

209974

HARKINS CUNNINGHAM LLP

Attorneys at Law

Paul A. Cunningham  
202.973.7601  
pac@harkinscunningham.com

Suite 600  
801 Pennsylvania Avenue, N.W.  
Washington, D.C. 20004-2615  
Telephone 202.973.7600  
Facsimile 202.973.7610

January 28, 2004

**BY HAND**

Ms. Victoria J. Rutson, Chief  
Section of Environmental Analysis  
Surface Transportation Board  
1925 K Street, N.W., Room 504  
Washington, DC 20423-0001



ENTERED  
Office of Proceedings  
JAN 28 2004  
Part of  
Public Record

**Re: STB Finance Docket No. 34424, Railroad Control Application, Canadian National Railway Company and Grand Trunk Corporation – Control – Duluth, Missabe and Iron Range Railway Company, Bessemer and Lake Erie Railroad Company, and The Pittsburgh & Conneaut Dock Company**

Dear Ms. Rutson:

This responds to your request that Canadian National Railway Company ("CN") supplement CN's Environmental Appendix. CN had previously submitted its Environmental Appendix to the Section of Environmental Analysis ("SEA") and made it available to the public. You requested a supplement that would address certain issues raised by the United States Department of Transportation ("DOT") and by Region 5 of the United States Environmental Protection Agency ("EPA") in their comments on the Environmental Appendix.<sup>1</sup> In particular, you asked that the supplement to the Environmental Appendix address issues relating to (1) noise; (2) grade crossing delay; (3) safety at grade crossings; (4) environmental justice; and (5) historic preservation.

CN retained HDR Engineering, Inc. ("HDR"), to examine these issues and to prepare CN's supplement. HDR's findings are contained in the attached report to CN and summarized below. Those findings support CN's earlier conclusion that the potential environmental impacts resulting from the proposed transaction would not be significant. CN

<sup>1</sup> Comments of the United States Department of Transportation on the Environmental Appendix (DOT-1) (Dec. 10, 2003); Letter to Phillis Johnson-Ball (Environmental Project Manager, SEA) from Kenneth A. Westlake (Chief, Environmental Planning and Evaluation Branch, Region 5, EPA) (Dec. 12, 2003).

PHILADELPHIA  
2800 One Commerce Square  
2005 Market Street  
Philadelphia, PA 19103-7042  
215.851.6700

NEW YORK  
One Penn Plaza  
25th Floor  
New York, NY 10119-2532  
212.329.1750

# HARKINS CUNNINGHAM LLP

*Attorneys at Law*

Ms. Victoria J. Rutson, Chief  
January 28, 2004  
Page 2

therefore requests that the Board exercise its authority under 49 C.F.R. § 1105.6(d) to determine that the proposed transaction is one for which preparation of an Environmental Assessment ("EA") or Environmental Impact Statement ("EIS") is not required under NEPA and the Board's environmental rules.

CN explained in the Environmental Appendix that, because there would be no construction or abandonment of rail lines, and no construction or operational changes in connection with rail yards or intermodal facilities, the proposed transaction should have no impact on land use, biological resources, or natural resources. No party has disagreed with that conclusion.

The only operational change contemplated as a result of the proposed transaction that could have environmental consequences is the coordination of operations on the parallel CN and DMIR lines between Shelton Junction and Nopeming Junction, Minnesota. As CN explained in the Environmental Appendix, CN has projected that increased rail traffic would not exceed the Board's 8-train threshold for analysis on any affected rail line segment. Traffic would exceed the Board's increased tonnage threshold of 100% only on the 6.0-mile segment of DMIR track passing through the rural area between Adolph and Nopeming Junction, Minnesota, on which CN projects a net increase of 5.7 trains per day.<sup>2</sup>

It was these anticipated changes that gave rise to the concerns of EPA and DOT. As we show in the following summary of HDR's findings regarding the subjects of the DOT and EPA comments, none of the impacts from those changes would "significantly affect[] the quality of the human environment."<sup>3</sup> Thus, CN believes that there is no need for further environmental review under NEPA.

---

<sup>2</sup> This increase would result from re-routing an average of 6.5 southbound trains per day, now operating on CN's parallel line, from that line to the DMIR line, and from re-routing an average of 0.8 northbound trains per day, now operating on the DMIR line, to the parallel CN line.

In the Environmental Appendix, CN noted that the iron ore mine and taconite pellet plant operated by Eveleth Mines, LLC, doing business as EVTAC Mining ("EVTAC"), had closed on May 15, 2003, and that if rail traffic moving to and from those facilities was excluded from the traffic base, then the 100% tonnage threshold would be exceeded on other portions of the DMIR line between Shelton Junction and Nopeming Junction. Since the submission of the Environmental Appendix, the EVTAC facilities have been acquired by United Taconite LLC (a joint venture of Cleveland-Cliffs, Inc., and Laiwu Steel Group, a Chinese enterprise). United Taconite has resumed production at those facilities. Therefore, the former volumes of rail traffic to and from those facilities should appropriately be included in the traffic base. As a result, the only rail line segment on which any projected traffic increases would exceed the Board's thresholds for environmental analysis is the 6.0-mile segment of DMIR track between Adolph and Nopeming Junction, Minnesota.

<sup>3</sup> 42 U.S.C. §4332(2)(C).

## HARKINS CUNNINGHAM LLP

*Attorneys at Law*

Ms. Victoria J. Rutson, Chief

January 28, 2004

Page 3

Noise: In its comments, EPA stated that the examination of noise impacts of the proposed transaction should include the number of trains per day, the time of day when trains are expected to travel through the lightly populated, rural community along the DMIR line between Adolph and Nopeming Junction, and the proximity of that line to residential or other sensitive units. As noted above, CN has projected a net increase of 5.7 trains per day on that line. Without control of, and experience on the line, CN cannot reliably predict the times of day when trains would operate over that line, and so instructed HDR to assume for purposes of its analyses that the trains would be evenly spaced throughout the daytime and nighttime hours. HDR's analyses indicate that the noise impacts of the proposed transaction would be minimal. There do not appear to be any schools or hospitals near this rail line; the only potentially sensitive receptors would be farmsteads or other residential buildings. Only a very small number of such receptors lie near the affected rail line, and HDR has determined that only one receptor is located close enough to the line that transaction-related increases in train traffic could cause Ldn noise levels to rise by 3dBA or more and to a level of 65 dBA. These noise impacts of the proposed transaction are comparable to those which SEA determined to be insignificant in STB Finance Docket No. 34002<sup>4</sup> and should similarly be regarded as insignificant here.

Environmental Justice. EPA asked whether the rural community adjacent to the Adolph-to-Nopeming Junction segment is classified as an environmental justice community. HDR has examined the affected area and determined that it does not contain any environmental justice populations. Accordingly, the proposed transaction would have no significant impacts on environmental justice.

Traffic Delay at Grade Crossings. There are 37 grade crossings on the DMIR rail line for which rail traffic increases have been projected. Only seven of these cross the segment between Adolph and Nopeming Junction on which rail tonnage growth is projected to exceed the Board's 100% threshold for environmental analysis. In recent cases, the Board has judged that delay at grade crossings would be significant only if the increase in average delay per delayed vehicle ( $D_a$ ) would exceed 30 seconds as a result of the transaction under review.<sup>5</sup> HDR has determined that the maximum increase in  $D_a$  resulting from the proposed transaction would be 0.29 minutes (17.4 seconds), which is 42% lower than the 30-second criterion of significance applied in other cases. The increase in  $D_a$  would be 17.4 seconds only at the seven crossings between Adolph and Nopeming Junction. This increase in  $D_a$  is largely attributable to the fact

---

<sup>4</sup> Environmental Assessment at 5-9 (served Apr. 12, 2002) (six residences within 500 feet of affected line, with noise levels between 60 and 67 dBA), *Alamo North Texas Railroad Corporation – Construction and Operation Exemption – In Wise County, Texas*, STB Finance Docket No. 34002.

<sup>5</sup> E.g., Environmental Assessment at 4-14 (served July 20, 2001), *Illinois Central Railroad Company – Construction and Operation – In East Baton Rouge Parish, Louisiana*, STB Finance Docket No. 33877.

## HARKINS CUNNINGHAM LLP

*Attorneys at Law*

Ms. Victoria J. Rutson, Chief  
January 28, 2004  
Page 4

that there is presently little train traffic on the segment at all.<sup>6</sup> Average delay for all vehicles ( $D_v$ ) on this segment would rise to 0.07 minutes (4.2 seconds), which is no higher than  $D_v$  on any other affected segment. Such minimal increases in traffic delays would not have a significant effect on the environment.

Traffic Safety at Grade Crossings. DOT requested that CN consult with the public agencies responsible for grade crossings that would be affected by increases in train traffic, to determine whether and to what extent safety may be compromised by the projected operational changes, and whether suitable protection measures are in place. As CN has noted in its Safety Integration Plan (submitted to the Board on December 15, 2003), the list contained in Appendix B of the Environmental Appendix (based on data from DOT) shows that 17 of the 37 affected grade crossings have average daily traffic ("ADT") of fewer than 100 vehicles, and, of the remaining 20, 14 have ADT of fewer than 500 vehicles day (based on data from DOT). The remaining six crossings, with ADT over 500, have active warning systems in place. Four of those, including the two with the highest traffic volumes, have gates and constant warning time circuitry.<sup>7</sup> Accordingly, SEA may appropriately judge the effects of the proposed transaction on safety at grade crossings to be insignificant.

Nevertheless, as recommended by DOT, CN is consulting with the Minnesota Department of Transportation ("MnDOT") to determine whether, in MnDOT's view, the crossing protection at affected grade crossings is appropriate for projected vehicular and train traffic. DOT's comments indicate that, if CN and MnDOT agree on the appropriate level of crossing protection, DOT would not regard any further analysis to be necessary. CN does not believe MnDOT would find existing crossing protection to be inadequate for expected train traffic at any affected grade crossing, but will notify SEA in any event of whatever response it receives from MnDOT.

In addition, EPA requested that the discussion of grade crossings include rail passenger safety. The issue of passenger safety does not arise in connection with the proposed transaction because no passenger trains operate over either of the parallel rail lines between Shelton Junction and Nopeming Junction that could be affected by shifts of rail traffic.

---

<sup>6</sup> Increases in  $D_a$  would be much lower – between 0.04 and 0.12 minutes (2.4 to 7.2 seconds) – on other affected rail segments, even though the net increases in train traffic on those segments (between 5.4 and 6.5 trains per day) would be approximately the same as the 5.7 per day net increase on the segment between Adolph and Nopeming Junction.

<sup>7</sup> Constant warning time ("CWT") circuitry is able to sense a train as it approaches a crossing, measuring its speed and distance from the crossing, and activating the crossing gate protection at the appropriate time before the passage of the train. Traffic control systems equipped with CWT help to prevent unnecessarily long waits for slow moving trains and contribute to safety by decreasing the likelihood that motorists frustrated by long delays will attempt to drive around the gates.

# HARKINS CUNNINGHAM LLP

*Attorneys at Law*

Ms. Victoria J. Rutson, Chief

January 28, 2004

Page 5

Cultural Resources. Section 106 of the National Historic Preservation Act (“NHPA”)<sup>8</sup> provides that, before licensing any undertaking (such as the proposed transaction in this case), a federal agency must “take into account the effect of the undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register [of Historic Places].” HDR has determined that the DMIR car and locomotive shops at Proctor, Minnesota, appear to be eligible for inclusion in the National Register. CN, however, as stated in its Environmental Appendix, has no plans to dispose of or alter the Proctor shops, or any other properties that are 50 years old or older.<sup>9</sup> The proposed transaction should therefore have no effect on those properties that requires review under section 106 of NHPA. Moreover, the proposed transaction constitutes “common control through stock ownership . . . which will not substantially change the level of maintenance of railroad property”<sup>10</sup> and thus is exempt from historic review under the Board’s regulations implementing NHPA.

EPA, however, requested that the Minnesota State Historic Preservation Office (“SHPO”) be contacted. CN has therefore asked HDR to contact the Minnesota SHPO to request its views on the impact of the proposed transaction on the shops at Proctor. At the time HDR prepared the attached supplement, HDR had not yet received any comments from the SHPO, but since that time has received a copy of a letter that was sent to SEA recommending that the Board consult with the Advisory Council on Historic Preservation (“ACHP”) to determine whether the proposed transaction has the potential to cause effects on historic properties and therefore would be subject to review under the process outlined at 36 C.F.R. Part 800 (the “section 106 process”). Although the Board’s regulations clearly provide for exclusion of a transaction such as this one from historic review, CN has asked HDR to contact the ACHP and to request their comments on potential impacts of the proposed transaction on historic properties. CN will notify SEA of whatever response is received from the ACHP.

Other Issues. EPA also requested that CN be required to revise its documentation regarding the expected increase in number of trains per day, annual gross ton-miles, rail yard activity, use of intermodal facilities, etc., if CN should connect its existing rail lines with those of B&LE or P&C Dock. CN is unable to connect with those lines; but if it should acquire the capacity to do so before the date of a final decision by the Board in this proceeding, CN will provide SEA with the requested information.

\* \* \* \* \*

---

<sup>8</sup> 16 U.S.C. § 470f.

<sup>9</sup> Environmental Appendix at 12.

<sup>10</sup> 49 C.F.R. § 1105.8(b)(3).

HARKINS CUNNINGHAM LLP

*Attorneys at Law*

Ms. Victoria J. Rutson, Chief

January 28, 2004

Page 6

This additional information, combined with that already provided in the Environmental Appendix, should enable SEA to conclude that the proposed transaction has no potential to cause significant impacts on the human environment. That conclusion would warrant the exercise of the Board's authority under 49 C.F.R. § 1105.6(d) to reclassify the proposed transaction as one for which no further environmental documentation (EA or EIS) is required in order to satisfy the Board's obligations under NEPA.<sup>11</sup>

Please call me if you have any questions regarding any of the additional information provided in CN's supplement or the proposed transaction.

Very truly yours,



Paul A. Cunningham

Attachment

---

<sup>11</sup> This reclassification, based on SEA's judgment in this individual case that the transaction has no potential for significant environmental impacts, can be analogized to a "categorical exclusion" (such as that made in promulgating 49 C.F.R. § 1105.6(c)) for a category of transactions, in which the Board determines that the transactions in that category do not individually or cumulatively have a significant effect on the human environment. See 40 C.F.R. § 1508.4.

|          |                                                                                   |          |       |
|----------|-----------------------------------------------------------------------------------|----------|-------|
| To:      | <b>Jim Guinivan, Normand Pellerin</b>                                             |          |       |
| From:    | <b>Mark Wollschlager</b>                                                          | Project: | 10323 |
| Subject: | Supplemental environmental information CN/DM&IR transaction. STB Docket No. 34424 |          |       |
| Date:    | 1/20/04                                                                           |          |       |

We have reviewed the Environmental Appendix, the EPA comment letter and the USDOT comment letter, as well as the noise analysis provided by ATS Consulting, LLC. As to those issues you requested input on, the following summarizes our findings.

## 1. NOISE

CN has informed us that it presently operates an average of approximately 13 trains per day (6.5 in each direction) over the lines of its subsidiary, the Duluth, Winnipeg and Pacific Railway Company (DWP) between Shelton Junction and Nopeming Junction, MN. The Environmental Appendix states that, upon consummation of CN's proposed acquisition of control of DMIR, DWP and DMIR would exchange trackage rights over their parallel lines between Shelton Junction and Nopeming Junction, MN. CN assumed, for purposes of the Environmental Appendix, that it would use those trackage rights to re-route the 6.5 southbound trains that now operate over the DWP line to the DMIR line. This increase of traffic on the DMIR line, combined with the shift of an average of 0.8 northbound DMIR trains to the parallel DWP line, would be expected to result in a net tonnage increase of greater than 100% on the 6.0 miles of DMIR rail line between Adolph and Nopeming Junction, MN.

The rail line segment from Adolph to Nopeming Junction runs through a fairly lightly populated rural area. The sensitive receptors in this area consist of farmsteads and other residential buildings. There do not appear to be any schools or hospitals in close proximity to the rail line.

In response to various comments on the Environmental Appendix, this memo provides additional information about the potential effects of this increase.

As indicated in the Environmental Appendix, CN has assumed that a net average of 5.7 additional trains per day would operate over the DMIR track between Adolph and Nopeming Junction. CN does not know what time of day the additional trains can be expected to move over the affected track, therefore it is assumed for purposes of this analysis that the trains would be evenly spaced throughout the day and nighttime hours.

ATS Consulting, LLC has conducted an analysis of the expected noise impacts of this additional traffic. ATS determined that, with that additional traffic, wayside noise would be at 65 dBA Ldn for a distance of 105 feet from the center line of the rail right-of-way (compared to 20 feet with existing traffic), and that wayside noise levels would increase by 3 dBA Ldn up to 337 feet from the center line (i.e., the 65 dBA contour would be extended to 105 feet, and the 3 dBA incremental noise contour would be at 337 feet).

ATS also determined that, in the vicinity of at-grade crossings, where engine horns are sounded on approaching and passing through the crossing, horn noise would be at 65 dBA Ldn for a distance of 190 feet from the center line, and that horn noise levels would increase by 3 dBA Ldn up to 583 feet from the center line (i.e., the 65 dBA noise contour would be extended to 190 feet, and the 3 dBA incremental noise contour would be at 583 feet).

Nonetheless, these changes in noise levels appear to have had relatively minimal impacts. Using aerial photos and a field visit, CN has determined the number of sensitive receptors lying within the future 65 dBA and 3 dBA incremental noise contours identified by ATS. There appears to be only one sensitive receptor within the future 65 dBA Ldn contour and 17 sensitive receptors within the 3dBA incremental contour. This would not appear to be a significant change.

## **2. COMMUNITY – ENVIRONMENTAL JUSTICE**

### **ENVIRONMENTAL JUSTICE**

#### **Affected Environment**

We have also been asked to determine whether the rural community that would be affected by traffic increases of 100% or more would be classified as an environmental justice community. Environmental Justice (EJ) addresses equity in all federally funded programs and activities, in compliance with Title VI of the 1964 Civil Rights Act and Executive Order (EO) 12898 (Federal Actions to Address Environmental Justice in Minority and Low-Income Populations). According to Title VI and EO 12898, Federal agencies must identify and address the potential disproportionately high adverse environmental effects on minority and low-income populations, referred to as EJ populations, prior to permitting or approving a program or activity or providing Federal funds.

To comply with the regulations of Title VI and EO 12898, environmental and socioeconomic characteristics of the region surrounding the Proposed Project corridor were examined. This was done by studying the minority and low-income populations within St. Louis County, and

comparing these populations and groups with those found in the census tract-block groups<sup>1</sup> encompassing the Proposed Project area.

### ***Minority Populations***

Minority populations are made up of two groups, racial minority and ethnic minority. The US Census Bureau defines race as, "a self-identification data item in which respondents choose the race or races with which they most closely identify." This study of racial minorities within the proposed project area used data from the US Census Bureau collected for the five minimum race categories as required by the Federal Office of Management and Budget (OMB), including the following categories:

- ❖ White alone
- ❖ Black or African-American alone
- ❖ American Indian or Alaska Native alone
- ❖ Asian alone
- ❖ Native Hawaiian or other Pacific Islander alone.

In addition, two other categories included by the US Census Bureau for racial minorities, Some Other Race Alone and Two or More Races, were used for this study.

Ethnicity is classified by the US Census Bureau as, "people whose origins are from Spain, the Spanish-speaking countries of Central or South America, the Caribbean, or those identifying themselves generally as Spanish, Spanish-American, etc." (US Census Bureau Glossary, 2000). This study of ethnic minorities within the Proposed Project area used data from the US Census Bureau collected for Spanish, Hispanic, and Latino people of any race.

The racial minority population within the Proposed Project area is a smaller percentage of the population than that of St. Louis County, but the ethnic minority population is a slightly higher percentage than that of St. Louis County. Table 2.1 identifies the specific racial and ethnic compositions for St. Louis County, and the block groups within the Proposed Project area.

---

<sup>1</sup> The U.S. Census Bureau Glossary defines census tracts-block groups as "the smallest geographic unit for which the Census Bureau tabulates sample data. A block group consists of all the blocks within a census tract with the same beginning number" (2000).

**TABLE 2.1 – DEMOGRAPHICS**

| AREA                                         | TOTAL<br>POPULATION | CAUCASIAN    | RACIAL<br>MINORITY | ETHNIC<br>MINORITY |
|----------------------------------------------|---------------------|--------------|--------------------|--------------------|
| <b>St. Louis County</b>                      | 200,528             | 94.9%        | 5.1%               | 0.83%              |
| <b>Project Area Census Tract-Block Group</b> |                     |              |                    |                    |
| <b>102-1</b>                                 | 1,713               | 96.2%        | 3.7%               | 0.82%              |
| <b>103-3</b>                                 | 871                 | 97.7%        | 2.3%               | 1.72%              |
| <b>111-5</b>                                 | 1,860               | 96.8%        | 3.1                | 0.48%              |
| <b>Total Project Area</b>                    | <b>4,444</b>        | <b>96.8%</b> | <b>3.2%</b>        | <b>0.86%</b>       |

*Source: U.S. Census Bureau, 2000, Census Summary File 1 (SF1)*

### ***Low-income Populations***

Low-income populations were identified by studying the Median Household Income and Percentage of Persons Below Poverty Level for the block groups in the Proposed Project area and comparing that to St. Louis County. The Median Household Income value for an area divides the income distribution into two groups, that is, half of the households in the designated area have a higher income and half of the households have a lower income than the Median Household Income value (US Census Bureau, 2000). The US Census Bureau defines the Percentage of Persons Below Poverty Level by following guidelines stated in Directive 14 of the OMB. This involves comparing family characteristics to money income thresholds based on family size and composition as formulated by the OMB. If the total income for an individual or family is below the relevant poverty threshold, that individual or family is classified as below the poverty level (US Census Bureau Glossary, 2000).

An examination of income data indicates that the Proposed Project area contains a Median Household Income higher than that of St. Louis County. In addition, the Proposed Project area contains a Percentage of Persons Below Poverty Level lower than that of both St. Louis County. Table 2.2 lists income data for St. Louis County and the block groups within the Proposed Project area.

**TABLE 2.2 – INCOME**

| AREA                                         | MEDIAN HOUSEHOLD INCOME | PERCENTAGE OF PERSONS BELOW POVERTY LEVEL |
|----------------------------------------------|-------------------------|-------------------------------------------|
| <b>St. Louis County</b>                      | <b>\$36,306</b>         | <b>12.05%</b>                             |
| <b>Project Area Census Tract-Block Group</b> |                         |                                           |
| <b>102-1</b>                                 | <b>\$41,205</b>         | <b>5.43%</b>                              |
| <b>103-3</b>                                 | <b>\$73,500</b>         | <b>0.0%</b>                               |
| <b>111-5</b>                                 | <b>\$45,804</b>         | <b>4.08%</b>                              |
| <b>Total Project Area</b>                    | <b>\$53,506</b>         | <b>3.73%</b>                              |

*Source: U.S. Census Bureau, 2000, Census Summary File 3 (SF3)*

### **Conclusion**

The Proposed Project area does not contain EJ populations with respect to racial minority and low-income populations. The percentage of racial minority and low-income population within the Proposed Project area is lower than that for St. Louis County. The percentage of ethnic minority population in the proposed project area is slightly higher (0.86%) than in St. Louis County (0.83%). However, this difference is not really distinguishable in such a limited population.

### **3. AT-GRADE CROSSINGS DELAY**

Due to increasing rail traffic volume on the Duluth Missabe and Iron Range (DMIR) Virginia, Missabe, and Spirit Lake Subdivisions, an analysis was prepared to determine the impact on vehicle delay at existing public highway/rail at-grade crossings. The potential increase of rail traffic is a result of the proposed shift of approximately 6.5 CN trains per day between Shelton Junction and Nopeming Junction, which affects 37 grade crossings in St. Louis County, Minnesota over 5 line segments, as documented in Table 3.1.

**TABLE 3.1 – SUMMARY OF GRADE CROSSINGS BY LINE SEGMENT**

| LINE SEGMENT                  | LENGTH            | NUMBER OF PUBLIC AT-GRADE CROSSINGS IN LINE SEGMENT |
|-------------------------------|-------------------|-----------------------------------------------------|
| <b>Shelton Jct. - Wolf</b>    | 2.9 miles         | 1                                                   |
| <b>Wolf – Iron Jct.</b>       | 2.2 miles         | 1                                                   |
| <b>Iron Jct. – Fairlane</b>   | 4.4 miles         | 4                                                   |
| <b>Fairlane – Adolph</b>      | 48.2 miles        | 24                                                  |
| <b>Adolph – Nopeming Jct.</b> | 6.0 miles         | 7                                                   |
| <b>Total</b>                  | <b>63.7 miles</b> | <b>37</b>                                           |

*Source: CN using information from USDOT*

The calculation of delay impact of at-grade highway/railroad crossings is a function of three primary factors:

- ❖ The number of trains per day
- ❖ The estimated time it takes for a train to pass over the grade crossings
- ❖ The roadway traffic volume

Several values were calculated to estimate the potential impact on delay on vehicle traffic as a result of increased train volume. These factors are:

- ❖ Blocked crossing time per train
- ❖ Average delay per delayed roadway vehicle
- ❖ Number of vehicles delayed per day
- ❖ Vehicle queue
- ❖ Average delay for all vehicles

#### **ASSUMPTIONS USED IN ANALYSIS**

The results of the delay analyses are heavily dependent on the assumptions used throughout. A more detailed discussion of assumptions for each specific measure of delay is included in the following sections. Overall assumptions that impact each of the delay measure calculations include the following:

- ❖ **Train Speed** – These analyses assumed that trains would operate at the existing maximum timetable speed for each line segment. The current speed limits on most of the segments are between 35 and 40 miles per hour (mph). The two exceptions are the Spirit Lake Subdivision between Adolph and Nopeming Junction, which has a maximum timetable speed of 25 mph, and the connecting tracks at Shelton Junction (between the CN mainline and the DMIR Virginia Subdivision) at Adolph (between the Spirit Lake and Missabe Subdivisions).
- ❖ **Train Length** – Due to the wide variation in train length, it is not possible to provide a precise calculation for average conditions. Therefore, reasonably conservative train lengths were assumed of 5,300 feet for DMIR trains and 6,400 feet for CN trains. A weighted average of DMIR and CN train lengths was used based on the respective lengths and number of each type of train traveling on each DMIR segment.
- ❖ **Train Volume** – The existing and projected train volume for each line segment were provided by CN using the Environmental Appendix submitted on November 5, 2003, in connection with STB Finance Docket No. 34424. Since the submission of that document, the former EVTAC mine at Thunderbird and pellet plant at Fairlane, which had ceased production in May 2003, have been acquired by United Taconite (a joint venture of Cleveland-Cliffs, Inc., and Laiwu Steel Group, a Chinese enterprise). United Taconite has announced plans to resume production at those facilities at their former levels. Accordingly, our analyses have assumed that existing traffic over affected segments would include traffic to and from the former EVTAC facilities at their former volume levels. The analyses further assumed that, as projected in the Environmental Appendix, the existing levels would change, as a result of the proposed transaction, by shifting an average of 6.5 southbound CN trains per day to the DMIR route and shifting 1.1 northbound DMIR trains per day to the existing CN route.
- ❖ **Vehicle Traffic Volume** – For most grade crossings, the Average Daily Traffic (ADT) volume at public grade crossings was assumed to be consistent with the reported values in Exhibit D of CN's Environmental Appendix. Two modifications to these ADT volumes were made at locations with unusual crossing configurations. In these two locations, the existing DMIR track crosses directly through a four-legged highway intersection (often described as a 45-degree crossing). In these cases, the sum of the ADT of both roadways is used as the ADT for purposes of delay calculation. These modifications are documented in Table 3.2.

**TABLE 3.2 – MODIFICATIONS TO ADT AT 4-LEGGED CROSSINGS**

| LINE SEGMENT                  | CROSSING                   | ADT<br>REPORTED IN<br>CN SUBMITTAL | CROSSING<br>ADT FOR<br>INTERSECTION |
|-------------------------------|----------------------------|------------------------------------|-------------------------------------|
| <b>Shelton Jct. - Wolf</b>    | CSAH 7 (Kane / Voss Roads) | 930                                | 3,850 <sup>1</sup>                  |
| <b>Adolph – Nopeming Jct.</b> | CSAH 13 / CR 696           | 4,800                              | 5,200 <sup>2</sup>                  |

Sources: (1) Mountain Iron Area Traffic Volume Map, 1999 (Mn/DOT Office of Transportation Data & Analysis)  
(2) Duluth Area Traffic Volume Map, 1999 (Mn/DOT Office of Transportation Data & Analysis)

**DELAY MEASURE #1: BLOCKED CROSSING TIME PER TRAIN (D<sub>c</sub>)**

Blocked Crossing Time per Train (D<sub>c</sub>) estimates the time required for a train to pass over a grade crossing. This measurement is also used in later calculations to determine the length of time vehicles wait when a train occupies a highway/rail at-grade crossing. The Blocked Crossing Time per Train equation, developed by Stanford Research Institute for the Federal Railroad Administration,<sup>2</sup> is a function of length of train and train speed, as outlined below.

$$D_c = [L / V * 88] + 0.50$$

where:

D<sub>c</sub> = Time required for the train to pass over the grade crossing (in minutes)

L = Length of train (in feet)

V = Train speed (in mph)

88 = Conversion factor from mph to feet per minute

0.50 = Time in minutes for gate closing and opening prior to and after the passage of train

A summary of the estimated before and after (pre- and post-merger) Blocked Crossing Time per Train is documented in Table 3.3.

<sup>2</sup> Stanford Research Institute, *Guidebook for Planning to Alleviate Urban Railroad Problems RP-31, August 1974, Prepared for the Federal Railroad Administration.*

**TABLE 3.3 – AVERAGE  
BLOCKED CROSSING TIME PER TRAIN**

| LINE SEGMENT                  | EXISTING<br>(DMIR) | CN + DMIR    | INCREASE<br>(MINUTES) | INCREASE<br>(%) |
|-------------------------------|--------------------|--------------|-----------------------|-----------------|
| <b>Shelton Jct. - Wolf</b>    | 2.22 minutes       | 2.33 minutes | 0.11                  | 5.0%            |
| <b>Wolf – Iron Jct.</b>       | 2.01 minutes       | 2.07 minutes | 0.06                  | 3.1%            |
| <b>Iron Jct. – Fairlane</b>   | 2.01 minutes       | 2.10 minutes | 0.09                  | 4.5%            |
| <b>Fairlane – Adolph</b>      | 2.22 minutes       | 2.40 minutes | 0.18                  | 8.0%            |
| <b>Adolph – Nopeming Jct.</b> | 2.91 minutes       | 3.35 minutes | 0.45                  | 15.3%           |

*Source: HDR Engineering using assumptions and input data outlined above*

**Delay Measure #2: Average Delay per Delayed Vehicle ( $D_a$ )**

Average Delay per Delayed Vehicle ( $D_a$ ) is the average amount of time that a driver would be delayed at a grade crossing as a result of a single train event (one train passby). The measure assumes that arrival of vehicles on the highway is uniform. When the crossing becomes blocked, vehicles begin to queue. When the train event ends, vehicles begin to discharge at a constant rate until the queue is dissipated. By plotting these rates, the corresponding result is a “queue triangle” in which the area inside the triangle represents delay. The Average Delay per Delayed Vehicle ( $D_a$ ) can be estimated as a function of Blocked Crossing Time per Train as follows:

$$D_a = (\text{Aggregate Delay} / \text{Delayed Vehicles}) * 1.3 = 0.5 * D_c * 1.3$$

where:

$D_a$  = Average delay per delayed vehicle (in minutes)

$D_c$  = Blocked crossing time per train (in minutes)

0.5 = Factor used in the calculation of the area of a triangle

1.3 = Factor widely used by traffic engineers to approximate initial deceleration, queue propagation, and final acceleration of delayed vehicles

A summary of the before and after (pre- and post-merger) Average Delay per Delayed Vehicle is documented in Table 3.4.

**TABLE 3.4**  
**AVERAGE DELAY PER DELAYED VEHICLE**

| LINE SEGMENT                  | EXISTING<br>(DMIR) | CN + DMIR    | INCREASE<br>(MINUTES) | INCREASE<br>(%) |
|-------------------------------|--------------------|--------------|-----------------------|-----------------|
| <b>Shelton Jct. - Wolf</b>    | 1.44 minutes       | 1.52 minutes | 0.08                  | 5.0%            |
| <b>Wolf - Iron Jct.</b>       | 1.30 minutes       | 1.34 minutes | 0.04                  | 3.1%            |
| <b>Iron Jct. - Fairlane</b>   | 1.30 minutes       | 1.36 minutes | 0.06                  | 4.5%            |
| <b>Fairlane - Adolph</b>      | 1.44 minutes       | 1.56 minutes | 0.12                  | 8.0%            |
| <b>Adolph - Nopeming Jct.</b> | 1.89 minutes       | 2.18 minutes | 0.29                  | 15.3%           |

*Source: HDR Engineering using assumptions and input data outlined above*

**Delay Measure #3: Number of Vehicles Delayed per Day ( $T_D$ )**

Number of Vehicles Delayed per Day ( $T_D$ ) represents the number of drivers in a 24-hour period that would be stopped for trains at grade crossings. This estimate is a function of the time required for trains to pass, and the combined volume of trains and vehicles. This measure is calculated as follows:

$$T_D = (D_c / 1440) * N * ADT$$

where:

- $T_D$  = Number of vehicles delayed per day
- $D_c$  = Blocked crossing time (in minutes)
- 1,440 = Number of minutes in one 24-hour period
- $N$  = Number of trains per day
- $ADT$  = Average Daily Traffic on highway

Since this measure provides a different value for each of the 37 grade crossings, the complete data set is included as an appendix. A summary of the percent change in Vehicles Delayed per Day for is documented in Table 3.5 by line segment.

**TABLE 3.5**  
**PERCENTAGE INCREASE OF DELAYED VEHICLES**

| LINE SEGMENT                  | % INCREASE VEHICLES<br>DELAYED PER DAY |
|-------------------------------|----------------------------------------|
| <b>Shelton Jct. - Wolf</b>    | 51.7%                                  |
| <b>Wolf - Iron Jct.</b>       | 28.9%                                  |
| <b>Iron Jct. - Fairlane</b>   | 37.3%                                  |
| <b>Fairlane - Adolph</b>      | 84.8%                                  |
| <b>Adolph - Nopeming Jct.</b> | 426.1%                                 |

*Source: HDR Engineering using assumptions and input data outlined above*

Despite the large increase by percentage for multiple line segments, the actual number of drivers experiencing increased delay is estimated to be less than 10 per day at all crossings except three locations, as documented in Table 3.6.

**TABLE 3.6**  
**LOCATIONS WITH INCREASE OF >10 DELAYED VEHICLES**

| LINE SEGMENT                  | CROSSING                 | INCREASE IN<br>NUMBER OF<br>DELAYED<br>VEHICLES<br>PER DAY |
|-------------------------------|--------------------------|------------------------------------------------------------|
| <b>Shelton Jct. - Wolf</b>    | CSAH 7 (Kane/Voss Roads) | 44.8                                                       |
| <b>Fairlane - Adolph</b>      | CSAH 13 (Midway Road)    | 47.7                                                       |
| <b>Adolph - Nopeming Jct.</b> | CSAH 13 / CR 696         | 71.6                                                       |

*Source: HDR Engineering using assumptions and input data outlined above*

#### **Delay Measure #4: Vehicle Queue (Q)**

Vehicle Queue (Q) is the estimated number of vehicles in line at the end of the blocked crossing time for a single train event. The vehicle queue is equal to the number of vehicles that arrive during the blocked crossing time,  $D_c$ . This measure is a function of the peak hour of roadway traffic. For this analysis, the peak hour was assumed to be 10% of the daily traffic, since site-specific data were not available. In addition, this measure is also a function of the percentage of

peak hour traffic traveling in one direction. Due to the rural nature of this corridor, the peak direction was assumed to account for 60% of the peak hour flow. The estimated vehicle queue is calculated as follows:

$$Q = ADT * K * (PHD/60) * (D_c / NL / 2)$$

where:

Q = Vehicle queue at the end of a single train event (number of vehicles)

ADT = Average Daily Traffic across grade crossing

K = Percent of ADT occurring during peak hour (assumed to be 10%)

PHD = Factor for Peak Hour Directional flow (assumed to be 60%)

$D_c$  = Blocked crossing time (in minutes)

NL = Number of lanes at the crossing as reported by the FRA database

2 = Factor to convert total number of lanes to lanes in the peak direction

Since this measure provides a different value for each of the 37 grade crossings, the complete data set is included as an appendix. The percentage increase by line segment is a function of the same variables as Blocked Crossing Time per Train ( $D_c$ ) and Average Delay per Delayed Vehicle ( $D_a$ ).

#### **Delay Measure #5: Average Delay for All Vehicles ( $D_v$ )**

Average Delay for All Vehicles ( $D_v$ ) is the estimated delay for all delayed vehicles averaged over the total number of vehicles which may pass through an at-grade crossing during a 24-hour period. The average delay for all vehicles ( $D_v$ ) is defined as the aggregate delay incurred by vehicles that are delayed divided by the total vehicle traffic over the crossing. As a result of the relative infrequency of train blocking (as compared to the amount of time the crossing is open), comparison using this delay measure is difficult, as a large percentage increase results in an overall change in delay per vehicle of only a few seconds. The measure of average delay for all vehicles is calculated as follows:

$$D_v = (T_D * D_a) * 2 / ADT$$

where:

$D_v$  = Average delay for all vehicles (minutes per vehicle)

$T_D$  = Number of vehicles delayed per day

$D_a$  = Average delay per delayed vehicle (in minutes)

ADT = Average Daily Traffic across grade crossing

2 = Factor which approximates a 95% confidence interval that the peak delay will not exceed the average (produces a conservative estimate of delay)

A summary of change in Average Delay for all Vehicles is documented in Table 3.7. Since most traffic delay measures are reported in seconds per vehicle, the increase of average delay for all vehicles has been reported in the following tables as well.

**TABLE 3.7**  
**AVERAGE DELAY FOR ALL VEHICLES**

| LINE SEGMENT                  | INCREASE<br>(MIN. / VEIL.) | INCREASE<br>(SEC. / VEIL.) | INCREASE<br>(%) |
|-------------------------------|----------------------------|----------------------------|-----------------|
| <b>Shelton Jct. - Wolf</b>    | 0.04 minutes               | 2.31 seconds               | 59.2%           |
| <b>Wolf - Iron Jct.</b>       | 0.03 minutes               | 1.86 seconds               | 32.9%           |
| <b>Iron Jct. - Fairlane</b>   | 0.03 minutes               | 1.63 seconds               | 43.4%           |
| <b>Fairlane - Adolph</b>      | 0.03 minutes               | 2.02 seconds               | 99.7%           |
| <b>Adolph - Nopeming Jct.</b> | 0.06 minutes               | 3.72 seconds               | 506.6%          |

*Source: HDR Engineering using assumptions and input data outlined above*

#### **Discussion on Specific Crossing Delays**

Due to the configuration of the track near CSAH 13 (Midway Road- near Adolph) drivers on CSAH 13 may experience higher than calculated delays. The southbound CN trains cross CSAH 13, pass through a curve and then cross CSAH 13 again approximately one mile south of the Missabe Subdivision crossing in Adolph. Therefore, the actual delay impacts on road users at these two locations may be underestimated because southbound vehicles on CSAH 13 will not arrive randomly at the Spirit Lake Subdivision crossing. The queue developed at the Missabe Subdivision crossing will reach the southerly crossing at approximately the same time as the front of the CN train (assuming an average train length of 6400 feet). Therefore some southbound vehicles may experience delay at both crossings as a result of a single train.

## **Conclusion**

While the projected shift in train traffic would result in some increased delay on the Adolph to Nopeming segment, this is largely related to the fact there is little train traffic on that segment at present. Since the shifted trains are not new train traffic, drivers at other grade crossings would likely see somewhat of a reduction in delay on the corresponding CN segment. The net effect would not appear to be significant.

In other transactions, SEA has indicated that it considers an ADT of 5,000 vehicles to represent a minimum traffic volume with the potential for significant vehicular delay,<sup>3</sup> and that delays could be regarded as significant if train operations at a grade crossing would result in an average 30-second increase in vehicle delay.<sup>4</sup> In this case, only one grade crossing (the combined crossing of CSAH 13 and CR 696) has an ADT exceeding 5,000, and the average increase in vehicle delay would not exceed 30 seconds at that or any other affected grade crossing. It would appear that vehicular delays resulting from the proposed transaction would not be significant.

## **4. GRADE CROSSING SAFETY**

In its comments on the Environmental Appendix, the United States Department of Transportation (DOT) noted that there would be an increase in train traffic at 37 DMIR grade crossings and stated its concern about the level of safety at some of these crossings. It was DOT's position that CN should be required to consult with those public agencies responsible for the affected grade crossings to determine whether and to what extent safety might be compromised by the projected operational changes, and whether suitable protection measures were in place. Although CN does not expect crossing safety to be adversely impacted by the projected operational changes, it will ensure that the Minnesota State Department of Transportation (MnDOT) is aware of the traffic levels where roads cross DMIR and will consult with MnDOT so that it can take these traffic levels and projected increases in train traffic at affected crossings into account in reviewing the adequacy of existing grade crossing protection. CN will keep SEA advised of any input it receives from MnDOT on this issue.

---

<sup>3</sup> E.g., Environmental Assessment at 4-29 (served Nov. 20, 2002), *Norfolk Southern Corporation and Norfolk Southern Railway Company – Construction and Operation – in Indiana County, Pennsylvania*, STB Finance Docket No. 33928.

<sup>4</sup> Environmental Assessment at 4-14 (served July 20, 2001), *Illinois Central Railroad Company – Construction and Operation – in East Baton Rouge Parish, Louisiana*, STB Finance Docket No. 33877.

---

## **5. HISTORIC RESOURCES**

We looked into the background information on the maintenance facilities at Proctor. It appears likely they would be eligible for listing on the National Register.

Since the Minnesota State Historic Preservation Office (SHPO) has only recently received the Environmental Appendix information, it has not been able to comment at this time on the potential impact of the proposed transaction on the Proctor facilities. We will remain in contact with the Minnesota SHPO and will pass on to CN and SEA any comments they may provide.

APPENDIX

**TABLE A.1-1**  
Delay Calculations for Pre-Merger (DMIR Only)

| DMIR Line Segment  | Roadway  | Subdivision & Milepost | ADT  | Blocked Crossing Time / Train (Dc) |                 | Avg. Delay per Delayed Veh. (Da) |                    | Veh. Delayed per day (Td) | Vehicle Queue (Q) |                         |          | Avg. Delay for all Veh. (Dv) |       |       |      |
|--------------------|----------|------------------------|------|------------------------------------|-----------------|----------------------------------|--------------------|---------------------------|-------------------|-------------------------|----------|------------------------------|-------|-------|------|
|                    |          |                        |      | Train Length (L)                   | Speed (V) (mph) | Dc (min.)                        | Peak Hour % of ADT |                           | Direction         | Lanes in Split Fraction | Q (veh.) |                              |       |       |      |
| Sheldon Jct.-Wolf  | CSAH 7   | Virginia 0.77          | 3850 | 5300                               | 35              | 222                              | 1.44               | 14.6                      | 86.7              | 10%                     | 60%      | 1                            | 8.55  | 0.065 | 3.90 |
| Wolf-Iron Jct.     | CSAH 127 | Missabe 63.50          | 330  | 5300                               | 40              | 201                              | 1.30               | 26                        | 12.0              | 10%                     | 60%      | 1                            | 0.68  | 0.094 | 5.67 |
| Iron Jct.-Fairlane | CSAH 127 | Missabe 63.21          | 680  | 5300                               | 40              | 201                              | 1.30               | 17.2                      | 16.3              | 10%                     | 60%      | 1                            | 1.36  | 0.062 | 3.75 |
| Iron Jct.-Fairlane | CSAH 16  | Missabe 61.24          | 175  | 5300                               | 40              | 201                              | 1.30               | 17.2                      | 4.2               | 10%                     | 60%      | 1                            | 0.35  | 0.062 | 3.75 |
| Iron Jct.-Fairlane | TWP      | Missabe 60.19          | 475  | 5300                               | 40              | 201                              | 1.30               | 17.2                      | 11.4              | 10%                     | 60%      | 1                            | 0.95  | 0.062 | 3.75 |
| Iron Jct.-Fairlane | CR 311   | Missabe 59.20          | 55   | 5300                               | 40              | 201                              | 1.30               | 17.2                      | 1.3               | 10%                     | 60%      | 1                            | 0.11  | 0.062 | 3.75 |
| Fairlane-Adolph    | CR 312   | Missabe 58.70          | 60   | 5300                               | 35              | 222                              | 1.44               | 7.6                       | 0.7               | 10%                     | 60%      | 1                            | 0.13  | 0.034 | 2.03 |
| Fairlane-Adolph    | CR 312   | Missabe 57.17          | 195  | 5300                               | 35              | 222                              | 1.44               | 7.6                       | 2.3               | 10%                     | 60%      | 1                            | 0.43  | 0.034 | 2.03 |
| Fairlane-Adolph    | CSAH 27  | Missabe 55.70          | 330  | 5300                               | 35              | 222                              | 1.44               | 7.6                       | 3.9               | 10%                     | 60%      | 1                            | 0.73  | 0.034 | 2.03 |
| Fairlane-Adolph    | CR 28    | Missabe 49.12          | 120  | 5300                               | 35              | 222                              | 1.44               | 7.6                       | 1.4               | 10%                     | 60%      | 1                            | 0.24  | 0.034 | 2.03 |
| Fairlane-Adolph    | CR 52    | Missabe 46.14          | 110  | 5300                               | 35              | 222                              | 1.44               | 7.6                       | 1.4               | 10%                     | 60%      | 1                            | 0.27  | 0.034 | 2.03 |
| Fairlane-Adolph    | CR 160   | Missabe 45.14          | 55   | 5300                               | 35              | 222                              | 1.44               | 7.6                       | 0.6               | 10%                     | 60%      | 1                            | 0.11  | 0.034 | 2.03 |
| Fairlane-Adolph    | CSAH 29  | Missabe 44.68          | 50   | 5300                               | 35              | 222                              | 1.44               | 7.6                       | 0.6               | 10%                     | 60%      | 1                            | 0.11  | 0.034 | 2.03 |
| Fairlane-Adolph    | CR 980   | Missabe 44.14          | 5    | 5300                               | 35              | 222                              | 1.44               | 7.6                       | 0.1               | 10%                     | 60%      | 1                            | 0.01  | 0.034 | 2.03 |
| Fairlane-Adolph    | CR 740   | Missabe 40.32          | 5    | 5300                               | 35              | 222                              | 1.44               | 7.6                       | 0.1               | 10%                     | 60%      | 1                            | 0.01  | 0.034 | 2.03 |
| Fairlane-Adolph    | CSAH 133 | Missabe 39.32          | 740  | 5300                               | 35              | 222                              | 1.44               | 7.6                       | 8.7               | 10%                     | 60%      | 1                            | 1.64  | 0.034 | 2.03 |
| Fairlane-Adolph    | CR 142   | Missabe 35.27          | 5    | 5300                               | 35              | 222                              | 1.44               | 7.6                       | 0.1               | 10%                     | 60%      | 1                            | 0.01  | 0.034 | 2.03 |
| Fairlane-Adolph    | CSAH 47  | Missabe 32.41          | 430  | 5300                               | 35              | 222                              | 1.44               | 7.6                       | 5.0               | 10%                     | 60%      | 1                            | 0.95  | 0.034 | 2.03 |
| Fairlane-Adolph    | CR 8     | Missabe 28.79          | 125  | 5300                               | 35              | 222                              | 1.44               | 7.6                       | 1.5               | 10%                     | 60%      | 1                            | 0.28  | 0.034 | 2.03 |
| Fairlane-Adolph    | CR 887   | Missabe 28.57          | 5    | 5300                               | 35              | 222                              | 1.44               | 7.6                       | 0.1               | 10%                     | 60%      | 1                            | 0.01  | 0.034 | 2.03 |
| Fairlane-Adolph    | CR 694   | Missabe 26.06          | 45   | 5300                               | 35              | 222                              | 1.44               | 7.6                       | 0.5               | 10%                     | 60%      | 1                            | 0.10  | 0.034 | 2.03 |
| Fairlane-Adolph    | CR 874   | Missabe 22.47          | 285  | 5300                               | 35              | 222                              | 1.44               | 7.6                       | 3.3               | 10%                     | 60%      | 1                            | 0.63  | 0.034 | 2.03 |
| Fairlane-Adolph    | CR 875   | Missabe 21.11          | 5    | 5300                               | 35              | 222                              | 1.44               | 7.6                       | 0.1               | 10%                     | 60%      | 1                            | 0.01  | 0.034 | 2.03 |
| Fairlane-Adolph    | CR 873   | Missabe 20.28          | 85   | 5300                               | 35              | 222                              | 1.44               | 7.6                       | 1.0               | 10%                     | 60%      | 1                            | 0.19  | 0.034 | 2.03 |
| Fairlane-Adolph    | CR 864   | Missabe 16.57          | 260  | 5300                               | 35              | 222                              | 1.44               | 7.6                       | 3.0               | 10%                     | 60%      | 1                            | 0.58  | 0.034 | 2.03 |
| Fairlane-Adolph    | CR 880   | Missabe 16.26          | 5    | 5300                               | 35              | 222                              | 1.44               | 7.6                       | 0.1               | 10%                     | 60%      | 1                            | 0.01  | 0.034 | 2.03 |
| Fairlane-Adolph    | CSAH 98  | Missabe 15.21          | 810  | 5300                               | 35              | 222                              | 1.44               | 7.6                       | 9.5               | 10%                     | 60%      | 1                            | 1.80  | 0.034 | 2.03 |
| Fairlane-Adolph    | CR 223   | Missabe 14.23          | 340  | 5300                               | 35              | 222                              | 1.44               | 7.6                       | 4.0               | 10%                     | 60%      | 1                            | 0.76  | 0.034 | 2.03 |
| Fairlane-Adolph    | TWP      | Missabe 13.59          | 30   | 5300                               | 35              | 222                              | 1.44               | 7.6                       | 0.4               | 10%                     | 60%      | 1                            | 0.07  | 0.034 | 2.03 |
| Fairlane-Adolph    | CSAH 13  | Missabe 10.79          | 4800 | 5300                               | 35              | 222                              | 1.44               | 7.6                       | 56.3              | 10%                     | 60%      | 1                            | 10.66 | 0.034 | 2.03 |
| Adolph-Nopenning   | CO 894   | Spirit Lake 1.07       | 5200 | 5300                               | 25              | 291                              | 1.89               | 1.6                       | 16.8              | 10%                     | 60%      | 1                            | 15.13 | 0.012 | 0.73 |
| Adolph-Nopenning   | TWP 123  | Spirit Lake 2.22       | 230  | 5300                               | 25              | 291                              | 1.89               | 1.6                       | 0.7               | 10%                     | 60%      | 1                            | 0.67  | 0.012 | 0.73 |
| Adolph-Nopenning   | CSAH 45  | Spirit Lake 2.46       | 55   | 5300                               | 25              | 291                              | 1.89               | 1.6                       | 1.2               | 10%                     | 60%      | 1                            | 0.16  | 0.012 | 0.73 |
| Adolph-Nopenning   | CSAH 45  | Spirit Lake 3.24       | 385  | 5300                               | 25              | 291                              | 1.89               | 1.6                       | 0.2               | 10%                     | 60%      | 1                            | 0.12  | 0.012 | 0.73 |
| Adolph-Nopenning   | TWP 5487 | Spirit Lake 3.77       | 55   | 5300                               | 25              | 291                              | 1.89               | 1.6                       | 0.2               | 10%                     | 60%      | 1                            | 0.16  | 0.012 | 0.73 |
| Adolph-Nopenning   | CR 899   | Spirit Lake 4.94       | 80   | 5300                               | 25              | 291                              | 1.89               | 1.6                       | 0.3               | 10%                     | 60%      | 1                            | 0.23  | 0.012 | 0.73 |
| Adolph-Nopenning   | T-146    | Spirit Lake 5.13       | 41   | 5300                               | 25              | 291                              | 1.89               | 1.6                       | 0.1               | 10%                     | 60%      | 1                            | 0.12  | 0.012 | 0.73 |

**TABLE A.2-1**  
Delay Calculations for Post-Merger (CN + DMIR)

| DMIR Line Segment  | Roadway     | Subdivision & Milepost | Blocked Crossing Time / Train (Dc) |                 | Dc (min.) | Avg. Delay per Delayed Veh. (Da) | Veh. Delayed per day (Td) | Vehicle Queue (Q) |           |                         | Avg. Delay for all Veh. (Dv) |       |       |      |
|--------------------|-------------|------------------------|------------------------------------|-----------------|-----------|----------------------------------|---------------------------|-------------------|-----------|-------------------------|------------------------------|-------|-------|------|
|                    |             |                        | Train Length (L)                   | Speed (V) (mph) |           |                                  |                           | Peak % of ADT     | Direction | Lanes in Peak Direction |                              |       |       |      |
| Shelton Jct.-Wolf  | CSAH 7      | Virginia 0.77          | 3850                               | 35              | 2.33      | 1.52                             | 21.1                      | 131.5             | 10%       | 60%                     | 1                            | 8.97  | 0.103 | 6.21 |
| Wolf-Iron Jct.     | CSAH 127    | Missabe 63.50          | 330                                | 5520            | 40        | 2.07                             | 32.5                      | 15.4              | 10%       | 60%                     | 1                            | 0.88  | 0.125 | 7.53 |
| Iron Jct.-Fairlane | CSAH 127    | Missabe 63.21          | 680                                | 5616.4          | 40        | 2.10                             | 22.6                      | 22.4              | 10%       | 60%                     | 1                            | 1.42  | 0.090 | 5.38 |
| Iron Jct.-Fairlane | CR 310      | Missabe 61.24          | 175                                | 5616.4          | 40        | 2.10                             | 22.6                      | 5.8               | 10%       | 60%                     | 1                            | 0.37  | 0.090 | 5.38 |
| Iron Jct.-Fairlane | CSAH 16     | Missabe 60.19          | 475                                | 5616.4          | 40        | 2.10                             | 22.6                      | 15.6              | 10%       | 60%                     | 1                            | 1.00  | 0.090 | 5.38 |
| Iron Jct.-Fairlane | TWP         | Missabe 59.20          | 55                                 | 5616.4          | 40        | 2.10                             | 22.6                      | 1.8               | 10%       | 60%                     | 1                            | 0.12  | 0.090 | 5.38 |
| Fairlane-Adolph    | CR 311      | Missabe 58.70          | 60                                 | 5850            | 35        | 2.40                             | 13                        | 1.3               | 10%       | 60%                     | 1                            | 0.14  | 0.068 | 4.05 |
| Fairlane-Adolph    | CR 312      | Missabe 57.17          | 195                                | 5850            | 35        | 2.40                             | 13                        | 4.2               | 10%       | 60%                     | 1                            | 0.47  | 0.068 | 4.05 |
| Fairlane-Adolph    | CSAH 27     | Missabe 55.70          | 330                                | 5850            | 35        | 2.40                             | 13                        | 7.1               | 10%       | 60%                     | 1                            | 0.79  | 0.068 | 4.05 |
| Fairlane-Adolph    | CR 28       | Missabe 49.12          | 120                                | 5850            | 35        | 2.40                             | 13                        | 2.6               | 10%       | 60%                     | 1                            | 0.29  | 0.068 | 4.05 |
| Fairlane-Adolph    | CR 52       | Missabe 46.14          | 110                                | 5850            | 35        | 2.40                             | 13                        | 2.4               | 10%       | 60%                     | 1                            | 0.26  | 0.068 | 4.05 |
| Fairlane-Adolph    | CR 160      | Missabe 45.14          | 55                                 | 5850            | 35        | 2.40                             | 13                        | 1.2               | 10%       | 60%                     | 1                            | 0.13  | 0.068 | 4.05 |
| Fairlane-Adolph    | CSAH 29     | Missabe 44.68          | 50                                 | 5850            | 35        | 2.40                             | 13                        | 1.1               | 10%       | 60%                     | 1                            | 0.12  | 0.068 | 4.05 |
| Fairlane-Adolph    | CR 980      | Missabe 44.14          | 5                                  | 5850            | 35        | 2.40                             | 13                        | 0.1               | 10%       | 60%                     | 1                            | 0.01  | 0.068 | 4.05 |
| Fairlane-Adolph    | CR 740      | Missabe 40.32          | 5                                  | 5850            | 35        | 2.40                             | 13                        | 0.1               | 10%       | 60%                     | 1                            | 0.01  | 0.068 | 4.05 |
| Fairlane-Adolph    | CSAH 133    | Missabe 39.32          | 740                                | 5850            | 35        | 2.40                             | 13                        | 16.0              | 10%       | 60%                     | 1                            | 1.78  | 0.068 | 4.05 |
| Fairlane-Adolph    | CR 142      | Missabe 35.27          | 5                                  | 5850            | 35        | 2.40                             | 13                        | 0.1               | 10%       | 60%                     | 1                            | 0.01  | 0.068 | 4.05 |
| Fairlane-Adolph    | CSAH 47     | Missabe 32.41          | 430                                | 5850            | 35        | 2.40                             | 13                        | 9.3               | 10%       | 60%                     | 1                            | 1.03  | 0.068 | 4.05 |
| Fairlane-Adolph    | CR 8        | Missabe 28.79          | 125                                | 5850            | 35        | 2.40                             | 13                        | 2.7               | 10%       | 60%                     | 1                            | 0.30  | 0.068 | 4.05 |
| Fairlane-Adolph    | CR 867      | Missabe 26.57          | 5                                  | 5850            | 35        | 2.40                             | 13                        | 0.1               | 10%       | 60%                     | 1                            | 0.01  | 0.068 | 4.05 |
| Fairlane-Adolph    | CR 694      | Missabe 26.06          | 45                                 | 5850            | 35        | 2.40                             | 13                        | 1.0               | 10%       | 60%                     | 1                            | 0.11  | 0.068 | 4.05 |
| Fairlane-Adolph    | CR 874      | Missabe 22.47          | 285                                | 5850            | 35        | 2.40                             | 13                        | 6.2               | 10%       | 60%                     | 1                            | 0.68  | 0.068 | 4.05 |
| Fairlane-Adolph    | CR 875      | Missabe 21.11          | 5                                  | 5850            | 35        | 2.40                             | 13                        | 0.1               | 10%       | 60%                     | 1                            | 0.01  | 0.068 | 4.05 |
| Fairlane-Adolph    | CR 873      | Missabe 20.28          | 85                                 | 5850            | 35        | 2.40                             | 13                        | 1.8               | 10%       | 60%                     | 1                            | 0.20  | 0.068 | 4.05 |
| Fairlane-Adolph    | CR 864      | Missabe 18.57          | 260                                | 5850            | 35        | 2.40                             | 13                        | 5.6               | 10%       | 60%                     | 1                            | 0.62  | 0.068 | 4.05 |
| Fairlane-Adolph    | CR 880      | Missabe 16.26          | 5                                  | 5850            | 35        | 2.40                             | 13                        | 0.1               | 10%       | 60%                     | 1                            | 0.01  | 0.068 | 4.05 |
| Fairlane-Adolph    | CSAH 98     | Missabe 15.21          | 810                                | 5850            | 35        | 2.40                             | 13                        | 17.5              | 10%       | 60%                     | 1                            | 1.94  | 0.068 | 4.05 |
| Fairlane-Adolph    | CR 223      | Missabe 13.69          | 340                                | 5850            | 35        | 2.40                             | 13                        | 7.4               | 10%       | 60%                     | 1                            | 0.82  | 0.068 | 4.05 |
| Fairlane-Adolph    | TWP         | Missabe 10.79          | 4800                               | 5850            | 35        | 2.40                             | 13                        | 0.6               | 10%       | 60%                     | 1                            | 0.07  | 0.068 | 4.05 |
| Fairlane-Adolph    | CSAH 13     | Missabe 10.79          | 4800                               | 5850            | 35        | 2.40                             | 13                        | 104.0             | 10%       | 60%                     | 1                            | 11.52 | 0.068 | 4.05 |
| Adolph-Nopemning   | CSAH 13+696 | Spirit Lake 1.07       | 5200                               | 6279.5          | 25        | 3.35                             | 7.3                       | 88.4              | 10%       | 60%                     | 1                            | 17.44 | 0.074 | 4.45 |
| Adolph-Nopemning   | CO 894      | Spirit Lake 2.22       | 230                                | 6279.5          | 25        | 3.35                             | 7.3                       | 3.9               | 10%       | 60%                     | 1                            | 0.77  | 0.074 | 4.45 |
| Adolph-Nopemning   | TWP 123     | Spirit Lake 2.46       | 55                                 | 6279.5          | 25        | 3.35                             | 7.3                       | 0.9               | 10%       | 60%                     | 1                            | 0.18  | 0.074 | 4.45 |
| Adolph-Nopemning   | CSAH 45     | Spirit Lake 3.24       | 385                                | 6279.5          | 25        | 3.35                             | 7.3                       | 6.5               | 10%       | 60%                     | 1                            | 1.29  | 0.074 | 4.45 |
| Adolph-Nopemning   | TWP 5487    | Spirit Lake 3.77       | 55                                 | 6279.5          | 25        | 3.35                             | 7.3                       | 0.9               | 10%       | 60%                     | 1                            | 0.18  | 0.074 | 4.45 |
| Adolph-Nopemning   | CR 899      | Spirit Lake 4.54       | 80                                 | 6279.5          | 25        | 3.35                             | 7.3                       | 1.4               | 10%       | 60%                     | 1                            | 0.27  | 0.074 | 4.45 |
| Adolph-Nopemning   | T-146       | Spirit Lake 5.13       | 41                                 | 6279.5          | 25        | 3.35                             | 7.3                       | 0.7               | 10%       | 60%                     | 1                            | 0.14  | 0.074 | 4.45 |

**TABLE A.3-1**  
Comparison of Grade Crossing Delay Pre- (DMIR Only) and Post-Merger (CN + DMIR)

| DMIR Line Segment   | Roadway  | Subdivision & Milepost | ADT  | Blocked Crossing Time / Train (hr) |            |      | Average Delay per Delayed Vehicle (hr) |            |       | Vehicles Delayed per Day (Tid) |            |       | Vehicle Queue (ft) |            |      | Average Delay for all Vehicles (hr) |            |      |      |
|---------------------|----------|------------------------|------|------------------------------------|------------|------|----------------------------------------|------------|-------|--------------------------------|------------|-------|--------------------|------------|------|-------------------------------------|------------|------|------|
|                     |          |                        |      | DMIR                               | Change (%) | DMIR | DMIR                                   | Change (%) | DMIR  | DMIR                           | Change (%) | DMIR  | DMIR               | Change (%) | DMIR | DMIR                                | Change (%) | DMIR |      |
| Stations Rd - Woff  | CSAH 17  | Woff 0.77              | 3850 | 2.22                               | 2.40       | 8.0% | 1.44                                   | 1.56       | 12.0% | 96.7                           | 131.5      | 44.80 | 51.7%              | 8.55       | 8.97 | 0.42                                | 5.0%       | 0.07 |      |
| Woff Rd - Jct       | CSAH 17  | Woff 0.77              | 3850 | 2.22                               | 2.40       | 8.0% | 1.44                                   | 1.56       | 12.0% | 96.7                           | 131.5      | 44.80 | 51.7%              | 8.55       | 8.97 | 0.42                                | 5.0%       | 0.07 |      |
| Woff Rd - Jct       | CSAH 17  | Woff 0.77              | 3850 | 2.22                               | 2.40       | 8.0% | 1.44                                   | 1.56       | 12.0% | 96.7                           | 131.5      | 44.80 | 51.7%              | 8.55       | 8.97 | 0.42                                | 5.0%       | 0.07 |      |
| Iron Jct - Fairlane | CSAH 127 | Misabe 63.50           | 330  | 2.01                               | 2.10       | 0.09 | 1.30                                   | 1.36       | 0.06  | 4.5%                           | 4.2        | 5.8   | 1.66               | 37.3%      | 0.35 | 0.37                                | 0.02       | 4.5% | 0.06 |
| Iron Jct - Fairlane | CSAH 127 | Misabe 63.50           | 330  | 2.01                               | 2.10       | 0.09 | 1.30                                   | 1.36       | 0.06  | 4.5%                           | 4.2        | 5.8   | 1.66               | 37.3%      | 0.35 | 0.37                                | 0.02       | 4.5% | 0.06 |
| Iron Jct - Fairlane | CSAH 127 | Misabe 63.50           | 330  | 2.01                               | 2.10       | 0.09 | 1.30                                   | 1.36       | 0.06  | 4.5%                           | 4.2        | 5.8   | 1.66               | 37.3%      | 0.35 | 0.37                                | 0.02       | 4.5% | 0.06 |
| Iron Jct - Fairlane | CSAH 16  | Misabe 61.24           | 175  | 2.01                               | 2.10       | 0.09 | 1.30                                   | 1.36       | 0.06  | 4.5%                           | 11.4       | 15.6  | 4.24               | 37.3%      | 0.35 | 0.37                                | 0.02       | 4.5% | 0.06 |
| Iron Jct - Fairlane | CSAH 16  | Misabe 61.24           | 175  | 2.01                               | 2.10       | 0.09 | 1.30                                   | 1.36       | 0.06  | 4.5%                           | 11.4       | 15.6  | 4.24               | 37.3%      | 0.35 | 0.37                                | 0.02       | 4.5% | 0.06 |
| Iron Jct - Fairlane | CSAH 16  | Misabe 61.24           | 175  | 2.01                               | 2.10       | 0.09 | 1.30                                   | 1.36       | 0.06  | 4.5%                           | 11.4       | 15.6  | 4.24               | 37.3%      | 0.35 | 0.37                                | 0.02       | 4.5% | 0.06 |
| Fairlane-Adolph     | CR 311   | Misabe 59.20           | 55   | 2.01                               | 2.10       | 0.09 | 1.30                                   | 1.36       | 0.06  | 4.5%                           | 0.7        | 1.3   | 0.60               | 84.8%      | 0.13 | 0.14                                | 0.01       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 311   | Misabe 59.20           | 55   | 2.01                               | 2.10       | 0.09 | 1.30                                   | 1.36       | 0.06  | 4.5%                           | 0.7        | 1.3   | 0.60               | 84.8%      | 0.13 | 0.14                                | 0.01       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 311   | Misabe 59.20           | 55   | 2.01                               | 2.10       | 0.09 | 1.30                                   | 1.36       | 0.06  | 4.5%                           | 0.7        | 1.3   | 0.60               | 84.8%      | 0.13 | 0.14                                | 0.01       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 312   | Misabe 57.17           | 195  | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 2.3        | 4.2   | 1.94               | 84.8%      | 0.43 | 0.47                                | 0.03       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 312   | Misabe 57.17           | 195  | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 2.3        | 4.2   | 1.94               | 84.8%      | 0.43 | 0.47                                | 0.03       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 312   | Misabe 57.17           | 195  | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 2.3        | 4.2   | 1.94               | 84.8%      | 0.43 | 0.47                                | 0.03       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 27    | Misabe 55.70           | 330  | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 3.9        | 7.1   | 3.28               | 84.8%      | 0.73 | 0.79                                | 0.06       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 27    | Misabe 55.70           | 330  | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 3.9        | 7.1   | 3.28               | 84.8%      | 0.73 | 0.79                                | 0.06       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 27    | Misabe 55.70           | 330  | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 3.9        | 7.1   | 3.28               | 84.8%      | 0.73 | 0.79                                | 0.06       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 28    | Misabe 49.12           | 120  | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 1.4        | 2.6   | 1.19               | 84.8%      | 0.27 | 0.29                                | 0.02       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 28    | Misabe 49.12           | 120  | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 1.4        | 2.6   | 1.19               | 84.8%      | 0.27 | 0.29                                | 0.02       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 28    | Misabe 49.12           | 120  | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 1.4        | 2.6   | 1.19               | 84.8%      | 0.27 | 0.29                                | 0.02       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 62    | Misabe 46.14           | 110  | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 1.3        | 2.4   | 1.09               | 84.8%      | 0.24 | 0.26                                | 0.02       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 62    | Misabe 46.14           | 110  | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 1.3        | 2.4   | 1.09               | 84.8%      | 0.24 | 0.26                                | 0.02       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 62    | Misabe 46.14           | 110  | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 1.3        | 2.4   | 1.09               | 84.8%      | 0.24 | 0.26                                | 0.02       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 160   | Misabe 45.14           | 55   | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 0.6        | 1.2   | 0.55               | 84.8%      | 0.12 | 0.13                                | 0.01       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 160   | Misabe 45.14           | 55   | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 0.6        | 1.2   | 0.55               | 84.8%      | 0.12 | 0.13                                | 0.01       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 160   | Misabe 45.14           | 55   | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 0.6        | 1.2   | 0.55               | 84.8%      | 0.12 | 0.13                                | 0.01       | 8.0% | 0.03 |
| Fairlane-Adolph     | CSAH 29  | Misabe 44.88           | 50   | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 0.1        | 0.1   | 0.05               | 84.8%      | 0.01 | 0.01                                | 0.00       | 8.0% | 0.03 |
| Fairlane-Adolph     | CSAH 29  | Misabe 44.88           | 50   | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 0.1        | 0.1   | 0.05               | 84.8%      | 0.01 | 0.01                                | 0.00       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 800   | Misabe 40.32           | 5    | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 0.1        | 0.1   | 0.05               | 84.8%      | 0.01 | 0.01                                | 0.00       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 800   | Misabe 40.32           | 5    | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 0.1        | 0.1   | 0.05               | 84.8%      | 0.01 | 0.01                                | 0.00       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 800   | Misabe 40.32           | 5    | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 0.1        | 0.1   | 0.05               | 84.8%      | 0.01 | 0.01                                | 0.00       | 8.0% | 0.03 |
| Fairlane-Adolph     | CSAH 133 | Misabe 35.37           | 5    | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 6.7        | 16.0  | 7.36               | 84.8%      | 1.64 | 1.78                                | 0.13       | 8.0% | 0.03 |
| Fairlane-Adolph     | CSAH 133 | Misabe 35.37           | 5    | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 6.7        | 16.0  | 7.36               | 84.8%      | 1.64 | 1.78                                | 0.13       | 8.0% | 0.03 |
| Fairlane-Adolph     | CSAH 133 | Misabe 35.37           | 5    | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 6.7        | 16.0  | 7.36               | 84.8%      | 1.64 | 1.78                                | 0.13       | 8.0% | 0.03 |
| Fairlane-Adolph     | CSAH 47  | Misabe 32.41           | 430  | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 1.5        | 2.7   | 1.24               | 84.8%      | 0.38 | 0.40                                | 0.02       | 8.0% | 0.03 |
| Fairlane-Adolph     | CSAH 47  | Misabe 32.41           | 430  | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 1.5        | 2.7   | 1.24               | 84.8%      | 0.38 | 0.40                                | 0.02       | 8.0% | 0.03 |
| Fairlane-Adolph     | CSAH 47  | Misabe 32.41           | 430  | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 1.5        | 2.7   | 1.24               | 84.8%      | 0.38 | 0.40                                | 0.02       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 8     | Misabe 28.79           | 125  | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 0.1        | 0.1   | 0.05               | 84.8%      | 0.01 | 0.01                                | 0.00       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 8     | Misabe 28.79           | 125  | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 0.1        | 0.1   | 0.05               | 84.8%      | 0.01 | 0.01                                | 0.00       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 8     | Misabe 28.79           | 125  | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 0.1        | 0.1   | 0.05               | 84.8%      | 0.01 | 0.01                                | 0.00       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 867   | Misabe 26.57           | 5    | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 0.5        | 1.0   | 0.45               | 84.8%      | 0.10 | 0.11                                | 0.01       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 867   | Misabe 26.57           | 5    | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 0.5        | 1.0   | 0.45               | 84.8%      | 0.10 | 0.11                                | 0.01       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 867   | Misabe 26.57           | 5    | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 0.5        | 1.0   | 0.45               | 84.8%      | 0.10 | 0.11                                | 0.01       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 864   | Misabe 26.06           | 45   | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 3.3        | 6.2   | 2.83               | 84.8%      | 0.63 | 0.68                                | 0.05       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 864   | Misabe 26.06           | 45   | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 3.3        | 6.2   | 2.83               | 84.8%      | 0.63 | 0.68                                | 0.05       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 864   | Misabe 26.06           | 45   | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 3.3        | 6.2   | 2.83               | 84.8%      | 0.63 | 0.68                                | 0.05       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 874   | Misabe 22.47           | 285  | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 0.1        | 0.1   | 0.05               | 84.8%      | 0.01 | 0.01                                | 0.00       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 874   | Misabe 22.47           | 285  | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 0.1        | 0.1   | 0.05               | 84.8%      | 0.01 | 0.01                                | 0.00       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 874   | Misabe 22.47           | 285  | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 0.1        | 0.1   | 0.05               | 84.8%      | 0.01 | 0.01                                | 0.00       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 875   | Misabe 21.11           | 5    | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 1.0        | 1.8   | 0.84               | 84.8%      | 0.19 | 0.20                                | 0.02       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 875   | Misabe 21.11           | 5    | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 1.0        | 1.8   | 0.84               | 84.8%      | 0.19 | 0.20                                | 0.02       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 875   | Misabe 21.11           | 5    | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 1.0        | 1.8   | 0.84               | 84.8%      | 0.19 | 0.20                                | 0.02       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 873   | Misabe 20.28           | 85   | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 3.0        | 5.6   | 2.58               | 84.8%      | 0.58 | 0.62                                | 0.05       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 873   | Misabe 20.28           | 85   | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 3.0        | 5.6   | 2.58               | 84.8%      | 0.58 | 0.62                                | 0.05       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 873   | Misabe 20.28           | 85   | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 3.0        | 5.6   | 2.58               | 84.8%      | 0.58 | 0.62                                | 0.05       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 864   | Misabe 16.57           | 260  | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 0.1        | 0.1   | 0.05               | 84.8%      | 0.01 | 0.01                                | 0.00       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 864   | Misabe 16.57           | 260  | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 0.1        | 0.1   | 0.05               | 84.8%      | 0.01 | 0.01                                | 0.00       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 864   | Misabe 16.57           | 260  | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 0.1        | 0.1   | 0.05               | 84.8%      | 0.01 | 0.01                                | 0.00       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 880   | Misabe 16.26           | 5    | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 9.5        | 17.5  | 8.05               | 84.8%      | 1.80 | 1.94                                | 0.14       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 880   | Misabe 16.26           | 5    | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 9.5        | 17.5  | 8.05               | 84.8%      | 1.80 | 1.94                                | 0.14       | 8.0% | 0.03 |
| Fairlane-Adolph     | CR 880   | Misabe 16.26           | 5    | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 9.5        | 17.5  | 8.05               | 84.8%      | 1.80 | 1.94                                | 0.14       | 8.0% | 0.03 |
| Fairlane-Adolph     | CSAH 88  | Misabe 15.21           | 610  | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 4.0        | 7.4   | 3.38               | 84.8%      | 0.76 | 0.82                                | 0.06       | 8.0% | 0.03 |
| Fairlane-Adolph     | CSAH 88  | Misabe 15.21           | 610  | 2.22                               | 2.40       | 0.18 | 1.44                                   | 1.56       | 0.12  | 8.0%                           | 4.0        | 7.4   | 3.38               | 8          |      |                                     |            |      |      |