Table 3.11-1. Population Trends by County for Arrowhead Region

				% Change	
County	**1980**	**1990**	**2000**	**1980–2000**	**1990–2000**
Aitkin	13,404	12,425	15,301	14.2	23.1
Carlton	29,936	29,259	31,671	5.8	8.2
Cook	4,092	3,868	5,168	26.3	33.6
Itasca	43,069	40,863	43,992	2.1	7.7
Koochiching	17,571	16,299	14,355	-18.3	-11.9
Lake	13,043	10,415	11,058	-15.2	6.2
St. Louis	222,229	198,213	200,528	-9.8	1.2
Arrowhead Region	343,344	311,342	322,073	-6.2	3.4

Source: MDOA, 2006

The populations of the 10 largest municipal districts in the Arrowhead Region are provided in Table 3.11-2. There are 278 cities and townships in the Arrowhead region. As shown in Table 3.11-2, approximately one-quarter of the regional population lives in the City of Duluth.

Table 3.11-2. The 10 Largest Municipalities in Northeast Minnesota (2002)

City	2002 Population
Duluth	86,044
Hibbing	16,968
Cloquet	11,378
Virginia	9,108
Hermantown	8,178
Grand Rapids	7,829
International Falls	6,554
Chisholm	4,872
Thomson Township (Carlton County)	4,361
Rice Lake Township (St. Louis Township)	4,190

Source: MDOA, 2006

The Minnesota State Demographic Center predicts that the Arrowhead Region will increase in population by 15 percent between 2000 and 2030. The Center expects the population of St. Louis County to increase by about 9 percent and that of Itasca County to increase by about 22 percent between 2000 and 2030 (MSDC, 2002).

3.11.1.2 West Range Site and Corridors

The West Range Site is located within the city limits of Taconite in Census Tract 9810 of Itasca County. Itasca County is the third largest county in Minnesota occupying approximately 3,000 square miles (7,770 square kilometers). The county has a population of approximately 44,000, and the county seat is located in Grand Rapids.

Census Tract 9810 (Figure 3.11-2) includes Taconite and Iron Range Township, as well as several other small communities along US 169 between the eastern outskirts of Grand Rapids and Nashwauk. As

indicated in Table 3.11-3, the population of Iron Range Township grew at a higher rate during the 1990s than the larger census units. However, the population in the City of Taconite has remained relatively constant since 1980, as indicated in Table 3.11-4. The smallest census unit in which the West Range Site is located (Block Group 3, Block 3083) had a population of 86 in the last census.

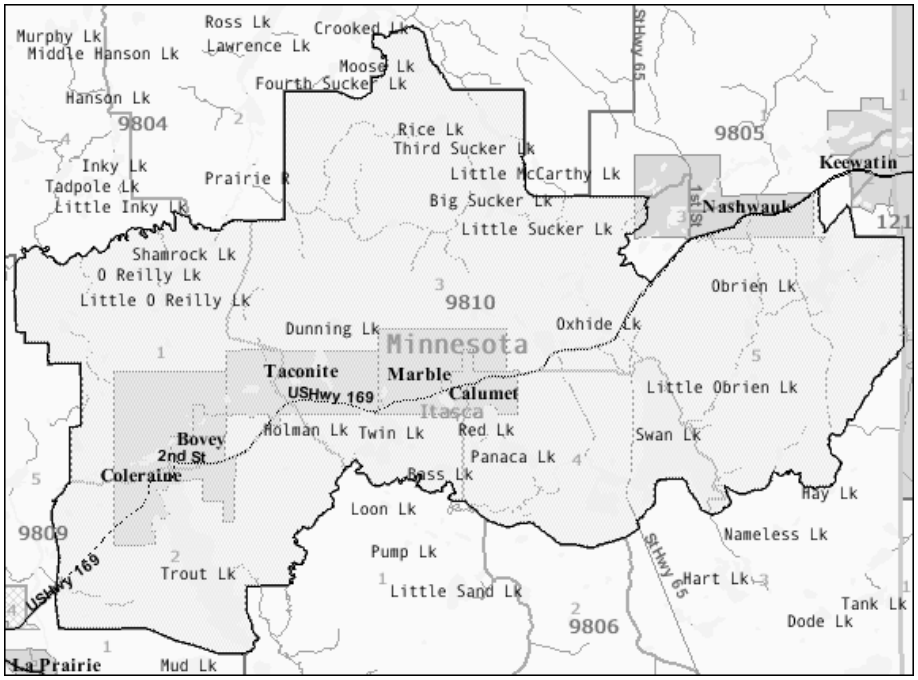

Figure 3.11-2. Census Tract 9810 in Itasca County

The area near Taconite experiences a seasonal increase in population primarily consisting of visitors to lake cabins, resorts and campgrounds during the summer. These seasonal increases are not reflected in census data but should be considered when evaluating housing availability, transportation, and the capacity of local government services to meet local needs.

Table 3.11-3. Local Population Change, West Range (1990 to 2000)

Unit	1990	2000	% Change
Taconite	310	315	1.6
Iron Range Township	590	651	10.3
Census Tract 9810, Block Group 3	1,324	1,448	9.4
Census Tract 9810	5,597	5,938	6.1

Source: U.S. Census Bureau, 2006

Table 3.11-4. Population Trend in Taconite (1980 to 2004)

Municipality	1980	1990	2000	2004
Taconite	331	310	315	323

Source: MDOA, 2006

3.11.1.3 East Range Site and Corridors

The East Range Site is located in the City of Hoyt Lakes (Census Tract 140) in St. Louis County (Figure 3.11-3). St. Louis County is the largest county in Minnesota, occupying approximately 6,860 square miles (17,800 square kilometers). The county has a population of approximately 200,000 including the City of Duluth, which is the county seat and most populous city in the Arrowhead Region.

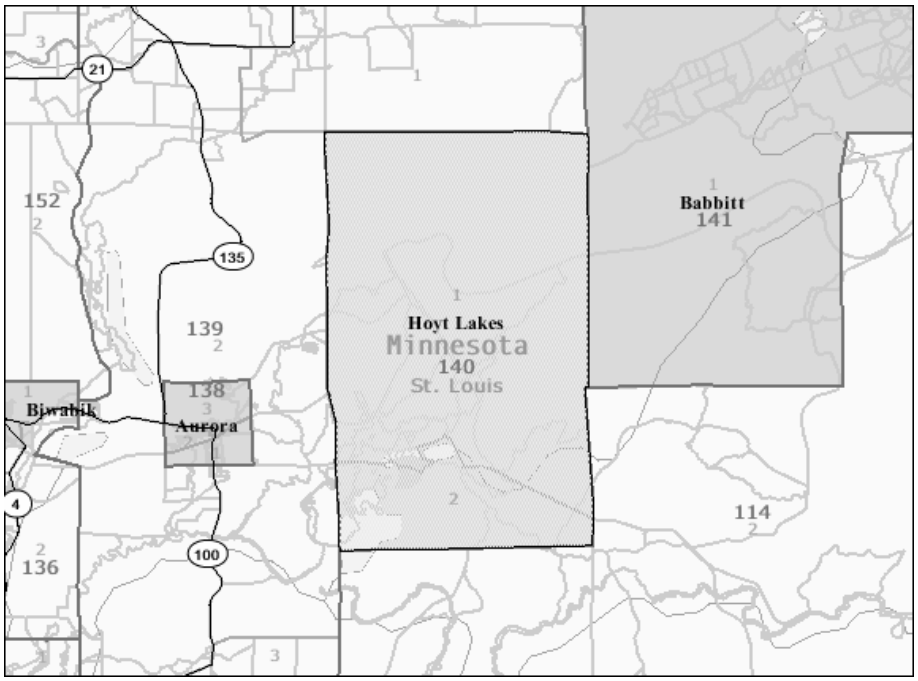

Figure 3.11-3. Hoyt Lakes (Census Tract 140) in St. Louis County

Table 3.11-5 illustrates the steady decline in population experienced by Hoyt Lakes since 1980. The smallest census unit in which the East Range Site is located (Census Tract 140, Block Group 1, Block 1008) had no recorded population in the last census.

Table 3.11-5. Population Trend in Hoyt Lakes (1980 to 2004)

Municipality	1980	1990	2000	2004
Hoyt Lakes	3,186	2,348	2,082	1,961

Source: MDOA, 2006

Hoyt Lakes, like much of the region, gets a large influx of temporary residents and visitors at lake cabins, resorts and campgrounds during the summer that impact the capacity of local government services to meet local needs. However, these temporary residents are not counted in these population statistics.

3.11.2 Housing

3.11.2.1 Regional Conditions

Based on 2000 census data, there were a total of about 35,300 vacant housing units in the Arrowhead Region. Over 27,600 (78 percent) of these were for seasonal, recreational, or occasional use, leaving approximately 7,700 year-round vacant housing units (U.S. Census Bureau, 2006).

3.11.2.2 West Range Site and Corridors

Table 3.11-6 presents housing characteristics in Itasca County. In the 2000 census, there were 24,528 housing units in Itasca County of which 27 percent were vacant, and most of the vacant units were considered seasonal units. Approximately 12 percent of all housing units were renter-occupied. The number of housing units countywide grew by 9 percent over the prior decade, and the vacancy rate declined, while the percentage of rental units remained relatively stable. The median value of owner-occupied housing in Itasca County ($81,700) remained substantially below the median values in Minnesota ($122,400) and the United States ($119,600) in 2000. However, the median home value in the county increased at a substantially higher rate (84 percent) during the decade compared to the rates of increase for the state (65 percent) and nation (51 percent).

As of the 2000 census, Iron Range Township, including the City of Taconite, had 314 housing units, of which 11 percent were renter-occupied and 18 percent were vacant during the last census. Taconite had approximately 150 housing units, of which 21 percent were renter-occupied and 9 percent were vacant. Census Block 3083, in which the West Range Site is located, had 33 housing units (including one renter-occupied and three vacant seasonal units). The township added 35 housing units (13 percent increase) during the prior decade; Taconite added 11 new units (8 percent increase). Both Iron Range Township and Taconite have generally older housing than the county and state. The median house values in Iron Range Township ($61,400) and Taconite ($40,400) were substantially lower than the median value in the county, but median values in both jurisdictions grew by much higher rates than the county during the decade (163 and 122 percent, respectively).

Table 3.11-6. Itasca County Housing Characteristics (2000)

General Housing Data	2000 Census	% of 2000 Total	1990 Census	% of 1990 Total	Change from 1990 to 2000
Total Housing Units	24,528		22,494		9.0%
Occupied	17,789	72.5%	15,461	68.7%	15.1%
Vacant	6,739	27.5%	7,033	31.3%	-4.2%
Vacant Seasonal	5,747	23.4%	5,302	23.6%	8.4%
Owner-Occupied	14,768	83.0%	12,855	83.1%	14.9%
Renter-Occupied	3,021	17.0%	2,606	16.9%	15.9%
Mobile Home	2,815	11.5%	2,739	12.2%	2.8%
Median Value of Owner-Occupied Units	$81,700		$44,300		84.4%
Median Gross Rent	$406		$297		36.7%

Source: U.S. Census Bureau, 2006

3.11.2.3 East Range Site and Corridors

Table 3.11-7 presents housing characteristics in St. Louis County. In the 2000 census, there were 95,800 housing units in St. Louis County of which 14 percent were vacant, and most of the vacant units were considered seasonal units. Approximately 22 percent of all housing units were renter-occupied. The number of housing units countywide remained relatively constant over the prior decade, and the vacancy rate declined, while the percentage of rental units remained relatively stable. The median value of owner-occupied housing in St. Louis County remained substantially below the median values in the state and nation in 2000. However, the median home value in the county increased at a noticeably higher rate (78 percent) during the decade compared to the rates of increase for Minnesota and the nation.

As of the 2000 census, Hoyt Lakes had approximately 995 housing units, of which 8 percent were renter-occupied and 8 percent were vacant. Hoyt Lakes added 33 new housing units (a 3 percent increase) during the prior decade, which was a small, but higher rate of increase than the county. Hoyt Lakes and St. Louis County in general have older housing stock than Minnesota as a whole, but new homes are currently being constructed in the Hoyt Lakes area on lakeshore property owned by Minnesota Power. The median house value in Hoyt Lakes ($39,100) was substantially lower than the median value in the county and grew at a slower rate (47 percent) than the county during the decade.

Table 3.11-7. St. Louis County Housing Characteristics (2000)

General Housing Data	2000 Census	% of 2000 Total	1990 Census	% of 1990 Total	Change from 1990 to 2000
Total Housing Units	95,800		95,403		0.4%
Occupied	82,619	86.2%	78,901	82.7%	4.7%
Vacant	13,181	13.7%	16,502	17.3%	-20.1%
Vacant Seasonal	8,896	9.3%	11,046	11.6%	-19.5%
Owner-Occupied	61,683	74.7%	58,541	74.2%	5.4%
Renter-Occupied	20,936	25.3%	20,360	25.8%	2.8%
Mobile Home	5,090	5.3%	5,052	5.3%	0.7%
Median Value of Owner-Occupied Units	$75,000		$42,200		77.7%
Median Gross Rent	415		291		42.6%

Source: U.S. Census Bureau, 2006

3.11.3 Employment and Income

3.11.3.1 Regional Conditions

Northeastern Minnesota has relied on the mining and forestry industries historically for well-paying jobs and economic base. However, between 2000 and 2003, jobs in mining declined by 36 percent, and mining and agriculture, forestry, fishing, and hunting now comprise 4 percent of the region's jobs. Increased foreign competition and improved technological efficiencies have resulted in the slow decline in employment. However, increasing global iron ore demand and the steady fall of the U.S. dollar have temporarily reduced stress in the industry. This has increased the value of many local products and has created a rebounding demand for skilled workers. Mining still provides 5 percent of wages in the region, which are paid at hourly rates significantly higher than most service-oriented jobs. In comparison, 39 percent of jobs in the region paid less than $10 per hour in 2002 (DEED, 2006b).

Employment in the service sector also is an increasingly large percentage of total employment in the Arrowhead Region, which reflects a nationwide trend. Three sectors – healthcare and social assistance, retail, and accommodation and food services – account for more than half of all regional employment. The health care industry is now the top employing industry in northeast Minnesota, representing 20.7 percent of the total private employment in the region, which is well above the 12.7 percent statewide and the 10.1 percent in the Twin Cities (Schoeppner, 2006). The regional occupations expected to increase the most through 2012 include Community and Social Services Occupations (35 percent), Healthcare Support Occupations (31 percent), and Computer and Mathematical Occupations (26 percent).

The median ages of the populations in Itasca County (41 years) and St. Louis County (39 years) were both considerably higher than the statewide median (35 years) in the 2000 census. Therefore, the aging of the regional workforce is a growing concern in the Arrowhead Region as the Baby Boom generation

begins to retire. DEED expects this trend to significantly slow the labor force growth over the next two decades (DEED, 2006b).

Unemployment is generally higher in most of the Arrowhead Region compared to Minnesota as a whole. The unemployment rate in the seven-county region averaged 5.2 percent for 2005, but dropped to 4.5 percent in May 2006 (DEED, 2006a). Unemployment in the region has gradually declined over the last several years, due to a slow recovery from the 2001 recession. As shown in Figure 3.11-4, the unemployment rate in the Arrowhead Region was consistently 2 percent or more higher than the state average through the 1980s and 1990s, and about 1 percent higher than the state average for the last four years.

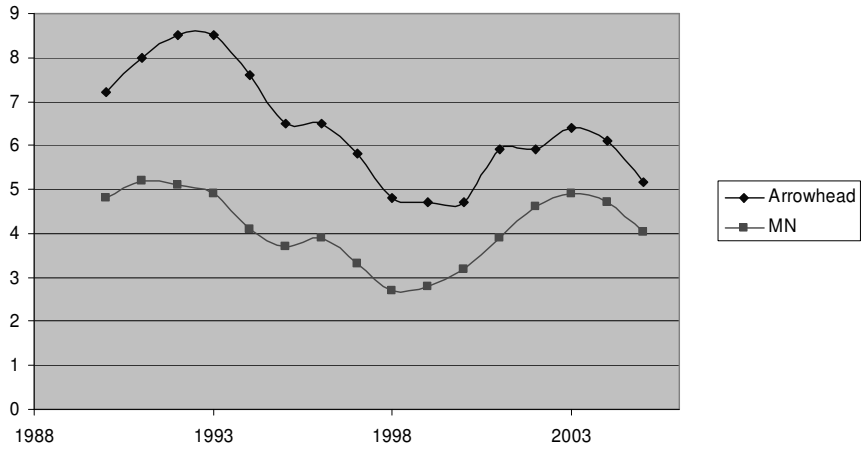

Figure 3.11-4. Annual Unemployment Rate (Percent), Arrowhead Region vs. Statewide Average

3.11.3.2 West Range Site and Corridors

In the 2000 census, the median incomes in Itasca County were $44,025 for a family, $36,234 for a household, and $17,717 per capita. Locally, the median incomes in Iron Range Township were $46,750 for a family, $35,000 for a household, and $16,384 per capita. In comparison, median incomes statewide ($56,874 family, $47,111 household, and $23,198 per capita) were substantially higher.

Many local residents travel long distances to work. Approximately 17 percent of workers in Iron Range Township, including Taconite, commuted at least 40 minutes to their places of employment in 2000, compared to 12 percent for both Itasca County and the state (U.S. Census Bureau, 2006). The use of public transport is negligible and more than 80 percent of local workers drive to work alone.

Unemployment in Itasca County has been comparable to the Arrowhead Region but higher than the state as a whole. The unemployment rate in May 2006 for Itasca County was 4.7 percent, and the annual unemployment rate has ranged between 4 and 6 percent since 1995, after having reached rates as high as 8 percent in the early 1990s (DEED, 2006a). The median age of the population in Iron Range Township (37 years) was lower than the county median in 2000 but slightly higher than the statewide median, pointing to potential workforce aging.

3.11.3.3 East Range Site and Corridors

The median incomes in St. Louis County in 2000 were $47,134 for a family, $36,306 for a household, and $18,982 per capita. Locally, the median incomes in Hoyt Lakes were $45,603 for a family, $39,493 for a household, and $18,882 per capita. These median incomes were substantially lower than those of the state as a whole.

Many local residents travel long distances to work. Approximately 15 percent of workers in Hoyt Lakes commuted at least 40 minutes to their places of employment in 2000, compared to 9 percent for the

county and 12 percent for the state (U.S. Census Bureau, 2006). The use of public transport is negligible and nearly 80 percent of local workers drive to work alone.

Unemployment in St. Louis County has been generally comparable to the Arrowhead Region but higher than the state as a whole. The unemployment rate in May 2006 for St. Louis County was 4.4 percent, and the annual unemployment rate has ranged between 4 and 6 percent since 1995 after having reached rates exceeding 8 percent in the early 1990s (DEED, 2006a). The median age of the population in Hoyt Lakes (over 45 years) was even higher than the county median in 2000, pointing to an aging local workforce.

3.11.4 Business and Economy

3.11.4.1 Regional Conditions

The Arrowhead Region, including the Iron Range, has relied on a natural resource-based economy for more than 100 years. Minnesota's economy has been driven by the development of its varied natural resources including iron ore, used in the making of steel through iron mining and ore processing; timber, used in papermaking and fiberboard; and, tourism. Of all these industries, the mining industry, which now accounts for a very small percentage of the annual gross state product in Minnesota, is viewed as the industry that drew many of the ancestors of current residents to settle in this region of Minnesota. However, global competition and increased production efficiency in the mining industry following the general economic crisis of the 1980s and earlier this decade, have forced the region to adopt economic diversification as a long-term strategy (Excelsior, 2006b).

The Arrowhead Region is evolving into a service- and commercial-oriented economy. Like the rest of rural Minnesota, the Arrowhead Region depends on smaller businesses. However, business development appears to be lagging in the Arrowhead Region. From 1998 to 2001, the state saw a 4.7 percent increase in the total number of establishments, while the Arrowhead Region saw only a 1 percent increase. Among the smallest businesses, those employing one to nine people, the Arrowhead Region saw no growth, staying virtually steady (0.6 percent) while the rest of rural Minnesota increased its number of establishments by 2.7 percent and the state as a whole grew by 4.2 percent.

Various state and regional organizations have been established with the objective of promoting economic stability and growth in the Arrowhead Region. Representative organizations include:

- Iron Range Resources (IRR) – Located in Eveleth, this state agency is responsible to help stabilize the economy and advance regional growth and diversity in the Taconite Assistance Area (the Taconite Tax Relief Area). The agency focuses its development efforts on four key industries: secondary wood products manufacturing, industrial machinery manufacturing, high-end customer service centers, and electronics manufacturing.
- Itasca Development Corporation – The Itasca Development Corporation, located in Grand Rapids, provides services including business development assistance and counseling, loan packaging, and site location assistance, and hosts a Minnesota Small Business Development Center.
- Arrowhead Regional Development Commission (ARDC) in Duluth.
- Northland Foundation in Duluth.
- The Northspan Group, Inc. in Duluth.

3.11.4.2 West Range Site and Corridors

Key businesses in Itasca County include the UPM Blandin Paper Mill in Grand Rapids, Ainsworth Grand Rapids OSB Plant, and Grand Itasca Clinic and Hospital, as well as numerous small and medium-sized businesses in Grand Rapids and other local communities. In the vicinity of the West Range Site,

smaller commercial businesses are located along US 169 and other local roads in Taconite, Bovey, Holman, Marble, Pengilly, and nearby communities.

3.11.4.3 East Range Site and Corridors

Key businesses in St. Louis County in the vicinity of the East Range Site include Cliffs-Erie, LLC, PolyMet Mining Corp., and Cliffs Natural Stone, as well as commercial businesses located along CR 110, CR 100 and other local roads in Hoyt Lakes, Aurora, Biwabik, and surrounding communities.

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3.12 ENVIRONMENTAL JUSTICE

Environmental justice, in the context of this document, refers to the potential for minority and low-income populations to bear a disproportionate share of high and adverse environmental impacts from activities within the project area and the municipalities nearest to the two main sites under consideration: Taconite and Iron Range Township (West Range Site) and Hoyt Lakes (East Range Site). The general population for demographic analysis and comparison includes the counties of Aitkin, Carlton, Cook, Itasca, Koochiching, Lake, and St. Louis, which are defined by the Minnesota Department of Employment and Economic Development (DEED) as the Arrowhead Region.

3.12.1 Background and Definitions

Executive Order 12898 provides that "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations" (The White House, 1994).

The U.S. Department of Energy (2006a) defines "environmental justice" as:

> *The fair treatment and meaningful involvement of all people—regardless of race, ethnicity, and income or education level—in environmental decision making. Environmental Justice programs promote the protection of human health and the environment, empowerment via public participation, and the dissemination of relevant information to inform and educate affected communities. Department of Energy Environmental Justice programs are designed to build and sustain community capacity for meaningful participation for all stakeholders in Department of Energy host communities.*

In its guidance for the consideration of environmental justice under NEPA, the Council on Environmental Quality (CEQ) defines a "minority" as an individual who is American Indian or Alaskan Native, Black or African American, Asian, Native Hawaiian or Pacific Islander, Hispanic or Latino. CEQ characterizes a "minority population" as existing in an affected area where the percentage of defined minorities exceeds 50 percent of the population, or where the percentage of defined minorities in the affected area is meaningfully greater than the percentage of defined minorities in the general population or other appropriate unit of geographic analysis. The CEQ guidance further recommends that low-income populations in an affected area should be identified using data on income and poverty from the U.S. Census Bureau (CEQ, 1997).

3.12.2 Minority Populations

3.12.2.1 Regional Conditions

Table 3.12-1 compares the distributions of regional population with those of the state and nation. The 2000 Census revealed a more racially and ethnically diverse population in Minnesota compared to the 1990 Census. In 2000, 11.8 percent of Minnesotans (582,000 people) identified themselves as non-white, up from 6.3 percent (274,000 people) in 1990. However, the state population is far less diverse than that of the nation, and the population in the Arrowhead Region is even less diverse, with low distributions of minorities. The largest minority concentrations in the region are in central Duluth and on tribal reservations relatively distant from either the West Range or East Range Sites.

Table 3.12-1. National and Regional Population Distributions (2000)

Area	White	American Indian or Alaskan Native	Black or African American	Hispanic or Latino (all races)	Other Minorities	Total Population (Number)
Arrowhead Region	94.3%	2.5%	0.7%	0.7%	1.8%	322,073
State of Minnesota	88.2%	1.1%	3.4%	2.9%	4.4%	4,919,479
United States	69.1%	0.7%	12.1%	12.5%	5.6%	281,421,906

Source: U.S. Census Bureau, 2006

3.12.2.2 West Range Site and Corridors

Table 3.12-2 compares the minority compositions of the census units surrounding the West Range Site with larger areas based on the 2000 Census. The proposed West Range Site is located in Census Tract 9810, Block Group 3, Block 3083, for which no minority population was recorded in 2000. Iron Range Township, which includes the population of the City of Taconite, had a minority population of nearly 3 percent, and the percentage of minorities generally increases as the census units grow larger. The proportions of the non-minority (white) populations in these smaller census units are generally higher than in Itasca County and are substantially higher than the state and nation. Since the population in the area surrounding the proposed site is far more homogeneous racially and ethnically than the general population of the region, state, and country, a "minority population" as characterized by CEQ does not exist in the potentially affected area of the Mesaba Energy Project.

Table 3.12-2. Population Profiles (2000): Percentage of Minorities, West Range

Area	White	American Indian or Alaskan Native	Black or African American	Hispanic or Latino (all races)	Other Minorities	Total Population (Number)
Tract 9810, BG3, Block 3083	100.0	0.0	0.0	0.0	0.0	86
Iron Range Township	97.2	0.2	0.0	0.2	2.4	651
Tract 9810, BG3	96.1	1.5	0.0	1.0	1.4	1,448
Tract 9810	96.9	1.0	0.1	0.6	1.4	5,938
Grand Rapids	95.1	1.9	0.3	0.9	1.8	7,764
Itasca County	94.3	3.3	0.2	0.6	1.6	43,992

Source: U.S. Census Bureau, 2006

3.12.2.3 East Range Site and Corridors

Table 3.12-3 compares the minority compositions of the census units surrounding the East Range Site with larger areas based on the 2000 Census. The East Range Site is located in Census Tract 140, Block Group 1, Block 1008, which had no population in the 2000 Census. The nearest populated census block to the East Range Site (Block 1023) had no minority population recorded in the 2000 Census, and the larger Block Group 1 and City of Hoyt Lakes (Census Tract 140) each had a minority population of 1 percent. The proportions of the non-minority (white) population in these smaller census units are generally higher than in St. Louis County and are substantially higher than in the state and country. Since the population in the area surrounding the proposed site is far more homogeneous racially and ethnically than the general population of the region, state, and country, a "minority population" as characterized by CEQ does not exist in the potentially affected area of the Mesaba Energy Project.

Table 3.12-3. Population Profiles (2000): Percentage of Minorities, East Range

Area	White	American Indian or Alaskan Native	Black or African American	Hispanic or Latino (all races)	Other Minorities	Total Population (Number)
Tract 140, BG1, Block 1008	0.0	0.0	0.0	0.0	0.0	0
Tract 140, BG1, Block 1023	100.0	0.0	0.0	0.0	0.0	84
Tract 140, BG1	99.3	0.2	0.0	0.2	0.3	1,060
Hoyt Lakes	99.0	0.2	0.3	0.2	0.3	2,082
Virginia	94.6	2.2	0.5	0.8	1.9	9,157
St. Louis County	94.4	2.0	0.8	0.8	2.0	200,528

Source: U.S. Census Bureau, 2006

3.12.3 Low Income Populations

3.12.3.1 Regional Conditions

Table 3.12-4 compares regional poverty rates for the Arrowhead Region, Minnesota, and the United States for the 2000 Census. The data indicate that the Arrowhead Region has poverty rates for individuals, families, and households that are closer in line with national poverty rates than those of the state which are generally lower.

Table 3.12-4. Regional and National Poverty Rates

Percentage of Income in 1999 Below Poverty Level			
Area	**Families**	**Households**	**Individuals**
Arrowhead Region	7.2	11.6	11.2
State of Minnesota	5.1	7.9	7.9
United States	9.2	11.8	12.4

Source: U.S. Census Bureau, 2006

3.12.3.2 West Range Site and Corridors

Median incomes in the communities near the West Range Site as described in Section 3.11.3 are considerably lower than those of the state, but generally comparable to those in Itasca County. Table 3.12-5 compares the poverty rates for census units in the vicinity of the West Range Site with those in the larger community of Grand Rapids and in Itasca County from the 2000 Census. The table indicates that the county has a significantly higher percentage of families, households, and individuals with incomes below the poverty level than does the state as a whole but lower poverty rates than the nation.

The poverty rates in the smallest census unit encompassing the West Range Site (Census Tract 9810, Block Group 3), as well as in Taconite and Iron Range Township, are higher than the rates in the larger Census Tract 9810 and in the rest of the county. Poverty rate data are not available from the U.S. Census Bureau below the Block Group level, but the residential properties closest to the West Range Site include lakefront properties along Diamond Lake Road to the south and large-sized lots along CR 7 to the west. Therefore, it is reasonable to assume that the poverty rates in neighborhoods closest to the West Range Site are more comparable to those in Census Tract 9810 and the Arrowhead Region in general than to those in the City of Taconite.

Table 3.12-5. Population Profiles (2000): Local Poverty Rates, West Range

Percentage of Income in 1999 Below Poverty Level			
Area	**Families**	**Households**	**Individuals**
Taconite	14.9	13.1	17.1
Iron Range Township	9.7	10.9	15.0
Tract 9810, BG3	9.4	16.0	13.2
Tract 9810	7.9	11.7	11.3
Grand Rapids	7.9	10.2	10.5
Itasca County	7.7	10.6	10.6

Source: U.S. Census Bureau, 2006

3.12.3.3 East Range Site and Corridors

As described in Section 3.11.3, median incomes in the communities near the East Range Site are considerably lower than those of the state, but generally comparable to those in St. Louis County. Table 3.12-6 compares the poverty rates for census units in the vicinity of the East Range Site with those in the larger community of Virginia and in St. Louis County from the 2000 census. The table indicates that the county has a significantly higher percentage of families, households, and individuals with incomes below the poverty level than does the state as a whole but lower poverty rates than the nation.

Poverty rates in Hoyt Lakes are considerably lower than those in St. Louis County and the Arrowhead Region in general but more in line with those of Minnesota. Moreover, the poverty rates in the smallest census unit encompassing the East Range Site (Census Tract 140, Block Group 1), are substantially lower than those in Hoyt Lakes, the county and the state as a whole. Also, the residential properties closest to the East Range Site, consisting of lakefront and lake-view homes, are located about 1 mile south of the site. Therefore, it is reasonable to assume that the poverty rates in neighborhoods closest to the East Range Site are substantially lower than in the larger census units.

Table 3.12-6. Population Profiles (2000): Local Poverty Rates, East Range

Percentage of Income in 1999 Below Poverty Level			
Area	**Families**	**Households**	**Individuals**
Tract140, BG1	3.0	4.3	3.9
Hoyt Lakes	6.6	7.7	8.9
Virginia	10.6	17.3	15.9
St. Louis County	7.2	12.3	12.1

Source: U.S. Census Bureau, 2006

3.13 COMMUNITY SERVICES

This section describes the existing local government services for the Cities of Taconite (West Range Site) and Hoyt Lakes (East Range Site) that may be affected by the proposed project.

3.13.1 Law Enforcement

3.13.1.1 West Range Site and Corridors

The Itasca County Sheriff's Office provides law enforcement in Itasca County, including the City of Taconite and surrounding areas. The Sheriff's Office includes 64 employees working as deputies, jailers, dispatchers, and clerical support. The county has been divided into five patrol districts; deputies live and work within their assigned patrol districts to provide community policing. Taconite is in the East End patrol district. The office has employees with specialized training in D.A.R.E. (Drug Abuse Resistance Education), pre-employment background investigation, boat and water safety, snowmobile safety, drug task force, emergency response team, dive team, and special enforcement projects. Two supporting groups, the Itasca County Sheriff's Posse and the Itasca County Dive Team, are staffed by trained volunteers who contribute their time to search for lost persons, recover drowning victims, and provide time to community service work (Itasca County Sheriff, 2006).

3.13.1.2 East Range Site and Corridors

Hoyt Lakes Police Department serves the City of Hoyt Lakes with support from the St. Louis County Sheriff's Office, which has jurisdiction in surrounding areas. The Hoyt Lakes Police Department consists of five full-time and five part-time officers. The St. Louis County Sheriff's Office has 94 full-time and 23 part-time deputies on staff (Excelsior, 2006b). The patrol division is the largest division. In addition to their regular duty assignments, deputies also participate in activities such as background investigations of potential deputy sheriff candidates; field training officers for newly hired deputies; boat and water patrol; snowmobile patrol; Driving While Intoxicated (DWI) saturation patrol; illegal drug investigation; arson investigation; and membership on the Emergency Response Team (ERT).

The county is divided into three major regional sheriff's offices in Duluth, Hibbing, and Virginia. The Virginia office serves the East Range vicinity. The St. Louis County Sheriff's Office also provides law enforcement services for the community of Aurora. The Aurora Sheriff's Office consists of a sergeant and five deputies who patrol within a 4-mile radius of Aurora. Deputies also provide immediate response to any emergency outside of Aurora, which may extend into the neighboring City of Hoyt Lakes (St. Louis County Sheriff, 2006).

3.13.2 Emergency Response

3.13.2.1 West Range Site and Corridors

The City of Taconite has seven Emergency Medical Technician (EMT) volunteers and 14 fire department volunteers. Ambulance services are dispatched from Nashwauk or Grand Rapids, depending on the location of the 911 caller. The City of Taconite also has a mutual aid agreement with nearby Cohasset and Grand Rapids (Excelsior, 2006b). Itasca County provides additional emergency response as needed. The Itasca County Sheriff is also the Itasca County Director of Emergency Management for the Minnesota Department of Public Safety and for coordination with the U.S. Department of Homeland Security (MDPS, 2006).

Itasca County is served by three hospitals and 12 outpatient clinics (Excelsior, 2006b). The nearest hospitals to Taconite are the Grand Itasca Clinic and Hospital in Grand Rapids (13 miles) which has 64 beds, and University Medical Center-Mesabi in Hibbing (27 miles) which has 175 beds (MDH, 2006).

3.13.2.2 East Range Site and Corridors

Hoyt Lakes operates a volunteer emergency response and fire department cooperatively with the surrounding communities of Aurora, Biwabik, and White Township, which contribute funds to cover administrative expenses and build up reserves for capital purchases. The cooperative service has 25 EMTs and fire fighters who are paid by service run. Hoyt Lakes also has mutual aid agreements with nearby communities for police, fire, and ambulance services.

St. Louis County assists its municipalities when emergency response demands exceed their local capabilities. The St. Louis County Sheriff's Office Emergency Management Division coordinates emergency management plans and has jurisdiction throughout the county outside of cities that establish their own emergency management organizations (Excelsior, 2006b). The St. Louis County Sheriff is also the St. Louis County Director of Emergency Management for the Minnesota Department of Public Safety and for coordination with the U.S. Department of Homeland Security (DPS, 2006). In an extreme emergency or disaster situation within the county, the Chairman of the Board of Commissioners, the County Administrator, or the Sheriff activates the St. Louis County Emergency Operations Center (EOC). Response activities are coordinated through the EOC to assure effective response and recovery.

St. Louis County is served by eight hospitals and 56 outpatient clinics (Excelsior, 2006b). The nearest hospitals to Hoyt Lakes are the White Community Hospital in Aurora (4 miles) which has 16 beds, and the Virginia Regional Medical Center in Virginia (25 miles) which has 83 beds (MDH, 2006).

3.13.3 Parks and Recreation

3.13.3.1 West Range Site and Corridors

Itasca County is known for its trails, resorts, and campgrounds. Residents and visitors enjoy outdoor activities year-round, including fishing, hiking, hunting, snowmobiling, cross-country skiing, and golf. The Forest History Center in Grand Rapids is a state historical park and interpretive center demonstrating the history of forestry in northern Minnesota. The Edge of the Wilderness National Scenic Byway extends north from Grand Rapids through the Chippewa National Forest. The closest boundary of the Chippewa National Forest is located less than 10 miles northwest of the West Range Site, and the closest boundary of George Washington State Forest is located less than 15 miles north of the site. Scenic State Park is located approximately 25 miles to the northwest. The West Range Site is also located within 65 miles southwest of the Boundary Waters Canoe Area and within 75 miles south of Voyageurs National Park.

Recreational areas in the vicinity of the West Range Site include the Hill-Annex State Park and Gibbs Park. The Hill-Annex State Park, which exhibits the history of iron ore mining on the Mesabi Range, is within 4 miles east of the West Range Site. Gibbs Park is a day park that provides a fishing pier and swimming beach located on Holman Lake about 2 miles south of the West Range Site. Numerous lakes and woodlands in the area, including the West Range Site property, provide recreational opportunities for area residents. Activities such as hiking, swimming, boating, fishing, bird watching, and similar activities are prevalent. Former mine pits that have filled with water, such as the Canisteo Pit, also provide opportunities for recreational boating and fishing. MDNR has indicated that the CMP is used for recreational boating approximately 2,210 hours per year and for recreational fishing approximately 6,500 hours per year (Kavanaugh, 2007).

The Mesabi Trail is a multiuse trail (e.g., biking, hiking, snowmobiling, and wheelchair use) that will extend from Grand Rapids to Ely. When completed, the trail will traverse 132 miles and connect more than 25 communities. One segment of this trail is located about 1.5 miles south of the West Range Site along an abandoned rail grade situated parallel to and north of US 169.

3.13.3.2 East Range Site and Corridors

The East Range Site is located just west of the boundary of the Laurentian District of Superior National Forest, which provides opportunities for hiking, biking, hunting, bird watching and similar recreational activities. The City of Hoyt Lakes is located on the Superior National Forest Scenic Byway, approximately 1.5 miles south of the site, which extends from Aurora to Silver Bay on Lake Superior. The East Range Site is located within 25 miles southwest of the Boundary Waters Canoe Area and within 60 miles south of Voyageurs National Park.

Approximately 1 mile south of the East Range Site is Birch Cove Park, which includes a playground, beach, and boat launch on Colby Lake. Numerous lakes and woodlands in the area also provide recreational opportunities for area residents. Activities such as hiking, swimming, boating, fishing, snowmobiling, bird watching, and others are prevalent.

3.13.4 School Systems

3.13.4.1 West Range Site and Corridors

School districts in Itasca County include Deer River, Grand Rapids, Greenway, and Nashwauk-Keewatin. The county maintains five private schools and 20 public schools. The City of Taconite is located within the Greenway school district and, according to the Minnesota Department of Education, the Greenway district maintains four public schools (i.e., two elementary schools, one middle school, and one senior high school.) Table 3.13-1 provides a summary of the district's educational statistics.

Table 3.13-1. Educational Statistics for Greenway School District in Itasca County

Enrollment	
Elementary	710
Secondary	571
Spending per Student	
Total	$9,285
Instructional	$4,236
Student Teacher Ratio	
Elementary (1:1)	14.96
Secondary (1:1)	15.32
Private Elementary School Enrollment	
Number of Schools	0
Total Enrollment	N/A
Private Secondary School Enrollment	
Number of Schools	0
Total Enrollment	N/A

Source: MDE, 2006

3.13.4.2 East Range Site and Corridors

St. Louis County is divided into 16 school districts, including Mesabi east district, which serves the City of Hoyt Lakes. The Mesabi east district maintains two public schools, Mesabi East Elementary School and Mesabi East Secondary School. Table 3.13-2 provides a summary of the district's educational statistics.

Table 3.13-2. Educational Statistics for Mesabi East School District in St. Louis County

Enrollment	
Elementary	495
Secondary	417
Spending per Student	
Total	$10,260
Instructional	$4,796
Student Teacher Ratio	
Elementary (1:1)	12.04
Secondary (1:1)	21.06
Private Elementary School Enrollment	
Number of Schools	0
Total Enrollment	N/A
Private Secondary School Enrollment	
Number of Schools	0
Total Enrollment	N/A

Source: MDE, 2006

3.14 UTILITY SYSTEMS

3.14.1 Potable Water Supply

This section discusses the existing potable water supplies potentially utilized by the Mesaba Energy Project.

3.14.1.1 West Range Site

The nearest potable water supplier to the West Range Site is in the City of Taconite, located 2.5 miles south of the proposed Mesaba Generating Station footprint. Taconite is permitted to use 20 million gallons a year (about 55,000 gallons per day) based on their current groundwater allocation permit and is currently using an average of 8 million gallons a year (about 22,000 gallons per day). This system currently serves approximately 330 residents (Excelsior, 2006b).

3.14.1.2 East Range Site

The City of Hoyt Lakes' potable water is supplied from a 1.5 million-gallon per day surface water treatment plant located at the north end of the city near Colby Lake, approximately 1 mile southwest of the proposed plant site. The plant was constructed in 1954. Raw water is supplied to the plant from two intakes located in Colby Lake. The intakes are set at different depths and the quality of the water dictates which intake is used to supply water to the treatment plant. Treated water is pumped to a 1.7 million gallon standpipe located in the center of town and to a 150,000 gallon elevated tower located west of the City in the Laskin Energy Park. A pumping station is located at the standpipe that can pump water to the elevated tower at a maximum rate of 1,200 gallons per minute. The elevated tower supplies water to the Industrial Park site and MP through a 12-inch distribution main. The average water use for the City of Hoyt Lakes is 275,000 gallons per day with a maximum daily demand of 700,000 gallons per day (255.5 million gallons per year). The treatment plant currently serves approximately 2,400 residents.

3.14.2 Sanitary Wastewater

3.14.2.1 West Range Site

The City of Taconite has a wastewater collection system that conveys wastewater to the joint Coleraine-Bovey-Taconite WWTF located on CR 10 in Bovey. The WWTP is roughly 4 miles southwest of the West Range site, but the City of Taconite's collection system is only about 2 miles from the site. This facility is a conventional activated sludge treatment plant designed to treat typical domestic wastewater. The National Pollution Discharge Elimination System (NPDES) permit (permit # MN0053341) for this facility allows a discharge of 499,000 gallons per day of treated effluent to the Swan River. This permit will require renewal in March 2007. The facility currently treats an average of 334,000 gallons per day (EPA, 2006b). While the WWTF is currently in compliance with all permit requirements (EPA, 2006b), the collection system within the City of Taconite does experience bypass events. During high groundwater or rainfall, the main wastewater pump station in Taconite cannot handle the additional flows, creating a need to bypass untreated wastewater into a natural pond system.

3.14.2.2 East Range Site

The City of Hoyt Lakes has a wastewater collection system that conveys wastewater to the Hoyt Lakes WWTF located in the city. Access to the WWTP collection system is near the Syl Laskin Energy Center, about a mile southwest of the East Range site. This Hoyt Lakes WWTP is a trickling filter design to treat domestic wastewater. The NPDES permit (permit # MN0020206) for the Hoyt Lakes facility allows a discharge of 680,000 gallons per day of treated effluent to Whitewater Lake (EPA, 2006c). This permit will require renewal in January 2010. The facility currently treats an average of 300,000 gallons per day of wastewater effluent.

3.14.3 Electricity

3.14.3.1 State Electricity Infrastructure

There are thousands of miles of transmission lines in Minnesota. The transmission system in Minnesota connects more than 175 electric generating plants, sized from a few megawatts to more than 1100 MW; including fossil fuel-fired (coal, natural gas, and oil), nuclear, wind, hydro, and biomass plants, located both within and outside the state, to serve the state's more than five million residents. The system is also connected to utilities in other states and Canada in all directions, including over 6,500 miles of 69-kilovolt (kV) lines, nearly 3,500 miles of 115-kV lines, 820 miles of 161-kV lines, approximately 1,500 miles of 230-kV lines, 870 miles of 345-kV lines, and 340 miles of 500-kV lines. In addition, there are almost 300 miles of direct current (DC) lines in Minnesota. A map of transmission lines in Minnesota 69 kV and larger can be found on the Public Utility Commission's webpage at: http://server.admin.state.mn.us/maps/ElecTran03.pdf (PUC, 2005).

In the spring of 2004, six utility companies initiated a concerted effort to ensure that the transmission system in Minnesota was adequate to serve a growing demand for electricity and to plan for major capital expenditures that would be required to construct major new transmission infrastructure in the near future. The utilities are Great River Energy, MP, Missouri River Energy Services, Otter Tail Power Company, Southern Minnesota Municipal Power Agency, and Xcel Energy. These utilities initiated an effort, under the name CapX2020 (Capital Expansion by the year 2020), using the individual utility load growth figures from the Mid-Continent Area Power Pool (MAPP) *2004 Load and Capability Report* (CapX2020, 2004) to estimate the demand for electricity in the future. Based on their assessment, electricity demand could increase by roughly 6,300 MW by 2020 in the region, including Minnesota and portions of the Dakotas, Iowa, and Wisconsin.

3.14.3.2 Regional Electrical Infrastructure

Current electricity providers in the Iron Range region include: Arrowhead Electric Cooperative, Inc.; Bigfork Valley Electric Service Company, Inc.; Crow Wing Cooperative Power & Light Co.; Lake Country Power; Mille Lacs Power Cooperative; Minnesota Power; North Itasca Electric Cooperative, Inc.; North Star Electric Cooperative, Inc.; and The Cooperative Light & Power Association of Lake County (Iron Range Resources, 2006).

Minnesota is divided geographically into the following six Transmission Planning Zones: Northwest; Northeast; West Central; Twin Cities; Southwest; and Southeast. Both project alternative locations would be located within the Northeast Zone. The Northeast Planning Zone covers the area north of the Twin Cities suburban area to the Canadian border and from Lake Superior west to the Walker and Verndale areas. The zone includes the counties of Aitkin, Carlton, Cass, Cook, Crow Wing, Hubbard, Isanti, Itasca, Kanabec, Koochiching, Lake, Mille Lacs, Morrison, Pine, St. Louis, Todd, and Wadena counties. The primary population centers in the Northeast Planning Zone include the cities of Brainerd, Cambridge, Cloquet, Duluth, Ely, Grand Rapids, Hermantown, Hibbing, International Falls, Little Falls, Long Prairie, Milaca, Park Rapids, Pine City, Princeton, Verndale, Virginia, and Walker.

The following utility companies own transmission facilities in the Northeast Planning Zone:

- American Transmission Company, LLC
- Great River Energy
- Minnesota Power
- Xcel Energy

The transmission system in the Northeast Planning Zone consists mainly of 230-kV, 138-kV, and 115-kV lines that serve lower voltage systems comprised of 69 kV, 46 kV, 34.5 kV, 23 kV, and 14 kV. A 345-kV line extends between Duluth, Minnesota, and Wausau, Wisconsin, (the Arrowhead line is

currently under construction). The 345 kV and 230 kV system is used as an outlet for generation and to deliver power to the major load centers within the Northeast Planning Zone. From the regional load centers, 115-kV lines carry power to lower voltage substations where it is distributed to outlying areas. In a few instances, 230-kV lines serve this purpose. A ± 250-kV DC line runs from North Dakota to Duluth and serves as a generator outlet for lignite-fired generation located in North Dakota. In addition, a 500-kV line and a 230-kV line provide interconnections with Manitoba and a 115-kV line interconnects with Ontario at International Falls. The interconnections with Canada provide for generation resource sharing as well as seasonal and economic power interchanges between Minnesota and Canada (PUC, 2005).

Figure 3.14-1 shows the transmission lines in the Northeast Planning Zone.

3.14.3.3 West Range Site

There are a number of HVTLs and power substations in Itasca County. The point of intersection for the HVTLs and substations in the area is the Blackberry Substation, an existing 230/115-kV substation owned and operated by MP, that serves as the major HVTL hub in the area. The Blackberry Substation is located at the intersection of Itasca CR 10 and CR 434, approximately 8.5 miles south-southeast of the West Range Site (Figure 3.14-2).

3.14.3.4 East Range Site

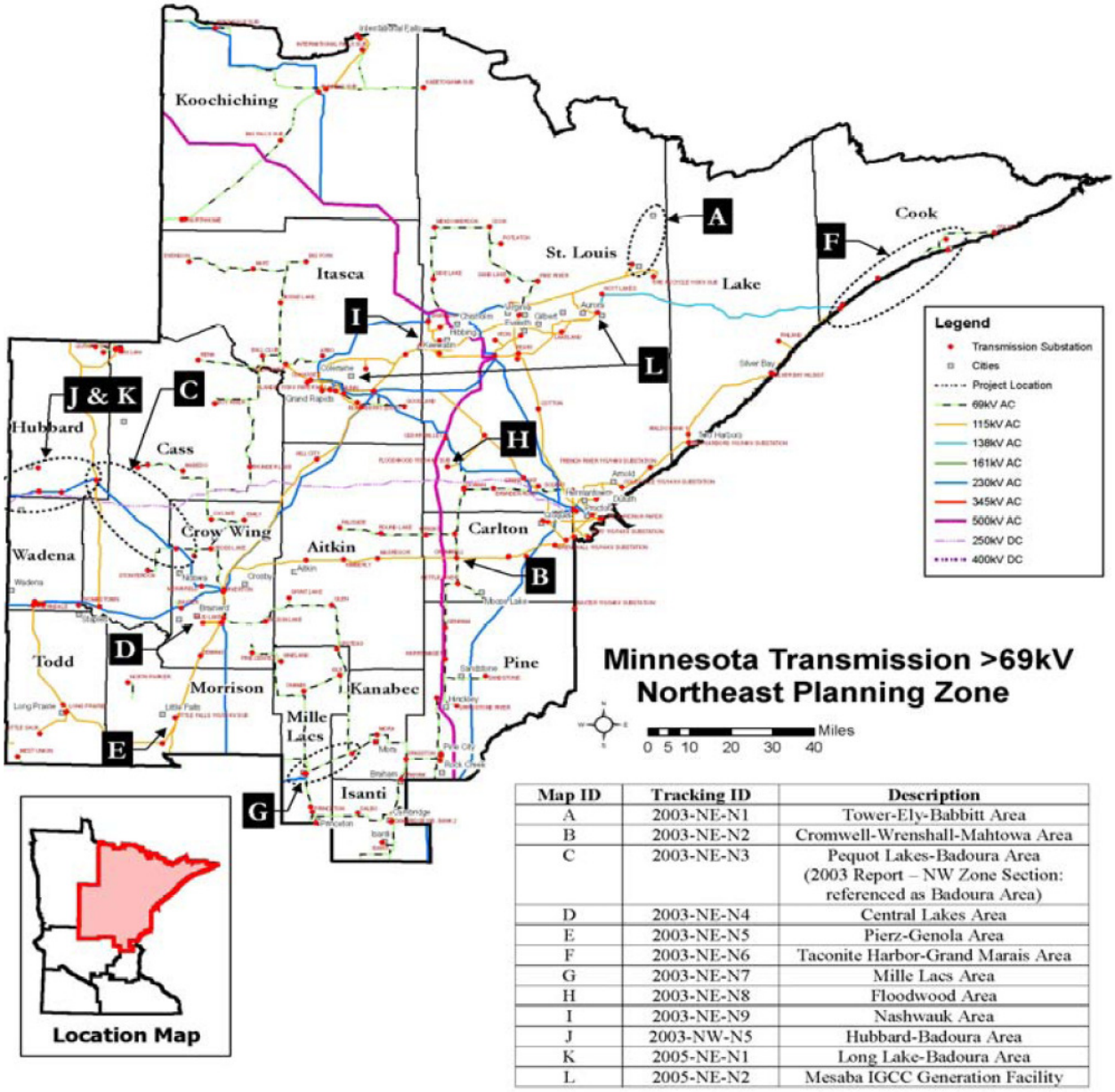
Current municipal utility providers in St. Louis County are: Hibbing Public Utilities; Northern Minnesota Utilities, Ltd.; Peoples Natural Gas Division; and Virginia Department of Public Utilities (Iron Range Resources, 2006).

The East Range Site is located approximately 3.5 miles south of a former taconite processing plant. Adjacent to this plant is an existing 138 kV substation that provides electric service to CE. Three 138-kV transmission lines traverse the CE property to deliver power to this substation, two of which occupy the same corridor and line as the CE Substation to the coal fueled power plant at Taconite Harbor. A third 138-kV HVTL runs between a substation serving MP's Syl Laskin Energy Center (the "Laskin Substation") and the CE Substation (Figure 3.14-3). These facilities are part of the Minnesota Power transmission network known as the "North Shore Loop," which extends from the east end of the Iron Range, along the North Shore of Lake Superior, and into Duluth. The 115/138-kV transmission facilities that make up this "loop" are heavily loaded and currently operate with several special protection schemes involving generation reduction and/or unit tripping to avoid overloading the remaining transmission facilities during critical equipment outages. HVTL route designations shown on Figures 3.14-2 and 3.14-3, such as 39 Line or 39L, are based on the identification numbers provided by their respective electric companies.

3.14.4 Natural Gas

This section describes the natural gas pipeline infrastructure located in the vicinities of the West and East Range Sites.

Minnesota's Iron Range is served by two major natural gas pipeline transmission companies: GLG and NNG. GLG has been providing energy services to the U.S. and Canada since 1967. They transport more than 2.2 billion cubic feet of natural gas per day through 2,100 miles of pipelines (GLG, 2006). NNG operates an interstate natural gas pipeline that extends from the Permian Basin located in Texas and New Mexico to the upper Midwest. Their system includes 16,500 miles of pipeline, which provides 4.5 billion cubic feet per day of market area peak capacity. NNG also has five natural gas storage facilities with a 59 billion cubic foot capacity, which includes four billion cubic feet of liquefied natural gas (NNG, 2006). The GLG natural gas pipeline transmission system interconnects with NNG's natural gas pipeline system near Carlton, Minnesota.



Map ID	Tracking ID	Description
A	2003-NE-N1	Tower-Ely-Babbitt Area
B	2003-NE-N2	Cromwell-Wrenshall-Mahtowa Area
C	2003-NE-N3	Pequot Lakes-Badoura Area (2003 Report – NW Zone Section: referenced as Badoura Area)
D	2003-NE-N4	Central Lakes Area
E	2003-NE-N5	Pierz-Genola Area
F	2003-NE-N6	Taconite Harbor-Grand Marais Area
G	2003-NE-N7	Mille Lacs Area
H	2003-NE-N8	Floodwood Area
I	2003-NE-N9	Nashwauk Area
J	2003-NW-N5	Hubbard-Badoura Area
K	2005-NE-N1	Long Lake-Badoura Area
L	2005-NE-N2	Mesaba IGCC Generation Facility

Figure 3.14-1. Minnesota Transmission Lines, Northeast Planning Zone

Source: PUC, 2005.

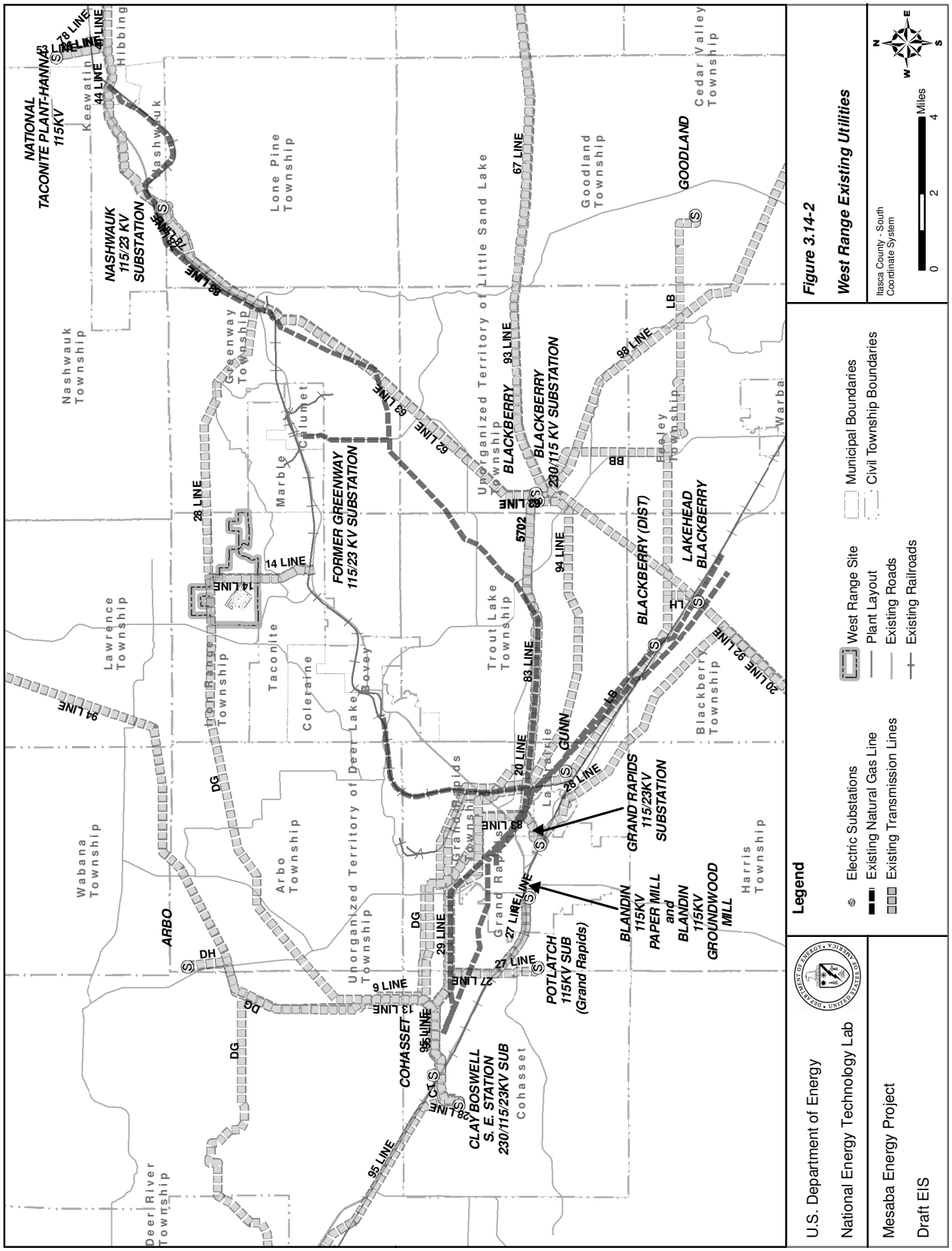


Figure 3.14-2
West Range Existing Utilities

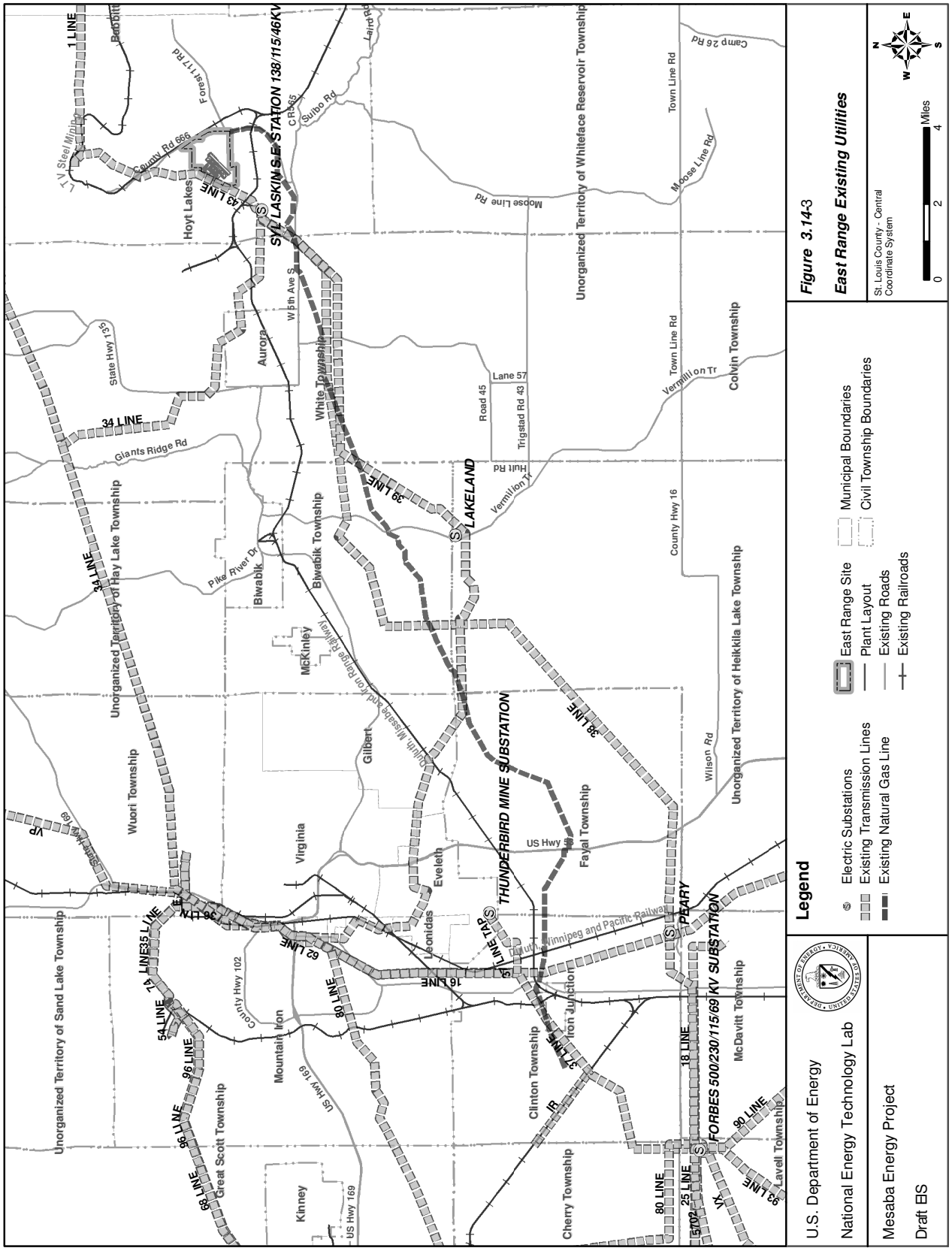


Figure 3.14-3
East Range Existing Utilities

3.14.4.1 West Range Site

Natural gas in the area of the West Range Site is supplied by either the GLG pipeline located about 12 miles due south of the West Range Site or from NNG's tapping point located in La Prairie, Minnesota, about 10 miles west-southwest of the West Range Site.

3.14.4.2 East Range Site

The NNG pipeline is the only natural gas pipeline serving the vicinity of the East Range Site. An existing branch pipeline (known as the Erie Branch line) from NNG's main pipeline (which originates at a tap of the GLG pipeline in Carlton, Minnesota), directly abuts the eastern boundary of the East Range Site.

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3.15 TRAFFIC AND TRANSPORTATION

This section describes the existing transportation infrastructure within the vicinity of the proposed Mesaba Energy Project (West Range and East Range Sites), including the regional railway system. Transportation safety issues, including traffic accidents and rail crossings, are presented in section 3.17, Health and Safety.

3.15.1 Regional Transportation System

Northeastern Minnesota's transportation system connects the region to the local, regional, and national transportation system through air, land, and water-based transport.

3.15.1.1 Modes of Transportation

Northeastern Minnesota's aviation infrastructure includes 23 public-use airports. Scheduled commercial air passenger service is provided at five of the 23 airports in northeastern Minnesota. These airports include Duluth International, Falls International, Grand Rapids, Chisholm-Hibbing, and Ely (seasonal). All the airline services provided at these five airports feed into networks of domestic and international services at Minnesota's major hub airport of Minneapolis-St. Paul International.

The structure of the region's current transit system is highly influenced by variables such as population, age, disabilities, population density, and employment characteristics. Transit service in the region's rural areas presents a challenge because of low population densities and the distance between destination points. The region has a number of transit options for the traveling public. Some of the service is limited to defined city boundaries, while much of the service is between cities, both within and outside of the region. The vast majority of travelers using transit service in the northeastern Minnesota region rely on public transit operated by public and private non-profit entities.

There are four major water ports in northeastern Minnesota: Duluth/Superior, Two Harbors, Silver Bay, and Taconite Harbor. Approximately 40 million metric tons of bulk and packaged general cargo pass through the Duluth-Superior Port on Lake Superior annually, which is ranked among the nation's top ports based upon tonnage. Outbound ships carry more than 17 million tons of taconite pellets and iron ore from Minnesota annually, along with millions of tons of other commodities destined for eastern U.S. markets and for eight ports via the Great Lakes and the St. Lawrence Seaway.

Railroads traverse the landscape of northeastern Minnesota, providing major hauling and shipping capacities for area manufacturers and industries. As a direct result of the region's wood products and iron ore industries, along with grain shipments to the Port of Duluth-Superior, most of the communities in northeastern Minnesota are served by four rail carriers: BNSF, CN, Canadian Pacific (CP), and Union Pacific/Wisconsin Central (UP). BNSF and CN are the two rail lines that service the vicinity of the project and are discussed in greater detail in Section 3.15.3.

Most major northeastern Minnesota communities are connected by a four-lane highway system and have easy access to state and Federal roads. In this region, US 2, 53, and 169 are the major routes for U.S. and Canadian trucking companies, which move wood products, agricultural products, and other goods. These roads are part of a well-established highway network that provides access from the Canadian border to Duluth, Minneapolis/St. Paul, Wisconsin, North Dakota, and the rest of the country.

3.15.1.2 Transportation Trends and Planning

With respect to transportation planning, Itasca and St. Louis Counties are part of the Mn/DOT District 1, the Arrowhead Regional Development Commission (ARDC), and the Northeast Minnesota Area Transportation Partnership (NE MN ATP) planning areas. These transportation planning organizations support the transportation network of northeastern Minnesota, which includes the counties of Cook, Lake, St. Louis, Carlton, Pine, Aitkin, Itasca, and Koochiching.

Increased development and recreational travel within Itasca and St. Louis counties could have impacts on transportation needs and traffic volumes. However, because of northeastern Minnesota's mainly rural characteristics, there is limited traffic information in local transportation plans for each community. In conjunction with the ARDC, Mn/DOT District 1 has developed a transportation plan (Northeast Minnesota Long Range Transportation Plan Fiscal Years 2008-2030) that covers northeastern Minnesota. The transportation plan is the agency's instrument used to implement the plans resulting from the statewide and other regional planning organizations' transportation planning process. At this time, there are no scheduled improvement projects identified in this transportation plan that would be considered immediately significant to this project.

As stated in Section 3.11 (Socioeconomics), northeastern Minnesota has experienced a population decrease beginning in 1980 that was spurred by a decline in the national steel industry and the subsequent downturn in taconite mining operations on Minnesota's Iron Range. Beginning in 1991 the region reversed this trend and generally experienced slow, but steady growth throughout the 1990s. Seven of the eight counties started to gain back population, with only Koochiching County losing population in the 1990s. Several counties in the northeastern Minnesota region are projected to experience considerable growth through 2030, with Itasca and St. Louis Counties projected at approximately 22 percent and 9 percent projected growth rates, respectively (Mn/DOT, 2005a).

In addition to the permanent population identified as residents of northeastern Minnesota, recreational and seasonal visitors make up a population component that greatly affects the transportation system but is difficult to estimate. At various times during the year, substantial numbers of people visit the northeastern Minnesota region and reside on a part-time or weekend basis at recreational accommodations. While occupancy of these housing units varies seasonally, it is possible for all of the seasonal units to be occupied during peak summer and holiday periods, resulting in a substantial shift in population and accompanying traffic to northeastern Minnesota. Therefore, while this "temporary" population is not included in the census totals or population estimates, their presence often has major impacts on the transportation and infrastructure system of the region, particularly as it relates to potential traffic congestion and safety problems.

As manufacturing and mining activities decline there will be less heavy goods moving on the trunk highway system in northeastern Minnesota. This may lead to changes in pavement life and traffic patterns. Considering the importance of tourism to the region's economy, the needs of visitors and the businesses that serve them need to be taken into account in the development, maintenance, and investment planning of the area's transportation system and infrastructure. The transportation needs of these commercial centers and larger communities will play an important role in the continuing development of the region's economy.

3.15.2 Roadway System and Local Traffic

Figures 2.3-1 and 2.3-5 illustrate the existing highway system in the West Range and East Range Sites, respectively. The significant roads that service the West Range Site include US 169 and CR 7. For the East Range Site, the significant roads include CR 666 and CR 110.

3.15.2.1 Load Limits

Minnesota roadways are generally categorized into two specific groups. One group consists of all state trunk highways, which includes all state, U.S., and interstate highways, and certain other routes designated by the commissioner of transportation. These are commonly referred to as 10-ton routes. All routes other than state trunk highways and designated routes are commonly referred to as 9-ton routes. Minnesota statutes provide for maximum loads which may be carried upon any wheel, any single axle, any group of consecutive axles, and the gross vehicle weight (MN State Patrol, 2006).

In the spring of each year, county and town roads not paved with concrete are restricted to 10,000 pounds on single axles and 5/9 of the weight restrictions prescribed for two or more consecutive

axles, unless otherwise posted. The starting and ending dates for these restrictions is determined by the commissioner of transportation for each of the frost zones in the state. Any road may be restricted at any other time by the appropriate jurisdiction when conditions threaten damage or deterioration. Bridges with rated capacities less than the maximums permitted on Minnesota highways will have restricted weights posted and all drivers must observe these restrictions.

3.15.2.2 Traffic

All references to level of service (LOS) of a road are defined by the Highway Capacity Manual (HCM), published by the Transportation Research Board (TRB), which is an industry standard for traffic engineering. LOS is a qualitative measure that is typically used to describe operational conditions within a traffic flow and the perception of these conditions by drivers or passengers. The HCM defines six levels of service that reflect the level of traffic congestion and qualify the operating conditions of a roadway or intersection. The six levels are given letter designations ranging from A to F, with "A" representing the best operating conditions (free flow, little delay) and "F" the worst (congestion, long delays) (TRB 2000). Various factors that influence the operation of a roadway or intersection include speed, delay, travel time, freedom to maneuver, traffic interruptions, comfort, convenience, and safety. The Highway Capacity Manual describes the levels of service as follows:

- LOS A describes completely free-flow conditions. Individual users are virtually unaffected by the presence of others in the traffic stream.
- LOS B also indicates free flow, but the presence of other vehicles becomes more noticeable. Freedom to select desired speeds is relatively unaffected, but there is a slight decline in the freedom to maneuver within the traffic stream from Level of Service A.
- LOS C is in the range of stable flow, but marks the beginning of the range of flow in which operation of individual users becomes significantly affected by interactions with others in the traffic stream. The selection of speed is now affected by others and maneuvering requires substantial vigilance on the part of the user.
- LOS D represents high density but stable flow. Speed and freedom to maneuver are severely restricted, and the driver experiences a generally poor level of comfort and convenience.
- LOS E represents operating conditions at or near capacity level. All speeds are reduced to a low but relatively uniform value.
- LOS F is used to define breakdown of traffic flow or stop and go traffic. This condition exists wherever the amount of traffic approaching a point exceeds the amount that can traverse the point. Queues form behind such locations. Operations within the queue are characterized by stop-and-go waves, and they are extremely unstable.

LOSs A, B, or C are typically considered good operating conditions in which minor or tolerable delays of service are experienced by motorists. Both the West Range and East Range Sites are located in low population density areas, which do not see significant traffic volumes on a daily basis. In general, Itasca and St. Louis Counties' local traffic can be described as relatively slow due to the rural nature of the region, with insignificant traffic delays and low annual average accident rates. LOSs of the existing network of roads surrounding both project sites are generally operating at an LOS of C or better.

3.15.2.3 West Range Site and Corridors

Roadways

The existing roadway system in the area of the West Range Site is shown in Chapter 2, Figure 2.3-1. US 169 traverses east-west through Itasca County and borders the West Range Site on the south. US 169 is classified as a principal arterial road and is generally a four-lane highway extending across the Iron Range from Grand Rapids to Virginia, Minnesota; however, it is a two-lane roadway in the vicinity of the West Range Site. Many historical mining areas are located along US 169 between Virginia and Grand

Rapids. Mn/DOT has developed preliminary plans to expand US 169 to four lanes in the project area, but these plans are unfunded to date, and therefore, not yet scheduled. The posted speed limit on US 169 is 55 miles per hour and the legal load limit is 10 tons. US 169 is designated as a Trunk Highway and receives funding for construction and maintenance mainly from Federal funds (Itasca County, 2003).

The West Range Site is bordered on the west by CR 7. Though not officially designated as a state byway, CR 7 is sometimes locally referred to as Scenic Highway 7. CR 7 is a winding two-lane roadway stretching from Taconite to Bigfork. CR 7 is a 9-ton roadway except during spring load restrictions when it is posted at 7-tons/axle. The posted speed limit on CR 7 is 55 miles per hour. CR 7 is designated as a County State Aid Highway and receives funds from the state mainly for construction and maintenance (Itasca County, 2003).

Another existing road corridor in the project area is the Cross-Range Heavy Haul Road, which is a gravel road in place for generations as a way to allow heavy or slow loads to be transported between mines across the Iron Range; however, because of numerous winding and high gradient topography, Excelsior has not pursued the use of this road any further. In the West Range project area, the Cross-Range Heavy Haul Road also serves as access to a cluster of homes in the Big Diamond Lake/Dunning Lake area.

Traffic Volumes

Table 3.15-1 lists historical annual average daily traffic (AADT) volumes and the associated levels of service along US 169 and CR 7 near the West Range Site.

Table 3.15-1. Annual Average Daily Traffic Volumes and Levels of Service on US 169 and CR 7 (Itasca County, Minnesota)

Year	US 169		CR 7	
	West of CR 7	East of CR 7	North of new CR 7[1]	South of new CR 7[1]
2000	5,800 (C)	5,500 (C)	1,100 (A)	1,100 (A)
2002	6,500 (C)	5,800 (C)	N/A	N/A
2004	7,200 (C)	5,700 (C)	N/A	N/A

[1] From western-most point of the new CR 7, just south of West Range power plant site.
N/A – data not available
Source: SEH, 2006a

During 2004, US 169 had between 5,700 to 7,200 vehicles per day near the West Range Site. According to Mn/DOT data for the year 2004, average volumes of commercial trucks on US 169 ranged between 300 and 599 heavy trucks per day (Mn/DOT, 2005b). For two-lane roads in fairly rural areas, these AADT levels on US 169 reflect relatively moderate traffic flow with an LOS of C. As Table 3.15-1 indicates, the traffic volumes on US 169 are heavier west of CR 7. The main reason for this can be attributed to the residential areas just northwest of the site near Riley Lake. Vehicles from this area most likely travel through CR 7 en route to Grand Rapids. Although not reflected in the table, these areas mainly influence traffic on a seasonal basis as these are mainly vacation homes.

Traffic volume data for CR 7 was available only during the year 2000 at approximately 1,100 vehicles per day. These volumes on CR 7 reflect relatively less than average daily traffic with an LOS of A.

3.15.2.4 East Range Site and Corridors

Roadways

The East Range Site is located approximately 2 miles north of Hoyt Lakes and is bordered on the south by Colby Lake, on the east by St. Louis CR 666, and on the north and west by various mine pits and operations. The existing roadway system in the vicinity of the East Range Site consists entirely of county roads with a load limit of 9 tons. The nearest state highway is US 135 that serves the western portion of Aurora, approximately 7 miles west of the project site. CR 666 begins at its intersection with CR 110 (also referred to as Kensington Drive near the East Range Site) that traverses east-west through Hoyt Lakes. Hampshire Drive is a short connector between CR 110 and CR 666.

The primary county road in the area is CR 110 (designated as a County State Aid Highway) which connects with US 135 in Aurora, then passes through Hoyt Lakes. The east-west section of CR 110 that runs through Hoyt Lakes parallels and is approximately 1.6 miles south of the southern border of the East Range Site. From Hoyt Lakes to Aurora, CR 110 forms the western terminus of the Superior National Forest Scenic Byway. This byway, also known as Forest Highway 11, has been recently constructed and serves to connect the North Shore of Lake Superior with the Mesabi Iron Range. The Superior National Forest Scenic Byway also provides access to a historical drilling site, known as the Longyear Drill Site. This historic site is located approximately 3 miles north of Hoyt Lakes on CR 666 (see Section 3.9, Cultural Resources).

There are no other roadways in the area of the proposed East Range Site. The existing roadway system in the area is shown in Chapter 2, Figure 2.3-5.

Public Law 109-59 was signed in August 2005 and $2.4 million was authorized for construction of a new highway between the bridge over the Partridge River on CR 565 in Hoyt Lakes to the intersection of Highways 21 and 70 in Babbitt. Currently, the only approach from the north (e.g., town of Babbitt) to Hoyt Lakes is a circuitous trip south on US 135. The new highway would create a feasible option for approaching the Hoyt Lakes area from the north.

Traffic Volumes

Table 3.15-2 lists the AADT volumes and the associated levels of service along CR 110 and CR 666 near the East Range Site. There is no AADT data available for Hampshire Drive.

Table 3.15-2. Annual Average Daily Traffic Volumes and Levels of Service on CR 110 and CR 666 (St. Louis County, Minnesota)

Year	CR 110		CR 666	
	West of CR 666	East of Hampshire Rd	North of CR 110	East of Hampshire Rd
1995	4,400 (B)	520 (A)	N/A	N/A
1999	2,950 (B)	650 (A)	930 (A)	830 (A)
2003	2,950 (B)	710 (A)	750 (A)	520 (A)

N/A – data not available
Source: SEH, 2006b

Table 3.15-2 reflects relatively low AADT volumes near the East Range site. The operating levels of these roads are currently at LOS A or B.

3.15.3 Rail System

The rail network in Minnesota is important for moving heavy bulk goods and a variety of commodities. Approximately 23 railroad companies and three private industries haul rail freight in Minnesota on approximately 4,500 miles of track.

Rail companies are divided into three classes (I, II, and III), established by the Federal Surface Transportation Board (STB). These classes are based upon a railroad company's gross operating revenues and generally reflect the type of service provided: long haul, regional and local. In general, the higher the rail class, the more daily trains, the greater tonnage, and the longer the haul route. The Class I railroads in Minnesota provide service in corridors connecting the region with the Chicago rail hub and its connections with the eastern seaboard lines; south to Mexico through Texas; and west to the major California ports and the ports in the Pacific Northwest. Class I companies operate approximately 3,200 miles of rail lines in Minnesota and include:

- BNSF (1,600 miles);
- CN (450 miles);
- Canadian Pacific Railway (CP) (650 miles); and
- Union Pacific Railroad (UP) (500 miles).

3.15.3.1 Regional Rail Network

Northeastern Minnesota has an extensive system of rail lines serving the region and the Lake Superior ports. Taconite, coal, and grain are major commodities transported primarily by rail to the Duluth/Superior Port, a bulk transshipment port. There are a total of nine railroads that provide services within the state's northeastern region, running nearly 1,000 miles of track. As shown in Figure 3.15-1, the BNSF and CN rail services are the two lines that service the vicinity of the project.

The BNSF is an important railway within northeastern Minnesota. The BNSF line operates two primary lines in the region and has track running through Itasca, Aitkin, Carlton, and St. Louis Counties. The northern line brings grain from Canada and the western U.S. to the ports of Duluth and Superior. The other, more southern line connects central Minnesota, South Dakota, and the coal mining areas of the western U.S. to the ports. In total, there are approximately 380 miles of BNSF tracks running through the northeastern region of the state. The bulk of this is located within the boundaries of St. Louis County, where the BNSF has 133 miles of track. Itasca County contains the second most with 87 miles.

The CN Railroad recently completed purchasing the Duluth, Missabe, and Iron Range (DMIR) line. The DMIR has been the main arterial for the transportation of taconite pellets from the Iron Range to the port cities Duluth and Two Harbors. The DMIR, soon to bear the CN name to reflect its new ownership, consists of two primary lines. The first is the western line, or Missabe, that connects the iron ore mines to the ore docks in Duluth. The Iron Range line is the eastern line and connects the mines to the loading docks in Two Harbors. The main cargos transported on the DMIR include taconite pellets, limestone, coal, and miscellaneous freight.

With the addition of DMIR's 254 miles of track and another 155 miles that CN added to its track inventory with the acquisition of the Duluth, Winnipeg, and Pacific Railroad, CN is the largest railroad in the northeastern Minnesota region. CN owns and operates 409 miles of track in the region; the most significant of which is a 209-mile stretch of DMIR track in St. Louis County. Lake County, containing the port of Two Harbors, has the second most miles of former DMIR track with 42 miles. The DMIR line runs through a small portion of both Itasca and Carlton counties with 3 miles and 0.6 miles of track, respectively.

The western Missabe line that serves the port of Duluth has an average volume of 13 trains per day. The eastern Iron Range line sees an average of approximately 12 trains a day. For both portions of the DMIR line, the track speed limit is 35 miles per hour (Mn/DOT, 2004b).

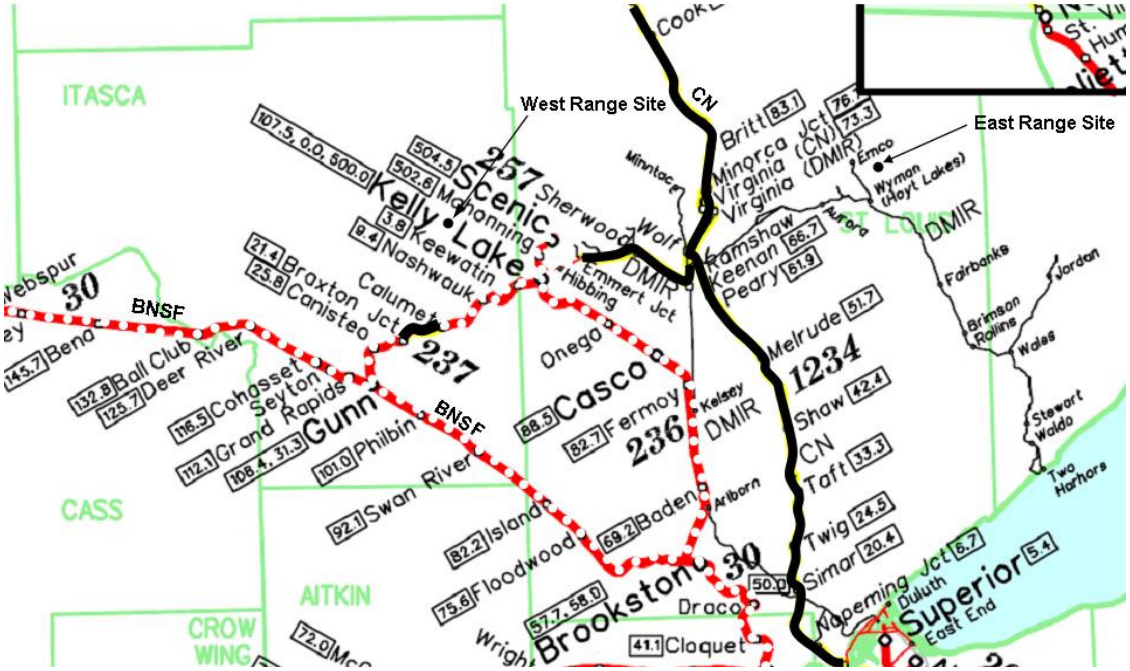

Figure 3.15-1. BNSF and CN Rail Lines in Vicinity of Project Sites (BNSF, 2005)

3.15.3.2 West Range Site and Corridors

The proposed West Range Site is located approximately 1.5 miles north of the mainline tracks of the BNSF and CN. The existing layout of the BNSF and CN trackage in the region are provided in Figure 3.15-1 and in Chapter 2, Figure 2.3-2.

Historically, the BNSF and CN railroads had their own mainline tracks throughout the area around Grand Rapids, Minnesota. In the 1960s, the BNSF and CN railroads combined their regional operations to a single track. The BNSF currently owns most of the 80-mile track from Gunn (an unincorporated "railroad town" located immediately east of La Prairie, Minnesota) to Brookston (near Carlton, Minnesota), except for approximately 4.5 miles of track, owned by CN, beginning about 0.5 miles east of CR 7 and west to Bovey. Since railroads are restricted from originating or delivering traffic from another railroad's line, even though many share each other's tracks, this short section of rail track owned by CN allows it direct access to the West Range Site.

The BNSF lines in the region have a wide range of daily train volume and speed limits. The existing railroad system in the area has generally handled between four and 10 trains per day when the taconite industry was producing. With the slump in taconite production the track has seen infrequent use between Keewatin and Gunn. The greatest volume of trains on the BNSF line occurs in the southeast corner of Carlton County and Pine County, where approximately 16 trains per day make use of the track. Between Grand Rapids and Cloquet, the BNSF line has a speed limit of 50 miles per hour and a volume of approximately nine trains per day, while the portion from Hibbing to Cloquet has a speed limit of 50 miles per hour and approximately four trains per day (Mn/DOT, 2005a). The BNSF line that runs between the cities of Grand Rapids and Hibbing has a speed limit of 35 miles per hour.

The shortest route for delivering coal from the Powder River Basin in Wyoming to the West Range Site is via the BNSF trackage across North Dakota. The preferred route would go through Fargo, North Dakota; north to Grand Forks, North Dakota; and across Minnesota through Grand Rapids to Gunn and then to Taconite. About six trains per day currently travel on the BNSF line through Grand Rapids at speeds up to 25 miles per hour (MEP, 2004).

The track from Gunn to the West Range site (approximately 12.5 miles in length) operates at speeds of 25 miles per hour, has traditionally carried 4 to 10 trains per day and has six public grade crossings. Currently, this segment of track is inoperable due to rising water levels in the CMP. The CMP is an approximately 300-foot deep mine pit, where no ore has been mined for over 20 years, but has continued filling with water at such a rate that it is projected to overflow into the towns of Bovey and Coleraine sometime in the next 7 to 14 years (MEP, 2004). The sloughing of bank material separating the track from the steep edge of the mine pit has decreased in distance from 100 feet to 50 feet and has therefore weakened the structural support along this section of track near Bovey. An alternative route to the West Range Site via BNSF tracks would be from Brookston northward to Kelly Lake and Keewatin and westward to the plant site.

The use of CN rail would be from the Superior, Wisconsin area northward to Virginia and then west past Hibbing and Keewatin to Taconite/Bovey for the West Range Site. The route from Superior to Virginia typically sees 13 trains per day and the route from Virginia to Hibbing sees approximately four trains per week (Mn/DOT, 2005a). The short length of CN track in the vicinity of the West Range Site (approximately 4 to 4.5 miles in length) is temporarily out of service because of rising water levels in the CMP.

Approximately six trains (i.e., three roundtrips) currently pass through the city of Grand Rapids in Itasca County each day. Ten at-grade crossings (i.e., when a road crosses a railroad track at the same level) are located within the city limits of Grand Rapids and La Prairie. Public roads that are crossed at-grade by the existing rail lines from Grand Rapids en route to the West Range site are listed in Table 3.15-3 and shown in Figure 3.15-2.

Table 3.15-3. Location of Railroad At-Grade Crossings – West Range Site

Map ID*	Road Crossed
1	County Road 63
2	NW 15th Ave
3	NW 11th Avenue
4	NW 2nd Avenue
5	NW 1st Avenue
6	Pokegama Avenue
7	NE 1st Avenue
8	NE 3rd Street
9	NE 5th Avenue
10	NE 7th Avenue
11	Brock Lane
12	County Route 21
13	County Route 61
14	unnamed gravel road
15	Hodgins Street

*See Figure 3.15-2

Based on 2004 annual average daily traffic volumes, the vehicular traffic at the crossings listed in Table 3.15-3 in La Prairie and Grand Rapids experience low to moderate volumes (e.g., from 4,250 to 12,500 vehicles per day) (Mn/DOT, 2005c).

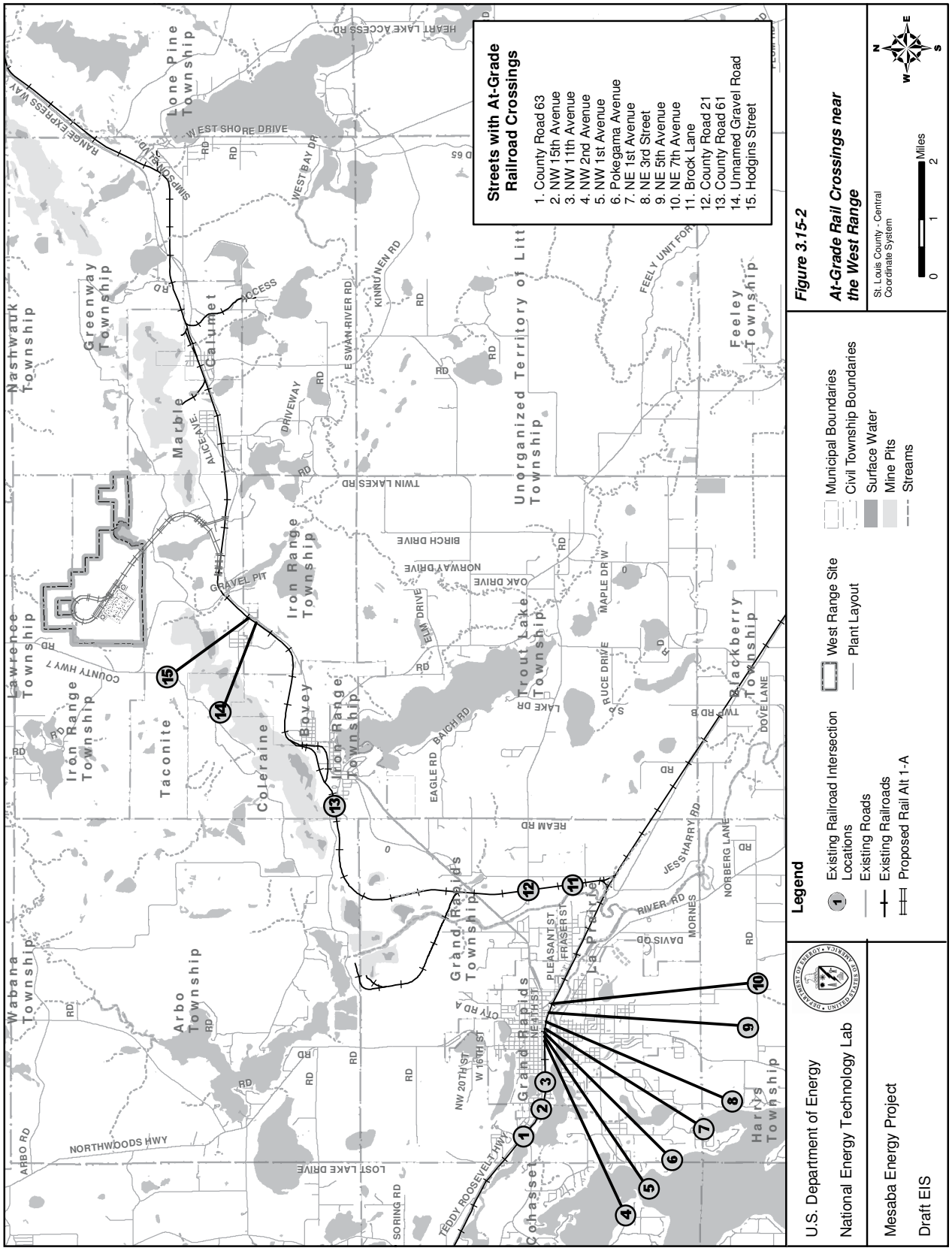

Figure 3.15-2
At-Grade Rail Crossings near the West Range

3.15.3.3 East Range Site and Corridors

The East Range Site is located approximately 1 mile north and 1 mile west of two CN tracks. The east-west track runs from Eveleth to Two Harbors. The north-south track connects with the east-west track southeast of the site and extends north to Embarrass. The north-south track connects with the east-west track at Wyman Junction (approximately 1.7 miles southeast of the East Range site) and extends northward to Embarrass. The CN track can be accessed by other railroads via Superior, WI and/or a railroad yard south of Eveleth. The nearest competitive rail provider is located at the BNSF Railway near Hibbing, approximately 40 miles west of the site. The CN rail system near the project is shown in Figure 2.3-6.

The CN operates daily on the track servicing the MP's Syl Laskin Generating Station, the former Erie Mining Taconite Plant and several existing and proposed industrial customers. The CN rail line near the East Range site sees approximately 12 trains daily (i.e., six roundtrips per day) (Excelsior, 2006c). The posted track speed is 35 miles per hour.

At-grade crossings located on the CN rail route between Clinton Township and Hoyt Lakes (East Range Site) are listed in Table 3.15-4 and shown in Figure 3.15-3.

Table 3.15-4. Location of Railroad At-Grade Crossings – East Range Site

Map ID*	Road Crossed
1	Keenan Road (CR 310)
2	Iron Junction Road (CR 452)
3	Main Street (CSAH 127)
4	County Highway 7 (CSAH 7)
5	Township Road 6718 (T 1248)
6	Sparta Road (CSAH 97)
7	Heritage Tr (CSAH 20)
8	N. Main Street W (CSAH 100)

*See Figure 3.15-3

Based on 2004 annual average daily traffic volumes, the vehicular traffic at the crossings listed in Table 3.15-4 experience low volumes (Mn/DOT, 2004a).

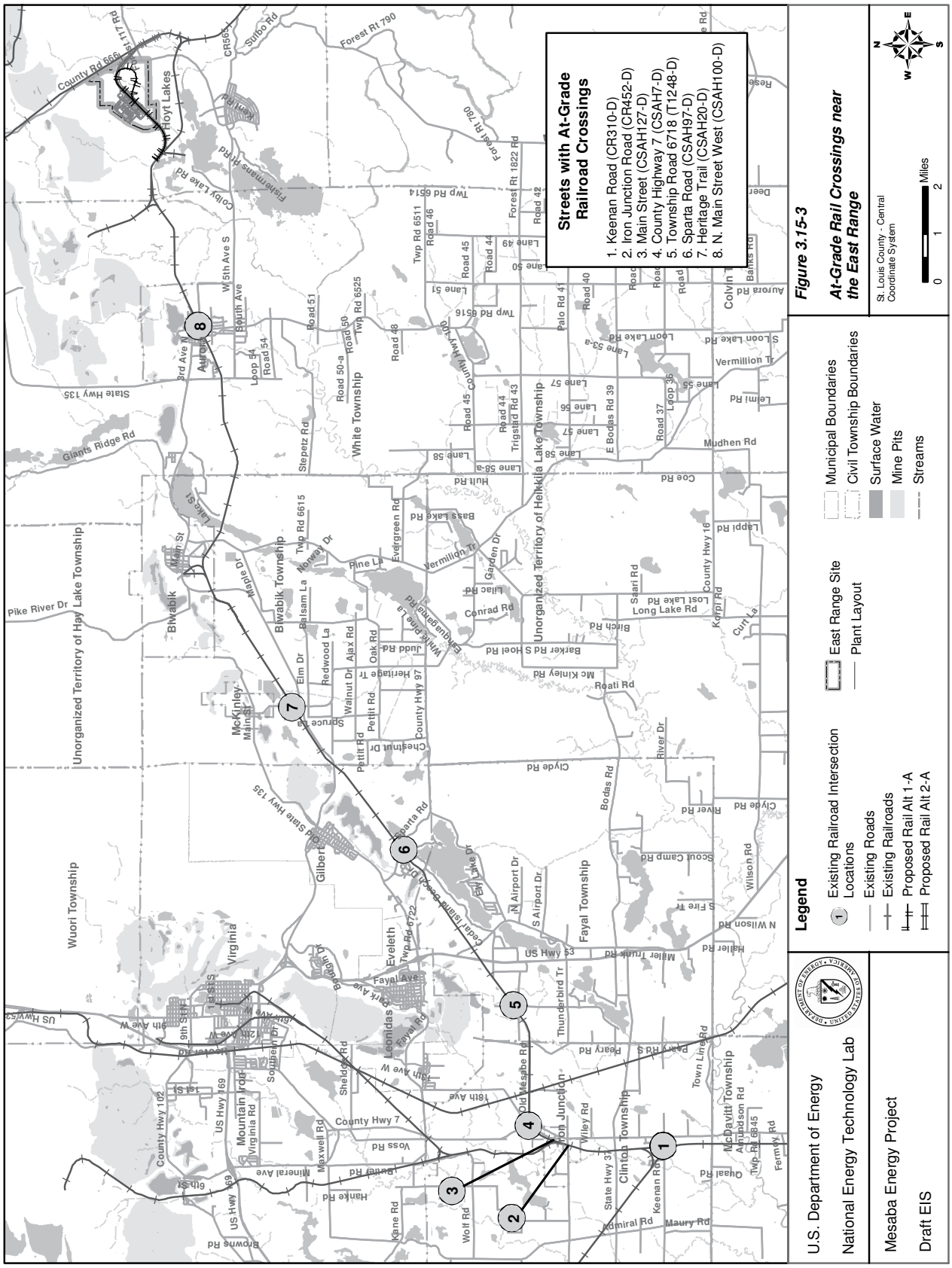

Figure 3.15-3
At-Grade Rail Crossings near the East Range

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3.16 MATERIALS AND WASTE MANAGEMENT

3.16.1 Regional and Local Conditions

3.16.1.1 Construction Materials and Suppliers

Common construction materials such as ready-mix concrete, wood, gravel fill, reinforcing steel fabrication, equipment rentals, and office supplies are available by in-state suppliers with out-of-state suppliers being used as necessary. In-state, national, or international suppliers provide materials, such as specialized operating equipment, to Minnesota companies. Construction water is provided to construction sites by pumping and treating surface waters or by connection to the local municipal water system. Construction materials in the Iron Range are delivered by either truck or rail, depending on a site's locality.

3.16.1.2 Fuels, Feedstocks, and Other Materials and Suppliers

Wyoming, Montana, and Canada are common suppliers of coal, petroleum coke, or feedstock. These materials are either shipped by truck or rail. As described in Chapter 2, the Duluth, Missabe, and Iron Range Railroad, recently acquired by the CN, and the BNSF Railway serve the area of the West Range Site. Rail service to the East Range Site would be provided by two CN rails located approximately one mile north and one mile west of the East Range Site in Eveleth, Minnesota. Local highways also connect the West Range and East Range Sites to interstate highways for truck deliveries. As described in Chapter 2, existing natural gas pipelines are present in the vicinities of both the West Range and the East Range Sites.

3.16.1.3 Hazardous Waste Management

The Minnesota Office of Environmental Assistance (MOEA) (currently part of the MPCA) compiled data on the quantity of hazardous waste generated from 1996 to 1999 in Minnesota in a report titled "Manifested Shipments of Hazardous Waste by Minnesota Generators (1996-1999)" (MOEA, 2001). Based on the 2001 report, 8,037 companies generated approximately 87,000 tons of hazardous waste in Minnesota in 1999; of this, 69 companies generated 109 tons of hazardous waste in Itasca County (West Range Site locale) and 422 companies generated 1,146 tons of hazardous waste in St. Louis County (East Range Site locale). Hazardous waste generated in the state is sent to both in-state and out-of-state treatment, storage, and disposal facilities. Table 3.16-1 summarizes the types of facilities that accepted hazardous waste for treatment or disposal in 1996 and 1999. There are at least 35 companies (not including company subsidiaries) both in state and out of state that accept hazardous waste from generators in Minnesota.

Table 3.16-1. Shipments of Manifested Waste from Minnesota Generators to Treatment, Storage or Disposal Facilities (1996 and 1999)[a]

Facility Type	Quantity of Hazardous Waste in 1996 (tons)	Quantity of Hazardous Waste in 1999 (tons)
Aqueous Treatment/Stabilization	5,354	5,654
Fuel Blending	3,737	4,636
Landfills	8,548	9,140
Metal Recovery	34,979	37,426
PCB Treatment	767	620

Table 3.16-1. Shipments of Manifested Waste from Minnesota Generators to Treatment, Storage or Disposal Facilities (1996 and 1999)[a]

Facility Type	Quantity of Hazardous Waste in 1996 (tons)	Quantity of Hazardous Waste in 1999 (tons)
Solvent Recovery	14,988	15,813
Thermal Treatment	6,343	6,333
Transfer/Storage (In-State)	4,187	1,936
Transfer/Storage (Out-of-State)	993	5,133
Total	79,896	86,691

[a]Does not include waste manifested from cleanup sites
Source: MOEA, 2001

3.16.1.4 Non-Hazardous Waste Management and Recycling

In 1989, the Minnesota Legislature adopted comprehensive waste reduction and recycling legislation and adopted the Governor's Select Committee on Recycling and the Environment (SCORE), which is a program under Minnesota's Waste Management Act that provides counties with funding to develop effective waste reduction, recycling, and solid waste management programs. Annual SCORE reports present recycling and municipal solid waste (MSW) data for each county in Minnesota (MOEA, 2004). In addition, MPCA prepares a Solid Waste Policy Report in odd-numbered years, which presents trends in landfill use and recycling in Minnesota. The 2005 Solid Waste Policy Report (the most recent report available) identified MPCA's strategic plan to increase the statewide recycling rate from 43 percent (2005) to 50 percent by 2010, and to increase Minnesota's waste reduction goal from 2 percent (140,000 tons) in 2005 to 10 percent (750,000 tons) by 2010 (MPCA, 2006b). The 2005 Solid Waste Report also called for Minnesota to send 35 percent of its total waste to waste-to-energy and source-separated composting processing facilities by 2011. Currently, 21 percent of total waste is sent to such processing facilities.

Landfills

Minnesota generated approximately 6 million tons of solid waste in 2004. In 2004, waste remaining for disposal after recycling and reduction efforts totaled nearly 3.6 million tons, a decrease of 1.6 percent from 2003. Mixed MSW (i.e., garbage, refuse, and other solid waste from residential, commercial, industrial, and community activities that the generator of waste aggregates for collection) is sent to 33 MSW landfills located both in state (22) and out of state (11) (MPCA, 2006b). In 2005, out-of-state landfills accepted 840,000 tons (36 percent) of all Minnesota solid waste going to MSW landfills, an increase of 20 percent from 2004. The total landfill capacity for in-state and out-of-state landfills in 2005 was just below 65 million tons and is projected to decrease to approximately 55 million tons by 2010 (MPCA, 2006b).

West Range Site

In April 1994, the Itasca County Transfer Station was constructed, providing the county with a means to transport MSW out of the county and to close its landfill. Licensed haulers and individual self-haulers deliver most of the MSW to the Itasca County Transfer Station. The remainder goes to transfer stations in both Aitkin and Cass Counties. Waste delivered to the transfer stations is directed to the Elk River Landfill located in Elk River in Sherburne County (MOEA, 1999). In 2004, Itasca County sent 25,173 tons of MSW to the Elk River Sanitary Landfill (MOEA, 2004). According to the EPA, the Elk River Landfill has approximately 1.5 million tons of solid waste in place and will not reach capacity until 2042 (EPA, 2006d).

Based on information available from MPCA, there are two closed landfills in Itasca County: the Iron Range Sanitary Landfill and the Grand Rapids Landfill (MPCA, 2006c). The Iron Range Sanitary Landfill is located along the southern border of the West Range Site adjacent to the Itasca County Transfer Station, and the Grand Rapids Landfill is located approximately 10 miles southwest of the West Range Site. At the Iron Range Landfill, groundwater monitoring in 2002 to 2003 indicated that levels of total VOCs had decreased since 2001, but remained relatively stable with total VOCs measured at approximately 24 micrograms per liter. Exceedances of the Health Risk Limits maximum contaminant level (MCL) were detected for arsenic, barium, and manganese in a monitoring well (W-3) that is hydraulically downgradient from the landfill. Monitoring well W-4 also had an exceedance of manganese in 2003. According to the MPCA, no potable water supply wells are at risk (MPCA, 2004a).

East Range Site

St. Louis County sent 54,560 tons of municipal solid waste to the St. Louis County Sanitary Landfill in 2004 (MOEA, 2004). MSW landfilled in the county increased from approximately 65,000 tons in 1991 to over 80,000 tons in 1998 (MOEA, 1999). The St. Louis County Solid Waste Landfill in Virginia, Minnesota, accepts the county's solid waste, and has the capacity to accept almost 1.4 million cubic yards of MSW per year (MCPA, 2006c).

There are 16 closed landfills in St. Louis County (MPCA, 2006d). One closed landfill, the Hoyt Lakes Sanitary Landfill, is located approximately 3,000 feet south of the East Range Site. According to the MPCA, groundwater monitoring at the closed landfill indicates that impacts to the groundwater are minimal and that natural attenuation is occurring. No exceedances of drinking water standards have occurred based on groundwater sampling performed from 2003 to 2004 (MPCA, 2006d).

Recycling Facilities

In 2004, the state's base recycling rate was 41 percent, with recycling programs accepting over 2.42 million tons of recyclable materials (e.g., paper, metals, glass, plastic, and food) (MOEA, 2004). The MPCA maintains a list of companies that accept materials from Minnesota for recycling. Most of the companies listed are located in Minnesota, however, facilities located in other states are also listed.

West Range Site

In Itasca County, recycling is a primary element in the county's solid waste management plan. Private contractors provide recycling services to businesses and other institutions in the county. In 2004, recycling programs collected 18,831 tons of recyclable materials from residents and organizations (MOEA, 2004).

East Range Site

In St. Louis County, the current waste reduction and recycling program consists of a volume-based collection and disposal pricing structure, support for regional materials exchange programs, and public education and information programs encouraging reuse and reduction. Approximately 52,619 tons of recyclable materials were collected in 2004 (MOEA, 2004).

3.16.2 West Range Site and Corridors Site Assessment

The West Range Site is located in an area formerly mined for iron ore and taconite, and there are several mine pits, rock stockpiles, and tailing basins in the vicinity. Mining activities ceased in the 1970s, and mined areas of the Canisteo complex and Hill Annex complex have subsequently filled with water.

Industrial or commercial areas near the West Range Site include the Itasca County Solid Waste Transfer Station and a closed landfill located along the southern boundary of the West Range Site. Other industrial uses in the area include substations, communication facilities, power plants, private air strips, landfills, storage maintenance yards, businesses, factories, lumber mills, and commercial livestock/poultry/grain operations.

A Phase I site assessment was performed for the West Range Site and surrounding areas in 2005 (SEH, 2005a) that included a search of available Federal and state databases for information pertaining to the location of contaminated sites in the vicinity of the West Range Site. Based on the database searches, no contaminated sites or sites undergoing cleanup or remediation are located near the West Range Site.

The Phase I site assessment also included a review of aerial photographs. Mining activities, including the Arcturus Mine Complex, are evident in aerial photographs for 1947 and 1966. The Arcturus Mine Complex appears as a lake in a 1991 photograph with portions of the tailings pile covered with vegetation. In a 2003 photograph, small cleared areas are visible north of Big Diamond Lake (SEH, 2005a).

Topographic maps (1952 Bovey, Minnesota USGS 7.5 minute) revised in 1969 and 1977 were also reviewed as part of the Phase I Assessment. During the 1950s through 1970s, the area was mostly forested with the Arcturus Mine pit, tailings ponds, and mine stockpiles as prominent features. Numerous roads, trails, and railroad corridors also were present. The 1969 map shows a road north of Big Diamond Lake, and the extent of tailings ponds associated with the Arcturus Mine is expanded from the 1952 map. The 1977 map is similar to the 1952 map, revised in 1969 (SEH, 2005a).

A site reconnaissance performed in 2005 for the Phase I Assessment observed the following at the site or surrounding areas (SEH, 2005a):

- Remnants of mining activities in the area; however, no structures were observed on the site.
- Numerous dumpsters and solid waste containers at the entrance of the capped landfill located south of the site.
- Small burn piles (approximately 4 feet in diameter), which appeared to contain household waste, near all-terrain vehicle (ATV) trails.
- Solid waste, including tires, household waste, and building materials. One empty container of paint thinner was observed.
- Stockpiled batteries and old equipment at an offsite property located southwest of the property in the northeastern portion of Taconite.
- Railroad tracks along the eastern boundary of the site.

A site visit performed in May 2006 for the preparation of this EIS noted some areas where household trash was discarded on and adjacent to the West Range Site.

3.16.3 East Range Site and Corridors Site Assessment

Land north and west of the East Range Site was part of a large mining complex now owned principally by CE, where a mineral sales business (decorative and other specialty rock) is currently in operation. Other industrial uses in the vicinity of the East Range Site include the Minnesota Power Syl Laskin Energy Center (a coal-fired, steam electric generating plant) located about 6,900 feet southwest of the East Range Site, and Laskin Energy Park located about 11,500 feet southwest of the East Range Site.

The East Range Site has been disturbed through years of mining activity and is currently unoccupied with no structures. Past and present mining activity is evident by the presence of mine pits, piles of rock debris, and tailing basins at the former LTV Mining Company. A large pile of rock debris (80 to 100 feet high, covering over 300 acres) is located immediately to the west of the East Range Site and was observed during a site visit to be overgrown with grasses. The rock pile likely resulted from placement of overburden materials excavated as part of past mining operations. A site visit performed in May 2006 for this EIS noted the rock pile as well as some areas where household trash was discarded on and adjacent to the East Range Site.

3.17 SAFETY AND HEALTH

This section describes the affected environment for occupational and public safety and health, including worker injuries, transportation safety, community health, and electromagnetic field (EMF) issues. Baseline data for assessing sensitive receptors within a 2-mile (3-kilometer) radius of the West Range Site and East Range Site, and within a 0.5-mile radius of the proposed HVTL and gas pipeline corridors associated with each site are presented. Transportation safety issues are discussed as it relates to traffic accidents and rail crossings. With respect to EMFs, this section provides a discussion of current standards established for utility lines and the current scientific studies related to potential health concerns associated with EMFs.

3.17.1 Occupational Safety and Health

Worker fatalities and injuries are generally a concern in construction and in industrial facility operation. The OSHA regulates worker safety in both construction and industrial settings. OSHA has promulgated a number of regulations that are codified under Chapter 29 of the CFR that are designed to protect workers from potential construction and industrial accidents, as well as to minimize exposure to work place hazards (e.g., noise, chemicals). Workplace injuries can and still do occur even with these regulations and protections in place. Table 3.17-1 summarizes safety statistics from the Bureau of Labor Statistics for industry categories that are relevant to the Proposed Action. The rate of recordable injury cases for the construction field is nearly twice that of the utility sector.

Table 3.17-1. Statistics for Work Place Hazards

Industry	Total recordable incidents (rate per 100 FTEs)[a]	Lost workday cases (rate per 100 FTEs)[a]	Fatalities (rate per 100,000 FTEs)[b]
Construction	5.8	2.2	14.3
Utilities	3.1	0.9	12.7[c]

Source: a. BLS, 2004 b. BLS, 1999
Notes: c. This fatality statistic is found under the sector "Transportation and Public Utilities." Most fatalities in this group are in the transportation category.
FTE=full-time employee

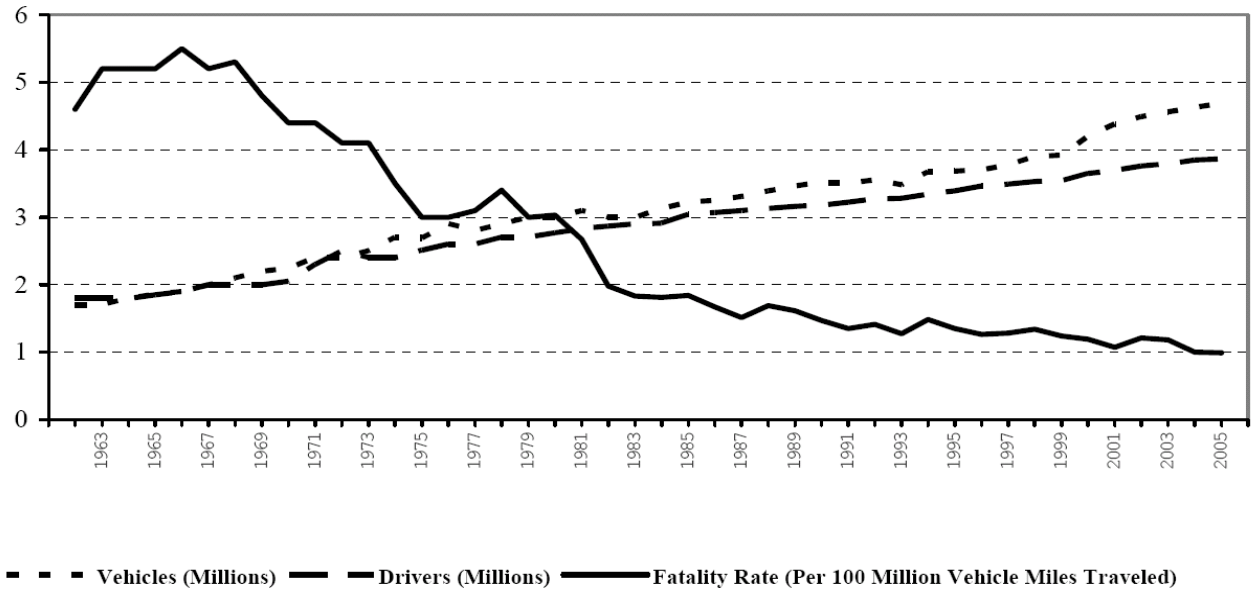
Although power plants are much safer than they once were, plant employees can still encounter workplace hazards. Among the most common hazards to power plant workers are electrical shocks, burns, boiler fires and explosions, and contact with hazardous chemicals (Hansen, 2005). According to the National Board of Boiler and Pressure Vessel Inspectors, between 1999 and 2003 there were 1,477 reported boiler accidents, resulting in 143 injuries and 26 deaths (power boilers include utility boilers as well as boilers used by other industries for cogeneration and on-site power production) (Hansen, 2005). Many power plant workers are also routinely exposed to dangerous chemicals such as corrosives (acids and bases), oxidizers, and solvents. Comprehensive training, detailed pre-job planning, and proper and well-maintained safety equipment are key to accident prevention, regardless of the hazard (Hansen, 2005).

3.17.2 Transportation Safety

3.17.2.1 Roadway Safety

In 1966 there were 53,041 traffic fatalities in the U.S., or 5.7 for every 100 million vehicle miles of travel (VMT) (OTS, 2006). In 1968, there were 1,060 traffic fatalities in Minnesota, or 5.3 per 100 million miles of travel. To date, these represent the worst years for traffic fatalities for the country and Minnesota. Since then, both the rate and the number of fatalities have declined in a fairly steady

pattern for both the country and the state. In 2005, there were 43,200 traffic fatalities throughout the country and 559 in Minnesota. The respective rates per 100 million miles of travel were 1.46 and 0.99, and therefore, represent a relatively dramatic decrease since 1966. In general, the VMT fatality rate in Minnesota has shown dramatic improvement in the last three decades. For example, 1990 had a rate of 1.47, 1980 had a rate of 3.03, and 1970 had a rate of 4.41 (see Figure 3.17-1).



Source: OTS, 2006

Figure 3.17-1. Number of Vehicles, Drivers, and Fatalities in Minnesota from 1962-2005

The decline in traffic fatalities is in large part the result of conscious decision-making on traffic safety issues in the U.S. The National Highway Traffic Safety Administration (originally called the National Highway Safety Bureau) was established by the U.S. Department of Transportation (DOT) in 1967. Since then it has promoted, and Congress has passed, legislation mandating the manufacture of safer cars. At the same time, the Federal interstate highway system has expanded, contributing to a safer roadway environment. Simultaneously there has been an effort to change human behavior factors. Minnesota's legislature has made significant amendments to the Driving While Intoxicated (DWI) law since 1971 and has also passed the child passenger protection law in 1981 and the mandatory seat belt law in 1986. Therefore, although there has been a steady increase in the number of drivers and vehicles, there has been a general steady decrease in the vehicle fatality rate per hundred million miles of travel as evidenced in Figure 3.17-1.

West Range

According to the *2005 Minnesota Motor Vehicle Crash Facts*, of the 729 total vehicular crashes that occurred in Itasca County during 2004, 10 of them were fatal. The year 2005 showed a decrease in accidents with 667 total crashes, four of which were fatal. In general, these represent low numbers relative to the county's population.

Itasca County's Transportation Department provided a listing of reported vehicle accidents within a one-mile radius at the US 169 and CR 7 intersection near the project area. The accident reports cover a five-year period (2001 through 2005). The number of accidents occurring in this area is shown in Table 3.17-2.

Table 3.17-2. Five-Year Traffic Accident History near Intersection of US 169 and CR 7 at West Range Site

Location	2001	2002	2003	2004	2005
US 169	5	3	6	1	10
CR 7	4	5	2	5	4

Source: Itasca County, 2006

As indicated in Table 3.17-2, the number of accidents on key roads remained more or less steady over the five-year period, except for US 169 in 2005, which showed a marked increase. After reviewing the reports, it appears that approximately half of the accidents in 2005 were caused by icy/snowy conditions. There were no recorded fatal accidents within the one-mile radius of this intersection over the five-year period. In general, Itasca County has experienced slope stability problems with CR 7 near its intersection with US 169. According to the County Engineer, this intersection is dangerous for heavy truck hauls because of the steep approach to US 169 (Excelsior, 2006b).

East Range

According to the *2005 Minnesota Motor Vehicle Crash Facts*, of the 2,553 total vehicular crashes that occurred in Itasca County during 2004, 21 were fatal. The year 2005 showed a decrease in accidents with 2,364 total crashes, 19 of which were fatal.

According to accident data from the St. Louis County's Public Works Department, there have been three accidents in the past five years (2001 through 2006) at the intersection of CR 666 and CR 110 in Hoyt Lakes (St. Louis County, 2006). There were no accidents reported at the intersection of CR 110 and Hampshire Drive (Hoyt Lakes) during this same period. From 2000 to 2005, there were 11 accidents reported on CR 110 between CR 665 in Aurora (now referred to as CR 130) and CR 666 in Hoyt Lakes. Five of these accidents were related to poor visibility or icy roads as a result of weather conditions.

3.17.2.2 Railroad Safety

The extensive network of roads crisscrossing over railroads within the region facilitates the potentially dangerous interaction between motor vehicles and freight trains. Each day, thousands of vehicles using local roads cross over active railroad tracks. Including private crossings, there are a total of approximately 740 railroad crossings within the northeastern Minnesota region. Given the fact that some of the high-speed railroads within the region have been experiencing increasing volumes, railroad safety planning has become increasingly important in providing safe interaction between trains and motor vehicles.

A structure that allows one track to cross another track or a highway at the same elevation is referred to as an *at-grade crossing*. A structure or set of structures allowing two tracks, or one or more tracks, and a highway to cross each other at different elevations is referred to as a *grade-separated crossing*. Grade-separated crossings are provided by either a bridge over highway or bridge over rail. At-grade rail-highway crossings can contribute to traffic bottlenecks depending on their location.

As of 2002, Minnesota ranked 17th in the nation for the highest number of collisions and 14th in overall deaths and injuries from crashes at highway-rail intersections. Minnesota has worked actively with counties, cities, townships and railroads to improve safety for at-grade crossings. Active warning devices have been installed at over 1,300 of the approximately 4,500 public grade crossings in the state. The number of at-grade rail crossings with high exposure ratings and hazard ratings has increased significantly from 1996 to 2000 (Excelsior, 2006b). In 2000, 22 percent of the 363 at-grade crossings in the region had high hazard ratings, up from 3 percent in 1996. It is likely that this growth is attributable primarily to increased vehicle traffic rather than increased train traffic. All of the at-grade intersections on

trunk highways are guarded with gates and signals. Safety improvements for at-grade crossings are funded through a shared-cost negotiated between Mn/DOT and the railroad company.

According to the *2005 Minnesota Motor Vehicle Crash Facts*, 17 percent of all vehicle/train crashes in Minnesota resulted in a fatality in 2004 (train collisions with pedestrians or bicyclists were not counted in these crashes). Over the years, the number of vehicle/train crashes in Minnesota has been declining. Seventy-two crashes were reported in 2004, an 18 percent decrease from the 1995-2002 average of 87. Fourteen of the 72 vehicle/train crashes, including three of the 12 fatal crashes, occurred at a railroad crossing signed by a railroad crossbuck. An additional 11 crashes (including three fatal crashes) occurred at crossings with a railroad crossing stop sign. Combined, these two types of traffic control devices were present at 35 percent of the crashes and accounted for nearly half of the fatalities.

Motor vehicle crashes involving a train were a predominantly rural phenomenon, defined as an area with less than 5,000 population. In 2004, 69 percent of the total crashes, 74 percent of the injuries, and 85 percent of the fatalities occurred in rural areas. Furthermore, for the motor vehicles involved in train crashes, failure to yield ROW, driver inattention or distraction, and disregard for traffic control device were the three contributing factors cited most often by officers at the scene. These three reasons accounted for 74 percent of all contributing factors cited.

The location of at-grade crossings and existing traffic volumes at these crossings near the West Range and East Range Sites are discussed in Section 3.15.3.2 and 3.15.3.3, respectively.

3.17.3 Community Health Issues

Information from health profiles for Itasca County and St. Louis County were compiled from the Minnesota Department of Health. The health profiles comprise an overview of the health status of Minnesota residents at the state and county levels.

Minnesota statistics for adults with behavioral health risks (shown as a percentage of the adult population considered at risk due to a particular behavior) on a state-wide and county basis are shown in Table 3.17-3. These behavioral health risk factors of adults are similar rates for both counties and state-wide. Cancer statistics for the state and counties is provided in Table 3.17-4.

Table 3.17-3. Estimated Percent of Adults with Behavioral Health Risk Factors (2004)

Behavioral Health Risk Factors of Adults	Minnesota (percent)	Itasca County (percent)	St. Louis County (percent)
Overweight	59.6	60.0	58.9
Current Smokers	20.8	19.7	20.3
Acute Drinking	19.9	18.0	19.1
Chronic Drinking	5.6	5.5	5.7
Perceiving health status as fair or poor	10.0	11.3	10.7
Limitation of activities due to any impairment or health problem	21.8	23.7	22.7
No exercise	15.9	16.6	16.3
Hypertension	28.5	28.5	26.5

Source: MDH, 2004

Leading causes of mortality (as a total for 2004 and a percent of total deaths) for the state and each county are provided in Table 3.17-5. Overall, health risk factors and mortality rates (percentages) are similar in both counties and to state-wide statistics. Both counties have higher cancer incidence rates when compared to state-wide rates, although this may not be statistically significant due to the small sample size (population) of each county. Itasca County has a slightly higher cancer incident rate than St. Louis County, however, this data may be skewed due to the large difference in the population between the two counties (St. Louis County's population is over four times that of Itasca County).

Table 3.17-4. Estimated Number of Adults with Cancer Incidences (2004)

Type of Cancer	Minnesota Men	Minnesota Women	Itasca County Men	Itasca County Women	St. Louis County Men	St. Louis County Women
Cancer Incidence -all types	14,049 (0.56%)[1]	13,524 (0.53%)[1]	208 (0.94%)[1]	166 (0.75%)[1]	812 (0.83%)[1]	702 (0.70%)[1]
Colon and Rectum Cancer	1,290	1,436	14	21	74	68
Lung Cancer	3,748	3,033	63	43	210	152
Breast Cancer	20	2,054	1	24	2	114
Prostate Cancer	1,797	0	35	0	110	0
Other Types	7,194	6,731	95	78	416	368

Note: [1] Percentages are based on 2000-2002 cancer numbers divided by reported 2003 populations.
Source: MDH, 2002a.

Table 3.17-5. Causes of Mortality, State and County Statistics (2003 and 2004)

U.S. 15 Leading Causes of Death	Minnesota, Percent of Total Deaths (2004)	Itasca County, Percent of Total Deaths (2003)	St. Louis County, Percent of Total Deaths (2003)
Malignant Neoplasms (Cancer)	24.6	24.3	24.5
Diseases of the Heart	21.3	22.1	24.3
Cerebrovascular Diseases (stroke)	6.9	7.0	6.3
Accidents	5.0	4.7	4.7
Chronic Lower Respiratory Diseases	5.0	4.0	5.1
Alzheimer's Disease	3.3	4.0	3.3
Diabetes Mellitus	3.1	3.4	3.4
Influenza and Pneumonia	2.0	3.2	1.8
Nephritis, Nephrotic Syndrome and Nephrosis	1.8	0.6	1.6
Intentional Self-Harm	1.4	2.3	1.8

Table 3.17-5. Causes of Mortality, State and County Statistics (2003 and 2004)

U.S. 15 Leading Causes of Death	Minnesota, Percent of Total Deaths (2004)	Itasca County, Percent of Total Deaths (2003)	St. Louis County, Percent of Total Deaths (2003)
Essential Hypertension and Hypertensive Renal Disease	1.3	1.9	0.9
Parkinson's Disease	1.1	0	0
Chronic Liver Disease and Cirrhosis	0.9	1.3	1.6
Aortic Aneurysm and Dissection	0.8	0	0
Septicemia	0.7	1.1	0.6
All Other Causes	20.8	20.1	20.1

Source: MDH, 2003

3.17.4 Sensitive Receptors and Chemicals of Potential Concern

3.17.4.1 Sensitive Receptors

Sensitive receptors include populations that are the most vulnerable to adverse health effects associated with air pollutants and chemical exposure, such as the elderly and the very young. Sensitive receptor locations are typically associated with residential areas, hospitals, long-term health care facilities, playgrounds, and schools. Additionally, farms and fishable bodies of water are also considered significant receptor locations because potential chemical or pollutant deposition at these sites can affect food supplies. Aerial photography, current as of 2003, was used to identify significant receptors in Itasca County and St. Louis County in relation to the proposed West Range Site and East Range Site, respectively.

3.17.4.2 West Range Site and Corridors

There are no farms, schools, daycare centers, recreation centers, playgrounds, nursing homes, or hospitals located within 0.5 miles of the West Range Site.

The residences nearest to the West Range Site are located to the southeast on the north shore of Big Diamond Lake and the southeast shore of Dunning Lake (approximately 0.6 to 0.8 miles from the West Range Site). The residences along the lakes are a mix of seasonal and year-round dwellings. The City of Taconite, located approximately 1.7 miles from the West Range Site, has both single-family and multi-family residential houses that are occupied year-round. Based on a review of aerial photography, there are as many as 214 residences (depending on corridor) located within 0.5 miles of the centerline of the proposed HVTL corridors, and a maximum of 935 residences (depending on corridor) located within 0.5 miles of the centerline of the proposed natural gas pipelines associated with the West Range Site. No hospitals, long-term health care facilities, playgrounds, schools, farms or fishing areas were noted to be within 0.5 miles of the centerline of the proposed HVTLs based on aerial photographs, however, one church and four cemeteries were identified within 0.5 miles of the centerline of the proposed natural gas pipeline corridors associated with the West Range Site.

3.17.4.3 East Range Site and Corridors

The nearest residences to the East Range Site are located about 1 mile directly south of the site in the City of Hoyt Lakes. No sensitive receptors such as schools, daycare centers, recreation centers, playgrounds, nursing homes or hospitals are located within 0.5 miles of the East Range Site. Based on a review of aerial photography, residential areas are located along the corridors proposed for the HVTLs (maximum 962 residences) and natural gas pipelines (856 residences). In addition, two schools (Fayal School and Lincoln School), the Mamrelund Church, Forbes Cemetery, Camp Olcott, and Eveleth Scout Camp are located along the proposed HVTL corridor within 0.5 miles of the HVTL ROW centerline. A 4H Camp and the Eveleth-Virginia Airport are located within approximately 0.5 miles of the natural gas pipelines. No hospitals, long-term health care facilities, playgrounds, or fishing areas are noted within 0.5 miles of the proposed HVTLs or natural gas pipeline corridors.

3.17.4.4 Chemicals of Potential Concern

Exposure to certain chemicals, or chemicals of potential concern (COPCs), can adversely affect human health through toxic and/or carcinogenic effects. Chemical exposure can occur as a result of a variety of human activities ranging from the use of household chemicals and products to the fueling of a motor vehicle. In addition, exposure can result from chemicals that could be present in the air, water, soil, or the food chain through air emissions or other discharges from industrial sources to the environment.

The EPA has developed cancer and non-cancer toxicity values for COPCs that serve as the basis for many of the regulatory standards for emission and exposure limits that have been established to protect human health and the environment. In addition, EPA has established standards for evaluating risks of exposure to chemicals related to specific project and site conditions. For a chemical exposure to occur at a specific site, several conditions must be met, including: (1) a chemical or exposure source; (2) a release mechanism; (3) a migration pathway; (4) an exposure route; and (5) a receptor population. Consequently, if either a chemical-specific (toxic) effect or exposure pathway is not present, there is no unacceptable carcinogenic risk (or non-carcinogen hazard).

To calculate potential risks associated with chemical exposures, categories of sensitive receptor populations are defined. These populations reflect persons with potentially high exposure rates due to the frequency and duration of exposure, or increased sensitivity due to health or age. To estimate the potential risk associated with an action, risk calculations are conducted for the most susceptible populations, including resident/home gardener (adult and child), farmer (adult and child), and fisherman (adult and child).

3.17.5 Electromagnetic Fields

3.17.5.1 Electric and Magnetic Field Primer

High-voltage alternating-current (AC) transmission lines produce extremely low frequency (60 Hertz (Hz)) alternating electric and magnetic fields. Electric fields are lines of force exerted on electrically charged particles. Magnetic fields, on the other hand, are lines of force exerted on moving charged particles (current). Magnetic fields are generally considered to have more potential for affecting human health than electric fields, in part because electric fields are more easily reduced by shielding. The intensity of the electric field is related to the voltage of the line. However, the intensity of the magnetic field is directly related to the amount of current flowing through the conductors, not the voltage. Therefore, a higher-voltage transmission line does not necessarily produce stronger magnetic fields than lower voltage lines.

Electric fields are characterized by their wavelength, frequency, or energy. The frequency of an electromagnetic wave is simply the number of oscillations which pass a fixed point per unit of time. Frequency is measured in cycles per second, or Hz. One cycle per second equals one Hz. Typically, the shorter the wavelength, the higher the frequency. An electromagnetic wave consists of very small packets

of energy called photons. The energy in each packet or photon is directly proportional to the frequency of the wave; the higher the frequency, the larger the amount of energy in each photon.

The voltages on the conductors of transmission lines generate electric fields in the space between the conductors and the ground. Directly under transmission lines, the electric field is nearly constant in magnitude and direction over distances of several feet. Electric fields are vector quantities; that is, they have both magnitude and direction. The direction corresponds to the direction that a positive charge would move in the field. In general, the field decreases with distance from the conductors. If an energized conductor (source) is inside a grounded conducting enclosure, then the electric field outside the enclosure is zero, and the source is said to be shielded.

The strength of the electric field is measured in volts per meter (V/m), and is calculated at a height of 3.28 feet (1 meter) above an un-vegetated, flat earth under straight parallel transmission lines.

In contrast to electric fields, a magnetic field is only produced once a device is switched on and current flows. The higher the current, the greater the strength of the magnetic field. Like electric fields, magnetic fields are strongest close to their origin and rapidly decrease at greater distances from the source. Magnetic fields are not blocked by common materials such as the walls of buildings. In the case of transmission lines, distribution lines, house wiring, and appliances, the 60-Hz electric current flowing in the conductors generates a time-varying, 60-Hz magnetic field in the vicinity of these sources. The strength of a magnetic field is measured in terms of magnetic lines of force per unit area (amperes per meter (A/m)), or magnetic flux density (measured in units of gauss (G), or milligauss (mG)).

The uniformity of a magnetic field depends on the nature and proximity of the source, just as the uniformity of an electric field does. Transmission-line-generated magnetic fields are quite uniform over horizontal and vertical distances of several feet near the ground. However, for small sources such as appliances, the magnetic field decreases rapidly over distances comparable with the size of the device.

The magnetic field generated by currents on transmission-line conductors extends from the conductors through the air and into the ground. The magnitude of the field at a height of 3.28 feet (1 meter) is frequently used to describe the magnetic field under transmission lines. As previously mentioned, the distance from the transmission-line conductors is inversely proportional to the magnetic field.

Electromagnetic waves can be classified as either ionizing radiation (IR) or non-ionizing radiation (NIR):

- IR are extremely high frequency electromagnetic waves (X-rays and gamma rays), which have enough photon energy to produce ionization (create positive and negative electrically charged atoms or parts of molecules) by breaking the atomic bonds that hold molecules in cells together.
- NIR is a general term for that part of the electromagnetic spectrum which has photon energies too weak to break atomic bonds. They include ultraviolet (UV) radiation, visible light, infrared radiation, radiofrequency and microwave fields, extremely low frequency (ELF) fields, as well as static electric and magnetic fields.

3.17.5.2 Current Standards

Regulations that apply to transmission-line electric and magnetic fields fall into two categories: safety standards/codes and field limits/guidelines. Safety standards or codes are intended to limit or eliminate electric shocks that could seriously injure or kill persons. Field limits or guidelines are intended to limit electric- and magnetic-field exposures that can cause nuisance shocks or may cause health effects. In no case has a limit or standard been established because of a known or demonstrated health effect. The majority of the national standards draw on the guidelines set by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). This non-governmental organization evaluates scientific

results from all over the world. ICNIRP has included a safety factor of 10 for occupational exposure levels and a safety factor of 50 for public exposure levels.

An important point is that there is no specific level above which exposures become hazardous to health. Instead, the potential risk to human health gradually increases with higher exposure levels. Guidelines indicate that, below a given threshold, electromagnetic field exposure is safe according to scientific knowledge. However, it does not automatically follow that, above the given limit, exposure is harmful.

At low frequencies, exposure guidelines ensure that the level of currents induced by electromagnetic fields is below that of natural body currents. The main effect of radiofrequency energy is the heating of tissue. Consequently, exposure guidelines for radiofrequency fields and microwaves are set to prevent health effects caused by localized or whole-body heating.

In the United States, there are no Federal standards limiting occupational or residential exposure to 60 Hz EMF. Only six states (Florida, Minnesota, Montana, New Jersey, New York, and Oregon) have set standards limitations for electric fields, and two states (Florida and New York) have standards for magnetic fields as shown in Table 13.17-6.

3.17.5.3 EMF Health Concerns

Some people have attributed a diverse collection of symptoms to low levels of exposure to electromagnetic fields at home. Reported symptoms include headaches, anxiety, suicide and depression, nausea, fatigue and loss of libido. To date, scientific evidence does not support a link between these symptoms and exposure to electromagnetic fields (WHO, 2006).

Scientists are also investigating the possibility that effects below the threshold level for body heating occur as a result of long-term exposure. To date, no adverse health effects from low level, long-term exposure to radiofrequency or power frequency fields have been confirmed, but scientists are actively continuing to research this area (WHO, 2006).

Some initial epidemiological studies of 60 Hz EMF levels showed a weak but possible correlation between magnetic fields and childhood leukemia. However, after over 20 years of research there is general scientific consensus that there is no evidence that power line EMF causes biological responses and health effects in humans. Recent research indicates:

- There is little evidence that power lines are associated with an increase in cancer.
- Laboratory studies have shown little evidence of a link between power-frequency fields and cancer.
- An extensive series of studies have shown that life-time exposure of animals to power-frequency magnetic fields does not cause cancer.
- A connection between power line fields and cancer is physically implausible (Moulder, 2005).

Table 3.17-6. State Transmission Line Standards and Guidelines

State	Electric Field		Magnetic Field	
	On ROW	Edge ROW	On ROW	Edge ROW
Florida	8 kV/m[a]	2 kV/m	NA	150 mG[a] (max load)
	10 kV/m[b]	NA	NA	200 mG[b] (max load)
	NA	NA	NA	250 mG[c] (max load)
Minnesota	8 kV/m	NA	NA	NA

Table 3.17-6. State Transmission Line Standards and Guidelines

State	Electric Field		Magnetic Field	
	On ROW	Edge ROW	On ROW	Edge ROW
Montana	7 kV/m	1 kV/m[e]	NA	NA
New Jersey	NA	3 kV/m	NA	NA
New York	11.8 kV/m	1.6 kV/m	NA	200 mG (max load)
	11 kV/m[f]	NA	NA	NA
	7 kV/m[d]	NA	NA	NA
Oregon	9 kV/m	NA	NA	NA

[a] For lines of 69-230 kV
[b] For 500 KV lines
[c] For 500 KV lines in certain existing ROW
[d] Maximum for highway crossings
[e] May be waived by the landowner
[f] Maximum for private road crossings
ROW = right-of-way; NA= not applicable: kV/m=kilovolts per meter ; mG= miligauss
Source: NIEHS, 2002

In 1999, the National Institute of Environmental Health Sciences (NIEHS) issued its final report on "Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields" in response to the 1992 Energy Policy Act. NIEHS concluded that the scientific evidence linking EMF exposures with health risks is weak and that this finding does not warrant aggressive regulatory concern (NIEHS, 2002).

In 2002, Minnesota formed an Interagency Working Group to evaluate the body of research and develop policy recommendations to protect the public health from any potential problems resulting from HVTL EMF effects. The Working Group consisted of staff from the Minnesota Department of Health, the Department of Commerce, the Public Utilities Commission, the Minnesota Pollution Control Agency, and the Environmental Quality Board. In September 2002, the Working Group published its findings in a White Paper on Electric and Magnetic Field Policy and Mitigation Options (MDH, 2002b). The following summarizes the findings of the Working Group.

Research on the health effects of EMF has been carried out since the 1970s. Epidemiological studies have mixed results – some have shown no statistically significant association between exposure to EMF and health effects, and some have shown a weak association. More recently, laboratory studies have failed to show such an association, or to establish a biological mechanism for how magnetic fields may cause cancer. A number of scientific panels convened by national and international health agencies and the United States Congress have reviewed the research carried out to date. Most concluded that there is insufficient evidence to prove an association between EMF and health effects; however, many of them also concluded that there is insufficient evidence to prove that EMF exposure is safe (MDH, 2002b).

Despite this general consensus, however, there are still concerns. For example, California's Department of Health Services published a report by the California EMF Program in 2002 that concluded there was a weak, but probably real association between EMF and cancer. In addition, on June 3, 2005, the British Medical Journal released a paper entitled "Childhood Cancer in Relation to Distance from High Voltage Power Lines in England and Wales: A Case-Control Study" (Draper, 2005). This paper contained findings from a study on childhood cancer carried out by Oxford University that analyzed and compared 33 years of data (from 1962 to 1995) on 29,000 children diagnosed with cancer. The study found slightly elevated rates of childhood leukemia in children whose residence at birth was close to

power lines. Proponents of the EMF health connection have argued that the magnetic fields produced by the power lines are responsible for this correlation.

The British study found elevated rates of childhood leukemia at distances less than 0.5 miles (approximately 600 meters) from the lines. At such distances, the magnetic fields in homes due to power lines are negligible compared to existing background levels. Moreover, the authors of the study found no causal link between childhood leukemia and EMF, stating "we emphasize again the uncertainty about whether this statistical association represents a causal relation." In addition, the authors state "neither the association reported here nor previous findings relating to level of exposure to magnetic fields are supported by convincing laboratory data or any accepted biological mechanism" (Draper, 2005).

Additional studies and areas of concern include:

- Effects on pregnancy outcome. Many different sources and exposures to electromagnetic fields in the living and working environment, including computer screens, water beds, and electric blankets, radiofrequency welding machines, diathermy equipment, and radar, have been evaluated by the World Health Organization and other organizations. The overall weight of evidence shows that exposure to fields at typical environmental levels does not increase the risk of any adverse outcome such as spontaneous abortions, malformations, low birth weight, and congenital diseases. There have been occasional reports of associations between health problems and presumed exposure to electromagnetic fields, such as reports of premature births and low birth weight in children of workers in the electronics industry, but these have not been regarded by the scientific community as being necessarily caused by the field exposures (as opposed to factors such as exposure to solvents) (WHO, 2006).
- Cataracts. General eye irritation and cataracts have sometimes been reported in workers exposed to high levels of radiofrequency and microwave radiation, but animal studies do not support the idea that such forms of eye damage can be produced at levels that are not thermally hazardous. There is no evidence that these effects occur at levels experienced by the general public (WHO, 2006).
- Electromagnetic fields and cancer. Over the last 20 years, research has been conducted in the United States and around the world to examine whether exposures to electric and magnetic fields at 50/60 Hz from electric power lines are a cause of cancer or adversely affect human health. The research included epidemiology studies that suggested a link with childhood leukemia for some types of exposures, as well as other epidemiology studies that did not; it also included lifetime animal studies, which showed no evidence of adverse health effects. Comprehensive reviews of the research conducted by governmental and scientific agencies in the U.S. and in the United Kingdom (UK) did not find a basis for imposing additional restrictions (NIEHS, 1999; IEE, 2000).
- Electromagnetic hypersensitivity and depression. Some individuals report "hypersensitivity" to electric or magnetic fields. In the past, residents have questioned whether their reported symptoms (e.g., aches and pains, headaches, depression, lethargy, sleeping disorders, and even convulsions and epileptic seizures) could be associated with electromagnetic field exposure near their homes. There is little scientific evidence to support the idea of electromagnetic hypersensitivity. Recent Scandinavian studies found that individuals do not show consistent reactions under properly controlled conditions of electromagnetic field exposure. Currently, there is not an accepted biological mechanism to explain hypersensitivity (WHO, 2006).
- Henshaw Effect. Researchers in England have suggested that the AC electric fields from power lines might affect health indirectly, by interacting with the electrical charges on certain airborne particles. This phenomenon, sometimes referred to as the Henshaw Effect, relates to the hypothesis that particles would be deposited on the skin by a strong electric field, or in the lung by charges on particles (Henshaw et al., 1996; Fews et al., 1999a, 1999b). In their laboratory, Henshaw and colleagues have developed models to test the physical assumptions of their

hypothesis: that an electric field can change the behavior of particulates in the air. For example, they measured the deposition of radon daughter particles on metal plates, in the presence of an electric field at intensities found under or near power lines. Under these conditions, deposition of particles on surfaces was slightly increased, an occurrence that implies that the deposition might also occur on other surfaces, such as skin. However, Henshaw and colleagues have not tested the most speculative parts of their hypothesis: that such changes in deposition rate of particles would lead to an important increase in human exposure and also that the increased skin exposure would be sufficient to affect human health. Henshaw et al. also hypothesized that AC electric fields at the surface of power line conductors lead to increased charges on particles, and thereby increases the likelihood that inhaled particles (including radon daughters) would be deposited on surfaces inside the lungs and airways, even at considerable distances from a power line. Outside air generally contains particles of various sizes, including aerosols from emissions from vehicles and manufacturing, as well as natural sources such as radon from soil, rock, and building materials. If, as hypothesized, charges on aerosol particles were increased, and if this change were to increase deposition in the lungs when inhaled over long periods of time, in theory these events could lead to increases in respiratory disease and other diseases.

Radon daughters are short-lived radioactive decay products of radon that decay into longer-lived lead isotopes that can attach themselves to airborne dust and other particles and if inhaled, damage the lining of the lungs.

An **aerosol** is a mixture of microscopic solid or liquid particles in a gaseous medium. Smoke, haze, and fog are examples of aerosols.

There are many sources of more detailed information on the potential health effects of EMF. For example, the Minnesota Department of Heath maintains information on its web site: http://www.health.state.mn.us/divs/eh/radiation/emf/index.html. Another extensive site maintained by a University of Wisconsin medical research faculty is found at: http://www.mcw.edu/gcrc/cop/powerlines-cancer-FAQ/toc.html#19N.

3.17.5.4 Existing Sources of EMF

Existing sources of EMF in the vicinity of each proposed site include HVTLs and sub-stations. A description of these sources is provided below. However, the electric and magnetic field strengths for these sources are not available.

West Range Site and Corridors

The West Range Site is bounded by CR 7 to the west and the Iron Range Township to the east. MP currently owns an existing 115-kV HVTL (designated as 28Line), located north of the power plant footprint and buffer land (hereafter, all HVTLs will be identified by their number followed by the letter "L" for "Line," e.g., 28L). The line runs between the Clay Boswell Generating Station and a 115-kV substation near Nashwauk, Minnesota.

MP also owns the 83L, a 230-kV HVTL that connects the Clay Boswell Station with the Blackberry Substation, and the 20L, an 115-kV HVTL that interconnects the Grand Rapids and Blackberry Substations. The Blackberry Substation is the major HVTL hub in the area.

Finally, MP operates two 115-kV HVTLs known as 62L and 63L between the Nashwauk and Blackberry Substations. At one time, two 115-kV tap lines identified as 45L ran along the east side of the Project Site and connected 28L to the Greenway 115-kV Substation (just north of Holman Lake). The two 115-kV tap lines have since been de-energized and the Greenway Substation retired.

Two HVTL corridors traverse the West Range Site, one in a north/south direction and a second in an east-west direction. The HVTLs that occupy the north-south corridor are not currently used.

East Range Site and Corridors

The East Range Site comprises approximately 800 acres of undeveloped property currently owned by CE, within the City Limits of the Hoyt Lakes in St. Louis County, Minnesota. This site is bounded by CR 666 to the east, the Superior Natural Forest to the north, and an existing 138-kV HVTL corridor leading to MP's Syl Laskin Energy Center Substation (Laskin Substation) to the west.

Three existing transmission lines emanate from the Laskin Station, located approximately 2 miles southwest of the generating station footprint, and connect with the Forbes and Virginia substations. The three 115-kV lines connect the Laskin Substation (34L, 38L, and 39L) with the Forbes and Virginia substations. These facilities are part of the MP transmission network known as the "North Shore Loop."

The 38L that interconnects directly to the Forbes Substation is about 35.5 miles in length, is rated at 146 Mega Volt-Amps (MVA) , and has one intermediate distribution load service substation (the Peary Substation). For the 39L and 34L routes that connect to the Virginia Substation, there are existing 115-kV lines (37L directly to the Forbes Substation and 16L/18L to the Forbes Substation via United Taconite).

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3.18 NOISE

This section presents the current noise conditions at and in the vicinity of the proposed Mesaba Energy Project. It provides background information about noise principles, guidelines, and regulations; noise measurement methods and criteria; and existing noise levels and sources in the West Range and East Range Sites.

3.18.1 Background

3.18.1.1 Noise Principles

Definitions

Noise, simply defined as unwanted sound, can have an adverse effect on humans and their activities as well as the natural environment. Sound pressure (loudness) is the physical force from a sound wave that affects the human ear, and is typically discussed in terms of decibels (dB), which is a logarithmic unit of the sound pressure level (SPL). Zero dB represents the threshold of hearing.

The impact of noise is highly dependent upon the characteristics of the noise (i.e., loudness, pitch, time of day, duration, etc.) and the sensitivity (or perception) of the noise receptor. The EPA has classified noise levels for several common sounds along with typical human responses or perceptions for these noises (Table 3.18-1).

Table 3.18-1. Noise Levels for Common Sounds

Sources*	Noise Level (dBA)	Response
Carrier deck, jet operation	140	Painfully loud
Live rock music	130	Limits amplified speech
New York subway station	90	Hearing damage (8 hours)
Dishwasher	80	Annoying
Freeway traffic (50 ft)	70	Telephone use difficult
Air conditioning unit (20 ft)	60	Intrusive
Light auto traffic (100 ft)	50	Quiet
Breathing	10	Just audible
Silence	0	Threshold of hearing

*Noise levels decrease with distance from the source and are reduced by barriers, both man-made (e.g., sound walls) and natural (forested areas, hills, etc.).

Sound can be quantified in terms of its amplitude (loudness) and frequency (pitch). The standard unit of sound amplitude measurement is the dB; however, since the human ear is not equally sensitive to sound at all frequencies, four weighted scales (A through D) have been developed to measure noise from different sources. Typically, the A-weighted scale is used to measure noise as it relates human sensitivity, by discriminating against frequencies in a manner approximating the sensitivity of the human ear. Sound pressure presented in the A-weighted decibel scale is designated with the symbol dBA. Generally, a change of less than 3 dBA in noise levels with respect to existing conditions is not perceptible to humans in ambient situations. Noise levels for combinations of sounds are added and subtracted based on a

logarithmic scale. As a result, the addition of two noises, such as a garbage truck (100 dBA) and a lawn mower (95 dBA), would result in a cumulative sound level of 101.2 dBA, not 195 dBA. In most cases, where the addition of decibels only needs to be accurate by ±1 dB, the following rule of thumb can be used to add decibels:

When two decibel values differ by:	Add the following amount to the higher value:
0 or 1 dB	3 dB
2 or 3 dB	2 dB
4 or 9 dB	1 dB
10 dB or more	0 dB

Because the decibel scale is logarithmic, a relative increase of 10 decibels represents a sound pressure level that is 10 times higher. However, humans do not perceive a 10-dBA increase as 10 times louder; they perceive it as twice as loud. The following is typical of human response to relative changes in noise level:

- ±3 dBA change is the threshold of change detectable by the human ear, in ambient environments;
- ±5 dBA change is readily noticeable;
- +10 dBA increase is perceived as a doubling of noise level/loudness; and
- +20 dBA increase is perceived as a fourfold increase in noise level/loudness.

The SPL that humans experience typically varies from moment to moment. Therefore, a variety of descriptors are used to evaluate noise levels over time. Some typical descriptors are defined below:

- L_{eq} is the continuous equivalent sound level. The sound energy from the fluctuating sound pressure levels is averaged over time to create a single number to describe the average energy or intensity level. High noise levels during a monitoring period will have greater effect on the L_{eq} than low noise levels. The L_{eq} has an advantage over other descriptors because L_{eq} values from different noise sources can be added and subtracted to determine cumulative noise levels.
- L_{dn} is the day-night equivalent sound level. It is similar to a 24-hour L_{eq}, but with 10 dBA added to SPL measurements between 10:00 pm and 7:00 am to reflect the greater intrusiveness of noise experienced during these hours. L_{dn} is also termed DNL.
- L_{min} is the lowest SPL measured during a given period of time and L_{max} is the highest.
- L_{10} is the SPL exceeded 10 percent of the time. Similar descriptors are the L_{50}, L_{01}, and L_{90}.

Noise Loss Over Distance

Sound travel over distance is acted upon by many factors. Temperature, humidity, wind direction, barriers, and absorbent materials such as soft ground and light snow are all factors in how sound will be perceived at different distances.

Sound energy is lost at higher humidity conditions due to the combined action of the viscosity and heat conduction of the air, and the behavioral state of the molecules therein. When humidity rises, there is an increase in the high frequency absorption of air. Thus, in the summer months, and assuming a higher relative humidity, less of the high frequency noise will be heard. As well, leaves and shrubs while in bloom during the summer months will further serve to attenuate propagated noise.

Noise from a fixed location (e.g., industrial equipment) is termed a stationary or point source. Point sources of noise attenuate at a rate of 6 dBA per doubling of distance when traveling through air over a

hard surface and up to 7 or 8 dBA when traveling over a soft surface. These attenuation rates are general rules for total noise levels from a given source.

A roadway or railway is considered a line source because a motor vehicle or diesel engine moves from one point to another along a fixed linear route, and the receiver experiences noise from all points along the line. Noise from a line source typically attenuates at the rate of 3 dBA per doubling of distance based on a reference distance of 50 feet. Thus, traffic noise level of 65 dBA at a distance of 50 feet from a roadway would be 62 dBA at a distance of 100 feet from the roadway, and it would be 59 dBA at a distance of 200 feet from the roadway. The 3-dBA attenuation rate is used for noise traveling through the air or over a hard surface. Noise traveling over a soft surface, such as grass or other vegetation, may attenuate at a more rapid rate of approximately 4.5 dBA.

Vibration

Ground vibration is commonly viewed as the major concern for off-site damage to existing structures. The measurement of ground vibration is Peak Particle Velocity (PPV), which is the maximum speed (measured in inches per second or millimeters per second) at which a particle in the ground is moving relative to its inactive state. The U.S. Bureau of Mines and the Office of Surface Mining (OSM) have conducted extensive research over the last 40 years to develop acceptable vibration standards, vibration damage criteria, and techniques to predict and control blast vibrations that greatly reduce the risk of off-site impacts.

The OSM initially found that if PPV were limited to 1 inch per second, then 95 percent of the damage to surrounding houses and structures would be prevented. After more recent research, the PPV limit was changed to 0.5 inches per second to avoid off-site damage.

A PPV of 0.5 is generally equivalent to the vibration caused by a loaded truck or bus passing by 50 to 100 feet away. As a general rule, a person will begin to feel blast vibrations at levels as low as 0.02 inches per second. This is well below the level at which research has shown that damage may occur.

3.18.1.2 Methodology

Ambient Noise

In order to describe baseline noise conditions, ambient noise monitoring was performed in key areas throughout the West Range and East Range Sites, including areas of common use by residences. Descriptions of the noise monitoring locations (i.e., receptor locations) are detailed in subsequent paragraphs in this section under respective site-specific discussions.

MPCA guidelines for noise equipment calibration and monitoring procedures were followed in order to establish accuracy and consistency (MPCA, 1999). All monitoring was completed using a Type II, ANSI-approved noise level meter with calibration being performed before and after each monitoring cycle. A windscreen was also used to counter any wind effects and no monitoring was performed during times when winds greater than 15 miles per hour were measured or when precipitation was occurring.

The results of the ambient noise levels discussed in this section were used to predict traffic noise levels at chosen virtual receptor sites as a result of the Proposed Action. Virtual receptor sites refer to sites that were not included in the original ambient noise monitoring, but nonetheless, were modeled to describe future noise levels (i.e., no actual field measurements were taken at these locations). The virtual receptor locations and predicted noise levels are discussed in Section 4.18.

Guidelines and Regulations

Several agencies have noise regulations for different noise sources. Noise regulations are either source standards or receiver-based standards. The MPCA has a receiver-based standard intended to limit noise levels and protect the health and welfare of the general public. These standards were used for comparison in describing baseline noise conditions measured at each of the receptor locations.

The MPCA noise standards are grouped according to land activities by the noise area classification (NAC) system (MPCA, 1999). The NAC has four classes. NAC-1 includes household units, including farmhouses, as well as religious activities. NAC-2 applies to more commercial development, such as retail, businesses, government services, and parks. NAC-3 and NAC-4 are less stringent and are composed primarily of industrial uses. NAC-3 and NAC-4 were not used for this monitoring.

The MPCA guidelines, measured in dBA, are stipulated in the form of L_{10} and L_{50}. Simply stated, L_{10} means that the measured SPL (in dBA) must not exceed a certain threshold more than 10 percent of the time (for a 1-hour survey), and L_{50}, being a level that must not be exceeded more than 50 percent of the time (again, for a 1-hour survey). These thresholds for NAC-1 and NAC-2 are listed in Table 3.18-2 as SPL maximums by the MPCA.

Table 3.18-2. Noise Area Classification (NAC) Thresholds for NAC-1 and NAC-2

	NAC-1		NAC-2	
	L_{50}	L_{10}	L_{50}	L_{10}
Daytime (7:00 a.m. to 10:00 p.m.)	60 dBA	65 dBA	65 dBA	70 dBA
Nighttime (10:00 p.m. to 7:00 a.m.)	50 dBA	55 dBA	65 dBA	70 dBA

Source: MPCA, 1999

For this project, ambient monitoring at each location was performed for no less than one hour and during both times specified as “night” (i.e., 10:00 pm to 7:00 am) and “day” (7:00 am to 10:00 pm) by the MPCA classification.

Other agency noise guidelines that were reviewed include guidelines under the Federal Highway Administration (FHWA) and the Federal Rail Administration (FRA) for traffic- and rail-related noise, respectively. The FHWA does not provide actual noise standards, but has guidelines of an L_{10} of 70 dBA, which are used to trip a Federal funding mechanism for noise abatement on highway projects. The FRA provides noise impact criteria for railroad projects, which are dependent on land use categories as defined by the U.S. Department of Transportation (DOT). Further details on these agencies’ requirements are discussed in Section 4.18 as these were examined in relation to predicted noise levels as a result of the Proposed Action.

Investigations regarding noise ordinances at the West Range and East Range sites revealed little to no written local noise ordinances. In general, noise is dealt with on a complaint basis and is determined by general annoyance and disruption of the common peace. Discussions with local officials at both sites confirmed that the MPCA regulations should be used for noise monitoring and analysis (SEH et al., 2005 and SEH, 2005b).

3.18.2 Existing Noise Levels

As stated earlier, to establish and characterize the baseline noise environment, a noise monitoring program was developed and implemented. The program focused on potential noise-sensitive receptors in areas near proposed project activities in the West Range and East Range Sites. Noise sensitive receptors are defined as homes, schools, hospitals, etc., which are especially sensitive to high noise levels. The monitoring results and descriptions of the significant receptors are provided below.

3.18.2.1 West Range Site

Existing noise levels were monitored at five receptor locations near the proposed plant site, the railroad and roadways, or both. Monitoring events took place during the months of June and July 2005.

Results of the ambient noise monitoring during the daytime and nighttime for the West Range Site are provided in Table 3.18-3. It is presumed that noise levels that equaled or exceeded the MPCA noise thresholds occurred because of a receptor location's proximity to a major transportation corridor (i.e., CR 7).

Table 3.18-3. Existing Noise Levels at Ambient Noise Receptors for West Range Site

Receptor	Approximate Distance from nearest edge of Plant Footprint	Time of Monitoring	L_{10}	L_{50}	$L_{10\ dB}$ over State Compliance	$L_{50\ dB}$ over State Compliance
Receptor 1, Reclaimed County Landfill	1,700 ft south	9:15 am – 10:15 am	53 dBA	52 dBA	0 dB	0 dB
		10:04 pm – 11:04 pm	51dBA	49 dBA	0dB	0dB
Receptor 2, Residence Big Diamond Lake	3,900 ft southeast	3:15 pm – 4:15 pm	54 dBA	53 dBA	0 dB	0 dB
		11:15 pm – 12:16 am	50 dBA	49 dBA	0 dB	0 dB
Receptor 3, 31950 CR7	3,900 ft west	1:03 pm – 2:04 pm	59 dBA	55 dBA	0 dB	0 dB
		11:15 pm – 12:16 am	**59 dBA**	**55 dBA**	4 dB	0 dB
Receptor 4, 32423 CR7	4,400 ft west	2:30 pm – 3:30 pm	59 dBA	52 dBA	0 dB	0 dB
		11:45 pm – 12:45 pm	**56 dBA**	**53 dBA**	1 dB	3 dB
Receptor 5, Dunning Lake	4,100 ft southeast	4:00 pm – 5:00 pm	51 dBA	50 dBA	0 dB	0 dB
		correlated with Receptor 2	50 dBA	49 dBA	0 dB	0 dB

Values in bold indicate areas in which MPCA noise thresholds have been reached or exceeded.
Source: Noise Analysis, West Range Site; SEH et al., 2005

In general, results of the monitoring at the West Range Site indicate noise levels typical of townships and locales of this size and are below those of typical urban environments that are in close proximity to major transportation corridors. Since the setting surrounding the West Range Site can generally be described as a quiet, rural area with sparsely-spaced residential areas, any significant increases in noise levels could result in substantial acoustical impacts to surrounding receptors.

Receptor Location 1, Reclaimed County Landfill

Receptor 1 was the closest measurement point towards the proposed facility; however its proximity to CR 7 accounted for a small amount of traffic noise especially during the daytime monitoring event. The area where this receptor resides is within a reclaimed waste management sight. Although no residences are within this area, monitoring at this location was performed in an attempt to collect readings as close to the proposed facility as possible.

Ambient noise recorded during the daytime event consisted mainly of slight winds through the surrounding woods, and car and truck passes along CR 7. Ambient noise during the nighttime hours consisted mainly of insect noise, slight winds through the surrounding woods, and three cars passing along CR 7. Results from both monitoring events fall within the MPCA thresholds for acceptable noise daytime and nighttime criteria.

Receptor 2, Residence Big Diamond Lake

Receptor 2 was located along a cluster of residential and summer homes along the northern edge of Big Diamond Lake. These homes are situated along an undeveloped roadway with access off of CR 7 and proceeding east north of Big Diamond Lake. The roadway itself consists of dirt and red clay and is, at times, difficult to navigate without a four-wheel drive vehicle.

Daytime ambient noise consisted of slight winds through the surrounding woods, some slight traffic along the adjacent roadway and insect noise. Since winds were calm and there was no traffic along the adjacent roadway, ambient noise during the nighttime event almost exclusively consisted of insect noise. Results from both monitoring events fall within the MPCA thresholds for acceptable noise for daytime and nighttime criteria.

Receptor 3, 31950 CR 7

Receptor 3 was located at 31950 Scenic CR 7 and was within the property of a medium-sized residential home with a small hobby farm attached. The residents run a small tourist-orientated horse-riding business.

Traffic during the daytime monitoring event was consistent with car passes 2 to 3 times per minute, and cement trucks proceeding south and exiting CR 7 and proceeding south along CR 7. The cement trucks were counted traveling both north and south (presumed laden and then empty) at a consistent rate of two passes every 2 to 3 minutes for a large part of the daytime monitoring event. These cement trucks were also observed traveling at a relatively high rate of speed, which also heightened pavement noise. Noise levels during the nighttime monitoring event were equal to or exceeded MPCA noise thresholds presumably due to their proximity to CR 7.

Receptor 4, 32423 Scenic Highway 7

Receptor 4 was located along CR 7 near a residential area. Traffic-related noise along CR 7 was the predominant noise source during times of monitoring. Noise levels during the nighttime monitoring event exceeded MPCA noise thresholds presumably due to their proximity to CR 7.

Receptor Location 5, Dunning Lake

Receptor 5 was located along the southern end on North Dunning Lake and represented one residential location and the location of future potential residential expansion. Because of its remote location and the fact that there was a locked and gated roadway, no nighttime measurements were made (i.e., after 10:00 pm). Nighttime measurements are therefore correlated with the nearest receptor, Receptor 2.

The results of the daytime monitoring event fall within the MPCA thresholds for acceptable noise for daytime criteria.

3.18.2.2 East Range Site

Existing noise levels were monitored at four receptor locations throughout the East Range Site and within areas of common use by residences. These areas included one residential location and three locations surrounding the proposed plant site. Monitoring events took place during the month of July 2005. Results of the ambient noise monitoring during the daytime and nighttime for the East Range Site are provided in Table 3.18-4.

In general, Hoyt Lakes and the surrounding areas are in relatively quiet places. During daytime hours there is little to no manufacturing noise other than from the Laskin power plant across Colby Lake. There are limited traffic passes along Kennedy Memorial Drive proceeding through town and very few school related noise sources such as buses and playgrounds.

The preponderance of noise observed during daytime monitoring events related to lawn mowers in the distance, a small amount of light plane passes overhead, and distant noise from the Laskin power plant when in the vicinity of Colby Lake. Nighttime monitoring events were equally quiet with readings 1-2 decibels lower than daytime readings in most instances. Daytime and nighttime noise levels fluctuated slightly due to insect noise during evening events, and higher traffic and wind noise generated during the day.

Table 3.18-4. Existing Noise Levels at Ambient Noise Receptors for East Range Site

Receptor	Approximate Distance from nearest edge of Plant Footprint	Time of Monitoring	L_{10}	L_{50}	$L_{10\ dB}$ over State Compliance	$L_{50\ dB}$ over State Compliance
Receptor 1, Access Road Southeast of Plant	800 ft northwest	8:23 a.m.–9:23 a.m.	50 dBA	50 dBA	0 dB	0 dB
		10:12 a.m.–11:13 p.m.	49 dBA	49 dBA	0 dB	0 dB

Table 3.18-4. Existing Noise Levels at Ambient Noise Receptors for East Range Site

Receptor	Approximate Distance from nearest edge of Plant Footprint	Time of Monitoring	L_{10}	L_{50}	$L_{10\ dB}$ over State Compliance	$L_{50\ dB}$ over State Compliance
Receptor 2, Boat Landing and Park	9,200 ft southwest	9:50 a.m.–10:50 a.m.	52 dBA	51 dBA	0 dB	0 dB
		11: 30 p.m.–12:30 a.m.	50 dBA	49 dBA	0 dB	0 dB
Receptor 3, Colby Ridge Development	8,300 ft southwest	10:23 a.m.–11:23 a.m.	53 dBA	51 dBA	0 dB	0 dB
		12:40 a.m.–1:40 a.m.	50 dBA	49 dBA	0 dB	0 dB
Receptor 4, 321 Kent St, Hoyt Lakes, MN	11,500 ft south	12:30 p.m.–1:30 p.m.	52 dBA	50 dBA	0 dB	0 dB
		1:45 a.m.–2:45 a.m.	49 dBA	48 dBA	0 dB	0 dB

Source: Noise Analysis, West Range Site, SEH et al., 2005

Receptor Location 1, Access Road Southeast of Plant

Receptor 1 was the closest measurement point from the East Range Site. This location is fairly remote residing on an old township highway (6401) with no throughway.

Daytime monitoring conditions were calm with light cloud cover and variable winds. Any slight noise that was collected by the sound level meter during daytime hours was from leaves rustling through the trees and one small plane pass. Ambient noise during the nighttime hours consisted mainly of insect noise and slight winds through the surrounding woods. Results from both monitoring events fall within the MPCA thresholds for acceptable daytime and nighttime noise criteria.

Receptor Location 2, Boat Landing and Park

Receptor 2 was located along a public boat landing and city park. The sound level meter was placed near the waters edge and away from the park users.

There was no traffic entering and exiting the park. Daytime ambient noise consisted of slight winds through the surrounding woods, some slight boating traffic, and water noise. Ambient noise during the nighttime event consisted of insect noise and slight wind noise (leaves rustling). Results from both monitoring events fall within the MPCA thresholds for acceptable daytime and nighttime noise criteria.

Receptor Location 3, Colby Ridge Developments, Pospeck Lane

Receptor 3 was within a newly developed area along the southern end of Colby Lake on Pospeck Lane, adjacent the property of a medium sized residential lake home and 50 ft from the waters edge. The existing Laskin plant across the lake was a continual source of noise.

Results from both monitoring events fall within the MPCA thresholds for acceptable daytime and nighttime noise criteria.

Receptor Location 4, 321 Kent St, Hoyt Lakes

Receptor 4 was located within the southeastern neighborhoods of Hoyt Lakes, directly south of the proposed plant site.

Both daytime and nighttime monitoring sessions were quiet with the occasional car passing though the neighborhood. Additionally, during daytime monitoring, lawn mower noise was slightly evident in the distance. Results from both monitoring events fall within the MPCA thresholds for acceptable daytime and nighttime noise criteria.

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