB levels associated with construction activities has not been determined, based on other similar projects, it is not anticipated that dB levels associated with construction of a new tracks on an existing alignment will exceed acceptable levels as established by the State of Minnesota in areas more than 500 ft. from the project area.

The use of an existing alignment may result in temporary increases in dust and particulate matter associated with earthmoving activity, loading and unloading of materials. Dust levels in the air associated with this potential activity would be intermittent and would vary depending upon atmospheric conditions; however, the level of dust in the air would disperse as distance from the project area increased. Since the repair/replacement of existing tracks will be completed using tie and ballast replacement trains from the existing rail corridor and no changes to grade profiles is proposed, the area that could potentially be adversely affected by increases in dust should be limited to no more than 500 ft. from the project area.

According to information provided by SRF in March and August 2011, the proposed upgrade of the existing alignment will not include any changes to the existing grade or height and profile of the existing track; therefore, permanent visual effects should be relatively minimal and, based on other railroad projects in Minnesota, should be confined to an area within 500 ft. of the project area.

Permanent vibratory effects associated with repair or replacement of existing tracks could include vibrations from ground disturbing activity and from rail-based equipment loading and unloading materials in the project area. Vibrations from such activities would most likely be minimal and would not likely impact an area more than 500 ft. from the project area. Given the potential range of vibrations, an APE of 500 ft. on either side of the project area would be sufficient to address vibrations associated with the repair or replacement of existing tracks.

In summary, the APE for utilizing existing tracks along an existing railroad corridor should include a 500 foot buffer on either side of the project area.

Operation of the Line

Operation of the line could potentially result in permanent direct and indirect effects to historic properties. Potential permanent direct effects associated with an increase in vibrations from the trains and associated vehicular traffic include impacts to historic properties that could potentially result in their structural degradation and compromise overtime. However, as stated in the assumptions section, the vibrations caused from the operation of high-speed passenger trains, which will have fewer cars and will be lighter in weight, will be less than the existing freight trains. While the operation of the proposed line will result in increases of train traffic and a slight increase in the frequency of train vibrations, the overall increases will be minimal.

Permanent indirect effects associated with operation of the line include noise due to increased train traffic, and increased vehicular traffic associated with the trains. Additional noise resulting from individual trains (operation and horns), and associated noise such as crossing signals may also potentially result in permanent indirect effects. Noise is typically defined as unwanted or undesirable sound, where sound is characterized by small air pressure fluctuations above and below the atmospheric pressure. The basic parameters of environmental noise that affect human response are (1) intensity or level, (2) frequency content and (3) variation with time (Johnson et al. 2011).

Several federal and state agencies have developed standards for evaluating noise impacts; however, since this project is subject to FRA approval, its criteria were used to determine an APE for noise. The FRA has established allowable noise levels for trains and train horns. The maximum allowed noise level for locomotives manufactured after December 31, 1979 and for moving trains is 90 decibels (dB) (FRA 2000). The minimum noise level for train horns is 96 dB and the maximum is 110 dB (FRA n.d.). As traditional diesel powered train sets, the HSTs will need to adhere to these standards. As noted in the assumptions section, the HSTs will be shorter, lighter and faster than the freight trains that currently utilize the line, so noise from their movement typically will not be greater than existing higher speed freight trains on the proposed line. However, a noise and vibration impact study for the proposed project prepared by Harris Miller Miller & Hanson (HMM&M) in April 2011, notes that an important characteristic of the noise from HSTs is the onset rate of the sound signature, which is the average rate of change of increasing sound pressure level in decibels per second (dB/sec) during a single noise event (Johnson et al. 2011:2). The rapid approach of a HST

> Is accompanied by a sudden increase in noise for a receiver near the tracks. Sounds that have faster onset rates can cause more annoyance than sounds with slower variation or steady noise with the same noise level. The relationship between speed and distance defines locations where the onset rate for high-speed train operations may cause surprise or startle (Johnson et al. 2011:2-3).

According to the study, the maximum speed of the HSTs along the NLX corridor is 110 mph. Based on this speed, the area for potential for surprise or "startle" includes all areas within 22 ft. of the track centerline (Johnson et al. 2011:3).

This study also looked at overall noise impacts using the FRA's criteria, which are "based on well-documented research on community reaction to noise and are based on change in noise exposure using a sliding scale" (Johnson et al. 2011). The FRA criteria rely on the noise sensitivity levels of different land uses to determine impacts (Table 2). FRA criteria also include two levels of impact: severe impact and moderate impact. A severe impact is when project-generated noise is expected to cause a significant percentage of people to be highly annoyed by the new noise and normally requires mitigation. A moderate impact is when the change in the cumulative noise level is noticeable to most people, but may not be sufficient to cause strong, adverse reactions from the community. In these areas mitigation may or may not be required, depending on other factors, including existing noise levels, predicted level of increase over existing noise levels, the types and numbers of noise-sensitive land uses affected, the noise sensitivity of the properties, the effectiveness of the mitigation measures, community views and the cost of mitigating noise to more acceptable levels (Johnson et al. 2011:6-7).

TABLE 1. LAND USE CATEGORIES AND METRICS FOR HST NOISE IMPACT CRITERIA

Land Use Category	Description of Land Use Category
1	Tracts of land where quiet is an essential element in their intended purpose. This category includes lands set aside for serenity and quiet, and such land uses as outdoor amphitheaters and concert pavilions, as well as National Historic Landmarks with significant outdoor use.
2	Residences and buildings where people normally sleep. This category includes homes, hospitals and hotels where a nighttime sensitivity to noise is assumed to be of utmost importance.
3	Institutional land uses with primarily daytime and evening use. This category includes schools, libraries and churches where it is important to avoid interference with such activities as speech, meditation and concentration on reading material. Buildings with interior spaces where quiet is important, such as medical offices, conference rooms, recording studios and concert halls fall into this category, as well as places for meditation or study associated with cemeteries, monuments and museums. Certain historical sites, parks and recreational facilities are also included.
Source: Johnson et al. 2011, from Federal Railroad Administration, 2005	

Using FRA criteria, the HMM&M study assessed the overall impacts from HST noise using a "source-path-receiver" framework where the "source" generates noise levels that depends on the type of source (e.g., HSTs) and its operating characteristics (e.g., speed), the "receiver" is the noise-sensitive land use (e.g., a house or school) exposed to noise from the source, and the "path" between the source and the receiver is where the noise is reduced by distance, intervening buildings and topography (Johnson et al. 2011). During the study representative sites in sensitive land use areas along the proposed NLX line were monitored to (a) characterize existing baseline noise conditions and (b) determine the level of impact from the proposed project. Monitoring sites ranged from 10 ft. to 474 ft. from the proposed NLX tracks (Johnson et al. 2011). While the study did not specifically look at historic properties, it identified a total of 61 severe noise impacts and 289 moderate noise impacts to sites up to 459 ft. from the proposed NLX tracks (Johnson et al. 1011). Based on this study, at a minimum, the APE should include areas within 459 ft. of the centerlines of the proposed NLX tracks. However, since this study did not specifically consider impacts to historic properties where lower noise levels may be important aspects of their significance and historic integrity, a slightly larger APE is recommended. Therefore, an APE of 500 ft. on either side of the project area is recommended to account for potential impacts from noise related to operation of HSTs to architectural history resources.

In summary, the operation of the line would be a compatible use with the historical and current function of the area and associated rail corridors. Therefore, the APE for operation of the line, separate from the associated new construction, is recommended as 500 ft. on either side of the project area.

Other Associated Features
As noted previously the construction and operation of the proposed line would necessitate the construction of additional facilities such as repair and maintenance buildings; passenger stations; ticket booths; and parking lots. The construction of these associated facilities and their potential effect(s) will be addressed through a separate NEPA process.

Traditional Cultural Properties
Traditional cultural properties will have their own APE, which will need to be determined by FRA in consultation with Federally recognized Native American tribes.

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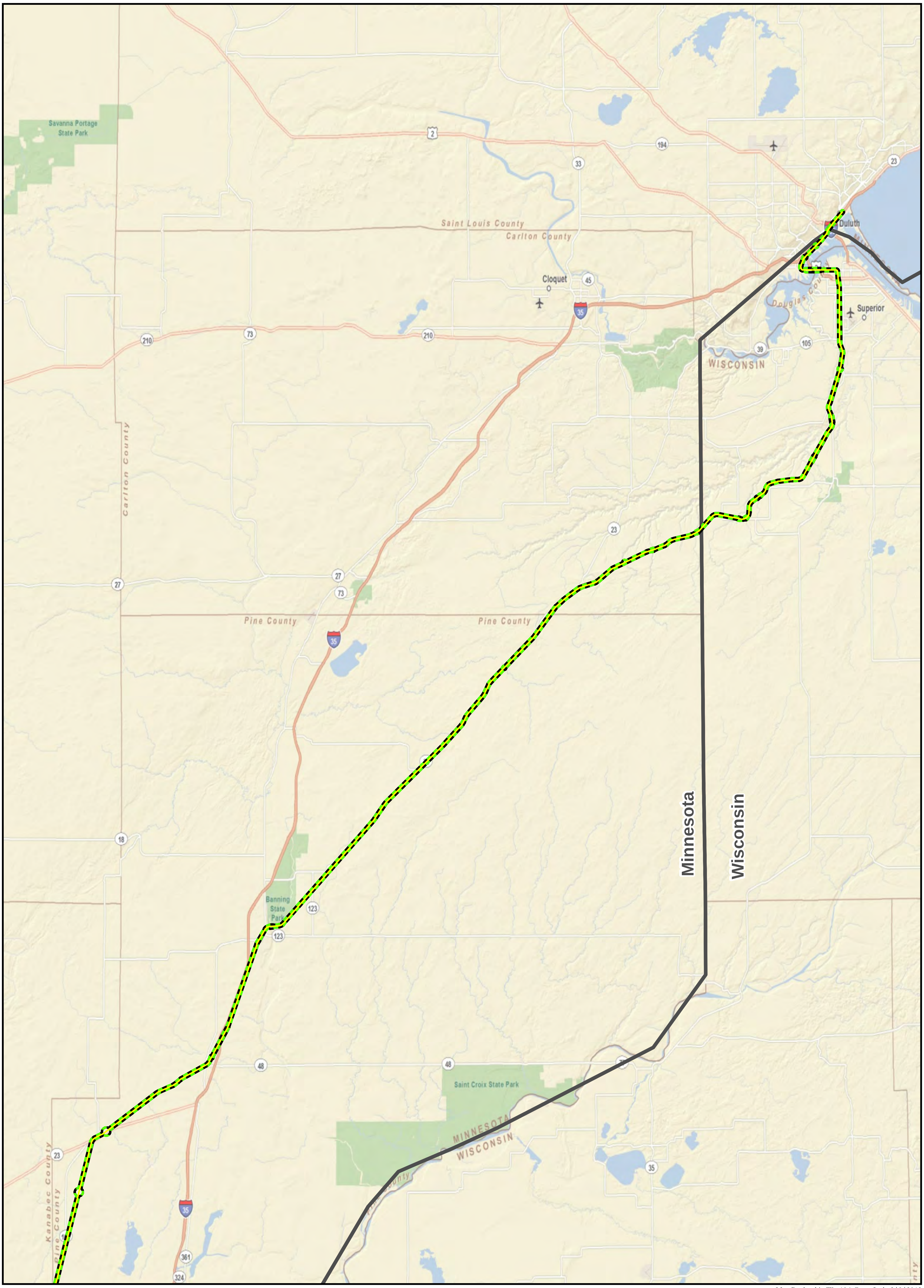


Source: USGS 1:250,000-scale series; ESRI; The 106 Group Ltd.

Map Produced by The 106 Group Ltd: 2/9/2012

Northern Lights Express
Phase I Architectural History Survey
Minnesota and Wisconsin

Project Overview

Proposed Northern Lights Express Line
Architectural History APE

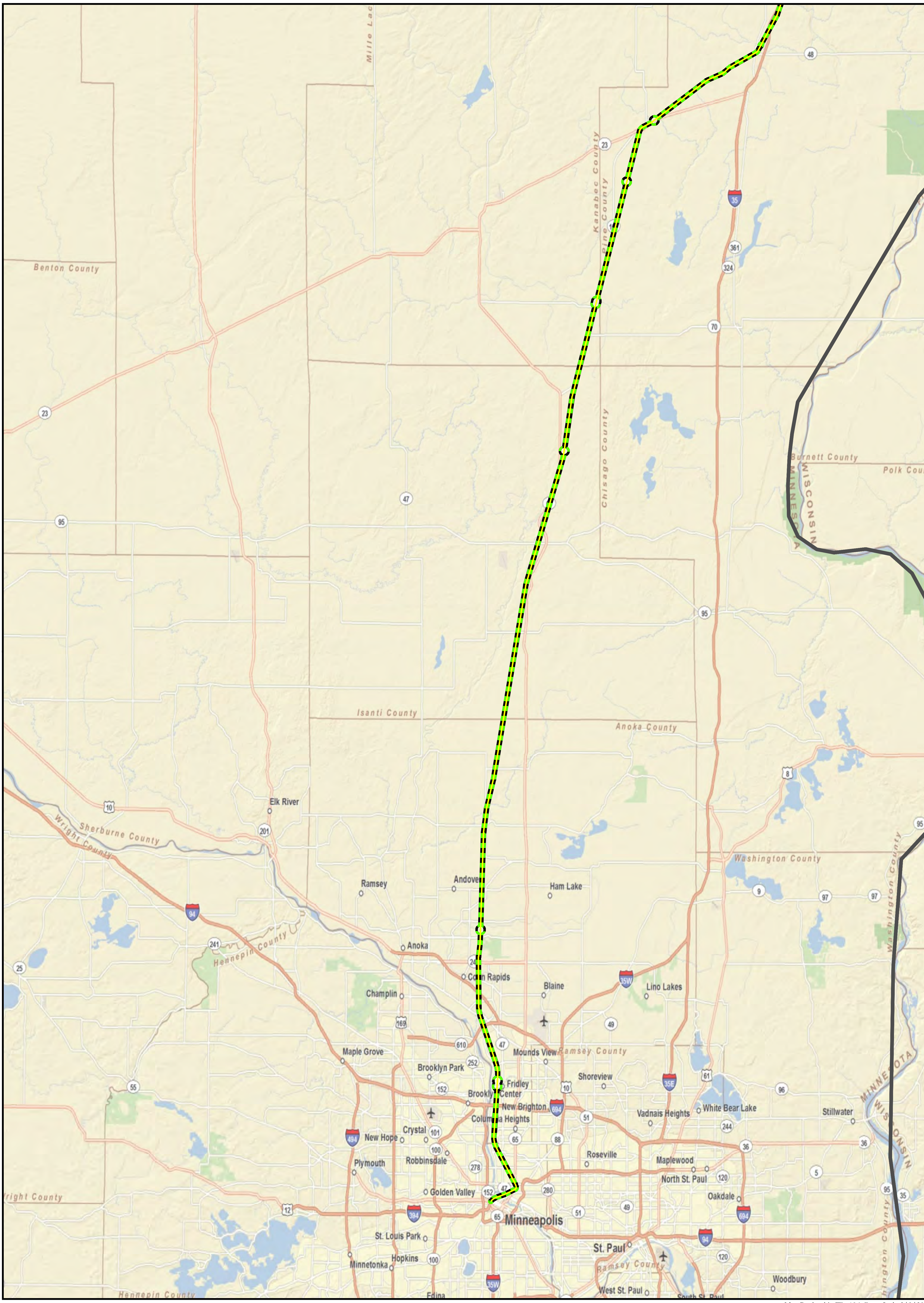
0 6 12 Kilometers

0 6 12 Miles

1:349,677

N

North



Source: USGS 1:250,000-scale series; ESRI; The 106 Group Ltd.

Map Produced by The 106 Group Ltd: 2/9/2012

Northern Lights Express
Phase I Architectural History Survey
Minnesota and Wisconsin

Project Overview

Proposed Northern Lights Express Line
Architectural History APE

N

0 10 20
Kilometers
Miles
0 6 12
1:350,000

South

APPENDIX J

COMMUNITY FACILITIES

Table J-1: Community Facilities within the NLX Corridor

Table J.1. Community Facilities within the NLX Corridor

Facility	Address	City	State	Distance from corridor	Type
Bethlehem Lutheran Church	6316 Kirke Alle	Askov	MN	1 block	Church
Church of Jesus Christ and Latter Day Saints	3422 Highway 23	Askov	MN	Over 3 blocks	Church
Askov City Hall	6369 Kobmagergade	Askov	MN	1 block	Municipal
Fire Department	6369 Kobmagergade	Askov	MN	2 blocks	Municipal
Bethel Community Church	23850 Dewey St NW	Bethel	MN	1 block	Church
Braham Evan Covenant Church	508 Broadway Ave N	Braham	MN	2 blocks	Church
St. Stephens Lutheran Church	400 8th St SE	Braham	MN	Over 3 blocks	Church
Braham Medical Clinic	210 Douglas Dr S	Braham	MN	Over 3 blocks	Hospital
First Baptist Church	304 Main St S	Cambridge	MN	2 blocks	Church
New Hope Community Church	370 Main St S	Cambridge	MN	1 block	Church
Cambridge United Pentecostal Church	210 10th Ave SW	Cambridge	MN	1 block	Church
Victory Christian Center	2440 Main St S	Cambridge	MN	1 block	Church
East Central Regional Library	244 Birch St S	Cambridge	MN	4 blocks	Library
Cambridge Union Cemetery	Old South Main St	Cambridge	MN	W/in 1 block of existing	Cemetery
Christ the King Cemetery	Old South Main St	Cambridge	MN	W/in 1 block of existing	Cemetery
Mobile Home Park	Pine Village Dr	Cambridge	MN	Begins 1 block	Other
Rum River South School	140 Buchanan St N	Cambridge	MN	W/in 1 block	School
Cambridge-Isanti Schools	625 Main St N	Cambridge	MN	2 blocks	School
Cambridge Middle School	801 20th Ave NE	Cambridge	MN	3 blocks	School
Blaine Congregation	9140 E River Rd NW	Coon Rapids	MN	W/in 2 blocks	Church
Mercy Hospital	4050 Coon Rapids Blvd	Coon Rapids	MN	Approx. 2 miles	Hospital
Coon Rapids City Hall	11155 Robinson Dr NW	Coon Rapids	MN	Over 6 blocks	Municipal
Police Station	11155 Robinson Dr NW	Coon Rapids	MN	Over 6 blocks	Municipal
Fire Station	11155 Robinson Dr NW	Coon Rapids	MN	Over 6 blocks	Municipal
Fire Station	1460 Egret Blvd NW	Coon Rapids	MN	Over 10 blocks	Municipal
Creekside Estates	1100 Egret Blvd NW	Coon Rapids	MN	W/in 1 block	Other
Arona Academy	9237 E River Rd NW	Coon Rapids	MN	W/in 1 block; Bldg (rear) w/in 200' of existing track	School

Facility	Address	City	State	Distance from corridor	Type
Coon Rapids High School	2340 Northdale Blvd NW	Coon Rapids	MN	Over 10 blocks	School
Coon Rapids Middle School	11600 Raven St NW	Coon Rapids	MN	Over 10 blocks	School
Sand Creek Elementary School	12156 Olive St NW	Coon Rapids	MN	Over 3 blocks	School
Duluth Public Library	520 W Superior St	Duluth	MN	2 blocks	Library
Fire Station	602 W 2nd St	Duluth	MN	4 blocks	Municipal
Duluth Entertainment Convention Center	350 Harbor Dr	Duluth	MN	1 block	Other
Bayfront Festival Park	10th Ave W & Railroad St W	Duluth	MN	1 block	Other
Great Lakes Aquarium	353 Harbor Dr	Duluth	MN	1 block	Other
St. Louis County Heritage & Arts Center	506 W Michigan St	Duluth	MN	W/in 1 block (station location)	Other
Avalon Educational Institute	404 West Superior St	Duluth	MN	2 blocks	School
Harbor City International School	332 W Michigan St	Duluth	MN	2 blocks	School
University of Minnesota - Duluth	1049 University Dr	Duluth	MN	Approx. 2 miles	School
College of St. Scholastica	1200 Kenwood Ave	Duluth	MN	Approx. 2 miles	School
Lake Superior College	2101 Trinity Rd	Duluth	MN	Approx. 1 mile	School
Redeemer Lutheran Church	61 Mississippi St NE	Fridley	MN	W/in 1 block; bldg (side) w/in 200' of existing track	Church
Mississippi Branch Library	410 Mississippi St NE	Fridley	MN	Over 5 blocks	Library
Fridley City Hall	6431 University Ave NE	Fridley	MN	Over 3 blocks	Municipal
Fridley Community Center	6085 7th St NE	Fridley	MN	Over 10 blocks	Municipal
Post Office	2961 369th Avenue NE	Grandy	MN	1 block	Municipal
Church	Highway 65 & 367th Ln NE	Grandy	MN	1 block	Church
Grasston Baptist Church	402 Oak St	Grasston	MN	3 blocks	Church
Hope Lutheran Church	301 Oak St	Grasston	MN	3 blocks	Church
Grace Christian School	406 Pine St	Grasston	MN	Approx 1/2 mile	School
City Offices	119 Main St	Henriette	MN	W/in 1 block; w/in 200' of existing track	Municipal
First Presbyterian Church	1813 Fire Monument Rd	Hinckley	MN	Approx. 2 miles	Church
Tatting Methven Funeral Chapel	402 Lawler Ave S	Hinckley	MN	W/in 1 block	Church
First Lutheran Church ECLA	301 Lawler Ave S	Hinckley	MN	W/in 1 block	Church
St. Patrick's Lutheran Church	203 Lawler Ave S	Hinckley	MN	1 block	Church
Faith Baptist Church	601 2nd St SE	Hinckley	MN	3 blocks	Church

Facility	Address	City	State	Distance from corridor	Type
Seventh Day Adventist Church	550 1st St NE	Hinckley	MN	2 blocks	Church
Hinckley Evangelical Free Church	518 Barry Ave	Hinckley	MN	3 blocks	Church
Alliance of Devine Love	125 Main St E	Hinckley	MN	2 blocks	Church
Bible Baptist Church	209 Old Highway 61 N	Hinckley	MN	2 blocks	Church
Gateway Family Health Clinic	206 Main St W	Hinckley	MN	3 blocks	Hospital
Hinckley Public Library	106 1st St SE	Hinckley	MN	2 blocks	Library
Hinckley Community Center	102 Dunn Ave N	Hinckley	MN	3 blocks	Municipal
Hinckley City Hall	106 1st St	Hinckley	MN	2 blocks	Municipal
Hinckley-Finlayson High School	201 Main St E	Hinckley	MN	2 blocks	School
Hinckley Elementary School	111 Blair Ave S	Hinckley	MN	2 blocks	School
Elim Baptist Church	114 Dahlin Ave	Isanti	MN	1 block	Church
Faith Lutheran Church	109 2nd Ave S	Isanti	MN	2 blocks	Church
Fire Station	401 N 1st Ave	Isanti	MN	1 block	Municipal
Post Office	25 W Main St	Isanti	MN	W/in 1 block; w/in 100' from existing track	Municipal
City Hall	110 1st Ave NW	Isanti	MN	W/in 1 block; w/in 200' from existing track	Municipal
Cambridge Isanti Schools	424 1st Ave	Isanti	MN	2 blocks	School
Isanti Primary School	305 County Road 5	Isanti	MN	Over 10 blocks	School
Post Office	County Road 46	Kerrick	MN	W/in 1 block	Municipal
Kerrick Community Church	24 3rd Ave	Kerrick	MN	2 blocks	Church
Antioch Communuty Church	301 Main St NE	Minneapolis	MN	1 Block	Church
Our Spiritual Center	615 1st Ave NE	Minneapolis	MN	W/in 1 block; Bldg (rear) w/in 200' of existing track	Church
Beltrami Community Church	1111 Summer St NE	Minneapolis	MN	1 block	Church
Our Lady of Mount Carmel Church	701 Fillmore St NE	Minneapolis	MN	3 blocks	Church
Abbey Way Covenant Church	685 13th Avenue NE	Minneapolis	MN	2 blocks	Church
Northeast Community Lutheran Church	697 13th Ave	Minneapolis	MN	2 blocks	Church
Strong Tower Parish	697 13th Ave NE	Minneapolis	MN	2 blocks	Church
New Commandment Church	1429 Madison St NE	Minneapolis	MN	3 blocks	Church
Firefighters Hall and Museum	664 22nd Ave NE	Minneapolis	MN	W/in 200' of existing track	Other
Minneapolis Public Schools	807 Broadway St NE	Minneapolis	MN	1 block	School

Facility	Address	City	State	Distance from corridor	Type
Edison High School	700 22nd Ave NE	Minneapolis	MN	1 block ; athletic field w/in 200' of existing track	School
Town Hall	Hwy 23 & Main Street	Nickerson	MN	2 blocks	Municipal
Lifelong Learning Center	18900 Cedar Drive NW	Oak Grove	MN	W/in 1 block	School
Assembly of God	701 Commercial Ave N	Sandstone	MN	2 blocks	Church
Evangelical Free Church	522 N Main St	Sandstone	MN	1 block	Church
United Church of Christ	210 Commercial Ave N	Sandstone	MN	2 blocks	Church
St. Luke's Catholic Church	122 Commercial Ave N	Sandstone	MN	2 blocks	Church
Community Worship Center	114 Minnesota St	Sandstone	MN	2 blocks	Church
Pine Medical Center	109 Court Ave s	Sandstone	MN	3 blocks	Hospital
Sandstone Public Library	119 4th St	Sandstone	MN	3 blocks	Library
Sandstone City Hall	119 4th St	Sandstone	MN	3 blocks	Municipal
Sandstone Fire Department	113 Main St	Sandstone	MN	W/in 1 block	Municipal
Stanchfield Baptist Church	38850 Stanchfield Rd NE	Stanchfield	MN	W/in 1 block	Church
Cemetery	Midway St NE	Stanchfield	MN	1 block	Other
Homecraft Mobile Home Park	4015 Tower Ave	Superior	WI	W/in 1 block	Other
Cooper Elementary School	1807 Missouri Ave	Superior	WI	Over 10 blocks	School
Greenwood Cemetery	8402 Tower Ave	Superior Village	WI	W/in 1 block	Cemetery
Bryant Elementary School	1423 Central Ave	Superior Village	WI	Over 5 blocks	School

APPENDIX K

PUBLIC AND PRIVATE RAILROAD CROSSINGS

Table K-1: At-grade Railroad Crossings between Minneapolis, Minnesota and Superior, Wisconsin – NLX Corridor

Table K-1. At-grade Railroad Crossings between Minneapolis, Minnesota and Superior, Wisconsin – Route 9

Subdivision	Mile Post	Public/ Private	At-grade Type	Community	Name of Crossing
Wayzata	10.79	Public	Flashing Signal	Minneapolis	W Island Ave
Wayzata	9.83	Public	Flashing Signal with Automatic Gates	Minneapolis	Harrison St NE
Midway	10.19	Public	Flashing Signal with Automatic Gates	Minneapolis	12th Ave NE
Midway	10.37	Public	Flashing Signal with Automatic Gates	Minneapolis	14th Ave NE
Staples	15.26	Private	Crossing	Fridley	
Staples	17.84	Public	Flashing Signal with Automatic Gates	Fridley	Osborne Rd NE
Staples	18.10	Public	Flashing Signal with Automatic Gates	Fridley	77th Ave NE
Staples	19.46	Public	Flashing Signal with Automatic Gates	Fridley	85th Ave NW
Staples	20.50	Public	Flashing Signal with Automatic Gates	Coon Rapids	Foley Blvd
Hinckley	135.91	Public	Flashing Signal with Automatic Gates	Coon Rapids	Egret Blvd
Hinckley	134.61	Public	Flashing Signal with Automatic Gates	Coon Rapids	Northdale Blvd
Hinckley	134.01	Public	Flashing Signal with Automatic Gates	Coon Rapids	121st Ave NW
Hinckley	133.66	Public	-	Coon Rapids	Main St
Hinckley	132.73	Private	Crossing	Coon Rapids	
Hinckley	131.93	Public	Flashing Signal with Automatic Gates	Andover	Bunker Lake Blvd
Hinckley	130.99	Public	Flashing Signal with Automatic Gates	Andover	Andover Blvd NW
Hinckley	130.16	Private	Crossing	Andover	
Hinckley	129.65	Public	Flashing Signal with Automatic Gates	Andover	Crosstown Blvd
Hinckley	128.98	Public	Flashing Signal with Automatic Gates	Andover	161st Ave NW
Hinckley	128.56	Private	Crossing	Andover	
Hinckley	128.23	Private	Crossing	Andover	
Hinckley	127.92	Private	Crossing	Andover	
Hinckley	127.73	Private	Crossing	Andover	
Hinckley	127.47	Public	Crossbucks	Andover	Ward Lake Dr
Hinckley	126.51	Public	Flashing Signal with Automatic Gates	Andover	181st Ave NW
Hinckley	125.28	Public	Crossbucks		191st Ave N
Hinckley	125.04	Public	Flashing Signal		Viking Blvd NW
Hinckley	124.08	Public	Flashing Signal with Automatic Gates		Cedar Dr NW
Hinckley	123.34	Public	Flashing Signal with Automatic Gates		206th Ave NW
Hinckley	122.47	Public	Flashing Signal with Automatic Gates		Sims Rd NW
Hinckley	121.44	Public	Flashing Signal with Automatic Gates		221st Ave NW
Hinckley	120.44	Public	Flashing Signal with Automatic Gates		229th Ave NW
Hinckley	119.40	Public	Flashing Signal with Automatic Gates	Bethel	237th Ave NW
Hinckley	119.08	Public	Flashing Signal with Automatic Gates	Bethel	Main St
Hinckley	118.26	Public	Flashing Signal with Automatic Gates		County Road 56
Hinckley	117.29	Private	Crossing		LA Nelson
Hinckley	116.38	Public	Flashing Signal with Automatic Gates		County Road 56
Hinckley	115.88	Public	Crossbucks		T 184 (265th Ave NE)
Hinckley	114.84	Public	Crossbucks		T176 (273rd Ave NE)
Hinckley	113.87	Public	Crossbucks		T 169 (281st Ave NE)
Hinckley	113.03	Public	Flashing Signal with Automatic Gates	Isanti	Main Street
Hinckley	112.85	Public	Flashing Signal with Automatic Gates	Isanti	CSAH 5

Subdivision	Mile Post	Public/ Private	At-grade Type	Community	Name of Crossing
Hinckley	112.31	Public	Crossbucks		TH 149 (293rd Ave NE)
Hinckley	111.73	Public	Crossbucks		T 138 (299th Ave NE)
Hinckley	110.84	Public	Crossbucks		T 133 (305th Ave NE)
Hinckley	109.79	Public	Flashing Signal with Automatic Gates	Cambridge	40th Ave SW (313th Ave NE)
Hinckley	107.96	Public	Flashing Signal with Automatic Gates	Cambridge	11th Ave SW
Hinckley	107.19	Public	Flashing Signal with Automatic Gates	Cambridge	1st Ave E
Hinckley	106.59	Public	Flashing Signal with Automatic Gates	Cambridge	Emerson Ave N
Hinckley	105.95	Public	Crossbucks		T 75 (Highway 65)
Hinckley	105.11	Public	Crossbucks		T 74 (343rd Ave NE)
Hinckley	104.07	Public	Crossbucks		T 66 (349th Ave NE)
Hinckley	103.50	Public	Crossbucks		T 61 (357th Ave NE)
Hinckley	102.77	Public	Flashing Signal with Automatic Gates	Grandy	CSAH 6 (367 Ave NE)
Hinckley	102.51	Public	Crossbucks	Grandy	T 56 (369th Ave NE)
Hinckley	101.26	Public	-		379th Ave NE
Hinckley	100.41	Private	Crossing		
Hinckley	99.94	Public	Flashing Signal with Automatic Gates	Stanchfield	CSAH 3
Hinckley	99.54	Private	Crossing		
Hinckley	99.23	Public	Flashing Signal with Automatic Gates		CR 36
Hinckley	98.81	Private	Crossing		
Hinckley	98.49	Public	Crossbucks		T 20 (401st Ave NE)
Hinckley	97.77	Private	Crossing		
Hinckley	96.95	Public	Flashing Signal with Automatic Gates	Braham	CSAH 4 (413th Ave NE)
Hinckley	96.59	Public	Flashing Signal with Automatic Gates	Braham	4th St SE
Hinckley	96.37	Public	Flashing Signal with Automatic Gates	Braham	Central Dr E
Hinckley	95.94	Private	Crossing	Braham	
Hinckley	94.72	Private	Crossing		
Hinckley	94.40	Public	Crossing and Crossbucks		T 212 (115th Ave)
Hinckley	93.88	Public	Flashing Signal with Automatic Gates		Hwy 70
Hinckley	92.75	Public	Crossbucks		CR 42
Hinckley	92.60	Public	Crossbucks		CSAH 28
Hinckley	91.37	Public	Flashing Signal with Automatic Gates	Grasston	Pine St
Hinckley	89.25	Private	Crossing		
Hinckley	88.47	Public	Crossbucks	Henriette	T 34 (CR 11, 5th Ave SW)
Hinckley	87.95	Private	Crossing		
Hinckley	86.65	Private	Crossing		
Hinckley	86.48	Private	Crossing		
Hinckley	86.13	Public	Crossbucks		
Hinckley	85.87	Public	Crossbucks		CSAH 12 (Pokegama Ave E)
Hinckley	84.58	Public	Crossbucks		T 56 (CR 126)
Hinckley	84.11	Private	Crossing		
Hinckley	80.19	Public	Flashing Signal with Automatic Gates	Brook Park	2nd Ave (Mallard Rd)
Hinckley	79.72	Public	Crossbucks	Brook Park	M-2 (3rd Street)
Hinckley	79.12	Private	Crossing		
Hinckley	78.49	Public	Crossbucks		T 97 (Township Road)

Subdivision	Mile Post	Public/ Private	At-grade Type	Community	Name of Crossing
Hinckley	77.69	Public	Crossbucks		T 97 (Township Road)
Hinckley	76.60	Public	Crossbucks		T 154 (Aspen Rd)
Hinckley	75.01	Public	Crossbucks		CSAH 17
Hinckley	73.94	Private	Crossing		
Hinckley	73.79	Public	Crossbucks		T 178
Hinckley	72.25	Public	Flashing Signal with Automatic Gates	Hinckley	Old Highway 61
Hinckley	72.14	Public	Flashing Signal with Automatic Gates	Hinckley	Lawler - 3rd St S
Hinckley	72.05	Public	Flashing Signal with Automatic Gates	Hinckley	2nd St SE
Hinckley	71.89	Public	Flashing Signal with Automatic Gates	Hinckley	Main Street
Hinckley	71.10	Public	Crossbucks	Hinckley	7th St NE
Hinckley	64.37	Public	Crossbucks	Sandstone	T 512 (Airport Road)
Hinckley	63.63	Public	Flashing Signal with Automatic Gates	Sandstone	Hwy 123
Hinckley	62.90	Public	Flashing Signal with Automatic Gates	Sandstone	Oak St
Hinckley	58.86	Public	Flashing Signal with Automatic Gates		CR 123
Hinckley	57.33	Public	Flashing Signal with Automatic Gates	Askov	CO HWY 33
Hinckley	57.18	Public	Flashing Signal with Automatic Gates	Askov	Bregnedalgade St
Hinckley	56.01	Public	Crossbucks		T 956 (Partridge Dr)
Hinckley	55.68	Public	Crossbucks		T 889 (Mulling Rd)
Hinckley	53.36	Public	Crossbucks		T 575 (CR 145 Root Rd)
Hinckley	52.11	Public	Crossbucks		Starch Rd (CR 148)
Hinckley	51.48	Private	Crossing		
Hinckley	48.82	Public	Flashing Signal with Automatic Gates	Bruno	Main Street
Hinckley	49.57	Public	Crossbucks	Bruno	Pine St
Hinckley	47.22	Public	Crossbucks		T 893
Hinckley	46.18	Public	Crossbucks		T 892
Hinckley	43.74	Private	Crossing		
Hinckley	43.12	Public	Flashing Signal		CSAH 46 (Deerfield Rd)
Hinckley	42.63	Public	Crossbucks		MN 9
Hinckley	42.38	Private	Crossing		
Hinckley	42.13	Private	Crossing		
Hinckley	40.54	Public	Crossbucks		T 648
Hinckley	40.07	Public	Crossbucks		T 649
Hinckley	39.39	Public	Crossbucks		T 650
Hinckley	38.71	Public	Crossbucks		T 805
Hinckley	37.96	Public	Crossbucks		T 913
Hinckley	37.60	Public	Crossbucks		T 914
Hinckley	36.65	Public	Crossbucks		T 807
Hinckley	35.61	Public	Crossbucks		CR 145
Hinckley	33.75	Public	Crossbucks		CR 146
Hinckley	33.10	Private	Crossing		
Hinckley	30.81	Public	Crossbucks		CR 147
Hinckley	29.70	Public	Crossbucks	Holyoke	CR 145
Hinckley	29.15	Private	Crossing		
Hinckley	28.59	Public	Crossbucks		T 362

Subdivision	Mile Post	Public/ Private	At-grade Type	Community	Name of Crossing
Hinckley	28.03	Private	Crossing		
Hinckley	27.54	Public	Crossbucks		T 365
Hinckley	26.18	Public	Crossbucks		T 367
Hinckley	25.90	Public	Crossbucks		
Hinckley	25.67	Public	Flashing Signal with Automatic Gates		CSAH 8
Hinckley	25.01	Private	Crossing		
Hinckley	24.57	Public	Crossbucks		John Harris Rd
Hinckley	24.10	Public	Crossbucks		John Harris Rd
Hinckley	23.57	Private	Crossing		
Hinckley	23.21	Public	Flashing Signal		S CR-W
Hinckley	22.47	Private	Crossing		
Hinckley	21.97	Private	Crossing		
Hinckley	20.46	Private	Crossing		
Hinckley	18.72	Public	Crossbucks		Deadham Rd
Hinckley	17.46	Public	Crossbucks		Reed-Merril Rd
Hinckley	16.60	Public	Crossbucks		Manski Rd
Hinckley	15.17	Public	Crossbucks		Station Rd
Hinckley	14.51	Private	Crossing		Gustafson Rd
Hinckley	13.43	Public	Crossbucks		Ellison Rd
Hinckley	12.93	Public	Crossbucks		Rahrer Rd
Hinckley	12.42	Public	Crossbucks	Boylston	Short Cut Rd
Hinckley	12.04	Public	Flashing Signal	Boylston	
Hinckley	11.96	Public	Flashing Signal		
Lakes	11.85	Public	Crossbucks		Schallermeir Rd
Lakes	11.10	Public	Crossbucks		Ames Rd
Lakes	9.05	Public	Crossbucks	Superior Village	69th St (Park Ave)
Lakes	8.32	Public	Flashing Signal with Automatic Gates	Superior Village	61st St (Central Ave)
Lakes	8.05	Public	Crossbucks	Superior Village	58th St
Lakes	6.99	Private	Crossing	Superior	
Lakes	5.49	Public	Flashing Signal	Superior	28th St

Source: BNSF Track Charts

APPENDIX L

ENVIRONMENTAL JUSTICE

- **Table A: Population, Households and Race**
- **Table B: Income and Poverty**

TABLE A
POPULATION, HOUSEHOLDS AND RACE
2010 CENSUS

Demographic Group	State of Minnesota		Hennepin County		Anoka County		Isanti County		Kanabec County		Pine County		Carlton County		St. Louis County	
	#	% of Pop.	#	% of Pop.	#	% of Pop.	#	% of Pop.	#	% of Pop.	#	% of Pop.	#	% of Pop.	#	% of Pop.
Population	5,303,925	100%	1,152,425	100%	330,844	100%	37,816	100%	16,239	100%	37,816	100%	35,386	100%	200,226	100%
• White	4,524,062	85.3%	856,834	74.4%	287,802	87.0%	36,319	96.0%	15,754	97.0%	36,319	96.0%	31,727	89.7%	186,212	93.0%
• Minorities	1,030,121	14.7%	373,267	25.6%	55,062	13.0%	2,079	4.0%	699	3.0%	2,079	4.0%	4,143	10.3%	16,423	7.0%
- Black	274,412	5.2%	136,262	11.8%	14,503	4.4%	245	0.6%	55	0.3%	245	0.6%	498	1.4%	2,739	1.4%
- AIAN (1)	60,916	1.1%	10,591	0.9%	2,257	0.7%	174	0.5%	90	0.6%	174	0.5%	2,086	5.9%	4,477	2.2%
- Asian	214,234	4.0%	71,905	6.2%	12,868	3.9%	309	0.8%	53	0.3%	309	0.8%	160	0.5%	1,774	0.9%
- NHPI (2)	2,156	0.0%	506	0.0%	104	0.0%	19	0.1%	3	0.0%	19	0.1%	4	0.0%	64	0.0%
- Other Race	103,000	1.9%	38,878	3.4%	4,789	1.4%	134	0.4%	34	0.2%	134	0.4%	56	0.2%	445	0.2%
- Two or More Races	125,145	2.4%	37,449	3.2%	8,521	2.6%	616	1.6%	250	1.5%	616	1.6%	855	2.4%	4,515	2.3%
• Hispanic Origin (3)	250,258	4.7%	77,676	6.7%	12,020	3.6%	582	1.5%	214	1.3%	582	1.5%	484	1.4%	2,409	1.2%

Source: Year 2010 U.S. Census Data SF 1 (Tables P3, 8, 15)
(1) AIAN = American Indian or Alaska Native
(2) NHPI = Native Hawaiian & Other Pacific Islander
(3) Those of Hispanic Origin may consider themselves white or of another race; therefore, population totals and percentages will be greater than 100 percent

Anoka County

Demographic Group	Tract 502.08		Tract 502.17		Tract 502.21		Tract 502.22		Tract 506.08		Tract 507.02		Tract 507.04	
	#	% of Pop.	#	% of Pop.	#	% of Pop.	#	% of Pop.	#	% of Pop.	#	% of Pop.	#	% of Pop.
Population	3,281	100%	2,724	100%	6,365	100%	5,393	100%	4,431	100%	3,125	100%	4,736	100%
• White	3,019	92.0%	2,556	93.8%	5,938	93.3%	5,011	92.9%	3,664	82.7%	2,846	91.1%	4,107	86.7%
• Minorities	363	8.0%	213	6.2%	539	6.7%	491	7.1%	995	17.3%	373	8.9%	789	13.3%
- Black	53	1.6%	36	1.3%	138	2.2%	104	1.9%	301	6.8%	81	2.6%	252	5.3%
- AIAN (1)	8	0.2%	9	0.3%	25	0.4%	7	0.1%	35	0.8%	26	0.8%	32	0.7%
- Asian	76	2.3%	78	2.9%	136	2.1%	144	2.7%	173	3.9%	55	1.8%	156	3.3%
- NHPI (2)	0	0.0%	0	0.0%	1	0.0%	2	0.0%	1	0.0%	0	0.0%	2	0.0%
- Other Race	30	0.9%	9	0.3%	27	0.4%	22	0.4%	91	2.1%	27	0.9%	59	1.2%
- Two or More Races	95	2.9%	36	1.3%	100	1.6%	103	1.9%	166	3.7%	90	2.9%	128	2.7%
• Hispanic Origin (3)	101	3.1%	45	1.7%	112	1.8%	109	2.0%	228	5.1%	94	3.0%	160	3.4%

TABLE A
POPULATION, HOUSEHOLDS AND RACE
2010 CENSUS

Demographic Group	Tract 507.07		Tract 507.10		Tract 507.11		Tract 507.12		Tract 511.01		Tract 512.01		Tract 512.06	
	#	% of Pop.	#	% of Pop.	#	% of Pop.	#	% of Pop.	#	% of Pop.	#	% of Pop.	#	% of Pop.
Population	6,229	100%	3,489	100%	4,703	100%	4,289	100%	4,985	100%	3,733	100%	2,409	100%
• White	5,509	88.4%	2,870	82.3%	4,089	86.9%	3,682	85.8%	3,960	79.4%	2,400	64.3%	1,784	74.1%
• Minorities	851	11.6%	761	17.7%	743	13.1%	713	14.2%	1,265	20.6%	1,659	35.7%	832	25.9%
- Black	224	3.6%	297	8.5%	221	4.7%	258	6.0%	443	8.9%	700	18.8%	294	12.2%
- AIAN (1)	21	0.3%	32	0.9%	34	0.7%	25	0.6%	38	0.8%	56	1.5%	42	1.7%
- Asian	285	4.6%	129	3.7%	185	3.9%	156	3.6%	235	4.7%	245	6.6%	98	4.1%
- NHPI (2)	2	0.0%	0	0.0%	0	0.0%	0	0.0%	1	0.0%	0	0.0%	6	0.2%
- Other Race	54	0.9%	53	1.5%	31	0.7%	24	0.6%	104	2.1%	127	3.4%	90	3.7%
- Two or More Races	134	2.2%	108	3.1%	143	3.0%	144	3.4%	204	4.1%	205	5.5%	95	3.9%
• Hispanic Origin (3)	131	2.1%	142	4.1%	129	2.7%	106	2.5%	240	4.8%	326	8.7%	207	8.6%

Hennepin

Demographic Group	Tract 6.01		Tract 1005		Tract 1018		Tract 1025		Tract 1026		Tract 1031		Tract 1036	
	#	% of Pop.	#	% of Pop.	#	% of Pop.	#	% of Pop.	#	% of Pop.	#	% of Pop.	#	% of Pop.
Population	4,641	100%	1,921	100%	3,828	100%	2,813	100%	1,920	100%	2,038	100%	2,084	100%
• White	3,688	79.5%	1,386	72.1%	2,064	53.9%	1,934	68.8%	1,169	60.9%	1,444	70.9%	1,766	84.7%
• Minorities	1,314	20.5%	708	27.9%	2,589	46.1%	1,304	31.2%	1,067	39.1%	814	29.1%	414	15.2%
- Black	379	8.2%	190	9.9%	810	21.2%	330	11.7%	299	15.6%	278	13.6%	120	5.8%
- AIAN (1)	37	0.8%	76	4.0%	114	3.0%	106	3.8%	83	4.3%	46	2.3%	12	0.6%
- Asian	144	3.1%	90	4.7%	76	2.0%	66	2.3%	103	5.4%	58	2.8%	89	4.3%
- NHPI (2)	3	0.1%	1	0.1%	1	0.0%	1	0.0%	0	0.0%	0	0.0%	1	0.0%
- Other Race	177	3.8%	74	3.9%	452	11.8%	202	7.2%	151	7.9%	108	5.3%	40	1.9%
- Two or More Races	213	4.6%	104	5.4%	311	8.1%	174	6.2%	115	6.0%	104	5.1%	56	2.7%
• Hispanic Origin (3)	361	7.8%	173	9.0%	825	21.6%	425	15.1%	316	16.5%	220	10.8%	96	4.6%

TABLE A
POPULATION, HOUSEHOLDS AND RACE
2010 CENSUS

	Hennepin County				St Louis County							
Demographic Group	Tract 1037		Tract 1262		Tract 19		Tract 20		Tract 156		Tract 158	
	#	% of Pop.	#	% of Pop.	#	% of Pop.	#	% of Pop.	#	% of Pop.	#	% of Pop.
Population	3,015	100%	4,291	100%	1,917	100%	1,225	100%	3,082	100%	3,747	100%
• White	2,302	76.4%	3,217	75.0%	1,475	76.9%	1,028	83.9%	2,384	77.4%	3,459	92.3%
• Minorities	839	23.6%	1,306	25.0%	480	23.1%	214	16.1%	780	22.6%	343	7.7%
- Black	219	7.3%	612	14.3%	144	7.5%	68	5.6%	223	7.2%	36	1.0%
- AIAN (1)	42	1.4%	67	1.6%	141	7.4%	36	2.9%	207	6.7%	70	1.9%
- Asian	303	10.0%	222	5.2%	84	4.4%	11	0.9%	36	1.2%	40	1.1%
- NHPI (2)	0	0.0%	0	0.0%	0	0.0%	3	0.2%	1	0.0%	1	0.0%
- Other Race	54	1.8%	37	0.9%	7	0.4%	1	0.1%	15	0.5%	4	0.1%
- Two or More Races	95	3.2%	136	3.2%	66	3.4%	78	6.4%	216	7.0%	137	3.7%
• Hispanic Origin (3)	126	4.2%	232	5.4%	38	2.0%	17	1.4%	82	2.7%	55	1.5%

TABLE A
POPULATION, HOUSEHOLDS AND RACE
2010 CENSUS

	Superior											
Demographic Group	Wisconsin		Douglas County		Tract 206		Tract 207		Tract 208		Tract 211	
	#	% of Pop.	#	% of Pop.	#	% of Pop.	#	% of Pop.	#	% of Pop.	#	% of Pop.
Population	5686986	100%	44,159	100%	4438	100%	4147	100%	3477	100%	2257	100%
• White	4902067	86.2%	41,166	93.2%	4011	90.4%	3946	95.2%	3268	94.0%	1916	84.9%
• Minorities	1120975	13.8%	3,487	6.8%	497	9.6%	230	4.8%	245	6.0%	388	15.1%
- Black	359148	6.3%	486	1.1%	82	1.8%	22	0.5%	25	0.7%	78	3.5%
- AIAN (1)	54526	1.0%	868	2.0%	140	3.2%	76	1.8%	65	1.9%	107	4.7%
- Asian	129234	2.3%	376	0.9%	36	0.8%	20	0.5%	34	1.0%	35	1.6%
- NHPI (2)	1827	0.0%	8	0.0%	2	0.0%	1	0.0%	0	0.0%	0	0.0%
- Other Race	135867	2.4%	82	0.2%	8	0.2%	11	0.3%	4	0.1%	3	0.1%
- Two or More Races	104317	1.8%	1,173	2.7%	159	3.6%	71	1.7%	81	2.3%	118	5.2%
• Hispanic Origin (3)	336056	5.9%	494	1.1%	70	1.6%	29	0.7%	36	1.0%	47	2.1%

TABLE B
INCOME AND POVERTY
2000 CENSUS

Demographic Group	State of Minnesota	Hennepin County	Anoka County	Isanti County	Kanabec County	Pine County	Carlton County	St. Louis County	Douglas County
Population	4,794,144	1,092,571	294,583	30,832	16,239	25,111	35,386	192,585	41,918
Number of Households	1,896,209	456,278	106,468	11,266	5,759	9,908	12,064	82,720	17,787
Number of Families	1,262,953	269,112	79,921	8,487	4,157	6,922	8,370	51,815	11,321
Median household income in 1999 (dollars)	$47,111	$51,711	$57,754	$50,127	$38,520	$37,379	$40,021	$36,306	$35,226
Median family income in 1999 (dollars)	$56,874	$65,985	$64,261	$55,996	$43,603	$44,058	$48,406	$47,134	$43,813
Per capita income in 1999 (dollars)	$23,198	$28,789	$23,297	$20,348	$17,441	$17,445	$18,073	$18,982	$17,638
Percent of population for whom poverty status is determined - all ages (income in 1999 below poverty level) (1)	7.9%	8.3%	4.2%	5.7%	8.6%	11.3%	6.8%	12.1%	11.0%
Percent of families for whom poverty status is determined (income in 1999 below poverty level)	5.1%	5.0%	2.9%	4.0%	6.4%	7.8%	5.4%	7.2%	7.6%

Source: Year 2000 U.S. Census Data SF 3 (Tables P10, 53, 77, 82, 87, 90)

TABLE B
INCOME AND POVERTY
2000 CENSUS

Hennepin Co

Demographic Group	Tract 6.01	Tract 35.01	Tract 35.02	Tract 1005	Tract 1018	Tract 1025	Tract 1026	Tract 1030	Tract 1031	Tract 1036
Population	4,702	596	728	1,935	3,586	2,826	2,214	1,639	2,112	1,720
Number of Households	2,078	91	500	793	1,484	1,253	853	764	1,111	960
Number of Families	1,158	4	104	426	766	584	475	283	414	375
Median household income in 1999 (dollars)	$40,863	$21,771	$55,556	$31,783	$30,747	$32,470	$35,186	$33,125	$28,829	$46,181
Median family income in 1999 (dollars)	$48,024	$13,750	$76,747	$40,962	$34,808	$42,683	$38,723	$45,703	$40,417	$76,452
Per capita income in 1999 (dollars)	$20,158	$11,844	$53,011	$16,751	$15,563	$17,436	$14,891	$17,887	$20,040	$43,785
Percent of population for whom poverty status is determined - all ages (income in 1999 below poverty level) (1)	10.6%	36.6%	2.1%	13.8%	21.8%	17.3%	27.8%	22.0%	17.1%	9.5%
Percent of families for whom poverty status is determined (income in 1999 below poverty level)	7.7%	0.0%	0.0%	10.8%	17.4%	14.6%	24.6%	23.0%	6.8%	8.8%

TABLE B
INCOME AND POVERTY
2000 CENSUS

	Anoka									Duluth					
Demographic Group	**Tract 502.08**	**Tract 502.22**	**Tract 506.08**	**Tract 507.02**	**Tract 507.04**	**Tract 507.07**	**Tract 507.09**	**Tract 507.10**	**Tract 507.11**	**Tract 507.12**	**Tract 19**	**Tract 20**	**Tract 25**	**Tract 27**	**Tract 28**	**Tract 32**
Population	3,287	5,016	4,907	3,138	4,750	4,476	2,560	3,544	5,139	4,207	1,839	1,180	832	1,259	965	832
Number of Households	990	1,482	1,958	1,138	1,764	1,383	1,060	1,331	1,717	1,682	1,419	577	490	537	411	397
Number of Families	884	1,345	1,290	885	1,356	1,267	676	951	1,447	1,036	87	281	123	322	220	186
Median household income in 1999 (dollars)	$69,861	$84,634	$49,784	$54,068	$53,910	$77,993	$49,943	$54,051	$68,460	$51,044	$9,804	$27,986	$13,810	$28,750	$17,270	$17,104
Median family income in 1999 (dollars)	$75,107	$85,798	$53,913	$57,829	$57,885	$80,675	$61,473	$61,012	$69,544	$62,131	$22,946	$36,250	$16,797	$34,200	$23,393	$23,750
Per capita income in 1999 (dollars)	$23,152	$26,338	$21,941	$20,461	$22,180	$26,643	$24,295	$21,158	$28,107	$23,334	$10,833	$17,318	$11,405	$13,741	$10,008	$11,293
Percent of population for whom poverty status is determined - all ages (income in 1999 below poverty level) [1]	0.5%	1.6%	6.2%	3.9%	5.5%	1.1%	2.7%	6.2%	2.1%	3.4%	43.1%	19.9%	42.5%	19.8%	32.6%	24.5%
Percent of families for whom poverty status is determined (income in 1999 below poverty level)	0.0%	0.9%	5.9%	3.3%	3.7%	0.7%	1.2%	4.7%	1.2%	2.3%	0.0%	14.2%	46.3%	14.3%	27.7%	22.6%

TABLE B
INCOME AND POVERTY
2000 CENSUS

	N. end					
Demographic Group	**Wisconsin**	**Douglas County**	**Tract 201**	**Tract 202**	**Tract 206**	**Tract 208**
Population	5,211,603	41,918	1,709	573	4,290	3,299
Number of Households	2,084,544	17,787	813	320	2,067	1,319
Number of Families	1,395,037	11,321	395	111	1,029	930
Median household income in 1999 (dollars)	$43,791	$35,226	$21,635	$16,548	$26,020	$38,726
Median family income in 1999 (dollars)	$52,911	$43,813	$26,641	$15,202	$33,423	$43,871
Per capita income in 1999 (dollars)	$21,271	$17,638	$12,361	$13,602	$15,790	$16,965
Percent of population for whom poverty status is determined - all ages (income in 1999 below poverty level) [1]	8.7%	11.0%	21.4%	40.3%	20.7%	10.7%
Percent of families for whom poverty status is determined (income in 1999 below poverty level)	5.6%	7.6%	16.2%	40.5%	17.1%	8.9%

APPENDIX M

PUBLIC INVOLVEMENT

- **NLX Newsletter – November 2009**
- **NLX Flyer – July 2010**
- **Open House Summary Reports:**

  - Cambridge – December 3, 2009

  - Coon Rapids – December 8, 2009

  - Superior – December 9, 2009

  - Hinckley – December 10, 2009

  - Duluth – July 27, 2010

  - Minneapolis – July 28, 2010

  - Sandstone – July 29, 2010

  - Cambridge – August 3, 2010

NORTHERN LIGHTS EXPRESS

Minneapolis – Duluth/Superior Passenger Rail Alliance

Newsletter #1 November 2009

About the Minneapolis-Duluth/Superior Passenger Rail Alliance

NLX is spearheaded by a joint powers board, called the Minneapolis-Duluth/Superior Passenger Rail Alliance. It was formed in 2007 to explore options for renewing passenger rail service in the 155 mile corridor. The Alliance works with community partners and elected officials at the local, state and federal levels to move NLX forward. Already the Alliance has completed a feasibility study, continues to work closely with the BNSF Railway. The Alliance is working with the Minnesota Department of Transportation, Wisconsin Department of Transportation, and FRA on an environmental study anticipated to be completed by the end of 2010.

Alliance members include: the regional rail authorities of Hennepin, Anoka, Isanti, Pine, St. Louis and Lake Counties, and the cities of Minneapolis and Duluth. Also participating are Douglas County in Wisconsin, the Mille Lacs Band of Ojibwe, the cities of Coon Rapids, Cambridge, Hinckley, Sandstone and Superior in Wisconsin, and other agencies along the corridor. The group is led by St. Louis County Commissioner Steve Raukar, chair, and Anoka County Commissioner Dan Erhart, vice-chair.

NORTHERN LIGHTS EXPRESS

High Speed Passenger Rail is gaining momentum!

Comfortable, accessible, affordable rail service between Minneapolis and Duluth has been a vision of federal, state and local leaders. That vision has made significant progress toward reality. The proposed action offers an opportunity to provide reliable and competitive passenger rail service as a viable alternative to vehicular travel by:

- *Decreasing travel times;*
- *Providing safe and reliable transit service; and*
- *Providing amenities to improve passenger travel quality and comfort.*

Confirmation of the corridor's economic viability in the Northern Lights Express (NLX) Feasibility Study in 2007 supported funding for the next stage of the project. Over the next year, concept-level engineering plans and environmental review of NLX will be completed, facilitating completion of plans to begin construction in the next 5 years.

Recent accomplishments include:

- *NLX was designated one of eight top priorities for development by the National Passenger Rail Study Group, headed by the U.S. Secretary of Transportation, in December 2007.*
- *NLX feasibility study completed in December 2007.*
- *Received $1.1 million from the Federal Railroad Administration (FRA) in its first Capital Assistance Grant Program.*
- *$475,000 designated for NLX in the Fiscal Year 2009 Omnibus Appropriations Bill.*
- *A consultant has been hired and work has begun on environmental review and documentation and associated preliminary engineering.*
- *$825,000 invested by local cities and counties in the Corridor.*
- *$900,000 of Minnesota bonding has been leveraged with the $1.1 million from the FRA to start the environmental and preliminary engineering work.*
- *In the 2009 Minnesota legislative session, $26 million in bonding for rail projects was passed.*
- *Four years into the planning process, NLX is uniquely positioned to take advantage of funding opportunities through both the 2008 Passenger Rail Investment and Improvement Act and the 2009 American Recovery and Reinvestment Act.*

What is High Speed Rail?

High speed rail, just as its name implies, runs at higher maximum speeds than conventional rail. Improvements made to typical freight or passenger rail tracks to facilitate travel at these higher speeds include welded instead of butt-jointed rails and broader curves that allow comfortable travel at higher speeds. Parallel tracks and improved rail signaling systems facilitate travel by both high speed passenger service and freight rail in the same corridors. Safety improvements at roadway crossings better protect both rail and automobile travelers.

....continued other side

Upcoming Public Meetings

Please join us at one of the following public meetings to learn about plans to advance the NLX corridor. Representatives of the Alliance and the consultant team will be available to answer your questions and receive input. Your participation is important!

Directions to each meeting location will be posted to www.NorthernLightsExpress.org

Cambridge, Minnesota
Thursday, December 3, 2009, 4:30 – 6:00 pm
Brief presentation at 5 pm
Armed Forces Reserve Community Center – Assembly Hall
505 Spirit River Drive (County Road 70)
Cambridge, MN 55008

Coon Rapids, Minnesota
Tuesday, December 8, 2009, 4:30 – 6:30 pm
Brief presentation at 5 pm
Anoka-Ramsey Community College – Legacy Room (2nd Floor)
11200 Mississippi Blvd. NW
Coon Rapids, MN 55433

Superior, Wisconsin
Wednesday, December 9, 2009, 4:30 – 6:30 pm
Brief presentation at 5 pm
Superior Middle School - Cafeteria
3626 Hammond Ave., Superior, WI 54880

Hinkley, Minnesota
Thursday, December 10, 2009, 4:30 – 6:30 pm
Brief presentation at 5 pm
Fine Arts Center – Lobby
(enter from east parking lots at Hinckley-Finlayson High School)
201 Main St. E., Hinckley, MN 55037

For more information visit www.NorthernLightsExpress.org

Bob Manzoline, *St. Louis & Lake Regional Rail Authority, phone: (218)254-2575*

Jon Olson, *Anoka County, phone: (763)323-5789*

NORTHERN LIGHTS EXPRESS

Just as importantly, however, is a greater emphasis on passenger comfort and convenience. Rail stations are located in conjunction with other transportation facilities to allow easy connections to commuter rail, light rail transit, and busways as well as automobile facilities. Tickets are purchased at the station to enable quick and easy boarding with minimal delays at passenger stops. Once on the train, passengers are treated to a relaxing comfortable ride and high amenity service.

High speed rail connections between Minneapolis and Duluth will facilitate recreational and business travel alike. Connections in Minneapolis will allow continued travel along the Northstar corridor and to the south metro area along Hiawatha LRT as well as future LRT lines serving the Twin Cities region. Plans are in the works for high speed rail connections to Milwaukee, Chicago, and many destinations beyond.

Related planning efforts also underway

In addition to concept engineering and environmental documentation, a number of other planning efforts are underway that will support the NLX corridor. These efforts include:

- *Station area planning at the Duluth Depot*
- *Planning for a multi-modal facility connection Northstar Commuter Rail, Hiawatha LRT, future Central Corridor LRT and NLX at the new Twins Ballpark*
- *Plans to extend the Northstar corridor to the St. Cloud area*
- *Station area planning in the communities of Sandstone, Hinkley, Cambridge and Mora*
- *Midwest Regional Rail Initiative Planning including connections from Chicago to Minneapolis*
- *Comprehensive Statewide Freight and Passenger Rail Plan*

Evaluating the environmental impacts of NLX

NLX would provide transportation connections for a variety of passengers. However, transportation projects have the potential to negatively impact communities, natural environments and cultural resources if not planned and designed appropriately. Efforts are currently underway to identify critical resources in both the urban, suburban and rural areas of the corridor, and to take early measures to avoid or minimize impacts to those critical resources. NLX staff have initiated coordination with federal, state and local agencies to facilitate evaluation efforts.

Input from local communities is also critical to these efforts. The current NLX study has planned for meetings at three critical points in the planning process – project initiation, evaluation, and review of the environmental document – to inform planning and design at critical points in the project process. At each point in the process, we will hold meetings at a variety of locations throughout the corridor to encourage participation from residents and businesses.

The first series of meetings will be held December 3 – December 10, 2009. Please see sidebar – for more information about meeting locations. If you are not able to join us for one of these meetings, please visit the NLX website at www.NorthernLightsExpress.org to review project materials and provide your input via email. Your insights and input will be carefully considered and are appreciated.

NORTHERN LIGHTS EXPRESS

Minneapolis – Duluth/Superior Passenger Rail Alliance

Northern Lights Express Update: **July 2010**

About the Minneapolis-Duluth/Superior Passenger Rail Alliance

NLX is spearheaded by a joint powers board, called the Minneapolis-Duluth/Superior Passenger Rail Alliance. It was formed in 2007 to explore options for renewing passenger rail service in the 155 mile corridor. The Alliance works with community partners and elected officials at the local, state and federal levels to move NLX forward. Already the Alliance has completed a feasibility study, continues to work closely with the BNSF Railway. The Alliance is working with the Minnesota Department of Transportation, Wisconsin Department of Transportation, and FRA on an environmental study anticipated to be completed by the end of 2010.

Alliance members include: the regional rail authorities of Hennepin, Anoka, Isanti, Pine, St. Louis and Lake Counties, and the cities of Minneapolis and Duluth. Also participating are Douglas County in Wisconsin, the Mille Lacs Band of Ojibwe, the cities of Coon Rapids, Cambridge, Hinckley, Sandstone and Superior in Wisconsin, and other agencies along the corridor. The group is led by St. Louis County Commissioner Steve Raukar, chair, and Anoka County Commissioner Dan Erhart, vice-chair.

NORTHERN LIGHTS EXPRESS

Please join us!

Come hear about progress on the Northern Lights Express (NLX) Minneapolis to Duluth/Superior high speed passenger rail project since last December's public meetings. Learn more about ongoing study results, a recent public opinion survey, agency coordination activities, and connections to other transit options and destinations.

Duluth

Tuesday, July 27, 5 to 7 p.m.
The Depot, Great Hall
506 W. Michigan St.
Parking available in ramps
From I-35, take Mesaba Avenue exit and turn onto Fifth Avenue West.
The Depot is one block west.

Minneapolis

Wednesday, July 28, 5 to 7 p.m.
Hennepin County Environmental Services Building
417 N. Fifth St.
Located next to Target Field and easily accessible by transit
Enter from 6th Avenue (see www.NorthernLightsExpress.org for a map)
Free parking available after 5 p.m.

Sandstone

Thursday, July 29, 6 to 8 p.m.
Sandstone Senior Center
206 N. Main St.
From I-35, take Sandstone exit and turn east onto Highway 23.
Take Highway 123 to the right, which turns into Main Street.
The Senior Center is inside the American Legion.

Cambridge

Tuesday, August 3, 6:30 to 8:30 p.m.
Armed Forces Reserve Community Center
505 Spirit River Drive (County Road 70)
From Highway 65, take exit for Highway 95 (First Avenue) and turn west onto Highway 95. Drive through Cambridge and take a left on County Road 70 (Spirit River Drive).

Contact:

Bob Manzoline, Executive Director
Minneapolis-Duluth/Superior Passenger Rail Alliance,
phone: (218)254-2575
Email: bmanzoline@mndiscoverycenter.com

For more information visit: www.NorthernLightsExpress.org

NORTHERN LIGHTS EXPRESS PROJECT
SUMMARY OF PUBLIC INFORMATION OPEN HOUSE
CAMBRIDGE, MINNESOTA
December 3, 2009 from 4:30 p.m. to 6:00 p.m.

Introduction

A Public Information Open House for the Northern Lights Express high speed passenger rail project was held on Thursday, December 3, 2009 from 4:30 p.m. to 6:00 p.m. at the Armed Forces Reserve Community Center, Cambridge, Minnesota.

Notice of Public Information Meeting

Press releases announcing the Public Information Meeting were distributed to press contacts by SRF staff on November 19, 2009. The contacts were provided by Jill Brown and Birdie Oddo. Additionally, newsletters announcing the meeting were mailed to area community facilities and agencies the week of November 23, 2009. A PDF of the newsletter was emailed to the NLX Alliance Board meeting notification email list (approximately 90 people) on November 19, 2009. A reminder email was sent to the NLX Alliance Board meeting notification list the week of the meeting.

Attendees

The following agencies had representatives at the meeting to explain the project and answer questions:

NLX Alliance Board:	Bob Manzoline Jeanne Witzig Commissioner Larry Southerland
***Mn/DOT*:**	Dave Christianson
***SRF Consulting*:**	Chuck Gonderinger Beth Bartz Kelcie Young

An attendance record sheet was prominently displayed on a table at the front door and all persons entering were asked to sign in for the record. A total of 73 people signed in.

Summary of Open House

The meeting was an informal open house and with a short presentation at about 5:00. Attendees viewed informational exhibits and engaged in one-on-one or small group discussions with the project staff. Boards shown at the meeting were 36 by 48 inches in size. Copies of the presentation boards are attached.

Comment forms were made available to meeting attendees. Meeting attendees were encouraged to submit comments either directly at the meeting in a comment box, or by mail. Contact information for project staff was provided in the project newsletter.

Written Comments

A total of seven comments were received at the night of the Public Meeting and no comments were received after the meeting as of December 14, 2009. The comments are summarized below.

Summary of Comments

Project Process

- Questions about project timeline
- Meeting times are too early

Project Cost

- Concerns about cost estimates
- Will the Hinckley Casino participate in the cost?
- Support for project even though cost is high

Station Location

- Keep the number of stations to a minimum
- Concerns about a station near the Cambridge Mall due to traffic flow and increased development (comment from nearby resident)

Issues for Further Study

- Concerns about roadway/rail crossings
- Could the project revitalize the Cambridge Airport?
- Concerns about noise
- Price should be competitive with cost of driving
- Allow flexible departures from stations or allow transfers to allow passengers to get off train and visit local businesses and tourist sites`

Support for project

- Support for NLX as a transportation connection within the state and beyond
- Support for positive impacts to businesses that NLX could bring

NORTHERN LIGHTS EXPRESS PROJECT
SUMMARY OF PUBLIC INFORMATION OPEN HOUSE
COON RAPIDS, MINNESOTA
December 8, 2009 from 4:30 p.m. to 6:30 p.m.

Introduction

A Public Information Open House for the Northern Lights Express high speed passenger rail project was held on Tuesday, December 8, 2009 from 4:30 p.m. to 6:30 p.m. at the Anoka-Ramsey Community College, Coon Rapids, Minnesota.

Notice of Public Information Meeting

Press releases announcing the Public Information Meeting were distributed to press contacts by SRF staff on November 19, 2009. The contacts were provided by Jill Brown and Birdie Oddo. Additionally, newsletters announcing the meeting were mailed to area community facilities and agencies the week of November 23, 2009. A reminder email was sent to the NLX Alliance Board list the week of the meeting.

Attendees

The following agencies had representatives at the meeting to explain the project and answer questions:

NLX Alliance Board: Jeanne Witzig
Commissioner Dan Erhart

***SRF Consulting*:** Chuck Gonderinger
Nancy Frick
Kelcie Young

An attendance record sheet was prominently displayed on a table at the front door and all persons entering were asked to sign in for the record. A total of ten people signed in.

Summary of Open House

The meeting was an informal open house and with a short presentation at about 5:00. Attendees viewed informational exhibits and engaged in one-on-one or small group discussions with the project staff. Boards shown at the meeting were 36 by 48 inches in size.

Comment forms were made available to meeting attendees. Meeting attendees were encouraged to submit comments either directly at the meeting in a comment box, or by mail. Contact information for project staff was provided in the project newsletter.

Written Comments

A total of three comments were received at the night of the Public Meeting and no comments were received after the meeting as of December 14, 2009. The comments are summarized below.

Summary of Comments

Project Cost

- What is the projected fare?
- What is the comparative cost of adding a lane to 35E?
- When will the generated revenue be greater than the cost of operation?

Issues for Further Study

- How many permanent jobs will the project create?
- Access to/from 610 to Foley Station would allow for greater economic development opportunities

Support for project

- Concerns about lack of public interest in the project study

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NORTHERN LIGHTS EXPRESS PROJECT
SUMMARY OF PUBLIC INFORMATION OPEN HOUSE
SUPERIOR, WISCONSIN
December 9, 2009 from 4:30 p.m. to 6:30 p.m.

Introduction

A Public Information Open House for the Northern Lights Express high speed passenger rail project was held on Wednesday, December 9, 2009 from 4:30 p.m. to 6:30 p.m. at the Superior Middle School, Superior, Wisconsin.

Notice of Public Information Meeting

Press releases announcing the Public Information Meeting were distributed to press contacts by SRF staff on November 19, 2009. The contacts were provided by Jill Brown and Birdie Oddo. Additionally, newsletters announcing the meeting were mailed to area community facilities and agencies the week of November 23, 2009. A reminder email was sent to the NLX Alliance Board list the week of the meeting.

Attendees

The following agencies had representatives at the meeting to explain the project and answer questions:

NLX Alliance Board:	Jeanne Witzig Bob Manzoline Commissioner Nick Baker
***SRF Consulting*:**	Beth Bartz Kelcie Young

An attendance record sheet was prominently displayed on a table at the front door and all persons entering were asked to sign in for the record. A total of 18 people signed in.

Summary of Open House

The meeting was an informal open house and with a short presentation at about 5:00. Attendees viewed informational exhibits and engaged in one-on-one or small group discussions with the project staff. Boards shown at the meeting were 36 by 48 inches in size.

Comment forms were made available to meeting attendees. Meeting attendees were encouraged to submit comments either directly at the meeting in a comment box, or by mail. Contact information for project staff was provided in the project newsletter.

Written Comments

A total of three comments were received at the night of the Public Meeting and two comments were received after the meeting as of December 17, 2009. The comments are summarized below.

Summary of Comments

Project Cost

- Concerns about study costs
- Questions about overall project costs
- Concerns about tax impacts to states and municipalities
- More emphasis should be placed on the local match and funding sources

Issues for Further Study

- Questions about affordability of fare
- Will the line connect with light rail in the Twin Cities?
- Will the terminal in Superior or Duluth include a multimodal transportation facility?
- Coordinate service with the proposed Bethel-Minneapolis commuter service

Support for project

- Concerns about lack of public interest in the project study
- Concerns about cost of studies to Superior and Douglas County
- Would like to see NLX as a local referendum
- Train service is needed to augment and coordinate with airline travel to reduce traffic and exhaust, provide a more fuel-efficient option, and bring economic growth

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SRF No. 0096894

NORTHERN LIGHTS EXPRESS PROJECT
SUMMARY OF PUBLIC INFORMATION OPEN HOUSE
HINCKLEY, MINNESOTA
December 10, 2009 from 4:30 p.m. to 6:30 p.m.

Introduction

A Public Information Open House for the Northern Lights Express high speed passenger rail project was held on Thursday, December 10, 2009 from 4:30 p.m. to 6:30 p.m. at the Hinckley Fine Arts Center, Hinckley, Minnesota.

Notice of Public Information Meeting

Press releases announcing the Public Information Meeting were distributed to press contacts by SRF staff on November 19, 2009. The contacts were provided by Jill Brown and Birdie Oddo. Additionally, newsletters announcing the meeting were mailed to area community facilities and agencies the week of November 23, 2009. A reminder email was sent to the NLX Alliance Board list the week of the meeting.

Attendees

The following agencies had representatives at the meeting to explain the project and answer questions:

NLX Alliance Board: Jeanne Witzig
Bob Manzoline
Commissioner Dan Erhart
Commissioner Doug Carlson

SRF Consulting: Beth Bartz
Kelcie Young

An attendance record sheet was prominently displayed on a table at the front door and all persons entering were asked to sign in for the record. A total of 34 people signed in.

Summary of Open House

The meeting was an informal open house and with a short presentation at about 5:00. Attendees viewed informational exhibits and engaged in one-on-one or small group discussions with the project staff. Boards shown at the meeting were 36 by 48 inches in size.

Comment forms were made available to meeting attendees. Meeting attendees were encouraged to submit comments either directly at the meeting in a comment box, or by mail. Contact information for project staff was provided in the project newsletter.

Written Comments

A total of ten comments were received at the night of the Public Meeting and no comments were received after the meeting as of December 14, 2009. The comments are summarized below.

Summary of Comments

Project Cost

- Concerns about funding and federal debt

Issues for Further Study

- Difficult for Hinckley to plan for a station since the casino loop plans are not known
- Concerns about use of eminent domain – "not necessary to allow transportation to a remote area."
- Concerns about freight train congestion with the addition of passenger rail
- Questions about the number of trains through town each day
- Does BNSF support the track upgrades necessary for high speed passenger rail?
- Consider using the Munger Trail for a connection into Duluth
- Would like to see Hinckley station in Hinckley rather than at the casino
- Concerns about whether the project would require taking of the Senior Center land, but could be okay if the facility is relocated
- Will the casino be willing to work with the federal agency that oversees railroads?
- Concerns about safety and access for an unregulated crossing
- Questions about station locations
- Congestion reduction is not needed outside the Twin Cities area

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SRF No. 0096894

NORTHERN LIGHTS EXPRESS PROJECT
SUMMARY OF PUBLIC INFORMATION OPEN HOUSE
DULUTH, MINNESOTA
July 27, 2010 from 5:00 p.m. to 7:00 p.m.

Introduction

A Public Information Open House for the Northern Lights Express high speed passenger rail project was held on Tuesday, July 27, 2010 from 5:00 p.m. to 7:00 p.m. at the St. Louis County Heritage and Arts Center (The Depot), Duluth, Minnesota.

Notice of Public Information Meeting

Press releases announcing the Public Information Meeting were distributed to press contacts by SRF staff on July 13, 2010. The contacts were provided by Jill Brown and Birdie Oddo. Additionally, flyers announcing the meeting were mailed to area community facilities and agencies the week of July 13, 2010. A PDF of the newsletter was emailed to the NLX Alliance Board meeting notification email list (approximately 90 people) on July 13, 2010.

Attendees

The following agencies had representatives at the meeting to explain the project and answer questions:

NLX Alliance:	Bob Manzoline, NLX Exec Dir Jeanne Witzig, KHA Ken Buehler, NLX staff Steve Fecker, NLX staff
***SRF Consulting*:**	Nancy Frick Kelcie Young

An attendance record sheet was prominently displayed on a table at the front door and all persons entering were asked to sign in for the record. A total of six people signed in.

Summary of Open House

The meeting was an informal open house and with a short presentation at about 5:30. Attendees viewed informational exhibits and engaged in one-on-one or small group discussions with the project staff. Boards shown at the meeting were 36 by 48 inches in size. Copies of the presentation boards are attached.

Comment forms were made available to meeting attendees. Meeting attendees were encouraged to submit comments either directly at the meeting in a comment box, or by mail. Contact information for project staff was provided in the project newsletter.

Written Comments

A total of one comment was received at the night of the Public Meeting and no comments were received after the meeting as of August 5, 2010. The comments are summarized below.

Summary of Comments

Support for project

- NLX will be beneficial to the hospitality industry near the Duluth Depot and should be used as a marketing opportunity. The project should coordinate with local hotels and businesses to offer discounts for riders.

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NORTHERN LIGHTS EXPRESS PROJECT
SUMMARY OF PUBLIC INFORMATION OPEN HOUSE
MINNEAPOLIS, MINNESOTA
July 28, 2010 from 5:00 p.m. to 7:00 p.m.

Introduction

A Public Information Open House for the Northern Lights Express high speed passenger rail project was held on Wednesday, July 28, 2010 from 5:00 p.m. to 7:00 p.m. at the Hennepin County Environmental Services Building, Minneapolis, Minnesota.

Notice of Public Information Meeting

Press releases announcing the Public Information Meeting were distributed to press contacts by SRF staff on July 13, 2010. The contacts were provided by Jill Brown and Birdie Oddo. Additionally, flyers announcing the meeting were mailed to area community facilities and agencies the week of July 13, 2010. A PDF of the newsletter was emailed to the NLX Alliance Board meeting notification email list (approximately 90 people) on July 13, 2010.

Attendees

The following agencies had representatives at the meeting to explain the project and answer questions:

NLX Alliance:	Jeanne Witzig, KHA Joe Gladke, Hennepin County Kim Benson, Hennepin County Frank Pafko, Mn/DOT Jill Brown, NLX staff
***SRF Consulting*:**	Beth Bartz Kelcie Young

An attendance record sheet was prominently displayed on a table at the front door and all persons entering were asked to sign in for the record. A total of 22 people signed in.

Summary of Open House

The meeting was an informal open house and with a short presentation at about 5:30. Attendees viewed informational exhibits and engaged in one-on-one or small group discussions with the project staff. Boards shown at the meeting were 36 by 48 inches in size. Copies of the presentation boards are attached.

Comment forms were made available to meeting attendees. Meeting attendees were encouraged to submit comments either directly at the meeting in a comment box, or by mail. Contact information for project staff was provided in the project newsletter.

Written Comments

A total of one comment was received at the night of the Public Meeting and no comments were received after the meeting as of August 5, 2010. The comments are summarized below.

Summary of Comments

Issues for Further Study

- Concerns about diesel exhaust exposure for downtown Minneapolis residents due to staging/idling BNSF trains.

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NORTHERN LIGHTS EXPRESS PROJECT
SUMMARY OF PUBLIC INFORMATION OPEN HOUSE
SANDSTONE, MINNESOTA
July 29, 2010 from 6:00 p.m. to 8:00 p.m.

Introduction

A Public Information Open House for the Northern Lights Express high speed passenger rail project was held on Thursday, July 29, 2010 from 6:00 p.m. to 8:00 p.m. at the Sandstone Senior Center, Sandstone, Minnesota.

Notice of Public Information Meeting

Press releases announcing the Public Information Meeting were distributed to press contacts by SRF staff on July 13, 2010. The contacts were provided by Jill Brown and Birdie Oddo. Additionally, flyers announcing the meeting were mailed to area community facilities and agencies the week of July 13, 2010. A PDF of the newsletter was emailed to the NLX Alliance Board meeting notification email list (approximately 90 people) on July 13, 2010.

Attendees

The following agencies had representatives at the meeting to explain the project and answer questions:

NLX Alliance:	Bob Manzoline, NLX Exec Dir Jeanne Witzig, KHA Commissioner Doug Carlson, NLX Board
***SRF Consulting*:**	Beth Bartz Kelcie Young

An attendance record sheet was prominently displayed on a table at the front door and all persons entering were asked to sign in for the record. A total of 47 people signed in.

Summary of Open House

The meeting was an informal open house and with a short presentation at about 6:30. Attendees viewed informational exhibits and engaged in one-on-one or small group discussions with the project staff. Boards shown at the meeting were 36 by 48 inches in size. Copies of the presentation boards are attached.

Comment forms were made available to meeting attendees. Meeting attendees were encouraged to submit comments either directly at the meeting in a comment box, or by mail. Contact information for project staff was provided in the project newsletter.

Written Comments

A total of five comments were received at the night of the Public Meeting and no comments were received after the meeting as of August 5, 2010. The comments are summarized below.

Summary of Comments

Project Process

- Let the planning process proceed without political intervention.

Sandstone Facilities

- Bring station and/or maintenance facility to Sandstone.

Issues/Concerns for Further Study

- Parking cost and availability at stations.
- Suggestion for the Hinckley stop to stay on existing rail and use a shuttle to reach the casino to reduce cost and environmental impacts.

Support for project

- Support for NLX as an environmentally friendly travel mode easier than driving
- Encourage commuters to use NLX to encourage people to move to Sandstone and create jobs and housing.

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SRF No. 0096894

NORTHERN LIGHTS EXPRESS PROJECT
SUMMARY OF PUBLIC INFORMATION OPEN HOUSE
CAMBRIDGE, MINNESOTA
August 3, 2010 from 6:30 p.m. to 8:30 p.m.

Introduction

A Public Information Open House for the Northern Lights Express high speed passenger rail project was held on Tuesday, August 3, 2010 from 6:30 p.m. to 8:30 p.m. at the Armed Forces Reserve Community Center, Cambridge, Minnesota.

Notice of Public Information Meeting

Press releases announcing the Public Information Meeting were distributed to press contacts by SRF staff on July 13, 2010. The contacts were provided by Jill Brown and Birdie Oddo. Additionally, flyers announcing the meeting were mailed to area community facilities and agencies the week of July 13, 2010. A PDF of the newsletter was emailed to the NLX Alliance Board meeting notification email list (approximately 90 people) on July 13, 2010.

Attendees

The following agencies had representatives at the meeting to explain the project and answer questions:

NLX Alliance:	Bob Manzoline, NLX Exec Dir Jeanne Witzig, KHA Commissioner Larry Southerland, NLX Board Commissioner, Dan Erhart NLX Board Co-Chair Dave Christianson, Mn/DOT
***SRF Consulting*:**	Beth Bartz Kelcie Young

An attendance record sheet was prominently displayed on a table at the front door and all persons entering were asked to sign in for the record. A total of 53 people signed in.

Summary of Open House

The meeting was an informal open house and with a short presentation at about 7:00. Attendees viewed informational exhibits and engaged in one-on-one or small group discussions with the project staff. Boards shown at the meeting were 36 by 48 inches in size. Copies of the presentation boards are attached.

Comment forms were made available to meeting attendees. Meeting attendees were encouraged to submit comments either directly at the meeting in a comment box, or by mail. Contact information for project staff was provided in the project newsletter.

Written Comments

A total of three comments were received at the night of the Public Meeting and no comments were received after the meeting as of August 5, 2010. The comments are summarized below.

Summary of Comments

Issues for Further Study

- Trains in Europe have "regular" and "limited stop" or express service, and perhaps NLX could use that model to decide how many stations are needed.

Support for project

- Support for NLX as a transportation option for commuters to keep residents in the area.

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