

4.3 ENVIRONMENTAL IMPACTS

4.3.1 Air Quality

This section documents the potential air quality impacts associated with the proposed project. The purpose of the analysis is to estimate the future air quality conditions in the project area with the proposed project, identify potential regional and local air quality impacts and potential mitigation, and address conformity with regional air quality implementation plans.

Existing Conditions

The discussion of existing conditions includes a listing of the relevant pollutants, the National Ambient Air Quality Standards (NAAQS), the applicable regulations, and a description of the level of maintenance in the Twin Cities region.

Relevant Pollutants

Motor vehicles emit a variety of pollutants including carbon monoxide (CO), nitrogen oxides (NO_x), particulate matter with a diameter of 10 microns or less (PM₁₀), and volatile organic compounds (VOCs). Another pollutant, ozone (O₃), is not a direct emission from automobiles (or other sources), but is formed in the atmosphere by chemical reactions involving hydrocarbons (HCs) and nitrogen oxides. CO is a pollutant of local concern with the highest concentrations generally occurring near heavily congested roadway intersections. O₃ problems tend to be regional in nature because the chemical reactions that produce O₃ occur over time.

Ambient Air Quality Standards

Under the authority of the Clean Air Act, U. S. Environmental Protection Agency (EPA) established a set of National Ambient Air Quality Standards (NAAQS) for various “criteria” air pollutants. These standards are intended to protect the public health and welfare. Primary NAAQS are established at levels intended to protect the public health, including sensitive population groups, with an adequate margin of safety. Secondary NAAQS are set at levels designed to protect the public welfare by accounting for the effects of air pollution on vegetation, soil, materials, and other aspects of the general welfare. States can develop ambient air quality standards provided that they are at least as stringent as the National standards. Table 4.3.1-1 presents the NAAQS and the Minnesota Ambient Air Quality Standards (MAAQS) which are similar to the NAAQS. Compliance with these standards must be achieved by any project to be constructed in the State of Minnesota.

Impacts

No Build Alternative

The No Build Alternative will have no impact on the air quality in the region.



Build Alternative

TABLE 4.3.1-1: NATIONAL AND MINNESOTA AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Period	National Ambient Air Quality Standards ^a		Minnesota Ambient Air Quality Standards ^a	
		Primary	Secondary	Primary	Secondary
NO ₂	Annual arithmetic mean	0.053 ppm ^b (100 µg/m ³) ^c	Same as primary.	0.053 ppm ^b (100 µg/m ³) ^c	Same as primary.
O ₃ ^d	1-Hour average	0.12 ppm (235 µg/m ³) ^e	Same as primary.	0.12 ppm (235 µg/m ³)	Same as primary.
CO	8-Hour average	9 ppm (10 mg/m ³) ^g	No standard. ^f	9 ppm (10 mg/m ³)	9 ppm (10 mg/m ³)
	1-Hour average	35 ppm (40 mg/m ³)	No standard. ^f	30 ppm (35 mg/m ³)	30 ppm (35 mg/m ³)
PM10 ^d	Annual arithmetic mean	50 µg/m ³ ^h	Same as primary.	50 µg/m ³	Same as primary.
	24-hour average	150 µg/m ³ ^h	Same as primary.	150 µg/m ³	Same as primary.
TSP	Annual geometric mean	No standard. ^f	No standard. ^f	75 µg/m ³	60 µg/m ³
	24-Hour average	No standard. ^f	No standard. ^f	260 µg/m ³	150 µg/m ³
SO ₂	Annual arithmetic mean	80 µg/m ³ (0.03 ppm)	Same as primary.	80 µg/m ³ (0.03 ppm)	60 µg/m ³ (0.02 ppm)
	24-Hour average	365 µg/m ³ (0.14 ppm) ⁱ	Same as primary.	365 µg/m ³ (0.14 ppm)	Same as primary.
	3-Hour Average	No standard.	1,300 µg/m ³ (0.5 ppm)	1,300 µg/m ³ (0.5 ppm)	1300 µg/m ³ (0.5 ppm) ^j
	1-Hour Average	No standard.	No standard.	1,300 µg/m ³ (0.5 ppm)	No standard.
Lead	Quarterly mean	1.5 µg/m ³	Same as primary.	1.5 µg/m ³	Same as primary.

Notes:

- a Short-term standards (1 to 24 hours) are not to be exceeded more than once per calendar year.
- b ppm: parts per million.
- c µg/m³: micrograms per cubic meter.
- d In 1997, EPA promulgated new NAAQS for O₃ (8-hour average) and particulate matter of 2.5 microns diameter or smaller (PM_{2.5}). Minnesota promulgated similar standards. These standards are subject to continuing judicial challenges. In May 1999, the U.S. Court of Appeals for the District of Columbia Circuit invalidated portions of the rules establishing these new standards. However, in February 2001, the Supreme Court overruled the Circuit Court's decision on a number of grounds and remanded the case back to the Circuit Court for further proceedings. In the interim, the new standards have not been vacated but also are not being implemented. EPA has not designated areas in attainment or nonattainment of the new standards.
- e Maximum daily 1-hour average. The O₃ standard is attained when the expected number of days with maximum hourly average concentrations above the value of the standard, averaged over a three-year period, is less than or equal to one.
- f Former national secondary standards for CO, and former national primary and secondary standards for TSP, have been repealed.
- g mg/m³: milligrams per cubic meter.
- h The PM₁₀ standard is attained when the expected number of days with maximum average concentrations above the value of the standard, averaged over a three-year period, is less than or equal to one.
- i National standards are block averages rather than moving averages.
- j Minnesota secondary standard for SO₂ (Sulfur Dioxide) varies by region. Value of 1,300 µg/m³ applies to the Minneapolis-Saint Paul Intrastate Air Quality Control Region (AQCR number 131) including the project.

Not shown: Minnesota standards for hydrogen sulfide (H₂S). Transportation sources do not emit significant amounts of H₂S, and therefore H₂S is not assessed in the EA.

Sources: National – 40 CFR 50, Section 121; Minnesota – Minnesota Rules, Part 7009.0080.

Air Quality Regulations and Planning

Public awareness of the effects of air pollution has increased noticeably in recent years. This concern resulted in the passage of the Federal Clean Air Act of 1970, as amended in 1977 and 1990. These statutes are the basis for most federal air pollution control programs. The Minnesota State Implementation Plan (SIP), developed under the Clean Air Act, as amended, contains the major state-level requirements with respect to the proposed project.

Air quality is regulated nationally by the EPA under the Clean Air Act. The EPA delegates authority to the Minnesota Pollution Control Agency (MPCA) for monitoring and enforcing air quality regulations in Minnesota. The MPCA is responsible for preparing the SIP and submitting it to the EPA for approval. The project is within the geographic jurisdiction of the Twin Cities Metropolitan Council, which has responsibilities related to transportation and air quality planning in the Twin Cities region. Because the Twin Cities region has been designated maintenance for CO, regionally significant transportation plans and projects in the region must conform to the SIP.

Air Quality Analysis

The proposed Union Depot project is not regionally significant because it primarily involves rerouting of existing transit vehicles in Saint Paul. In addition, 40 CFR 93.126 identifies reconstruction of transit terminals as exempted from regional air quality conformity analyses, and 40 CFR 93.127 identifies bus transfer terminals as exempt. Therefore, the project is not required to conduct a regional analysis, nor a localized hot spot carbon monoxide intersection analysis. The impact to localized air quality would be minimal as demonstrated by the lack of need for any mitigation measures in the Section 4.2.1, Traffic, of this EA.

The Indirect Source Permit (ISP) rule 7023.9010 was terminated in 2001, therefore an ISP is not required for the project.

The EPA has approved a screening method to determine which intersections need analysis for potential hot spot air quality impacts. The screening analysis consists of two criteria. If either criterion is met, then an intersection analysis would be required.

The first criterion is to check if the total daily approach volume of the project area exceeds 77,200 Average Daily Traffic (ADT). If it does, then an analysis would be required. For this project, the total daily approach volume is the combined ADT for Kellogg Boulevard at Sibley Street. The 2006 ADT on Kellogg Boulevard was 13,900, and the 2006 ADT on Sibley Street was 7,700, for a combined total of 21,600. This volume is well below the 77,200 threshold and, with anticipated growth in the area, would remain well below the threshold; therefore, the project volume does not meet the first criterion.

The second criterion compares the project location to the locations of ten intersections that the MPCA has identified as having the highest volumes in the metro area. If any of these ten intersections were affected by this proposed project, then analysis would be required. The nearest of these intersections is approximately three miles away, at the intersection of Lexington



and University Avenues, and would not be impacted by the proposed project; therefore, the second criterion is not met. No hot spot analysis is needed.

Mitigation Measures

No mitigation is required.

4.3.2 Energy

Impacts

No Build Alternative

Under the no-build alternative, there would be no change in energy use.

Build Alternative

The project is expected to have a relatively small net benefit in energy usage.

Reuse of the existing Union Depot including the concourse, waiting room and elevated rail yard foregoes the energy that would be required to demolish the existing structure and the energy that would be required to build a new structure.

The Union Depot multi-modal transit hub would provide improved transit connectivity and mobility for area residents and intercity travelers. This improved transit mobility could result in reduced dependence on private motor vehicles, potentially fewer vehicle miles of travel, and a reduction in motor vehicle fuel use.

Mitigation Measures

No mitigation is required.

4.3.3 Noise

The noise assessment for Minnesota's Union Depot Multi-Modal Transit Hub includes an evaluation of the existing noise and vibration levels in the areas surrounding the proposed station. A noise and vibration measurement program was undertaken to characterize the existing noise environment in the vicinity of the current Union Depot. The full report on noise and vibration can be found in Appendix G.

Noise is "unwanted sound" and, by this very definition, the perception of noise is a subjective process. Several factors affect the actual level and quality of sound (or noise) as perceived by the human ear and can generally be described in terms of loudness, pitch (or frequency), and time variation.

Loudness. The loudness, or magnitude, of noise determines its intensity and is measured in decibels (dB). The noise decibel is used to describe a large range of sound levels. For example, ambient noise ranges from 40 dB from the rustling of leaves, to over 70 dB from a truck passby, to over 100 dB from a rock concert.

Pitch. Pitch describes the character and frequency content of noise. Measured in Hertz (Hz), frequency is typically used to identify the annoying characteristics of noise and

thereby identify the proper mitigation to help eliminate or minimize its magnitude. The human ear is typically sensitive to noise frequencies between 20 Hz (low-pitched noise) and 20,000 Hz (high-pitched noise). For example, noise may range from very low-pitched “rumbling” noise from stereo sub-woofers, to mid-range traffic noise, to very high-pitched whistle noise.

Time Variation. The time variation of some noise sources can be characterized as continuous, such as a building ventilation fan, intermittent, such as for a train passby, or impulsive, like a car backfire.

Legal and Regulatory Requirements

Operational Noise

Operational criteria are used to assess noise impacts from the project alternatives when they are fully operational. These criteria are, therefore, typically evaluated against the project operations that occur in the design year.

- **Federal Noise Guidelines**

For the Union Depot Environmental Assessment, the most current federal noise guidelines are used in the analysis of potential noise impacts. The most current federal guidelines are the Federal Transit Administration's (FTA) *Transit Noise and Vibration Impact Assessment* guidance manual (FTA-VA-90-1003-06, May 2006). The FTA manual presents the basic concepts, methods, and procedures for evaluating the extent and severity of noise impacts from transit projects. Transit noise impacts are assessed based on land use categories and sensitivity to noise from transit sources under the FTA guidelines. The FTA noise impact criteria are defined by two curves that allow increasing project noise levels as existing noise increases up to a point, beyond which impact is determined based on project noise alone. The FTA land use categories and required noise metric is described in Table 4.3.3-1.

TABLE 4.3.3-1 FTA LAND USE CATEGORIES AND NOISE LEVELS

Land Use Category	Noise Level	Description
1	$L_{EQ}(h)$	Tracts of land where quiet is an essential element in their intended purpose. Included are uses such as concert pavilions, Nation Historic Landmarks with significant outdoor use, recording studios, and concert halls.
2	L_{DN}	Residences and buildings where people normally sleep. This category includes homes, hospitals and hotels.
3	$L_{EQ}(h)$	Institutional land uses with primarily daytime and evening uses. This includes schools, libraries, churches, museums, cemeteries, historic sites, and parks, and certain recreational facilities used for study or meditation.

Source: Transit Noise and Vibration Impact Assessment –Federal Transit Administration, Washington, D.C., May 2006.

The FTA noise criteria are delineated into two categories: moderate impact and severe impact. The moderate impact threshold defines areas where the change in noise is noticeable but may not be sufficient to cause a strong, adverse community reaction. The



severe impact threshold defines the noise limits above which a significant percentage of the population would be highly annoyed by new noise. The level of impact at any specific site can be established by comparing the predicted project noise level at the site to the existing noise level at the site.

- Minnesota Department of Transportation Criteria**

Mn/DOT does not utilize any additional rail noise standards, other than the FTA criteria discussed previously. However, although the Union Depot project is primarily a transit project, the multi-modal transit hub could also have an effect on the noise generated by local traffic in the area. This would be primarily due to changes in bus routes and USPS delivery truck operations. Mn/DOT’s Highway Planning and Development Process (HPDP) Handbook specifies various guidelines and regulations for highway projects (HPDP Handbook, Part II, Section D, Subject Guidance: Noise, September 11, 2007).

The HPDP Guide makes use of the standard Federal Highway Administration (FHWA) criteria which are set forth in 23 CFR Part 772 “Procedures for Abatement of Highway Traffic Noise and Construction Noise” (July 1982; revised August 1997), and “Highway Traffic Noise Guidance and Abatement ”(June 1995). These documents specify Noise Abatement Criteria (NAC) for particular categories of land use, as shown in Table 4.3.3-2. Mn/DOT also publishes documents which provide guidance for projects which may be exempt from the FHWA criteria (“Noise Analysis/Noise Exemption: Tech Memo 03-12-ENV-01”, December 5, 2003 and “Guidance for Local, Federal Aid Projects Exempt from State Noise Standards”, January 1, 2003).

TABLE 4.3.3-2 FHWA NOISE ABATEMENT CRITERIA

Activity Category	$L_{EQ}(h)^1$	Description
A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries and hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above
D	-	Undeveloped lands
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals and auditoriums.

- Minnesota Pollution Control Agency Criteria**

The Minnesota Pollution Control Agency (MPCA) has established Noise Rules and Statutes which specify noise limits in Minnesota Rules Chapter 7030 (Revised 3/99). The standards are consistent with speech, sleep, annoyance, and hearing conservation requirements for receivers within areas grouped according to land activities by the noise area classification (NAC) system and are shown in Table 4.3.3-3.

TABLE 4.3.3-3 MINNESOTA NOISE POLLUTION CONTROL RULES – NOISE STANDARDS (7030.0040)

Noise Area Classification	Daytime Limit (dBA)		Nighttime Limit (dBA)	
	L50	L10	L50	L10
1	60	65	50	55
2	65	70	65	70
3	75	80	75	80

Daytime hours 7 AM to 10 PM; nighttime hours 10 PM to 7 AM; L10 is the level exceeded 10 percent of the time during a 1 hour survey; L50 is the level exceeded 50 percent of the time during a 1 hour survey.

NAC 1: Household Units, Hotels, Medical, Educational, Religious, Cultural; NAC 2: Railroad terminals, rapid transit, bus terminals, airport, automobile parking, retail trade, wholesale trade; NAC 3: Manufacturing, rail and motor vehicle transportation (except terminals), highway and street right-of-way.

Source: Minnesota Code 7030.0040

- **City of Saint Paul Criteria**

The City of Saint Paul includes noise regulations in chapter 293 of the city code. Section 293.07 includes a table showing “noise source limitations”. These criteria are shown in Table 4.3.3-4.

TABLE 4.3.3-4 CITY OF SAINT PAUL NOISE SOURCE LIMITATIONS

Land Use Classification	Time	Sound Level Limit (One hour L10)
I-1, I-2 and I-3	All times	80 dBA
R-1 through R-4, RT-1, RT-2	7 AM to 10 PM	65 dBA
RM-1 through RM-3, P-1 and PD	10 PM to 7 AM	55 dBA
B-1 through B-5, B-2C and OS-1	All times	70 dBA
Construction Noise	All times	85 dBA @ 50 feet*

I-1 Industrial; R1- One Family; RM-1 Low Density Multiple Family; B1 – Local Business District; RT-1 Tow Family; RM-3 Multiple Family High Rise ; measured at the point of “human activity”

*Domestic power tools when used between the hours of 7 am and 10 pm are exempted

Source: Saint Paul Code 293.07

Existing Conditions

Measured Noise Levels

A field monitoring program was undertaken in October 2007 to characterize and quantify the existing noise environment in the vicinity of the Union Depot and along associated bus routes in the immediate area. Noise levels were measured using a CEL Instruments Model 593 environmental noise monitor. This meter meets the requirements set forth in the ANSI S1.4-1983 standards for Type I quality and accuracy. During the measurement program, the meter was calibrated using a CEL 110/1 acoustic calibrator.

A total of 12 measurement sites were selected to be representative of the neighborhoods near the station and associated bus routes. Several of the sites are representative of FTA Category 2 receptors, such as the Great Northern Warehouse lofts and apartments at Kellogg and Wall (Location 5), or the Union Depot residences on Fourth Street (Location 3). However, the majority of the land use in the area is more typical of FTA Category 3 receptors, or represents commercial land use which FTA does not recognize for impact mitigation. This includes



locations such as Depot Bar (Location 1), Mears Park on Fifth and Wacouta (Location 9), the USPS facility (Location 2), and the western edge of the Bruce Vento Nature Sanctuary (Location 12). The general location of the sites is shown in Figure 4.3.3-1.

The measured levels at the sites are shown in Table 4.3.3-5. To be consistent with FTA methodology, measurements collected at the Category 2 sites included sufficient data to calculate L_{DN} levels by using three short-term measurements collected during midday, peak hour, and nighttime. The table also shows the FTA land use category, as previously introduced in Table 4.3.3-1, the date of the measurement, and the time (for Category 3 sites - Category 2 sites use the 24-hour L_{DN} metric). The table also shows the category of land use according to FHWA, MPCA, and Saint Paul criteria. Since the MPCA and Saint Paul criteria are stated using L_{10} levels, these noise levels are also shown in the table. Figures 4.3.3-2 and 4.3.3-3 show the measured levels compared to the FHWA/MnDOT and MPCA/ Saint Paul City criteria, respectively. The FTA criteria are not shown since they are different for each location; they are discussed in the Impacts portion of this section.

TABLE 4.3.3-5 SUMMARY OF NOISE MEASUREMENTS

Number	Description	Date	Time	FTA Category	Measured Noise Level
1	Kellogg and Wacouta (Depot Bar)	23-Oct-07	16:12	3	71 L_{EQ}
2	Kellogg and Sibley (USPS Office)	22-Oct-07	16:25	3	69 L_{EQ}
3	220 Fourth (Depot Courtyard)	24-Oct-07	-	2	61 L_{DN}
4	End of Broadway Parking Area	23-Oct-07	18:43	3	68 L_{EQ}
5	290 Kellogg (Great Northern Apts.)	24-Oct-07	-	2	73 L_{DN}
6	Kellogg and Jackson	22-Oct-07	17:30	3	67 L_{EQ}
7	357 Kellogg (Charter School Admin)	23-Oct-07	9:01	3	70 L_{EQ}
8	Sibley and Fifth (Condo Tower)	23-Oct-07	8:03	3	70 L_{EQ}
9	Wacouta and Fifth (Mears Park)	23-Oct-07	7:34	3	66 L_{EQ}
10	Prince and Broadway (Zen Center)	25-Oct-07	-	2	68 L_{DN}
11	Broadway and Prince (Artists Co-op)	25-Oct-07	-	2	65 L_{DN}
12	530 Fourth (Bruce Vento Sanctuary)	23-Oct-07	14:13	2	69 L_{EQ}

Based on the data, the general area is not very quiet, which is typical for a dense urban area. In particular, there is bus and truck traffic during much of the day which accounts for the relatively high L_{EQ} and L_{DN} levels. Even late at night, truck activity is quite prominent on Kellogg Boulevard. All of the L_{EQ} levels are between 67-71 dBA and most of the L_{DN} levels are between 65-73 dBA. The L_{DN} level at Location 3 (Depot Courtyard - just north of the head house) was distinctly quieter at 61 dBA. This was because there is relatively light traffic on this block of Fourth Street. The location at Bruce Vento Nature Sanctuary measured 69 dBA, which was quite loud due to the proximity of major highway bridges (MN-52 and I-94), a freight rail line, and a nearby airport.

When comparing the measurement results to the FHWA/MnDOT criteria shown in Figure 4.3.3-2, it can be seen that two of the four Category B locations exceed FHWA/MnDOT criteria, and that none of the Category C locations exceed these criteria. In Figure 4.3.3-3, two of the

four Category 1 locations exceed MPCA/Saint Paul City criteria, and that four of the eight Category 2 locations exceed the criteria.

Impacts

Noise Assessment based on Federal Transit Administration Methodology

Although potential noise sources in an urban environment are numerous, the proposed project is not expected to influence any sources other than primarily the buses and rail vehicles using the Union Depot and, secondarily, traffic patterns in the vicinity of the station.

The primary noise sources directly affecting the station area consist of:

- Local Buses
- Intercity Buses
- Light rail vehicles
- Amtrak passenger trains

The levels used for each of these sources are the same as those recommended by the FTA methodology and are shown in Table 4.3.3-6. Although the FTA prefers measurements to be used for the LRT, the Central Corridor LRT is currently under preliminary engineering and its impacts will be studied separately as part of the project's development of its own Supplemental Draft Environmental Impact Statement.

TABLE 4.3.3-6 REFERENCE SOURCE NOISE LEVELS FOR RAIL VEHICLES AND BUSES AT 50 FEET

Description	FTA Type	Reference SEL
Amtrak Locomotive	Locomotive Diesel	92 dBA
Amtrak Passenger Car	Rail Car	82 dBA
Mn/DOT LRT	Rail Transit	82 dBA
City Bus	Two-axle Buses	84 dBA
Intercity Bus	Three-axle Buses	88 dBA
Amtrak Loco Idling	Locomotive Idling	116 dBA
LRT Idling	Rail Transit Idling	106 dBA
Idling Bus	Buses Idling	111 dBA

Source: Transit Noise and Vibration Impact Assessment –Federal Transit Administration, Washington, D.C., May 2006.

The project area is comprised of a mixture of commercial and residential high-rise buildings. The study identified 29 commercial properties and 20 residential properties which were evaluated for noise exposure levels contributed by the project. Noise level calculations were performed at each of the 49 identified receptors. The noise sources used for these calculations include all the rail operations and bus operations directly associated with the Union Depot multi-modal transit hub.

The calculated noise levels were then compared to the established criteria for Moderate and Severe Impact, which were derived from the measured project levels discussed in Appendix G. The criteria tend to be greater for locations in areas with more noise, such as those adjacent to



Kellogg Boulevard. The Union Depot Courtyard residences on Fourth Street had the lowest background levels in the project area, and therefore, the lowest criteria.

The results of the noise impact analysis indicate that out of the 49 analyzed receptors, no impacts were found. Location R101B, on the south side of the Union Depot head house had a calculated Ldn level which was equal to the FTA Criterion at 65 dBA. In the calculated level, the dominant noise at this location would be from buses idling. However, because of the relatively high background noise from traffic on Kellogg Boulevard, the noise from the idling buses would not be sufficient to cause an impact condition, according to FTA criteria.

Noise Assessment based on Federal Highway Administration Methodology

The Union Depot is located in a dense urban area which is dominated by local traffic, including local buses and heavy trucks. The project could affect the future pattern of the local traffic. In particular, some of the local bus routes may change. Although the USPS processing facility and its associated traffic will also change due to relocation of the facility, this condition would be equally true for the No-Build Alternative as well as the Build Alternative. Therefore an analysis was performed to determine only the effect of these bus traffic pattern changes on the noise levels in the area.

Using the FHWA-approved Traffic Noise Model (TNM), noise levels were calculated at several receptors in the project area for the No-Build and Build conditions. The calculated noise levels were compared, and the receptors were evaluated for noise impacts. Much of the area is currently above the FHWA criterion and the MPCA and City of Saint Paul criteria for noise limits. Therefore, the results of the FHWA analysis can only serve to indicate if there might be an increase in noise exposure for certain receptors.

The Union Depot project will modify several existing bus routes that currently travel along Fifth and Sixth Streets by routing them into the Union Depot. These buses will access the Union Depot Station using Broadway Street. Currently, the USPS operates a mail processing facility at the Union Depot site that induces frequent truck trips to and from the area. *The frequent truck traffic induced by the USPS facility is a significant contribution to the existing noise exposure, particularly during the late-night and early-morning hours. This effect is greatest on the streets adjacent to the USPS facility, notably East Kellogg Boulevard and Broadway Street.*

Broadway Street currently has bus service. Under future conditions additional buses will be using Broadway Street to rejoin their existing routes. Under future conditions when the existing USPS facility relocates, USPS-induced truck traffic on East Kellogg Boulevard and Broadway Street will discontinue. A similar number of bus trips, as compared with the existing USPS truck trips, are likely to occur on Broadway Street during the daytime. Therefore, the overall sound level along Broadway Street due to street traffic is expected to be similar during the day and early evening periods. Under future conditions, a notable benefit is likely to occur during the late-evening and early-morning hours when the USPS truck traffic is discontinued and bus traffic subsides. Currently, the late night and early morning USPS-induced truck traffic is the most significant noise source on the local streets and dominates the local noise exposure. The Union Depot is not expected to have substantial operations during the late night and early morning

hours. In addition, the current number of bus operations on Fifth and Sixth Streets is not expected to increase in the future, except that the buses will be routed down Wall Street into the Union Depot. As a result, the traffic noise on Fifth and Sixth Streets is not expected to change.

Mitigation Measures

Although the results of the noise assessment indicate that the project will produce no noise impacts, the use of noise mitigation may still be considered. This is particularly true for residents living in the south section of the Union Depot condominiums, where the calculated noise level was equal to the FTA limiting criterion. Table 4.3.3-7 shows the calculated noise levels for each source at Location R101B, which is situated at the south façade of the Union Depot head house.

TABLE 4.3.3-7 NOISE LEVELS AT RECEPTOR R101B (SOUTH SIDE OF HEAD HOUSE) BY SOURCE

Noise Source	L _{DN} Level
Amtrak	43 dBA
LRT	59 dBA
Local Buses	54 dBA
Intercity Buses	37 dBA
Idling Buses	63 dBA
Total Noise	65 dBA
Noise Impact Limit	65 dBA

Limit Bus Idling Time – It can be seen from the table that the major contributor to the noise level at this receptor is due to the idling buses. The table also shows that the location is 3 dBA above the criterion of 64 dBA. If the bus idling time is reduced to about half the assumed time of 20 seconds per bus, the total noise level at this receptor would decrease by about 3 dBA. Therefore, limiting the idling time of the buses at the station would provide mitigation of the noise impact. This would be particularly true at night, when residents might be more annoyed by the noise level from idling buses.

Building Insulation – Since the Depot Square apartments are so close to the station, the only practical noise mitigation measure may be to provide sound insulation for the building. The most effective treatments are to caulk and seal gaps in the building envelope and to use windows that are especially designed to meet acoustical transmission-loss requirements. Additional building sound insulation, if needed, can be provided by sealing vents and ventilation openings and relocating them to a side of the building away from the noise source.

4.3.4 Vibration

The noise assessment for Minnesota’s Union Depot Multi-Modal Transit Hub includes an evaluation of the existing noise and vibration levels in the areas surrounding the proposed station. A noise and vibration measurement program was undertaken to characterize the existing noise environment in the vicinity of the current Union Depot. The full report on noise and vibration can be found in Appendix G.



Describing Vibration

Ground-borne vibration associated with vehicle movements is usually the result of uneven interactions between the wheel and the road or rail surfaces. Examples of such interactions (and subsequent vibrations) include train wheels over a jointed rail, railcar wheel with “flats”, and motor vehicle wheels hitting a pothole or manhole cover.

Unlike noise, which travels in air, transit vibration typically travels along the surface of the ground. Depending on the geological properties of the surrounding ground and the type of building structure exposed to transit vibration, vibration propagation may be more or less efficient. Buildings with a solid foundation set in bedrock are “coupled” more efficiently to the surrounding ground and experience relatively higher vibration levels than those buildings located in sandier soil.

Similarly, ground-borne noise results from vibrating room surfaces located near a heavily traveled transit corridor, such as a subway line. Consequently, annoyance resulting from the “rumbling” sound of ground-borne noise is only evaluated indoors and is described using the A-weighted decibel.

Vibration Level Metrics

Vibration induced by vehicle passbys is generally discussed in terms of displacement, velocity, or acceleration. However, human responses to vibration are typically best described with velocity. Therefore, the vibration velocity level is used to assess vibration impacts.

Legal and Regulatory Requirements

Vibration Evaluation Criteria

Federal Criteria

The FTA vibration criteria for evaluating ground borne vibration (and noise) impacts from train passbys at nearby sensitive receptors are shown in Table 4.3.3-8. These vibration criteria are related to ground borne vibration levels that are expected to result in human annoyance, and are based on root mean square (RMS) velocity levels expressed in decibels (VdB). The FTA's experience with community response to ground borne vibration indicates that when there are only a few train events per day, it would take higher vibration levels to evoke the same community response that would be expected from more frequent events. This is taken into account in the FTA criteria by distinguishing between projects with frequent and infrequent events, where the frequent events category is defined as more than 70 events per day. The vibration criteria levels shown in Table 4.3.3-9 are defined in terms of human annoyance for different land use categories such as high sensitivity (Category 1), residential (Category 2), and institutional (Category 3). In general, the vibration threshold of human perceptibility is roughly 65 VdB.

The vibration levels shown in Table 4.3.4-1 are well below the damage criteria levels of approximately 95 to 100 VdB. It is extremely rare for vibration from train operations to cause any sort of building damage, including minor cosmetic damage.

TABLE 4.3.4-1 SUMMARY OF VIBRATION MEASUREMENT RESULTS

Number	Description	FTA Category	Measured Vibration Level (VdB)
1V	225 Kellogg (Under Bridge)	3	82
4V	USPS Parking Lot - Truck Source	3	57
4V	USPS Parking Lot - Locomotive Source	3	82

While vibration criteria are generally used to assess annoyance from transit sources at the exterior facade of receptors, ground borne noise, or the rumbling sound due to vibrating room surfaces, is typically assessed indoors. In general, the relationship between vibration and ground borne noise depends on the dominant frequency of the vibration and the acoustical absorption characteristics of the receiving room. Typical soil conditions were assumed everywhere along the corridor for computing ground-borne noise.

Impacts

Vibration Measurements

Vibration measurements were conducted close to noise measurement locations 1 and 4. These locations are shown in Figure 4.3.4-1. It should be recognized that currently there are no LRT or Amtrak operations in the area, and therefore, measured vibration levels are indicative of either heavy truck traffic, or freight rail operations. Location 1V lies under the bridge structure above Kellogg and shows the level for one of the typical large trucks which pass by this spot. The measurements obtained at Location 4V were recorded during the low speed pass-by of a freight train approximately 50 feet from the measurement spot.

The results of the vibration measurements are summarized in Table 4.3.4-1. The maximum measured velocity levels range from 57 to 82 VdB. Some of these levels are above the criteria specified in Table 4.3.4-2, as shown in Figure 4.3.4-2. Notably, the truck vibration measurement at Location 1V is quite high and above the criterion because of its close proximity to the source. This location, which was on a small median strip between lanes on Kellogg Boulevard, was chosen to show an example of the largest truck vibration level in the project area.

Using the FTA's General Assessment methodology, vibration levels from Amtrak, LRT, and Bus movements in the station area were predicted at receptor locations in the study area. The source levels for the three types of sources are shown in Figure 4.3.4-3.

Using the FTA vibration curve, adjusted for speed, and the distance from each receptor to the nearest track, or bus loading area, vibration levels were calculated at each of the receptor locations. These calculated vibration levels were then compared to the FTA criterion to determine impact. The residential criterion for the Amtrak operations is 80 VdB (infrequent events) and for LRT and Bus operations is 72 VdB (frequent events). For other categories of receptors, the respective criteria used are 75 VdB and 83 VdB, as described in Table 4.3.4-2.



The results of the vibration impact analysis are shown in Appendix G. There were no vibration impacts according to FTA criteria. The highest calculated levels were 69 VdB, 51 VdB, and 48 VdB respectively for Amtrak, LRT, and Bus movements.

Mitigation Measures

No mitigation is required.

TABLE 4.3.4-2 FTA GROUND-BORNE VIBRATION (GBV) AND GROUND-BORNE NOISE (GBN) IMPACT CRITERIA FOR GENERAL ASSESSMENT (VdB)

Land Use		GBV Impact Levels (VdB re 1 micro-inch/sec)			GBN Impact Levels (db re 20 micro Pascals)		
Category	Description	Frequent Events	Occasional Events	Infrequent Events	Frequent Events	Occasional Events	Infrequent Events
1	Buildings where vibration would interfere with interior operations.	65 VdB	65 VdB	65 VdB	N/A	N/A	N/A
2	Residences and buildings where people normally sleep	72 VdB	75 VdB	80 VdB	35 dBA	38 dBA	43 dBA
3	Institutional land use with primarily daytime use.	75 VdB	78 VdB	83 VdB	40 dBA	43 dBA	48 dBA
Specific Buildings	TV/Recording Studios/Concert Halls	65 VdB	65 VdB	65 VdB	25 dBA	25 dBA	25 dBA
	Auditoriums	72 VdB	80 VdB	80 VdB	30dBA	38 dBa	38 dBA
	Theaters	72 VdB	80 VdB	80 VdB	35 dBA	43 dBA	43 dBA

Note: N/A = not applicable. Vibration-sensitive equipment is not affected by ground-borne noise.

“Frequent Events”: more than 70 events per day; “Occasional Events”: between 20 and 70 events per day; “Infrequent Events”: fewer than 30 events per day

Source: Transit Noise and Vibration Impact Assessment –Federal Transit Administration, Washington, D.C., May 2006



4.3.5 Wetlands and Ecologically Sensitive Areas

Legal and Regulatory Requirements

Wetlands are regulated at the federal level by the U.S. Army Corps of Engineers (COE) under Section 404. At the state level, the DNR regulates wetlands identified as Public Waters. At the local level, the Minnesota Wetland Conservation Act is enforced by the City of Saint Paul, which acts as the Local Government Unit (LGU).

Existing Conditions

Parking lots and paved surfaces cover the majority of the Union Depot project area. Only a small portion of the site at the east end is not paved or covered with buildings or other impervious surfaces. There are no wetlands in the National Wetland Inventory for the area. The soil survey indicates that the west end of the site is mapped as "Urban Land" and the east end as "Udorthents," or human disturbed soils. There are no wetlands indicated on the site in the Public Waters Inventory. A review of available air photos did not show any wetlands within the project area.

Impacts

No Build Alternative

Because no wetlands exist on site, no impacts on wetlands would occur due to the selection of the No Build Alternative.

Build Alternative

Because there are no wetlands either on the site or adjacent to the site, no impacts on wetlands would be anticipated.

Mitigation Measures

Because no wetlands exist on site, and no impacts are anticipated, no wetland mitigation would be required.

4.3.6 Floodplains

Legal and Regulatory Requirements

The National Flood Insurance Program (NFIP) is administered on the federal level by the Federal Emergency Management Agency (FEMA) and on the state level by the DNR. Local units of government may also add additional floodplain requirements. The City of Saint Paul has a floodplain ordinance that regulates activities within the floodway and floodplain.

State and federal (44 CFR Chapter I parts 60 and 65) floodplain regulations do not apply to the Union Depot project area because it is not mapped in the regulatory floodplain or floodway shown on the FIRM panel.

The Capitol Region Watershed District (CRWD) regulations would be in effect with regard to the flood elevation of storm water storage and treatment facilities, including:

- Low floor of habitable buildings must be at least 2 feet above 100-year flood elevation
- Underground parking structures must have low opening 2 feet above the 100-year flood elevation
- Roadways shall not flood when adjacent to flood storage facilities designed to store the 100-year storm event
- Compensatory flood storage is required for fill in the floodplain.

The City of Saint Paul requires:

- Low floor of new construction be at least 1 foot above the critical 100-year flood elevation and be 4 feet above groundwater.

Existing Condition

The City of Saint Paul's Flood Insurance Rate Map (FIRM) panel 2752480029F, published April 2, 2003, shows the floodplain adjacent to the site. The floodway and floodplain boundaries as well as the site boundary are shown on Figure 4.3.6-1. The site is not included in the mapped floodway and floodplain (1% and 0.2% previously referred to as the 100-year and 500-year).

The existing lower parking level (under track) may be subject to flooding from local stormwater runoff. The depth of local flooding is not significant enough to impact its use as a parking facility.

Impacts

No Build Alternative

Under the No Build Alternative, there would be no impact on the regulatory floodplain administered by the NFIP. Local or street flooding issues would not be changed.

Build Alternative

Under the Build Alternative, there would be a minor impact on the regulatory floodplain administered by the NFIP. The lower level will be used for temporary storage and parking. Local or street flooding issues may be improved by the storm water storage and treatment facilities installed as part of the project.

Proposed project facilities would be located predominately on the train deck which is above the Mississippi River flood elevation. Ancillary structures, such as bicycle storage, elevators, and escalators that are all or partially located in the under track level, would have a low damage potential and would be flood proofed in accordance with building codes and local floodplain regulations. Such facilities would have their mechanical and electrical systems above the flood elevations and emergency procedures would be developed to protect the public safety and property.

Mitigation Measures

The lower level will be used for temporary storage and parking. Stored items and parked vehicles will be located in areas not subject to local flooding. Public access to the lower level will be restricted when the area is inundated.



Utilities and mechanical and electrical systems within the lower level will be designed consistent with State and local rules. Water supply and waste disposal systems will be constructed or modified to prevent entry of flood waters. Essential mechanical and electrical systems, including systems to operate escalators or elevators, will be placed above calculated flood levels.

The activities in the lower level will be consistent with State and local rules and “will not have an unduly adverse effect on flood flows, velocities, or stages associated with the regional flood”.

Local and street flooding issues administered by the CRWD would need to be addressed in the final design of storm water storage and treatment facilities.

4.3.7 Storm Water Drainage

Legal and Regulatory Requirements

Peak discharge requirements

Peak discharge requirements for the redevelopment of the project area would be:

CRWD:

- No increase in 2-, 10- and 100-year discharge

City of Saint Paul:

- 1.64 cubic feet per second per acre (cfs/acre)
- Permit required for hookups to city’s storm sewer system.

The proposed redevelopment would have hydrologic characteristics similar to the existing site. Therefore the existing conditions peak discharge from the site could be maintained in accordance with the CRWD requirements. The volume control requirements and the storm treatment system would be expected to attenuate and reduce the peak discharge such that the city’s discharge requirements would be met. Hydrologic modeling performed as part of the final design would verify that the discharge requirements are met.

Storm water volume requirements

The CRWD requires the reduction of storm water runoff volume equivalent to one-inch runoff from impervious surfaces in the project area. This requirement could be met by either infiltration or filtration methods. Infiltration would consist of Best Management Practices (BMPs) that would provide a means for storm water to be infiltrated into the groundwater. Filtration would consist of BMPs that would provide a means for the storm water to be filtered through granular soils and be recollected and discharged into the storm sewer. The CRWD has allowed filtration and other BMPs that treat 1.3 inches of runoff from the impervious area on sites.

Existing Condition

Currently the site is predominately impervious surfaces, with little infiltration, storage, or treatment of storm water. Storm water is generally collected in catch basins and piped to the city's storm sewer system. The storm sewer system conveys the water directly to the Mississippi River.

The majority of the rainfall that falls on the train deck currently drains to the southeast quadrant of the deck where it is collected in a series of catch basins and piped in two 24-inch storm sewers to the city's large storm sewer interceptor. This storm sewer interceptor extends southward from the intersection of Broadway Street and Kellogg Boulevard and consists of a seven-foot box culvert that discharges into the Mississippi River. Additionally, storm water from the northeast quadrant of the deck is collected in a series of catch basins and is conveyed to the storm sewer interceptor in a 15-inch pipe.

The storm water from the south central portion of the deck is collected by catch basins and transported to the river via a 12-inch storm sewer. The storm water from the western area of the deck is collected in catch basins and conveyed to the river in the Sibley Street storm sewer, which consists of a 42-inch reinforced concrete pipe.

Storm water from the area east of the deck area and west of the Lafayette Bridge is collected in catch basins and piped to the city's storm sewer system. A 15-inch pipe enters the storm sewer interceptor from the east near the southern site boundary. Additional catch basins collect the storm water from the northern portion of the site and discharge it into the Kellogg Boulevard storm sewer.

Field observations indicate that many of the catch basins and storm sewer pipes contain varying amounts of sediment. Some of the structures have impaired functionality due to sediment plugging.

Currently there is no storm water storage or treatment on site.

Impacts

No Build Alternative

Under the No Build Alternative, storm water discharges to the Mississippi River untreated and without measures to reduce the peak discharge rate.

Build Alternative

Since the redevelopment of the site would have to meet stringent volume requirements, environmental impacts would be lessened. The final design of the site would incorporate storm water drainage features and BMPs that meet the CRWD volume requirements. These features would include one or more of the following BMPs:

Pervious pavements – Since the site would be predominately impervious, pervious pavement would likely be used. In this scenario, the pervious pavement could be underlain by up to three feet of gravel to store the storm water. The gravel would be drained either by infiltration to the groundwater or by filtration to drain tile and then discharged into the storm sewer. The site



would require nearly 1.3 acres of pervious pavement for this method alone to meet the requirements of the train deck area. Storm water would need to be directed to the surface of the pervious pavement, it is therefore likely that several pervious pavement areas would need to be installed at various locations within the project area. Collected sediment would be periodically swept up or vacuumed from the surface of the pavement.

Figure 4.3.7-1 shows an area where pervious pavement and the gravel storage layer could be installed. The area shown would basically cover the traffic lanes on the upper deck. Area shown in Figure 4.3.7-1 illustrates the required area if pervious pavements alone were used to treat the storm water.

Underground storage – Structural systems (open pipes or chambers), voids in granular materials, or a combination of structural systems and granular materials could be designed for underground storage. Structural systems would likely require at least six feet of depth from the bottom of the gravel drainage layer to the top of the overlying pavement. The areal extent of the storage area would likely be 0.7 acres to treat storm water discharged from the upper deck and rail areas. The storm water could be collected by a catch basin and piping system and brought to one location. To maintain the life of the underground system, the storm water should be pre-treated using an inline storm water treatment unit (SWTU) which uses non-mechanical and gravity methods to remove sediment and floating debris.

Figure 4.3.7-1 shows the area where underground storage could be incorporated into the design. The area shown would be required if this BMP alone was used to treat the storm water from the redeveloped site.

Rainwater gardens/bioretention area – Rainwater gardens or bioretention areas could be incorporated into some of the landscaping islands, as a linear feature along Kellogg Boulevard, or along the proposed reconstructed railroad track. If storm water is carried to the bioretention gardens in piping, SWTUs could be installed to reduce the maintenance of the bioretention areas.

Figure 4.3.7-1 shows a location where rainwater gardens / bioretention areas could be incorporated into the design. The rainwater gardens would provide diversity to the Kellogg Boulevard streetscape. The area shown on Figure 4.3.7-1 is the extent of the rainwater gardens needed to treat storm water from the entire redeveloped site.

Combination of BMPs – It is likely that a combination of BMPs would be incorporated into the plans during the final design. By incorporating several of these practices, storm water would be efficiently collected and the most effective BMPs selected. If each of the BMPs listed above are used in equal proportions, the areal extent required of each BMP is a third of the area shown on Figure 4.3.7-1.

Mitigation Measures

As described above, the proposed redevelopment of the site will incorporate storm water volume BMPs that will provide mitigation for any impacts.

4.3.8 Water Quality

Legal and Regulatory Requirements

Storm water discharges are regulated through the EPA and its National Pollutant Discharge Elimination System (NPDES). These requirements are administered on the state level by the MPCA. Local units of government may also add additional requirements. Storm water discharges are regulated both during and after construction.

Construction requirements

MPCA

- General Storm Water Permit-Construction Activity
- Storm Water Pollution Prevention Plan (SWPPP)

City of Saint Paul

- SWPPP review by the city
- Temporary sedimentation basin if more than 10 acres disturbed at one time

Permanent storm water treatment requirements

The storm water treatment requirements include:

City of Saint Paul	Treat 0.5 inches of runoff from new impervious surface
CRWD	90 percent solids removal from 2.5-inch 24-hour rainstorm

Existing Conditions

Currently, storm water is collected in a series of catch basins and is piped directly into the city's storm sewer system. The storm sewers discharge directly into the Mississippi River without treatment.

This reach of the Mississippi River is listed as an impaired water for aquatic consumption, listing polychlorinated biphenyl (PCB) and perfluorooctane sulfonate (PFOS) in fish tissue.

Impacts

No Build Alternative

Under the No Build Alternative, untreated storm water continues to discharge into the city's existing storm sewer system and directly into the Mississippi River.

Build Alternative

An Erosion and Sediment Control Plan would be developed as part of the SWPPP and would be incorporated into the construction plans. BMPs used during the construction of the project would include silt fence, catch basin protection, street sweeping staged construction, and, if necessary, a temporary sedimentation basin.

The CRWD treatment requirements would be met primarily through the infiltration / filtration system. Inline SWTUs would also be installed on storm sewer lines as needed to improve water



quality by capturing sediment and floating debris. These SWTUs would need to be maintained by periodically removing the accumulated sediment and debris.

The final configuration of storm water treatment BMPs would likely be a mix of the BMPs discussed in Section 4.3.7, Storm Water Drainage and inline SWTUs. The precise mix and methods would be determined during the final design.

Mitigation Measures

Erosion and sediment controls would be implemented as part of the SWPPP and NPDES to control sediment discharge from the site to current levels, thus mitigating the effects of construction. Construction of the project would positively impact the water quality of the storm water discharge due to the incorporation of storm water BMPs into the project design.

4.3.9 Endangered Species

Legal and Regulatory Requirements

The Endangered Species Act of 1973 requires federal agencies to determine the effects of their actions on threatened and endangered species of fish, wildlife, and plants and on their habitats, and to take steps to conserve and protect these species.

The FHWA and the U.S. Fish and Wildlife Service (USFWS) have a Memorandum of Agreement (MOA) delegating the review authority from FHWA to state transportation agencies. Thus, a federal endangered species review request was sent to Mn/DOT's Office of Environmental Services (OES) on December 11, 2007 for project review of potential effects to federally listed threatened, or endangered, proposed, candidate species and critical habitat. In a letter dated January 12, 2008 (Appendix H), a determination of no effect was made by the OES. This determination of no effect precludes further action under Section 7 of the Endangered Species Act of 1973.

State threatened and endangered species have been coordinated through the DNR, Natural Heritage and Nongame Research Program. A natural heritage information system data request from was submitted to DNR on December 11, 2007 to initiate a state endangered species review. In a letter dated December 20, 2007 (Appendix I), the DNR concluded that there are six known occurrences of rare species of native plant communities within an approximate one-mile radius of the project site. However, based on the nature and location of the proposed project, the DNR has determined that no known occurrences of rare features would likely be negatively affected

Existing Conditions

The Union Depot project area is located in an urban environment with business, industrial, and transportation land uses (Figure 4.1.3-1). The Mississippi River is adjacent to the project area. The existing project area and surrounding environment contain a high percentage of impervious surface and very little natural vegetation. Wildlife habitat within the project area is very limited. Typical species likely to live in proximity to the project area include those that are adapted to an urban environment, such as small mammals and songbirds.

Impacts

No impacts on federal or state listed rare, threatened, or endangered (RTE) species would be anticipated under any of the alternatives.

Mitigation Measures

The proposed project would not adversely affect wildlife populations or RTE species. No mitigation is proposed.

4.3.10 Hazardous Materials

Existing Conditions

A Phase I Environmental Site Assessment (ESA) was conducted in October 2007 on the proposed Union Depot project area to evaluate whether current or historical activities on or near the area may have resulted in hazardous substances or petroleum products, also referred to as “recognized environmental conditions” (RECs) (Appendix J). This section summarizes the findings and recommendations of the ESA and describes other existing hazardous materials and waste that could affect or be affected by the proposed project. Due to the large project area and differences in how each section would be impacted by the project, the affected environment, impacts, and mitigation measures are described for each of the following sections (shown in Figure 4.3.10-1):

- Train Deck of Elevated Rail Yard: Section of project area between Sibley and Broadway Streets, plus wedge south of Second Street, includes train deck parking, semi-trailer parking, 1978 USPS Annex Building, concourse, and waiting room;
- Under Track Level of Elevated Rail Yard: Section of the project area between Sibley and Broadway Streets, includes under track parking and utility/storage rooms, plus ramp at Broadway Street to train deck;
- Northern Ground Level Paved Lot: Includes street level public parking on the paved lot extending from Broadway Street northeast to where the pavement ends;
- Northern Unpaved Lot: Includes unpaved fenced lot northeast of the ground level paved lot extending northeast to active rail lines;
- Train Deck of Elevated Rail Yard east of Broadway Street: Includes paved parking lot on raised area with retaining wall starting at Broadway Street and extending northeast, narrowing and curving to the north as it becomes unpaved and approaches the active rail wye.

In addition to the Phase I ESA, RCRRA commissioned an independent Phase II ESA of the Union Depot concourse area. A draft *Phase II Environmental Assessment Report*, dated October 11, 2007, is provided in Appendix K¹. Where appropriate and applicable, Phase II ESA findings are summarized in the remaining portion of the existing conditions summary.

¹ The Phase II Environmental Site Assessment was done only for the USPS parcel and does not include properties to the east of Broadway.



Phase I ESA Research Methodology

The Phase I ESA for this project was conducted in conformance with the scope and limitations of American Society for Testing and Materials ASTM Practice E1527-00 (Appendix J). The scope-of-services for this work item did not include the collection and analysis of any samples including water, soil, paint, air, or asbestos. The scope of services included the following:

1. Conduct an interior and exterior site reconnaissance for obvious evidence of potential contamination such as current hazardous materials storage, or use; unusually stained soils, slabs, and pavements; drains, sumps, drums, tanks, and electrical transformers; stressed vegetation; and discarded hazardous materials containers.
2. Interview the USPS Maintenance Operations Manager and USPS Maintenance Manager to inquire about past and present environmental practices involving hazardous materials/wastes.
3. Research project area history by reviewing a chronology of aerial photographs, topographic maps, and historic maps for the site and adjoining property; and review historical city directories for the site and nearby properties.
4. Review readily available topographic, geologic, and hydrogeologic information relating to the project area and surrounding area;
5. Conduct a limited review of recorded federal, state, and local regulatory information of potential environmental hazards within one-half mile of the center of the project area boundaries.
6. Conduct inquiries by telephone and via internet database to the appropriate regulatory agencies for information regarding environmental violations or incidents, and/or the status of enforcement actions at the project area and surrounding properties of concern.
7. Conduct a review of project files at the Minnesota Pollution Control Agency (MPCA) to obtain further information on specific sites of concern identified in the EDR report.
8. Review the historic environmental reports for the project area.

Phase II ESA (2007) Methodology

The Phase II ESA was conducted to evaluate potential environmental impacts associated with the Union Depot concourse area. As such, coverage in this assessment does not extend over the entire study area contemplated by the Phase I ESA. The following tasks were performed as part of the Phase II ESA that was completed in October 2007:

1. Completion of 14 hollow stem auger (HSA) soil borings to depths ranging from 3 to 6 feet below grade in the under track level of the elevated rail yard.
2. Completion of 10 HSA soil borings to depths ranging from 2 to 2.5 feet below grade within the train deck level of the elevated rail yard.
3. Evaluation of soil samples collected during drilling operations for indications of contamination, including field screening of samples with a photoionization detector (PID).
4. Laboratory analysis of select soil samples for a wide range of target compounds.

Affected Environment

The Phase I ESA developed a list of potential sites of concern, both on the Union Depot project area and in the vicinity. All of the resulting sites are listed in Tables 4.3.10-1 and 4.3.10-2. The sites are also depicted on Figure 4.3.10-2. Map IDs shown in Tables 4.3.10-1 and 4.3.10-2 correspond to the point IDs on Figure 4.3.10-2. The project area history and potential hazardous materials for each section of the project area are described below.



TABLE 4.3.10-1 ON-SITE POTENTIAL CONCERNS

Map ID	Facility	Potential Contaminant	Details	Cleanup Performed
1A	UNION DEPOT CONCOURSE/ U.S. POSTAL SERVICE PROPERTY 200 E. Kellogg Blvd.	<ul style="list-style-type: none"> Asbestos containing materials (ACM) Lead-based paint Railroad impacted soil 	Asbestos containing materials (ACM), lead-based paint, railroad impacted soil	Some ACM already removed. Some RR-impacted soil removed.
1B	H & H TRANSPORTATION Former Gas Station (SQG) 390 E. Kellogg Blvd.	<ul style="list-style-type: none"> Gasoline or diesel 	No records could be found that storage tanks have been removed.	Not known
1C	FORMER GAS STATION (pre-1966) 390 E. Kellogg Blvd., east of current location	<ul style="list-style-type: none"> Gasoline or diesel 	No records could be found that storage tanks have been removed.	Not known
1D	REMOVED GASOLINE UST, UNDER TRACK LEVEL (LUST) 200 E. Kellogg Blvd.	<ul style="list-style-type: none"> Gasoline 	Gasoline leaked from UST at Continental Cable vehicle storage.	Tank and contaminated soil removed.
1E	REMOVED FUEL OIL UST, UNDER TRACK LEVEL (LUST) 200 E. Kellogg Blvd.	<ul style="list-style-type: none"> Fuel oil 	From former boiler room.	Tank and contaminated soil removed.
1F	FORMER SAINT PAUL UNION DEPOT PROPERTY (VIC) 200-500 E. Kellogg Blvd.	<ul style="list-style-type: none"> PAH in groundwater TPH in soil and groundwater 	Former railroad switchyard. Petroleum contamination has been detected in soil and groundwater. Details not available.	Not known

TABLE 4.3.10-2 OFF-SITE POTENTIAL CONCERNS

Map ID	Facility	Potential Contaminant	Details	Cleanup Performed	Adjacent to Site?
2	TILSNER BUILDING PARKING LOT (SQG, LUST) 331 E. Kellogg Blvd.	<ul style="list-style-type: none"> Gasoline 	Soil and groundwater contamination on site.	Not known. Files not available.	Yes
3	TILSNER CARTON CO INC (SQG) 319 E. Kellogg Blvd.	<ul style="list-style-type: none"> N/A 	Small quantity generator of hazardous waste. No concerns.	N/A	Yes
4	JOHNSONS GARAGE FORMER GAS STATION (LAST) 271-279 E. Kellogg Blvd.	<ul style="list-style-type: none"> No. 1 & 2 Fuel Oil Gasoline 	Fuel oil AST leak. Soil and groundwater contamination. Former site of gas station.	Remediation proposed for fuel oil.	Yes
5	ALASKA TRANSIT, ASHBACH CONSTRUCTION (LUST, SQG) 431 E. Kellogg Blvd.	<ul style="list-style-type: none"> No. 1 & 2 Fuel Oil 	Fuel oil leaked from UST	Tank removed and some of contaminated soil removed.	Yes
6	MINERVA/LOWERTOWN ARTS BUILDING (SQG) 255 E. Kellogg Blvd.	<ul style="list-style-type: none"> N/A 	Small quantity generator of hazardous waste. No concerns.	N/A	Yes
7	US POSTAL SERVICE PROCESSING & DISTRIBUTION CENTER (SQG, AST, UST) 180 E. Kellogg Blvd.	<ul style="list-style-type: none"> N/A 	Small quantity generator of hazardous waste. Location of fuel oil AST and UST. No concerns.	N/A	Yes
8	TWIN CITIES PUBLIC TELEVISION (SQG) 172 E. 4 th St.	<ul style="list-style-type: none"> N/A 	Small quantity generator of hazardous waste. No concerns.	N/A	Yes
9	DIAMOND PRODUCTS CO. (GILLETTE)/ FORMER MANUFACTURED GAS PLANTS (BROWNFIELD) 310 E. 5 th St.	<ul style="list-style-type: none"> Chlorinated VOCs DRO/GRO Cyanide Coal Distillate PAH SVOCs Metals Hydraulic Fluid 	<p>Site of former manufactured gas plants up to mid 1900's, known source of petroleum and metals soil and groundwater contamination.</p> <p>Recent manufacturing operation led to chlorinated solvent contamination and hydraulic fluid spill.</p>	<p>Hydraulic fluid spill-impacted soil was removed.</p> <p>No cleanup of other contaminants.</p>	No
10	CRANE-ORDWAY BUILDING (BROWNFIELD) 281 E. 5 th St.	<ul style="list-style-type: none"> Not known 	Brownfield site. Further records not available.	Not known.	No
11	ST. PAUL/COMMERCIAL STREET (VIC) 260 Commercial St.	<ul style="list-style-type: none"> None 	VIC site. No contamination identified at the site.	N/A	No



Map ID	Facility	Potential Contaminant	Details	Cleanup Performed	Adjacent to Site?
12	BUCKBEE MEARS- RIVER PARK LOFTS/BUSINESS TECH CENTER/GMT PARKING RAMP (VIC, LUST) 245 E. 6 th St.	<ul style="list-style-type: none"> Nos. 4 & 6 Fuel Oil Ferric Chloride Nitric Acid VOC DRO/GRO Metals 	Fuel oil leaked from UST. Ferric chloride and nitric acid released to sanitary sewer and some soil contamination remains.	Fuel oil-impacted soil was removed, but some remains.	No
13	INDUSTRIAL CENTER (VIC) 275 & 293 Commercial St.	<ul style="list-style-type: none"> Petroleum compounds PAH Metals 	Contaminated soil on site.	None	No
14	BARBER ELECTRIC (VIC) 470 Kittson St.	<ul style="list-style-type: none"> VOC Metals Lead 	Lead in soil is above MPCA action levels.	Not known.	No
15	HRA BLOCK 19 PARKING RAMP (VIC) 459 Jackson St.	<ul style="list-style-type: none"> Not known 	VIC site. Further records not available.	Not known.	No
16	TWIN TOOL (VIC) 378 E. 8 th St.	<ul style="list-style-type: none"> Trihalomethane 	Groundwater contamination thought to be caused by sewer leak.	None	No
17	500 PAYNE AVE DEVELOPMENT/STANDARD SPRING (LUST, VIC)	<ul style="list-style-type: none"> PAH Diesel/DRO 	Oily water released during removal of UST.	Soil excavated and removed.	No
18	LYONS COURT APARTMENTS/ UNITED ELECTRIC (LUST, VIC, BROWNFIELD) 510 – 512 Sibley St.	<ul style="list-style-type: none"> Mercury Asbestos PAH Diesel/DRO 	Soil contamination and diesel UST release.	Mercury and asbestos contaminated soil removed. Diesel release cleaned up.	No
19	METROPOLITAN STATE LIBRARY/ NOBLES MFG. (VIC) 403 Maria Ave.	<ul style="list-style-type: none"> Solvent Diesel Asbestos 	Solvent-impacted soil. Diesel leak. Asbestos in fill.	Some diesel removed, some contained in place.	No
20	ROYS PHILLIPS 66 SERVICE STATION (LUST) 305 Maria Ave.	<ul style="list-style-type: none"> Gasoline 	Gasoline in groundwater. Extent not known.	Not known.	No
21	ROSSMOR BUILDING (VIC) 500 N. Robert St.	<ul style="list-style-type: none"> Chlorinated Solvents 	Soil contamination. Not known if groundwater also contaminated.	Soil removed and isolated.	No
22	MILLER & HOLMES, INC. FORMER GAS STATION (LUST) 501 N. Lafayette Rd.	<ul style="list-style-type: none"> Fuel oil/DRO Non-petroleum VOC 	Non-petroleum VOC in groundwater.	None.	No
23	FORMER GAS STATION (BROWNFIELD, LUST) 513 Jackson St.	<ul style="list-style-type: none"> Used oil Gasoline 	Brownfield. Oil spill. Leaking gasoline UST. Details not available.	Not known.	No

Map ID	Facility	Potential Contaminant	Details	Cleanup Performed	Adjacent to Site?
24	BRUCE VENTO NATURE SANCTUARY (BROWNFIELD) E. 4 th St. and Commercial St.	<ul style="list-style-type: none"> • Lead • Mercury • Arsenic • VOC • Chromium • Cyanide • Benzo(a)pyrene • DRO/GRO 	Brownfield site redeveloped into a park.	Proposed removal of 4ft deep layer of contaminated soil. Completion not known.	No

Train Deck

The train deck currently is used for parking and loading dock operations. It was built upon raised concrete piers, a 24-inch-thick concrete slab, and a top layer of soil or gravel as ballast for the tracks. The triangular wedge south of Second Street and the southern third of the train deck are built on top of fill surrounded by a concrete retaining wall with no concrete slab underneath. When the USPS assumed ownership of this property, it removed the tracks, paved over the soil/gravel ballast, and removed a portion of the train deck at Broadway Street to create a ramp from Kellogg Boulevard to the train deck, and eventually built the USPS 1978 Annex Building. In the early 1990s, the asphalt was removed and two-to-three feet of petroleum-impacted ballast was removed from the train deck. Clean sand replaced the excavated ballast. The concrete truck pad east of and adjacent to the USPS 1978 Annex Building and the concrete upper and lower sidewalks along Kellogg Boulevard from Sibley to Wacouta Streets was not disturbed and original ballast remains below them.

USPS operations at the USPS 1978 Annex Building uses small amounts of hazardous substances and materials, including paint, caulk, cleaners, oil, diesel fuel, gasoline, propane, solvents, hydraulic fluid, and water treatment chemicals. The facility maintains and stores electrical equipment and light fixtures that may contain mercury or PCBs. The facility maintains a bank of gel-based batteries for the warehouse equipment and has a self-contained battery wash system used in the past when lead acid batteries were in use. The battery room at one time had an open floor drain, presumably connected to the sanitary sewer when lead acid batteries were in use.

The concourse and waiting room are built on raised piers. The concourse is accessible from the train deck through a temporary plywood building enclosing stairs and an elevator. Due to the era of construction, it is expected that ACM and lead-based paint (LBP) are present in the concourse and waiting room. No known asbestos or lead surveys have been conducted. ACM may have been used in many parts of the concourse and waiting room, including floor tiles, wall panels, and insulation. According to USPS personnel, some asbestos was removed along with parts of the original heating system in the 1970s. The concourse and waiting room have been used primarily for cold storage. Natural gas heaters were added around 2000 to prevent further deterioration of the building. The concourse and waiting room do not have any chillers. Hazardous material use and storage was observed only in the mechanical room for the elevator, located in the plywood building.



The train deck, USPS 1978 Annex Building, concourse, and waiting room do not include any existing or removed aboveground or underground fuel storage tanks. The concourse elevator has a built-in hydraulic fluid tank with an approximate 100-gallon capacity.

A water retardant layer was encountered just above the cement deck in multiple soil borings advanced within the upper deck area during the Phase II ESA. Collection and analysis of a sample collected from this layer revealed a positive detection for asbestos-containing materials (ACM). Quantitative analysis of soil samples collected from fill placed on the upper deck revealed that this material was impacted by diesel range organics (DRO) and semi-volatile organic compounds (SVOCs). Concentrations of polynuclear aromatic hydrocarbon (PAH) compounds (included within the SVOC scan) exceeded regulatory action levels in one sample. Analysis of this data in the Phase II ESA suggested the contamination in fill was likely derived from releases at the fill source and not from site operations.

Under Track Level

The under track level includes parking areas and storage rooms. There are two storage rooms in the west corner, one used by the U.S. Coast Guard, the other for USPS electrical parts storage. The chillers serving the USPS 1978 Annex Building are located in the electrical storage room. A fenced storage area at the eastern corner contains USPS equipment, diesel fuel dispensing from a 55-gallon drum, propane storage, and piles of sand, gravel, and sand bags.

An area of the under track level along Kellogg Boulevard at Wacouta Street is enclosed by a fence with a large storage shed used by non-USPS tenants for vehicle storage and refueling. This area had a 2,000-gallon gasoline underground storage tank (UST), which was removed in 1992. Eight cubic yards of impacted soil were thin spread on the site. MPCA closed the site and issued a “no further action” letter in 1993 under leaking underground storage tank (LUST) ID 5584.

The former boiler room area at the south corner is believed to have been the site of a boiler room with two boilers and a 10,000-gallon fuel oil UST. The UST is presumed to be removed, but tank removal documentation was not available from the USPS or MPCA.

No ASTs or USTs are currently located in the under track level.

One leaking aboveground storage tank (LAST) site is adjacent to the project area on the north side of Kellogg Boulevard. The leak was reported as fuel oil at the site of a parking garage. This site was closed in 1997, but the database does not indicate if contaminated soil was removed. This location, 271-279 East Kellogg Boulevard, was also at one time a gas station.

Quantitative analysis of soil samples collected during the Phase II ESA of the under track level revealed an apparent oil release from an elevator present at this level. In addition, elevated levels of metals and PAHs were detected in samples coinciding with a buried ash layer located near the corner of Kellogg Boulevard and Broadway Street.

Northern Ground Level Paved Lot

This area is currently used as a public parking lot and includes a bus stop building and an inactive gasoline service station building, both adjacent to Kellogg Boulevard just west of the Lafayette Street Bridge. The area currently does not support the use or storage of any hazardous materials.

This area has been a parking lot since the 1960's. From the 1800s until the mid-20th century, this area was a rail yard for freight receiving. Early Sanborn Maps and areal photographs (1885-1927) show freight house structures along Kellogg Boulevard from Broadway to John Streets with tracks extending from John Street to the northeast. This area hosted several railroad operations, including an oil house, an oil shed, a gas house with storage tank, and a turntable. The area was later used as a warehouse for a lead pipe company.

The area adjacent to Kellogg Boulevard under the Lafayette Street Bridge was previously a gas station moved ca. 1966 to its current location southwest of the bridge to accommodate the construction of the bridge supports. MPCA database records do not indicate if underground tanks at either site have been removed or if they have leaked. Both of the gas stations used the address 390 East Kellogg Boulevard.

Adjacent to this area on the north side of Kellogg Boulevard are several LUST sites. A gas station was located at 331 East Kellogg Boulevard, where there was a gasoline leak. This site was closed in 1992 with contaminated soils remaining. This site is currently a parking lot west of 343 East Kellogg Boulevard.

A leaking 1,000-gallon fuel oil UST was removed from 431 East Kellogg Boulevard and closed in 1998 under LUST ID 10135. The database does not indicate how much contaminated soil was removed or if impacted soil remains. This site is currently a parking lot east of the Lafayette Street Bridge, on the north side of Kellogg Boulevard.

Northern Unpaved Lot

This area is currently fenced and does not appear to be in active use. Some foliage grows on this unpaved area. The soil is sandy and may be the original railroad yard base. The site reconnaissance of this area located numerous piles of dumped materials. Most piles appeared to consist of soil, gravel, brick, concrete, metal and wood construction debris, paint cans, and various paper and plastic litter. A monitoring well is located at the far north end of the area, but this could not be identified in the County Well Index. Historically the main use of this land has been as a railroad switchyard.

Train Deck of Elevated Rail Yard East of Broadway Street

This area is currently used as a public parking lot. The area does not support the use or storage of any hazardous materials.

Retaining walls were built and the area was raised and filled in as part of the elevated rail yard to support the rail lines into the new Union Depot. When rail use ceased in the late 1970s, aerial photos show all tracks removed from this area with some concrete platforms remaining. The rest of this area appears to be unused, with foliage regrowth, until this area was paved and used as a



parking lot some time between 2000 and 2003. It is presumed that the fill under the pavement is the original railroad base and ballast.

The far northern unpaved sliver of this lot does not have a retaining wall and slopes gradually down to the level of the active rail lines and the adjacent lower unpaved lot.

A few piles of dumped material containing bagged yard waste, rock salt, furniture, and construction materials were observed during site reconnaissance.

Impacts and Mitigation

Based on the information presented above, the proposed project may encounter hazardous materials in disturbed soils and building materials.

Numerous listings of known and potential releases of hazardous substances were identified within and adjacent to the Union Depot project area during the ESA process. The source of these substances is primarily historical rail/industrial land-use in the project area and the presence of multiple former USTs and ASTs. Site reconnaissance has also identified evidence of uncontrolled dumping within the project area. Based on available information, heavy molecular-weight petroleum hydrocarbons and PAH impacts to near-surface soil appear to be the most prevalent contaminants of concern (COC). The presence of these compounds, with the addition of metals in poor-quality urban fill, were confirmed in the Union Depot concourse area during the Phase II ESA. These COCs are common along railroad roadbeds related to the creosote treatment of railroad ties and leakage from railroad cars and equipment. In addition to being associated with railroad tracks, PAHs are known to be associated with petroleum contamination. Other potential COCs (in uninvestigated areas of the study area) could include halogenated/non-halogenated semi-volatile organic compounds (SVOCs), volatile organic compounds (VOCs), lighter fractions of petroleum hydrocarbons, heavy metals, and polychlorinated biphenyls (PCBs).

Given the potential for widespread hazardous materials across the site, RCRRA will initiate a comprehensive Phase II Environmental Site Assessment (Phase II ESA) of potentially affected areas as the proposed project as part of the preliminary engineering. The purpose of this second phase of subsurface investigation would be to fill data gaps in the Union Depot property (specifically related to future construction) and to evaluate potential environmental concerns in other areas of the property². This Phase II ESA would be conducted under the regulatory supervision of the MPCA's Voluntary Investigation and Cleanup (VIC) program. To facilitate this process, RCRRA will prepare and submit a Phase II Work Plan document to the MPCA VIC program for agency review and comment. Using existing data and design documents to guide the effort, the Phase II Work Plan would outline an investigative approach to characterize areas of concern where active construction is likely to occur. A Phase II Investigation Report will be prepared at the conclusion of this process to summarize investigative findings.

² Unlike the Phase II ESA (2007), this will included the entire Union Depot property and be targeted at portions of the site which are likely to be disturbed during construction.

Site investigation data will also be used to develop construction planning documents to guide the management of hazardous materials encountered during active construction. Depending upon the nature of the COCs, RCRRA will prepare a Response Action Plan (RAP) and/or a Development Response Action Plan (DRAP) for the Proposed Action. The RAP would be submitted to the MPCA's VIC program, proposing intended response actions (RAs) associated with the management of non-petroleum impacted media during construction. The DRAP would be submitted to the MPCA's Petroleum Brownfield program to address management of petroleum-impacted media during construction. A third document, a Construction Contingency Plan (CCP), would be prepared and submitted to both agency programs to provide a mechanism for addressing any unexpected environmental issues encountered during redevelopment. Upon MPCA approval of the planning documents, RCRRA will conduct on-site inspection throughout construction to assure that proposed RAs are implemented according to state and federal regulations. RAs implemented in connection with the above planning documents during active construction would be summarized at the conclusion of the project in a Response Action Implementation Plan and submitted to the MPCA for approval.

Rehabilitation of the concourse, waiting room, and under track and the demolition of the USPS 1978 Annex Building would have the potential to encounter ACM and LBP and/or other hazardous building materials (PCB-containing electrical equipment, mercury switches, refrigerants, and the like). In addition, construction activity in the train deck area will have the potential to disturb the water-retardant barrier previously identified as containing ACM. Prior to the initiation of rehabilitation or demolition, RCRRA will complete a review of existing hazardous building material survey documents and address any deficiencies through additional surveys. A state licensed asbestos inspector certified by the Minnesota Department of Health (MDH) is required to perform this type of survey. Pre-construction abatement of ACM, LBP, or other hazardous building materials may be required to address those materials disturbed during the project. Hazardous building materials would be handled according to specifications contained in the appropriate construction contracts and in accordance with all federal and state regulations to minimize potential adverse impacts.

4.3.11 Geotechnical

Legal and Regulatory Requirements

There are no regulatory requirements associated with the site geotechnical conditions.

Existing Condition

The geotechnical studies prepared for RCRRA for the proposed Union Depot project include two *A Geotechnical Evaluation Report: Union Depot Concourse*, October 15, 2007 (Appendix L) and the draft *Phase II Environmental Assessment Report* dated October 11, 2007 (Appendix K). Specific soil boring data are provided in the *Geotechnical Evaluation Report*. Additional information includes a subsurface investigation report dated March 1990 (Appendix M) and soil information on plan sheet 7-1-1 for the U.S. Post Office and Custom House dated July 1961 (Appendix N).



General Surface Conditions

The ground surface of the lower deck slopes about 0.5 percent to the south, with elevations generally ranging from 707 to 704 feet above sea level. The surface of the upper deck slopes about 1 percent to the north, with elevations generally ranging from 726 to 719 feet above sea level. Ground surface in the area outside of the building structure is relatively flat at about 705 feet above sea level, gradually sloping toward the center of the site. The Mississippi River is located about 250 feet to the south. The average water surface elevation of the Mississippi River is about 687 feet above sea level.

The Ramsey County Soil Survey classifies the soil on the site east of the Lafayette Bridge as Udorthents (Soil Map Unit Description of 1027). The soil on the site west of the Lafayette Bridge is classified as Urban Land (Soil Map Unit Description of 1039). Both soil classifications describe the soil as disturbed or fill.

Existing Site Conditions (Subsurface Conditions)

The *A Geotechnical Evaluation Report* was the product of a field exploration program conducted in October 2007, which consisted of drilling and sampling borings in the area of proposed construction. The test borings were drilled with a trailer-mounted drill rig equipped with hollow-stem auger.

Samples were taken in the borings using a Standard Penetration Test (SPT) sampler in accordance with ASTM Test Method D 1586. SPT samples were generally taken at 2.5-foot intervals, with some variations. Twenty-four borings were drilled to depths ranging from about 9 inches to 14½ feet below existing site grades. Thirteen borings (Borings ST-1 through ST-13) were drilled in the lower level parking garage. The borings in the lower level encountered bituminous pavement at the surface, underlain by various thicknesses of older concrete and bituminous layers. A series of 11 borings (Borings ST-14 through ST-24) were drilled on the upper parking deck, and typically encountered bituminous pavement overlying aggregate base and sand fill. Sand fill with varying amounts of clay and silt was encountered below the pavements.

The Soil Information drawing for the then-proposed U.S. Post Office and Custom House presents the logs of 14 borings drilled on the proposed site (one was drilled on Jackson Street adjacent to the site) during a period from February 1 to February 5, 1960. The U.S. Post Office and Custom House site is located immediately west of the Union Depot site, between Sibley and Jackson streets. The surface of the site area varied about 3.5 feet in elevation. The drawing also shows the logs of four borings advanced previously on the site by GOW Company in 1932. Fill of sand, cinder, gravel, and concrete existed over most of the area to about 16 feet in depth. A layer of soft green silt occurred below most of this fill, varying in thickness from 5 to 42 feet. Layers of sand and some silt occurred below the soft green silt down to the sandstone. The elevation of the sandstone varied from minus 60 feet to about minus 75 feet, referenced to the Saint Paul city datum (Zero Saint Paul city datum equals 694.1 ft above sea level). Boulders were encountered in the borings at all levels down to the sandstone. The Soil Information drawing for the U.S. Post Office and Custom House is attached in Appendix N. The U.S. Post

Office Custom House is located due west of the site and is included because these borings were deeper than those on the site.

Additional information concerning soil contamination is discussed in Section 4.3.10, Hazardous Materials. The soil contamination analysis was documented in the Draft Phase II Environmental Assessment dated October 11, 2007 attached in Appendix K.

The types of materials encountered by the borings are described below in order from the ground surface to increasing depth. The soil and structural conditions encountered by the geotechnical and structural evaluations and soil borings are described below:

- **Train Deck** - The train deck is supported by numerous concrete columns, typically spaced about 18 feet on center. The structural condition of the structures on the property is documented in the *Structural Condition Report of the USPS Union Depot Property* dated October 5, 2007. A copy is included in Appendix O.
- **Pavement** - Each of the borings encountered bituminous pavement at the surface. The bituminous pavement thickness ranged from about 3 to 7 inches. In the lower parking level, the borings typically encountered additional buried pavements consisting of bituminous material or brick overlying concrete.
- **Fill** - Existing fill was encountered beneath the pavements, and extended to the termination depth in each of the borings. The fill typically consisted of sand with varying amounts of gravel. Wood, brick, ash, and other debris were noted in several of the samples of fill.
- **Under Track Level** - The existing pavements in the under-track level generally appear to be serviceable.

Existing Foundations

The Geotechnical Evaluation Report states that it is anticipated that the existing structure is founded on deep foundations, likely consisting of driven timber piles. Driven timber piles typically rot in zones above the groundwater level. Therefore, if the existing structure is supported by timber piles, it is anticipated that the load-carrying capability of the structure is somewhat less (possibly significantly less) than the original design. However, visual observations of the existing columns were made and no signs of substantial settlement or bearing capacity failure have occurred.

The structural condition of the structures on the property was documented in the *Structural Condition Report of the USPS Union Depot Property*. The report states that deterioration of some structural elements has occurred. Exposures to corrosive environments, water damage due to leaking joints or drain spouts and impact damage from vehicles are the major causes of the deterioration. Repairs of deficient structural elements and elimination of sources of damage will increase the capacity and slow further deterioration.



Groundwater

Groundwater was not observed in the borings completed at this site, probably due to their shallow penetration. At the time the borings were drilled, the static groundwater level was apparently deeper than the termination depths of the borings. The deeper borings drilled in 1960 and shown on the drawing reproduced in Appendix N did encounter groundwater at an elevation of approximately zero (Saint Paul City datum) or 694.1 ft above sea level. It should be noted that the water levels were only checked during drilling; groundwater levels can be expected to fluctuate in response to rainfall, flooding, irrigation, seasonal freezing and thawing, surface drainage modifications, changes in pumping from any wells and other seasonal and annual factors.

Impacts

No-Build Alternative

Under the No Build Alternative, there would be no impact on the site geotechnical conditions.

Build Alternative

This geotechnical evaluation was limited to the evaluation of materials within the upper 10 feet of the under-track level surface and the materials between the pavement and the concrete deck on the train deck surface. If necessary for design, additional soil borings would need to be evaluated for areas on the east side of the site (i.e. east of the driveway ramp and south of Kellogg Blvd in the at-grade parking lot and the adjacent fill area).

The following impacts will be encountered as a result of construction:

Pavement

Prior to constructing new pavements or railbeds, the existing bituminous pavement should be removed. The bituminous pavement ranged from about 3 to 7 inches thick. The exposed subgrade should then be evaluated by a geotechnical engineer.

Fill

Existing fill will need to be completely removed in the proposed track areas. To provide for surface drainage, all or most of the fill will need to be removed in the proposed vehicle areas.

Where existing fill will remain in place, the surface of the existing materials should be moisture-conditioned and compacted to at least 100 percent of their standard Proctor maximum dry density (ASTM D 698).

Based on the present information, it was concluded that the existing fill materials on the train deck can be re-used for rail or pavement support. Likewise, the fill encountered beneath the under-track level generally appears suitable for support of future pavements. At a minimum, moisture-conditioning and surface compaction of those materials should be expected for materials exposed during construction.

A waterproofing membrane was constructed over the train deck, and fill and bituminous pavement were placed over the membrane. In several locations water is seeping through the

concrete ceiling, into the under-track level; therefore, it appears that water is collecting within the subgrade soils of the train deck and seeping through cracks or other discontinuities in the waterproofing membrane.

It is anticipated that a properly designed subgrade drainage system could effectively collect the subgrade moisture and reduce the seepage that is presently occurring. It is anticipated that the drainage system could consist of perforated drain tiles connected to the surface drainage system.

Under Track Level

The existing pavements in the under-track level generally appear to be serviceable. Based on the thicknesses of the several pavement layers that are present, it is anticipated that under the current traffic and climate conditions the pavement section would remain serviceable for perhaps 10 more years with typical maintenance consisting of patching, crack filling, and seal coating.

Due to the large amounts of existing bituminous and concrete pavements, excavations will be difficult and will require sawcutting or breaking of concrete. Once the concrete is penetrated, it is anticipated that standard excavation equipment (such as a backhoe or bulldozer) could be used to excavate the subgrade soils.

Existing Foundations

Additional exploration should be conducted to evaluate the condition and capacity of the existing foundation elements, including the concrete foundation and possible timber piles. After the the approximate design loads for the columns are determined, the existing foundation system could be evaluated for support of those loads. Due to lack of documentation of the existing foundation system, it is recommended that some foundations be exposed in test pits to study the nature and general condition of the foundation system. After investigating the existing foundation system, a test program could be developed to evaluate its capacity.

Mitigation Measures

No mitigation is required.