Minneapolis-St. Paul International Airport

MINNEAPOLIS, MINNESOTA

VOLUME I:

2020 Improvements
Final Environmental Assessment /
Environmental Assessment Worksheet

January 2013

Prepared for:

Metropolitan Airports Commission

This environmental assessment becomes a Federal document when evaluated, signed, and dated by the Responsible FAA Official.

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Responsible FAA Official Date

EXECUTIVE SUMMARY

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EXECUTIVE SUMMARY

The Metropolitan Airports Commission (MAC/Sponsor) is proposing development at the Minneapolis-St. Paul International Airport (MSP). Environmental review of the proposed development is required to comply with both the National Environmental Policy Act (NEPA) and the Minnesota Environmental Policy Act (MEPA). The environmental review of the proposed development is documented in this Environmental Assessment (EA) and Environmental Assessment Worksheet (EAW).

ES.1 Introduction

The proposed development will require actions / approvals on the part of the Federal Aviation Administration (FAA), the Federal Highway Association (FHWA) and the MAC. Therefore, the environmental review of the proposed development must satisfy each of these agencies related regulatory requirements.

Federal agencies must comply with NEPA prior to taking actions or issuing approvals. The FAA and FHWA have different policies and requirements regarding NEPA and decision making. The FAA considers near-term and immediate-term development as ripe for decision making. Therefore, this EA considers proposed terminal and airport landside development needed through 2020. The FHWA decision making process is focused on development proposed for the 20 year planning horizon. Therefore, this EA addresses proposed regional roadway improvements needed through 2030.

The FAA and FHWA also have different requirements/guidance regarding NEPA impact analysis. FAA NEPA requirements are contained in Orders 1050.1E, *Environmental Impacts: Policies and Procedures* and 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions.* The FHWA policies and procedures to implement NEPA are prescribed in 23 CFR Part 771, *Environmental Impact and Related Procedures*. Related guidance includes the FHWA Technical Advisory T6640.8A, *Guidance for Preparing and Processing Environmental and Section 4(f) Documents*. Therefore, this EA includes analysis of environmental impact categories in a manner that is consistent with both FAA's and FHWA's requirements and guidance.

The MAC must comply with MEPA prior to taking action. Therefore, the MAC must prepare an EAW for the proposed development. Use of a federal EA as a substitute for the EAW is authorized under the Minnesota Environmental Review Program provided that the EA addresses the impact categories required in the EAW and the procedural requirements of the EAW process are completed. Therefore, this EA addresses all of the EAW impact categories as well as the FAA and FHWA NEPA impact categories.

ES.2 Purpose and Need

The purpose of the proposed development is to accommodate the expected demand such that the level of service is acceptable throughout MSP's terminal and landside facilities through 2020 and the regional roadway system through 2030.

MSP's terminal and landside facilities do not and/or will not meet current and forecasted demand. MSP is experiencing unacceptable levels of service within Terminal 1-Lindbergh at both landside and terminal facilities: the arrivals curb, parking ramps and international arrivals facility are currently congested. Additionally, the demand for gates at Terminal 2-Humphrey exceeds capacity during the winter period. As passenger activity grows, the levels of service for landside facilities and regional roadways are expected to deteriorate further. Similarly, the levels of service within the terminal environment are projected to deteriorate to unacceptable levels based on standard airport planning practices.

ES.3 Alternatives

The examination of alternatives is a critical component of the environmental review process. A range of alternatives were identified and then evaluated to determine if they were reasonable; i.e., met the purpose and need. Reasonable alternatives were further screened to determine which alternatives would be analyzed in detail within the NEPA document.

Table ES.3.1 provides a brief comparison of all the alternatives considered and whether they were carried forward for detailed analysis. A comparison of the alternatives retained for detailed environmental analysis is provided in **Table ES.3.2.** Based on this comparison the MAC has identified the Airlines Relocate Alternative as the Sponsor's Preferred Alternative.

In order to meet the purpose and need, the Sponsor's Preferred Alternative/Proposed Action includes providing additional arrival curb area; remodeling ticketing and baggage claim areas; remodeling Concourse E; extending and remodeling Concourse G; constructing a new international facility; and constructing a new parking ramp at Terminal 1-Lindbergh. Improvements to Terminal 2-Humphrey include constructing new gates, providing auto rental facilities, expanding parking, and improving the roadway access system to the terminal.

The specific improvements are listed in **Table E.3.3** and illustrated on **Figures ES.3-1**, **ES.3-2** and **ES.3-3**.

Table ES.3.1
Summary of Alternatives Considered

Alternative	Meets Purpose and Need?	Reasons for Meeting or Not Meeting Purpose and Need	Carried Forward for Detailed Review?
Other Airports	No	Neither the development of a competing hub nor a supplemental airport appears likely given current airline behavior and trends. Additionally, even if the Tier 2 Airports are able to capture 100 percent of their markets, the need for MSP terminal and landside improvements would only be temporarily delayed.	No
Other Transportation	No	Analysis of the high speed rail corridors concluded that the diversion of air travelers to rail would have little effect on the needs at MSP. Even if the current Minnesota high speed rail initiatives are implemented, they would not be available during the planning time period and the need for improvements at MSP would only be temporarily delayed.	No
New Terminal	No	The investment needed in both money and time to develop a new west side terminal including reconstructing Terminal 1-Lindbergh into remote concourses, constructing roadways, parking facilities and an underground hub tram as well as relocating the air traffic control tower, etc., would be markedly greater than expanding the current terminal complex. For these reasons as well as the changes in the airline industry, the new west side terminal was not included in the 2030 LTCP Update and is eliminated from further consideration.	No
Alternative 1 - Airlines Remain	Yes	This alternative includes the improvements needed through 2020 presuming that the airlines remain in their current terminals. The gate, terminal, landside, roadway and airside facility improvements consist of those necessary to accommodate the forecasted airlines' growth at each terminal.	Yes
Alternative 2 - Airlines Relocate (Sponsor's Preferred Alternative)	Yes	This alternative includes the improvements needed through 2020 presuming that the non-SkyTeam airlines currently located in Terminal 1-Lindbergh are relocated to Terminal 2-Humphrey. This Alternative was conceived in recognition of the fact that the MSP's two-terminal system could be utilized more efficiently. Relocating all airlines other than Delta and the SkyTeam airlines would relieve some capacity constraints at Terminal 1-Lindbergh while better balancing the mix of passengers at the two terminals.	Yes
No Action	No	The No Action Alternative does not meet the Purpose and Need of the Proposed Action, but is retained as required by NEPA per Council on Environmental Quality (CEQ) Regulations.	Yes

Table ES.3.2

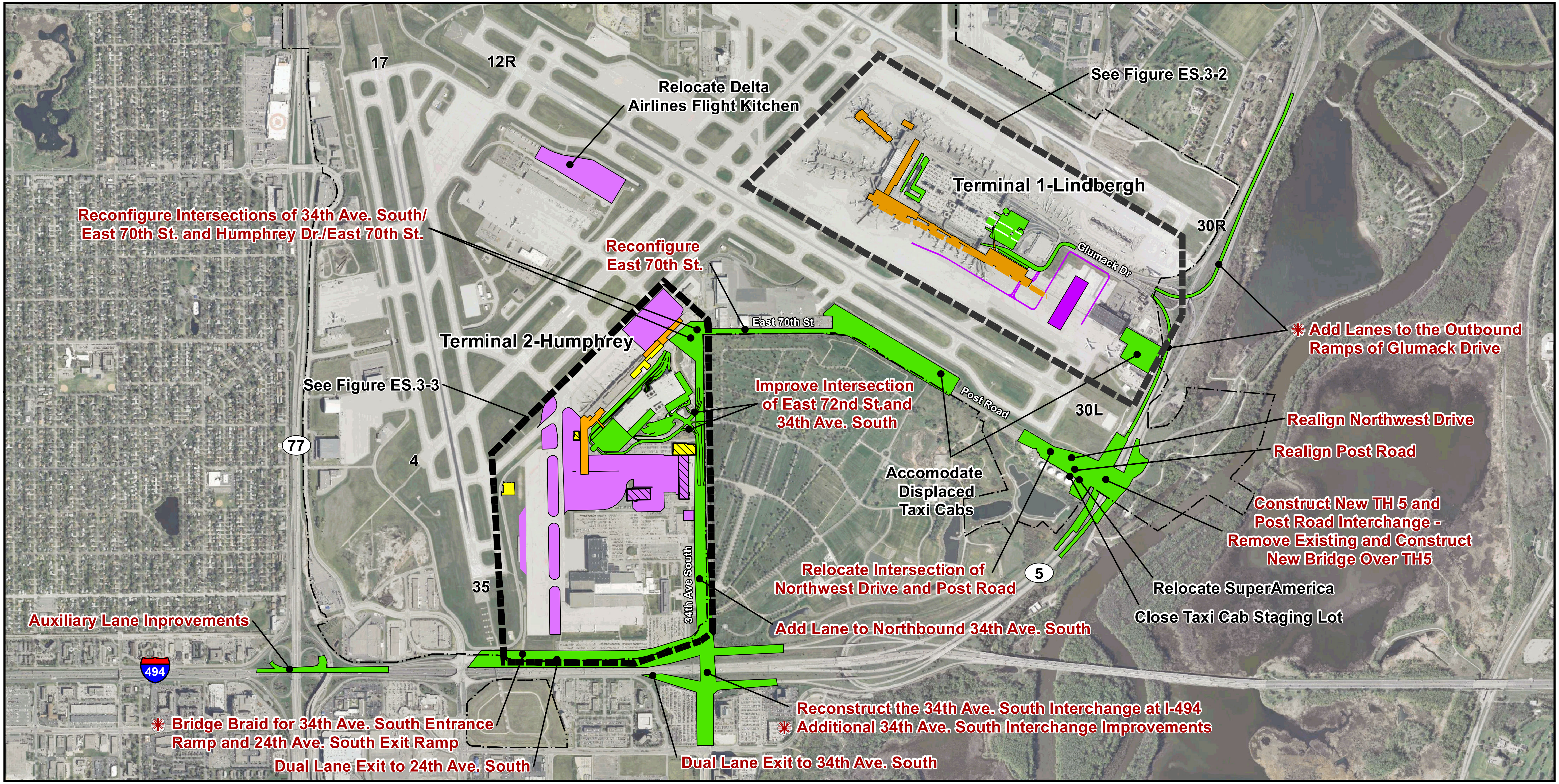
Comparison of Alternatives Retained for Further Consideration

Comparison Criteria	Alternative		
	No Action	**Airlines Remain**	**Airlines Relocate**
Airfield/ Airspace Simulation	Airfield and airspace analysis was conducted for all of the alternatives by using the airport and airspace simulation model (SIMMOD). SIMMOD is a standard analysis tool used by the airport industry and accepted by FAA to develop detailed simulations of current and proposed airport and airspace operations. Based on the simulation, all of the Alternatives would result in about the same level of annual delay per aircraft operation in 2020 and in 2025. This was to be expected given that the Alternatives do not include changes to the runways and they include only minor changes to taxiways. Information regarding the simulation analysis is provided in ***Appendix D,*** *MSP Airfield Simulation Analysis*.		
Construction Phasing	Not Applicable	Phasing of projects at Terminal 1-Lindbergh would be difficult because many of the facilities are already operating at or over their design capacities. As a result construction will likely be more difficult to schedule, take longer and cost more. Although the MAC would strive to maintain an adequate LOS it would be very difficult to avoid negatively impacting the passengers' experience during construction.	Phasing of projects at Terminal 1-Lindbergh would be facilitated by the movement of the non-SkyTeam Airlines to Terminal 2-Humphrey. After the move, demand on strained facilities would be reduced and abandoned space could be renovated or temporarily used while other facilities are being renovated/constructed. In addition, the expansion of facilities at Terminal 2-Humphrey would be generally outside the confines of the existing terminal and could be accomplished with minimal disruption to passengers.
Order of Magnitude Cost	Minor	$1.3 billion dollars Because this is a rough estimate of cost based on conceptual/preliminary planning it does not include the added cost attributed to the difficulty of phasing construction at Terminal 1-Lindbergh. Detailed planning would be required to determine the magnitude of cost associated with phasing the construction at Terminal-1 Lindbergh with this alternative.	$1.5 billion dollars Part of the reason that the Airlines Relocate Alternative is more expensive than the Airlines Remain Alternative is that the Airlines Relocate provides for more capacity. By virtue of building out the full footprint of some of the facilities at Terminal 1-Lindbergh, the Airlines Relocate Alternative provides more capacity albeit at a higher cost. Though the airport will be able to handle more capacity as a result of this alternative, the additional capacity is not needed as part of this project and will occur as a secondary benefit. All applicable environmental documentation will be completed in the future when additional capacity is necessary.
Customer Service	Customer service would deteriorate as aircraft operations and the number of passengers grows.	Once construction is complete, customer service with the Airlines Remain Alternative would be improved when compared to the customer service with the No Action Alternative. However, during construction customer service would suffer because construction would impact facilities that are already operating at or over their design capacities.	The primary reason to move all of the non-SkyTeam Airlines to Terminal 2-Humphrey is to improve customer service. With this Alternative, the traveling public would be able to easily determine the "correct terminal," the terminal they need to go to depart or drop off/pick-up passengers: Terminal 1-Lindbergh for Delta/SkyTeam Airlines and Terminal 2-Humphrey for everyone else. In addition, customer service would be less impacted by construction than with the Airlines Remain Alternative because the renovation/expansion could be completed with minimal disruption to passengers.
Post 2020	Poor LOS and potential near grid lock of some facilities.	Additional capacity would be needed particularly in terms of gates almost immediately post-2020 to accommodate any growth in passengers without a deterioration in service.	Though the intent of this project is to improve the level of service at terminal facilities, this Alternative would result in adequate capacity to handle growth at Terminal 1-Lindbergh without the need for additional facilities.
Environmental Impact	No potential environmental impacts that would exceed the thresholds of significance were identified for any of the Alternatives. There would be little or no difference in the potential environmental impacts associated with the Airlines Remain and the Airlines Relocate Alternatives.		

Source: MAC Analysis, 2011.

Table ES.3.3

Sponsor's Preferred Alternative	
Terminal 1-Lindbergh	**Terminal 2-Humphrey**
• **Terminal** – Expand and remodel Concourse G ▪ Construct new International Facility ▪ Install new Concourse G tram – Remodel and reconfigure the terminal lobby – Reconfigure and expand baggage claim area – Remodel Concourse E	• **Terminal** – Expand terminal
• **Landside / Roadway** **Before 2020** – Expand terminal arrivals curb and relocate commercial ground transportation center (GTC) – Construct a new parking ramp ▪ Relocate portions of Glumack Drive ▪ Extend underground hub tram tunnel **After 2020** – Add dual lane exits to the outbound ramps from Glumack Drive to Trunk Highway (TH) 5	• **Landside / Roadway** **Before 2020** – Expand terminal curb – Expand existing and construct new parking ramps – Reconstruct 34th Avenue South interchange at I-494 – Add lane to Northbound 34th Avenue South – Improve intersection of East 72nd Street and 34th Avenue South – Reconfigure the intersections of 34th Avenue South / East 70th Street and Humphrey Drive / East 70th Street – Reconfigure East 70th Street – Construct a new Trunk Highway (TH) 5 and Post Road Interchange ▪ Remove existing and construct new bridge over TH 5 ▪ Realign Post Road and Northwest Drive ▪ Relocate the intersection of Northwest Drive and Post Road ▪ Relocate SuperAmerica ▪ Close taxi cab staging lot and accommodate displaced taxi cabs – Construct a dual lane exit from eastbound I-494 to 34th Avenue South – Construct a dual lane exit from westbound I-494 to 24th Avenue South – Construct auxiliary lane improvement on westbound I-494 between 24th Avenue South and the exit to southbound TH 77 **After 2020** – Construct bridge braid for 34th Avenue South entrance ramp to westbound I-494 and exit ramp to 24th Avenue South from westbound I-494 – Additional expansion of the 34th Avenue South interchange at I-494
• **Airside** – Relocate Runway 30L deicing pad – Relocate airfield service road – Extend Airport Operations Area tunnel and A Street – Relocate Concourse G Fuel Main Line	• **Airside** – Expand terminal apron – Construct Remain Overnight (RON) aircraft apron ▪ Construct new taxiway ▪ Demolish Building F – Relocate run-up pad – Demolish and relocate Delta Air Lines Flight Kitchen – Relocate ground support equipment facility



LEGEND

- Proposed Terminal Projects
- Proposed Landside/Roadway Projects
- Proposed Airside Projects
- Planned Post 2020
- Projects that are Underway
- Remove and/or Relocate
- MAC Property

Sponsor's Preferred Alternative

N

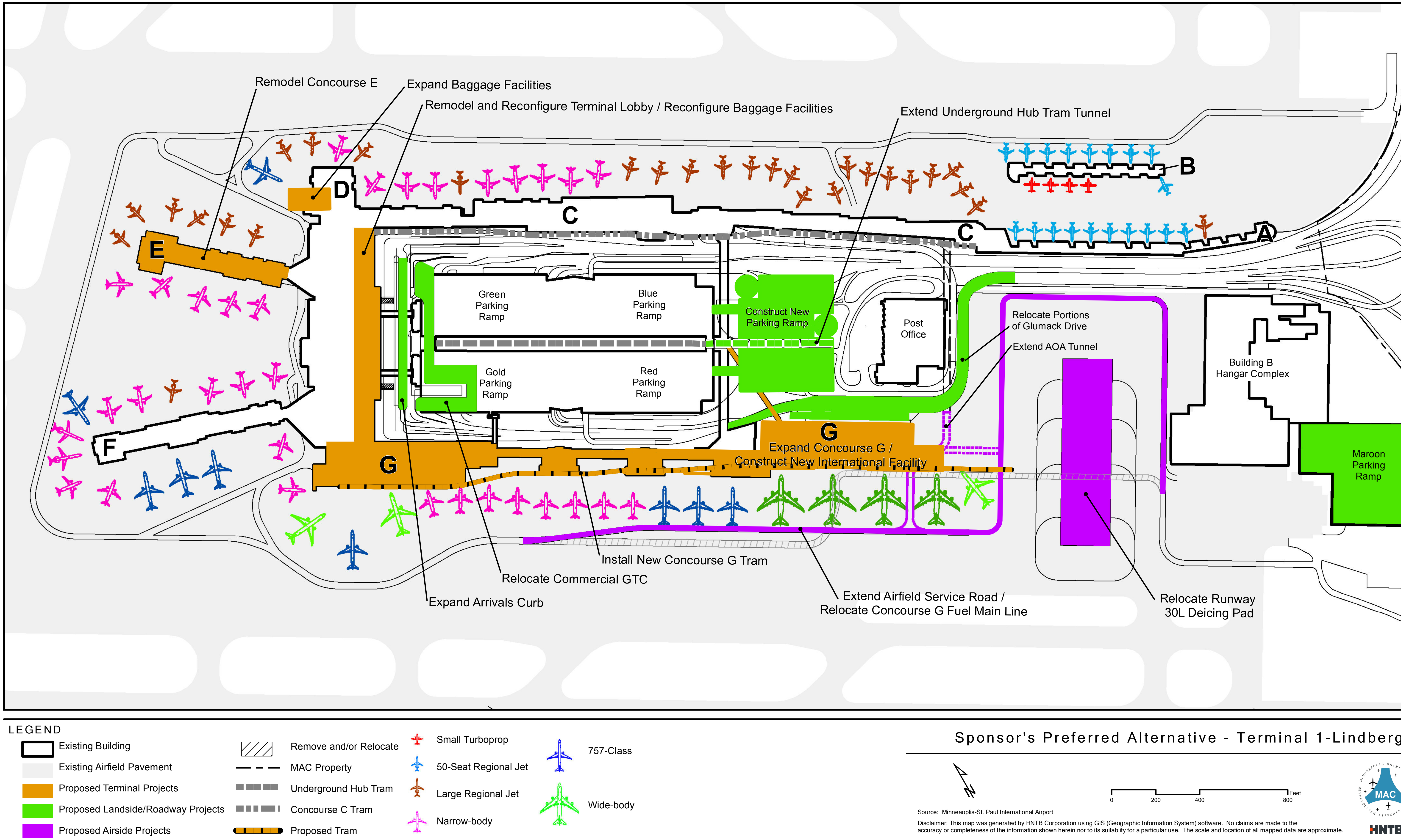
0 750 1,500 3,000 Feet

Source: Minneapolis-St. Paul International Airport

Disclaimer: This map was generated by HNTB Corporation using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitability for a particular use. The scale and location of all mapped data are approximate.

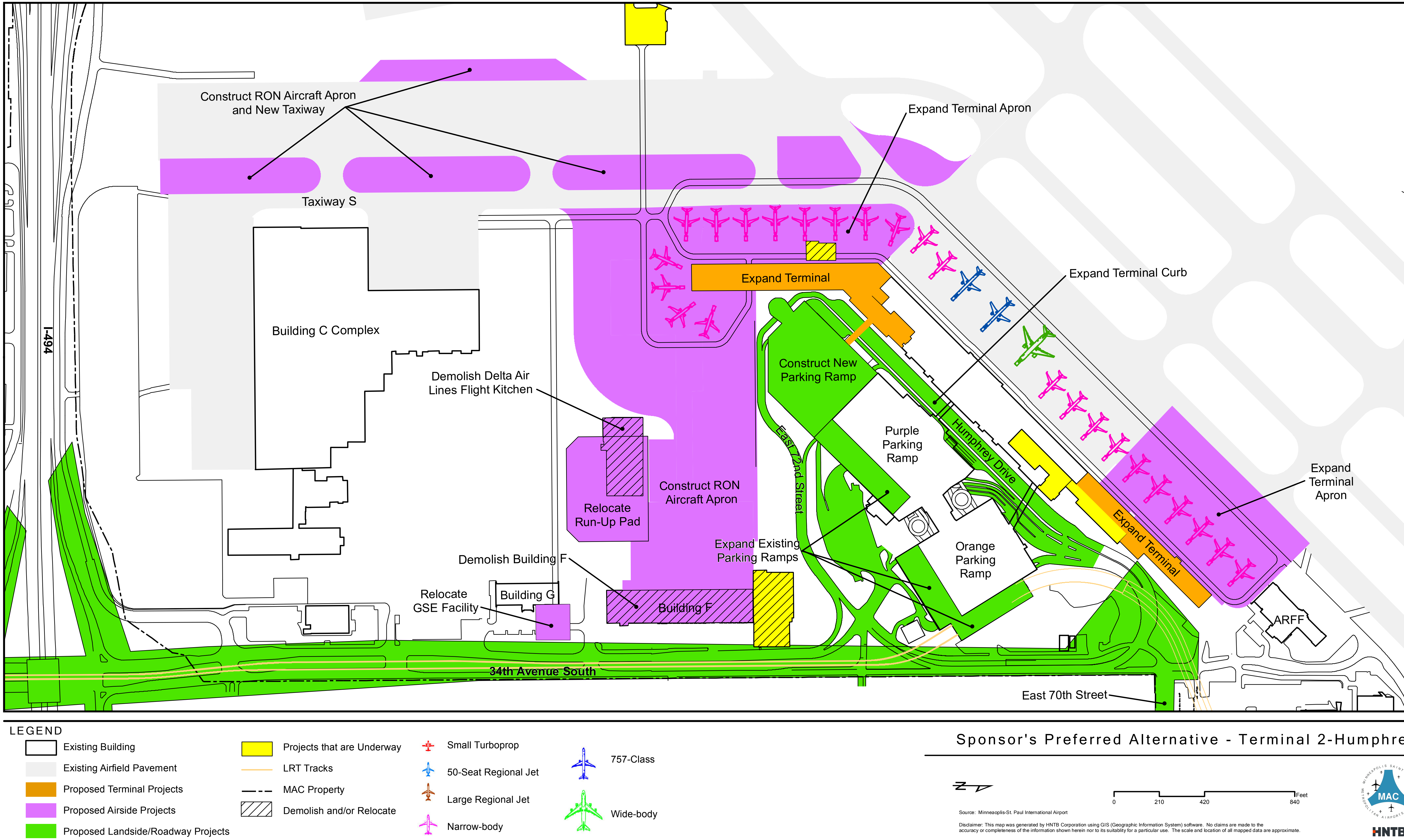
MAC

HNTB



Sponsor's Preferred Alternative - Terminal 1-Lindbergh

Source: Minneapolis-St. Paul International Airport
Disclaimer: This map was generated by HNTB Corporation using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitablity for a particular use. The scale and location of all mapped data are approximate.



Sponsor's Preferred Alternative - Terminal 2-Humphrey

ES.4 Environmental Effects and Mitigation Measures

The impacts of the Action Alternatives were determined by comparing the projected future conditions of the Action Alternatives with the corresponding future conditions of the No Action Alternative. In accordance with FAA guidance, impacts were evaluated for the year of implementation, 2020, and five years thereafter, 2025. The year 2025 was included to adequately disclose potential impacts after implementation of the proposed projects. In addition, for traffic related impacts, effects were analyzed for 2030 to address FHWA's requirement to consider the 20 year planning horizon.

Impacts were assessed in accordance with FAA Orders 1050.1E and 5050.4B. Analysis beyond that required in these Orders was completed to meet FHWA requirements and address all impact categories in the Minnesota EAW.

Table ES.4.1 provides an overview of the environmental impacts associated with the Action Alternatives and the No Action Alternative. Additional information regarding the assessment of environmental impacts is provided following Table ES.4.1.

Table ES.4.1

Environmental Consequences Summary

<table>
<tr><th rowspan="2">Environmental Impact Category</th><th colspan="3">Environmental Impact</th></tr>
<tr><th>No Action Alternative</th><th>Alternative 1 – Airlines Remain</th><th>Alternative 2 – Airlines Relocate</th></tr>
<tr><td rowspan="2">Air Quality</td><td>MSP is within a carbon monoxide (CO) maintenance area</td><td colspan="2">- Operational and construction-related emissions do not exceed de-minimis levels.
- CO concentrations are below the NAAQS/MAAQS.</td></tr>
<tr><td colspan="3">- 2030 Mobile Source Air Toxic emissions are not expected to differ substantially between alternatives and no impacts are anticipated under any of the alternatives.</td></tr>
<tr><td>Climate</td><td>No Impact</td><td colspan="2">- Greenhouse gas emissions increase slightly compared to the No Action Alternative.</td></tr>
<tr><td>Coastal Resources</td><td colspan="3">n/a</td></tr>
<tr><td>Compatible Land Use</td><td>No impact</td><td colspan="2">- No noise changes to noise sensitive land uses exceed the threshold of significance.
- No change in land use compatibility related to safe aircraft operations or wildlife hazards.</td></tr>
<tr><td>Construction Impacts</td><td>Minimal construction</td><td colspan="2">- Air emissions conform to SIP.
- Construction stormwater permit needed.</td></tr>
<tr><td>Department of Transportation: Section 4(f)</td><td>No impact</td><td colspan="2">- No use of a Section 4 (f) resource would be anticipated.</td></tr>
<tr><td>Farmlands</td><td colspan="3">n/a</td></tr>
<tr><td>Fish, Wildlife and Plants</td><td>No impact</td><td colspan="2">- No listed endangered or threatened species in Study Area.
- No adverse impacts to biotic resources would be expected.</td></tr>
<tr><td>Floodplains</td><td colspan="3">n/a</td></tr>
<tr><td>Hazardous Materials, Pollution Prevention and Solid Waste</td><td>No impact</td><td colspan="2">- No solid/hazardous waste facilities disturbed at MSP, but hazardous materials could be encountered during construction.</td></tr>
</table>

Table ES.4.1

Environmental Consequences Summary

Environmental Impact Category	Environmental Impact		
	No Action Alternative	**Alternative 1 – Airlines Remain**	**Alternative 2 – Airlines Relocate**
Historical, Architectural, Archaeological and Cultural Resources	No impact	- There may be an archaeological site in the area NW of the Post Road/TH 5 interchange. Both Action Alternatives include construction at this interchange. More detailed design information and potentially a site investigation are required to determine if there is potential to impact the archaeological site.	
Light Emissions and Visual Effects	No impact	- Additional apron and parking facility lighting not anticipated to cause adverse impacts.	
Natural Resources and Energy Supply	- Minimal differences in energy consumption between No Action and Action Alternatives.		
Aircraft Noise	No impact	- No noise changes at noise sensitive land uses exceed the threshold of significance (an increase of 1.5 dB DNL or above at the 65 DNL exposure). - Minor variations in contours between alternatives.	
Vehicular Noise	There are 35 daytime and 25 nighttime modeled receptors that approach or exceed state or federal standards.	- None of the modeled receptor locations are projected to experience a substantial increase in traffic noise levels. - Noise levels would approach or exceed federal noise abatement criteria at 24 modeled receptor in 2030. - The 2030 vehicular noise analysis found that noise barriers were not reasonable because they did not meet the federal noise reduction design goal or cost effectiveness criteria.	
Secondary (Induced) Impacts	- No significant impacts in other categories, therefore no secondary impacts expected.		
Socioeconomic Impacts, Environmental Justice and Children's Health and Safety Risks (including Traffic and Circulation)	No impact	- Requires relocation of SuperAmerica, but no anticipated loss in businesses or employment. - In terms of traffic and circulation, the Airlines Remain and Airlines Relocate Alternatives would generally operate significantly better than the No Action Alternative.	
Water Quality	No impact	- 6.5 acres net increase of impervious surface (of which 3.7 acres are associated with roadway improvements).	- 28.4 acres net increase of impervious surface (of which 1.1 acres are associated with roadway improvements).
		- Insignificant changes relative to surface water discharges as all projects will meet construction NPDES permit and Lower Minnesota River Watershed District (LMRWD) requirements. - Potential increase in deicing fluid collection efficiencies.	
Wetlands	n/a		
Wild and Scenic Rivers	n/a		
Cumulative Effects	The impacts associated with the Alternatives are minor. No single impact; even when considered with past, present and future actions; represents a substantial impact that cannot be mitigated. Therefore, none of the Alternatives would result in significant cumulative impacts.		

Note: n/a = No impact to Environmental Impact Category and/or category not applicable to MSP area.
NAAQS = National Ambient Air Quality Standard; MAAQS= Minnesota Ambient Air Quality Standard

Source: HNTB analysis, 2011.

ES.4.1 Air Quality

Air quality analyses included air emissions inventories and dispersion analysis to satisfy both FAA and FHWA Clean Air Act (CAA) and NEPA requirements.

To meet CAA regulations applicable to the FAA, the proposed projects were evaluated in terms of General Conformity. Under General Conformity, if the project-related emissions (those expected to result from the proposed projects) are within prescribed *de-minimis* levels, they automatically conform to the State Implementation Plan (SIP). Only carbon monoxide emissions were inventoried because MSP is located in an area designated as in attainment for all other criteria pollutants except carbon monoxide (CO). Analysis showed that the differences in CO emissions between each Action Alternative and the No Action Alternative would be below the General Conformity *de-minimis* threshold. Also, construction-related CO emissions associated with the Action Alternatives would be within the *de-minimis* threshold.

Dispersion analyses were conducted to address NEPA air quality requirements in accordance with FAA guidance. Macroscale and intersection CO dispersion concentrations were calculated for 2020 and 2025. As a result of these analyses, it was determined that the CO macroscale and intersection concentrations would be below the applicable standards.

The FHWA required that the following items be addressed in the 2030 air quality analysis of the regional roadway improvements:

- A hot-spot analysis if US Environmental Protection Agency (USEPA) approved screening thresholds are exceeded.
- That regionally significant projects are part of a conforming Long Range Transportation Policy Plan (LRTPP) and four-year Transportation Improvement Program (TIP).
- A Mobile Source Air Toxics (MSAT) analysis.

The FHWA adheres to the USEPA approved screening method to determine which intersections need a hot-spot analysis. The hot-spot screening method uses a threshold of 79,400 entering vehicles per day and the 2030 forecast entering traffic volumes to determine if a hot-spot analysis is required. Entering volumes at all intersections studied in the EA were forecast to be less than this threshold, therefore a hot-spot analysis was not completed for 2030.

The USEPA issued final rules on transportation conformity (40 CFR 93, Subpart A) which describe the methods required to demonstrate State Implementation Plan compliance for transportation projects. It requires that transportation projects must be part of a conforming Long Range Transportation Policy Plan (LRTPP) and four-year Transportation Improvement Program (TIP). The proposed regional roadway improvements are not considered regionally significant, as the proposed auxiliary lane addition along Interstate 494 (I-494) is less than one mile in length and no new interchange access would be provided. Therefore, these improvements do not conflict with the assumptions and conformity determination in the current LRTPP (approved by FHWA on February 2, 2011) and TIP (approved by FHWA on December 16, 2011).

The FHWA was consulted to determine the appropriate level of Mobile Source Air Toxic (MSAT) analysis for the proposed roadway improvements. This consultation resulted in the following response:

Although the projected 2030 ADT on I-494 exceeds the 140,000 to 150,000 ADT [Average Daily Traffic] threshold outlined in FHWA guidance that would [require] a quantitative assessment, the anticipated scope of work appears to (1) primarily improve highway operations without adding substantial new capacity, and (2) result in a facility that is not likely to meaningfully increase MSAT emissions.

As such, it was concluded that a qualitative MSAT analysis is adequate for the proposed roadway improvements in the MSP 2020 Improvements EA. The 2030 ADT would be the same for all Alternatives because the proposed improvements provide operational benefits but are not expected to reroute trips from elsewhere in the transportation network. As a result, MSAT emissions would not be expected to differ substantially between Alternatives.

ES.4.2 Climate

Greenhouse gas (GHG) emission inventories were completed for the No Action Alternative and the Action Alternatives.

With the implementation of the Airlines Remain Alternative, total GHG emissions would increase by 17,388 and 7,097 metric tons carbon dioxide equivalents (MT CO_2e) for 2020 and 2025 respectively, over the No Action Alternative. This change equates to a 0.44 and 0.16 percent increase over the No Action Alternative. With the implementation of the Airlines Relocate Alternative, total GHG emissions would increase by 18,715 and 24,624 metric tons for 2020 and 2025, respectively, over the No Action Alternative. This change equates to a 0.48 and 0.57 percent increase over the No Action Alternative.

The incremental increases in MT CO_2e emissions were considered in the context of US and global MT CO_2e emissions. For the Airline Remain Alternative, the increases would comprise less than 0.0003 percent of U.S.-based GHG emissions and less than 0.00004 percent of global GHG emissions. For the Airline Relocate Alternative, the increases would comprise less than 0.0004 percent of U.S.-based GHG emissions and less than 0.00006 percent of global GHG emissions.

ES.4.3 Historical, Architectural, Archaeological and Cultural Resources

Potential impacts to historical, architectural, archaeological and cultural resources were assessed in accordance with the National Historic Preservation Act of 1966 (as amended) (NHPA). A historic or cultural resource is defined as one that is listed, or eligible for listing, on the National Register of Historic Places (NRHP), the official list of the nation's cultural resources.

A reconnaissance assessment and an archaeological assessment were completed to determine if there are any cultural resources within the area impacted by the alternatives. The only potentially eligible NRHP site identified was an archaeological site in the area northwest of the Post Road/TH 5 interchange.

The Airlines Remain and Airlines Relocate Alternatives include construction of a new TH 5/Post Road interchange and therefore may result in an impact to the potential archaeological resource, if present. Additional design to define the limit of construction and additional archaeological investigations to determine if resources are present are necessary to determine if either Action Alternative will result in an adverse effect. However, additional design will not be completed until after the completion of this EA. Therefore, this project has been broken down into two separate phases to allow portions of the project to move forward while still meeting the requirements of the NHPA.

Phase I will include the entire project area except for the area around the Post Road/Trunk Highway (TH) 5 intersection. Phase II will include the Post Road/TH 5 intersection and all associated work (relocation of Northwest Drive and Post Road intersection, relocation of SuperAmerica, and construction of new Post Toad/TH 5 bridge and intersection).

The reconnaissance assessment and archaeological assessment did not identify any resources listed on or eligible for listing on the NRHP for Phase I. Therefore, the FAA has determined that a No Historic Properties Affected finding is adequate for Phase I. This finding was submitted to the State Historic Preservation Office (SHPO) and the Tribes with the Draft EA. Upon review, the SHPO concurred with the FAA's finding for Phase I. The letter from the SHPO is included in ***Appendix F***, *Historic Resources.*

Phase II will occur after the EA process is complete. Additional information is needed to determine if Phase II will result in an adverse effect. The impacts associated with Phase II will be determined prior to any construction activities in consultation with the SHPO and the Tribes.

ES.4.4 Noise

Aircraft noise impacts and vehicular noise impacts were evaluated for the alternatives.

ES.4.4.1 Aircraft

The threshold of significance for noise is triggered if the proposed action alternative would cause an increase of 1.5 dB DNL or greater for a noise sensitive land use at or above the 65 dB DNL noise exposure when compared to the No Action Alternative. [For instance, the threshold of significance is exceeded if an action results in a 1.5 dB DNL increase at a noise sensitive site where the No Action noise exposure is 63.5 dB DNL.]

There are no areas of sensitive land uses that would experience a 1.5 dB, or greater, increase in the 65 DNL noise contour and or a 3.0 dB, or greater, increase in the 60 DNL noise contour when comparing the 2020 and 2025 Airlines Remain Alternative and the Airlines Relocate Alternative noise contours to the respective No Action Alternative DNL noise contours. In 2020, the lowest number of residential units in the 65+ DNL noise contours is provided by the No Action Alternative. There are 10 more residential units in the Airlines Remain Alternative and 4 more residential units in the Airlines Relocate Alternative within the 65+ DNL noise contours. In 2025, the lowest number of residential units in the 65+ DNL noise contour is provided by the Airlines Remain Alternative. There are 81 more residential units in the No Action Alternative and 171 more residential units in the Airlines Relocate Alternative. However, in both 2020 and 2025 all residential units within the 65+ DNL noise contours of the development alternatives being considered have been provided noise mitigation and, as such, are considered a mitigated incompatible land use.

However, in consideration of the circumstances unique to MSP by virtue of past mitigation activities, the terms of the Consent Decree, and the local land use compatibility guidelines defined by the Metropolitan Council, mitigation is proposed. The proposed mitigation in the Draft EA/EAW was based on the 2020 Sponsor's Preferred Alternative 60+ DNL noise contour. The trigger for commencement of the mitigation was 484,879 annual operations or the year 2020, whichever came first.

The proposed noise mitigation program in the Draft EA/EAW was revised during the development of the Final EA/EAW. The mitigation program was revised to provide a more flexible framework that addresses actual noise impacts in the context of future airport development scenarios and FAA operational initiatives.

The revised program eligibility and timing are based on annually-developed actual noise contours. An outline of the proposed mitigation program follows:

- Mitigation eligibility would be assessed annually based on the actual noise contours for the previous year.
- The annual mitigation assessment would begin with the actual noise contour for the year in which the ROD was approved.
- For a home to be considered eligible for mitigation it must be located in the actual 60+ DNL noise contour, within a higher noise impact mitigation area when compared to its status relative to the Consent Decree noise mitigation program, for a total of three consecutive years, with the first of the three years beginning no later than 2020.
- The noise contour boundary would be based on the block intersect methodology.
- Homes would be mitigated in the year following their eligibility determination.

ES.4.4.2 Vehicular

A separate noise analysis was conducted for the 2030 vehicular traffic changes that would result from the proposed airport alternatives.

A traffic noise impact analysis is required for all Federal or Federal-aid Type I projects (construction of a highway meeting one or more of eight criteria defined in 23 CFR 772.5). Noise impacts are determined based on land use activities and predicted worst hourly L_{10} noise levels under future conditions. A "substantial increase" is defined as an increase of 5 dBA or greater from existing to future conditions.

Traffic noise levels were modeled at a total of 108 representative receptor locations along the I-494 and Trunk Highway (TH) 5 project corridor. Based on the modeling results, none of the modeled receptor locations would be projected to experience a substantial increase in traffic noise levels.

While there would not be a substantial increase in noise at the receptors, modeling showed that L_{10} noise levels would approach or exceed Federal noise abatement criteria at 24 modeled receptor locations within the project area in 2030. Receptor locations where noise levels are “approaching” or exceeding the criterion level must be evaluated for noise abatement feasibility and reasonableness. The evaluation of noise abatement measures included consideration of noise barriers. Noise barriers were evaluated at modeled receptor locations where traffic noise levels were predicted to exceed State standards or approach/exceed Federal noise abatement criteria. None of the modeled noise barriers were found to be reasonable (i.e. meet the noise reduction design goal of 7 dBA or the cost effectiveness criteria of $43,500/benefited receptor). Also, none of the other types of noise abatement measures considered for a Type I highway project would be reasonable.

ES.4.5 Traffic and Circulation

The analysis for traffic impacts consisted of evaluating on- and off-airport ground transportation facilities including roadways, parking facilities and curb roadways for the No Action, Airlines Remain and Airlines Relocate Alternatives in 2020 and 2025. In addition regional roadway improvements were evaluated out to 2030 based on the 2030 LTCP and background traffic growth to satisfy FHWA NEPA requirements. The potential vehicular traffic impacts resulting from implementation of the alternatives were determined by comparing the demand to the capacity of the facility under each alternative, and examining measures of effectiveness such as speed and density.

The Action Alternatives would provide sufficient parking and curb roadways for 2020, unlike the No Action Alternative. Additionally, nearly all of the on-airport roadways would operate at an acceptable LOS with all of the Alternatives. The only exception being outbound Glumack Drive which would operate at a LOS of F in 2025 with both the No Action and Airlines Remain Alternative.

For the off-airport ground transportation facilities within the Circulation and Traffic Study Area, the modeling results showed that the Airlines Remain and Airlines Relocate Alternatives would operate significantly better than the No Action Alternative. Under both Action Alternatives there would be no overall intersections with an undesirable LOS in 2020 or 2025. This compared to seven and 14 intersections that would have an undesirable LOS with the No Action Alternative in 2020 and 2025, respectively. Under 2030 build conditions there would be no overall intersections that would operate at an undesirable LOS.

ES.4.6 Water Resources

Surface water quality and groundwater quality impacts were evaluated for the alternatives.

ES.4.6.1 Surface Water

The following were evaluated to assess potential surface water quality impact: stormwater network hydrology, total suspended solids (TSS) removal, organic loading and the potential for petroleum/fuel releases.

A hydrologic analysis was conducted to evaluate the impact of the Action Alternatives on the storm sewer and pond system, taking into account the amount of impervious surface being drained. The Airlines Remain Alternative and Airlines Relocate Alternative include the addition of 6.5 and 28.4 acres of net new impervious surface, respectively. However, based on the result of the hydrologic modeling, the net increases would result in insignificant impacts to the peak discharges to the Minnesota River.

TSS is a pollutant of concern because the Minnesota River has very high TSS loads. An analysis was completed to determine the effect of new construction on the performance of the stormwater ponds and related best management practices (BMPs) in reducing TSS discharges. The analysis showed that the new construction from the Action Alternatives resulted in insignificant decreases in pond treatment efficiency.

Organic loadings in the airport's stormwater discharges are largely due to impacts from aircraft deicing activities. The primary component in Aircraft Deicing Fluid (ADF) is propylene glycol, which can exert an oxygen demand on receiving waters and potentially reduce dissolved oxygen levels. Therefore, a quantitative analysis of the estimated ADF collection efficiency of the alternatives was conducted. Based on this analysis, the Action Alternatives would result in an overall increase in collection efficiencies, which will reduce the overall organic loadings to the Minnesota River when compared with the No Action Alternative.

The Action Alternatives do not include any major modifications to the stormwater conveyance systems near the end of pipe where the petroleum impact discharge prevention mechanisms are located. It is expected that the location of fueling activities will be different based on the alternative selected, however, it is not anticipated this will impact petroleum surface water discharges.

ES.4.6.2 Groundwater

Impacts to groundwater at MSP are largely associated with fuel spills/leaks and the potential vertical migration or exfiltration of aircraft deicing fluids. Since the total number of aircraft operation in a given year would be the same for all alternatives, the total fueling operations are likely similar. Therefore, no material difference in the potential for groundwater impacts from fueling activities would be expected between the three alternatives. Additionally, the Action Alternatives would be expected to nominally reduce the overall potential for groundwater impacts because they include construction of new pavement with storm sewer systems that would likely include design criteria to improve collection of glycol-impacted stormwater.

The MAC is not aware of significant groundwater contamination issues in the roadway improvement areas. Furthermore, the industrial activities of concern, primarily aircraft fueling and deicing, have not and will not occur in roadway improvement areas.

ES.4.7 Cumulative Effects

Both CEQ Regulations and the Minnesota Administrative Rules require the consideration of cumulative effects. A cumulative effect is defined as the combined incremental effects of a proposed project and other past, present, and reasonable foreseeable projects. The first step in assessing cumulative effects was to identify past, present and reasonably foreseeable projects. Completed and anticipated projects at the airport and in the abutting communities, including the cities of Richfield, Bloomington and Minneapolis were identified for consideration of cumulative effects.

The next step was to identify the impacts associated with the Action Alternatives. Cumulative effects analysis is resource specific and generally addresses environmental resources that would be affected by the Alternatives. The key question is "do the effects of the proposed action on a particular environmental resource, when added to affects on the same resource due to other nearby and near-term actions, adversely impact that resource."[1]

Based on the analysis in the EA, the Action Alternatives would not likely impact the following environmental categories: air quality; coastal resources; compatible land use; DOT Section 4(f) resources, farmlands; fish, wildlife and plants; floodplains; hazardous materials; historic resources, light emissions and visual effects; secondary impacts; socioeconomic impacts (except traffic), environmental justice, children's health and safety risks; wetlands; and wild and scenic rivers. The Alternatives would potentially result in construction, traffic and circulation, water quality and noise impacts. Therefore, these impact categories were considered in identifying the potential for cumulative effects.

Construction of the Action Alternatives may create some unavoidable temporary impacts to surrounding communities such as noise, fugitive dust, and degraded water quality. These impacts would be minimized by implementing BMPs and would be localized; predominantly on the airport at the Post Road/TH 5 and 34th Avenue South/I-494 interchanges. Due to the localized nature of construction impacts, the potential for cumulative effects is likely most relevant to the South Loop District Plan. The MAC and City of Bloomington are coordinating construction sequencing for slated improvements. Given the need for the MAC and City of Bloomington to maintain traffic flow, it is unlikely construction projects will take place at the same time and in the same vicinity. Therefore, it is unlikely that the Alternatives along with the other identified projects would result in cumulative construction effects.

The Alternatives would result in traffic and circulation impacts. However, the analysis showed that the transportation facilities would generally operate significantly better with the Action Alternatives than with the No Action Alternative. Therefore, the Action Alternatives would not contribute to cumulative adverse traffic and circulation impacts.

The Alternatives including both airport and roadway improvements would result in minimal impacts to stormwater. Since none of the other projects considered would discharge stormwater to the storm sewer system at MSP, water quality impacts would not be cumulative. Other projects that discharge to non-MSP systems would be designed with rate and volume control measures to address water quality impacts. Therefore, significant cumulative impacts to the Minnesota River are not expected when considering past, present and future projects. Furthermore, NPDES permitting protects against water quality impacts that would exceed water quality standards.

Though the Action Alternatives do not result in any significant noise impacts, a cumulative analysis was completed to determine if the Action Alternatives; when considered with other past, present and reasonably foreseeable future actions; would potentially result in a cumulative significant noise impact. The only other project at the airport that could result in a noise impact is the proposed FAA Air Traffic Organization's (ATO) Performance Based Navigation (PBN) procedures, which includes Area Navigation (RNAV) and Required Navigation Performance (RNP) procedures, and are considered reasonably foreseeable. Therefore, an analysis was conducted to assess the potential for cumulative noise effects of the Alternatives and the proposed PBN procedures.

Based on extensive input from community leaders and airport neighbors, the MAC Full Commission voted on November 19, 2012 to provide support for partial implementation of the FAA ATO proposed PBN procedures. Specifically, the MAC passed the following action: "The Metropolitan Airports Commission supports implementation of the Area Navigation (RNAV) procedures as designed by the Federal Aviation Administration with the exception of RNAV departure procedures off Runways 30L and 30R at Minneapolis-St. Paul International Airport."

Therefore, the assessment of cumulative impacts included the partial implementation of the FAA ATO proposed PBN procedures. The combined noise impacts of the alternatives and the partial implementation of the proposed PBN procedures were assessed for 2020 and 2025. The noise modeling was updated to analyze the combined impacts of the proposed PBN procedures and the alternatives. The RNAV departure tracks off Runways 12L, 12R and 17 were incorporated into the forecasted scenarios for each of the alternatives without needing to adjust the arrival tracks.

The results of the analysis showed that following the partial implementation of the PBN procedures, no areas of sensitive land uses would experience a 1.5 dB, or greater, increase in the 65 DNL noise contour when comparing the No Action Alternative for 2020 and 2025 with either of the action alternatives, Airlines Remain and the Airlines Relocate Alternative for the respective years. Therefore, the cumulative effects of the alternatives along with the proposed PBN procedures would not exceed the FAA's threshold of significance.

In summary, no single impact; even when considered with past, present and future actions; represents a substantial impact that cannot be mitigated. Therefore, none of the Alternatives would result in significant cumulative impacts.

ES.5 Public and Agency Involvement

Public and agency coordination is conducted throughout the NEPA process to exchange information relevant to the Proposed Action and its potential impacts.

ES.5.1 Coordination Prior to the Publication of the Draft EA/EAW

The MAC coordinated with interested agencies and the public throughout the preparation of the EA. Coordination began early in the NEPA process with Agency and Community Briefings in late 2010. These briefings were followed by presentations and briefings at various Noise Oversight Committee (NOC) meetings. Also, the MAC conducted three open houses; two in July of 2011 and one in January of 2012.

Coordination focused on developing regional roadway improvements was also conducted. Potential interchange concepts to improve the level of service and reduce queuing were assessed as part of the MSP Area Roadway Improvements Project. The project management team (PMT) included representatives from the MAC, City of Bloomington, Minnesota Department of Transportation, FHWA, FAA, Metro Transit, Metropolitan Council and the Minnesota Department of Economic Development. The PMT played a key role in evaluating the interchange concepts and identifying a preferred concept.

ES.5.2 Coordination Related to the Publication of the Draft EA/EAW

The Draft EA/EAW was released for agency and public review on August 30th, 2012. Following the release of the Draft EA/EAW the MAC conducted open houses on September 17th and 18th, and October 1st, 2012. The purpose of these open houses was to share information regarding the Draft EA/EAW in an informal setting. The open house on October 1st preceded the public hearing on the same date. The purpose of the public hearing was to allow the public to formally submit verbal or written comments.

Agency and public comments received during the comment period from August 30th to October 11th, 2012 were considered in the development of the Final EA/EAW. Responses to all verbal and written comments received during the public hearing and all written comments received prior to the close of the comment period are provided in ***Appendix R***, *Draft EA/EAW Comments and Responses*.

Endnotes

[1] FAA, *Environmental Desk Reference for Airport Actions,* Chapter 23, Cumulative Impacts, Sections 5a and 6a, October 2007.

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APPENDICES

Chapter 1: INTRODUCTION

This Environmental Assessment (EA) is prepared to comply with both the National Environmental Policy Act (NEPA) and the Minnesota Environmental Policy Act (MEPA). NEPA requires environmental review of federal actions including federal funding, approvals and certifications. The Metropolitan Airports Commission (MAC/Sponsor) is proposing development at the Minneapolis-St. Paul International Airport (MSP) which would require several Federal actions / approvals by the Federal Aviation Administration (FAA) and the Federal Highways Administration (FHWA). FAA actions /approvals include possible funding and airport layout plan (ALP) approval. FHWA actions / approvals include approval of the Interchange Access Request (IAR) for the proposed Interstate 494 (I-494) /34th Avenue South interchange modification and other improvements affecting the interstate. Therefore, environmental review of the proposed development is required per NEPA.

The environmental review is documented in an EA in accordance with FAA and FHWA NEPA policies and procedures. FAA NEPA requirements are contained in Orders 1050.1E, *Environmental Impacts: Policies and Procedures* and 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions.* The FHWA policies and procedures to implement NEPA are prescribed in 23 CFR Part 771. Related guidance includes the FHWA Technical Advisory T6640.8A, *Guidance for Preparing and Processing Environmental and Section 4(f) Documents.*

MEPA requirements are addressed under the Minnesota Environmental Review Program. This program requires the Responsible Government Unit (RGU) to review projects using a standardized public process in order to disclose the environmental effects as well as ways to minimize and avoid the effects. In this case the MAC is the RGU, and per 1988 legislation specific to the MAC, must prepare an Environmental Assessment Worksheet (EAW) for the proposed development. Use of a federal EA as a substitute for the EAW form is authorized under the Minnesota Environmental Review Program provided that the EA addresses the impact categories required in the EAW and the procedural requirements of the EAW process are completed. Therefore, this EA addresses all of the EAW impact categories as well as the FAA and FHWA NEPA impact categories. It is noted that the term EA from this point forward refers to both the EA and EAW and is used interchangeably with the term EA/EAW.

The content and structure of this EA reflect the requirements / guidance provided in FAA Orders 5050.4B and 1050.1E as well as 23 CFR Part 771 and FHWA's T6640.8A. For this EA, the required content and related information is organized in the following manner:

Chapter 1: Introduction – provides background information

Chapter 2: Purpose and Need – describes why the proposed development is needed

Chapter 3: Alternatives – discusses the alternatives considered and why they are either dismissed or carried forward for detailed environmental analysis

Chapter 4: Affected Environment – provides an overview of the environment at and within the vicinity of MSP

Chapter 5: Environmental Consequences – describes the existing conditions of potentially impacted environmental resources and discloses the potential environmental impacts of the alternatives carried forward for detailed analysis

Chapter 6: Public and Agency Involvement – documents the public and agency outreach conducted for the EA

Chapter 7: List of Preparers – lists the document preparers along with their experience

Chapter 8: List of Abbreviations, Acronyms, & Glossary

1.1 Background

MSP is a large commercial service airport managed and run by the MAC, a public corporation established in 1943 by the Minnesota State legislature to provide for coordinated aviation services throughout the Twin Cities metropolitan area.[1] In 2010, MSP served nearly 33 million passengers and accommodated 437,075 landings and takeoffs, ranking it 15th in North America for the number of travelers served and the 12th busiest airfield in the United States.[2,3]

MSP is situated on 3,400 acres approximately seven miles south of downtown Minneapolis, Minnesota and seven miles southwest of downtown St. Paul, Minnesota. The location of MSP is depicted in **Figure 1.1-1**. MSP is not part of any city but is surrounded by Minneapolis, St. Paul and the suburban cities of Bloomington, Eagan, Mendota Heights, and Richfield.

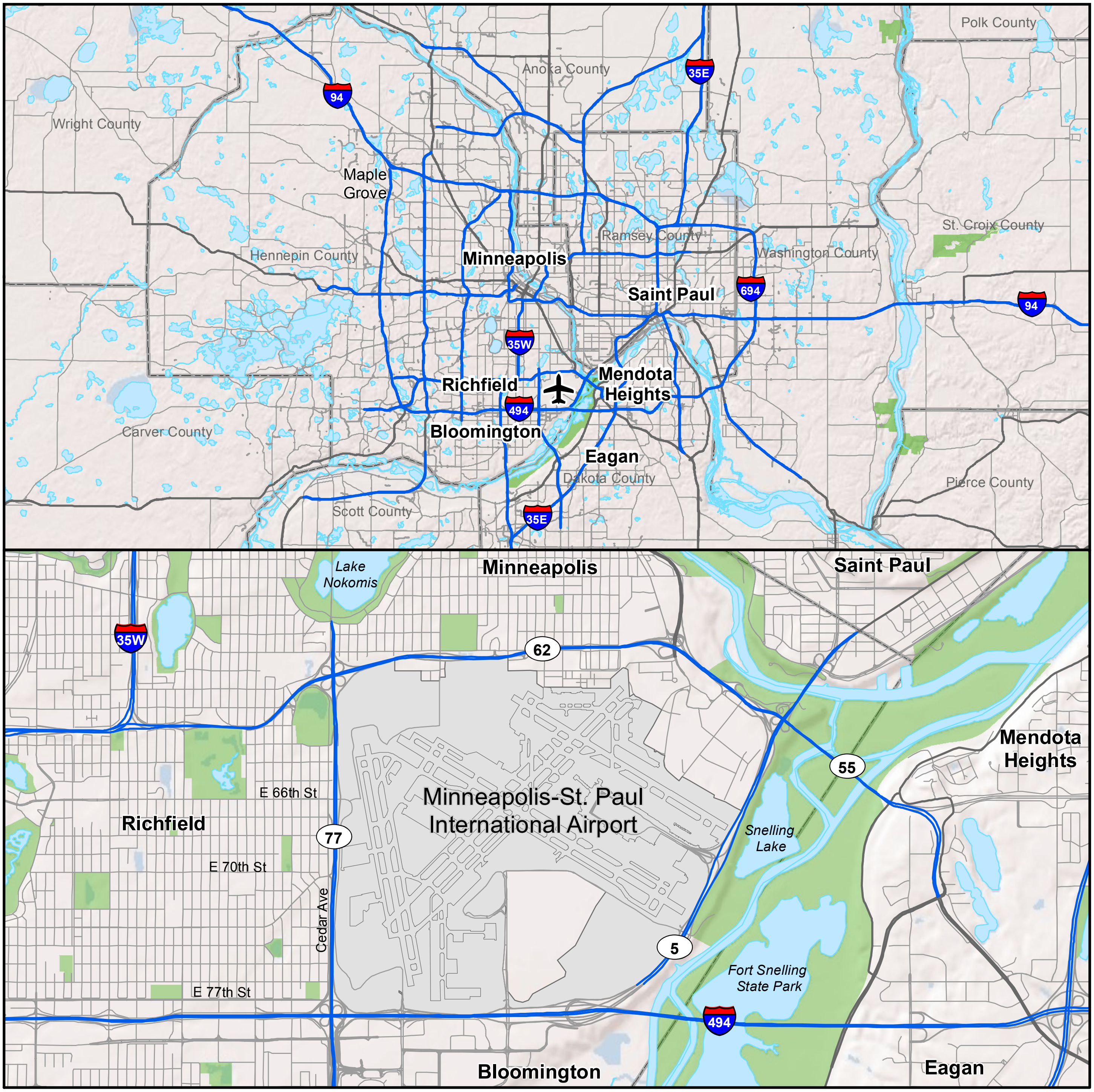
Features of the airfield, terminals and landside facilities are described in Sub-sections 1.1.1, 1.1.2 and 1.1.3, respectively.

1.1.1 Airfield Facilities

The general airfield layout of MSP is illustrated in **Figure 1.1-2**. The airfield consists of four runways; two parallel, one north-south and a crosswind. The two parallel runways, Runways 12L/30R and 12R/30L are 8,200 and 10,000 feet long, respectively. The north-south runway, Runway 17/35, is 8,000 feet long and the crosswind runway, Runway 4/22, is 11,006 feet long. Each runway has at least one associated full length taxiway. Additional taxiways provide access to and from the terminals. Service roads provide access to the all aspects of the airfield. The parallel runways have deicing pads at each end. Runway 17/35 has a deicing pad at the north end.

1.1.2 Terminals

Two terminals serve MSP: Terminal 1-Lindbergh and Terminal 2-Humphrey. Together, they provide a total of 3.2 million square feet of terminal facilities and 127 aircraft gate positions.



LEGEND

494	Interstate
5	Trunk Highway
	Secondary Road
	Parks
	Water

Airport Location and Vicinity Map

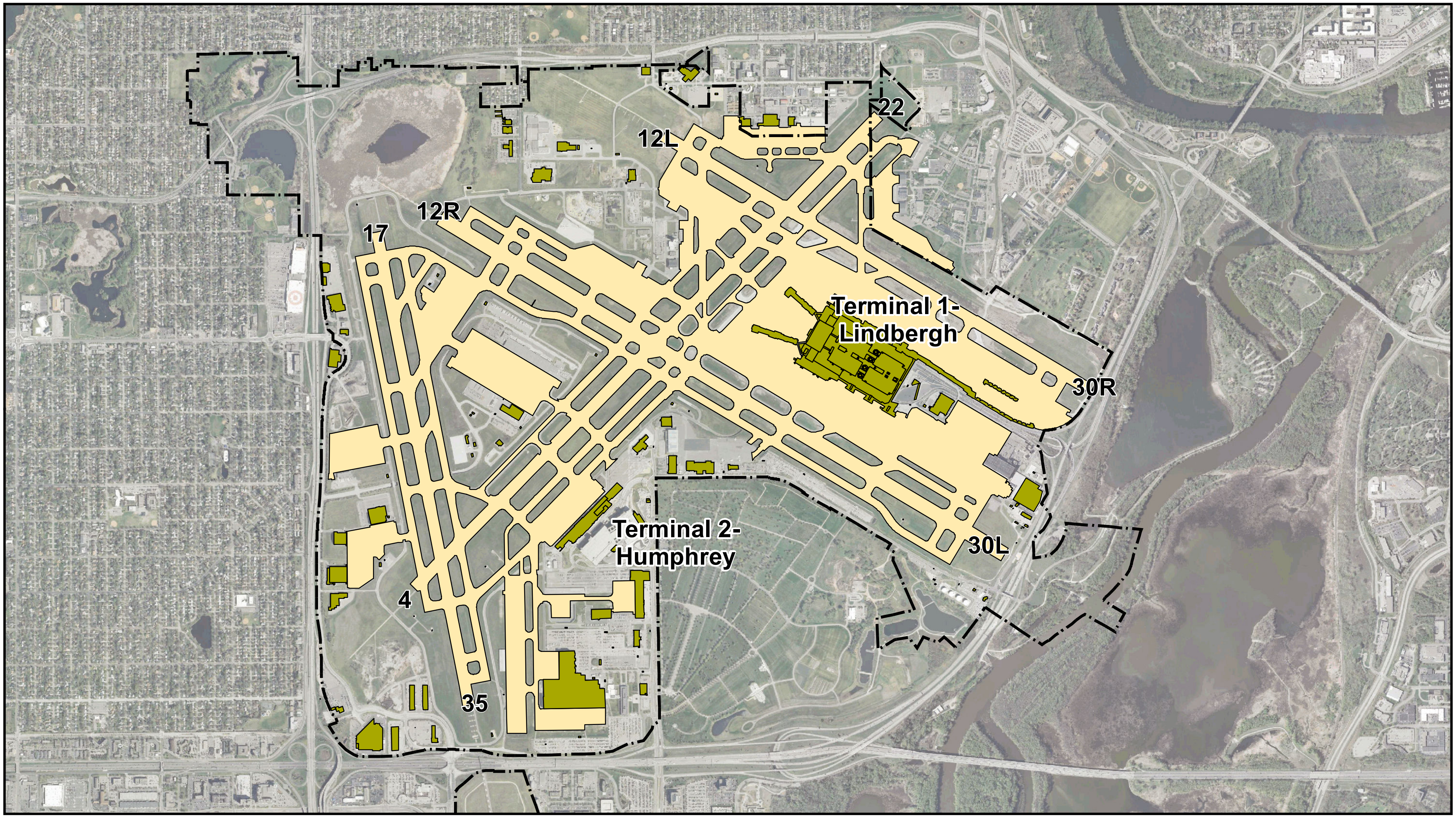
N

0 8 16 Miles

Source: ESRI Data

Disclaimer: This map was generated by HNTB Corporation using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitablity for a particular use. The scale and location of all mapped data are approximate.

FIGURE
1.1-2



LEGEND

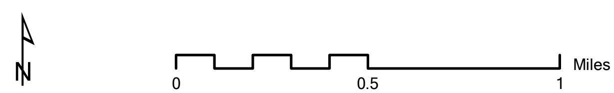
Airport Pavement

Building

Airport Boundary

12R Runways

Airfield Layout



Source: ESRI Data

Disclaimer: This map was generated by HNTB Corporation using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitablity for a particular use. The scale and location of all mapped data are approximate.

Terminal 1-Lindbergh

Terminal 1-Lindbergh is located between the two parallel runways, east of the crosswind runway as shown in Figure 1.1-2. Currently Air Canada, Alaska Airlines, American Airlines, Delta Air Lines, Frontier Airlines, United Airlines (including the former Continental Airlines), and US Airways are located at Terminal 1-Lindbergh.

Terminal 1-Lindbergh is illustrated in **Figure 1.1-3**. Aircraft gates, positions where aircraft are parked at the terminal to allow passengers to board or exit aircraft, are distributed among seven concourses labeled A through G. There are a total of 117 gate positions and 10 of these gates can support international arrivals into the International Arrival Facility, as well as domestic operations. Passenger bridges connect aircraft parked at the gates to Level 2 of Terminal 1-Lindbergh where ticketing/check-in facilities, passenger security screening, gate hold rooms and a wide array of concessions are provided. Domestic bag claim functions are located on Level 1.

Passenger movement is facilitated by moving sidewalks, trams and light rail transit (LRT). Moving sidewalks are provided along Concourses A, B, C, G and through the connector bridge between Concourses C and G. A concourse tram eases passenger travel along Concourse C. An underground tram connects Terminal 1-Lindbergh with parking and rental car facilities as well as a light rail transit (LRT) station. The LRT connecting Terminal 1-Lindbergh and Terminal 2-Humphrey provides for passenger movement between the two terminals.

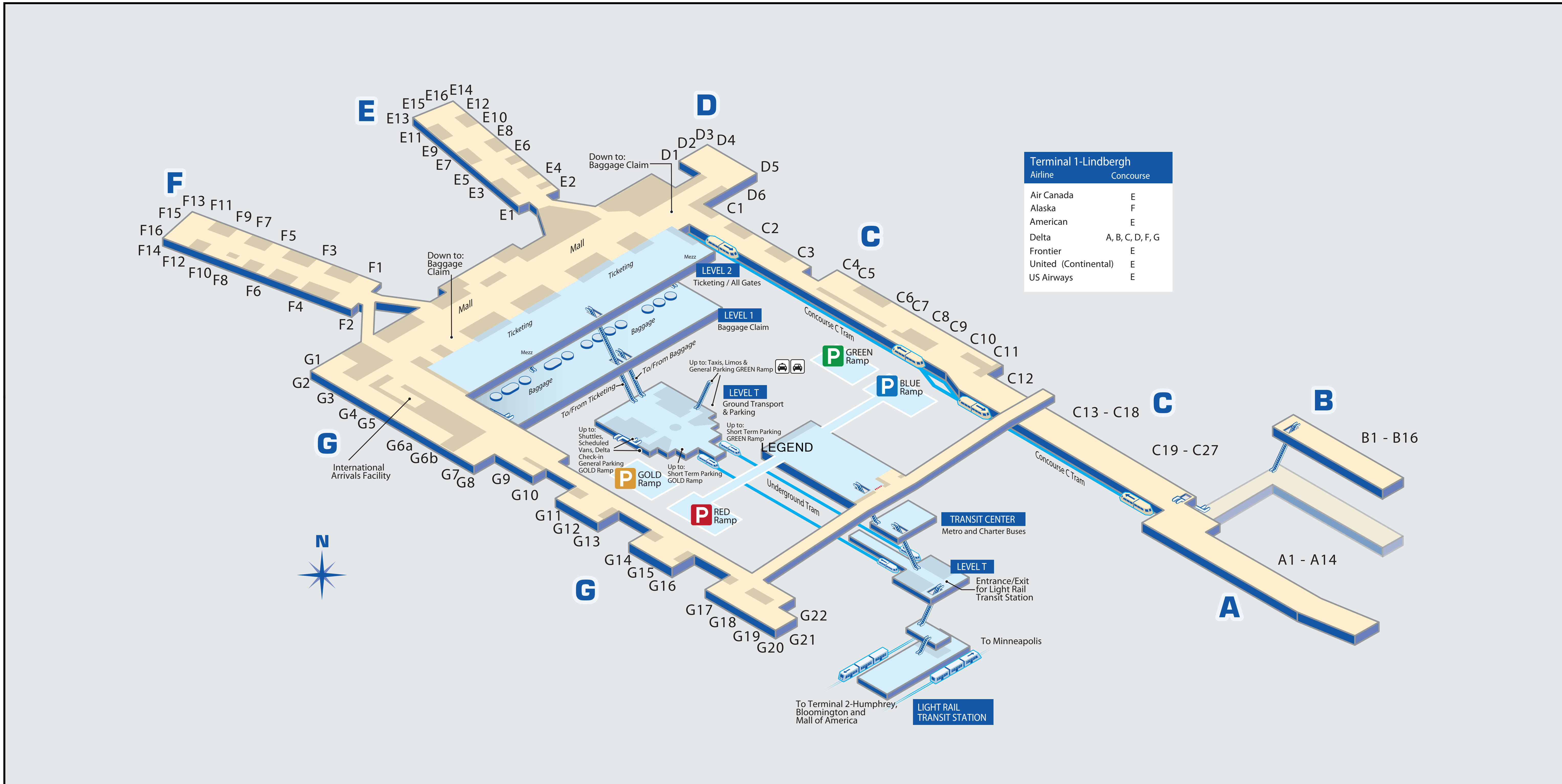
Use of public transportation to and from Terminal 1-Lindbergh is promoted by providing easy access to the LRT. Not only does the Metro Transit Hiawatha Line LRT connect the two terminals, it also allows MSP travelers and visitors to commute between the terminals and off-airport locations such as downtown Minneapolis and the Mall of America. The Terminal 1-Lindbergh LRT station is located below ground at the south end of the Terminal 1-Lindbergh parking complex. The Transit Center at ground level above the Terminal 1-Lindbergh LRT station provides additional mass transit service and connectivity between the LRT and bus systems.

Terminal 2-Humphrey

Terminal 2-Humphrey is located east of the crosswind runway and between Runways 12R/30L and 17/35 as shown in Figure 1.1-2. Terminal 2-Humphrey provides 10 gates (with four of those capable of serving the International Arrivals Facility as well as domestic operations) used by Icelandair, Southwest Airlines (including AirTran Airways provided the Single Operating Certificate is granted by the FAA), Sun Country Airlines and several charter airlines.

The general layout of Terminal 2-Humphrey is shown in **Figure 1.1-4**. The lower level, Level 1, features the ticketing/check-in area, international arrivals processing and the bag claim area. Level 2 of the terminal includes the security screening checkpoint and gate hold rooms.

There is also convenient access to the LRT from Terminal 2-Humphrey. An LRT station is located adjacent to the Orange Parking Ramp just to the east of the terminal.



LEGEND

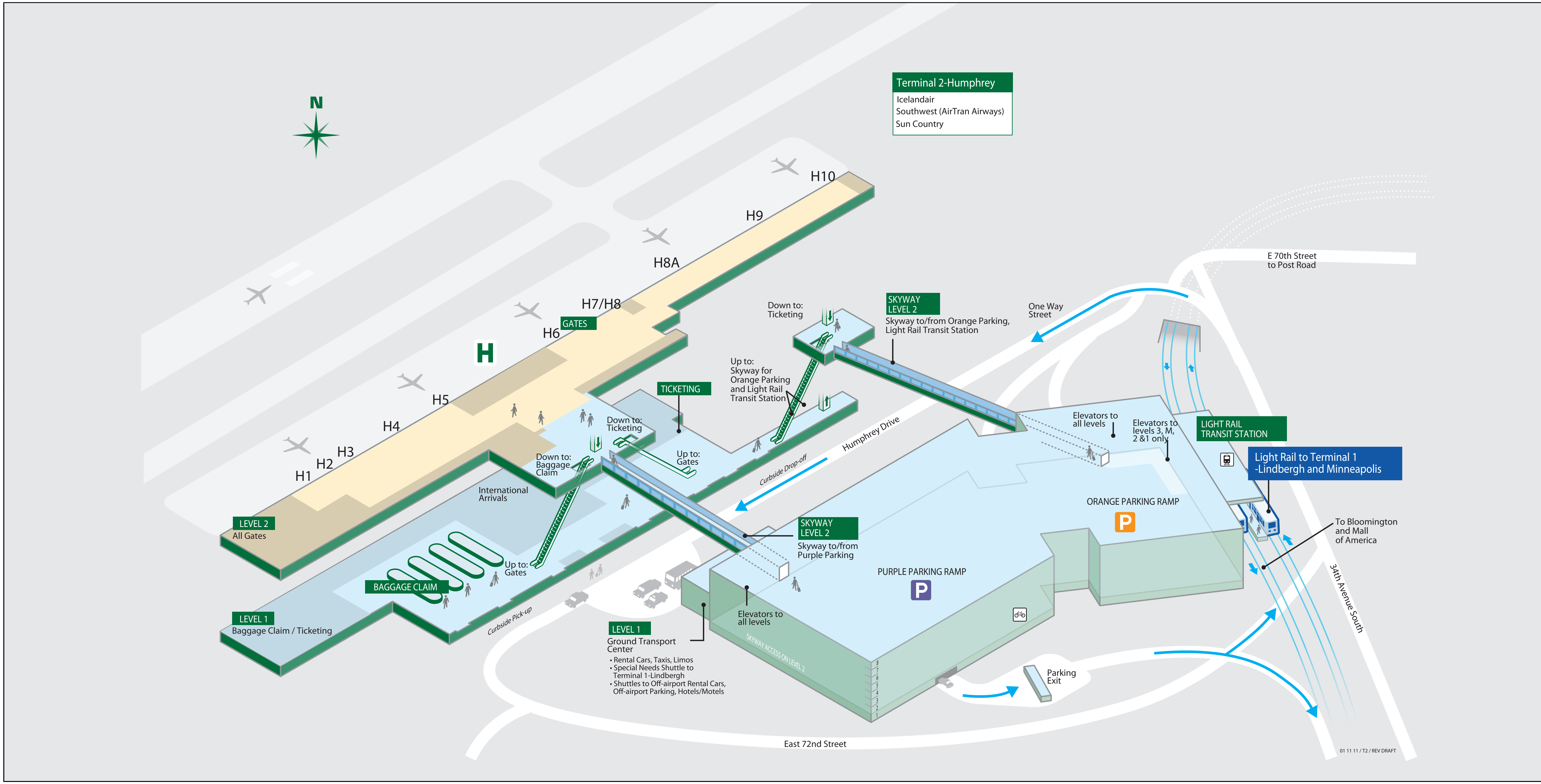
Inside Security

Outside Security

Terminal 1-Lindbergh

Source: Metropolitan Airports Commission

HNTB



LEGEND

Inside Security

Outside Security

Terminal 2-Humphrey

Source: Metropolitan Airports Commission

HNTB

1.1.3 Landside Facilities

Landside facilities include terminal curb roadways, ground transportation centers, parking facilities, rental car facilities and access roads. Each of these is described in the following paragraphs.

Terminal Curb Roadways

Terminal curb roadways are where passengers are dropped off or picked up in front of the terminal. At Terminal 1-Lindbergh there is a two-level curb roadway system with multiple parallel curbs on both the ticketing (departures) and baggage claim (arrivals) levels. The departures curb roadway (upper level) is designated for drop-offs of all departing passengers and is illustrated in **Figure 1.1-5**. The inner departures curb is the primary curb for drop-offs. It is 830 feet long with four striped lanes of traffic. The outer departures curb is currently used as a "backup" curb for peak periods, and for shuttles and shared ride vans. It is 40 feet wide with two full (12-foot wide) lanes and three 16-foot wide left lane curb pockets, totaling 630 linear feet of curbside for passenger drop off. This configuration allows two through lanes of traffic with opposite-side unloading in the curb pockets.

The Terminal 1-Lindbergh arrivals curb roadway (lower level) is designated for pick-ups of all arriving passengers and is illustrated in **Figure 1.1-6**. The inner arrivals curb, used for passenger pick up by privately-owned vehicles (POV), is 700-feet long and 60-feet wide with five striped lanes of traffic. This roadway generally operates with the outer two lanes accommodating through traffic. The remaining three lanes are used for loading, standing or through traffic, depending on the airport's level of activity. The outer arrivals curb is used by commercial vehicles and is separated from the inner curb by a barrier preventing pedestrians from crossing the roadway.

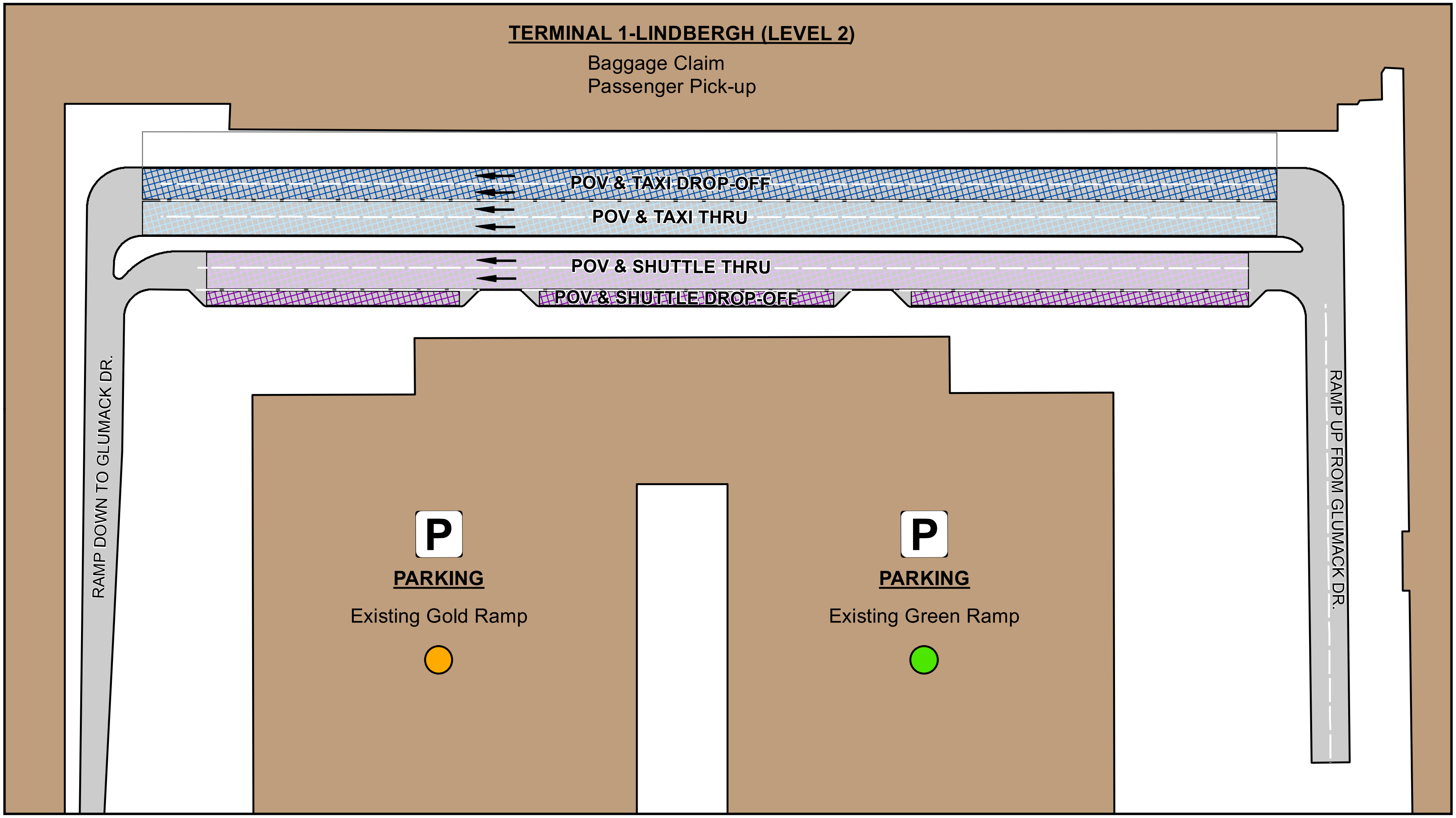
The Terminal 2-Humphrey curb roadway, illustrated in **Figure 1.1-7** is 700-feet long. The curb is a single-level four lane roadway, half of which is used for passenger drop-off at ticketing/check-in and half of which is used for passenger pick up at baggage claim. The left lane is signed to direct rental car return traffic to the rental car area.

Commercial Ground Transportation Centers

Commercial ground transportation centers (GTC) are provided at both Terminal 1-Lindbergh and Terminal 2-Humphrey for commercial vehicle operations. The commercial GTCs provide parking spaces for taxis, limousines, hotel shuttles, off-airport parking shuttles and scheduled shuttles picking up passengers.

At Terminal 1-Lindbergh the commercial GTC is located directly across from the terminal on the lower level between the Gold and Green Parking Ramps. Commercial vehicles enter the commercial GTC from the outer arrivals curb roadway. The west side of the commercial GTC has 25 pull-through spaces for taxicabs and hotel shuttle services. An additional 23 pull-through stalls are provided on the east side of the commercial GTC to serve special taxis, limousines, scheduled shuttles and off-airport parking shuttles.

The commercial GTC at Terminal 2-Humphrey is located adjacent to the Purple Parking Ramp. Commercial vehicles access the commercial GTC via Humphrey Drive. The commercial GTC has 15 loading spaces.



Terminal 1-Lindbergh Departures Curb Roadway

LEGEND

Building
Road Pavement
POV & Shuttle Drop-off
POV & Shuttle Thru
POV & Taxi Thru
POV & Taxi Drop-off

POV = Privately Owned Vehicle

N

Not to Scale

Source: ESRI Data

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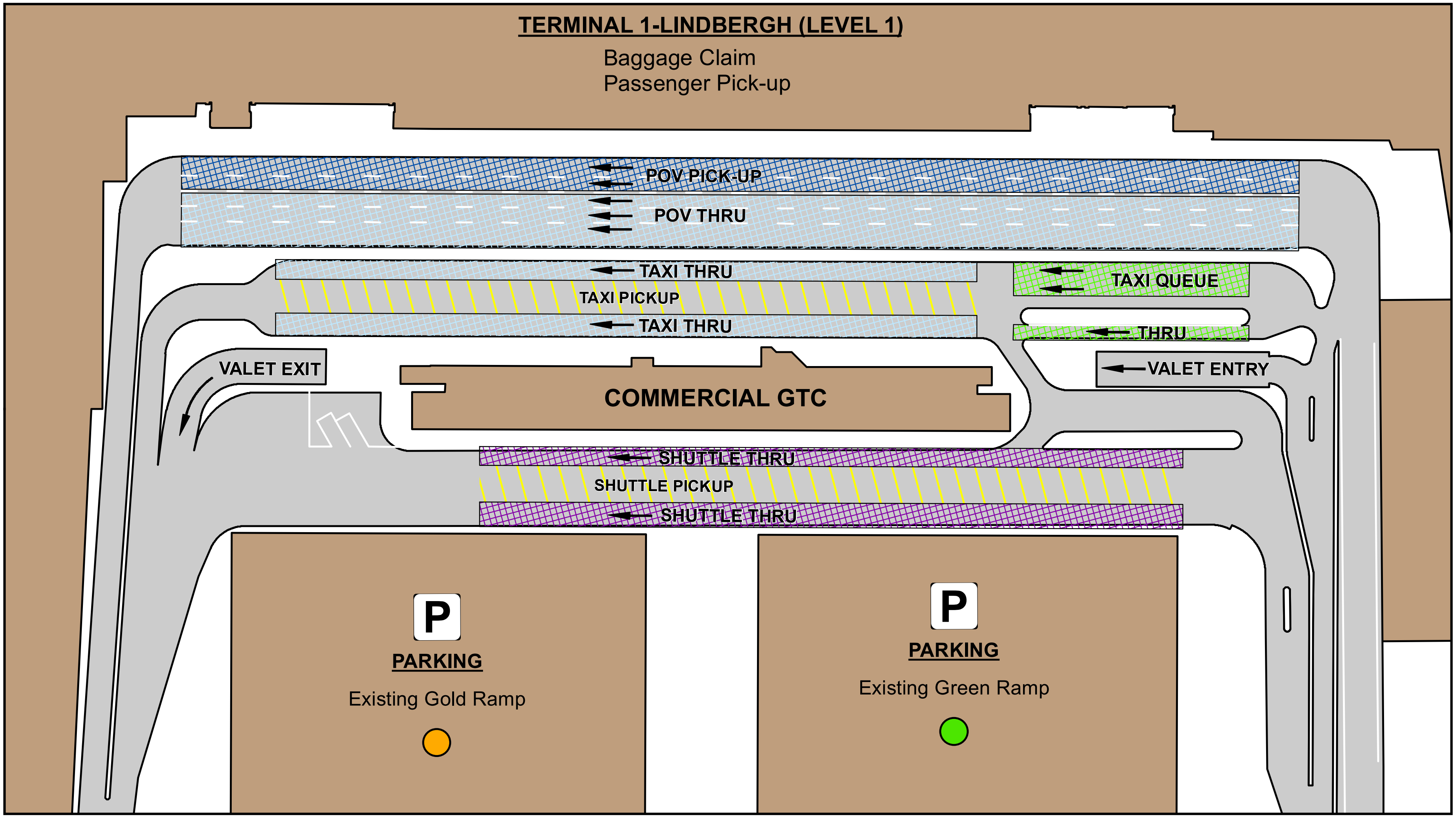


Terminal 1-Lindbergh Arrivals Curb Roadway

LEGEND

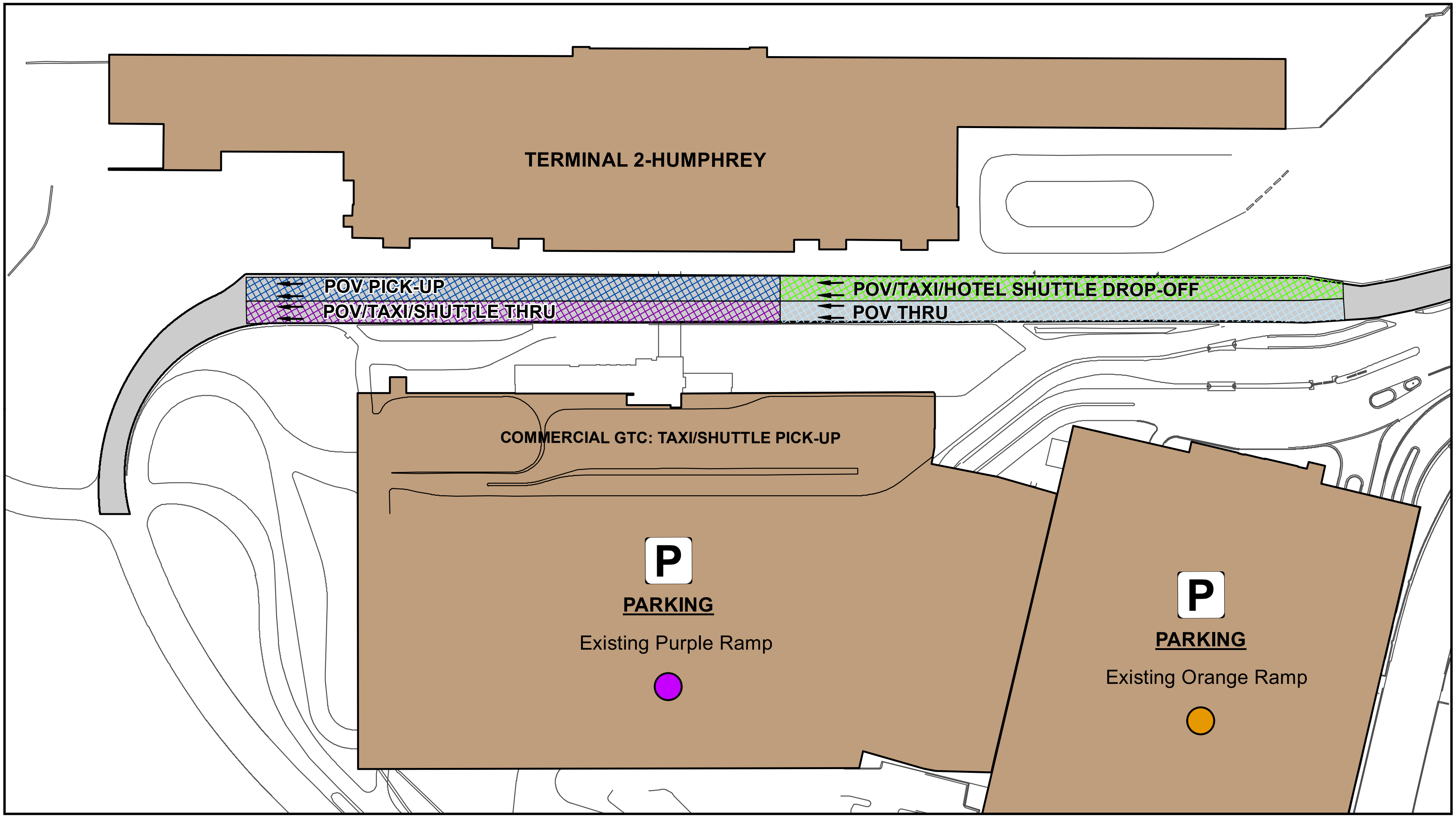
Building	Taxi Queue/Thru
Road Pavement	POV/Taxi Thru
Shuttle Thru	POV Pick-Up

POV = Privately Owned Vehicle
GTC = Grand Transportation Center

Not to Scale

Source: ESRI Data

Disclaimer: This map was generated by HNTB Corporation using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitablity for a particular use. The scale and location of all mapped data are approximate.



LEGEND

- Building
- Road Pavement
- POV/Taxi/ShuttleThru
- POV/Taxi/Hotel Shuttle Drop-Off
- POV Thru
- POV Pick-Up

POV = Privately Owned Vehicle
GTC = Ground Transportation Center

Terminal 2-Humphrey Curb Roadway

Not to Scale

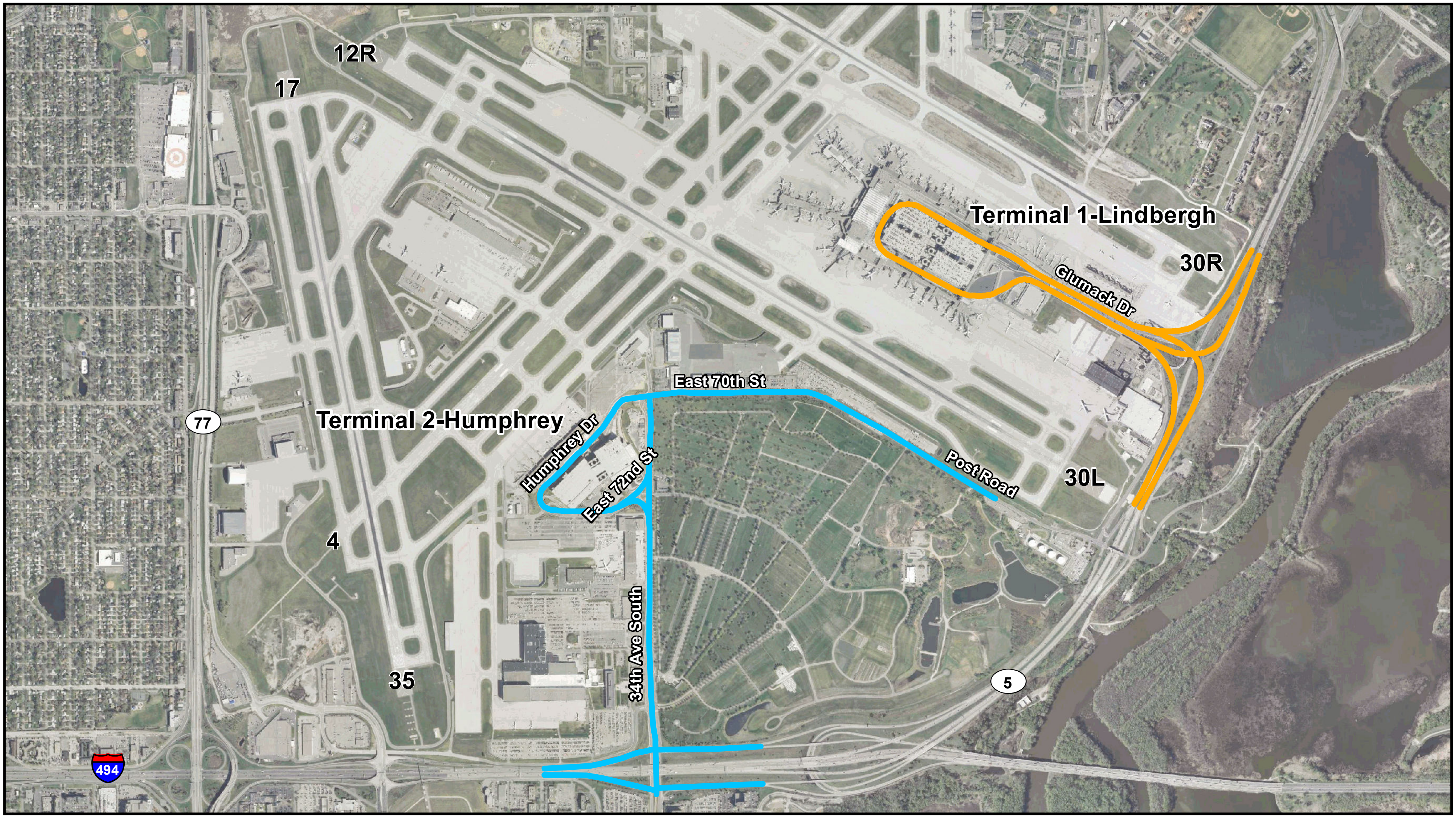
Source: ESRI Data

Disclaimer: This map was generated by HNTB Corporation using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitablity for a particular use. The scale and location of all mapped data are approximate.

Parking
There are approximately 23,850 public, rental and employee parking spaces at MSP, split between the Terminal 1-Lindbergh and Terminal 2-Humphrey parking ramps. Terminal 1-Lindbergh and associated parking ramps provide a total of 14,595 spaces (12,870 public and employee, and 1,725 rental car). The locations of the four parking ramps serving Terminal 1-Lindbergh, Green, Gold, Red and Blue are shown in Figure 1.1-3. These ramps provide short-term and general parking for passengers as well as space for rental cars. Short-term parking is located on Level 1 and the Mezzanine Level of the Green Ramp and Level 1 of the Gold Ramp. Rental car parking is provided on Levels 2 and 3 of the Red and Blue Ramps. Valet parking is also available in the lower level of Terminal 1-Lindbergh. Terminal 2-Humphrey has approximately 9,255 spaces (9,110 public and employee, and 145 rental car) in two parking ramps designated as the Orange and Purple ramps. The locations of the Orange and Purple ramps are illustrated in Figure 1.1-4.

Rental Car Facilities
Rental car ready-return facilities, where customers pick-up and return rental cars, are provided at both Terminal 1-Lindbergh (1,725 spaces) and Terminal 2-Humphrey (145 spaces); however the quick-turn-around (QTA) facility, where rental vehicles are fueled and washed between rentals, is provided only at Terminal 1-Lindbergh. The QTA at Terminal 1-Lindbergh Is located on Level 1 of the Red and Blue Ramps. Terminal 2-Humphrey rental cars are shuttled between Terminal 2-Humphrey rental spaces and the QTA facility at Terminal 1-Lindbergh between rentals.

Access Roads
MSP is the only major airport in the United States to have two terminals located on entirely separate roadway systems. Access routes to both terminals are highlighted on **Figure 1.1-8**. Terminal 1-Lindbergh is accessed directly off of Trunk Highway (TH) 5 via Glumack Drive. Terminal 2-Humphrey is accessed directly off of 34th Avenue South from Interstate 494 (I-494), or off of Post Road/East 70th Street from TH 5, via Humphrey Drive/East 72nd Street.



LEGEND

- 494 Interstate
- 5 Trunk Highway
- Access Routes to Terminal 1-Lindbergh
- Access Routes to Terminal 2-Humphrey

Access Routes to Terminals

N

0 | 1,000 | 2,000 | 4,000 Feet

Source: ESRI Data

Disclaimer: This map was generated by HNTB Corporation using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitablity for a particular use. The scale and location of all mapped data are approximate.

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Endnotes

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[1] Minneapolis-St. Paul International Airport, "About MSP", http://www.mspairport.com/about-msp.aspx (accessed 11/12/10).

[2] Minneapolis-St. Paul International Airport, "statistics", http://www.mspairport.com/about-msp/statistics.aspx (accessed 11/01/11).

[3] ACI North America, North American Airports Ranking, Passengers and Total Operations, May 2011, pages R-1 and R-9.

Chapter 2: PURPOSE AND NEED

The Purpose and Need for a proposed action are identified by describing the current problems and the proposed solutions. The Purpose and Need is used as the primary foundation to develop reasonable alternatives as required by the National Environmental Policy Act (NEPA).

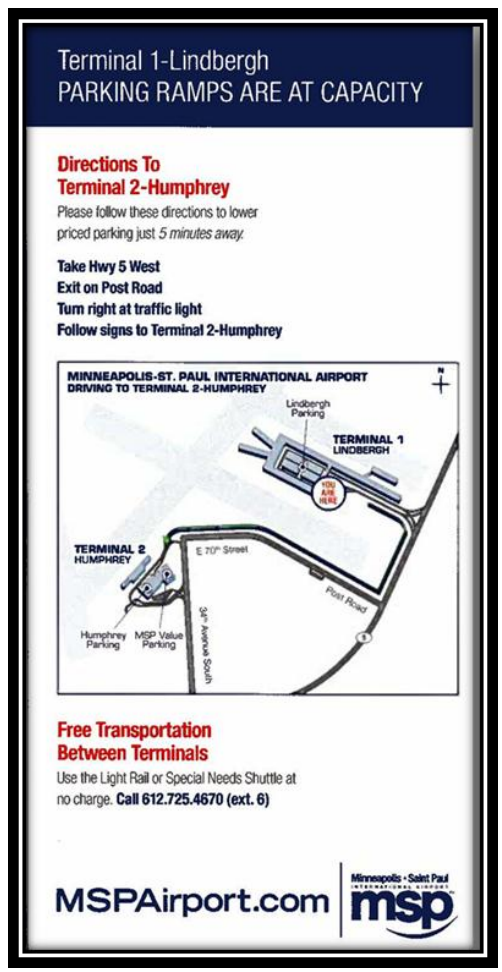
The Federal Aviation Administration (FAA) and the Federal Highways Administration (FHWA) have different policies and requirements regarding NEPA and decision making. The FAA considers near-term and immediate-term development as ripe for decision making. Therefore, this EA describes the purpose and need for the terminal and airport landside development proposed for implementation by 2020. The FHWA decision making process is focused on development proposed for the 20 year planning horizon. Therefore, this EA also addresses the purpose and need for regional roadway improvements proposed for implementation by 2030.

This Chapter begins with the statement of Purpose and Need. The subsequent sections provide:

- information to support the statement of Purpose and Need; and
- the requested Federal Actions required to implement the proposed projects.

2.1 Statement of Purpose and Need

Airport facilities do not and/or will not meet existing and future demand. Terminal 1-Lindbergh landside and terminal facilities including the arrivals curb, parking and the international arrivals facility are currently overcrowded. Also, during the winter, when seasonal charter carrier activity peaks, the demand for gates at Terminal 2-Humphrey exceeds capacity.



As passenger activity grows, current congestion will be exacerbated and spread to additional facilities. Conditions at landside facilities, including access and regional roads, are expected to deteriorate further. Similarly, terminal areas at gates, ticket counters, passenger check-in areas, security screening checkpoints and baggage claim areas will be overcrowded.

The purpose of the proposed project is to accommodate the expected demand such that the level of service is acceptable throughout MSP's facilities under both existing and 2020 conditions, and regional roadways under 2030 conditions.

Need (Problem):

Congestion and overcrowding at MSP terminal and landside facilities under current and 2020 conditions

Purpose (Solution):

Accommodate expected demand at MSP such that the airside and landside level of service is acceptable through the 2020 planning timeframe, and that the regional roadway level of service is acceptable through the 2030 planning timeframe.

2.2 Supporting Information

This section briefly presents information which supports the statement of Purpose and Need. Sub-section 2.2.1 discusses the MSP Long Term Comprehensive Plan. Sub-section 2.2.2 presents the aviation activity forecast developed for this EA. Finally, Sub-section 2.2.3 identifies the specific current and future needs based on the aviation activity forecast.

2.2.1 MSP Long Term Comprehensive Plan (LTCP)

The LTCP is a 20-year plan for MSP to accommodate forecast growth in a safe and efficient manner, and with a high level of customer service. The LTCP is prepared by the MAC in accordance with the Metropolitan Council's guidelines to plan, develop and operate MSP in a manner compatible with its surrounding environs.

In the latest version, completed in 2010, the MSP 2030 Long Term Comprehensive Plan Update (LTCP Update), the MAC identified development needed at MSP to efficiently serve the Twin Cities' commercial air transport demand through 2030. It demonstrated that airport improvements were needed to accommodate substantial changes in the aviation industry as well as future aviation activity.

Airline mergers, shifts in aircraft fleet, new technologies and evolving security protocols resulted in changes to airport operations. These changes affected airline service patterns, as well as passenger processing and behavior. For example, when security regulations limited the items in carry-on luggage, passengers checked more luggage. This in turn led to the need for more baggage handling facilities.

The LTCP Update stated that, "Over time, some of MSP's facilities have become less efficient and some have not been improved to meet the dynamic needs of today's travelers. While MSP's airfield was dramatically improved with the addition of a fourth runway in 2005, portions of the terminal and landside facilities have become outdated and need improvement."[1]

In the LTCP Update, the MAC identified specific needs based on forecasts of aviation activity. The forecast was prepared to determine future passenger and operation levels expected at MSP. Aviation planning was then conducted using these forecasts to determine if existing facilities were in need of improvement.

The LTCP Update concluded that, "the existing passenger terminal complexes and their landside facilities are not able to accommodate planned forecast growth without expansion. Growth in passenger boardings will prompt additional aircraft gates, parking, roadway improvements and terminal space to allow passengers to enjoy a safe and comfortable airport environment."

2.2.2 EA Activity Forecasts

Aviation and vehicular activity forecasts were developed for this EA.

2.2.2.1 Aviation Activity Forecast

An aviation activity forecast was prepared to support the purpose and need as well as provide information required for environmental analysis.

The FAA's Terminal Area Forecast (TAF) was considered for use in this study. "The TAF is prepared to assist the FAA in meeting its planning, budgeting, and staffing requirements. In addition, state aviation authorities and other aviation planners use the TAF as a basis for planning airport improvements."[2] However, the TAF did not provide the detail required to assess the noise and air quality impacts. Therefore, the TAF was not used for this EA.

The LTCP Update forecast was also considered. The LTCP Update forecast was prepared in 2009. Since then several significant factors have resulted in changes to aviation activity. These factors include the lagging economic recovery, the merger of Southwest Airlines and AirTran Airways, and changes in airline fleet plans. Additionally, more detailed forecast information was needed for various studies. Therefore, the LTCP Update forecast was updated and refined for this EA.

The forecast for this EA included the years for which environmental analysis would be conducted: 2010 (current), 2020 (year by which proposed improvements would be implemented) and 2025 (five years beyond implementation). Separate annual forecasts were developed for scheduled domestic and international passenger, non-scheduled passenger, air cargo, general aviation and military activity for each of the forecast years.

Table 2.2.1 summarizes domestic and international passenger enplanement forecasts. Total enplanements at MSP are projected to increase from 15.7 million in 2010 to 20.2 and 23.1 million in 2020 and 2025, respectively. The projected increase in enplanements equates to an average annual growth rate between 2010 and 2025 of 2.6 percent

Table 2.2.2 summarizes the forecast of aircraft operations at MSP. Total aircraft operations are estimated to increase from 437,075 in 2010 to 484,879 and 526,040 in 2020 and 2025, respectively. The scheduled passenger operation categories are projected to grow the most rapidly, while air cargo, general aviation and military aircraft operations are projected to grow at a slower rate. The projected increase in overall aircraft operations equates to an average annual growth rate between 2010 and 2025 of 1.2 percent.

Table 2.2.1

Forecast of Annual Domestic and International Revenue Enplanements

Year	Domestic	International	Charter	Total
2010	14,568,881	1,141,442	4,736	15,715,059
2020	18,608,747	1,564,092	6,081	20,178,920
2025	21,260,499	1,815,444	6,956	23,082,899

Sources: MAC Monthly Summary Reports and HNTB analysis, 2011.

Table 2.2.2

Summary of Forecast Aircraft Operations

	2010	2020	2025
Domestic Scheduled Air Carrier	367,851	410,410	448,074
International Scheduled Air Carrier	26,556	29,530	32,886
Charter	103	96	106
All-Cargo Carrier	12,499	12,764	12,826
General Aviation and Air Taxi	27,921	29,934	30,003
Military	2,145	2,145	2,145
Total	**437,075**	**484,879**	**526,040**

Sources: MAC Monthly Summary Reports and HNTB analysis, 2011.

The EA forecast was compared to the FAA's TAF. **Table 2.2.3** provides a comparison of the forecasts' enplanements and operations for the years of analysis. There are almost no differences in the number of operations while there are differences in the number of forecasted enplanements. The TAF enplanement forecasts are lower because they are based on a more recent base year and include more conservative assumptions about Delta Air Line's development of the MSP hub.

The differences between the forecasts are acceptable based on FAA Guidance and FAA's review of the EA forecast. FAA Guidance on the review and approval of aviation forecasts states that forecasts for total enplanements and total operations are "considered consistent with the TAF if they meet the following criterion: Forecasts differ by less than 10 percent in the 5-year forecast period, and 15 percent in the 10-year forecast period."[3] The EA forecast meets this criterion for both enplanements and aircraft operations. Additionally, the FAA reviewed and approved the EA forecast in July 2012.

Details regarding the forecast assumptions, methodology and results including the FAA's approval letter are included in ***Appendix A**, Aviation Activity Forecast Technical Report*.

2.2.2.2 Vehicular Activity Forecast

A vehicular activity forecast was also prepared to support the purpose and need as well as provide information required for environmental analysis.

As shown in **Table 2.2.4**, total vehicular trips are estimated to increase from 82,000 in 2010 to 111,000, 129,000 and 145,000 in 2020, 2025 and 2030, respectively. This equates to an average annual growth rate between 2010 and 2025 of 3.1 percent.

Table 2.2.3
Comparison of MSP Aviation Activity Forecasts

	2010	**2020**	**2025**
Enplanements			
EA Forecast (1)	15,715,059	20,178,920	23,082,899
2011 TAF (1)	15,295,616	18,643,055	20,626,495
% difference		8.2	11.9
Operations			
EA Forecast	437,075	484,879	526,040
2011 TAF	427,558	485,065	525,526
% difference		0.0	0.1

Note:
(1) Does not include non-revenue enplanements.

Sources: FAA 2010 Terminal Area Forecast and HNTB analysis, 2011.

Table 2.2.4
Summary of Daily Vehicular Trips

	2010	**2020**	**2025**	**2030**
MSP Airport Total Volume	82,000	111,000	129,000	145,000

Sources: Kimley-Horn and Associates, Inc. and SRF Consulting Group, Inc. analysis, 2011.

2.2.3 Aviation Flight Tracks

Flight tracks were developed in consultation between the FAA Air Traffic Control Tower and MAC. In addition, radar flight track data was also utilized.

The FAA along with representatives from various airlines, airport users, and support contractors and the MAC developed Performance Based Navigation (PBN), which includes Area Navigation (RNAV) and Required Navigation Performance (RNP) procedures for MSP. The proposed PBN procedures were not part of the Proposed Action/Alternatives evaluated in this EA. The PBN procedures have independent utility and are evaluated in a separate environmental review that is currently under review by the FAA Air Traffic Organization (ATO). The PBN procedures will also have their own, separate approval. However, the PBN procedures and associated flight tracks were considered in this Final EA/EAW in the context of cumulative impacts. See Section 5.21.4.2 *Cumulative Effects: Aircraft Noise.*

2.2.4 Current and Future Needs

Actual 2010 data and the EA forecast were used to verify the needs originally identified in the LTCP Update. Detailed planning was conducted to identify aircraft gate requirements, as well as terminal and landside needs for current (2010) and future (2020) conditions. The future needs are based on the assumption that MSP would operate as it currently does with respect to terminal use and the respective airlines use the same terminal in the future as they do today. **Table 2.2.5** shows the current and future needs at MSP. Refer to ***Appendix O***, *Purpose and Need Technical Report*, for more information on how these needs were identified.

2.2.5 Timeframe for Implementation

Subject to completion of the Federal and State environmental approval processes and provided funding is available, construction of the Proposed Action is anticipated to commence in late 2012 and be completed by 2020. Regional roadway improvements out to 2030 have been identified based on the 2030 LTCP and background traffic growth to satisfy FHWA NEPA requirements.

2.3 Requested Federal Actions

The requested Federal actions include FAA approval of the Airport Layout Plan (ALP) and environmental approval of the Sponsor's Proposed Action. Environmental approval would allow the MAC to establish eligibility for funding through the Federal Airport Improvement Program funds or Passenger Facility Charges (PFCs) for eligible airport development, assuming the independent requirements of these programs are met (49 U.S.C. Section 47101 et seq., 49 U.S.C. Section 40117).

The requested Federal actions also include FHWA approval of the Sponsor's Proposed Action. Environmental approval would allow FHWA to approve the Interstate Access Request (IAR) for the proposed Interstate 494 (I-494)/34th Avenue South interchange modifications and other improvements affecting the interstate.

Table 2.2.5

Current and Future Needs at MSP

Airport Component	Current Need (2010)	Future Need (2020)
Gates		
	Additional Gates are needed at Terminal 2-Humphrey to maintain adequate level of service during the winter period from late December through early April. Operations have grown considerably at Terminal 2-Humphrey and as a result the ability to meet the needs of seasonal charters at Terminal 2-Humphrey has deteriorated. Charter carriers submit requests for gate use on a specific day(s) at specific times. During the winter period, the MAC is often unable to accommodate the requested times and must offer alternative times to the charter carriers. The charter carriers may have limited ability to accept the alternative times because their schedules and planned use of their aircraft fleet must be adjusted. As a result, flexibility within Terminal 2-Humphrey is reduced and the level of service is impacted because operators are forced to operate within compressed time periods.	15,000 feet of additional gate frontage to accommodate future fleet
Terminals		
	Concourse E at Terminal 1-Lindbergh requires refurbishing	
	Additional 17,000 square feet of waiting area for the ticket counter in Terminal 1-Lindbergh	Additional 26,000 square feet of waiting area for the ticket counter in Terminal 1-Lindbergh
		Additional 6,000 square feet at security check points in Terminal 1-Lindbergh
	Additional 14,000 square feet at baggage claim in Terminal 1-Lindbergh	Additional 20,000 square feet at baggage claim in Terminal 1-Lindbergh
	International facilities, passenger processing and baggage claim overstressed at daily peak demand	Additional 11,000 square feet for international processing at Terminal 1-Lindbergh and 16 additional processing stations

Table 2.2.5

Current and Future Needs at MSP

Airport Component	Current Need (2010)	Future Need (2020)
Landside		
	Additional 100 feet of arrival curb roadway at Terminal 1-Lindbergh	Additional 400 feet of arrival curb at Terminal 1-Lindbergh
		14 additional commercial vehicle loading spaces, 13 at Terminal 1-Lindbergh and 1 at Terminal 2-Humphrey
		8,500 additional parking stalls at Terminal 1-Lindbergh
		150 and 350 new rental car spaces at Terminal 1-Lindbergh and Terminal 2-Humphrey, respectively, 81,900 square feet of new QTA area with 79,800 square feet of that area at Terminal 2-Humphrey
Regional Roadways		
		Under existing conditions there are periods of congestion at the existing I-494 and 34th Avenue S. interchange. Westbound I-494 also operates at LOS F during the AM and PM peak hours between TH 77 and 24th Avenue South. Under 2020 No Action conditions the north intersection at the I-494 & 34th Avenue South interchange will operate at an LOS F during the AM peak hour. The south intersection at TH 5 & Post Road will operate at LOS F during the 2020 No Action airport and PM peak hours. Traffic congestion on I-494 and TH 77 is also anticipated under 2020 No Action conditions. Roadway improvements are necessary to reduce congestion on the regional roadway network in 2030 under either the No Action or Build Alternative.

Source: Purpose and Need Technical Report, MAC and HNTB, 2012.

Endnotes

[1] Metropolitan Airports Commission, MSP Long Term Comprehensive Plan Update, 7/26/10, p.E.1.

[2] Federal Aviation Administration, Terminal Area Forecast Summary Fiscal Years 2010-2030, p. 3.

[3] FAA, *Review and Approval of Aviation Forecasts*, June 2008, p. 1.

Chapter 3: ALTERNATIVES

The evaluation of reasonable alternatives is considered the heart of the National Environmental Policy Act (NEPA) process according to the Council on Environmental Quality (CEQ). This chapter describes the alternatives considered.

A range of alternatives were identified and evaluated to determine if they were reasonable, i.e., met the purpose and need. Reasonable alternatives were then screened and the alternatives to be analyzed in detail within the NEPA document were determined.

When identifying alternatives, it is customary to consider both off-site and on-site alternatives. The following sections describe the off-site and on-site alternatives and whether they are reasonable.

3.1 Off-Site Alternatives

The evaluation of off-site alternatives included consideration of the use of other airports as well as other modes of transportation.

3.1.1 Other Airports

The use of another airport or airports was considered in the analysis of alternatives. Specifically, the ability to divert passengers to another airport(s) and thereby reduce/eliminate the need for improvements at Minneapolis-St. Paul International Airport (MSP) was assessed.

The first step in evaluating the Other Airports Alternative was to identify the airports with the most potential to draw passengers away from MSP. The Tier 2 Air Service Study[1] served as the basis for identifying these airports.

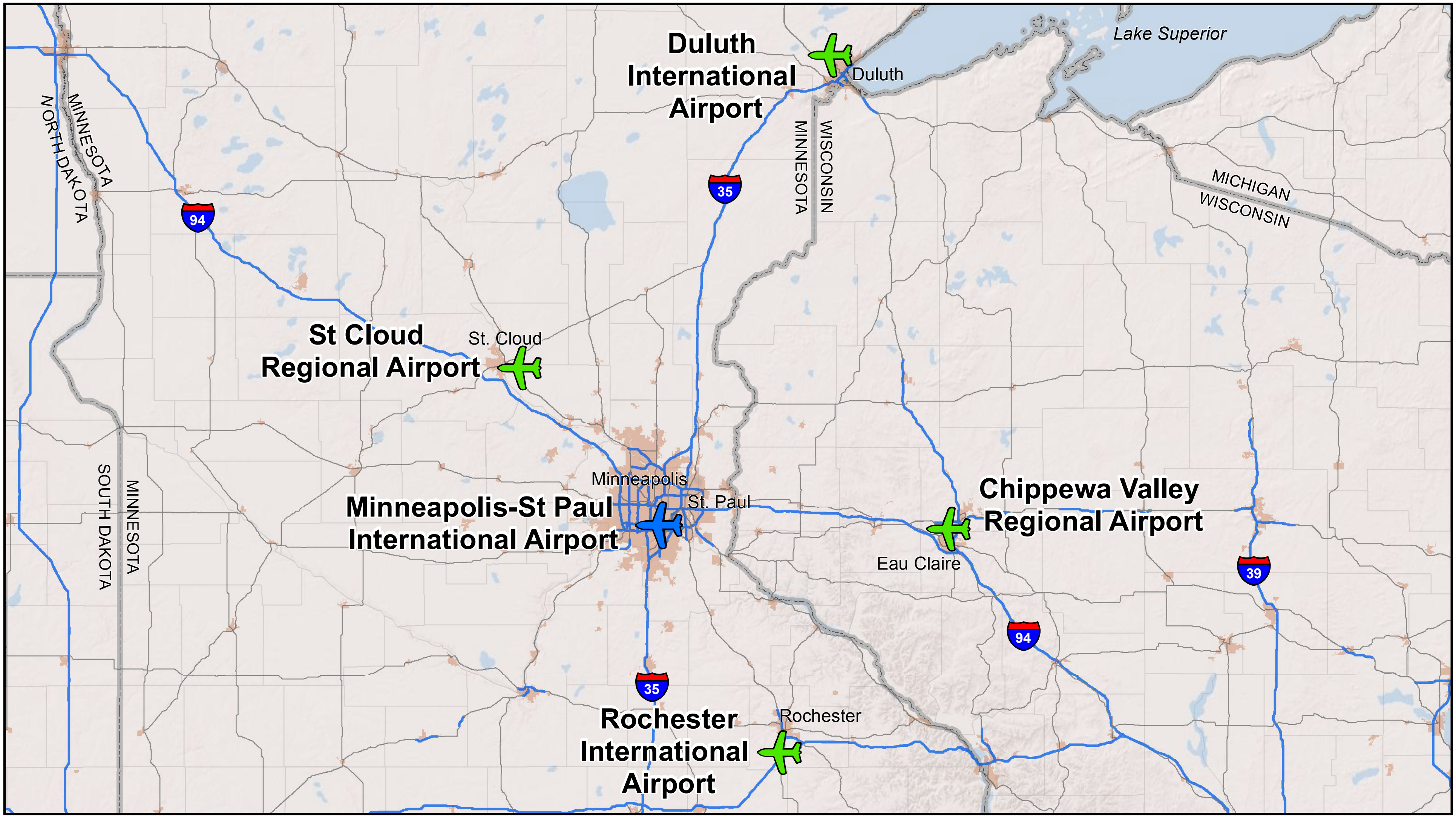
The Tier 2 Air Service Study was completed in 2003 by the Minnesota Department of Transportation Office of Aeronautics. The purpose of the Tier 2 Air Service Study was to explore how the perimeter regional airports or Tier 2 Airports could contribute to an inter-regional system of passenger airports surrounding the Minneapolis – St. Paul area. The Tier 2 Airports include:

- Duluth International Airport (DLH)
- Rochester International Airport (RST)
- Chippewa Valley Regional Airport (EAU)
- St. Cloud Regional Airport (STC)

While the Tier 2 Air Service Study is now eight years old, it remains relevant for the purposes of evaluating the Other Airports Alternative. The same four airports are of interest because they continue to be the most likely candidates for diverting passengers from MSP. All four of these airports have passenger service facilities, have an air traffic control tower and are located within approximately 70 to 170 drive miles from MSP. The locations of the Tier 2 Airports are illustrated on **Figure 3.1-1**.

Minneapolis-St. Paul International Airport 2020 Improvements EA

FIGURE 3.1-1



LEGEND

Tier 2 Airports

MSP

Tier 2 Airport

Interstate

State Highway

State Line

County Line

N

0 60 120 Miles

Source: ESRI Data

Disclaimer: This map was generated by HNTB Corporation using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitablity for a particular use. The scale and location of all mapped data are approximate.

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In addition, the socioeconomic characteristics of the Tier 2 Airports' market areas have not changed significantly. Therefore, the findings of the study in terms of capture rates are also still relevant.

Once the other airports were identified, three alternative ways in which the Tier 2 Airports might be able to divert passengers from MSP were examined:

- Turn a Tier 2 Airport into a competing connecting hub airport
- Convert a Tier 2 Airport into a low-cost carrier supplemental airport
- Increase the market capture of the Tier 2 Airports

The following sub-sections present a summary of the analysis completed for this EA and the resulting conclusions. A detailed discussion of the analysis is provided in ***Appendix B***, *Potential for Tier 2 Airports to Accommodate Projected MSP Activity.*

3.1.1.1 Competing Connecting Hub

The best opportunity to postpone the need for terminal development at MSP past 2020 would occur if one of the Tier 2 Airports were to develop into a competing connecting hub. Since the airlines determine the location of their connecting hubs, past airline hubbing behavior was considered. Major airlines tend to locate their hubs in large metropolitan areas. Memphis is the smallest metropolitan area currently served by an airline hub in the U.S. The population of Memphis is more than four times larger than the population of the largest populated area associated with any of the Tier 2 Airports. In addition, Memphis is more than a 4-hour drive from the closest competing airline hub – St. Louis. Therefore, it does not face the competitive pressures that Tier 2 Airports would face with their proximity to MSP. Thus, it was concluded that the Tier 2 Airport markets are too small to be considered viable candidates for connecting airline hubs. Additionally, the airline industry trend has been to reduce and consolidate hubbing activities rather than to expand into new communities.

3.1.1.2 Low-Cost Carrier Supplemental Airport

Low-cost carrier behavior was examined to determine the likelihood that a low-cost airline would opt to provide service at a Tier 2 Airport. In the 1980s and 1990s, most low-cost carriers, such as Southwest avoided direct competition with major airlines, by serving large metropolitan areas from supplemental/secondary airports. However, most low-cost carriers' strategies have changed in recent years. Within the past decade, Southwest has elected to challenge its competitors directly by adding service to the primary airport serving major metropolitan areas. MSP is a case in point; Southwest initiated service at Terminal 2-Humphrey in 2009.

Unlike most low-cost carriers, Sun County has always concentrated service at major airports such as MSP. Therefore, Sun Country is less likely than most low-cost carriers to introduce regular service at a Tier 2 Airport.

With the exception of very large markets, airlines prefer to serve a market through a single airport. Concentrating service at a single airport allows airlines to achieve economies of scale and reduce unit costs, while at the same time concentrating demand so that more nonstop markets become viable.

Houston is the smallest market with a significant secondary airport, William P. Hobby Airport, which is much closer to the center of market demand than any of the Tier 2 Airports in the Minneapolis-St. Paul area. Because of its proximity to the metropolitan area, Houston Hobby is much better positioned to compete with George Bush Intercontinental Airport than any of the Tier 2 Airports are positioned to compete with MSP. Additionally, the Houston market is about 25 percent larger than the Minneapolis-St. Paul market.

Therefore, based on recent low-cost carrier behavior and strategies, it was determined that attracting a low-cost carrier to one of the Tier 2 Airports is not likely.

3.1.1.3 Increased Capture of Local Market

The final Tier 2 Airports alternative considered was to divert passengers from MSP by attracting or "capturing" a greater number of the locally based air passengers. For this alternative, travelers that currently drive to MSP to initiate their air travel would instead choose to initiate their travel at a nearby Tier 2 Airport. Analysis was completed to determine whether the potential increased capture of passengers would be enough to delay or eliminate the need for improvements at MSP. The need for terminal-related improvements at MSP is driven by the number of passenger enplanements (departures and arrivals) and the need for landside-related improvements is driven by the number of originating passengers. Therefore, the impact of the increased Tier 2 Airports' capture of passengers on the needs at MSP was measured in terms of the anticipated reduction in passenger enplanements and originating passengers at MSP.

Two scenarios were examined:

- Scenario A - Tier 2 Airports capture 50 percent of the passengers from their local areas that currently use MSP.
- Scenario B – Tier 2 Airports capture 100 percent of the passengers from their local areas that use MSP.

Scenarios A and B reduced the future number of enplaning passengers at MSP by 0.9 percent and 1.8 percent, respectively. Based on these estimated reductions, the need for gate and terminal improvements could be postponed by about six months under Scenario A and for up to a year under Scenario B. Scenarios A and B reduced the future number of originating passengers at MSP by greater percentages, 4.2 percent and 8.5 percent, respectively. Thus, Scenario A could delay the need for landside facilities by about two years, and Scenario B could result in a three- or four-year delay.

It should be noted that, in order for the Tier 2 Airports to attract a greater percentage of air travelers from their local markets they must offer increased airline service. While several of the Tier 2 Airports are involved in aggressive air service development efforts, recent trends show that developing increased service may be difficult to achieve. Currently, airlines are withdrawing service from small airports (both nationally and in Minnesota), as they eliminate smaller aircraft from their fleet and consolidate operations. For example, commercial service at STC ceased in 2010 when Delta Air Lines stopped its scheduled service between MSP and STC and in November 2011 Delta Air Lines eliminated direct service from RST to Detroit Metropolitan Wayne County Airport (DTW). Given this airline trend of withdrawing service, the Tier 2 Airports may not be able to capture traffic that currently drives to MSP and their capture share could actually decline in the future. In that instance, facility expansion at MSP may need to be accelerated slightly.

3.1.1.4 Other Airports - Summary

Neither the development of a competing hub nor a supplemental airport appears likely given current airline behavior and trends. Additionally, even if the Tier 2 Airports are able to capture 100 percent of their markets, the need for MSP terminal and landside improvements would be delayed only temporarily. Therefore, it was concluded that the use of other airports would not meet the purpose and need for the Proposed Action and thus the Other Airports Alternative was dismissed from further consideration.

3.1.2 Other Modes of Transportation

Alternatives involving travel modes other than aviation were also considered. Among the other modes of transportation considered — automobile, bus, and rail — high-speed rail likely has the highest potential to divert passengers from air travel. As with the Other Airports Alternative, the ability to divert passengers and thereby reduce/eliminate the needs at MSP was assessed.

Three potential high-speed rail corridors were considered based on the Minnesota Comprehensive Statewide Freight and Passenger Rail Plan (State Rail Plan). Completed in early 2010, the purpose of the State Rail Plan "is to guide the future of the rail system and rail services in the State.".[2] According to the State Rail Plan one of the priorities for the passenger rail program is "High-Speed Rail passenger service from the Twin Cities to Madison / Milwaukee / Chicago, to Duluth and to Rochester (sustained speeds of 110 mph), with connections in Chicago to numerous other Midwestern cities also via high speed service."[3] Thus, the proposed high-speed rail projects in these corridors were reviewed with respect to their ability to divert passengers from MSP.

3.1.2.1 Twin Cities to Madison/Milwaukee/ Chicago High-speed Rail

The Twin Cities to Madison/ Milwaukee/Chicago corridor is part of the proposed Midwest Regional Rail System (MWRRS). One of the major plan elements of the MWRRS is to operate a "hub-and-spoke" passenger rail system with Chicago as the hub and locations like Minneapolis and Kansas City as the spokes. Another major element is to have the trains travel at speeds up to 110 miles per hour.[4]

The planning process for the section of the corridor between the Twin Cities and Madison/Milwaukee was initiated in 2010 with the commencement of an environmental impact statement (EIS). The EIS will result in the identification of a preferred alternative for the Milwaukee-Twin Cities corridor. The preliminary estimated travel time "between Milwaukee and Minneapolis/St. Paul is 5 hours and 58 minutes (making all stops) and 4 hours and 27 minutes (express)."[5]

Two factors were considered in estimating the number of passengers that could be diverted from air travel to high-speed rail. First, according to America 2050's report *High-Speed Rail in America*, rail competes with air travel for trip distances ranging between 200 to 600 miles. The report states that "To compete with air travel at these distances, very high-speeds must be maintained …"[6] Also, based on case studies of eight European air/rail routes, a high correlation has been found between rail journey time and rail/air share of the market.[7] From these case studies it was concluded that "Under present airport conditions, when a European train can provide city-center to city-center service in less than 3.5 hours, that train can gain a market share of greater than 50% of the aggregate of air and rail combined."[8]

The second factor is that connecting passengers are more difficult to divert to high-speed rail than origin-destination passengers. According to *High-Speed Rail in America*, connecting "…passengers differ from origin-destination passengers in that their destination is the airport, not another point within the metro region. It is therefore more difficult to attract these passengers to rail, even with competitive trip times and frequent service."[9]

Based on these two factors, a rough approximation of the number of diverted passengers was calculated. Given the estimated express travel time of 4 hours and 27 minutes between Milwaukee and Minneapolis/St. Paul, the estimated time between Chicago and Minneapolis/St. Paul would be more than 5 hours. Because this travel time is greater than 3.5 hours, a diversion rate of 50 percent was applied. With travel times greater than 3.5 hours, a 50 percent passenger diversion from air travel to high-speed rail is an aggressive estimation. Also, because of the difficulty in attracting connecting passengers, especially with the anticipated train travel time, the 50 percent diversion rate was applied to origination-destination passengers only.

Based on the forecast prepared for this EA, a total of approximately 859,000 air passengers would travel from the Twin Cities to Madison, Milwaukee and Chicago in 2020 assuming no high-speed rail service would be available. If 50 percent were diverted to high-speed rail in 2020, the forecast of total MSP originations would be reduced by 4.2 percent and the forecast of total enplanements would be reduced by 2.1 percent. These percentages are similar to the percentages that other airports would divert under the Other Airports Alternative. Therefore, similar conclusions can be drawn. The reduction in originating passengers attributed to high-speed rail is similar to the estimated reduction in originating passengers with Scenario A under the Other Airports Alternative. Thus, as with Scenario A, it is concluded that the need for landside improvements could be delayed by about two years. The reduction in enplaning passengers attributed to high-speed rail is similar to the estimated reduction in enplaning passengers with Scenario B under the Other Airports Alternative. Thus, as with Scenario B, it is concluded that the need for gate and terminal improvements could be delayed for up to a year.

3.1.2.2 Northern Lights Express

The Northern Lights Express (NLX) Passenger Rail is a proposed high-speed rail that would provide service between the Twin Cities and Duluth. Trains would travel a 155-mile corridor at top speeds of 110 miles per hour with an estimated trip time of two and one quarter hours.[10]

The potential for the NLX to reduce the need for improvements at MSP was considered. Based on the forecast, approximately 3,200 non-connecting passengers would travel via air between MSP and Duluth in 2020 assuming no high-speed rail service would be available. If 100 percent of these passengers would be diverted to the NLX, the number of originations and enplanements at MSP would decrease by less than 0.1 percent. Thus, the diversion of air travelers to the NLX would have little or no effect on the identified needs at MSP.

3.1.2.3 Zip-Rail

Zip-Rail is the name of the proposed high-speed rail between the Twin Cities and Rochester. Ultimately, high-speed passenger trains would travel at speeds of 150-220+ miles per hour on this route. New tracks would be required along most of the route in order to achieve these speeds. According to the Zip-Rail Web site, "Proponents of the Zip-Rail line are optimistic the line can be developed within the next 10-15 years."[11]

Similar to the NLX, the potential for the Zip-Rail to reduce the need for improvements at MSP was considered. Based on the forecast approximately 1,800 non-connecting passengers would travel via air between MSP and Rochester in 2020 assuming no high-speed rail service would be available. If 100 percent of these passengers would be diverted to the Zip-Rail, the number of originations and enplanements at MSP would decrease by less than 0.1 percent. Therefore, it is again concluded that the diversion of air travelers to the ZIP-Rail would have little or no effect on the identified needs at MSP.

3.1.2.4 Other Modes of Transportation - Summary

Considering the modes of transportation other than aviation, high-speed rail likely has the highest potential to divert additional air travelers because it may be able to compete in travel time. Even if the current Minnesota high-speed rail initiatives are implemented, the need for improvements at MSP would be delayed only temporarily. In addition, although these three high speed rail projects may become more viable in the future actual implementation would not likely occur prior to 2020 when the improvements are needed at MSP.

3.2 On-Site Alternatives

The range of on-site alternatives consisted of alternatives to develop new or expanded terminal and landside facilities at MSP to accommodate the anticipated 2020 demand.

3.2.1 New Terminal

The MSP 2020 Concept plan presented in the 1998 Dual Track Final EIS included a new terminal on the west side of MSP.[12] At that time, expansion of Terminal 1-Lindbergh to the east was severely limited by the presence of the Northwest Airlines (NWA) maintenance facility referred to as the Building B Hangar Complex. Therefore, the intent was for the new west side terminal to replace the existing Terminal 1-Lindbergh, which was to be reconfigured to a series of remote concourses. Terminal 2-Humphrey was anticipated to serve only charter operations.

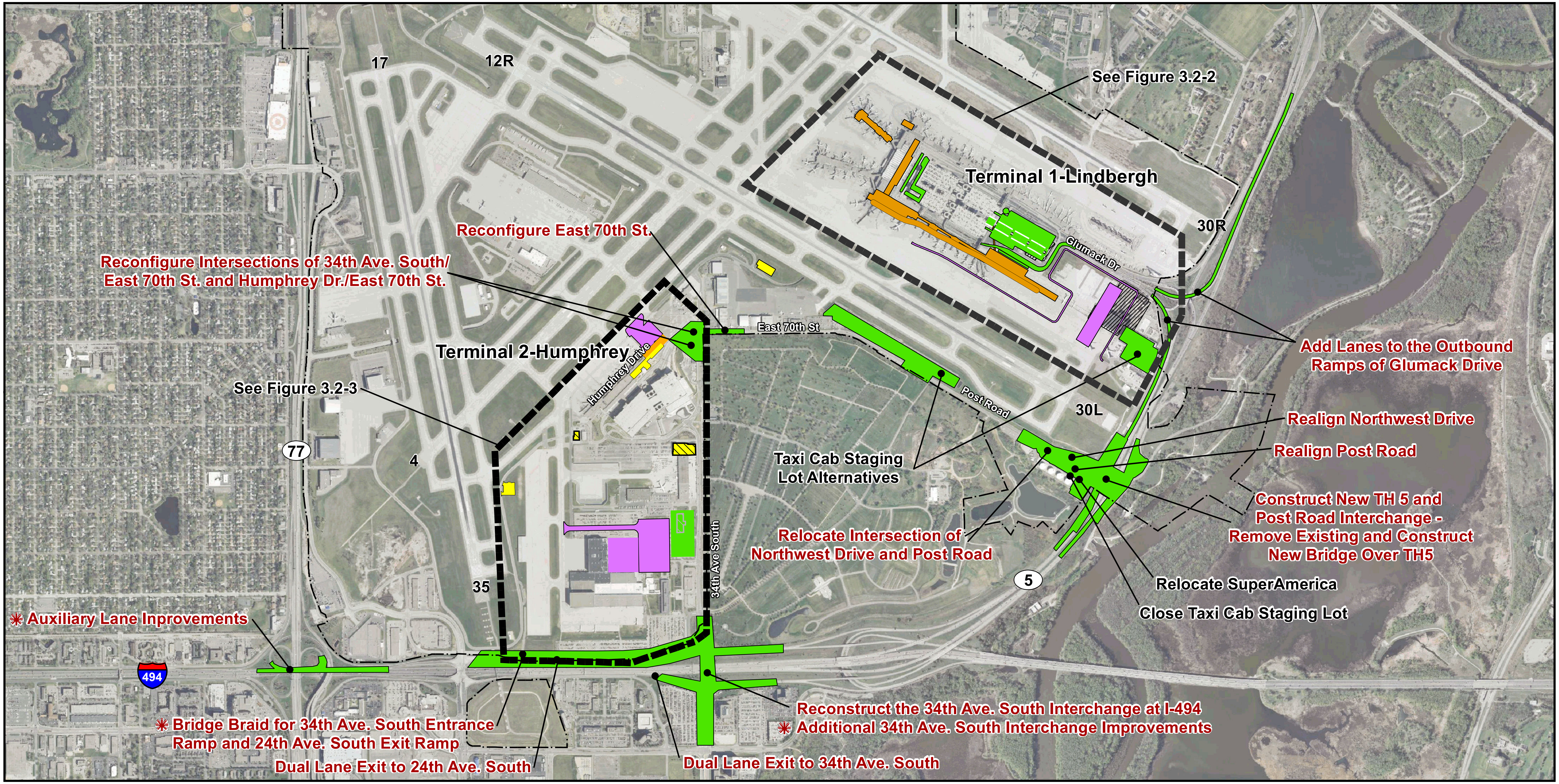
Post 1998, changes in the airline industry along with improvements in the existing airport infrastructure have impacted the feasibility of constructing a west side terminal. In 2005, Northwest Airlines declared bankruptcy and in 2008 announced a merger with Delta Air Lines. These events and an industry change to maintenance outsourcing led to a consolidation of the Northwest Airlines and Delta Air Lines maintenance facilities. This in turn resulted in the return of a significant portion of the Building B Hangar Complex to the MAC which has since been demolished. Therefore, the Building B Hangar Complex no longer limits the eastward expansion of Terminal 1-Lindbergh.

Since 1998, as part of the MSP 2010 Airport Expansion Plan, significant expansion and improvements were made to the existing terminal system. Forty-six new gates were added at Terminal 1-Lindbergh along with two 9-level general parking ramps and two passenger trams and an expanded Terminal 2-Humphrey was constructed with 10 gates and access to two new parking ramps. Several access road improvements were also constructed including a new Humphrey Drive. A light rail tunnel system was also constructed between the terminals. The Metro Transit operates the light rail between downtown Minneapolis and the Mall of America with stops at Terminal 1-Lindbergh and Terminal 2-Humphrey, facilitating free passenger transfers between the terminals.

The investment needed in both money and time to develop a new west side terminal including reconstructing Terminal 1-Lindbergh into remote concourses, constructing roadways, parking facilities and an underground hub tram as well as relocating the air traffic control tower, etc., would be markedly greater than expanding the current terminal complex. For these reasons as well as the changes in the airline industry, the new west side terminal was not included in the LTCP Update and is eliminated from further consideration.

3.2.2 Airlines Remain Alternative

The Airlines Remain Alternative includes the improvements needed through 2020 presuming that the airlines remain in their current terminals. Regional roadway improvements out to 2030 have been identified based on the 2030 LTCP and background traffic growth to satisfy FHWA NEPA requirements. The gate, terminal, landside, roadway and airside facility improvements consist of those necessary to accommodate the forecasted airlines' growth at each terminal. The specific gate, terminal and landside requirements are identified in ***Appendix O**, Purpose and Need Technical Report*. The following sub-sections describe the proposed infrastructure improvements required to accommodate those needs. The improvements included in the Airlines Remain Alternative are illustrated on **Figure 3.2-1** and listed in **Table 3.2.1**.



LEGEND

- Proposed Terminal Projects
- Proposed Landside/Roadway Projects
- Proposed Airside Projects
- Planned Post 2020
- Projects that are Underway
- Remove and/or Relocate
- MAC Property

Alternative 1 - Airlines Remain

N

0 750 1,500 3,000 Feet

Source: Minneapolis-St. Paul International Airport

Disclaimer: This map was generated by HNTB Corporation using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitability for a particular use. The scale and location of all mapped data are approximate.

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Table 3.2.1

Alternative 1 - Airlines Remain	
Terminal 1-Lindbergh	**Terminal 2-Humphrey**
• **Terminal** – Expand Concourse G ▪ Construct new International Facility ▪ Install new Concourse G tram – Remodel and reconfigure the terminal lobby – Reconfigure and expand baggage facilities – Remodel Concourse E	• **Terminal** – Expand terminal
• **Landside / Roadway** **Before 2020** – Expand terminal arrivals curb and relocate commercial ground transportation center (GTC) – Construct a new parking ramp ▪ Relocate portions of Glumack Drive ▪ Remove above-ground portion of Post Office ▪ Extend underground hub tram tunnel – Add lanes to the outbound ramps of Glumack Drive to Trunk Highway (TH) 5	• **Landside / Roadway** **Before 2020** – Construct new Delta Air Lines Employee Parking Ramp ▪ Demolish Building G – Reconstruct 34th Avenue South interchange at I-494 – Reconfigure the intersections of 34th Avenue South / East 70th Street and Humphrey Drive / East 70th Street – Reconfigure East 70th Street – Construct new Trunk Highway (TH) 5 and Post Road Interchange ▪ Remove existing and construct a new bridge over TH 5 ▪ Realign Post Road and Northwest Drive ▪ Relocate the intersection of Northwest Drive and Post Road ▪ Relocate SuperAmerica ▪ Close taxi cab staging lot and accommodate displaced taxi cabs – Construct a dual lane exit from eastbound I-494 to 34th Avenue South – Construct a dual lane exit from westbound I-494 to 24th Avenue South **After 2020** – Construct auxiliary lane improvement on westbound I-494 between 24th Avenue South and the exit to southbound TH 77 – Construct bridge braid for 34th Avenue South entrance ramp to westbound I-494 and exit ramp to 24th Avenue South from westbound I-494 – Additional expansion of 34th Avenue South interchange at I-494

Table 3.2.1

Alternative 1 - Airlines Remain	
Terminal 1-Lindbergh	**Terminal 2-Humphrey**
• **Airside** – Relocate Runway 30L deicing pad ▪ Demolish remainder of Building B Hangar Complex – Extend airfield service road – Extend Airport Operations Area (AOA) tunnel and A Street – Relocate Concourse G Fuel Main Line	• **Airside** – Expand terminal apron – Construct Replacement Hangar B Complex ▪ Construct access taxiway ▪ Construct apron

3.2.2.1 Terminal 1-Lindbergh

This sub-section identifies proposed terminal, landside/roadway and airside improvements needed at Terminal 1-Lindbergh to implement the Airlines Remain Alternative.

Alternative 1 - Airlines Remain
Terminal 1-Lindbergh
• **Terminal** – Expand Concourse G ▪ Construct new International Facility ▪ Install new Concourse G Tram – Remodel and reconfigure the terminal lobby – Reconfigure and expand baggage facilities – Remodel Concourse E

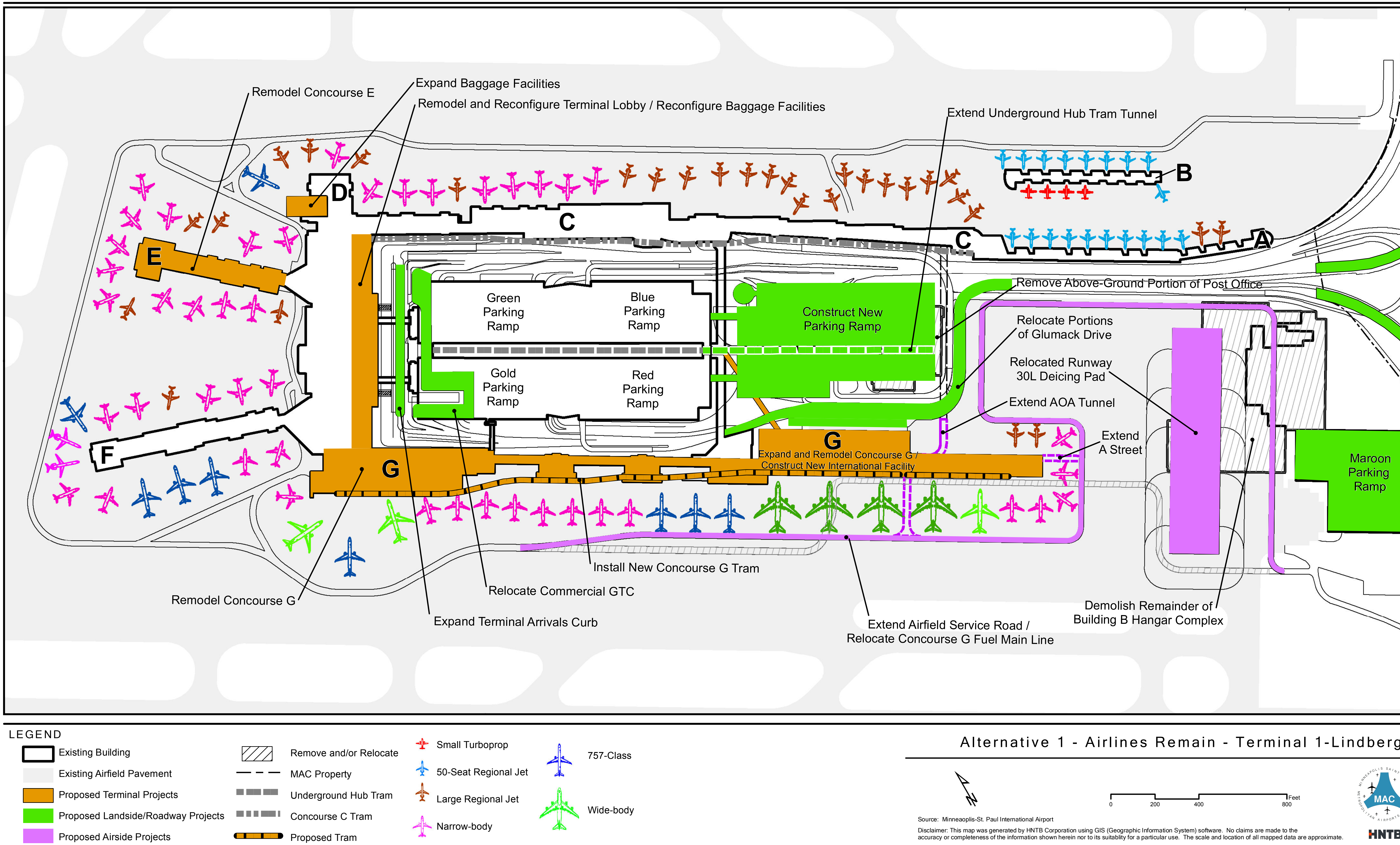
Expand Concourse G

Expansion of Concourse G would be required to accommodate the needed aircraft gate frontage as well as a new, larger International Facility.

The overall 2020 gate requirements are identified in *Appendix O*, Sub-section 2.3.1. Based on the gated aviation activity forecast for the Airlines Remain Alternative, the number and size of the gates required at Terminal 1-Lindbergh were identified. The type of aircraft dictates the size of the gate including the depth and length of terminal frontage. Using this information, a conceptual layout of the gates was completed. **Figure 3.2-2** depicts the conceptual layout developed for Terminal 1-Lindbergh.

Minneapolis-St. Paul International Airport 2020 Improvements EA

FIGURE 3.2-2



Alternative 1 - Airlines Remain - Terminal 1-Lindbergh

Source: Minneapolis-St. Paul International Airport

Disclaimer: This map was generated by HNTB Corporation using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitability for a particular use. The scale and location of all mapped data are approximate.

At Terminal 1-Lindbergh, the conceptual layout shows how the forecasted fleet would be accommodated at the gates. Modifications to gates and jet bridge locations may be necessary and the terminal would need to be expanded to accommodate the forecasted aircraft fleet. Concourse G is the only concourse with significant adjacent expansion space in part because of the removal/relocation of a significant portion of the Building B Hangar Complex. The conceptual layout shows that Concourse G can be extended to accommodate the required length of terminal frontage. Expansion of Concourse G includes remodeling of the existing gates at the east end of the concourse. All gates in the expanded concourse, as well as the gates from the modified existing concourse, would have the flexibility to accommodate domestic operations or to process international passengers through sterile corridors to US Customs and Border Protection processing.

It is envisioned that the new International Facility, located within the Concourse G expansion, would include development on three levels: gate, ground and below ground. The new ticket lobby and security checkpoint would be on the gate level. The ground level would include a meeter/greeter area and access to curbside pick-up. The curb would also function as a drop-off for departing international passengers. Access to parking, the underground tram and the Ground Transportation Center (GTC) would be provided via a pedestrian tunnel. A tug drive tunnel to the baggage processing area would be constructed one level below grade. Baggage carts would access the tug drive tunnel via an extension of the existing Airport Operations Area (AOA) tunnel.

The extension of Concourse G would also require installation of a new passenger tram system. The new tram is needed based on the findings of the 2006 *G Concourse Tram Study*.[13] The Study indicated that any significant extension of Concourse G, without addition of a tram, would result in an unacceptable customer level of service (LOS) and potential connecting passenger delays due to increased walking distance. Alternative locations were considered for the passenger tram. In order to avoid interference with the jet bridges, the passenger tram had to be constructed at or above the roof level of Concourse G. Options to build the actual tram infrastructure on top of or alongside the roof were evaluated. Locating the tram on top of the concourse would require significant structural improvements. A tram located alongside of the concourse at roof level would be supported as an independent structure. Thus, this option posed less inherent risk and fewer construction challenges and therefore was identified as the preferred option for the tram.

The new passenger tram system would have three roof-level stations; one at the west end of the concourse, one near the Concourse G to C Connector and one above the east end of the expanded Concourse G. The west station would require significant reconfiguration of the area connecting the main terminal building to the vertical circulation serving the station. The center station would require infill at the airside recess between existing gates. Beyond the east station, a facility would be required to provide a service area for the tram vehicles.

Remodel and Reconfigure the Terminal Lobby

The Airlines Remain Alternative would include remodeling and reconfiguring the existing Terminal 1-Lindbergh lobby area and adjacent facilities. Re-configuration would allow for more efficient use of existing space, resulting in additional space for passenger check-in, security checkpoints and adjacent queuing areas.

Reconfigure and Expand Baggage Facilities

Existing and future deficiencies in the baggage claim area would be addressed through a combination of improvements including reconfiguration of the existing areas, installation of new equipment and the construction of additional space. Reconfiguration of the existing baggage claim area would allow for better use of redundant circulation space. In addition, the baggage claim area would be expanded into the existing area allocated to inbound/outbound baggage where bags enter and exit the terminal facility. Thus, additional space would be created for baggage claim device queue areas and replacement of the existing round claim with new lengthened baggage claim devices that provide increased retrieval frontage.

The inbound/outbound baggage areas would be expanded to meet projected demands. The existing areas would be reconfigured to maximize efficiency and expanded at the ground level under Concourse D. An existing baggage storage area would be renovated and an adjacent expansion at the ground level of Concourse D would provide additional space for inbound and outbound baggage operations.

Remodel Concourse E

The Airlines Remain Alternative would include reconfiguring the interior of Concourse E to accommodate restroom upgrades and additions, concessions relocations and hold room modifications. Also, mechanical and technological upgrades and exterior modifications would be included to reduce energy consumption and increase passenger comfort.

Alternative 1 - Airlines Remain

Terminal 1-Lindbergh

- **Landside / Roadway**
  - Expand terminal arrivals curb and relocate commercial GTC
  - Construct a new parking ramp
    - Relocate portions of Glumack Drive
    - Remove above-ground portion of Post Office
    - Extend underground hub tram tunnel
  - Add lanes to the outbound ramps of Glumack Drive to TH 5

Expand Terminal Arrivals Curb and Relocate Commercial GTC

Terminal curb roadway improvements would be needed to address the 400-foot deficiency in arrivals curb length identified in *Appendix O*, Sub-section 2.3.3. Additional arrival curb would be provided by relocating the commercial GTC from the outer curb of the lower level and reconfiguring this area to allow for arriving passenger pick up by privately-owned vehicles (POV). Figure 3.2-2 shows the proposed arrivals curb and relocated commercial GTC.

In order to expand the arrival curbside for the private vehicle pick up, the commercial vehicle activity on the lower level outer roadway would be relocated to a reconfigured GTC on the West Commercial Roadway within the Gold Ramp. The reconfigured commercial GTC would provide more than double the current capacity of 25 vehicles and would accommodate 61 commercial vehicles during the peak period. This would replace the existing east and west commercial GTC combined capacity of 48 vehicles and provide space for an additional 13 vehicles.

Several sites such as the existing transit center were considered for the commercial GTC facility. However, the most efficient solution was to locate the commercial GTC in the Gold Parking Ramp because the necessary infrastructure already exists and this location is close to the terminal thereby maintaining relatively easy wayfinding and providing a high passenger level of service with short walking distances.

In addition, to provide convenient curbside access to and from the International Facility, a new single-level curb roadway would be added adjacent to the east face of Concourse G.

Construct a New Parking Ramp

With the Airlines Remain Alternative, approximately 8,300 additional public (general and short-term) parking spaces would be needed at Terminal 1-Lindbergh in order to meet demand in 2020. It is estimated that approximately 2,300 parking spaces would be required for Terminal 1-Lindbergh employees. To balance supply, it was assumed that approximately 27 percent of the Terminal 1-Lindbergh employees would continue to park at Terminal 2-Humphrey and approximately 1,700 would relocate to Terminal 1-Lindbergh. Therefore, a total of approximately 10,000 parking spaces would be needed.

Also, additional space would be needed for rental car services. Under the Airlines Remain Alternative, services for all rental cars would be provided at the Terminal 1-Lindbergh quick turn-around (QTA) facility. Therefore, approximately 82,000 additional square feet of space dedicated to rental car services at Terminal 1-Lindbergh would be needed in 2020.

Thus, it was determined that additional parking was needed to satisfy both future parking and rental car requirements. Options to provide a parking facility that would meet this need were studied.

The primary criterion for evaluation of the parking facility options was that the new parking facility must provide convenient parking for passengers and employees. Therefore, locations not within a walkable distance from Terminal 1-Lindbergh were eliminated from further consideration.

Various locations for additional parking facilities between the existing Red and Blue Ramps and TH 5 were considered. Based on the number of parking spaces needed and the limited area of available land, it was determined that surface parking was not a viable option. Therefore, various sites for a new parking ramp in the subject area were evaluated. Sites requiring demolition of existing facilities such as the Post Office and Building B were included in the evaluation. The sites were evaluated based on walking distance and the ability for construction to be accomplished in phases. The best site, the site that provided the shortest walking distance while also allowing for phased construction, was the site adjacent to the existing Red and Blue Ramps. This site was thus selected as the preferred option for a new parking ramp because it could accommodate the full parking demand while creating a cohesive landside network and it could be easily constructed in phases.

The new parking ramp with approximately 10,000 parking spaces would require both the relocation of Glumack Drive and the demolition of the aboveground portion of the Post Office. Glumack Drive would be relocated around the footprint of the existing Post Office to accommodate the new ramp construction and to provide access to the proposed International Facility.

The new parking ramp would be constructed above the underground portion of the Post Office in order to retain the existing loading docks. The aboveground portion of the existing Post Office would be demolished. Only a small portion of the aboveground structure currently serves as an actual post office. Given the consolidation efforts that are ongoing in the US Postal Service, similar services could be provided at a nearby community post office. It is not anticipated that a retail post office would be required at the airport. Currently, the belowground portion of the Post Office accommodates airmail processing and cargo activities, and serves as a loading dock. The belowground structure is valuable because it has access to the existing AOA tunnel via which goods can be distributed from the loading dock to the airfield.

The underground hub tram currently transfers travelers and employees between Terminal 1-Lindbergh and parking ramps, auto rental and the light rail station. An extension beyond its current termination point at the existing Red and Blue parking ramps is not required to meet demand in the 2020 timeframe. However, the construction of the hub tram tunnel structure extension would need to be accomplished with the Airlines Remain Alternative as an integral part of the new parking structure. This will allow for open cut excavation of the tunnel as opposed to boring, which minimizes cost, congestion and future service interruptions and provides for improved connectivity and level of service for travelers.

Add Lanes to the Outbound Ramps of Glumack Drive to Trunk Highway (TH) 5

Traffic exiting Terminal 1-Lindbergh under this alternative is anticipated to operate at level of service (LOS) E and LOS F during the peak hours. To mitigate these poor conditions, the exit ramps to both eastbound and westbound TH 5 would be expanded to two lanes. These lanes would be extended in both directions along TH 5 to facilitate safer vehicle merging to TH 5 and increase capacity.

Alternative 1 - Airlines Remain

Terminal 1-Lindbergh

- **Airside**
  - Relocate Runway 30L deicing pad
    - Demolish remainder of Building B Hangar Complex
  - Extend airfield service road
  - Extend AOA tunnel and A Street
  - Relocate Concourse G Fuel Main Line

Relocate Runway 30L Deicing Pad

At MSP deicing pads are located near the ends of the runways that are most frequently used for departures during deicing event weather conditions. Airlines apply deicing fluid to aircraft just prior to takeoff during snow, sleet or icing conditions. The location of the pad is integral to minimizing the timeline between application of the fluid and aircraft departure. Each deicing pad is designed to capture aircraft deicing fluid (glycol) for recycling and to minimize runoff to receiving waters.

The existing Runway 30L deicing pad would be displaced by proposed terminal expansion and would need to be relocated. The new deicing pad would be reconstructed with enhanced deicing fluid capture capabilities.

Given the desire to locate the pad in close proximity to the runway end, only two options for the relocation were considered. The first option was to relocate the pad to the east. In this location the pad could accommodate the necessary aircraft; however, access through and around the pad may be restricted by the existing Maroon parking ramp and Northwest Drive frontage road. While the Maroon parking ramp could be demolished and replaced elsewhere on the campus, access to Terminal 1–Lindbergh via Northwest Drive is critical and needs to be maintained. It is the only access available for deliveries to the Terminal, and there are currently no viable alternatives for relocating this road.

The second option considered, the preferred option, was to orient the pad in a north-south direction and place it where the Building B Hangar Complex currently exists, as shown on Figure 3.2-2. Therefore, the Building B Hangar Complex activities would need to be relocated to a new facility and the old building demolished to accommodate the relocated deicing pad. This deicing pad orientation is also consistent with the long-range plans for the future crossover taxiway identified in the Long Term Comprehensive Plan (LTCP) Update.

The Building B Hangar Complex has been reduced in size in recent years through demolition of the office spaces and five of the seven aircraft hangars. The remaining sections of the complex, currently occupied by Delta Air Lines, would need to be completely demolished in order to allow for the relocation of the Runway 30L deicing pad. This demolition would include:

- Removal of the remaining concrete slab (approximately 750,000 square feet), footings and foundations associated with the portion of the building that was previously demolished.
- Removal of approximately 38,000 square feet of underground tunnel that remains under the existing exposed slab.
- Demolition of 300,000 square feet of structures including two large hangars, three engine test cells and support facilities.
- Remediation of soil and removal of hazardous materials associated with the previous tenant's use of Building B.

Under the Airlines Remain Alternative, the Building B Hangar Complex would be relocated south of Terminal 2–Humphrey as depicted on Figure 3.2-3.

Extend Airfield Service Road

Airfield service roads are marked around terminal areas to define safe areas for vehicles to drive and access gate areas from the airside in order to service airplanes, transfer baggage and to clean and prepare aircraft for departure.

The service road must be in close proximity to the gate areas, and must provide access to all aircraft gates. Thus, the proposed terminal expansion would require an extension to the existing service road in order to provide access to the new gates. This road would also be extended around the newly constructed deicing pad to provide access for vehicles to other areas of the airfield.

Extend AOA Tunnel and A Street

To accommodate the extension of Concourse G, the AOA tunnel that connects the Concourse G airfield service road to the Concourse C airfield service road must be extended under Concourse G. This tunnel is an important asset because it reduces service vehicle travel time and air side congestion. Service vehicles use the tunnel between Concourses A, B and C located north of Glumack Drive and Concourse G located south of Glumack Drive. Without this tunnel, service vehicles would have to travel around Concourses E and F located on the west end of the terminal. The AOA tunnel must be extended to maintain this important route.

Similar to the AOA tunnel, A Street also provides important access between terminal concourses and the airfield at ground level. A Street runs under the G Concourse and is used by luggage tugs and MSP service vehicles. In order to maintain the connection to the airfield, A Street would be extended when the G Concourse is extended.

Relocate the Concourse G Fuel Main Line

Extension of Concourse G and construction of a concourse tram system would require the relocation of an existing fuel main line in order to comply with safety separation requirements from the tram columns. The relocated fuel line would serve the existing and new aircraft gates along Concourse G. The main is part of the underground hydrant fueling system and must be located close to the aircraft parking positions at each gate.

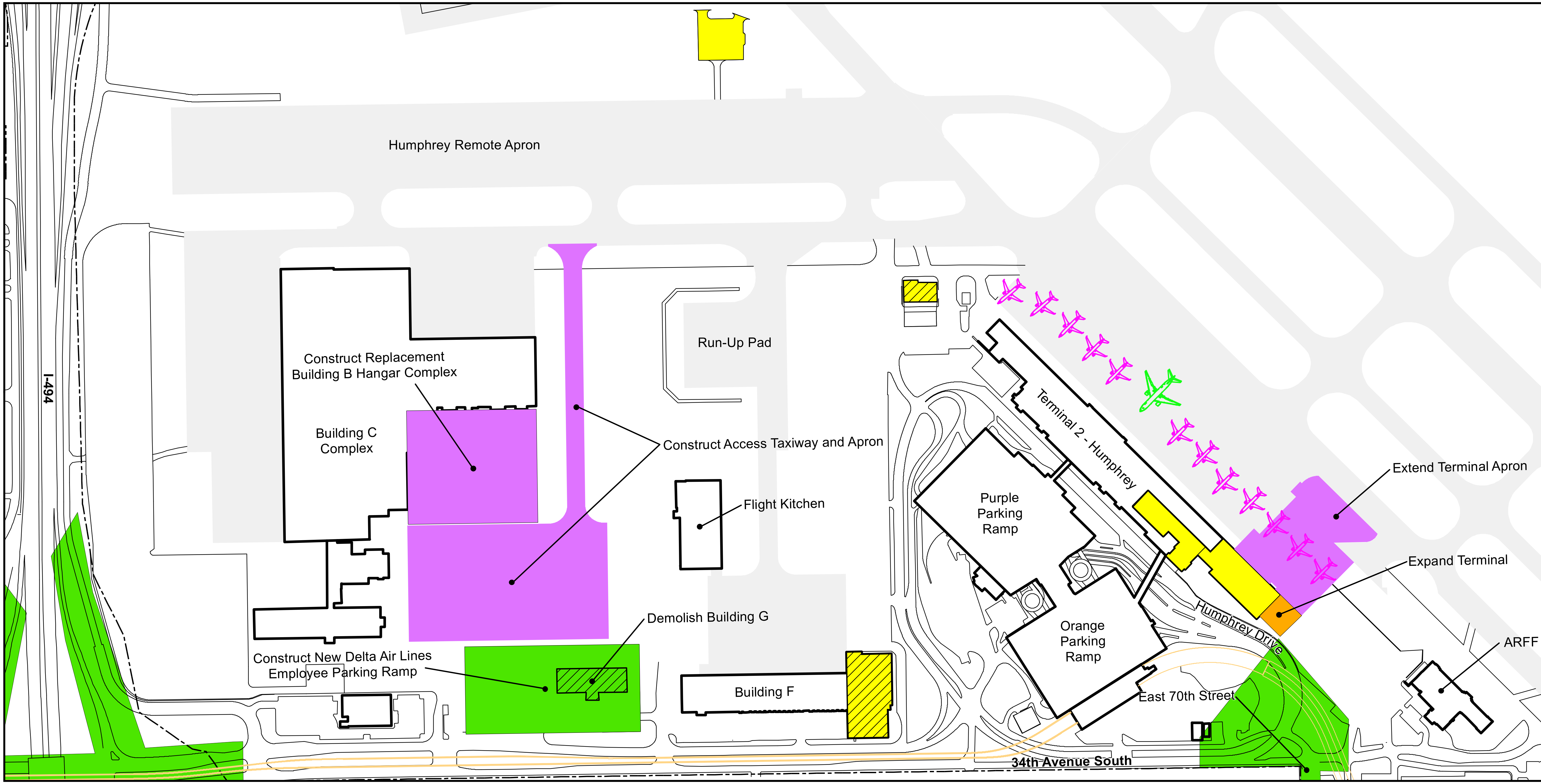
3.2.2.2 Terminal 2-Humphrey

This sub-section identifies proposed terminal, landside and airside improvements needed at Terminal 2-Humphrey to implement the Airlines Remain Alternative.

Alternative 1 - Airlines Remain
Terminal 2-Humphrey
• **Terminal** – Expand terminal

The 2020 gated forecast for the Airlines Remain Alternative, shows that three additional narrow-body aircraft gates would be needed at Terminal 2-Humphrey for airline growth of existing or new entrant carriers. Therefore, as part of the Airlines Remain Alternative, Terminal 2-Humphrey would be expanded to accommodate additional gates. The terminal would be expanded to the northeast where space is readily available. **Figure 3.2-3** depicts the expanded terminal and the conceptual gate layout for Terminal 2-Humphrey. The three gates would be constructed as an extension to the northeast end of the Terminal above the new outbound bag handling areas currently approved for development. To provide access to these gates and necessary amenities: additional gate hold room seating, concourse circulation and concession areas would be included in this alternative.

FIGURE 3.2-3



LEGEND

- Existing Building
- Existing Airfield Pavement
- Proposed Terminal Projects
- Proposed Airside Projects
- Proposed Landside/Roadway Projects
- Projects that are Underway
- LRT Tracks
- MAC Property
- Remove and or Relocate
- Small Turboprop
- 50-Seat Regional Jet
- Large Regional Jet
- Narrow-body
- 757-Class
- Wide-body

Alternative 1 - Airlines Remain - Terminal 2-Humphrey

0 200 400 800 Feet

Source: Minneaoplis-St. Paul International Airport

Disclaimer: This map was generated by HNTB Corporation using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitablity for a particular use. The scale and location of all mapped data are approximate.

Alternative 1 - Airlines Remain

Terminal 2-Humphrey

- **Landside/Roadway**

Before 2020

- Construct new Delta Air Lines Employee Parking Ramp
  - Demolish Building G
- Reconstruct 34th Avenue South interchange at I-494
- Reconfigure intersections of 34th Avenue South / East 70th Street and Humphrey Drive / East 70th Street
- Reconfigure East 70th Street
- Construct new TH 5 and Post Road Interchange
  - Remove existing and construct a new bridge over TH 5
  - Realign Post Road and Northwest Drive
  - Relocate the intersection of Northwest Drive and Post Road
  - Relocate SuperAmerica
  - Close taxi cab staging lot and accommodate displaced taxi cabs
- Construct a dual lane exit from eastbound I-494 to 34th Avenue South
- Construct a dual lane exit from westbound I-494 to 24th Avenue South

After 2020

- Construct auxiliary lane improvement on westbound I-494 between 24th Avenue South and the exit to southbound TH 77
- Construct bridge braid for 34th Avenue South entrance ramp to westbound I-494 and exit ramp to 24th Avenue South from westbound I-494
- Additional expansion of the 34th Avenue South interchange at I-494

For the Airlines Remain Alternative, sufficient parking capacity exists within the existing Terminal 2-Humphrey ramps to accommodate the forecasted growth through 2020. Additionally, existing arrival and departure curb roadway and GTC facilities will provide an acceptable Level of Service (LOS) through 2020. Thus, the only landside related improvement that would be needed, is the construction of a new Delta Air Lines Employee Parking Ramp.

Construct new Delta Air Lines Employee Parking Ramp

Delta Air Lines employees park in surface lots located adjacent to the Building C Complex. The north lot would necessarily be removed in order to construct the Building B Hangar Complex replacement facilities and its associated aircraft apron. Therefore, this Alternative would include the construction of a new elevated parking ramp in order to replace the lost Delta employee parking spaces. The parking ramp would be located adjacent to 34th Avenue South just south of Building F. In order to construct the parking ramp at the selected site building G would be demolished and its cargo receiving function accommodated in the replacement Building B Hangar Complex site.

Reconstruct 34th Avenue South Interchange at I-494

The existing diamond interchange at I-494 / 34th Avenue South would suffer significant queuing and delay in 2020 if not improved. The 2020 Airlines Remain Alternative operations would be anticipated to be similar to the 2020 No Action Alternative operations. Under the 2020 No Action Alternative, it is anticipated that the north ramp intersection would operate at an overall LOS F and several individual turning movements would operate at an LOS E or F throughout the day. Therefore, the Airlines Remain Alternative includes improvements to the 34th Avenue South Interchange at I-494.

Potential interchange concepts to improve the LOS and reduce queuing were assessed as part of the MSP Area Roadway Improvements Project. This project evaluation process commenced in 2010 and is funded by the Metropolitan Airports Commission (MAC), City of Bloomington and Minnesota Department of Transportation. One of the main objectives was to develop interchange concepts at I-494/34th Avenue South, TH 5/Post Road, and TH 5/Glumack Drive. A project management team (PMT) was formed to garner input from key agencies throughout the project duration. The agencies represented on the PMT included the following:

- Metropolitan Airports Commission
- City of Bloomington
- Minnesota Department of Transportation
- Federal Highway Administration
- Federal Aviation Administration
- Metro Transit
- Metropolitan Council
- Minnesota Department of Economic Development

The PMT played a key role in evaluating the interchange concepts and identifying a preferred concept. For the I-494/34th Avenue South Interchange, five concepts were evaluated using evaluation criteria developed by the PMT. Two concepts were based on improving the existing diamond interchange by providing additional grade separated ramps to reduce the volume of traffic that has to travel through the existing signalized intersections. These concepts would ultimately remove left turn movements from the two signal controlled intersections at the I-494 ramp terminals.

Two other concepts were based on a diverging diamond interchange (DDI). The DDI design "…accommodates left turning movements onto arterials and limited access highways while eliminating the need for a left-turn signal phase at signalized ramp terminal intersections. On the cross street, the traffic moves to the left side of the roadway between the signalized ramp intersections. This allows drivers of vehicles on the cross street who want to turn left onto the ramps the chance to continue to the ramps without conflicting with opposing through traffic and without stopping."[14]

The fifth concept featured a Single Point Urban Interchange (SPUI). With the SPUI all thru traffic on the cross-street and all left turns are controlled at a single signalized intersection.

Based on the evaluation criteria, the DDI was selected by the PMT as the preferred concept because it would require little or no right-of-way acquisition, it was the least expensive and it offered the most capacity. Thus, the Airlines Remain Alternative includes the reconstruction of the 34th Avenue South interchange at I-494 to a DDI configuration. Additional information including sketch diagrams of the various concepts can be found in ***Appendix C,*** *MSP Area Roadway Improvements Project Memos*.

Metro Transit has expressed concern regarding potential safety impacts of a DDI configuration that includes light-rail transit. The MAC, City of Bloomington and Mn/DOT all acknowledge a DDI with light-rail transit is unique. To address safety concerns for all agencies involved, a design enhancement study that reviewed several potential design considerations that may improve safety has been completed. The study includes a list of recommendations that should be further considered for incorporation into the design documents. The MAC will continue to work with the City of Bloomington, Mn/DOT and Metro Transit to develop a design that includes additional enhancements. It is noted that the potential safety related design enhancements are not anticipated to have environmental impacts and therefore would not change the evaluations included within this EA.

Construct a dual lane exit from eastbound I-494 to 34th Avenue South

To improve exiting traffic operations along eastbound I-494 at the exit to 34th Avenue South this exit will be converted from a single lane exit to a dual lane exit.

Construct a dual lane exit from westbound I-494 to 24th Avenue South

To improve exiting traffic operations along westbound I-494 at the exit to 24th Avenue South this exit will be converted from a single lane exit to a dual lane exit.

Reconfigure intersections of 34th Avenue South / East 70th Street and Humphrey Drive / East 70th Street

The 34th Avenue South / East 70th Street and Humphrey Drive / East 70th intersections are located to the northeast of Terminal 2-Humphrey as shown on Figure 3.2-3. The eastern intersection, 34th Avenue South / East 70th Street, is an all-way stop controlled intersection. The western intersection, Humphrey Drive / East 70th Street, is signalized. In 2020, these intersections would be anticipated to operate at an LOS F primarily because the intersections are too closely spaced and the eastern intersection is an all-way stop. Therefore, as part of the Airlines Remain Alternative, these intersections would be reconfigured into a single signalized intersection to increase capacity and improve the LOS.

Reconfigure East 70th Street

The Airlines Remain Alternative includes reconfiguring East 70th Street in the vicinity of the reconfigured intersection discussed in the previous sub-section. From the intersection, approximately 750 feet of East 70th Street would be expanded to a four lane divided roadway. The added lanes would allow for the reconfigured signalized intersection of Humphrey Drive, 34th Avenue south and East 70th Street to operate at an acceptable LOS. The new 750-foot long westbound lane would adequately store the westbound queues of traffic on the approach to 34th Avenue South. Without the addition of the second lane, the traffic queue would extend beyond several of the Signature Flight Support access points and thus would result in operational and safety concerns.

Construct new TH 5 / Post Road interchange and realign Northwest Drive

The interchange at TH 5 and Post Road would operate over capacity by 2020 under the No Action Alternative. The intersection of the eastbound TH 5 ramps and Post Road would operate at LOS F during the Airport and PM peak hours. Since the 2020 Airlines Remain Alternative's operations would be similar to the 2020 No Action Alternative's, improvements to increase the capacity of this interchange were included in the Airlines Remain Alternative.

This interchange at TH 5 and Post Road was also studied as part of the MSP Area Roadway Improvements Project. For this interchange, nearby features such as the MAC storm water ponds and the Runway 30L runway protection zone (RPZ) and approach surfaces limited the amount of land available for alternative interchange configurations. Many interchange alternatives that would normally be considered were not feasible due to impacts on adjacent infrastructure. Thus the PMT focused on interchange concepts based on diamond configurations. Various concepts were developed by considering a variety of options to improve capacity that included the following:

- Constructing a new bridge over TH 5 to supplement or replace the existing bridge
- Eliminating or relocating the intersection of Northwest Drive and Post Road
- Relocating the taxi cab staging lot and/or SuperAmerica

Ultimately, the PMT selected a new diamond interchange located south of the existing Post Road and TH 5 interchange. This option was preferred because the existing interchange could be used during construction, access to Northwest Drive could be maintained, and impacts to the RPZ for Runway 30L were minimized. Additional information including concept drawings of the various interchange configurations can be found in *Appendix C*.

Therefore, in order to improve the capacity of the Post Road and TH 5 interchange, the Airlines Remain Alternative includes the construction of a new Post Road and TH 5 diamond interchange. Construction of the new interchange would require the following improvements that are also included in the Airlines Remain Alternative:

- Remove existing and construct a new bridge over TH 5
- Realign Post Road and Northwest Drive
- Relocate the intersection of Northwest Drive and Post Road to the west
- Relocate the SuperAmerica just south of its current location
- Close taxi cab staging lot and accommodate displaced taxi cabs

Alternatives to accommodate the displaced taxi cabs were considered. Two potential sites were identified as viable alternatives: the Maroon Parking Ramp and an existing parking area on the north side of Post Road west of the current facility. Based on transportation analysis minor roadway improvements would be required for either option. To accommodate a taxi staging area at the Post Road location, a new right turn lane along Post Road and modifications to the parking lot entrances and exits would be required. To accommodate a taxi staging area at the Maroon Parking Ramp, the configuration of the Northwest Drive and Post Road intersection would be modified to provide southbound double left turn lanes from Northwest Drive to Post Road.

Other alternatives may become viable prior to the time when the existing taxi cab staging area is closed for the construction of the new diamond interchange at Post Road and TH 5. For instance, technology advances may result in a superior alternative that features a virtual taxi staging area. Therefore, the Sponsor has not identified a preferred alternative to accommodate the displaced taxi cabs as of the writing of this EA. The assessment of potential environmental impacts includes the evaluation of both of the potential relocation sites as part of this EA. If a different alternative to accommodate the taxi cabs is ultimately selected, additional environmental study will be completed and included in a supplement to this EA, if required.

The freeway modeling results show that without additional improvements to I-494 there will be significant congestion on westbound I-494 between TH 77 and 34th Avenue South and at the I-494/34th Avenue South interchange beyond 2020. The following improvements will be made along I-494 to serve the anticipated traffic demand post 2020:

Construct auxiliary lane improvement on westbound I-494 between 24th Avenue South and the exit to southbound TH 77

Construct a bridge braid for the 34th Avenue South entrance ramp to westbound I-494 and exit ramp to 24th Avenue South from westbound I-494.

This improvement allows traffic entering westbound I-494 from 34th Avenue South and traffic exiting from westbound I-494 to 24th Avenue South to cross via grade separation which reduces the weaving conflict on westbound I-494 improving freeway operations.

Additional expansion of the 34th Avenue South interchange at I-494 which will include:

- Modification of the southbound double right-turn lane to a triple right at the westbound I-494 ramps
- Modification of the eastbound left and right turn lanes from double to triple turn lanes at the eastbound I-494 ramps
- Modification of the northbound right to a triple right turn lane at the eastbound I-494 ramps
- Modification of the westbound left turn lane to southbound 34th Avenue from a double to a triple left at the westbound I-494 ramps

Alternative 1 - Airlines Remain

Terminal 2-Humphrey

- **Airside**
  - Expand terminal apron
  - Construct Replacement Hangar B Complex
    - Construct access taxiway
    - Construct apron

Expand Terminal Apron

Expansion of Terminal 2-Humphrey to accommodate three additional gates would require expansion of the adjacent aircraft apron and extension of the existing service road. Expansion of the apron would include not only the construction of concrete apron but also extension of the existing hydrant fueling system and deicing fluid capture facilities. The proposed apron location is tied to the terminal expansion, so there are no alternative sites for the apron.

Construct Replacement Building B Hangar Complex

Delta Air Lines currently provides maintenance and storage of aircraft, engines and ground support equipment (GSE) at the Building B Hangar Complex. Delta Air Lines plans to continue providing these services as part of its hubbing operation at MSP. Therefore, the relocated Building B Hangar Complex is expected to require the following services/shops and associated areas:

- Engine shop with test cells and associated engine storage (approximately 92,000 square feet).

- GSE maintenance shop (approximately 41,000 square feet) along with an exterior storage area for vehicles and equipment.

- Two large aircraft hangars, able to accommodate wide-body aircraft for maintenance, and the associated storage, personnel offices, break rooms and support areas for the maintenance operations (approximately 165,000 square feet).

In addition to providing a total of nearly 300,000 square feet of interior space, the new facility would require an apron area and airfield access so that large aircraft can move to and from the new hangar space.

Alternative locations that would accommodate the space and access needed for the relocated Building B Hangar Complex were considered. There is very little area available on the airport for development, particularly with airside access. Therefore, the options were limited to three areas: two areas adjacent to Longfellow Avenue South, one just north, and one just south of the West Cargo Apron, and one area adjacent to the Building C Complex. Based on preliminary layouts of the needed facilities, the airspace-related height restrictions for the areas adjacent to Longfellow Avenue South would limit the available parking for wide-body aircraft. The area adjacent to the Building C Complex is further from a runway than the Longfellow Avenue South areas, and therefore has fewer height restrictions and would allow for more flexibility for wide-body aircraft parking and service. Also, this area has the added advantage of being adjacent to Delta's other maintenance facilities. Therefore, the Building B Hangar Complex would be reconstructed in the area adjacent to the Building C Complex. The proposed new Building B Hangar Complex, associated apron and access taxiway are shown on Figure 3.2-3.

3.2.3 Airlines Relocate Alternative

The Airlines Relocate Alternative includes the improvements needed through 2020 presuming that the non-SkyTeam airlines currently located in Terminal 1-Lindbergh are relocated to Terminal 2-Humphrey. Regional roadway improvements out to 2030 have been identified based on the 2030 LTCP and background traffic growth to satisfy FHWA NEPA traffic, traffic-related air quality and traffic-related noise evaluation requirements.

This Alternative was developed during the LTCP Update when it was determined that MSP's 2-terminal system could be used more efficiently. Several factors contributed to this determination:

- Facilities at Terminal 1-Lindbergh, such as the bag claim, security check points and arrivals curb roadway are already congested. As passenger activity continues to grow, conditions at Terminal 1-Lindbergh will further deteriorate.

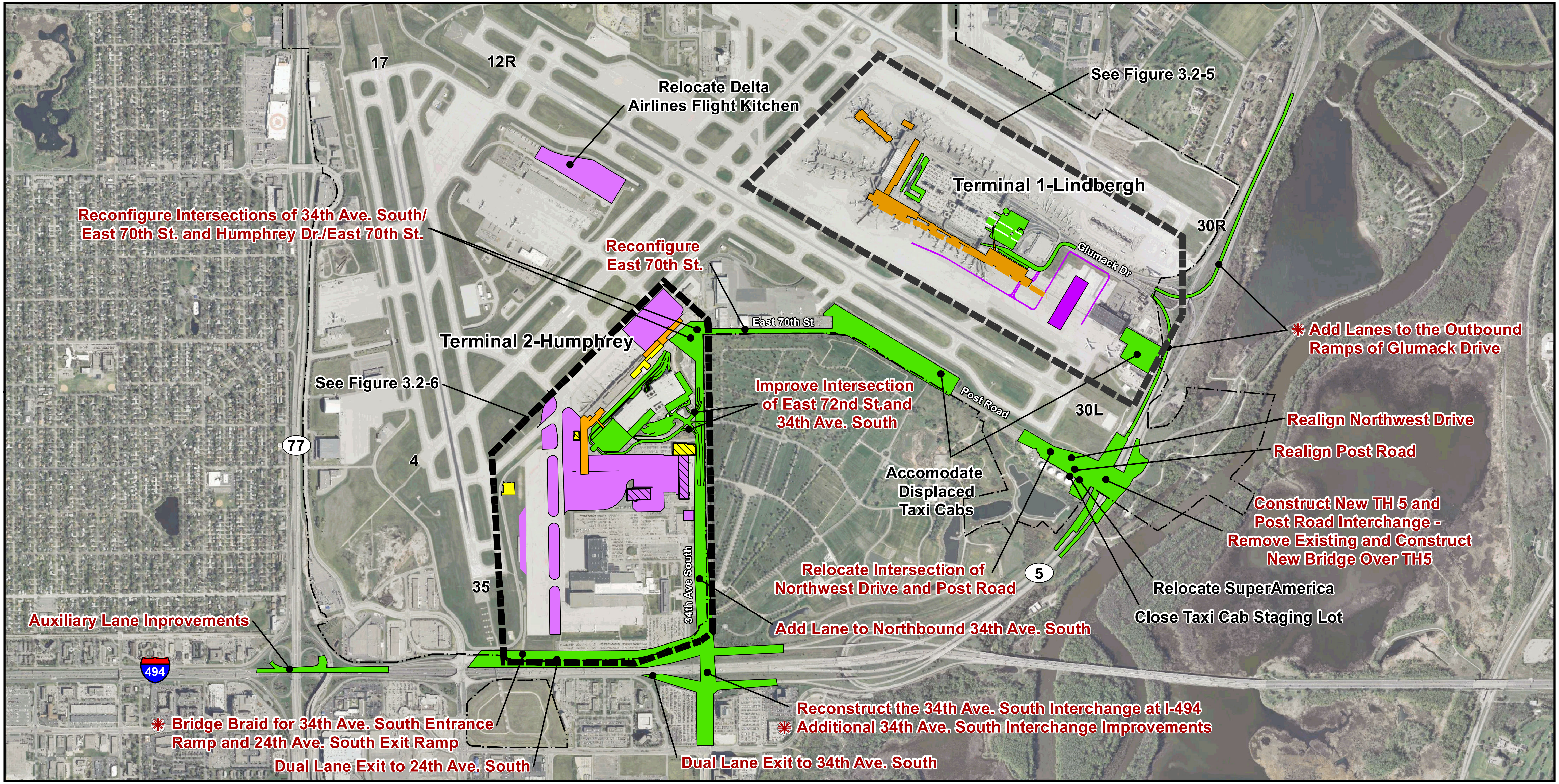
- Different types of airline operations require different passenger facilities. Delta Air Lines operates a major hub at MSP within Terminal 1-Lindbergh. Approximately 60 percent of Delta Air Lines' passengers at MSP are connecting passengers who do not begin or end their trips at MSP; they simply fly through on their way to another airport. These connecting passengers do not normally use baggage claim facilities, ticketing facilities, roadways or parking at MSP.

- Future expansion of the terminal and landside facilities at Terminal 2-Humphrey is more feasible than expansion at Terminal 1-Lindbergh because there is more available land and the supporting landside parking facilities have capacity to serve more passengers.

The LTCP Update concluded that relocating the non-SkyTeam airlines to Terminal 2-Humphrey would relieve some constraints at Terminal 1-Lindbergh.

The MAC proposed improvements based on the LTCP Update conclusions and recommendations. These improvements form the Airlines Relocate Alternative. The specific improvements are illustrated on **Figure 3.2-4** and listed in **Table 3.2.2**. The improvements address the forecasted terminal, landside/roadway and airside needs at each terminal complex. The specific needs at each terminal vary from those identified in *Appendix O*. This is because the analysis of future need conducted for *Appendix O* is based on the airlines remaining at their current terminal while the specific Airline Relocate Alternative improvements are based on relocating the non-SkyTeam airlines to Terminal 2-Humphrey. Regardless, the Airlines Relocate Alternative meets the purpose and need for the proposed project by accommodating expected demand at MSP such that the level of service is acceptable through the 2020 planning timeframe.

It is noted that the Airlines Relocate Alternative would provide terminal capacity beyond what is needed in 2020, albeit at a reduced level of service. Upon relocation of the non-Sky Team airlines, terminal space would become available at Concourse E in Terminal 1-Lindbergh. Not all of the available terminal space at Concourse E would be needed by 2020 to accommodate the forecasted SkyTeam partner's growth. Therefore, once this space is renovated, it would be available for growth in operations beyond the year 2020.



LEGEND

- Proposed Terminal Projects
- Proposed Landside/Roadway Projects
- Proposed Airside Projects
- Planned Post 2020
- Projects that are Underway
- Remove and/or Relocate
- MAC Property

Alternative 2 - Airlines Relocate

Source: Minneapolis-St. Paul International Airport

Disclaimer: This map was generated by HNTB Corporation using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitability for a particular use. The scale and location of all mapped data are approximate.

Table 3.2.2

Alternative 2 - Airlines Relocate	
Terminal 1-Lindbergh	**Terminal 2-Humphrey**
• **Terminal** – Expand and Remodel Concourse G ▪ Construct new International Facility ▪ Install new Concourse G tram – Remodel and reconfigure the terminal lobby – Reconfigure and expand baggage claim area – Remodel Concourse E	• **Terminal** – Expand terminal
• **Landside / Roadway** **Before 2020** – Expand terminal arrivals curb and relocate commercial GTC – Construct a new parking ramp ▪ Relocate portions of Glumack Drive ▪ Extend underground hub tram tunnel **After 2020** – Add dual lane exits to the outbound ramps from Glumack Drive to Trunk Highway (TH) 5	• **Landside / Roadway** **Before 2020** – Expand terminal curb – Expand existing and construct new parking ramps – Reconstruct 34th Avenue South interchange at I-494 – Add lane to Northbound 34th Avenue South – Improve intersection of East 72nd Street and 34th Avenue South – Reconfigure the intersections of 34th Avenue South / East 70th Street and Humphrey Drive / East 70th Street – Reconfigure East 70th Street – Construct a new Trunk Highway (TH) 5 and Post Road Interchange ▪ Remove existing and construct new bridge over TH 5 ▪ Realign Post Road and Northwest Drive ▪ Relocate the intersection of Northwest Drive and Post Road ▪ Relocate SuperAmerica ▪ Close taxi cab staging lot and accommodate displaced taxi cabs – Construct a dual lane exit from eastbound I-494 to 34th Avenue South – Construct a dual lane exit from westbound I-494 to 24th Avenue South – Construct auxiliary lane improvement on westbound I-494 between 24th Avenue South and the exit to southbound TH 77 **After 2020** – Construct bridge braid for 34th Avenue South entrance ramp to westbound I-494 and exit ramp to 24th Avenue South from westbound I-494 (post 2020) – Additional expansion of the 34th Avenue South interchange at I-494 (post 2020)

Table 3.2.2

Alternative 2 - Airlines Relocate	
Terminal 1-Lindbergh	**Terminal 2-Humphrey**
• **Airside** – Relocate Runway 30L deicing pad – Relocate airfield service road – Extend AOA tunnel and A Street – Relocate Concourse G Fuel Main Line	• **Airside** – Expand terminal apron – Construct Remain Overnight (RON) aircraft apron ▪ Construct new taxiway ▪ Demolish Building F – Relocate run-up pad – Demolish and relocate Delta Air Lines Flight Kitchen – Relocate GSE facility

3.2.3.1 Terminal 1-Lindbergh

This sub-section identifies proposed terminal, landside/roadway and airside improvements needed at Terminal 1-Lindbergh to implement the Airlines Relocate Alternative.

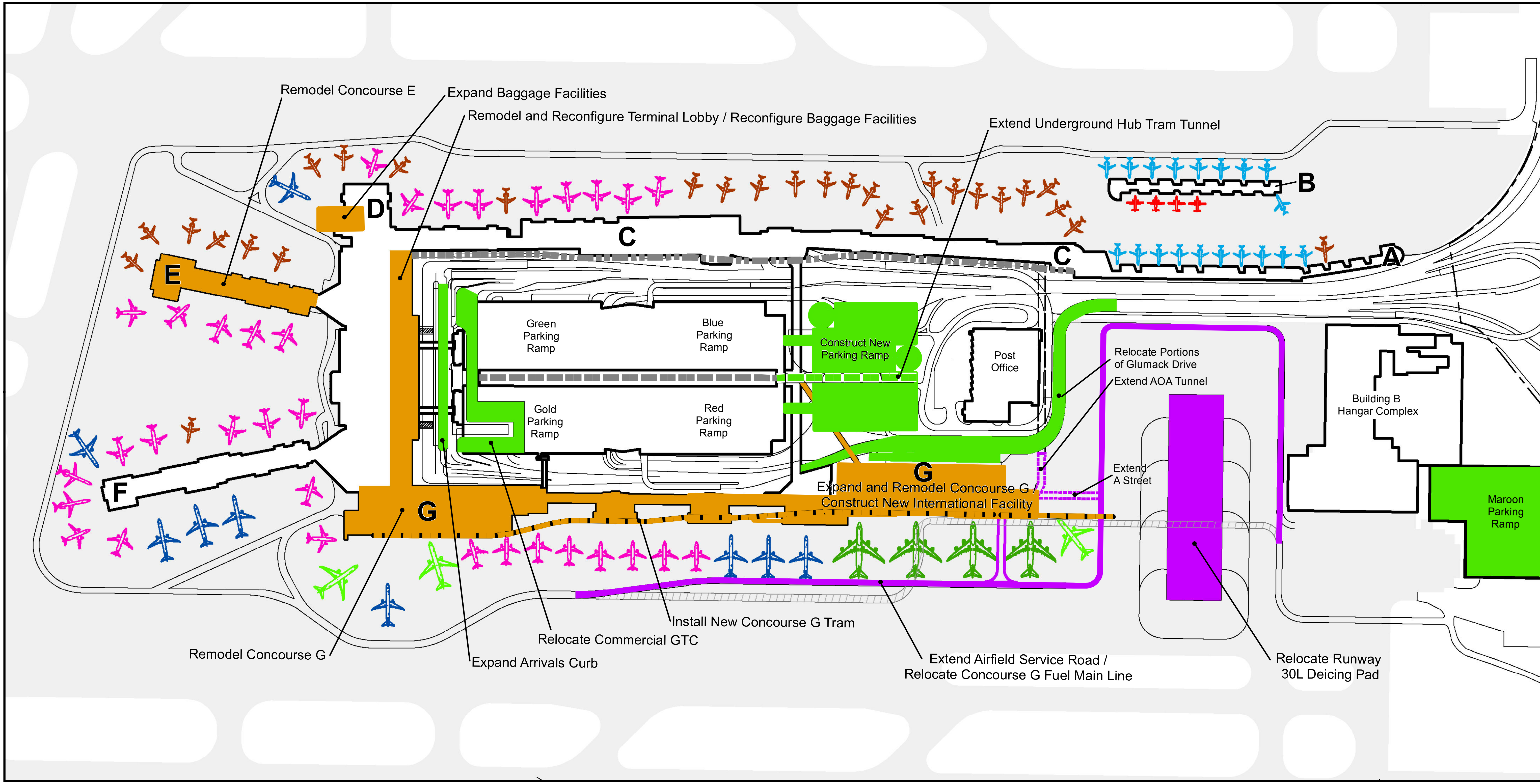
Alternative 2 - Airlines Relocate
Terminal 1-Lindbergh
• **Terminal** – Expand and Remodel Concourse G ▪ Construct new International Facility ▪ Install new Concourse G tram – Remodel and reconfigure the terminal lobby – Reconfigure and expand baggage claim area – Remodel Concourse E

The following sub-sections briefly describe the Terminal 1-Lindbergh improvements proposed as part of the Airlines Relocate Alternative. It is noted that, with the exception of the extent of the Concourse G expansion, most of the terminal improvements included in the Airlines Remain Alternative would also be included in the Airlines Relocate Alternative.

Expand and Remodel Concourse G

Expansion and Remodeling of Concourse G would be required to accommodate the needed aircraft gate frontage as well as a new larger International Facility. Based on the gated aviation activity forecast for the Airlines Relocate Alternative, the number and size of the gates required at Terminal 1-Lindbergh were identified. Using this information, a conceptual layout of the gates was completed. **Figure 3.2-5** depicts the conceptual layout developed for Terminal 1-Lindbergh under the Airlines Relocate Alternative.

At Terminal 1-Lindbergh, the conceptual layout shows how the forecasted fleet will be accommodated at the gates. Modifications to gates and jet bridge locations may be necessary and the terminal would need to be expanded to accommodate the forecasted aircraft fleet. Since Concourse G was the sole concourse



LEGEND

- Existing Building
- Existing Airfield Pavement
- Proposed Terminal Projects
- Proposed Landside/Roadway Projects
- Proposed Airside Projects
- Remove and/or Relocate
- MAC Property
- Underground Hub Tram
- Concourse C Tram
- Proposed Tram
- Small Turboprop
- 50-Seat Regional Jet
- Large Regional Jet
- Narrow-body
- 757-Class
- Wide-body

Alternative 2 - Airlines Relocate - Terminal 1-Lindbergh

0 200 400 800 Feet

Source: Minneapolis-St. Paul International Airport

Disclaimer: This map was generated by HNTB Corporation using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitability for a particular use. The scale and location of all mapped data are approximate.

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with significant adjacent expansion space available, the conceptual layout shows that Concourse G would be expanded or extended to accommodate the required length of terminal frontage. Expansion of Concourse G includes remodeling of the existing gates at the east end of the concourse. All gates in the expanded concourse, as well as the gates from the modified existing concourse, would have the flexibility to accommodate domestic operations or to collect arriving international passengers through sterile corridors to US Customs and Border Protection processing.

As would be expected, the required expansion of Concourse G with the Airlines Relocate Alternative is less than that required with the Airlines Remain Alternative. This is because all of the non-SkyTeam partners would move out of Terminal 1-Lindbergh with the Airlines Relocate Alternative.

It is envisioned that the new International Facility, located within the Concourse G expansion, would include development on three levels: gate, ground and below ground. The new ticket lobby and security checkpoint would be on the gate level. The ground level would include a meeter/greeter area and access to curbside pick-up. The curb would also function as a drop-off for departing international passengers. Access to parking, the underground hub tram and the GTC would be provided via a pedestrian tunnel. A tug drive tunnel to the baggage processing area would be constructed one level below grade. Baggage carts would access the tug drive tunnel via an extension of the existing AOA tunnel.

The extension of Concourse G would also require installation of a new passenger tram system. The new tram is needed based on the findings of the *G Concourse Tram Study*.[15] The study indicated that any significant extension of Concourse G, without addition of a tram, would result in an unacceptable LOS and potential connecting passenger delays due to increased walking distance. Alternative locations were considered for the passenger tram. In order to avoid interference with the jet bridges, the passenger tram had to be constructed at or above the roof level of Concourse G. Options to build the actual tram infrastructure on top of or alongside the roof were evaluated. Locating the tram on top of the concourse would require significant structural improvements. The tram located alongside of the concourse at roof level would be supported on an independent structure as opposed to on top of the existing Concourse G structure. Thus, this option posed less inherent risk and fewer construction challenges and therefore was identified as the preferred option for the tram location.

The passenger tram would be the same length as with the Airlines Remain Alternative in order to facilitate future expansion of Concourse G as shown in the LTCP Update. Building the full length of the tram as part of the Airlines Relocate Alternative would prevent expensive modifications when further extension of Concourse G is needed post 2020.

The new passenger tram system would have three roof-level stations; one at the west end of the concourse, one near the Concourse G to C Connector and one above the east end of the expanded Concourse G. The west station would require significant reconfiguration of the area connecting the main terminal building to the vertical circulation serving the station. The center station would require infill at the airside recess between existing gates. Beyond the east station, a facility would be required to provide a service area for the tram vehicles.

Remodel and Reconfigure the Terminal Lobby

The Airlines Relocate Alternative would include remodeling and reconfiguring the existing Terminal 1-Lindbergh lobby area and adjacent facilities. Re-configuration would allow for more efficient use of existing space thus resulting in additional space for the security checkpoints and adjacent queuing area.

Reconfigure and Expand Baggage Claim Area

The Airlines Relocate Alternative includes the same improvements to the baggage claim area as does the Airlines Remain Alternative. Existing and future deficiencies in the baggage claim area would be addressed through a combination of improvements: reconfiguration of the existing areas, installation of new equipment and the construction of additional space. Reconfiguration of the existing baggage claim area would allow for better use of redundant circulation space. In addition, the baggage claim area would be expanded into the existing area allocated to inbound/outbound baggage where bags enter and exit the terminal facility. Thus, additional space would be created for baggage claim device queue areas and replacement of the existing round claim with new lengthened baggage claim devices that provide increased frontage.

The inbound/outbound baggage areas would be expanded to meet projected demands. The existing areas would be reconfigured to maximize efficiency and expanded at the ground level under Concourse D. An existing baggage storage area would be renovated and an adjacent expansion at the ground level of Concourse D would provide additional space for inbound and outbound baggage operations.

These improvements would address current deficiencies that require enhanced capacity prior to the relocation of the non-SkyTeam airlines from Terminal 1-Lindbergh to Terminal 2-Humphrey. After the relocation of the non-SkyTeam airlines, the improved Terminal-1 Lindbergh baggage claim would provide a high level of passenger service and capacity to accommodate continued growth.

Remodel Concourse E

The Airlines Relocate Alternative would include remodeling the interior of Concourse E to accommodate restroom upgrades and additions, concessions relocations and hold room modifications. Also, mechanical and technological upgrades and exterior modifications would be included to reduce energy consumption.

Alternative 2 - Airlines Relocate

Terminal 1-Lindbergh

- **Landside / Roadway**

Before 2020

- Expand terminal arrivals curb roadway and relocate commercial GTC
- Construct a new parking ramp
  - Relocate portions of Glumack Drive
  - Extend underground hub tram tunnel

After 2020

- Add dual lane exits to the outbound ramps from Glumack Drive to Trunk Highway (TH) 5

The Airlines Relocate Alternative would result in the movement of airlines and passengers from Terminal 1-Lindbergh to Terminal 2-Humphrey which would shift demand on the landside facilities. Although demand would shift to Terminal 2-Humphrey, many facilities would continue to operate at or over capacity at Terminal 1-Lindbergh without modifications. Thus, necessary improvements to Terminal 1-Lindbergh landside facilities are described in the following sub-sections.

Expand Terminal Curb Roadway and Relocate Commercial GTC

Terminal curb roadway improvements would be needed to address the deficiency in arrivals curb length. This deficiency would be reduced with the shift in passengers to Terminal 2-Humphrey; however, to ensure passenger level of service is not diminished, additional arrival curb is still necessary. This would be provided by relocating the commercial GTC from the outer curb of the lower level, and reconfiguring this area to allow for arriving passenger pick up by privately-owned vehicles (POV).

In order to expand the arrivals curbside for POV pick up, the commercial vehicle activity occurring on the lower level outer roadway would be relocated to a reconfigured commercial GTC on the West Commercial Roadway within the Gold Ramp. The reconfigured commercial GTC would provide more than double the current capacity of 25 vehicles and would accommodate 61 vehicles during the peak period. This would replace the existing east and west commercial GTC combined capacity of 48 vehicles and provide space for an addition 13 vehicles.

In addition, to provide convenient curbside access to and from the International Facility, a new single-level curb roadway would be added adjacent to the east face of Concourse G.

Construct New Parking Ramp

With the Airlines Relocate Alternative, the deficiency in the number of Terminal 1-Lindbergh general parking spaces would be reduced. However, 2,400 additional public parking spaces (general and short-term) would still be needed at Terminal 1-Lindbergh in order to meet demand in 2020. In addition, it was recognized that employees working at Terminal 1-Lindbergh but currently parking at Terminal 2-Humphrey would be better served if they could park at Terminal 1-Lindbergh. It is estimated that approximately 1,500 parking spaces would be required for these employees. Therefore, a total of 3,900 parking spaces would be needed.

Under the Airlines Relocate Alternative, services for Terminal 2-Humphrey rental cars would be provided at a new Terminal 2-Humphrey QTA facility. As a result of this shift, adequate rental car service area would be available at Terminal 1-Lindbergh and no expansion would be needed.

To meet the parking space needs, it was determined that a new parking ramp would be required. Alternatives for siting the new parking ramp were considered in the same manner as for the Airlines Remain Alternative. Therefore, locations not within a walkable distance from Terminal 1-Lindbergh were eliminated from consideration.

Various locations for additional parking facilities between the existing Red and Blue Ramps and TH 5 were considered. Based on the number of parking spaces needed and the limited amount of available land, it was determined that surface parking was not a viable option. Therefore, various sites for a new parking ramp in the subject area were evaluated. Sites requiring demolition of existing facilities such as the Post Office and Building B Hangar Complex were included in the evaluation. The sites were evaluated based on walking distance and the ability for construction to be accomplished in phases. The best site, the site that provided the shortest walking distance while also allowing for phased construction, was the site adjacent to the existing Red and Blue Ramps. This site was thus selected as the preferred option for a new parking ramp because it could accommodate the full parking demand while creating a cohesive landside network and it could be easily constructed in phases.

Because fewer additional parking spaces are needed with the Airlines Relocate Alternative, it was determined that the new ramp could be accommodated between the existing Blue and Red Ramps and the existing Post Office, leaving the Post Office in service. Alternatives without additional vertical circulation and without vehicular access between the existing ramps were eliminated because of customer service concerns.

The proposed configuration would provide a uniform entrance plaza, maximize available space and connectivity and maintain future growth potential. An approximately 4,700-space structure would be provided on the selected site located east of the existing ramps. Development would require relocation of Glumack Drive around the Post Office to accommodate the new ramp construction and provide easy access to the proposed International Facility curb roadway. The additional 1,000 spaces above the needed amount are the result of building out the footprint of the parking structure and would allow for growth beyond 2020.

Just as with the Airlines Remain Alternative, the extension of the underground hub tram beyond its current termination point at the existing Red and Blue parking ramps would not be needed to meet demand in the 2020 timeframe. However, the construction of the tunnel structure would be included in the Airlines Relocate Alternative because constructing it as an integral part of the new parking structure would allow for open cut excavation, which minimizes cost, congestion and service interruptions after the ramp is constructed and in service.

The freeway modeling results show that without additional improvements at the Trunk Highway (TH) 5/Glumack Drive interchange there will be significant congestion exiting Terminal 1-Lindbergh post 2020. The following improvements will be made at the TH 5/Glumack Drive interchange to serve the anticipated traffic demand after 2020:

Add dual lanes exits to the outbound ramps from Glumack Drive to Trunk Highway (TH) 5

Alternative 2 - Airlines Relocate
Terminal 1-Lindbergh
• **Airside** – Relocate Runway 30L deicing pad – Relocate airfield service road – Extend AOA tunnel – Relocate Concourse G Fuel Main Line

Relocate Runway 30L Deicing Pad

As with the Airlines Remain Alternative, the Runway 30L existing deicing pad would be displaced by the terminal expansion and therefore would be relocated. Given the desire to locate the pad in close proximity to the runway end, only two sites for the relocation were considered. The first alternative was to relocate the pad to the east. The second alternative was to orient the pad north-south and fit it in between the new terminal and the existing Building B Hangar Complex. Upon further consideration, it was determined that the first alternative would not work because, during deicing conditions, the access doors to the aircraft maintenance hangar, Building B, would be blocked. Therefore, the Airlines Relocate Alternative includes relocating the Runway 30L deicing pad by constructing a new north-south-oriented pad between the expanded terminal and the Building B Hangar Complex.

Relocate Airfield Service Road

The service road must be located close to the gate areas, and must provide access to all aircraft gates. Thus, the terminal expansion would require an extension to the existing service road in order to provide access to the new gates. This road would also be extended to route around the relocated deicing pad in order to provide access for vehicles to eastern portions of the airfield.

Extend AOA Tunnel and A Street

To accommodate the extension of Concourse G, the AOA tunnel that connects the Concourse G airfield service road to the Concourse C airfield service road must be extended under Concourse G. This tunnel is an important asset because it reduces service vehicle travel time and air side congestion. Service vehicles use the tunnel between Concourses A, B and C located north of Glumack Drive and Concourse G located south of Glumack Drive. Without this tunnel, service vehicles would have to travel around Concourses E and F located on the west end of the terminal. The AOA tunnel must be extended to maintain this important route.

Similar to the AOA tunnel, A Street also provides important access between terminal concourses and the airfield at ground level. A Street runs under the G Concourse and is used by luggage tugs and MSP service vehicles. In order to maintain the connection to the airfield, A Street would be extended when the G Concourse is extended.

Relocate the Concourse G Fuel Main Line
Extension of Concourse G and construction of a concourse tram system would require the relocation of an existing fuel main line in order comply with safety separation requirements from the tram columns. The relocated fuel line would serve the existing and new aircraft gates along Concourse G. The main is part of the underground hydrant fueling system and must be located close to the aircraft parking positions at each gate.

3.2.3.2 Terminal 2-Humphrey

The following sub-sections describe the Terminal 2-Humphrey terminal, landside/roadway, airside and other improvements proposed as part of the Airlines Relocate Alternative. As would be expected, the improvements would be more extensive than with the Airlines Remain Alternative because of the shift of the non-SkyTeam airlines to Terminal 2-Humphrey. The proposed improvements at Terminal 2-Humphrey are illustrated in **Figure 3.2-6**.

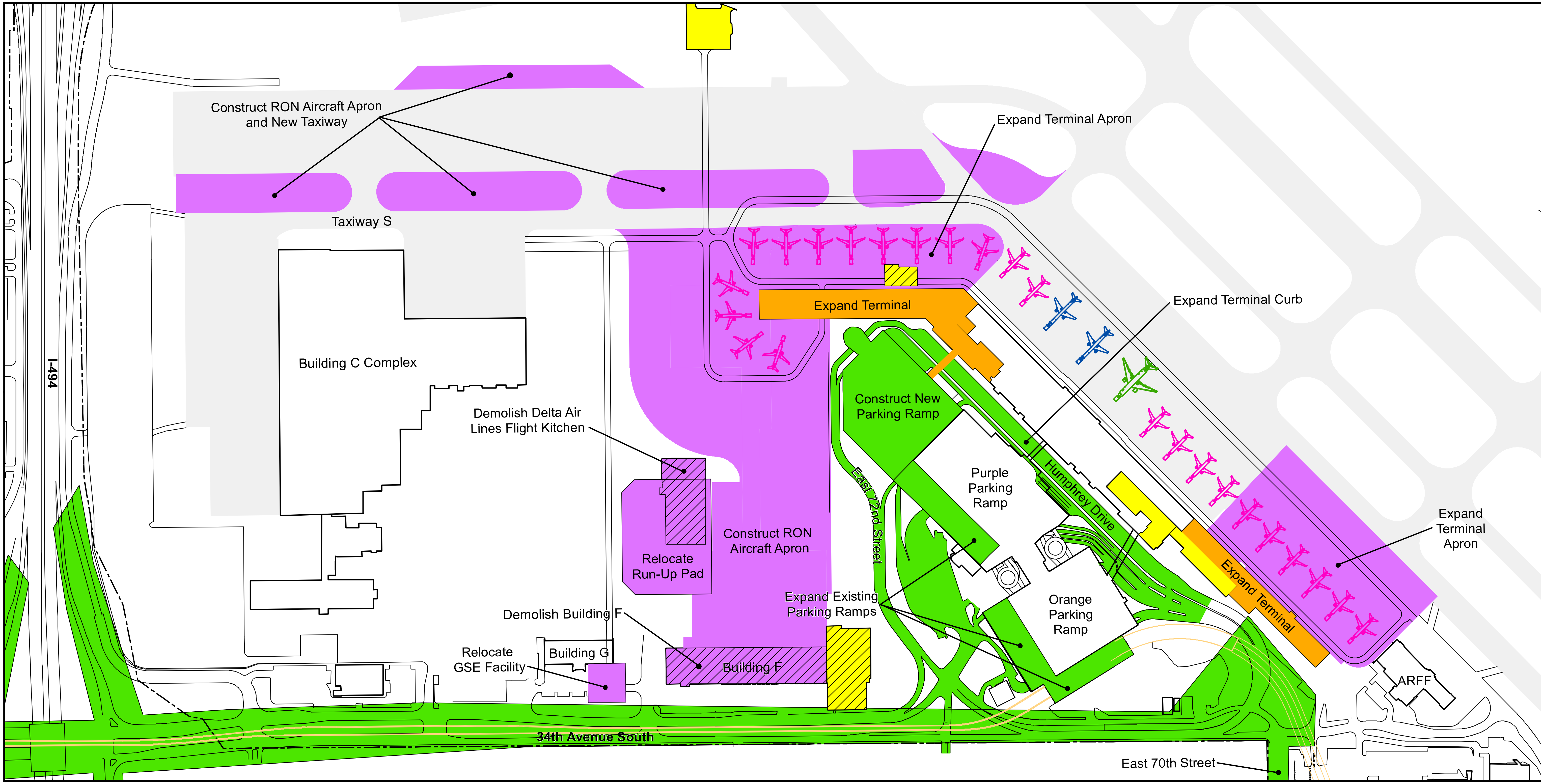
Alternative 2 - Airlines Relocate

Terminal 2-Humphrey

- **Terminal**
  - Expand terminal

The terminal would be expanded to accommodate the additional gates needed to meet the projected demand of existing and relocated airlines in 2020. Six narrow-body gates would be added on the northeast end of the existing Terminal. The existing Aircraft Rescue and Fire Facility (ARFF) precludes expansion beyond the six gates. The ARFF's location is directly related to runway response time requirements, and maintaining this location is vital for that reason. Therefore, the terminal would also be expanded to the south to provide the remainder of the needed gates. The expansion would be phased, with the north end of the terminal expansion completed first. Loading dock facilities would be relocated to the north end as part of the first phase. This would allow for the south expansion to take place in the area of the original loading dock during the next phase of construction.

In addition to the gates themselves, a significant increase in the capacity of all the Terminal 2-Humphrey functions would be required with the Airlines Relocate Alternative. The concourse, lobby, parking access and baggage areas would be expanded to accommodate the increased number of passengers. The concourse would be expanded to provide added circulation area, gate hold area seating, restrooms and concessions in the vicinity of the new gates. The lobby would be expanded to provide additional circulation area as well as to accommodate a new 6-lane security checkpoint. A third skyway would be added for access to the parking ramps. The baggage claim area would be expanded to accommodate four new baggage claim devices. The baggage facilities for arriving international passengers would be expanded to include two additional Explosive Detection System (EDS) machines and associated baggage handling equipment. Lastly, the baggage inbound/outbound area would be expanded to include eight new sloped-plate carousels.



LEGEND

Existing Building
Existing Airfield Pavement
Proposed Terminal Projects
Proposed Airside Projects
Proposed Landside/Roadway Projects
Projects that are Underway
LRT Tracks
MAC Property
Demolish and/or Relocate
Small Turboprop
50-Seat Regional Jet
Large Regional Jet
Narrow-body
757-Class
Wide-body

Alternative 2 - Airlines Relocate - Terminal 2-Humphrey

N

0 210 420 840 Feet

Source: Minneaoplis-St. Paul International Airport

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Alternative 2 - Airlines Relocate

Terminal 2-Humphrey

- **Landside/Roadway**

Before 2020

- Expand terminal curb
- Expand existing and construct new parking ramps
- Reconstruct the 34th Avenue South interchange at I-494
- Construct a dual lane exit from eastbound I-494 to 34th Avenue South
- Construct a dual lane exit from westbound I-494 to 24th Avenue South
- Construct auxiliary lane improvement on westbound I-494 between 24th Avenue South and the exit to southbound TH 77
- Add a lane to Northbound 34th Avenue South
- Improve the intersection of East 72nd Street and 34th Avenue South
- Reconfigure the intersections of 34th Avenue South / East 70th Street and Humphrey Drive / East 70th Street
- Reconfigure East 70th Street
- Construct a new TH 5 and Post Road Interchange
  - Remove existing and construct new bridge over TH 5
  - Realign Post Road and Northwest Drive
  - Relocate the intersection of Northwest Drive and Post Road
  - Relocate SuperAmerica
  - Close taxi cab staging lot and accommodate displaced taxi cabs

After 2020

- Construct bridge braid for 34th Avenue South entrance ramp to westbound I-494 and exit ramp to 24th Avenue South from westbound I-494
- Additional expansion of the 34th Avenue South interchange at I-494

The Airlines Relocate Alternative would result in the movement of airlines and passengers from Terminal 1-Lindbergh to Terminal 2-Humphrey which would shift demand to Terminal 2-Humphrey. This increased demand at Terminal 2-Humphrey would require improvement to ensure sufficient landside/roadway capacity would be provided and adequate passenger level of service would be maintained. Proposed improvements to landside/roadway facilities are described in the following sub-sections.

Expand Terminal Curb

Terminal curb roadway improvements would be needed to address the increased demand on the single-level curbside. Two additional lanes would be provided to accommodate demand, along with an additional 840 linear feet of curb.

Expand Existing and Construct New Parking Ramps

With the Airlines Relocate Alternative, there would be an increase in public parking demand at Terminal 2-Humphrey associated with the shift in passengers. This increase would be partially offset by the shift of approximately 1,500 employee parking spaces to Terminal 1-Lindbergh. As a result an additional 4,285 public and employee parking spaces would be needed to meet demand. However, the shift in passenger demand would also result in the need for an additional 875 rental car ready-return spaces at Terminal 2-Humphrey. Thus, a total of approximately 5,200 new public, employee and rental car parking spaces would be needed at Terminal 2-Humphrey.

Added space would also be needed to accommodate rental car servicing. Under the Airlines Relocate Alternative all rental car servicing for Terminal 2-Humphrey rental cars, currently provided at Terminal 1-

Lindbergh, would be shifted to Terminal 2-Humphrey. This shift would result in a need for 164,700 square feet of space dedicated to rental car servicing at Terminal 2-Humphrey.

As a result, it was determined that expanded parking facilities would be required to meet demand through 2020. All of the alternatives considered included vertical expansion of the existing ramp outriggers. The outriggers are where the upper levels of the existing ramp are not built out to the entire footprint of the base of the ramp. Alternatives with rental car spaces provided in the Orange Ramp and QTA service facilities outside of the ramp footprints were eliminated due to circulation problems and concerns that the rental car service area would be unprotected from the weather. The proposed improvements would include an expansion of the Purple and Orange ramp outriggers, providing 2,450 additional spaces, a two-level vertical expansion of the Orange Ramp to 10 levels, providing 1,000 additional stalls and a new 3,450-space ramp to the south of the Purple Ramp. In total, 6,900 additional passenger and employee parking spaces as well as a rental car QTA would be provided and would allow for growth beyond 2020. This alternative would provide GTC, rental car and parking access close to the terminal while maintaining a logical flow and segregation of traffic entering and exiting the ramps.

Reconstruct the 34th Avenue South interchange at I-494

The I-494 and 34th Avenue South interchange would also suffer significant queuing and delay with the Airlines Relocate Alternative. For example, during the PM peak hours both ramp intersections would be anticipated to operate at an overall intersection LOS F. As previously explained, potential interchange concepts to improve the LOS and reduce queuing were assessed as part of the MSP Area Roadway Improvements Project. Under this Project the PMT identified the DDI design as the preferred concept for the interchange modification. Thus, the Airlines Relocate Alternative includes the preferred concept of modifying the 34th Avenue South interchange at I-494 to a DDI design. Additional information can be found in *Appendix C*.

Metro Transit has expressed concern regarding potential safety impacts of a DDI configuration that includes light-rail transit. The MAC, City of Bloomington and Mn/DOT all acknowledge a DDI with light-rail transit is unique. To address safety concerns for all agencies involved, a design enhancement study reviewing several potential design considerations that may improve safety has been completed. The study includes a list of recommendations that should be further considered for incorporation into the design documents. The MAC will continue to work with the City of Bloomington, Mn/DOT and Metro Transit to develop a design that includes additional enhancements. It is noted that the potential safety related design enhancements are not anticipated to have environmental impacts and therefore would not change the evaluations included within this EA.

Construct a dual lane exit from eastbound I-494 to 34th Avenue South

To improve exiting traffic operations along eastbound I-494 at the exit to 34th Avenue South the exit will be converted from a single lane exit to a dual exit.

Construct a dual lane exit from westbound I-494 to 24th Avenue South & Construct auxiliary lane improvement on westbound I-494 between 24th Avenue South and the exit to southbound TH 77 to improve westbound traffic operations along I-494.

Add a lane to Northbound 34th Avenue South

Northbound 34th Avenue South would be modified by adding an additional lane to provide three northbound lanes. Without the additional lane there would not be adequate northbound capacity and the northbound approaches to several intersections would operate at a LOS F. The additional lane would be provided by modifying the available median between the roadway and the light rail transit way. No impacts would be anticipated on the Fort Snelling National Cemetery property.

Improve the intersection of East 72nd Street and 34th Avenue South

The intersection of East 72nd Street and 34th Avenue South would have several movements that operate at LOS E and F by 2020 during peak periods if no improvements were constructed. Therefore, this intersection would be modified to include the following improvements as part of the Airlines Relocate Alternative: a two-lane light rail track crossing for the eastbound to northbound movement, a dual right turn lane onto southbound 34th Avenue South from East 70th Street, and the conversion of the secondary access at the Fort Snelling National Cemetery to a right-in / right-out access.

Reconfigure the intersections of 34th Avenue South / East 70th Street and Humphrey Drive / East 70th Street

The 34th Avenue South / East 70th Street and the Humphrey Drive / East 70th intersections are located to the northeast of Terminal 2-Humphrey as shown on Figure 3.2-6. The eastern intersection, 34th Avenue South / East 70th Street, is an all-way stop controlled intersection. The western intersection, Humphrey Drive / East 70th Street, is signalized. In 2020, these intersections would be anticipated to operate at an LOS F primarily because the intersections are too closely spaced and the eastern intersection is an all-way stop control at the eastern intersection. Therefore, as part of the Airlines Relocate Alternative, these intersections would be reconfigured into a single signalized intersection to increase capacity and improve the LOS.

Reconfigure East 70th Street

The Airlines Relocate Alternative includes reconfiguring East 70th Street in the vicinity of the reconfigured intersection discussed in the previous sub-section. From the intersection, approximately 1,500 feet of East 70th Street would be expanded to a four lane divided roadway. The added lanes would allow for the reconfigured signalized intersection of Humphrey Drive, 34th Avenue south and East 70th Street to operate at an acceptable LOS. Reconfiguration would primarily be required to adequately store the westbound queues of traffic on the approach to 34th Avenue South and provide additional distance for drivers to move into the appropriate lane. With two westbound lanes, one lane would be used primarily to access the parking facilities and the other would be used to travel to the curb at Terminal 2-Humphrey. Also, the length of the added westbound lane would allow for an adequate distance for signing and for drivers to choose and travel into the appropriate lane. Without the addition of the westbound lane, the traffic queue would extend beyond several of the Signature Flight Support access points and thus would result in operational and safety concerns.

Construct a new TH 5 and Post Road Interchange and realign Northwest Drive

As with the Airlines Remain Alternative, the interchange at TH 5 and Post Road would also operate over capacity by 2020 with the Airlines Relocate Alternative. Due to inadequate capacity during the PM peak period, the eastbound approach to the TH 5 / Post Road interchange will operate at a LOS F. There are also periods during the day when the queue for the northbound TH 5 to westbound Post Road traffic will extend onto TH 5 due to undesirable delays at the east ramp intersection.

As previously discussed, this interchange was also studied as part of the MSP Area Roadway Improvement Project. For this interchange, nearby features such as the MAC storm water ponds and the Runway 30L runway protection zone (RPZ) and approach surfaces limited the amount of land available for alternative interchange configurations. Many interchange alternatives that would normally be considered were not feasible due to impacts on adjacent infrastructure. Thus the PMT focused on interchange concepts based on diamond configurations. Various concepts were developed by considering a variety of options to improve capacity that included the following:

- Constructing a new bridge over TH 5 to supplement or replace the existing bridge
- Eliminating or relocating the intersection of Northwest Drive and Post Road
- Relocating the taxi cab staging lot and/ SuperAmerica

Ultimately, the PMT selected a new diamond interchange located south of the existing Post Road and TH 5 interchange. This option was preferred because the existing interchange could be used during construction, access to Northwest Drive could be maintained, and impacts to the runway protection zone (RPZ) for Runway 30L were minimized. Additional information including concept drawings of the various interchange configurations can be found in *Appendix C*.

Therefore, in order to improve the capacity of the Post Road and TH 5 interchange, the Airlines Relocate Alternative includes the construction of a new Post Road and TH 5 diamond interchange. Construction of the new interchange would require the following improvements that are also included in the Airlines Relocate Alternative:

- Remove existing and construct a new bridge over TH 5
- Realign Post Road and Northwest Drive
- Relocate the intersection of Northwest Drive and Post Road to the west
- Relocate the SuperAmerica just south of its current location
- Close taxi cab staging lot and accommodate displaced taxi cabs

As previously explained, alternatives to accommodate the displaced taxi cabs were considered and there are viable alternatives for the relocation of the staging area. Two potential sites were identified: the Maroon Parking Ramp and an existing parking area on the north side of Post Road west of the current facility. Based on transportation analysis minor roadway improvements would be required with both options. To accommodate a taxi staging area at the Post Road location, a new right turn lane along Post Road and modifications to the parking lot entrances and exits would be required. To accommodate a taxi staging area at the Maroon Parking Ramp, the configuration of the Northwest Drive and Post Road intersection would be modified to provide southbound double left turn lanes from Northwest Drive to Post Road.

The Sponsor has not identified a preferred alternative to accommodate the displaced taxi cabs as of the writing of this EA. Therefore, assessment of potential environmental impacts will include the consideration of both of the potential relocation sites.

The freeway modeling results show that without additional improvements to I-494 there will be significant congestion on westbound I-494 between TH 77 and 34th Avenue South and at the I-494/34th Avenue South interchange beyond 2020. The following improvements will be constructed along I-494 to serve the anticipated traffic demand after 2020:

Construct bridge braid for 34th Avenue South entrance ramp to westbound I-494 and exit ramp to 24th Avenue South from westbound I-494.

This improvement allows traffic entering westbound I-494 from 34th Avenue South and traffic exiting from westbound I-494 to 24th Avenue South to cross via grade separation which reduces the weaving conflict on westbound I-494 improving freeway operations.

Additional expansion of the 34th Avenue South interchange at I-494 which will include:

- Modification of the southbound double right-turn lane to a triple right at the westbound I-494 ramps
- Modification of the eastbound left and right turn lanes from double to triple turn lanes at the eastbound I-494 ramps
- Modification of the northbound right to a triple right turn lane at the eastbound I-494 ramps
- Modification of the westbound left turn lane to southbound 34th Avenue from a double to a triple left at the westbound I-494 ramps

Alternative 2 - Airlines Relocate

Terminal 2-Humphrey

- **Airside**
  - Expand terminal apron
  - Construct RON aircraft apron
    - Construct new taxiway
    - Demolish Building F
  - Relocate run-up pad
  - Demolish and Relocate Delta Air Lines Flight Kitchen
  - Relocate GSE facility

Expand Terminal Apron

The addition of gates at Terminal 2-Humphrey would require construction of additional aircraft apron adjacent to the Terminal expansions. Concrete aprons would be constructed adjacent to both the north and south extensions of Terminal 2-Humphrey. As part of the proposed apron construction, the existing in-pavement fueling systems and deicing fluid capture capabilities would be extended. An extension to the existing service road would also be needed to provide vehicle access to all of the new gates.

Construct RON Aircraft Apron

The relocation of the non-SkyTeam airlines would result in a need for additional Remain Overnight (RON) parking near Terminal 2-Humphrey. RON parking is needed when airline schedules dictate that an aircraft stay overnight at the airport for a next-day departure. Not all of these aircraft can remain parked at the terminal gates until their departure the next day because other aircraft are scheduled to use the subject gates in the interim. In this event, aircraft are moved to unused gates or the RON apron until their scheduled departure.

Future RON requirements would be met by allowing aircraft to park at unused Terminal 2-Humphrey gates and at two expanded aircraft aprons. One of these aprons would be the Building F apron and the other would be the Humphrey Remote apron.

To accommodate a portion of the RON requirement, the existing aircraft apron adjacent to Building F would be reconstructed and expanded. In order to expand the apron, Building F would be demolished. Building F currently houses offices and cargo processing facilities for Delta Air Lines. The building, formerly owned by Delta Air Lines, has reverted to MAC ownership, although Delta Air Lines continues to lease space within the cargo section of the building. It is anticipated that Delta Air Lines would not continue to lease this space long-term and that the MAC would demolish the building to provide space for RON aircraft.

In addition to the Building F site apron, the existing Humphrey Remote apron would provide expanded RON parking. In order to accommodate the increasing fleet and size of aircraft, taxiways would be needed on the east and west sides of the Humphrey Remote apron to facilitate the movement of aircraft in and out for RON parking. Given the fleet mix forecast for this Alternative, it is anticipated that wide-body aircraft would use the Humphrey Remote apron for RON parking. Thus, the taxiways would need to provide the clearance appropriate for wide-body aircraft. The existing Taxiway S lies too close to the Delta maintenance hangar, Building C, to provide the necessary clearance. In addition, the Humphrey Remote Apron cannot be expanded to the west because of the close proximity of Runway 17/35. Therefore, to develop a

RON apron that accommodates wide-body aircraft, the existing grass islands between the Humphrey Remote Apron and Taxiway S would be paved. the Taxiway S centerline would be moved to the west and a new taxiway would be established on the west side of the existing Humphrey Remote apron.

The reconstructed/expanded RON aprons would result in additional impervious surfaces. Therefore, associated storm water management measures would be implemented as part of the Airlines Relocate Alternative.

Relocate Run-up Pad, and Demolish and Relocate Delta Air Lines Flight Kitchen

The expansion of Terminal 2-Humphrey to the south would displace the existing run-up pad. The run-up pad, located south of the existing terminal building, is a perimeter enclosure where aircraft mounted engines are tested by performing up to and including full throttle engine run-ups. The enclosure is made up of a blast fence to prevent blast-borne debris from damaging nearby buildings, vehicles or aircraft. Under this alternative, the run-up pad would be relocated in the same general vicinity south of the terminal, but would be moved to the east/southeast approximately 900 feet, toward 34th Avenue South.

Other locations around the airfield were considered for the relocation of the run-up pad. However, it was recognized that maintaining the existing site is critical for maintenance operations. Delta Air Lines, as the hub operator, is the main user of the facility. The current run-up pad location is near Delta's maintenance facility and therefore taxiing between the maintenance facility and the run-up pad is minimized. Other potential sites would require that Delta Air Lines' aircraft cross a runway in order to travel between the run-up pad and the maintenance facility. Additional aircraft runway crossings are undesirable because of the increased potential for runway incursions. The facility is centrally-located on the airport which minimizes impacts in the neighboring communities. From a noise standpoint, maintaining the facility in the same general vicinity will not create changes in the noise footprint.

In order to construct the run-up pad in the preferred location, the existing Delta Air Lines flight kitchen must be relocated. This building houses the facilities needed to prepare in-flight meals for aircraft passengers. The existing flight kitchen is accessible from both landside/public roadways and airside/airfield service roads. Ingredients are delivered to the flight kitchen via the public roadways. Once prepared, the meals are trucked to the aircraft via the airfield service road system. Therefore, the replacement location must have both airside and landside access.

There are alternative sites on the airfield that meet this requirement. These sites have varying height restrictions based on their distance from the runways. The sites with few to no height restrictions are reserved for aircraft-related uses where hangars and related structures must be high enough to accommodate aircraft. Therefore, the potential sites for the relocated flight kitchen were limited to those with more restrictive height limits. As a result, the proposed location of the flight kitchen would be just south of Runway 12R/30L as shown on Figure 3.2-4.

Relocate GSE

A ground support equipment (GSE) facility is located just to the south of the existing Terminal 2-Humphrey. This facility would be demolished in order to extend the terminal to the south. Therefore this GSE facility would be relocated as part of the Airlines Relocate Alternative.

The new location for the GSE facility was determined by considering available sites near the Terminal 2-Humphrey Complex. Available space is extremely limited and further constrained by the relocation of the run-up pad. Therefore, the GSE facility would be relocated to a site adjacent to Building G and adjacent to the proposed Delta parking structure. Service road access would also be provided to this location.

3.3 No Action Alternative

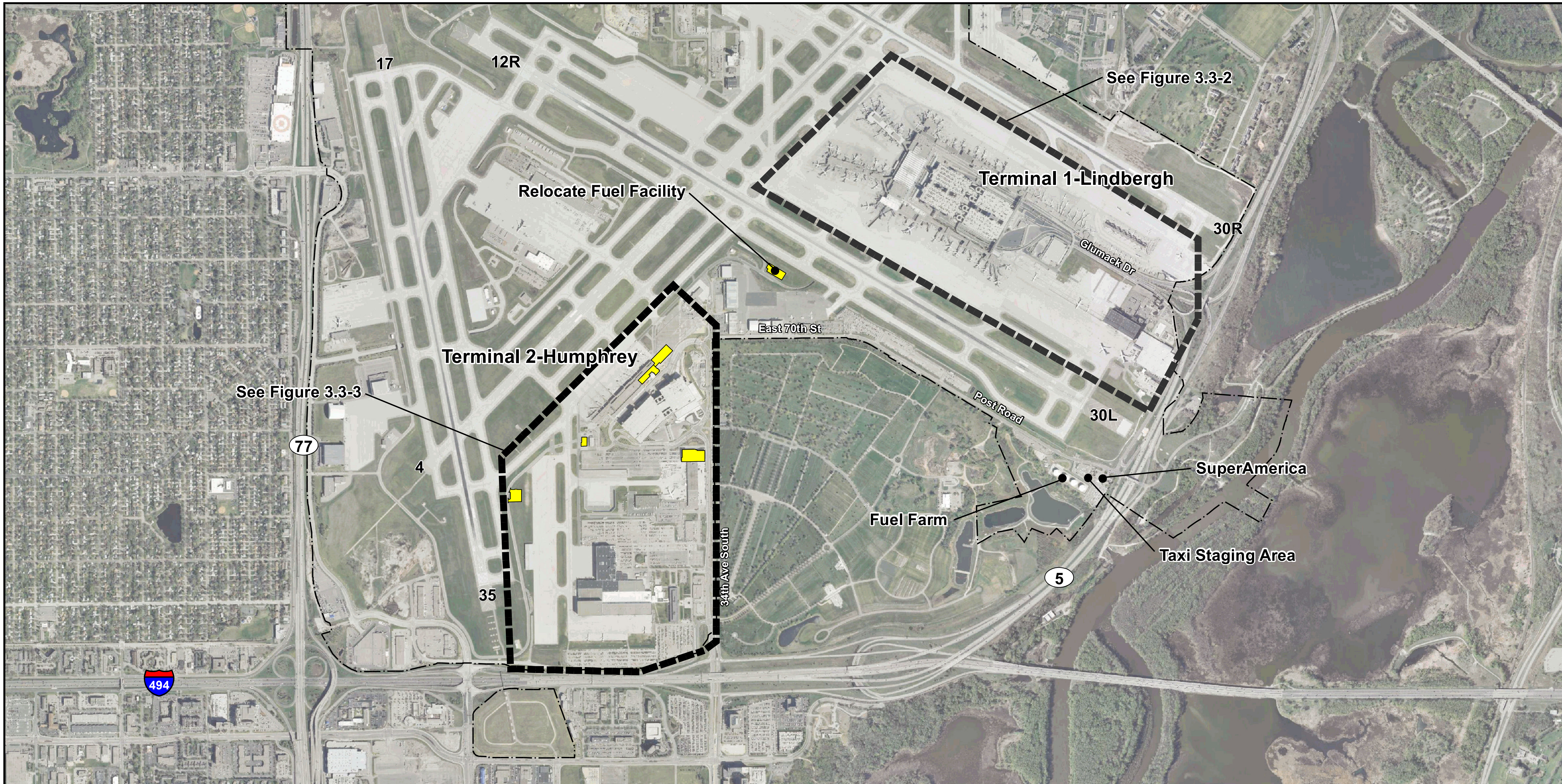
Consideration of the No Action Alternative is required by NEPA per CEQ Regulations. This alternative serves as a basis of comparison with other alternatives considered for detailed analysis.

The No Action Alternative represents the airport without any improvements . The No Action Alternative includes some airport improvements that will be implemented prior to the completion of the EA. These improvements are independent and have already received environmental approval or are categorically excluded from formal environmental assessment by the FAA and the Minnesota Environmental Quality Board (EQB).

Table 3.3.1 lists the improvements that are included in the No Action Alternative and an illustration of the No Action Alternative is presented on **Figure 3.3-1**. Illustrations of the No Action Alternative for Terminal 1-Lindbergh and Terminal 2-Humphrey are presented on **Figures 3.3-2 and 3.3-3** respectively.

Table 3.3.1

No Action Alternative	
Terminal 1-Lindbergh	**Terminal 2-Humphrey**
	• **Terminal** – Construct north security checkpoint – Construct Checked Baggage Inspection System (CBIS)
	• **Airside** – Construct new Glycol Storage Facility – Relocate Fuel Facility
	• **Other** – Demolish Building F Tower



LEGEND

Projects that are Underway

MAC Property

No Action Alternative

N

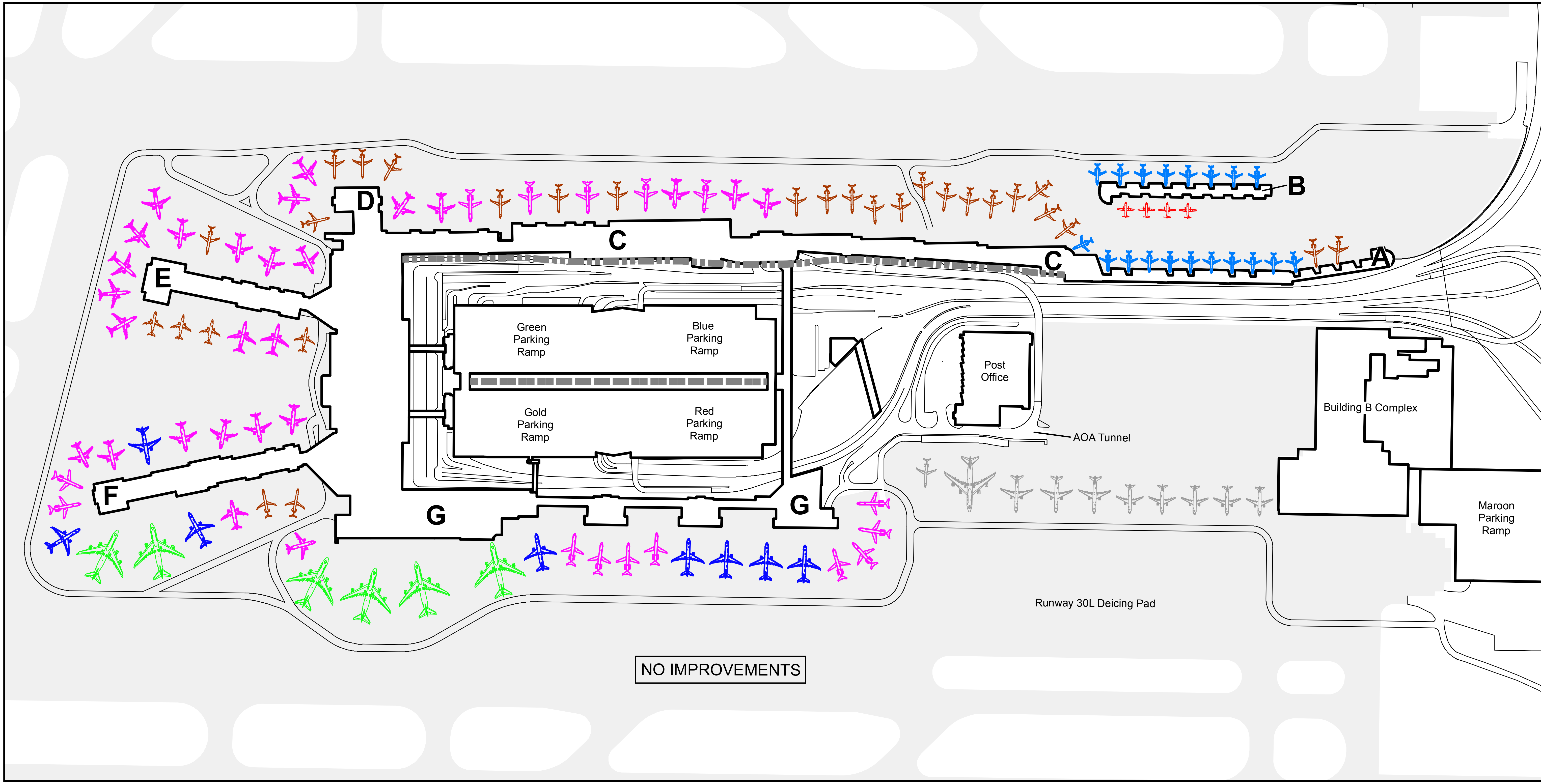
0 750 1,500 3,000 Feet

Source: Minneapolis-St. Paul International Airport

Disclaimer: This map was generated by HNTB Corporation using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitablity for a particular use. The scale and location of all mapped data are approximate.

HNTB

FIGURE 3.3-2



LEGEND

- Existing Building
- Existing Airfield Pavement
- MAC Property
- Underground Hub Tram
- Concourse C Tram
- Small Turboprop
- 50-Seat Regional Jet
- Large Regional Jet
- Narrow-body
- 757-Class
- Wide-body
- Non-Contact Gate Parking Position

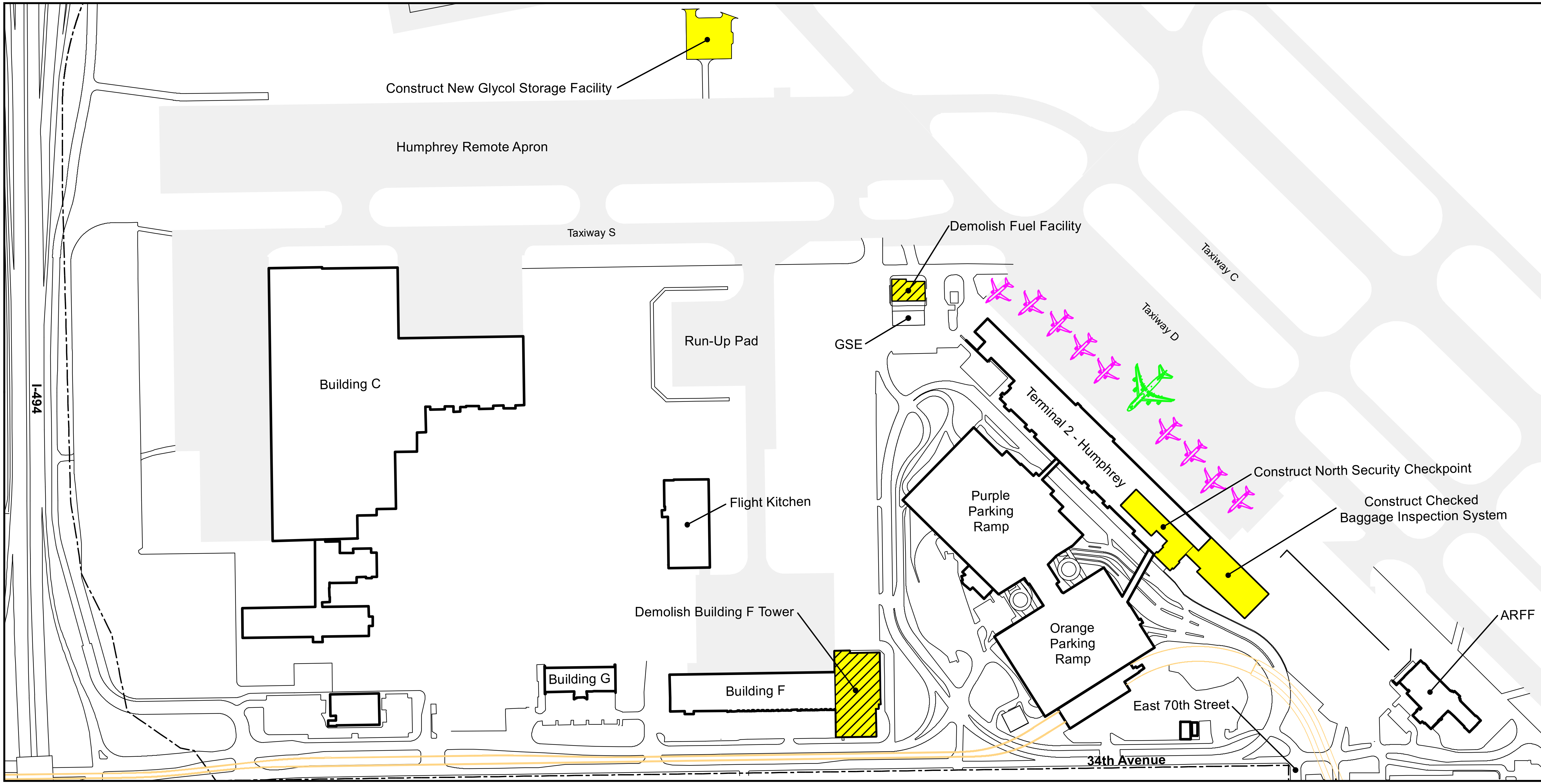
No Action Alternative - Terminal 1-Lindbergh

0 200 400 800 Feet

Source: Minneaoplis-St. Paul International Airport

Disclaimer: This map was generated by HNTB Corporation using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitablity for a particular use. The scale and location of all mapped data are approximate.

FIGURE 3.3-3



LEGEND

Existing Building
Existing Airfield Pavement
Projects that are Underway
Demolish
MAC Property
LRT Tracks
Small Turboprop
50-Seat Regional Jet
Large Regional Jet
Narrow-body
757-Class
Wide-body

No Action Alternative - Terminal 2-Humphrey

Feet 0 200 400 800

Source: Minneapolis-St. Paul International Airport

Disclaimer: This map was generated by HNTB Corporation using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitability for a particular use. The scale and location of all mapped data are approximate.

HNTB

When compared to Airlines Remain and Airlines Relocate Alternatives, the No Action Alternative represents a much more crowded condition with increased airline operating burdens, especially when schedule disruptions occur. However, the projected daily and annual demand could be accommodated, albeit at a reduced level of service. The No Action Alternative design day flight schedule and associated airfield simulation analysis demonstrate that the airlines would need to make some changes in their scheduled flight times to accommodate projected demand with existing terminal facilities through 2025. Therefore, the induced aviation activity (difference between project and no-action activity) resulting from the proposed terminal facility improvements consists of a redistribution of existing activity rather than creation of new activity. As such, the No Action Alternative represents a reasonable estimate of how the Airport and the airlines would attempt to accommodate demand if the proposed terminal facilities were not built.

3.4 Alternatives Retained for Further Consideration

Only the No Action Alternative and those alternatives that would meet the purpose and need (the Airlines Remain and the Airlines Relocate Alternatives) are retained for further consideration. The following paragraphs briefly describe each of these Alternatives and summarize how each addresses the overall Purpose and Need. **Tables 3.4.1** and **3.4.2** list the specific airport, landside and roadway needs identified in Chapter 2 and how each alternative meets those specific needs.

Table 3.4.1

Do Alternatives Meet the Needs Identified in Chapter 2? - Airport and Landside Facilities

Current Need (2010)	Future Need (2020)	No Action Alternative: Meets Needs?	No Action Alternative: Improvement(s) that Address the Identified Needs	Alternative 1 - Airlines Remain: Meets Needs?	Alternative 1 - Airlines Remain: Improvement(s) that Address the Identified Needs	Alternative 2 - Airlines Relocate: Meets Needs?	Alternative 2 - Airlines Relocate: Improvement(s) that Address the Identified Needs
Gates							
Additional Gates at Terminal 2-Humphrey	15,000 feet of additional gate frontage to accommodate future fleet	No	N/A	Yes	• Expand Terminal 1-Lindbergh Concourse G • Expand Terminal 2-Humphrey	Yes	• Expand Terminal 1-Lindbergh Concourse G • Expand Terminal 2-Humphrey
Terminals							
Refurbish Concourse E at Terminal 1-Lindbergh		No	N/A	Yes	• Remodel Terminal1-Lindbergh Concourse E	Yes	• Remodel Terminal1-Lindbergh Concourse E
Additional 17,000 square feet of waiting area for the ticket counter in Terminal 1-Lindbergh	Additional 26,000 square feet of waiting area for the ticket counter in Terminal 1-Lindbergh	No	N/A	Yes	• Remodel and reconfigure the Terminal 1-Lindbergh lobby	Yes	• Remodel and reconfigure the Terminal 1-Lindbergh lobby
	Additional 6,000 square feet of area at security check points in Terminal 1-Lindbergh	No	N/A	Yes	• Remodel and reconfigure the Terminal 1-Lindbergh lobby	Yes	• Remodel and reconfigure the Terminal 1-Lindbergh lobby
Additional 14,000 square feet at baggage claim in Terminal 1-Lindbergh	Additional 20,000 square feet at baggage claim in Terminal 1-Lindbergh	No	N/A	Yes	• Reconfigure and expand the Terminal-1 Lindbergh baggage facilities	Yes	• Reconfigure and expand the Terminal-1 Lindbergh baggage facilities
International facilities, passenger processing and baggage claim overstressed at daily peak demand	Additional 11,000 square feet of area for international processing at Terminal 1-Lindbergh and 16 additional processing stations	No	N/A	Yes	• Construct a new International Facility within Concourse G of Terminal-1 Lindbergh	Yes	• Construct a new International Facility within Concourse G of Terminal 1-Lindbergh
Landside							
Additional 100 feet of arrival curb roadway at Terminal 1-Lindbergh	Additional 400 feet of arrival curb at Terminal 1-Lindbergh	No	N/A	Yes	• Expand terminal arrivals curb at Terminal 1-Lindbergh	Yes	• Expand terminal arrivals curb at Terminal 1-Lindbergh • Expand curb at Terminal 2-Humphrey(1)
	14 additional commercial vehicle loading spaces, 13 at Terminal 1-Lindbergh and 1 at Terminal 2-Humphrey	No	N/A	Yes	• Relocate and expand Commercial GTC at Terminal 1-Lindbergh	Yes	• Relocate and expand Commercial GTC at Terminal 1-Lindbergh • Construct new parking ramp at Terminal 2-Humphrey (includes additional GTC spaces)
	8,500 additional parking stalls at Terminal 1-Lindbergh	No	N/A	Yes	• Construct a new parking ramp at Terminal 1-Lindbergh	Yes	• Construct a new parking ramp at Terminal 1-Lindbergh • Expand existing and construct new parking ramps at Terminal 2-Humphrey(1)
	150 and 350 new rental car spaces at Terminal 1-Lindbergh and Terminal 2-Humphrey, respectively 81,900 square feet of new QTA areas with 79,800 square feet of that area at Terminal 2-Humphrey	No	N/A	Yes	• Reconfigure rental car spaces at Terminal 1-Lindbergh and continue to provide QTA services for Terminal 2-Humphrey rental cars at Terminal 1-Lindbergh	Yes	• Expand existing and construct new parking ramps at Terminal 2-Humphrey(2)

Note:
(1) Although the identified need is at Terminal 1-Lindbergh it is addressed by constructing improvements at both Terminals. This is because the analysis of future need conducted for Chapter 2 is based on the airlines remaining at their current terminal while the specific Airline Relocate Alternative improvements are based on relocating the non-SkyTeam airlines to Terminal 2-Humphrey.
(2) Although the identified need is at both Terminals it is addressed by constructing improvements at Terminal 2-Humphrey. This is because the analysis of future need conducted for Chapter 2 is based on the airlines remaining at their current terminal while the specific Airline Relocate Alternative improvements are based on relocating the non-SkyTeam airlines to Terminal 2-Humphrey.

Source: *Purpose and Need Technical Report*, MAC and HNTB, 2012, *Landside Facilities Technical Report*, MAC and HNTB, 2011.

Table 3.4.2

Do Alternatives Meet the Needs Identified in Chapter 2? - Regional Roadways

Current Need	Future Need (2020)	Future Need 2030	No Action Alternative		Alternative 1 - Airlines Remain		Alternative 2 – Airlines Relocate	
			Meets Needs?	Improvement(s) that Address the Identified Needs	Meets Needs?	Improvement(s) that Address the Identified Needs	Meets Needs?	Improvement(s) that Address the Identified Needs
Increased capacity at the I-494 and 34th Avenue South Interchange	Increased capacity at the I-494 and 34th Avenue South Interchange	Increased capacity at the I-494 and 34th Avenue South Interchange	No	N/A	Yes	• Reconstruct 34th Avenue South interchange at I-494 • Additional expansion of 34th Avenue South interchange at I-494 (Post 2020)	Yes	• Reconstruct 34th Avenue South interchange at I-494 • Additional expansion of 34th Avenue South interchange at I-494 (Post 2020)
	Increased capacity at the TH 5 and Post Road Interchange		No	N/A	Yes	• Construct new Trunk Highway (TH) 5 and Post Road Interchange	Yes	• Construct new Trunk Highway (TH) 5 and Post Road Interchange
Improved traffic operations on I-494	Improved traffic operations on I-494	Improved traffic operations on I-494	No	N/A	Yes	• Construct a dual lane exit from eastbound I-494 to 34th Avenue South • Construct a dual lane exit from westbound I-494 to 24th Avenue South • Construct auxiliary lane improvement on westbound I-494 between 24th Avenue South and the exit to southbound TH 77 (Post 2020) • Construct bridge braid for 34th Avenue South entrance ramp to westbound I-494 and exit ramp to 24th Avenue South from westbound I-494 (Post 2020)	Yes	• Construct a dual lane exit from eastbound I-494 to 34th Avenue South • Construct a dual lane exit from westbound I-494 to 24th Avenue South • Construct auxiliary lane improvement on westbound I-494 between 24th Avenue South and the exit to southbound TH 77 • Construct bridge braid for 34th Avenue South entrance ramp to westbound I-494 and exit ramp to 24th Avenue South from westbound I-494 (Post 2020)
	Increased capacity on 34th Avenue South		No	N/A	Yes	• Reconfigure the intersections of 34th Avenue South / East 70th Street and Humphrey Drive / East 70th Street	Yes	• Add lane to northbound 34th Avenue South • Improve intersection of East 72nd Street and 34th Avenue South • Reconfigure the intersections of 34th Avenue South / East 70th Street and Humphrey Drive / East 70th Street
	Increased capacity at the TH 5 and Glumack Drive Interchange	Increased capacity at the TH 5 and Glumack Drive Interchange	No	N/A	Yes	• Add dual lanes to the outbound ramps of Glumack Drive at TH 5	Yes	• Add dual lanes to the outbound ramps of Glumack Drive at TH 5 (Post 2020)
	Increased capacity on East 70th Street		No	N/A	Yes	• Reconfigure East 70th Street east of 34th Avenue South	Yes	• Reconfigure East 70th Street east of 34th Avenue South

Source: *Appendix C*, MSP Area Roadway Improvements Project Memos, KHA and SRF, 2012.

The No Action Alternative includes some airport improvements that will be implemented prior to the completion of the EA. The No Action Alternative would not meet the purpose and need for the Proposed Action as it does not accommodate expected demand at an acceptable level of service through the year 2020. Regardless, the No Action Alternative was retained for detailed environmental analysis and comparison as required by CEQ Regulations.

The Airlines Remain Alternative includes the improvements needed through 2020 presuming that the airlines remain in their current terminals. The improvements included in the Airlines Remain Alternative are listed in Table 3.2.1 and an illustration of the Airlines Remain Alternative is presented on Figure 3.2-1. The specific improvements that make up this alternative consist of those necessary to accommodate the airlines' forecasted growth within their current terminal. The improvements were specifically designed to provide an acceptable level of service. Therefore, the Airlines Remain Alternative meets the purpose and need and is retained for detailed environmental analysis.

The Airlines Relocate Alternative includes the improvements needed through 2020 presuming that the non-SkyTeam airlines currently located in Terminal 1-Lindbergh are relocated to Terminal 2-Humphrey. The improvements included in the Airlines Relocate Alternative are listed in Table 3.2.2 and an illustration of the Airlines Relocate Alternative is presented on Figure 3.2-4. The improvements that make up this alternative were specifically designed to provide an acceptable level of service through 2020. Therefore, the Airlines Relocate Alternative meets the purpose and need and is retained for detailed environmental analysis. Additionally, the Airlines Relocate Alternative was identified as the Sponsor's Preferred Alternative.

All improvements included in the Sponsor's Preferred Alternative will be designed and constructed in a manner that will not affect the safety of aircraft operations nor require changes to established air traffic procedures. For instance, the relocated Delta Air Lines Flight Kitchen must be designed and constructed to avoid any adverse impact on the Runway 12R CATIII approach procedure.

3.4.1 Comparison of Alternatives

A comparison of the alternatives retained for further consideration is provided in **Table 3.4.3**. The alternatives were compared based on a variety of criteria including potential environmental impacts. The criteria selected for comparison reflect the analyses conducted for the EA as well as other information that decision makers typically consider in reviewing alternatives.

Table 3.4.3

Comparison of Alternatives Retained for Further Consideration

Comparison Criteria	Alternative		
	No Action	**Airlines Remain**	**Airlines Relocate**
Airfield/ Airspace Simulation	Airfield and airspace analysis was conducted for all of the alternatives by using the airport and airspace simulation model (SIMMOD). SIMMOD is a standard analysis tool used by the airport industry and accepted by FAA to develop detailed simulations of current and proposed airport and airspace operations. Based on the simulation, all of the Alternatives would result in about the same level of annual delay per aircraft operation in 2020 and in 2025. This was to be expected given that the Alternatives do not include changes to the runways and they include only minor changes to taxiways. Information regarding the simulation analysis is provided in ***Appendix D,*** *MSP Airfield Simulation Analysis*.		
Construction Phasing	N/A	Phasing of projects at Terminal 1-Lindbergh would be difficult because many of the facilities are already operating at or over their design capacities. As a result construction will likely be more difficult to schedule, take longer and cost more. Although the MAC would strive to maintain an adequate LOS it would be very difficult to avoid negatively impacting the passengers' experience during construction.	Phasing of projects at Terminal 1-Lindbergh would be facilitated by the movement of the non-SkyTeam Airlines to Terminal 2-Humphrey. After the move, demand on strained facilities would be reduced and abandoned space could be renovated or temporarily used while other facilities are being renovated/constructed. In addition, the expansion of facilities at Terminal 2-Humphrey would be generally outside the confines of the existing terminal and could be accomplished with minimal disruption to passengers.
Order of Magnitude Cost	Minor	$1.3 billion dollars Because this is a rough estimate of cost based on conceptual/preliminary planning it does not include the added cost attributed to the difficulty of phasing construction at Terminal 1-Lindbergh. Detailed planning would be required to determine the magnitude of cost associated with phasing the construction at Terminal-1 Lindbergh with this alternative.	$1.5 billion dollars Part of the reason that the Airlines Relocate Alternative is more expensive than the Airlines Remain Alternative is that the Airlines Relocate provides for more capacity. By virtue of building out the full footprint of some of the facilities at Terminal 1-Lindbergh, the Airlines Relocate Alternative provides more capacity albeit at a higher cost. Though the airport will be able to handle more capacity as a result of this alternative, the additional capacity is not needed as part of this project and will occur as a secondary benefit. All applicable environmental documentation will be completed in the future when additional capacity is necessary.
Customer Service	Customer service would deteriorate as aircraft operations and the number of passengers grows.	Once construction is complete, customer service with the Airlines Remain Alternative would be improved when compared to the customer service with the No Action Alternative. However, during construction customer service would suffer because construction would impact facilities that are already operating at or over their design capacities.	The primary reason to move all of the non-SkyTeam Airlines to Terminal 2-Humphrey is to improve customer service. With this Alternative, the traveling public would be able to easily determine the "correct terminal," the terminal they need to go to depart or drop off/pick-up passengers: Terminal 1-Lindbergh for Delta/SkyTeam Airlines and Terminal 2-Humphrey for everyone else. In addition, customer service would be less impacted by construction than with the Airlines Remain Alternative because the renovation/expansion could be completed with minimal disruption to passengers.
Post 2020	Poor LOS and potential near grid lock of some facilities.	Additional capacity would be needed particularly in terms of gates almost immediately post-2020 to accommodate any growth in passengers without a deterioration in service.	Though the intent of this project is to improve the level of service at terminal facilities, this Alternative would result in adequate capacity to handle growth at Terminal 1-Lindbergh without the need for additional facilities.
Potential Environmental Impact	No potential environmental impacts that would exceed the thresholds of significance were identified for any of the Alternatives. There would be little or no difference in the potential environmental impacts associated with the Airlines Remain and the Airlines Relocate Alternatives.		

Source: MAC Analysis, 2011.

Endnotes

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[1] Minnesota Department of Transportation, *Tier 2 Air Service Study: Minnesota in Partnership with Wisconsin Technical Report*, June 2003.

[2] Minnesota Department of Transportation, *Minnesota Comprehensive Statewide Freight and Passenger Rail Plan*, February 2010, p. ES.1.

[3] Ibid., p.ES.4.

[4] Transportation Economics & Management Systems, Inc., *Midwest Regional Rail System Executive Report*, September 2004, p. 5.

[5] US Department of Transportation, Wisconsin Department of Transportation and the Minnesota Department of Transportation, *Milwaukee-Twin Cities High-Speed Rail Corridor Program Fact Sheet*, 2010.

[6] America 2050, *High Speed Rail in America*, January 2011, p. 10.

[7] Steer Davies Gleave for the European Commission Directorate General for Energy and Transport, *Air and Rail Competition and Complementarity*, August 2006, p.30.

[8] Transportation Research Board of the National Academies, *Innovative Approaches to Addressing Aviation Capacity Issues in Coastal Mega-regions*, *ACRP Report 31*, 2010, p. 35.

[9] America 2050, *High Speed Rail in America*, January 2011, p. 11.

[10] Northern Lights Express Passenger Rail Project, NLX, http://www.northernlightsexpress.org/joomla/ (accessed 9/14/11).

[11] Southeast Minnesota Rail Alliance, Zip Rail, Frequently Asked Questions, http://www.goziprail.com/the-project/faqs/ (accessed 8/25/11).

[12] Federal Aviation Administration (FAA), *Dual Track Airport Planning Process Twin Cities Metropolitan Area, Minnesota Final Environmental Impact Statement*, May 1998, Executive Summary, p. iii.

[13] Architectural Alliance and Lea + Elliot, with assistance from TKDA, MBJ, and Kraus Anderson, *G Concourse Tram Study*, Sept. 18, 2006.

[14] Federal Highway Administration (FHWA), TECHBRIEF, *Double Crossover Diamond Interchange*, FHWA Publication No.: FHWA-HRT-09-054, October 2009, p. 2.

[15] Architectural Alliance and Lea + Elliot, with assistance from TKDA, MBJ, and Kraus Anderson, *G Concourse Tram Study*, Sept. 18, 2006.

Chapter 4: AFFECTED ENVIRONMENT

This chapter provides an overview of the environment at and within the vicinity of MSP. Specific information related to each environmental impact category listed below is presented in Chapter Five, *Environmental Consequences*.

- Air Quality (including Odors)
- Climate
- Coastal Resources
- Compatible Land Use
- Construction Impacts
- Department of Transportation Act: Section 4(f)
- Farmlands
- Fish, Wildlife and Plants
- Floodplains
- Hazardous Materials, Pollution Prevention and Solid Waste
- Historical, Architectural, Archaeological and Cultural Resources
- Light Emissions and Visual Effects
- Natural Resources and Energy Supply
- Noise
- Secondary (Induced) Impacts
- Socioeconomic Impacts, Environmental Justice and Children's Health and Safety Risks
- Water Resources
- Wetlands
- Wild and Scenic Rivers
- Cumulative Effects

MSP is located in an urban area between the Twin Cities of Minneapolis and St. Paul, Minnesota and is surrounded by the suburban cities of Bloomington, Eagan, Mendota Heights and Richfield. Minneapolis is located to the northwest of the airport, St. Paul to the northeast, Bloomington to the southwest, Eagan to the southeast, Mendota Heights directly east and Richfield directly west of MSP. **Figure 4.0-1** depicts features of the environment around MSP, as discussed in this Chapter.

The land surrounding MSP includes residential, industrial, institutional, commercial and cultural uses. Land to the west and northwest is primarily residential use, and land to the south and east consists of a mix of commercial and industrial land use with pockets of residential use throughout. The Mall of America is located adjacent to the southwest corner of MSP.

There are many state and regional parks within the vicinity of MSP, including Fort Snelling State Park located just beyond Runways 30R/30L, Pike Island Park,

LEGEND

494	Interstate
5	Trunk Highway
	Secondary Road
	Parks
	Water

Environment Around MSP

N

0 4,000 8,000 16,000 Feet

MINNEAPOLIS SAINT PAUL METROPOLITAN AIRPORTS COMMISSION MAC

HNTB

Source: ESRI Data

Disclaimer: This map was generated by HNTB Corporation using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitablity for a particular use. The scale and location of all mapped data are approximate.

Washington Park, Wilson Park, Veterans Memorial Park, Taft Park and Morris Park. The Minnesota Valley National Wildlife Refuge is adjacent to MSP, located just south of Interstate 494 (I-494) in Bloomington.

Additionally, there are many historic sites at or nearby MSP. Historic sites include Fort Snelling beyond the northeast corner of the airport, and the Original Wold-Chamberlain Terminal Historic District on airport property.

The Minnesota River runs along the east side of MSP from the northeast corner and continuing south. The majority of stormwater from the airport drains via storm sewers to retention ponds prior to discharge to the Minnesota River. There are also many lakes within the vicinity of MSP, including Mother Lake at the northwest corner of the airport and Snelling Lake to the southeast.

Chapter 5: ENVIRONMENTAL CONSEQUENCES

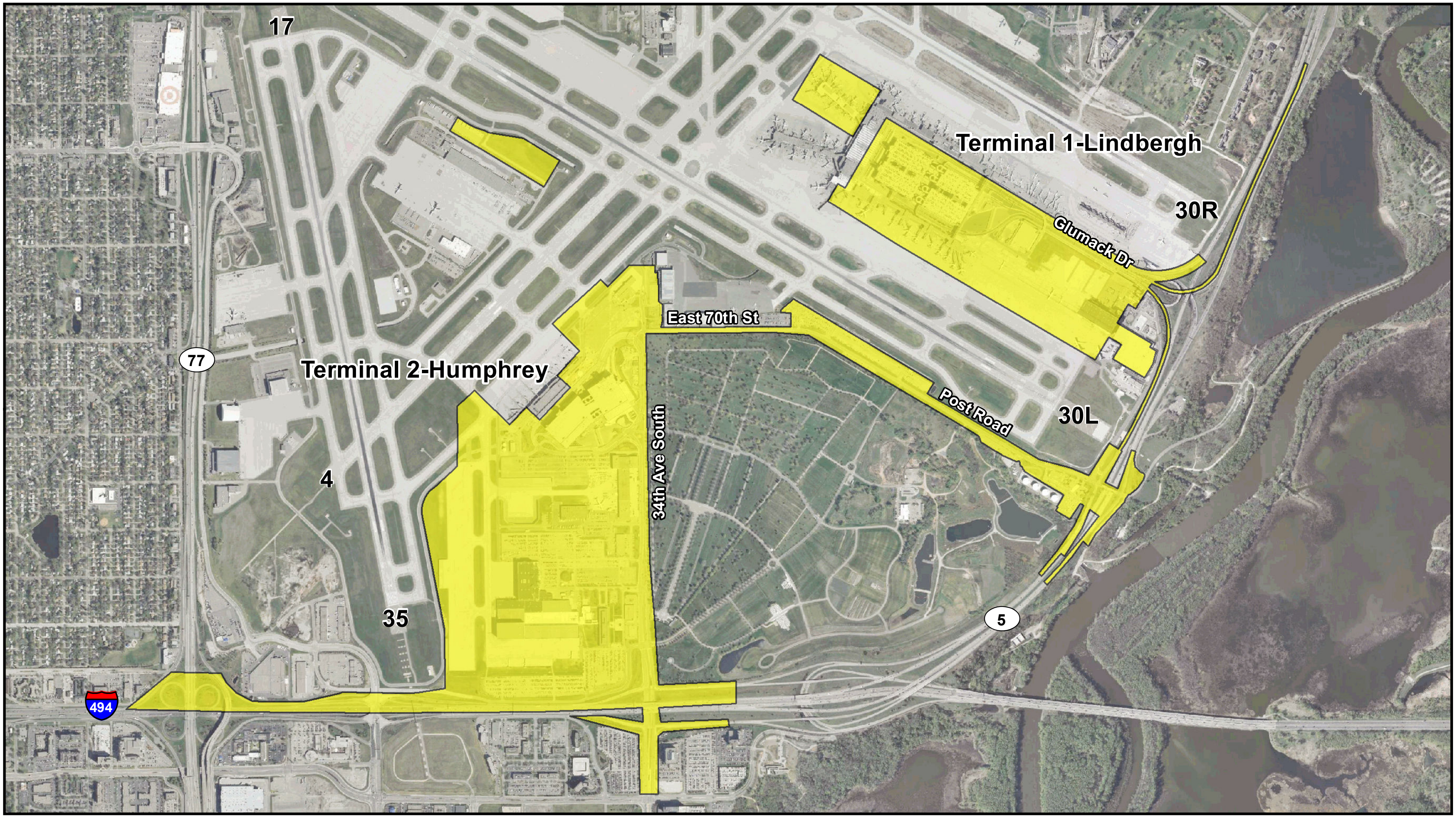
This chapter presents the environmental consequences of the alternatives retained for further consideration: the No Action Alternative, the Airlines Remain Alternative and the Airlines Relocate Alternative. As discussed in Chapter 3, *Alternatives*, the Airlines Relocate Alternative is the Sponsor's Preferred Alternative.

Environmental consequences were assessed in accordance with Federal Aviation Administration (FAA) Orders 1050.1E and 5050.4B and the Federal Highway Administration (FHWA) National Environmental Policy Act (NEPA) regulations. In addition, this chapter addresses all impact categories in the Minnesota Environmental Assessment Worksheet (EAW).

The impacts of the Action Alternatives were determined by comparing the projected future conditions of the Action Alternatives with the corresponding future conditions of the No Action Alternative.

Environmental consequences were analyzed within the geographic area where the Alternatives would cause impacts. This area is known as the study area. The extent of the study area depends upon the environmental resource being evaluated. For many resource categories the geographic area of interest includes areas of ground disturbance. Therefore, the general Study Area for this EA was established based on the combined limits of construction for all of the Alternatives. The location of this general Study Area is illustrated in **Figure 5.0-1**. For resource categories such as noise and traffic, the study area would not be related to the limits of construction. For these types of resources, the applicable study area is described in the section addressing that specific resource category.

Table 5.0.1 provides an overview of the impact categories evaluated and the associated impacts for each of the Alternatives. Additional information regarding the analysis of the impact categories is provided in the following sections.



Study Area

LEGEND

Study Area

Source: ESRI Data

Disclaimer: This map was generated by HNTB Corporation using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitablity for a particular use. The scale and location of all mapped data are approximate.

Table 5.0.1

Environmental Consequences Summary

Environmental Impact Category	Environmental Impact		
	No Action Alternative	**Alternative 1 – Airlines Remain**	**Alternative 2 – Airlines Relocate**
Air Quality	MSP is within a carbon monoxide (CO) maintenance area	- Operational and construction-related emissions do not exceed *de-minimis* levels. - CO concentrations are below the NAAQS/MAAQS.	
	- 2030 Mobile Source Air Toxic emissions are not expected to differ substantially between alternatives and no impacts are anticipated under any of the alternatives.		
Climate	No Impact	- Greenhouse gas emissions increase slightly compared to the No Action Alternative	
Coastal Resources	n/a		
Compatible Land Use	No impact	- No noise changes to noise sensitive land uses exceed the threshold of significance. - No change in land use compatibility related to safe aircraft operations or wildlife hazards.	
Construction Impacts	Minimal construction	- Air emissions conform to SIP. - Construction stormwater permit needed.	
Department of Transportation: Section 4(f)	No impact	- No use of a Section 4 (f) resource would be anticipated.	
Farmlands	n/a		
Fish, Wildlife and Plants	No impact	- No listed endangered or threatened species in Study Area. - No adverse impacts to biotic resources would be expected.	
Floodplains	n/a		
Hazardous Materials, Pollution Prevention and Solid Waste	No impact	- No solid/hazardous waste facilities disturbed at MSP, but hazardous materials could be encountered during construction.	
Historical, Architectural, Archaeological and Cultural Resources	No impact	- There may be an archaeological site in the area NW of the Post Road/TH 5 interchange. Both Action Alternatives include construction at this interchange. More detailed design information and potentially a site investigation are required to determine if there is potential to impact the archaeological site.	
Light Emissions and Visual Effects	No impact	- Additional apron and parking facility lighting not anticipated to cause adverse impacts.	
Natural Resources and Energy Supply	- Minimal differences in energy consumption between No Action and Action Alternatives.		
Aircraft Noise	No impact	- No noise changes at noise sensitive land uses exceed the threshold of significance (an increase of 1.5 dB DNL or above at the 65 DNL exposure). - Minor variations in contours between alternatives.	

Table 5.0.1

Environmental Consequences Summary

Environmental Impact Category	Environmental Impact		
	No Action Alternative	**Alternative 1 – Airlines Remain**	**Alternative 2 – Airlines Relocate**
Vehicular Noise	There are 35 daytime and 25 nighttime modeled receptors that approach or exceed state or federal standards.	- None of the modeled receptor locations are projected to experience a substantial increase in traffic noise levels - Noise levels would approach or exceed federal noise abatement criteria at 24 modeled receptor in 2030 - The 2030 vehicular noise analysis found that noise barriers were not reasonable because they did not meet the federal noise reduction design goal or cost effectiveness criteria	
Secondary (Induced) Impacts	- No significant impacts in other categories, therefore no secondary impacts expected.		
Socioeconomic Impacts, Environmental Justice and Children's Health and Safety Risks (including Traffic and Circulation)	No impact	- Requires relocation of SuperAmerica, but no anticipated loss in businesses or employment. - In terms of traffic and circulation, the Airlines Remain and Airlines Relocate Alternatives would generally operate significantly better than the No Action Alternative.	
Water Quality	No impact	- 6.5 acres net increase of impervious surface. (of which 3.7 acres are associated with roadway improvements)	- 28.4 acres net increase of impervious surface. (of which 1.1 acres are associated with roadway improvements)
		- Insignificant changes relative to surface water discharges as all projects will meet construction NPDES permit and Lower Minnesota River Watershed District (LMRWD) requirements. - Potential increase in deicing fluid collection efficiencies.	
Wetlands	n/a		
Wild and Scenic Rivers	n/a		
Cumulative Effects	The impacts associated with the Alternatives are minor. No single impact: even when considered with past, present and future actions; represents a substantial impact that cannot be mitigated. Therefore, none of the Alternatives would result in significant cumulative impacts.		

Note: n/a = No impact to Environmental Impact Category and/or category not applicable to MSP area.
NAAQS = National Ambient Air Quality Standard; MAAQS= Minnesota Ambient Air Quality Standard

Source: HNTB analysis, 2011.

5.1 Air Quality

This section provides an overview of the methodologies and results of air quality impact analyses.

5.1.1 Regulatory Background

NEPA and the Federal Clean Air Act of 1970 (CAA) are the primary regulations that apply in the consideration of air quality impacts.

5.1.1.1 NEPA

NEPA requires disclosure of the proposed project's impact on the human environment including air quality.

5.1.1.2 Clean Air Act

The CAA requires the US Environmental Protection Agency (USEPA) to establish and periodically review National Ambient Air Quality Standards (NAAQS),[1] to protect public health, welfare and the environment. These standards have been established for the following "criteria" air pollutants: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter equal to or less than 10 micrometers (coarse particulates or PM_{10}), particulate matter equal to or less than 2.5 micrometers (fine particulates or $PM_{2.5}$), and lead (Pb). The Minnesota Pollution Control Agency (MPCA) has adopted these standards or in some cases, adopted its own standards (Minnesota AAQS or MAAQS). The national and state standards are shown in **Table 5.1.1**.

Table 5.1.1
National and Minnesota Ambient Air Quality Standards

Pollutant	Averaging Period	Ambient Air Quality Standards	
		National	Minnesota
Carbon monoxide (CO)	1-hour	35 ppm ($40 mg/m^3$)	30 ppm ($35 mg/m^3$)
	8-hour	9 ppm ($10 mg/m^3$)	9 ppm ($10 mg/m^3$)
Ozone (O_3)	8-hour	0.075 ppm ($147 µg/m^3$)	0.075 ppm ($147 µg/m^3$)
Nitrogen dioxide (NO_2)	1-hour	0.10 ppm ($188 µg/m^3$)	NA
	Annual	0.053 ppm ($100 µg/m^3$)	0.053 ppm ($100 µg/m^3$)
Sulfur dioxide (SO_2)	1-hour	0.075 ppm ($196 µg/m^3$)	0.5 ppm ($1300 µg/m^3$)
	3-hour	0.5 ppm ($1300 µg/m^3$)	0.5 ppm ($1300 µg/m^3$)
	24-hour	0.14 ppm ($365 µg/m^3$)	0.14 ppm ($365 µg/m^3$)
	Annual	0.03 ppm ($80 µg/m^3$)	0.02 ppm ($60 µg/m^3$)
Particulate matter (PM_{10})[1]	24-hour	$150 µg/m^3$	$150 µg/m^3$
	Annual	NA	$50 µg/m^3$
Particulate matter ($PM_{2.5}$)	24-hour	$35 µg/m^3$	NA
	Annual	$15 µg/m^3$	NA
Lead (Pb)	3-month[2]	$0.15 µg/m^3$	NA
	Quarterly	$1.5 µg/m^3$	$1.5 µg/m^3$

Notes:
(1) USEPA revoked the annual PM_{10} standard in 2006.
(2) Rolling average.
NA = not applicable
ppm = parts per million
$µg/m^3$ = micrograms/cubic meter
mg/m^3 = milligrams/cubic meter

Source: USEPA, 2010 and Minnesota Pollution Control Agency (MPCA) 2000.

States must identify geographic areas that do not meet the NAAQS for each criteria pollutant. These areas are designated as nonattainment areas for the applicable criteria pollutant(s). States must then develop State Implementation Plan(s) (SIP) for nonattainment areas. The SIP includes a variety of emission control measures that will result in attainment of the applicable standard(s) in the future.

An area previously designated as nonattainment and subsequently re-designated as attainment, is termed a maintenance area. A maintenance area must have a maintenance plan as a revision to the SIP to ensure attainment of the air quality standards is maintained.

In summary:

- An attainment area is any area that meets the air quality standard for a given criteria pollutant,
- A nonattainment area is any area that does not meet the air quality standard for a given criteria pollutant, and
- A maintenance area is any area previously designated nonattainment and subsequently re-designated as attainment.

Hennepin County, including the area surrounding MSP, is currently designated as attainment for all NAAQS (Pb, NO_2, SO_2, PM_{10}, $PM_{2.5}$, and the current 8-hour standard for O_3), with the exception of CO. Hennepin County is designated as a CO maintenance area. The designation signifies that violations of the NAAQS for CO have occurred in the past but that the area is currently in attainment. Because of this status, a CO Maintenance Plan was developed.

The CO Maintenance Plan establishes area-wide emission budgets, control strategies and timeframes for maintaining the attainment status. The CO Maintenance Plan is periodically updated as part of the SIP for the Minneapolis-St. Paul area.

General Conformity

The General Conformity Rule of the federal CAA prohibits federal agencies (including the FAA) from permitting or funding projects that do not conform to an applicable SIP. The General Conformity Rule applies only to nonattainment or maintenance areas.

Under the General Conformity Rule, project-related emissions of the applicable non-attainment/maintenance pollutants are compared to *de-minimis* level thresholds. If the emissions exceed the thresholds, a formal Conformity Determination is required to demonstrate that the action conforms to the applicable SIP.

Transportation Conformity

Under the Transportation Conformity Rule, federally-funded roadway projects of regional significance are shown to conform to the SIP by inclusion into the Transportation Improvement Plan (TIP).

The federal transportation bill, Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users requires that all federally-funded transportation projects within the seven-county metropolitan area be included in the four-year TIP. The TIP is prepared by the Metropolitan Council (MC) with assistance from the Minnesota Department of Transportation. It represents a fiscally-constrained four-year program of project delivery. The most recent adopted TIP is for the period 2012 through 2015.

5.1.2 Approach and Methodology

The assessment of air quality impacts attributable to the planned improvements to MSP includes analyses to address both FAA and FHWA NEPA and CAA requirements.

To address FAA requirements, the air quality impact assessment was conducted following the guidelines contained in FAA Order 1050.1E, FAA Order 5050.4B and the FAA's *Air Quality Procedures for Civilian Airports and Air Force Bases*.[2]

To address FHWA requirements, the following items were addressed in the 2030 air quality analysis of the regional roadway improvements:

- A hot-spot analysis if USEPA approved screening thresholds are exceeded.
- That regionally significant projects are part of a conforming Long Range Transportation Policy Plan (LRTPP) and four-year TIP. The USEPA issued final rules on transportation conformity (40 CFR 93, Subpart A) which describe the methods required to demonstrate SIP compliance for transportation projects.
- A Mobile Source Air Toxics (MSAT) analysis as required by FHWA's, *Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA*.

The following sub-sections discuss the analyses approach and methodology. **Table 5.1.2** provides a summary of the analyses and the basis for inclusion in the air quality assessment. Detailed methodologies, assumptions, data, and results (by emission source) associated with the air quality assessment are provided in ***Appendix E,*** *Air Quality Technical Report* and ***Appendix P,*** *Vehicular Air Quality Analysis Memorandum*.

The air quality assessment considered a comprehensive list of sources of airport-related air emissions, including: aircraft; auxiliary power units (APU); ground support equipment (GSE); motor vehicles traveling to, from and moving about the Airport; and stationary sources such as boilers, generators, snowmelters and fuel storage tanks.

Table 5.1.2

Summary Matrix of Air Quality Impact Analyses

Analysis	Purpose	Applicable Regulations or Guidelines
Criteria Pollutant Emissions Inventory	To identify the sources and types, and quantify the amounts of air emissions associated with the operation/construction of the alternatives. The results are also used to compare future-year emissions associated with each alternative, used in support of the General Conformity Rule Applicability Analysis.	▪ FAA Order 1050.1E, Change 1, *Environmental Impacts: Policies and Procedures* ▪ FAA Order 5050.4B *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Projects* ▪ FAA *Air Quality Procedures for Civilian Airports & Air Force Bases* including the *Addendum*
General Conformity Rule Applicability Analysis	To determine if project-related emissions exceed the CAA General Conformity Rule *de- minimis* levels and if a formal determination is needed to demonstrate that the alternatives will conform to the applicable SIP.	▪ FAA Order 1050.1E, Change 1, *Environmental Impacts: Policies and Procedures*, Section 2. *Air Quality* ▪ 40 CFR Part 93, Subpart B, *Determining Conformity of General Federal Actions to State or Federal Implementation Plans* ▪ FAA, EPA *General Conformity Guidance for Airports - Questions & Answers*
CO Macroscale Dispersion Analysis	To predict existing and future-year ambient (i.e., outdoor) levels of CO both on and off the airport site and ensure that the project-related emissions do not cause or contribute to violations of the NAAQS/MAAQS.	▪ FAA *Air Quality Procedures for Civilian Airports and Air Force Bases including Addendum*
CO Roadway Intersection Analysis	To predict existing and future-year ambient levels of CO in the vicinities of roadway intersections both on and off the airport, and to ensure that the project-related traffic emissions do not cause or contribute to violations of the NAAQS/MAAQS. To demonstrate State Implementation Plan compliance for transportation projects.	▪ USEPA, *Guideline for Modeling Carbon Monoxide from Roadway Intersection* ▪ 40 CFR 93, Subpart A, *Conformity to State or Federal Implementation Plans of Transportation Plans, Programs, and Projects Developed, Funded or Approved Under Title 23 U.S.C. or the Federal Transit Laws*

Source: Wenck Associates, Inc., KB Environmental Sciences, Inc., and David Braslau Associates, Inc., 2011.

5.1.2.1 Criteria Pollutant Emission Inventories

The criteria pollutant emissions inventories are used to disclose and compare the action alternatives to the future no-action alternative and determine the air quality impacts for purposes of NEPA. Emissions inventories are also used to compare the project-related emissions to the General Conformity thresholds.

In general terms, an emissions inventory is a quantification of the amount of pollutants emitted from a source over a period of time. The amount is calculated by applying emission factors (i.e., grams of pollutant/operation) to source activity levels (i.e., number of aircraft operations). The results are provided in tons by pollutant (i.e., CO, NO_x, and SO_x), emission source (i.e., aircraft, motor vehicles, and stationary sources) and analysis year.

For this assessment, the emissions inventory includes CO, NO_x, PM_{10}, $PM_{2.5}$ and SO_x. Because emissions of O_3 cannot be calculated directly, volatile organic compounds (VOCs) and NO_x (the primary precursors to O_3 formation) are used as surrogates for this pollutant.

Operational Emissions

Operational emission inventories are developed for baseline conditions and each of the Action Alternatives. Operational emissions include emissions from aircraft, airport equipment, motor vehicles and stationary sources associated with the airport. The FAA's *Emissions and Dispersion Modeling System* (EDMS), the FAA-required and USEPA-preferred model, was used to calculate emissions from aircraft and airport equipment such as GSE and APU.[3] For motor vehicles, the USEPA MOBILE6.2 emissions model is used.[4] For stationary sources such as heating/cooling plants and emergency generators, the emissions are based on the approximated amount of annual fuel use.

To identify potential air quality impacts, the operational emissions inventory for the No Action Alternative are compared to the operational inventory for each of the Action Alternatives. In addition, the differences between the No Action and Action Alternatives CO emissions are compared to the CO *de-minimis* level of 100 tons per year to determine if a General Conformity Determination would be required.

Pb emissions are not typically considered in emission inventories for commercial service airports because they are primarily from piston engine aircraft. However, Pb emissions are quantified for this analysis for comparison to the air monitoring requirement threshold of 1.0 ton per year.

Construction Emissions

Construction emissions were also quantified for the Action Alternatives. The emission sources included on- and off-road construction vehicles, machinery and equipment. The construction schedules and requirements (i.e., work crews, equipment types, etc.) for each Action Alternative were estimated. The construction schedules were then used to estimate hours of operation for non-road equipment and miles driven for on-road vehicles. Emission factors obtained from USEPA NONROAD2008[5] and MOBILE6.2 models were applied to obtain estimates of annual emissions of CO, NO_x, VOC, SO_x PM_{10}, and $PM_{2.5}$.

As with the operational emissions, the quantity of CO construction emissions was compared to the CO *de-minimis* level to determine if a General Conformity Determination would be required.

5.1.2.2 CO Concentrations

CO concentrations were estimated on both the macroscale and roadway intersection levels in order to determine if project related emissions would cause or contribute to violations of the air quality standards. CO concentrations included contributions from both background and project emissions sources.

Ambient monitoring data was used to conservatively approximate background concentrations. The MPCA operates several air quality monitoring stations in the Minneapolis-St. Paul area as part of its permanent, state-wide air monitoring program. Pollutant monitoring data for 2008 through 2010 from the nearest air monitoring stations was reviewed. The maximum concentrations from the 1088 West University Avenue station in St. Paul were selected to represent the background concentration, which were 4.4 ppm and 2.6 ppm for the 1-hour and 8-hour averaging periods respectively. These background concentrations account for other emission sources in the region and natural sources not accounted for in the project dispersion modeling analyses. Their inclusion along with the project impacts represents a conservative assessment of the potential total CO concentrations.

For the macroscale analysis, CO concentrations at locations on and around the airport were quantified using EDMS and USEPA AERMOD dispersion model.

For the roadway intersection analysis, CO concentrations near select roadway intersections were assessed. The 34th Avenue South at American Boulevard and the I-494 on- and off-ramp intersections at 34th Avenue South were analyzed because these are the most critical at-grade roadway intersections adjacent to the airport. The USEPA CAL3QHC[6] roadway dispersion model was used to quantify CO concentrations at the selected intersections.

Finally, the background plus project CO concentrations from both the macroscale and roadway intersection analyses were compared to the NAAQS/MAAQS.

All standard methods were used except where project-specific conditions and inputs were more appropriate and allowable under FAA and USEPA modeling conventions. Any non-standard approaches were coordinated with the FAA's Office of Environment and Energy through the use of an *Air Quality Assessment Protocol.*[7]

5.1.2.3 2030 Regional Roadway Analysis

Motorized vehicles affect air quality by emitting airborne pollutants. Changes in traffic volumes, travel patterns, and roadway locations affect air quality by changing the number of vehicles and the congestion levels in a given area. The air quality impacts from the project are analyzed by addressing criteria pollutants, a group of common air pollutants regulated by the U.S. EPA on the basis of criteria (information on health and/or environmental effects of pollution). Potential impacts resulting from these pollutants are assessed by comparing projected concentrations to the NAAQS.

In addition to the criteria air pollutants, the EPA also regulates air toxics. The FHWA provides guidance for the assessment of Mobile Source Air Toxic (MSAT) effects for transportation projects in the NEPA process. A quantitative evaluation of MSATs was performed for this project. The scope and methods of the analysis performed were developed in collaboration with the MnDOT, MPCA, and FHWA.

5.1.2.4 Transportation Conformity

Under Transportation Conformity, there are no project-specific quantitative criteria for determining if surface transportation or transit-related emissions comply with the SIP. Instead, the individual project(s) are listed as planned improvements to the area-wide roadway or transit systems in a conforming TIP.

5.1.2.5 Odors and Fugitive Dust

Odor is one of the items identified on the Minnesota Environmental Quality Board's (EQB) Environmental Assessment Worksheet. According to the EQB's guidance, one should "discuss both odors which have potential human health effects and also those which, although they do not pose health risks, may result in a loss of quality of life to surrounding neighbors due to nuisance or annoyance conditions."[8] Therefore, potential odor impacts are included in the air quality assessment.

Also, according to the EQB's guidance, fugitive dust i.e. wind-blown dust from construction, demolition, haul roads and other activities should be addressed. Therefore, potential fugitive dust is also included in the air quality assessment.

5.1.2.6 Hazardous Air Pollutant Emissions Inventory

In recent years, public and agency interest has increased regarding airport contributions to levels of hazardous air pollutants (HAPs).[9] HAPs comprise gaseous organic and inorganic chemicals and particulate matter with known or suspected potential to cause cancer (carcinogenic) or other serious health effects (non-carcinogenic). They are commonly emitted by a wide range of airport and non-airport sources, including aircraft, ground support equipment, motor vehicles, home furnaces, evaporating fuel and paints, wood burning, carpets, dry-cleaning of clothing, and industrial facilities.

The term HAPs refers to pollutants that do not have established Ambient Air Quality Standards (AAQS) but present potential adverse human health risks from short-term or long-term exposures. There are no Federal or state reporting requirements applicable to airports for these pollutants. However, a HAPs inventory was completed to disclose potential HAPs quantities for each of the Alternatives.

Annual emissions of specific air toxic compounds in tons per year were estimated from all activities at the Airport and from motor vehicles on the major roadways in the vicinity of the airport. Refer to *Appendix E* for more information regarding the methodology used to generate HAPs inventories.

5.1.3 Threshold of Significance

The applicable thresholds of significance for air quality are the NAAQS/MAAQS and the General Conformity Rule *de-minimis* thresholds, particularly as they apply to CO.

5.1.4 Affected Environment

Minnesota Pollution Control Agency (MPCA) operates several ambient ("outdoor") air quality monitoring stations in the Minneapolis/St. Paul area as part of its permanent, state-wide air monitoring program. These stations sample and record levels of the U.S. EPA criteria air pollutants. The closest of these air monitoring stations to MSP are located at H.C. Anderson School and Ramsey Health Center. All concentrations are within the National Ambient Air Quality Standards (NAAQS). Moreover, the concentrations decreased over the past three years. Also, in May of 2006, the MPCA published a study of ambient monitoring conditions near MSP[10]. The monitoring study included measurements of air toxics and criteria pollutants including $PM_{2.5}$ at two locations within MSP and at Wenonah School and Richfield Intermediate School. Overall, median and average concentrations of pollutants monitored near MSP were similar to concentrations monitored at other locations in the Twin Cities Metropolitan Area.

The extent of the air quality study area varies by emission source (i.e., aircraft, GSE, motor vehicles) and pollutant. Aircraft emissions during the approach and climb-out modes of a landing-takeoff cycle (LTO) extend up to the atmospheric mixing height (approximately 3,000 feet). Based upon the type of aircraft that use MSP, this altitude is reached approximately 1.5 miles beyond the runway ends. GSE emissions are mainly restricted to the airport main terminal aprons and cargo facilities. On-site motor vehicles emissions are mostly confined to the on-site roadways, terminal curbsides and parking facilities.

Airport-related motor vehicle traffic traveling to and from the airport also has the potential to affect air quality in the vicinity of off-site roadway intersections located near the airport. Therefore, the air quality study area includes several regional roadways around MSP. A regional roadway has a functional classification of principal arterial that is operated by MnDOT. A principal arterial is intended to provide mobility of the larger roadway network. Regional roadways that are adjacent to MSP are I-494, TH 77, TH 62, and TH 5. An evaluation of vehicular air quality for this project was completed using methods established in cooperation with MnDOT and FHWA.

To describe the affected environment within the air quality study area, the following sub-sections provides a summary of the baseline (2010) conditions. Baseline conditions reflect 2010 aircraft operations, airport activity and traffic volumes.

5.1.4.1 Emissions Inventory

Total baseline (2010) emissions were estimated to be approximately 5,818 tons per year of CO; 407 tons per year of VOC; 2,027 tons per year of NO_x; 177 tons per year of SO_2; 38.8 tons per year of PM_{10}; 36.2 tons per year of $PM_{2.5}$ and 0.04 tons per year of Pb.

5.1.4.2 CO Concentrations

Table 5.1.3 summarizes the baseline condition for the macroscale dispersion analysis. The maximum estimated 1-hour CO concentration of 28.4 ppm occurs at a location southeast of Terminal 1-Lindbergh. At this location the CO concentration is influenced mainly by GSE activity, taxiing aircraft and aircraft waiting to depart. The maximum-predicted concentration is less than the 1-hour CO standard of 30 ppm. The maximum 8-hour CO concentration of 8.0 ppm occurs in the same location as a result of the same activities. This concentration does not exceed the 8-hour CO standard of 9 ppm.

Table 5.1.4 summarizes the baseline concentrations from the CO roadway intersection analyses. The highest 1-hour CO concentration predicted at the National Cemetery near the 34th Avenue South and I-494 Interchange is estimated to be 6.2 ppm. The maximum 8-hour concentration of 4.4 ppm occurs at the same location. The 1-hour concentration at the Crown Plaza Hotel at the 34th Avenue South and American Boulevard intersection is estimated to be 5.8 ppm with an 8-hour concentration of 3.7 ppm. All of the estimated maximum 1-hour and 8-hour CO concentrations are within the applicable standards of 35/30 and 9 ppm, respectively.

Table 5.1.3

2010 Baseline Condition CO Macroscale Dispersion Modeling Results
(ppm)

Averaging Time	Maximum Modeled Concentration	Background Concentration	Total Predicted Concentration	NAAQS/ MAAQS	Exceeds NAAQS/MAAQS
1-hour	24.0	4.4	28.4	35/30	No
8-hour	5.4	2.6	8.0	9/9	No

Notes:
NAAQS = National Ambient Air Quality Standard
MAAQS = Minnesota Ambient Air Quality Standard

Source: Wenck Associates, Inc., KB Environmental Sciences, Inc., and David Braslau Associates, Inc., 2011.

Table 5.1.4

2010 Baseline Condition CO Roadway Intersection Analysis Results
(ppm)

Intersection	Averaging Time	Maximum Modeled Concentration	Background Concentration	Total Predicted Concentration	NAAQS/ MAAQS	Exceeds NAAQS/ MAAQS
34th Ave S and I-494 Interchange	1-hour	1.8	4.4	6.2	35/30	No
	8-hour	1.8	2.6	4.4	9/9	No
34th Ave S and American Boulevard	1-hour	1.4	4.4	5.8	35/30	No
	8-hour	1.1	2.6	3.7	9/9	No

Notes:
NAAQS = National Ambient Air Quality Standard
MAAQS = Minnesota Ambient Air Quality Standard

Source: Wenck Associates, Inc., KB Environmental Sciences, Inc., and David Braslau Associates, Inc., 2011.

5.1.4.3 2030 Regional Roadway Analysis

Ozone levels in the Twin Cities metropolitan area currently meet state and federal standards, and reductions in ozone levels have been observed between 2007 and 2010. Additionally, the State of Minnesota is classified by the EPA as an "ozone attainment area," which means that Minnesota has been identified as a geographic area that meets the national health-based standards for ozone levels. Because of these factors, a quantitative ozone analysis was not conducted for this project.

The entire State of Minnesota has been designated as an unclassifiable/ attainment area for PM. This means that Minnesota has been identified as a geographic area that meets the national health based standards for PM levels, and therefore is exempt from performing PM qualitative hot-spot analyses.

Within the project area, it is unlikely that NO_2 standards will be approached or exceeded based on the relatively low ambient concentrations of NO_2 in Minnesota and on the long-term trend toward reduction of NO_x emissions. Because of these factors, a specific analysis of NO2 was not conducted for this project.

Emissions of sulfur oxides from transportation sources are a small component of overall emissions and continue to decline due to the desulphurization of fuels. Additionally, the State of Minnesota is classified by the EPA as a "sulfur dioxide attainment area," which means that Minnesota has been identified as a geographic area that meets the national health-based standards for sulfur dioxide levels. Because of these factors, a quantitative analysis for sulfur dioxide was not conducted for this project.

Due to the phase out of leaded gasoline, lead is no longer a pollutant associated with vehicular emissions.

5.1.4.4 Transportation Conformity

Only funded and approved projects are included in the TIP and evaluated for Transportation Conformity. At this time, the I-494 and 34th Avenue Interchange improvement is listed in the MC 2012 – 2015 Transportation Improvement Program for the Twin Cities Metropolitan Area.

5.1.5 Impact Analysis

This section provides the results of the air quality impact assessment for the No Action Alternative and the two Action Alternatives.

5.1.5.1 Emissions Inventories

Operational Emissions

Tables 5.1.5 and **Table 5.1.6** present a comparison of the No Action and Action Alternatives operational emissions for 2020 and 2025, respectively. In 2020 and 2025 there are only minor differences between the No Action Alternative emissions and the Action Alternatives emissions. The differences are the result of varying operating conditions between the Alternatives. For instance, airplane taxiing distances to and from the runways differs for some airlines because they are operating out of a different terminal.

Table 5.1.5

2020 Operational Emissions Inventory

(tons per year)

Alternative	CO	VOC	NO_x	SO_x	PM_{10}	$PM_{2.5}$	Pb
No Action	4,705	387	2,241	218	39	36	0.04
Airlines Remain	4,707	387	2,241	218	39	36	0.04
Airlines Relocate	4,706	381	2,230	214	39	36	0.04

Note: Off-airport roadways include airport-related motor vehicles only.

Source: Wenck Associates, Inc., KB Environmental Sciences, Inc., and David Braslau Associates, Inc., 2011.

Table 5.1.6

2025 Operational Emissions Inventory

(tons per year)

Alternative	CO	VOC	NO_x	SO_x	PM_{10}	$PM_{2.5}$	Pb
No Action	5,256	436	2,545	249	43	39	0.04
Airlines Remain	5,174	429	2,531	244	42	39	0.04
Airlines Relocate	5,285	438	2,545	248	43	39	0.04

Note: Off-airport roadways include airport-related motor vehicles only.

Source: Wenck Associates, Inc., KB Environmental Sciences, Inc., and David Braslau Associates, Inc., 2011.

The differences in CO emissions between each Action Alternative and the No Action Alternative comprise the Project-related emissions. Importantly, these values are below the General Conformity *de-minimis* threshold of 100 tons per year. Therefore, a General Conformity Determination is not required.

Lastly, Pb emissions for all the Alternatives are less than the monitoring requirement threshold of 1.0 ton per year.

Construction Emissions

Table 5.1.7 presents the estimated project-related emissions during the nine-year construction period. The construction emissions inventory results reflect that the Airlines Relocate Alternative involves greater amounts of excavation, terminal expansion and parking facility construction. Thus, the Airlines Relocate Alternative construction-related emissions are greater than the Airlines Remain Alternative. However, the CO emissions associated with construction activities for both Action Alternatives are below the *de-minimis* threshold of 100 tons per year. Therefore, a Conformity Determination is not required.

Table 5.1.7
Construction Emissions Inventory
(tons per year)

Alternative	Pollutant	Construction Year 2012	2013	2014	2015	2016	2017	2018	2019	2020
Airlines Remain	CO	1.08	15.9	11.4	12.2	13.9	13.5	11.1	5.74	5.72
Airlines Relocate	CO	1.23	12.6	20.1	22.2	25.2	16.4	5.39	5.22	5.20
Airlines Remain	VOC	0.23	3.02	2.28	2.39	2.84	2.68	2.13	0.98	0.98
Airlines Relocate	VOC	0.26	2.49	4.01	4.48	5.08	3.23	0.93	0.89	0.88
Airlines Remain	NO_x	1.31	28.7	19.5	21.5	24.1	24.8	22.1	13.3	13.3
Airlines Relocate	NO_x	1.66	21.5	35.8	38.8	44.9	31.3	11.4	12.0	12.0
Airlines Remain	SO_x	0.03	0.64	0.44	0.49	0.57	0.59	0.51	0.29	0.29
Airlines Relocate	SO_x	0.04	0.48	0.82	0.90	1.04	0.73	0.25	0.26	0.26
Airlines Remain	PM_{10}	0.17	2.45	1.79	1.91	2.24	2.18	1.77	0.86	0.86
Airlines Relocate	PM_{10}	0.19	1.97	3.19	3.56	4.03	2.63	0.81	0.78	0.78
Airlines Remain	$PM_{2.5}$	0.17	2.38	1.73	1.86	2.18	2.12	1.71	0.84	0.83
Airlines Relocate	$PM_{2.5}$	0.19	1.91	3.09	3.45	3.91	2.55	0.78	0.76	0.76

Source: Wenck Associates, Inc., KB Environmental Sciences, Inc., and David Braslau Associates, Inc., 2011.

5.1.5.2 CO Concentrations

Table 5.1.8 presents a comparison of the No Action and Action Alternatives CO macroscale dispersion results. These are the maximum predicted concentrations (including background levels of 4.4 and 2.6 ppm for 1-hour and 8-hour, respectively) over the entire receptor network. That is, the value represents the highest concentration throughout the year at any receptor.

In 2020, the Airlines Remain Alternative and the Airlines Relocate Alternative CO concentrations are lower than the No Action Alternative CO concentrations. In 2025, the Airlines Remain Alternative CO concentrations are higher than the No Action Alternative while the Airlines Relocate Alternative CO concentrations are lower than the No Action Alternative. Regardless, all CO concentrations are below the NAAQS/MAAQS. Therefore, the action does not cause or contribute to violations of the air quality standards for CO concentrations.

The CO roadway intersection dispersion results for the No Action Alternative and the Action Alternatives are presented in **Table 5.1.9**. All CO concentrations are below the NAAQS/MAAQS. Therefore, the action does not cause or contribute to violations of the air quality standards for CO concentrations.

Table 5.1.8
2020 and 2025 CO Macroscale Dispersion Results
(ppm)

	2020		2025	
	Maximum Concentration		Maximum Concentration	
Alternative	**1 hour**	**8 hour**	**1 hour**	**8 hour**
No Action	11.9	4.8	11.4	4.4
Airlines Remain	11.5	4.8	11.9	4.5
Airlines Relocate	10.6	4.5	10.7	4.4

Source: Wenck Associates, Inc., KB Environmental Sciences, Inc., and David Braslau Associates, Inc., 2011.

Table 5.1.9
2020 and 2025 CO Intersection Dispersion Results
(ppm)

	2020		2025	
	Maximum Concentration		Maximum Concentration	
Alternative/Intersection	**1 hour**	**8 hour**	**1 hour**	**8 hour**
No Action				
34th Ave South & I-494 Interchange	7.3	5.5	7.3	5.5
34th Ave South & American Blvd.	5.8	3.7	5.7	3.6
Airlines Remain Alternative				
34th Ave South & I-494 Interchange	6.4	4.6	6.7	4.9
34th Ave South & American Blvd.	6.5	4.3	6.4	4.2
Airlines Relocate Alternative				
34th Ave South & I-494 Interchange	7.3	5.5	7.7	5.9
34th Ave South & American Blvd.	6.3	3.6	6.4	4.2

Source: Wenck Associates, Inc., KB Environmental Sciences, Inc., and David Braslau Associates, Inc., 2011.

5.1.5.3 2030 Regional Roadway Analysis

An evaluation of vehicular air quality for this project was completed using methods established in cooperation with MnDOT and FHWA. The FHWA typically requires a 20 year forecast horizon be reviewed for the air quality analysis as a part of its NEPA guidance. This analysis reviewed the regional roadway conditions in 2030 to satisfy FHWA requirements. Regardless of whether the Airlines Remain or Airlines Relocate Alternative is selected, the proposed regional roadway improvements are the same by 2030. Therefore, analysis was conducted by comparing air quality conditions with the unimproved regional roadways to those with the 2030 regional roadway improvements. . This evaluation is documented in ***Appendix P***, *Vehicle Air Quality Analysis Memorandum*.

A carbon monoxide (CO) evaluation is performed by evaluating the worst-operating (hot-spot) intersections in the project area. The EPA has approved a screening method to determine which intersections need hot-spot analysis. The hot-spot screening method uses a traffic volume threshold of 79,400 entering vehicles per day. Entering traffic volumes at all intersections in the project area are forecast to be less than this threshold, as shown in **Table 5.1.10**. The results of the screening procedure indicate that the intersections do not require a hot-spot analysis.

The FHWA was consulted to determine the appropriate level of MSAT analysis for the proposed roadway improvements. This consultation resulted in the following response:

Although the projected 2030 ADT on I-494 exceeds the 140,000 to 150,000 ADT threshold outlined in FHWA guidance that would [require] a quantitative assessment, the anticipated scope of work appears to (1) primarily improve highway operations without adding substantial new capacity, and (2) result in a facility that is not likely to meaningfully increase MSAT emissions.

As such, it was concluded that a qualitative MSAT analysis is adequate for the proposed roadway improvements in the Minneapolis-St. Paul International Airport 2020 Improvements EA.

In summary, 2030 Mobile Source Air Toxic emissions are not expected to differ substantially between alternatives and no impacts are anticipated under any of the alternatives.

Table 5.1.10
Project Area Intersection Volumes

Intersection	Year 2030 Volume
34th Ave & I-494 Westbound Ramps	77,550
34th Ave & I-494 Eastbound Ramps	61,450
Post Rd & TH 5 Westbound Ramps	39,100
Post Rd & TH 5 Eastbound Ramps	18,400

Source: Wenck Associates, Inc., KB Environmental Sciences, Inc., and David Braslau Associates, Inc., 2011.

5.1.5.4 Transportation Conformity

The EPA issued final rules on transportation conformity (40 CFR 93, Subpart A) which describe the methods required to demonstrate SIP compliance for transportation projects. It requires that transportation projects must be part of a conforming Long Range Transportation Policy Plan (LRTPP) and four-year Transportation Improvement Program (TIP).

Only funded and approved projects are included in the TIP and evaluated for Transportation Conformity. Although the FAA and MAC are not directly responsible for Transportation Conformity determinations, any required transportation conformity analyses and determinations in the future will be coordinated with the appropriate federal, state, and local agencies. At this time, the I-494 and 34th Avenue Interchange improvement is listed in the MC 2012 – 2015 Transportation Improvement Program for the Twin Cities Metropolitan Area. When funding for the other roadway improvements becomes available, the MAC will request that these roadway improvements are included in the TIP. If necessary, the MAC will provide additional analysis as part of the request to demonstrate conformance with the TIP.

5.1.5.5 Odors and Fugitive Dust

Generally, operations of airports do not generate significant odor impacts. Odors generated during construction are expected to be minor and temporary and would be mitigated by maintaining construction equipment to the manufacturer's specifications. Thus, none of the Alternatives is expected to result in significant odors.

Fugitive dust generated by heavy equipment during construction would be minimized by enforcing Best Management Practices during construction including: limit the time periods and extent of exposed and/or graded areas; watering disturbed areas during periods of high winds or high levels of construction activity; and minimizing the use of vehicles on unpaved surfaces.

5.1.5.6 HAPs Emissions Inventory

A summary of the HAPs emissions inventory is presented in **Table 5.1.11.** Generally, the HAPs emissions for the Airlines Remain Alternative and the Airlines Relocate Alterative are less than the No Action Alternative due to lower aircraft taxi times and other airfield improvements. The differences in emission totals between 2020 and 2025 are attributable to the forecasted increases in airport operations, changes in ground-based aircraft taxi times, and changes in on- and off-site surface traffic volumes over this time period. However, some of these increases are offset by the reductions in HAPs emissions factors due to regulated improvements in GSE and motor vehicle engine exhaust.

Table 5.1.11
Summary of HAPs Emissions Inventory (tons)

	No Action		Airlines Remain		Airlines Relocate	
Pollutant	**2020**	**2025**	**2020**	**2025**	**2020**	**2025**
1,3-butadiene	3.92	4.58	3.93	4.45	3.80	4.58
2,2,4-trimethylpentane	0.28	0.23	0.28	0.23	0.28	0.23
2-methylnaphthalene	0.43	0.51	0.44	0.50	0.42	0.51
Acetaldehyde	9.92	11.6	9.95	11.3	9.61	11.6
Acetone	0.88	1.02	0.88	0.99	0.85	1.02
Acrolein	5.27	6.18	5.29	6.01	5.08	6.18
Benzaldehyde	1.03	1.20	1.03	1.17	0.99	1.20
Benzene	7.23	8.14	7.24	8.00	7.21	8.22
Chlorobenzene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cyclohexane	0.02	0.02	0.03	0.03	0.03	0.03
Ethylbenzene	0.85	0.94	0.85	0.92	0.83	0.93
Formaldehyde	27.7	32.4	27.8	31.5	26.8	32.4
Isopropylbenzene (cumene)	0.03	0.04	0.03	0.04	0.03	0.04
M & P-xylene	1.92	2.19	1.92	2.17	1.90	2.19
Methyl alcohol	3.80	4.47	3.81	4.34	3.66	4.47
M-xylene	0.34	0.29	0.34	0.29	0.34	0.30
Naphthalene	1.23	1.44	1.23	1.40	1.18	1.44
N-heptane	0.49	0.52	0.50	0.52	0.49	0.52
N-hexane	0.77	0.78	0.77	0.78	0.77	0.78
O-xylene	1.08	1.18	1.08	1.17	1.06	1.18
Phenol (carbolic acid)	1.54	1.81	1.54	1.75	1.48	1.80
Propionaldehyde	1.62	1.90	1.63	1.84	1.57	1.89
Styrene	0.68	0.79	0.68	0.77	0.65	0.79
Toluene	3.32	3.64	3.33	3.60	3.28	3.64

Source: Wenck Associates, Inc, KB Environmental Sciences, Inc, and David Braslau Associates, Inc., 2011.

5.1.6 Permitting

The MAC facility currently operates under an Option D Registration Permit for its air emissions. Under an Option D Registration Permit the facility can make changes and not require a permit action as long as its actual air emissions do not exceed any of the Registration Permit thresholds. Based on projected emissions, the MAC is not expected to exceed any of the permit thresholds for any of the Alternatives and under applicable rules will not be required to submit an application for any other type of air permit.

In addition, the State of Minnesota does not administer an indirect source permitting program applicable to projects which indirectly cause mobile source activity resulting in air emissions. Therefore, the Action Alternatives do not require an indirect source permit.

5.1.7 Summary

The differences in emissions between Alternatives are minimal. A General Conformity Determination is not required and CO concentrations for the Alternatives do not exceed air quality standards.

Similarly, the MSAT emissions are not expected to change for either alternative. Therefore, the air quality impacts associated with the proposed improvements to MSP do not exceed the thresholds of significance.

5.2 Climate

Although there are no federal standards for aviation-related GHG emissions, it is well-established that GHG emissions can affect climate.[11] The Council on Environmental Quality (CEQ) has indicated that climate should be considered in NEPA analyses. As noted by CEQ, however, "it is not currently useful for the NEPA analysis to attempt to link specific climatological changes, or the environmental impacts thereof, to the particular project or emissions; as such direct linkage is difficult to isolate and to understand".[12]

5.2.1 Approach and Methodology

Greenhouse gases were inventoried in accordance with Airport Cooperative Research Program (ACRP) Guidebook on Preparing Airport Greenhouse Gas Emission Inventories (ACRP Report 11),[13] MPCA's General Guidance for Carbon Footprint Development in Environmental Review,[14] and FAA guidance.[15]

GHGs are defined as including carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). GHG emissions were reported using the carbon dioxide equivalents (CO_2e) metric which accounts for Global Warming Potentials (GWP) based on the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report,[16] which range from 1 for CO_2 to 25 for CH_4 to 298 for N_2O. Based on these CO_2e factors, 1 ton of CH_4 is 24 times more potent than 1 ton of CO_2 and is weighted, as such, in the GHG emissions inventory.

GHG emissions were calculated in much the same way as criteria air pollutants. Input data included activity levels or material throughput (i.e., fuel use, vehicle miles traveled, electrical consumption, etc.). Appropriate emission factors were applied to the input data (i.e., in units of GHG emissions per gallon of fuel).

The inventories were summed to provide total GHG emissions in metric tons (MT) CO_2e for each Alternative in 2020 and 2025. The incremental differences between the No Action Alternative MT CO_2e and the Action Alternatives were compared. In addition, the incremental differences were considered in the context of US and global MT CO_2e emissions.

Detailed methodologies, assumptions, data, and results (by ownership and scope) associated with the GHG assessment are provided in *Appendix E*.

5.2.2 Threshold of Significance

At this time, there are no federal standards for GHGs.

5.2.3 Affected Environment

Research has shown there is a direct correlation between fuel combustion and GHG emissions. In terms of U.S. contributions, the General Accounting Office reports that "domestic aviation contributes about 3 percent of total CO_2 emissions, according to USEPA data," compared with other industrial sources including the remainder of the transportation sector (20 percent) and power generation (41 percent).[17] The International Civil Aviation

Organization estimates that GHG emissions from aircraft account for roughly 3 percent of all anthropogenic GHG emissions globally.[18] Climate change due to GHG emission is a global phenomenon, so the affected environment is the global climate.[19]

The scientific community is continuing efforts to better understand the impact of aviation emissions on the global atmosphere. The FAA is leading and participating in a number of initiatives intended to clarify the role that commercial aviation plays in GHG emissions and climate. The FAA, with support from the U.S. Global Change Research Program and its participating federal agencies (e.g., NASA, NOAA, EPA and DOE), has developed the Aviation Climate Change Research Initiative (ACCRI) in an effort to advance scientific understanding or regional and global climate impacts of aircraft emissions. FAA also funds the Partnership for AiR Transportation Noise & Emissions Reduction (PARTNER) Center of Excellence research initiative to quantify the effects of aircraft exhaust and contrails on global and U.S. climate and atmospheric composition. Similar research topics are being examined at the international level by the International Civil Aviation Organization.

5.2.4 Impact Analysis

FAA guidance states that estimated levels of GHG emissions can serve as a reasonable proxy for assessing potential climate change impacts, and provide decision makers and the public with useful information for a reasoned choice among alternatives.[20]

Thus, GHG emission inventories were completed for the No Action Alternative and the Action Alternatives.

Tables 5.2.1 and 5.2.2 present a comparison of the No Action and Action Alternatives GHG emissions in 2020 and 2025, respectively.

Table 5.2.1
2020 GHG Emissions Comparisons

Alternative	**GHG Emissions** (MT CO_2e)	**Difference from No Action**	**% Difference from No Action**	**% of U.S. Emissions(1)**	**% of Global Emissions(2)**
No Action	3,910,933	-	-	-	-
Airlines Remain	3,928,321	17,388	0.44	< 0.0003	< 0.00004
Airlines Relocate	3,929,648	18,715	0.48	< 0.0003	< 0.00004

Notes:
(1) National GHGs in 2009 at 6,633.2 million MT CO_2e, EPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks*, 1990-2009, 2011, Executive Summary, p. 4.

(2) Global GHGs in 2004 at 49,000 million MT CO_2e, Intergovernmental Panel on Climate, Technical Summary In: *Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, 2007, p. 27.

Source: Wenck Associates, Inc., KB Environmental Sciences, Inc., and David Braslau Associates, Inc., 2011.

Table 5.2.2
2025 GHG Emissions Comparisons

Alternative	GHG Emissions (MT CO_2e)	Difference from No Action	% Difference from No Action	% of U.S. Emissions(1)	% of Global Emissions(2)
No Action	4,305,163	-	-	-	-
Airlines Remain	4,312,261	7,098	0.16	< 0.0002	< 0.00002
Airlines Relocate	4,329,787	24,624	0.57	< 0.0004	< 0.00006

Notes:
(1) National GHGs in 2009 at 6,633.2 million MT CO_2e, EPA*, Inventory of U.S. Greenhouse Gas Emissions and Sinks*, 1990-2009, 2011, Executive Summary, p. 4.
(2) Global GHGs in 2004 at 49,000 million MT CO_2e, Intergovernmental Panel on Climate, Technical Summary In: *Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, 2007, p. 27.

Source: Wenck Associates, Inc., KB Environmental Sciences, Inc., and David Braslau Associates, Inc., 2011.

With the implementation of the Airlines Remain Alternative, total GHG emissions are expected to increase by 17,388 and 7,097 MT CO2e for 2020 and 2025 respectively, over the No Action Alternative. This change equates to a 0.44 and 0.16 percent increase over the No Action Alternative. The increase is largely due to increases in expected electrical consumption due to proposed terminal improvements.

With the implementation of the Airlines Relocate Alternative, total GHG emissions are expected to increase by 18,715 and 24,624 metric tons for 2020 and 2025, respectively, over the No Action Alternative. This change equates to a 0.48 and 0.57 percent increase over the No Action Alternative. Again, the increase is largely due to increases in expected electrical consumption due to proposed terminal improvements.

The incremental increases in MT CO_2e emissions were considered in the context of US and global MT CO_2e emissions. For the Airline Remain Alternative, the increases would comprise less than 0.0003 percent of U.S.-based GHG emissions and less than 0.00004 percent of global GHG emissions. For the Airline Relocate Alternative, the increases would comprise less than 0.0004 percent of U.S.-based GHG emissions and less than 0.00006 percent of global GHG emissions.

The cumulative impact of this proposed action on the global climate when added to other past, present, and reasonably foreseeable future action is not currently scientifically predictable. Aviation has been calculated to contribute approximately 3 percent of the global CO_2 emissions; this contribution may grow to 5 percent by 2050. Actions are underway within the US and by other nations to reduce aviation's contribution through such measures as new aircraft technologies to reduce emissions and improve fuel efficiency, renewable alternative fuels with lower carbon footprints, more efficient air traffic management, market-based measures and environmental regulations including an aircraft CO_2 standard.

The US has ambitious goals to achieve carbon-neutral growth for aviation by 2020 compared to a 2005 baseline, and to gain absolute reductions in GHG emissions by

2050. At present there are no calculations of the extent to which measures individually or cumulatively may affect aviation's CO_2 emissions. Moreover, there are large uncertainties regarding aviation's impact on climate. The FAA, with support from the U.S. Global Change Research Program and its participating federal agencies, has developed the ACCRI in an effort to advance scientific understanding or regional and global climate impacts of aircraft emissions, with quantified uncertainties for current and projected aviation scenarios under changing atmospheric conditions.[21]

5.3 Coastal Resources

The Coastal Zone Management Act (CZMA) of 1972 ensures the effective management, beneficial use, protection, and development of the coastal zone. Coastal Zone Management Programs (CZMPs), prepared by states are designed to address issues affecting coastal areas. In July 1999, Minnesota approved the Lake Superior Coastal Program. MSP is not within the coastal boundary as defined by the program. Consequently, analysis of alternatives with respect to an approved CZMP is not required.

The Coastal Barriers Resources Act of 1982 prohibits federal financing for development within the Coastal Barrier Resources System, which consists of undeveloped coastal barriers along the Atlantic and Gulf coasts. The legislation was amended by the Coastal Barrier Improvement Act of 1990 to include undeveloped coastal barriers along the shores of the Great Lakes including one in Minnesota; the Minnesota Point unit in Lake Superior. Since MSP is not in or near this area, none of the alternatives would impact a Coastal Barrier Resource and no further analysis is required.

In summary, the Alternatives would not impact coastal resources.

5.4 Compatible Land Use

This section discusses land use and potential land use impacts.

5.4.1 Regulatory Background

FAA Orders 1050.1E, "Environmental Impacts: Policies and Procedures" and 5050.4B, "National Environmental Policy Act Implementing Instructions for Airport Actions," as well as FAA 14 C.F.R. Part 150 "Airport Noise Compatibility Planning" and the Metropolitan Council's Land Use Compatibility Guidelines for Aircraft Noise are the guiding criteria for compatible land use evaluation.

5.4.2 Approach and Methodology

In accordance with FAA Order 1050.1E, the Alternatives were evaluated to determine if they would be compatible with existing and future land uses. An alternative would be compatible with land uses if the following apply:

- The noise analysis conducted for the Proposed Action and/or its alternatives concludes that there is no significant impact;
- The airport sponsor is taking appropriate action to the extent reasonable to restrict the use of land adjacent to or in the immediate vicinity of the airport to activities and purposes compatible with normal airport operations in accordance with 49 USC 47107(a)(10) of the 1982 Airport Act;

- The state authorized public planning agency finds that the proposed action is consistent with plans (existing at the time the project is approved) for development of the area in which the airport is located to comply with 49 USC 47106(a)(1); and
- The alternative does not result in changed conditions in land use compatibility related to safe aircraft operations and wildlife.

5.4.3 Threshold of Significance

The threshold of significance for noise and land use compatibility is exceeded if the proposed action would cause an increase of 1.5 dB DNL or greater for a sensitive land use at or above the 65 DNL noise exposure when compared to the No Action Alternative.

5.4.4 Affected Environment

Since impacts to land use are normally the results of changes in noise, the existing and future land uses within the Noise Study Area are described.

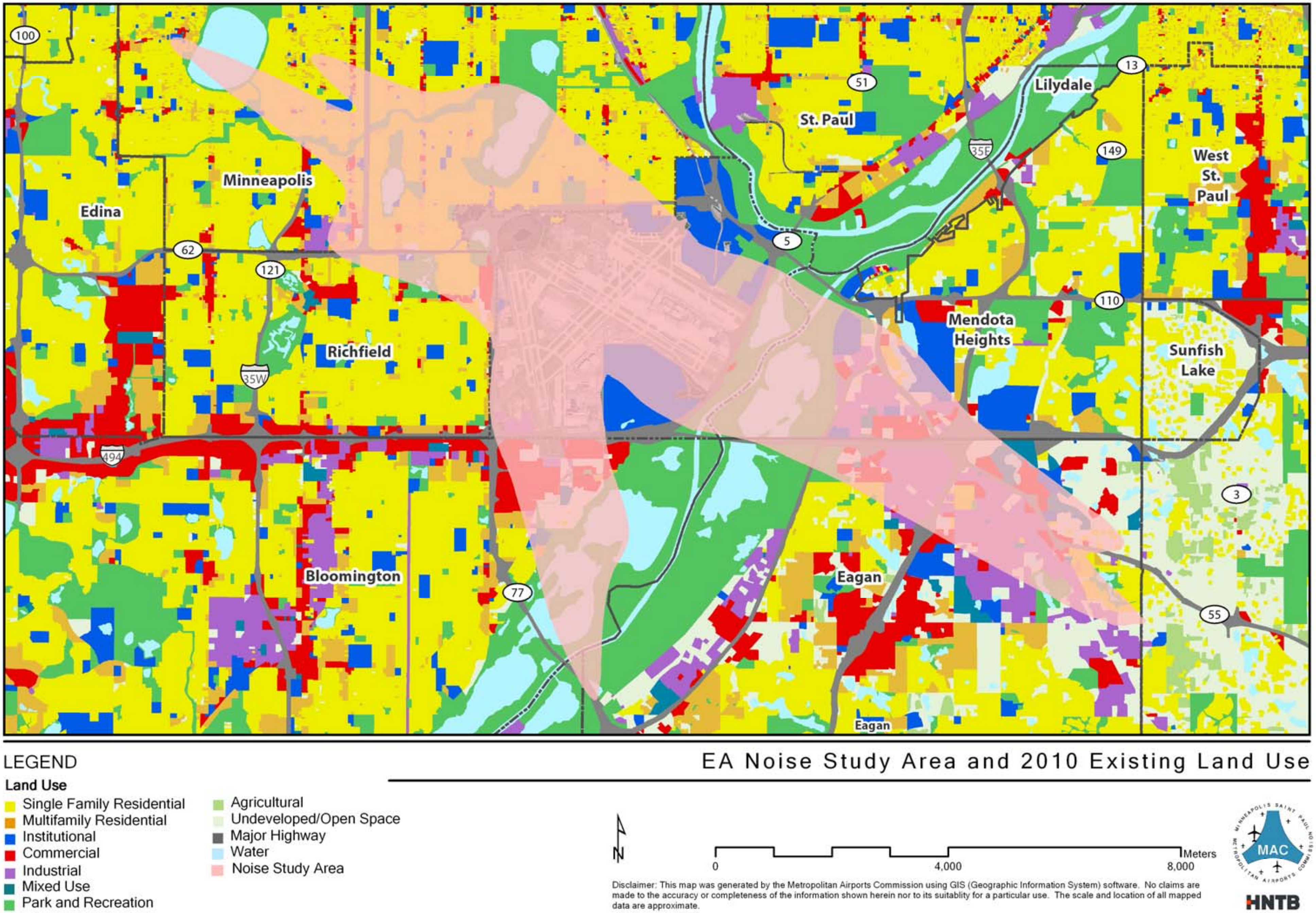
The extent of the Noise Study Area was established based on the FAA's primary metric for aircraft noise exposure; yearly Day/Night Average Sound Level (DNL). For this EA, the 2025 (future year of analysis) 60+dB DNL noise exposure contour was used to define the Noise Study Area. Information related to the development of the 2025 noise exposure contours is provided in Section 5.14. As illustrated in **Figure 5.4-1**, the Noise Study Area includes portions of the cities of Minneapolis, Richfield, Bloomington, Eagan and Mendota Heights.

Figure 5.4-1 illustrates the existing 2010 land use within the Noise Study Area. The following paragraphs discuss the existing and future land use for each city/region within the Noise Study Area. It is noted that with the exception of 35 residential units, all residential properties within the 2010 60+ DNL noise contours have been, or will be, provided noise mitigation by virtue of the residential noise mitigation program at MSP that will be completed by 2014. The 35 unmitigated residential units are located at the furthest extent of the Runway 12R arrival lobe. **Table 5.4.1** provides the count of noise sensitive sites located within the 2010 noise contours.

5.4.4.1 Minneapolis

Minneapolis is located to the northwest of the airport in Hennepin County. The portion of Minneapolis within the Noise Study Area is primarily residential. A number of lakes and parks are also located in the area. Although the area is primarily residential, there are small pockets of commercial, public/institutional and cultural/ entertainment uses.

The portions of Minneapolis that are within the Noise Study Area are fully developed. There are no significant future land use changes planned in these areas that would change the degree of compatibility. Anticipated development over the next 10 years would be primarily in-fill development, which would be consistent with the existing land use designations.



EA Noise Study Area and 2010 Existing Land Use

Disclaimer: This map was generated by the Metropolitan Airports Commission using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitablity for a particular use. The scale and location of all mapped data are approximate.

Table 5.4.1
Noise Sensitive Uses within the 2010 DNL Contours

Use	Number of Noise Sensitive Uses within DNL Contours				
	60-64	**65-69**	**70-74**	**75+**	**Total**
Historic Site	120	18	5	0	143
Nursing Home	0	0	0	0	0
Preschool	4	1	0	0	5
Place of Worship	11	1	0	0	12
School	3	1	0	0	4
*Residential	7942	1604	23	0	9569
Total	**8080**	**1625**	**28**	**0**	**9733**

Note:
*All residential units within the 65+ DNL noise contours have been provided noise mitigation and, as such, are considered a mitigated incompatible land use.

Source: MAC analysis, 2012.

5.4.4.2 Richfield

Richfield is located directly west of the airport in Hennepin County. The predominant existing land use within the Noise Study Area is residential. Commercial, park and institutional uses also exist within the Noise Study Area.

Area 1 on **Figure 5.4-2** details the area of planned development in the City of Richfield within the Noise Study Area. The Redevelopment Master Plan for the Cedar Avenue Corridor provides the long-term vision of the eastern border of the city. The plan focuses on an area north of 72nd Street to TH 62 (Crosstown) outlining the development of multi-family, office and retail uses. In 2007 the first phase of this development was completed north of 66th Street just west of Cedar Avenue and included the development of two large retail stores and a number of smaller retail sites.

5.4.4.3 Bloomington

The center of Bloomington is located southwest of the airport in Hennepin County. However, a sizeable portion of the northeast portion of the city, located east of TH 77 (Cedar Avenue) and south of MSP is located in the Noise Study Area. The predominant land use in this area is commercial, mixed use and undeveloped. There are small pockets of multi-family and single-family residential uses in the area.

There is significant opportunity for growth within the portion of Bloomington in the Noise Study Area. This area located south of Interstate Highway 494 (I-494), east of TH 77 (Cedar Avenue) and north of the Minnesota River Valley is known as the "South Loop District". The South Loop District is Area 2 on Figure 5.4-2. The South Loop development includes the Lindau Link, Mall of America Phase 2, Bloomington Central Station and new residential neighborhoods. The development focuses on providing quality transit options and creating a walkable district with enhanced access to the Minnesota Valley National Wildlife Refuge. By 2020 the development is planned to notably increase the amount of office, retail, hotel and residential building square footage in the area.

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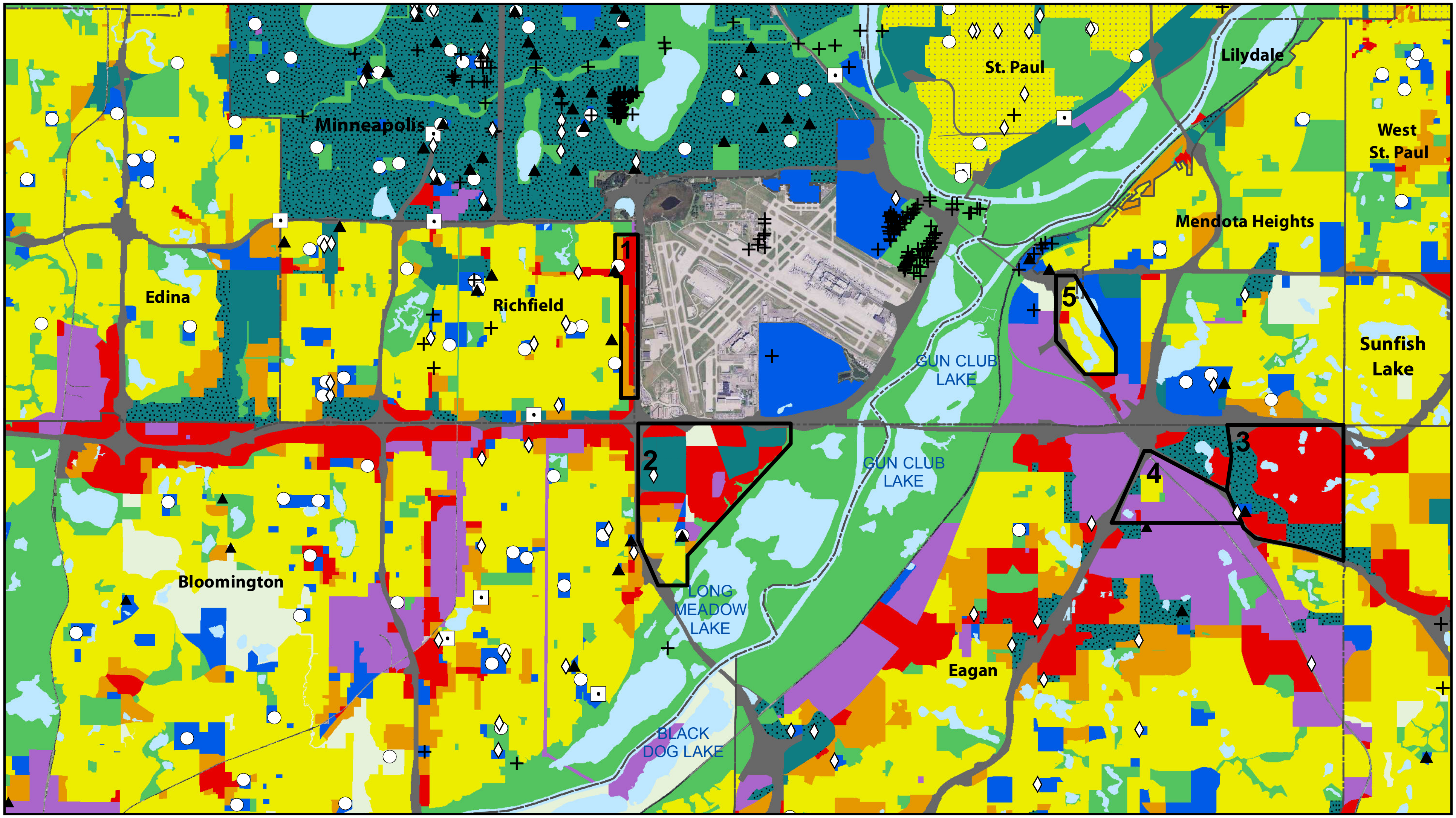
FIGURE 5.4-2



LEGEND

Land Use

- St. Paul Residential
- Single Family Residential
- Multifamily Residential
- Multi-Optional Development
- Institutional
- Commercial
- Industrial
- Mixed Use
- Park and Recreation
- Agricultural
- Undeveloped/Open Space
- Vacant or Unknown
- Major Highway
- Water

Existing Uses

- Historic Site
- Nursing Home
- Preschool
- Place of Worship
- School

Land Use Changes

1. Richfield Cedar Ave Corridor
2. Bloomington South Loop
3. Eagan Northeast Area
4. Eagan North Lexington Commons
5. Mendota Heights Development

Forecast Land Use Changes Around MSP from 2010 to 2030

N

0 4,100 8,200 Meters

Source: Metropolitan Council

Disclaimer: This map was generated by the Metropolitan Airports Commission using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitablity for a particular use. The scale and location of all mapped data are approximate.

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5.4.4.4 Eagan

Eagan is located southeast of the airport in Dakota County. The predominant land use types within the Noise Study Area are industrial and commercial with pockets of residential. There is also an expanse of parkland within the Minnesota River floodplain.

Areas 3 and 4 on Figure 5.4-2 depict the locations of planned development within the Noise Study Area. The Northeast Area (Area 3 on Figure 5.4-2) is 740 acres in size. The plan for this area outlines the conversion of agricultural, residential, vacant and underutilized uses to employment and commercial uses. The North Lexington Commons (Area 4 on Figure 5.4-2) is in an area where land values are anticipated to rise due to the area's visibility and accessibility. As this occurs, it is anticipated that desire to redevelop to newer, higher income-generating uses will increase. The area is envisioned to be an attractive gateway and employment center for the community that would include an employment-based Transit Oriented Development. The existing residential neighborhood would remain, although it is anticipated to transition to other uses over the long-term. No new resident land uses are planned in the area.

5.4.4.5 Mendota Heights

Mendota Heights is located to the east of the airport in Dakota County. The predominant land uses within the Noise Study Area are industrial, commercial and business. Only limited changes to land use within the Noise Study Area are anticipated. Area 5 on Figure 5.4-2 details a small area where future development is anticipated to change to residential.

5.4.5 Impact Analysis

5.4.5.1 Noise

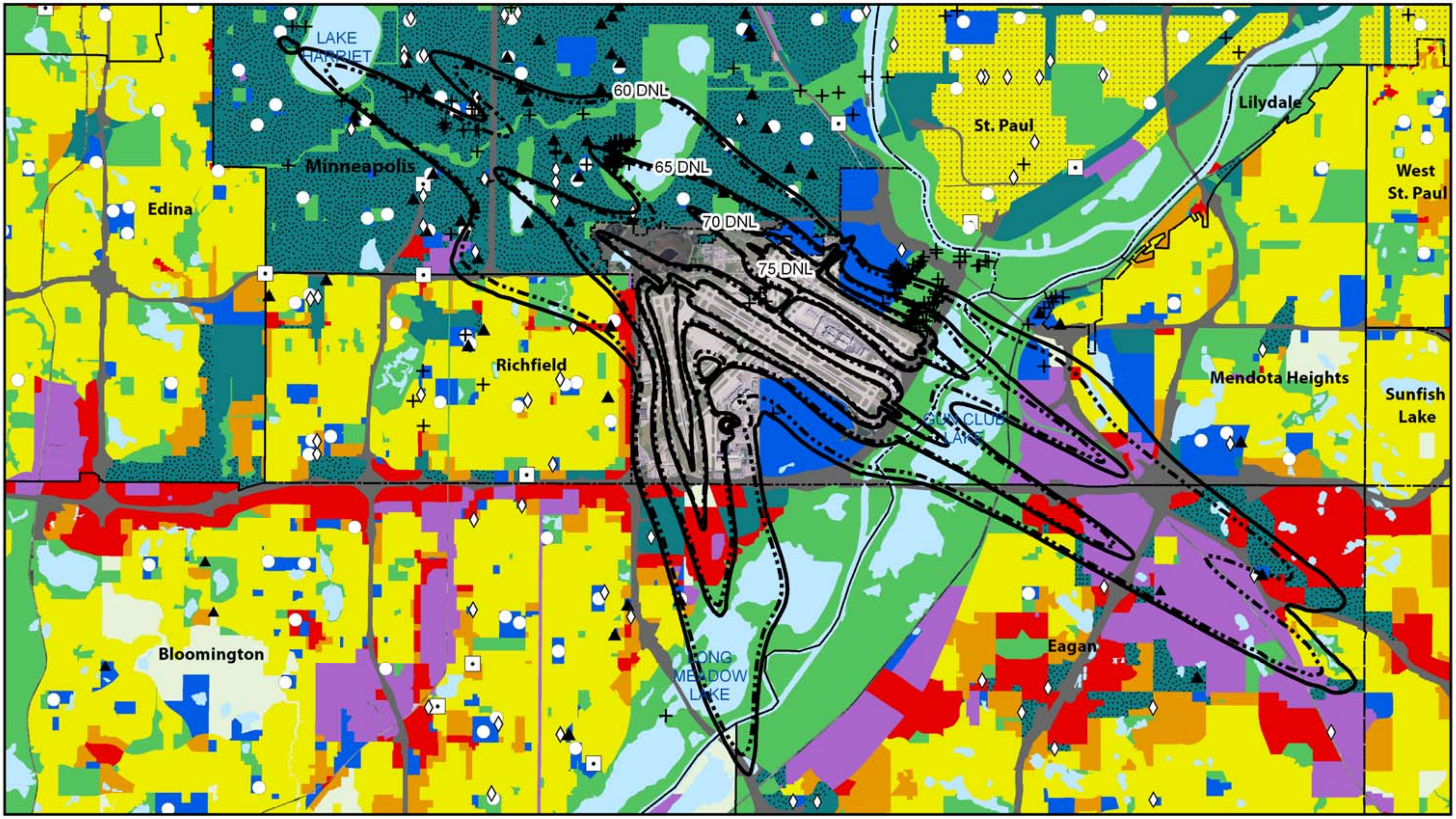
This section discusses noise in the context of land use planning and zoning in the vicinity of MSP. Noise analysis was conducted for 2020 and 2025. The analysis and results described in this section did not include the proposed PBN procedures (see Section 2.2.3 for more information). The PBN procedures were considered in this EA in the context of cumulative impacts. See Section 5.21.4.2 *Cumulative Effects: Aircraft Noise.*

The results of the noise analysis are summarized in the following paragraphs for the purposes of evaluating compatible land use. Details regarding the noise analysis and results are presented in Section 5.14.

Figure 5.4-3 provides the 2030 forecasted land use around the airport within the 2020 and 2025 No Action Alternative DNL noise contours; **Figure 5.4-4** provides the 2030 forecasted land use around the airport with the 2020 and 2025 Airlines Remain Alternative DNL noise contours; and **Figure 5.4-5** provides the 2030 forecasted land use around the airport with the 2020 and 2025 Airlines Relocate Alternative DNL noise contours. The maps include the location of historic sites, nursing homes, preschools, places of worship and schools. **Table 5.4.2 and Table 5.4.3** provide the count of sensitive sites located within the noise contours.

Minneapolis-St. Paul International Airport 2020 Improvements EA

FIGURE 5.4-3



LEGEND

No Action Alternative 2020 and 2025 Forecast DNL Noise Contours and 2030 Forecast Land Use

Land Use
- St. Paul Residential
- Single Family Residential
- Multifamily Residential
- Multi-Optional Development
- Institutional
- Commercial
- Industrial
- Mixed Use
- Park and Recreation
- Agricultural
- Undeveloped/Open Space
- Vacant or Unknown
- Major Highway
- Water

Existing Uses
- Historic Site
- Nursing Home
- Preschool
- Place of Worship
- School

Noise Contours
- 2020 No Action
- 2025 No Action

N

0 4,000 8,000 Meters

Source: Metropolitan Council

Disclaimer: This map was generated by the Metropolitan Airports Commission using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitablity for a particular use. The scale and location of all mapped data are approximate.

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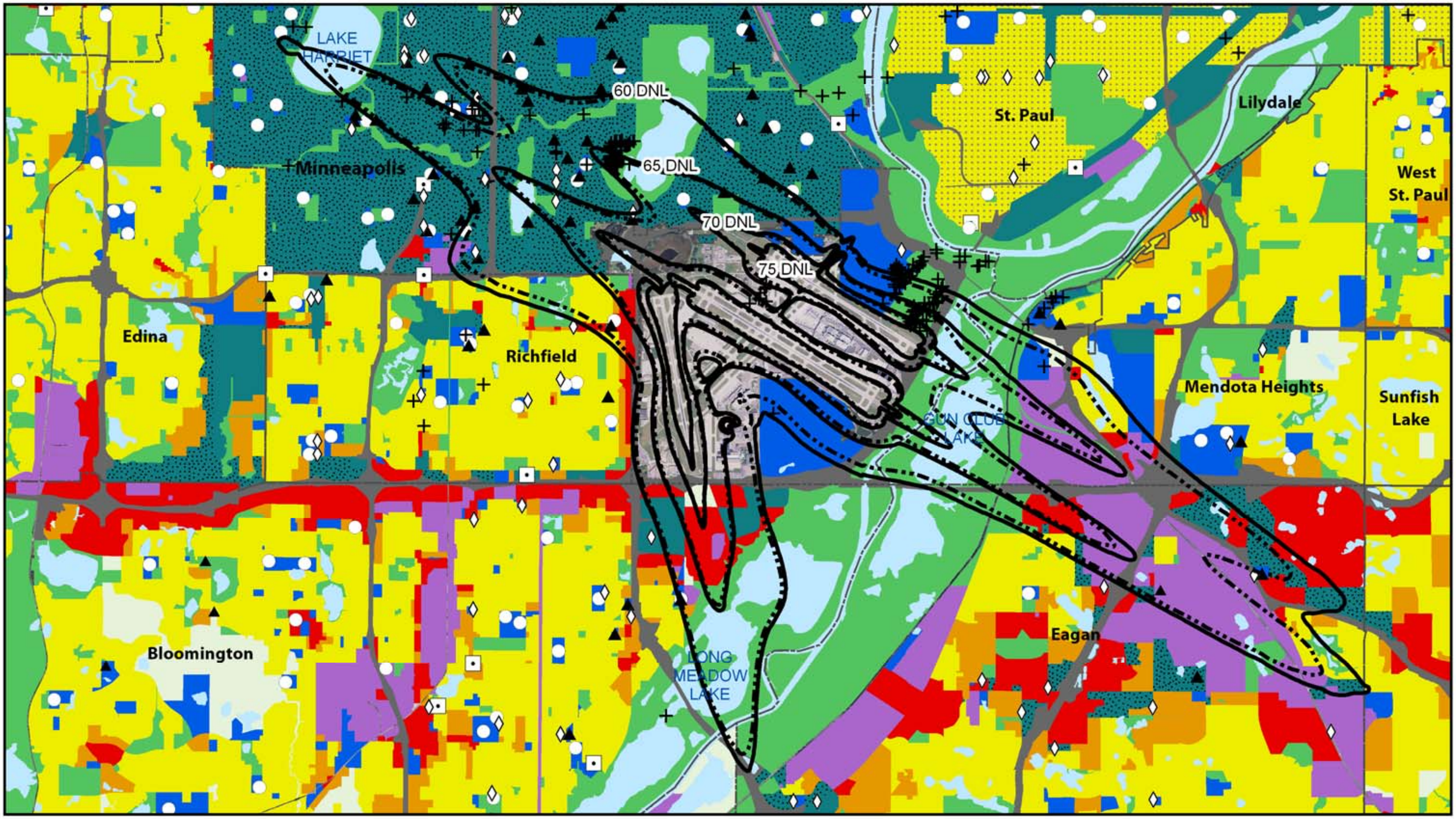

Alternative 1 - Airlines Remain 2020 and 2025 Forecast DNL Noise Contours and 2030 Forecast Land Use

LEGEND

Land Use

- St. Paul Residential
- Single Family Residential
- Multifamily Residential
- Multi-Optional Development
- Institutional
- Commercial
- Industrial
- Mixed Use
- Park and Recreation
- Agricultural
- Undeveloped/Open Space
- Vacant or Unknown
- Major Highway
- Water

Existing Uses

- Historic Site
- Nursing Home
- Preschool
- Place of Worship
- School

Noise Contours

- 2020 Alternative 1 - Airlines Remain
- 2025 Alternative 1 - Airlines Remain

N

0 4,000 8,000 Meters

Source: Metropolitan Council

Disclaimer: This map was generated by the Metropolitan Airports Commission using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitablity for a particular use. The scale and location of all mapped data are approximate.

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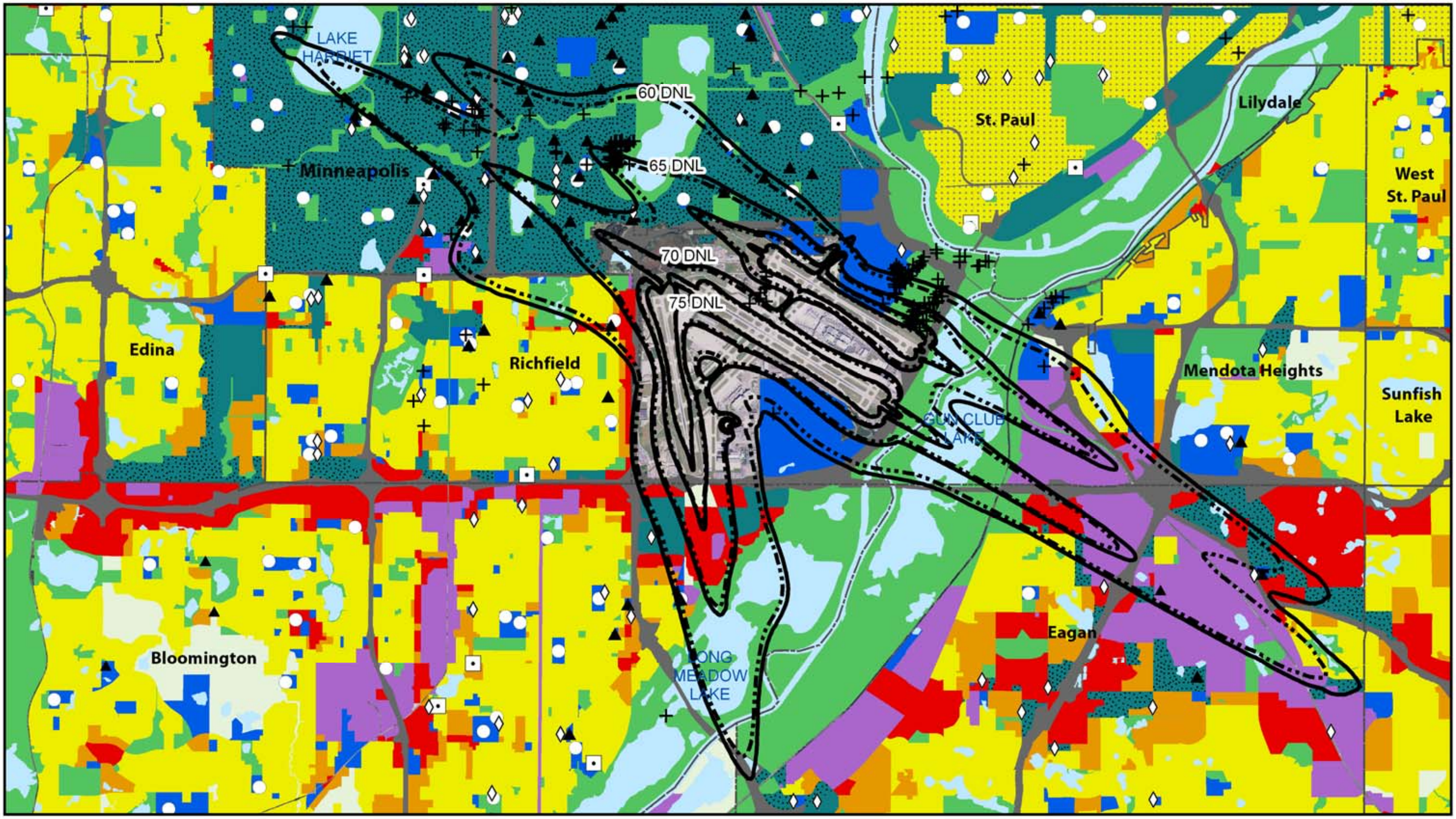
FIGURE 5.4-5



Alternative 2 - Airlines Relocate 2020 and 2025 Forecast DNL Noise Contours and 2030 Forecast Land Use

LEGEND

Land Use

- St. Paul Residential
- Single Family Residential
- Multifamily Residential
- Multi-Optional Development
- Institutional
- Commercial
- Industrial
- Mixed Use
- Park and Recreation
- Agricultural
- Undeveloped/Open Space
- Vacant or Unknown
- Major Highway
- Water

Existing Uses

- Historic Site
- Nursing Home
- Preschool
- Place of Worship
- School

Noise Contours

- 2020 Alternative 2 - Airlines Relocate
- 2025 Alternative 2 - Airlines Relocate

N

0 4,000 8,000 Meters

Source: Metropolitan Council

Disclaimer: This map was generated by the Metropolitan Airports Commission using GIS (Geographic Information System) software. No claims are made to the accuracy or correctness of the information shown herein nor to its suitablity for a particular use. The scale and location of all mapped data are approximate.

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Table 5.4.2

Noise Sensitive Uses within 2020 Forecast DNL Contours

2020 DNL Noise Contours	Use	Number of Noise Sensitive Uses within DNL Contours				
		60-64	65-69	70-74	75+	Total
2020 No Action Alternative	Historic Site	102	44	9	0	155
	Nursing Home	0	0	0	0	0
	Preschool	5	1	0	0	6
	Place of Worship	14	1	0	0	15
	School	4	1	0	0	5
	*Residential	10236	2115	47	0	12398
	Total	**10361**	**2162**	**56**	**0**	**12579**
2020 Airlines Remain Alternative	Historic Site	101	45	9	0	155
	Nursing Home	0	0	0	0	0
	Preschool	5	1	0	0	6
	Place of Worship	14	1	0	0	15
	School	4	1	0	0	5
	*Residential	10257	2124	48	0	12429
	Total	**10381**	**2172**	**57**	**0**	**12610**
2020 Airlines Relocate Alternative	Historic Site	115	30	9	0	154
	Nursing Home	0	0	0	0	0
	Preschool	5	1	0	0	6
	Place of Worship	14	1	0	0	15
	School	4	1	0	0	5
	*Residential	10106	2133	33	0	12272
	Total	**10244**	**2166**	**42**	**0**	**12452**

Note:
*All residential units within the 65+ DNL noise contours have been provided noise mitigation and, as such, are considered a mitigated incompatible land use.

Source: MAC Analysis, 2012.

Table 5.4.3

Noise Sensitive Uses within 2025 Forecast DNL Contours

2025 DNL Noise Contours	Use	Number of Noise Sensitive Uses within DNL Contours				
		60-64	65-69	70-74	75+	Total
2025 No Action Alternative	Historic Site	92	60	11	0	163
	Nursing Home	0	0	0	0	0
	Preschool	6	2	0	0	8
	Place of Worship	18	3	0	0	21
	School	6	1	0	0	7
	*Residential	11396	2657	85	0	14138
	Total	**11518**	**2723**	**96**	**0**	**14337**
2025 Airlines Remain Alternative	Historic Site	94	58	11	0	163
	Nursing Home	0	0	0	0	0
	Preschool	7	1	0	0	8
	Place of Worship	18	3	0	0	21
	School	5	1	0	0	6
	*Residential	11410	2583	78	0	14071
	Total	**11534**	**2646**	**89**	**0**	**14269**
2025 Airlines Relocate Alternative	Historic Site	96	60	11	0	167
	Nursing Home	0	0	0	0	0
	Preschool	6	2	0	0	8
	Place of Worship	18	3	0	0	21
	School	8	1	0	0	9
	*Residential	11873	2747	85	0	14705
	Total	**12001**	**2813**	**96**	**0**	**14910**

Note:
*All residential units within the 65+ DNL noise contours have been provided noise mitigation and, as such, are considered a mitigated incompatible land use.

Source: MAC Analysis, 2012.

The figures show that there is little difference between the 65 DNL contours for the Action Alternatives when compared to the No Action Alternative. The number of non-residential noise sensitive uses within the 65 DNL contour varies only slightly between the various alternatives. In 2020 the lowest number of residential units in the 65+ DNL noise contours is provided by the No Action Alternative. There are 10 more residential units in the Airlines Remain Alternative and 4 more residential units in the Airlines Relocate Alternative within the 65+ DNL noise contours. In 2025 the lowest number of residential units in the 65+ DNL noise contour is provided by the Airlines Remain Alternative. There are 81 more residential units in the No Action Alternative and 171 more residential units in the Airlines Relocate Alternative. However, in both 2020 and 2025 all residential units within the 65+ DNL noise contours of the development alternatives being considered have been provided noise mitigation and, as such, are considered a mitigated incompatible land use.

In summary, the analysis determined that the threshold for significant noise impact was not exceeded for any of the alternatives considered.

5.4.5.2 Action to Restrict Land Use near MSP

The development and implementation of the MSP Zoning Ordinance is evidence that the MAC is complying with the required airport sponsor's assurance under 49 USC 47107(a)(10). An airport zoning ordinance has been in place since 1984 and has been adopted on a local level by the respective communities with land use control around the airport operations.

5.4.5.3 Consistent with Plans for Development

The completion and approval of the 2030 Long Term Comprehensive Plan (LTCP) for MSP validates that the Proposed Action is consistent with regional plans for the Twin Cities metropolitan area. The 2030 LTCP which includes the Proposed Action, was developed by the MAC in accordance with the regional planning authority's, the Metropolitan Council's (MC's), guidelines to integrate information pertinent to planning, developing and operating the region's airports in a manner compatible with their surrounding environs. The MC found the MSP 2030 LTCP to be consistent with its 2030 Transportation Policy Plan at their June 23, 2010 meeting. The minutes from this meeting are provided as Attachment 2 in ***Appendix G***, *Noise Metrics, The Effects of Aviation Noise on People, Noise Guidelines for Compatibility and Noise Model Development*. Therefore, it is concluded that the Proposed Action is consistent with plans for development in the vicinity of MSP.

5.4.5.4 Safe Aircraft Operations

The potential for the Proposed Action to result in changed conditions in land use compatibility related to safe aircraft operations and wildlife hazards need to be considered as well.

Wildlife attractants are defined by the FAA as follows, "Any human-made structure, land-use practice, or human-made or natural geographic feature that can attract or sustain hazardous wildlife within the landing or departure airspace or the airport's AOA [air operations area]. These attractants can include architectural features, landscaping, waste disposal sites, wastewater treatment facilities, agricultural or aquaculture activities, surface mining or wetlands."[22]

The FAA provides guidance on how to assess and address wildlife hazards in AC 150/5200-33B, *Hazardous Wildlife Attractants on or Near Airports* including recommendations to prevent creating new attractants. Also, the MAC has a Wildlife Hazard Management Plan (WHMP) for MSP that focuses on identification and abatement of wildlife hazards within the airfield environment. The WHMP includes review of future projects to avoid an inadvertent increase in wildlife hazards resulting from architectural or landscape changes. The Action Alternatives would be designed in accordance with both AC 150/5200-33B and the MAC's WHMP, and therefore would not generate new wildlife attractants.

Conditions relative to the wildlife attractants and safe aircraft operations could also change if the Proposed Action would result in a change to aircraft approach or departure procedures. The Action Alternatives do not include changes in runways or changes in departure or approach paths. Additionally, while operations would increase from existing conditions, the number of operations is the same for all of the alternatives and runway use is forecasted to be similar for all alternatives. Therefore, it is concluded that none of the Alternatives would result in changed conditions in land use compatibility related to safe aircraft operations and wildlife hazards.

5.4.6 Permitting

There are no permits required related to land use.

5.4.7 Summary

None of the Alternatives would result in a significant noise impact and all of the Alternatives would be compatible with surrounding land uses.

5.5 Construction Impacts

Implementation of the Action Alternatives requires construction, which may create some unavoidable temporary impacts to surrounding communities such as noise, fugitive dust and degraded water quality. These impacts would be minimized by implementing best management practices (BMPs).

The following sub-sections present a summary of the impacts that may be expected to result from typical construction activities associated with the Action Alternatives.

5.5.1 Air Quality

Fugitive dust pollution from excavated areas and construction equipment emissions can result in temporary impacts to air quality. Fugitive dust would be minimized by enforcing BMPs during construction, including minimizing the periods and extent of exposed and/or graded areas, watering disturbed areas during periods of high winds or high levels of construction activity, and minimizing the use of vehicles on unpaved surfaces. As a result of implementing these BMPs, it is concluded that minimal temporary fugitive dust impacts would result from either Action Alternative.

Construction equipment emissions are accounted for in the air quality analysis. It was determined that the construction-related emissions associated with the Action Alternatives would be within the *de-minimis* levels. Therefore, these emissions would conform to the SIP and no further analysis was required. See section 5.1 for more information regarding the analysis of construction emissions.

5.5.2 Noise

The construction activities associated with implementation of the Action Alternatives will result in increased noise levels relative to existing conditions. There are no anticipated changes to aircraft noise during construction as the runway use is not expected to change. Therefore, these impacts will primarily be associated with construction equipment and pile driving.

Table 5.5.1 shows peak noise levels monitored at 50 feet from various types of construction equipment. This equipment is primarily associated with site grading and site preparation, which is generally the roadway construction phase associated with the greatest noise levels.

Elevated noise levels are, to a degree, unavoidable for this type of project. MnDOT and the MAC will require that construction equipment be properly muffled and in proper working order. While MnDOT and its contractor(s) are exempt from local noise ordinances, it is the practice to require contractor(s) to comply with applicable local noise restrictions and ordinances to the extent that is reasonable. Advanced notice will be provided to affected communities of any planned abnormally loud construction activities. It is anticipated that night construction may sometimes be required to minimize traffic impacts and to improve safety. However, construction will be limited to daytime hours as much as possible. The duration of structure and roadway construction activities will be identified with future preliminary design and engineering studies.

Any associated high-impact equipment noise, such as pile driving, pavement sawing, or jack hammering, will be unavoidable with construction of the proposed project. Pile-driving noise is associated with any bridge construction and sheet piling necessary for retaining wall construction. While pile-driving equipment results in the highest peak noise level, as shown in Table 5.5.1, it is limited in duration to the activities noted above (e.g., bridge construction). The use of pile drivers, jack hammers, and pavement sawing equipment will be prohibited during nighttime hours, to the extent possible.

Table 5.5.1
Typical Construction Equipment Noise Levels At 50 Feet

Equipment Type	Manufacturers Sampled	Total Number of Models in Sample	Peak Noise Level (dBA)	
			Range	Average
Backhoes	5	6	74-92	83
Front Loaders	5	30	75-96	85
Dozers	8	41	65-95	85
Graders	3	15	72-92	84
Scrapers	2	27	76-98	87
Pile Drivers	N/A	N/A	95-105	101

Source: United States Environmental Protection Agency and Federal Highway Administration

5.5.3 Water

Construction can cause temporary impacts to water quality such as increased turbidity. BMPs would be implemented in order to protect against these temporary impacts. Additionally, water quality would be protected by complying with construction permit requirements.

Implementation of appropriate erosion and sediment control BMPs, typically included:

- silt fences
- temporary sediment basins
- stormwater inlet filters
- check-dams in ditches (rock, bio-rolls, etc.)
- silt curtains

Additional BMPs would be implemented to prevent and recover minor leaks and spills from equipment fueling and maintenance operations.

Construction stormwater permits are required when the project disturbs more than one acre of soil. Permitting requirements will include:

- the creation of a Construction Stormwater Pollution Prevention Plan (SWPPP)
- BMP inspection (weekly, and within 24 hours after each runoff event) and final stabilization area inspection (monthly)

As a result of implementing BMPs and complying with permit requirements, it is concluded that only minimal temporary water quality would result from either Action Alternative.

5.5.4 Hazardous Materials

Construction activities associated with either the Airlines Remain Alternative or the Airlines Relocate Alternative will require excavation, construction dewatering, and building renovation and demolition. Hazardous materials are present at the Airport and may be encountered during these types of construction activities. See Section 5.10, Hazardous Materials, Pollution Prevention and Solid Waste for information about the potential locations of hazardous materials at the Airport.

Construction activities would follow all applicable standards, rules, regulations, and protocols related to hazardous materials. Excavated materials would be managed in accordance with the Soil Management Plan. Construction dewatering would be done in accordance with appropriate permits. Renovation and demolition would be conducted in accordance with MPCA Regulations for Renovation and Demolition (Minn. R. 7035.0805). Impacted and contaminated soil, asbestos-containing material, demolition debris, and other regulated materials would be re-used, recycled, or disposed in accordance with applicable regulations.

Hazardous materials would be encountered during construction of all of the Alternatives. All contaminated soil, asbestos-containing material and other regulated materials will be handled and disposed of in accordance with applicable regulations. Therefore, none of the Alternatives would be expected to result in hazardous materials impacts that would exceed the threshold of significance.

5.5.5 Traffic

Temporary road/lane closures are likely unavoidable during construction of the roadway improvements included in the Action Alternatives. A Temporary Traffic Control Plan would be developed to maintain traffic flow during construction. As a result, road/lane closures would be minimized particularly during rush hours. The Temporary Traffic Control Plan would also include signage to notify drivers of closures and direct them to alternative routes. Therefore, since a Temporary Traffic Control plan would be developed to maintain traffic flow during construction, the Action Alternative would not be expected to cause temporary traffic impacts that would exceed the threshold of significance.

5.6 Department of Transportation Act: Section 4(f)

This section discusses potential impacts to Department of Transportation Act Section 4(f) resources such as parks and wildlife refuges.

5.6.1 Regulatory Background

Section 303(c), Title 49 USC, commonly referred to as Section 4(f) of the Department of Transportation Act of 1966, states that the "…Secretary of Transportation will not approve a project that requires the use of any publicly-owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance or land from a historic site of national, state, or local significance as determined by the officials having jurisdiction thereof, unless there is no feasible and prudent alternative to the use of such land…and [unless] the project includes all possible planning to minimize harm resulting from the use."[23]

5.6.2 Approach and Methodology

The term "use" as it applies to 4(f) properties encompasses both physical use, as well as constructive use. In determining whether there is a physical use, the FAA must establish whether the project requires Section 4(f) property to be acquired or altered in any way. In determining whether there is a constructive use, the FAA must consider whether impacts such as noise would substantially impair the property. A Section 4(f) property is determined to be substantially impaired when the activities, features, or attributes of the site that contribute to its significance or enjoyment are substantially diminished.

5.6.3 Affected Environment

There are several 4(f) resources near the airport; however, the only Section 4(f) resource within the limits of construction (the general Study Area) is a potentially eligible National Register archaeological site. The site is located northwest of the existing TH 5/Post Road interchange. See section 5.11, *Historical, Architectural, Archaeological, and Cultural Resources* for additional information.

The identification of 4(f) resources was limited to the extent of construction, because, although, the alternatives would cause changes in noise around MSP, the noise impacts would not exceed the threshold of significance. Therefore, it was concluded that the alternatives would not impact the use of 4(f) resources outside the limits of construction.

5.6.4 Impact Analysis

The Action Alternatives at MSP may require a physical use of one 4(f) property, the potential archaeological site. Archaeological sites may be protected under Section 4(f) only if the sites warrant preservation in place and not in the value of the data it contains.[24] Based on preliminary information it is unlikely that the subject site would warrant preservation in place. However, additional study and coordination will be required. See section 5.11, *Historical, Architectural, Archaeological, and Cultural Resources* for additional information. If it is determined that the archeological resources should be preserved in place, a Section 4(f) evaluation would be completed as required.

Potential noise impacts were reviewed to determine if they would result in a constructive use of a 4(f) resource. Section 5.14 of this EA describes the potential noise effects due to the Action Alternatives when compared to the No Action Alternative. The analysis showed that there would be no noise changes that would cause a noise sensitive area to experience an increase in noise of DNL 1.5 dB or more at or above DNL 65 dB. Additionally, there are only small differences between the future DNL 65 dB contours for the Action Alternatives as compared to the No Action Alternative. Therefore, it is concluded that the increase in noise would not substantially impair a Section 4(f) property.

The Action Alternatives include construction of a new TH 5 and Post Road interchange. Post Road serves as the park entrance access road to Fort Snelling State Park. Therefore, coordination with the Minnesota Department of Natural Resources will be conducted prior to construction to ensure safe vehicular access for park visitors during interchange construction. As a result, it is concluded that construction would not impair the use of Fort Snelling State Park.

5.6.5 Summary

The No Action Alternative would not impact Section 4(f) resources. Both the Airlines Remain and Airlines Relocate Alternatives would result in the use of a Section 4(f) resource only if the potential archaeological site warrants preservation in place. Preliminary information indicates that this would not be likely.

5.7 Farmlands

The Farmland Protection Policy Acts (FPPA) of 1980 and 1995 regulates the conversion of important farmland to non-agricultural uses. The purpose of the FPPA is "to minimize the extent to which Federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses…"[25] The term "farmland," as defined by the US Department of Agriculture (USDA) in the FPPA "does not include land already in or committed to urban development or water storage (i.e., airport developed areas), regardless of its importance as defined by NRCS [Natural Resource Conservation Service]."[26]

All proposed development is within airport property or existing road right-of-way; i.e. land already committed to urban development. Therefore, no farmlands would be converted to nonagricultural uses and none of the Alternatives would impact farmlands.

5.8 Fish, Wildlife and Plants

This section presents the potential impacts to fish, wildlife and plants otherwise referred to as biotic resources. Biotic resources include flora (plants), fauna (fish, birds, reptiles, amphibians, mammals, etc.) and their habitat areas such as lakes, streams, wetlands, forests and upland environments.

5.8.1 Regulatory Background

Section 7 of the Endangered Species Act (ESA), sets forth requirements for consultation regarding federally listed threatened or endangered species and their critical habitat. If a proposed project would potentially impact a federally listed species or habitat, the FAA must consult with the US Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS), to ensure that the proposed action does not jeopardize the continued existence of the affected species.

The Bald and Golden Eagle Protection Act prohibits actions that take a bald or golden eagle or their nests or eggs without a permit.

The Fish and Wildlife Conservation Act encourages all federal departments and agencies to conserve and promote conservation of non-game fish and wildlife and their habitats.

The Migratory Bird Treaty Act provides for federal protection of migratory birds including their nests and eggs.

5.8.2 Approach and Methodology

Regulatory agencies were consulted to identify any known federal or state-listed endangered, threatened, or special concern species or critical habitat areas. Potential impacts to other biotic resources in or adjacent to the Study Area were also considered.

5.8.3 Affected Environment

Biotic resources in the Study Area are limited because the area is fully developed with paved areas and buildings associated with MSP and adjoining public roadways. There are no native plant communities, forests, fish, wetlands or other aquatic biotic resources in the Study Area. Vegetation is generally limited to mowed turf grass areas between existing impervious surfaces.

Wildlife does exist on the Airport and thus may be found in the Study Area. Several bird species including swallows, doves, crows, terns, sparrows, hawks, eagles, blackbirds, geese and ducks have been observed at MSP. Mammals such as gophers, ground squirrels, bats, muskrats, raccoons, red fox, deer, rabbits and woodchucks also reside at or visit MSP.

5.8.3.1 Threatened and Endangered Species

Coordination was conducted to determine whether any of the biotic resources found in the Study Area are federal or state listed species. A Minnesota Department of Natural Resources (MNDNR) Natural Heritage Information System (NHIS) data review was requested. The MNDNR NHIS review, dated June 10, 2011 (see MNDNR NHIS response in ***Appendix K,*** *Biotic Resources)*, identified known federal and state-listed endangered, threatened and special concern species as well as critical habitat areas on or within one-mile of the Study Area. Also, the USFWS; US Army Corps of Engineers (USACE); US Department of Agriculture Natural Resource

Conservation Service; and the MNDNR were contacted directly for additional information regarding listed species and critical habitat areas.

In addition, a habitat review was conducted for one state listed threatened flora species, the kittentail, in a small portion of the Study Area. *Besseya bullii* (kittentail) is a native perennial found primarily in oak savanna communities, often along bluffs near major rivers in the State. The area near the TH 5 and Glumack Drive was reviewed for potential prime habitat for the kittentail. The potential for kittentail habitat within the area near TH 5 and Glumack Drive was determined to be minimal. No kittentail was observed during the area review. The landscape position, coverage with non-native vegetation, previous disturbance and on-going maintenance activities reduce the chance for kittentail to be present. Refer to the technical memorandum Habitat Review for Besseya bullii (kittentail) in *Appendix K* for further information.

Based on review of the MNDNR NHIS response and coordination with regulatory agencies, there are no known federal-listed endangered or threatened species located in or adjacent to the Study Area. There are also no state-listed endangered, threatened or special concern species, critical habitat, natural plant communities or other natural features reported to exist in or adjacent to the Study Area.

5.8.3.2 Bald Eagles

The USFWS commented on the possibility that there are bald eagle nests near MSP in the Fort Snelling National Cemetery. Therefore, a visual survey for bald eagle nests was conducted in the Fort Snelling National Cemetery and areas adjacent to the Study Area in December 2011. The visual survey focused on areas favorable to bald eagle nesting as identified in the USFWS *National Bald Eagle Management Guidelines* (May 2007). No bald eagle nests were sited in Fort Snelling National Cemetery or within sight of the Study Area.

5.8.4 Impact Analysis

5.8.4.1 Threatened and Endangered Species

No federal or state listed species, critical habitat, natural plant communities or other natural features were reported in or adjacent to the Study Area. Therefore, none of the Alternatives would impact threatened or endangered species.

5.8.4.2 Other Biotic Resources

The Action Alternatives generally consist of expanding existing buildings, pavements and roadways in areas of currently impervious surfaces. Therefore, impacts to biotic resources in and adjacent to the Study Area would be negligible.

Impacts to biotic species outside the Study Area were also considered based on comments from the USFWS. Specifically, potential impacts to bald eagles and aquatic species were reviewed.

<u>*Bald Eagles*</u>

The USFWS expressed concern regarding bald eagle nests in Fort Snelling National Cemetery. The USFWS also indicated that increased flights may disrupt bald eagles.

While there were no bald eagles nests sited in or near the Study Area, new nests could be built prior to construction. Therefore, USFWS guidelines to avoid disturbing nesting bald eagles will be implemented during construction. The USFWS *National Bald Eagle Management Guidelines* (Guidelines) recommend a 100 meter buffer for roadway construction and a 200 meter buffer from building construction in excess of two stories provided the nests are not within sight of the construction. The Guidelines also recommend maintaining existing landscape buffers.

Aircraft traffic has long been present in and near the Study Area. Any existing and new nesting sites would be established in the presence of air traffic. Additionally, the number of flights projected under either Action Alternative is the same as the projected flights under the No Action Alternative.

Aquatic Species

During scoping, the USFWS commented that increased runoff may have an impact on aquatic vertebrate and invertebrate populations. Based on the MNDNR NHIS data review, potential impacts within one mile of the Study Area are limited to aquatic vertebrates downstream in the Minnesota and Mississippi Rivers.

Potential increases in runoff and changes in runoff water quality resulting from the No Action and Action Alternatives were assessed. (refer to Section 5.18). Under the No Action Alternative, there would be minimal new construction and a very small increase in impervious surface. The volume of runoff would not measurably change. The amount of impervious area would increase by 6.5 acres under the Airlines Remain Alternative and would increase by 28.4 acres under the Airlines Relocate Alternative. These changes are insignificant relative to the approximately 1,880 acres of impervious surface currently draining to the Minnesota River from MSP.

Section 5.18 also includes an analysis of runoff water quality for each of the Alternatives. As discussed therein, there would be very little difference between the alternatives in regards to water quality. This is primarily because the number of aircraft operations and thus fuel usage and aircraft deicing usage volumes are the same for all of the Alternatives.

The Alternatives would have little impact on the quantity or quality of runoff to the Minnesota River. Therefore, it was concluded that none of the Alternatives would impact downstream aquatic invertebrates or vertebrates.

5.8.5 Mitigation

The Alternatives would not adversely impact biota and/or natural habitats; therefore no mitigation is needed.

5.8.6 Permitting

Based on the information available, no known permits are necessary for implementation of the improvements as related to the biological resources at MSP. A permit from the USFWS would be required if there were bald eagles nesting in Fort Snelling National Cemetery concurrent with construction activities. However, as previously identified, no bald eagle nests are known to exist in the area.

5.8.7 Summary

None of the Alternatives would impact biotic resources including threatened and endangered species.

5.9 Floodplains

Executive Order No. 11988 was enacted in order to avoid, to the extent possible, the long and short-term adverse impacts associated with the occupancy and modification of floodplains, including the avoidance of direct and indirect support of floodplain development wherever there is a practical alternative. The order was issued in furtherance of NEPA, the National Flood Insurance Act of 1968, and the Flood Disaster Protection Act of 1973.

The term floodplain in Executive Order No. 11988 is interpreted to mean the 100-year floodplain and is defined as lowland and flat areas adjoining waters that are subject to a one percent or greater chance of flood in any given year, i.e., a 100 year flood event.

Potential floodplain impacts were evaluated by comparing the location of the Action Alternatives with floodplain mapping data obtained from the MNDNR. As shown on **Figure 5.8-1** all of the proposed development would be in areas outside the 100-year floodplain. It is noted that the limits of the 100-year floodplain are very near TH 5 where the lanes would be added to the outbound ramps of Glumack Drive and in the vicinity of where the new Post Road and TH 5 Interchange would be constructed. Since these improvements would be constructed within existing right-of-way, it was presumed that they would not encroach upon the 100-year floodplain. Therefore, none of the Alternatives would impact floodplains.

5.10 Hazardous Materials, Pollution Prevention and Solid Waste

This section discusses hazardous materials, pollution prevention and solid waste.

5.10.1 Regulatory Background

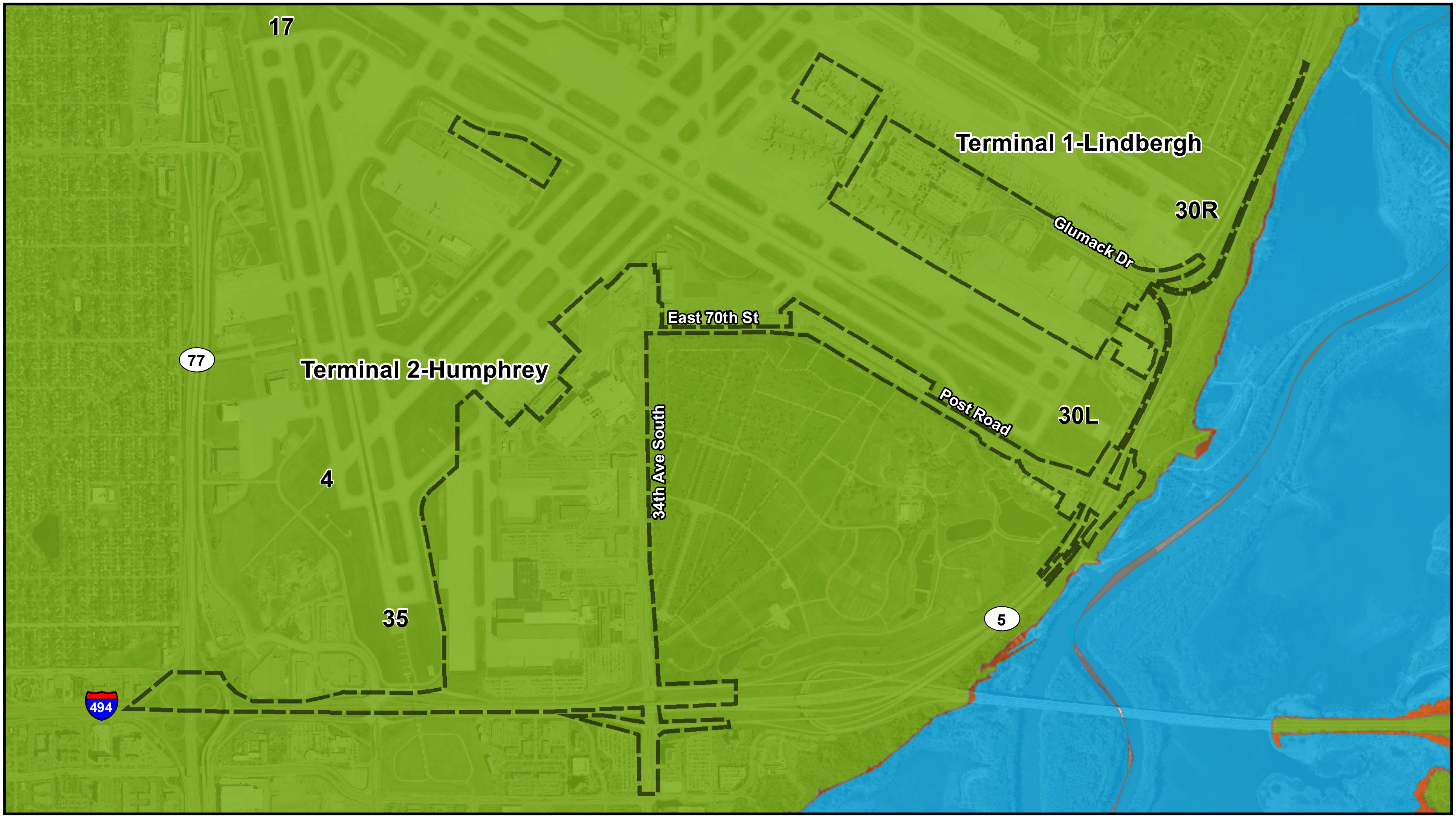
Relevant hazardous materials statutes include the Resource Conservation and Recovery Act (RCRA, as amended by the Federal Facilities Compliance Act of 1992), the Minnesota Hazardous Waste Rules and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended. RCRA and the Minnesota Hazardous Waste Rules govern the generation, treatment, storage and disposal of hazardous wastes. CERCLA provides remedies for uncontrolled and abandoned hazardous materials.

For buildings and structures, the USEPA National Emission Standards for Hazardous Air Pollutants (*NESHAP 40 CFR 61*) and MPCA Regulations for Renovation and Demolition (*Minn. R. 7035.0805*) provide the standards for the identification, handling and management of regulated materials. These rules outline the requirements imposed upon building and structure owners to inspect and properly decommission recognized hazards. Included within these standards are the means for submitting notifications and obtaining permits from each applicable agency.

The Pollution Prevention Act of 1990 declared that pollution should be reduced at the source whenever possible. Under this law, “Pollution prevention includes practices that increase efficiency in the use of energy, water, or other natural resources, and protect our resource base through conservation.”[27] The CEQ *Memorandum on*

Minneapolis-St. Paul International Airport 2020 Improvements EA

FIGURE 5.8-1



LEGEND

Study Area

Flood Zone

100-Year Floodplain

500-Year Floodplain

Area Outside 100 and 500-Year Floodplains

100-Year Floodplain

Source: Minnesota Department of Natural Resources, ESRI Data

N

0 1,000 2,000 4,000 Feet

Disclaimer: This map was generated by HNTB Corporation using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitablity for a particular use. The scale and location of all mapped data are approximate.

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Pollution Prevention and the National Environmental Policy Act encourages federal agencies to consider future opportunities for pollution prevention and to include pollution prevention in NEPA documents.

5.10.2 Approach and Methodology

The potential for the Alternatives to use, generate or disturb hazardous materials was assessed. The Alternatives involve construction activities that could disturb hazardous materials such as building demolition, soil disturbance and de-watering. Therefore, potential hazardous materials sites were identified in and near the limits of construction. Each Alternative was then evaluated to determine potential impacts related to these sites.

Pollution prevention and solid waste impacts were also considered. The opportunities for pollution prevention were identified. Solid waste impacts in terms of relative amounts and disposal were reviewed.

5.10.3 Threshold of Significance

Impacts related to hazardous materials may exceed the threshold of significance if:

- A National Priority List (NPL) site is involved, or
- It would be difficult to meet federal, Tribal, state or local applicable laws/regulations, or
- There is an unresolved issue regarding hazardous materials.

5.10.4 Affected Environment

Potential locations of hazardous materials were identified within the Study Area.

The buildings and structures located within the Study Area are listed in **Table 5.10.1** and identified by the corresponding number on **Figure 5.10-1**. The potential for these building and structures to contain hazardous materials was identified based upon prior surveys, previous discoveries or date of construction. The construction date can be used to narrow the likelihood for certain regulated material to be present. However, it cannot be used as the definitive and exclusive tool for the determination of regulated material presence. Refer to ***Appendix I,*** *Buildings and Structures Subject to Renovation, Demolition, and/or Material Alteration,* for more information.

Table 5.10.1
Buildings and Structures Located Within the Study Area

Terminal 1-Lindbergh		**Terminal 2 -Humphrey**	
#	**Building Name**	**#**	**Building Name**
1	Terminal 1-Lindbergh Concourse E	32	Terminal 2-Humphrey
2	Glycol Tanks by Gate E8	33	Terminal 2-Humphrey Purple Parking Ramp
3	Glycol Tanks by Gate E4	34	Terminal 2-Humphrey Orange Parking Ramp
4	Glycol Tanks by Gate E9	35	Terminal 2-Humphrey PMO
5	Glycol Tanks by Gate E5	36	Terminal 2-Humphrey Snow Melters
6	Trash Compactors – Northwest Corner of Concourse D	37	Terminal 2-Humphrey LRT Building
7	Terminal 1-Lindbergh Concourse G	38	Terminal 2-Humphrey LRT Maintenance Buildings
8	Trash Compactors by Gate G14	39	Servisair Office Building
9	Electrical Vault - West of G17	40	Servisair Fueling Station
10	Terminal 1-Lindbergh Green Parking Ramp	41	Integrated De-Icing Services Maintenance Building
11	Terminal 1-Lindbergh Gold Parking Ramp	42	Terminal 2-Humphrey Fuel Farm Tanks and Piping
12	Terminal 1-Lindbergh Blue Parking Ramp	43	Skychef Building
13	Terminal 1-Lindbergh Red Parking Ramp	44	Skychef Fuel Tank
14	Terminal 1-Lindbergh PMO	45	MAC Storage Building
15	Guard Shack by Gate 113 - East of Concourse G	46	U.S. Customs & Border Protection Shack
16	Post Office Maintenance Building	47	Delta Parking Lot Employee Pick-up Booth - North of Delta Building C
17	Post Office Building	48	Delta Building F
18	Delta Building B	49	Delta Building F – Generators, Transformers, AC units
19	Delta Hangers 7 & 8	50	Delta Building G
20	Delta Boiler Building	51	Delta Building H Employee West Bus Shelters - South of Humphrey Fuel
21	Maroon Parking Ramp - East of Delta Building B	52	Delta Building H Employee East Bus Shelters - South of Humphrey Fuel
22	Delta Reservoir Building - East of Delta Building B	53	Delta Employee East Bus Shelters - North of Delta Hangers
23	Electric Substation - East of Delta Building B	54	Transformers & Shed - Northeast Corner of Delta Building G Parking Lot on East Side of Building
24	Fueling Station by Delta Parking Ramp - East of Delta Hangars 7 and 8	55	Shed - East of Delta Building G Adjacent to 34th Avenue
25	Pipeline Receiving Station	56	Shed - East of Delta Building G Adjacent to 34th Avenue
26	Pipeline Receiving Station Shed	57	Delta Office Complex
27	VMF/Swissport Office Building	**Outlying Improvement Area**	
28	Swissport Storage Shed	58	SuperAmerica Convenience Complex
29	Swissport Maintenance Building		
30	Swissport Tank - West of Maintenance Building		
31	Pipe Line building - Building in AOA south of VMF		

Source: Liesch Associates, Inc. 2011.

LEGEND

Hazardous Materials Study Area

Structures Within The Hazardous Materials Study Area

0 700 1,400 2,800 4,200 Feet

Source: Data compiled and maintained by Liesch Associates, Inc. Base Map provided by MDNR

Disclaimer: This map was generated by Liesch Associates, Inc. using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitablity for a particular use. The scale and location of all mapped data are approximate.

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Potentially contaminated soil and groundwater were identified by reviewing and mapping the locations of historic leak sites, spill sites and previously identified contaminated soils. **Figure 5.10-2** illustrates the locations of these sites. None of the sites are on or eligible to be on the NPL. Refer to ***Appendix J,*** *Impacted and Contaminated Soil and Groundwater Management,* for more information.

No NPL sites were identified within the Study Area. One NPL site was identified just outside of the Study Area. The site is at the Air Force Firing Range, near the Minnesota River and east of MSP as shown on Figure 5.10-2. The NPL site is located down gradient from airport property and thus hazardous materials from the site would not be transported to the airport via storm or ground water.

5.10.5 Impact Analysis

5.10.5.1 Hazardous Materials

Hazardous materials would be encountered under the No Action Alternative and the Action Alternatives.

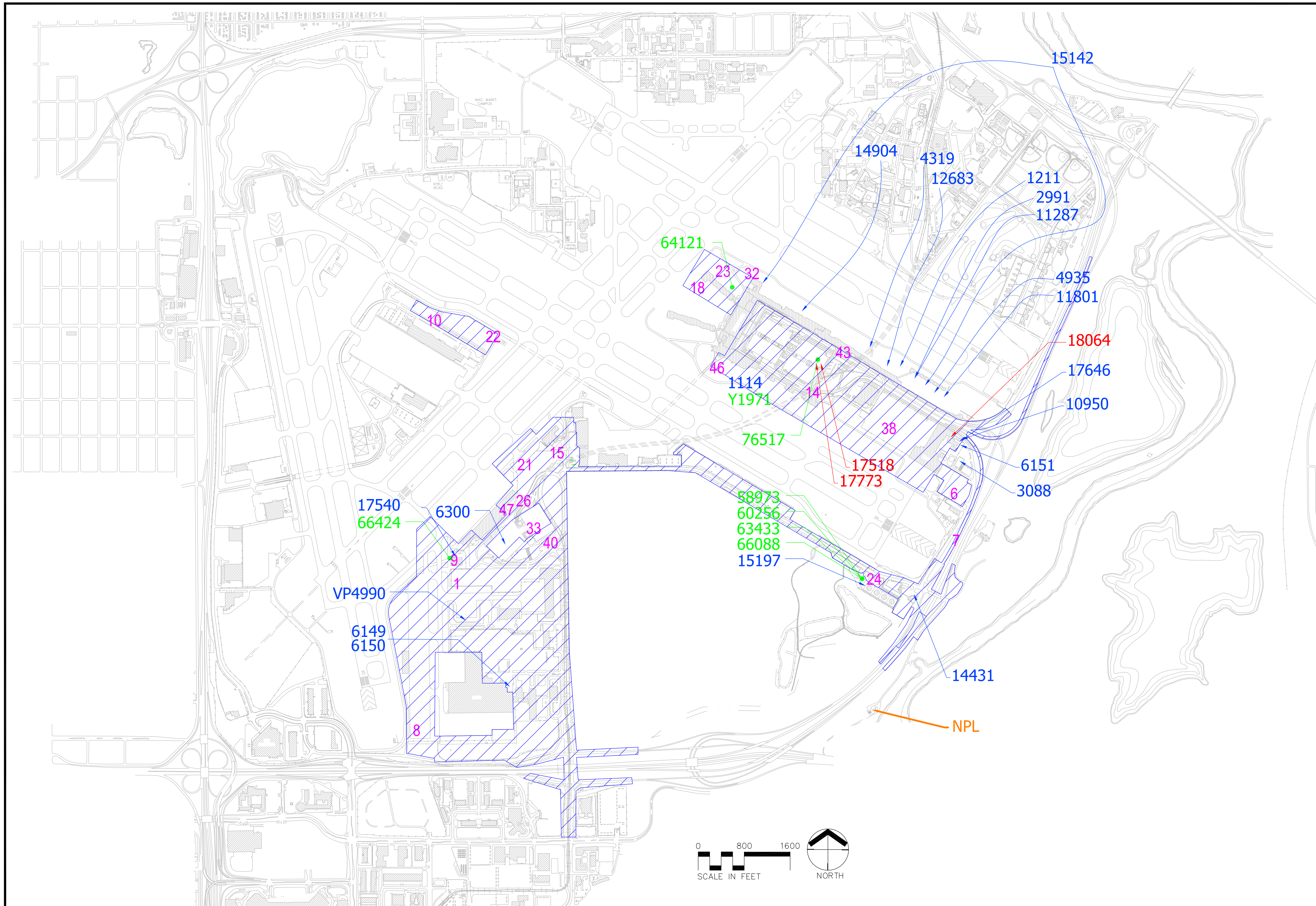
The No Action Alternative includes the demolition of the Terminal 2-Humphrey Fuel Facility and the Building F Tower. Hazardous materials are known to exist in both. Additionally, contaminated soil has been encountered near the Fuel Facility.

The Airlines Remain Alternative includes the demolition of the Building B Hangar Complex, Building G and a portion of the Post Office. This Alternative also involves renovating Terminal 1-Lindbergh, including Concourses E and G. All of these buildings are known or deemed likely to contain hazardous materials. Also, contaminated soil has been encountered at the Building B Hangar Complex.

The Airlines Relocate Alternative includes the demolition of the Delta Air Lines Flight Kitchen and the remainder of Building F. Renovation of Terminal 1-Lindbergh, including Concourses E and G, is also part of the Airlines Relocate Alternative. All of these buildings are known or deemed likely to contain hazardous materials. Also, contaminated soil has been encountered near the Terminal 2-Humphrey Fuel Facility, the Orange Ramp expansion location and the former Northwest Airlines Building B complex.

Potentially impacted buildings will be subject to a thorough inspection prior to disturbing any components of the subject buildings. These inspections will likely include destructive sampling to determine whether hazardous materials are in any of the building components. Based upon the findings of the inspections, corrective action will be implemented to remove and decommission identified hazards prior to demolition, renovation or building material alteration.

Contaminated soil, asbestos-containing material and other regulated materials will be handled and disposed of in accordance with applicable regulations. Excavated materials will be managed in accordance with the MPCA approved Soil Management Plan for MAC projects. Construction dewatering will be accomplished in accordance with the MAC's Construction Dewatering National Pollution Discharge Elimination System (NPDES) permit and/or its Metropolitan Council Environmental Services (MCES) permit. Renovation and demolition will be conducted in accordance



LEAK SITES
1114 MAC GATE 1 (1989)
1211 NATIONAL CAR RENTAL (1989))
2991 HERTZ RENT A CAR (1990)
3088 NWA BUILDING B MAINTENANCE FACILITY (1990)
4319 USPS AIRMAIL FACILITY (1991)
4935 AVIS RENT A CAR (1991)
6149 (NWA BUILDING C - MINERAL SPIRIT) (1993)
6150 (NWA) (1993)
6151 NWA BUILDING B (1993)
6300 SIGNATURE FLIGHT SUPPORT (1988)
10950 BUILDING B TEST CELL AREA MSP (1997)
11287 HERTZ RENT A CAR (1998)
11801 ALAMO CAR RENTAL (1998)
12683 BUDGET RENT A CAR (1999)
14431 SUPERAMERICA NO. 4369 (2001)
14904 ENERGY MANAGEMENT CENTER (2002)
15142 MSP AIRPORT - LINDBERGH TERMINAL (2003)
15197 MSP AIRPORT POST ROAD TANK FARM (2003)
17518 MPLS/ST. PAUL CAR RENTAL QTA (2009)
17540 HHH BULK FACILITY RELEASE (2009)
17646 NWA AIRLINES BUILDING B (2009)
17773 MSP AIRPORT HERTZ RENTAL CAR SERVICE (2009)
18064 DELTA AIRLINES BUILDING B (2010)

VIC PROGRAM SITES
VP - 4990 NWA (1994)

SELECTED SPILL SITES (Spill ID#)
58973 MFC VESSEL #6 POST ROAD FUEL FARM (2003)
60256 MFC POST ROAD FUEL FARM (2003)
63433 MFC RECLAIM TANK (2005)
64121 GATE E-4 CONSTRUCTION (2005)
66424 ASIG FUEL TRUCK AT HHH FUEL FARM (2006)
66088 MAGELLAN PIPELINE - MSP STATION (2006)
76517 HERTZ RENTAL CAR (2009)

Y1971 - 1971 HYDRANT RELEASE* (1971)

NPL - AIR FORCE FIRING RANGE NPL SITE

SITES WHERE SOIL MANAGEMENT WAS REQUIRED
1. SIGNATURE GROUND SERVICES BUILDING (2000)
6. MAC PARKING REPLACEMENT PROJECT (2000)
7. NORTHWEST DRIVE AND POST ROAD PROJECT (2000)
8. SUN COUNTRY APRON EXPANSION (2000)
9. HUBERT H. HUMPHREY TERMINAL FUELING PROJECT (2000)
10. MAC FEDERAL EXPRESS CARGO BUILDING (2001)
14. LRT SOUTH SHAFT (2001)
15. MAC LRT SOUTH PORTAL (2001)
18. 2004 PAVEMENT REHABILITATION (2004)
21. 2005 HUMPHREY FUEL LINE INSTALLATION (2005)
22. RWY 4-22 TUNNEL (PHASE 2) (2005)
23. 2005 PAVEMENT REHABILITATION (2005)
24. MSP FUEL CONSORTIUM MODIFICATIONS/IMPROVEMENTS (2005)
26. HUMPHREY PARKING ENTRANCE P.O. (2005)
32. 2006 PAVEMENT REHABILITATION (2006)
33. HUMPHREY ORANGE RAMP (2006-08)
38. CONCOURSE G EXPANSION SITE PREPARATION - BID PACKAGE #2 (2008)
40. HUMPHREY TERMINAL EXPANSION B.P.R.4 - EXIT ROADWAYS (2009)
43. TRANSIT CENTER VALVE VAULT (2009)
46. LINDBERGH TERMINAL SOUTH BAGGAGE SCREENING (2010)
47. HUMPHREY TERMINAL SKYWAY EXPANSION (2010)

(XXXX) - YEAR IN WHICH THE PROJECT WAS INCLUDED IN THE ANNUAL SOIL MANAGEMENT REPORT

LEGEND

XXXX - Spill Site (Closed)
XXXX - Active Site (Open)
XXXX - Closed Site
NPL - National Priority List Site
XX - Site Where Soil Management Was Conducted
Study Area

* Y1971 is a reference to a hydrant fuel release that occurred in 1971. The release occurred at the G Concourse, no specific location provided.

Soil Management and Release Sites

Source: Data compiled and maintained Liesch Associates, Inc. Base Map provided by TKDA.

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with MPCA Regulations for Renovation and Demolition (Minn. R. 7035.0805).

The only identified NPL site is outside of the Study Area. Since the Study Area was delineated based on the limits of construction, it is concluded that none of the Alternatives would impact an NPL site.

5.10.5.2 Pollution Prevention

Pollution prevention is an integral part of MAC's culture of sustainability. MAC's environmental goals include reducing waste disposal through their recycling and composting programs. Other environmental goals include reducing the use of hazardous materials and decreasing energy consumption.

Both Action Alternatives include the renovation of Concourses E in part to complete mechanical and technological upgrades as well as exterior modifications that would reduce energy consumption. Thus, the Action Alternatives include opportunities to prevent pollution.

5.10.5.3 Solid Waste

The same amount of post-construction solid waste would be generated for all Alternatives. The volume of waste generated is generally proportional to the number of passengers served. Since the number of passengers would be the same under all Alternatives, the amount of solid waste generated would also be the same. Therefore, when compared to the No Action Alternative, the Action Alternatives would not impact post construction solid waste.

Waste materials generated during construction activities are generally handled by the project's contractor. Deconstruction and salvaging of reusable building materials is done whenever appropriate. It is standard practice to maximize the recovery of recyclable construction and demolition (C&D) wastes such as concrete and metal. Recycling of these materials is driven by financial incentives, including avoidance of taxes and fees in addition to the value as a commodity in secondary markets. To the extent possible, large volumes of concrete are crushed and reused on site. C&D wastes that are not recyclable are transported to a local landfill for disposal. Hazardous and otherwise regulated wastes are managed at permitted local disposal facilities in accordance with all applicable rules and regulations. The processing facilities and disposal sites that receive these wastes have adequate capacity to accommodate construction waste from the Action Alternatives.

5.10.6 Permitting

Construction will be accomplished in accordance with existing permits including the MAC's Construction Dewatering NPDES permit and its Metropolitan MCES permit.

5.10.7 Summary

Hazardous materials would be encountered during construction of all of the Alternatives. None of the Alternatives would impact a site on the NPL. All contaminated soil, asbestos-containing material and other regulated materials will be handled and disposed of in accordance with applicable regulations. Therefore, none of the Alternatives would be expected to result in hazardous materials impacts that would exceed the threshold of significance.

Pollution prevention is incorporated into the Action Alternatives. When compared to the No Action Alternative, the Action Alternatives would not impact post construction solid waste.

5.11 Historical, Architectural, Archaeological, and Cultural Resources

This section provides an overview of the analysis conducted to address potential impacts to historical, architectural, archaeological and cultural resources.

5.11.1 Regulatory Background

The National Historic Preservation Act of 1966 (as amended) (NHPA) and the Archaeological and Historic Preservation Act of 1974 (AHPA) are the primary acts that govern the evaluation of potential impacts to historic or cultural resources. A historic or cultural resource is defined as one that is listed, or eligible for listing, on the National Register of Historic Places (NRHP), the official list of the nation's cultural resources.

The NHPA established the National Historic Preservation Program which includes elements for identification and protection of historic properties. The Act also authorizes the maintenance and expansion of the NRHP. Section 106 of the Act requires federal agencies to consider the impacts of a proposed action on historic resources.

The AHPA provides for the survey, recovery and preservation of significant scientific, prehistoric, historic or archaeological data that may be destroyed or irreparably lost due to a federally-funded or-licensed project.

5.11.2 Approach and Methodology

The Section 106 process, as defined in 36 CFR Part 800, Protection of Historic Properties, was used to evaluate impacts to historical, architectural, archaeological and cultural resources. The Section 106 process includes the following basic steps:

- Initiate the Section 106 process
  - Determine whether the proposed action is an undertaking
  - Begin consultation
- Identify historic properties
  - Establish the area of potential effect (APE)
  - Review APE for properties on or eligible to be on the NRHP
- Assess adverse effects
- Resolve adverse effects

5.11.3 Threshold of Significance

A determination of adverse effect does not necessarily constitute a significant impact in terms of NEPA. In the event of an adverse effect determination, consultation with the State Historic Preservation Office (SHPO) and the associated Tribes will be conducted to determine the significance of the impact and if the impact could be avoided or minimized.

5.11.4 Affected Environment

5.11.4.1 Initiate the Section 106 Process

The first step in initiating the Section 106 process is to determine if the Sponsor's Proposed Action would be considered an undertaking and whether it has the potential to effect historic resources. The Proposed Action at MSP would be considered an undertaking because it involves federal funding and approval. The Proposed Action also has the potential to affect historic resources because it requires demolition of buildings and ground disturbance.

Once it was determined that the Proposed Action would be an undertaking, consulting parties were identified. The following consulting parties were identified:

- Minnesota State Historic Preservation Office (SHPO);
- State of Minnesota Indian Affairs Council (the liaison between the State and the tribal Governments); and
- Lower Sioux, Mendota Mdewakanton Dakota, Shakopee Mdewakanton Sioux and Prairie Island Tribes.

The FAA invited the consulting parties to participate in the Section 106 process and advised them that Section 106 requirements would be addressed as part of the NEPA process.

5.11.4.2 Identify Historic Properties

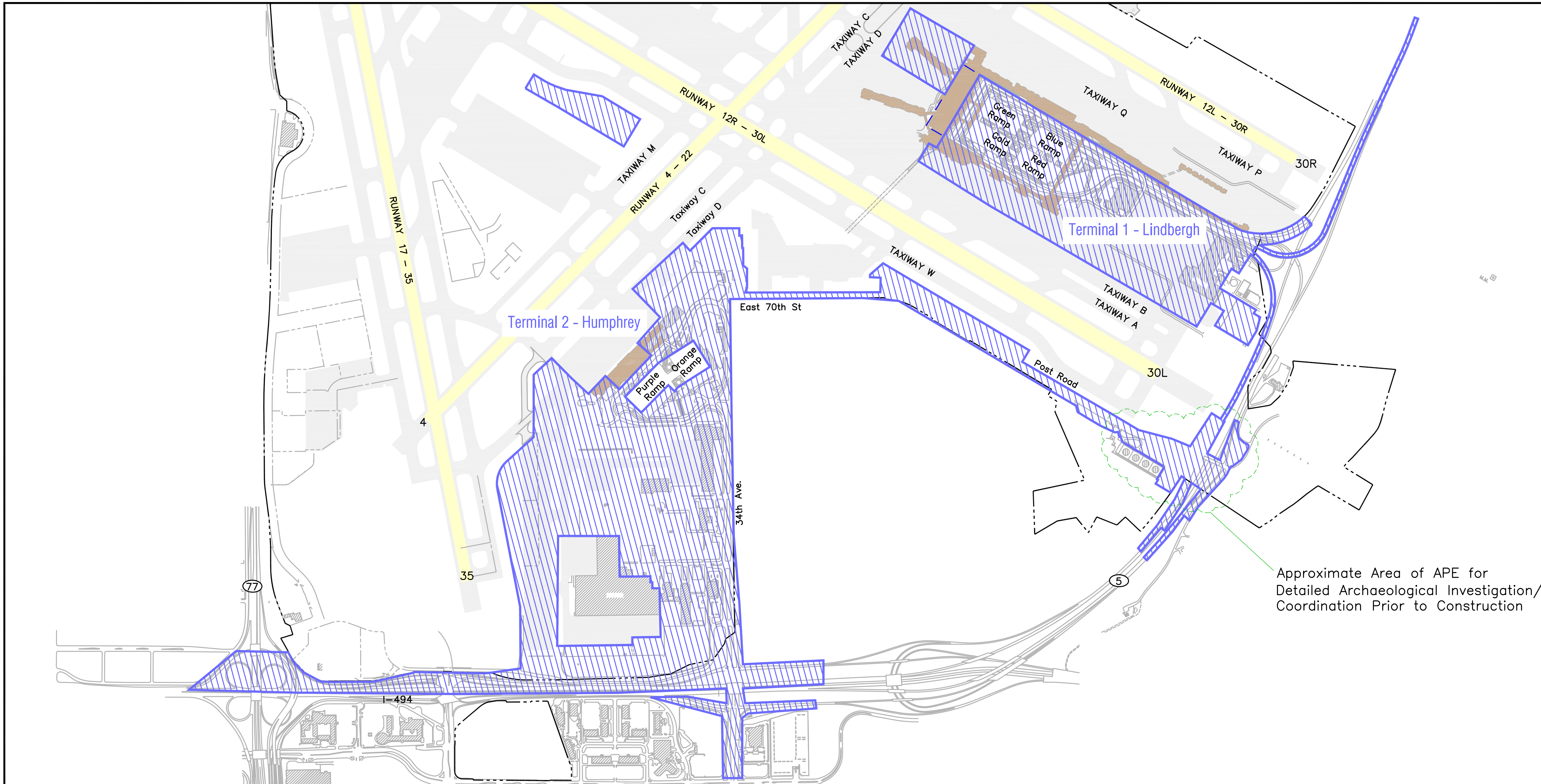
The first step in identifying historic resources is to establish the APE. The APE is the study area for historical, architectural, archaeological and cultural resources. As such, it includes the area where the alternatives may cause changes in the character or use of a historic resource. The potential impacts of the alternatives are considered in determining the boundaries of the APE.

The Airlines Remain and Airlines Relocate Alternatives would cause ground disturbance and, therefore, at a minimum the APE must include the limits of construction. Although the alternatives would also cause changes in noise around MSP, the noise impacts resulting from the alternatives would not exceed the threshold of significance. Therefore, it was concluded that the alternatives would not impact the character or use of historic properties outside the limits of construction. The proposed APE was limited to areas of potential disturbance.

The SHPO concurred with the proposed APE on February 8th, 2011 and agreed with the FAA's assertion that the APE should not include the area that would be impacted by noise unless the noise impacts are found to be significant. The SHPO also confirmed that the visual impacts to historic resources would be minimal and thus need not be considered in defining the extent of the APE.

The original APE was altered due to expansion of the limits of construction and inclusion of additional regional roadway projects. On October 19, 2011 the FAA sent a letter to the SHPO requesting concurrence with a revised APE that encompassed the expanded limits of construction. The SHPO concurred with the revised APE on November 16, 2011.

In June of 2012, regional roadway improvements were added to the Alternatives to satisfy FHWA requirements. The proposed APE was revised to include these regional roadway improvements. Therefore, the FAA is coordinating with the SHPO to obtain concurrence with the updated APE illustrated in **Figure 5.11-1**. The FAA continues to endorse an APE that is bounded by the limits of construction for this undertaking.



LEGEND

- Area of Potential Effect (APE)
- Runways
- Terminals

Section 106 Area of Potential Effect

N

0 1,300' 2,600'

Source: Data compiled and maintained by MAC, HNTB, TKDA

Disclaimer: This map was generated by HNTB Corporation based off of CAD files supplied by other parties. No claims are made to the accuracy or completeness of the information shown herein nor to its suitability for a particular use. The scale and location of map are approximate.

A reconnaissance assessment and an archaeological assessment were completed to determine if there are any resources within the APE that are listed on or eligible for listing on the NRHP. Both of these assessments were completed by individuals who meet the Secretary of Interiors Professional Qualification Standards.

The reconnaissance assessment included review of historic data and a windshield survey. Facilities within the APE were reviewed to assess whether they would be eligible for listing on the NRHP. Based on the findings of the reconnaissance assessment, it was concluded that alterations have compromised the historic integrity of the facilities in the APE such that they would not qualify for listing on the NRHP. For additional information refer to the reconnaissance assessment report in ***Appendix F***, *Historic Resources*.

The archaeological assessment included a review of previous archaeological investigations for areas within and adjacent to the APE. Areas not covered by previous investigation were visually inspected. Results of the records search along with the visual inspection indicated that decades of construction and landscaping have caused deep and far- reaching disturbance around Terminal 1-Lindbergh and Terminal 2-Humphrey as well as the intersection of I-494 and 34th Avenue South. Therefore, it was concluded that NRHP eligible archaeological resources would not be present in these areas. However, archaeological evidence associated with Native Americans may be present in the area northwest of the Post Road/TH 5 interchange. Additional information regarding archaeological resources is provided in the Archaeological Assessment included in *Appendix F.*

5.11.5 Impact Analysis (Assess Adverse Effects)

The only potentially eligible NRHP site identified in the APE was the archaeological site in the area northwest of the Post Road/TH 5 interchange. Since the No Action Alternative would not include construction in the vicinity of the TH 5 and Post Road interchange, it would not result in an adverse effect. However, both the Airlines Remain and Airlines Relocate Alternatives include construction of a new TH 5/Post Road interchange and therefore may result in an impact to the potential archaeological resource, if present. According to 36 CFR Part 800, “An adverse effect is found when an undertaking may alter, directly or indirectly, any of characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property’s location, design, setting, materials, workmanship, feeling, or association.”[28]

Additional design to define the limit of construction and additional archaeological investigations to determine if resources are present are necessary to determine if either Action Alternative will result in an adverse effect. However, additional design will not be completed until after the completion of this EA. Therefore, this project has been broken down into two separate phases to allow portions of the project to move forward while still meeting the requirements of the NHPA.

Phase I will include the entire project area except for the area around the Post Road/Trunk Highway (TH) 5 intersection. Phase II will include the Post Road/TH 5 intersection and all associated work (relocation of Northwest Drive and Post Road intersection, relocation of SuperAmerica, and construction of new Post Toad/TH 5 bridge and intersection).

Phase I and Phase II will be considered separate undertakings for the purposes of Section 106 consultation. Each phase will include efforts to identify and evaluate historic and archaeological resources, in consultation with the SHPO. In addition, each phase will conclude with its own Section 106 finding.

The reconnaissance assessment and archaeological assessment did not identify any resources listed on or eligible for listing on the NRHP for Phase I. Therefore, the FAA has determined that a No Historic Properties Affected finding is adequate for Phase I. This finding was submitted to the SHPO and the Tribes with the Draft EA. After reviewing the documentation provided by the FAA, the SHPO concurred with the FAA's finding for Phase I. The finding and related correspondence are included in *Appendix F*.

Phase II will occur after the EA process is complete. However, the FAA and MAC will have flexibility to consider alternatives outside the preferred alternative approved in the EA to avoid or minimize impacts. If an alternative is selected that is different from what was approved in the EA, the FAA and MAC will complete additional work, as required, to comply with the NEPA.

5.11.6 Mitigation

Phase I will not require any mitigation. If archaeological resources are identified during Phase II, the FAA and MAC will work with the SHPO and Tribes to identify ways to minimize impacts. If impacts cannot be avoided, the FAA and MAC will work with the SHPO and Tribes to mitigate the impacts through a Memorandum of Agreement.

5.11.7 Summary

The No Action Alternative will not impact historic or cultural resources. In addition, Phase I of the proposed project (including both Action Alternatives) will not impact any historic or cultural resources. Additional information is needed to determine if Phase II will result in an adverse effect. The impacts associated with Phase II will be determined prior to any construction activities in consultation with the SHPO and the Tribes.

5.12 Light Emissions and Visual Effects

This section discusses potential impacts related to changes in light emissions and aesthetics.

5.12.1 Regulatory Background

There are no Federal regulations for airport related light emissions or visual effects.

5.12.2 Approach and Methodology

The primary sources of light emissions from airports are the FAA required lighting for security, obstruction clearance, and navigation. An analysis of the impact of light emissions on the surrounding environment is required when proposed projects introduce new lighting that may affect residential or other sensitive land uses. To evaluate the potential for light emissions impact, the FAA considers the extent to which any lighting associated with an action would create an annoyance among people or interfere with their normal activities.

Visual, or aesthetic, impacts are inherently more difficult to define than light emission impacts because of the subjectivity involved. Aesthetic impacts deal more broadly with the extent that the development contrasts with the existing environment and whether the community's jurisdictional agency considers this contrast objectionable. Therefore, the Alternatives are assessed by considering their potential to contrast with the surrounding environment and consulting with appropriate agencies.

5.12.3 Threshold of Significance

There are no established thresholds of significance.

5.12.4 Impact Analysis

The potential new light sources associated with the Action Alternatives would primarily include apron lighting and parking facility lighting. Apron lighting would be installed on the new/expanded aprons near Terminal 2-Humphrey. Since there is already apron lighting in these areas and the nearest residents are south of I-494 and west of TH 77, it is not anticipated that the new apron lights would interfere with residents' normal activities. Parking facility lighting would be added to the new/expanded parking structures. Again, this lighting would be adjacent to existing lighted parking structures. Therefore, it is not anticipated that the lighting on the new parking structures would impact residents.

Since the Action Alternatives essentially amount to expansion of aviation related facilities on the airport and road improvements within existing right-of-way, the aesthetic character at MSP would not change. The SHPO also confirmed that the visual impacts to historic resources would be minimal. Therefore, it is not anticipated that the Alternatives would disturb the visual integrity of the area.

5.12.5 Summary

In summary, none of the Alternatives would be expected to introduce lighting that would create an annoyance or interfere with normal activities. Additionally, none of the Alternatives would disturb the visual integrity of the Airport area.

5.13 Natural Resources and Energy Supply

This section discusses the potential impacts to natural resources and energy supply.

5.13.1 Regulatory Background

CEQ Regulations require that the analysis of environmental consequences include a discussion of each alternative's potential energy requirements and energy conservation, as well as their potential to require the use of natural and depletable resources.

5.13.2 Approach and Methodology

The FAA requires the environmental analysis of proposed airport projects to include an evaluation of the project's effect on natural resources and energy supply. The analysis takes into account the project's energy consumption, energy conservation, and the use of natural and consumable resources to construct and maintain the airport facilities and operations.

In accordance with Order 1050.1E, the Alternatives were examined to identify any resulting measurable effect on local supplies of energy or natural resources.

Energy consumption for each of the Action Alternatives was calculated and compared to the energy consumption for the No Action Alternative. Additionally, anticipated construction materials were considered to determine if any involved natural resources that are in short supply.

5.13.3 Threshold of Significance

An impact would exceed the threshold of significance if the construction, operation or maintenance of a proposed action would cause demands that exceed future supplies. Factors to consider include whether the proposed action would require use of a rare natural resource or would cause a substantial demand on energy or natural resources.

5.13.4 Impact Analysis

Anticipated energy consumption by source for each of the Alternatives in 2020 and 2025 is shown in **Table 5.13.1**. The information in Table 5.13.1 was used to generate comparisons of anticipated energy consumption by fuel type in 2020 and 2025.

Table 5.13.1
Energy Consumption by Source

Source	2020			2025		
	No Action	Alternative 1	Alternative 2	No Action	Alternative 1	Alternative 2
Aircraft within LTO (gallons)						
Jet A(1)	49,867,789	49,847,276	48,950,768	56,773,514	55,792,465	56,556,498
Avgas(1)	2,927	2,869	2,822	2,915	2,876	2,869
Ground Support Equipment (gallons)						
Diesel(1)	1,104,633	1,080,503	1,080,483	1,243,800	1,225,234	1,209,042
Gasoline(1)	2,489,830	2,500,134	2,497,137	2,828,063	2,799,972	2,785,024
Propane(1)	9,164	9,171	9,171	9,164	9,171	9,171
Electrical Consumption (kwh)						
Electrical(2)	164,080,243	190,979,243	202,301,243	164,080,243	190,979,243	202,301,243
Stationary Sources – Boilers and snowmelters (therms)						
Natural Gas(2)	4,782,150	5,051,016	5,113,309	4,782,150	5,051,016	5,113,309
Stationary Sources - Boilers (gallons)						
Jet A(2)	4,012	4,295	4,236	4,012	4,295	4,236
Propane(2)	1,168	1,168	1,168	1,168	1,168	1,168
Stationary Sources - Generators (gallons)						
Diesel(2)	5,140	5,361	6,958	5,140	5,361	6,958

Notes:
(1) Future year fuel usage based on forecasted aircraft operations and fleet mix as well as ground-based taxi/delay and aircraft/gate positioning.
(2) Future year usage based on estimated energy needs for the terminal expansion.

Source: Wenck Associates, Inc., KB Environmental Sciences, Inc., and David Braslau Associates, Inc., 2011.

Table 5.13.2 compares the estimated energy consumption by fuel type in 2020. As can be seen from this table, the anticipated Jet A, Avgas and diesel consumption would be less with the Action Alternatives than with the No Action Alternative. Gasoline and propane consumption would be slightly higher with the Action Alternatives. Natural gas consumption would be approximately 6 and 7 percent higher with the Airlines Remain Alternatives and the Airlines Relocate Alternative, respectively. Electrical consumption would be approximately 16 and 23 percent greater with the Airlines Remain Alternative and the Airlines Relocate Alternative, respectively. This larger increase in electrical consumption is expected because both Action Alternatives provide for expanded terminal facilities.

Table 5.13.2
2020 Energy Consumption by Fuel Type

Fuel Type	No Action	Alternative 1	Difference (1)	Alternative 2	Difference (2)
Jet A (gallons)					
Aircraft with LTO	49,867,789	49,847,276	-20,513	48,950,768	-917,021
Boilers	4,012	4,295	283	4,236	224
Total			-20,230		-916,797
Avgas (gallons)					
Aircraft with LTO	2,927	2,869	-58	2,822	-105
Diesel (gallons)					
GSE	1,243,800	1,225,234	-18,566	1,209,042	-34,758
Generators	5,140	5,361	221	6,958	1,818
Total			-18,345		-32,940
Gasoline (gallons)					
GSE	2,489,830	2,500,134	10,304	2,497,137	7,307
Propane (gallons)					
GSE	9,164	9,171	7	9,171	7
Boilers	1,168	1,168	0	1,168	0
Total			7		7
Natural Gas (therms)					
Boilers and Snowmelters	4,782,150	5,051,016	268,866	5,113,309	331,159
Electrical Consumption (kwh)	164,080,243	190,979,243	26,899,000	202,301,243	38,221,000

Notes:
(1) Difference between Alternative 1 and the No Action Alternative. Negative number indicates decrease.
(2) Difference between Alternative 2 and the No Action Alternative. Negative number indicates decrease.

Source: Wenck Associates, Inc., KB Environmental Sciences, Inc., and David Braslau Associates, Inc., 2011.

Table 5.13.3 compares the estimated energy consumption by fuel type in 2025. This table shows that the anticipated Jet A, Avgas, diesel and gasoline consumption would be less with the Action Alternatives than with the No Action Alternative in 2025. Propane consumption would be slightly higher with the Action Alternatives. Natural gas consumption would be approximately 6 and 7 percent higher with the Airlines Remain Alternatives and the Airlines Relocate Alternative, respectively. Electrical consumption would be approximately 16 and 23 percent greater with the Airlines Remain Alternatives and the Airlines Relocate Alternative, respectively. Again, this larger increase in electrical consumption is expected because both Action Alternatives provide for expanded terminal facilities.

Table 5.13.3
2025 Energy Consumption by Fuel Type

Fuel Type	No Action	Alternative 1	Difference (1)	Alternative 2	Difference (2)
Jet A (gallons)					
Aircraft with LTO	56,773,514	55,792,465	-981,049	56,556,498	-217,016
Boilers	4,012	4,295	283	4,236	224
Total			-980,766		-216,792
Avgas (gallons)					
Aircraft with LTO	2,927	2,869	-58	2,822	-105
Diesel (gallons)					
GSE	1,104,633	1,080,503	-24,130	1,080,483	-24,150
Generators	5,140	5,361	221	6,958	1,818
Total			-23,909		-22,332
Gasoline (gallons)					
GSE	2,828,063	2,799,972	-28,091	2,785,024	-43,039
Propane (gallons)					
GSE	9,164	9,171	7	9,171	7
Boilers	1,168	1,168	0	1,168	0
Total			7		7
Natural Gas (therms)					
Boilers and Snowmelters	4,782,150	5,051,016	268,866	5,113,309	331,159
Electrical Consumption (kwh)	164,080,243	190,979,243	26,899,000	202,301,243	38,221,000

Notes:
(1) Difference between Alternative 1 and the No Action Alternative. Negative number indicates decrease.
(2) Difference between Alternative 2 and the No Action Alternative. Negative number indicates decrease.

Source: Wenck Associates, Inc., KB Environmental Sciences, Inc., and David Braslau Associates, Inc., 2011.

With the exception of electrical consumption, the Action Alternatives would decrease or only minimally increase energy consumption. Even with an anticipated increase of 23 percent over the No Action Alternative, the electrical consumption is not anticipated to result in energy demand that would exceed supply.

Additionally, based on anticipated construction materials, no unusual materials or those in short supply would be used to construct of the Action Alternatives.

Finally, in terms of conservation, environmental sustainability is integral to the MAC's mission. "[The] MAC is committed to developing green buildings and to operating its facilities in ways that conserve energy, water resources, and other natural resources. From the new Humphrey Terminal at MSP, to an extensive recycling and alternative fuels program, MAC continues to focus on best practices to improve and operate its airport system in a resource-efficient and sustainable manner."[29]

5.14 Aviation Noise

The following sub-sections provide the regulatory background, methodology, thresholds of significance, analysis and potential mitigation for noise impacts.

5.14.1 Regulatory Background

In addition to FAA Order 1050.1E, Environmental Impacts: Policies and Procedures and FAA Order 5050.4B, National Environmental Policy Act Implementing Instructions for Airport Actions, FAA 14 C.F.R. Part 150, Airport Noise Compatibility Planning" and the Metropolitan Council's Land Use Compatibility Guidelines for Aircraft Noise are the guiding criteria for airport noise impact evaluation in this EA. See *Appendix G*, for additional information on FAA and local noise guidance.

5.14.2 Methodology

For aviation noise analysis, the FAA has determined that the cumulative noise exposure to individuals resulting from aviation activities must be established in terms of yearly Day/Night Average Sound Level (DNL). Typically the FAA uses the 65+ DNL contour for land use compatibility. For this EA, in addition to the 65+ DNL contour, the MAC is using the 60+ DNL contour for analysis and evaluation consistent with the mitigation program defined by the Consent Decree, see Sub-section 5.14.4.1 for history and description of the Consent Decree.

The FAA-established mechanism for quantifying airport DNL noise impacts is the Integrated Noise Model (INM). The INM is used to assess the noise impact of aircraft operations. INM Version 7.0c was used to develop the existing, 2020 and 2025 noise contours.

The INM uses input files consisting of information relative to runway use, flight track use, aircraft fleet mix, aircraft performance and thrust settings, topography information and atmospheric conditions to generate noise exposure contours. The contours are typically represented in five DNL increments that depict an annualized average day of aircraft noise impacts.

The noise impact analysis was conducted using a Geographic Information System (GIS). The GIS facilitated a detailed, comprehensive analysis of the type and number of residential structures, as well as the total population, in the respective noise contours. MetroGIS provided the most current data available for this study; the parcel data are current as of August 2011. Multi-family and single-family dwelling unit population multipliers were provided by MetroGIS on a city-by-city basis. Parcel unit count data were developed through a combination of field work done by MAC staff and data from the cities and counties neighboring MSP as a part of previous and current residential noise mitigation program efforts around the airport.

The total population living on each parcel was estimated by multiplying the number of dwelling units by the population multiplier for that respective city. For instance, according to MetroGIS data, a residential multi-family parcel with four units in the City of Richfield has a 2.02 person multiplier per unit. Multiplying 2.02 people by four dwelling units results in an estimated 8.08 people that live on that parcel of land. This procedure was completed for all affected communities and provided the final information needed to perform the population estimate for noise impacts.

5.14.3 Threshold of Significance

The threshold of significance for noise is triggered if the action alternative will cause an increase of 1.5 dB DNL or greater for a noise sensitive land use at or above the 65 DNL noise exposure when compared to the No Action Alternative.

5.14.4 Affected Environment

Because the existing noise environment around MSP is significantly influenced by the aggressive noise mitigation programs at MSP, it is appropriate to begin this section with a description of the history of noise mitigation at MSP.

5.14.4.1 History of Noise Mitigation

Since 1992 the MAC has been mitigating and acquiring noise sensitive land uses around MSP. With completion of the final phase of this program in 2014, over 15,000 properties will be mitigated at a total cost approaching $500 million.

In the mid-1990s, as part of the Dual-Track Airport Planning Process, the MAC made a policy decision to provide some level of noise mitigation out to the 60 DNL noise contour, which is more inclusive than the federally-recognized mitigation threshold of 65 DNL. During the Dual-Track Airport Planning Process, the MSP Noise Mitigation Committee was tasked with developing a noise mitigation plan to be considered in conjunction with the 2010 MSP expansion plan.

Following completion of the Dual-Track Airport Planning Process Final Environmental Impact Statement (Dual–Track FEIS), the intent of the MSP Noise Mitigation Committee's recommendation regarding mitigation outside the 65 DNL contour was a topic of detailed discussion and debate. During the course of a Part 150 Update process the MAC formulated a number of mitigation proposals, culminating in a final MAC position on mitigation outside the 65 DNL contour. In the November 2004 Part 150 Update, the MAC's recommendation for mitigation in the 64 to

60 DNL contours called for providing central air-conditioning to single-family homes that did not have it, with a homeowner co-pay based on the degree of noise impact. The MAC based eligibility for the mitigation proposal on the 2007 forecast mitigated noise contour using the block intersect eligibility methodology.

The cities located around MSP expressed dissatisfaction with the MAC's proposal, asserting that the MSP Noise Mitigation Committee recommended that the 5 dB package previously offered to homeowners in 65+ DNL was to be expanded to all properties in the 64 to 60 DNL noise contours. The MAC countered that the MSP Noise Mitigation Committee recommendations did not specify the mitigation package elements to be offered in the 64 to 60 DNL noise contour area and that, because homes in Minnesota have higher than the national average pre-existing noise attenuation characteristics, the full 5 dB package was not necessary outside the 65 DNL contour to ensure an interior noise level less than 45 dB.

In early 2005, the Cities of Minneapolis, Eagan and Richfield filed suit in Hennepin County District Court claiming the MAC violated the Minnesota Environmental Rights Act (MERA) by failing to provide a 5 dB package to single-family homes in the 64 to 60 DNL contours. In September 2005, plaintiffs seeking class action certification filed a separate action against the MAC alleging breach of contract claims associated with mitigation in the 64 to 60 DNL contours.

On October 19, 2007, prior to completion of trial on all counts, Judge Stephen Aldrich approved a Consent Decree entered into by the MAC and the cities of Minneapolis, Eagan and Richfield that settled the cities' litigation. The Decree provides that approximately 433 homes in the forecast 2007 64 to 63 DNL noise contours are eligible to receive the same level of noise mitigation that the MAC provided in the 1996 65 DNL and greater contours. The 2007 64 to 63 DNL noise contour mitigation program is designed to achieve 5 dB of noise reduction on average, with mitigation measures that may include the following, depending upon the home's existing condition: central air-conditioning; exterior and storm window repair or replacement; prime door and storm door repair or replacement; wall and attic insulation; and baffling of roof vents and chimney treatment. The Decree required that the MAC complete construction of mitigation in the 2007 64 and 63 DNL noise contours by December 31, 2009.

In addition, under the Decree, owners of the approximately 5,394 single-family homes in the 2007 62 to 60 DNL noise contours are eligible for one of two mitigation packages: 1) an estimated 2,852 homes that did not have central air-conditioning as of September 1, 2007 will receive it and up to $4,000 (including installation costs) in other noise mitigation products and services they could choose from a menu provided by the MAC; or 2) owners of homes that already had central air-conditioning installed as of September 1, 2007 or who choose not to receive central air-conditioning will be eligible for up to $14,000 (including installation costs) in noise mitigation products and services they could choose from a menu provided by the MAC. The mitigation menu includes upgrades such as: exterior and storm window repair or replacement; prime door and storm door repair or replacement; wall and attic insulation; and baffling of roof vents and chimney treatment. The Decree requires that the MAC complete construction of mitigation in the 2007 62 to 60 DNL contours by December 1, 2012.

Single-family homes in the 2007 64 and 63 DNL contours and in the 2007 62 to 60 DNL contours whose earlier owners opted out of the previously completed MAC noise mitigation program for the 1996 65 and greater DNL contours but that had new owners on September 1, 2007 are eligible to "opt in" and receive noise mitigation. If the total cost to the MAC of the opt-in mitigation is less than $7 million, any remaining funds will be used to reimburse owners of single-family homes between the 2005 mitigated 60 DNL contour and the 2007 forecast mitigated 60 DNL contour for purchase and installation of products included on a menu provided by the MAC. The amount each homeowner receives will be determined by subtracting dollars spent for the opt-in program from the total $7 million budget, and then dividing the remainder among the total number of single-family homes within the 2005 60 DNL and 2007 60 DNL contours. The MAC has begun to issue reimbursements and will complete them by July 31, 2014. The total cost of the "opt-in" mitigation and the 2005 mitigated 60 DNL contour reimbursement mitigation program is capped at $7 million.

The MAC began implementing the Noise Mitigation Program in October 2007 following the terms and conditions of the Consent Decree that settled the noise mitigation lawsuit. As of June 2012, the MAC has completed noise mitigation for all of the single-family homes in the 2007 63-64 DNL contours. (401 homes participated in the program.) In addition, the MAC has completed 5,463 homes in the 2007 60-62 DNL and has another 32 homes in the design and construction phases. A total of 1,082 homes have been provided reimbursements for approved noise mitigation enhancements in the 2007 60 DNL to 2005 60 DNL contour area. With regard to the multi-family noise mitigation program, the MAC has installed acoustical covers on the air-conditioners in 1,724 living units and completed the installation of new air-conditioning units in 255 living units in 2010 that are within the 2007 60 DNL forecast mitigated noise contour.

5.14.4.2 Noise Study Area

The Noise Study Area includes areas within the cities of Minneapolis, Richfield, Bloomington, Eagan and Mendota Heights located within the 60 DNL noise contour.

5.14.4.3 Existing (2010) Conditions

Existing noise conditions were evaluated by using INM. Several inputs are required by INM. The following sub-sections describe the necessary inputs.

INM Inputs

2010 AIRCRAFT OPERATIONS AND FLEET MIX

The MAC derived total 2010 MSP operations numbers for this EA from MAC Noise and Operations Monitoring System (MACNOMS) data. The MACNOMS total operations number was 0.8 percent lower than the FAA Air Traffic Activity Data System (ATADS) number. To rectify the numbers, the MAC adjusted the MACNOMS data upward to equal the total 2010 FAA ATADS number. **Table 5.14.1** provides the total number of 2010 aircraft operations at MSP by operational category.

The 2010 total operations number of 435,583 is up slightly from the 2009 number of 432,604 (0.6 percent increase).

Table 5.14.1

2010 Total Operations Numbers

Operations Category	Number of Operations
Scheduled Passenger Air Carrier[a]	394,407
Cargo	12,049
Charter	103
GA	26,185
Military	2,839
TOTAL	**435,583**

Notes:
(a) Includes both air carrier and regional carrier operations

Source: Based on actual 2010 MACNOMS data adjusted to match FAA ATADS data (to account for unavailable MACNOMS operations data).

The detailed fleet mix for 2010 is provided in *Appendix G* **(**see Table G.4.2). In summary for 2010, the average daily number of total nighttime operations was 94.3 with overall total average daily operations of 1,193.4.

2010 RUNWAY USE

Runway use throughout the year for arrival and departure operations at MSP has a notable effect on the noise impact around the airport. The number of people and dwellings impacted by noise is a direct result of the number of operations on a given runway and the land uses off the end of the runway. *Appendix G* (see Table G.4.6) provides the 2010 runway use percentages.

2010 FLIGHT TRACKS

In large part, the INM flight tracks used to develop the 2010 actual noise contour are consistent with those used previously to develop the noise litigation Consent Decree 2007 forecast noise contour, with the exception of Runways 17, 35 and 4 departure tracks. The INM departure tracks were updated to conform to actual radar flight track data for Runway 17 and Runways 35 and 4 as used during the 2009 reconstruction of Runway 12L/30R. *Appendix G* includes figures that provide the INM departure and arrival flight tracks and specific track use information used to develop the 2010 actual noise contour, see Figures G-4-1 through G-4-16.

2010 ATMOSPHERIC CONDITIONS

Atmospheric data from the National Weather Service (NWS) was gathered for the development of the 2010 actual noise contours. The NWS 2010 annual average temperature of 49.9 degrees Fahrenheit and 2010 average annual wind speed of 8.2 Knots was used in the INM modeling process. The 2010 average annual pressure of 29.98 inches and a 2010 annual average relative humidity of 63.9 percent were also used.

2010 Noise Contours

Based on the 435,583 total operations in 2010, approximately 3,903 acres are in the 65 DNL noise contour and approximately 9,494 acres are in the 60 DNL noise contour. **Table 5.14.2** contains the count of single-family and multi-family dwelling units and population in the 2010 existing noise contours. The counts are based on parcels that are within or are intersected by the respective DNL contour lines. Parcels with one dwelling unit are counted as single-family and parcels with more than one dwelling unit are counted as multi-family.

There are 35 residential units located at the furthest extent of the Runway 12R arrival lobe within the 2010 60 DNL noise contour that will not be provided noise mitigation as part of the existing residential noise mitigation program. However, all remaining residential units within the actual 2010 60+ DNL noise contours have been, or will be, provided noise mitigation by virtue of previous noise mitigation programs and the completion of the existing program in 2014 as defined by the Consent Decree.

A depiction of the unmitigated residential parcels, blocks that have been mitigated, and those that will be provided noise mitigation by 2014 per the noise litigation Consent Decree, and the 2010 actual noise contours are provided in **Figure 5.14-1.** See *Appendix G,* for additional details on the development of the 2010 actual noise contours.

Table 5.14.2

Summary of 2010 Actual DNL Noise Contour Single-Family and Multi-Family Unit and Population Counts

City	Count	Single-Family					Multi-Family				
		60-64	65-69	70-74	75+	Total	60-64	65-69	70-74	75+	Total
Minneapolis	Units	5478	1083	19	0	6580	1184	511	4	0	1699
	Population	13969	2761	49	0	16779	2425	900	9	0	3334
Bloomington	Units	3	1	0	0	4	618	2	0	0	620
	Population	7	3	0	0	10	995	4	0	0	999
Richfield	Units	468	6	0	0	474	54	0	0	0	54
	Population	1221	16	0	0	1237	90	0	0	0	90
Eagan	Units	131	0	0	0	131	0	0	0	0	0
	Population	368	0	0	0	368	0	0	0	0	0
Mendota Heights	Units	6	1	0	0	7	0	0	0	0	0
	Population	16	3	0	0	19	0	0	0	0	0
All Cities	Units	6086	1091	19	0	7196	1856	513	4	0	2373
	Population	15581	2783	49	0	18413	3510	904	9	0	4423

Notes:
- Parcel Intersect Methodology; Single-Family=1 Unit, Multi-Family>1 Unit
- Population Reflects Estimation Based on Multipliers Provided by Met Council

Source: MAC analysis, 2012.

5.14.5 Impact Analysis

The forecast noise impacts and any potential mitigation in this EA are defined by the forecast 2020 noise contours. The analysis focuses on forecast 2020 noise contours in the context of existing residential structures within the Noise Study Area. A future year (2025) analysis is also included.

The 2020 and 2025 aircraft noise exposure levels were assessed in INM using output data from the SIMMOD simulation analysis as well as existing flight track locations and usage trends at MSP where appropriate. The forecast flight tracks used in this EA include operational assumptions based on recent FAA ATC implementation of increased heading dispersion for northbound departure operations off

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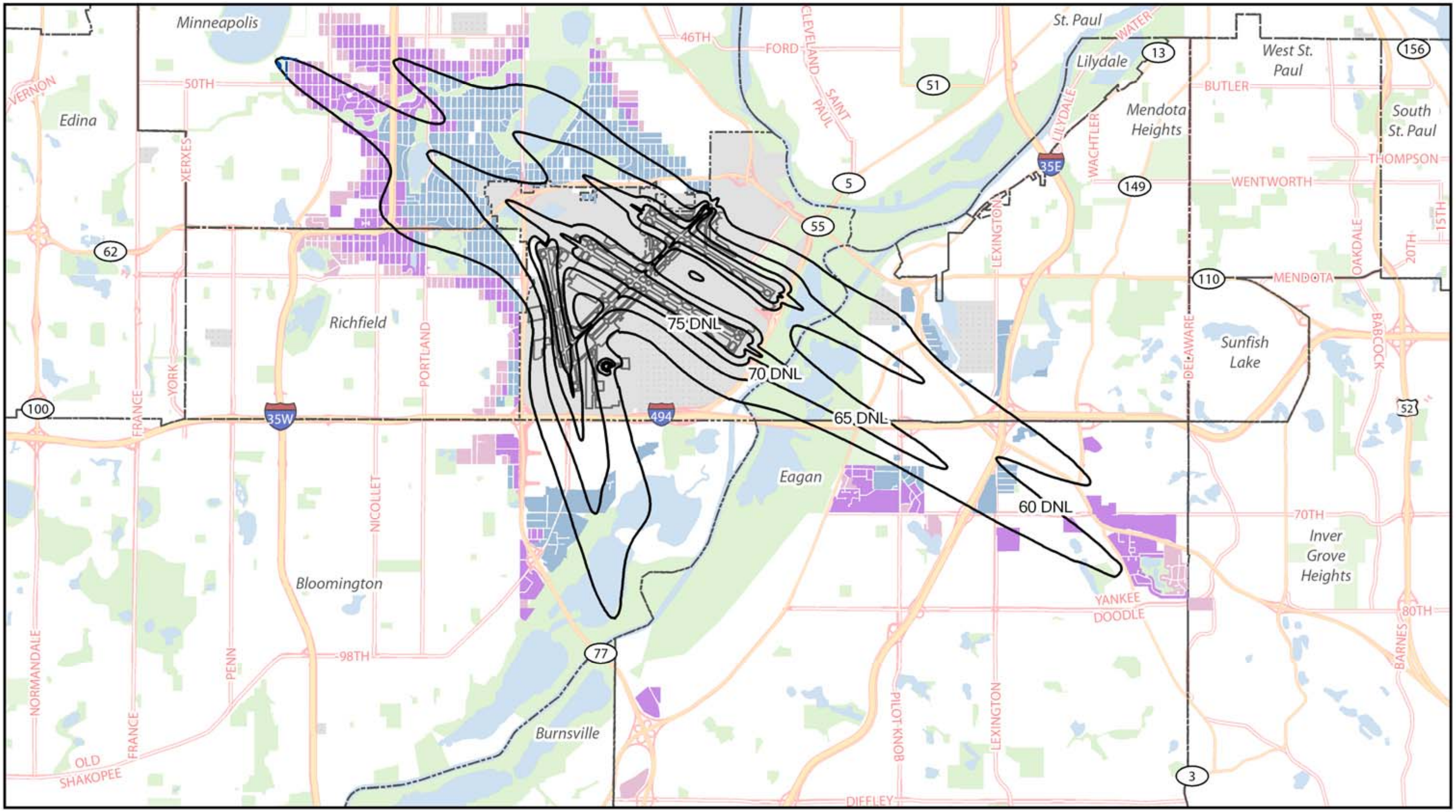
FIGURE 5.14-1



Legend

MAC Existing Noise Mitigation Packages

- Reimbursement
- Central AC & $4K or $14K
- -5 dBA Modifications
- 2010 Actual Noise Contours
- Parcels in 2010 60 DNL outside Mitigation Area

MAC Existing Noise Mitigation Program and 2010 Actual Noise Contours

N

0 — 4,400 — 8,800 Meters

Disclaimer: This map was generated by the Metropolitan Airports Commission using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitablity for a particular use. The scale and location of all mapped data are approximate.

MAC — Minneapolis Saint Paul Metropolitan Airports Commission

HNTB

Runway 30R as requested by the City of Minneapolis, the MSP Noise Oversight Committee (NOC) and the MAC. Additionally, the HESTN ONE and SLAYR ONE Area Navigation (RNAV) Standard Instrument Departures (SIDs) off Runway 17, as implemented on November 30, 2012 by FAA ATC, per the request of the NOC and MAC, are modeled in the forecast flight tracks in this EA. See ***Appendices D***, *MSP Airfield Simulation Analysis*, and ***G*** for more details on the simulation analysis and noise model development respectively.

The noise analysis and results described in this section did not include the proposed PBN procedures (see Section 2.2.3 for more information). The RNAV/RNP procedures were considered a separate action as they are independent of the Alternatives. However, the RNAV/RNP procedures were considered in this EA in the context of cumulative impacts. See Section 5.21.4.2 *Cumulative Effects: Aircraft Noise.*

The small variation between the runway use for the various alternatives is a function of FAA air traffic control procedures during low-demand time periods and the different geographic locations of new gate additions at MSP that are provided with the various development options.

5.14.5.1 No Action Alternative Noise Impacts

Based on the 484,879 total forecast operations in 2020, approximately 4,388 acres are in the 65+ DNL noise contour and approximately 11,240 acres are in the 60+ DNL noise of the No Action Alternative. **Table 5.14.3** contains the count of single-family and multi-family dwelling units and population in the 2020 and 2025 No Action Alternative DNL noise contours. The counts are based on parcels that are within or are intersected by the respective DNL contour lines. Parcels with one dwelling unit are counted as single-family and parcels with more than one dwelling unit are counted as multi-family.

Figure 5.14-2 provides the 2020 and 2025 No Action Alternative DNL noise contours and the parcels within the respective contours.

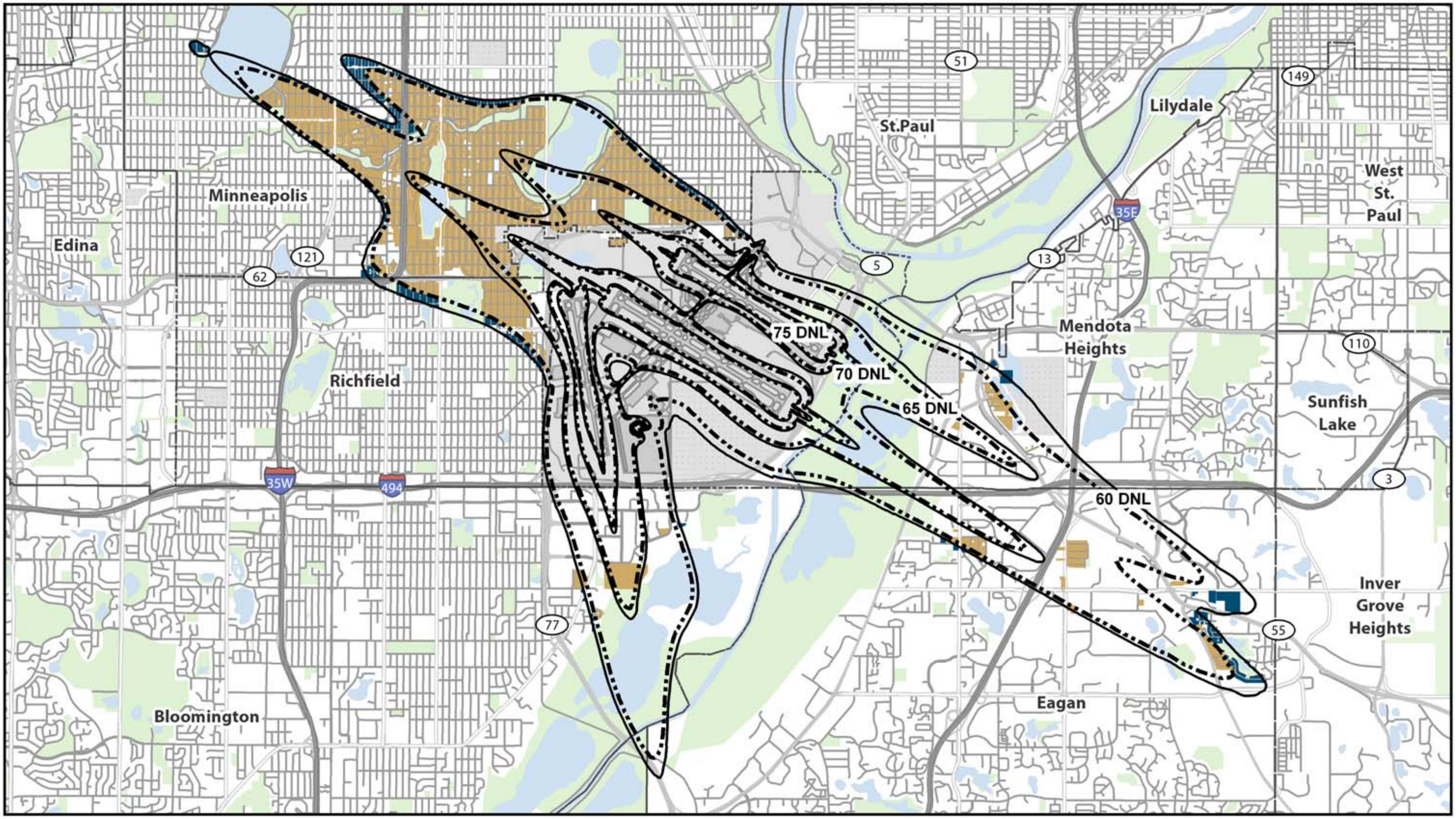
Table 5.14.3

Summary of 2020 and 2025 DNL No Action Alternative Noise Contour Single-Family and Multi-Family Unit and Population Counts by Parcel

	City	Count	Single-Family					Multi-Family				
			60-64	65-69	70-74	75+	Total	60-64	65-69	70-74	75+	Total
2020 DNL Noise Contours	Minneapolis	Units	6867	1441	43	0	8351	1748	655	4	0	2407
		Population	17511	3674	110	0	21295	3467	1195	9	0	4671
	Bloomington	Units	37	1	0	0	38	702	2	0	0	704
		Population	94	3	0	0	97	1130	4	0	0	1134
	Richfield	Units	571	15	0	0	586	69	0	0	0	69
		Population	1491	39	0	0	1530	116	0	0	0	116
	Eagan	Units	199	0	0	0	199	0	0	0	0	0
		Population	559	0	0	0	559	0	0	0	0	0
	Mendota Heights	Units	40	1	0	0	41	3	0	0	0	3
		Population	109	3	0	0	112	4	0	0	0	4
	All Cities	Units	7714	1458	43	0	9215	2522	657	4	0	3183
		Population	19764	3719	110	0	23593	4717	1199	9	0	5925
2025 DNL Noise Contours	Minneapolis	Units	7362	1872	79	0	9313	2108	706	6	0	2820
		Population	18773	4774	201	0	23748	4161	1306	14	0	5481
	Bloomington	Units	46	1	0	0	47	747	2	0	0	749
		Population	117	3	0	0	120	1202	4	0	0	1206
	Richfield	Units	692	74	0	0	766	69	0	0	0	69
		Population	1806	193	0	0	1999	116	0	0	0	116
	Eagan	Units	312	1	0	0	313	0	0	0	0	0
		Population	877	3	0	0	880	0	0	0	0	0
	Mendota Heights	Units	57	1	0	0	58	3	0	0	0	3
		Population	156	3	0	0	159	4	0	0	0	4
	All Cities	Units	8469	1949	79	0	10497	2927	708	6	0	3641
		Population	21729	4976	201	0	26906	5483	1310	14	0	6807

Note: Parcel Intersect Methodology; Single-Family=1 Unit, Multi-Family>1 Unit; Population Reflects Estimation Based on Multipliers Provided by Met Council.

Source: MAC analysis, 2012.



2020 and 2025 No Action Alternative DNL Noise Contours and Affected Parcels

LEGEND

Affected Parcels

Inside 2020 60 DNL

Between 2020 and 2025 60 DNL

Noise Contours

2020 No Action

2025 No Action

N

0 4,000 8,000 Meters

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5.14.5.2 Airlines Remain Alternative Noise Impacts

Based on the 484,879 total forecast operations in 2020, approximately 4,386 acres are in the 65 DNL noise contour and approximately 11,234 acres are in the 60 DNL contour of the Airlines Remain Alternative. **Table 5.14.4** contains the count of single-family and multi-family dwelling units and population in the 2020 and 2025 Airlines Remain Alternative DNL noise contours. The counts were completed using the same methodology used for the No Action Alternative.

Figure 5.14-3 provides the 2020 and 2025 Airlines Remain Alternative DNL noise contours and the parcels within the respective contours.

There are no areas of sensitive land uses that experience a 1.5 dB, or greater, increase in the 65 DNL noise contour when comparing the 2020 and 2025 Airlines Remain Alternative contours to the respective No Action DNL noise contours. The FAA’s impact threshold of significance is not met with the Airlines Remain Alternative. Therefore, no adverse impacts to sensitive land uses would be expected.

Table 5.14.4

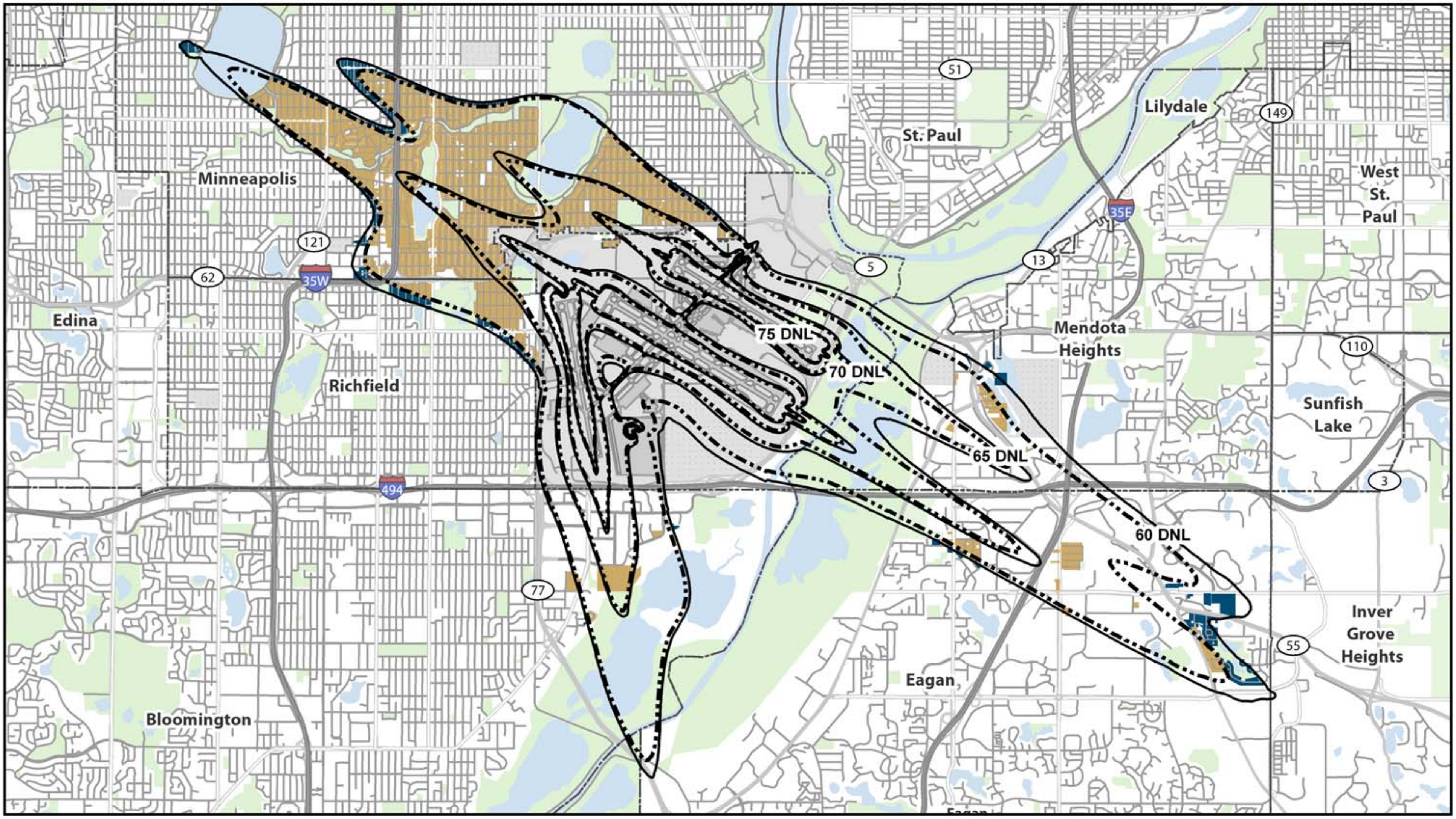
Summary of 2020 and 2025 DNL Alternative 1 – Airlines Remain Noise Contour Single-Family and Multi-Family Unit and Population Counts by Parcel

	City	Count	Single-Family					Multi-Family				
			60-64	65-69	70-74	75+	Total	60-64	65-69	70-74	75+	Total
2020 DNL Noise Contours	Minneapolis	Units	6890	1450	44	0	8384	1750	655	4	0	2409
		Population	17569	3698	112	0	21379	3472	1195	9	0	4676
	Bloomington	Units	37	1	0	0	38	702	2	0	0	704
		Population	94	3	0	0	97	1130	4	0	0	1134
	Richfield	Units	569	15	0	0	584	69	0	0	0	69
		Population	1485	39	0	0	1524	116	0	0	0	116
	Eagan	Units	198	0	0	0	198	0	0	0	0	0
		Population	556	0	0	0	556	0	0	0	0	0
	Mendota Heights	Units	39	1	0	0	40	3	0	0	0	3
		Population	107	3	0	0	110	4	0	0	0	4
	All Cities	Units	7733	1467	44	0	9244	2524	657	4	0	3185
		Population	19811	3743	112	0	23666	4722	1199	9	0	5930
2025 DNL Noise Contours	Minneapolis	Units	7312	1816	72	0	9200	2156	699	6	0	2861
		Population	18646	4630	184	0	23460	4239	1289	14	0	5542
	Bloomington	Units	40	1	0	0	41	747	2	0	0	749
		Population	102	3	0	0	105	1202	4	0	0	1206
	Richfield	Units	687	63	0	0	750	69	0	0	0	69
		Population	1794	164	0	0	1958	116	0	0	0	116
	Eagan	Units	341	1	0	0	342	0	0	0	0	0
		Population	958	3	0	0	961	0	0	0	0	0
	Mendota Heights	Units	55	1	0	0	56	3	0	0	0	3
		Population	150	3	0	0	153	4	0	0	0	4
	All Cities	Units	8435	82	72	0	10389	2975	701	6	0	3682
		Population	21650	4803	184	0	26637	5561	1293	14	0	6868

Note: Parcel Intersect Methodology; Single-Family=1 Unit, Multi-Family>1 Unit; Population Reflects Estimation Based on Multipliers Provided by Met Council.

Source: MAC analysis, 2012.

FIGURE 5.14-3



2020 and 2025 Alternative 1 - Airlines Remain DNL Noise Contours and Affected Parcels

LEGEND

Affected Parcels

- Inside 2020 60 DNL
- Between 2020 and 2025 60 DNL

Noise Contours

- 2020 Alternative 1
- 2025 Alternative 1

N

0 4,000 8,000 Meters

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5.14.5.3 Airlines Relocate Alternative Noise Impacts

Based on the 484,879 total forecast operations in 2020, approximately 4,387 acres are in the 65 DNL noise contour and approximately 11,230 acres are in the 60 DNL noise contour of the Airlines Relocate Alternative (Sponsor's Preferred Alternative). **Table 5.14.5** contains the count of single-family and multi-family dwelling units and population in the 2020 and 2025 Preferred Alternative DNL noise contours. The counts were completed using the same methodology used for the No Action Alternative.

Figure 5.14-4 provides the 2020 and 2025 Airlines Relocate Alternative (Sponsor's Preferred Alternative) DNL noise contours and the parcels within the respective contours.

There are no areas of sensitive land uses that experience a 1.5 dB, or greater, increase in the 65 DNL noise contour when comparing the 2020 and 2025 Airlines Relocate Alternative (Sponsor's Preferred Alternative) contours to the respective No Action Alternative DNL noise contours. The FAA's impact threshold of significance is not met with the Airlines Relocate Alternative (Sponsor's Preferred Alternative). Therefore, no adverse impacts to sensitive land uses would be expected.

Table 5.14.5
Summary of 2020 and 2025 DNL Alternative 2 - Airlines Relocate Noise Contour
Single-Family and Multi-Family Unit and Population Counts by Parcel

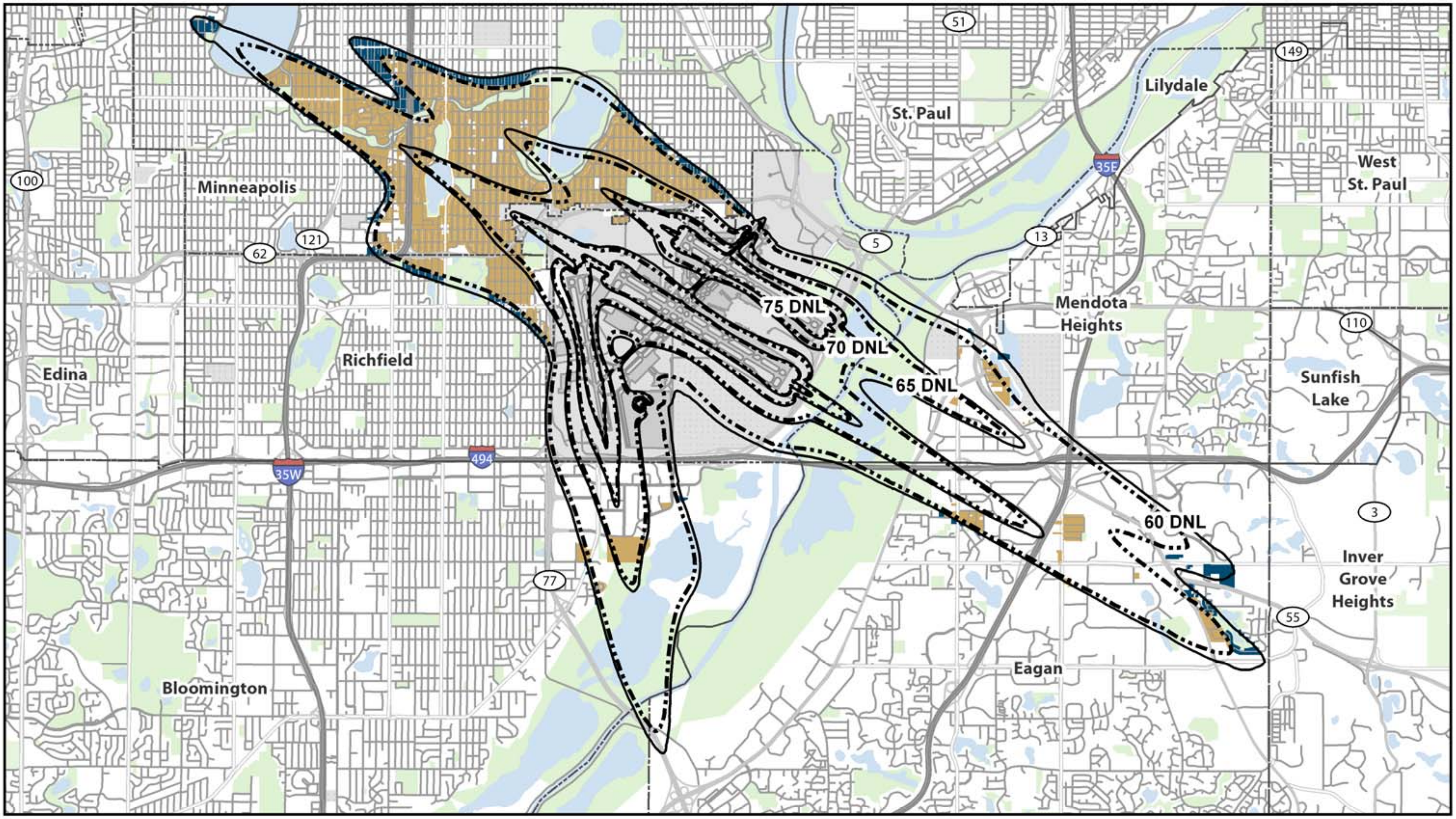
	City	Count	Single-Family					Multi-Family				
			60-64	65-69	70-74	75+	Total	60-64	65-69	70-74	75+	Total
2020 DNL Noise Contours	Minneapolis	Units	6718	1457	29	0	8204	1744	653	4	0	2401
		Population	17131	3715	74	0	20920	3445	1190	9	0	4644
	Bloomington	Units	38	1	0	0	39	702	2	0	0	704
		Population	97	3	0	0	100	1130	4	0	0	1134
	Richfield	Units	583	19	0	0	602	69	0	0	0	69
		Population	1521	50	0	0	1571	116	0	0	0	116
	Eagan	Units	210	0	0	0	210	0	0	0	0	0
		Population	590	0	0	0	590	0	0	0	0	0
	Mendota Heights	Units	39	1	0	0	40	3	0	0	0	3
		Population	107	3	0	0	110	4	0	0	0	4
	All Cities	Units	7588	1478	29	0	9095	2518	655	4	0	3177
		Population	19446	3771	74	0	23291	4695	1194	9	0	5898
2025 DNL Noise Contours	Minneapolis	Units	7580	1964	79	0	9623	2392	716	6	0	3114
		Population	19330	5008	201	0	24539	4632	1329	14	0	5975
	Bloomington	Units	46	1	0	0	47	747	2	0	0	749
		Population	117	3	0	0	120	1202	4	0	0	1206
	Richfield	Units	684	62	0	0	746	69	0	0	0	69
		Population	1785	162	0	0	1947	116	0	0	0	116
	Eagan	Units	308	1	0	0	309	0	0	0	0	0
		Population	865	3	0	0	868	0	0	0	0	0
	Mendota Heights	Units	44	1	0	0	45	3	0	0	0	3
		Population	120	3	0	0	123	4	0	0	0	4
	All Cities	Units	8662	2029	79	0	10770	3211	718	6	0	3935
		Population	22217	5179	201	0	27597	5954	1333	14	0	7301

Note: Parcel Intersect Methodology; Single-Family=1 Unit, Multi-Family>1 Unit; Population Reflects Estimation Based on Multipliers Provided by Met Council.

Source: MAC analysis, 2012.

Minneapolis-St. Paul International Airport 2020 Improvements EA

FIGURE 5.14-4



2020 and 2025 Alternative 2 - Airlines Relocate DNL Noise Contours and Affected Parcels

LEGEND

Affected Parcels

- Inside 2020 60 DNL
- Between 2020 and 2025 60 DNL

Noise Contours

- 2020 Alternative 2
- 2025 Alternative 2

N

0 4,000 8,000 Meters

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5.14.5.4 Comparison of Development Alternative Noise Impacts

There are no areas of sensitive land uses that would experience a 1.5 dB, or greater, increase in the 65 DNL noise contour and/or a 3.0 dB, or greater, increase in the 60 DNL noise contour when comparing the 2020 and 2025 Airlines Remain Alternative and the Airlines Relocate Alternative noise contours to the respective No Action Alternative DNL noise contours. When comparing the Action Alternatives DNL noise contours in 2020 and 2025 to the respective No Action Alternatives DNL noise contours the range of DNL change is minor. Specifically, when comparing the 2020 Airlines Remain Alternative 60+ DNL noise contour to the 2020 No Action Alternative 60+ DNL noise contour, the range of DNL change is -0.2 dB DNL to 0.2 dB DNL. In the case of the 2020 Airlines Relocate Alternative 60+ DNL noise contour the range of change when compared to the 2020 No Action Alternative 60+ DNL noise contour is -0.2 dB DNL to 0.3 dB DNL. Similarly, when comparing the 2025 Airlines Remain Alternative 60+ DNL noise contour to the 2025 No Action Alternative 60+ DNL noise contour the range of DNL change is -0.6 dB DNL to 0.6 dB DNL. In the case of the 2025 Airlines Relocate Alternative 60+ DNL noise contour the range of change when compared to the 2025 No Action Alternative 60+ DNL noise contour is -0.4 dB DNL to 0.6 dB DNL.

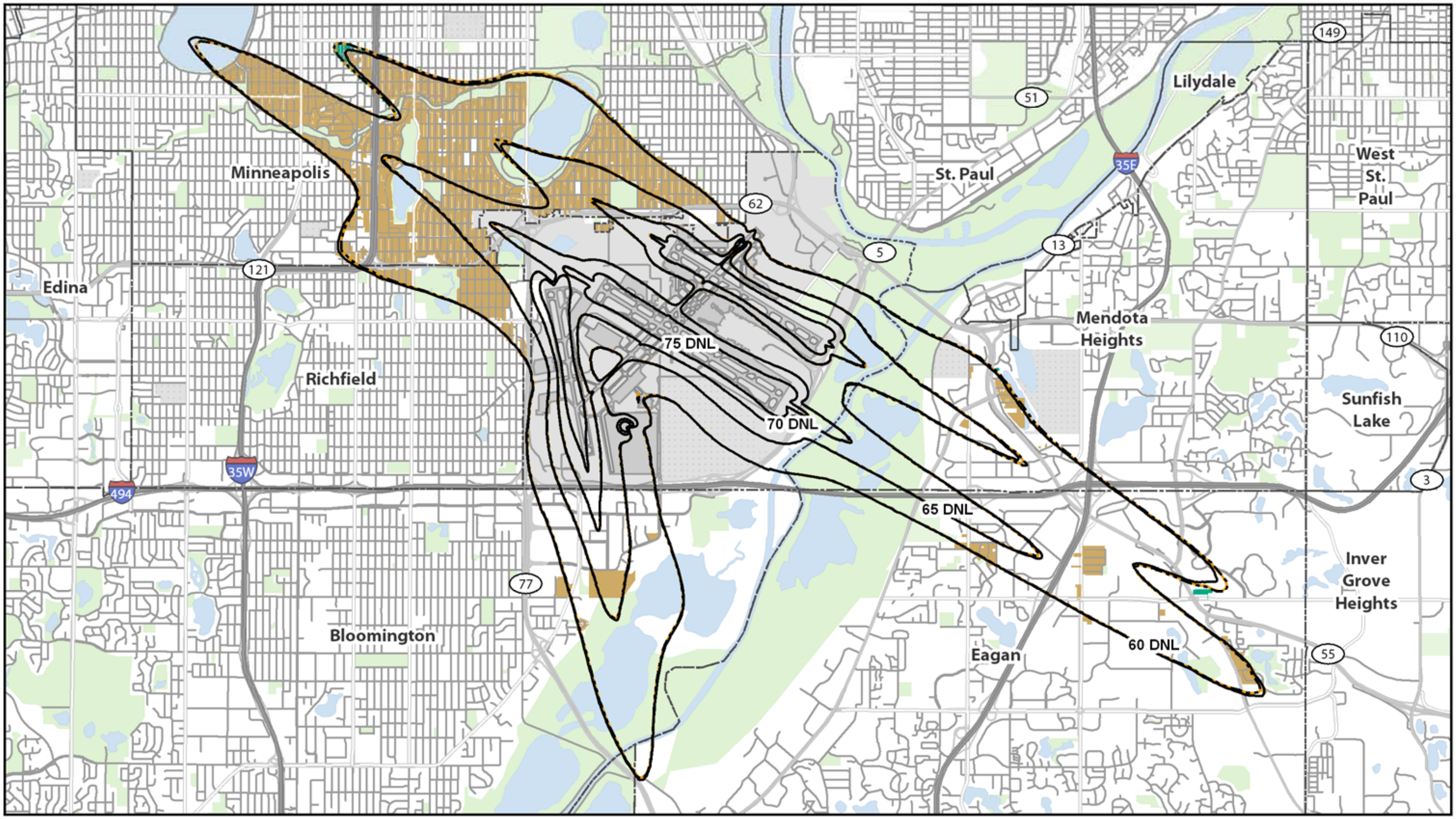
In 2020 the lowest number of residential units in the 65+ DNL noise contours is provided by the No Action Alternative. There are 10 more residential units in the Airlines Remain Alternative and 4 more residential units in the Airlines Relocate Alternative within the 65+ DNL noise contours. In 2025 the lowest number of residential units in the 65+ DNL noise contour is provided by the Airlines Remain Alternative. There are 81 more residential units in the No Action Alternative and 171 more residential units in the Airlines Relocate Alternative. However, for both 2020 and 2025 all residential units within the 65+ DNL noise contours of the development alternatives being considered have been provided noise mitigation. **Figure 5.14-5** provides a comparison of the 2020 No Action Alternative, the Airlines Remain Alternative, and the Airlines Relocate Alternative noise contours. **Figure 5.14-6** provides a comparison of the 2025 No Action Alternative, Airlines Remain Alternative, and the Airlines Relocate Alternative noise contours.

As is detailed in **Table 5.14.6** and **Table 5.14.7** there are only minor variations in 2020 and 2025 between the No Action Alternative and the Action Alternatives when looking at noise contour acreages, and the unit and population counts within each contour.

The small variation between the forecast impacts for the various alternatives is a function of FAA air traffic control procedures during low-demand time periods in conjunction with the RUS and the different geographic locations of new gate additions at MSP that are provided with the various development options.

Minneapolis-St. Paul International Airport 2020 Improvements EA

FIGURE 5.14-5



2020 Forecast DNL Noise Contour Comparison and Affected Parcels

LEGEND

Noise Contours
- No Action
- Alternative 1
- Alternative 2

Affected Parcels
- Inside Alternative 2 60 DNL
- Between No Action 60 DNL and Alternative 2
- Between Alternative 1 60 DNL and Alternative 2

N

0 | 3,700 | 7,400 Meters

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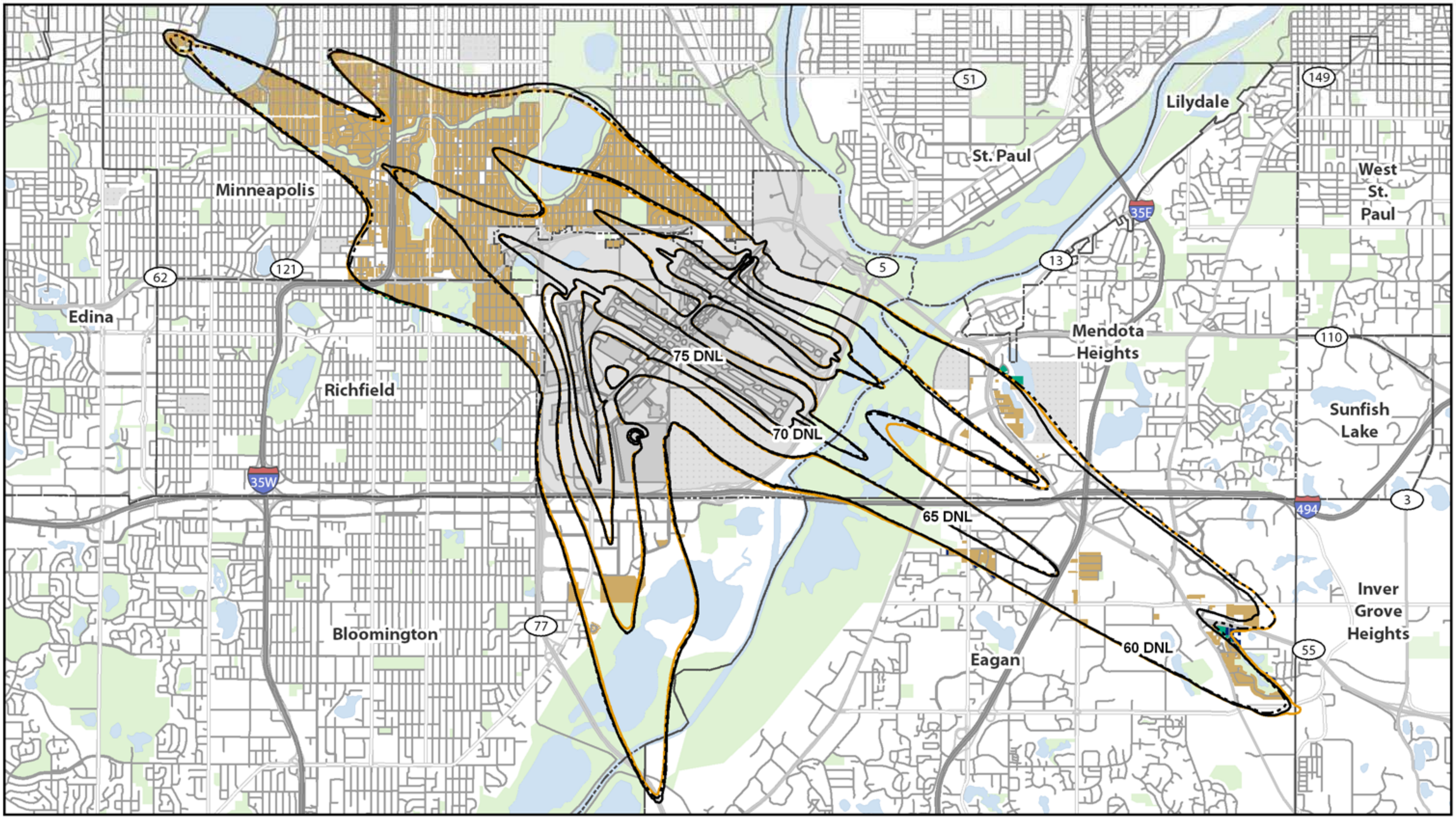
FIGURE
5.14-6



2025 Forecast DNL Noise Contour Comparison and Affected Parcels

LEGEND

Noise Contours
- No Action
- Alternative 1
- Alternative 2

Affected Parcels
- Inside Alternative 2 60 DNL
- Between No Action 60 DNL and Alternative 2
- Between Alternative 1 60 DNL and Alternative 2

N

0 3,900 7,800 Meters

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Table 5.14.6

2020 Comparison of DNL Noise Contour
Acreage and Affected Units and Population by Parcel

	Count	60-64	65-69	70-74	75+	Total
2020 No Action DNL Noise Contours	Acreage	6852	2795	928	665	**11240**
	Units	10236	2115	47	0	**12398**
	Population	24481	4918	119	0	**29518**
2020 Alternative 1 - Airlines Remain DNL Noise Contours	Acreage	6848	2793	928	665	**11234**
	Units	10257	2124	48	0	**12429**
	Population	24534	4941	121	0	**29596**
2020 Alternative 2 – Airlines Relocate DNL Noise Contours	Acreage	6843	2793	928	666	**11230**
	Units	10106	2133	33	0	**12272**
	Population	24141	4965	83	0	**29189**

Note:
Parcel intersect methodology; unit count reflects single-family and multi-family; population reflects estimation based on multipliers provided by Met Council.

Source: MAC analysis, 2012.

Table 5.14.7

2025 Comparison of DNL Noise Contour
Acreage and Affected Units and Population by Parcel

	Count	60-64	65-69	70-74	75+	Total
2025 No Action DNL Noise Contours	Acreage	7837	3188	1078	740	**12843**
	Units	11396	2657	85	0	**14138**
	Population	27212	6286	215	0	**33713**
2025 Alternative 1 – Airlines Remain DNL Noise Contours	Acreage	7796	3205	1074	739	**12814**
	Units	11410	2583	78	0	**14071**
	Population	27211	6096	198	0	**33505**
2025 Alternative 2 – Airlines Relocate DNL Noise Contours	Acreage	7834	3181	1081	740	**12836**
	Units	11873	2747	85	0	**14705**
	Population	28171	6512	215	0	**34898**

Note:
Parcel intersect methodology; unit count reflects single-family and multi-family; population reflects estimation based on multipliers provided by Met Council.

Source: MAC analysis, 2012.

5.14.6 Mitigation

The FAA's impact threshold of significance was not met with the Airlines Remain Alternative nor the Airlines Relocate Alternative, the Sponsor's Preferred Alternative.

As is detailed in Section 5.14.4.1, the MAC has been aggressively mitigating residential structures around MSP since 1992.

Table 5.14.8 contains the count of single-family dwelling units and population in the 2020 Sponsor's Preferred Alternative noise contours and **Table 5.14.9** contains the count of multi-family dwelling units and population within the 2020 Sponsor's Preferred Alternative noise contours. The counts are based on the block intersect methodology which is different from the impact analysis required by NEPA. This methodology counts all structures that are on parcels located on the blocks that are within or intersected by the respective DNL contour lines. Parcels with one to three dwelling units are counted as single-family and parcels with more than three dwelling units are counted as multi-family. This is the same methodology used since 1992 at MSP to determine mitigation eligibility around the airport. The counts in Tables 5.14.8 and 5.14.9 detail the 2020 Sponsor's Preferred Alternative counts in relation to previously mitigated areas and the 2020 Sponsor's Preferred Alternative noise contours.

Table 5.14.8

Summary of 2020 DNL Alternative 2 – Airlines Relocate Noise Contour Single-Family Unit and Population Counts by Block

City	Mitigation	Count	60-62	63-64	65-69	70-74	75+	Total
Minneapolis	In 2020 Forecast Contours previously mitigated under existing noise mitigation program	Units	4699	2021	2224	96	-	**9040**
		Population	11864	5124	5628	244	-	**22860**
2020 Forecast Changes	In 2020 63-64 DNL previously in 2007 60-62 DNL	Units	-	404	-	-	-	**404**
		Population	-	1020	-	-	-	**1020**
	In 2020 60-62 DNL previously between 2005 and 2007 60 DNL	Units	279	-	-	-	-	**279**
		Population	704	-	-	-	-	**704**
	In 2020 60-62 DNL previously outside 2005 and 2007 60 DNL	Units	448	-	-	-	-	**448**
		Population	1141	-	-	-	-	**1141**
	Total	Units	5426	2425	2224	96	-	**10171**
		Population	13709	6144	5628	244	-	**25725**
Bloomington	In 2020Forecast Contours previously mitigated under existing noise mitigation program	Units	39	51	3	0	-	**93**
		Population	100	130	6	0	-	**236**
Richfield	In 2020 Forecast Contours previously mitigated under existing noise mitigation program	Units	534	193	43	0	-	**770**
		Population	1388	504	112	0	-	**2004**
Eagan	In 2020 Forecast Contours previously mitigated under existing noise mitigation program	Units	179	63	0	0	-	**242**
		Population	503	177	0	0	-	**680**
Mendota Heights	In 2020 Forecast Contours previously mitigated under existing noise mitigation program	Units	45	0	1	0	-	**46**
		Population	119	0	3	0	-	**122**
All Cities	In 2020 Forecast Contours previously mitigated under existing noise mitigation program	Units	5496	2328	2271	96	-	**10191**
		Population	13974	5935	5749	244	-	**25902**
2020 Forecast Changes *(All Minneapolis)*	In 2020 63-64 DNL previously in 2007 60-62 DNL	Units	-	404	-	-	-	**404**
		Population	-	1020	-	-	-	**1020**
	In 2020 60-62 DNL previously between 2005 and 2007 60 DNL	Units	279	-	-	-	-	**279**
		Population	704	-	-	-	-	**704**
	In 2020 60-62 DNL previously outside 2005 and 2007 60 DNL	Units	448	-	-	-	-	**448**
		Population	1141	-	-	-	-	**1141**
	Total	Units	6223	2732	2271	96	-	**11322**
		Population	15819	6955	5749	244	-	**28767**

Note: Block Intersect Methodology; Single-Family=1-3 Units; Population Reflects Estimation Based on Multipliers Provided by Met Council.

Source: MAC analysis, 2012.

Table 5.14.9

Summary of 2020 DNL Alternative 2 – Airlines Relocate Noise Contour Multi-Family Unit and Population Counts by Block

City	Mitigation	Count	60-64	65-69	70-74	75+	Total
Minneapolis	In 2020 Forecast Contours previously mitigated under existing noise mitigation program	Units	872	520	-	-	**1392**
		Population	1639	869	-	-	**2508**
	Additional	Units	98	-	-	-	**98**
		Population	159	-	-	-	**159**
	Total	Units	1083	520	-	-	**1603**
		Population	1798	869	-	-	**2667**
Bloomington	In 2020 Forecast Contours previously mitigated under existing noise mitigation program	Units	1065	-	-	-	**1065**
		Population	1715	-	-	-	**1715**
Richfield	In 2020 Forecast Contours previously mitigated under existing noise mitigation program	Units	69	-	-	-	**69**
		Population	116	-	-	-	**116**
Eagan	In 2020 Forecast Contours previously mitigated under existing noise mitigation program	Units	-	-	-	-	**0**
		Population	-	-	-	-	**0**
Mendota Heights	In 2020 Forecast Contours previously mitigated under existing noise mitigation program	Units	-	-	-	-	**0**
		Population	-	-	-	-	**0**
All Cities	In 2020 Forecast Contours previously mitigated under existing noise mitigation program	Units	2119	520	-	-	**2639**
		Population	3470	869	-	-	**4339**
	Additional *(All Minneapolis)*	Units	98	-	-	-	**98**
		Population	159	-	-	-	**159**
	Total	Units	2217	520	-	-	**2737**
		Population	3629	869	-	-	**4498**

Note: Block Intersect Methodology; Multi-Family>3 Units; Population Reflect Estimation Based on Multipliers Provided by Met Council.

Source: MAC analysis, 2012.

As detailed in Table 5.14.8, there are 404 single-family homes that may move from the 60-62 DNL noise contour under the Consent Decree program to the 63 DNL noise contour in the 2020 Sponsor's Preferred Alternative noise contours. (Under the terms of the Consent Decree homes in the 63 and greater 2007 DNL noise contour received the full 5 dB noise mitigation package.)

There are 279 single-family homes that were, or will be, provided an estimated $2,900 in reimbursements for approved mitigation enhancements under the existing Consent Decree program that may move from the 2005 60 DNL noise contour under the Consent Decree to the 60 DNL in the 2020 Sponsor's Preferred Alternative noise contours. As stated above, under the terms of the Consent Decree homes in the 2007 60-62 DNL noise contours received air-conditioning and $4,000 for approved mitigation upgrades, or $14,000 for approved mitigation upgrades. Additionally, there are 448 single-family homes that were not eligible for mitigation under the terms of the Consent Decree that may move into the 60 DNL noise contour for the 2020 Sponsor's Preferred Alternative. The same mitigation program features would be available for homes that become eligible in the future. All of the single-family homes added to the DNL noise contours are located in the City of Minneapolis.

As is provided in Table 5.14.9**,** there are 98 multi-family units that were previously not included in the Consent Decree that would fall within the 2020 Preferred Alternative 60 DNL noise contour. Again, this estimate assumes the same multi-family mitigation program would be applied to the 2020 Preferred Alternative noise contour. All of the multi-family units added to the DNL noise contours are located in the City of Minneapolis.

A depiction of the residential blocks that have been mitigated, and those that will be provided noise mitigation by 2014 per the noise litigation Consent Decree, and the changes in eligibility relative to the 2020 Sponsor's Preferred Alternative noise contours are provided in **Figure 5.14-7**.

In consideration of the circumstances unique to MSP by virtue of past mitigation activities, the terms of the Consent Decree, and the local land use compatibility guidelines defined by the Metropolitan Council, mitigation is proposed. The proposed mitigation in the Draft EA/EAW was based on the 2020 Sponsor's Preferred Alternative 60+ DNL noise contour and included a trigger for when mitigation would begin (484,879 annual ops or the year 2020, whichever came first).

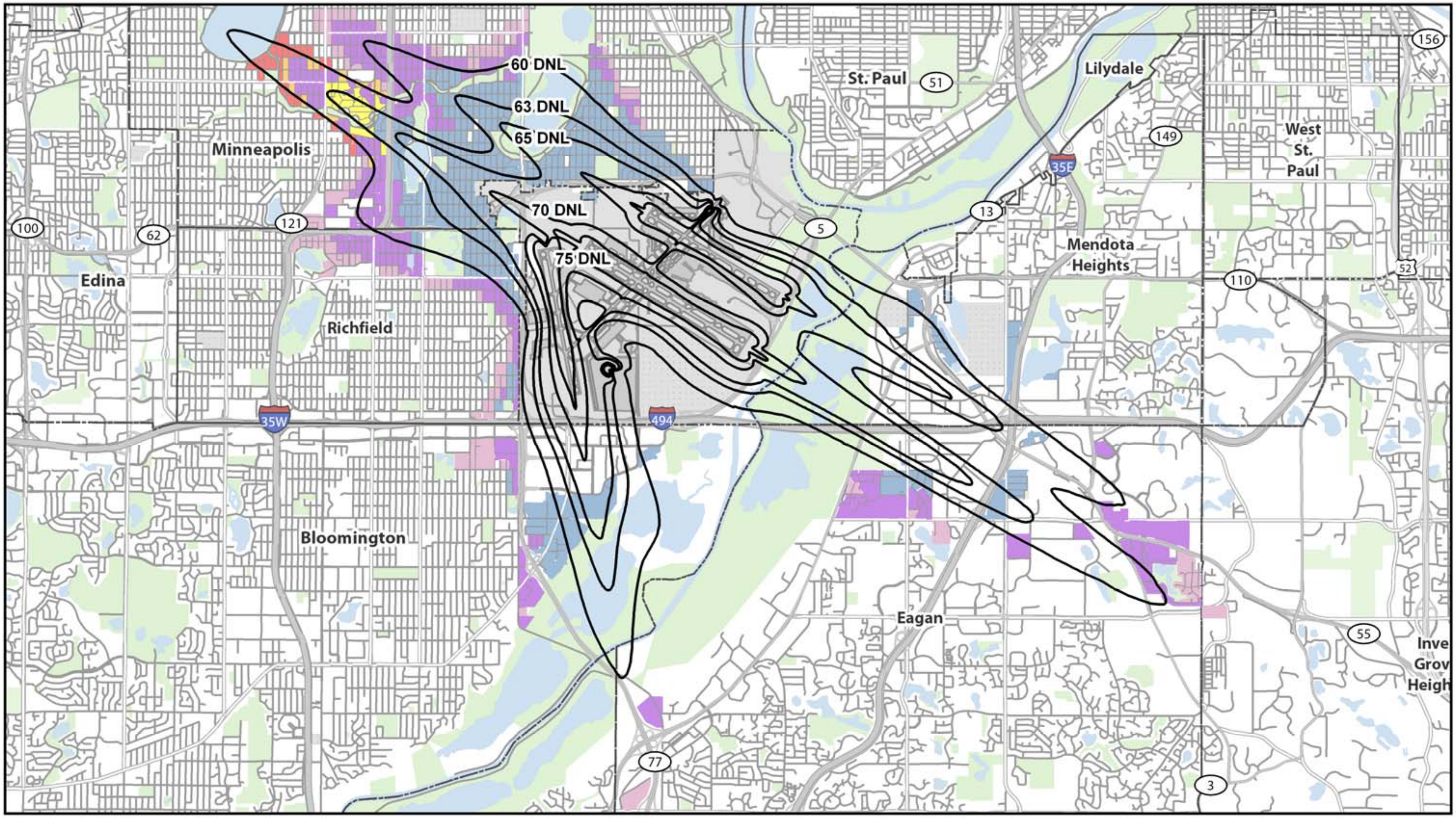
The proposed noise mitigation program in the Draft EA/EAW was revised during the development of the Final EA/EAW based on public comment. The mitigation program was revised to provide a more flexible framework that accounts for actual noise impacts in the context of future airport development scenarios and FAA operational initiatives.

The revised program eligibility and timing is based on annually-developed actual noise contours as opposed to the 2020 Sponsor's Preferred Alternative 60+ DNL noise contour and a 484,879 annual operations level. An outline of the proposed mitigation program follows:

- Mitigation eligibility would be assessed annually based on the actual noise contours for the previous year.

Minneapolis-St. Paul International Airport 2020 Improvements EA

FIGURE 5.14-7



MAC Existing Noise Mitigation Program and 2020 Alternative 2 - Airlines Relocate DNL Noise Contours

LEGEND

MAC Existing Noise Mitigation Packages

- Reimbursement
- Central AC & $4K or $14K
- -5 dBA Modifications

2020 Alternative 2 - Airlines Relocate Changes

- 2020 Alternative 2 Noise Contours
- Blocks in 2020 63 DNL previously in 2007 60-62 DNL
- Blocks in 2020 60 DNL previously between 2005 and 2007 60 DNL
- Blocks in 2020 60 DNL previously outside 2005 and 2007 60 DNL

N

0 4,250 8,500 Meters

Disclaimer: This map was generated by the Metropolitan Airports Commission using GIS (Geographic Information System) software. No claims are made to the accuracyor completeness of the information shown herein nor to its suitablity for a particular use. The scale and location of all mapped data are approximate.

HNTB

- The annual mitigation assessment would begin with the actual noise contour for the year in which the ROD was approved.
- For a home to be considered eligible for mitigation it must be located in the actual 60+ DNL noise contour, within a higher noise impact mitigation area when compared to its status relative to the Consent Decree noise mitigation program, for a total of three consecutive years, with the first of the three years beginning no later than 2020.
- The noise contour boundary would be based on the block intersect methodology.
- Homes would be mitigated in the year following their eligibility determination.

5.14.7 Permitting

There are no permits required related to noise.

5.14.8 Summary

There are no areas of sensitive land uses that would experience a 1.5 dB, or greater, increase in the 65 DNL noise contour and or a 3.0 dB, or greater, increase in the 60 DNL noise contour when comparing the 2020 and 2025 Airlines Remain Alternative and the Airlines Relocate Alternative noise contours to the respective No Action Alternative DNL noise contours. In 2020 the lowest number of residential units in the 65+ DNL noise contours is provided by the No Action Alternative. There are 10 more residential units in the Airlines Remain Alternative and 4 more residential units in the Airlines Relocate Alternative within the 65+ DNL noise contours. In 2025 the lowest number of residential units in the 65+ DNL noise contour is provided by the Airlines Remain Alternative. There are 81 more residential units in the No Action Alternative and 171 more residential units in the Airlines Relocate Alternative. However, in both 2020 and 2025 all residential units within the 65+ DNL noise contours of the development alternatives being considered have been provided noise mitigation and, as such, are considered a mitigated incompatible land use.

However, in consideration of the circumstances unique to MSP by virtue of past mitigation activities, the terms of the Consent Decree, and the local land use compatibility guidelines defined by the Metropolitan Council, this EA/EAW proposes mitigation based on the annually-developed actual noise contours in a manner consistent with the provisions of the Consent Decree.

5.15 Vehicular Noise

The following sub-sections provide the regulatory background, methodology, thresholds of significance, existing conditions, impact analysis and potential mitigation for vehicular noise impacts.

5.15.1 Regulatory Background

A separate noise analysis was conducted for the vehicular traffic changes that would result from the proposed airport alternatives to satisfy FHWA requirements. The FHWA typically requires a 20 year forecast horizon be reviewed for the noise analysis as a part of its NEPA guidance. A vehicular noise impact analysis must be completed for all Federal or Federal-aid Type I projects (construction of a highway meeting one or more of eight criteria defined in 23 CFR 772.5). The planned auxiliary lane on westbound I-494 between 24th Avenue

South and the ramp to southbound TH 77 makes this a Type I project.

5.15.2 Methodology

This analysis reviewed the 2030 vehicular noise with and without the proposed regional roadway improvements. The Airlines Remain and Airlines Relocate Alternatives are two different development scenarios that result in different development plans in 2020 and 2025. However, regardless of whether the Airlines Remain or Airlines Relocate Alternative is selected, the development plan by 2030 is the same. Therefore, consistent with the 2030 MSP LTCP, only one Action Alternative was evaluated for the traffic noise analysis. The details of this analysis can be found in ***Appendix Q****, Traffic Noise – Proposed Roadway Improvements technical memorandum*.

Noise is defined as any unwanted sound. For highway traffic noise, an adjustment, or weighting, of the high- and low- pitched sound is made to approximate the way that an average person hears sound. The adjusted sound levels are stated in units of "A-weighted decibels" (dBA). A sound increase of 3 dBA is barely noticeable by the human ear, a 5 dBA increase is clearly noticeable, and a 10 dBA increase is heard as twice as loud. For example, if the sound energy is doubled (i.e., the amount of traffic doubles), there is a 3 dBA increase in noise, which is just barely noticeable to most people. On the other hand, if traffic increases by a factor of ten times, the resulting sound level will increase by about 10 dBA and be heard to be twice as loud.

In Minnesota, traffic noise impacts are evaluated by measuring and modeling the traffic noise levels that are exceeded 10 percent and 50 percent of the time during the hours of the day and/or night that have the loudest traffic scenario. These numbers are identified as the L_{10} and L_{50} levels, respectively. The L_{10} value is the noise level that is exceeded for a total of 10 percent, or 6 minutes, of an hour. The L_{50} value is the noise level that is exceeded for a total of 50 percent, or 30 minutes, of an hour.

5.15.3 Thresholds of Significance

A traffic noise impact analysis is completed for all Federal or Federal-aid Type I projects. Noise impacts are determined based on land use activities and predicted worst hourly L_{10} noise levels under future conditions. Land use activities in the vicinity of MSP include industrial, hotel, commercial, business, office, recreational, cemeteries and parks. The federal noise abatement criterion are described for these land uses below:

- For parks, cemeteries, and recreational areas (Activity Category C), the federal noise abatement criterion is 70 dBA (L_{10}).
- For hotels, motels, and commercial/business/office land uses (Activity Category E), the federal noise abatement criterion is 75 dBA (L_{10}).
- There is no impact criterion for developed lands that are not sensitive to highway traffic noise (e.g., industrial land uses) (Activity Category F).

The MPCA is the state agency responsible for enforcing state noise rules. Minnesota state noise standards have been established for daytime and nighttime periods. The MPCA defines daytime as 7:00 a.m. to 10:00 p.m. and nighttime from 10:00

p.m. to 7:00 a.m. Minnesota state noise standards are described below:

- For residential land uses (Noise Area Classification 1), the state daytime standard is 65 dBA (L_{10}) and 60 dBA (L_{50}). The state nighttime standard is 55 dBA (L_{10}) and 50 dBA (L_{50}).
- For commercial land uses (Noise Area Classification 2), the state daytime and nighttime standard is 70 dBA (L_{10}) and 65 dBA (L_{50}).
- For industrial land uses (Noise Area Classification 3), the state daytime and nighttime standard is 80 dBA (L_{10}) and 75 dBA (L_{10}).

Receptor locations where noise levels are "approaching" or exceeding the federal criterion level, or exceeding state noise standards must be evaluated for noise abatement feasibility and reasonableness. A noise impact is defined as a "substantial increase" in the future modeled noise levels over the existing modeled noise levels. In Minnesota, "approaching" is defined as 1 dBA or less below the Federal noise abatement criteria. For example, 69 dBA (L_{10}) is defined as "approaching" the Federal noise abatement criterion for parkland uses (Activity Category C). A "substantial increase" is defined as an increase of 5 dBA or greater from existing to future conditions. Traffic noise levels were modeled at a total of 108 representative receptor locations along the I-494 and TH 5 project corridor.

5.15.4 Existing Conditions

Existing (2010) daytime modeled noise levels range from 55.7 dBA (L_{10}) to 77.1 dBA (L_{10}), whereas nighttime modeled noise levels range from 53.5 dBA (L_{10}) to 75.4 dBA (L_{10}). Modeled daytime traffic noise levels for existing conditions exceed state daytime L_{10} standards at 29 modeled receptor locations. Modeled nighttime traffic noise levels for existing conditions exceed state nighttime L_{10} standards at 22 modeled receptor locations. Modeled L_{10} noise levels are projected to approach or exceed federal noise abatement criteria at 11 modeled receptor locations for existing conditions.

5.15.5 Impact Analysis

Increases in forecast traffic volumes and construction of the proposed roadway improvements are projected to result in increases in traffic noise levels compared to existing conditions.

Modeled daytime traffic noise levels are predicted to increase by 0.9 dBA to 2.6 dBA under the No Action Alternative compared to existing conditions. Daytime modeled noise levels are predicted to range from 56.7 dBA (L_{10}) to 78.3 dBA (L_{10}) with the future No Action Alternative. Nighttime modeled noise levels are predicted to range from 54.6 dBA (L_{10}) to 76.6 dBA (L_{10}). Modeled daytime traffic noise levels are predicted to exceed State daytime L_{10} standards at 35 modeled receptor locations with the No Action Alternative. Modeled nighttime traffic noise levels are predicted to exceed state nighttime L_{10} standards at 25 modeled receptor locations with the No Action Alternative. Modeled L_{10} noise levels are projected to approach or exceed federal noise abatement criteria at 24 modeled receptor locations with the No Action Alternative.

Modeled daytime traffic noise levels are predicted to increase by 0.9 dBA to 2.7 dBA under the future (2030) Action Alternative compared to existing conditions. Daytime modeled noise levels are predicted to range from 56.8 dBA (L_{10}) to 78.3 dBA (L_{10}) with the future Action Alternative. Nighttime modeled noise levels are predicted to range from 54.6 dBA (L_{10}) to 76.6 dBA (L_{10}) with the future Action Alternative. Modeled daytime traffic noise levels are predicted to exceed state daytime L_{10} standards at 35 modeled receptor locations with the 2030 Action Alternative, whereas modeled nighttime traffic noise levels are predicted to exceed state nighttime L_{10} standards at 25 modeled receptor locations with the Action Alternative. Modeled L_{10} noise levels are projected to approach or exceed federal noise abatement criteria at 24 modeled receptor locations within the project area under the future Action Alternative.

Noise barriers were evaluated at modeled receptor locations where traffic noise levels were predicted to exceed state standards or approach/exceed federal noise abatement criteria. None of the modeled noise barriers were found to be reasonable (i.e. meet the noise reduction design goal of 7 dBA or the cost effectiveness criteria of $43,500/ benefited receptor).

5.15.6 Summary

There was no change in the number of modeled receptors that approach or exceed state standards or federal noise abatement criteria under the 2030 Action Alternative when compared to the 2030 No Action Alternative. None of the modeled receptor locations are projected to experience a substantial increase in traffic noise levels from existing conditions to the future Action Alternative. The 2030 vehicular noise analysis found that noise barriers were not reasonable because they did not meet the noise reduction design goal or cost effectiveness criteria.

5.16 Secondary (Induced) Impacts

Secondary impacts include shifts in patterns of population movement and growth, changes in demand for public services, and changes in business and economic activity that are influenced by airport development. It is not anticipated that the Alternatives would result in shifts in population movement or growth, changes in demands for public services or changes in business and economic activity. Furthermore, according to Order 1050.1E secondary impacts would not normally be significant except where there is also a significant impact to another category; particularly noise, compatible land use, or social impact. Since none of the Alternatives would result in impacts exceeding the threshold of significance in any impact category, secondary impacts would not be expected.

5.17 Socioeconomic Impacts, Environmental Justice, and Children's Health and Safety Risks

This section discusses the potential for socioeconomic, environmental justice, and Children's Health and Safety Risks impacts.

5.17.1 Socioeconomic Impacts (Except Vehicular Traffic)

Socioeconomic impacts may result from relocation of residences and businesses, alteration of surface transportation, division of established communities, disruption of orderly planned development, or changes in employment.

The potential for the alternatives to result in socioeconomic impacts related to all of these circumstances except alteration of surface transportation would be minimal and is addressed in this sub-section. Because of the nature of the Proposed Action, extensive analysis was conducted to evaluate the potential for surface transportation impacts. Therefore, the potential for the Alternatives to result in changes in surface transportation is addressed separately in the next sub-section, *Vehicular Traffic and Circulation*.

The No Action Alternative does not include property acquisition and includes minimal construction entirely on airport property. Therefore, the No Action Alternative would not result in the relocation of residences or businesses, division of communities, disruption of planned development, or appreciable changes in employment.

Neither of the Action Alternatives would require the relocation of residences. Both would require the relocation of one business, the SuperAmerica located at the intersection of Post Road and Trunk Highway (TH) 5. As the SuperAmerica would be relocated just to the south of its current location for both Action Alternatives, the relocation would not be considered a socioeconomic impact in relation to loss of businesses or employment. The Action Alternatives only require construction on existing airport property or within existing road right-of-way. Therefore, neither alternative would result in division of communities or disruption of planned development.

5.17.2 Socioeconomic Impacts - Vehicular Traffic and Circulation

Potential impacts to traffic and circulation are addressed to satisfy both NEPA and Minnesota's Environmental Assessment Worksheet requirements.

5.17.2.1 Regulatory Background

No known laws establish criteria for vehicular traffic operations on or off the airport. The focus of the analysis was on any potential impacts of on-airport and off-airport traffic that might disrupt or substantially reduce the quality of circulation and traffic movement in the vicinity of the airport.

5.17.2.2 Approach and Methodology

On- and off-airport ground transportation facilities were evaluated for impacts from the No Action, Airlines Remain and Airlines Relocate Alternatives in 2020 and 2025. Additionally, regional roadway improvements out to 2030 were assessed to satisfy FHWA NEPA traffic evaluation requirements. The potential vehicular traffic impacts were determined by comparing the operating conditions under each alternative. The following paragraphs briefly describe the evaluation methodology for each of the components of the ground transportation system.

Parking Facilities

The operating conditions of parking facilities were evaluated by determining if the demand for parking would exceed the available parking supply. More detailed information regarding the evaluation of parking facilities is provided in ***Appendix H***, *Landside Facilities Technical Report*.

Curb Roadways

Curb roadways operations were evaluated based on the ratio of volume to capacity (v/c). Terminal curb roadway capacity is considered a function of the through capacity, or number of lanes, the service capacity, or length of curb available to load and unload passengers and the ideal capacity balance of those activities. The volume to capacity (v/c) ratio represents the level of congestion on the curb as measured against the through capacity and service capacity. A v/c ratio of 1.0 represents the capacity of the roadway in a gridlock situation. A v/c ratio of 0.70 during peak periods represents an adequate LOS where conditions are busy but have not reached a gridlock scenario. More detailed information regarding the evaluation of curb roadways is provided in ***Appendix H***.

On and Off Airport Roadways

Operational conditions of roadways are qualitatively expressed in LOS. "Letters designate each level, from A to F, with LOS A representing the best operating conditions and LOS F the worst. Each LOS represents a range of operating conditions and the driver's perspective of those conditions."[30] For planning purposes LOS D or better (LOS A-D) is typically recognized by transportation agencies as satisfactory operations.

Different measures of effectiveness such as density of traffic or delay are used to determine the LOS for different elements of a transportation system. For instance, the LOS for basic freeway segments is based on the vehicle density expressed in passenger cars per mile per lane. General definitions of basic freeway service levels and the associated densities are presented in **Table 5.17.1.**

Table 5.17.1

Freeway Service Levels

LOS	Description	Density Range (pc/mi/ln)[(1)]
A	Free-flow operations; free-flow speeds prevail; vehicles are almost completely unimpeded	0-11
B	Reasonably free-flow operations, free-flow speeds are maintained; only slight restriction in ability to maneuver freely; a high level of physical and psychological comfort exists	>11-18
C	Speeds are at or near free-flow; there is noticeable restriction in the freedom to maneuver; lane change require more care; minor incidents may be absorbed but local deterioration in level of service may be significant	>18-26
D	Speeds begin to decline from free-flow speeds; flows and density increase; freedom to maneuver is limited and the physical and psychological comfort level is reduced; minor incidents can be expected to create queuing	>26-35
E	Operations are at capacity; operations are volatile because there are virtually no gaps in the traffic stream; vehicles are closely spaced; an incident can be expected to cause serious breakdown and queuing; physical and psychological comfort level is poor	>35-45
F	Breakdown in vehicular flow; demand exceeds capacity; significant queuing behind breakdown locations; speeds are often considerably below free-flow speeds	>45

Note:
(1) pc/ln/mi = passenger cars per lane per mile.

Source: Highway Capacity Manual.

ON-AIRPORT ROADWAYS

Determining the LOS for on-airport roadways is more complex than for basic freeway segments. On-airport roadways function differently than freeway segments. There are higher proportions of unfamiliar motorists and large vehicles, and a large number of complex directional signs.[31] As a result, the methodology and measures of effectiveness used to determine the LOS are also different.

The LOS for the on-airport roadway segments was determined using a number of factors and resources including:

- Measures of Effectiveness - Traffic models for the Terminal 1-Lindbergh and Terminal 2-Humphrey roadway networks were built using VISSIM micro-simulation software. This simulation tool was used to estimate the measures of effectiveness including density, speed and delay.
- Nature of the traffic function (merging, diverging, weaving, or none of these) on the roadway segment
- Animations of the traffic simulations used to generate the above measures of effectiveness
- Reference guidance from the *2010 Highway Capacity Manual* and Airport Cooperative Research Program (ACRP) Report 40: *Airport Curbside and Terminal Area Roadway Operations*

More detailed information regarding the evaluation of on-airport roadways is provided in *Appendix H.*

OFF-AIRPORT ROADWAYS

To evaluate the operating conditions of off-airport roadways the LOS of the intersections and freeway segments were determined. For intersections, the LOS of the overall intersections as well as the LOSs of the individual turning or thru movements were considered.

The LOS was determined by comparing the vehicle delay for intersections and the vehicle density for freeway segments to the LOS criteria in the Highway Capacity Manual. The delay and density data were obtained from VISSIM simulations of the roadway network. **Tables 5.17.2** and **5.17.3** list the LOS thresholds for signalized intersections and unsignalized intersections, respectively. The freeway service levels, descriptions and associated densities are shown in Table 5.17.1.

Table 5.17.2

LOS Criteria for Signalized Intersections

LOS	Control Delay per Vehicle (sec/veh)(1)
A	≤ 10
B	> 10-20
C	> 20-35
D	> 35-55
E	> 55-80
F	> 80

Notes:
(1) sec/veh = seconds per vehicle

Source: *Highway Capacity Manual*, Chapter 16.

Table 5.17.3

LOS Criteria for Unsignalized Intersections

LOS	Control Delay per Vehicle (sec/veh)(1)
A	$\leq$ 10
B	> 10-15
C	> 15-25
D	> 25-35
E	> 35-50
F	> 50

Notes:
(1) sec/veh = seconds per vehicle

Source: *Highway Capacity Manual*, Chapter 17.

5.17.2.3 Thresholds of Significance

Parking Facilities

For parking facilities, an impact may be considered significant if:

- The requirement for parking facilities exceeded the available supply under that alternative,
- That deficit would not exist under the No Action Alternative, and
- The deficit had secondary adverse impacts of significance on transportation system operations in the vicinity of the airport.

Curb Roadways

For terminal curb roadways an impact would be considered significant if:

- The alternative caused a curb roadway currently operating at an acceptable LOS, defined by a v/c ratio of less than or equal to 0.70, to deteriorate to a failing level (>1.0), or
- The alternative caused a curb roadway currently operating at a failing LOS, to deteriorate further and caused secondary adverse impacts to off-airport roadways.

On-Airport Roadways

For on-airport roadways, an impact would be considered significant if:

- The alternative caused a roadway currently operating at an acceptable LOS, defined as LOS D or better, to deteriorate to a failing level when the No Action Alternative for the same year of analysis operated at an acceptable LOS, or
- The alternative caused a roadway currently operating at an unacceptable LOS to deteriorate further and caused secondary adverse impacts to off-airport roadways.

Off-Airport Roadways

For overall intersections and intersection movements, an impact would be considered significant if:

- The alternative caused an intersection currently operating at an acceptable LOS to deteriorate to an E or F
  - and the No Action Alternative for the same year of analysis operated at an acceptable LOS,
  - and the alternative caused substantial secondary adverse impacts to nearby roadways,

or

- The alternative caused an intersection LOS to deteriorate to an F
  - and the No Action Alternative for the same year of analysis operated at an LOS E,
  - and the alternative caused substantial secondary adverse impacts to nearby roadways.

For freeway segments, an impact would be considered significant if:

- The alternative caused a freeway segment currently operating at an acceptable LOS, to deteriorate to an E or F
  - and the No Action Alternative for the same year of analysis operated at an acceptable LOS,
  - and the increase in airport traffic on the subject freeway link would be more than 10% of the total traffic on that link,

or

- The alternative caused a freeway segment to deteriorate to an LOS F
  - and the No Action Alternative for the same year of analysis operated at an LOS E,
  - and the increase in airport traffic on the subject freeway link would be more than 10% of the total traffic on that link.

5.17.2.4 Affected Environment

The Traffic and Circulation Study Area was identified by determining the limit of where the Alternatives would alter traffic patterns. The Traffic and Circulation Study Area shown in **Figure 5.17-1** includes all on-airport vehicle facilities as well as 34th Avenue South, Post Road, Glumack Drive, and segments of I-494, TH 5 and TH 77 (Cedar Avenue).

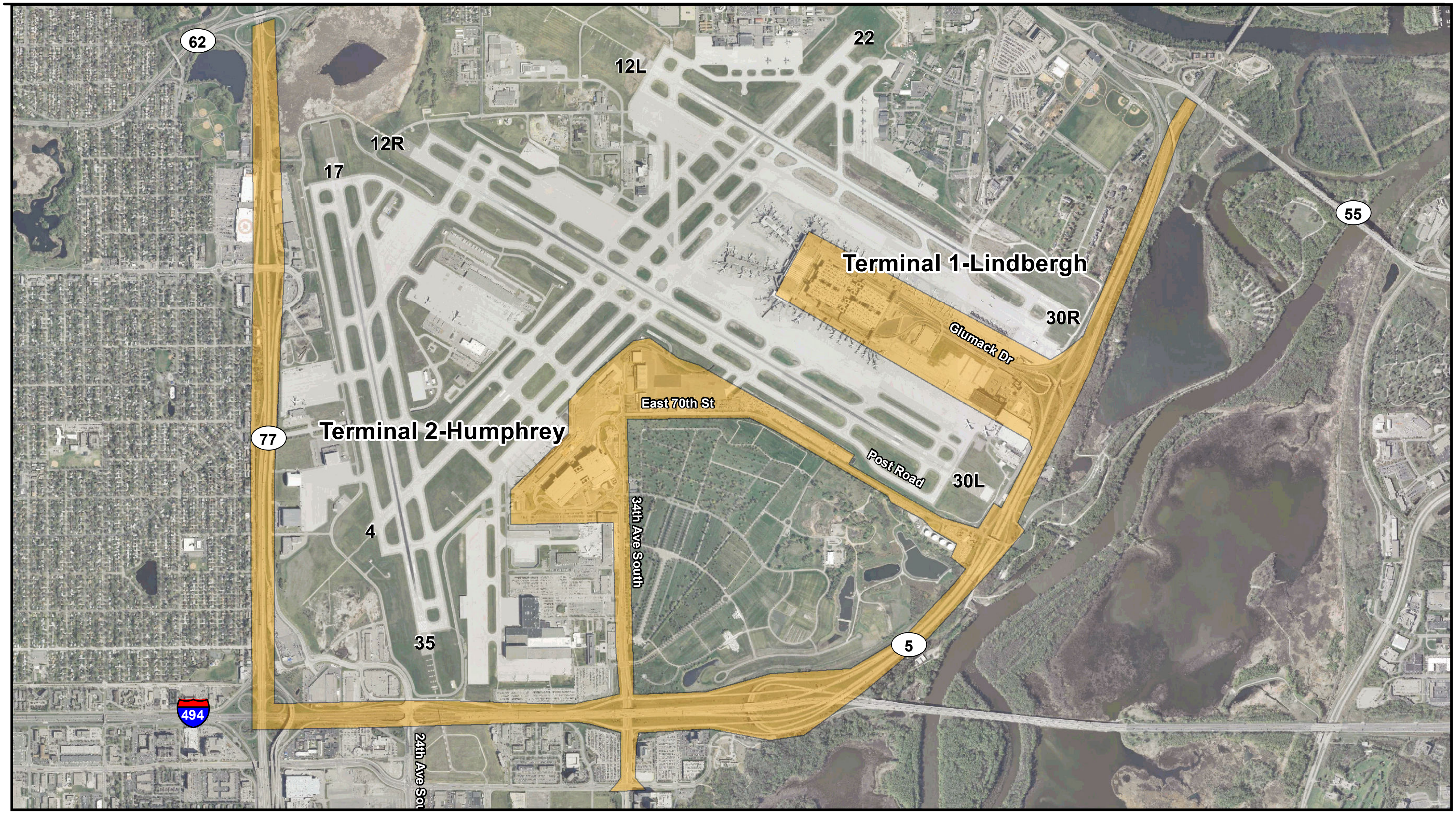
The existing ground transportation facilities within the Traffic and Circulation Study Area include parking facilities, terminal curb roadways, and access roads. Each of these facilities and its current (2010) operating conditions are summarized in the following sub-sections.

Parking Facilities

There are 12,870 and 9,110 public parking spaces available at Terminal 1-Lindbergh and Terminal 2-Humphrey, respectively. Of these spaces, 967 at Terminal 1-Lindbergh and 505 at Terminal 2-Humphrey are designated for short-term parking while the remainder are designated for general or long-term parking. A portion of the general parking spaces at Terminal 2-Humphrey are used by airport employees.

According to the operating conditions analysis, the parking facilities at both terminals provided a sufficient capacity in 2010. However, it was noted that on occasion during peak periods busier than the average day of the peak month, the demand for parking in the Terminal 1-Lindbergh parking ramps exceeds the capacity and vehicles are forced to park at the Terminal 2-Humphrey parking ramps.

FIGURE 5.17-1



LEGEND

Traffic and Circulation Study Area

Traffic and Circulation Study Area

N

0 0.2 0.4 0.8 Miles

Source: ESRI Data

Disclaimer: This map was generated by HNTB Corporation using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitablity for a particular use. The scale and location of all mapped data are approximate.

MAC

HNTB

Curb Roadways

Terminal 1-Lindbergh has a two-level terminal curb roadway with the upper level (ticketing) serving departing passengers and the lower level (baggage claim) serving arriving passengers. The upper level departures roadway has an inner curb which is used as the primary curb for passenger drop off. There is also an outer curb which has two through lanes and three left lane curb pockets for drop-off. The lower level arrivals roadway has an inner curb and five lanes used for passenger pick up by private vehicles. The outer curb is separated by a barrier and is used as a ground transportation center.

At Terminal 2-Humphrey the curb is four lanes wide. The first half of the curb located adjacent to airline ticketing facilities is used for passenger drop-off. The second half located adjacent to baggage claim facilities is used for passenger pick-up.

The 2010 operating conditions of the Terminal 1-Lindbergh and Terminal 2-Humphrey curbs were assessed. With the exception of the Terminal 1-Lindbergh arrivals curb, all curbs operated with a v/c ratio less than 0.70 in 2010. The v/c ratio for the Terminal 1-Lindbergh arrivals curb was 0.80 in 2010.

On-Airport Roadways

All inbound traffic enters the Terminal 1-Lindbergh campus from eastbound and westbound TH 5 via inbound Glumack Drive. Parking, rental car return, transit center and commercial vehicle traffic exit on the left side of Glumack Drive prior to the curbside roadways. All exiting traffic from Terminal 1-Lindbergh uses outbound Glumack Drive to TH 5. The Terminal 1-Lindbergh on-airport roadway segments are shown on **Figure 5.17-2**.

At Terminal 2-Humphrey, the majority of traffic uses 34th Avenue South to access the terminal facilities. Only taxis and a small portion of other traffic use Post Road and 70th Street to access Terminal 2-Humphrey. The majority of outbound traffic exits via 34th Avenue South. The Terminal 2-Humphrey on-airport roadway segments are shown on **Figure 5.17-3**.

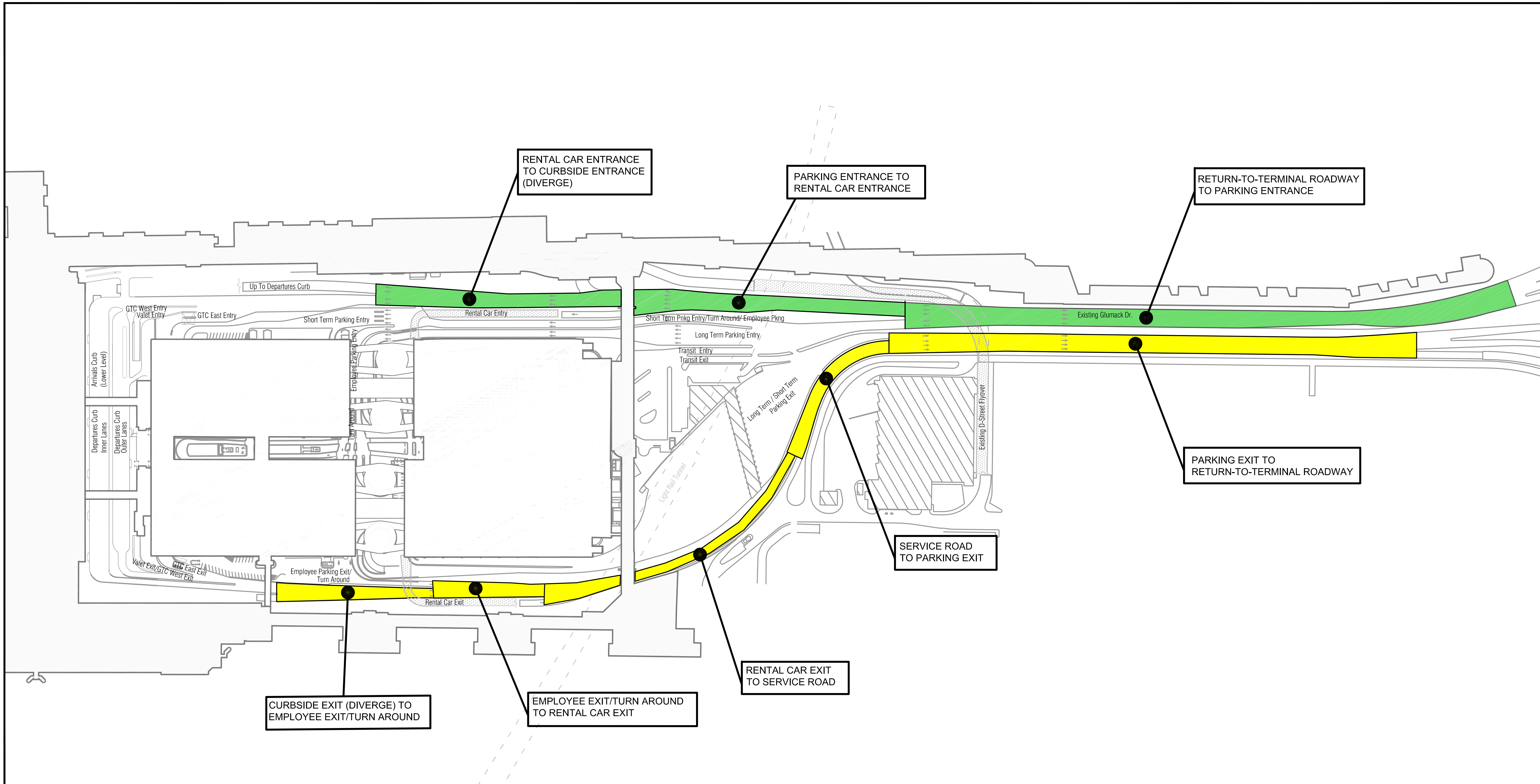
According to the analysis and modeling, all on-airport roadway segments at both terminals operate at an acceptable LOS C or better during the 2010 peak hour.

Off-Airport Roadways

The off-airport roadways within the Traffic and Circulation Study Area include 34th Avenue South, Post Road, East 70th Street, I-494, TH 5 and TH 77 (Cedar Avenue). **Table 5.17.4** shows a summary of general characteristics of these roadways including the posted speed, number of lanes and the 2010 average daily traffic (ADT) volumes. Descriptions of additional features are provided in the following sub-sections.

34TH AVENUE SOUTH

34th Avenue South follows a north/south alignment and provides access from I-494 to Terminal 2-Humphrey, Fort Snelling National Cemetery, and several Delta Air Lines Facilities. The portion of 34th Avenue South located north of I-494 is owned and maintained by the MAC. Five through-lanes are provided south of East 72nd Street with two lanes for northbound traffic and three lanes for southbound traffic. Traffic flow along 34th Avenue South is influenced by the Hiawatha LRT line which runs in the median. All left-turn movements across the LRT tracks have exclusive left-turn lanes where turns are permitted only when the traffic signal shows a green arrow.



LEGEND

Inbound

Outbound

Terminal 1-Lindbergh
On-Airport Roadways

N

0 200' 400'

Source: Data compiled and maintained by MAC, HNTB, TKDA

Disclaimer: This map was generated by HNTB Corporation based off of CAD files supplied by other parties. No claims are made to the accuracy or completeness of the information shown herein nor to its suitability for a particular use. The scale and location of map are approximate.

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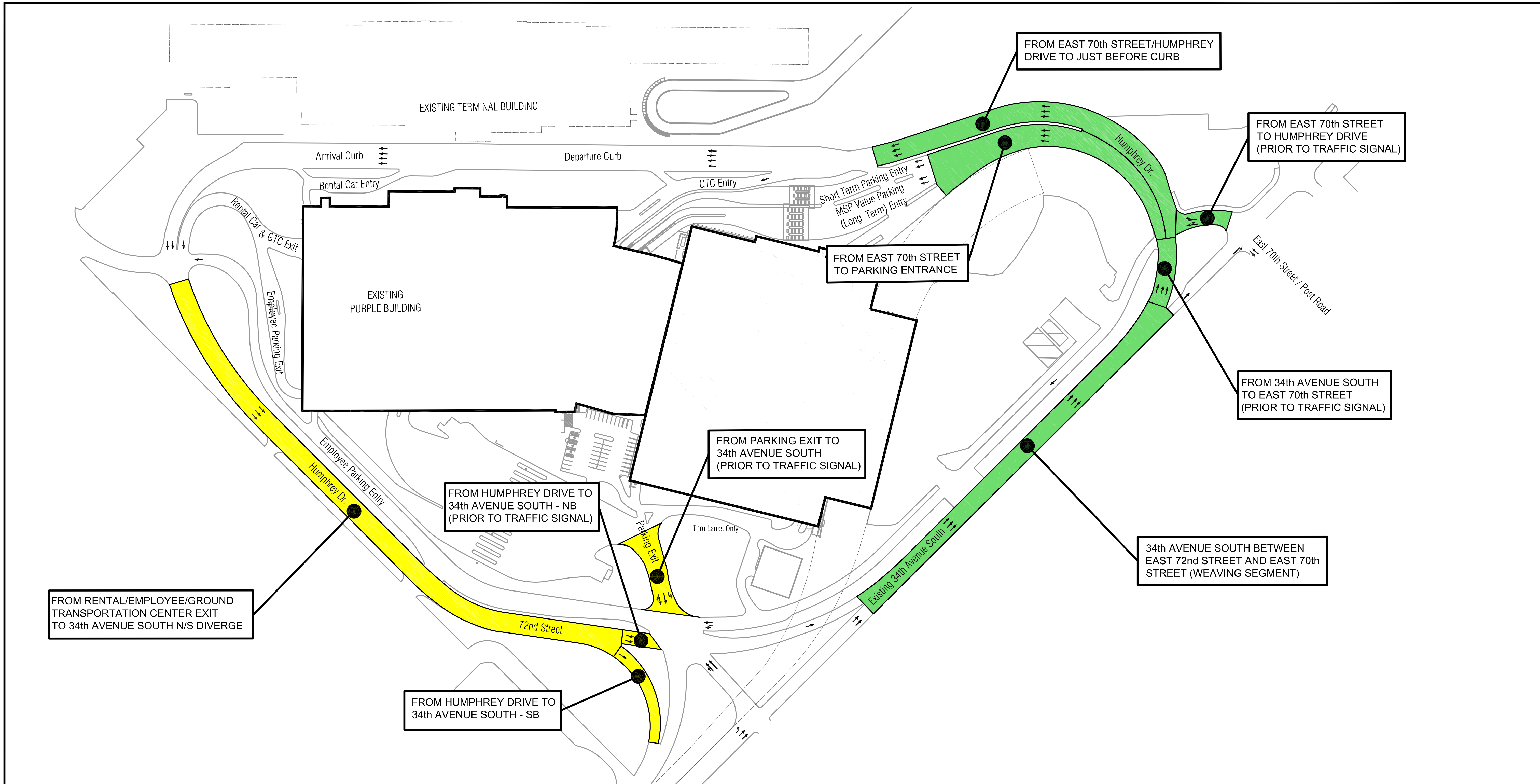

LEGEND

Inbound

Outbound

Terminal 2-Humphrey
On-Airport Roadways

N

0 200' 400'

Source: Data compiled and maintained by MAC, HNTB, TKDA

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Table 5.17.4

Off-Airport Roadways Characteristics

Roadway	Posted Speed (mph)	Thru Lanes	2010 Average Daily Traffic	
			Location	Vehicles per Day
34th Avenue South	35	5	north of I-494 south of East 72nd Street	26,000 14,000
Post Road/East 70th Street	35	2	west of TH 5 east of 34th Avenue South	15,000 7,000
I-494	60	6 to 8	between TH 5 and TH 77	150,000
TH 5	55	6	between I-494 and TH 55	68,000
TH 77	55	4	between I-494 and TH 62	72,000

Source: Kimley-Horn and Associates, Inc. analysis, 2012.

POST ROAD/EAST 70TH STREET

Post Road/East 70th Street provides access from TH 5 to Terminal 2-Humphrey and several other businesses and parking lots. The businesses and parking lots are primarily associated with the airport. Post Road/East 70th Street follows a northwest/southeast alignment from TH 5 prior to curving to an east/west alignment immediately east of 34th Avenue South. The east/west portion is named East 70th Street while the northwest/southeast portion is named Post Road. Although Post Road can be used to reach Terminal-2 Humphrey from TH 5, the current signing directs travelers to 34th Avenue South.

I-494

I-494 follows an east/west alignment along the southern boundary of the Traffic and Circulation Study Area and is the only interstate facility located in the Traffic and Circulation Study Area. Approximately two miles of I-494 is within the Traffic and Circulation Study Area including the interchanges with TH 5, 24th Avenue South, 34th Avenue South and TH 77.

TH 5

The approximately 2.5 mile segment of TH 5 between I-494 and TH 55 is within the Traffic and Circulation Study Area. TH 5 follows a southwest/northeast alignment and forms the southeast boundary of the Traffic and Circulation Study Area. TH 5 is classified as a principal arterial by MnDOT.

TH 77

TH 77 (Cedar Avenue) follows a north/south alignment and forms the western boundary of the Traffic and Circulation Study Area. TH 77 is classified as a principal arterial by Mn/DOT. TH 77 intersects with the Study Area boundary roadways of I-494 on the south and TH 62 (Crosstown) on the north. The length of TH 77 located within the Traffic and Circulation Study Area is about 2.3 miles.

The 2010 operating conditions of the off-airport roadways were assessed. Peak hour analyses were completed using VISSIM to assess existing roadway intersection and freeway operating conditions.

Existing conditions at the roadway intersections were analyzed during the AM, airport and PM peak hours. The results are presented in **Table 5.17.5.**

In the AM peak hour (7:30 AM - 8:30 AM), all overall intersections operate at LOS D or better.

In the airport peak hour (1:30 PM - 2:30 PM), during the shift change for airport employees, all intersections operate at LOS C or better.

In the PM peak hour (4:30 PM - 5:30 PM.), all intersections operate at LOS C or better except for the Post Road/SuperAmerica East Driveway intersection. During the PM peak, this intersection operates at LOS F due insufficient gaps in Post Road traffic for vehicles leaving SuperAmerica East Driveway.

The operating conditions of the freeway segments were also assessed using VISSIM. Peak hour analyses were completed to assess freeway operations during the AM, airport and PM peak hours. **Table 5.17.6** shows the results of the analysis for each freeway segment.

Table 5.17.5
Intersection Level of Service – Existing Conditions (2010)

Intersection	Control	AM Peak LOS	Airport Peak LOS	PM Peak LOS
34th Ave South & American Blvd	Signal	B	B	C
34th Ave South & EB I-494 Ramps	Signal	B	B	B
34th Ave South & WB I-494 Ramps	Signal	D	B	B
34th Ave South & Airport Lane	Signal	A	A	A
34th Ave South & East 75th St	Signal	B	B	B
34th Ave South & East 73rd St	Signal	A	A	A
34th Ave South & East 72nd St NB	Signal	A	A	A
34th Ave South & East 72nd St SB	Signal	B	B	B
34th Ave South & East 70th St	All Way Stop	A	B	B
34th Ave South & Humphrey Dr	Signal	A	A	A
Post Rd & West Employee Lot Entrance	Side Street Stop	A	A	A
Post Rd & East Employee Lot Entrance	Side Street Stop	A	A	A
Post Rd & Taxi Staging Middle Exit	Side Street Stop	A	A	A
Post Rd & Taxi Staging East Exit	Side Street Stop	A	A	B
Post Rd & SuperAmerica West Driveway	Side Street Stop	A	A	C
Post Rd & SuperAmerica East Driveway	Side Street Stop	A	C	F
Post Rd & Northwest Dr/SB TH 5 Ramps	Signal	B	B	B
Post Rd & NB TH 5 Ramps	Side Street Stop	A	A	A

Notes
EB = east bound SB = south bound
NB = north bound WB = west bound

Source: Kimley-Horn and Associates, Inc. analysis, 2012.

Table 5.17.6

Freeway Segments Level of Service – Existing Conditions (2010)

Freeway Segment	AM Peak Hour		Airport Peak Hour		PM Peak Hour	
I-494	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**
TH 77 to 24th Ave South	B	F	B	C	B	F
24th Ave South to 34th Ave South	B	C	B	B	C	D
34th Ave to TH 5	B	C	B	B	C	D
TH 5	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**
I-494 to Post Rd	A	B	A	B	B	B
Post Rd to Glumack Dr	B	B	B	B	B	B
Glumack Dr to TH 55	A	B	B	B	B	B
TH 77	**NB**	**SB**	**NB**	**SB**	**NB**	**SB**
I-494 to Diagonal Rd	D	B	B	B	C	B
Diagonal Rd to 66th St	D	B	B	B	C	C
66th St to TH 62	C	B	B	B	B	B

Notes:
EB = east bound WB = west bound
SB = south bound NB = north bound

Source: Kimley-Horn and Associates, Inc. and SRF Consulting Group, Inc. analysis, 2012

Under 2010 existing conditions the freeway segment between TH 77 and 24th Avenue South along I-494 westbound operates at an unacceptable LOS of F during the AM and PM peak hours. This LOS is not directly attributable to traffic from MSP. The poor operations identified on westbound I-494 are caused by the weave between the northbound I-35W on-ramp loop and southbound I-35W off-ramp loop. This operational problem is compounded due to the traffic congestion caused by the interaction between the entering volume from southbound I-35W and the entering volume from Penn Avenue located over 3 miles west of the I-494 and 24th Avenue South interchange. Additional information about the evaluation of off-airport roadways is provided in ***Appendix C,*** *MSP Area Roadway Improvements Project Memos*.

5.17.2.5 Impact Analysis

Parking Facilities

NO ACTION ALTERNATIVE

Under the No Action Alternative, Terminal 1-Lindbergh would have a deficiency of over 8,500 parking stalls by 2020, increasing to a deficiency of more than 11,000 by 2025. At Terminal 2-Humphrey sufficient parking capacity would exist to accommodate requirements for public and employee parking through 2020, but in 2025 there would be a deficiency of more than 1,800 spaces. In 2020 there would be total airport deficit of over 8,000 parking spaces, increasing to approximately 13,000 by 2025.

AIRLINES REMAIN ALTERNATIVE

The Airlines Remain Alternative includes a 10,000 space parking ramp at Terminal 1-Lindbergh. It was assumed these improvements would be in place when analyzing future parking facilities sufficiency.

With this added parking in place, the Airlines Remain Alternative would provide sufficient parking spaces in 2020 to accommodate all of the public and 73 percent of the Terminal 1-Lindbergh employees. The remaining Terminal 1-Lindbergh employees would use the Terminal 2-Humphrey parking ramps and access Terminal 1-Lindbergh on the light rail train. Even with additional parking at Terminal 1-Lindbergh, there would be a deficit of approximately 2,700 parking spaces in 2025. Employee parking would need to be relocated to an alternate site to provide all the available walkable parking spaces for Terminal 1-Lindbergh passengers. This would decrease the deficit to approximately 1,000 spaces for the public.

No new parking facilities would be provided At Terminal 2- Humphrey as part of the Airlines Remain Alternative. The existing Terminal 2-Humphrey parking ramps would accommodate the parking requirements for the public and employees through 2020. By 2025 there would be a deficit of approximately 500 spaces. Employee parking would need to be relocated to accommodate the passenger demand for walkable parking spaces at Terminal 2-Humphrey.

Future projects may include additional parking facilities to meet the projected 2025 demand for public and employee parking spaces. These projects have not yet been identified and are not addressed in this EA. When these projects are ready for decision, they will be assessed for environmental impacts.

AIRLINES RELOCATE ALTERNATIVE

Additional parking facilities would be provided at both terminals under the Airlines Relocate Alternative. A new approximately 4,700-space structure would be constructed at Terminal 1-Lindbergh. At Terminal 2-Humphrey, the Purple and Orange ramps would be expanded and new ramp would be constructed to provide a total of 6,900 new parking spaces. It was assumed these improvements would be in place when analyzing future parking facilities sufficiency.

With the additional parking facilities, the parking ramps at Terminal 1-Lindbergh would provide sufficient parking spaces in 2020 to accommodate all of the public and Terminal 1-Lindbergh employees. However, by 2025 there would be a deficit of approximately 1,200 parking spaces. Employees parking would need to be relocated to an alternate site to provide sufficient walkable parking spaces for Terminal 1-Lindbergh passengers.

At Terminal 2-Humphrey, the added parking facilities included in the Airlines Relocate would provide sufficient parking through 2020. However, by 2025 there would be a deficit of approximately 2,400 spaces. Employees parking would need to be relocated to accommodate the passenger demand for walkable parking spaces at Terminal 2-Humphrey. This would reduce the deficit of public spaces to approximately 1,000 spaces.

Future projects may include additional parking facilities to meet the projected 2025 demand for public and employee parking spaces. These projects have not yet been identified and are not addressed in this EA. When these projects are ready for decision, they will be assessed for environmental impacts.

Terminal Curb Roadways

NO ACTION ALTERNATIVE

The Terminal 1-Lindbergh departures curb roadway would operate at or under capacity through 2025. The Terminal 1-Lindbergh arrivals curb roadway, which is over capacity today, would operate over capacity in 2020, requiring additional curb (lanes and/or length) to operate at an acceptable volume to capacity ratio. At Terminal 2-Humphrey, the single level curb roadway would operate at or under capacity through 2020. However, by 2025 the Terminal 2-Humphrey curb roadway would operate over capacity and would require an additional lane to operate at an acceptable volume to capacity ratio.

AIRLINES REMAIN ALTERNATIVE

The Airlines Remain Alternative includes improvements to the arrival curb at Terminal 1–Lindbergh. Additional arrival curb would be provided by relocating the commercial ground transportation center from the outer curb of the lower level. Also, curb roadway would be added at the new International Facility at Terminal 1-Lindbergh. The analysis of future curb roadway conditions under the Airlines Remain Alternative accounts for the added arrival curb at Terminal 1-Lindbergh.

With the reconfiguration of the arrivals curb (an outer curb is added) and the addition of the international curb, the Terminal 1-Linbergh arrivals curb would operate at or under capacity through 2025 with a volume to capacity (v/c) ratio of 0.70 or better. The Terminal 1-Lindbergh departures curb roadway would also operate at or under capacity through 2025. The Terminal 1-Lindbergh international curb would operate at a v/c ratio of 0.70 or better in 2020 increasing to 0.73 for departures by 2025. The Terminal 2-Humphrey curb would also operate at a v/c ratio of 0.70 or better in 2020 increasing to 0.76 for departures by 2025. Thus, with the Airlines Remain Alternative, all curb roadway v/c ratios would be under the significance threshold of 1.

AIRLINES RELOCATE ALTERNATIVE

The Airlines Relocate Alternative includes curb roadway improvements at both Terminals. At Terminal 1-Lindbergh additional arrival curb would be provided by relocating the commercial ground transportation center from the outer curb of the lower level. Also, curb roadway would be added at the new International Facility. At Terminal 2-Humphrey, two additional curb lanes along with an additional 840 linear feet of curb would be provided. The analysis of future curb roadway conditions under the Airlines Relocate Alternative accounts for the added curb roadway at both terminals.

With the reconfiguration of the arrivals curb and the addition of the international curb at Terminal 1 Lindbergh, the arrivals curbs would operate at or under capacity through 2025 with a volume to capacity (v/c) ratio of 0.70 or better. The Terminal 1-Lindbergh departures curb roadway would also operate at or under capacity through 2025.

With the additional curb at Terminal 2-Humphrey, the curb roadway would operate at a v/c ratio of 0.70 or better in 2020. However, the v/c ratio for the arrivals curb at Terminal 2-Humphrey would increase to 0.84 by 2025. Regardless, all curb roadway v/c ratios would be under the threshold of significance of 1.

On-Airport Roadways

NO ACTION ALTERNATIVE

Under the No Action Alternative, the on-airport roadways would operate at an acceptable LOS D or better in 2020. However, by 2025 the Terminal 1-Lindbergh outbound roadway operations would deteriorate to an unacceptable LOS F.

AIRLINES REMAIN ALTERNATIVE

Under the Airlines Remain Alternative the on-airport roadways would operate at an acceptable LOS D or better through 2020. However, in 2025, Terminal 1-Lindbergh outbound roadway operations would deteriorate to an unacceptable LOS F similar to the No Action Alternative.

While the LOS on the outbound segments of Glumack Drive would deteriorate from an acceptable LOS under current conditions, it would be the same as the LOS for the 2025 No Action Alternative. Also, there would be no external impacts on other roadways in the airport vicinity because the deteriorated LOS would only occur on outbound segments of Glumack. The degree of degradation of LOS from the No Action Alternative to the Airlines Remain Alternative would be modest, with the various measures of effectiveness in the same range of driver perception. Thus, it was determined that the impact would not exceed the threshold of significance.

AIRLINES RELOCATE ALTERNATIVE

All on-airport roadways would operate at an acceptable LOS D or better in 2020 and 2025.

Off-Airport Roadways

NO ACTION ALTERNATIVE

Off-airport intersection and freeway operations were analyzed using year 2020 and 2025 No Action Alternative traffic volumes. Signal timings were optimized in the model. The only roadway improvement included in the modeling of the No Action Alternative was the addition of an auxiliary lane on westbound I-494 from the northbound I-35W on-ramp loop to the west to TH 100. This improvement was included because it is programmed to be constructed prior to 2020 by MnDOT.

Overall 2020 and 2025 intersection LOSs are provided in **Table 5.17.7**. As expected, the 2025 No Action Alternative intersection LOSs would be worse than the 2020 No Action Alternative LOSs.

Table 5.17.7

No Action Alternative Overall Intersection LOS

Intersection	Control	2020			2025		
		AM Peak	Airport Peak	PM Peak	AM Peak	Airport Peak	PM Peak
34th Ave South & American Blvd	Signal	C	B	D	D	C	E
34th Ave South & EB I-494 Ramps	Signal	B	C	D	C	D	E
34th Ave South & WB I-494 Ramps	Signal	F	C	D	F	C	E
34th Ave South & Airport Lane	Signal	A	B	C	A	B	D
34th Ave South & East 75th St	Signal	A	B	C	A	B	E
34th Ave South & East 73rd St	Signal	A	A	B	A	A	E
34th Ave South & East 72nd St NB	Signal	A	A	A	A	A	A
34th Ave South & East 72nd St SB	Signal	C	B	B	B	A	E
34th Ave South & East 70th St	All Way Stop	C	B	B	D	A	A
34th Ave South & Humphrey Dr	Signal	A	A	B	A	B	B
Post Rd & West Employee Lot Entrance	Side Street Stop	A	A	A	A	A	A
Post Rd & East Employee Lot Entrance	Side Street Stop	A	A	A	A	A	A
Post Rd & Taxi Staging Middle Exit	Side Street Stop	E	C	A	E	D	A
Post Rd & Taxi Staging East Exit	Side Street Stop	A	E	A	B	E	B
Post Rd & SA West Driveway	Side Street Stop	B	E	B	C	E	C
Post Rd & SA East Driveway	Side Street Stop	B	E	D	C	E	E
Post Rd & Northwest Dr/SB TH 5 Ramps	Signal	B	D	C	B	C	C
Post Rd & NB TH 5 Ramps	Side Street Stop	B	F	F	B	F	F

Notes:
S = South SB = South Bound SA = SuperAmerica
E = East NB = North Bound

Source: Kimley-Horn and Associates, Inc. analysis, 2012.

The 2020 No Action modeling results showed that seven overall intersections would operate at LOS E or F. The 2025 No Action modeling results showed that 14 overall intersections would operate at LOS E or F. Poor operating conditions at the TH 5/Post Road and I-494/34th Avenue South interchanges would cause the majority of the intersection movements to operate at an unacceptable LOS.

Freeway segments within the Traffic and Circulation Study Area were also evaluated for the 2020 and 2025 No Action Alternative. The LOS for each freeway segment is provided in **Table 5.17.8**.

Under the 2020 No Action Alternative, six freeway segments would operate at an LOS of E or F. By 2025, the regional roadway system becomes more congested and twelve freeway segments would operate at unacceptable LOSs.

Table 5.17.8

No Action Alternative Freeway Segment LOS

	2020						2025					
Freeway Segment	**AM Peak Hour**		**Airport Peak Hour**		**PM Peak Hour**		**AM Peak Hour**		**Airport Peak Hour**		**PM Peak Hour**	
I-494	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**
TH 77 to 24th Ave South	C	C	B	E	B	E	C	F	B	E	B	F
24th Ave South to 34th Ave South	B	C	B	B	C	D	C	B	C	C	C	F
34th Ave South to TH 5	B	C	B	B	C	D	B	C	B	B	C	E
TH 5	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**
I-494 to Post Rd	B	B	F	B	B	B	B	B	F	B	B	B
Post Rd to Glumack Dr	B	B	B	D	C	C	B	B	B	C	C	B
Glumack Dr to TH 55	B	B	B	B	C	B	B	B	B	D	C	B
TH 77	**NB**	**SB**	**NB**	**SB**	**NB**	**SB**	**NB**	**SB**	**NB**	**SB**	**NB**	**SB**
I-494 to Diagonal Rd	F	B	B	B	D	C	F	B	C	B	F	C
Diagonal Rd to 66th St	F	B	B	C	D	D	F	C	C	C	F	D
66th St to TH 62	E	B	B	B	B	C	E	B	B	B	F	C

Notes:

EB = east bound WB = west bound
SB = south bound NB = north bound

Source: Kimley-Horn and Associates, Inc. and SRF Consulting Group, Inc. analysis, 2012.

AIRLINES REMAIN ALTERNATIVE

Off-airport intersection and freeway operations were analyzed using year 2020 and 2025 Airlines Remain Alternative traffic volumes. The following Airlines Remain Alternative improvements were incorporated into the traffic analysis models:

Before 2020

- Reconstruct 34th Avenue South interchange at I-494 to a diverging diamond
- Reconfigure the intersections of 34th Avenue South/East 70th Street and Humphrey Drive/East 70th Street
- Reconfigure East 70th Street beginning at 34th Avenue South to a four lane roadway for about 750 feet
- Construct new TH 5 and Post Road interchange
    - Remove existing and construct new bridge over TH 5
    - Realign Post Road and Northwest Drive
    - Relocate the intersection of Northwest Drive and Post Road
- Construct a dual lane exit from eastbound I-494 to 34th Avenue South

- Construct a dual lane exit from westbound I-494 to 24th Avenue South
- Add lanes to the outbound ramps of Glumack Drive to TH 5

The final construction phasing of the various improvements will be determined as part of the FHWA interstate access request procedures.

Overall 2020 and 2025 intersection LOSs for the Airlines Remain Alternative are provided in **Table 5.17.9**. The 2020 Airlines Remain Alternative modeling results show that all intersections would operate at LOS C or better. For 2025, intersection operations were analyzed using year 2025 Airlines Remain Alternative traffic volumes. The intersection geometrics were the same as those for the 2020 Airlines Remain Alternative. The 2025 Airlines Remain Alternative modeling results showed that all overall intersections would operate at an LOS D or better.

Analysis of freeway segment operations under the Airlines Remain Alternative in 2020 and 2025 was conducted. The resulting LOSs for the freeway segments are provided in **Table 5.17.10.**

Table 5.17.9
Alternative 1 – Airlines Remain Overall Intersection LOS

Intersection	Control	2020			2025		
		AM Peak	Airport Peak	PM Peak	AM Peak	Airport Peak	PM Peak
34th Ave South & American Blvd	Signal	C	B	C	C	B	D
34th Ave South & EB I-494 Ramps	Signal	B	B	B	B	B	C
34th Ave South & WB I-494 Ramps	Signal	B	B	B	B	B	C
34th Ave South & Airport Lane	Signal	A	A	A	A	B	A
34th Ave South & East 75th St	Signal	B	B	B	B	B	B
34th Ave South & East 73rd St	Signal	A	A	A	A	A	A
34th Ave South & East 72nd St NB	Signal	A	A	A	A	A	A
34th Ave South & East 72nd St SB	Signal	C	C	B	B	C	B
34th Ave South & Humphrey Dr	Signal	C	B	B	C	B	B
Post Rd & North Taxi Lot	Side Street Stop	A	A	A	A	A	A
Post Rd & Northwest Dr	Side Street Stop	A	A	A	A	A	A
Post Rd & SB TH 5 Ramps	Signal	A	A	A	A	A	A
Post Rd & NB TH 5 Ramps	Signal	B	B	B	B	B	B

Notes
EB = east bound WB = west bound
SB = south bound NB = north bound

Source: Kimley-Horn and Associates, Inc. analysis, 2012.

Table 5.17.10

Alternative 1 – Airlines Remain Freeway Segment LOS

Freeway Segment	2020						2025					
	AM Peak Hour		Airport Peak Hour		PM Peak Hour		AM Peak Hour		Airport Peak Hour		PM Peak Hour	
I-494	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**
TH 77 to 24th Ave South	C	C	B	E	B	F	C	D	B	E	C	F
24th Ave South to 34th Ave South	B	B	B	B	B	C	B	B	B	B	C	D
34th Ave South to TH 5	B	C	B	B	C	D	B	C	B	B	C	D
TH 5	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**
I-494 to Post Rd	B	B	A	B	B	C	B	B	A	B	B	C
Post Rd to Glumack Dr	B	B	B	B	C	B	B	B	B	B	C	B
Glumack Dr to TH 55	B	B	B	B	B	B	B	B	B	E	C	C
TH 77	**NB**	**SB**	**NB**	**SB**	**NB**	**SB**	**NB**	**SB**	**NB**	**SB**	**NB**	**SB**
I-494 to Diagonal Rd	F	B	B	B	D	C	F	B	C	B	E	C
Diagonal Rd to 66th St	F	B	B	C	D	D	F	B	C	C	E	D
66th St to TH 62	D	B	B	B	B	C	E	B	B	B	C	C

Notes

EB = east bound WB = west bound
SB = south bound NB = north bound

Source: Kimley-Horn and Associates, Inc. and SRF Consulting Group, Inc. analysis, 2012.

Freeway segments that deteriorated from current conditions to an LOS of E or F with the Airlines Remain Alternative were compared to the No Action Alternative LOSs (Table 5.17.8) to determine whether further evaluation was required.

Daily traffic volumes on each freeway segment as well as the differences in airport related trips were identified. The total traffic volume and changes in airport trips on each freeway segment with the Airlines Remain Alternatives are provided in **Tables 5.17.11** and **5.17.12** for the 2020 and 2025 respectively. This data was used to determine whether the changes on the identified freeway segments would exceed the threshold of significance of a 10% increase in airport traffic.

Table 5.17.11

2020 Alternative 1 – Airlines Remain Change in Airport Trips

Freeway Segment	2020 Daily Volumes					
	No Action		Airlines Remain			
	Total	Airport Trips	Total	Airport Trips	Change in Airport Trips	Airport Trip % of Daily Trips
I-494						
TH 77 to 24th Ave South	163,000	53,100	163,000	52,800	-300	-0.2%
24th Ave South to 34th Ave South	184,000	54,400	184,000	54,100	-300	-0.2%
34th Ave South to TH 5	186,000	47,900	186,000	48,200	300	0.2%
TH 5						
I-494 to Post Rd	90,000	48,400	90,000	49,300	900	1.0%
Post Rd to Glumack Dr	95,000	54,800	95,000	55,800	1,000	1.1%
Glumack Dr to TH 55	85,000	44,500	85,000	44,200	-300	-0.4%
TH 77						
I-494 to Diagonal Rd	81,000	5,500	81,000	5,300	-200	-0.2%
Diagonal Rd to 66th St	82,000	5,000	82,000	4,800	-200	-0.2%
66th St to TH 62	87,000	3,500	87,000	3,200	-300	-0.3%

Source: Kimley-Horn and Associates, Inc. and SRF Consulting Group, Inc. analysis, 2012.

Table 5.17.12

2025 Alternative 1 – Airlines Remain Change in Airport Trips

Freeway Segment	2025 Daily Volumes					
	No Action		Airlines Remain			
	Total	Airport Trips	Total	Airport Trips	Change in Airport Trips	Airport Trip % of Daily Trips
I-494						
TH 77 to 24th Ave South	171,000	63,200	171,000	62,800	-400	-0.2%
24th Ave South to 34th Ave South	197,000	64,400	197,000	64,000	-400	-0.2%
34th Ave South to TH 5	198,000	57,700	198,000	58,100	400	0.2%
TH 5						
I-494 to Post Rd	97,000	57,400	97,000	58,500	1,100	1.1%
Post Rd to Glumack Dr	103,000	63,000	103,000	64,200	1,200	1.2%
Glumack Dr to TH 55	92,000	53,200	92,000	52,800	-400	-0.4%
TH 77						
I-494 to Diagonal Rd	84,000	6,800	84,000	6,600	-200	-0.2%
Diagonal Rd to 66th St	86,000	6,400	86,000	6,100	-300	-0.3%
66th St to TH 62	91,000	4,900	91,000	4,500	-400	-0.4%

Source: Kimley-Horn and Associates, Inc. and SRF Consulting Group, Inc. analysis, 2012.

Under the 2020 Airlines Remain Alternative there would be one segment that deteriorates from an LOS E to F. The westbound segment of I-494 between TH 77 and 24th Avenue South would have an LOS E during the PM peak hour with the No Action Alternative and an LOS F with the Airlines Remain Alternative.

The Airport's relative contribution to traffic on this segment of I-494 was reviewed. As shown in Table 5.17.11, there would be no increase in airport trips under the Airlines Remain Alternative when compared to the No Action Alternative. The change in LOS under the 2020 Airlines Remain Alternative is due to changes in traffic characteristics along this segment. Because this segment will operate under congested conditions under the No Action scenario, it is not unique that small changes in traffic characteristics would result in a change in the LOS. Since airport trips are not increasing with the Airlines Remain Alternative, the congested operations would not constitute an impact that would exceed the threshold of significance.

Under the 2025 Airlines Remain Alternative one segment would deteriorate from an acceptable LOS D to LOS E. The westbound segment of TH 5 between TH 55 and Glumack Drive would degrade from LOS D with the No Action Alternative to E with the Airlines Remain Alternative during the airport peak.

The Airport's relative contribution to traffic on the subject freeway segment was reviewed. As shown in Table 5.17.12, there would be no increase in airport trips on TH 5 between TH 55 and Glumack Drive under the Airlines Remain Alternative in 2025. The change in LOS under the 2025 Airlines Remain Alternative is due to changes in traffic characteristics along this segment. Because this segment will operate at LOS D under the No Action scenario, it is not unique that small changes in traffic characteristics would result in a change in the LOS. Since airport trips are not increasing along this freeway segment, the congested operations would not constitute an impact that would exceed the threshold of significance.

AIRLINES RELOCATE ALTERNATIVE

Off-airport intersection and freeway operations were analyzed using year 2020 and 2025 Airlines Relocate Alternative traffic volumes. The following Airlines Relocate Alternative improvements were incorporated into the traffic analysis models:

Before 2020

- Reconstruct 34th Avenue South interchange at I-494 to a diverging diamond
- Add lane to northbound 34th Avenue South
- Improve the intersection of East 72nd Street and 34th Avenue intersection
- Reconfigure the intersections of 34th Avenue South/East 70th Street and Humphrey Drive/East 70th Street
- Reconfigure East 70th Street beginning at 34th Avenue South to a four lane roadway for about 1,500 feet
- Construct new TH 5 and Post Road interchange
    - Remove existing and construct new bridge over TH 5

- Realign Post Road and Northwest Drive
- Relocate the intersection of Northwest Drive and Post Road

- Construct a dual lane exit from eastbound I-494 to 34th Avenue South
- Construct a dual lane exit from westbound I-494 to 24th Avenue South
- Construct auxiliary lane improvement on westbound I-494 between 24th Avenue South and the exit to southbound TH 77

Between 2020 and 2025

- Construct a bridge braid for the 34th Avenue South entrance ramp to westbound I-494 and exit ramp to 24th Avenue South from westbound I-494. This improvement allows traffic entering westbound I-494 from 34th Avenue South and traffic exiting from westbound I-494 to 24th Avenue South to cross via grade separation which reduces the weaving conflict on westbound I-494 improving freeway operations.

Additional expansion of the 34th Avenue South interchange at I-494 which will include:

- Modification of the southbound double right-turn lane to a triple right at the westbound I-494 ramps
- Modification of the eastbound left and right turn lanes from double to triple turn lanes at the eastbound I-494 ramps
- Modification of the northbound right to a triple right turn lane at the eastbound I-494 ramps
- Modification of the westbound left turn lane to southbound 34th Avenue from a double to a triple left at the westbound I-494 ramps

The final construction phasing of the various improvements will be determined as part of the FHWA interstate access request procedures.

Overall 2020 and 2025 intersection LOSs for the Airlines Relocate Alternative are provided in **Table 5.17.13**. The 2020 Airlines Relocate modeling results showed that all intersections would operate at LOS C or better.

For 2025, intersection operations were analyzed using year 2025 Airlines Relocate Alternative traffic volumes and the roadway improvements that are identified to be constructed between 2020 and 2025 under this Alternative. The 2025 Airlines Relocate modeling results showed that all intersections would operate at LOS C or better.

Analysis of freeway segment operations under the Airlines Relocate Alternative in 2020 and 2025 was conducted. The resulting LOSs are provided in **Table 5.17.14.** The total traffic volume and changes in airport trips on each freeway segment with the No Action Alternative and the Airlines Relocate Alternative are provided in **Tables 5.17.15** and **5.17.16** for 2020 and 2025, respectively.

Table 5.17.13

Alternative 2 – Airlines Relocate Overall Intersection LOS

Intersection	Control	2020			2025		
		AM Peak	Airport Peak	PM Peak	AM Peak	Airport Peak	PM Peak
34th Ave South & American Blvd	Signal	C	B	C	C	B	B
34th Ave South & EB I-494 Ramps	Signal	B	B	B	C	B	C
34th Ave South & WB I-494 Ramps	Signal	B	B	B	C	C	C
34th Ave South & Airport Lane	Signal	A	B	A	B	A	A
34th Ave South & East 75th St	Signal	B	B	B	B	B	B
34th Ave South & East 73rd St	Signal	A	A	A	A	A	A
34th Ave South & East 72nd St NB	Signal	A	B	B	A	B	B
34th Ave South & East 72nd St SB	Signal	B	C	B	B	B	B
34th Ave South & Humphrey Dr	Signal	B	C	C	B	C	C
Post Rd & North Taxi Lot	Side Street Stop	A	A	A	A	A	B
Post Rd & Northwest Dr	Side Street Stop	A	A	A	A	A	A
Post Rd & SB TH 5 Ramps	Signal	A	A	A	A	A	A
Post Rd & NB TH 5 Ramps	Signal	C	B	B	C	B	B

Notes
EB = east bound WB = west bound SB = south bound NB = north bound

Source: Kimley-Horn and Associates, Inc. analysis, 2011.

Table 5.17.14

Alternative 2 – Airlines Relocate Freeway Segment LOS

Freeway Segment	2020						2025					
	AM Peak Hour		Airport Peak Hour		PM Peak Hour		AM Peak Hour		Airport Peak Hour		PM Peak Hour	
I-494	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
TH 77 to 24th Ave South	C	C	B	C	B	C	C	D	B	C	C	C
24th Ave South to 34th Ave South	B	B	B	B	C	C	B	C	B	C	C	C
34th Ave South to TH 5	B	C	B	B	C	C	B	C	B	B	C	C
TH 5	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB	EB	WB
I-494 to Post Rd	B	B	A	B	B	B	B	B	A	B	B	B
Post Rd to Glumack Dr	B	B	B	B	C	B	B	B	B	B	C	C
Glumack Dr to TH 55	A	B	B	B	B	B	B	B	B	B	C	B
TH 77	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
I-494 to Diagonal Rd	F	B	C	B	E	C	F	B	C	B	F	C
Diagonal Rd to 66th St	F	B	C	C	E	D	F	C	C	C	F	E
66th St to TH 62	E	B	B	B	D	C	E	B	B	B	F	C

Notes:
EB = east bound WB = west bound SB = south bound NB = north bound

Source: Kimley-Horn and Associates, Inc. and SRF Consulting Group, Inc. analysis, 2012.

Table 5.17.15

2020 Alternative 2 – Airlines Relocate Change in Airport Trips

Freeway Segment	2020 Daily Volumes					
	No Action		Airlines Relocate			
	Total	Airport Trips	Total	Airport Trips	Change in Airport Trips	Airport Trip % of Daily Trips
I-494						
TH 77 to 24th Ave South	163,000	53,100	168,000	57,400	4,300	2.6%
24th Ave South to 34th Ave South	184,000	54,400	188,000	58,500	4,100	2.2%
34th Ave South to TH 5	186,000	47,900	177,000	43,800	-4,100	-2.3%
TH 5						
I-494 to Post Rd	90,000	48,400	75,000	37,400	-11,000	-14.7%
Post Rd to Glumack Dr	95,000	54,800	84,000	42,700	-12,100	-14.4%
Glumack Dr to TH 55	85,000	44,500	79,000	47,800	3,300	4.2%
TH 77						
I-494 to Diagonal Rd	81,000	5,500	86,000	8,300	2,800	3.3%
Diagonal Rd to 66th St	82,000	5,000	86,000	7,700	2,700	3.1%
66th St to TH 62	87,000	3,500	92,000	7,400	3,900	4.2%

Source: Kimley-Horn and Associates, Inc. and SRF Consulting Group, Inc. analysis, 2012.

Table 5.17.16

2025 Alternative 2 – Airlines Relocate Change in Airport Trips

Freeway Segment	2025 Daily Volumes					
	No Action		Airlines Relocate			
	Total	Airport Trips	Total	Airport Trips	Change in Airport Trips	Airport Trip % of Daily Trips
I-494						
TH 77 to 24th Ave South	171,000	63,200	177,000	67,300	4,100	2.3%
24th Ave South to 34th Ave South	197,000	64,400	202,000	68,800	4,400	2.2%
34th Ave South to TH 5	198,000	57,700	187,000	53,400	-4,300	-2.3%
TH 5						
I-494 to Post Rd	97,000	57,400	80,000	46,000	-11,400	-14.3%
Post Rd to Glumack Dr	103,000	63,000	90,000	50,600	-12,400	-13.8%
Glumack Dr to TH 55	92,000	53,200	85,000	56,500	3,300	3.9%
TH 77						
I-494 to Diagonal Rd	84,000	6,800	90,000	9,800	3,000	3.3%
Diagonal Rd to 66th St	86,000	6,400	91,000	9,400	3,000	3.3%
66th St to TH 62	91,000	4,900	97,000	8,600	3,700	3.8%

Source: Kimley-Horn and Associates, Inc. and SRF Consulting Group, Inc. analysis, 2012.

Under the 2020 Airlines Relocate Alternative, two freeway segments would degrade from LOS D to E:

- Northbound TH 77 between I-494 and Diagonal Road (LOS would degrade from D to E). An additional 2,800 airport trips would be added with the 2020 Airlines Relocate Alternative when compared to the 2020 No Action Alternative. The difference in airport trips would be 3.3% of the daily forecast volume. Therefore, the reduction in LOS would not constitute an impact that would exceed the threshold of significance.
- Northbound TH 77 between Diagonal Road and East 66th Street (LOS would degrade from LOS D to E). An additional 2,700 airport trips would be added with the 2020 Airlines Relocate Alternative when compared to the 2020 No Action Alternative. The difference in airport trips would be 3.1% of the daily forecast volume. Therefore, the reduction in LOS would not constitute an impact that would exceed the threshold of significance.

Under the 2025 Airlines Relocate Alternative one freeway segment would degrade from an acceptable LOS to LOS E:

- Southbound TH 77 between Diagonal Road and East 66th Street that would change to an LOS E during the PM peak. The Airport's relative contribution to traffic on this segment of TH 77 would be 3,000 additional airport trips. The difference in airport trips would amount to 3.3% of the daily forecast volume. Therefore, the congested operations would not constitute an impact that would exceed the threshold of significance.

The results of the 2025 Airlines Relocate Alternative modeling suggest a continued degradation of traffic flow on northbound TH 77 would occur. This would be caused by design deficiencies in the current TH 77/TH 62 interchange. These deficiencies are well outside the immediate project area. The current traffic model indicates adverse traffic queuing extending the length of northbound TH 77 to the I-494 interchange then back to the current westbound ramp at the 34th Avenue South/I-494 Interchange. This queuing is anticipated to result in secondary adverse impacts to nearby roadways adjacent the 34th Avenue South/I-494 Interchange.

After a review of the 2025 traffic distribution and the unused capacity at the 34th Avenue South/I-494 interchange eastbound ramp and the revised TH 5/Post Road interchange eastbound ramp, it is expected that a natural redistribution of traffic would take place to the east during periods of congestion. This redistribution would mitigate traffic queuing at the 34th Avenue South westbound entrance ramp and would allow the 34th Avenue South interchange to function as previously detailed. This diversion would resolve the queuing at 34th Avenue South westbound ramp, and should occur naturally by driver behavior.

YEAR 2030 ANALYSIS (FHWA)

The FHWA typically requires a 20 year forecast horizon be reviewed for the traffic analysis as a part of its NEPA guidance. To meet the requirements of the FHWA, a 20-year forecast was developed for the off-airport arterial regional roadways and for freeway segments with the 2030 No Action Alternative and the 2030 Action Alternative. The Airlines Remain and Airlines Relocate Alternatives are two different development scenarios that result in different development plans in 2020 and 2025. However, regardless of whether the Airlines Remain or Airlines Relocate Alternative is selected, the development plan by 2030 is the same. Therefore, consistent with the 2030 MSP LTCP, one 2030 Action Alternative was evaluated for the 2030 traffic analysis.

Off-airport roadway analysis was conducted at six ramp terminal intersections. There were no changes in geometrics between the 2025 Airlines Relocate and 2030 Action Alternative modeled except lanes were added to the outbound ramps of Glumack Drive to TH 5.

Overall 2030 No Action and 2030 Action intersection LOSs are shown in **Table 5.17.17**. The 2030 No Action modeling results showed that seven overall intersections will operate at LOS E or F. There would be impacts to adjacent intersections similar to those that would occur under the 2025 No Action scenario. For the 2030 Action Alternative, the modeling results show that all intersections would operate at LOS C or better.

For freeway operations, year 2030 No Action modeling results showed 13 segments with unacceptable operations (LOS E or F), as shown in **Table 5.17.18**. These results are similar to the 2025 No Action Alternative LOS.

The 2030 No Action results show that poor operations exist on westbound I-494 that will impact the operation of the I-494/34th Avenue South interchange. These are similar to the analysis results for the 2025 Airlines Relocate Alternative. This also causes poor operations on the northbound TH 77 to westbound I-494 regional flyover ramp. Poor operations were still identified on northbound TH 77 between I-494 and TH 62 and the queues spill back and impact the I-494/34th Avenue South interchange. These operational deficiencies located outside of the EA project area effect the ability to accurately test the proposed EA mitigation measures. Therefore, additional improvements were assumed to be completed “by others” and included in the traffic modeling. The alternative that includes these improvements is referred to as the 2030 No Action Improved Alternative. Additional information is provided in Appendix C, *MSP Area Roadway Improvements Project Memos*.

Table 5.17.17

2030 Overall Intersection LOS

Intersection	Control	2030 No Action			2030 Action		
		AM Peak	Airport Peak	PM Peak	AM Peak	Airport Peak	PM Peak
34th Ave S & EB I-494 Ramps	Signal	D	D	F	C	C	C
34th Ave S & WB I-494 Ramps	Signal	F	C	F	C	C	C
Post Rd & SA West Driveway	Side Street Stop	C	E	D	A	A	A
Post Rd & SA East Driveway	Side Street Stop	B	E	D	A	B	A
Post Rd & Northwest Dr/SB TH 5 Ramps	Signal	B	D	B	C	B	B
Post Rd & NB TH 5 Ramps	Signal	B	F	E	C	C	C

Notes
S = South SB = South Bound
E = East NB = North Bound

Source: Kimley-Horn and Associates, Inc. analysis, 2012.

Table 5.17.18

2030 No Action Freeway LOS

Freeway Segment	AM Peak Hour		Airport Peak Hour		PM Peak Hour	
I-494	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**
TH 77 to 24th Ave South	C	**E**	B	**F**	B	**F**
24th Ave South to 34th Ave South	C	B	C	C	C	**F**
34th Ave South to TH 5	B	B	B	B	C	**F**
TH 5	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**
I-494 to Post Rd	B	B	**F**	B	B	**D**
Post Rd to Glumack Dr	B	B	B	**D**	C	C
Glumack Dr to TH 55	B	B	B	C	B	B
TH 77	**NB**	**SB**	**NB**	**SB**	**NB**	**SB**
I-494 to Diagonal Rd	**F**	B	C	B	**F**	C
Diagonal Rd to 66th St	**F**	C	C	C	**F**	**E**
66th St to TH 62	**F**	B	B	B	**F**	C

Source: Kimley-Horn and Associates, Inc. and SRF Consulting Group, Inc. analysis, 2012.

The results of the operational analysis of the 2030 No Action Improved Alternative are provided in **Table 5.17.19**. For this alternative, the number of segments with unacceptable operations is reduced from 13 to six.

For the Year 2030 Action Alternative, only one freeway link has unacceptable results (LOS F), as shown in **Table 5.17.20**, which also operates at an LOS F under the Year 2030 No Action Improved Alternative. Therefore, the congested operations would not constitute change that would exceed the threshold of significance.

Table 5.17.19
2030 No Action Improved Alternative Freeway LOS

Freeway Segment	AM Peak Hour		Airport Peak Hour		PM Peak Hour	
I-494	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**
TH 77 to 24th Ave South	C	C	B	F	B	F
24th Ave South to 34th Ave South	C	B	C	C	C	F
34th Ave South to TH 5	B	B	B	B	C	F
TH 5	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**
I-494 to Post Rd	B	C	F	B	B	C
Post Rd to Glumack Dr	B	B	B	D	C	C
Glumack Dr to TH 55	B	B	B	C	C	B
TH 77	**NB**	**SB**	**NB**	**SB**	**NB**	**SB**
I-494 to Diagonal Rd	B	B	B	B	B	C
Diagonal Rd to 66th St	B	C	B	C	B	F
66th St to TH 62	B	B	B	B	D	C

Source: Kimley-Horn and Associates, Inc. and SRF Consulting Group, Inc. analysis, 2012.

Table 5.17.20
2030 Action Alternative Freeway LOS

Freeway Segment	AM Peak Hour		Airport Peak Hour		PM Peak Hour	
I-494	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**
TH 77 to 24th Ave South	C	B	B	C	C	C
24th Ave South to 34th Ave South	B	B	B	C	C	C
34th Ave South to TH 5	B	C	B	B	C	D
TH 5	**EB**	**WB**	**EB**	**WB**	**EB**	**WB**
I-494 to Post Rd	B	B	A	B	B	B
Post Rd to Glumack Dr	B	B	B	B	C	B
Glumack Dr to TH 55	B	B	B	B	B	B
TH 77	**NB**	**SB**	**NB**	**SB**	**NB**	**SB**
I-494 to Diagonal Rd	B	B	B	B	C	C
Diagonal Rd to 66th St	B	C	B	C	C	F
66th St to TH 62	B	B	B	B	C	C

Source: Kimley-Horn and Associates, Inc. and SRF Consulting Group, Inc. analysis, 2012.

5.17.2.6 Permitting

FHWA approval of the Interstate Access Request(s) (IARs) will be required prior to any modifications to I-494. Metropolitan Council approval will also be obtained prior to constructing controlled access highway projects at Trunk Highway 5 or Interstate I-494 in accordance with MN Statute 473.166. FHWA, MnDOT, and the project sponsors are currently working on the IAR for the funded portions of the I-494 and 34th Avenue South Interchange. For other road improvements that may require FHWA involvement, an additional IAR would be required by FHWA prior to construction of those improvements. Supplemental NEPA review for FHWA approval may also be required for those improvements depending on timing, funding and changes in potential impacts.

5.17.2.7 Summary

Both on- and off-airport ground transportation facilities were evaluated to determine potential impacts to circulation and traffic. A comparison of the circulation and traffic impacts for the Alternatives in 2020 and 2025 is presented in **Table 5.17.21**. A summary of the 2030 regional roadway traffic analysis is shown in **Table 5.17.22**.

Table 5.17.21

Circulation and Traffic Impacts Comparison of Alternatives

	No Action		**Alternative 1 – Airlines Remain**		**Alternative 2 – Airlines Relocate**	
	2020	**2025**	**2020**	**2025**	**2020**	**2025**
Parking						
	8,000 Space Deficit	13,000 Space Deficit	Sufficient Parking Available	3,200 Space Deficit	Sufficient Parking Available	3,600 Space Deficit
Curb Roadways						
Terminal 1-Lindbergh Departure	At or Under Capacity	At or Under Capacity	At or Under Capacity	At or Under Capacity	At or Under Capacity	At or Under Capacity
Terminal 1-Lindbergh Arrival	Over Capacity	Over Capacity	At or Under Capacity	At or Under Capacity	At or Under Capacity	At or Under Capacity
Terminal 2-Humphrey	At or Under Capacity	Over Capacity	At or Under Capacity	At or Under Capacity	At or Under Capacity	At or Under Capacity
On Airport Roadways						
	LOS D or better	Outbound Glumack LOS F	LOS D or better	Outbound Glumack LOS F	LOS B or better	LOS D or better
Off-Airport Roadways (1)						
Intersection	7 at LOS E or F	14 at LOS E or F	All LOS C or better	All LOS D or better	All LOS C or better	All LOS C or better
Freeway Segments	6 at LOS E or F	12 at LOS E or F	4 at LOS E or F	8 at LOS E or F	5 at LOS E or F	7 at LOS E or F

Note:
(1) Total provided includes the sum of intersection, individual movements, or freeway segments for the AM, airport, and PM peak hours for each alternative (from Tables 5.17.7-16).

Source: Kimley-Horn and Associates, Inc., SRF Consulting Group, Inc. and HNTB analysis, 2012.

Table 5.17.22

2030 Regional Roadway Summary

	No Action	Improved No Action	Action
Off-Airport Roadways [1]			
Intersection	7 at LOS E or F	Not Applicable	All LOS C or better
Freeway Segments	13 at LOS E or F	6 at LOS E or F	1 at LOS E or F

Note:
(1) Total provided includes the sum of intersection, individual movements, or freeway segments for the AM, airport, and PM peak hours for each alternative.

Source: Kimley-Horn and Associates, Inc., and SRF Consulting Group, Inc., 2012.

The evaluation of on-airport ground transportation facilities included assessment of conditions of parking ramp, curb roadways and on-airport roadways. The conditions of the parking ramps and the curb roadways with the Action Alternatives would be better than or the same as the conditions with the No Action Alternatives for the same year of analysis. Additionally, nearly all of the on-airport roadways would operate at an acceptable LOS with all of the Alternatives. The only exception being outbound Glumack Drive which would operate at a LOS of F in 2025 with both the No Action and Airlines Remain Alternatives. Therefore, none of the Alternatives would result in impacts to on-airport ground transportation facilities that would exceed the threshold of significance.

For the off-airport ground transportation facilities within the Circulation and Traffic Study Area the modeling results show that both the Airlines Remain and Airlines Relocate Alternatives would operate significantly better than the No Action Alternative. Similarly, the 2030 analysis showed that the regional roadways would operate better with the proposed regional roadway improvements.

In summary, none of the Alternatives would result in impacts to off-airport ground transportation facilities that would exceed the threshold of significance.

5.17.3 Environmental Justice and Children's Health and Safety Risks

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations, regulates against federal actions that would result in high and adverse human health or environmental impacts that would disproportionately impact minority and low income population.

The FAA is also directed to identify and assess disproportionate impacts to children's environmental health and safety risks pursuant to Executive Order 13045 - Protection of Children from Environmental Health Risks and Safety Risks. The Executive Order states that, "'Environmental health risks and safety risks' mean risks to health or to safety that are attributable to products or substances that the child is likely to come in contact with or ingest (such as the air we breathe, the food we eat, the water we drink or use for recreation, the soil we live on, and the products we use or are exposed to)."

Since none of the Alternatives would result in impacts exceeding the thresholds of significance for any of the impact categories, it may be concluded that there would not be high and adverse human health or environmental impacts. Therefore, none of the Alternatives would disproportionately impact minority and/or low-income populations nor children's environmental health and safety risks.

5.18 Water Resources

This section describes water resources and potential water resource impacts. Water resources are divided into three categories: surface water, groundwater and drinking water for the purposes of this discussion.

5.18.1 Surface Water

This sub-section provides information about surface water related regulations, the affected environment and potential impacts.

5.18.1.1 Regulatory Background

The Federal Water Pollution Control Act (commonly referred to as the Clean Water Act or CWA) provides for: the establishment of water quality standards; control of discharges; development of wastewater treatment management plans and practices; prevention or minimization of the loss of wetlands; protection of aquifers and sensitive ecological areas; and the regulation of other issues concerning water quality.

Section 402 of the CWA provides for permitting of stormwater discharges to surface waters under the National Pollutant Discharge Elimination System (NPDES). Stormwater discharges originating from MSP are authorized under the Airport's NPDES permit.

5.18.1.2 Approach and Methodology

Nearly all stormwater from MSP is ultimately discharged to the Minnesota River. Therefore, to address surface water impacts, the Alternatives were evaluated for their potential to change the quantity or quality of MSP's stormwater.

To meet FAA requirements, the impacts to stormwater as a result of the 2020 proposed improvements were analyzed. To address FHWA requirements, 2030 conditions including the regional roadway improvements post 2020 were evaluated.

Potential stormwater quantity impacts were assessed by modeling and analyzing the storm water collection system. The potential changes in localized flooding on MSP and peak stormwater discharges for each Alternative were identified.

The conditions of the Minnesota River were considered in developing a methodology to evaluate the stormwater quality. The Minnesota River has been cited as one of the most polluted rivers in the state and the nation. The MPCA has designated the Minnesota River impaired under Section 303(d) of the CWA for dissolved oxygen, turbidity, mercury and polychlorinated biphenyls (PCBs).

Airport stormwater can include organic materials that lead to reduced dissolved oxygen in the receiving water. Microorganisms deplete oxygen in the receiving water during the process of breaking down organic materials. With less oxygen available, higher forms of aquatic life become stressed and ultimately suffocate and die.[32] Organic materials in airport stormwater are largely from aircraft deicing activities and to a lesser extent pavement deicing activities. Therefore, in order to determine if the Alternatives would potentially impact dissolved oxygen in the Minnesota River, the ability to capture aircraft deicing fluid (ADF) on the Airport was quantified for each Alternative.

Total suspended solids (TSS) are another pollutant of concern because the Minnesota River has very high TSS loads and is impaired for turbidity. The amount of TSS in the airport stormwater is related to the expanse of impervious surfaces, application of sand and periodic construction activities. Modeling was completed to determine the effectiveness of the MSP retention ponds in removing TSS from the stormwater for each of the Alternatives.

Potential petroleum/fuel discharges into airport stormwater are also of concern in terms of water quality in the Minnesota River. Therefore, the potential for the Alternatives to cause petroleum discharges was considered.

5.18.1.3 Threshold of Significance

Impacts may be considered significant if there is a potential to exceed water quality standards, there are water quality problems that cannot be avoided or mitigated, or there would be difficulty in obtaining necessary permits.

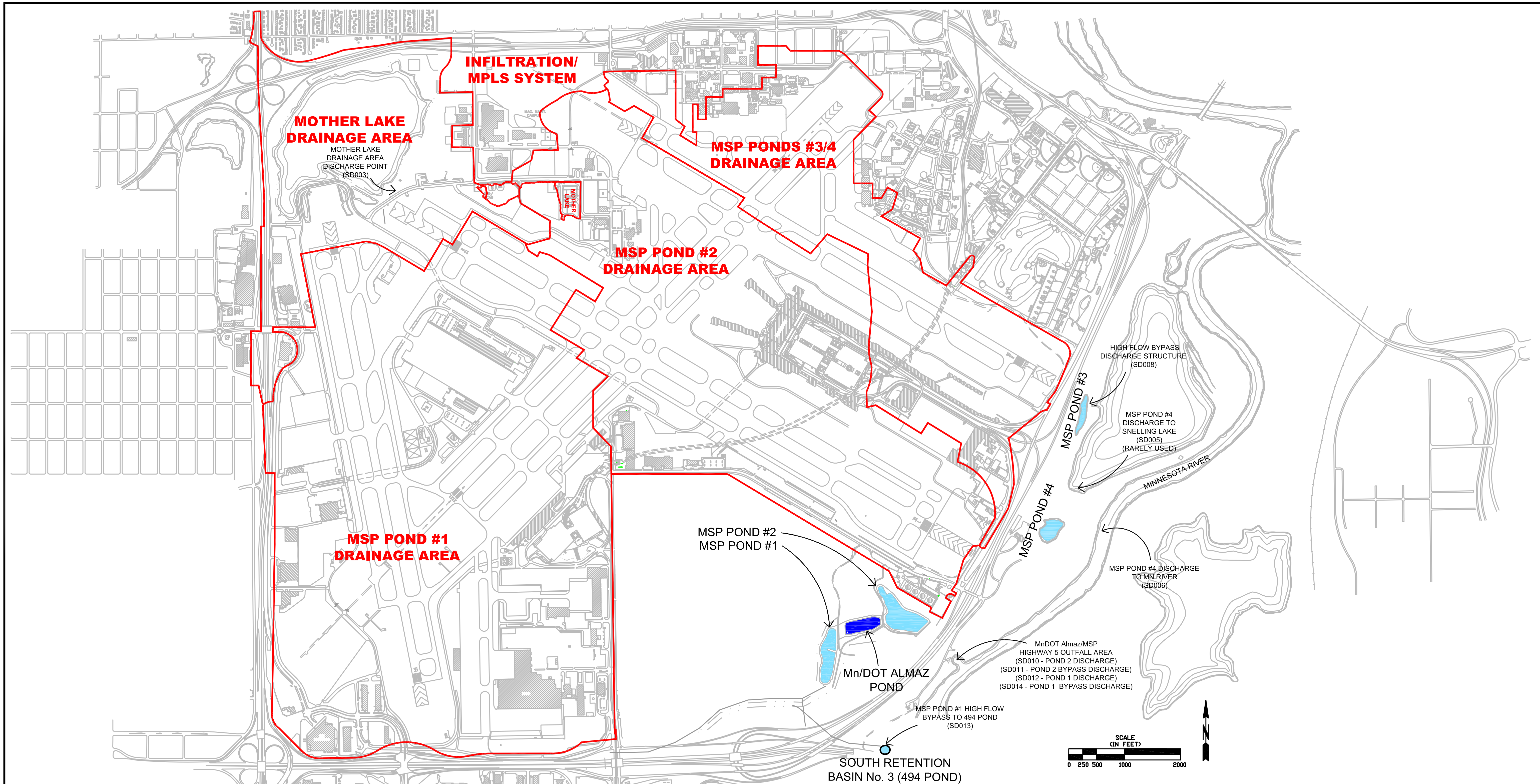
5.18.1.4 Affected Environment

The Study Area for surface water includes the storm sewer collection system, the MSP stormwater ponds, the 494 Bypass Pond, the Mn/DOT Almaz Pond and the Minnesota River. The drainage areas of these ponds on MSP property cover approximately 2,840 acres, of which approximately 1,880 acres are impervious surfaces. Nearly all stormwater from MSP drains via storm sewers to retention ponds prior to discharge to the Minnesota River. A small area of MSP drains to Mother Lake. Stormwater from MSP Pond 3 can overtop into Snelling Lake during peak storm events before entering the Minnesota River. **Figure 5.18-1** shows the drainage areas and the discharge locations to public waters.

The MSP Pond 1 Drainage Area receives stormwater discharges from virtually all airport activity on the west side of MSP, including Terminal 2-Humphrey, the cargo facilities and Runway 17-35. The MSP Pond 2 Drainage Area receives stormwater from the majority of airport activity at MSP, including most of Terminal 1-Lindbergh. MSP Ponds 1 and 2 were designed to reduce TSS discharges to the Minnesota River by approximately 80% and can contain fuel spills.

MSP Ponds 3 and 4 operate in series. They receive discharges from the portion of Terminal 1-Lindbergh servicing regional aircraft, portions of Runways 12L-30R and 4-22 and associated taxiways, inbound and outbound roadways, Post Office and Air Force Reserve and Air National Guard Airside Operations. The combined Ponds 3 and 4 system also reduces TSS discharges by 80% or more to the Minnesota River and can contain fuel spills.

In addition the Mn/DOT Almaz Pond serves portions of I-494, TH 77 and related roadways. It was designed to the same standards as MSP Ponds 1 and 2 to reduce annual TSS discharges by approximately 80%.



LEGEND

- MSP Stormwater Pond
- Mn/DOT Almaz Stormwater Pond

Drainage Area

Source: Data compiled and maintained Liesch Associates, Inc. Base Map provided by TKDA.

Disclaimer: This map was generated by HNTB Corporation based off of CAD files supplied by other parties. No claims are made to the accuracy or completeness of the information shown herein nor to its suitability for a particular use. The scale and location of map are approximate.

MAC

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5.18.1.5 Impact Analysis

Impacts on surface water quality were assessed by considering storm sewer network hydrology; organic loadings, TSS removal; and petroleum/fuel discharges. The impact analysis for each of these considerations is briefly described in the following sections. See ***Appendix L**, Hydrology and Stormwater Pond Analysis*, for detailed information.

Storm Sewer Network

The Action Alternatives result in changes in the impervious surfaces which could in turn change the ability of the storm sewer system to convey stormwater. Where changes in impervious surfaces were more than minimal, hydrologic models were updated to assess system performance. The models were used to determine the ability of the existing storm sewer system to handle the 10-year storm event and changes in total stormwater discharges to the Minnesota River in the 100-year storm event.

The No Action Alternative includes minimal construction. Therefore, the No Action Alternative would have little or no impact on localized flooding and peak discharges to the Minnesota River.

The Airlines Remain Alternative includes the addition of 2.7 acres of net new impervious surface within the Pond 1 drainage area, and 3.7 acres associated with roadway improvements outside the Mn/DOT Almaz area. Pond 2 and combined Ponds 3 and 4 have negligible changes in net impervious surfaces, -0.2 and 0.3 acres, respectively. The net increase in impervious surface of 6.5 acres is insignificant relative to the existing approximately 1,880 acres of impervious surfaces. The Airlines Remain Alternative would have no significant impact on localized flooding and peak discharges to the Minnesota River.

The Airlines Relocate Alternative includes 27.5 acres of net new impervious surface proposed in the Pond 1 drainage area, and 1.1 acres of net new impervious surface associated with roadway improvements outside the Mn/DOT Almaz drainage area. Pond 2 and combined Ponds 3 and 4 have negligible change in net impervious surfaces, -0.2 and 0.0 acres, respectively. The existing Pond 1 drainage area model was updated to include the new impervious surface. Results show the existing storm system is capable of conveying the 10 year storm event without flooding pavements. Total peak discharges during the 100-year storm event at TH 5 (which include Pond 1, Pond 2 and MnDOT Pond discharges) increase by 6 cfs, less than 0.2% of the peak flow rate. Additionally, the net increase in impervious surfaces of 28.4 acres is insignificant relative to the existing approximately 1,880 acres of impervious surfaces.

The impacts on the stormwater network in 2030 were also assessed to address FHWA requirements. The post 2020 regional roadway improvements would increase the Mn/DOT Almaz Pond drainage area by 6.5 acres; 5.2 acres impervious and 1.3 acres pervious. Peak discharges from the MSP Pond 1, 2 and Almaz pond are not expected to increase measurably at TH 5 as a result of these drainage area increases. However, Mn/DOT reports that areas upstream of the proposed improvements overload the I-494 stormwater system in 5-year storm events. Prior to addition of new impervious areas to the Almaz pond, the project sponsor will investigate design options to address additional runoff to the system that will not create a wildlife hazard for the airport.

Organic Loading – Aircraft Deicing Fluid (ADF) Impacts

The potential impacts to organic loading in the Minnesota River were evaluated by quantifying the ability to capture aircraft deicing fluid (ADF). ADFs are applied by MSP tenants as required by FAA requirements and at the direction of the pilot. The airport operates a Glycol Recovery Program that collects spent ADF from various deicing locations around MSP and transports the spent fluid to the Glycol Management Facility where the glycol-impacted stormwater is either sent to treatment or recycled. The primary focus of the Glycol Recovery Program is to minimize the amount of glycol that discharges from MSP into the Minnesota River. Over the past five deicing seasons the Glycol Recovery Program has reduced the organic loadings to the Minnesota River by an average of 83%.

Spent glycol collection efficiencies can differ substantially based on the location the ADF is applied. The Action Alternatives would change the locations where aircraft deicing would occur. Therefore, modeling of ADF capture based on the aircraft deicing locations was conducted. The results of the modeling allowed for comparison of glycol collection efficiency between the alternatives.

Modeling results show that the No Action Alternative provides essentially the same glycol collection performance as is currently available.

Under the Airlines Remain Alternative, non-hub airlines remain at Terminal 1-Lindbergh and are assumed to continue deicing operations at the aircraft gates. The G Concourse will be expanded in this alternative, which includes constructing facilities to permit at-gate deicing as well as replacing the existing 30L Deicing Pad with a newly configured pad. Terminal 2-Humphrey will include the addition of three new gates under this alternative and it is assumed at-gate deicing would occur at those gates.

The modeling shows that the Airlines Remain Alternative would result in overall collection efficiencies increasing by 0.7%. This is due to the migration of deicing activities from older plug and pump (PnP) sites to the newer PnP pavements associated with the expanded G Concourse and the three new Terminal 2-Humphrey gates.

Under the Airlines Relocate Alternative, non-SkyTeam airlines are relocated to a newly expanded Terminal 2-Humphrey. This construction includes substantial areas of new pavement to service the new gates. It is assumed at-gate deicing will continue to be the preferred deicing option for Terminal 2-Humphrey tenants. Terminal 1-Lindbergh will have a new International Facility constructed at the end of the G Concourse. The new G Concourse gates include constructing new pavement facilities to permit at-gate deicing as well as replacing the existing Runway 30L Deicing Pad with a newly configured pad.

The results of the modeling show that the Airlines Relocate Alternative would result in overall collection efficiencies increasing by 1.7%. This is due largely from the migration of deicing activities from the E Concourse PnP to the new Terminal 2-Humphrey PnP systems. In addition, some deicing activity at Terminal 1-Lindbergh will migrate to the new Concourse G PnP areas associated with the new International Facility.

Therefore, it is concluded that the Action Alternatives would result in a small benefit to water quality in terms of organic loading. See ***Appendix M***, *Change in Surface Water Impacts from Aircraft Deicing and Fueling* for more information regarding the analysis of these impacts.

Total Suspended Solids

Analyses were conducted to demonstrate the effectiveness of the exiting stormwater ponds in removing TSS with each of the alternatives. Proposed changes in impervious surfaces under each alternative were input into stormwater detention pond models to determine the effect on TSS removal performance.

The No Action Alternative does not result in changes to the amount of impervious surface. Therefore, there would be no change in TSS removal performance from existing conditions.

Under the Airlines Remain Alternative, the amount of new impervious surface in the drainage areas for Pond 2 and combined Ponds 3 and 4 is negligible. Therefore, neither Pond 2 nor combined Ponds 3 and 4 TSS treatment performance would be affected. The net impervious area within the Pond 1 drainage area increases by 2.7 acres. Model results show a decrease in Pond 1 treatment efficiency from 93.6% to 93.5% TSS removal. Additionally, 3.7 acres of net new impervious surface will be constructed outside the Mn/DOT Almaz Pond drainage areas in association with roadway improvements.

As with the Airlines Remain Alternative, the drainage areas associated with Pond 2 and combined Ponds 3 and 4 have negligible change in net new impervious surfaces under the Airlines Relocate Alternative. Therefore, neither Pond 2 nor combined Ponds 3 and 4 TSS treatment performance would be affected. The net impervious area within the Pond 1 drainage area increases by 27.5 acres. Model results show a decrease in Pond 1 treatment efficiency from 93.6% to 92.4% TSS removal with the Airlines Relocate alternative. Additionally, 1.1 acres of net new impervious surface would be constructed outside the Mn/DOT Almaz drainage areas in association with roadway improvements.

The change in TSS removal within the MSP drainage area between the No Action and Action Alternatives would be relatively small. For context, 1.2% of Pond 1 TSS discharge is approximately 400 lbs/year, or 0.4% of all MSP discharges to the Minnesota River. Also, the amount of new impervious surface outside the pond drainage area is small and would need to comply with construction NPDES and Lower Minnesota River Watershed District permit requirements. Therefore, it is concluded that the alternatives would have little impact on TSS loads in the Minnesota River.

The impacts on the TSS removal in 2030 were also assessed to address FHWA requirements. The post 2020 regional roadway improvements only impact the Mn/DOT Almaz Pond. Modeling shows that the TSS removal in the MnDOT Almaz Pond would be reduced from 84.60% to 84.30%. The TSS treatment efficiency is greater than 80% which is deemed acceptable.

Petroleum / Fuel Impacts

Factors that may change the collection of petroleum and fuel spills are considered to assess potential related impacts to water quality. None of the alternatives include major modifications to the stormwater conveyance systems near the end of pipe where the petroleum impact discharge prevention mechanisms are located. In addition, it is assumed that spill response, notification and clean-up will continue to be part of MSP operations regardless of the alternative selected. Lastly, the total number of operations does not change based on the alternative selected, therefore the total number of fueling operations and total volume of fuel is not expected to change.

It is expected that the location of fueling activities will be different based on the alternative selected, in particular if Airlines Relocate Alternative is selected and Terminal 2-Humphrey is considerably expanded. However, it is not anticipated that the relocation of fueling facilities would negatively impact petroleum surface water discharges. With the Airlines Relocate Alternative, the fueling activities move from the MSP Pond 2 drainage area to the MSP Pond 1 drainage area. The stormwater ponds serving these areas are equipped with essentially identical spill release prevention measures. Therefore, it is not expected there would be a material change in potential impacts from any of the alternatives.

5.18.1.6 Permitting

All projects must comply with the SWPPP and meet construction NPDES permit and Lower Minnesota River Watershed District permit requirements. Also, a Mn/DOT drainage permit will be obtained for projects that impact TH 5 and I-494 drainage.

5.18.1.7 Summary

Table 5.18.1 summarizes the results of the analyses and the impacts on surface water due to each alternative. The analysis shows that changes in stormwater runoff volume and runoff water quality discharged to the Minnesota River would be negligible for all of the Alternatives. In addition, all projects will comply with the SWPPP and meet construction NPDES permit and Lower Minnesota River Watershed District permit requirements. Therefore, the Alternatives would have minimal impacts on surface water quality.

See ***Appendix L*** and ***Appendix M*** for more information regarding the analysis of these impacts.

Table 5.18.1

Surface Water Impacts

<table>
<tr><th></th><th>Storm Sewer Network Hydrology</th><th>Organic Loadings</th><th>Total Suspended Solids (TSS)</th><th>Petroleum/Fuel Discharges</th></tr>
<tr><td>No Action</td><td>- Minimal construction results in no impact on localized flooding and peak discharges to Minnesota River.</td><td>- Same glycol collection performance as is currently available.</td><td>- No changes in impervious surfaces, therefore no changes in impacts.</td><td rowspan="3">- Spill Response Plan and spill control mechanisms are currently in place.
- The total number of operations does not change based on the alternative, therefore fueling operations and volume of fuel does not change.
- Location of fueling operations may vary but is not expected to impact petroleum surface water discharges.</td></tr>
<tr><td>Airlines Remain</td><td>- Net increase of 6.5 acres of impervious surface
- Insignificant relative to existing impervious surface of~1,880 acres. (increase equates to ~0.4%)</td><td>- Overall collection efficiencies would increase by 0.7%, due to the migration of deicing activities from older sites to newer pavements.</td><td rowspan="2">- Impervious areas for MSP Ponds 2 and combined Ponds 3 and 4 change minimally.
- Pond 1 maximum increase in impervious area is 27.5 acres.
- Pond 1 treatment maximum efficiency decrease from 93.6% to 92.4% TSS
- 1.2% of Pond 1 TSS discharge is approximately 400 lbs/year, or 0.4% of all MSP discharges to the Minnesota River.</td></tr>
<tr><td>Airlines Relocate</td><td>- Net increase of 28.4 acres of impervious surface
- Insignificant relative to existing impervious surface of ~1,880 acres. (increase equates to ~1.5%)</td><td>- Overall collection efficiencies would increase by 1.7%, due to the migration of deicing activities from the E concourse to the new Terminal 2 systems.</td></tr>
<tr><td>2030 Analysis</td><td>- Drainage area for the Mn/DOT Almaz Pond would increase by 6.5 acres; 5.2 acres impervious and 1.3 acres pervious.
- Modeling shows no measureable increases in peak flow.</td><td>Not applicable – changes in organic loading are related to aircraft deicing.</td><td>- TSS removal in the Mn/DOT Almaz Pond would be reduced from 84.60 % to 84.30%. The TSS treatment efficiency is greater than 80% which is deemed acceptable.</td><td>Not applicable – petroleum/ fuel discharges are related to potential spills on the airport.</td></tr>
</table>

Source: Liesch Associates, Inc. 2012.

5.18.2 Groundwater

This sub-section provides information about groundwater related regulations, the affected environment and potential impacts.

5.18.2.1 Regulatory Background

The CWA also applies to groundwater. Additionally, the MPCA has broad authority to regulate activities that have the potential to contaminate groundwater. The Airport's NPDES/SDS (State Disposal System) permit can include groundwater as an aspect of the permit's authorization. The more typical (and more direct) regulatory jurisdiction is through the leaks/spills clean-up authority that the MPCA may use. The MPCA has historically reviewed cases of potential groundwater impacts on a case-by-case basis and responded appropriately given the potential severity of the impacts and the potential for those impacts to affect off-site receptors. This risk-based approach has served both the public and the airport well to maintain efficient and effective response to potential groundwater issues.

5.18.2.2 Approach and Methodology

Impacts to groundwater at MSP are largely associated with fuel spills/leaks and the potential vertical migration or exfiltration of aircraft deicing fluids. Therefore, the Alternatives were reviewed regarding their relative potential for fuel spills/leaks and capture of aircraft deicing fluids.

5.18.2.3 Threshold of Significance

The threshold of significance for surface water impacts also applies to groundwater impacts.

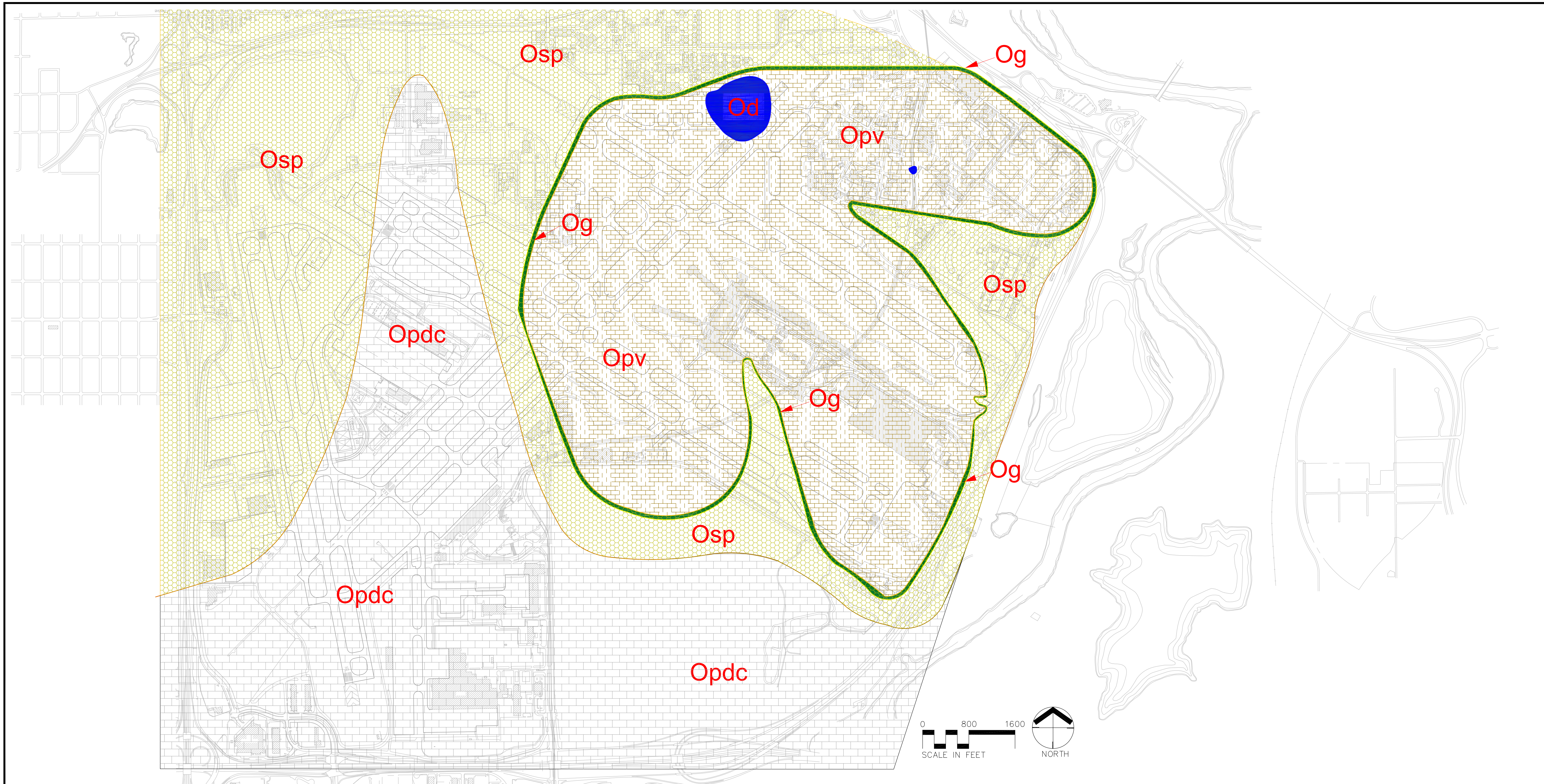
5.18.2.4 Affected Environment

Groundwater at MSP generally flows in an east/southeasterly direction towards the Minnesota River. All groundwater eventually flows into the Minnesota River basin. The Minnesota River and related Fort Snelling State Park water bodies are the only downstream receptors for MSP groundwater flows.

MSP is underlain by the complete section of Paleozoic bedrock units found in the Twin Cities Basin, which are overlain by a variety of glacial sediments. The bedrock topography is illustrated in **Figure 5.18-2**. The bedrock units include (from youngest to oldest) Decorah shale, Platteville limestone, Glenwood shale, St. Peter sandstone, Prairie du Chien formation, Jordan sandstone and the St. Lawrence formation. The Glenwood shale serves as a confining layer that prevents vertical migration of groundwater into the St. Peter sandstone. The base of the St. Peter sandstone also serves as a confining layer to prevent groundwater migration into the Prairie du Chien/Jordan aquifer system.

There is a perched water table in the Platteville limestone, a deeper water table in the St. Peter sandstone and, in the bedrock valleys, a water table in the unconsolidated glacial sediments.

The MAC has constructed a comprehensive well network (CWN) to monitor groundwater at MSP, and has regularly sampled and reported groundwater quality from the CWN since 2005. The primary contaminants of concern at MSP are petroleum-related impacts and residuals from aircraft deicing fluid (ADF) in the groundwater. **Figure 5.18-3** shows the location of the monitoring wells in the CWN.



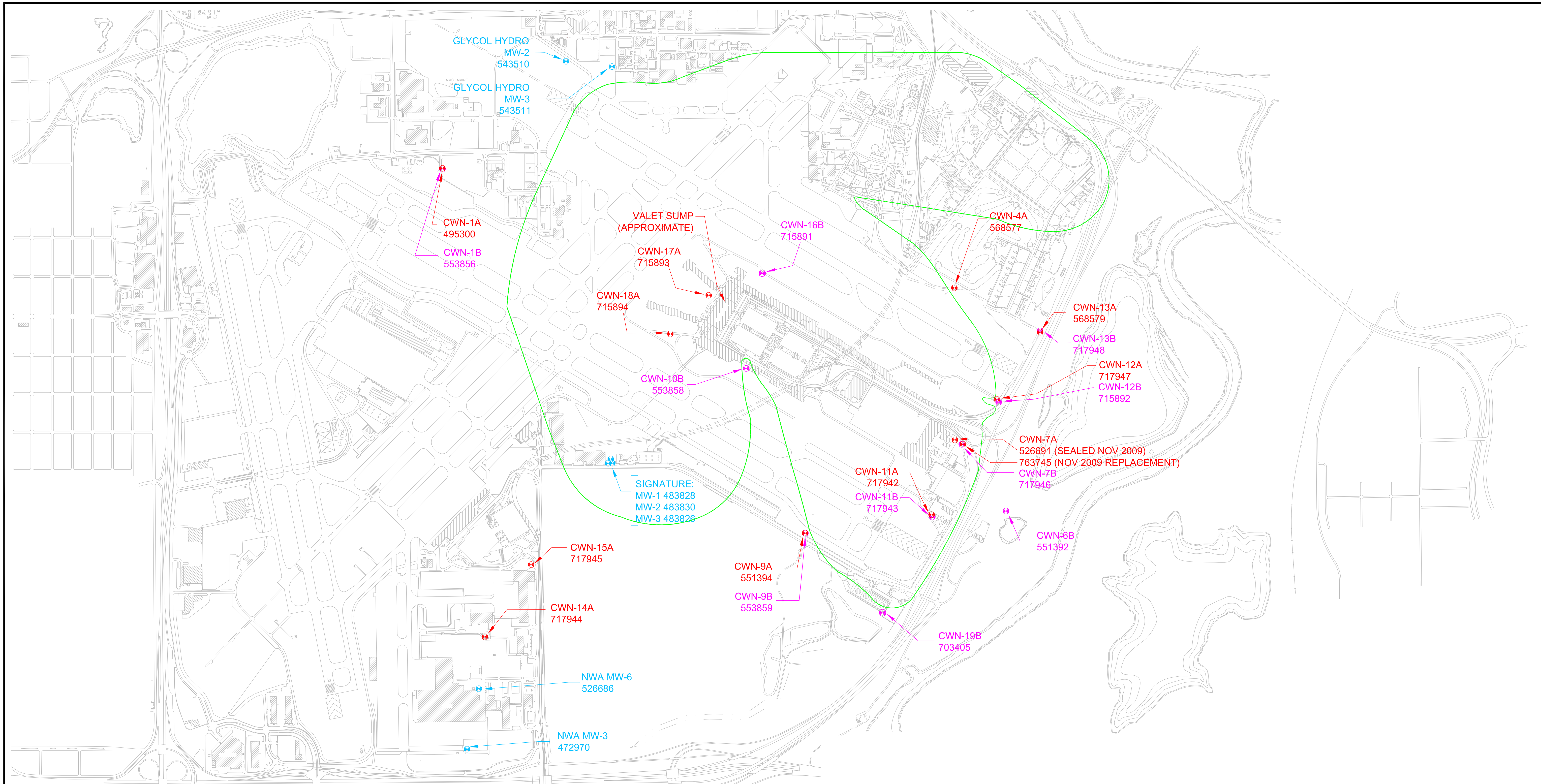
LEGEND

Od Ordovician Decorah Shale
Opv Ordovician Platteville Limestone
Og Ordovician Glenwood Shale
Osp Ordovician St. Peter Sandstone
Opdc Ordovician Prairie du Chien Dolomitic

Bedrock Topography

Source: Data compiled and maintained Liesch Associates, Inc. Base Map provided by TKDA.

Disclaimer: This map was generated by HNTB Corporation based off of CAD files supplied by other parties. No claims are made to the accuracy or completeness of the information shown herein nor to its suitability for a particular use. The scale and location of map are approximate.



LEGEND

- CWN WATER TABLE WELLS WITH ANALYTICAL
- CWN WATER TABLE WELLS WATER LEVEL ONLY
- CWN ST. PETER WELLS WITH ANALYTICAL
- ESTIMATED EXTENT OF SHALE CONFINING LAYER

Comprehensive Well Network (CWN) Monitoring Wells

Source: Data compiled and maintained Liesch Associates, Inc. Base Map provided by TKDA.

Disclaimer: This map was generated by HNTB Corporation based off of CAD files supplied by other parties. No claims are made to the accuracy or completeness of the information shown herein nor to its suitability for a particular use. The scale and location of map are approximate.

Groundwater monitoring in the St. Peter sandstone has resulted in a limited number of contaminant detections and the majority of detections that have been observed are transient in nature (i.e., they are not found in subsequent sampling events), with the exception of detections associated with known historic releases. In general, groundwater monitoring data have not identified free product or significant petroleum contamination at MSP outside of the known historical petroleum release sites. In addition, propylene glycol and chemical oxygen demand testing has indicated airport-wide subsurface glycol impacts are not present at MSP.

Two factors make the overall airport site an attractive hydrogeological setting in terms of natural protection of the deeper aquifers. First, the Prairie du Chien/Jordan Aquifer is protected by the basal St. Peter sandstone confining layer, and the St. Peter sandstone is protected by the Glenwood shale confining layer (in those locations where shale is present). These confining layers inhibit downward movement of fuel or other surface contaminants into the water resources below. Second, the Minnesota River system is believed to represent the regional groundwater discharge location, constraining the area of potential impact to the zone between MSP and the river system.

In addition to natural protection features, the MAC and its tenants have active programs in place to protect against groundwater contamination at MSP. These include fueling system and tank tightness testing; tanks and fueling systems in compliance with current regulations for secondary containment, corrosion protection and spill/overfill protection; an integrated spill plan (ISP); glycol collection systems at locations ADF is applied; and the extensive groundwater monitoring network.

5.18.2.5 Impact Analysis

The airport activities that have the greatest potential to result in groundwater impacts are fueling and to a lesser extent aircraft deicing. The total number of aircraft operations does not change between the Alternatives. Therefore the total fueling operations should remain similar. Given the accidental and unpredictable nature of fuel spills/leak, it is not anticipated that there would be a material difference in the potential for groundwater impacts from fueling activities between the Alternatives.

Aircraft deicing may have the potential to impact groundwater. The mechanism for the groundwater impacts from deicing is still under review; however it is believed that it is related to storm sewer pipe exfiltration and/or vertical migration through the surface pavement. Regardless of the potential pathway, the two Action Alternatives would be expected to reduce the overall potential for groundwater impacts because each alternative includes the construction of new pavements with storm sewer systems that will likely include design criteria to improve collection of glycol-impacted stormwater. If pipe exfiltration or vertical migrations are sources of groundwater impacts from deicing, these new systems would reduce the potential compared to the No Action Alternative. However, the reduction in potential will be fairly nominal as the vast majority of deicing activities will remain unchanged between the No Action Alternative and the Action Alternatives.

The MAC is not aware of significant groundwater contamination issues in the roadway improvement areas. Furthermore, the industrial activities of concern, primarily aircraft fueling and deicing, have not and will not occur in roadway improvement areas.

5.18.2.6 Summary

The potential for groundwater impacts from fueling and aircraft deicing activities would likely be similar for all Alternatives. Therefore, when compared to the No Action Alternative, the Action Alternatives would not result in an impact to groundwater quality.

5.18.3 Drinking Water

All of the potable water used on the MSP campus is supplied by the City of Minneapolis Water Department with the exception of the Runway 35 approach runway protection zone (RPZ) area which is serviced by the City of Bloomington.

There are no drinking water wells on MSP or down gradient between MSP and the groundwater discharge location at the Minnesota River. The Minnesota River is not a drinking water resource.

The nearest public water supply is the City of Richfield. All construction actions would take place at locations down-gradient of public wells and outside the limits of the City of Richfield wellhead protection area.

5.18.4 Wastewater

All wastewater generated on the MSP campus is treated by the Metropolitan Council Environmental Services (MCES) at its Metro Wastewater Treatment plant. The operating capacity of the Metro plant is 251 million gallons per day (MGD).

The amount of wastewater generated is related to the number of enplanements. Since the number of enplanements is the same for the No Action Alternative and the Action Alternatives, the wastewater generation would be expected to be the same. However, the amount of wastewater would be reduced by incorporating low-flow restroom facilities in expanded or remodeled locations as part of the Action Alternatives. Therefore, the Action Alternatives would generate less wastewater than the No Action Alternative.

5.19 Wetlands

Executive order 11990, Order DOT 5660.1A, *the Rivers and Harbors Act of 1899* and the *Clean Water* Act address activities within wetlands. Wetlands are also regulated under the Minnesota Wetland Conservation Act of 1991 (WCA).

The only location in the Study Area with wetland characteristics is a small area between the north- and south-bound lanes of TH 5. This location is not shown as a wetland on the National Wetland Inventory map. The Hennepin County Soil Survey identifies non-hydric soils at this location. A review of old aerial photographs and highway construction drawings shows this location to be a former upland that included a gravel roadway and was wooded with oak and maple trees. The wetland characteristics were man-induced, and therefore exempt from the WCA. Thus, there are no MNDNR-protected or WCA jurisdictional wetlands within the Study Area. Based on the same considerations, it is assumed that the subject area does not qualify as a wetland according to USACE criteria. Coordination with the USACE confirmed this assumption. Refer to Appendix F for related correspondence.

Therefore, it is concluded that there are no wetlands in the Study Area.

Since there are no wetlands within the Study Area, none of the Alternatives would directly impact wetlands.

The potential for indirect impacts outside the Study Area was also considered. None of the Alternatives would significantly alter drainage areas or runoff volumes beyond the Study Area. The Action Alternatives would result in minor increases in impervious surfaces. The minor changes in impervious surfaces are in locations were stormwater runoff is collected by storm sewers. The storm sewers discharge directly into stormwater ponds for quantity and quality control prior to release into the Minnesota River. Therefore, none of the Alternatives would cause indirect impacts to wetlands located outside of the Study Area.

5.20 Wild and Scenic Rivers

The *Wild and Scenic River Act* defines river areas eligible for protection under the legislation as those that are free flowing and have "outstanding remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, and similar values."[33] River segments that have been designated as Wild and Scenic are included in the National and Wild and Scenic Rivers System. River segments that potentially qualify for inclusion in the National Wild and Scenic River System are listed on the Nationwide Rivers Inventory (NRI), compiled by the US National Park Service.

The Proposed Action would have a significant impact if it would alter a river designated as Wild and Scenic pursuant to the federal *Wild and Scenic Rivers Act*. The closest designated Wild and Scenic River to MSP is the St. Croix River which is approximately 25 miles east of MSP. Due to its distance from MSP, the St. Croix River would not be altered or impacted by any of the Alternatives.

The only river segment listed on the Nationwide Rivers Inventory within five miles of the Airport is the Mississippi River between St. Croix and the USACE Lock and Dam #1 in Minneapolis. Since none of the Alternatives would physically alter this river segment and analysis shows that changes in stormwater runoff volume and runoff water quality discharged to the Minnesota River would be negligible for all Alternatives, it is concluded that the Alternatives would not alter an NRI river. Therefore, none of the Alternatives would impact Wild and Scenic Rivers.

5.21 Cumulative Effects

The following sub-sections describe the regulatory background for considering cumulative impacts, the other projects considered, and potential cumulative impacts.

5.21.1 Regulatory Background

The Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (40 CFR Parts 1500 – 1508) require that cumulative impacts are addressed as part of the NEPA process. The CEQ Regulations define a cumulative impact as "…the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."[34]

The Minnesota Administrative Rules also require that the Environmental Assessment Worksheets include the identification of cumulative potential effects.[35] The Minnesota Administrative Rules provide a definition for cumulative impacts that is very similar to that found in the CEQ Regulations. The Minnesota Administrative Rule 4410.0200 goes one step further and defines the term cumulative potential effects. ""Cumulative potential effects" means the effect on the environment that results from the incremental effects of a project in addition to other projects in the environmentally relevant area that might reasonably be expected to affect the same environmental resources, including future projects actually planned or for which a basis of expectation has been laid, regardless of what person undertakes the other projects or what jurisdictions have authority over the projects. Significant cumulative potential effects can result from individually minor projects taking place over a period of time. In analyzing the contributions of past projects to cumulative potential effects, it is sufficient to consider the current aggregate effects of past actions."[36]

5.21.2 Approach and Methodology

Completed and anticipated projects at the airport and in the abutting communities, including the cities of Richfield, Bloomington and Minneapolis, were reviewed for inclusion in the list of projects to be considered in evaluating cumulative impacts. However, since the communities of Mendota Heights, St. Paul and Eagan do not abut the airport, projects in these communities were not considered in evaluating cumulative impacts.

The MAC reviewed available planning documents for projects in the Cities of Richfield, Bloomington and Minneapolis to develop a list of recent and potential projects near the airport. The MAC shared these lists with the subject cities and met with their planning representatives. The lists of projects were updated based on information provided at these meetings.

Once the projects were identified, the next step was to determine which of the environmental impact categories need to be considered. Cumulative effects analysis is resource specific and generally addresses environmental resources that would be affected by the Alternatives. The key question is "do the effects of the proposed action on a particular environmental resource, when added to effects on the same resource due to other nearby and near-term actions, adversely impact that resource."[37] Therefore, cumulative effects are assessed only for the environmental categories that would be impacted by the alternatives.

Based on the analysis in this Chapter, the Action Alternatives would not likely impact the following environmental categories: coastal resources; air quality, compatible land use; DOT Section 4(f) resources, farmlands; fish, wildlife and plants; floodplains; hazardous materials; historic resources, light emissions and visual effects; secondary impacts; socioeconomic impacts (except traffic), environmental justice, children's health and safety risks; wetlands; and wild and scenic rivers. The Alternatives would potentially result in construction, traffic and circulation, water quality and noise impacts. Therefore, these impact categories were considered in identifying the potential for cumulative effects.

It is noted that induced demand is not considered reasonably foreseeable and therefore not included in the assessment of cumulative impacts. The Action Alternatives are not expected to result in induced demand. In other words, the forecasted numbers of aircraft operations are the same for all alternatives. While the No Action Alternative represents a much more crowded condition, the projected daily and annual demand can be accommodated, albeit at a reduced level of service. The No Action Alternative design day flight schedule and associated airfield simulation analysis demonstrate that the airlines will need to make some changes in their scheduled flight times to accommodate projected demand with existing terminal facilities through 2025. Therefore, the induced aviation activity (difference between Action Alternatives and No Action Alternative activity) resulting from the proposed terminal facility improvements consists of a redistribution of existing activity rather than creation of additional demand from new aircraft operations.

5.21.3 Thresholds of Significance

The thresholds of significance are the thresholds noted previously for construction; traffic and circulation; water quality and noise.

5.21.4 Impact Analysis

The projects listed in **Table 5.21.1** were considered in the assessment of potential cumulative impacts.

Table 5.21.1

Projects Identified for Consideration of Cumulative Potential Effects

Project	Description	Construction Year
MSP		
Runway 17 Deicing Pad Construction	Constructed a deicing/holding pad for Runway 17. Included paving of adjacent Taxiways W, Y, K8 and Y3 and a snow melt pad associated with the glycol collection system. Also included construction of a support facility for deicing vehicles. The support facility has six 2000-gallon glycol tanks and pumps and supply piping for Type I glycol.	2005
Runway 17/35 Land Acquisition	Acquired off-airport land required to provide for the Runway 17/35 Protection Zone (RPZ). In addition, 29 single family residences and two apartment complexes with a total of 132 units located in Bloomington south and east of the Mall of America were acquired for noise mitigation purposes.	2005-2006
Taxiway Q Construction	Constructed Taxiway Q between Runway 4/22 and Taxiway C	2005
Residential Sound Insulation – 2007 DNL 65 contour	Completed the program to insulate single family residential houses within the certified 2007 DNL 65-noise contour.	2007
Taxiway C/D Complex	Reconstructed and reconfigured Taxiways C and D between Runway 12L/30R and Runway 12R/30L. This project relocated both taxiways further to the west which allowed unrestricted access of Group V aircraft around the west side of Concourses E and F.	2005-2010
34th Avenue Reconstruction – North of 70th Street	Reconstructed 34th Avenue north of 70th Street	2005
Taxiway M Extension	Extended Taxiway M to the south approximately 2,100 feet to connect with Taxiway S to provide an alternative taxi route for Runway 17 departures for the Lindbergh Terminal during low visibility conditions.	2006
Multi-family Sound Insulation (Inside 2007 65 DNL	Sound insulation of 575 multi-family units within the 2007 65 DNL contour.	2007
Humphrey Parking Structure Expansion	Expanded the Humphrey Parking Structure to provide an additional 4,550 parking spaces as well as vertical circulation to link the LRT to the new skyway to the Humphrey Terminal.	2007
Pavement Rehabilitation – Runway 12R/30L	Reconstructed the middle section of Runway 12R/30L located between Runway 4/22 and Taxiway A4.	2009
Residential Sound Insulation	Sound insulation program based on the 2007 Noise Exposure Map contained in the Part 150 Update consistent with the terms and conditions of the court ordered Consent Decree	2008-
Taxiway P Reconstruction	Realigned and reconstructed the section of Taxiway P from Taxiway C to Taxiway P4. This project provided for the mill and	2008-2009

Table 5.21.1

Projects Identified for Consideration of Cumulative Potential Effects

Project	Description	Construction Year
	overlay of the bituminous section on Runway 12L/30R from Runway 4/22 to Taxiway P6.	
Concourse G Extension – Site Preparation	Demolition of the Building B complex except for premises retained by Northwest Airlines.	2009
Airport Lane/34th Ave. Access Reconfiguration	Realigned the access from 34th Avenue and Airport to conform to standards for similar types of intersections	2009
Noise Mitigation Settlement	Continuation of the implementation of the noise mitigation program based on the Noise Exposure Map contained in the court ordered Consent Decree,	2011-2012
Data Center Facilities	Construct a new consolidated data center.	2012
Taxiway C Extension to Humphrey Remote	Extended Taxiway C between Taxiway S and the Humphrey Remote Apron to improve access to and from the Humphrey Remote Apron and Delta Air Lines Building C maintenance complex.	2011
North Side Storm Sewer Improvements	Improvements to the storm sewer system and Ponds 3 and 4 between Pond 3 and the Minnesota River.	2012-2013

Table 5.21.1

Projects Identified for Consideration of Cumulative Potential Effects

Project	Description	Construction Year
City of Richfield		
Metro Sewer/Regional Trail Project	Upgrade of a sanitary sewer line that serves Edina and Richfield. The project begins at 75th Street and Xerxes Avenue and extends east along 75th Street to I-35W. It crosses I-35W near the 76th Street bridge and extends east along 76th Street to 11th Avenue, where it turns north. It extends north along 11th Avenue to 72nd Street, turns east on 72nd, and extends east to Cedar Avenue on 72nd Street or on Diagonal Blvd. Project was completed in 2011.	2010
New Richfield City Hall	Construction of a new City Hall on Portland Avenue, near 67th Street began in 2010 and was completed in 2011.	2010
Portland Avenue Bridge over Crosstown	The Portland Avenue Bridge deck was replaced and the lighting and railings were replaced for enhanced safety. Completed in 2010.	2010
1120 East 66th Street	Build O'Reilly Auto Parts store in Richfield. Assuming the City Council approves variances for this project, construction should begin in late 2012.	2012
1600 East 78th Street	Rehabilitation of the Eco Smart store building. Project has not yet begun.	Not Available
77th Street Underpass	Extend 77th Street under TH 77 to connect to the 24th Avenue interchange of I-494. The project would improve I-494 by eliminating the need for frontage roads and allowing for expansion of I-494. Funding has not been identified for this project.	Likely after 2020
Taft Lake Improvements / Richfield Parkway Connection to Bloomington Avenue / Taft Lake and Legion Lake Active Treatment	This project demolishes the frontage road, creates pre-treatment (including treatment for water coming out of Mother Lake) for Taft Lake in its place and constructs a Richfield Parkway connection on the south side of Taft Park. This includes acquiring right-of-way and adding trails and open space to Taft Park. The project also includes construction of an active treatment system in the Legion/Taft Lake system to improve water quality within the Minnehaha Creek Watershed District. These projects are being funded by the Minnehaha Creek Watershed District.	2013

Table 5.21.1

Projects Identified for Consideration of Cumulative Potential Effects

Project	Description	Construction Year
North Richfield Parkway/Taft Lake Improvements	This project replaces the Cedar Avenue connection that was lost with the reconstruction of the 66th Street / TH 77 Interchange. It also reroutes the north-south collector between TH 62 and 66th Street along Bloomington Avenue. The new roadway includes two vehicular lanes, on-street bicycle lanes, green boulevards, a concrete walkway and an asphalt regional trail. Approximately three homes will need to be acquired for the new roadway. An additional 18 homes would be acquired for associated residential redevelopment. The proposed residential redevelopment consists of three to four story corridor accessed units with no decks or patios. The units are likely to be developed as senior housing with a care component as there is a need for senior housing in this area. However, low-income housing is not ruled out. The residential redevelopment is demand driven and therefore the associated year(s) of construction are difficult to predict. A total of 100 to 170 units will likely be developed. A noise study was also completed to define developer requirements to ensure noise compatibility.	Prior to 2020
South Richfield Parkway	This project replaces Cedar Avenue with the new Richfield Parkway. It will include redevelopment of area between 66th Street and 70th or 71st Street. The 2.5 blocks just west of TH 77 would be developed as light industrial and the remainder would be residential; all envisioned to be one- to two-story low-density development. However, the redevelopment is demand driven and right now there is not enough vacant land.	Prior to 2020
Bus Rapid Transit on Cedar Avenue	The current Transportation Policy Plan calls for continued development of two Bus Rapid Transit (BRT) corridors in the area, the Cedar Avenue BRT and I-35W BRT. These will provide high frequency express bus services running on dedicated lanes connecting the suburbs with downtown Minneapolis and other transit modes in the region. Transit stations at key points on these routes will offer park-and-ride facilities and bus transfers from local routes to expedite travel in the Metro area. These are Metropolitan Council and Metro Transit projects and, although they will run through Richfield, they will not stop in Richfield.	Prior to 2030*

Table 5.21.1

Projects Identified for Consideration of Cumulative Potential Effects

Project	Description	Construction Year
Nine Mile Creek Regional Trail	Nine Mile Creek Regional Trail will provide connections to the Minneapolis Park and Recreation Board's regional trail system near Lake Nokomis to the north, the Minnesota River Valley Wildlife Refuge Visitor Center to the south, and the Minnesota River Bluffs LRT Regional Trail to the west. The trail is planned to enter the City from Edina through a tunnel under York Avenue. The trail will continue east along 75th Street and over I-35W on the 76th Street bridge. The trail will follow 76th Street to 12th Avenue where it will split and provide both a northern and southern connection. The northern connection goes to the proposed Intercity Regional Trail and the southern connection goes to the Minnesota Valley Wildlife Refuge Visitor Center. The Three Rivers Park District will continue planning efforts to finalize the southern connection with the Minnesota Valley Wildlife Visitor Center. The route for Nine Mile Creek Regional Trail through the City of Edina was recently approved by the Edina City Council and Park District Board of Commissioners. This was a critical step in identifying a contiguous route between the Minnesota River Bluffs LRT Regional Trail in Hopkins and the Minnesota Valley National Wildlife Refuge Visitor Center in Bloomington.	2014
Intercity Regional Trail	The trail that follows Richfield Parkway is the Intercity Regional Trail. The Master Plan for this trail is to be completed in the Fall of 2011. "Most of the Intercity Regional Trail is not yet constructed. However, 3.8 miles between Lake Nokomis and the Mall of America, including a new pedestrian and bicyclist bridge over I-494, received a Federal Surface Transportation Program grant in the amount of $5.5 million. Construction may commence as early as 2014. Remaining unfunded gaps between Lake Nokomis and the Mall of America will be constructed as additional funding, right-of-way, and redevelopment opportunities occur".	2014
Ramp Entrance to Diagonal Boulevard	The ramp entrance from TH 77 may be eliminated post-2020.	Post 2020
Crosstown Highway Widening	This project would construct auxiliary lanes along the Crosstown Highway from Portland Avenue to TH 77. MnDOT is reviewing the corridor to determine if a lane(s) can fit within available width or whether bridge abutments will be impacted.	Prior to 2030*
Amphitheater	This project would construct a small amphitheater (100 people max) either at 66th and Portland or 66th and Lyndale Avenue. The City is aware of potential airport noise effects.	2012

Table 5.21.1

Projects Identified for Consideration of Cumulative Potential Effects

Project	Description	Construction Year
Bloomington		
Mall of America Phase II & South Pad Hotel	Mall of America (MOA) Phase II: • Framework for 5.6 million square feet in integrated mixed use center at the Met Center parcel, consisting of retail, hotel, office, residential and entertainment uses • Direct connection to existing MOA • Revised preliminary development plan approved 11/20/2006, but no development as occurred to date	Prior to 2030*
	South Pad Hotel • 2100 Killebrew Drive • 12-story hotel with 501 rooms built over a 3-level parking structure • Construction began Spring 2011, anticipated to open in Spring 2013	2011
Radisson Blu Hotel	500-room, 13-story hotel connected to the MOA. Construction began in early 2011 and is expected to be completed by late 2012.	2011
Bloomington Central Station	The project is transit oriented development centered around the Bloomington Central Station, an LRT station in the City of Bloomington. Phase I (Reflections) • 2.9 acre parcel, north and west of 34th Avenue and East Old Shakopee Road • Two 17-story residential towers (263 dwelling units) above an underground two level parking structure • Opened in 2006	2006
	Bloomington Central Station Park • 1.9 acre public park with seating areas, garden rooms, water walls and fountains, walkways and public art • Opened in June 2007	2007
South Loop District Plan – 4 Signature Elements	Lindau Link Signature Element includes: • Connecting the Mall of America and Bloomington Central Station • New office, hotel and retail uses along Lindau Lane • Building streetscape, squares and plazas • Complete street design accommodates pedestrians, bicyclists, automobiles and transit	Prior to 2030*
	A portion of the Lindau Link developments has been funded – Lindau Lane, located just north of Mall of America between TH-77 (Cedar Avenue) and 24th Avenue will be improved and extended east to 30th Avenue. The project includes: • Modification to intersection of Lindau Lane and TH 77 with an additional lane between south-bound TH 77 and the Mall of America	2012-2014

Table 5.21.1

Projects Identified for Consideration of Cumulative Potential Effects

Project	Description	Construction Year
	• Lower portion of Lindau Lane (adjacent to the Mall of America) to provide a ground level connection between the existing Mall of America and future phases of the Mall • Extension of Lindau Lane from 24th to 30th Avenue to create a development spine between the Mall of America and the Bloomington Central Station developments • Redesign of 30th Avenue between American Boulevard and East Old Shakopee Road to provide connections to Bloomington Central Station and the Mall of America	
	34th and American Boulevard Signature Element includes: • Mixed-Use Transit Oriented Development (TOD) • Compact development focused around LRT station • 1600 new dwellings combined with office, hotel and support retail • The area around the intersection of 34th Avenue and American Boulevard is envisioned as a new residential neighborhood with up to 3,500 multifamily dwellings in 2050	Prior to 2030*
	24th Avenue Gateway Signature Element includes: • Gateway features at the intersection of American Boulevard and 24th Avenue • Coordinated streetscape on the east and west side of 24th Avenue from American Boulevard to Killebrew Drive • New public plaza at Lindau Lane and 24th Avenue • Buffers along street with trees and rain gardens • Renovated Mall of America transit station	Prior to 2030*
	Bluff Edge Signature Element includes: • Low-impact sustainable development practices on property abutting bluff • Additional trail access to Minnesota Valley National Wildlife Refuge • New trails in the Minnesota Valley National Wildlife Refuge	Prior to 2030*
Nine Mile Creek Regional Trail	See Nine Mile Creek Regional Trail under City of Richfield	2014

Table 5.21.1

Projects Identified for Consideration of Cumulative Potential Effects

Project	Description	Construction Year
City of Minneapolis		
I-35W/Hwy 62 Crosstown Reconstruction	The I-35W/Highway 62 Reconstruction involved reconstruction of the major interchange between I-35W and Hwy 62, as well as segments of both freeways that lead into the interchange. The project extended from 42nd Street to 66th Street on I-35W, and from Penn Avenue to Portland Avenue on Highway 62. The project was completed in 2010.	2007-2010
Riverview Senior Housing	A four-story, 42-unit apartment complex for low-income seniors located at 5114 54th Street E. The building is currently under construction.	2012
Vantage Flats	A four-story, 37-unit apartment building in the Minnehaha Neighborhood located at 5359 Minnehaha Avenue. Project was completed in the Summer 2008.	2007-2008
Creekside Commons	A 30-unit apartment building located at 5412 Stevens Avenue. Project was completed in 2010.	2009-2010
Asphalt Pavement Resurfacing	Asphalt Pavement Resurfacing at 60th Street, East of Chicago Avenue (PV056)	2013
	Asphalt Pavement Resurfacing at Wenonah West (PV056)	2011
Major Pavement Maintenance	Pavement sealcoating at 58th Street East between 28th Avenue South and 34th Avenue South, and at 57th Street East between 34th Avenue South and 42nd Avenue South (PV059)	2011
35W Bus Rapid Transit (BRT)	Proposed 35W BRT (along Crosstown Highway East of 35W) as part of the 2025 Transitway System with no new stops south of Minnehaha Parkway	Prior to 2030*
Intercity Regional Trail	See Intercity Regional Trail under City of Richfield	2014
Lyndale Avenue: A Vision	This plan is to upgrade and revitalize South Lyndale Avenue from Lake Street to 56th Street. It also supports Gateway Committee recommendations for Lyndale between 56th Street and the Crosstown Highway. These improvements include new entrance ramps to the Crosstown Highway and 35W, and exit ramp from Highway 35W to bring traffic to Lyndale Avenue via 59th Street or possibly 61st Street. This would allow for closure of TH 121 and conversion of land use to residential and/or open space. It is likely that at least the recommended improvements South of the Minnehaha Creek Parkway will be in the next CIP.	Likely before 2020

Table 5.21.1

Projects Identified for Consideration of Cumulative Potential Effects

Project	Description	Construction Year
MnDOT		
I-494 between 34th Avenue and France Avenue	This plan includes milling, overlay and construction of a west-bound auxiliary lane from Portland Avenue to Nicollet Avenue, a median barrier and drainage. It also includes construction of a west-bound auxiliary lane 35W to TH 100 and replacement of the Xerxes Avenue bridge.	2013
FAA		
PBN Procedure Design and Implementation	Since November 2010, the FAA has been working to develop PBN procedures and plan for implementation. In addition to safety and operational considerations, the FAA included noise criteria that were developed by the MSP NOC. The NOC noise criteria focused on a noise analysis, including Day-Night Average Sound Level (DNL) noise contour and single-event noise evaluations of the proposed procedures; a public information program; and various procedure design considerations intended to reduce noise impacts around the airport where possible. At the September 19, 2012 NOC meeting the FAA ATO presented the PBN procedures, highlighting the considerations given to the NOC procedure design criteria. The MAC provided their noise analysis of the procedures in compliance with the related NOC criteria. (The NOC facilitated the noise contour analysis.) The FAA indicated during the meeting that a statement of support for the RNAV implementation was needed from the MAC by the end of November 2012 to avoid lengthy delays in procedure publications. This support was needed to meet FAA ATO's requirements under FAA Order 7400.2. In response, the NOC took action to move forward with hosting two public open houses prior to the November 2012 NOC meeting. (The NOC facilitated the public information process.) Subsequently, at the November 14, 2012 NOC meeting the Committee determined that the FAA's process adequately considered the Committee's noise criteria and forwarded their recommendations to the MAC Commission. However, based on extensive input from community leaders and airport neighbors, the MAC Full Commission voted on November 19, 2012 to provide support for the FAA's plan except for departures on Runways 30L and 30R that fly to the northwest of the airport over communities such as South Minneapolis and Edina. The FAA ATO is currently evaluating the partial implementation supported by the MAC Full Commission.	2013

Table 5.21.1

Projects Identified for Consideration of Cumulative Potential Effects

Project	Description	Construction Year

Note:
(*) Exact construction dates for these projects are not known. For many of these improvements, studies and preliminary designs have already been completed. However, the estimated project construction date is highly dependent upon future funding and other project completion dates, among other things. Many of the forecasted conditions for traffic, employment, population, etc. in the studies are for the year 2030, and in addition the cities' Comprehensive Plans look at growth in the next 10 to 20 years. "Prior to 2030" designates the latest year for development in order to provide for forecasted volumes.

Sources:
- Richfield Comprehensive Plan, May 2009.
- City of Richfield Minnesota Capital Improvement Budget and Plan, 2011-2015.
- City of Richfield, Future Projects and Land Use, Meeting with MAC, Meeting Minutes, August 11, 2011.
- Bloomington Community Investments Program, 2011-2015 Draft.
- South Loop District Plan Presentation, May 3, 2011.
- Bloomington Comprehensive Plan, 2008.
- Bloomington CityWEB, Planning Division Development Map and Construction Projects.
- Minneapolis Capital Improvements Projects, 2011 Construction and Proposed 2012 – 2016 Capital Plan (Map) (April 29, 2011).
- The Minneapolis Plan for Sustainable Growth, Approved by City Council 10/2/2009.
- City of Minneapolis, Future Projects and Land Use, Meeting with MAC, Meeting Minutes, August 11, 2011.
- Highway Investment Plan Annual Update, MnDOT, February 2011.

The Alternatives would potentially result in construction, traffic and circulation, water quality and noise impacts. Therefore, these impact categories were considered in identifying the potential for the Action Alternatives along with the projects listed in Table 5.21.1 to result in a significant cumulative impact.

5.21.4.1 Cumulative Effects: Construction; Traffic and Circulation; and Water Quality

Construction of the Action Alternatives may create some unavoidable temporary impacts to surrounding communities such as noise, fugitive dust, and degraded water quality. These impacts would be minimized by implementing BMPs and would be localized; predominantly on the airport at the Post Road/TH 5 and 34th Avenue South/I-494 interchanges. Due to the localized nature of construction impacts, the potential for cumulative effects is likely most relevant to the South Loop District Plan. The MAC and City of Bloomington are coordinating construction sequencing for slated improvements. Given the need for the MAC and City of Bloomington to maintain traffic flow, it is unlikely construction projects will take place at the same time and in the same vicinity. Therefore, it is unlikely that the Alternatives along with the other identified projects would result in cumulative construction effects.

The Alternatives would result in traffic and circulation impacts. However, the analysis showed that the transportation facilities would generally operate significantly better with the Action Alternatives than with the No Action Alternative. Therefore, the Action Alternatives would not contribute to cumulative adverse traffic and circulation impacts.

The Alternatives including both airport and roadway improvements would result in minimal impacts to stormwater. Since none of the other projects considered would discharge stormwater to the storm sewer system at MSP, water quality impacts would not be cumulative. Other projects that discharge to non-MSP systems would be designed with rate and volume control measures to address water quality impacts. Therefore, significant cumulative impacts to the Minnesota River are not expected when considering past, present and future projects. Furthermore, NPDES permitting protects against water quality impacts that would exceed water quality standards.

5.21.4.2 Cumulative Effects: Aircraft Noise

Though the Action Alternatives do not result in any significant impacts, there is the potential for a cumulative significant impact when considering other airport projects. The only other project at the airport that could result in a noise impact is the FAA ATO proposed Performance Based Navigation (PBN) procedures, which includes Area Navigation (RNAV) and Required Navigation Performance (RNP) procedures, and are considered reasonably foreseeable. Therefore, an analysis was conducted to assess the potential for cumulative noise effects of the Alternatives and the proposed PBN procedures.

It is noted that this analysis was added during the development of the Final EA. At the time the Draft EA was published, the FAA was developing the proposed PBN procedures and therefore, it was not possible to evaluate associated noise impacts.

PBN Background

Since 2007 the Minneapolis-St. Paul International Airport (MSP) Noise Oversight Committee (NOC) has been analyzing possible air traffic procedures to reduce aircraft noise impacts around MSP. Early in this effort it was established that a critical element of this initiative would be the use of Area Navigation (RNAV), a method of navigation that permits aircraft operations on any desired course within the coverage of station-referenced navigation signals or within the limits of a self-contained system capability, or a combination of these. In short, this navigation technology provides the capability for aircraft to fly a desired track in a reproducible manner. This approach also allows for more seamless transition to Required Navigation Performance (RNP) operations in the future. Both RNAV and RNP are part of the PBN procedures.

Since November 2010, the FAA has been working to develop PBN procedures and plan for implementation. These procedures are part of a national effort to modernize the national airspace system as part of the Next Generation Air Transportation System. The Next Generation Air Transportation System (NextGen) is the FAA's plan to modernize the National Airspace System (NAS) through 2025. Through NextGen, the FAA is addressing the impact of air traffic growth by increasing NAS capacity and efficiency while simultaneously improving safety, reducing environmental impacts, and increasing user access to the NAS. To achieve its NextGen goals, the FAA is implementing new Performance-Based Navigation (PBN) routes and procedures that leverage emerging technologies and aircraft navigation capabilities.

The NOC developed and forwarded noise criteria for the FAA ATO's consideration during its development and implementation of PBN procedures at MSP. The NOC noise criteria focused on a noise analysis including Day- Night Average Sound Level (DNL) noise contour and single-event noise evaluations of the proposed procedures; a public information program; and various procedure design considerations intended to reduce noise impacts around the airport where possible. At the March 16, 2011 NOC meeting the Committee took unanimous action adopting the criteria to be forwarded to the FAA ATO. The criteria are included in Appendix N.

At the September 19, 2012 NOC meeting the FAA ATO presented the proposed PBN procedure tracks including 13 Standard Instrument Departures (SIDs) and six Standard Terminal Arrival Routes (STARs) and reviewed the design process and the noise considerations addressed in the FAA ATO's design process. Additionally, the MAC staff prepared a detailed noise analysis that was presented to the NOC in compliance with the related NOC criteria. (The NOC facilitated the noise contour analysis.) During this meeting, the FAA ATO indicated that a statement of support for the PBN implementation was needed from the MAC by the end of November 2012 to avoid lengthy delays in procedure publications. This support was needed to meet FAA ATO's requirements under FAA Order 7400.2. In response, the NOC took action to move forward with a public information program including two public open houses prior to the November 2012 NOC meeting. (The NOC facilitated the public information process.)

MAC Public Involvement Process for PBN

Shortly after the September 19, 2012 NOC meeting, NOC-sponsored PBN informational open houses were scheduled to help residents understand how the use of the FAA-proposed procedures could affect flight patterns at MSP and information was posted on the MAC Noise Program website (http://www.macnoise.com/news/open-houses-scheduled-msp-performance-based-navigation). Open houses were held on the evenings of November 8, 2012 at the Crosstown Covenant Church in Minneapolis and November 13, 2012 at the Eagan Community Center. Notice of the open houses was published widely in area newspapers. Several stories about the FAA ATO's project ran in local newspapers and on news channels. Coverage by local news channels included a piece on KSTP Channel 5 on October 8 directing those interested to attend the FAA ATO and MAC staff briefing to the Mendota Heights City Council on October 30. The story also announced the community open houses and directed interested parties to the information on the MAC Noise Program website.

In addition to the open houses, there was a focus on community briefings. FAA ATO and MAC staff provided an informational briefing to any entity that requested one, including the city councils of Richfield, Eagan, and Mendota Heights. Additionally, briefings were provided to the Mayor of Minneapolis, to a group of Minneapolis policy makers and legislative officials, to Apple Valley and Burnsville city staffs, to participants in the fourth quarter 2012 NOC Public Input Meeting on October 23, and to multiple individual residents.

Depending on where people lived, the feedback ranged from positive to very concerned. The predominant concern was with the concentration of overflights over certain residential areas. A large volume of communication was received by the MAC from residents and elected officials following the open houses expressing concern relative to concentrating flights over the residential areas (South Minneapolis and Edina) and the speed of the process, among other concerns.

MAC Support of PBN

Based on extensive input from community leaders and airport neighbors, the MAC Full Commission voted on November 19, 2012 to provide support for the FAA ATO's plan except for departures on Runways 30L and 30R that fly to the northwest of the airport over communities such as South Minneapolis and Edina. Specifically, the MAC passed the following action:

"The Metropolitan Airports Commission supports implementation of the Area Navigation (RNAV) procedures as designed by the Federal Aviation Administration with the exception of RNAV departure procedures off Runways 30L and 30R at Minneapolis-St. Paul International Airport."

The FAA ATO is evaluating the partial implementation supported by the MAC Full Commission.

The noise analysis completed by MAC that incorporated the partial PBN implementation was completed to determine if the Proposed Action would result in cumulative impacts for this EA. The analysis was based upon assumptions known as of November 20, 2012, including the final recommendation by the MAC Full Commission. The FAA ATO will continue with the PBN process in accordance with their procedural and environmental requirements prior to being able to proceed with any implementation.

Impact Analysis

The combined noise impacts of the alternatives and partial implementation of the FAA proposed PBN procedures (herein referred to as proposed PBN) were assessed for 2020 and 2025. The noise modeling was updated to analyze the combined impacts of the proposed PBN procedures and the alternatives included within this EA. The RNAV departure tracks off Runways 12L, 12R and 17 have been incorporated into the forecasted scenarios for each of the alternatives while arrival tracks were not adjusted.

NO ACTION ALTERNATIVE WITH PBN NOISE IMPACTS

Based on the 484,879 total forecast operations in 2020, approximately 4,383 acres are in the 65+ DNL noise contour and approximately 11,138 acres are in the 60+ DNL noise contour. **Table 5.21.2** contains the count of single-family and multi-family dwelling units and population in the 2020 and 2025 No Action Alternative with PBN DNL noise contours. The counts are based on parcels that are within or are intersected by the respective DNL contour lines. Parcels with one dwelling unit are counted as single-family and parcels with more than one dwelling unit are counted as multi-family.

Figure 5.21-1 provides the 2020 and 2025 No Action Alternative with PBN DNL noise contours and the parcels within the respective contours.

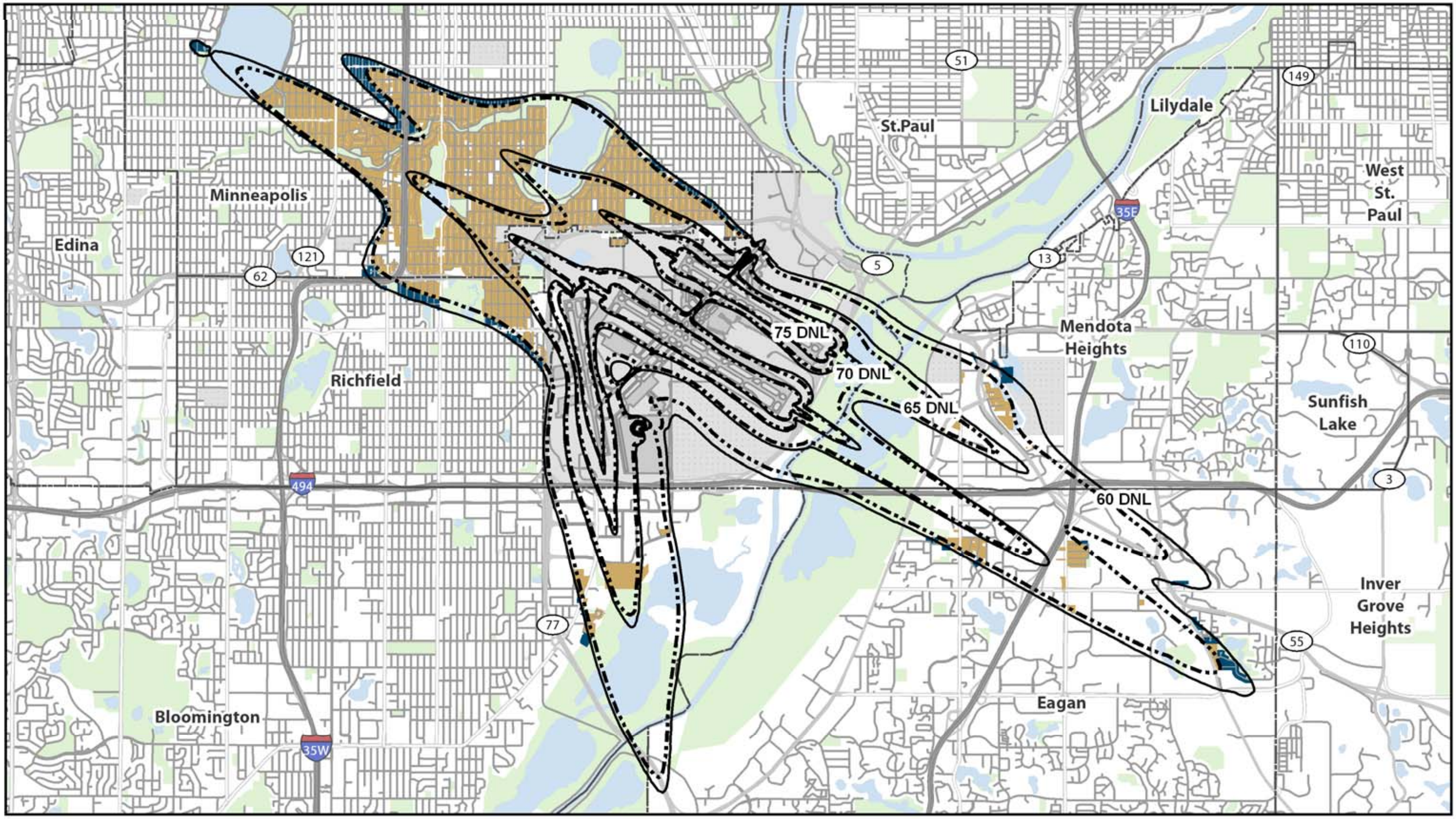
Table 5.21.2

Summary of 2020 and 2025 DNL No Action Alternative with PBN Noise Contour Single-Family and Multi-Family Unit and Population Counts by Parcel

	City	Count	Single-Family					Multi-Family				
			60-64	65-69	70-74	75+	Total	60-64	65-69	70-74	75+	Total
2020 DNL Noise Contours with PBN	Minneapolis	Units	6869	1444	43	0	8356	1750	655	4	0	2409
		Population	17516	3682	110	0	21308	3472	1195	9	0	4676
	Bloomington	Units	62	1	0	0	63	702	2	0	0	704
		Population	158	3	0	0	161	1130	4	0	0	1134
	Richfield	Units	573	16	0	0	589	69	0	0	0	69
		Population	1496	42	0	0	1538	116	0	0	0	116
	Eagan	Units	168	0	0	0	168	0	0	0	0	0
		Population	472	0	0	0	472	0	0	0	0	0
	Mendota Heights	Units	40	1	0	0	41	3	0	0	0	3
		Population	109	3	0	0	112	4	0	0	0	4
	All Cities	Units	7712	1462	43	0	9217	2524	657	4	0	3185
		Population	19751	3730	110	0	23591	4722	1199	9	0	5930
2025 DNL Noise Contours with PBN	Minneapolis	Units	7362	1877	79	0	9318	2108	706	6	0	2820
		Population	18773	4786	201	0	23760	4161	1306	14	0	5481
	Bloomington	Units	79	1	0	0	80	702	2	0	0	704
		Population	201	3	0	0	204	1130	4	0	0	1134
	Richfield	Units	695	74	0	0	769	69	0	0	0	69
		Population	1814	193	0	0	2007	116	0	0	0	116
	Eagan	Units	265	2	0	0	267	0	0	0	0	0
		Population	745	6	0	0	751	0	0	0	0	0
	Mendota Heights	Units	61	1	0	0	62	3	0	0	0	3
		Population	167	3	0	0	170	4	0	0	0	4
	All Cities	Units	8462	1955	79	0	10496	2882	708	6	0	3596
		Population	21700	4991	201	0	26892	5411	1310	14	0	6735

Note: Parcel Intersect Methodology; Single-Family=1 Unit, Multi-Family>1 Unit; Population Reflects Estimation Based on Multipliers Provided by Met Council.

Source: MAC analysis, 2012.



2020 and 2025 PBN - No Action Alternative DNL Noise Contours and Affected Parcels

LEGEND

Affected Parcels
- Inside 2020 60 DNL
- Between 2020 and 2025 60 DNL

Noise Contours
- 2020 No Action
- 2025 No Action

0 4,000 8,000 Meters

AIRLINES REMAIN ALTERNATIVE WITH PBN NOISE IMPACTS

Based on the 484,879 total forecast operations in 2020, approximately 4,382 acres are in the 65 DNL noise contour and approximately 11,134 acres are in the 60 DNL noise contour. **Table 5.21.3** contains the count of single-family and multi-family dwelling units and population in the 2020 and 2025 Airlines Remain Alternative with PBN DNL noise contours. The counts were completed using the same methodology used for the No Action Alternative.

Figure 5.21-2 provides the 2020 and 2025 Airlines Remain Alternative with PBN DNL noise contours and the parcels within the respective contours.

There are no areas of sensitive land uses that experience a 1.5 dB, or greater, increase in the 65 DNL noise contour when comparing the 2020 and 2025 Airlines Remain Alternative with PBN contours to the respective No Action Alternative with PBN DNL noise contours. Therefore, the FAA's impact threshold of significance is not exceeded.

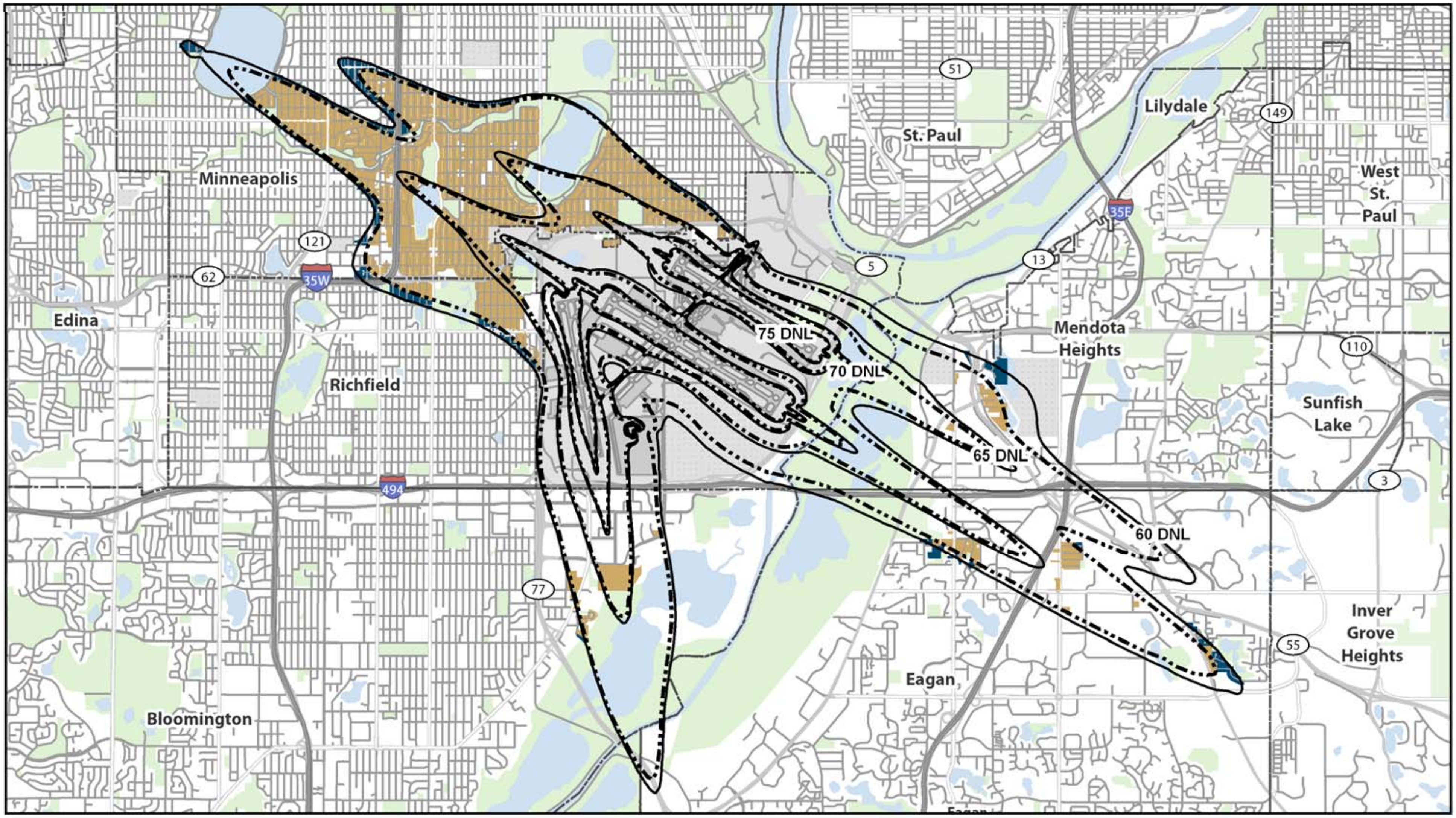
Table 5.21.3

Summary of 2020 and 2025 DNL Alternative 1 – Airlines Remain with PBN Noise Contour Single-Family and Multi-Family Unit and Population Counts by Parcel

	City	Count	Single-Family					Multi-Family				
			60-64	65-69	70-74	75+	Total	60-64	65-69	70-74	75+	Total
2020 DNL Noise Contours with PBN	Minneapolis	Units	6891	1452	44	0	8387	1750	655	4	0	2409
		Population	17572	3703	112	0	21387	3472	1195	9	0	4676
	Bloomington	Units	62	1	0	0	63	702	2	0	0	704
		Population	158	3	0	0	161	1130	4	0	0	1134
	Richfield	Units	570	16	0	0	586	69	0	0	0	69
		Population	1488	42	0	0	1530	116	0	0	0	116
	Eagan	Units	171	0	0	0	171	0	0	0	0	0
		Population	481	0	0	0	481	0	0	0	0	0
	Mendota Heights	Units	40	1	0	0	41	3	0	0	0	3
		Population	109	3	0	0	112	4	0	0	0	4
	All Cities	Units	7734	1470	44	0	9248	2524	657	4	0	3185
		Population	19808	3751	112	0	23671	4722	1199	9	0	5930
2025 DNL Noise Contours with PBN	Minneapolis	Units	7316	1821	72	0	9209	2158	699	6	0	2863
		Population	18656	4644	184	0	23484	4243	1289	14	0	5546
	Bloomington	Units	69	1	0	0	70	702	2	0	0	704
		Population	176	3	0	0	179	1130	4	0	0	1134
	Richfield	Units	687	64	0	0	751	69	0	0	0	69
		Population	1794	167	0	0	1961	116	0	0	0	116
	Eagan	Units	256	2	0	0	258	0	0	0	0	0
		Population	719	6	0	0	725	0	0	0	0	0
	Mendota Heights	Units	68	1	0	0	69	3	0	0	0	3
		Population	186	3	0	0	189	4	0	0	0	4
	All Cities	Units	8396	1889	72	0	10357	2932	701	6	0	3639
		Population	21531	4823	184	0	26538	5493	1293	14	0	6800

Note: Parcel Intersect Methodology; Single-Family=1 Unit, Multi-Family>1 Unit; Population Reflects Estimation Based on Multipliers Provided by Met Council.

Source: MAC analysis, 2012.



2020 and 2025 PBN - Alternative 1 - Airlines Remain DNL Noise Contours and Affected Parcels

LEGEND

Affected Parcels

- Inside 2020 60 DNL
- Between 2020 and 2025 60 DNL

Noise Contours

- 2020 Alternative 1
- 2025 Alternative 1

N

0 4,000 8,000 Meters

Disclaimer: This map was generated by the Metropolitan Airports Commission using GIS (Geographic Information System) software. No claims are made to the accuracyor completeness of the information shown herein nor to its suitablity for a particular use. The scale and location of all mapped data are approximate.

MAC METROPOLITAN AIRPORTS COMMISSION MINNEAPOLIS SAINT PAUL

HNTB

Airlines Relocate Alternative with PBN Noise Impacts

Based on the 484,879 total forecast operations in 2020, approximately 4,384 acres are in the 65 DNL noise contour and approximately 11,123 acres are in the 60 DNL noise contours. **Table 5.21.4** contains the count of single-family and multi-family dwelling units and population in the 2020 and 2025 Airlines Relocate with PBN DNL noise contours. The counts were completed using the same methodology used for the No Action Alternative.

Figure 5.21-3 provides the 2020 and 2025 Airlines Relocate Alternative with PBN DNL noise contours and the parcels within the respective contours.

There are no areas of sensitive land uses that experience a 1.5 dB, or greater, increase in the 65 DNL noise contour when comparing the 2020 and 2025 Airlines Relocate Alternative with PBN contours to the respective No Action Alternative with PBN DNL noise contours. Therefore, the FAA's impact threshold of significance is not exceeded.

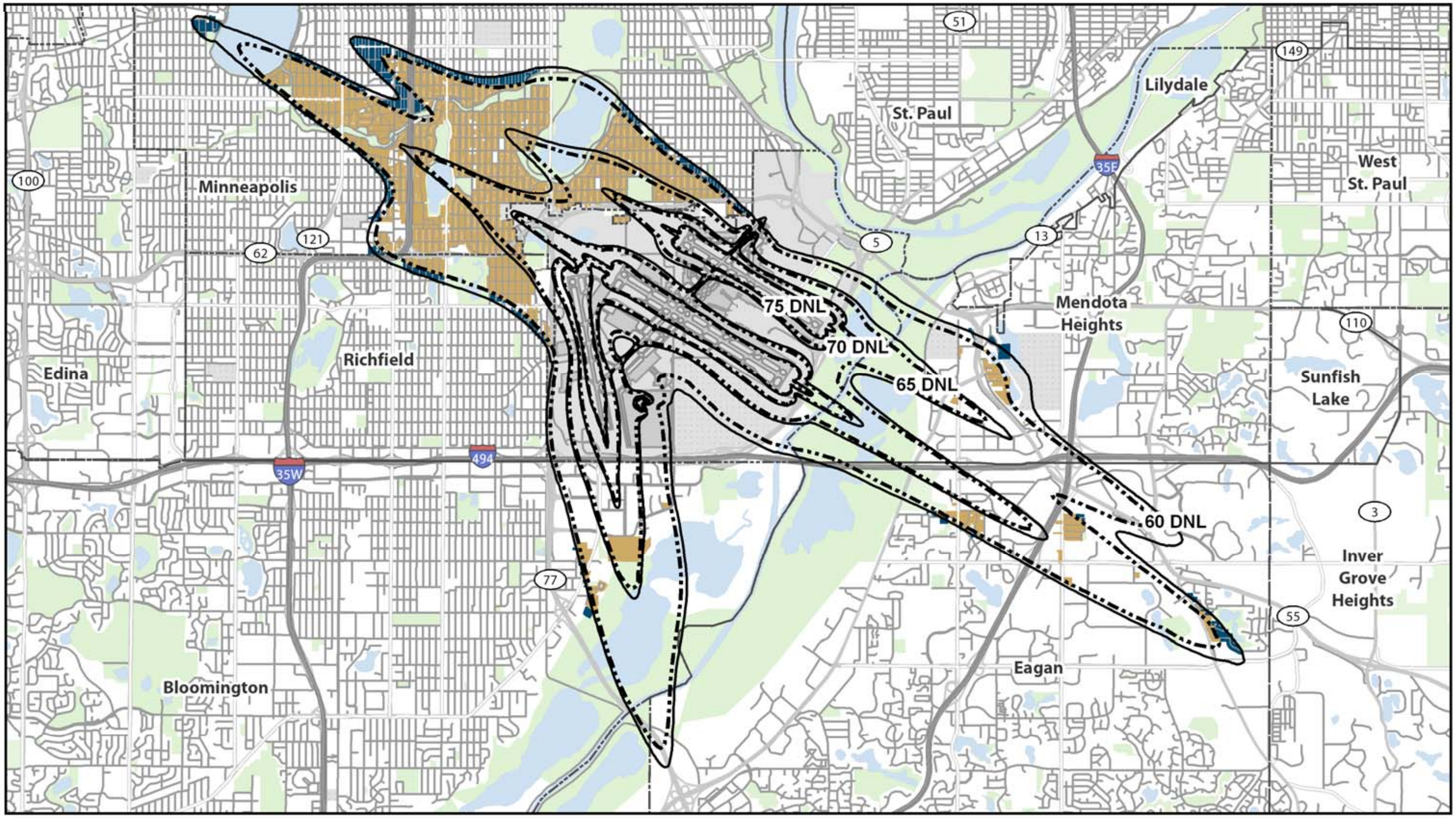
Table 5.21.4

Summary of 2020 and 2025 Alternative 2 - Airlines Relocate with PBN Noise Contour
Single-Family and Multi-Family Unit and Population Counts by Parcel

	City	Count	Single-Family					Multi-Family				
			60-64	65-69	70-74	75+	Total	60-64	65-69	70-74	75+	Total
2020 DNL Noise Contours with PBN	Minneapolis	Units	6719	1461	29	0	8209	1750	653	4	0	2407
		Population	17133	3726	74	0	20933	3459	1190	9	0	4658
	Bloomington	Units	67	1	0	0	68	702	2	0	0	704
		Population	171	3	0	0	174	1130	4	0	0	1134
	Richfield	Units	583	19	0	0	602	69	0	0	0	69
		Population	1521	50	0	0	1571	116	0	0	0	116
	Eagan	Units	176	0	0	0	176	0	0	0	0	0
		Population	495	0	0	0	495	0	0	0	0	0
	Mendota Heights	Units	40	1	0	0	41	3	0	0	0	3
		Population	109	3	0	0	112	4	0	0	0	4
	All Cities	Units	7585	1482	29	0	9096	2524	655	4	0	3183
		Population	19429	3782	74	0	23285	4709	1194	9	0	5912
2025 DNL Noise Contours with PBN	Minneapolis	Units	7593	1965	80	0	9638	2394	716	6	0	3116
		Population	19362	5011	204	0	24577	4636	1329	14	0	5979
	Bloomington	Units	82	1	0	0	83	708	2	0	0	710
		Population	209	3	0	0	212	1140	4	0	0	1144
	Richfield	Units	685	62	0	0	747	69	0	0	0	69
		Population	1788	162	0	0	1950	116	0	0	0	116
	Eagan	Units	250	2	0	0	252	0	0	0	0	0
		Population	703	6	0	0	709	0	0	0	0	0
	Mendota Heights	Units	60	1	0	0	61	3	0	0	0	3
		Population	164	3	0	0	167	4	0	0	0	4
	All Cities	Units	8670	2031	80	0	10781	3174	718	6	0	3898
		Population	22226	5185	204	0	27615	5896	1333	14	0	7243

Note: Parcel Intersect Methodology; Single-Family=1 Unit, Multi-Family>1 Unit; Population Reflects Estimation Based on Multipliers Provided by Met Council.

Source: MAC analysis, 2012.



2020 and 2025 PBN - Alternative 2 - Airlines Relocate DNL Noise Contours and Affected Parcels

LEGEND

Affected Parcels

Inside 2020 60 DNL

Between 2020 and 2025 60 DNL

Noise Contours

2020 Alternative 2

2025 Alternative 2

N

0 4,000 8,000 Meters

Disclaimer: This map was generated by the Metropolitan Airports Commission using GIS (Geographic Information System) software. No claims are made to the accuracy or completeness of the information shown herein nor to its suitablity for a particular use. The scale and location of all mapped data are approximate.

COMPARISON OF DEVELOPMENT ALTERNATIVE NOISE IMPACTS

There are no areas of sensitive land uses that would experience a 1.5 dB, or greater, increase in the 65 DNL noise contour and or a 3.0 dB, or greater, increase in the 60 DNL noise contour when comparing the 2020 and 2025 Airlines Remain Alternative with PBN and the Airlines Relocate Alternative with PBN noise contours to the respective No Action Alternative with PBN DNL noise contours. In 2020 the lowest number of residential units in the 65+ DNL noise contours is provided by the No Action Alternative. There are 4 more residential units in the Airlines Relocate Alternative and 9 more residential units in the Airlines Remain Alternative within the 65+ DNL noise contours. In 2025 the lowest number of residential units in the 65+ DNL noise contour is provided by the Airlines Remain Alternative.

When comparing the Action Alternatives DNL noise contours with PBN in 2020 and 2025 to the respective No Action Alternatives DNL noise contours with PBN the range of DNL change is minor. Comparing the:

- 2020 Airlines Remain Alternative 60+ DNL noise contour with PBN to the 2020 No Action Alternative 60+ DNL noise contour with PBN the range of DNL change is -0.2 dB DNL to 0.2 dB DNL.
- 2020 Airlines Relocate Alternative 60+ DNL noise contour with PBN the range of change when compared to the 2020 No Action Alternative 60+ DNL noise contour with PBN is -0.2 dB DNL to 0.3 dB DNL.
- 2025 Airlines Remain Alternative 60+ DNL noise contour with PBN to the 2025 No Action Alternative 60+ DNL noise contour with PBN the range of DNL change is -0.6 dB DNL to 0.6 dB DNL.
- 2025 Airlines Relocate Alternative 60+ DNL noise contour with PBN the range of change when compared to the 2025 No Action Alternative 60+ DNL noise contour with PBN is -0.4 dB DNL to 0.6 dB DNL.

Figure 5.21-4 provides a comparison of the 2020 No Action Alternative with PBN, the Airlines Remain Alternative with PBN, and the Airlines Relocate Alternative with PBN noise contours.

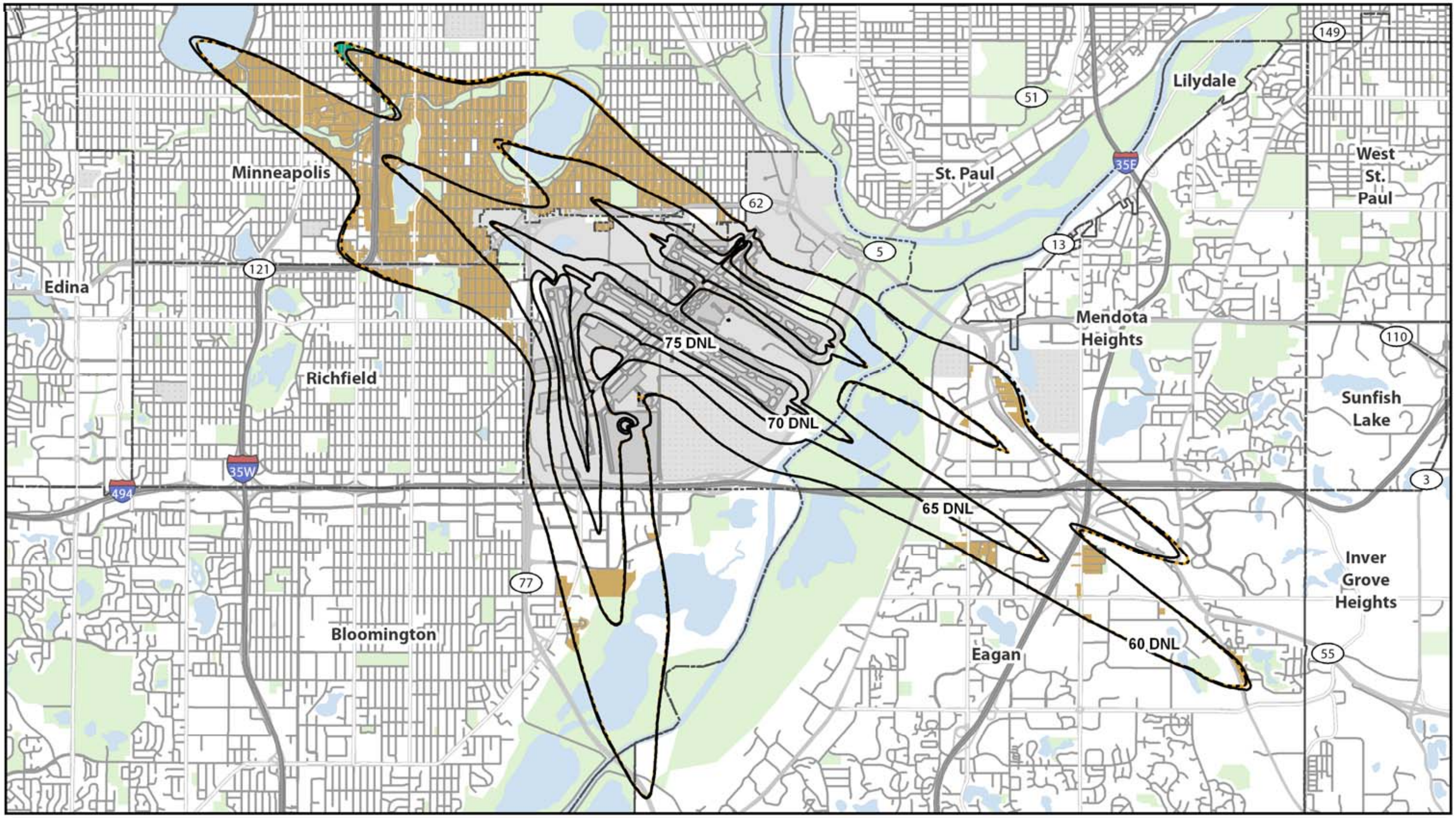
Figure 5.21-5 provides a comparison of the 2025 No Action Alternative with PBN, Airlines Remain Alternative with PBN, and the Airlines Relocate Alternative with PBN noise contours.

As is detailed in **Table 5.21.5** and **Table 5.21.6** there are only minor variations in 2020 and 2025 between the No Action Alternative with PBN and the Action Alternatives with PBN when looking at noise contour acreages, and the unit and population counts within each contour. The noise contours expand and contract slightly relative to one another to varying degrees and at different locations around the airport. This variability may result in the scenario with a slight reduction in acreage even though there is a slight increase in units within the contours, or vice versa, depending on the density of residential land use within each contour.

The small variation between the forecast impacts for the various alternatives is a function of FAA air traffic control procedures

Minneapolis-St. Paul International Airport 2020 Improvements EA

FIGURE 5.21-4



2020 Forecast PBN DNL Noise Contour Comparison and Affected Parcels

LEGEND

Noise Contours

- No Action
- Alternative 1
- Alternative 2

Affected Parcels

- Inside Alternative 2 60 DNL
- Between No Action 60 DNL and Alternative 2
- Between Alternative 1 60 DNL and Alternative 2

0 3,700 7,400 Meters

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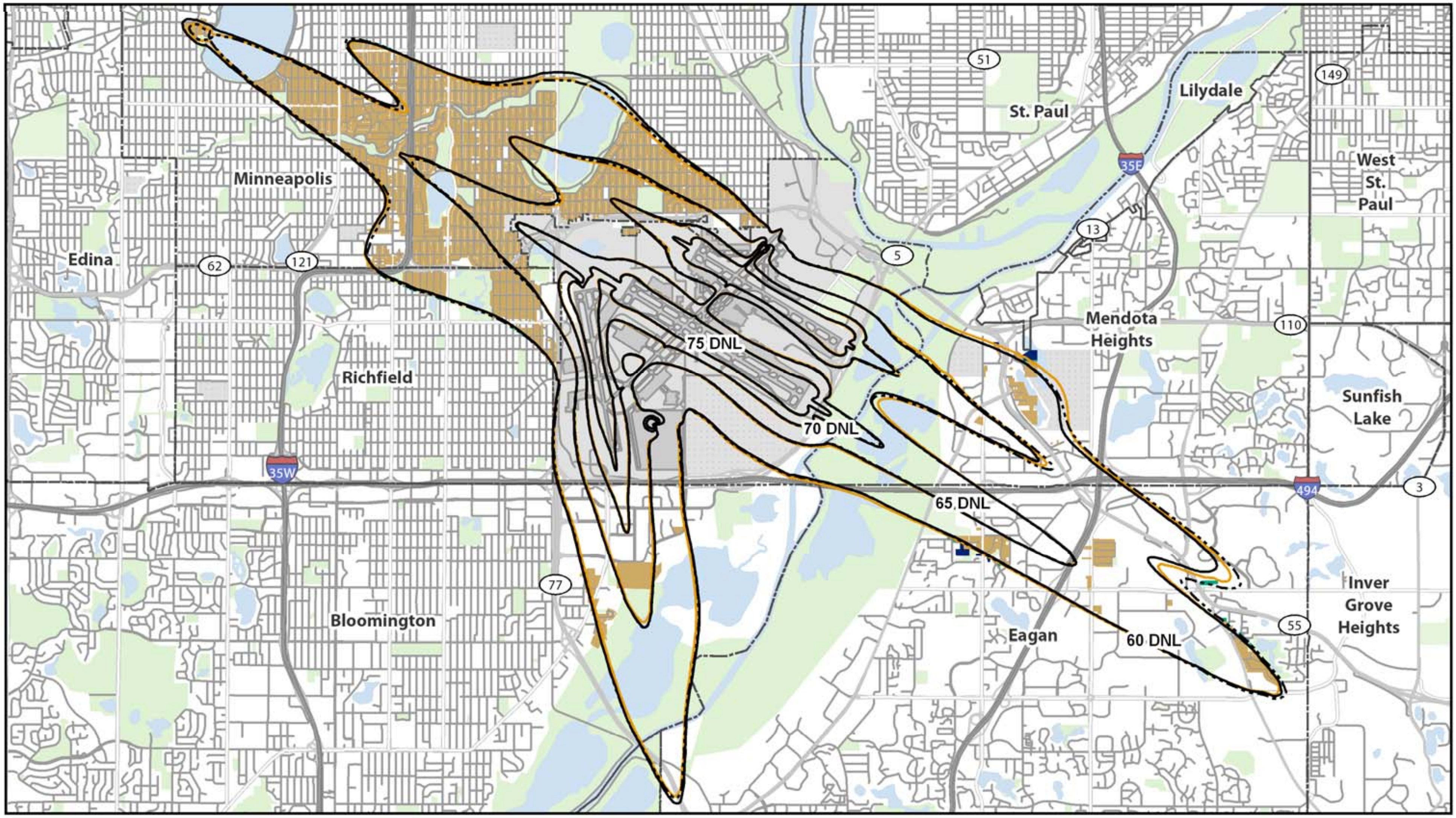
Minneapolis-St. Paul International Airport 2020 Improvements EA

FIGURE 5.21-5



2025 Forecast PBN DNL Noise Contour Comparison and Affected Parcels

LEGEND

Noise Contours

- No Action
- Alternative 1
- Alternative 2

Affected Parcels

- Inside Alternative 2 60 DNL
- Between No Action 60 DNL and Alternative 2
- Between Alternative 1 60 DNL and Alternative 2

N

0 3,900 7,800 Meters

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during low-demand time periods in conjunction with the RUS and the different geographic locations of new gate additions at MSP that are provided with the various development options.

Table 5.21.5

2020 PBN Comparison of DNL Noise Contour Acreage and Affected Units and Population by Parcel

	Count	60-64	65-69	70-74	75+	Total
2020 No Action Alternative with PBN DNL Noise Contours	Acreage	6755	2789	930	664	**11138**
	Units	10236	2119	47	0	**12402**
	Population	24473	4929	119	0	**29521**
2020 Alternative 1 - Airlines Remain with PBN DNL Noise Contours	Acreage	6752	2788	930	664	**11134**
	Units	10258	2127	48	0	**12433**
	Population	24530	4950	121	0	**29601**
2020 Alternative 2 – Airlines Relocate with PBN DNL Noise Contours	Acreage	6739	2788	931	665	**11123**
	Units	10109	2137	33	0	**12279**
	Population	24138	4976	83	0	**29197**

Note:
Parcel intersect methodology; unit count reflects single-family and multi-family; population reflects estimation based on multipliers provided by Met Council.

Source: MAC analysis, 2012.

Table 5.21.6

2025 PBN Comparison of DNL Noise Contour Acreage and Affected Units and Population by Parcel

	Count	60-64	65-69	70-74	75+	Total
2025 No Action Alternative with PBN DNL Noise Contours	Acreage	7720	3165	1080	739	**12704**
	Units	11344	2663	85	0	**14092**
	Population	27111	6301	215	0	**33627**
2025 Alternative 1 – Airlines Remain with PBN DNL Noise Contours	Acreage	7621	3152	1075	738	**12586**
	Units	11328	2590	78	0	**13996**
	Population	27024	6116	198	0	**33338**
2025 Alternative 2 – Airlines Relocate with PBN DNL Noise Contours	Acreage	7685	3155	1083	739	**12662**
	Units	11844	2749	86	0	**14679**
	Population	28122	6518	218	0	**34858**

Note:
Parcel intersect methodology; unit count reflects single-family and multi-family; population reflects estimation based on multipliers provided by Met Council.

Source: MAC analysis, 2012.

SUMMARY

There are no areas of sensitive land uses that would experience a 1.5 dB, or greater, increase in the 65 DNL noise contour when comparing the 2020 and 2025 Airlines Remain Alternative with PBN and the Airlines Relocate Alternative with PBN noise contours to the respective No Action Alternative with PBN DNL noise contours. Therefore, the cumulative effects of the alternatives along with the proposed PBN procedures would not exceed the FAA's threshold of significance.

5.21.5 Cumulative Impacts Summary

The impacts associated with the Alternatives are minor. No single impact; even when considered with past, present and future actions; represents a substantial impact that cannot be mitigated. Therefore, none of the Alternatives would result in significant cumulative impacts.

Endnotes

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[5] USEPA, User's Guide for the Final NONROAD2005 Model, December 2005.

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[9] HAPs are also referred to as toxic air contaminants and, more generally, as air toxics.

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[14] Minnesota Pollution Control Agency, *Discussing Greenhouse Gas Emissions in Environmental Review*, December 2011, http://www.pca.state.mn.us/index.php/view-document.html?gid=12570.

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[17] US Government Accountability Office (GAO), Report to Congressional Committees, *Aviation and Climate Change: Aircraft Emissions Expected to Grow, but Technological and Operational Improvements and Government Policies Can Help Control Emissions*, June 2009, http://www.gao.gov/assets/300/290594.pdf.

[18] Alan Melrose, "European ATM and Climate Adaptation: A Scoping Study," *ICAO Environmental Report*, 2010.

[19] As explained by the USEPA, "greenhouse gases, once emitted, become well mixed in the atmosphere, meaning U.S. emissions can affect not only the U.S. population and environment but other regions of the world as well; likewise, emissions in other countries can affect the United States." Climate Change Division, Office of Atmospheric Programs, U.S. Environmental Protection Agency, Technical Support Document for *Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the Clean Air Act* 2-3, 2009, available at http://epa.gov/climatechange/endangerment/.

[20] CEQ, *Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions*, 2010.

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[23] FAA, *Order 1050.1E, CHG 1: Environmental Impacts: Policies and Procedures*, Appendix A, 2006, page A-19.

[24] Federal Highway Administration (FHWA), Department of Transportation, 23 CFR Part 774 – Parks, Recreation Areas, Wildlife and Waterfowl Refuges, and Historic Sites (Section 4(f)), §774.13, 2008.

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Chapter 6: Public and Agency Involvement

Public and agency coordination is conducted throughout the National Environmental Policy Act (NEPA) process to ensure exchange of information relevant to the Proposed Action and its potential impacts. **Figure 6.0-1** presents an overview of the coordination/consultation conducted during each phase of the NEPA process. The following sections provide detailed information about how and when coordination was conducted.

Figure 6.0-1

Public and Agency Involvement Overview

6.1 Early Coordination

According to Federal Aviation Administration (FAA) Order 5050.4B, early coordination with interested agencies and municipalities should begin early in the NEPA process in order to ensure that major issues are addressed. Therefore, one of the first steps the Metropolitan Airports Commission (MAC) completed in initiating the Environmental Assessment (EA) was to consult with the interested agencies and the surrounding communities.

6.1.1 Agency Briefing

Early coordination letters were sent to invite the following agencies to an Agency Briefing:

- Minnesota Department of Transportation (Mn/DOT) Office of Aeronautics
- Mn/DOT Environmental Services
- Minnesota Department of Agriculture
- Minnesota Department of Commerce

- Minnesota Environmental Quality Board
- Minnesota Department of Health
- Minnesota Department of Natural Resources
- Minnesota Pollution Control Agency
- Minnesota Board of Water and Soil Resources
- Office of the State Archaeologist
- FAA Airport District Office
- US Army Corps of Engineers
- US Environmental Protection Agency
- US Fish and Wildlife Service
- Veterans Affairs
- Federal Highway Administration
- Hennepin County
- National Park Service
- Minnesota Historical Society
- Indian Affairs Council
- Lower Minnesota Watershed Management Organization
- Minnehaha Creek Watershed District

The Agency Briefing was held on December 7, 2010. The briefing opened with introductions which were followed by a presentation. Via the presentation, the Proposed Action, Purpose and Need, preliminary alternatives and the anticipated level of analysis for each environmental impact category were described. The presentation concluded with a request that comments be submitted to the MAC by January 6, 2011. The sign-in sheet, meeting agenda, presentation, comment form and the Minneapolis-St. Paul International Airport (MSP) EA Informational Document are included in ***Appendix N,*** *Public and Agency Involvement***.**

After the Agency Briefing, a follow-up email, including electronic versions of the materials provided at the briefing, was sent to the agencies.

6.1.2 Community Briefing

The MAC held Community Briefing meetings for community officials to discuss the proposed airport improvements and the EA process. Representatives from the cities of Minneapolis, Richfield, Burnsville and Mendota Heights attended a briefing held on November 15, 2010, and representatives from the cities of Bloomington, Eagan, St. Paul and Apple Valley attended an additional briefing held on November 18, 2010. At the briefings, the MAC described the Proposed Action, presented a draft schedule and requested comments. The community briefing agenda and presentation are included in *Appendix N.*

Following the Agency Briefing on December 7, 2010, the MAC sent an email to the communities providing them with a copy of the Agency Briefing materials including the presentation, MSP EA Informational Document and the comment form. The email can be found in *Appendix N***.**

6.1.3 Agency/Community Comments

Written comments were received from the following agencies and cities during the early coordination period:

- US Army Corps of Engineers
- City of Mendota Heights
- City of Eagan
- US Environmental Protection Agency
- US Fish and Wildlife Service
- The Minneapolis Mayor's Office
- State Historic Preservation Office

Copies of the comments are provided in *Appendix N*. All comments were considered in the preparation of the EA.

6.1.4 Initiation of Section 106 Consultation

The FAA initiated Section 106 consultation early in the NEPA process to comply with Section 106 of the National Historic Preservation Act (NHPA). In a letter dated January 6, 2011, the FAA notified the State Historic Preservation Office (SHPO) that the Section 106 process would be completed as part of the EA. The letter also included a request that the SHPO concur with the FAA's proposed area of potential effect (APE).

As part of initiating Section 106 consultation, the FAA invited the Lower Sioux, Mendota Mdewakanton Dakota, Shakopee Mdewakanton Sioux and the Prairie Island Tribes to become consulting parties. The FAA also contacted the State of Minnesota Indian Affairs Council, the liaison between the State of Minnesota and the Tribal Governments, for input on concerns that uniquely or significantly affect the Tribes related to the Proposed Action. All correspondence between the FAA, the SHPO and the Tribal entities are provided in *Appendix N.*

6.2 Coordination during the Development of the Draft EA

The MAC coordinated with interested agencies and the public throughout the preparation of the Draft EA.

6.2.1 Noise Oversight Committee (NOC) Coordination

The MSP Noise Oversight Committee (NOC) was established in 2002 for the purpose of bringing industry and community representatives together to discuss noise issues at MSP and to bring policy recommendations to the MAC. The NOC has a representative from each of MSP's surrounding cities and representatives from various air carriers. The NOC meets every other month.

At the NOC meeting on May 18, 2011, the MAC provided a briefing focused on the aviation activity forecast for the MSP 2020 Improvements EA. The importance of updating the Long Term Comprehensive Plan (LTCP) Forecast was discussed. As part of the EA, the LTCP Forecast was updated to incorporate economic and airline industry changes that occurred since the LTCP Forecast was prepared. Several questions regarding the EA forecast and the gated flight schedules were addressed. The NOC agreed to disseminate information related to the Draft EA forecast via the *MSP Noise News*, MAC Web site and two public open houses (which were held July 13-14, 2011). The meeting agenda, forecast presentation, meeting notes and *MSP Noise News* article are included in *Appendix N*.

At the NOC meeting on July 20, 2011 the MAC briefly discussed the status of the EA. The MAC provided an update on the EA noise analysis at the November 16, 2011 NOC meeting. The MAC presented information on the MSP 2020 Improvements EA at the NOC meeting on January 18, 2012. The MAC also held NOC meetings on March 21, 2012, May 16, 2012 and July 11, 2012. Meeting agendas and notes are included in *Appendix N*.

6.2.2 Public Open Houses / Information Meetings

The MAC conducted two open houses in July 2011 to inform the public of the MSP 2020 Improvements EA. Open house notices were posted on various community web sites and published in both the *Southwest Journal* and the *Star Tribune*. An email was also sent out to subscribers of the *MSP Noise News* mailing list, which notified the subscriber that an update was posted to the Noise Programs Web site, which included a notice of the dates for the two open houses.

The open houses were conducted on July 13th and 14th, 2011. Presentation boards illustrating the EA/Environmental Assessment Worksheet (EAW) processes, Proposed Action, aviation activity forecast and alternatives were set-up around the meeting room. Representatives from the MAC and their consultants were available at the presentation boards to explain the board content and answer related questions. Members of the public thus had the opportunity to focus on the topics of interest to them and talk one on one with knowledgeable project representatives. All materials related to the public open house including announcements, web posts, sign-in sheets and copies of the presentation boards are contained in *Appendix N*.

Another open house was held on January 31, 2012 to share the results of the EA analysis with the public. Related materials are included in *Appendix N*.

Public open houses were held on September 17th and 18th, and October 1st to answer questions regarding the Draft EA. The open house on October 1st preceded the public hearing on the same date. See section 6.3 for more information regarding the public hearing.

6.2.3 Federal Highway Administration Coordination

Potential interchange concepts to improve the LOS and reduce queuing were assessed as part of the MSP Area Roadway Improvements Project. This project evaluation process commenced in 2010 and is funded by the MAC, City of Bloomington and Minnesota Department of Transportation. One of the main objectives was to develop interchange concepts at I-494/34th Avenue South, TH 5/Post Road, and TH 5/Glumack Drive. These interchange concepts are the foundation of the roadway improvements included under the two proposed airport development alternatives studied.

A project management team (PMT) was formed to garner input from key agencies throughout the project duration. The agencies represented on the PMT included the following:

- Metropolitan Airports Commission
- City of Bloomington
- Minnesota Department of Transportation
- Federal Highway Administration
- Federal Aviation Administration
- Metro Transit
- Metropolitan Council
- Minnesota Department of Economic Development

During the eleven PMT meetings held thus far, the PMT played a key role in evaluating the interchange concepts and identifying a preferred concept.

Several coordination meetings were held with FHWA to identify the additional analysis needed to meet FHWA NEPA requirements for the roadway improvements.

6.3 Draft EA Comments and Responses

The Draft EA was released for agency and public review and comment on August 30th, 2012. To facilitate submittal of comments, the MAC conducted open houses on September 17th and 18th, and October 1st, 2012. The purpose of these open houses was to share information regarding the Draft EA in an informal setting. The open house on October 1st preceded the public hearing on the same date. The purpose of the public hearing was to allow the public to formally submit verbal or written comments.

Agency and public comments received during the comment period from August 30th to October 11th, 2012 were considered in the development of the Final EA. Responses to all verbal and written comments received during the public hearing and all written comments received prior to the close of the comment period are provided in Appendix R, *Draft EA/EAW Comments and Responses*.

Chapter 7:
List of Preparers

7.1 List of Preparers

This chapter identifies the individuals assisting in the preparation and independent review of this Environmental Assessment (EA) along with each preparer's responsibilities.

Table 7.1.1 includes FAA staff who are responsible for the preparation of the EA and/or who were involved in its review. Supporting the FAA in this effort are individuals from the Metropolitan Airports Commission (MAC) and several consulting firms.

Table 7.1.1

List of Preparers

Name	Project Role	Education/ Registration	Experience (Years)	EA Project Responsibility
Federal Aviation Administration				
Kandice Krull	Environmental Protection Specialist	M.S. Environmental Science	6	Reviewer
Al Fenedick	Environmental Protection Specialist	M.S. Environmental Biology	26	Reviewer
Federal Highway Administration				
James McCarthy	Traffic Operations Engineer	M.S. Civil Engineering	28	Reviewer
Philip Forst	Environmental Protection Specialist	M.S. Civil Engineering	15	Reviewer
Emeka Ezekwemba	Field Operations Engineer	B.S. Civil Engineering	3	Reviewer
Minnesota Department of Transportation				
Peter Wasko, INCE	Metro District Noise and Air Quality Supervisor	Associates Degree	14	Reviewer (noise and air)

Name	Project Role	Education/ Registration	Experience (Years)	EA Project Responsibility
The Metropolitan Airports Commission				
Roy R. Fuhrmann	EA Project Manager	B.S. Airport Management	20	EA Project Management
Chad E. Leqve	Noise and Land Use Planner	B.S. Airport Management	15	Noise and Land Use Analysis, Document Development
Dana Swanson	GIS Analyst	B.S. Aviation Management	2	Spatial Analysis and Map Development
Amanda Nyren	INM Analyst	B.A. Geology	4	Noise Contour Development
Christene Sirois Kron	Proofreader /Editor	B.A. English, MA Education: Curriculum & Instruction	20	Document Review
Toni Howell	EA Reviewer	B.S. Biology	20	Document Review and Data Collection
Garry Warren, P.E.	Airport Development	B.S./ M.S. Civil Engineering/ P.E.	40	Purpose and Need; Alternatives; Airside and Landside Development and Facility Layouts: Transportation Analysis; Airfield Construction Impacts and Cost Estimate Review
Bridget Rief, P.E.	Airport Development	B.S. Civil Engineering/ P.E.	20	Purpose and Need; Alternatives; Airside and Landside Development and Facility Layouts; Transportation Analysis; Airfield Construction Impacts and Cost Estimate Review
Alan W. Howell, A.I.A.	EA Reviewer/ Design Direction	B. Architecture / A.I.A.	18	Alternatives and Facility Planning Design Direction
Alan Dye, P.E.	EA Reviewer/ Design Directions	B.S. Civil Engineering/ P.E.	24	Alternatives and Transportation Planning

Name	Project Role	Education/ Registration	Experience (Years)	EA Project Responsibility
HNTB Corporation				
Greg Albjerg, P.E.	Project Manager	B.S. Civil Engineering/ P.E.	35	Overall Project Manager
Audrey Wald	Deputy Project Manager	B.S. Airway Science Management	21	Project and Consultant Coordination
Kim Hughes, P.E.	Quality Assurance /Quality Control Manager	B.S. Civil Engineering/ P.E.	25	Quality Assurance (QA)/Quality Control (QC) for Overall Document Development
Barbara Kulvelis, C.E.P	Sr. Environmental Planner	B.S. Civil /Environmental Engineering/ C.E.P.	26	Document Development, Purpose and Need, Alternatives
Pat Kennon	Sr. Aviation Economist	B.S. Urban Planning M.S. Economics	30	Forecast and Fleet Mix Development
Ken Reed	Sr. Aviation Planner	B.S. Aviation Technology	25	SIMMOD Analysis
Kent Miller	GIS Analyst		12	GIS Analysis
Yue Xu	Aviation Economist	M.S./ Ph.D Civil Engineering	4	Day/Night Operations Split
Todd Wright	Aviation Planner	B.A. Aviation Management	10	Airside Analysis
Scott Litsheim	Aviation Planner	B.A. Geography	15	Airside Analysis
Chris LaBounty	Airport Planning Engineer	B.S. Civil Engineering	4	Concept Development and Planning Support
Jason Staebell	Website Manager	B.S. Civil Engineering	10	EA Project Website Management
Caroline Pinegar, A.I.C.P.	Environmental Planner	B.A. Historic Preservation, M.C.R.P. Masters in City and Regional Planning / A.I.C.P.	6	Document Development
Jillian Daniels	Jr. Aviation Environmental Planner	B.S. Aviation Management	2	Document Development, SIMMOD Analysis
Ryan Carey, E.I.T.	Jr. Environmental Planner	B.S. Civil Engineering/ E.I.T.	1	Document Development
Jessica Wyatt	Principle Landside Planner	B.S./ M.S. Civil Engineering	14	Landside QC and Documentation
Bo Yuan, P.E.	Sr. Transportation Engineer	B.S./ M.S. Civil Engineering/ P.E.	9	Landside Analysis
Shankar Natarajan	Transportation Engineer	B.S./ M.S. Civil Engineering	6	Landside Analysis
Ybette Ochoa	Transportation Engineer	B.S./ M.S. Civil Engineering	3	Landside Analysis
Neelima Ghanta	Transportation Engineer	B.S./ M.S. Civil Engineering	4	Landside Analysis

Name	Project Role	Education/ Registration	Experience (Years)	EA Project Responsibility
TKDA				
Robert Engstrom, P.E.	Airfield Consultant	B.S. Civil Engineering/ P.E.	27	Airfield Construction / Impacts
Michael Gould	Sr. Engineering Specialist		40	Airport Layout Plan / Graphics
Kimley-Horn and Associates, Inc.				
Melissa Barnes, P.E.	Traffic Forecasting and Arterial Modeling	B.S. Civil Engineering/ P.E.	7	Lead Arterial Operations Modeling And Traffic Forecasting
Brandon Bourdon, P.E.	Deputy Project Manager	B.S./ M.S. Civil Engineering/ P.E.	13	Deputy Project Manager, QA/QC – Traffic Analysis and Document Development
Gary Christensen, P.E.	Concept Layouts	B.S. Civil Engineering/ P.E.	38	Concept Alternatives Development and QA/QC
Gary Ehret, P.E.	Project Manager	B.S. Civil Engineering/ P.E.	32	Project Manager and QA /QC
Nicole Gulick, P.E.	Concept Layouts	B.S. Civil Engineering /P.E.	10	Concept Alternatives Development
Beth Kunkel, C.W.D., P.W.S.	Environmental Scientist	B.S. Wildlife Management/ C.W.D., P.W.S.	24	QA/QC and Document Development
HenWen Westman, E.I.T.	Arterial Modeling	B.A. Physics/ M.S. Civil Engineering/ E.I.T.	4	Lead Traffic Data Collection
Liesch Environmental Consultants & Engineers				
Harry Summitt, P.E.	Liesch Project Manager	B.S. Civil Engineering/ P.E.	37	Project Manager and QA/QC
Mat Knutson	Surface and Groundwater Quality Analysis	M.S. Environmental Engineering	16	Water Quality
Kris Langlie, P.E.	Hydrology & Hydraulics	B.S. Civil Engineering/ P.E.	5	Surface Water Modeling
Mark Miller	Biotic Assessments	B.S. Aquatic Biology/ Certified Fisheries Scientist	32	Biotic Resources; Endangered & Threatened Species
Tom Orr	Hazardous, Solid, and Other Regulated Waste Assessments	B.S. Wildlife Management/Soil Science; Asbestos Inspector; Wetland Delineator	18	Hazardous And Solid Waste; Contaminated Soil and Construction Dewatering Impacts
Eric Sundbo	Hazardous, Solid and Other Regulated Waste Assessments	B.S. Biology/ Asbestos Project Designer; Asbestos Site Supervisor	23	Hazardous and Solid Waste ; ACM; Renovation and Demolition Waste Impacts

Name	Project Role	Education/ Registration	Experience (Years)	EA Project Responsibility
Miller Dunwiddie Architecture				
Craig Lau, A.I.A.	Architect	B. Architecture/. B.A. Environmental Design/ A.I.A.	30	Facility Planning
Joel Stromgren, A.I.A., LEED AP	Architect	B. Architecture M. Architecture/ A.I.A., LEED AP	24	Facility Planning
Architectural Alliance				
Dennis LaFrance, A.I.A.	Aviation Planner / Designer	B. Architecture/ A.I.A.	44	Alternatives, Preliminary Engineering
Jeff Loeschen, A.I.A.	Project Manager	B. Architecture, B.S. Environmental Design/ A.I.A.	13	Document development, Purpose and Need, Alternatives, Preliminary Engineering and Environmental Consequences
Greg Maxam, A.I.A.	Aviation Planner	Bach of Architecture/ A.I.A.	28	Document development, Purpose and Need, Alternatives, Preliminary Engineering and Environmental Consequences
Wenck Associates, Inc.				
Peter G. Miller, P.S.S.	Project Manager	B.S. Environmental Studies/ P.S.S	18	Air Quality Document Development
Michael R. Shoemaker, P.E.	Air Quality Engineer	B.S. Chemical Engineering; M.B.A./ P.E.	8	Greenhouse Gases Analysis
Lori Bartels, P.E.	Air Quality Engineer	B.S. Chemical Engineering/ P.E.	24	Stationary Source Air Emissions
Archaeological Research Services – Sub-Consultant to HNTB Corporation				
Christina Harrison	Archaeological Consultant	M.Phil. and B.A. Archaeology and Historic Preservation	40	Archaeology
Hess, Roise and Company– Sub-Consultant to HNTB Corporation				
Charlene Roise	Historical Consultant	M.A., Preservation Studies	30	Historical/Architectural Resources
Penny Petersen	Researcher	B.A., Art History and Humanities	12	Historical/Architectural Resources
Curtis Transportation Consulting LLC. – Sub-Consultant to HNTB Corporation				
Owen Curtis	Senior Landside Consultant	B.S.E. Aerospace & Mechanical Sciences, M.S.E. Civil Engineering /Transportation	39	Landside Planning and QA/QC

Name	Project Role	Education/ Registration	Experience (Years)	EA Project Responsibility
SRF Consulting Group, Inc – Sub-Consultant to Kimley-Horn and Associates, Inc.				
Steve Wilson	Traffic Forecasting and Freeway Modeling	B.A. Geography/ M.S. Civil and Environmental Engineering	29	Task manager, QA/QC – traffic
Paul Morris, P.E.	Traffic Forecasting	B.A. Physics/ M.S. Civil Engineering/ P.E.	6	Lead traffic forecast development and analysis
Leif Garnass, P.E.	Freeway Modeling	B.S. Civil Engineering/ P.E.	8	Lead freeway operations modeling and analysis
Josh Maus, P.E.	Freeway Modeling	B.S. Civil Engineering/ P.E.	11	Freeway modeling QA/QC and analysis
Ryan Loos, E.I.T.	Freeway Modeling	B.S. Civil Engineering/ E.I.T.	3	Freeway operations modeling and analysis
Don Demers, P.E.	Project Manager	B.S. Civil Engineering/ P.E.	21	Project manager, QA/QC – concept alternatives
Bob Leba, P.E.	Concept Layouts	B.S. Civil Engineering/ P.E.	14	Lead concept alternatives development
Kristy Morter, P.E.	Concept Layouts	B.S. Civil Engineering/ P.E.	12	Concept alternatives development
Jeff Tykeson, P.E.	Concept Layouts	B.S. Civil Engineering/ P.E.	12	Concept alternatives development
Brett Danner	Senior Associate	Master of Science in Biology	11	Noise Analyst
KB Environmental Sciences – Sub-Consultant to Wenck Associates, Inc.				
Michael Kenney, C.H.M.M., Q.E.P., C.I.H.	Sr. Air Quality Scientist	B.A. Environmental Sciences M.S. Environmental Engineering Sciences/ C.H.M.M., Q.E.P., C.I.H.	30	Air Quality Analysis
Michael Ratte	Sr. Air Quality Scientist	B.S. Meteorology	20	Air Quality Analysis
Paul Sanford	Air Quality Scientist	B.S. Environmental Science and Policy	4	Air Quality Analysis
David Braslau Associates, Inc. – Sub-Consultant to Wenck Associates, Inc.				
David Braslau	Sr. Air Quality Scientist	B.S. MIT; M.S. UC Berkeley; Ph.D. UC Berkeley	40	Mobile source air emissions

Chapter 8: Abbreviations, Acronyms, & Glossary

8.1 Abbreviations and Acronyms

AC	Advisory Circular
ACBM	Asbestos-containing building materials
ACCRI	Aviation Climate Change Research Initiative
ACHP	Advisory Council on Historic Preservation
ACM	Asbestos Containing Materials
ACRP	Airport Cooperative Research Program
ADF	Aircraft Deicing Fluids
ADT	Average Daily Traffic
AGL	Above Ground Level
ALP	Airport Layout Plan
ANOMS	Airport Noise and Operations Monitoring System
AOA	Airport Operations Area
APE	Area of Potential Effect
APU	Auxiliary Power Units
ARFF	Aircraft Rescue and Fire Facility
AST	Aboveground Storage Tank
ASTM	American Society for Testing and Materials
ATADS	Air Traffic Activity Data System
ATC	Air Traffic Control

ATCT	Airport Traffic Control Tower
BMP	Best Management Practices
BRT	Bus Rapid Transit
BOD	Biochemical Oxygen Demand
BPATDS	Border Protection Airport Technical Design Standards
CAA	Clean Air Act
CBIS	Checked Baggage Inspection System
$CBOD_5$	Carbonaceous Biochemical Oxygen Demand
CBP	Customs Border Protection
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	cubic feet per second
CH_4	Methane
CIP	Capital Improvement Program
CMSA	Consolidated Metropolitan Statistical Area
CO	Carbon Monoxide
CWA	Clean Water Act
CWN	Comprehensive Well Network
CZMA	Coastal Zone Management Act of 1972
CZMP	Coastal Zone Management Program

dB	Decibel
dBA	A-weighted Decibel
DDI	Diverging Diamond Interchange
DNL	Day-Night Average Sound Level
DOT	Department of Transportation
DLH	Duluth International Airport
EA	Environmental Assessment (Note: the EA meets the requirements for an EAW and the term EA is used interchangeably with EA/EAW)
EA/EAW	Environmental Assessment/Environmental Assessment Worksheet (Note: this term is used interchangeably with the term EA.)
EAU	Chippewa Valley Regional Airport
EAW	Environmental Assessment Worksheet
EB	East Bound
EDMS	Emissions and Dispersion Modeling System
EDS	Explosive Detection System
EIS	Environmental Impact Statement
EQB	Environmental Quality Board
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
FBO	Fixed Base Operator
FEMA	Federal Emergency Management Agency
FGDC	Federal Geographic Data Committee

FHWA	Federal Highway Administration
FICAN	Federal Interagency Committee on Aviation Noise
FICON	Federal Interagency Committee on Noise
FIRM	Flood Insurance Rate Map
FPPA	Farmland Protection Policy Acts of 1980 and 1995
FWS	U.S. Fish and Wildlife Service
GAO	General Accounting Office
GHGs	Greenhouse Gases
GIS	Geographic Information System
GISW	Glycol-Impacted Storm Water
GPS	Global Positioning System
GRV	Glycol Recovery Vehicle
GSE	Ground Support Equipment
GTC	Ground Transportation Center
HAPs	Hazardous Air Pollutants
H_2O	Water Vapor
HC	Hydrocarbons
HFCs	Hydrofluorocarbons
HPC	Minneapolis Heritage Preservation Commission
IAR	Interstate Access Request
IATA	International Air Transport Association

IHW	Industrial hazardous waste
INM	Integrated Noise Model
IPCC	Intergovernmental Panel on Climate Change
ISP	Integrated Spill Plan
LBP	Lead-Based Paint
LOS	Level of Service
LPST	Leaking Petroleum Storage Tank
LRT	Light Rail Transit
LTCP	Long Term Comprehensive Plan
LTO	Landing-Takeoff Cycle
MAC	Metropolitan Airports Commission
MACNOMS	MAC Noise and Operations Monitoring System
MEPA	Minnesota Environmental Policy Act
MERA	Minnesota Environmental Rights Act
MC	Metropolitan Council (of the Twin Cities Metropolitan Area)
MCBS	Minnesota County Biological Survey
MDNR	Minnesota Department of Natural Resources
mgd	million gallons per day
Mn/DOT	Minnesota Department of Transportation
MNAAQS	Minnesota Ambient Air Quality Standards
MPCA	Minnesota Pollution Control Agency
MPO	Metropolitan Planning Organization

MSATs	Mobile Source Air Toxics
MSL	Mean Sea Level
MSP	Minneapolis-St. Paul International Airport
MTOW	Maximum Take-Off Weight
MWRRS	Midwest Regional Rail System
N_2O	Nitrous Oxide
NAAQS	National Ambient Air Quality Standards
NAD	North American Datum
NB	North Bound
NCP	Noise Compatibility Program
NEPA	National Environmental Policy Act of 1969
NESHAP	National Emission Standard for Hazardous Air Pollutants
NHPA	National Historic Preservation Act of 1966
NLX	Northern Lights Express (Passenger Rail)
NO_2	Nitrogen Dioxide
NOAA	National Oceanic and Atmospheric Administration
NOC	Noise Oversight Committee
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NRHP	National Register of Historic Places
NURP	Nationwide Urban Runoff Program
NWI	National Wetland Inventory
NWS	National Weather Service

O_3	Ozone
O&M	Operations and maintenance
PA	Programmatic Agreement
PAC	Policy Advisory Committee
Part 77	14 Code of Federal Regulations Part 77
Pb	Lead
PBN	Performance-Based Navigation
PCBs	Polychlorinated Biphenyls
PFCs	Passenger Facility Charges
PFCs	Perfluorocarbons
PHOP	Peak Hour Originating Passenger
PHTP	Peak Hour Terminating Passenger
$PM_{2.5}$	Particulate Matter with a diameter of 2.5 microns or less
PM_{10}	Particulate Matter with a diameter of 10 microns or less
PnP	Plug and Pump
POV	Privately Owned Vehicle
ppm	parts per million
QTA	Quick Turn-Around
RCRA	Resource Conservation and Recovery Act
REC	Recognized Environmental Conditions

RGU	Responsible Governmental Unit
RJ	Regional Jet
RMT	Remote Monitoring Tower
RNAV	Area Navigation
RNP	Required Navigation Performance
RPZ	Runway Protection Zone
RON	Remain Over-Night
RST	Rochester International Airport
RUS	Runway Use System
SB	South Bound
SBAS (WAAS)	Satellite Based Augmentation System (Wide Area Augmentation System)
SDS	State Disposal System
SF/PHOP	Square Feet/ Peak Hour Originating Passenger
SF_6	Sulfur Hexafluoride
SHPO	State Historic Preservation Officer (Minnesota Historical Society)
SIP	State Implementation Plan
SLAMM	Source Loading and Management Model
SMP	Soil Management Plan
SO_2	Sulfur Dioxide
SOC	Species of Concern
SPCCP	Spill Prevention Control and Countermeasure Plan
SPUI	Single Point Urban Interchange
STC	St. Cloud Regional Airport

SWMF	Storm Water Management Facility
SW3P	Storm Water Pollution Prevention Plan
TAF	Terminal Area Forecast
TH	Trunk Highway
TIP	Transportation Improvement Plan
TOD	Transit Oriented Development
TRB	Transportation Research Board
TSA	Transportation Security Administration
TSS	Threshold Siting Surface
TSS	Total Suspended Solids
USACE	U.S. Army Corp of Engineers
USC	United States Code
USEPA	US Environmental Protection Agency
UST	Underground Storage Tank
USGS	United States Geological Survey
v/c	Volume/Capacity
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compound
WB	West Bound
WEB	Watershed Environmental Baseline
XPSWMM	Storm Water Management Model

8.2 Glossary of Terms

A-Weighted Sound Level (dBA) – The A-Weighted Sound Level is sound pressure level which has been filtered or weighted to reduce the influence of the low and high frequency noise (formerly DBA). It was designed to approximate the response of the human ear to sound.[1]

Air Carrier – A person who undertakes directly by lease, or other arrangement, to engage in air transportation.[2]

Air Traffic Control (ATC) – A service operated by appropriate authority to promote the safe, orderly, and expeditious flow of air traffic.[3]

Airport Elevation – The highest point of an airport's usable runways measured in feet from mean sea level (MSL). [4]

Airport Master Plan – An airport master plan is a comprehensive study of the airport and typically describes short-, medium-, and long-term plans for airport development. One of the key products of a master plan is a set of drawings that provides a graphic representation of the long-term development plan for an airport. The primary drawing in this set is the Airport Layout Plan.[5]

Airport Operations – The landing, takeoff or touch-and-go procedure by an aircraft on a runway at an airport. [6]

> **Local Operations** – Aircraft operations performed by aircraft that are based at the airport and that operate in the local traffic pattern or within sight of the airport, that are known to be departing for or arriving from flights in local practice areas within a prescribed distance from the airport, or that execute simulated instrument approaches at the airport.
>
> **Itinerant Operations** – Operations by aircraft that leaves the local airspace.

Airport Reference Point (ARP) – The latitude and longitude of the approximate center of the airport.[7]

Airside / Airfield – The portion of an airport that contains the facilities necessary for the operation of aircraft.[8]

Airport Sponsor – The entity that is legally responsible for the management and operation of an airport including the fulfillment of the requirements of laws and regulations related thereto. [9]

Altitude – The height of a level, point, or object measured in feet Above Ground Level (AGL) or from Mean Sea Level (MSL).[10]

Apron – A specified portion of the airfield used for passenger, cargo or freight loading and unloading, aircraft parking, and the refueling, maintenance and servicing of aircraft. [11]

Biotic Community – A naturally occurring assemblage of animals and plants that live in the same environment and are mutually sustaining and interdependent.[12]

Clean Air Act (CAA) – The Federal law regulating air quality. The first Clean Air Act (CAA), passed in 1967, required that air quality criteria necessary to protect the public health and welfare be developed. Since 1967, there have been several revisions to the CAA. The Clean Air Act Amendments of 1990 represent the fifth major effort to address clean air legislation.[13]

Criteria Pollutants – The six pollutants listed in the CAA that are regulated by the EPA through the NAAQS because of their health and/or environmental effects. They are: nitrogen dioxide (NO_2), sulfur dioxide (SO_2), carbon monoxide (CO), ozone (O_3), particulate matter equal to or less than 10 microns in diameter (PM_{10}) and equal to or less than 2.5 microns in diameter ($PM_{2.5}$), and lead (Pb).[14]

Day-Night Average Sound Level (DNL) – The 24-hour average sound level, in decibels, for the period from midnight to midnight, obtained after the addition of ten decibels to sound levels for the periods between midnight and 7 a.m. and between 10 p.m. and midnight, local time, as averaged over a span of one year. It is the FAA standard metric for determining the cumulative exposure of individuals to noise.[15]

Decibel (dB) – Sound pressure level is a measure of the amplitude of the sound, while frequency relates to the sound's pitch. The range of sound pressures of interest is represented on the low end by the threshold of hearing of normal young people and on the upper end by the noise of gunfire at close range.[16]

Effect – Effects includes ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial.[17]

Environmental Assessment (EA) – An environmental assessment "Means a concise public document for which a Federal agency is responsible that serves to (1) Briefly provide sufficient evidence and analysis for determining whether to prepare and environmental impact statement or a finding of no significant impact. (2) Aid an agency's compliance with the Act [National Environmental Policy Act, as amended] when no environmental impact statement is necessary. (3) Facilitates preparation of a statement when one is necessary." [18] Use of a federal EA as a substitute for the Environmental Assessment Worksheet (EA/EAW) form is authorized under the Minnesota Environmental Review Program provided that the EA addresses the impact categories required in the EAW and the procedural requirements of the EAW process are completed.[19] Therefore, in this document the term EA generally refers to both the EA and EAW and is used interchangeably with the term EA/EAW.

Environmental Assessment Worksheet (EAW) – According to the Minnesota Environmental Policy Act (MEPA), " "Environmental assessment worksheet" means a brief document which is designed to set out the basic facts necessary to determine whether an environmental impact statement is required for a proposed action."[20] The responsible governmental unit (RGU) prepares an EAW "to provide the information needed to determine whether the project has the potential for significant environmental effects. It also provides permit information, informs the public about a project and helps identify ways to protect the environment." [21]

Equivalent Sound Level (L_{eq}, LAEQ, LAEQD or LAEQN) – Is the steady A-weighted sound level over an specified period (not necessarily 24 hours) that has the same acoustic energy as the fluctuating noise during that period (with no consideration of a nighttime weighting.) It is a measure of cumulative acoustical energy. Because the time interval may vary, it should always be specified by a subscript (such as L_{eq} 8) for an 8-hr exposure to workplace noise) or be clearly understood.[22]

Fixed Base Operator (FBO) – A business enterprise located at on airport that provides services to pilots including aircraft rental, training, fueling, maintenance, parking, and the sale of pilot supplies. [23]

General Aviation (GA) – The segment of aviation that encompasses all aspects of civil aviation except certified air carriers and other commercial operators such as airfreight carriers. [24]

Habitat – Habitat is a combination of environmental factors that provides food, water, cover and space that a living thing needs to survive and reproduce. Habitat types include: coastal and estuarine, rivers and streams, lakes and ponds, wetlands, riparian areas, deserts grasslands/prairie, forests, coral reefs, marine, perennial snow and ice, and urban.[25]

Hydrocarbons (HC) – These gases represent unburned and wasted fuel. They come from incomplete combustion of gasoline and from evaporation of petroleum fuels.[26]

Instrument Flight Rules (IFR) – Rules governing the procedures for conducting instrument flight. Also a term used by pilots and controllers to indicate type of flight plan.[27]

Instrument Meteorological Conditions (IMC) – Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling less than the minima specified for visual meteorological conditions.[28]

Invasive Species – Invasive species means an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health. Alien species means, with respect to a particular ecosystem, any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem.[29]

Landside – The portion of an airport that provides the facilities necessary for the processing of passengers, cargo, freight, and ground transportation vehicles.[30]

Land Use – The present or planned utilization of a given parcel of land. Such land uses are normally indicated or delineated on a land use map. Land use maps may indicate usages for any given time period past, present, or future, and such period should always be indicated.[31]

Land Use Plan – The long-range plan for desirable use of land in the city as officially adopted and as amended from time to time by the plan commission; the purpose of such plan includes to serve as a guide in the zoning and progressive changes in the zoning of land and to meet the changing needs [of the community], in the subdividing and use of undeveloped land, and in the acquisition of rights-of-way or sites for public purposes such as streets, parks, schools, and public buildings.[32]

Metropolitan and Micropolitan Statistical Areas (metro and micro areas) – Geographic entities defined by the U.S. Office of Management and Budget (OMB) for use by Federal statistical agencies in collecting, tabulating, and publishing Federal statistics. The term "Core Based Statistical Area" (CBSA) is a collective term for both metro and micro areas. A metro area contains a core urban area of 50,000 or more population, and a micro area contains an urban core of at least 10,000 (but less than 50,000) population. Each metro or micro area consists of one or more counties and includes the counties containing the core urban area, as well as any adjacent counties that have a high degree of social and economic integration (as measured by commuting to work) with the urban core.[33]

National Ambient Air Quality Standards (NAAQS) – Air Quality standards established by the EPA to protect human health (primary standards) and to protect property and aesthetics (secondary standards).[34]

National Environmental Policy Act (NEPA) – Federal legislation that establishes environmental policy for the nation. It requires an interdisciplinary framework for federal agencies to evaluate environmental impacts and contains action-forcing procedures to ensure that federal agency decision makers take environmental factors into account.[35]

Noise-Sensitive Area – An area where noise interferes with normal activities associated with its use. Normally, noise sensitive areas include residential, educational, health, and religious structures and sites, and parks, recreational areas (including areas with wilderness characteristics), wildlife refuges, and cultural and historical sites.[36]

Minnesota Environmental Policy Act (MEPA) – State of Minnesota statue that (a) declares a state policy that will encourage productive enjoyable harmony between human beings and their environment: (b) promotes efforts that will prevent of eliminate damage to the environment and biosphere and stimulate the health and welfare of human beings; and (c) enriches the understanding of the ecological systems and natural resources important to the state and the nation.[37]

Object Free Area (OFA) – An area on the ground centered on a runway, taxiway, or taxilane centerline provided to enhance the safety of aircraft operations by having the area free of objects, except for objects that need to be located in the OFA for air navigation or aircraft ground maneuvering purposes.[38]

Ozone (O_3) – A colorless, toxic gas formed by the photochemical reactions in the atmosphere of VOCs with the oxides of nitrogen. Ozone commonly is referred as “Smog”. Ozone is not emitted directly by any airport.[39]

Peak Hour – An estimate of the busiest hour in a day. This is also known as the design hour.[40]

Prime Farmland – Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, and labor, and without intolerable soil erosion, as determined by the Secretary. Prime farmland includes land that possesses the above characteristics but is being used currently to produce live stock and timber. It does not include land already in or committed to urban development or water storage.[41]

Principal Arterial – Principal arterials are roadways that are intended to provide the mobility of a larger network, with lower category roadways feeding into them. These Principal Arterials may range from fully grade-separated facilities to two-lane urban streets.

Record of Decision (ROD) – A ROD is a concise public record of the Agency's decision. The ROD states what the decision is, identifies all alternatives considered in reaching the Agency's decision, and specifies which were environmentally preferable. The ROD discusses all other relevant factors considered, including any essential considerations of national policy, economic and technical considerations, and the agency's statutory mission. The ROD states whether all practicable means to avoid or minimize environmental harm from the alternative selected have been adopted, and if not, why they were not. Where applicable, the ROD may include a monitoring and enforcement program for mitigation.[42]

Regional Roadway – A regional roadway is a roadway that has the functional classification of principal arterial that is operated and maintained by MnDOT. For this project the regional roadways are I-494, TH 77, TH 62, and TH 5.

Responsible Governmental Unit – "Responsible governmental unit" means the governmental unit that is responsible for preparation and review of environmental documents under MEPA.[43]

Runway Protection Zone (RPZ) – An area off the runway end to enhance the protection of people and property on the ground.[44]

Runway Safety Area (RSA) – A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway.[45]

Runway Threshold – The beginning of that portion of a runway usable for landing.[46]

Sound Exposure Level (SEL) – A single event metric that takes into account both the noise level and duration of the event and referenced to a standard duration of one second.[47]

Sound Pressure Level (SPL) – One-third octave band sound pressure levels that form the starting point for all other noise metrics. SPL provides a detailed description of the frequency components of single complex sound and are used in assessing the effectiveness of soundproofing.[48]

Unique Farmland – Unique farmland is land other than prime farmland that is used for production of specific high-value food and fiber crops, as determined by the Secretary. It has the special combination of soil quality, location, growing season, and moisture supply needed to economically produce sustained high quality or high yields of specific crops when treated and managed according to acceptable farming methods. Examples of such crops include citrus, tree nuts, olives, cranberries, fruits, and vegetables.[49]

Visual Meteorological Conditions (VMC) – Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling equal to or better than specified minima.[50]

Visual Flight Rules (VFR) – Rules that govern the procedures for conducting flight under visual conditions. The term 'VFR' is also used in the United States to indicate weather conditions that are equal to or greater than minimum VFR requirements. In addition, it is used by pilots and controllers to indicate type of flight plan.[51]

Volatile Organic Compound (VOC) – A type of chemical emitted as gas from certain solids or liquids. VOCs include a variety of chemicals, some of which may have short- and long-term adverse health effects. Concentrations of many VOCs are consistently higher indoors (up to ten times higher) than outdoors. Examples include: paints and lacquers, paint strippers, cleaning supplies, pesticides, building materials and furnishings, office equipment such as copiers and printers, correction fluids and carbonless copy paper, graphics and craft materials including glues and adhesives, permanent markers, and photographic solutions.[52]

Wake Turbulence – Phenomena resulting from the passage of an aircraft through the atmosphere. The term includes vortices, thrust stream turbulence, jet blast, jet wash, propeller wash, and rotor wash both on the ground and in the air.[53]

Wetland – An area that is regularly saturated by surface water or groundwater and is characterized by a prevalence of vegetation that is adapted for life in saturated soil conditions (e.g., swamps, bogs, fens, marshes, and estuaries).[54]

Zoning – An exercise of the police powers of the State, as delegated to local government, designating the uses permitted on each parcel of land within the zoning jurisdiction.[55]

Endnotes

[1] FAA Order 150/5020-1, August, 5 1983, p. 3

[2] 14 CFR, Title 14: Aeronautics and Space, Part 1 – Definitions and Abbreviations.

[3] Federal Aviation Administration Pilot/Controller Glossary, 2/14/08.

[4] FAA AC 150/5300-13 CHG 12, 1/3/08, p. 1

[5] FAA AC 150/5070-6B Airport Master Plans, 7/29/05, p. 5&6

[6] FAA AC 150/5070-6B Airport Master Plans, 7/29/05, p. Appendix A.

[7] FAA AC 150/5300-13 CHG 12, 1/3/08, p. 1

[8] FAA AC 150/5070-6B Airport Master Plans, 7/29/05, p. Appendix A.

[9] FAA AC 150/5070-6B Airport Master Plans, 7/29/05, p. Appendix A.

[10] Federal Aviation Administration Pilot/Controller Glossary, 2/14/08.

[11] FAA AC 150/5070-6B Airport Master Plans, 7/29/05, p. Appendix A.

[12] Environmental Protection Agency, http://www.epa.gov/OCEPAterms/bterms.html.

[13] Air Quality Procedures For Civilian Airports & Air Force Bases, US Department of Transportation Federal Aviation Administration and U.S. Department of Defense U.S. Air Force, 1997, p xiv.

[14] Ibid p. xv and AD 5.

[15] FAA Order 150/5020-1, August, 5 1983, p. 5.

[16] FAA Order 150/5020-1, August, 5 1983, p. 11.

[17] A Citizens Guide to NEPA Having Your Voice Heard, Council on Environmental Quality, 12/07, Appendix E.

[18] CEQ, Regulations For Implementing the Procedural Provisions Of The National Environmental Policy Act, §1508.9.

[19] Minnesota Environmental Quality Board, EAW Guidelines, May 12, 2010, p. 4.

[20] State of Minnesota, Minnesota Statutes 2012, section 116D.04.

[21] Minnesota Environmental Quality Board, Guide to Minnesota Environmental Review Rules, May 2010, p. 20.

[22] FAA Order 150/5020-1, August, 5 1983, p. 5.

[23] FAA AC 150/5070-6B Airport Master Plans, 7/29/05, p. Appendix A.

[24] FAA AC 150/5070-6B Airport Master Plans, 7/29/05, p. Appendix A.

[25] US Fish and Wildlife Service, http://www.fws.gov/habitat/, 6/20/08.

[26] Air Quality Procedures For Civilian Airports & Air Force Bases, US Department of Transportation Federal Aviation Administration and U.S. Department of Defense U.S. Air Force, 1997, p xviii.

[27] Federal Aviation Administration Pilot/Controller Glossary, 2/14/08.

[28] Ibid.

[29] Executive Order 13112, Invasive Species, 64 FR 6183, 2/8/99.

[30] FAA AC 150/5070-6B Airport Master Plans, 7/29/05, p. Appendix A.

[31] FAA Order 150/5020-1, August, 5 1983, p. 4

[32] American Planning Association, *A Planner's Dictionary,* 2004.

[33] US Census Bureau, http://www.census.gov/population/www/estimates/metroarea.html, 6/20/08.

[34] Air Quality Procedures For Civilian Airports & Air Force Bases, US Department of Transportation Federal Aviation Administration and U.S. Department of Defense U.S. Air Force, 1997, p xx.

[35] FAA AC 150/5070-6B Airport Master Plans, 7/29/05, p. Appendix A.

[36] FAA Order 1050.1E, 6/8/2004, Appendix A, p. A-14.

[37] State of Minnesota, Minnesota Statutes 2012, section 116D.01.

[38] FAA AC 150/5300-13 CHG 12, 1/3/08, p. 2

[39] Air Quality Procedures For Civilian Airports & Air Force Bases, US Department of Transportation Federal Aviation Administration and U.S. Department of Defense U.S. Air Force, 1997, p xxi.

[40] FAA AC 150/5070-6B Airport Master Plans, 7/29/05, p. Appendix A.

[41] Farmland Protection Policy Act, 7 USC 4201, Section 2, paragraph c(1)(A)

[42] FAA Order 1050.1E CHG 1, Environmental Impacts: Policies and Procedures, 3/20/06, p. 5-2.

[43] State of Minnesota, Minnesota Administrative Rules, 4410.0200 Definitions and Abbreviations, November 30, 2009, Subpart 75.

[44] FAA AC 150/5300-13 CHG 12, 1/3/08, p. 3.

[45] FAA AC150/5300-13 CHG 12, 1/3/08, p. 3.

[46] Federal Aviation Administration Pilot/Controller Glossary, 2/14/08.

[47] FAA Order 1050.1E, 6/8/2004, Appendix A, p. A-65.

[48] FAA Order 1050.1E, 6/8/2004, Appendix A, p. A-65.

[49] Farmland Protection Policy Act, 7 USC 4201, Section 2, paragraph c(1)(B).

[50] Federal Aviation Administration Pilot/Controller Glossary, 2/14/08.

[51] Federal Aviation Administration Pilot/Controller Glossary, 2/14/08.

[52] U.S. Environmental Protection Agency, "Basic Information," http://www.epa.gov/iaq/voc.html.

[53] Federal Aviation Administration Pilot/Controller Glossary, 2/14/08.

[54] Environmental Protection Agency, www.epa.gov/glnpo/rptcong/1994/glossary.htm.

[55] FAA Order 150/5020-1, August, 5 1983, p. 4