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### Appendix A – Runway Length Needs Determination

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<tr>
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</tr>
</thead>
</table>
Appendix A

Runway Length Needs Documentation

This appendix substantiates and documents the need for primary and crosswind runway lengths that meet user needs at Lake Elmo Airport, using the LTCP runway length analysis as a starting point. The following subsections present aircraft operations data and the associated runway length analysis:

- Existing and Forecasted Aircraft Activity Estimates
  - LTCP Base Year (2012) Aircraft Operations Estimate
  - Revised Base Year (2016) Aircraft Operations Estimate
  - LTCP Aircraft Operations Forecast (2012 to 2035)
  - Revised Aircraft Operations Forecast (2016 to 2035)

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  - Role and Classification of the Airport
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  - Takeoff Operations
  - Landing Operations
  - Crosswind Runway Length
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  - Runway Length Conclusions

- Summary of Recommendations

1. Existing and Forecasted Aircraft Activity Estimates

Aircraft activity estimates for Lake Elmo Airport provide the basis for identifying the critical aircraft for which the runways at the Airport should be designed. According to FAA Advisory Circular (AC) 150/5000-17, Critical Aircraft and Regular Use Determination, “the critical aircraft is the most demanding aircraft type, or grouping of aircraft with similar characteristics, that make regular use of the airport. Regular use is 500 annual operations, including both itinerant and local operations but excluding touch-and-go operations. An operation is either a takeoff or a landing.”

Aircraft activity estimates also provide the basis for developing several operational inputs used to generate existing and future noise exposure maps with the FAA Aviation Environmental Design Tool (AEDT), such as the number of aircraft operations and the types of aircraft (fleet mix). This report presents the method used to estimate aircraft activity for the Lake Elmo Airport EA/EAW. These estimates were used to substantiate the purpose and need for proposed airfield improvements and to develop noise exposure contour maps for the no-action and reasonable alternatives.

Aircraft activity at Lake Elmo Airport is analyzed in the following sections:
- LTCP Base Year (2012) Aircraft Operations Estimate
- Revised Base Year (2016) Aircraft Operations Estimate
- LTCP Aircraft Operations Forecast (2012 to 2035)
- Revised Aircraft Operations Forecast (2016 to 2035)
1.1 LTCP Base Year (2012) Aircraft Operations Estimate

This section summarizes the criteria and assumptions used by the LTCP to identify base year aircraft operations and fleet mix at Lake Elmo Airport.

There is no Air Traffic Control Tower (ATCT) at Lake Elmo Airport, so there is no "official" count of aircraft operations. The existing (2014) level of aircraft operations at the Airport (25,727 annual operations, or approximately 70 operations per day) was calculated for the LTCP as follows:

- The MAC Noise and Operations Monitoring System (MACNOMS) flight tracking system recorded 17,705 flight tracks for aircraft arriving to or departing from Lake Elmo Airport during 2014.
- The MACNOMS capture rate at all MAC-owned towered reliever airports (MACNOMS tracks compared to the official FAA Tower Count) for 2014 was 66.5%. The Anoka County-Blaine Airport (ANE) capture rate is 68.82%, and was used to adjust the Lake Elmo data set to account for missing flight tracks in MACNOMS.
- The MACNOMS capture rate adjustment for Lake Elmo is as follows: 17,705 MACNOMS recorded tracks / 68.82% ANE capture rate = 25,727 annual operations.

This estimate is consistent with on-site observations conducted at the Airport during a two-week period in December 2011 and a one-week period in August 2012.

- Average daily aircraft operations were 52 in December 2011 and 87 in August 2012.
- Monthly operations estimates for December 2011 and August 2012 were extrapolated using data from the towered reliever airports.
- A ratio of December and August operations as a percentage of the entire year was established using data from the towered reliever airports.
- This ratio was applied to the monthly estimates at Lake Elmo to estimate total 2012 operations (26,709).

The LTCP used the 2012 base year estimate of 26,709 aircraft operations to prepare forecasts for the years 2015, 2020, 2025, 2030, and 2035. The LTCP estimated operational fleet mix in 2012 by aircraft categories as follows:

- 26,088 (97.7%) single-engine piston operations (including experimental and light sport),
- 112 (0.4%) multi-engine piston operations,
- 56 (0.2%) turboprop operations,
- 4 (<0.1%) jet operations, and
- 449 (1.7%) helicopter operations.

According to the *Minneapolis-St. Paul Reliever Airports Activity Forecasts Technical Report* (revised October 2014), the percentage shares of base year operations per aircraft type were estimated based on MAC radar data and observations collected during the December 2011 and August 2012 on-site counts. These aircraft type shares assume that the annual shares of single-engine piston, multi-engine piston, and helicopter operations for the entire 2012 calendar year were consistent with observations from the on-site counts, and that MAC radar identified all operations by turboprop and jet aircraft that occurred at Lake Elmo Airport in 2012.
The LTCP used the 2012 annual operations estimates by aircraft category described above as a critical input in deriving the composition of the operational fleet by specific aircraft make and model, for conducting a base case (existing conditions) noise analysis. The process used to derive operations by specific aircraft make and model was as follows:

- MACNOMS data was gathered for the 12-month period ending October 2014, which included 1,187 flight tracks for which the aircraft make and model was known.
- The composition of aircraft types for the 1,187 flight tracks in this dataset for which the aircraft make and model was known was quantified on a per aircraft basis.
- The summary 2012 base year operations numbers described above served as the targets for scaling the MACNOMS fleet mix to equal total annual aircraft operations by operations type (i.e. arrival, departure, touch-and-go) and aircraft category (i.e. single-engine piston, multi-engine piston, turboprop, etc.). Table 1 illustrates the adjustments made to scale the MACNOMS counts to match the 2012 forecast base year operations estimates.
- In cases where there were no MACNOMS flight tracks for which the aircraft make and model was known, flight tracks for similar types of operations by similar aircraft types were substituted. For example, there were no flight tracks for helicopter arrivals or touch-and-goes in the dataset, but there were flight tracks for helicopter departures. Therefore, the helicopter arrivals and touch-and-goes were modeled based on helicopter departure data.

### Table 1: LTCP Base Year Fleet Mix Adjustments

<table>
<thead>
<tr>
<th>Operation Type</th>
<th>Aircraft Group</th>
<th>MACNOMS Count</th>
<th>Forecast Target</th>
<th>Adjustment Factor</th>
<th>Adjusted Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Arrivals</strong></td>
<td>Single Engine Piston + Other</td>
<td>501</td>
<td>11,436</td>
<td>22.826</td>
<td>11,436</td>
</tr>
<tr>
<td></td>
<td>Multi-Engine Piston</td>
<td>60</td>
<td>46</td>
<td>0.767</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>Turboprop</td>
<td>26</td>
<td>28</td>
<td>1.077</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>Jets</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Helicopter</td>
<td>0</td>
<td>162</td>
<td>162</td>
<td>162</td>
</tr>
<tr>
<td><strong>Arrival Total</strong></td>
<td></td>
<td><strong>587</strong></td>
<td><strong>11,674</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Departures</strong></td>
<td>Single Engine Piston + Other</td>
<td>531</td>
<td>11,436</td>
<td>21.537</td>
<td>11,436</td>
</tr>
<tr>
<td></td>
<td>Multi-Engine Piston</td>
<td>39</td>
<td>46</td>
<td>1.179</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>Turboprop</td>
<td>24</td>
<td>28</td>
<td>1.167</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>Jets</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Helicopter</td>
<td>2</td>
<td>162</td>
<td>81</td>
<td>162</td>
</tr>
<tr>
<td><strong>Departure Total</strong></td>
<td></td>
<td><strong>596</strong></td>
<td><strong>11,674</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Touch and Go</strong></td>
<td>Single Engine Piston + Other</td>
<td>4</td>
<td>1,608</td>
<td>402</td>
<td>1,608</td>
</tr>
<tr>
<td></td>
<td>Multi-Engine Piston</td>
<td>0</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Turboprop</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Jets</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Helicopter</td>
<td>0</td>
<td>62.5</td>
<td>62.5</td>
<td>62.5</td>
</tr>
<tr>
<td><strong>Touch and Go Total</strong></td>
<td></td>
<td><strong>4</strong></td>
<td><strong>1,680.5</strong></td>
<td></td>
<td><strong>1,680.5</strong></td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td></td>
<td><strong>1,187</strong></td>
<td><strong>25,028.5</strong></td>
<td></td>
<td><strong>25,028.5</strong></td>
</tr>
</tbody>
</table>

Note: Two military operations identified by MACNOMS are not counted in table above.
1.2 Revised Base Year (2016) Aircraft Operations Estimate

This section describes the approach Mead & Hunt used to develop its own independent aircraft operations estimates for the most recent full calendar year (2016), and explains the rationale for recommending modification of the operational fleet mix estimates developed for and presented in the LTCP. To make these estimates, Mead & Hunt conducted detailed analysis of Airport-specific operations data available from both the FAA Traffic Flow Management System Counts (TFMSC) and the MACNOMS databases. The purpose, data collection methods, and limitations of these databases are summarized below.

The TFMSC is a nationwide database designed to provide information on traffic counts by airport or by city pair. It includes data for flights that fly under Instrument Flight Rules (IFR) and are captured by the FAA’s enroute computers. Most Visual Flight Rules (VFR) and some non-enroute IFR traffic is excluded from these counts. The source data are created when pilots file flight plans and/or when flights are detected by the surveillance system in the National Airspace System (NAS), usually via RADAR. This data source provides an incomplete record of operations at Lake Elmo Airport, because most of its users operate in VFR conditions without an IFR flight plan. However, this data provides valuable information regarding the operational fleet at the Airport because it includes the aircraft make and model associated with each flight it captures.

The MACNOMS is a MAC-owned and operated database designed primarily to help MAC staff analyze aircraft noise impacts, assess noise abatement procedures, and provide public access to flight tracking and detailed aircraft noise data. Deployed in 1992, the system correlates information from a state-of-the-art flight tracking data feed with noise data collected at 39 Remote Monitoring Towers (RMTs) located around Minneapolis-St. Paul International Airport. The flight tracking data feed draws on information provided by FAA enroute radar systems, terminal secondary surveillance systems, Airport Surface Detection Equipment (ASDE-X) systems, Wide Area Multilateration (WAM) systems, and the nationwide Automatic Dependent Surveillance-Broadcast (ADS-B) system. For MACNOMS flights tracks at Lake Elmo, aircraft make and model information is available if the pilot filed an IFR flight plan, or the aircraft has the required cockpit transponder equipment to communicate with the data feed source system.

There were 19,757 total aircraft flight tracks captured by MACNOMS at Lake Elmo Airport in 2016. Based on MAC staff analysis of flight track beginning and end points, Mead & Hunt estimates that 1,215 of the 19,757 tracks (6.1%) were conducted by aircraft flying near but not taking off and landing at the Airport, resulting in an estimated 18,542 total flight tracks associated with actual takeoff and landing operations at Lake Elmo Airport. Table 2 on the next page summarizes these flight tracks based on origin/destination and aircraft engine type information included in the MACNOMS data.
### Table 2: Lake Elmo Airport 2016 MACNOMS Flight Tracks by Aircraft Engine and Operation Types

<table>
<thead>
<tr>
<th>Aircraft Engine Type</th>
<th>Local</th>
<th>Itinerant</th>
<th>Other Twin Cities Airport</th>
<th>Outside Twin Cities</th>
<th>Origin / Destination Unknown</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-Engine Piston</td>
<td>396</td>
<td>233</td>
<td>333</td>
<td>836</td>
<td></td>
<td>1,798</td>
</tr>
<tr>
<td>Single-Engine Turboprop</td>
<td>0</td>
<td>4</td>
<td>11</td>
<td>15</td>
<td></td>
<td>30</td>
</tr>
<tr>
<td>Multi-Engine Piston</td>
<td>2</td>
<td>8</td>
<td>17</td>
<td>42</td>
<td></td>
<td>69</td>
</tr>
<tr>
<td>Multi-Engine Turboprop</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Jet</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Helicopter</td>
<td>0</td>
<td>117</td>
<td>0</td>
<td>2</td>
<td></td>
<td>119</td>
</tr>
<tr>
<td>Unknown</td>
<td>10,482</td>
<td>1,779</td>
<td>0</td>
<td>4,261</td>
<td></td>
<td>16,522</td>
</tr>
<tr>
<td><strong>Total Flight Tracks</strong></td>
<td>10,880</td>
<td>2,143</td>
<td>363</td>
<td>5,156</td>
<td></td>
<td>18,542</td>
</tr>
</tbody>
</table>

Sources: MACNOMS, Mead & Hunt.

Notes: Flight tracks by unknown aircraft types were adjusted to eliminate those conducted by aircraft flying near but not taking off and landing at Lake Elmo Airport, assuming this percentage was the same as among similar flight tracks for which the aircraft type is known. Local operations are defined by FAA as takeoffs and landings conducted by aircraft operating in the traffic pattern or within sight of the tower, or aircraft known to be departing or arriving from flight in local practice areas, or aircraft executing practice instrument approaches at the airport. Itinerant operations are defined as all aircraft operations other than local operations, and essentially represent takeoffs and landings of aircraft going from one airport to another.

### 1.2.1 Turboprop and Jet Aircraft Flight Tracks

Turboprop and jet aircraft are generally more expensive to own and operate than single-engine piston, multi-engine piston, and helicopter aircraft. To protect their investment and comply with insurance requirements, pilots of these aircraft are more likely to file IFR flight plans and the aircraft are more likely to have state-of-the-art avionics in the cockpit. For these reasons, it is reasonable to assume that MACNOMS captured most turboprop and jet aircraft operations that occurred at Lake Elmo Airport in 2016. Mead & Hunt normalized the turboprop and jet aircraft flight track counts so that for every arrival operation, there was a corresponding departure. The adjusted flight track totals are shown in Table 3 below.

### Table 3: 2016 Turboprop and Jet Aircraft Flight Track Estimates

<table>
<thead>
<tr>
<th>Aircraft Engine Type</th>
<th>Local</th>
<th>Itinerant</th>
<th>Other Twin Cities Airport</th>
<th>Outside Twin Cities</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-Engine Turboprop</td>
<td>0</td>
<td>6</td>
<td>34</td>
<td></td>
<td>40</td>
</tr>
<tr>
<td>Multi-Engine Turboprop</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Jet</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td></td>
<td>2</td>
</tr>
</tbody>
</table>

Sources: MACNOMS, Mead & Hunt
1.2.2 Single-Engine Piston, Multi-Engine Piston, and Helicopter Flight Tracks

As shown in Table 3, Mead & Hunt estimates that a minimum of 48 flight tracks in the 2016 MACNOMS data set were conducted by turboprop and jet aircraft. To assign the remaining flight tracks to aircraft type categories, Mead & Hunt assumed that these flight tracks were conducted by single-engine piston, multi-engine piston, and helicopter aircraft. The following narrative explains how Mead & Hunt assigned the flight tracks to these three aircraft categories.

Mead & Hunt concluded that both the aircraft make/model and origin/destination airport are known when 1) the pilot filed an IFR flight plan, or 2) the pilot did not file an IFR flight plan, but the aircraft make/model was captured because it had an ADS-B transponder and the origin/destination airport was captured because it was within the Twin Cities metropolitan area. Mead & Hunt further concluded that only the aircraft make/model is known when the pilot did not file a flight plan and the origin/destination airport was outside the Twin Cities metro area, but the aircraft had an ADS-B transponder. Finally, Mead & Hunt concluded that flight tracks for which the aircraft make/model is unknown represent VFR operations by aircraft without an ADS-B transponder.

Mead & Hunt reviewed ADS-B equipage statistics for various aircraft types to determine appropriate assumptions regarding the fleet mix of flight tracks for which the aircraft make/model is unknown. The FAA has mandated that aircraft operating in most controlled airspace install ADS-B transponders by January 1, 2020. Based on available FAA statistics, Mead & Hunt estimates that only 8.1% of the national GA and air taxi fleet was equipped with functioning ADS-B equipment as of September 1, 2016. Multi-engine piston, turboprop, and jet aircraft were more likely to have ADS-B transponders than other types of aircraft, as shown in Table 4.

<table>
<thead>
<tr>
<th>Aircraft Type</th>
<th>ADS-B Equipped (Good Install)</th>
<th>Active GA &amp; Air Taxi Fleet</th>
<th>Estimated Percentage Equipped</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-Engine Piston</td>
<td>11,508</td>
<td>162,775</td>
<td>7.1%</td>
</tr>
<tr>
<td>Rotorcraft</td>
<td>814</td>
<td>10,700</td>
<td>7.6%</td>
</tr>
<tr>
<td>Multi-Engine Piston, Turboprop, &amp; Jet</td>
<td>4,704</td>
<td>36,430</td>
<td>12.9%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>17,026</strong></td>
<td><strong>209,905</strong></td>
<td><strong>8.1%</strong></td>
</tr>
</tbody>
</table>

Sources: FAA Aerospace Forecasts, FAA ADS-B Performance Monitor, Mead & Hunt

Notes: ADS-B equipage by aircraft type derived from FAA statistics as of September 1, 2016. Active GA & Air Taxi Fleet are 2016 domestic fleet estimates from FAA Aerospace Forecast FY2017-2021. Single-engine piston includes experimental, light sport, and other aircraft.

Mead & Hunt also quantified MACNOMS flight tracks conducted by based aircraft, to determine whether an adjustment factor should be applied to account for the higher likelihood that multi-engine piston aircraft are ADS-B equipped, and therefore over-represented among the flight tracks for which the aircraft type is known. This analysis determined that 37 of the 194 (19.0%) airplanes based at Lake Elmo are represented among these flight tracks. Of these, 36 are single-engine piston aircraft, while one is a multi-engine piston aircraft. In other words, 19.3% of the 187 based single-engine piston aircraft are represented among the flight tracks for which the aircraft type is known, while 20.0% of the five based
multi-engine aircraft are represented. Because based single-engine piston aircraft were just as likely to be represented among these flight tracks as based multi-engine piston aircraft, Mead & Hunt concluded that an adjustment factor to account for ADS-B equipage is not appropriate for multi-engine piston aircraft at Lake Elmo Airport.

**Local Operations**

There were 10,880 MACNOMS flight tracks in 2016, or 58.6% of total flight tracks, which represent local operations at Lake Elmo Airport. This is consistent with the January 2017 FAA Terminal Area Forecast, which estimates that approximately 61.2% of aircraft activity at Lake Elmo Airport consists of local operations. The aircraft type is known for 398 of the 10,880 local flight tracks captured by MACNOMS, 99.5% of which were conducted by single-engine piston aircraft and 0.5% were conducted by multi-engine piston aircraft. This aircraft type split is relatively consistent with the based fleet mix at Lake Elmo Airport, which is 96.4% single-engine piston, 2.6% multi-engine piston, and 1.0% helicopters, which is appropriate because local operations at an airport are typically conducted by aircraft based at that airport.

To allocate the local flight tracks to aircraft type categories, the type shares for which the aircraft type is known were applied to the 10,482 local operations for which the aircraft type is unknown, as shown in Table 5.

<table>
<thead>
<tr>
<th>Aircraft Engine Type</th>
<th>Share Among Flight Tracks for Which Aircraft Type is Known</th>
<th>Estimated Flight Tracks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-Engine Piston</td>
<td>99.5%</td>
<td>10,433</td>
</tr>
<tr>
<td>Multi-Engine Piston</td>
<td>0.5%</td>
<td>49</td>
</tr>
<tr>
<td>Helicopter</td>
<td>0.0%</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total Flight Tracks</strong></td>
<td></td>
<td><strong>10,482</strong></td>
</tr>
</tbody>
</table>

Sources: MACNOMS, Mead & Hunt

**Itinerant Operations**

There were 2,506 MACNOMS flight tracks in 2016, or 13.5% of total flight tracks, which represent itinerant operations at Lake Elmo Airport for which the origin/destination airport is known. The aircraft type is known for 727 of these 2,506 itinerant operations. Of these 727 operations, 19 were associated with turboprop or jet aircraft. The fleet mix for the remaining 708 operations varied depending on whether the origin/destination airport was within or outside the Twin Cities metro area, as shown in Table 6 on the next page.
Table 6: 2016 MACNOMS Itinerant Piston & Helicopter Flight Tracks by Known Aircraft Types

<table>
<thead>
<tr>
<th>Aircraft Type</th>
<th>Origin/Destination at Another Twin Cities Airport Operations</th>
<th>Share</th>
<th>Origin/Destination at Airport Outside Twin Cities Operations</th>
<th>Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-Engine Piston</td>
<td>233</td>
<td>65.1%</td>
<td>333</td>
<td>95.1%</td>
</tr>
<tr>
<td>Multi-Engine Piston</td>
<td>8</td>
<td>2.2%</td>
<td>17</td>
<td>4.9%</td>
</tr>
<tr>
<td>Helicopter</td>
<td>117</td>
<td>32.7%</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>Total</td>
<td>358</td>
<td>100.0%</td>
<td>350</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Sources: MACNOMS, Mead & Hunt

The remaining 1,779 itinerant MACNOMS flight tracks, for which the origin/destination airport is known but the aircraft type is not known, were for flights occurring between Lake Elmo Airport and other airports in the Twin Cities metro area. Of these, four are assumed to have been completed by turboprop and jet aircraft as assigned in Section 1.2.1. The Twin Cities itinerant flight track type shares shown in Table 6 for which the aircraft type is known were applied to the 1,775 Twin Cities itinerant flight tracks for which the aircraft type is unknown, as shown in Table 7.

Table 7: 2016 Aircraft Type Estimates for Twin Cities Itinerant Piston & Helicopter Flight Tracks by Unknown Aircraft Type

<table>
<thead>
<tr>
<th>Aircraft Engine Type</th>
<th>Share Among Flight Tracks for Which Aircraft Type is Known</th>
<th>Estimated Flight Tracks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-Engine Piston</td>
<td>65.1%</td>
<td>1,155</td>
</tr>
<tr>
<td>Multi-Engine Piston</td>
<td>2.2%</td>
<td>40</td>
</tr>
<tr>
<td>Helicopter</td>
<td>32.7%</td>
<td>580</td>
</tr>
<tr>
<td>Total Flight Tracks</td>
<td></td>
<td>1,775</td>
</tr>
</tbody>
</table>

Sources: MACNOMS, Mead & Hunt

The origin/destination airport of the remaining 5,156 flight tracks is unknown. The aircraft type is known for 895 of these flight tracks, but unknown for the remaining 4,261 flight tracks. Of these 895 flight tracks, 15 were associated with turboprop aircraft. The fleet mix for the remaining 880 flight tracks for which the aircraft type is known but origin/destination airport is unknown is compared to that for the 350 non-metro itinerant piston and helicopter flight tracks for which the aircraft type is known in Table 8 on the next page.
The similarity of the aircraft type shares for these two flight track categories strongly suggests that the flight tracks for which the origin/destination is unknown represent flight tracks to or from airports outside the Twin Cities metro area. This is also supported by the fact that MACNOMS captures flight tracks at all Twin Cities metro area airports, and therefore the origin and destination for both local flight tracks and flight tracks between Twin Cities metro area airports should already be captured. For these reasons, Mead & Hunt concluded that the 5,156 operations for which the origin/destination airport is unknown represent flights between Lake Elmo and airports outside the Twin Cities metro area. Of these, 25 are assumed to have been completed by turboprop and jet aircraft as assigned in Section 1.2.1, and 880 were conducted by known aircraft types as shown in Table 8. To allocate the remaining 4,251 non-metro itinerant flight tracks to aircraft type categories, the type shares for which the aircraft type is known were applied as shown in Table 9.

### Table 8: 2016 Non-Metro Itinerant Piston & Helicopter Operations and Operations with Unknown Origin/Destination by Known Aircraft Types

<table>
<thead>
<tr>
<th>Aircraft Type</th>
<th>Origin/Destination at Airport Outside Twin Cities</th>
<th>Unknown Origin/Destination Airport</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Operations</td>
<td>Share</td>
</tr>
<tr>
<td>Single-Engine Piston</td>
<td>333</td>
<td>95.1%</td>
</tr>
<tr>
<td>Multi-Engine Piston</td>
<td>17</td>
<td>4.9%</td>
</tr>
<tr>
<td>Helicopter</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>350</strong></td>
<td>100%</td>
</tr>
</tbody>
</table>

Sources: MACNOMS, Mead & Hunt

### Table 9: Aircraft Type Estimates for Non-Metro Itinerant Piston & Helicopter Flight Tracks by Unknown Aircraft Type

<table>
<thead>
<tr>
<th>Aircraft Engine Type</th>
<th>Share Among Flight Tracks for Which Aircraft Type is Known</th>
<th>Estimated Flight Tracks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-Engine Piston</td>
<td>95.0%</td>
<td>4,038</td>
</tr>
<tr>
<td>Multi-Engine Piston</td>
<td>4.8%</td>
<td>203</td>
</tr>
<tr>
<td>Helicopter</td>
<td>0.2%</td>
<td>10</td>
</tr>
<tr>
<td><strong>Total Flight Tracks</strong></td>
<td></td>
<td><strong>4,251</strong></td>
</tr>
</tbody>
</table>

Sources: MACNOMS, Mead & Hunt

### 1.2.3 Aircraft Activity Estimate Summary

The 2016 MACNOMS flight tracks for Lake Elmo Airport are summarized in Table 10 on the next page according to the aircraft type assignments described above. The flight track totals in Table 10 were then adjusted using the 72.44% MACNOMS capture rate reported to the state legislature in 2016, to account for missing flight tracks in MACNOMS. After making this adjustment, Mead & Hunt estimates there were 25,596 total aircraft operations at Lake Elmo Airport in 2016, as summarized in Table 11 on the next page.
### Table 10: Lake Elmo 2016 MACNOMS Flight Tracks by Aircraft and Operation Types

<table>
<thead>
<tr>
<th>Aircraft Type</th>
<th>Operation Type</th>
<th>Local</th>
<th>Other Twin Cities Airport</th>
<th>Outside Twin Cities</th>
<th>Total Flight Tracks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Aircraft Type</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Assigned by</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mead &amp; Hunt</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single-Engine Piston</td>
<td>Aircraft Type</td>
<td>396</td>
<td>10,433</td>
<td>233</td>
<td>1,155</td>
</tr>
<tr>
<td></td>
<td>Known</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Assigned by</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mead &amp; Hunt</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single-Engine Turboprop</td>
<td>Aircraft Type</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Assigned by</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mead &amp; Hunt</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multi-Engine Piston</td>
<td>Aircraft Type</td>
<td>2</td>
<td>49</td>
<td>8</td>
<td>40</td>
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<tr>
<td></td>
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<td></td>
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<tr>
<td></td>
<td>Mead &amp; Hunt</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multi-Engine Turboprop</td>
<td>Aircraft Type</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
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<tr>
<td></td>
<td>Assigned by</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mead &amp; Hunt</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Jet</td>
<td>Aircraft Type</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Assigned by</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mead &amp; Hunt</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helicopter</td>
<td>Aircraft Type</td>
<td>0</td>
<td>117</td>
<td>580</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Assigned by</td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Mead &amp; Hunt</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Flight Tracks</strong></td>
<td>Aircraft Type</td>
<td>398</td>
<td>10,482</td>
<td>364</td>
<td>1,780</td>
</tr>
</tbody>
</table>

Sources: MACNOMS, Mead & Hunt

### Table 11: Lake Elmo 2016 Operations Estimate by Aircraft and Operation Types

<table>
<thead>
<tr>
<th>Engine Type</th>
<th>Operation Type</th>
<th>Local</th>
<th>Other Twin Cities Airport</th>
<th>Outside Twin Cities</th>
<th>Total Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-Engine Piston</td>
<td>Aircraft Type</td>
<td>14,949</td>
<td>1,916</td>
<td>7,188</td>
<td>24,053</td>
</tr>
<tr>
<td></td>
<td>Assigned by</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mead &amp; Hunt</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single-Engine Turboprop</td>
<td>Aircraft Type</td>
<td>0</td>
<td>8</td>
<td>47</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td>Assigned by</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mead &amp; Hunt</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multi-Engine Piston</td>
<td>Aircraft Type</td>
<td>70</td>
<td>66</td>
<td>362</td>
<td>498</td>
</tr>
<tr>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Mead &amp; Hunt</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multi-Engine Turboprop</td>
<td>Aircraft Type</td>
<td>0</td>
<td>2</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Assigned by</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mead &amp; Hunt</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jet</td>
<td>Aircraft Type</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Assigned by</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mead &amp; Hunt</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helicopter</td>
<td>Aircraft Type</td>
<td>0</td>
<td>962</td>
<td>17</td>
<td>979</td>
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<tr>
<td></td>
<td>Assigned by</td>
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</tr>
<tr>
<td></td>
<td>Mead &amp; Hunt</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>Aircraft Type</td>
<td>15,019</td>
<td>2,960</td>
<td>7,617</td>
<td>25,596</td>
</tr>
</tbody>
</table>

Sources: MACNOMS, Mead & Hunt

This 2016 operations estimate is slightly less than the 2012 and 2014 estimates generated for the LTCP, which were 26,709 and 25,727 operations, respectively. This 2016 estimate indicates that the LTCP may underestimate current operations by multi-engine piston and helicopter aircraft. The Mead & Hunt 2016 estimates are compared to the LTCP 2012 estimates in Table 12 on the next page.
### Table 12: Base Year Operations Estimate Comparison

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-Engine Piston</td>
<td>26,088</td>
<td>24,053</td>
</tr>
<tr>
<td>Multi-Engine Piston</td>
<td>112</td>
<td>498</td>
</tr>
<tr>
<td>Turboprop</td>
<td>56</td>
<td>63</td>
</tr>
<tr>
<td>Jet</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Helicopter</td>
<td>449</td>
<td>979</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>26,709</strong></td>
<td><strong>25,596</strong></td>
</tr>
</tbody>
</table>

1.2.4 Aircraft Activity Estimate by Aircraft Make/Model

Mead & Hunt analyzed the prevalence of specific aircraft makes and models at Lake Elmo Airport, to derive aircraft-specific fleet mix estimates for developing a noise analysis and for determining the design family of aircraft for a runway length analysis. Because the makes and models operating at a specific airport vary from year to year, the 2016 MACNOMS information was compared to TFMSC information for the years 2012 to 2016, to verify the aircraft types are using the Airport on a consistent basis. This comparison is shown in Table 13 on the next page. The 2016 MACNOMS percentages shown in Table 12 were then used to categorize the operations summarized in Table 11 by specific aircraft make/model, as shown in Table 14 on the following page. The fleet estimates confirm the design aircraft family at Lake Elmo Airport remains the small, propeller-driven aircraft weighing less than 12,500 pounds and with fewer than 10 passenger seats – which accounted for 24,614 estimated operations in 2016.
## Table 13: Lake Elmo Airport - Available Usage Information by Aircraft Type (Jets & Helicopters Excluded)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Single-Engine Piston Aircraft</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piper PA-28/32 Cherokee/Warrior/Dakota/Arrow</td>
<td>822</td>
<td>21.8%</td>
<td>544</td>
<td>30.3%</td>
<td>4</td>
</tr>
<tr>
<td>Van's RV-6/7/8/9/10/12</td>
<td>87</td>
<td>2.3%</td>
<td>369</td>
<td>20.5%</td>
<td>4</td>
</tr>
<tr>
<td>Cessna 140/150/152/170/172/177/180/182/185</td>
<td>921</td>
<td>24.4%</td>
<td>256</td>
<td>14.2%</td>
<td>4</td>
</tr>
<tr>
<td>Cirrus SR20/SR22/SR22-Turbo</td>
<td>744</td>
<td>19.7%</td>
<td>216</td>
<td>12.0%</td>
<td>5</td>
</tr>
<tr>
<td>Beech Bonanza 33/34/35/36</td>
<td>568</td>
<td>15.0%</td>
<td>140</td>
<td>7.8%</td>
<td>6</td>
</tr>
<tr>
<td>Other Single-Engine Piston</td>
<td>50</td>
<td>1.3%</td>
<td>103</td>
<td>5.7%</td>
<td>4</td>
</tr>
<tr>
<td>Cessna 205/206/210</td>
<td>289</td>
<td>7.7%</td>
<td>66</td>
<td>3.7%</td>
<td>6</td>
</tr>
<tr>
<td>Mooney M-20 (various models)</td>
<td>132</td>
<td>3.5%</td>
<td>50</td>
<td>2.8%</td>
<td>4</td>
</tr>
<tr>
<td>Lancair LC-41 Columbia 300/400</td>
<td>48</td>
<td>1.3%</td>
<td>30</td>
<td>1.7%</td>
<td>4</td>
</tr>
<tr>
<td>Rockwell Commander 112</td>
<td>68</td>
<td>1.8%</td>
<td>12</td>
<td>0.7%</td>
<td>4</td>
</tr>
<tr>
<td>Piper PA-24 Comanche</td>
<td>37</td>
<td>1.0%</td>
<td>9</td>
<td>0.5%</td>
<td>6</td>
</tr>
<tr>
<td>Piper PA-46 Malibu</td>
<td>10</td>
<td>0.3%</td>
<td>3</td>
<td>0.2%</td>
<td>6</td>
</tr>
<tr>
<td><strong>Single-Engine Piston Total</strong></td>
<td><strong>3,776</strong></td>
<td></td>
<td><strong>1,798</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Single-Engine Turboprop Aircraft</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Socata TBM-700/850</td>
<td>120</td>
<td>71.9%</td>
<td>23</td>
<td>76.7%</td>
<td>6</td>
</tr>
<tr>
<td>Piper PA-46T Malibu Meridian</td>
<td>12</td>
<td>7.2%</td>
<td>3</td>
<td>10.0%</td>
<td>6</td>
</tr>
<tr>
<td>Pilatus PC-12</td>
<td>35</td>
<td>21.0%</td>
<td>2</td>
<td>6.7%</td>
<td>9</td>
</tr>
<tr>
<td>Cessna 208 Caravan</td>
<td>0</td>
<td>0.0%</td>
<td>2</td>
<td>6.7%</td>
<td>9</td>
</tr>
<tr>
<td><strong>Single-Engine Turboprop Total</strong></td>
<td><strong>167</strong></td>
<td></td>
<td><strong>30</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Multi-Engine Piston Aircraft</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cessna 335/337/340</td>
<td>167</td>
<td>58.6%</td>
<td>31</td>
<td>44.9%</td>
<td>5</td>
</tr>
<tr>
<td>Beech Baron 55/58</td>
<td>37</td>
<td>13.0%</td>
<td>19</td>
<td>27.5%</td>
<td>6</td>
</tr>
<tr>
<td>Cessna 414/421</td>
<td>2</td>
<td>0.8%</td>
<td>7</td>
<td>10.1%</td>
<td>8</td>
</tr>
<tr>
<td>Diamond Twin Star DA50</td>
<td>21</td>
<td>7.4%</td>
<td>3</td>
<td>4.3%</td>
<td>4</td>
</tr>
<tr>
<td>Piper PA-31 Navajo / Chieftain</td>
<td>24</td>
<td>8.4%</td>
<td>2</td>
<td>2.9%</td>
<td>7</td>
</tr>
<tr>
<td>Piper PA-34 Seneca</td>
<td>8</td>
<td>2.8%</td>
<td>2</td>
<td>2.9%</td>
<td>6</td>
</tr>
<tr>
<td>Cessna 310</td>
<td>5</td>
<td>1.8%</td>
<td>2</td>
<td>2.9%</td>
<td>6</td>
</tr>
<tr>
<td>Piper PA-44 Seminole</td>
<td>11</td>
<td>3.9%</td>
<td>1</td>
<td>1.4%</td>
<td>4</td>
</tr>
<tr>
<td>Piper PA-23 Apache/Aztec</td>
<td>3</td>
<td>1.1%</td>
<td>1</td>
<td>1.4%</td>
<td>6</td>
</tr>
<tr>
<td>P-68 Observer</td>
<td>0</td>
<td>0.0%</td>
<td>1</td>
<td>1.4%</td>
<td>6</td>
</tr>
<tr>
<td>Piper PA-30 Twin Comanche</td>
<td>5</td>
<td>1.8%</td>
<td>0</td>
<td>0.0%</td>
<td>6</td>
</tr>
<tr>
<td>Beech 95 Travel Air</td>
<td>2</td>
<td>0.7%</td>
<td>0</td>
<td>0.0%</td>
<td>5</td>
</tr>
<tr>
<td><strong>Multi-Engine Piston Total</strong></td>
<td><strong>285</strong></td>
<td></td>
<td><strong>69</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Multi-Engine Turboprop Aircraft</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Swearingen Merlin III</td>
<td>1</td>
<td>10.0%</td>
<td>1</td>
<td>33.3%</td>
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<tr>
<td>Cessna Conquest 441</td>
<td>0</td>
<td>0.0%</td>
<td>1</td>
<td>33.3%</td>
<td>9</td>
</tr>
<tr>
<td>Beech Super King Air 90/200/300/350</td>
<td>7</td>
<td>70.0%</td>
<td>1</td>
<td>33.3%</td>
<td>9</td>
</tr>
<tr>
<td>Rockwell Aero Commander 690</td>
<td>2</td>
<td>20.0%</td>
<td>0</td>
<td>0.0%</td>
<td>6</td>
</tr>
<tr>
<td><strong>Multi-Engine Turboprop Total</strong></td>
<td><strong>10</strong></td>
<td></td>
<td><strong>3</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sources: TFMSC, MACNOMS, Mead & Hunt. Note: Aircraft highlighted in orange were selected for primary runway length analysis; aircraft highlighted in blue were selected for crosswind runway length analysis.
Table 14: 2016 Operational Fleet Mix Estimates by Aircraft Make/Model

<table>
<thead>
<tr>
<th>Aircraft Make &amp; Model</th>
<th>Share of Flight Tracks in Category</th>
<th>Estimated Operations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Single-Engine Piston Aircraft</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piper PA-28/32 Cherokee/Warrior/Dakota/Arrow</td>
<td>30.3%</td>
<td>7,277.44</td>
</tr>
<tr>
<td>Van's RV-6/7/8/9/10/12</td>
<td>20.5%</td>
<td>4,936.35</td>
</tr>
<tr>
<td>Cessna 140/150/152/170/172/177/180/182/185</td>
<td>14.2%</td>
<td>3,424.68</td>
</tr>
<tr>
<td>Cirrus SR20/SR22/SR22-Turbo</td>
<td>12.0%</td>
<td>2,889.57</td>
</tr>
<tr>
<td>Beech Bonanza 33/34/35/36</td>
<td>7.8%</td>
<td>1,872.87</td>
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<tr>
<td>Other Single-Engine Piston</td>
<td>5.7%</td>
<td>1,377.90</td>
</tr>
<tr>
<td>Cessna 205/206/210</td>
<td>3.7%</td>
<td>882.92</td>
</tr>
<tr>
<td>Mooney M-20 (various models)</td>
<td>2.8%</td>
<td>668.88</td>
</tr>
<tr>
<td>Lancair LC-41 Columbia 300/400</td>
<td>1.7%</td>
<td>401.33</td>
</tr>
<tr>
<td>Rockwell Commander 112</td>
<td>0.7%</td>
<td>160.53</td>
</tr>
<tr>
<td>Piper PA-24 Comanche</td>
<td>0.5%</td>
<td>120.40</td>
</tr>
<tr>
<td>Piper PA-46 Malibu</td>
<td>0.2%</td>
<td>40.13</td>
</tr>
<tr>
<td><strong>Single-Engine Turboprop Aircraft</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Socata TBM-700/850</td>
<td>76.7%</td>
<td>42.17</td>
</tr>
<tr>
<td>Piper PA-46T Malibu Meridian</td>
<td>10.0%</td>
<td>5.50</td>
</tr>
<tr>
<td>Pilatus PC-12</td>
<td>6.7%</td>
<td>3.67</td>
</tr>
<tr>
<td>Cessna 208 Caravan</td>
<td>6.7%</td>
<td>3.67</td>
</tr>
<tr>
<td><strong>Multi-Engine Piston Aircraft</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cessna 335/337/340</td>
<td>27.2%</td>
<td>133.88</td>
</tr>
<tr>
<td>Beech Baron 55/58</td>
<td>16.6%</td>
<td>82.06</td>
</tr>
<tr>
<td>Piper PA-30 Twin Comanche</td>
<td>16.2%</td>
<td>80.00</td>
</tr>
<tr>
<td>Piper PA-31 Navajo / Chieftain¹</td>
<td>9.9%</td>
<td>48.64</td>
</tr>
<tr>
<td>Piper PA-23 Apache/Aztec¹</td>
<td>9.0%</td>
<td>44.32</td>
</tr>
<tr>
<td>Cessna T-50 Bobcat¹</td>
<td>8.1%</td>
<td>40.00</td>
</tr>
<tr>
<td>Cessna Chancellor 414</td>
<td>3.0%</td>
<td>15.12</td>
</tr>
<tr>
<td>Cessna Golden Eagle 421</td>
<td>3.0%</td>
<td>15.12</td>
</tr>
<tr>
<td>Diamond Twin Star DA50</td>
<td>2.6%</td>
<td>12.96</td>
</tr>
<tr>
<td>Piper PA-34 Seneca</td>
<td>1.8%</td>
<td>8.64</td>
</tr>
<tr>
<td>Cessna 310</td>
<td>1.8%</td>
<td>8.64</td>
</tr>
<tr>
<td>Piper PA-44 Seminole</td>
<td>0.9%</td>
<td>4.32</td>
</tr>
<tr>
<td>P-68 Observer</td>
<td>0.9%</td>
<td>4.32</td>
</tr>
<tr>
<td><strong>Multi-Engine Turboprop</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beech King Air 200</td>
<td>33.3%</td>
<td>2.67</td>
</tr>
<tr>
<td>Cessna Conquest 441</td>
<td>33.3%</td>
<td>2.67</td>
</tr>
<tr>
<td>Swearingen Merlin III</td>
<td>33.3%</td>
<td>2.67</td>
</tr>
<tr>
<td><strong>Jet Aircraft</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cessna Citation Jet 560XLS</td>
<td>100.0%</td>
<td>3.00</td>
</tr>
<tr>
<td><strong>Helicopters</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Robinson R44</td>
<td>100.0%</td>
<td>979.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>25,596.00</td>
<td></td>
</tr>
</tbody>
</table>

Sources: TFMSC, MACNOMS, Mead & Hunt

¹Multi-engine piston aircraft percentages adjusted to account for operations by these based aircraft types. Based on discussion with Airport staff and tenants, as well as analysis of typical operations by other based aircraft, Mead & Hunt estimates 40 annual operations by each based multi-engine piston aircraft.
1.3 LTCP Aircraft Operations Forecast Overview (2012 to 2035)

This section provides an overview of the methodology used to generate the preferred LTCP aircraft operations forecasts.

For each aircraft type category, the LTCP assumed that aircraft operations would increase proportional to the rate of hours flown per based aircraft. For this reason, aircraft operations were anticipated to grow slightly from 2012 to 2035, even though based aircraft were expected to decline. The Base Case LTCP aircraft operations forecast, which does not consider potential increases in operations due to provision of additional runway length, is shown below in Table 15.

<table>
<thead>
<tr>
<th>Year</th>
<th>Single Engine Piston</th>
<th>Multi-Engine Piston</th>
<th>Turboprop</th>
<th>Microjets</th>
<th>Other Jets</th>
<th>Helicopter</th>
<th>Other*</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>21,664</td>
<td>110</td>
<td>58</td>
<td>2</td>
<td>2</td>
<td>441</td>
<td>3,176</td>
<td>25,454</td>
</tr>
<tr>
<td>2020</td>
<td>20,092</td>
<td>109</td>
<td>59</td>
<td>3</td>
<td>3</td>
<td>662</td>
<td>3,304</td>
<td>24,232</td>
</tr>
<tr>
<td>2025</td>
<td>19,802</td>
<td>100</td>
<td>58</td>
<td>4</td>
<td>4</td>
<td>664</td>
<td>3,276</td>
<td>23,908</td>
</tr>
<tr>
<td>2030</td>
<td>20,946</td>
<td>132</td>
<td>57</td>
<td>5</td>
<td>5</td>
<td>668</td>
<td>3,388</td>
<td>25,200</td>
</tr>
<tr>
<td>2035</td>
<td>21,823</td>
<td>125</td>
<td>56</td>
<td>5</td>
<td>5</td>
<td>672</td>
<td>3,450</td>
<td>26,138</td>
</tr>
</tbody>
</table>

Notes: * Includes Experimental and Light Sport Aircraft

The LTCP also considered the proposed primary runway extension and developed a forecast for this scenario, which found that a runway extension would result in a slight increase in total aircraft operations as it would allow aircraft to use the Airport more often. However, the increase would be limited to turboprop and jet aircraft because the existing runway length is generally sufficient for smaller aircraft. The Extended Runway scenario forecast is shown below in Table 16.

<table>
<thead>
<tr>
<th>Year</th>
<th>Single Engine Piston</th>
<th>Multi-Engine Piston</th>
<th>Turboprop</th>
<th>Microjets</th>
<th>Other Jets</th>
<th>Helicopter</th>
<th>Other*</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>21,664</td>
<td>110</td>
<td>58</td>
<td>2</td>
<td>2</td>
<td>441</td>
<td>3,176</td>
<td>25,454</td>
</tr>
<tr>
<td>2020</td>
<td>20,092</td>
<td>109</td>
<td>323</td>
<td>33</td>
<td>16</td>
<td>662</td>
<td>3,304</td>
<td>24,539</td>
</tr>
<tr>
<td>2025</td>
<td>19,802</td>
<td>100</td>
<td>335</td>
<td>56</td>
<td>28</td>
<td>664</td>
<td>3,276</td>
<td>24,261</td>
</tr>
<tr>
<td>2030</td>
<td>20,946</td>
<td>132</td>
<td>346</td>
<td>90</td>
<td>45</td>
<td>668</td>
<td>3,388</td>
<td>25,615</td>
</tr>
<tr>
<td>2035</td>
<td>21,823</td>
<td>125</td>
<td>358</td>
<td>128</td>
<td>64</td>
<td>672</td>
<td>3,450</td>
<td>26,620</td>
</tr>
</tbody>
</table>

Notes: * Includes Experimental and Light Sport Aircraft
1.4 Revised Aircraft Operations Forecast (2016 to 2035)

The estimated total of 25,596 operations at Lake Elmo Airport in 2016 is consistent with the Base Case LTCP forecast, which projected between 25,000 and 26,000 operations for 2016. The LTCP included High Range and Low Range forecasts, with the Base Case and Extended Runway scenario forecasts falling in between as shown in Chart 1. Because the 2016 operations estimate presented in Section 2 is consistent with the overall LTCP operations forecasts, Mead & Hunt used the overall operation estimates from the LTCP Base Case and Extended Runway scenario forecasts to study future Airport use and associated aircraft noise in the EA/EAW.

Chart 1: LTCP Aircraft Operations Forecast Comparison

However, as discussed in Section 2, Mead & Hunt's review of TFMSC and MACNOMS data suggests that the LTCP base year operational fleet mix estimates may have underestimated operations by multi-engine and helicopter aircraft. Based on consideration of the increased utility of an extended primary runway relative to each aircraft category, Mead & Hunt developed percentage estimates of expected future operations given an extended primary runway, which are presented in Table 17 on the next page. These estimates anticipate increases in the share of multi-engine piston, turboprop, and jet aircraft operations because of the additional available runway length. This equates to approximately 3 additional multi-engine piston, 4 additional turboprop, and 0.5 additional jet aircraft operations per week when compared to the base year condition.
The percentages shown in Table 17 were applied to the total annual operations from the LTCP extended runway operations forecast scenario to produce the revised operations forecast presented in Table 18. Compared to the LTCP extended runway scenario, the revised forecast operations are higher in single-engine piston, multi-engine piston and helicopters and lower in turboprop and jet aircraft.

2. Runway Length Analysis

2.1 Role and Classification of the Airport

The primary role of the Lake Elmo Airport is to serve personal, recreational, and some business aviation users in Washington County and the eastern portion of the Minneapolis-St. Paul metropolitan area. Example business services include flight training and aircraft maintenance. The role of the Airport is not expected to change during the 20-year planning window analyzed in the 2035 LTCP.

The critical aircraft to be accommodated at the Lake Elmo Airport are small, propeller-driven aircraft weighing less than 12,500 pounds with fewer than 10 passenger seats. A wide variety of single and multi-engine aircraft are included within this category. Table 19 outlines a representative mix of aircraft selected for individual evaluation. The aircraft were selected because they are the most demanding aircraft using the Airport consistent with the operations forecasts presented in the previous section.
### Table 19 - Representative Family of Aircraft - Lake Elmo Airport

**Small Airplanes with Maximum Certified Takeoff Weight of 12,500 lbs or less**

<table>
<thead>
<tr>
<th>Aircraft Model</th>
<th>Engine Type</th>
<th>Wingspan (ft)</th>
<th>Maximum Takeoff Weight (lbs)</th>
<th>Operating Empty Weight (lbs)</th>
<th>Maximum Useful Load (lbs)</th>
<th>Passenger Seat Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beechcraft King Air 200</td>
<td>Multi - Turboprop</td>
<td>54.5</td>
<td>12,500</td>
<td>8,750</td>
<td>3,750</td>
<td>7-9</td>
</tr>
<tr>
<td>Pilatus PC-12</td>
<td>Single - Turboprop</td>
<td>53.3</td>
<td>9,921</td>
<td>5,468</td>
<td>4,453</td>
<td>7-9</td>
</tr>
<tr>
<td>Cessna 421C</td>
<td>Multi - Piston</td>
<td>41.1</td>
<td>7,450</td>
<td>4,501</td>
<td>2,949</td>
<td>6-8</td>
</tr>
<tr>
<td>Socata TBM 700</td>
<td>Single - Turboprop</td>
<td>41.6</td>
<td>7,394</td>
<td>6,032</td>
<td>1,362</td>
<td>4-6</td>
</tr>
<tr>
<td>Piper PA 31P-350 Chieftain</td>
<td>Multi - Turboprop</td>
<td>44.5</td>
<td>7,000</td>
<td>4,319</td>
<td>2,681</td>
<td>5-7</td>
</tr>
<tr>
<td>Cessna 414A</td>
<td>Multi - Piston</td>
<td>44.1</td>
<td>6,750</td>
<td>4,365</td>
<td>2,385</td>
<td>6-8</td>
</tr>
<tr>
<td>Cessna 340</td>
<td>Multi - Piston</td>
<td>38.1</td>
<td>6,000</td>
<td>3,921</td>
<td>2,079</td>
<td>4-5</td>
</tr>
<tr>
<td>Cessna 310R</td>
<td>Multi - Piston</td>
<td>36.9</td>
<td>5,500</td>
<td>3,260</td>
<td>2,240</td>
<td>5-6</td>
</tr>
<tr>
<td>Beechcraft Baron G58</td>
<td>Multi - Piston</td>
<td>37.8</td>
<td>5,500</td>
<td>4,030</td>
<td>1,470</td>
<td>4-6</td>
</tr>
<tr>
<td>Piper PA-30 Twin Comanche</td>
<td>Multi - Piston</td>
<td>36.0</td>
<td>3,600</td>
<td>2,160</td>
<td>1,440</td>
<td>4-6</td>
</tr>
</tbody>
</table>

*Source: Aircraft Manufacturers*

This report utilizes both the general runway length guidance provided in FAA Advisory Circular (AC) 150/5325-4B, *Runway Length Recommendations for Airport Design*, for this representative aircraft family, as well as the aircraft manuals for the specific aircraft shown in Table 19, to determine individual runway length requirements for both takeoff and landing operations.

Federal, state, regional and local agencies each have their own classification systems for airports. While different in name, there are often similar infrastructure characteristics. The various classifications for the Lake Elmo Airport are described briefly below. These classifications are consistent with the representative family of aircraft identified in Table 19.

**Federal Aviation Administration (FAA):** The Lake Elmo Airport is included in the FAA's National Plan of Integrated Airport Systems (NPIAS) as a Regional General Aviation (GA) Airport. Airports of this category are in metropolitan areas and serve relatively large populations. They support regional economies with interstate and some long-distance flying, and have high levels of activity, including some jets and multiengine propeller aircraft. The NPIAS also identifies Lake Elmo as a Reliever to the Minneapolis-St. Paul International Airport.

**Metropolitan Airports Commission (MAC):** Within its system of airports, the MAC further classifies its reliever airports as being either “primary” or “complimentary” facilities. The MAC classifies Lake Elmo Airport as a complimentary reliever airport, designed to accommodate the smaller end of the GA traffic spectrum, such as the family of small propeller-driven airplanes with fewer than 10 passenger seats as described above. By the MAC’s definition, the “primary reliever” airports are those better equipped to serve business jets and corporate aircraft in addition to small GA aircraft.

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1 Additional information available at: [https://www.faa.gov/airports/planning_capacity/npias/](https://www.faa.gov/airports/planning_capacity/npias/)
Minnesota Department of Transportation (MnDOT): The Minnesota State Aviation System Plan (SASP)\(^2\) classifies Lake Elmo as an Intermediate Airport. Airports of this type have a paved and lighted primary runway that is less than 5,000 feet in length. These airports can accommodate all single-engine aircraft, some multi-engine aircraft (including turboprops), and some business jets. Intermediate Airports serve as landing facilities for flight training, aircraft maintenance, and GA aircraft up to the smaller business jet size.

Metropolitan Council: The Metropolitan Council develops regional transportation policy, including the Regional Aviation System Plan, which classifies Lake Elmo as a Minor Airport. Facilities within this definition have a primary runway length between 2,500 and 5,000 feet, with either a precision or non-precision instrument approach. These airports can accommodate personal use and recreational aircraft, business GA, air taxi traffic, and flight training.

### 2.2 FAA Runway Length Design Guidance

Primary Runway 14-32 at Lake Elmo Airport (21D) is currently 2,849 feet long. To determine the adequacy of the existing runway length, the LTCP documented specific runway length requirements based upon guidance from FAA AC 150/5325-4B *Runway Length Requirements for Airport Design*. The following summarizes some of the important concepts from AC 150/5325-4B regarding regular use and recommended runway length:

- The goal is to construct an available runway length for new runways or extensions to existing runways that is suitable for the critical design airplanes.
- The critical design airplanes (or single airplane) are the aircraft that result in the longest recommended runway length.
- The design objective for the primary runway is to provide a runway length for all airplanes that will regularly use it without causing operational weight restrictions.

The recommended runway length is determined according to a family grouping of airplanes having similar performance characteristics and operating weights. The 2035 LTCP states that the critical aircraft at 21D remain small, propeller-driven airplanes, weighing less than 12,500 pounds and with fewer than 10 passenger seats. FAA AC 150/5325-4B divides the fewer than 10 passenger seat category into two fleet subcategories, namely, “95 percent of fleet” or “100 percent of fleet”. The 95 percent of fleet category applies to airports that are primarily intended to serve medium size population communities with a diversity of usage and a greater potential for increased aviation activities. Also included in this category are those airports that are primarily intended to serve low-activity locations, small population communities, and remote recreational areas. The 100 percent of fleet category applies to airports primarily intended to serve communities located on the fringe of a metropolitan area or a relatively large population remote from a metropolitan area. Based on these definitions, the 100 percent of fleet subcategory is most applicable at Lake Elmo Airport. AC 150/5325-4B provides runway length curves for each of these fleet categories as illustrated below in **Chart 2**.

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\(^2\) Additional information available at: [http://www.dot.state.mn.us/aero/planning/sasp.html](http://www.dot.state.mn.us/aero/planning/sasp.html)
Chart 2: Runway Length Requirements for Small Airplanes with Fewer than 10 Passenger Seats

Using the airport elevation of 932 feet above mean sea level (MSL), and a mean daily maximum temperature of 83 degrees Fahrenheit, Chart 2 recommends a primary runway length of 3,300 feet for the 95 percent of fleet subcategory and a primary runway length of 3,900 feet for the 100 percent of fleet subcategory. AC 150/5325-4B further states that an appropriate runway length can also be determined from airplane flight manuals for the aircraft types to be accommodated. To more precisely define a recommended primary runway length for Lake Elmo Airport, the following sections analyze runway length requirements for the representative aircraft family shown in Table 19 above.
2.3 Takeoff Operations

In evaluating takeoff operations, two conditions were evaluated. First, takeoff length requirements were determined for operating weights ranging from the maximum gross takeoff weight of each aircraft (100% useful load) down to a 60% useful load. Useful load is the difference between the maximum allowable structural gross weight and the operational empty weight of an aircraft; in other words, useful load consists of passengers, cargo, and fuel. These takeoff lengths are summarized in Table 20 and assume the following airfield conditions:

- Mean daily maximum hot month temperature: 30° Celsius (86° Fahrenheit)
- Airport Elevation: 932' MSL
- Headwind: 0 knots
- Flaps: Typical
- Slope of Runway: Uphill

### Table 20 - Runway Length Requirements - Takeoff Operations

<table>
<thead>
<tr>
<th>Aircraft Model</th>
<th>Takeoff Length Requirements for % Useful Load (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>@ 100% UL</td>
</tr>
<tr>
<td>Beechcraft King Air 200</td>
<td>3,300</td>
</tr>
<tr>
<td>Pilatus PC-12</td>
<td>3,300</td>
</tr>
<tr>
<td>Cessna 421C</td>
<td>3,000</td>
</tr>
<tr>
<td>Socata TBM 700</td>
<td>3,290</td>
</tr>
<tr>
<td>Piper PA 31P-350 Chieftain</td>
<td>3,100</td>
</tr>
<tr>
<td>Cessna 414A</td>
<td>3,150</td>
</tr>
<tr>
<td>Cessna 340</td>
<td>2,740</td>
</tr>
<tr>
<td>Cessna 310R</td>
<td>2,000</td>
</tr>
<tr>
<td>Beechcraft Baron G58</td>
<td>2,850</td>
</tr>
<tr>
<td>Piper PA-30 Twin Comanche</td>
<td>2,600</td>
</tr>
<tr>
<td><strong>Average:</strong></td>
<td><strong>2,933</strong></td>
</tr>
<tr>
<td><strong>Median:</strong></td>
<td><strong>3,050</strong></td>
</tr>
</tbody>
</table>

Source: Aircraft manuals

---

3 While the LTCP used a 5-knot headwind, this analysis takes into account that users often must operate with a tailwind to take off from the more favorable runway end. Use of zero wind is consistent with FAA guidance in AC 150/5325-4B, Section 206.

4 Use of typical flaps is based on recommendations found in the individual airplane flight manuals and use of these manuals to establish the needs of the design aircraft is allowable per AC 150/5325-4B, Section 202.

5 If provided by the performance chart in question, the actual Runway 14/32 gradient was used. The evaluation of runway gradient considers FAA guidance. AC 150/5325-4B, Section 206, states that runway gradient and “other factors” are “accounted for in the runway length curves by increasing the takeoff and landing distance (whichever is longer) of the group’s most demanding airplane by 10 percent for the various combinations of elevation and temperature.”
Second, the length of runway required for an aborted takeoff operation was evaluated, which is referred to as the accelerate-stop distance. The runway lengths required to satisfy these distances are summarized in Table 21 for the same range of useful load percentages, and assume the same airfield conditions.

### Table 21 - Runway Length Requirements - Accelerate Stop Distance

**Representative Family of Aircraft - Lake Elmo Airport (21D)**

<table>
<thead>
<tr>
<th>Aircraft Model</th>
<th>Accelerate Stop Distances for % Useful Load (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>@ 100% UL</td>
</tr>
<tr>
<td>Beechcraft King Air 200</td>
<td>3,600</td>
</tr>
<tr>
<td>Pilatus PC-12</td>
<td>3,800</td>
</tr>
<tr>
<td>Cessna 421C</td>
<td>4,200</td>
</tr>
<tr>
<td>Socata TBM 700</td>
<td>3,750</td>
</tr>
<tr>
<td>Piper PA 31P-350 Chieftain</td>
<td>4,000</td>
</tr>
<tr>
<td>Cessna 414A</td>
<td>4,644</td>
</tr>
<tr>
<td>Cessna 340</td>
<td>3,400</td>
</tr>
<tr>
<td>Cessna 310R</td>
<td>4,000</td>
</tr>
<tr>
<td>Beechcraft Baron G58</td>
<td>3,400</td>
</tr>
<tr>
<td>Piper PA-30 Twin Comanche</td>
<td>3,600</td>
</tr>
<tr>
<td><strong>Average:</strong></td>
<td><strong>3,839</strong></td>
</tr>
<tr>
<td><strong>Median:</strong></td>
<td><strong>3,775</strong></td>
</tr>
</tbody>
</table>

Source: Aircraft manuals

In comparing the runway lengths outlined in Tables 20 and 21, the accelerate-stop distance is the more demanding runway length requirement when considering takeoff operations. As this length provides a factor of safety in the event of an aborted takeoff, it is consistent with the Airport’s key objective for enhancing safety and operational capabilities. The individual runway lengths shown in Table 21 were obtained independently from operating handbooks of these representative aircraft, and align closely to those lengths presented in the 2035 LTCP.

When considering the range of runway lengths for various useful load percentages, a runway length of 3,500 to 3,600 feet would accommodate most aircraft and loading conditions for aborted takeoff operations from 21D, and would accommodate all takeoff length requirements. Although the AC 150/5325-4B method identifies a recommended runway length of 3,900 feet, a runway length of 3,500 to 3,600 feet would accommodate user in most scenarios and would provide a substantial safety and operational improvement over the current primary runway length of 2,849 feet. The method used to establish the recommended runway length is based on applying FAA’s guidance taking into account the natural and built environment in the vicinity of the Airport to: 1) provide runway protection zones (RPZs) that are clear of incompatible land uses; 2) allow realignment of 30th Street North such that the existing four-way intersection of 30th Street and Neal Avenue can be maintained; and 3) maximize the distance of the proposed runway ends from adjacent private properties. In all cases, the pilot is in command of his or her aircraft and must make the final determination on whether his or her aircraft may be safely operated within the available runway length.
2.4 Landing Operations

The runway length required for takeoffs is generally greater than that required for landing operations as the aircraft is usually heavier and must accelerate from a stopped position. However, during periods when the runway is wet and slippery from snow cover or ice, these “contaminated” surface conditions decrease the effectiveness of braking and thereby increase the length of runway needed for landing.

Table 22 illustrates the landing length requirements for the representative family of aircraft under various useful load factors, and assumes the following airfield conditions:

- Dry and uncontaminated runway pavement surface
- Mean daily maximum hot month temperature: 30° Celsius (86° Fahrenheit)
- Airport Elevation: 932’ MSL
- Headwind: 0 knots
- Flaps: Typical
- Slope of Runway: Downhill

<table>
<thead>
<tr>
<th>Aircraft Model</th>
<th>Landing Length Requirements for % Useful Load (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>@ 100% UL</td>
</tr>
<tr>
<td>Beechcraft King Air 200</td>
<td>2,500</td>
</tr>
<tr>
<td>Pilatus PC-12</td>
<td>2,400</td>
</tr>
<tr>
<td>Cessna 421C</td>
<td>2,360</td>
</tr>
<tr>
<td>Socata TBM 700</td>
<td>2,660</td>
</tr>
<tr>
<td>Piper PA 31P-350 Chieftain</td>
<td>1,950</td>
</tr>
<tr>
<td>Cessna 414A</td>
<td>2,490</td>
</tr>
<tr>
<td>Cessna 340</td>
<td>1,959</td>
</tr>
<tr>
<td>Cessna 310R</td>
<td>1,620</td>
</tr>
<tr>
<td>Beechcraft Baron G58</td>
<td>2,750</td>
</tr>
<tr>
<td>Piper PA-30 Twin Comanche</td>
<td>2,210</td>
</tr>
<tr>
<td><strong>Average:</strong></td>
<td><strong>2,290</strong></td>
</tr>
<tr>
<td><strong>Median:</strong></td>
<td><strong>2,380</strong></td>
</tr>
</tbody>
</table>

*Source: Aircraft manuals*

Users of the Lake Elmo Airport were contacted during the LTCP process concerning their runway length requirements. In addition to identifying longer takeoff lengths in the hot summer months because of payload and density-altitude factors, the users also commented on the need for additional landing length during the winter months for slippery conditions when longer landing rolls were required.

The landing length requirements shown in Table 22 are shorter than the takeoff and accelerate-stop distances presented in Section 2.3, but do not include any factors for wet or slippery surface conditions. In referencing the pilot operating handbooks, many identify a 30% increase to be added to the required landing length for slippery conditions or similar surface contamination. Requirements for commuter and on-demand (i.e. charter) operators of turboprop aircraft also have landing limitations that are specified...
within Part 135 code of federal regulations. These regulations specify the need for operators to be able to conduct a full stop landing within 60% of the available runway length at the destination airport, or within 70% of the available runway length at an alternate airport destination. While these regulations generally pertain to turboprop operators only, they do provide a frame of reference for suitable safety factors to be applied when considering winter landing length requirements.

As shown in Table 22, a 2,200-foot runway length would accommodate most landing operations for the family of aircraft shown during dry and uncontaminated conditions. Table 23 illustrates the adjusted landing length requirements when accounting for the various contamination and safety factors discussed above.

<table>
<thead>
<tr>
<th>Adjusted Average Landing Length</th>
<th>Landing Length Requirements for % Useful Load (ft)</th>
<th>@ 100% UL</th>
<th>@ 90% UL</th>
<th>@ 75% UL</th>
<th>@ 60% UL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landing Length in Dry and Uncontaminated Conditions (ft):</td>
<td>2,290</td>
<td>2,192</td>
<td>2,089</td>
<td>1,988</td>
<td></td>
</tr>
<tr>
<td>Landing Length with 30% Increase for Wet and Slippery (ft):</td>
<td>2,977</td>
<td>2,850</td>
<td>2,716</td>
<td>2,584</td>
<td></td>
</tr>
<tr>
<td>Landing within 70% of Available Runway Length (ft):</td>
<td>3,271</td>
<td>3,131</td>
<td>2,984</td>
<td>2,840</td>
<td></td>
</tr>
<tr>
<td>Landing within 60% of Available Runway Length (ft):</td>
<td>3,817</td>
<td>3,653</td>
<td>3,482</td>
<td>3,313</td>
<td></td>
</tr>
</tbody>
</table>

In considering the adjusted landing lengths presented in Table 23, and the accelerate-stop distances presented in Table 21, a primary runway length of 3,500 to 3,600 feet would provide suitable operational distance. This length accounts for the safety factors associated with an aborted operation during takeoff and contaminated surface conditions during landings. Although the AC 150/5325-4B method identifies a recommended runway length of 3,900 feet, a runway length of 3,500 to 3,600 feet would accommodate user needs in most scenarios and would provide a substantial safety and operational improvement over the current primary runway length of 2,849 feet. The method used to establish the recommended runway length is based on applying FAA’s guidance taking into account the natural and built environment in the vicinity of the Airport to: 1) provide runway protection zones (RPZs) that are clear of incompatible land uses; 2) allow realignment of 30th Street North such that the existing four-way intersection of 30th Street and Neal Avenue can be maintained; and 3) maximize the distance of the proposed runway ends from adjacent private properties. In all cases, the pilot is in command of his or her aircraft and must make the final determination on whether his or her aircraft may be safely operated within the available runway length.

### 2.5 Crosswind Runway Length

AC 150/5325-4B also provides guidance for determining appropriate crosswind runway length. The runway length for crosswind runways is based on the recommended length for lower crosswind capable airplanes using the primary runway. At Lake Elmo, these consist of light, single-engine aircraft. For this analysis, a grouping of aircraft of this category and type, weighing less than 5,000 pounds, was selected from IFR operational databases maintained by FAA and the MACNOMS database described in Section

---

6 Electronic code of federal regulations, Part 135.385 pertains to landing limitations. Additional information is available at: https://www.ecfr.gov/cgi-bin/text-idx?SID=6f264ba184562097b414fe34a507ebbe&node=14:3.0.1.1.11.9.3.14&rgn=div6
1.2.4. **Table 24** on the next page summarizes the grouping of the light, single-engine aircraft that make regular use of the Lake Elmo Airport, and the takeoff runway length requirements of these aircraft. Based on the analysis of 2016 MACNOMS data presented in Section 1, approximately 97% of operations on Runway 04/22 are conducted by single-engine piston aircraft, nearly all of which weigh less than 5,000 pounds. Furthermore, the 2016 MACNOMS data indicate that approximately 25% of total aircraft operations at Lake Elmo Airport take place on Runway 04/22. Given the estimated total of 25,596 annual aircraft operations, approximately 6,399 operations were conducted on Runway 04/22 in 2016.

The existing crosswind Runway 04/22 is currently 2,496 feet long. According to user input received during development of the Airport’s LTCP, the current crosswind runway length can be uncomfortably short during certain wind conditions. In consideration of user feedback, and the recommended takeoff lengths of the smaller and lighter aircraft identified in **Table 24**, a runway length of 2,700 to 2,800 feet would most appropriately accommodate crosswind operations at Lake Elmo. This length would accommodate the average takeoff requirements of the smaller and lighter airplanes operating at Lake Elmo Airport on a regular basis. Landing length requirements were not considered by this analysis, as they are generally shorter than the takeoff length requirements for these types of aircraft.

<table>
<thead>
<tr>
<th>Aircraft Model</th>
<th>Wingspan (ft)</th>
<th>Maximum Takeoff Weight (lbs)</th>
<th>Takeoff Runway Length Requirements (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Piper PA-34 Seneca</td>
<td>38.9</td>
<td>4,570</td>
<td>3,000</td>
</tr>
<tr>
<td>Piper PA-46 Malibu</td>
<td>43.0</td>
<td>4,340</td>
<td>2,800</td>
</tr>
<tr>
<td>Lancair IV</td>
<td>35.5</td>
<td>3,850</td>
<td>2,800</td>
</tr>
<tr>
<td>Piper PA-30 Twin Comanche</td>
<td>36.0</td>
<td>3,600</td>
<td>3,600</td>
</tr>
<tr>
<td>Cirrus SR22</td>
<td>38.2</td>
<td>3,600</td>
<td>3,300</td>
</tr>
<tr>
<td>Beechcraft Bonanza 33</td>
<td>33.5</td>
<td>3,400</td>
<td>2,750</td>
</tr>
<tr>
<td>Mooney M20TN</td>
<td>36.5</td>
<td>3,368</td>
<td>2,450</td>
</tr>
<tr>
<td>Piper PA-28 Cherokee</td>
<td>36.0</td>
<td>2,550</td>
<td>2,300</td>
</tr>
<tr>
<td>Cessna 172</td>
<td>36.0</td>
<td>2,300</td>
<td>1,750</td>
</tr>
</tbody>
</table>

**Average:** 2,750

1 Takeoff Length based on: Airport Elevation of 932 MSL, 30° Celsius, 10 knot headwind. Use of a headwind is appropriate for crosswind runway length analysis because the runway is intended for use during periods of crosswinds with respect to the primary runway, which translates to headwinds on the crosswind runway. Source: Aircraft manuals

2.6 **Stage Length Considerations**

In addition to safety, one of the key objectives of the LTCP was to increase the operational capabilities of the design aircraft family. As part of outreach efforts to assess the needs of Airport users, business operators noted the convenience that the Lake Elmo Airport provides to their operations by accommodating direct access to outlying areas in which they conduct business that are not otherwise serviced by major carriers. Users identified the frequent use of the Airport for business operations to a variety of locations throughout the Midwest, but additionally commented on restrictions due to the short runways and lack of instrument approaches.
Flight plans filed for instrument (IFR) operations to and from the Lake Elmo Airport were obtained for the past five years to identify the range of stage lengths that are currently accommodated. While IFR operations represent a small fraction of overall operations, business operators and those conducting longer cross country flights are more likely to file this type of flight plan. Table 25 on the next page illustrates the various ranges of IFR operations (in nautical miles) filed to and from the Lake Elmo Airport from 2012 to 2016.

Table 25 - Stage Length of IFR Operations to/from Lake Elmo Airport

<table>
<thead>
<tr>
<th>Years 2012 -2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage Length Range (NM)</td>
</tr>
<tr>
<td>-------------------</td>
</tr>
<tr>
<td>0 to 100</td>
</tr>
<tr>
<td>100 to 200</td>
</tr>
<tr>
<td>200 to 300</td>
</tr>
<tr>
<td>300 to 400</td>
</tr>
<tr>
<td>400 to 500</td>
</tr>
<tr>
<td>500 to 600</td>
</tr>
<tr>
<td>600 to 700</td>
</tr>
<tr>
<td>700 to 800</td>
</tr>
<tr>
<td>800 to 900</td>
</tr>
<tr>
<td>900 to 1000 and greater</td>
</tr>
</tbody>
</table>

Source: FAA Traffic Flow Management System Counts (TFMSC) Database - City Pair for Calendar Years 2012 - 2016

Table 25 shows that approximately 92% of IFR operations at Lake Elmo were conducted to or from other airports within 500 nautical miles (NM). This affirms the FAA’s NPIAS classification of the Airport as a Regional GA facility. The range of IFR operations is depicted graphically in the map provided in Chart 3.
Chart 3: Range of Stage Length Operations to/from Lake Elmo Airport (2012-2016)

While most operations to and from the Lake Elmo Airport are anticipated to remain concentrated locally within the upper Midwest region, the IFR data shows that longer stage length operations are also conducted to distances that can stretch as far as the east coast, northern Florida and the western Rocky Mountains. In considering the objective to improve facilities for the family of aircraft using the Lake Elmo Airport, the runway lengths identified within the earlier sections will make longer trips to and from Lake Elmo Airport more feasible, and help operators reach a greater service area.

2.7 Runway Length Conclusions

Primary runway length needs were first evaluated utilizing FAA guidance provided in AC 150/5325-4B Runway Length Requirements for Airport Design for small, propeller-driven aircraft weighing less than 12,500 pounds and with fewer than 10 passenger seats. The AC identifies a recommended primary runway length of 3,300 feet for the 95 percent of fleet subcategory and a recommended primary runway length of 3,900 feet for the 100 percent of fleet subcategory. To more precisely identify an appropriate runway length within that range, individual takeoff and landing length requirements for a grouping of representative aircraft were then evaluated. In considering the individual operational requirements, the accelerate-stop distance was found to be the most demanding length, resulting in a recommended primary runway length of 3,500 to 3,600 feet. This length provides sufficient safety to accommodate aborted takeoffs, as well as longer roll out lengths required for landings when the runway surface conditions are wet and slippery, and braking is less effective.

Crosswind runway length needs were determined by evaluating smaller, single-engine aircraft with maximum takeoff weights of less than 5,000 pounds. A grouping of aircraft of this size and type were selected from those making the most regular use of Lake Elmo Airport, and represent airplanes less capable of operating against a crosswind component on the primary runway. Runway length
requirements were evaluated from performance charts for these aircraft, and a 2,700 to 2,800-foot runway length for crosswind operations was found to be the most appropriate for Lake Elmo Airport.

Feedback from the Airport users, and an analysis of trip lengths to and from the Lake Elmo Airport were also considered in evaluating the appropriate runway length conditions. The recommended lengths for each runway are summarized in Table 26.

<table>
<thead>
<tr>
<th>Table 26 - Recommended Runway Lengths</th>
<th>Primary and Crosswind Runways - Lake Elmo Airport (21D)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Recommended Runway Length</strong></td>
<td></td>
</tr>
<tr>
<td>Primary Runway 14-32:</td>
<td>3,500 feet</td>
</tr>
<tr>
<td>Crosswind Runway 04-22:</td>
<td>2,750 feet</td>
</tr>
</tbody>
</table>

The runway lengths identified in Table 26 are consistent with the findings of the 2035 LTCP completed for the Lake Elmo Airport, and will serve to meet the key objectives of improving the safety and operational capabilities for the users at the Lake Elmo Airport.

3. Summary of Recommendations

The following is a summary of recommendations identified in this appendix:

- **Aircraft Activity.** The share of existing operations by multi-engine piston aircraft may have been underestimated by the LTCP; however, these aircraft are within the critical aircraft family and therefore re-allocation of operations to these aircraft should not change the project as proposed. The revised extended runway operations forecast shown in Table 18 was used to inform the Purpose & Need, Alternatives Analysis, and Environmental Consequences chapters of the EA/EAW.

- **Runway Length.** The required runway lengths identified in the LTCP are consistent with the needs of the representative family of aircraft with the most demanding performance characteristics that operate on either runway.
## Appendix B – 30th Street North Realignment Alternatives Review

<table>
<thead>
<tr>
<th>Content</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>30th Street North Realignment Alternatives Review Report</td>
<td>B-1 thru B-62</td>
</tr>
</tbody>
</table>
30th Street North Realignment Alternatives Review

Lake Elmo Airport Environmental Assessment

Report prepared by Mead & Hunt
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Table 2: ........................................................... Anticipated Changes to Travel Time
Table 3: ......................................................... Alternative Geometric Design Characteristics
Table 4: .............................................................. Anticipated Right-of-Way Needs
Table 5: .............................................................. Anticipated Agricultural and Wetland Impacts
Table 6: ................................................................. Alternative Evaluation Matrix

Exhibits

Exhibit 1: Project Location
Exhibit 2: 2035 LTCP 30th Street N Relocation Alignment Alternatives
1. Introduction

A. Study Purpose

In September of 2016, the Metropolitan Airports Commission (MAC) adopted the 2035 Long-Term Comprehensive Plan (LTCP) for the Lake Elmo Airport. The study’s final preferred alternative recommended the construction of a new 3,500-foot Runway 14-32 adjacent to the existing runway, which will be converted into a taxiway for the new runway. The existing 30th Street N is in direct conflict with the proposed new runway.

Three alternatives were presented and analyzed in the LTCP for realigning 30th Street N. This report provides an overview of the road realignment alternatives considered by the LTCP, and presents two additional alternatives to consider during the National Environmental Policy Act (NEPA) process that seek to respond to public concerns while also meeting the project objectives. The purpose of this report is to summarize alternatives considered by the Environmental Assessment (EA), in addition to the preferred alternative alignment identified in the LTCP.

B. Location of Study

The airport is located approximately 12 miles northeast of downtown St. Paul and one mile east of downtown Lake Elmo, within Baytown and West Lakeland Townships. The focal point of the study is 30th Street N (located along the southern edge of Lake Elmo Airport), Neal Avenue North, and the intersection of these two roadways. As shown in Exhibit 1 on the next page, the analysis area is bound by CSAH 14 (40th Street N) to the north, CSAH 65 (Oakgreen Avenue North) to the east, CSAH 10 (10th Street North) to the south, and CSAH 15 (Manning Avenue N) to the west.

2. Existing Site Conditions

Existing land uses within the study area consists of a mix of agricultural, residential, and public (Lake Elmo Airport), however, the land use around the proposed realignment area is primarily agricultural with large lot rural residential property located east of Neal Avenue N and south of the airport. The terrain within the analysis area is classified as level.

Soils maps available from National Resources Conversation Service (NRCS) show the soils in the area generally consist of Antigo Silt Loam, Campia Silt Loam, and Crystal Lake Silt Loam. These soils generally have an A-4 rating under the AASHTO Group Classification, which categorizes this soil type as fair to poor for use as a roadway subgrade material.
3. Alternative Descriptions

Three build alternatives for 30th Street N were presented in the 2035 LTCP. This report reviews these alternatives and develops two additional alternative layouts, which are introduced in the following section and are shown in Appendix A. An Alternative Evaluation Matrix summarizing the impacts of the two new alternatives compared to the preferred alignment from the LTCP (Alternative 3) can be found on Table 6 in Section 6.

Based on public input received during the LTCP and EA processes, 30th Street North is an important local traffic corridor that must be maintained. Therefore, closing 30th Street North was discarded as an alternative and was not considered in detail by the LTCP or EA.

A. Previous Build Alternatives 1-3 from the 2035 LTCP

Alternatives 1-3 as described in the 2035 LTCP are presented below and shown on Exhibit 2.

(1) Realignment Alternative 1

This alternative realigns 30th Street N to the southeast of the relocated Runway 32 RPZ so that it intersects with Neal Avenue approximately ¼-mile south of the existing intersection. The design speed for the relocated roadway is 45 miles per hour. With this alignment option, through traffic
on 30th Street N would experience two additional turning movements in each direction and an increase in total travel distance (about 1,800 feet). Also, 30th Street N through traffic would be introduced onto the segment of Neal Avenue between the intersections. Conversely, local traffic flowing between Manning Avenue and residential developments to the south of the new intersection would be removed from this segment of Neal Avenue and benefit from a reduced travel distance. For the reasons identified above, this alternative was discarded.

(2) Realignment Alternative 2
This alternative realigns 30th Street N around the end of the relocated Runway 32 RPZ but continues the curve to the north so that the roadway reconnects at the existing Neal Avenue alignment and intersection. Access to existing Neal Avenue south of the realigned area would be maintained through construction of a new "T" intersection. The design speed for the relocated roadway is 45 miles per hour. With this alignment option, through traffic on 30th Street N would experience one additional turning movement in each direction and an increase in total travel distance (about 1,500 feet). Compared to Realignment Alternative 1, 30th Street N traffic would be introduced onto a shorter segment of the existing Neal Avenue alignment. Impacts to local traffic flowing between Manning Avenue and residential developments to the south of the new intersection are like those in Alternative 1. For the reasons identified above, this alternative was discarded.

(3) Realignment Alternative 3
This alternative maintains the existing four-way intersection at 30th Street N and Neal Avenue; the realigned roadway curves around the relocated Runway 32 RPZ. Due to the tighter curves, the design speed for the relocated roadway is reduced to 30 miles per hour. With this alignment option, there are no new intersections or turning movements for thru traffic on 30th Street N and no new traffic is introduced onto Neal Avenue. However, this alignment does not allow for the relocated Runway 14/32 to be extended to its recommended length of 3,600 feet as originally proposed and was designed specifically for a shortened 3,500-foot runway, however this layout does intersect the corners of the MnDOT Clear Zone. This alternative was selected as the Final LTCP Preferred Alternative and will be compared to the two new realignment concepts in Sections 4, 5, and 6 of this report.
EXHIBIT 2: 2035 LTCP 30TH STREET N RELOCATION ALIGNMENT ALTERNATIVES

ALTERNATIVE 1
- SPEED LIMIT: 45 mph
- COMPATIBLE WITH AIRFIELD ALTERNATIVE B (3,600')
- COMPATIBLE WITH AIRFIELD ALTERNATIVE C (3,900')
- ADDS 20TH ST N TRAFFIC TO A PORTION OF NEAL AVE N
- REQUIRES CONSTRUCTION OF ADDITIONAL INTERSECTION

ALTERNATIVE 2
- SPEED LIMIT: 45 mph
- COMPATIBLE WITH AIRFIELD ALTERNATIVE B (3,600')
- COMPATIBLE WITH AIRFIELD ALTERNATIVE C (3,900')
- ADDS 30TH ST N TRAFFIC TO A PORTION OF NEAL AVE N
- REQUIRES CONSTRUCTION OF ADDITIONAL INTERSECTION

ALTERNATIVE 3
- SPEED LIMIT: 30 mph
- RESTRICTS AIRFIELD ALT. B RUNWAY LENGTH TO 3,150'
- RESTRICTS AIRFIELD ALT. C RUNWAY LENGTH TO 3,760'
- NO ADDITIONAL INTERSECTION REQUIRED
B. Realignment Alternatives 4A and 4B – Realigned 30th Street / Neal Ave

The roadway alignment shown in the Alternative 4A and 4B layouts are modified hybrid versions of Alternatives 2 and 3. Assuming a Runway 14/32 length of 3,500 feet and reduced runway protection zone (RPZ) size as identified by the LTCP Final Preferred Development Alternative, these alternatives shift the road alignment to the northwest, introducing a longer straight section to incorporate an intersection treatment. The Alternate Layouts in Appendix A show the two intersection treatment options. Alternative 4A includes a roundabout at the intersection of realigned 30th Street N and Neal Avenue N, while Alternative 4B shows a tee intersection option.

These alternatives realign 30th Street N to the southeast of the proposed Runway 32 RPZ and intersects realigned portions of Neal Avenue N at a proposed intersection 600 feet southwest of the existing intersection. This layout intersects the corners of the MnDOT Clear Zone to minimize impacts to adjacent residential properties along Neal Avenue N.

The proposed design speed for 30th Street N west of the proposed intersection is 60 MPH transitioning to 35 MPH prior to entering the intersection. Realigned 30th Street N to the east of the intersection and Neal Avenue N to the south of the intersection would have design speeds of 35 MPH. See Section 5.C for more information regarding existing and proposed posted speed limits and design speeds. An access road is proposed on the southeast leg of the intersection to connect to the existing Neal Avenue N to provide access to the adjacent property owners and has a design speed of 25 MPH. Both alternatives effectively move the four-way stop controlled intersection to the southwest and increase the total travel distance on 30th Street N by approximately 985 feet compared to the existing condition.

Both alternatives would also move through traffic further away from the residential properties located on Neal Avenue North, creating a larger buffer between traffic and existing residential properties.

The following intersection types were evaluated on this alignment alternative:

(1) Alternative 4A - Realigned 30th Street / Neal Ave with a Roundabout

Alternative 4A constructs a single lane roundabout at the proposed intersection of 30th Street N and Neal Avenue N. This alternative provides the following considerations:

- Reduced travel delays at the intersection.
- Several state DOTs and the Insurance Institute for Highway Safety have found roundabouts reduce severe crashes, especially at right angles.
- Does not prioritize traffic on one entering roadway over another.
- Provides traffic calming along 30th Street N between curves with different speed zones along the proposed realignment.
- Roundabout provides options for landscape and creation of a gateway into the adjacent residential areas.
- More expensive construction and right-of-way costs than the tee intersection option.
Alternative 4B - Realigned 30th Street / Neal Ave with a Tee Intersection

Alternative 4B constructs a tee intersection that provides a left turn with a through bypass for the 30th Street N westbound traffic and a right-turn lane onto Neal Ave N from eastbound 30th Street N. Along Neal Avenue N, northbound traffic will be required to stop at the intersection and wait for gaps in the 30th Street N traffic. This alternative provides the following considerations:

- Increased travel delays along Neal Avenue N at the intersection for the stop condition.
- Decreased travel delays along 30th Street N.
- Prioritize traffic on 30th Street N over traffic on Neal Avenue N.
- Intersection is located within a speed change zone along 30th Street N between the two curves.
- Intersection sight distance from Neal Avenue N requires driver to look more than 90 degrees to the right for vehicles while turning left onto 30th Street N due to curvature of the roadway.
- Less expensive construction and right-of-way costs than the roundabout option.

4. Traffic

Traffic in the area was evaluated along 30th Street N and Neal Avenue N based on count data available from Washington County count stations located west of CSAH 15 and east of CSAH 65.

A. Existing Traffic Volumes

Existing traffic volumes were collected by Washington County at the following count stations:

<table>
<thead>
<tr>
<th>Roadway Location</th>
<th>Date of Count</th>
<th>Volume from count</th>
</tr>
</thead>
<tbody>
<tr>
<td>30th St. N East of CSAH 15</td>
<td>Monday July 18 – Wednesday July 20, 2016</td>
<td>1478</td>
</tr>
<tr>
<td>30th St. N East of CSAH 65</td>
<td>Tuesday May 24 – Thursday May 26, 2016</td>
<td>1024</td>
</tr>
</tbody>
</table>

The volume signifies a daily total and is the total number of vehicles for both directions of travel. An hourly breakdown of data from these counts can be found in Appendix B.

B. Proposed Traffic Volumes

Traffic forecasts were based off the Manning Avenue corridor study prepared for Washington County in 2014. The report can be found at: https://www.co.washington.mn.us/DocumentCenter/View/7426. Based on growth factors in the area, the projected average daily traffic (ADT) for 30th Street N is anticipated to be 2,000 vehicles per day by 2030.

C. Intersection Operations

Various intersection alternatives including roundabouts and tee intersections are proposed as part of this study. Based on the proposed traffic volumes above, hourly volumes were developed and a capacity analysis of the proposed layouts was run using Highway Capacity Software (HCS). The results of this
analysis can be found in Appendix B. Based the capacity analysis, the proposed intersection alternatives for 30th Street N with Neal Avenue N are anticipated to provide a minimum Level-of-Service (LOS) of A, which signifies minimal delays are anticipated during the peak hour of travel.

D. Emergency Response Times

Comments received during public review of the 2035 LTCP identified potential increases in emergency response times as a concern of residents. An initial review of the travel times for each new alternative is shown and compared to Alternative 3 below in Table 2. The travel time differences were determined by computing the travel time along the proposed alternative beginning at the existing intersection of 30th Street N / Manning Avenue N and traveling eastbound to 30th Street N / Neal Avenue N, and comparing them to the base travel time along the existing roadway. The travel times are computed based on the difference in length of proposed roadway compared to the existing length, the anticipated posted speed limit along the roadway, and delay associated with the proposed intersection type. The delay at the intersection is the approach delay which includes stopped-time delay and the time loss due to deceleration from the approach speed to a stop and the time loss due to re-acceleration back to the desired speed. This delay is computed utilizing Highway Capacity Software (HCS) based on estimated peak hour volumes. It should be noted that emergency response times could be higher or lower since the first responder’s vehicles travel speed may differ from the anticipated posted speed limit. In addition, changes to travel time differ under each alternative based on whether the destination is east or south of the study area.

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Anticipated Changes to Travel Time (seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>+46.1</td>
</tr>
<tr>
<td>4A</td>
<td>+28.5</td>
</tr>
<tr>
<td>4B</td>
<td>+26.8</td>
</tr>
</tbody>
</table>

Notes:
- Alternative 3 did not include approach delay since the existing and proposed alternatives ends at the all-way stop controlled intersection and the approach delay would be the same for both conditions. Alternative travel time change is based solely on the increased length and the decrease in the anticipated posted speed.
- Alternatives 4A and 4B existing condition includes an additional approach delay of 8.9 seconds for the existing all-way stop control intersection of 30th Street N with Neal Avenue N per the highway capacity manual. The proposed alternatives do not have approach delay at this location since the existing all-way stop is anticipated to be removed.
- Alternative 4A includes an approach delay of 3.1 sec. on the approach of each leg of the roundabout per the results of the Highway Capacity Software
- Alternative 4B does not includes a deceleration/acceleration delay for vehicles traveling eastbound on 30th Avenue N since no stop control is present and includes a deceleration/acceleration delay only for vehicles turning right onto Neal Avenue N.
The Airport and adjacent areas in Bayport and West Lakeland Townships to the immediate north, south, and east are within the Bayport Fire Department (BFD) service area, while adjacent areas to the immediate west are within the City of Lake Elmo Fire Department service area. Because it is located outside the City of Lake Elmo, the proposed realignment of 30th Street N would not affect primary emergency response west of the Airport. The realigned segment of 30th Street N is located entirely within the BFD service area. The BFD headquarters building is located approximately four and a half miles northeast of and is an approximate seven-minute drive from the Airport.

The project team met with BFD staff during the EA process to assess potential impacts to emergency response associated with the realignment of 30th Street N. The realignment of 30th Street N is not anticipated to be a detriment to initial emergency response times from BFD to any locations within its service area. This conclusion is based on information provided by BFD that indicates the affected segment of 30th Street N would not be used during its initial response to emergencies at any location within its service area. The primary use of 30th Street N with respect to emergency response would be for shuttling municipal water from hydrants in the City of Lake Elmo to replenish water capacity when fighting fires in areas east of the airport that do not have water service. The BFD fleet has a combined water tank capacity of over 4,000 gallons, and is supported by mutual aid responders from Stillwater, Lower St. Croix, Lake Elmo, and Hudson with a combined fleet capacity of over 10,000 gallons. Based on fleet capacity and planned extension of water services to new residential areas immediately west of the airport, the project team does not believe that the changes in travel times shown in Table 2 represent an adverse effect to water shuttles that cannot be mitigated by available means.

5. Alternative Review

This section provides a detailed review, analysis, and comparison of Alternatives 3, 4A, and 4B. The 30th Street N roadway east of Manning Avenue N is functionally classified as a major collector based on the Functional Classification System prepared by the Metropolitan Council in September of 2014 (http://giswebsite.metc.state.mn.us/mapgallery/pdfs/large_reference_fun_class.pdf). According to the 2030 Washington County transportation plan, “collector roadways serve shorter trips and allow more direct access from local streets and driveways. These roadways collect and distribute traffic to the arterial system from neighborhoods as well as commercial and industrial areas.” Neal Avenue to the immediate south of 30th Street N is functionally classified as a local road, which “connect blocks within residential neighborhoods as well as commercial and industrial areas.” These classifications define a roadway’s purpose and use, and are important in determining which roadway, shoulder, and right-of-way widths would be applied to each segment of roadway based on the town standards.

A. Typical Sections

A rural typical section was assumed for the build alternatives due to the existing location and characteristics of the project setting. The project is in an undeveloped area and characterized by relatively higher / rural speed limits. The assumed typical section is based on Baytown and West Lakeland...
Township street design standards, which call for the following minimum pavement widths for a collector roadway:

- Minimum Roadway Width: 24 feet
- Shoulder Width: 8 feet

Note: The difference between the West Lakeland and Baytown Township street design standards is that the West Lakeland standard requires a 4-foot shoulder width for a collector roadway, whereas the Baytown standard requires an 8-foot shoulder width. Furthermore, the Baytown Township standards require an 8-foot shoulder width for collector roads and a 4-foot shoulder width for local roads. For this study, an 8-foot shoulder width was utilized for both 30th Street N and Neal Avenue N to determine the costs and impact of the proposed alternatives.

**B. Design Vehicles**

For the design of horizontal alignment, super elevations, and roundabout design in Alternative 4A, the WB-19 (WB-62) semi tractor-trailer combination design vehicle was utilized. For the design of turning movements and sight lines at the tee and all-way stop intersections in Alternative 3 and 4B, the SU (single unit) design vehicle was utilized.

As noted previously, the project team met with the Baytown Fire Department during the EA process to discuss the alternative layouts presented in this report. Following the meeting, the design and turning movements within the cul de sacs in Alternatives 4A and 4B were checked against the following vehicles utilized by the fire department:

- 2001 Pierce Dash
- 2007 Pierce Velocity
- 2014 Rosenbauer Commander
- 2001 Kenworth tandem

The turning movements evaluated for the fire department included the ability of the engines to turn around and maneuver within the cul de sac and the ability of water tenders to circulate between a water source and a drop tank located on the cul de sac. All turning movements were checked utilizing AutoTurn design software.

**C. Posted Speed Limits and Design Speed**

Posted speed limits are relatively high in the project area. The following posted speed limits were observed within the project area:

- 30th Street N (between Manning Ave N and Neal Ave N): 55 MPH
- 30th Street N (east of Neal Ave N): 45 MPH
- Neal Street North (south of 30th Street N): 45 MPH
- Neal Street North (north of 30th Street N): Unposted

Design speed is the speed used to determine the various geometric design features of a roadway. The design speeds for each alternative vary for each roadway, are shown on the Alternative Layouts, and are
anticipated to be 5 miles per hour higher than the posted speed limits. This assumption is based on industry best practice, as well as the MnDOT Road Design Manual, which states that “it is typically desirable to choose a design speed that equals or exceeds the anticipated posted speed, and complements the highway type, setting, functional classification, traffic volume, and terrain.” The design speeds are described in the alternative description section based on guidance provided in MnDOT Road Design Manual for rural highways and are super-elevated based on a maximum rate of 6% slope across the roadway.

D. Roadway Characteristics

The roadway geometric design characteristics for Alternatives 3, 4A, and 4B are presented below in Table 3.

### TABLE 3: ALTERNATIVE GEOMETRIC DESIGN CHARACTERISTICS

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Alternative 3</th>
<th>Alternative 4A</th>
<th>Alternative 4B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final LTCP Alternative</td>
<td>Modified Hybrid with New Roundabout</td>
<td>Modified Hybrid with New T-Intersection</td>
<td></td>
</tr>
<tr>
<td>Design Speed</td>
<td>30-mph</td>
<td>60-mph transitioning to 35-mph</td>
<td>60-mph transitioning to 35-mph</td>
</tr>
<tr>
<td>Curve Radius</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radius #1</td>
<td>R = 675’ Length = 544.18 SE% = 5.7%</td>
<td>R = 1,273’ Length = 1,035.50 SE% = 6.0%</td>
<td></td>
</tr>
<tr>
<td>Radius #2</td>
<td>R = 500’ Length = 1,157.85 SE% = 6.0%</td>
<td>R = 498’ Length = 981.32 SE% = 3.5%</td>
<td></td>
</tr>
<tr>
<td>Radius #3</td>
<td>R = 215’ Length = 295.96’ SE% = 6.0%</td>
<td>R = 315’ Length = 376.90 SE% = 6.0%</td>
<td></td>
</tr>
<tr>
<td>Intersection Type</td>
<td>All-way stop</td>
<td>Roundabout</td>
<td>Tee Intersection</td>
</tr>
<tr>
<td>No. of Conflict Points</td>
<td>32</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>Required Field of Vision</td>
<td>213°</td>
<td>133°</td>
<td>173°</td>
</tr>
<tr>
<td>Typical Section</td>
<td>12’ Travel Lanes with 8’ gravel shoulders</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cross Slope</td>
<td>2% Typical</td>
<td></td>
<td></td>
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<tr>
<td>Paved Surface</td>
<td>Assumed Asphalt Paved with Gravel Base</td>
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</tr>
</tbody>
</table>

Notes:
- Radius are presented starting on the west end on the proposed alternative and proceeding easterly.
- The 60-mph design speed for Alternatives 4A and 4B applies west of the southernmost curve of the proposed realigned road.
Key characteristics to highlight for this review include the curve radius, vehicle conflict points, and field of vision or sight distance.

(1) **Horizontal Curve Radius**

The horizontal curve radius of the layout is directly related to the design speed. A shorter, smaller radius curve will generally be associated with lower design speeds than a larger, longer radius. This is also demonstrated in the travel time changes presented in Table 2. Alternative 3 generally has smaller curve radii along the entire alignment than Alternatives 4A/4B. This results in a speed change from 55 mph to 30 mph occurring prior to entering the project area for Alternative 3, whereas Alternative 4A/4B uses a larger radius on the west end of the project area, allowing the 55 mph speed limit to continue into the project area before requiring a speed reduction to 30 mph.

(2) **Vehicular Conflict Points**

A vehicular conflict point is the point at which the paths of two through or turning highway users (motorist, pedestrian, bicyclist) diverge, merge, or cross. An increased number of conflict points is generally associated with increased levels of roadway accidents, so reducing the number of conflicts points is an approach to improve safety along the road corridor.

(3) **Field of Vision**

Field of vision and sight distance are critical components of the intersection operation and safety. How sight lines affect the intersection differ based on the type of traffic control that is in place. This is described in more detail in the next section.

### E. Intersection Characteristics

Three different intersection treatments are presented in the alternatives. Below is a brief description of the intersection control types and the advantages and disadvantages of each alternative.

(1) **Minor road stop control (one-way) for Alternative 4B**

This treatment was applied to the new intersection proposed by Alternative 4B. It includes a stop sign on the south approach along Neal Avenue N and no stop sign for traffic on 30th Street N. This is the most common type of intersection installed on rural roadway systems that are determined to need minimal traffic control.

**Advantages**
- Low installation costs
- Low maintenance costs
- Reduced number of vehicular conflict points (total of 9)
- Continuous traffic flow for major approaches.

**Cons:**
- Higher stop control delay during peak periods for minor approach.
• Requires longer sight lines be maintained for visibility and safety for stopped vehicle to
gauge, react, and enter traffic stream safely.
• Risk for severe crashes as traffic increases.

(2) All-way, stop-controlled for Alternative 3
This intersection treatment was applied to Alternative 3 and maintains the existing all-way stop
control at the intersection of 30th Street N and Neal Avenue N. All-way, stop control can be useful
as a safety measure at intersections if certain traffic volume and safety conditions exist. Safety
concerns typically associated with all-way stops include pedestrians, bicyclists, and all road users
expecting other road users to stop, inability to provide adequate sight distance, or where the
volume of traffic on the intersecting roads is approximately equal and when traffic conditions are
met in accordance to the Manual of Uniform Traffic Control Devices (MUTCD).

Advantages
• Provides for orderly flow of traffic
• Reduce the severity and frequency of right angle and left turn crashes over minor road
stop control
• Relatively inexpensive and quick to implement
• Does not require extensive sight lines like the minor road stop control intersection, but
sight distance is required for vehicles to react in case one vehicle is non-compliant with
the traffic sign (i.e. failure to stop).

Disadvantages
• Some types of crashes may increase (i.e. rear end)
• Highest number of vehicular conflict points (total of 32)
• Limited to lower volume intersections
• Increases delay to all legs of the intersection
• Total intersection capacity is limited
• Providing for U turns can be difficult and may be prohibited

(3) Single lane roundabout for Alternative 4A
This treatment was applied to the new intersection proposed by Alternative 4A and consists of a
three-way roundabout with yield signs along all three approaches. Roundabouts are circular
intersections with specific design and traffic control features. These features include yield control
of all entering traffic, channelized approaches, and appropriate geometric curvature to ensure that
travel speeds on the circulatory roadway are typically less than 30 miles per hour (mph). Also,
trafﬁc movement is possible only in a counter-clockwise direction within the roundabout.
Roundabout intersections eliminate several vehicle conﬂict points typically associated with
traditional intersections. A four-legged, single lane roundabout has 75 percent fewer vehicle
conﬂict points than a traditional stop-controlled intersection. Roundabouts also enhance safety by
reducing vehicle speeds both in and through the intersection.
Advantages

- Provides for orderly flow of traffic
- Lowest number of vehicular conflict points (total of 6)
- Minimizes the severity and frequency of most crash types (89 percent decrease in fatal crashes, a 74 percent decrease in life-altering injury crashes, and a 39 percent decrease in all crashes)
- Provides traffic calming by reducing vehicular speeds on all approaches
- U turns can be executed safely and easily
- Less delay than other types of intersection control (reduced fuel consumption, better air quality)
- Does not require extensive sight lines like the minor road stop control intersection, but sight distance is required for vehicles to see next approach and vehicle within circulatory roadway and react.

Disadvantages

- Highest installation costs
- May need additional right of way at intersection
- Typically requires additional features such as landscaping, lighting, and truck aprons
- Typically requires more initial design effort than other intersection types
- Works best with single lane approaches

F. Right-of-Way (ROW) and Access Management

Right-of-way (ROW) impacts were estimated assuming a 50-foot offset from the centerline of the proposed pavement for both the 30th Street North and Neal Avenue North roadways. This assumption coincides with the minimum ROW width of 100 feet for a collector roadway as required in the Baytown and West Lakeland Township street design standards. Although the standard 60-foot ROW width for a local road is narrower, a 100-foot ROW was used for Neal Avenue N to account for uneven terrain in some areas which may require a wider ROW to accommodate the proposed design. This assumption also allows for a standard ditch section. Existing and proposed ROW is shown on the Alternative layouts. Proposed modifications to existing property access points in also shown on the Alternative Layouts in Appendix A.

The following table breaks down the right-of-way needed for each alternative into right-of-way required within airport property, right-of-way required outside of airport property, and total right-of-way required:

<table>
<thead>
<tr>
<th>Alternative</th>
<th>ROW within Airport Property (Acres)</th>
<th>ROW outside of Airport Property (Acres)</th>
<th>Total ROW Required (Acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>7.24</td>
<td>0.00</td>
<td>7.24</td>
</tr>
<tr>
<td>4A</td>
<td>9.51</td>
<td>0.00</td>
<td>9.51</td>
</tr>
<tr>
<td>4B</td>
<td>9.29</td>
<td>0.00</td>
<td>9.29</td>
</tr>
</tbody>
</table>
The right-of-way needs for each alternative are shown on the Alternate Layouts in Appendix A.

**G. Constructability and Construction Sequencing**

The proposed roadways are on new alignments, south of the existing 30th Street N roadway. It is anticipated the existing roadway will remain open to traffic while the new roadway and associated intersections are constructed. Short term closures of 30th Street N and Neal Street N would be required to construct the connections to the existing roadway. These closures would be non-concurrent to maintain access to residents along these routes.

**H. Environmental Impacts**

Based on the National Historic Preservation Act Section 106 investigation completed for the EA, there are no historical or archeological sites affected by Alternatives 3, 4A, or 4B. The primary known environmental impacts are the need for additional right-of-way required Airport property currently being used for agricultural purposes and encroachments to wetlands located adjacent to 30th Street N. The right-of-way need from agricultural properties and wetland encroachments for each new alternative are estimated and compared to Alternative 3 in Table 5 and on the Alternative Layout in Appendix A.

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Agricultural ROW Required (Acres)</th>
<th>Anticipated Wetland Impact within ROW (Acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>7.24</td>
<td>0.124</td>
</tr>
<tr>
<td>4A</td>
<td>9.51</td>
<td>0.115</td>
</tr>
<tr>
<td>4B</td>
<td>9.29</td>
<td>0.115</td>
</tr>
</tbody>
</table>
6. Summary

Several parameters were used to review the three build alternatives presented in this study. Table 6 summarizes the outcome of alternative review. Design characteristics and travel time increases associated with Alternatives 4A and 4B are preferable to those associated with Alternative 3. However, these new alternatives would be more costly to implement.

**Table 6: Alternative Review Matrix**

<table>
<thead>
<tr>
<th></th>
<th>Alternative 3</th>
<th>Alternative 4A</th>
<th>Alternative 4B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final LTCP</td>
<td>Modified Hybrid with New Roundabout</td>
<td>Modified Hybrid with New T-Intersection</td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td>$1.0 million</td>
<td>$1.5 million</td>
<td>$1.4 million</td>
</tr>
<tr>
<td>Design Characteristics</td>
<td>Vehicle Points of Conflict at Intersection</td>
<td>32</td>
<td>6</td>
</tr>
<tr>
<td>Required Field of Vision at Intersection</td>
<td>213°</td>
<td>133°</td>
<td>173°</td>
</tr>
<tr>
<td>Radius of Easternmost Curve</td>
<td>200 feet</td>
<td>315 feet</td>
<td>315 feet</td>
</tr>
<tr>
<td>Travel Time</td>
<td>Travel Time Increase from Manning Avenue to East of Existing 30th/Neal Intersection</td>
<td>+ 46.1 seconds</td>
<td>+ 28.5 seconds</td>
</tr>
<tr>
<td></td>
<td>Travel Time Increase from Manning Avenue to South of Existing 30th/Neal Intersection</td>
<td>+ 46.1 seconds</td>
<td>+ 10.8 seconds</td>
</tr>
<tr>
<td>Environmental Factors</td>
<td>Wetland Fill Area (approx.)</td>
<td>0.12 acres</td>
<td>0.12 acres</td>
</tr>
</tbody>
</table>
Appendix A: Alternative Layouts
Lake Elmo Airport
30th Avenue Realignment

Alternative 4B
Appendix B: Traffic Data
<table>
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<th></th>
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</thead>
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### General Information

**Analyst:** DLW  
**Agency or Co.:** Mead & Hunt  
**Date Performed:** 4/21/2017  
**Analysis Year:** Design  
**Time Analyzed:** Peak Hour Alternate 1  
**Project Description:** Lake Elmo Airport

### Site Information

**Intersection:** 30th Street & Neil Avenue  
**E/W Street Name:** 30th Street  
**N/S Street Name:** Neil Avenue  
**Analysis Time Period (hrs):** 0.25  
**Peak Hour Factor:** 0.92

### Volume Adjustments and Site Characteristics

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<th>SB</th>
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<tr>
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### Critical and Follow-Up Headway Adjustment

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### Flow Computations, Capacity and v/c Ratios

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### Delay and Level of Service

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### Lanes

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<td>Percent Heavy Vehicles (%)</td>
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### Vehicle Volumes and Adjustments

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<td>R</td>
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<tr>
<td>Percent Heavy Vehicles (%)</td>
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### Critical and Follow-up Headways

- **Base Critical Headway (sec)**
- **Critical Headway (sec)**
- **Base Follow-Up Headway (sec)**
- **Follow-Up Headway (sec)**

### Delay, Queue Length, and Level of Service

| Flow Rate, v (veh/h) | 38 | 16 |
| Capacity, c (veh/h) | 962 | 1543 |
| v/c Ratio | 0.04 | 0.01 |
| 95% Queue Length, Q₉₅ (veh) | 0.1 | 0.0 |
| Control Delay (s/veh) | 8.9 | 7.4 |
| Level of Service, LOS | A | A |
| Approach Delay (s/veh) | 8.9 | 4.4 |
| Approach LOS | A |
# HCS7 Two-Way Stop-Control Report

## General Information

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<th>Field</th>
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## Site Information

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## Lanes

![Diagram of Lanes](image)

## Vehicle Volumes and Adjustments

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<th>Westbound</th>
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<td>Configuration</td>
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<td>LR</td>
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## Critical and Follow-up Headways

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## Delay, Queue Length, and Level of Service

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Appendix C: Cost Estimate Summaries
## PRELIMINARY COST ESTIMATE

### 30th STREET NORTH REALIGNMENT ALTERNATE 3

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<td>N/A</td>
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<tr>
<td></td>
<td><strong>TOTAL ROW COSTS (Items 16-18)</strong></td>
<td></td>
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<tr>
<td>18</td>
<td>CONTINGENCY</td>
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# Preliminary Cost Estimate
## 30th Street North Realignment Alternate 4A

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<tr>
<th>Item</th>
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<th>Unit</th>
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<tbody>
<tr>
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<td>Removal</td>
<td>STA</td>
<td>33</td>
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<td>$18,150.00</td>
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<td>New Pavement</td>
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<td>3650</td>
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<td>2305</td>
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<tr>
<td>3</td>
<td>Earthwork</td>
<td>YD³</td>
<td>15000</td>
<td>$6.00</td>
<td>$90,000.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>YD³</td>
<td>0</td>
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<td>$0.00</td>
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<tr>
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<td><strong>Subtotal Roadway Costs (Items 1-3)</strong></td>
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<tr>
<td>4</td>
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<td>6</td>
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<tr>
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<tr>
<td>9</td>
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<tr>
<td>10</td>
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<td>11</td>
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<td>13</td>
<td>Structures</td>
<td></td>
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<tr>
<td></td>
<td>Box Culverts</td>
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<td></td>
<td>Retaining Walls</td>
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<tr>
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<td>Structural Incidentals</td>
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<td>10 % of Structures</td>
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<td><strong>Retaining Wall Subtotal</strong></td>
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<tr>
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<tr>
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<tr>
<td></td>
<td><strong>Total Row Costs (Items 16-18)</strong></td>
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<td><strong>$0.00</strong></td>
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## Preliminary Cost Estimate

### 30th Street North Realignment Alternate 4B

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<th>Unit</th>
<th>Quantity</th>
<th>Unit Price</th>
<th>Total Cost (Rounded)</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Removal</td>
<td>STA</td>
<td>33</td>
<td>$550.00</td>
<td>$18,150.00</td>
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<td>3</td>
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<td>YD³</td>
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<td>$90,000.00</td>
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<td></td>
<td></td>
<td>0</td>
<td>$0.00</td>
<td>$0.00</td>
</tr>
<tr>
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<td><strong>Subtotal Roadway Costs (Items 1-3)</strong></td>
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<td><strong>$638,450.00</strong></td>
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<td>Drainage</td>
<td>L.S.</td>
<td>7.5 % of Items 1-3</td>
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<td>2 % of Items 1-3</td>
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<tr>
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<td>Traffic Control</td>
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<td>5 % of Items 1-3</td>
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<tr>
<td>7</td>
<td>Lighting</td>
<td>L.S.</td>
<td>0 % of Items 1-3</td>
<td>N/A</td>
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</tr>
<tr>
<td>8</td>
<td>Signing/Markings</td>
<td>L.S.</td>
<td>3 % of Items 1-3</td>
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<tr>
<td>9</td>
<td>Overhead Sign Structures</td>
<td>EACH</td>
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<td>N/A</td>
<td>$0.00</td>
</tr>
<tr>
<td>10</td>
<td>Traffic Signals</td>
<td>EACH</td>
<td>0</td>
<td>$150,000</td>
<td>$0.00</td>
</tr>
<tr>
<td>11</td>
<td>Mobilization</td>
<td>L.S.</td>
<td>5 % of Items 1-10 &amp; 13</td>
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<td>$37,600.00</td>
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<tr>
<td>12</td>
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<td>$236,400.00</td>
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<tr>
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<td>13</td>
<td>Structures</td>
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<tr>
<td></td>
<td>Box Culverts</td>
<td></td>
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<td>$0.00</td>
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<tr>
<td></td>
<td>Retaining Walls</td>
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</tr>
<tr>
<td></td>
<td>Structural Incidentals</td>
<td>L.S.</td>
<td>10 % of Structures</td>
<td>N/A</td>
<td>$0.00</td>
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<tr>
<td></td>
<td><strong>Retaining Wall Subtotal</strong></td>
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<td></td>
<td><strong>$0.00</strong></td>
</tr>
<tr>
<td>14</td>
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<td>15 % of Items 1-13</td>
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<td>$153,652.50</td>
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<td>Row Acquisition</td>
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<td>$0.00</td>
</tr>
<tr>
<td>16</td>
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<td>L.S.</td>
<td>20 % of Item 16</td>
<td>N/A</td>
<td>$0.00</td>
</tr>
<tr>
<td>17</td>
<td>Real Estate Delivery</td>
<td>L.S.</td>
<td>25 % of Item 16</td>
<td>N/A</td>
<td>$0.00</td>
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<tr>
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</tr>
<tr>
<td>18</td>
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<td><strong>$1,354,802.50</strong></td>
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Appendix C – Wetland Delineation, Functional Assessment, and Associated Correspondence

<table>
<thead>
<tr>
<th>Content</th>
<th>Page</th>
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<tbody>
<tr>
<td>Minnesota Wetland Conservation Act Notice of Decision August 23, 2018</td>
<td>C-1 thru C-5</td>
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<tr>
<td>Wetland Delineation Report Addendum June 2018</td>
<td>C-6 thru C-71</td>
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<td>U.S. Army Corps of Engineers Approved Jurisdictional Determination March 19, 2018</td>
<td>C-72 thru C-85</td>
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<td>Minnesota Wetland Conservation Act Notice of Decision November 9, 2017</td>
<td>C-86 thru C-92</td>
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<tr>
<td>Minnesota Wetland Conservation Act Notice of Decision January 25, 2018</td>
<td>C-93 thru C-134</td>
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<tr>
<td>Wetland Delineation and Function Assessment Report October 2017</td>
<td>C-135 thru C-314</td>
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</table>
**Minnesota Wetland Conservation Act**

**Notice of Decision**

**Local Government Unit (LGU)**

**Valley Branch Watershed District (VBWD)**

**Address**

P.O. Box 838
Lake Elmo, MN 55042

---

### 1. PROJECT INFORMATION

<table>
<thead>
<tr>
<th>Applicant Name</th>
<th>Project Name</th>
<th>Date of Application</th>
<th>Application Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chad Leqve, Metropolitan Airports Commission</td>
<td>Lake Elmo Airport</td>
<td>7/11/2018</td>
<td></td>
</tr>
</tbody>
</table>

- Attach site locator map.

- **Type of Decision:**
  - Wetland Boundary or Type
  - No-Loss
  - Exemption
  - Sequencing
  - Replacement Plan
  - Banking Plan

- Technical Evaluation Panel (TEP) Findings and Recommendation (if any):
  - [ ] Approve
  - [ ] Approve with conditions
  - [ ] Deny

Summary (or attach): **No TEP Findings Report. See below for TEP involvement.**

---

### 2. LOCAL GOVERNMENT UNIT DECISION

**Date of Decision: 8/23/2018**

- [ ] Approved
  - [ ] Approved with conditions (include below)
  - [ ] Denied

**LGU Findings and Conclusions (attach additional sheets as necessary):**

On behalf of the Metropolitan Airports Commission, Mead & Hunt submitted an addendum wetland delineation report and request for wetland boundary and type concurrence for an additional area associated with the Lake Elmo Airport Runway Relocation and Improvements project in Lake Elmo, Minnesota (Sec. 18 and 19, T29N, R20W) within Washington County. In 2017, wetland boundaries and types were approved for the majority of the project area. This addendum covers an extended project area not previously evaluated.

Two wetlands were delineated within the extended evaluation with the following type designations:

<table>
<thead>
<tr>
<th>Wetland</th>
<th>Wetland Type</th>
<th>Circular 39 Type</th>
<th>Dominant Vegetation</th>
<th>Area (Sq. Ft)</th>
<th>Area (Acres)</th>
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<tbody>
<tr>
<td>5</td>
<td>Fresh (wet) Meadow/Shrub Carr/Floodplain Forest</td>
<td>Type 2/Type 6/Type 1</td>
<td>Reed canary grass, box elder, buckthorn, stinging nettle, green ash</td>
<td>43,382.57</td>
<td>0.996</td>
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<tr>
<td>10</td>
<td>Floodplain Forest</td>
<td>Type 1</td>
<td>Box elder, American elm, buckthorn</td>
<td>9,424.66</td>
<td>0.216</td>
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</tbody>
</table>
For Replacement Plans using credits from the State Wetland Bank:

<table>
<thead>
<tr>
<th>Bank Account #</th>
<th>Bank Service Area</th>
<th>County</th>
<th>Credits Approved for Withdrawal (sq. ft. or nearest .01 acre)</th>
</tr>
</thead>
</table>

**Replacement Plan Approval Conditions.** In addition to any conditions specified by the LGU, the approval of a Wetland Replacement Plan is conditional upon the following:

- **Financial Assurance:** For project-specific replacement that is not in-advance, a financial assurance specified by the LGU must be submitted to the LGU in accordance with MN Rule 8420.0522, Subp. 9 (List amount and type in LGU Findings).

- **Deed Recording:** For project-specific replacement, evidence must be provided to the LGU that the BWSR “Declaration of Restrictions and Covenants” and “Consent to Replacement Wetland” forms have been filed with the county recorder’s office in which the replacement wetland is located.

- **Credit Withdrawal:** For replacement consisting of wetland bank credits, confirmation that BWSR has withdrawn the credits from the state wetland bank as specified in the approved replacement plan.

**Wetlands may not be impacted until all applicable conditions have been met!**

LGU Authorized Signature:

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Date</th>
<th>Phone Number and E-mail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Karen Wold</td>
<td>Senior Environmental Scientist, Barr Engineering Co. – Engineers for the VBWD</td>
<td>8/23/2018</td>
<td>952-832-2707 <a href="mailto:kwold@barr.com">kwold@barr.com</a></td>
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</tbody>
</table>

**THIS DECISION ONLY APPLIES TO THE MINNESOTA WETLAND CONSERVATION ACT.**

Additional approvals or permits from local, state, and federal agencies may be required. Check with all appropriate authorities before commencing work in or near wetlands.

Applicants proceed at their own risk if work authorized by this decision is started before the time period for appeal (30 days) has expired. If this decision is reversed or revised under appeal, the applicant may be responsible for restoring or replacing all wetland impacts.

This decision is valid for five years from the date of decision unless a longer period is advised by the TEP and specified in this notice of decision.
3. APPEAL OF THIS DECISION
Pursuant to MN Rule 8420.0905, any appeal of this decision can only be commenced by mailing a petition for appeal, including applicable fee, within thirty (30) calendar days of the date of the mailing of this Notice to the following as indicated:

Check one:

☐ Appeal of an LGU staff decision. Send petition and $_____ fee (if applicable) to:
☒ Appeal of LGU governing body decision. Send petition and $500 filing fee to:
   Executive Director
   Minnesota Board of Water and Soil Resources
   520 Lafayette Road North
   St. Paul, MN 55155

4. LIST OF ADDRESSEES
☒ SWCD TEP member: Jay Riggs - Washington Conservation District
☒ BWSR TEP member: Ben Meyer
☒ DNR TEP member: Becky Horton
☒ WD or WMO (if applicable): John Hanson
☒ Applicant (notice only) and Landowner (if different): Chad Leqve (Metropolitan Airports Commission), Evan Barrett and Brauna Hartzell (Mead & Hunt, Inc.)
☒ Corps of Engineers Project Manager: Tom Hingsberger
☒ BWSR Wetland Bank Coordinator (wetland bank plan decisions only)

5. MAILING INFORMATION
➢ For a list of BWSR TEP representatives: www.bwsr.state.mn.us/aboutbwsr/workareas/WCA_areas.pdf
➢ For a list of DNR TEP representatives: www.bwsr.state.mn.us/wetlands/wca/DNR_TEP_contacts.pdf
➢ Department of Natural Resources Regional Offices:

<table>
<thead>
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<th>NW Region:</th>
<th>NE Region:</th>
<th>Central Region:</th>
<th>Southern Region:</th>
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<tbody>
<tr>
<td>2115 Birchmont Beach Rd. NE</td>
<td>1201 E. Hwy. 2</td>
<td>1200 Warner Road</td>
<td>261 Hwy. 15 South</td>
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<tr>
<td>Bemidji, MN 56601</td>
<td>Grand Rapids, MN 55744</td>
<td>St. Paul, MN 55106</td>
<td>New Ulm, MN 56073</td>
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</tbody>
</table>

For a map of DNR Administrative Regions, see: http://files.dnr.state.mn.us/aboutdnr/dnr_regions.pdf
➢ For a list of Corps of Project Managers: www.mvp.usace.army.mil/regulatory/default.asp?pageid=687

or send to:

US Army Corps of Engineers
St. Paul District, ATTN: OP-R
180 Fifth St. East, Suite 700
St. Paul, MN 55101-1678

➢ For Wetland Bank Plan applications, also send a copy of the application to:

Minnesota Board of Water and Soil Resources
Wetland Bank Coordinator
520 Lafayette Road North
St. Paul, MN 55155

6. ATTACHMENTS

In addition to the site locator map, list any other attachments:
☒ wetland delineation map

C-3
Project Location and Topography

**LAKE ELMO AIRPORT**
Proposed Runway 14/32 Relocation and Associated Improvements

Legend
- **2017 Area of Interest**
- **2018 Area of Interest**
- **LRR Subregion: K**

**Project Location**
- T29N, R20W, S18 and S19
- Baytown and West Lakeland Townships
- Washington County, MN
- LRR Subregion: K
- USACE Regional Supplement: NC/NE
- Area = 130.1 acres
Wetland Delineation Report Addendum

Lake Elmo (21D) Airport
Runway 14/32 Relocation and Associated Improvements

Report prepared for Metropolitan Airports Commission
Minneapolis, Minnesota

Report prepared by Mead & Hunt
www.meadhunt.com

June 2018
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1. **Introduction** ........................................................................................................ 1

2. **Methods** ............................................................................................................ 3

3. **Results and Discussion** .................................................................................... 5
   
   A. Site Description ................................................................................................. 5
      
      (1) Soils Mapping ....................................................................................... 5
      
      (2) Aquatic Resources ................................................................................. 6
      
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1. Introduction

Lake Elmo Airport (21D or the Airport) is a general aviation reliever airport owned and operated by the Metropolitan Airports Commission (MAC). The airport is located just east of St. Paul, Minnesota. The Airport is bordered by Manning Avenue N. (MN 15) to the west, a Union Pacific Railroad line on the north, and 30th Street N. to the south. Airport property covers approximately 640 acres over three parcels. The central parcel includes the main airfield and associated facilities, roads, and hangar areas. Additional parcels of land extend ownership to the north along Manning Avenue to 40th Street N. (Minnesota Trunk Highway 14), encompassing about 40 acres, and to the south of 30th Street N. for an additional 80 acres. To the south and east, the Airport is bordered by rolling farmland and woodlands with scattered residences, and lies within the Downs Lake subwatershed of the St. Croix River - Stillwater watershed. Areas west of the Airport consist primarily of single-family residential development. A project location map is presented in Appendix A.

The airfield at 21D consists of two runways, two supporting taxiways, and numerous privately owned hangars. Runway 14/32 is the primary runway and is 2,850 feet long and 75 feet wide. The crosswind runway (Runway 4/22) is 2,497 feet long and 75 feet wide. There are two non-precision instrument approaches to the Airport, which has no control tower. Fueling, flight training, and aircraft maintenance services are available from a fixed-base operator. The primary role of the airport is to serve personal, recreational, and business aviation users. The Airport provides business services including flight training and aircraft maintenance.

A previous wetland delineation and functional assessment, completed in October 2017, documented nine wetlands within an Area of Interest on Airport property. The October delineation supported an alternatives analysis that explores how to meet planning goals related to runway and safety improvements at the Airport, which was included in a draft federal environmental assessment (EA) / state environmental assessment worksheet (EAW) published by the MAC on February 26, 2018.

In November 2017, Mead & Hunt, Inc. (Mead & Hunt) determined that approximately 0.6 acres of on-Airport tree clearing would need to occur in two wetland areas that were not delineated by the 2017 wetland boundary survey. These areas are located near the Runway 22 end and are identified by the U.S. Fish & Wildlife Service (USFWS) National Wetland Inventory (NWI) database as Type 1 seasonally flooded basins. Visual observations made by Mead & Hunt staff during the 2017 wetland boundary survey indicated that Type 1 is the appropriate classification, and that the wetlands will remain Type 1 following removal of any trees. Based on consultation with the Federal Aviation Administration (FAA) and the Valley Branch Watershed District (VBWD), Mead & Hunt determined that these wetland areas should be delineated to confirm the wetland boundaries and types, because tree removal in wetlands which results in a change in wetland type may be considered a regulated activity under the Minnesota Wetland Conservation Act (WCA). However, seasonal considerations dictated that this additional delineation work be completed in the spring of 2018, following publication of the Draft EA/EAW. The Draft EA/EAW included a commitment to complete the delineation work prior to publication of the Final EA/EAW document.
Mead & Hunt conducted a wetland delineation within an Area of Interest (AOI) on April 27 and 29, 2018. The Area of Interest, identified as Area E in this report, lies adjacent to Area B in the October 2017 delineation. The 2017 delineation identified the portion of Wetland 5 that is located within Area B as identified in Appendix A. This expanded 2018 delineation investigated the remainder of Wetland 5, as well as another small isolated area identified as Wetland 10, as shown in Appendix D.

The AOI comprises 7.7 acres located in Section 18, Township 29 North, Range 20 West, Washington County, Minnesota. Two wetlands were identified within the AOI. The information contained in this report confirms that tree removal within these wetlands will not change the Circular 39 wetland type, as stated by the Draft EA/EAW. Therefore, this report does not change the conclusions of the Draft EA/EAW.

This report summarizes the results of the wetland delineation. Delineator qualifications are provided in Appendix F. One Mead & Hunt staff member performed the wetland delineation:

- Brauna Hartzell, BS Biological Science, Florida State University, 1982; MS Environmental Monitoring, University of Wisconsin-Madison, 1994; 15 years wetland delineation practice.
2. Methods

Available resources used to provide context and background information and to assist in the field assessment for the wetland determination included:

- U.S. Geological Survey (USGS) topographic maps and 2-foot elevation contours provided by Minnesota Geospatial Commons, Minnesota Elevation Mapping Project, 2011.


- U.S. Fish and Wildlife National Wetland Inventory (NWI) mapping with update for East-Central Minnesota at https://www.fws.gov/wetlands/data/mapper.html

- 2016 National Wetland Plant List (Lichvar, R.W., D. L. Banks, W. N. Kirchner, and N. C. Melvin, 2016)

- Climatic norms at Minneapolis/St. Paul Airport, MN from USDA WETS tables at https://www.wcc.nrcs.usda.gov/climate/navigate_wets.html

- Gridded precipitation data provided by Minnesota State Climatology Office at http://climateapps.dnr.state.mn.us/gridded_data/precip/monthly/monthly_gridded_precip.asp

- Aerial photography (MnGEO WMS Image Service)

The field methods used conform to the Routine Onsite Method of the 1987 U.S. Army Corps of Engineers’ (USACE) Wetland Delineation Manual, as enhanced by the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (USACE, 2011). Soil characteristics were examined by digging pits with a 16-inch tile spade and hydrologic indicators were visually assessed. Soil pits remained open for a minimum of 15 minutes to adequately assess the water table. Use of Munsell Soil Color charts determined the hue, value, and chroma for the matrix and any redoximorphic features in each soil layer.

Vegetation was documented on the North Central/Northeast Regional (NC/NE) data forms. Percent cover of each species in each stratum was estimated. The herbaceous stratum was sampled within a 5-foot radius plot; a 15-foot radius plot for the shrub/sapling stratum; and a 30-foot radius plot for the tree and woody vine stratum. The 2016 National Wetland Plant List (Lichvar, R.W., et al, 2016) was used to determine the wetland indicator status for each species and the 50/20 rule was applied to determine dominance.

Antecedent precipitation was assessed following procedures developed by the NRCS. Precipitation data three months prior to fieldwork were compared to 30-year precipitation averages (1981-2010) to determine if hydrologic conditions were normal, wetter, or drier than normal for the area.
All area within the AOI was examined. A total of four data points—two in uplands and two in wetlands—were established to characterize the range of soil, vegetation, and hydrologic conditions. Wire pin flags placed approximately 25-50 feet apart indicated wetland boundary points. These sampling points and wetland boundary flags were surveyed with a Trimble Geo7X capable of sub-meter accuracy and mapped using Geographic Information System (GIS) software.

The following appendices are included with this report:

- Appendix A – Project Location and Topography Map
- Appendix B – Detailed Topography Map, Aquatic Resources Map, and NRCS Soils Map
- Appendix C – WETS Analysis and Climatic Data
- Appendix D – Wetland Boundary Map
- Appendix E – Data Sheets with Field Photographs
- Appendix F – Delineator Qualifications
3. Results and Discussion

A. Site Description

The AOI covers approximately 7.7 acres near the Runway 22 end. A project location map is presented in Appendix A.

Most of the AOI is under row-crop cultivation east of Runway 4/22. Two areas of wooded wetlands appear in this area. Each is located at topographic lows surrounded by agricultural fields. Natural sheet flow from the surrounding terrain moves towards these depressional basins over gradients varying from 2.5 percent to 15 percent. See Appendix B for a detailed Topographic Map.

At the time of field work, the agricultural fields had not been planted and vegetation was absent. Isolated woodlands and depressional areas appeared undisturbed.

(1) Soils Mapping

Most of the AOI is covered by three soils: well drained Antigo silt loams (0 to 2 percent slopes), well drained Santiago silt loam (2 to 6 percent slopes), and moderately well drained Freeon silt loam (2 to 6 percent slopes). Typical soil profiles for Antigo silt loams (49) show a dark grayish brown (10YR 4/2) silt loam over a brown (10YR 5/3) silt loam. Santiago silt loam (153B) shows a dark brown (10YR 3/3) silt loam in the A horizon; underlying this is a brown (10YR 5/3) silt loam with remnants of dark yellowish brown (10YR 4/4) silt loam. Soil profiles for the Freeon soil series (264) describe a very dark grayish brown (10YR 3/2) silt loam underlain by a brown (10YR 5/3) silt loam with remnants of dark yellowish brown (10YR 4/4) silt loam and strong brown (7.5YR 4/6) masses of iron accumulation.

Antigo and Santiago silt loams and their minor components are non-hydric while Freeon silt loam contains a minor component, Capitola muck at 5 percent, which is hydric.

Depressional areas within the AOI generally are covered by soils from the well-drained Freeon series. An area of Auburnsdale silt loam (0 to 2 percent slopes) covers the northern corner of the AOI and corresponds to an area previously mapped as wetland in the NWI and the October 2017 delineation. A very dark grayish brown (10YR 3/2) silt loam covers a grayish brown (10YR 5/2) silt loam with many medium prominent strong brown (7.5YR 5/8) masses of iron accumulation in a typical soil profile for the poorly drained Auburnsdale series.

Soils present within the AOI are summarized in Table 1. Soils mapping is presented in Appendix B.
Table 1. Summary of Soils in Area of Interest

<table>
<thead>
<tr>
<th>Map unit symbol</th>
<th>Map unit name</th>
<th>Soil Unit Component Percentage</th>
<th>Landform</th>
<th>Hydric Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>49</td>
<td>Antigo silt loam, 0 to 2 percent slopes</td>
<td>Antigo/ minor comp. 80/20</td>
<td>Terraces, flats</td>
<td>No</td>
</tr>
<tr>
<td>49B</td>
<td>Antigo silt loam, 2 to 6 percent slopes</td>
<td>Antigo/ minor comp. 80/20</td>
<td>Terraces, flats, hillslopes</td>
<td>No</td>
</tr>
<tr>
<td>153B</td>
<td>Santiago silt loam, 2 to 6 percent slopes</td>
<td>Santiago/ minor comp. 90/10</td>
<td>Moraines</td>
<td>No</td>
</tr>
<tr>
<td>155B</td>
<td>Chetek sandy loam, 0 to 6 percent slopes</td>
<td>Chetek/ minor comp. 90/10</td>
<td>Outwash plains</td>
<td>No</td>
</tr>
<tr>
<td>155C</td>
<td>Chetek sandy loam, 6 to 12 percent slopes</td>
<td>Chetek/ minor comp. 90/10</td>
<td>Pitted outwash plains</td>
<td>No</td>
</tr>
<tr>
<td>189</td>
<td>Auburndale silt loam, 0 to 2 percent slopes</td>
<td>Auburndale/ minor comp. 85/15</td>
<td>Depressions and drainageways on ground moraines</td>
<td>Yes</td>
</tr>
<tr>
<td>264</td>
<td>Freeon silt loam, 2 to 6 percent slopes</td>
<td>Freeon/ minor comp. 95/5</td>
<td>Ground moraines</td>
<td>No</td>
</tr>
</tbody>
</table>

(2) Aquatic Resources
The NWI indicates two areas of mapped wetlands within the AOI: one area mapped as a combination of seasonally flooded emergent (PEM1A) and forested wetland (PFO1) and another area, a small pocket of forested wetland (PFO1A), is mapped in the southern portion of the AOI.

Both wetlands within the AOI are classified as Circular 39 Type 1. No Minnesota Public Waters are mapped in the AOI. See Appendix B for aquatic resources mapping.

(3) Antecedent Climatic Conditions
A precipitation worksheet using the gridded method from the Minnesota State Climatology Office was calculated for the Airport. Climatic normals covered the period 1981 – 2010. On-site precipitation data was accessed from the Minnesota State Climatology Office and used to analyze climatic conditions for three months prior to field work. As the delineation occurred on April 27, the month of April was included in the analysis. This analysis indicated climatic conditions within normal range based on precipitation.

Within the early season timeframe of this delineation, average precipitation as rain is low. In the three months prior to delineation (April, March, and February), precipitation falls mainly as snow. Snowfall data from the Woodbury, Minnesota, station was used for comparing on-site conditions to long-term snowfall normals from the Minneapolis-St. Paul International Airport. The Lake Elmo station does not collect snow data.
Table 2 summarizes snowfall amounts compared to normal long-term data. April’s snowfall exceeded normal by more than 22 inches; one event, experienced over two days on April 15 and 16, accounted for 14.4 inches of snow. At the time of field work (April 27), no snow accumulation was observed. On-site conditions, however, were very wet.

Table 2. Summary of Snowfall for Three Months Prior to Field Work

<table>
<thead>
<tr>
<th>Month</th>
<th>Average Monthly Snowfall¹</th>
<th>On-site Monthly Snowfall²</th>
<th>Amount above Normal</th>
</tr>
</thead>
<tbody>
<tr>
<td>February</td>
<td>8.5</td>
<td>15.8</td>
<td>+7.3</td>
</tr>
<tr>
<td>March</td>
<td>10.5</td>
<td>11.2</td>
<td>+0.7</td>
</tr>
<tr>
<td>April</td>
<td>3.0</td>
<td>25.7</td>
<td>+22.7</td>
</tr>
</tbody>
</table>

¹ Minneapolis/St Paul Airport
² Woodbury 1.7 N, MN

The amount of water in snow, or snow water equivalent (SWE), depends on the density of the snow and the temperature during which the snowfall occurred. SWE is calculated as the inches of snow multiplied by the density of the snow. Using a typical snow density of 10 percent for temperatures between 28˚F and 34˚F, 25.7 inches of snow would yield an additional 2.57 inches of water for the month of April.

Based on precipitation data and an estimate of the SWE for April, climatic conditions were considered wetter than normal.

A WETS analysis worksheet and supporting precipitation and snowfall data appear in Appendix C along with precipitation and snowfall data.

(4) Growing Season
Climatic normal data from the Minneapolis-St. Paul International Airport indicate the start of the growing season with 50 percent probability of 28˚F or higher to be April 13 (See Appendix C). Conditions encountered during field work on April 27 showed the start of vegetative growth of herbaceous vegetation; however, bare ground conditions were observed within forested areas. Hydrophytic vegetation determinations in these areas were made based on the tree and shrub strata.

B. Findings

(1) Wetlands
A total of two wetlands were delineated within the AOI. A wetland boundary map with sampling point locations is presented in Appendix D followed by data sheets and field photographs in Appendix E. Table 3 summarizes the delineated wetlands described in detail below.
Table 3. Summary of Delineated Wetlands within the Area of Interest

<table>
<thead>
<tr>
<th>Wetland</th>
<th>Wetland Type</th>
<th>Circular 39 Type</th>
<th>Dominant Vegetation</th>
<th>Area (Sq. Ft)</th>
<th>Area (Acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Fresh (wet) Meadow/Shrub Carr/Floodplain Forest</td>
<td>Type 2/Type 6/Type 1</td>
<td>Reed canary grass, box elder, buckthorn, stinging nettle, green ash</td>
<td>43,382.57</td>
<td>0.996</td>
</tr>
<tr>
<td>10</td>
<td>Floodplain Forest</td>
<td>Type 1</td>
<td>Box elder, American elm, buckthorn</td>
<td>9,424.66</td>
<td>0.216</td>
</tr>
</tbody>
</table>

(a) **Wetland 5 (PEMB/Type 2, PSS1/Type 6, PFO1/Type 1)**

Wetland 5 (W5) is a shallow closed basin located near the end of Runway 22. The wetland consists of three plant communities: a dense emergent fringe dominated by reed canary grass on the western edge of the wetland, transitioning to a shrub-carr component and a forested floodplain community on the eastern end. The basin is at the base of knolls on all sides with slopes as steep as 15 percent. Within the wetland, drainage flows from the basin to the southeast through the shrub-carr complex then through a shallow swale to the forest community at its southern extent. The swale hydrologically connects the two lobes of the wetland. The wetland appears to have no outlets.

The 2017 delineation identified the portion of Wetland 5 that was located within Area B. The current delineation completes the delineation of Wetland 5 in Area E.

The NWI mapping indicates this area as a temporary flooded emergent/shrub (PEM1A/PFO1A) wetland. See Appendix B for NWI mapping.

Two data points (DP20 and DP21) were sampled at the northern side of the wetland boundary within the shrub-carr complex. No vegetation disturbance due to management activities was noted. The locations of these points are shown on the Wetland Boundary Map provided in Appendix D; data sheets along with field photographs are presented in Appendix E.

Vegetation

Early season growing conditions were evident at the time of field work. Herbaceous vegetation was beginning to show signs of vegetative growth; however, much of the ground was bare in wetland areas, leading to a hydrophytic vegetation determination primarily made based on shrub and tree strata.

At DP21 (wetland), the dominant vegetation was box elder (*Acer negundo*: FAC), buckthorn (*Rhamnus cathartica*: FAC), and stinging nettle (*Urtica dioica*: FAC). Other tree and shrub components observed were willow (*Salix* sp.) and red osier dogwood (*Cornus alba*: FACW). Reed canary grass (*Phalaris arundinacea*: FACW) was present along the wetland fringe in open, non-forested areas. The hydrophytic vegetation criterion was satisfied at this sampling point.
Hydrology
The western end of the wetland is a steep-sided basin on three sides, approximately five feet deep, situated at the base of two knolls on the north and west sides. The topography flattens to the east, allowing water to flow eastward through a shrub-carr complex and into a forested community. The eastern part of the wetland also receives natural sheet flows from the surrounding higher areas.

At the time of the June 2017 field work, the western end of the wetland held no surface water in the steep-sided basin; conditions during the April 2018 field work revealed a basin completely filled with surface water. Surface water was present within the forested area at the eastern end of the wetland and other areas of the wetland exhibited saturated ground conditions.

At DP21, wetland hydrology was present and indicated by a High Water Table (A2) at nine inches in depth, Saturation (A3) at the surface and secondary indicators of Geomorphic Position (D2) and a positive FAC-Neutral Test (D5). Surface Water (A1) to a depth of 3 inches also was observed within 10 feet of the sampling point. These four primary and secondary indicators meet the wetland hydrology criterion at DP21.

Soils
The area is mapped as poorly drained Auburndale silt loam, a soil unit rated as hydric. At DP 21 (Wetland), a matrix of black (10YR2/1) silt loam overlaid a black (10YR2/1) sandy loam with reddish-brown (5YR4/4) redox concentrations, satisfying hydric soils indicator Redox Dark Surface (F6).

Wetland Boundary
The wetland boundary was determined by differences in vegetation, hydrology, soils, and at various points, a significant change in elevation. In transition to uplands, upland vegetation including white pine (\textit{Pinus strobus}: FACU), Siberian elm (\textit{Ulmus pumila}: FACU), and Kentucky blue grass (\textit{Poa pratensis}: FACU) dominated, even as reed canary grass crossed the boundary at upland sampling point DP20. Elderberry (\textit{Sambucus racemosa}: FACU) was present along the boundary within the eastern forested portion of the wetland. The lack of hydric soils and wetland hydrology indicators also determined the boundary.

A sharp topographic rise of about 4-5 feet accompanied the transition to uplands around the rim of the basin at the western end. Less significant topographic breaks were observed in other areas of the wetland.

\textbf{(b) Wetland 10 (PFO1/Type 1)}
Wetland 10 (W10) is a shallow basin populated with a forested community consisting of box elder, elm, and buckthorn. This closed basin receives sheet flow from the surrounding agricultural fields and has no outlets.
Topography varies little over the breadth of the wetland, which is largely enclosed by the 928-foot contour. Areas in the surrounding farm fields are just a few feet higher in elevation.

This area is mapped on the NWI as forested wetland (PFO1/Type 1). See Appendix B for NWI mapping.

Two data points (DP22 and DP23) were sampled on the north side of the wetland boundary. No vegetation disturbance due to management activities was noted. The locations of these points are shown on the Wetland Boundary Map provided in Appendix D; data sheets along with field photographs are presented in Appendix E.

**Vegetation**
Box elder and buckthorn, both facultative species, were co-dominants at wetland sampling point DP23. The herbaceous layer was not sampled due to lack of early season growth. Several dead standing elms were present within the central area of the wetland. The dominant species within the wetland are hydrophytic and meet the hydrophytic vegetation criterion.

**Hydrology**
Standing water was present within the central core of the wetland at the time of field work. Wetland hydrology was strongly present and indicated within W10. Primary indicators were Surface Water (A1) to a depth of 3 inches, High Water Table (A2) to a depth of 4 inches, and Saturation (A3) at the soil surface. Secondary indicators of wetland hydrology consisted of Geomorphic Position (D2) and a positive FAC-Neutral Test (D5). These five indicators satisfied the wetland hydrology criterion and sampling point DP23.

**Soils**
Soils mapping shows this forested area mapped on Freeon silt loam (2 to 6 percent slopes) and Santiago silt loam (2 to 6 percent slopes). Neither soil is rated as hydric. At wetland sampling point (DP23), a soil profile of black (10YR2/1) loam underlain by a depleted matrix of gray (10YR5/1) clay loam with strong brown (7.5YR4/6) redoximorphic features satisfied the Depleted Below Dark Surface (A11) and the Thick Dark Surface (A12) field indicators. The hydric soils criterion was satisfied with these indicators.

**Wetland Boundary**
The wetland boundary was determined by a transition to upland vegetation, a lack of hydric soils indicators, and a lack of wetland hydrology. At upland sampling point DP22, the hydrophytic vegetation crossed the boundary with box elder, buckthorn, and black cherry (*Prunus serotina*: FACU) dominating the tree and shrub layers. This assemblage of species, though, failed the Prevalence Index at 3.18. The herbaceous layer was not sampled due to early season growing conditions.

This sampling point was approximately 1-2 feet higher in elevation and this topographic difference was also a determinant of the boundary. Hydric soils indicators were absent at upland sampling point DP22 as were wetland hydrology indicators.
C. Uplands

Uplands within the AOI consisted primarily of cultivated fields in corn-soybean rotation. Dominant upland vegetation included Kentucky blue grass, white pine, Siberian elm, and black cherry. Transition to upland was marked by a lack of wetland hydrology and absence of hydric soils in many cases. Often, topographic breaks of 2-3 feet were associated with upland areas.

D. Summary

In summary, the AOI is primarily covered by silt loam and sandy loam soils, with several areas in agricultural production or in managed landscapes. Two wetlands were identified within the AOI: an extension to previously-identified Wetland 5 and Wetland 10, a new wetland investigated in this delineation. These wetlands are documented by four sampling points. The wetland boundary was determined by the observation of multiple indicators of wetland hydrology associated with wetland vegetation on soils exhibiting Depleted Below Dark Surface (A11), Thick Dark Surface (A12), and Redox Dark Surface (F6), in isolated depressional basins. Wetland hydrology was directly observed as Saturation (A3), High Water Table (A2), and/or Surface Water (A1) in both wetlands. The boundary determinations primarily relied on the absence of all three wetland criteria - lack of hydrophytic vegetation, wetland hydrology indicators, and hydric soils – as well as topographic breaks.

(1) Other waters

This AOI does not include any intermittent or perennial streams or navigable waters. No other water bodies were identified during the delineation.
4. Conclusion

A total of two separate wetland boundaries enclosing 1.212 acres were delineated within the AOI near the Runway 22 end at Lake Elmo Airport. The boundary and type information in this report supplements, and should be considered an addendum to, the previous delineation and functional assessment report completed in October 2017.

The information contained in this report confirms that tree removal within these wetlands will not change the Circular 39 wetland type, as stated by the Draft EA/EAW. Therefore, this report does not change the conclusions of the Draft EA/EAW.

On November 9, 2017, the local government unit (LGU) under the Minnesota Wetland Conservation Act (WCA), Valley Branch Watershed District (VBWD), issued a Notice of Decision concurring with the wetland boundaries and types identified in the October 2017 report. The MAC will request an update to this decision that incorporates the additional boundary and type information described in this report addendum for wetlands near the Runway 22 end.
5. Certification and Limitations

The undersigned does hereby certify and state that she is an employee of Mead & Hunt, Inc., that she has been designated as being in responsible charge of the delineation of wetlands described herein; and that this delineation was performed in accordance with the USACE 1987 *Wetland Delineation Manual* as enhanced by the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region* (U.S. Army Corps of Engineers, 2011).

This wetland delineation report documents vegetation, soils, and hydrology conditions on the above-referenced parcel according to these standard accepted practices, and the wetland boundary so established is valid only for the designated area. No uses or interpretations of wetland conditions or boundaries outside of the work area are supported by this work.

The mapped wetland boundaries are valid under the environmental conditions existing at the time of delineation. The user of this information is hereby notified that changing environmental conditions may affect the future validity of the wetland boundary.

MEAD & HUNT, Inc.

Brauna Hartzell
Wetland Ecologist & GIS Analyst

Date: June 2018
6. References

The following data sources were examined prior to fieldwork:


- National Wetlands Inventory (with Minnesota Update) from the U.S. Fish and Wildlife Service at https://www.fws.gov/wetlands/data/mapper.html


Appendix A. Project Location and Topography Map
LAKE ELMO AIRPORT
Proposed Runway 14/32 Relocation and Associated Improvements
Appendix B. Detailed Topographic Map, Aquatic Resources Map, and NRCS Soils Map
Detailed Topography Map
LAKE ELMO AIRPORT
Proposed Runway 14-32 Runway Shift

Project Information
T29N, R20W, S18 and S19
City of Lake Elmo
Washington County, MN
Area of Interest = 130.1 acres
Field work conducted:
June 5 - 9, 2017

Image Source: MnGEO WMS Image Service,
Washington County (2016 color 7-county)

Legend
- Area of Interest (2017)
- Area of Interest (2018)
- Airport Property Boundary

Contour Elevation
- Index Contour
- Intermediate Contour

Note: Contour interval is 2 feet.

Path: X:\2838700\161542.02\TECH\GIS_CAD\Maps\21D_LakeElmoDetailedTopoMap.mxd
Project Information
T29N, R20W, S18 and S19
City of Lake Elmo
Washington County, MN
Area of Interest = 130.1 acres
Field work conducted:
June 5 - 9, 2017

Wetland Data:
National Wetlands Inventory (NWI), Minnesota Public Waters, and National Hydrography Dataset

Mn Public Waters Data:
Public Waters (PW) Basin and Watersource Delineations, Washington County, MN Geospatial Commons

Stream Data:
National Hydrography Dataset (NHD), USGS

Image Source:
MnGEO WMS Image Service, Washington County (2016 color 7-county)
The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: Coordinate System: Web Mercator (EPSG:3857)
Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Washington County, Minnesota
Survey Area Data: Version 12, Oct 4, 2017

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 1, 2013—Sep 13, 2016

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.
## Hydric Rating by Map Unit

<table>
<thead>
<tr>
<th>Map unit symbol</th>
<th>Map unit name</th>
<th>Rating</th>
<th>Acres in AOI</th>
<th>Percent of AOI</th>
</tr>
</thead>
<tbody>
<tr>
<td>49</td>
<td>Antigo silt loam, 0 to 2 percent slopes</td>
<td>0</td>
<td>2.0</td>
<td>20.2%</td>
</tr>
<tr>
<td>49B</td>
<td>Antigo silt loam, 2 to 6 percent slopes</td>
<td>0</td>
<td>0.6</td>
<td>5.8%</td>
</tr>
<tr>
<td>153B</td>
<td>Santiago silt loam, 2 to 6 percent slopes</td>
<td>0</td>
<td>1.9</td>
<td>19.2%</td>
</tr>
<tr>
<td>155B</td>
<td>Chetek sandy loam, 0 to 6 percent slopes</td>
<td>0</td>
<td>0.1</td>
<td>0.8%</td>
</tr>
<tr>
<td>155C</td>
<td>Chetek sandy loam, 6 to 12 percent slopes</td>
<td>0</td>
<td>1.3</td>
<td>13.0%</td>
</tr>
<tr>
<td>189</td>
<td>Auburndale silt loam, 0 to 2 percent slopes</td>
<td>95</td>
<td>0.7</td>
<td>7.1%</td>
</tr>
<tr>
<td>264</td>
<td>Freeon silt loam, 2 to 6 percent slopes</td>
<td>3</td>
<td>3.3</td>
<td>33.9%</td>
</tr>
<tr>
<td><strong>Totals for Area of Interest</strong></td>
<td></td>
<td><strong>9.9</strong></td>
<td></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>
Description

This rating indicates the percentage of map units that meets the criteria for hydric soils. Map units are composed of one or more map unit components or soil types, each of which is rated as hydric soil or not hydric. Map units that are made up dominantly of hydric soils may have small areas of minor nonhydric components in the higher positions on the landform, and map units that are made up dominantly of nonhydric soils may have small areas of minor hydric components in the lower positions on the landform. Each map unit is rated based on its respective components and the percentage of each component within the map unit.

The thematic map is color coded based on the composition of hydric components. The five color classes are separated as 100 percent hydric components, 66 to 99 percent hydric components, 33 to 65 percent hydric components, 1 to 32 percent hydric components, and less than one percent hydric components.

In Web Soil Survey, the Summary by Map Unit table that is displayed below the map pane contains a column named 'Rating'. In this column the percentage of each map unit that is classified as hydric is displayed.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). Under natural conditions, these soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

References:


Rating Options

Aggregation Method: Percent Present
Component Percent Cutoff: None Specified
Tie-break Rule: Lower
Hydric Soil List - All Components

This table lists the map unit components and their hydric status in the survey area. This list can help in planning land uses; however, onsite investigation is recommended to determine the hydric soils on a specific site (National Research Council, 1995; Hurt and others, 2002).

The three essential characteristics of wetlands are hydrophytic vegetation, hydric soils, and wetland hydrology (Cowardin and others, 1979; U.S. Army Corps of Engineers, 1987; National Research Council, 1995; Tiner, 1985). Criteria for all of the characteristics must be met for areas to be identified as wetlands. Undrained hydric soils that have natural vegetation should support a dominant population of ecological wetland plant species. Hydric soils that have been converted to other uses should be capable of being restored to wetlands.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

Hydric soils are identified by examining and describing the soil to a depth of about 20 inches. This depth may be greater if determination of an appropriate indicator so requires. It is always recommended that soils be excavated and described to the depth necessary for an understanding of the redoximorphic processes. Then, using the completed soil descriptions, soil scientists can compare the soil features required by each indicator and specify which indicators have been matched with the conditions observed in the soil. The soil can be identified as a hydric soil if at least one of the approved indicators is present.

Map units that are dominantly made up of hydric soils may have small areas, or inclusions, of nonhydric soils in the higher positions on the landform, and map units dominantly made up of nonhydric soils may have inclusions of hydric soils in the lower positions on the landform.

The criteria for hydric soils are represented by codes in the table (for example, 2). Definitions for the codes are as follows:
1. All Histels except for Folistels, and Histosols except for Folists.

2. Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, Pachic subgroups, or Cumulic subgroups that:
   A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
   B. Show evidence that the soil meets the definition of a hydric soil;

3. Soils that are frequently ponded for long or very long duration during the growing season.
   A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
   B. Show evidence that the soil meets the definition of a hydric soil;

4. Map unit components that are frequently flooded for long duration or very long duration during the growing season that:
   A. Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or
   B. Show evidence that the soil meets the definition of a hydric soil;

Hydric Condition: Food Security Act information regarding the ability to grow a commodity crop without removing woody vegetation or manipulating hydrology.

References:
<table>
<thead>
<tr>
<th>Component/Local Phase</th>
<th>Component</th>
<th>Comp. pct.</th>
<th>Landform</th>
<th>Hydric status</th>
<th>Hydric criteria met (code)</th>
</tr>
</thead>
<tbody>
<tr>
<td>49: Antigo silt loam, 0 to 2 percent slopes</td>
<td>Antigo</td>
<td>70-100</td>
<td>Terraces,flats</td>
<td>No</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Billyboy</td>
<td>0-15</td>
<td>Terraces,flats</td>
<td>No</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Sconsin</td>
<td>0-10</td>
<td>Terraces,flats</td>
<td>No</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Rosholt</td>
<td>0-10</td>
<td>Terraces,flats</td>
<td>No</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Ossmer</td>
<td>0-5</td>
<td>Terraces,flats</td>
<td>No</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Brill</td>
<td>0-5</td>
<td>Terraces,flats</td>
<td>No</td>
<td>—</td>
</tr>
<tr>
<td>49B: Antigo silt loam, 2 to 6 percent slopes</td>
<td>Antigo</td>
<td>70-100</td>
<td>Terraces,flats,hillslopes</td>
<td>No</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Rosholt</td>
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<td>Terraces,flats,hillslopes</td>
<td>No</td>
<td>—</td>
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<tr>
<td></td>
<td>Billyboy</td>
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<td>—</td>
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<tr>
<td></td>
<td>Ossmer</td>
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<td>Terraces,flats,hillslopes</td>
<td>No</td>
<td>—</td>
</tr>
<tr>
<td>153B: Santiago silt loam, 2 to 6 percent slopes</td>
<td>Santiago</td>
<td>90</td>
<td>Moraines</td>
<td>No</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Freeon</td>
<td>5</td>
<td>—</td>
<td>No</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Kingsley</td>
<td>5</td>
<td>—</td>
<td>No</td>
<td>—</td>
</tr>
<tr>
<td>155B: Chetek sandy loam, 0 to 6 percent slopes</td>
<td>Chetek</td>
<td>90</td>
<td>Outwash plains</td>
<td>No</td>
<td>—</td>
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<td></td>
<td>Kingsley</td>
<td>5</td>
<td>—</td>
<td>No</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Poskin</td>
<td>5</td>
<td>—</td>
<td>No</td>
<td>—</td>
</tr>
<tr>
<td>155C: Chetek sandy loam, 6 to 12 percent slopes</td>
<td>Chetek</td>
<td>90</td>
<td>Pitted outwash plains</td>
<td>No</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Poskin</td>
<td>5</td>
<td>—</td>
<td>No</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>Kingsley</td>
<td>5</td>
<td>—</td>
<td>No</td>
<td>—</td>
</tr>
<tr>
<td>189: Auburndale silt loam, 0 to 2 percent slopes</td>
<td>Auburndale</td>
<td>70-100</td>
<td>Depressions on ground moraines,drainage ways on ground moraines</td>
<td>Yes</td>
<td>2,3</td>
</tr>
<tr>
<td></td>
<td>Almena</td>
<td>0-10</td>
<td>Ground moraines</td>
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<td>—</td>
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<td>Map symbol and map unit name</td>
<td>Component/Local Phase</td>
<td>Comp. pct.</td>
<td>Landform</td>
<td>Hydric status</td>
<td>Hydric criteria met (code)</td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>-----------------------</td>
<td>------------</td>
<td>---------------------------------------------------</td>
<td>---------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>Capitola</td>
<td>0-10</td>
<td></td>
<td>Depressions on ground moraines, drainage ways on ground moraines</td>
<td>Yes</td>
<td>2,3</td>
</tr>
<tr>
<td>Cathro</td>
<td>0-5</td>
<td></td>
<td>Depressions on ground moraines</td>
<td>Yes</td>
<td>1,3</td>
</tr>
<tr>
<td>Auburndale-Briefly flooded</td>
<td>0-5</td>
<td></td>
<td>Drainageways on ground moraines</td>
<td>Yes</td>
<td>2</td>
</tr>
<tr>
<td>264: Freeon silt loam, 2 to 6 percent slopes</td>
<td>Freeon</td>
<td>75-95</td>
<td>Ground moraines, moraines</td>
<td>No</td>
<td>—</td>
</tr>
<tr>
<td>Magnor</td>
<td>5-15</td>
<td></td>
<td>Ground moraines, moraines</td>
<td>No</td>
<td>—</td>
</tr>
<tr>
<td>Santiago</td>
<td>0-5</td>
<td></td>
<td>Ground moraines, moraines</td>
<td>No</td>
<td>—</td>
</tr>
<tr>
<td>Capitola</td>
<td>0-5</td>
<td></td>
<td>Depressions on ground moraines, drainage ways on ground moraines</td>
<td>Yes</td>
<td>2,3</td>
</tr>
<tr>
<td>Haugen</td>
<td>0-5</td>
<td></td>
<td>Moraines</td>
<td>No</td>
<td>—</td>
</tr>
<tr>
<td>Freeon-Very stony</td>
<td>0-5</td>
<td></td>
<td>Ground moraines, moraines</td>
<td>No</td>
<td>—</td>
</tr>
</tbody>
</table>

**Data Source Information**

Soil Survey Area: Washington County, Minnesota
Survey Area Data: Version 12, Oct 4, 2017
Appendix C. WETS Analysis and Climatic Data
## WETS Analysis Worksheet

**Project Name:** Lake Elmo Airport (21D) Runway 14/32 Relocation  
**Period Of Interest:** January - March  
**Station:** LAKE ELMO, MN (Gridded)  
**County:** Washington, MN  
**Normals Period:** 1981 - 2010

### Long-term rainfall records (MN State Climatology Office)

<table>
<thead>
<tr>
<th>Month</th>
<th>30% chance &lt;</th>
<th>Normal</th>
<th>30% chance &gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st month prior: April</td>
<td>2.10</td>
<td>2.81</td>
<td>3.23</td>
</tr>
<tr>
<td>2nd month prior: March</td>
<td>1.48</td>
<td>1.85</td>
<td>2.08</td>
</tr>
<tr>
<td>3rd month prior: February</td>
<td>0.49</td>
<td>0.80</td>
<td>0.94</td>
</tr>
</tbody>
</table>

**Sum =** 5.46

### Site Determination†

<table>
<thead>
<tr>
<th>Site Rainfall (in)</th>
<th>Condition (Dry/Normal*/Wet)</th>
<th>Condition** Value</th>
<th>Month Weight</th>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.72</td>
<td>Normal</td>
<td>2</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>1.22</td>
<td>Dry</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>1.73</td>
<td>Wet</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>

**Sum*** = 11

† MN State Climatology Office

* Normal precipitation with 30% to 70% probability of occurrence  
**Condition value:  
Dry = 1  
Normal = 2  
Wet = 3  
***If sum is:  
6 to 9 then period has been drier than normal  
10 to 14 then period has been normal  
15 to 18 then period has been wetter than normal

**Precipitation data source:**  
http://www.ncdc.noaa.gov/cdo-web/datatools  
Minnesota State Climatology Office (http://climateapps.dnr.state.mn.us/gridded_data/precip/wetland/wetland.asp)

**Reference:**  

---

C-38
Precipitation data for target wetland location:

- County: Washington
- Township number: 29N
- Township name: Baytown
- Range number: 20W
- Nearest community: Lake Elmo
- Section number: 18

Source: Minnesota State Climatology Office (http://climateapps.dnr.state.mn.us/gridded_data/precip/monthly/monthly_gridded_precip.asp)

### Precipitation Totals

- **Precipitation totals are in inches**
- **Multi-month totals:**
  - **WARM** = warm season (May thru September)
  - **ANN** = calendar year (January thru December)
  - **WAT** = water year (Oct. previous year thru Sep. present year)

### Period-of-Record Summary Statistics

<table>
<thead>
<tr>
<th>Year</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>WARM</th>
<th>ANN</th>
<th>WAT</th>
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</thead>
<tbody>
<tr>
<td>2018</td>
<td>1.79</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2017</td>
<td>1.57</td>
<td>0.73</td>
<td>0.89</td>
<td>3.51</td>
<td>6.42</td>
<td>3.39</td>
<td>2.59</td>
<td>5.56</td>
<td>1.35</td>
<td>4.26</td>
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<td>0.89</td>
<td>19.30</td>
<td>31.67</td>
<td>34.11</td>
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<td>0.88</td>
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<td>2.86</td>
<td>2.87</td>
<td>4.59</td>
<td>5.57</td>
<td>9.03</td>
<td>6.12</td>
<td>3.31</td>
<td>2.29</td>
<td>2.51</td>
<td>28.18</td>
<td>42.56</td>
<td>46.10</td>
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<tr>
<td>2015</td>
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<td>0.37</td>
<td>0.68</td>
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<td>4.36</td>
<td>5.24</td>
<td>7.71</td>
<td>3.38</td>
<td>5.56</td>
<td>3.14</td>
<td>5.27</td>
<td>3.24</td>
<td>21.95</td>
<td>35.12</td>
<td>36.02</td>
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<tr>
<td>2014</td>
<td>1.28</td>
<td>1.41</td>
<td>0.93</td>
<td>7.01</td>
<td>11.46</td>
<td>2.55</td>
<td>3.68</td>
<td>2.31</td>
<td>1.66</td>
<td>1.08</td>
<td>24.82</td>
<td>39.40</td>
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<tr>
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<td>2.29</td>
<td>5.29</td>
<td>5.65</td>
<td>8.32</td>
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<td>0.78</td>
<td>1.61</td>
<td>3.87</td>
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<td>17.86</td>
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<tr>
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<td>0.94</td>
<td>2.08</td>
<td>3.23</td>
<td>4.05</td>
<td>5.73</td>
<td>4.67</td>
<td>4.59</td>
<td>3.56</td>
<td>2.99</td>
<td>1.90</td>
<td>20.59</td>
<td>33.09</td>
<td>32.88</td>
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<tr>
<td>2011</td>
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<td>1.29</td>
<td>1.85</td>
<td>2.81</td>
<td>3.89</td>
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<td>4.02</td>
<td>4.59</td>
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<td>2.67</td>
<td>3.22</td>
<td>2.46</td>
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<td>2009</td>
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### Color Key

- **Total is in lowest 30th percentile of the period-of-record distribution**
- **Total is >= 30th and <= 70th percentile**
- **Total is in highest 30th percentile of the period-of-record distribution**

- A "R" following a monthly total indicates a provisional value derived from radar-based estimates.
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0.58
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Jan
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Minnesota State Climatology Office

Nearest Station Precipitation Data Retrieval

Minnesota's precipitation data archive is searched for data closest to a selected target location for each month. Values from the site closest to the target location are returned below after clicking the retrieve monthly data or retrieve daily data buttons. The precipitation data are made up of measured rainfall and the measured liquid content of snowfall.

Temperature, snowfall, and snow depth data from National Weather Service reporting stations are no longer retrieved from this application. To obtain those data, see our newest data retrieval tool (May 2014). National Weather Service precipitation data continue to be available from this application.

Obtaining data for legal purposes
Guide for column headers in the data table

target location: Washington-Baytown-Lake Elmo 29N 20W S18 (latitude: 44.99844 longitude: 92.85172)

[click to select target location]

years: 2018 ▼ to 2018 ▼

number of missing days allowed per month: 3

[retrieval options]

results:

| mon year | cc | tttN | rrW | ss | mnnn | oooo | ooo0 | ooo00 | ooo000 | ooo0000 | pre (inches) | dis | m |
|----------|----|------|-----|----|------|------|------|-------|--------|-----------|----------------|-----|
| Jan 2018 | 82 | 29N  | 20W | 29 | SwCD |       | 1.52 |       | 2 mi   |           | 2 mi.          |     |
| Feb 2018 | 82 | 29N  | 20W | 29 | SwCD |       | 1.73 |       | 2 m    |           | 2 m.           |     |
| Mar 2018 | 82 | 29N  | 20W | 29 | SwCD |       | 1.22 |       | 2 m    |           | 2 m.           |     |
| Apr 2018 | 82 | 29N  | 20W | 29 | SwCD |       | 2.72 |       | 2 m    |           | 2 m.           |     |
| May 2018 | 82 | 29N  | 20W | 29 | SwCD |       | 3.13 |       | 2 m    |           | 2 m.           |     |
| Jun 2018 |    |      |     |    |      |       |      |       |        | 999 mi.   |                | m |
| Jul 2018 |    |      |     |    |      |       |      |       |        | 999 mi.   |                | m |
| Aug 2018 |    |      |     |    |      |       |      |       |        | 999 mi.   |                | m |
| Sep 2018 |    |      |     |    |      |       |      |       |        | 999 mi.   |                | m |
| Oct 2018 |    |      |     |    |      |       |      |       |        | 999 mi.   |                | m |
| Nov 2018 |    |      |     |    |      |       |      |       |        | 999 mi.   |                | m |
| Dec 2018 |    |      |     |    |      |       |      |       |        | 999 mi.   |                | m |

Where indicated, Missing values are shown as ‘m’. Days on which precip accumulated in the gage are shown as ‘+’. ‘TTTN RR SS’ is the ‘public land survey (PLS) or ‘legal’ location of the observed data. Section values greater 36 are SECTOR ‘TIC’ locations plus 100. ‘NWS ID’ the National Weather Service Cooperative station number. Note that the ‘PLS will always be correct for precipitation data while the ‘NWS ID will always be correct for the temperature data. If no PLS info is supplied the ‘NWS ID’ number applies to all shown data.

State Climatology Office - MnDNR - Ecological and Water Resources
### WETS Table

**WETS Station:** MINNEAPOLIS/ST PAUL AP, MN  
**Requested years:** 1971 - 2010

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### GROWING SEASON DATES

- **Years with missing data:**
  - 24 deg = 0
  - 28 deg = 0
  - 32 deg = 0

- **Years with no occurrence:**
  - 24 deg = 0
  - 28 deg = 0
  - 32 deg = 0

- **Data years used:**
  - 24 deg = 40
  - 28 deg = 40
  - 32 deg = 40

- **Probability**
  - 24 F or higher
  - 28 F or higher
  - 32 F or higher

- **50 percent**
  - 4/5 to 11/4: 213 days
  - 4/13 to 10/9: 189 days
  - 4/28 to 10/8: 163 days

- **70 percent**
  - 4/1 to 11/9: 222 days
  - 4/8 to 10/24: 199 days
  - 4/24 to 10/12: 171 days

* Percent chance of the growing season occurring between the Beginning and Ending dates.

### STATS TABLE - total precipitation (inches)

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<td>3.78</td>
<td>1.75</td>
<td>2.47</td>
<td>1.30</td>
<td>1.64</td>
<td>0.71</td>
<td>71.22</td>
</tr>
<tr>
<td>1944</td>
<td>0.24</td>
<td>1.10</td>
<td>1.20</td>
<td>2.24</td>
<td>6.15</td>
<td>6.69</td>
<td>4.39</td>
<td>3.65</td>
<td>0.97</td>
<td>0.26</td>
<td>0.90</td>
<td>0.80</td>
<td>35.08</td>
</tr>
<tr>
<td>1945</td>
<td>0.63</td>
<td>1.84</td>
<td>1.95</td>
<td>2.95</td>
<td>3.09</td>
<td>5.57</td>
<td>4.13</td>
<td>2.27</td>
<td>2.09</td>
<td>0.00</td>
<td>0.00</td>
<td>0.27</td>
<td>19.19</td>
</tr>
<tr>
<td>1946</td>
<td>0.94</td>
<td>1.15</td>
<td>1.20</td>
<td>0.66</td>
<td>3.04</td>
<td>7.80</td>
<td>2.76</td>
<td>0.43</td>
<td>6.00</td>
<td>2.10</td>
<td>0.00</td>
<td>28.00</td>
<td></td>
</tr>
</tbody>
</table>

C-44
<table>
<thead>
<tr>
<th>Date</th>
<th>Temperature (F)</th>
<th>Precipitation (Inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TAVG TMAX TMIN HTDD CLDD EMXT</td>
<td>DX90 DX32 DT32 DT00 PRCP EMXP SNOW EMSD DP01 DP10 DP1X</td>
</tr>
<tr>
<td></td>
<td>Mean Mean Mean Min Heating Degree Days Cooling Degree Days Highest Lowest Number of Days Number of Days</td>
<td>Total Greatest Observed Snow, Sleet</td>
</tr>
<tr>
<td></td>
<td>Max. Min</td>
<td>Max &gt;= 90</td>
</tr>
<tr>
<td>Jan</td>
<td>1.27 0.99 23 18.6</td>
<td>4 3 0</td>
</tr>
<tr>
<td>Feb</td>
<td>1.69 0.59 25 15.8</td>
<td>7 4 0</td>
</tr>
<tr>
<td>Mar</td>
<td>1.58 0.63 06 11.2</td>
<td>8 5 0</td>
</tr>
<tr>
<td>Apr</td>
<td>3.13 1.21 15 25.7</td>
<td>8 5 1</td>
</tr>
</tbody>
</table>

**Notes**

(Blank) Data element not reported or missing.

+ Occurred on one or more previous dates during the month. The date in the Date field is the last day of occurrence.

A Accumulated amount.

T Trace Amount.

X Monthly means or totals based on incomplete time series.
ESTIMATING THE WATER EQUIVALENT OF SNOW

When the water equivalent of snow cannot be accurately measured by melting, weighing, or core sampling; the observer shall estimate the water equivalent to the nearest 0.01 inch. Use Figure 11-8, New Snowfall to Estimated Meltwater Conversion Table, only as a guide in estimating the water equivalency of newly fallen snow.

### New Snowfall to Estimated Meltwater Conversion Table

<table>
<thead>
<tr>
<th>MELT WATER EQUIVALENT (INCHES)</th>
<th>NEW SNOWFALL (INCHES)</th>
<th>Temperature (°F)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>34 to 28</td>
<td>27 to 20</td>
</tr>
<tr>
<td>trace</td>
<td>trace</td>
<td>0.1</td>
</tr>
<tr>
<td>.01</td>
<td>0.1</td>
<td>0.2</td>
</tr>
<tr>
<td>.02</td>
<td>0.2</td>
<td>0.3</td>
</tr>
<tr>
<td>.03</td>
<td>0.3</td>
<td>0.4</td>
</tr>
<tr>
<td>.04</td>
<td>0.4</td>
<td>0.5</td>
</tr>
<tr>
<td>.05</td>
<td>0.5</td>
<td>0.6</td>
</tr>
<tr>
<td>.06</td>
<td>0.6</td>
<td>0.7</td>
</tr>
<tr>
<td>.07</td>
<td>0.7</td>
<td>0.8</td>
</tr>
<tr>
<td>.08</td>
<td>0.8</td>
<td>0.9</td>
</tr>
<tr>
<td>.09</td>
<td>0.9</td>
<td>1.0</td>
</tr>
<tr>
<td>.10</td>
<td>1.0</td>
<td>1.1</td>
</tr>
<tr>
<td>.11</td>
<td>1.1</td>
<td>1.2</td>
</tr>
<tr>
<td>.12</td>
<td>1.2</td>
<td>1.3</td>
</tr>
<tr>
<td>.13</td>
<td>1.3</td>
<td>1.4</td>
</tr>
</tbody>
</table>

Temperature (°F): 34 to 28, 27 to 20, 19 to 15, 14 to 10, 9 to 0, -1 to -20, -21 to -40.
| .14 | 1.4 | 2.1 | 2.8 | 4.2 | 5.6 | 7.0 | 14.0 |
| .15 | 1.5 | 2.3 | 3.0 | 4.5 | 6.0 | 7.5 | 15.0 |
| .16 | 1.6 | 2.4 | 3.2 | 4.8 | 6.4 | 8.0 | 16.0 |
| .17 | 1.7 | 2.6 | 3.4 | 5.1 | 6.8 | 8.5 | 17.0 |
| .18 | 1.8 | 2.7 | 3.6 | 5.4 | 7.2 | 9.0 | 18.0 |
| .19 | 1.9 | 2.9 | 3.8 | 5.7 | 7.6 | 9.5 | 19.0 |
| .20 | 2.0 | 3.0 | 4.0 | 6.0 | 8.0 | 10.0 | 20.0 |
| .21 | 2.1 | 3.1 | 4.2 | 6.3 | 8.4 | 10.5 | 21.0 |
| .22 | 2.2 | 3.3 | 4.4 | 6.6 | 8.8 | 11.0 | 22.0 |
| .23 | 2.3 | 3.4 | 4.6 | 6.9 | 9.2 | 11.5 | 23.0 |
| .24 | 2.4 | 3.6 | 4.8 | 7.2 | 9.6 | 12.0 | 24.0 |
| .25 | 2.5 | 3.8 | 5.0 | 7.5 | 10.0 | 12.5 | 25.0 |
| .30 | 3.0 | 4.5 | 6.0 | 9.0 | 12.0 | 15.0 | 30.0 |
| .35 | 3.5 | 5.3 | 7.0 | 10.5 | 14.0 | 17.5 | 35.0 |
| .40 | 4.0 | 6.0 | 8.0 | 12.0 | 16.0 | 20.0 | 40.0 |
| .45 | 4.5 | 6.8 | 9.0 | 13.5 | 18.0 | 22.5 | 45.0 |
| .50 | 5.0 | 7.5 | 10.0 | 15.0 | 20.0 | 25.0 | 50.0 |
| .60 | 6.0 | 9.0 | 12.0 | 18.0 | 24.0 | 30.0 | 60.0 |
| .70 | 7.0 | 10.5 | 14.0 | 21.0 | 28.0 | 35.0 | 70.0 |
| .80 | 8.0 | 12.0 | 16.0 | 24.0 | 32.0 | 40.0 | 80.0 |
| .90 | 9.0 | 13.5 | 18.0 | 27.0 | 36.0 | 45.0 | 90.0 |
| 1.00 | 10.0 | 15.0 | 20.0 | 30.0 | 40.0 | 50.0 | 100.0 |
| 2.00 | 20.0 | 30.0 | 40.0 | 60.0 | 80.0 | 100.0 | 200.0 |
| 3.00 | 30.0 | 45.0 | 60.0 | 90.0 | 120.0 | 150.0 | 300.0 |

This figure can only be used in determining amounts of newly fallen snow. It cannot be used for determining the water equivalency (933RRR) of "old" snow. Packing and melting/refreezing have substantial effects on the density of the snow pack and are not accounted for by this figure.
Appendix D. Wetland Boundary Map
Wetland Boundary Map Addendum
LAKE ELMO AIRPORT
Proposed Runway 14-32 Runway Shift

Legend

- Photo Location (2018)
- Data Point Location (2018)
- 2017 Area of Interest
- 2018 Area of Interest
- Photo Location (2017)
- Data Point Location (2017)
- Wetland Boundary (2017)
- Wetland Boundary (2018)
- Wetland within AOI
- Wetland outside AOI
- Culvert End Location
- Flow Direction
- Ditch/Swale Flow
- Airport Property Boundary

Project Information

T29N, R20W, S18 and S19
City of Lake Elmo
Washington County, MN
Area of Interest = 130.1 acres
Field work conducted:
June 5 - 9, 2017;
April 27 and 29, 2018

Image Source: MnGEO WMS Image Service, Washington County (2016 color 7-county)

Contour Source:
Minnesota Geospatial Commons, Minnesota Elevation Mapping Project
Twin Cities Metro Region 2011
Appendix E.  Data Sheets with Field Photographs
Project/Site: Lake Elmo airport (21D) Runway 14/32 Relocation     City/County: Washington     Sampling Date: 04/27/2018
Applicant/Owner: Metropolitan Airports Commission     State: Minnesota     Sample Point: DP 20
Investigator(s): Brauna Hartzell, Mead & Hunt, Inc.       Section, Township, Range: Section 18, T29N, R20W
Landform (hillslope, terrace, etc.): backslope   Local relief (concave, convex, none): convex  Slope (%): < 1%
Subregion (LRR or MLRA): K/153 ____________  Lat: 45.001641     Long: -92.848589     Datum: NAD 83
Soil Map Unit Name: Auburndale silt loam, 0 – 2 percent slopes (189)     NWI classification: Are climatic hydrologic conditions on the site typical for this time of year?  Yes No (If no, explain in Remarks.)
Are Vegetation__, Soil__, or Hydrology__ significantly disturbed? Are "Normal Circumstances" present?  Yes No (If needed, explain any answers in Remarks.)
Are Vegetation__, Soil__, or Hydrology__ naturally problematic? (If needed, explain any answers in Remarks.)

**SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.**

<table>
<thead>
<tr>
<th>Hydrophytic Vegetation Present?</th>
<th>Yes ☐ No ☒</th>
<th>Is the Sampled Area within a Wetland?</th>
<th>Yes ☐ No ☒</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydric Soil Present?</td>
<td>Yes ☐ No ☒</td>
<td>If yes, optional Wetland Side ID:</td>
<td></td>
</tr>
<tr>
<td>Wetland Hydrology Present?</td>
<td>Yes ☐ No ☒</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Remarks: (Explain alternative procedures here or in a separate report.) A WETS analysis of the antecedent precipitation indicates the hydrologic conditions on the site were wetter than normal range at the time of investigation.

**VEGETATION - Use scientific names of plants**

<table>
<thead>
<tr>
<th>Tree Stratum (Plot size: 30')</th>
<th>Absolute % Cover</th>
<th>Dominant Species?</th>
<th>Indicator Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Pinus strobus</td>
<td>10</td>
<td>X</td>
<td>FACU</td>
</tr>
<tr>
<td>2. Ulmus pumila</td>
<td>3</td>
<td>X</td>
<td>FACU</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sapling/Shrub Stratum (Plot size: _____)</th>
<th>13 = Total Cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Herb Stratum (Plot size: 5')</th>
<th>Absolute % Cover</th>
<th>Dominant Species?</th>
<th>Indicator Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Phalaris arundinacea</td>
<td>45</td>
<td>X</td>
<td>FACW</td>
</tr>
<tr>
<td>2. Helianthus annuus</td>
<td>10</td>
<td>FACU</td>
<td></td>
</tr>
<tr>
<td>3. Poa pratensis</td>
<td>45</td>
<td>X</td>
<td>FACU</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Woody Vine Stratum (Plot size: _____)</th>
<th>100 = Total Cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
</tbody>
</table>

50/20 Thresholds: 20% 65% 6.5%
Tree Stratum 2.6
Sapling/ Shrub Stratum
Herb Stratum
Woody Vine Stratum

**Dominance Test worksheet:**
Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 25 (A/B)

**Prevalence Index worksheet:**
Total % Cover of. Multiply by:
OBL species ___ x 1 =
FACW species ___ x 2 =
FAC species ___ x 3 =
FACU species ___ x 4 =
UPL species ___ x 5 =
Column Totals: (A) (B)
Prevalence Index = B/A =

**Hydrophytic Vegetation Indicators:**
☐ Rapid Test for Hydrophytic Vegetation
☐ Dominance Test is >50%
☐ Prevalence Index is < 3.01
☐ Morphological Adaptations’ (Provide supporting data in Remarks or on a separate sheet)
☐ Problematic Hydrophytic Vegetation’ (Explain)

1Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Vegetation Strata:**
Tree - Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
Sapling/shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.
Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
Woody vines - All woody vines greater than 3.28 ft in height.

**Hydrophytic Vegetation Present?**
Yes ☐ No ☒
### SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

<table>
<thead>
<tr>
<th>Depth (inches)</th>
<th>Matrix Color (moist)</th>
<th>Color (moist) %</th>
<th>Type¹</th>
<th>Loc²</th>
<th>Texture</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-20</td>
<td>10YR3/2</td>
<td></td>
<td></td>
<td></td>
<td>Sandy loam</td>
<td></td>
</tr>
</tbody>
</table>

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

### Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)

### Restrictive Layer (if observed):

Type: 

Depth (inches): 

Remarks: Hydric soils are not present. Does not meet hydric soils criteria.

### HYDROLOGY

### Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)
- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)

Secondary Indicators (minimum of two required)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

### Field Observations:

- Surface Water Present? Yes ☑ No ☒ Depth (inches): < 20
- Water Table Present? Yes ☑ No ☒ Depth (inches): 
- Saturation Present? Yes ☑ No ☒ Depth (inches): 

Field Observations Describe Recorded Data (stream gauge, monitoring, well, aerial photos, previous inspections), if available:

Remarks: Wetland hydrology is neither present nor indicated.

Photo: See general site Photos 29–34.
Data Points 20 and 21

Photo 32. View to the southwest.

Photo 31. General Site. View to the southwest.
**WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region**

- **Project/Site:** Lake Elmo airport (21D) Runway 14/32 Relocation
- **City/County:** Washington
- **Sampling Date:** 04/27/2018
- **Applicant/Owner:** Metropolitan Airports Commission
- **State:** Minnesota
- **Sample Point:** DP 21

**Investigator(s):** Brauna Hartzell, Mead & Hunt, Inc.

**Landform (hillslope, terrace, etc.):** Basin

**Local relief (concave, convex, none):** concave

**Slope (%):** < 1%

**Subregion (LRR or MLRA):** K/153 ____________

**Lat:** 45.001638

**Long:** -92.848691

**Datum:** NAD 83

**Soil Map Unit Name:** Auburndale silt loam, 0 to 2 percent slopes

**NWI classification:** PSS

**Are climatic hydrologic conditions on the site typical for this time of year?** Yes

**Are Vegetation, Soil, or Hydrology significantly disturbed? Are “Normal Circumstances” present?** Yes

**Are Vegetation, Soil, or Hydrology naturally problematic?** No

**SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.**

- **Hydrophytic Vegetation Present?** Yes
- **Hydric Soil Present?** Yes
- **Wetland Hydrology Present?** Yes

**Remarks:** (Explain alternative procedures here or in a separate report.) A WETS analysis of the antecedent precipitation indicates the hydrologic conditions on the site were wetter than normal range at the time of investigation.

**VEGETATION - Use scientific names of plants**

<table>
<thead>
<tr>
<th>Stratum</th>
<th>Plot Size</th>
<th>% Cover</th>
<th>Species</th>
<th>Indicator</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tree Stratum</td>
<td>30'</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Acer negundo</td>
<td></td>
<td>70</td>
<td>X</td>
<td>FAC</td>
<td></td>
</tr>
<tr>
<td>2. Rhamnus cathartica</td>
<td></td>
<td>20</td>
<td>X</td>
<td>FAC</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td>90</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sapling/Shrub Stratum</td>
<td>___</td>
<td>90 = Total Cover</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Herb Stratum</td>
<td>5'</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Acer negundo</td>
<td></td>
<td>5</td>
<td>X</td>
<td>FAC</td>
<td></td>
</tr>
<tr>
<td>2. Urtica dioica</td>
<td></td>
<td>5</td>
<td>X</td>
<td>FAC</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Woody Vine Stratum</td>
<td>___</td>
<td>10 = Total Cover</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**50/20 Thresholds**

<table>
<thead>
<tr>
<th>Stratum</th>
<th>Threshold</th>
<th>% Cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tree Stratum</td>
<td>18</td>
<td>45</td>
</tr>
<tr>
<td>Sapling/Shrub Stratum</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Herb Stratum</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Woody Vine Stratum</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Dominance Test worksheet:**

| Number of Dominant Species That Are OBL, FACW, or FAC: | 4 (A) |
| Total Number of Dominant Species Across All Strata: | 4 (B) |
| Percent of Dominant Species That Are OBL, FACW, or FAC: | 100 (A/B) |

**Prevalence Index worksheet:**

<table>
<thead>
<tr>
<th>Total % Cover of</th>
<th>Multiply by:</th>
</tr>
</thead>
<tbody>
<tr>
<td>OBL species</td>
<td>x 1 = ______</td>
</tr>
<tr>
<td>FACW species</td>
<td>x 2 = ______</td>
</tr>
<tr>
<td>FAC species</td>
<td>x 3 = ______</td>
</tr>
<tr>
<td>FACU species</td>
<td>x 4 = ______</td>
</tr>
<tr>
<td>UPL species</td>
<td>x 5 = ______</td>
</tr>
<tr>
<td>Column Totals:</td>
<td>(A) (B)</td>
</tr>
<tr>
<td>Prevalence Index</td>
<td>B/A = ______</td>
</tr>
</tbody>
</table>

**Hydrophytic Vegetation Indicators:**

- □ Rapid Test for Hydrophytic Vegetation
- □ Dominance Test is >50%
- □ Prevalence Index is <3.0
- □ Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet)
- □ Problematic Hydrophytic Vegetation' (Explain)

**Definitions of Vegetation Strata:**

- **Tree** - Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
- **Sapling/shrub** - Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.
- **Herb** - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
- **Woody vines** - All woody vines greater than 3.28 ft in height.

**Remarks:** (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation is present. Herbaceous vegetative growth limited due to early season conditions. DP21 (wetland) is about 2 feet lower in elevation than paired upland sampling point (DP20). About 25 feet separates the two points.
### Soil Sampling Point: DP21

#### Profile Description:
(Describe to the depth needed to document the indicator or confirm the absence of indicators.)

<table>
<thead>
<tr>
<th>Depth (inches)</th>
<th>Color (moist)</th>
<th>%</th>
<th>Color (moist)</th>
<th>%</th>
<th>Type¹</th>
<th>Loc²</th>
<th>Texture</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-6</td>
<td>10-YR2/1</td>
<td>100</td>
<td>5-YR4/4</td>
<td>4</td>
<td>C</td>
<td>M</td>
<td>Silt loam</td>
<td></td>
</tr>
<tr>
<td>6-20</td>
<td>10-YR2/1</td>
<td>96</td>
<td>5-YR4/4</td>
<td>4</td>
<td>C</td>
<td>M</td>
<td>Sandy loam</td>
<td></td>
</tr>
</tbody>
</table>

¹Type:  C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.
²Location:  PL=Pore Lining, M=Matrix.

#### Hydric Soil Indicators:
- Histosol (A1)
- Histic Epipedon (A2)
- Black Historic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)

#### Indicators for Problematic Hydric Histosol (A1)
- Stripped Matrix (S6)
- Dark Surface (S7) (LRR R, MLRA 149B)
- Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- Loamy Mucky Mineral (F1) (LRR K, L)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Redox Depressions (F8)

#### Restrictive Layer (if observed):
- Type: __________
- Depth (inches): __________

#### Remarks:
Hydric soils are present. Hydric soils indicator Redox Dark Surface (F6) is satisfied.

### Hydrology

#### Primary Hydrology Indicators:
- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

#### Secondary Hydrology Indicators:
- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- FAC-Neutral Test (D5)
- Microtopographic Relief (D4)

#### Field Observations:
- Surface Water Present? Yes ☒ No ☐ Depth (inches): 3
- Water Table Present? Yes ☒ No ☐ Depth (inches): 9
- Saturation Present? Yes ☒ No ☐ Depth (inches): 0

#### Remarks:
Wetland hydrology is present and indicated. Surface water to about 3 inches in depth about 10 feet to the south within the basin. Water is 4-5 feet deep in parts of the basin due to drainage of melting heavy early spring snowfall.

Photo: See general site Photos 29 - 34.
Data Points 20 and 21

Photo 32. View to the southwest.

Photo 31. General Site. View to the southwest.
Project/Site: Lake Elmo airport (21D) Runway 14/32 Relocation  City/County: Washington  Sampling Date: 04/27/2018
Applicant/Owner: Metropolitan Airports Commission  State: Minnesota  Sample Point: DP22
Investigator(s): Brauna Hartzell, Mead & Hunt, Inc.  Section, Township, Range: Section 18, T29N, R20W
Landform (hillslope, terrace, etc.): shoulder  Local relief (concave, convex, none): convex  Slope (%): < 1%
Subregion (LRR or MLRA): K/153 ____________  Lat: 45.000207     Long: -92.849608     Datum: NAD 83
Soil Map Unit Name: Santiago silt loam, 2 to 6 percent slopes (153B)  NWI classification:

Are climatic hydrologic conditions on the site typical for this time of year?  Yes  No
(If no, explain in Remarks.)

Are Vegetation, Soil, or Hydrology significantly disturbed? Are "Normal Circumstances" present?  Yes  No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

| Hydrophytic Vegetation Present? | Yes ☐  No ☒ |
| Hydric Soil Present? | Yes ☐  No ☒ |
| Wetland Hydrology Present? | Yes ☐  No ☒ |

Is the Sampled Area within a Wetland?  Yes ☐  No ☒
If yes, optional Wetland Side ID: ________

Remarks: (Explain alternative procedures here or in a separate report.)
A WETS analysis of the antecedent precipitation indicates the hydrologic conditions on the site were wetter than normal range at the time of investigation.

VEGETATION - Use scientific names of plants

<table>
<thead>
<tr>
<th>Tree Stratum (Plot size: 30')</th>
<th>Absolute % Cover</th>
<th>Dominant Species?</th>
<th>Indicator Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Acer negundo</td>
<td>45</td>
<td>X</td>
<td>FAC</td>
</tr>
<tr>
<td>2. Prunus serotina</td>
<td>25</td>
<td>X</td>
<td>FACU</td>
</tr>
<tr>
<td>3. Ulmus americana</td>
<td>15</td>
<td></td>
<td>FACW</td>
</tr>
<tr>
<td>4. Quercus rubra</td>
<td>15</td>
<td></td>
<td>FACU</td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sapling/Shrub Stratum (Plot size: 15')</th>
<th>13 = Total Cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Rhamnus cathartica</td>
<td>25</td>
</tr>
<tr>
<td>2. Ribes hirtellum</td>
<td>2</td>
</tr>
<tr>
<td>3.</td>
<td>3</td>
</tr>
<tr>
<td>4.</td>
<td>4</td>
</tr>
<tr>
<td>5.</td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Herb Stratum (Plot size: 5')</th>
<th>27 = Total Cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>2</td>
</tr>
<tr>
<td>2.</td>
<td>3</td>
</tr>
<tr>
<td>3.</td>
<td>4</td>
</tr>
<tr>
<td>4.</td>
<td>5</td>
</tr>
<tr>
<td>5.</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Woody Vine Stratum (Plot size: _______)</th>
<th>100 = Total Cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1</td>
</tr>
<tr>
<td>2.</td>
<td>2</td>
</tr>
</tbody>
</table>

50/20 Thresholds

<table>
<thead>
<tr>
<th>Tree Stratum</th>
<th>Sapling/Shrub Stratum</th>
<th>Herb Stratum</th>
</tr>
</thead>
<tbody>
<tr>
<td>20%</td>
<td>50%</td>
<td></td>
</tr>
</tbody>
</table>

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FAC, or FAC: 2 (A)
Percent of Dominant Species That Are OBL, FAC, or FAC: 66 (A/B)

Prevalence Index worksheet:
Total % Cover of OBL species x 1 =
Total % Cover of FACW species x 2 =
Total % Cover of FAC species x 3 =
Total % Cover of FACU species x 4 =
Total Column Totals: 127 (A) 404 (B)
Prevalence Index = B/A = 3.18

Hydrophytic Vegetation Indicators:
☐ Rapid Test for Hydrophytic Vegetation
☒ Dominance Test is >50%
☐ Prevalence Index is <3.0
☐ Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet)
☐ Problematic Hydrophytic Vegetation' (Explain)

Definitions of Vegetation Strata:
Tree - Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
Sapling/shrub - Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.
Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
Woody vines - All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present?
Yes ☐  No ☒
SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

<table>
<thead>
<tr>
<th>Depth (inches)</th>
<th>Color (moist)</th>
<th>%</th>
<th>Color (moist)</th>
<th>%</th>
<th>Type</th>
<th>Loc</th>
<th>Texture</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-20</td>
<td>10YR2/2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Silt Loam</td>
<td></td>
</tr>
</tbody>
</table>

1Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. 2Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:
- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)

Hydric Soil Present?  Yes [ ] No [X]

Hydric soils are not present. Does not meet hydric soils criteria.

HYDROLOGY

Wetland Hydrology Indicators:
- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Primary Indicators (minimum of one is required; check all that apply)
- Surface Water Present?  Yes [ ] No [X] Depth (inches): < 20
- Water Table Present?  Yes [ ] No [X] Depth (inches): 
- Saturation Present?  Yes [ ] No [X] Depth (inches): (includes capillary fringe)

Secondary Indicators (minimum of two required)
- Water-Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- FAC-Neutral Test (D5)
- Microtopographic Relief (D4)

Field Observations:
- Indicators of Wetland Hydrology Present?
  - Yes [ ] No [X]

Describe Recorded Data (stream gauge, monitoring, well, aerial photos, previous inspections), if available:

Remarks: Wetland hydrology is neither present nor indicated.

Photo: See Photos 35 and 36.
Data Points 22 and 23

Photo 35. View to the south.

Photo 36. General Site. View to the southeast.
**PROJECT/SITE:** Lake Elmo airport (21D) Runway 14/32 Relocation

**CITY/COUNTY:** Washington

**SAMPLING DATE:** 04/27/2018

**APPLICANT/OWNER:** Metropolitan Airports Commission

**STATE:** Minnesota

**SAMPLE POINT:** DP23

**INVESTIGATOR(S):** Brauna Hartzell, Mead & Hunt, Inc.

**SECTION, TOWNSHIP, RANGE:** Section 18, T29N, R20W

**LANDFORM (HILLSLOPE, TERRACE, ETC.):** Basin

**LOCAL RELIEF (CONCAVE, CONVEX, NONE):** concave

**SLOPE (%):** <1%

**SUBREGION (LRR OR MLRA):** K/153

**LAT:** 45.000131

**LONG:** -92.849617

**DAMN:** NAD 83

**SOIL MAP UNIT NAME:** Freeon silt loam, 1 to 4 percent slopes (264)

**NWI CLASSIFICATION:** PFO

**ARE CLIMATIC HYDROLOGIC CONDITIONS ON THE SITE TYPICAL FOR THIS TIME OF YEAR?** Yes

**ARE VEGETATION, SOIL, OR HYDROLOGY SIGNIFICANTLY DISTURBED? ARE "NORMAL CIRCUMSTANCES" PRESENT?** Yes

**ARE VEGETATION, SOIL, OR HYDROLOGY NATURALLY PROBLEMATIC?** (If needed, explain any answers in Remarks.)

**SUMMARY OF FINDINGS - ATTACH SITE MAP SHOWING SAMPLING POINT LOCATIONS, TRANSECTS, IMPORTANT FEATURES, ETC.**

<table>
<thead>
<tr>
<th>Hydrophytic Vegetation Present?</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydric Soil Present?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Wetland Hydrology Present?</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

**REMARKS:** (Explain alternative procedures here or in a separate report.) A WETS analysis of the antecedent precipitation indicates the hydrologic conditions on the site were wetter than normal range at the time of investigation.

**VEGETATION - USE SCIENTIFIC NAMES OF PLANTS**

<table>
<thead>
<tr>
<th>Tree Stratum (Plot size: ______)</th>
<th>Absolute</th>
<th>Dominant</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Acer negundo</td>
<td>40</td>
<td>X</td>
<td>FAC</td>
</tr>
<tr>
<td>2. Rhamnus cathartica</td>
<td>10</td>
<td>X</td>
<td>FAC</td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sapling/Shrub Stratum (Plot size: ______)</th>
<th>50 = Total Cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Rhamnus cathartica</td>
<td>75</td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Herb Stratum (Plot size: ______)</th>
<th>75 = Total Cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Woody Vine Stratum (Plot size: ______)</th>
<th>= Total Cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
</tbody>
</table>

**50/20 Thresholds**

<table>
<thead>
<tr>
<th></th>
<th>20%</th>
<th>50%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tree Stratum</td>
<td>10</td>
<td>25</td>
</tr>
<tr>
<td>Sapling/Shrub Stratum</td>
<td>15</td>
<td>37.5</td>
</tr>
<tr>
<td>Herb Stratum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Woody Vine Stratum</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**DOMINANCE TEST WORKSHEET:**

Number of Dominant Species

That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

**PREVALENCE INDEX WORKSHEET:**

<table>
<thead>
<tr>
<th>Total % Cover of</th>
<th>Multiply by:</th>
</tr>
</thead>
<tbody>
<tr>
<td>OBL species</td>
<td>x 1 =</td>
</tr>
<tr>
<td>FACW species</td>
<td>x 2 =</td>
</tr>
<tr>
<td>FAC species</td>
<td>x 3 = 375</td>
</tr>
<tr>
<td>FACU species</td>
<td>x 4 =</td>
</tr>
<tr>
<td>UPL species</td>
<td>x 5 =</td>
</tr>
</tbody>
</table>

Column Totals: 125 (A) 375 (B)

Prevalence Index = B/A = 3.0

**HYDROPHYTIC VEGETATION INDICATORS:**

- Rapid Test for Hydrophytic Vegetation
- Dominance Test is >50%
- Prevalence Index is <3.0
- Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet)
- Problematic Hydrophytic Vegetation'

**DEFINITIONS OF VEGETATION STRATA:**

- **Tree** - Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
- **Sapling/Shrub** - Woody plants less than 3 in. DBH and greater than 0.38 ft (1 m) tall.
- **Herb** - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 0.38 ft tall.
- **Woody Vine** - All woody vines greater than 0.38 ft in height.

**REMARKS:** (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation is present. Herbaceous vegetative growth limited due to early season conditions. Several dead elms (*Ulmus americana*) in standing water nearby.
### SOIL

#### Sampling Point: DP23

**Profile Description:** (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

<table>
<thead>
<tr>
<th>Depth (inches)</th>
<th>Color (moist)</th>
<th>%</th>
<th>Color (moist)</th>
<th>%</th>
<th>Type</th>
<th>Loc</th>
<th>Texture</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-12</td>
<td>10YR2/1</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Silt loam</td>
<td></td>
</tr>
<tr>
<td>12 - 20</td>
<td>10YRS/1</td>
<td>97</td>
<td>7.5YR4/6</td>
<td>3</td>
<td>C</td>
<td>M</td>
<td>Clay loam</td>
<td></td>
</tr>
</tbody>
</table>

1Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.  
2Location: PL=Pore Lining, M=Matrix.

#### Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)

#### Hydric Soil Present? Yes ☐ No ☐

**Remarks:** Hydric soils are present. Hydric soils indicators Depleted Below Dark Surface (A11) and Thick Dark Surface (A12) are satisfied.

### HYDROLOGY

#### Wetland Hydrology Indicators:

- **Primary Indicators (minimum of one is required; check all that apply):**
  - Surface Water (A1)
  - High Water Table (A2)
  - Saturation (A3)
  - Water Marks (B1)
  - Sediment Deposits (B2)
  - Drift Deposits (B3)
  - Algal Mat or Crust (B4)
  - Iron Deposits (B5)
  - Inundation Visible on Aerial Imagery (B7)
  - Sparsely Vegetated Concave Surface (B8)

- **Secondary Indicators (minimum of two required):**
  - Water-Stained Leaves (B9)
  - Aquatic Fauna (B13)
  - Marl Deposits (B15)
  - Hydrogen Sulfide Odor (C1)
  - Oxidized Rhizospheres on Living Roots (C3)
  - Presence of Reduced Iron (C4)
  - Recent Iron Reduction in Tilled Soils (C6)
  - Thin Muck Surface (C7)
  - Other (Explain in Remarks)

#### Field Observations:

- Surface Water Present? Yes ☒ No ☐ Depth (inches): 3
- Water Table Present? Yes ☒ No ☐ Depth (inches): 4
- Saturation Present? Yes ☒ No ☐ Depth (inches): 0

- **Indicators of Wetland Hydrology Present?** Yes ☒ No ☐

**Remarks:** Wetland hydrology is present and indicated. Closed shallow basin with standing water present.

**Photo:**

---

US Army Corps of Engineers  
Northcentral and Northeast Region - Final Version 2.0  
C-62
Data Points 22 and 23

Photo 35. View to the south.

Photo 36. General Site. View to the southeast.
Photo 29. Wetland 5, View to the north.

Photo 30. Wetland 5, View to the south.

Photo 31. Wetland 5, View to the southwest.

Photo 32. Wetland 5, Data Points 20 and 21, View to the south.
Photo 33. Wetland 5, Eastern Lobe, View to the south.

Photo 34. Wetland 5, Eastern Lobe, View to the southwest.

Photo 35. Wetland 10, Data points 22 and 23. View to the south.

Photo 36. Wetland 10. View to the south.
Appendix F. Delineator Qualifications
BRAUNA HARTZELL, GISP
GEOGRAPHIC INFORMATION SYSTEM (GIS)/IMAGE PROCESSING ANALYST

EXPERIENCE (GIS)

Brauna Hartzell has more than 20 years of experience applying GIS software and database design techniques to support wetlands and water resources, historic preservation, community planning, transportation, aviation and military planning, and municipal infrastructure and storm water management. She has worked extensively with GIS and mapping software including ArcGIS desktop and ARC/INFO workstation and has specialized experience with 3D Analyst, Network Analyst and Spatial Analyst. She also collects environmental field data using hand-held GPS units and post-processes information for inclusion in databases and use in spatial analyses. Brauna collaborates with personnel from multiple disciplines to solve complex spatial problems through scripting and spatial analysis to deliver results and data for project-specific needs. She utilizes geoprocessing models, Python, and VBA to meet analytical needs of projects.

Brauna is experienced with GIS-related data submittal requirements associated with the Federal Energy Regulatory Commission (FERC) and the Federal Aviation Administration (FAA) data standardization initiatives. She has extensive experience developing Geodatabases with the Spatial Data Standards for Facility, Infrastructure, and Environment (SDSFIE) standard and creating Federal Geographic Data Committee (FGDC)-compliant metadata.

Brauna has specialized experience with using 3D data formats for spatial analysis, contour generation and manipulation, and geospatial modeling. She is adept in the use of LiDAR-derived data and DTMs in support of hydrology and hydraulic analyses. Additionally, she has extensive experience with SSURGO databases and the National Hydrography Dataset.

EXPERIENCE (WETLAND/ENVIRONMENTAL)

Brauna Hartzell has more than fifteen years of experience in wetland delineation, wetland permitting, and restoration projects. She performs wetland and field delineations conforming to current United States Army Corps of Engineers (USACE) including the Northcentral and Northeast Regional Supplement and State standards, designs custom field data collection applications, collects field data using hand-held Global Positioning Systems (GPS) data collectors and tablets, and prepares National Environmental Policy Act (NEPA) documentation. Brauna has successfully guided numerous projects through the Section 404 permitting process.

Brauna has performed numerous wetland delineations in the Upper Midwest. She conducts wetland mitigation site monitoring according to established site-specific assessment protocols, performs vegetation surveys, and analyzes and presents field collected data in graphical and tabular form. She also assists in mitigation site design and construction specifications development.

Areas of Expertise
- Geographic Information Systems (GIS)
- Remote-sensing image processing
- Digital mapping
- Database design
- Programming
- Wetland delineation and permitting

Education
- MS, Environmental Monitoring, 1994, University of Wisconsin, Madison
- BS, Biological Science, 1982, Florida State University, Tallahassee, Florida

Registration/Certification
- Certified GIS Professional (GISP), GIS Certification Institute

Training and Seminars
- Building Web Applications Using the ArcGIS API for Flex, ESRI
- Geodatabase Design Concepts, ESRI
- Grasses, Sedges, and Rushes Workshop, University of Wisconsin–LaCrosse, 2017
- Vascular Flora of Wisconsin, University of Wisconsin – Madison, Spring 2002
- Wetlands Ecology, University of Wisconsin – Madison, Spring 2003
- Grasses: Identification and Ecology Workshop, University of Wisconsin – Milwaukee workshop, 2002
- GPS Field Collection Techniques Training Workshop for Trimble GeoXH, Seiler Instruments
- Basic Wetland Delineation Workshop, University of Wisconsin–LaCrosse, 2002
- Basic Hydric Soil Identification Workshop, University of Wisconsin – LaCrosse, 2005
- Advanced Wetland Delineation Workshop, University of Wisconsin – LaCrosse, 2007
- Wildlife Inventory and Monitoring, University of Wisconsin – Milwaukee workshop, 2015
RELATED PROJECTS (WETLANDS)

Wetland Delineations
Various Clients
Midwest USA

Brauna performed wetland delineations in accordance with the Routine On-Site Method of 1987 United States Army Corps of Engineers (USACE) wetland delineation manual at various sites in Wisconsin and Minnesota. Work included conducting the delineation, documenting field investigations and site conditions, creating wetland boundary maps, and report writing. Delineations were performed for the following projects:

- Pellet Subdivision – Middleton, Wisconsin, 2002
- Potter’s Creek Subdivision – Green Bay, Wisconsin, 2003
- Oak Street Bridge Design – La Crosse, Wisconsin, 2003
- State Trunk Highway (STH) 29 – Marathon County, Wisconsin, 2003
- Hampton Heights Subdivision – Ledgeview, Wisconsin, 2004
- County Trunk Highway (CTH) W – Oconto County, Wisconsin, 2004
- Town of Rockland Preliminary Plat – Brown County, Wisconsin, 2004
- Mourning Dove Subdivision – Oconto County, Wisconsin, 2004
- Cinnamon Ridge Subdivision – Suamico, Oconto County, Wisconsin, 2004
- Kenosha Regional Airport – Kenosha, Wisconsin, 2005
- County Trunk Highway (CTH) A – Lincoln County, Wisconsin
- CTH D – Vernon County, Wisconsin, 2006
- Burton Street – Beloit, Wisconsin, 2006
- Central Wisconsin Airport – Mosinee, Marathon County, Wisconsin, 2008
- State Trunk Highway (STH) 67, Fond du Lac County, Wisconsin, 2011
- Interstate Highway 90/94 Corridor Study, 2014 & 2015
- Ontonagon County Airport, Ontonagon County, Michigan, 2016
- Central Wisconsin Airport – Mosinee, Marathon County, Wisconsin, 2016
- Little Rock Lake, Vilas County, Wisconsin, 2016
- Green Bay-Austin Straubel International Airport, 2017
- Lake Elmo Airport, Lake Elmo, Minnesota, 2017
- STH 48/US 53 Interchange, Rice Lake, Wisconsin, 2017
- Waukesha County Airport, Waukesha, Wisconsin, 2017
- I-43 Ozaukee/Milwaukee counties, Wisconsin, 2017

Joint Section 404 – WCA Permit and Compensatory Mitigation Plan, 2017
Detroit Lakes–Becker County Airport
Detroit Lakes, MN

The proposed project at the Airport includes a relocation of the Runway 13 threshold 1,000 feet to the southeast to provide a 5,200-foot long runway which accommodates an instrument approach with CAT-I minimums. Additionally, a full-length taxiway will be constructed. In total, the proposed project will address airfield design deficiencies, improve runway pavement condition, and meet runway length requirements. Approximately 14 acres of wetland fill will be necessary to achieve project needs. A
compensatory mitigation plan is included in the permit application. Brauna served as the lead preparer of the permit application.

**Wetland Delineation, I-43 Ozaukee/Milwaukee counties, 2017**
Wisconsin Department of Transportation
Madison, Wisconsin
Brauna served as lead wetland delineator in support of roadway design alternatives analysis for a 1.4 mile stretch of Interstate highway in Ozaukee and Milwaukee counties. The area of interest is approximately 92 acres in size and resulted in the delineation of 61 wetlands. Wetland types encountered include: fresh wet meadows, and hardwood and shrub swamps.

**Wetland Delineation and Re-certification, Waukesha County Airport, 2017**
Waukesha, WI
Brauna served as lead wetland delineator to update and re-certify previously delineated wetland boundaries more than 5 years old. Airfield projects spanning more than 8 years necessitated multiple delineations. Permitting for the current Runway Safety Area (RSA) improvement project required a reassessment of previous wetland boundaries. The boundaries of 12 previous identified wetlands were investigated during field work using hand-held GPS equipment. Three boundaries were updated based on changed environmental conditions and one new wetland was identified in an area not previously investigated. Sampling points and photographs combined to provide documentation of the re-certification.

**Wetland Delineation, Lake Elmo Airport, 2017**
Metropolitan Airports Commission
Lake Elmo, Minnesota
Brauna served as lead wetland delineator in support of alternatives analysis for an environmental assessment for a proposed runway relocation and associated improvements. The area of interest is approximately 130 acres in size and resulted in the delineation of nine wetlands, one of which was in agricultural production. Wetland types encountered include: shallow marsh, fresh wet meadows, and shrub swamps. A functional assessment was performed using the MN Rapid Assessment Method (MNURAM), updating existing information and assessing newly delineated wetlands.

**Wetland Delineation, Green Bay-Austin Straubel International Airport, 2017**
Wisconsin Bureau of Aeronautics
Brown County, Wisconsin
Brauna served as lead wetland delineator in support of an environmental assessment for a proposed expansion to the East General Aviation apron and regrading associated with Runway 6/24. The area of interest is approximately 65 acres in size, covering airport infield areas, which resulted in the delineation of 23 emergent wet-meadow wetlands.

**Wetland Delineation, STH 48/US 53 Interchange Improvements, 2017**
Wisconsin Department of Transportation
Rice Lake, Wisconsin
Brauna served as the lead wetland delineator in support of permitting for interchange improvements to address safety, geometric and operational deficiencies, and improve facilities for non-motorized traffic. The area of interest is approximately 17.5 acres in size and resulted in the delineation of nine wetlands. Wetland types encountered include: fresh wet meadows and ditch wetlands.
BRAUNA HARTZELL, GISP (CONTINUED)

Wetland Delineation, Ontonagon County Airport, 2016
Michigan Bureau of Aeronautics
Ontonagon County, Michigan
Brauna served as the lead wetland delineator in support of permitting and on-site mitigation activities related to proposed wetland disturbance in another area of the airport. The area of interest is approximately 19.4 acres in size and resulted in the delineation of 11 wetlands in areas previously in agricultural production. Brauna also performed groundwater well monitoring and data analysis in support of mitigation site design.

Wetland Delineation, Central Wisconsin Airport, 2016
Wisconsin Bureau of Aeronautics
Mosinee, Marathon County, Wisconsin
Brauna served as the lead wetland delineator in support of master planning activities related to determining the viability of shifting Runway 17/35 to the south. The area of interest is approximately 70 acres in size and resulted in the delineation of three large wetlands on airport property and two off-site. The three on-site wetlands experience regular mowing and other maintenance activities as well as show evidence of groundwater contact on a sloping terrain with a seasonal high-water table; off-site wetlands consisted of an alder and a hardwood swamp.

Little Rock Lake Wetland Survey, 2016
National Ecological Observatory Network (NEON), Boulder, CO
Vilas County, Wisconsin
Brauna served as the lead wetland scientist in support of site equipment layout investigations for long-term ecological monitoring. A total of four wetlands were delineated within the area of interest at this mesotrophic seepage lake covering about 39 acres. Each proposed equipment installation site was surveyed and wetlands delineated in close proximity to any proposed location.

Interstate Highway (IH) 90/94 Corridor Study, 2013-2017
Wisconsin Department of Transportation (WisDOT) Southwest Region
Portage, Juneau, Sauk, and Columbia Counties, Wisconsin
Mead & Hunt is leading a team that is conducting a corridor study of IH 90/94 from US12/WIS 16 to IH39. The project consists of evaluating operational and safety issues, review of the interchanges and ramps within the corridor, and evaluating possible expansion. Environmental studies are being conducted and include; cultural resources surveys, endangered species surveys, contaminated material investigations, noise analysis and wetland delineations. Brauna is a wetland scientist assisting in the delineation, wetland field data collection and mapping. Cost: $210 million

STH 67 Resurfacing Design and Environmental Documentation, 2011
Wisconsin Department of Transportation (WisDOT) Northeast Region
Fond du Lac County, Wisconsin
Mead & Hunt lead redesign of this 20 mile corridor of STH 67 spanning Fond du Lac County through both rural and developed sections. In support of environmental documentation, a wetland delineation was performed within the right-of-way for the 20 mile corridor. Wetland types encountered include: shallow marsh, fresh wet meadows, shrub swamps, and riparian wetlands. In total, 69 wetlands were delineated. Brauna assisted with wetland delineation and survey, mapping and data management.
BRAUNA HARTZELL, GISP (CONTINUED)

Wetland Mitigation, Runway 14/32 Safety Area, 2004-2011
WisDOT Bureau of Aeronautics
Madison, Wisconsin

Brauna served as project scientist for this reconstruction of a runway safety area and railroad within a state natural area. 140 acres of fen and sedge meadow were restored and enhanced, and 6,000 feet of Starkweather creek was restored with an annually flooded riparian corridor. The project also included restoration of ten acres of swamp forest and 35 acres of upland buffer, plus negotiation of annual management and monitoring to enhance rare plant habitats within Cherokee Fen. The mitigation cost was more than $1.5 million, with a total project construction cost of $25 million. Brauna assisted with wetland monitoring and collection of botanical and hydrologic data for compliance. She also monitored for invasive species.
Regulatory File No. MVP-2017-04274-TJH

March 19, 2018

Dear Mr. Leqve:

This letter is in response to your request for an approved jurisdictional determination for the nine wetlands delineated in the Wetland Delineation and Functional Assessment Report for the Lake Elmo Airport - Runway 14/32 Relocation and Associated Improvements. The review area for our jurisdictional determination is identified on the enclosed figures, labeled MVP-2017-04274-TJH, Pages 1 through 8. The project site is in Sections 18 and 19, Township 29 North, Range 20 West, Washington County, Minnesota.

The review area contains no waters of the United States subject to Corps of Engineers jurisdiction. Therefore, you are not required to obtain Department of the Army authorization to discharge dredged or fill material within this area. The rationale for this determination is provided in the attached Approved Jurisdictional Determination form. This determination is only valid for the review area shown on the enclosed figures.

If you object to this approved jurisdictional determination, you may request an administrative appeal under Corps regulations at 33 CFR 331. Enclosed you will find a Notification of Appeal Process (NAP) fact sheet and Request for Appeal (RFA) form. If you request to appeal this determination, you must submit a completed RFA form to the Mississippi Valley Division Office at the address shown on the form.

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR 331.5, and that it has been received by the Division Office within 60 days of the date of the enclosed NAP. It is not necessary to submit an RFA form to the division office if you do not object to the determination in this letter.

This approved jurisdictional determination may be relied upon for five years from the date of this letter. However, the Corps reserves the right to review and revise the boundary in response to changing site conditions, information that was not considered during our initial review, or off-site activities that could indirectly alter the extent of wetlands and other resources on-site. This determination may be renewed at the end of the five year period provided you submit a written request and our staff are able to verify that the limits established during the original determination are still accurate.
If you have any questions, please contact me in our St. Paul office at (651) 290-5367 or Thomas.J.Hingsberger@usace.army.mil. In any correspondence or inquiries, please refer to the Regulatory file number shown above.

Sincerely,

Thomas Hingsberger
Project Manager

Enclosures

cc:
Evan Barrett (Mead & Hunt)
Ben Meyer (BWSR)
Karen Wold (Barr Engineering)
Jay Riggs (WCD)
Jennifer Sorenson (MnDNR)
Becky Horton (MnDNR)
This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION
A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): February 27, 2018

B. ST PAUL, MN DISTRICT OFFICE, FILE NAME, AND NUMBER: MVP-2017-04274-TJH Lake Elmo Airport

C. PROJECT LOCATION AND BACKGROUND INFORMATION:
State: Minnesota  County/parish/borough: Washington  City: Lake Elmo
Center coordinates of site (lat/long in degree decimal format): Lat. 44.997526° N, Long. -92.851647° W
Universal Transverse Mercator:
Name of nearest waterbody: St. Croix River
Name of watershed or Hydrologic Unit Code (HUC): 07030005 Upper Mississippi Region
☐ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):
☐ Office (Desk) Determination. Date: January 24, 2018
☐ Field Determination. Date(s): 

SECTION II: SUMMARY OF FINDINGS
A. RHA SECTION 10 DETERMINATION OF JURISDICTION.
There are no “navigable waters of the U.S.” within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area.

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.
There are no “waters of the U.S.” within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area.

1. Waters of the U.S.: N/A

2. Non-regulated waters/wetlands (check if applicable):¹
☐ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional.

Explain: There are 9 wetlands within the review area shown on the enclosed figures labeled MVP-2017-04274-TJH Page 1 of 2 through 2 of 2. These wetlands do not have a surface or shallow subsurface hydrologic connection to any navigable waters or their tributaries, as confirmed in the Wetland Delineation Report for the Lake Elmo (21D) Airport Runway 14/32 Relocation and Associated Improvements project dated October 2017. Each of the 9 wetland basins are surrounded by uplands and have no swales, pipes or other means to connect them to waters of the U.S. (WOUS). We have determined that these wetlands are isolated depressions and not waters of the U.S.

The 9 wetlands delineated in the review area do not support a link to interstate or foreign commerce because they are not known to be used by interstate or foreign travelers for recreation or other purposes; do not produce fish or shellfish that could be taken and sold in interstate or foreign commerce; and are not known to be used for industrial purposes by industries in interstate or foreign commerce. These wetlands do not have an ecological connection to other waters within the review area. Furthermore, even though the offsite portion of Wetland 1 was not delineated, based on the aerial photography and LiDAR contours it appears unlikely that the wetland would have a connection to another waterbody. The offsite portion of Wetland 1 is adjacent to residential housing and upland agricultural fields, and it does not appear to drain into any culverts, rivers, ditches, or storm water systems. The waterbodies within the review area were determined to not be jurisdictional under the CWA.

SECTION III: CWA ANALYSIS
A. TNWs AND WETLANDS ADJACENT TO TNWs: N/A

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY): N/A

¹ Supporting documentation is presented in Section III.F.
C. SIGNIFICANT NEXUS DETERMINATION: N/A

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY): N/A

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY): N/A

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):

[ ] If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.

[ ] Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.

[ ] Prior to the Jan 2001 Supreme Court decision in “SWANCC,” the review area would have been regulated based solely on the “Migratory Bird Rule” (MBR).

[ ] Waters do not meet the “Significant Nexus” standard, where such a finding is required for jurisdiction. Explain:

[ ] Other (explain, if not covered above):

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):

[ ] Non-wetland waters (i.e., rivers, streams): linear feet width (ft).

[ ] Lakes/ponds: acres.

[ ] Other non-wetland waters: acres. List type of aquatic resource:

[ ] Wetlands: Wetland 1 = 0.187, Wetland 2 = 0.117, Wetland 3 = 0.110, Wetland 4 = 0.167, Wetland 5 = 0.094, Wetland 6 = 0.009, Wetland 7 = 0.013, Wetland 8 = 3.766, Wetland 9 = 2.858 acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the “Significant Nexus” standard, where such a finding is required for jurisdiction (check all that apply):

[ ] Non-wetland waters (i.e., rivers, streams): linear feet width (ft).

[ ] Lakes/ponds: acres.

[ ] Other non-wetland waters: acres. List type of aquatic resource:

[ ] Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply) - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):

[ ] Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: Mead and Hunt

[ ] Data sheets prepared/submitted by or on behalf of the applicant/consultant.

[ ] Office concurs with data sheets/delineation report.

[ ] Office does not concur with data sheets/delineation report.

[ ] Data sheets prepared by the Corps.

[ ] Corps navigable waters’ study:

[ ] U.S. Geological Survey Hydrologic Atlas:

[ ] USGS NHD data.

[ ] USGS 8 and 12 digit HUC maps.

[ ] U.S. Geological Survey map(s). Cite scale & quad name: 1:24K MN-Stillwater

[ ] USDA Natural Resources Conservation Service Soil Survey. Citation: NRCS Web Soil Survey Washington Co.

[ ] National wetlands inventory map(s). Cite name: USFWS NWI

[ ] State/Local wetland inventory map(s):

[ ] FEMA/FIRM maps:

[ ] 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)

[ ] Photographs: [ ] Aerial (Name & Date):

[ ] or [ ] Other (Name & Date):

[ ] Previous determination(s). File no. and date of response letter:

[ ] Applicable/supporting case law:

[ ] Applicable/supporting scientific literature:

[ ] Other information (please specify):

B. ADDITIONAL COMMENTS TO SUPPORT JD:
LAKE ELMO AIRPORT
Proposed Runway 14/32 Relocation and Associated Improvements

Project Location and Topography

LAKE ELMO AIRPORT
Proposed Runway 14/32 Relocation and Associated Improvements

Legend
- Area of Interest (AOI)
- LRR Subregion: K

Map Source: National Geographic Society

Project Location

T29N, R20W, S18 and S19
Baytown and West Lakeland Townships
Washington County, MN
LRR Subregion: K
USACE Regional Supplement: NC/NE
Area = 130.1 acres
## T29N, R20W, S18 and S19
City of Lake Elmo
Washington County, MN
Area of Interest = 130.1 acres
Field work conducted:
June 5 - 9, 2017

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<td>5</td>
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<td>6</td>
<td>Fresh (wet) Meadow (Ditch Wetland)</td>
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### Table: Wetland Area

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<th>Area within AOI (sq. ft)</th>
<th>Area outside AOI (acres)</th>
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Wetland Boundary Map

LAKE ELMO AIRPORT
Proposed Runway 14-32 Runway Shift

Project Information
T29N, R20W, S18 and S19
City of Lake Elmo
Washington County, MN
Area of Interest = 130.1 acres
Field work conducted:
June 5 - 9, 2017

Image Source: MnGEO WMS Image Service, Washington County (2016 color 7-county)
Contour Source:
Minnesota Geospatial Commons, Minnesota Elevation Mapping Project Twin Cities Metro Region 2011
Wetland Boundary Map
LAKE ELMO AIRPORT
Proposed Runway 14-32 Runway Shift

Project Information
T29N, R20W, S18 and S19
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Image Source: MnGEO WMS Image Service,
Washington County (2016 color 7-county)
Contour Source:
Minnesota Geospatial Commons,
Minnesota Elevation Mapping Project
Twin Cities Metro Region 2011

Legend
- Photo Location
- Data Point Location
- Wetland Boundary
- Wetland within AOI
- Wetland outside AOI
- Culvert End Location
- Flow Direction
- Ditch/Swale Flow
- Area of Interest
- Airport Property Boundary

Elevation contour interval is 2 feet

Map 2 of 6
Wetland Boundary Map
LAKE ELMO AIRPORT
Proposed Runway 14-32 Runway Shift

Legend
- Photo Location
- Data Point Location
- Wetland Boundary
- Wetland within AOI
- Wetland outside AOI
- Culvert End Location
- Flow Direction
- Ditch/Swale Flow
- Area of Interest
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Washington County (2016 color 7-county)
Contour Source:
Minnesota Geospatial Commons,
Minnesota Elevation Mapping Project
Twin Cities Metro Region 2011

Elevation contour interval is 2 feet
Wetland Boundary Map
LAKE ELMO AIRPORT
Proposed Runway 14-32 Runway Shift

Project Information
T29N, R20W, S18 and S19
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Washington County, MN
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June 5 - 9, 2017

Image Source: MnGEO WMS Image Service,
Washington County (2016 color 7-county)

Contour Source:
Minnesota Geospatial Commons,
Minnesota Elevation Mapping Project
Twin Cities Metro Region 2011

Legend
● Photo Location

Data Point Location

Wetland Boundary

Wetland within AOI

Wetland outside AOI

Culvert End Location

Flow Direction

Ditch/Swale Flow

Area of Interest

Airport Property Boundary

Note: Elevation contour interval is 2 feet
Wetland Boundary Map

LAKE ELMO AIRPORT

Proposed Runway 14-32 Runway Shift

Project Information
T29N, R20W, S18 and S19
City of Lake Elmo
Washington County, MN
Area of Interest = 130.1 acres
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June 5 - 9, 2017

Image Source: MnGEO WMS Image Service,
Washington County (2016 color 7-county)
Contour Source:
Minnesota Geospatial Commons,
Minnesota Elevation Mapping Project
Twin Cities Metro Region 2011
## NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

### Applicant: Metropolitan Airports Commission c/o Chad Leqve

### File No.: MVP-2017-04274-TJH

### Date:

<table>
<thead>
<tr>
<th>Attached is:</th>
<th>See Section below</th>
</tr>
</thead>
<tbody>
<tr>
<td>INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)</td>
<td>A</td>
</tr>
<tr>
<td>PROFFERED PERMIT (Standard Permit or Letter of permission)</td>
<td>B</td>
</tr>
<tr>
<td>PERMIT DENIAL</td>
<td>C</td>
</tr>
<tr>
<td>APPROVED JURISDICTIONAL DETERMINATION</td>
<td>D</td>
</tr>
<tr>
<td>PRELIMINARY JURISDICTIONAL DETERMINATION</td>
<td>E</td>
</tr>
</tbody>
</table>

### SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at [http://usace.army.mil/inet/functions/cw/cecwo/reg](http://usace.army.mil/inet/functions/cw/cecwo/reg) or Corps regulations at 33 CFR Part 331.

#### A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.
- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

#### B: PROFFERED PERMIT: You may accept or appeal the permit
- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

#### C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

#### D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.
- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

#### E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.
# SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

**REASONS FOR APPEAL OR OBJECTIONS:** (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

---

**ADDITIONAL INFORMATION:** The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

**POINT OF CONTACT FOR QUESTIONS OR INFORMATION:**

<table>
<thead>
<tr>
<th>If you have questions regarding this decision and/or the appeal process you may contact:</th>
<th>If you only have questions regarding the appeal process you may also contact the Division Engineer through:</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.S. Army Corps of Engineers</td>
<td>Administrative Appeals Review Officer</td>
</tr>
<tr>
<td>Attention: Tom Hingsberger</td>
<td>Mississippi Valley Division</td>
</tr>
<tr>
<td>180 East 5th Street, Suite 700</td>
<td>P.O. Box 80 (1400 Walnut Street)</td>
</tr>
<tr>
<td>Saint Paul, Minnesota 55101</td>
<td>Vicksburg, MS 39181-0080</td>
</tr>
<tr>
<td>Telephone: (651) 290-5367</td>
<td>601-634-5820 FAX: 601-634-5816</td>
</tr>
</tbody>
</table>

**RIGHT OF ENTRY:** Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

<table>
<thead>
<tr>
<th>Signature of appellant or agent.</th>
<th>Date:</th>
<th>Telephone number:</th>
</tr>
</thead>
</table>

C-85
Minnesota Wetland Conservation Act
Notice of Decision

Local Government Unit (LGU)
Valley Branch Watershed District (VBWD)

Address
P.O. Box 838
Lake Elmo, MN 55042

1. PROJECT INFORMATION

<table>
<thead>
<tr>
<th>Applicant Name</th>
<th>Project Name</th>
<th>Date of Application</th>
<th>Application Number</th>
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<tr>
<td>Chad Levee, Metropolitan Airports Commission</td>
<td>Lake Elmo Airport</td>
<td>9/25/2017</td>
<td></td>
</tr>
</tbody>
</table>

☑ Attach site locator map.

Type of Decision:

☑ Wetland Boundary or Type □ No-Loss □ Exemption □ Sequencing
☐ Replacement Plan □ Banking Plan

Technical Evaluation Panel (TEP) Findings and Recommendation (if any):

☑ Approve □ Approve with conditions □ Deny

Summary (or attach): No TEP Findings Report

2. LOCAL GOVERNMENT UNIT DECISION

Date of Decision: 11/9/2017

☑ Approved □ Approved with conditions (include below) □ Denied

LGU Findings and Conclusions (attach additional sheets as necessary):

On behalf of the Metropolitan Airports Commission, Mead & Hunt submitted a wetland delineation report and request for wetland boundary and type concurrence associated with the Lake Elmo Airport Runway Relocation and Improvements project in Lake Elmo, Minnesota (Sec. 18 and 19, T29N, R20W) within Washington County.

The wetland delineation report and Notice of Application were provided to the TEP on 10/3/2017. A site review was conducted on 10/17/2017. Those present at the site review were Jay Riggs, Washington Conservation District; Ben Meyer, Board of Water and Soil Resources; Karen Wold, Barr Engineering Co. for the VBWD; and Brauna Hartzell, Mead & Hunt. During the site review, several changes were made to the wetland types. Mead & Hunt revised the wetland delineation report to reflect these changes and reference consistent wetland types throughout the report. The revised wetland delineation report was provided to TEP members. The comment period ended on 10/30/2017, and no other comments were received.

The revised wetland types are as follows:

<table>
<thead>
<tr>
<th>Wetland</th>
<th>Wetland Type</th>
<th>Circular 39 Type</th>
<th>Cowardin Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Seasonally Flooded Basin</td>
<td>Type 1</td>
<td>PEMA</td>
</tr>
<tr>
<td>2</td>
<td>Fresh (wet) Meadow</td>
<td>Type 2</td>
<td>PEMB</td>
</tr>
<tr>
<td>3</td>
<td>Fresh (wet) Meadow</td>
<td>Type 2</td>
<td>PEMB</td>
</tr>
</tbody>
</table>
The wetland boundaries and revised types within the evaluation area are accurate based on the requirements of the 1987 U.S. Army Corps of Engineers Wetland Delineation Manual, the 2012 Northcentral and Northeast Regional Supplement, and the 2015 Guidance for Submittal of Delineation Reports to the USACE and WCA LGU in Minnesota, Version 2.0.

The VBWD approves the wetland boundaries and types within the evaluation area.

For Replacement Plans using credits from the State Wetland Bank:

<table>
<thead>
<tr>
<th>Bank Account #</th>
<th>Bank Service Area</th>
<th>County</th>
<th>Credits Approved for Withdrawal (sq. ft. or nearest .01 acre)</th>
</tr>
</thead>
</table>

**Replacement Plan Approval Conditions.** In addition to any conditions specified by the LGU, the approval of a Wetland Replacement Plan is conditional upon the following:

☐ **Financial Assurance:** For project-specific replacement that is not in-advance, a financial assurance specified by the LGU must be submitted to the LGU in accordance with MN Rule 8420.0522, Subp. 9 (List amount and type in LGU Findings).

☐ **Deed Recording:** For project-specific replacement, evidence must be provided to the LGU that the BWSR “Declaration of Restrictions and Covenants” and “Consent to Replacement Wetland” forms have been filed with the county recorder’s office in which the replacement wetland is located.

☐ **Credit Withdrawal:** For replacement consisting of wetland bank credits, confirmation that BWSR has withdrawn the credits from the state wetland bank as specified in the approved replacement plan.

*Wetlands may not be impacted until all applicable conditions have been met!*

**LGU Authorized Signature:**

Signing and mailing of this completed form to the appropriate recipients in accordance with 8420.0255, Subp. 5 provides notice that a decision was made by the LGU under the Wetland Conservation Act as specified above. If additional details on the decision exist, they have been provided to the landowner and are available from the LGU upon request.

**Name**

David J. Buchek

**Title**

Valley Branch WD Board President

**Signature**

Date

11/9/2017

Phone Number and E-mail

651-770-1730
djbuchek@yahoo.com

**THIS DECISION ONLY APPLIES TO THE MINNESOTA WETLAND CONSERVATION ACT.** Additional approvals or permits from local, state, and federal agencies may be required. Check with all appropriate authorities before commencing work in or near wetlands.
Applicants proceed at their own risk if work authorized by this decision is started before the time period for appeal (30 days) has expired. If this decision is reversed or revised under appeal, the applicant may be responsible for restoring or replacing all wetland impacts.

This decision is valid for five years from the date of decision unless a longer period is advised by the TEP and specified in this notice of decision.

3. APPEAL OF THIS DECISION

Pursuant to MN Rule 8420.0905, any appeal of this decision can only be commenced by mailing a petition for appeal, including applicable fee, within thirty (30) calendar days of the date of the mailing of this Notice to the following as indicated:

Check one:

☐ Appeal of an LGU staff decision. Send petition and $_____ fee (if applicable) to:
☐ Appeal of LGU governing body decision. Send petition and $500 filing fee to:

Executive Director
Minnesota Board of Water and Soil Resources
520 Lafayette Road North
St. Paul, MN 55155

4. LIST OF ADDRESSEES

☐ SWCD TEP member: Jay Riggs - Washington Conservation District
☐ BWSR TEP member: Ben Meyer
☐ DNR TEP member: Becky Horton and Jenifer Sorensen
☐ WD or WMO (if applicable): John Hanson
☐ Applicant (notice only) and Landowner (if different): Chad Leqve (Metropolitan Airports Commission), Brauna Hartzell and Evan Barrett (Mead & Hunt, Inc.)
☐ Corps of Engineers Project Manager: Tom Hingsberger
☐ BWSR Wetland Bank Coordinator (wetland bank plan decisions only)

5. MAILING INFORMATION

➢ For a list of BWSR TEP representatives: www.bwsr.state.mn.us/aboutbwsr/workareas/WCA_areas.pdf
➢ For a list of DNR TEP representatives: www.bwsr.state.mn.us/wetlands/wca/DNR_TEP_contacts.pdf
➢ Department of Natural Resources Regional Offices:

<table>
<thead>
<tr>
<th>NW Region:</th>
<th>NE Region:</th>
<th>Central Region:</th>
<th>Southern Region:</th>
</tr>
</thead>
</table>

For a map of DNR Administrative Regions, see: http://files.dnr.state.mn.us/aboutdnr/dnr_regions.pdf

➢ For a list of Corps of Project Managers: www.mvp.usace.army.mil/regulatory/defualt.asp?pagid=687 or send to:

US Army Corps of Engineers
St. Paul District, ATTN: OP-R
180 Fifth St. East, Suite 700
St. Paul, MN 55101-1678

➢ For Wetland Bank Plan applications, also send a copy of the application to:

Minnesota Board of Water and Soil Resources
Wetland Bank Coordinator
520 Lafayette Road North
St. Paul, MN 55155
6. ATTACHMENTS

In addition to the site locator map, list any other attachments:

☑ wetland delineation map
LAKE ELMO AIRPORT
Proposed Runway 14/32 Relocation and Associated Improvements

Project Location and Topography

LAKE ELMO AIRPORT
Proposed Runway 14/32 Relocation and Associated Improvements

Legend

- Area of Interest (AOI)
- LRR Subregion: K

<table>
<thead>
<tr>
<th>Area</th>
<th>Acres</th>
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<tbody>
<tr>
<td>A</td>
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<tr>
<td>C</td>
<td>4.7</td>
</tr>
<tr>
<td>D</td>
<td>1.1</td>
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</table>

Map Source: National Geographic Society

Project Location

T29N, R20W, S18 and S19
Baytown and West Lakeland Townships
Washington County, MN
LRR Subregion: K
USACE Regional Supplement: NC/NE
Area = 130.1 acres
<table>
<thead>
<tr>
<th>Wetland Number</th>
<th>Area within AOI (acres)</th>
<th>Area within AOI (sq. ft)</th>
<th>Area outside AOI (acres)</th>
<th>Area outside AOI (sq. ft)</th>
<th>Total Area (acres)</th>
<th>Total Area (sq. ft)</th>
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**Wetland Number**

- **1** Seasonally Flooded Basin
- **2** Fresh (wet) Meadow
- **3** Fresh (wet) Meadow
- **4** Fresh (wet) Meadow
- **5** Fresh (wet) Meadow
- **6** Fresh (wet) Meadow (Ditch Wetland)
- **7** Fresh (wet) Meadow (Ditch Wetland)
- **8** Fresh (wet) Meadow (Shallow Marsh)
- **9** Fresh (wet) Meadow (Deep Marsh)

**Circular 39**

- **Type 1** Seasonally Flooded Basin
- **Type 2** Fresh (wet) Meadow
- **Type 2** Fresh (wet) Meadow
- **Type 2** Fresh (wet) Meadow
- **Type 2** Fresh (wet) Meadow
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- **Type 2** Fresh (wet) Meadow
- **Type 2** Fresh (wet) Meadow

**Project Information**

- **T29N, R20W, S18 and S19**
- **City of Lake Elmo**
- **Washington County, MN**
- **Area of Interest = 130.1 acres**
- **Field work conducted:** June 5 - 9, 2017

**Legend**

- Map Sheet
- Wetland Boundary
- Wetland within AOI
- Outside AOI
- Area of Interest
- Airport Property Boundary

**Image Source:** MnGEO WMS Image Service, Washington County (2016 color 7-county)
Project Information

T29N, R20W, S18 and S19
City of Lake Elmo
Washington County, MN
Area of Interest = 130.1 acres
Field work conducted:
June 5 - 9, 2017

* Mn Public Waters Data: Public Waters (PW) Basin and Watercourse Delineations, Washington County, MN Geospatial Commons

** Mn Public Waters Revised: Based on field-collected GPS points, aerial photography, and LiDAR topographic data

*** Delimited Wetland Boundary: Field work conducted June 5 - 9, 2017

Contour Source: Minnesota Geospatial Commons, Minnesota Elevation Mapping Project, Twin Cities Metro Region 2011

Image Source: MnGEO WMS Image Service, Washington County (2016 color 7-county)
Minnesota Wetland Conservation Act
Notice of Decision

Local Government Unit (LGU)
Valley Branch Watershed District (VBWD)

Address
P.O. Box 838
Lake Elmo, MN 55042

1. PROJECT INFORMATION

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<thead>
<tr>
<th>Applicant Name</th>
<th>Project Name</th>
<th>Date of Application</th>
<th>Application Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chad Leqve, Metropolitan Airports Commission</td>
<td>Lake Elmo Airport</td>
<td>12/4/2017</td>
<td>12/21/2017 additional information</td>
</tr>
</tbody>
</table>

☑ Attach site locator map.

Type of Decision:

☐ Wetland Boundary or Type ☑ No-Loss ☐ Exemption ☐ Sequencing

☐ Replacement Plan ☐ Banking Plan

Technical Evaluation Panel (TEP) Findings and Recommendation (if any):

☐ Approve ☐ Approve with conditions ☐ Deny

Summary (or attach): No TEP Findings Report

2. LOCAL GOVERNMENT UNIT DECISION

Date of Decision: 01/25/2018

☑ Approved ☐ Approved with conditions (include below) ☐ Denied

LGU Findings and Conclusions (attach additional sheets as necessary):

On behalf of the Metropolitan Airports Commission, Mead & Hunt, Inc. submitted a request for a WCA no-loss incidental wetland determination associated with the Lake Elmo Airport Runway Relocation and Improvements project in Lake Elmo, Minnesota (Sec. 18 and 19, T29N, R20W), within Washington County.

The wetland boundaries and types were previously approved by the VBWD on 11/09/2017. The incidental wetland request submittal provides documentation that Wetlands 3, 6, and 7 are incidental wetlands, according to MN Rule 8420.0105 Subp. 2 D, and not regulated within the scope of the WCA.

The submittal was provided to TEP members for review and comment. TEP members Ben Meyer, from the Minnesota Board of Water and Soil Resources; Jay Riggs, from the Washington Conservation District; and Karen Wold, with Barr Engineering Co. for the VBWD, all agree that the soil mapping and historical imagery for these three areas do not show a wetland prior to the runway construction. Therefore, these are wetland areas created in non-wetland areas solely by actions. Because it was not the purpose of these actions to create the wetland, the areas meet the definition of incidental wetlands.

The VBWD approves the incidental wetland determination for Wetlands 3, 6, and 7 according to MN Rule 8420.0105 Subp. 2 D and any project work within these areas as WCA no-loss activity.
under MN Rule 8420.0415 A.

For Replacement Plans using credits from the State Wetland Bank:

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Replacement Plan Approval Conditions. In addition to any conditions specified by the LGU, the approval of a Wetland Replacement Plan is conditional upon the following:

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Wetlands may not be impacted until all applicable conditions have been met!

LGU Authorized Signature:

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jill Lucas</td>
<td>Valley Branch WD Board President</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Signature</th>
<th>Date</th>
<th>Phone Number and E-mail</th>
<th>Email Address</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1/25/2018</td>
<td>612-860-0551</td>
<td><a href="mailto:Jill.m.lucas@gmail.com">Jill.m.lucas@gmail.com</a></td>
</tr>
</tbody>
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THIS DECISION ONLY APPLIES TO THE MINNESOTA WETLAND CONSERVATION ACT. Additional approvals or permits from local, state, and federal agencies may be required. Check with all appropriate authorities before commencing work in or near wetlands.

Applicants proceed at their own risk if work authorized by this decision is started before the time period for appeal (30 days) has expired. If this decision is reversed or revised under appeal, the applicant may be responsible for restoring or replacing all wetland impacts.

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<td>St. Paul, MN 55155</td>
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- BWSR TEP member: Ben Meyer
- DNR TEP member: Becky Horton and Jenifer Sorensen
- WD or WMO (if applicable): John Hanson
- Applicant (notice only) and Landowner (if different): Chad Leqve (Metropolitan Airports Commission), Brauna Hartzell and Evan Barrett (Mead & Hunt, Inc.)
- Corps of Engineers Project Manager: Tom Hingsberger
- BWSR Wetland Bank Coordinator (wetland bank plan decisions only)

5. MAILING INFORMATION

- For a list of BWSR TEP representatives: [www.bwsr.state.mn.us/aboutbwsr/workareas/WCA_areas.pdf](http://www.bwsr.state.mn.us/aboutbwsr/workareas/WCA_areas.pdf)
- For a list of DNR TEP representatives: [www.bwsr.state.mn.us/wetlands/wca/DNR_TEP_contacts.pdf](http://www.bwsr.state.mn.us/wetlands/wca/DNR_TEP_contacts.pdf)
- Department of Natural Resources Regional Offices:

<table>
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<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2115 Birchmont Beach Rd. Bemidji, MN 56601</td>
<td>1201 E. Hwy. 2 Grand Rapids, MN 55744</td>
<td>1200 Warner Road St. Paul, MN 55106</td>
<td>261 Hwy. 15 South New Ulm, MN 56073</td>
</tr>
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</table>

For a map of DNR Administrative Regions, see: [http://files.dnr.state.mn.us/aboutdnr/dnr_regions.pdf](http://files.dnr.state.mn.us/aboutdnr/dnr_regions.pdf)

- For a list of Corps of Project Managers: [www.mvp.usace.army.mil/regulatory/default.asp?pageid=687](http://www.mvp.usace.army.mil/regulatory/default.asp?pageid=687) or send to:
  
  US Army Corps of Engineers  
  St. Paul District, ATTN: OP-R  
  180 Fifth St. East, Suite 700  
  St. Paul, MN 55101-1678

- For Wetland Bank Plan applications, also send a copy of the application to:
  
  Minnesota Board of Water and Soil Resources  
  Wetland Bank Coordinator  
  520 Lafayette Road North  
  St. Paul, MN 55155

6. ATTACHMENTS

In addition to the site locator map, list any other attachments:
- application
Project Location and Topography

LAKE ELMO AIRPORT
Proposed Runway 14/32 Relocation and Associated Improvements

Legend

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Project Location

T29N, R20W, S18 and S19
Baytown and West Lakeland Townships
Washington County, MN
LRR Subregion: K
USACE Regional Supplement: NC/NE
Area = 130.1 acres
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Project Information

T29N, R20W, S18 and S19
City of Lake Elmo
Washington County, MN
Area of Interest = 130.1 acres
Field work conducted:
June 5 - 9, 2017
PROJECT: MAC 21D Lake Elmo Environmental Services  
DATE: 12/4/2017

SUBJECT: Lake Elmo Airport Wetland Determination Requests  
TRANSMITTAL ID: 00013

PURPOSE: For your approval  
VIA: Info Exchange

FROM

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<tr>
<td>Evan Barrett</td>
<td>Mead &amp; Hunt, Inc.</td>
<td><a href="mailto:Evan.Barrett@meadhunt.com">Evan.Barrett@meadhunt.com</a></td>
<td>952-641-8820</td>
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</table>
| 7900 W 78th Street, Suite 370  
Minneapolis MN 55439  
United States       |                      |                              |                  |

TO

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REMARKS: Good morning Ms. Wold & Mr. Hingsberger,  
On behalf of the Metropolitan Airports Commission, I would like to request the following with respect to our wetland delineation at Lake Elmo Airport. Below are links to a technical memorandum and related documentation that provide supporting documentation for these requests.

- From the Valley Branch Watershed District and Technical Evaluation Panel, we would like to request an incidental wetland review of Wetlands 3, 6, and 7.
- From the U.S. Army Corps of Engineers, we would like to request an approved jurisdictional determination for all nine wetlands identified in the wetland delineation report.

Please provide an approximate time frame we should expect for responses to these requests, and let Brauna Hartzell and I know if you have any questions or concerns.

Thank you!

R. Evan Barrett, AICP | Planner, Aviation Services
Mead & Hunt, Inc | 7900 West 78th Street, Suite 370 | Minneapolis, MN 55439  
ewan.barrett@meadhunt.com | www.meadhunt.com
## DESCRIPTION OF CONTENTS

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## COPIES:

Brauna Hartzell (Mead & Hunt, Inc.)
Technical Report

To: U.S. Army Corps of Engineers, St. Paul District
   Valley Branch Watershed District
From: Mead & Hunt, Inc.
Date: December 4, 2017
Subject: Lake Elmo Airport (21D)
Runway 14/32 Relocation and Associated Improvements
Request for U.S. Army Corps of Engineers Approved Jurisdictional Determination and
MN Wetland Conservation Act Incidental Wetland Determination

1. Determination Requests

Mead & Hunt, as agent for the Metropolitan Airports Commission (MAC), is requesting an approved
jurisdictional determination from the USCOE to determine which, if any, of the nine wetlands delineated at
Lake Elmo Airport are jurisdictional waters of the United States and therefore fall under the jurisdiction of
Section 404 of the Clean Water Act (CWA). We understand that this review will take approximately 60
days to complete.

Preliminary jurisdictional determinations are advisory in nature and are not appealable while approved
jurisdictional determinations document whether a wetland and/or waterbody is subject to regulatory
jurisdiction under Section 404 of the CWA. Proposed activities that result in dredge or fill material being
discharged into jurisdictional wetlands are regulated through a permit review process. Compensatory
mitigation will be required for unavoidable impacts to regulated wetlands.

Wetlands in Minnesota are also regulated under the Minnesota Wetland Conservation Act (WCA).
Unavoidable impacts to regulated wetlands require a replacement plan. However, certain types of
wetlands created within non-wetland areas due to drainage practices, impoundments, and the like, are
not regulated by the WCA. Impacts to wetlands of this type do not require a replacement plan under the
WCA. Therefore, Mead & Hunt is requesting an incidental wetland review of Wetlands 3, 6, and 7 from
the local government unit (LGU) under WCA, Valley Branch Watershed District. These wetlands appear
to have been created in association with drainage ditches and/or adverse construction grading and may
be determined incidental.

The overlapping but separate frameworks regulating wetlands in Minnesota at the federal and state levels
are complex. The purpose of these determination requests is to clarify the status of delineated wetlands
under both federal and state regulation at Lake Elmo. This information will be crucial in evaluating
required mitigation for potential wetland impacts associated with proposed actions at the Airport.

A wetland boundary map is included with this memo which shows the locations and types of these
specific wetlands. Documentation is provided as part of this memo for both determination requests.
Included as supplemental information to this memo for use in these determinations are materials included in the *Wetland Delineation and Functional Assessment Report* previously submitted to the USCOE and the LGU. More detailed site history and background can also be found in the delineation report as well as site photos and a wetland functional assessment. Supplemental materials provided here include:

- A detailed topographic map generated from LiDAR data collected by the Minnesota Elevation Mapping Project (2011)
- NRCS Hydric Soils Mapping
- Aquatic Resources Map showing National Wetland Inventory mapping, MN Public Waters, and Stream data from the National Hydrography Dataset
- Washington County, MN Public Waters Map (with Lake Elmo Airport Area highlighted)
- Historic Aerial Photo Review
- Wetland Boundary Maps (with detailed topographic information included)

### 2. Background

Lake Elmo Airport (21D) is a general aviation reliever airport owned and operated by the Metropolitan Airports Commission (MAC). The airport is located approximately 20 miles east of downtown St. Paul, Minnesota. The airfield at 21D consists of two runways, supporting taxiways, and numerous privately owned hangars. Runway 14/32 is the primary runway and is 2,849 feet long and 75 feet wide. The crosswind runway (Runway 4/22) is 2,496 feet long and 75 feet wide. There are two non-precision instrument approaches to the Airport, which has no control tower. Fueling, flight training, and aircraft maintenance services are available from a fixed-base operator. The primary role of the airport is to serve personal, recreational, and business aviation users.

MAC has prepared a number of Long-Term Comprehensive Plans (LTCP) for the Airport, beginning in 1966 with updates in 1976, 1992, 2008, and 2016. The LTCP identifies future facility needs, delineates the future footprint of the Airport, and aims to bring the Airport into alignment with Federal Aviation Administration (FAA) guidance and standards.

A joint federal Environmental Assessment (EA) / State Environmental Assessment Worksheet (EAW) is being completed to identify and evaluate environmental impacts associated with proposed actions to address future facility needs and various deficiencies identified at the Airport. In support of this effort, a wetland delineation and functional assessment was performed by Mead & Hunt, Inc. (Mead & Hunt) in 2017.

A Technical Evaluation Panel (TEP) field review meeting was held at the Airport on October 17, 2017 and a Minnesota Wetland Conservation Act (WCA) Notice of Decision was approved by the Valley Branch Watershed District (VBWWD), the LGU, on November 9, 2017. The wetland boundaries and types were approved by this Decision.

---

Nine wetlands were delineated at the Airport and consist primarily of Fresh (wet) Meadow (Type 2) wetlands. Table 1 lists the delineated wetlands and types.

<table>
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<th>Wetland</th>
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<td>Fresh (wet) Meadow/Shallow Marsh</td>
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3. Regulatory Agencies

Wetlands and other waters are regulated by a variety of agencies, including those at the federal, state, and local level. Overlapping jurisdictional responsibilities can sometimes cover the same wetland, as described below.

A. Federal

The U.S. Army Corps of Engineers (USCOE) and the U.S. Environmental Protection Agency (EPA), under Section 404 of the Clean Water Act (CWA), regulate discharge of dredged or fill materials to Waters of the U.S., including wetlands, as well as work within the channel of navigable waters as defined by Section 10 of the Rivers and Harbors Act. The current regulatory definition of “Waters of the U.S.” is complex and is under review. Operationally, the definition has reverted to the 1986/1988 definition.

To determine which wetlands may be regulated under Section 404, jurisdictional determinations are performed by the USCOE. A preliminary jurisdictional determination (JD) by the USCOE requires less time to complete, is advisory in nature, and may not be appealed. An approved jurisdictional determination by the USCOE results in documentation of the presence or absence of Waters of the U.S. and therefore whether a wetland and/or waterbody is subject to regulatory jurisdiction under Section 404 of the CWA. Approved JDs are valid for a period of five years from issuance.

Section 404 requires a permit before dredge or fill material may be discharged into Waters of the U.S. Prior to applying for a 404 permit, steps must be taken to avoid impacts to wetlands, minimize potential impacts, and to provide compensatory mitigation for all remaining unavoidable impacts.
B. State

At the State level, the Minnesota Department of Natural Resources (DNR) regulates areas listed as Public Waters – those areas below the Ordinary High Water of wetlands and waters. Public waters wetlands are a subset of the broader category of “public waters” regulated by the DNR, which includes most lakes and larger streams and rivers. Public waters wetlands are defined in Minn. Stat. § 103G.005, subd. 15a, as follows:

"Public waters wetlands" means all types 3, 4, and 5 wetlands, as defined in United States Fish and Wildlife Service Circular No. 39 (1971 edition), not included within the definition of public waters, that are ten or more acres in size in unincorporated areas or 2-1/2 or more acres in incorporated areas.2

MN Public Water 82046100 lies in close proximity to the project area of interest and is associated with Wetland 1.

C. Local

Under the Wetland Conservation Act of 1991, the State of Minnesota regulates wetlands not protected under the DNR’s public waters permit program. Wetlands regulated under the WCA are defined in Minn. Stat. § 103G.005, subd. 19:

"Wetlands" means lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of this definition, wetlands must have the following three attributes: (1) have a predominance of hydric soils; (2) be inundated or saturated by surface water or ground water at a frequency and duration sufficient to support a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions; and (3) under normal circumstances support a prevalence of hydrophytic vegetation.2

Under the WCA, responsibility for administration is shared by both local and state government. A local government unit (LGU), typically a city, county, watershed district or soil and water conservation district, has responsibility for administering provisions under the WCA at the local level. On state lands, the state agency with administrative responsibility for the land is also responsible for administering the WCA.

The WCA, however, does not regulate “incidental wetlands” as given in Chapter 8420 of the Minnesota Administrative Rules under Part 8420.0105, subp. 2D:

"Incidental wetlands" are wetland areas that the landowner can demonstrate, to the satisfaction of the local government unit, were created in nonwetland areas solely by actions, the purpose of which was not to create the wetland. Incidental wetlands include drainage ditches,

impoundments, or excavations constructed in nonwetlands solely for the purpose of effluent treatment, containment of waste material, storm water retention or detention, drainage, soil and water conservation practices, and water quality improvements and not as part of a wetland replacement process that may, over time, take on wetland characteristics. “

A replacement plan is required for unavoidable impacts to wetlands covered under WCA; a replacement plan, therefore, is not required for impacts to wetlands determined to be incidental.

4. Discussion of Subject Wetlands 3, 6, and 7

The airport was constructed around 1951-1952 (located in the southwest quarter of Section 18, T29N, R20W) on lands consistently in agricultural production since at least 1938 (the first available aerial photo). As can be seen in the series of aerial photos covering from 1938 to 2016, lands surrounding the airfield within Section 18 have been in agricultural production from completion of airport construction to today. Lands within the infield area are hayed or mown regularly and other areas outside of the airfield, but on Airport property, are in row crop production. Wet signatures, except those associated with isolated wetlands consistently seen in the series of aerial photos, appear to be absent in areas on Airport property under cultivation.

Soils in this part of the Section 18 are covered primarily by Crystal Lake silt Loam, 1 to 3 percent slopes (449) with a hydric rating of just 3 percent and non-hydric Antigo silt loam, 2 to 6 percent slopes (49B). These fertile well-drained soils support the nearly continuous agricultural production observed. See Soils mapping provided for coverage of these soil series.

Delineated Wetlands 1, 2, 5, 8, and 9 are consistent with previously mapped National Wetland Inventory (NWI) wetlands shown on the Aquatic Resources Map. However, Wetlands 3, 6, and 7 are not identified on the NWI. Wetlands 6 and 7 (See Wetland Boundary Maps 2 and 3, respectively) are ditch wetlands associated with culvert outlets designed to drain infield areas at the Airport. Wetland 6 is located at the base of a culvert near the end of Runway 14 and directs drainage to the west. Wetland 7 is located near the intersection of the two runways and drains from a large culvert into a wide swale that connects to Wetland 9. Both of these wetlands have developed as a result of the consistent hydrological support that the culvert drainage provides. These wetlands occur in moderately well-drained Crystal Lake silt loam and likely are incidental to the construction of the drainage system for the airport.

Wetland 3 is located near the Runway 22 end (See Wetland Boundary Map 1). Grading at a topographic high of 930 feet above sea level extends beyond the end of the runway for approximately 200 feet. Wetland 3 is located on the west side at the base of the slope associated with this runway safety area grading. The fillslope associated with the connecting taxiway bounds the southern side of the wetland. A swale, running parallel to the hangar area taxi lane, drains areas to the north and likely some of the associated hangar development to the west. Wetland 3, though, does not appear to connect hydrologically to the swale or the culvert draining to the south under the connector taxiway. Surface run-off from slopes on the east and south likely collects in this isolated low spot and supports this Fresh (wet) Meadow Type 2 wetland.
Wetland 3 occurs on soils mapped as well-drained non-hydric Antigo silt loam, 2 to 6 percent slopes (49B). From the aerial photo review, it appears that the area at the end of the runway was consistently in agricultural production until the runway was constructed and that grading for fill slopes and the runway safety area contributed to the formation of this wetland in non-wetland soils. Therefore, Wetland 3 is incidental to the construction of the runway and its drainage system.

5. Summary

This memorandum and its attachments support a request for jurisdictional determinations by the USCOE and the VBWD. Mead & Hunt is requesting an approved jurisdictional determination by the USCOE for all nine wetlands delineated at the Airport and an incidental wetland determination from the VBWD for Wetland 3, 6, and 7.
PART ONE: Applicant Information

If applicant is an entity (company, government entity, partnership, etc.), an authorized contact person must be identified. If the applicant is using an agent (consultant, lawyer, or other third party) and has authorized them to act on their behalf, the agent’s contact information must also be provided.

Applicant/Landowner Name: Chad Leqve (Metropolitan Airports Commission)
Mailing Address: 6040 28TH AVE S, MINNEAPOLIS MN 55450
Phone: 612-725-6326
E-mail Address: Chad.leqve@mspmac.org

Authorized Contact (do not complete if same as above):
Mailing Address:
Phone:
E-mail Address:

Agent Name: Evan Barrett (Mead & Hunt, Inc.)
Mailing Address: 7900 West 78th Street, Suite 370, Minneapolis, MN 55439
Phone: 952-641-8820
E-mail Address: evan.barrett@meadhunt.com

PART TWO: Site Location Information

County: Washington
City/Township: Lake Elmo (Baytown/West Lakeland Townships)
Parcel ID and/or Address: 3275 MANNING AVE N
Legal Description (Section, Township, Range): Section 18 and 19, T29N, R20W
Lat/Long (decimal degrees): 44.997089N, 92.857562W
Attach a map showing the location of the site in relation to local streets, roads, highways. (See Appendix A of delineation report)
Approximate size of site (acres) or if a linear project, length (feet): 130 acres

If you know that your proposal will require an individual Permit from the U.S. Army Corps of Engineers, you must provide the names and addresses of all property owners adjacent to the project site. This information may be provided by attaching a list to your application or by using block 25 of the Application for Department of the Army permit which can be obtained at:


PART THREE: General Project/Site Information

If this application is related to a delineation approval, exemption determination, jurisdictional determination, or other correspondence submitted prior to this application then describe that here and provide the Corps of Engineers project number.

Describe the project that is being proposed, the project purpose and need, and schedule for implementation and completion. The project description must fully describe the nature and scope of the proposed activity including a description of all project elements that effect aquatic resources (wetland, lake, tributary, etc.) and must also include plans and cross section or profile drawings showing the location, character, and dimensions of all proposed activities and aquatic resource impacts.
PART FOUR: Aquatic Resource Impact\(^1\) Summary

If your proposed project involves a direct or indirect impact to an aquatic resource (wetland, lake, tributary, etc.) identify each impact in the table below. Include all anticipated impacts, including those expected to be temporary. Attach an overhead view map, aerial photo, and/or drawing showing all of the aquatic resources in the project area and the location(s) of the proposed impacts. Label each aquatic resource on the map with a reference number or letter and identify the impacts in the following table.

<table>
<thead>
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<th>Aquatic Resource Type (wetland, lake, tributary etc.)</th>
<th>Type of Impact (fill, excavate, drain, or remove vegetation)</th>
<th>Duration of Impact (Permanent (P) or Temporary (T))(^3)</th>
<th>Size of Impact(^2)</th>
<th>Overall Size of Aquatic Resource (^3)</th>
<th>Existing Plant Community Type(s) in Impact Area(^4)</th>
<th>County, Major Watershed #, and Bank Service Area # of Impact Area(^5)</th>
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</table>

\(^1\) If impacts are temporary; enter the duration of the impacts in days next to the "T". For example, a project with a temporary access fill that would be removed after 220 days would be entered "T (220)".

\(^2\) Impacts less than 0.01 acre should be reported in square feet. Impacts 0.01 acre or greater should be reported as acres and rounded to the nearest 0.01 acre. Tributary impacts must be reported in linear feet of impact and an area of impact by indicating first the linear feet of impact along the flowline of the stream followed by the area impact in parentheses). For example, a project that impacts 50 feet of a stream that is 6 feet wide would be reported as 50 ft (300 square feet).

\(^3\) This is generally only applicable if you are applying for a de minimis exemption under MN Rules 8420.0420 Subp. 8, otherwise enter "N/A".

\(^4\) Use Wetland Plants and Plant Community Types of Minnesota and Wisconsin 3rd Ed. as modified in MN Rules 8420.0405 Subp. 2.

\(^5\) Refer to Major Watershed and Bank Service Area maps in MN Rules 8420.0522 Subp. 7.

If any of the above identified impacts have already occurred, identify which impacts they are and the circumstances associated with each:

PART FIVE: Applicant Signature

- Check here if you are requesting a pre-application consultation with the Corps and LGU based on the information you have provided. Regulatory entities will not initiate a formal application review if this box is checked.

By signature below, I attest that the information in this application is complete and accurate. I further attest that I possess the authority to undertake the work described herein.

Signature: [Signature]
Date: 9/25/2017

I hereby authorize [Agent's Name] to act on my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this application.

\(^1\) The term "impact" as used in this joint application form is a generic term used for disclosure purposes to identify activities that may require approval from one or more regulatory agencies. For purposes of this form it is not meant to indicate whether or not those activities may require mitigation/replacement.
Attachment B
Supporting Information for Applications Involving Exemptions, No Loss Determinations, and Activities Not Requiring Mitigation

Complete this part if you maintain that the identified aquatic resource impacts in Part Four do not require wetland replacement/compensatory mitigation OR if you are seeking verification that the proposed water resource impacts are either exempt from replacement or are not under CWA/WCA jurisdiction.

Identify the specific exemption or no-loss provision for which you believe your project or site qualifies:

- We are seeking verification that wetlands 3, 6, and 7 (identified in a previously submitted wetland delineation report for Lake Elmo Airport) are incidental and therefore do not fall under CWA/WCA jurisdiction.

Provide a detailed explanation of how your project or site qualifies for the above. Be specific and provide and refer to attachments and exhibits that support your contention. Applicants should refer to rules (e.g. WCA rules), guidance documents (e.g. BWSR guidance, Corps guidance letters/public notices), and permit conditions (e.g. Corps General Permit conditions) to determine the necessary information to support the application. Applicants are strongly encouraged to contact the WCA LGU and Corps Project Manager prior to submitting an application if they are unsure of what type of information to provide:

A detailed technical memo with supporting documentation (historic aerial photography, soils, and delineated wetland boundary maps) was submitted to the US Army Corps of Engineers, St. Paul District and the Valley Branch Watershed District (VBWD) on December 4, 2017. Additional information and clarification was requested by the VBWD on December 21, 2017. This Attachment B is also included as part of the supplemental information submittal. Information submitted as part of this additional info request includes historical aerial photos zoomed in to focus on the three wetlands in this review.
LAKE ELMO AIRPORT
Proposed Runway 14-32 Runway Shift

Project Information
T29N, R20W, S18 and S19
City of Lake Elmo
Washington County, MN
Area of Interest = 130.1 acres
Field work conducted:
June 5 - 9, 2017

Image Source: MnGEO WMS Image Service, Washington County (2016 color 7-county)
Contour Source:
Minnesota Geospatial Commons, Minnesota Elevation Mapping Project
Twin Cities Metro Region 2011

Legend
Area of Interest
Airport Property Boundary
Contour Elevation
- Index Contour
- Intermediate Contour

Note: Contour interval is 2 feet.
The soil surveys that comprise your AOI were mapped at 1:15,800.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below:

Soil Survey Area: Washington County, Minnesota
Survey Area Data: Version 11, Sep 19, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 16, 2012—Apr 26, 2012

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.
## Hydric Rating by Map Unit

<table>
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<tr>
<th>Map unit symbol</th>
<th>Map unit name</th>
<th>Rating</th>
<th>Acres in AOI</th>
<th>Percent of AOI</th>
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<tr>
<td>49</td>
<td>Antigo silt loam, 0 to 2 percent slopes</td>
<td>0</td>
<td>166.4</td>
<td>17.8%</td>
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<tr>
<td>49B</td>
<td>Antigo silt loam, 2 to 6 percent slopes</td>
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<td>68.2</td>
<td>7.3%</td>
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<tr>
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<td>0</td>
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<td>1.0%</td>
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<tr>
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<td>Brill silt loam</td>
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<td>0.6%</td>
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<tr>
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<td>Santiago silt loam, 2 to 6 percent slopes</td>
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<tr>
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<td>Auburndale silt loam, 0 to 2 percent slopes</td>
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<tr>
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<td><strong>Totals for Area of Interest</strong></td>
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<td></td>
<td><strong>935.5</strong></td>
<td><strong>100.0%</strong></td>
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</table>
Description

This rating indicates the percentage of map units that meets the criteria for hydric soils. Map units are composed of one or more map unit components or soil types, each of which is rated as hydric soil or not hydric. Map units that are made up dominantly of hydric soils may have small areas of minor nonhydric components in the higher positions on the landform, and map units that are made up dominantly of nonhydric soils may have small areas of minor hydric components in the lower positions on the landform. Each map unit is rated based on its respective components and the percentage of each component within the map unit.

The thematic map is color coded based on the composition of hydric components. The five color classes are separated as 100 percent hydric components, 66 to 99 percent hydric components, 33 to 65 percent hydric components, 1 to 32 percent hydric components, and less than one percent hydric components.

In Web Soil Survey, the Summary by Map Unit table that is displayed below the map pane contains a column named ‘Rating’. In this column the percentage of each map unit that is classified as hydric is displayed.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). Under natural conditions, these soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

References:


Rating Options

Aggregation Method: Percent Present
Component Percent Cutoff: None Specified
Tie-break Rule: Lower
Historic Aerial Imagery
LAKE ELMO AIRPORT
Proposed Runway 14-32 Runway Shift

Project Information
T29N, R20W, S18 and S19
City of Lake Elmo
Washington County, MN
Area of Interest = 130.1 acres
Field work conducted: June 5 - 9, 2017

Images are not to scale
Historic Aerial Imagery
LAKE ELM AIRPORT
Proposed Runway 14-32 Runway Shift

Images are not to scale

C-118
Historic Aerial Imagery
LAKE ELMO AIRPORT
Proposed Runway 14-32 Runway Shift

Images are not to scale

Project Information
T29N, R20W, S18 and S19
City of Lake Elmo
Washington County, MN
Area of Interest = 130.1 acres
Field work conducted: June 5 - 9, 2017

Images are not to scale
**Historic Aerial Imagery**

LAKE ELMO AIRPORT
Proposed Runway 14-32 Runway Shift

---

**Project Information**

T29N, R20W, S18 and S19
City of Lake Elmo, Washington County, MN
Area of Interest = 130.1 acres
Field work conducted: June 5 - 9, 2017

---

**Legend**

- Airport Property Boundary

---

**Image Source:** MnDNR Forestry Aerial Photography

**Image Date:** 10/16/1994

---

**Image Source:** MnGEO Aerial Photography (7-county BW)

**Image Date:** 1997
Historic Aerial Imagery
LAKE ELMO AIRPORT
Proposed Runway 14-32 Runway Shift

Legend

- Airport Property Boundary

Project Information
T29N, R20W, S18 and S19
City of Lake Elmo
Washington County, MN
Area of Interest = 130.1 acres
Field work conducted: June 5-9, 2017

Path: X:\2838700\161542.02\TECH\GIS\CAD\Maps\21D_HistoricImageryReview5.mxd

Image Date: 2000
Image Source: MnGEO Aerial Photography (7-county BW)

Image Date: 2010
Image Source: MnGEO Aerial Photography (2010 color FSA)
**Historic Aerial Imagery**

**LAKE ELMO AIRPORT**

Proposed Runway 14-32 Runway Shift

---

**Legend**

- **Airport Property Boundary**

**Project Information**

T29N, R20W, S18 and S19
City of Lake Elmo
Washington County, MN

Area of Interest = 130.1 acres
Field work conducted:
June 5 - 9, 2017

---

**Image Information**

- **Image Date:** 2013
  - Image Source: MnGEO Aerial Photography (2013 Washington)

- **Image Date:** 2016
  - Image Source: MnGEO Aerial Photography (2016 color 7-county)
Historic Aerial Imagery
LAKE ELMO AIRPORT
Proposed Runway 14-32 Runway Shift

Legend
- Project AOI
- Airport Property Boundary
- Delineated Wetland Boundary
- Index Contour
- Intermediate Contour
- PLSS Section Line
(Contour interval is 2 feet)

Project Information
T29N, R20W, S18 and S19
City of Lake Elmo
Washington County, MN
Area of Interest = 130.1 acres
Field work conducted:
June 5 - 9, 2017

Image Date: 7/28/1938
Image Source: Minnesota Historical Aerial Photographs, U of MN

Image Date: 5/8/1947
Image Source: Minnesota Historical Aerial Photographs, U of MN

Contour Source: Minnesota Geospatial Commons, Minnesota Elevation Mapping Project, Twin Cities Metro Region 2011
Historic Aerial Imagery

LAKE ELMO AIRPORT
Proposed Runway 14-32 Runway Shift

Legend
- Project AOI
- Delineated Wetland Boundary
- Airport Property Boundary
- Index Contour
- Intermediate Contour

(Contour interval is 2 feet)

Project Information

T29N, R20W, S18 and S19
City of Lake Elmo
Washington County, MN
Area of Interest = 130.1 acres
Field work conducted:
June 5 - 9, 2017

Image Date: 5/30/1957
Image Source: Minnesota Historical Aerial Photographs, U of MN

Image Date: 10/2/1964
Image Source: Minnesota Historical Aerial Photographs, U of MN

Contour Source: Minnesota Geospatial Commons, Minnesota Elevation Mapping Project, Twin Cities Metro Region 2011
Historic Aerial Imagery

LAKE ELMO AIRPORT
Proposed Runway 14-32 Runway Shift

Legend
- Project AOI
- Airport Property Boundary
- Delineated Wetland Boundary
- Index Contour
- Intermediate Contour
- PLSS Section (Contour interval is 2 feet)

Project Information
T29N, R20W, S18 and S19
City of Lake Elmo
Washington County, MN
Area of interest = 130.1 acres
Field work conducted:
June 5 - 9, 2017

Image Date: 10/28/1953
Image Source: Minnesota Historical Aerial Photographs, U of MN

Image Date: 11/28/1966
Image Source: USGS

Contour Source: Minnesota Geospatial Commons, Minnesota Elevation Mapping Project, Twin Cities Metro Region 2011
Historic Aerial Imagery

LAKE ELMO AIRPORT
Proposed Runway 14-32 Runway Shift

Legend
- Project AOI
- Airport Property Boundary
- Delineated Wetland Boundary
- Index Contour
- Intermediate Contour
- PLSS Section

Contour Source: Minnesota Geospatial Commons, Minnesota Elevation Mapping Project, Twin Cities Metro Region 2011
(Contour interval is 2 feet)

Project Information
T29N, R20W, S18 and S19
City of Lake Elmo
Washington County, MN
Area of Interest = 130.1 acres
Field work conducted: June 5 - 9, 2017
Historic Aerial Imagery
LAKE ELMO AIRPORT
Proposed Runway 14-32 Runway Shift

Legend
- Project AOI
- Delineated Wetland Boundary
- Airport Property Boundary
- Index Contour
- Intermediate Contour
- (Contour interval is 2 feet)
- PLSS Section Line

Image Date: 10/16/1994
Image Source: MnDNR Forestry Aerial Photography

Project Information
T29N, R20W, S18 and S19
City of Lake Elmo
Washington County, MN
Area of Interest = 130.1 acres
Field work conducted:
June 5 - 9, 2017

Image Date: 1997
Image Source: MnGEO Aerial Photography (7-county BW)
Contour Source: Minnesota Geospatial Commons, Minnesota Elevation Mapping Project, Twin Cities Metro Region 2011
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<th>Area within AOI (sq. ft)</th>
<th>Area outside AOI (acres)</th>
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**Legend**
- Map Sheet
- Wetland Boundary
- Wetland within AOI
- Outside AOI
- Area of Interest
- Airport Property Boundary

**Project Information**
- T29N, R20W, S18 and S19
- City of Lake Elmo, Washington County, MN
- Area of Interest = 130.1 acres
- Field work conducted: June 5 - 9, 2017

**Image Source:** MnGEO WMS Image Service, Washington County (2016 color 7-county)
Project Information

T29N, R20W, S18 and S19
City of Lake Elmo
Washington County, MN
Area of Interest = 130.1 acres
Field work conducted:
June 5 - 9, 2017

Image Source: MnGEO WMS Image Service, Washington County (2016 color 7-county)
Contour Source: Minnesota Geospatial Commons, Minnesota Elevation Mapping Project Twin Cities Metro Region 2011
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City of Lake Elmo
Washington County, MN
Area of Interest = 130.1 acres
Field work conducted:
June 5 - 9, 2017

Image Source:
MnGEO WMS Image Service, Washington County (2016 color 7-county)
Contour Source:
Minnesota Geospatial Commons, Minnesota Elevation Mapping Project
Twin Cities Metro Region 2011
Wetland Boundary Map
LAKE ELMO AIRPORT
Proposed Runway 14-32 Runway Shift

Project Information

T29N, R20W, S18 and S19
City of Lake Elmo
Washington County, MN
Area of Interest = 130.1 acres
Field work conducted:
June 5 - 9, 2017

Image Source: MnGEO WMS Image Service, Washington County (2016 color 7-county)
Contour Source:
Minnesota Geospatial Commons, Minnesota Elevation Mapping Project Twin Cities Metro Region 2011

Legend
- Photo Location
- Data Point Location
- Wetland Boundary
- Wetland within AOI
- Wetland outside AOI
- Culvert End Location
- Flow Direction
- Ditch/Swale Flow
- Area of Interest
- Airport Property Boundary

Elevation contour interval is 2 feet
Wetland Boundary Map
LAKE ELMO AIRPORT
Proposed Runway 14-32 Runway Shift

Project Information

T29N, R20W, S18 and S19
City of Lake Elmo
Washington County, MN
Area of Interest = 130.1 acres
Field work conducted:
June 5 - 9, 2017

Image Source: MnGEO WMS Image Service,
Washington County (2016 color 7-county)
Contour Source:
Minnesota Geospatial Commons,
Minnesota Elevation Mapping Project
Twin Cities Metro Region 2011

Legend

- Photo Location
- Data Point Location
- Wetland Boundary
- Wetland within AOI
- Wetland outside AOI
- Culvert End Location
- Flow Direction
- Ditch/Swale Flow
- Area of Interest
- Airport Property Boundary

Elevation contour interval is 2 feet
Wetland Boundary Map
LAKE ELMO AIRPORT
Proposed Runway 14-32 Runway Shift

Legend
- Photo Location
- Data Point Location
- Wetland Boundary
- Wetland within AOI
- Wetland outside AOI
- Culvert End Location
- Flow Direction
- Ditch/Swale Flow
- Area of Interest
- Airport Property Boundary

Project Information
T29N, R20W, S18 and S19
City of Lake Elmo
Washington County, MN
Area of Interest = 130.1 acres
Field work conducted: June 5 - 9, 2017

Image Source: MnGEO WMS Image Service, Washington County (2016 color 7-county)
Contour Source: Minnesota Geospatial Commons, Minnesota Elevation Mapping Project Twin Cities Metro Region 2011

Path: X:\2838700\161542.02\TECH\GIS_CAD\Maps\21D_LakeElmoWetlandBoundaryMaps1200.mxd
Wetland Delineation and Function Assessment Report (final)

Lake Elmo (21D) Airport
Runway 14/32 Relocation and Associated Improvements

Report prepared for
Metropolitan Airports Commission
Minneapolis, Minnesota

Report prepared by
www.meadhunt.com

October 2017
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G  Data Sheets with Field Photographs
H  MNRAM Functional Assessment Forms
I  Delineator Qualifications

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<tr>
<td>1</td>
<td>Summary of Soils in Area of Interest</td>
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<td>Summary of Delineated Wetlands within the Area of Interest</td>
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<td>Wetland and Functional Assessment IDs</td>
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1. Introduction

Lake Elmo Airport (21D) is a general aviation reliever airport owned and operated by the Metropolitan Airports Commission (MAC). The airport is located just east of St. Paul, Minnesota. The Airport is bordered by Manning Avenue N. (MN 15) to the west, a Union Pacific Railroad line on the north, and 30th Street N. to the south. Airport property covers approximately 640 acres over three parcels. The central parcel includes the main airfield and associated facilities, roads, and hangar areas. Additional parcels of land extend ownership to the north along Manning Avenue to 40th Street N. (Minnesota Trunk Highway 14), encompassing about 40 acres, and to the south of 30th Street N. for an additional 80 acres. To the south and east, the Airport is bordered by rolling farmland and woodlands with scattered residences, and lies within the Downs Lake subwatershed of the St. Croix River - Stillwater watershed. Areas west of the Airport consist primarily of single-family residential development. A project location map is presented in Appendix A.

The airfield at 21D consists of two runways, two supporting taxiways, and numerous privately owned hangars. Runway 14/32 is the primary runway and is 2,850 feet long and 75 feet wide. The crosswind runway (Runway 4/22) is 2,497 feet long and 75 feet wide. There are two non-precision instrument approaches to the Airport, which has no control tower. Fueling, flight training, and aircraft maintenance services are available from a fixed-base operator. The primary role of the airport is to serve personal, recreational, and business aviation users. The Airport provides business services including flight training and aircraft maintenance.

MAC has prepared a number of Long-Term Comprehensive Plans (LTCP) for the Airport, beginning in 1966 with updates in 1976, 1992, and 2008. The draft 2035 LTCP identifies future facility needs, delineates the future footprint of the Airport, and aims to bring the Airport into safety compliance with Federal Aviation Administration (FAA) guidelines.

The purpose of the proposed action at 21D is to pursue the following three general infrastructure goals for the Airport:

1) Address failing, end-of-life infrastructure;

2) Enhance safety for Airport users and neighbors; and

3) Improve facilities for the family of aircraft using and expected to use the Airport.

The need for the proposed action is based on the following four deficiencies at the existing facility:

1) The existing runway and taxiway pavements are deteriorating and need to be replaced.

2) Runway 14/32 has several incompatible land uses within its runway protection zones (RPZs), including a railroad and two public roads.

3) The existing lengths of Runway 14/32 and 4/22 do not meet the needs of current Airport operators and their aircraft.
4) The existing instrument approach procedures do not utilize the latest available navigational technology.

The proposed action will address these deficiencies by achieving the following four specific objectives:

1) Improve the runway and taxiway pavement condition;

2) Minimize incompatible land uses in the RPZs;

3) Meet runway length needs for existing users; and

4) Upgrade the instrument approach procedures.

In support of an alternatives analysis that explores meeting these goals, a wetland delineation and functional assessment was conducted by Mead & Hunt, Inc. (Mead & Hunt) within an Area of Interest (AOI) on June 5-9, 2017. The AOI comprises 130.1 acres spread over four separate areas and is located in Sections 18 and 19, Township 29 North, Range 20 West, Washington County, Minnesota. A total of nine wetlands were identified within the AOI.

This report summarizes the results of the wetland delineation. Delineator qualifications are provided in Appendix I. Mead & Hunt staff who performed the wetland delineation are:

- Brauna Hartzell, BS Biological Science, Florida State University, 1982; MS Environmental Monitoring, University of Wisconsin-Madison, 1994; 15 years wetland delineation practice.

- Kim Shannon, BS Biology, Oklahoma State University, 1994; MS Applied and Natural Science (Botany), Oklahoma State University, 1997; 10 years wetland delineation practice.
2. Methods

The wetland determination made use of available resources to provide context and background information and to assist in the field assessment including:

- U.S. Geological Survey (USGS) topographic maps and 2-foot elevation contours provided by Minnesota Geospatial Commons, Minnesota Elevation Mapping Project, 2011.


- U.S. Fish and Wildlife National Wetland Inventory (NWI) mapping with update for East-Central Minnesota at https://www.fws.gov/wetlands/data/mapper.html

- 2016 National Wetland Plant List (Lichvar, R.W., D. L. Banks, W. N. Kirchner, and N. C. Melvin, 2016)

- Climatic norms at Minneapolis/St. Paul Airport, MN from USDA WETS tables at https://www.wcc.nrcs.usda.gov/climate/navigate_wets.html


- Minnesota Wetland Functional Assessment (MNARAM) data provided by the Valley Branch Watershed District Engineer (via email dated 3/3/2017).

- Aerial photography (MnGEO WMS Image Service, MnDNR Department of Forestry, US Geological Survey, GoogleEarth)

The field methods used conform to the Routine Onsite Method of the 1987 U.S. Army Corps of Engineers’ (USACE) Wetland Delineation Manual, as enhanced by the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (U.S. Army Corps of Engineers, 2011). Soil characteristics were examined by digging pits with a 16-inch tile spade and hydrologic indicators were visually assessed. Soil pits were left open for a minimum of 15 minutes to adequately assess the water table. Munsell Soil Color charts were used to determine the hue, value, and chroma for the matrix and any redoximorphic features in each soil layer.

Vegetation was documented on the North Central/Northeast Regional (NC/NE) data forms. Percent cover of each species in each stratum was estimated. The herbaceous stratum was sampled within a 5-foot radius plot; a 15-foot radius plot for the shrub/sapling stratum; and a 30-foot radius plot for the tree and woody vine stratum. The 2016 National Wetland Plant List (Lichvar, R.W., et al, 2016) was used to determine the wetland indicator status for each species and the 50/20 rule was applied to determine dominance.
Antecedent precipitation was assessed following procedures developed by the NRCS. Precipitation data three months prior to fieldwork were compared to 30-year precipitation averages (1981-2010) to determine if hydrologic conditions were normal, wetter, or drier than normal for the area.

An offsite hydrology investigation per guidance established by the St. Paul District (USACE, 2016) was performed to assess areas in agricultural production for saturated soil or standing water. Each area identified was investigated in the field and documented.

All area within the AOI was examined. A total of 19 data points—ten in uplands and nine in wetlands—were established to characterize the range of soil, vegetation, and hydrologic conditions. Wetland boundary points were indicated by wire pin flags placed approximately 25-50 feet apart. These sampling points and wetland boundary flags were surveyed with a Trimble Geo7X capable of sub-meter accuracy and mapped using Geographic Information System (GIS) software.

The following appendices are included with this report:

- Appendix A – Project Location and Topography Map
- Appendix B – Detailed Topographic Map, NRCS Soils Map, and Aquatic Resources Map
- Appendix C – Historical Aerial Photography
- Appendix D – Offsite Hydrology Evaluation
- Appendix E – WETS Analysis and Climatic Data
- Appendix F – Wetland Boundary Maps
- Appendix G – Data Sheets with Field Photographs
- Appendix H – MNRAM Functional Assessment Forms
- Appendix I – Delineator Qualifications
3. Results and Discussion

A. Site Description
The AOI covers approximately 130 acres split across four separate areas. The largest section of the AOI, approximately 116 acres in size, extends across areas of the airfield, crossing over 30th Street to include most of the airport parcel south of 30th Street. Smaller sections of the AOI cover the safety area north of Runway 22 end (8.0 acres), an area on the western edge of the Airport along Manning Avenue (4.7 acres), and a small area adjacent to Runway 14/32 and northeast of the main hanger complex just over 1 acre in size. A project location map is presented in Appendix A.

Portions of the AOI are under row-crop cultivation east of Runway 4/22. Scattered woodlands and wetlands appear in this area. Undeveloped infield areas to the west of Runway 4/22 consist of grasses and forbs mown or hayed on a regular basis. The airfield is generally flat with little elevation change; the eastern side is somewhat higher at approximately 930 feet (NAVD 1988), gently sloping to the west and south to about 920 feet at the Airport entrance on Manning Avenue. See Appendix B for a detailed Topographic Map.

Drainage flows generally from northeast to southwest as it moves under 30th Street and Manning Avenue via numerous culverts. Within Airport property, the main southerly drainage conveys flows to a depressional shallow marsh and seasonally flooded basin near the Runway 32 end north of 30th Street. This wetland is connected hydrologically to a larger depressional shallow marsh south of 30th Street via a culvert. Area south of 30th Street is cultivated, although prior to construction of the road these two wetlands were likely physically connected.

Airport lands not in agricultural production are actively managed by regular mowing or periodic haying. At the time of field work, the west side (uncultivated areas) of the Airport had not been mown for some time, making vegetation readily identifiable. Most of these uncultivated areas were dominated by a mix of grasses and forbs consisting of Kentucky blue grass, orchard grass, red clover, common yarrow, milkweed, and Canada thistle. Farm fields on the east side of Runway 4/22 and south of 30th Street were under cultivation. Isolated woodlands and depressional areas appeared undisturbed.

(1) Soils Mapping
Most of the AOI is covered by three soils: well drained Antigo silt loams (0 to 2 percent slopes and 2 to 6 percent slopes) and moderately well drained Crystal Lake silt loam (1 to 3 percent slopes). Typical soil profiles for Antigo silt loams (49 and 49B) show a dark grayish brown (10YR 4/2) silt loam over a brown (10YR 5/3) silt loam. Crystal Lake silt loam (449) also shows a dark grayish brown (10YR 4/2) silt loam in the A horizon; however, underlying this is a light brownish gray (10YR 6/2) silt loam with few fine prominent yellowish red (5YR 4/6) masses of iron accumulation. Antigo silt loams and their minor components are non-hydric while Crystal Lake silt loam contains a minor component, Barronett silt loam at 3%, which is hydric.

Depressional areas within the AOI generally are covered by hydric soils from the poorly drained Auburndale series and by ponded, very poorly drained Aquolls and Histosols. A very dark grayish
brown (10YR 3/2) silt loam covers a grayish brown (10YR 5/2) silt loam with many medium prominent strong brown (7.5YR 5/8) masses of iron accumulation in a typical soil profile for the Auburndale series. Areas mapped as Aquolls and Histosols are rated as hydric.

Soils present within the AOI are summarized in Table 1. Soils mapping for the AOI is presented in Appendix B.

Table 1. Summary of Soils in Area of Interest

<table>
<thead>
<tr>
<th>Map unit symbol</th>
<th>Map unit name</th>
<th>Soil Unit Component Percentage</th>
<th>Landform</th>
<th>Hydric Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>49</td>
<td>Antigo silt loam, 0 to 2 percent slopes</td>
<td>Antigo/ minor comp. 80/20</td>
<td>Terraces, flats</td>
<td>No</td>
</tr>
<tr>
<td>49B</td>
<td>Antigo silt loam, 2 to 6 percent slopes</td>
<td>Antigo/ minor comp. 80/20</td>
<td>Terraces, flats, hillslopes</td>
<td>No</td>
</tr>
<tr>
<td>153B</td>
<td>Santiago silt loam, 2 to 6 percent slopes</td>
<td>Santiago/ minor comp. 90/10</td>
<td>Moraines</td>
<td>No</td>
</tr>
<tr>
<td>155B</td>
<td>Chetek sandy loam, 0 to 6 percent slopes</td>
<td>Chetek/ minor comp. 90/10</td>
<td>Outwash plains</td>
<td>No</td>
</tr>
<tr>
<td>155C</td>
<td>Chetek sandy loam, 6 to 12 percent slopes</td>
<td>Chetek/ minor comp. 90/10</td>
<td>Pitted outwash plains</td>
<td>No</td>
</tr>
<tr>
<td>155D</td>
<td>Chetek sandy loam, 12 to 25 percent slopes</td>
<td>Chetek/ minor comp. 90/10</td>
<td>Pitted outwash plains</td>
<td>No</td>
</tr>
<tr>
<td>189</td>
<td>Auburndale silt loam, 0 to 2 percent slopes</td>
<td>Auburndale/ minor comp. 85/15</td>
<td>Ground moraines</td>
<td>Yes</td>
</tr>
<tr>
<td>266</td>
<td>Freer silt loam</td>
<td>Freer/ minor comp. 90/10</td>
<td>Moraines</td>
<td>No</td>
</tr>
<tr>
<td>367B</td>
<td>Campia silt loam, 0 to 8 percent slopes</td>
<td>Campia/ minor comp. 90/10</td>
<td>Lake plains</td>
<td>No</td>
</tr>
<tr>
<td>449</td>
<td>Crystal Lake silt loam, 1 to 3 percent slopes</td>
<td>Crystal Lake/ minor comp. 90/10</td>
<td>Lake plains</td>
<td>No</td>
</tr>
<tr>
<td>452</td>
<td>Comstock silt loam</td>
<td>Comstock/ minor comp. 90/10</td>
<td>Lake plains</td>
<td>No</td>
</tr>
<tr>
<td>1055</td>
<td>Aquolls and Histosols, ponded</td>
<td>Histosols/Aquolls 50/50</td>
<td>Depressions on moraines</td>
<td>Yes</td>
</tr>
</tbody>
</table>
(2) Aquatic Resources
The National Wetland Inventory (NWI) indicates several areas of mapped wetlands within the AOI: two areas mapped as seasonally flooded emergent (PEM1C) with a fringe of temporary- flooded emergent (PEM1A), both within the eastern portion of the AOI. A small pocket of forested wetland (PFO1A) is mapped adjacent to an emergent wetland (PEM1A) just northeast of the Runway 22 end. A small emergent seasonally flooded wetland, mapped as PEM1A, lies at the very eastern edge of the AOI, just west of Neal Avenue.

Just outside of the AOI, south of 30th Street is a large open-water cattail swamp ringed by emergent vegetation and mapped as PEM1A, PEM1C, and PABG. The northern edge of this wetland was investigated because of its close proximity to the AOI and its likely connection to the wetland complex north of 30th Street. This wetland is identified as an unnamed MN Public Water (82-461W) and appears to be an isolated wetland with no downstream connections.

An unnamed intermittent stream flows southerly through the western half of Section 19 to Downs Lake. This lake is located west of Manning Avenue and south of the airport. The stream does not flow through the AOI.

Wetlands within the AOI are classified as Circular 39 Types 1 and 3. See Appendix B for aquatic resources mapping.

(3) Historic Aerial Photograph Review
Aerial photographs from 1938, 1947, 1953, 1966, 1972, 1980, 1994, 1997, 2000, 2002, 2004, 2008, 2010, and 2012-2016 were reviewed to assess areas within the AOI that have been and continue to be in agricultural production. A representative sample of these photos is presented in Appendix C. The earliest photograph of the area, taken in 1938, shows the general vicinity of the AOI mostly under cultivation with Manning Avenue, 30th Street, and the rail line in their current configuration. Two farmsteads are located within Sections 18 and 19, one at the southeast corner of Section 18 and one in the northeast corner of Section 19, situated across from each other on 30th Street. Four areas of isolated wetlands are seen much as they are today: the large swamp complex south of 30th Street, a similar smaller swamp area just north of 30th Street, an isolated depressional wooded wetland in the southeast quarter of Section 18, and a grouping of four smaller wooded areas just south of the rail line.

Land use remained the same over the next 10 years with little if any change seen in the 1947 photo. The airport was constructed around 1951-1952 and, with the exception of the airfield area (located in the southwest quarter of Section 18), the surrounding lands remained largely in agricultural production in 1953. By 1966, hangars were being developed on the west side of the airport with further hangar development seen in 1972, at which point the current configuration of runways and taxiways was set. It appears that the farmstead south of 30th Street may have been abandoned, noting the lack of driveway access and the growth of tree canopy.
The north side hangar development was well under way by the early 1990s and largely built out by 2000. The farmstead north of 30th Street was abandoned by 1994 and reversion to forest had nearly closed the canopy.

A small saturated area can be seen in a number of photos starting in 1994 located north of the Runway 22 end. Over the course of numerous photos (1994, 1997, 2004, 2010, 2013, and 2016), this area consistently shows saturated wet signatures; two years a wet signature did not appear. This location was investigated during field work and is documented as Wetland 4 in the Findings section below.

The pattern of agricultural use, both row cropping and forage production, in areas east of the airfield and south of 30th Street within Airport property, observed since the Airport’s construction, continues to the present and reflects conditions encountered at the time of field work in 2017. Isolated depressional wetlands appear to be intact and little disturbance was observed in these aerial photos.

No other wet signatures were observed in the farmed fields within the AOI with the exception of area just south of 30th Street situated between the two swamp complexes. This area has been farmed for many years and will be addressed separately as it relates to delineated wetlands, discussed in the following section under Wetland 1. An evaluation of this area using the methodology and guidelines described by the USACE for Offsite Hydrology and Wetland Determinations (USACE, 2016) is presented in Appendix D.

(4) Antecedent Climatic Conditions
A precipitation worksheet using the gridded method from the Minnesota Climatology Working Group was calculated for the three months prior to field work. This analysis indicated that climatic conditions were wetter than normal. Additionally, a WETS analysis using long-term climatic normal data from Minneapolis/St Paul Airport and rain data from the Woodbury, Minnesota, precipitation gage shows a total of 11.8 inches as compared to the long-term average of 7.56 inches. Based on the WETS analysis, hydrologic conditions were wetter than normal (see Appendix E).

B. Findings
(1) Wetlands
A total of nine wetlands were delineated within the AOI. Wetland boundary maps with sampling point locations are presented in Appendix F followed by data sheets and field photographs in Appendix G. Table 2 summarizes the delineated wetlands which are described in detail below.
Section 3
Results and Discussion

Table 2. Summary of Delineated Wetlands within the Area of Interest

<table>
<thead>
<tr>
<th>Wetland</th>
<th>Wetland Type</th>
<th>Circular 39 Type</th>
<th>Dominant Vegetation</th>
<th>Area within AOI (Sq. Ft)</th>
<th>Area within AOI (Acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Seasonally Flooded Basin&lt;sup&gt;1&lt;/sup&gt;</td>
<td>Type 1</td>
<td>Agricultural Field</td>
<td>8,142.91</td>
<td>0.187</td>
</tr>
<tr>
<td>2</td>
<td>Fresh (wet) Meadow</td>
<td>Type 2</td>
<td>Reed canary grass</td>
<td>5,079.60</td>
<td>0.117</td>
</tr>
<tr>
<td>3</td>
<td>Fresh (wet) Meadow</td>
<td>Type 2</td>
<td>Tall buttercup, horsetail, and broom sedge</td>
<td>4,776.96</td>
<td>0.110</td>
</tr>
<tr>
<td>4</td>
<td>Fresh (wet) Meadow</td>
<td>Type 2</td>
<td>Path rush, American manna grass</td>
<td>7,271.28</td>
<td>0.167</td>
</tr>
<tr>
<td>5</td>
<td>Fresh (wet) Meadow</td>
<td>Type 2/</td>
<td>Reed canary grass</td>
<td>4,104.29</td>
<td>0.094</td>
</tr>
<tr>
<td>6</td>
<td>Fresh (wet) Meadow (Ditch Wetland)</td>
<td>Type 2</td>
<td>American manna grass, reed canary grass</td>
<td>389.31</td>
<td>0.009</td>
</tr>
<tr>
<td>7</td>
<td>Fresh (wet) Meadow (Ditch Wetland)</td>
<td>Type 2</td>
<td>Reed canary grass</td>
<td>555.23</td>
<td>0.013</td>
</tr>
<tr>
<td>8</td>
<td>Fresh (wet) Meadow /Deep Marsh</td>
<td>Type 2/ Type 4</td>
<td>Reed canary grass, black willow, box elder</td>
<td>113,165.03</td>
<td>2.598</td>
</tr>
<tr>
<td>9</td>
<td>Fresh (wet) Meadow /Shallow Marsh</td>
<td>Type 2/ Type 3</td>
<td>Reed canary grass, sensitive fern</td>
<td>113,866.44</td>
<td>2.614</td>
</tr>
</tbody>
</table>

<sup>1</sup> Wetland 1 continues beyond the AOI boundary; delineated boundary within the AOI consists of farmed fields and wetland fringe.

(a) **Wetland 1 (PEMA/Type 1)**

Wetland 1 (W1) is a shallow basin located south of 30<sup>th</sup> Street with two central cores of open water populated with cattails and surrounded by a wide dense fringe dominated by reed canary grass. NWI mapping shows the central open water cores mapped as aquatic bed (PABG) with an inner ring mapped as seasonally-flooded emergent (PEM1C), and an outer ring of temporary flooded emergent (PEM1A). Only the northern extent of this wetland was investigated due to its proximity to the AOI boundary. Lands between 30<sup>th</sup> Street and the north end of the wetland have been in agricultural production for many years.

An offsite hydrology analysis of the agricultural area using 18 historic aerial photographs is provided in Appendix D. This analysis shows that 66% of the photographs taken with normal antecedent precipitation exhibit wet signatures. These signatures include both soil wetness and crop stress signatures, supporting observations taken in the field at sampling data point (DP) 3 and DP4.

Slopes around the basin vary from a 1% to 3% grade. The basin receives runoff from the surrounding fields and a 24 inch culvert under 30<sup>th</sup> Street contributes drainage from the north. It is
likely that, prior to the construction of 30th Street, these two wetlands were physically connected. Currently, they appear to be connected hydrologically.

Data points 1 through 6 were taken in W1. DPs 1, 2, 5, and 6 are indicative of the wetland fringe while DPs 3 and 4 were taken in the farmed area south of 30th Street. The locations of these sampling points are found on the Wetland Boundary Maps in Appendix F. Data sheets along with field photographs are presented in Appendix G.

Vegetation
At both wetland data points DP1 and DP5, the vegetation is dominated by reed canary grass in the herb layer. Other minor components of the herb stratum included stinging nettle (Urtica dioica: FAC) and water smartweed (Persicaria amphibia: OBL). The dominant species at wetland sampling points DP1 and DP5 are hydrophytic (FACW or FAC) and meet the wetland vegetation criterion.

At DP3 (wetland) within the farmed field, no identifiable vegetation was present and the sampling area was mostly bare. This appeared to be the result of inundation which caused soy bean seedling drown-out at this data point.

Hydrology
While evidence of surface water, a high water table, or saturation was not observed at either DP1 or DP5, oxidized rhizospheres were observed on living roots which met the C3 (Oxidized Rhizospheres on Living Roots) primary indicator of wetland hydrology at both these wetland sampling points. Secondary indicators Geomorphic Position (D2) and a positive FAC-Neutral Test (D5) were also present.

Wetland hydrology at DP3 (wetland) in the farm field was indicated by multiple primary indicators Drift Deposits (B3), Sparsely Vegetated Concave Surface (B8), and Water-Stained Leaves (B9). Secondary hydrology indicators included Surface Soil Cracks (B6) and Stunted or Stressed Plants (D1). The previous year’s corn debris had drifted and accumulated against the standing vegetation of the wetland fringe to the south of DP3. Water-staining was present on many of the old stalks. The soil surface at DP3 was devoid of planted soy beans, indicating crop drown-out conditions and plants under stress. Re-growth of weedy vegetation was noted; however, the shoots were too small to identify. Cracked soils were seen in overflow areas near the culvert exit under 30th Street, approximately 150 feet to the north of DP3. Standing water was present at the base of the culvert.

Offsite hydrology analysis using 18 historic aerial photographs showed that 66% of the photographs taken with normal antecedent precipitation exhibited wet signatures. Therefore, secondary indicator Saturation Visible on Aerial Imagery (C9) was also met at DP3.

In meeting multiple primary and secondary indicators of wetland hydrology, the hydrology criterion is satisfied.
Soils
Three mapped soils cover this area: Crystal Lake silt loam (1 to 3 percent slopes) at DP1, DP2, DP5, and DP6; Comstock silt loam at DP3 and DP4; and Aquolls and Histosols (ponded) within the basin itself.

The hydric soils criterion was satisfied at five of the six sample points taken in W1 which included two upland data points (DP2 and DP4). At DPs 1 through 5, the Depleted below Dark Surface (A11) was met. DP1 and DP2, on the west side of the wetland, also met Redox Dark Surface (F6). The Depleted Matrix (F3) indicator was also met at DP 5, located on the east side of the wetland.

The soil profiles at these five data points were all silt loams with very dark brown to very dark grayish brown matrix colors (10YR2/2 and 10YR3/2) and prominent redoximorphic features in strong brown colors (7.5YR4/6 and 7.5YR5/6). A depleted matrix was encountered at DP5 with a dark gray (10YR4/1) silt loam with strong brown (7.5YR4/6) redox features starting at 4 inches deep. With numerous hydric soils indicators being met, the hydric soils criterion is satisfied.

The upland data point (DP6) did not satisfy any hydric soils indicator with a dark brown (10YR3/3) silt loam and no redox features.

Wetland Boundary
The wetland boundary was based on distinct differences in vegetation, hydrology, and topography. All upland data points (DP2, DP4, and DP6) were taken in surrounding agricultural fields where soy beans had recently been planted after light discing. In transition to uplands, bean sprouts were vigorous and not stressed, and indicators of wetland hydrology were lacking. Hydric soils were present at most of the data points so this wetland criterion was not a factor in determining the boundary except on the east side of the wetland. Wetland hydrology was absent at all three upland data points.

Topography changes were more pronounced on the east side of the wetland as compared to the more subtle slopes on the west. The nearly flat field south of 30th Street exhibited many indicators of wetland hydrology and the loss of vegetation due to drown-out together determined the boundary in this area.

(b) Wetland 2 (PEMB/Type 2)
Wetland 2 (W2) is a depressional emergent wetland community located at the base of a steep hillslope on its northern and western sides and is bounded by the road fill slope of Neal Avenue on the east. Surface runoff from the surrounding hill slope flows over a 12-13% grade to this area and exits over a more gradual gradient to the south. W2 consists almost entirely of reed canary grass (*Phalaris arundinacea*: FACW) with a few isolated willow (*Salix* sp.) on the fringes. A few elm (*Ulmus americana*: FACW) and box elders (*Acer negundo*: FAC) appeared higher on the slope on the western side and a pocket of aspen (*Populus tremuloides*: FAC) and buckthorn (*Rhamnus cathartica*: FAC) was observed in the southeast corner of the area.
This area is mapped on the National Wetland Inventory map as emergent temporary flooded (PEM1A). See Appendix B for NWI mapping.

DPs 7, 8, and 9 were taken in W2. The locations of these sampling points are found on the Wetland Boundary Maps in Appendix F. Data sheets along with field photographs are presented in Appendix G.

Vegetation
Reed canary grass (FACW) was dominant within W2 and the hydrophytic vegetation criterion was satisfied at all three sampling points including the two upland data points (DP8 and DP9). A few isolated willows and a dead standing tree was observed on the wetland fringe and documented at DP7 (wetland).

Hydrology
Primary indicators of wetland hydrology present within W2 were High Water Table (A2) and Saturation (A3) observed at wetland sampling point DP7. Saturation (A3) was found at DP 8, an upland sampling point. Secondary indicators included Geomorphic Position (D2) and a positive FAC-Neutral Test (D5) for data points 7 and 8 and Stunted or Stressed Plants (D1) at DP 7 only. The numerous primary and secondary indicators satisfied the wetland hydrology criterion.

Soils
Chetek sandy loam (12 to 25 percent slopes) and Antigo silt loam (0 to 2 percent slopes) are mapped over Wetland 2. A very dark gray loam (7.5YR3/1) with distinct dark brown (7.5YR3/3) redoximorphic features met the Redox Dark Surface (F6) hydric soils criterion at DP7; however, a similar profile at DP8 did not meet hydric soils criteria due to depth and insufficient redoximorphic features. DP9 (upland) did not meet any hydric soils indicators due to high chroma soils.

Wetland Boundary
The wetland boundary in W2 was primarily determined by transitions to upland conditions in soils and hydrology field parameters along with topographic changes. Wetland vegetation crossed the boundary and was present at both upland sampling points (DP8 and DP9) but the lack of hydrology and hydric soils indicators determined the boundary over this sampling transect. In transition to upland, the boundary was primarily associated with changes in elevation of two to four feet on the north and west sides along the base of the hill slope and along the road fill slope on the east. On the southern end of the wetland, less abrupt topographic changes determined the boundary.

(c) Wetland 3 (PEMB/Type 2)
Wetland 3 (W3) is an emergent wetland community located north of Runway 22 end at the base of a narrow knoll on the east (likely related to construction of the runway), the fill slope of the connector taxiway, and a shallow swale on the west. This swale drains from northeast to southwest along a hangar access road and is drained by a culvert at the southern end. There does not appear to be a connection between W3 and the swale as a slight topographic rise between the two areas separates them.
This small basin collects surface runoff from the east and south and was relatively undisturbed at the time of field work. The area is mown frequently; however, regrowth was sufficient for identification at the time of field work. Some mower tracks were observed within the wetland, some of which were bare; others contained some iron staining. W3 does not appear on NWI mapping.

Sampling points DP10 (wetland) and DP11 (upland) were taken. The locations of these points are shown on the Wetland Boundary Maps provided in Appendix F; data sheets along with field photographs are presented in Appendix G.

Vegetation
The diverse mix of vegetation within W3 was dominated by tall buttercup (*Ranunculus acris*: FAC), field horsetail (*Equisetum arvense*: FAC), and broom sedge (*Carex scoparia*: FACW). Other species including selfheal (*Prunella vulgaris*: FAC), path rush (*Juncus tenuis*: FAC), Kentucky blue grass (*Poa pratensis*: FACU) and grass-leaf starwort (*Stellaria graminea*: UPL) completed the assemblage. The dominant species within W3 are hydrophytic (FAC and FACW) and meet the hydrophytic vegetation criterion.

Hydrology
Wetland hydrology was present and indicated. At data point DP10 (wetland), the soils were saturated at the surface and met primary indicator Saturation (A3). Geomorphic Position (D2), a secondary indicator of wetland hydrology, was also met. Runoff from slopes to the east and south appear to collect in this shallow basin with no apparent outlet before infiltrating into the subsoil. Primary and secondary hydrology indicators were satisfied at DP10 and wetland hydrology is present.

Soils
Antigo silt loam (2 to 6 percent slopes) is mapped underlying Wetland 3. While this series and several of its minor components are primarily mapped with silt loam profiles, one of the components (Rosholt) contains a sandy loam profile. At wetland sampling point DP10, a layer of very dark gray (5YR3/1) sandy loam with yellowish red (5YR4/6) redoximorphic features covering a dark reddish gray (5YR4/2) sand with yellowish red (5YR4/6) redoximorphic features was documented. This profile met hydric soils indicators Sandy Redox (S5) and Redox Dark Surface (F6) and therefore hydric soils are present.

Wetland Boundary
The wetland boundary was determined by a transition to a plant community dominated by upland species with minor wetland components, an absence of hydric soils indicators, and a lack of wetland hydrology indicators. A topographic transition of about 2-3 feet to uplands was also noted along the southern side due to the taxiway fill slope and due to a topographic rise on the eastern side. On the northern and western sides, vegetation changes and more minor topographic changes determined the boundary.
In uplands, the vegetation shifted to one dominated by Kentucky blue grass and grass-leaf starwort at upland sampling point DP11. Other species observed as minor components included white and red clover (*Trifolium repens*: FACU and *Trifolium pratense*: FACU), oxeye-daisy (*Leucanthemum vulgare*: UPL) as tall buttercup and common selfheal (both FAC) crossed the boundary. Hydric soils and wetland hydrology indicators were absent at DP11.

(d) **Wetland 4 (PEMB/Type 2)**

Wetland 4 (W4) is an emergent wetland community located north of the Runway 22 end, a flat area situated between two knolls with slopes rising six to eight feet on three sides. Surface runoff is collected at this low spot between these converging landforms. The wetland also receives drainage from the north over a more gradual gradient before exiting on the eastern side where a narrow neck appears to carry flow from this wetland to Wetland 5 (discussed below); however, at the time of field work, evidence of a wetland connection was not observed. A slight topographic rise serves to separate these wetland areas under most circumstances and hydric soils indicators were not observed in test soil pits dug in the rise.


Several areas of rutting due to mowing operations were observed at the time of field investigation although the area had not been mown recently. Two data points (DP12 and DP13) were sampled in an undisturbed area on the eastern side.

The locations of these points are shown on the Wetland Boundary Maps provided in Appendix F; data sheets along with field photographs are presented in Appendix G. The complex topography is shown on the detailed topography map in Appendix B.

**Vegetation**

The plant community at DP13 (wetland) was dominated by path rush (FAC) and American manna grass (*Glyceria grandis*: OBL), both hydrophytic wetland plants. Other minor components of the wetland plant assemblage were wooly-fruitsedge (*Carex lasiocarpa*: OBL), horsetail, reed canary grass, and broom sedge. A large area of matted vegetation was observed to the west of the data point locations. Hydrophytic vegetation dominated at DP13 and therefore meets the hydrophytic vegetation criterion.

**Hydrology**

Wetland hydrology is present and indicated at DP13 (wetland). One primary indicator of wetland hydrology was present with Saturation (A3) to a depth of 6 inches as well as secondary indicators of Geomorphic Position (D2), a positive FAC-Neutral Test (D5), and Saturation Visible on Aerial Imagery (C9). These four indicators of wetland hydrology satisfied the hydrology criterion.

**Soils**

As with Wetland 3, Antigo silt loam (2 to 6 percent slopes) is mapped underlying this wetland. A similar sandy soil profile was seen at DP13 as with DP 10 in W3. While soil disturbance was
noted here, the profile appeared to be intact. Two thin sandy layers overlaid a depleted matrix of dark gray (5YR4/1) sandy loam with yellowish red (5YR4/6) redoximorphic features starting at 6 inches deep which met field indicator Depleted Matrix (F3). The hydric soils criterion was satisfied.

**Wetland Boundary**  
The wetland boundary was determined by a transition to a plant community dominated by upland species, a lack of hydric soils and wetland hydrology indicators, and changes in elevation. In uplands, the plant community shifted to one dominated by Kentucky blue grass and grass-leaf starwort as seen at upland sampling point DP12. Both white and red clover and dandelion (*Taraxacum officinale*: FACU) entered the plant community as minor components.

A topographic rise of about two feet along the east and south sides of the wetland aided in boundary determination. Along the western and northern sides, transition to upland vegetation determined the boundary. Hydric soils indicators and wetland hydrology indicators were absent at DP12.

(e) **Wetland 5 (PEMB/Type 2)**  
Wetland 5 (W5) is a shallow closed basin with a dense fringe dominated by reed canary grass located at the northeastern corner of the AOI, near the end of Runway 22. The basin is at the base of knolls on the north, west, and east sides with slopes as steep as 15%. Drainage flows to the southeast through a shrub-carr complex just outside of the AOI. Within the AOI, the wetland is comprised of emergent vegetation only.

The NWI mapping indicates this area as a temporary flooded emergent/shrub (PEM1A/PFO1A) wetland. See Appendix B for NWI mapping.

Two data points (DP14 and DP15) were sampled at the northern side of the wetland boundary. No vegetation disturbance due to management activities was noted. The locations of these points are shown on the Wetland Boundary Maps provided in Appendix F; data sheets along with field photographs are presented in Appendix G.

**Vegetation**  
At DP15 (wetland), the dominant vegetation was reed canary grass with a minor component of water smartweed (*Persicaria amphibia*: OBL). Stinging nettle (*Urtica dioica*: FAC) appeared in the assemblage along the boundary. Within the AOI, vegetation was confined to the herb stratum; outside of the AOI to the east, tree and shrub components were observed consisting of box elder, willow (*Salix* sp.), and red osier dogwood. The hydrophytic vegetation criterion was satisfied at this sampling point.

**Hydrology**  
Wetland hydrology was present and indicated by a High Water Table (A2) to three inches in depth, Saturation (A3) at the surface and secondary indicators of Geomorphic Position (D2) and a
positive FAC-Neutral Test (D5). These four primary and secondary indicators meet the wetland hydrology criterion at DP15.

Soils
The area is mapped as poorly drained Auburndale silt loam, a soil unit rated as hydric. At DP 15, a depleted matrix of dark gray (10YR4/1) silt loam with reddish-brown (5YR4/4) redox concentrations overlaid a black (7.5YR2.5/1) silt loam. Two field indicators of hydric soils were observed including Depleted Matrix (F3) and Redox Depressions (F8). In satisfying these indicators, the hydric soils criterion was met.

Wetland Boundary
The wetland boundary was determined by differences in vegetation, hydrology, soils, and a significant change in elevation. In transition to uplands, reed canary grass was still dominant, crossing the boundary; however, Canada thistle became a major component of the limited plant assemblage, failing the Prevalence Index at 3.2 at the upland sampling point DP14. The lack of hydric soils and wetland hydrology indicators also determined the boundary.

A sharp topographic rise of about 4-5 feet accompanied the transition to uplands around the rim of the basin within the AOI.

(f) Wetlands 6 and 7 (PEMB/Type 2)
Wetlands 6 and 7 are small isolated ditch wetlands located at the base of culverts within the infield. Sampling points were not taken in these two wetlands. Photos of both wetlands are presented in Appendix G (Additional Photos). Neither of these wetlands was identified on the NWI mapping. Each wetland is discussed below.

Wetland 6 (W6), at just 389.31 square feet in size, is situated near the end of Runway 14 at the base of a fill slope for the connector taxiway. An 18-inch culvert directs drainage from the infield into this area which continues along a shallow swale which drains to the south before exiting under Manning Avenue.

Vegetation at W6 was dominated by American manna grass (*Glyceria grandis*: OBL), reed canary grass, and water smartweed. Some areas of bare soils were noted and the ditch and surrounding areas are mowed on a regular basis. Test pits visually confirmed the presence of hydric soils indicators. Wetland 6 is covered by Crystal Lake silt loam (1 to 3 percent slopes). Saturation was present within the ditch. Wetland hydrology is also confirmed by the domination by obligate vegetation.

The boundary was determined by a lack of hydric indicators in the soil, a change in vegetation and a lack of hydrology indicators. In transition to uplands, turf grasses dominated by Kentucky blue grass became dominant.

Wetland 7 (W7) is located just to the east of the runway intersection and is a small isolated ditch wetland at 555.23 square feet in size. This wetland is fed by a 30-inch culvert which drains to a
wide shallow swale flowing east. Reed canary grass dominated the hydrophytic vegetation and soils were visually assessed for hydric soils criteria. Standing water was present at the base of the culvert and much of the surface of the wetland was saturated. Soils within this wetland are mapped as Crystal Lake silt loam (1 to 3 percent slopes).

The wetland boundary was determined by a transition to upland vegetation, a lack of hydric soils indicators, and a lack of wetland hydrology. Upland vegetation was dominated by Kentucky blue grass, dandelion, and English plantain (*Plantago lanceolata*: FACU).

**(g) Wetland 8 (PEMB/Type 2 and PABF/Type 4)**

Wetland 8 (W8) is an isolated basin located to the east of Runway 4/22 and surrounded by farm fields. A large expanse of open water typified the interior of the wetland. The wetland fringe consists of a mixture of mature tree cover and emergent vegetation. Drainage from topographically-higher farm fields and wooded areas collects in this low spot with no apparent outlet. The boundary of W8 continues to the north outside the AOI.

This area is mapped on the NWI as temporary flooded emergent (PEM1A/Type1) and seasonally flooded emergent (PEM1C/Type 3). See Appendix B for NWI mapping. The wetland area is present in the 1938 aerial photo and appears largely undisturbed in subsequent photos (see Appendix C).

Two data points (DP16 and DP17) were sampled at the southern end of the wetland boundary. No vegetation disturbance due to management activities was noted. The locations of these points are shown on the Wetland Boundary Maps provided in Appendix F; data sheets along with field photographs are presented in Appendix G.

**Vegetation**

At wetland sampling point DP17, reed canary grass was dominant in the herb stratum while black willow (*Salix nigra*: OBL) and box elder (*Acer negundo*: FAC) were co-dominants in the tree layer. Other trees observed in the wetland included swamp white oak (*Quercus bicolor*: FACW), quaking aspen (*Populus deltoides*: FAC), American elm (*Ulmus americana*: FACW), and buckthorn (*Rhamnus cathartica*: FAC). Herbaceous cover throughout the wetland, especially on the wetland fringe, was dominated by reed canary grass. The dominant vegetation seen at the sampling point was either FAC, FACW, or OBL and met the hydrophytic vegetation criterion.

**Hydrology**

Wetland hydrology was strongly present and indicated within W8. Primary indicators were Surface Water (A1) to a depth of 2 inches, High Water Table (A2) to a depth of 8 inches, and Saturation (A3) at the soil surface. Oxidized Rhizospheres on Living Roots (C3) were also observed within the top foot of the soil profile. Secondary indicators of wetland hydrology consisted of Geomorphic Position (D2) and a positive FAC-Neutral Test (D5). These six indicators satisfied the wetland hydrology criterion.

**Soils**
Soils within the wetland are mapped as poorly drained Auburndale silt loam. The soil profile showed a deep layer of black (5YR2.5/1) loam with dark red (2.5YR3/6) redoximorphic features which satisfied the Redox Dark Surface (F6) field indicator. Due to the closed depressional landform within which the wetland is located, the Redox Depressions (F8) field indicator was also met. With these two indicators, the hydric soils criterion was satisfied.

**Wetland Boundary**

The wetland boundary was determined by a transition to upland vegetation, a lack of hydric soils indicators, and a lack of wetland hydrology. Upland sampling point (DP16) was taken in the farm field just to the south of the wetland. In the largely bare soil, upland herbaceous vegetation was dominated by Canada goldenrod (*Solidago canadensis*: FACU) and burdock (*Arctium minus*: FACU). Upland tree species noted along the boundary included northern pin oak (*Quercus ellipsoidalis*: UPL), white ash (*Fraxinus americana*: FACU), black cherry (*Prunus serotina*: FACU).

A well-defined change in elevation of about 3-4 feet accompanied the transition to uplands surrounding the wetland. Hydric soils indicators were absent in the high chroma soil profile at DP 16 (upland) and no wetland hydrology was observed or indicated.

**Wetland 9 (PEMB/Type 2 and PEMC/Type 3)**

Wetland 9 (W9) is a shallow basin with a central core of open water populated with cattails and surrounded by a wide dense fringe dominated by reed canary grass. It is located north of 30th Street and east of the Runway 32 end. Drainage flows from the west via a wide grassy swale north of Runway 14/32, from turf grass areas at the end of the runway, and runoff from surrounding farm fields on the north and east sides. The wetland is drained by one 24-inch culvert under 30th Street, which forms the southern boundary of the wetland.

Topography varies little over the breadth of the wetland which is largely enclosed by the 918-foot contour. Areas in the surrounding farm fields and grassy infield areas are just a few feet higher in elevation.

The wetland area is present in the 1938 aerial photo and appears largely undisturbed by farming operations in all subsequent photos (Appendix C). At the time of 1938 aerial, 30th Street had been constructed, which appears to have cut off this wetland from the larger wetland complex south of 30th Street.

This area is mapped on the NWI as temporary flooded emergent (PEM1A/Type 2) and seasonally flooded emergent (PEM1C/Type 3). See Appendix B for NWI mapping.

Two data points (DP18 and DP19) were sampled on the west side of the wetland boundary. No vegetation disturbance due to management activities was noted. Turf grass areas west of the wetland had been mown. The locations of these points are shown on the Wetland Boundary Maps provided in Appendix F; data sheets along with field photographs are presented in Appendix G.
Section 3  
Results and Discussion

Vegetation
Reed canary grass and sensitive fern (*Onoclea sensibilis*: FACW) were co-dominants at wetland sampling point DP19. Water smartweed was a minor component of the plant assemblage. In open water areas, cattail (*Typha angustifolia*: OBL) dominated with isolated willow (*Salix* sp.) and box elders on the fringe. North of the sampling point locations, the boundary includes areas extending into the western drainage swale which contained spike rush (*Eleocharis* sp.) and sedges (*Carex* sp.). The dominant species within the wetland are mostly hydrophytic and meet the hydrophytic vegetation criterion.

Hydrology
Wetland hydrology was strongly present and indicated within W9. Primary indicators were Surface Water (A1) to a depth of 4 inches, High Water Table (A2) to a depth of 8 inches, and Saturation (A3) at the soil surface. Secondary indicators of wetland hydrology consisted of Geomorphic Position (D2) and a positive FAC-Neutral Test (D5). These five indicators satisfied the wetland hydrology criterion.

Soils
Soils mapping shows this as an area of ponded Aquolls and Histosols. At wetland sampling point (DP19), a soil profile of very dark gray (5YR3/1) loam with yellowish red (5YR4/6) redoximorphic features satisfied the Redox Dark Surface (F6) indicator. The hydric soils criterion was satisfied with this field indicator.

Wetland Boundary
The wetland boundary was determined by a transition to upland vegetation, a lack of hydric soils indicators, and a lack of wetland hydrology. At upland sampling point DP18, the vegetation shifted to one dominated by Kentucky blue grass with a diverse array of upland species as minor components: plantain (*Plantago major*: FACU), grass-leaf starwort (UPL) and common chickweed (*Stellaria media*: FACU), dandelion, red clover, and bird’s foot trefoil (*Lotus corniculata*: FACU).

This sampling point was approximately 1-2 feet higher in elevation and this topographic difference was also a determinant of the boundary. Hydric soils indicators were absent at DP18 as were wetland hydrology indicators.

C. Uplands
Upland within the AOI consisted primarily of cultivated fields in corn-soybean rotation and mown infield areas with a mixture of grasses and forbs. Dominant upland vegetation included Kentucky blue grass, grass-leaf starwort, Canada thistle, burdock, and Canada goldenrod. A variety of species were also observed as minor components of the upland plant community including ox-eye daisy, white and red clover, and plantain. Transition to upland was marked a lack of wetland hydrology and absence of hydric soils in many cases. Often, topographic breaks of 2-3 feet were associated with upland areas.
D. Functional Assessment
A functional assessment of the delineated wetlands was performed using the Minnesota Routine Assessment Method (MNARAM). The scoring for the MNARAM assessment was done after completion of the wetland delineation using soils, plant community, hydrology information, and field observations collected as part of that effort. The rankings for each of the 72 questions were entered into the MNARAM database (version 3.4 beta) to arrive at the functional assessment.

Functional assessment information for wetlands in Section 18 and 19 previously identified was provided by the Valley Branch Watershed District (VBWD). This data was combined with field observations to assist with making rankings for wetlands within the AOI. Wetland IDs were assigned as part of the assessments. The numbering scheme provided by VBWD was kept for the current assessments, using a letter modifier to indicate an update record. If a new wetland was identified, a new ID number was assigned with a sequential number. Table 3 provides the Location ID numbers assigned to each wetland.

The assessments were completed for the AOI only. Two wetlands (1 and 5) continue beyond the boundary of the AOI. Wetland 1 is a seasonally-flooded farm field that receives drainage from a culvert under 30th Street at the northern end of the boundary, which flows to the dense fringe of reed canary grass forming the perennial northern extent of the wetland. The assessment record for this wetland is considered an addition, rather than an update. Wetlands 4 and 5 correspond to one previously assessed wetland. A connection between these two wetlands was not observed at the time of field work and thus are treated as two wetlands in this assessment. In addition, the assessment for Wetland 5 included only the emergent plant community within the AOI; the Shrub component previously assessed continued beyond the AOI boundary and was not evaluated.

Three new wetlands were delineated: an isolated depressional basin and two ditch wetlands (Wetlands 3, 6, and 7, respectively). These were assigned new location ID numbers and a new assessment completed. Site Response Forms and Assessment Summary reports are provided in Appendix H.

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<tr>
<th>Wetland</th>
<th>Location</th>
<th>Record Status</th>
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<tr>
<td>Wetland 2</td>
<td>82-029-20-19-005-B</td>
<td>Update</td>
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<td>Wetland 3</td>
<td>82-029-20-18-011-A</td>
<td>New</td>
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<td>82-029-20-18-008-B</td>
<td>VBWD Wetland split</td>
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<td>VBWD Wetland split</td>
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<td>New</td>
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<td>Wetland 9</td>
<td>82-029-20-18-002-B</td>
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E. Summary
In summary, the AOI is primarily covered by silt loam and sandy loam soils, with several areas in agricultural production or in managed landscapes. Nine wetland were identified within the AOI and are
documented by 19 sampling points. The wetland boundary was determined by the observation of multiple indicators of wetland hydrology associated with wetland vegetation on soils exhibiting Depleted Below Dark Surface (A11), Depleted Matrix (F3), Redox Dark Surface (F6), and Redox Depressions (F8) in isolated depressional basins. Wetland hydrology was directly observed as Saturation (A3), High Water Table (A2), and/or Surface Water (A1) at all wetlands except Wetland 1 (farm field). The boundary determinations primarily relied on the absence of all three wetland criteria: lack of hydrophytic vegetation, wetland hydrology indicators, and hydric soils.

(1) Other waters
This AOI does not include any intermittent or perennial streams or navigable waters. No other water bodies were identified during the delineation.
4. Conclusion

A total of nine separate wetland boundaries enclosing 5.909 acres were delineated within the AOI at Lake Elmo Airport. A jurisdictional determination for these wetlands will be needed from the U.S. Corps of Engineers (USACE) as they may be considered isolated water bodies. A Section 404 wetland fill permit from the USACE will be needed for any construction activities within the jurisdictional wetland boundaries. A Section 401 water quality certification of the 404 permit will also be required by the Minnesota Pollution Control Agency, and additional permits may be required from the Local Government Unit (LGU) under the Minnesota Wetland Conservation Act. Independent review by local land use authorities may also be required. Final authority over the project rests with the above federal, state, and local agencies.
5. Certification and Limitations

The undersigned does hereby certify and state that she is an employee of Mead & Hunt, Inc., that she has been designated as being in responsible charge of the delineation of wetlands described herein; and that this delineation was performed in accordance with the USACE 1987 *Wetland Delineation Manual* as enhanced by the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region* (U.S. Army Corps of Engineers, 2011).

This wetland delineation report documents vegetation, soils, and hydrology conditions on the above-referenced parcel according to these standard accepted practices, and the wetland boundary so established is valid only for the designated area. No uses or interpretations of wetland conditions or boundaries outside of the work area are supported by this work.

The mapped wetland boundaries are valid under the environmental conditions existing at the time of delineation. The user of this information is hereby notified that changing environmental conditions may affect the future validity of the wetland boundary.

MEAD & HUNT, Inc.

Brauna Hartzell
Wetland Ecologist & GIS Analyst

The undersigned does hereby certify and state he is a Professional Wetland Scientist (PWS); that work described herein was reviewed for conformance to best accepted professional practices; and that this delineation has been performed in accordance with the USACE 1987 Wetland Delineation Manual as enhanced by the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region* (U.S. Army Corps of Engineers, 2011).

MEAD & HUNT, Inc.

Perry Rossa
PWS Cert. No. 2382

Date: August 2017
6. References

The following data sources were examined prior to fieldwork:

- Google Earth. Historical Aerial Images, Google Inc.


- National Wetlands Inventory (with Minnesota Update) from the U.S. Fish and Wildlife Service at https://www.fws.gov/wetlands/data/mapper.html


Appendix A. Project Location and Topography Map
LAKE ELMO AIRPORT
Proposed Runway 14/32 Relocation and Associated Improvements

Project Location and Topography

Area A
(116.3 acres)

Area B
(8.0 acres)

Area C
(4.7 acres)

Area D
(1.1 acres)

Legend

- Area of Interest (AOI)
- LRR Subregion: K

Project Location

T29N, R20W, S18 and S19
Baytown and West Lakeland Townships
Washington County, MN
LRR Subregion: K
USACE Regional Supplement: NC/NE
Area = 130.1 acres
Appendix B. Detailed Topographic Map, NRCS Soils Map, and Aquatic Resources Map
The soil surveys that comprise your AOI were mapped at 1:15,800.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Washington County, Minnesota
Survey Area Data: Version 11, Sep 19, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 16, 2012—Apr 26, 2012

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.
## Hydric Rating by Map Unit

### Summary by Map Unit — Washington County, Minnesota (MN163)

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<th>Map unit name</th>
<th>Rating</th>
<th>Acres in AOI</th>
<th>Percent of AOI</th>
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**Totals for Area of Interest**

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</table>
Description

This rating indicates the percentage of map units that meets the criteria for hydric soils. Map units are composed of one or more map unit components or soil types, each of which is rated as hydric soil or not hydric. Map units that are made up dominantly of hydric soils may have small areas of minor nonhydric components in the higher positions on the landform, and map units that are made up dominantly of nonhydric soils may have small areas of minor hydric components in the lower positions on the landform. Each map unit is rated based on its respective components and the percentage of each component within the map unit.

The thematic map is color coded based on the composition of hydric components. The five color classes are separated as 100 percent hydric components, 66 to 99 percent hydric components, 33 to 65 percent hydric components, 1 to 32 percent hydric components, and less than one percent hydric components.

In Web Soil Survey, the Summary by Map Unit table that is displayed below the map pane contains a column named 'Rating'. In this column the percentage of each map unit that is classified as hydric is displayed.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). Under natural conditions, these soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

References:


Rating Options

Aggregation Method: Percent Present

Component Percent Cutoff: None Specified

Tie-break Rule: Lower
LAKE ELMO AIRPORT
Proposed Runway 14-32 Runway Shift

Project Information
T29N, R20W, S18 and S19
City of Lake Elmo
Washington County, MN
Area of Interest = 130.1 acres
Field work conducted:
June 5 - 9, 2017

Wetland Data: National Wetlands Inventory (NWI), Minnesota Public Waters, and National Hydrography Dataset

Mn Public Waters Data: Public Waters (PW) Basin and Watersource Delineations, Washington County, MN Geospatial Commons

Stream Data: National Hydrography Dataset (NHD), USGS

Image Source: MnGEO WMS Image Service, Washington County (2016 color 7-county)
subject to field determination. It is incumbent upon a person contemplating work in a public watercourse to investigate the factual data on which this map interpretation is based. However, the Department of Natural Resources does not warrant the accuracy of the information or visit http://mndnr.gov Minnesota Statutes, using geographic information systems (GIS) technology. Digital data products are available from DNR Ecological and Water Resources.

Legend:
- Public Water Watercourse
- Park District Boundary
- City Boundary
- School District Boundary
- Public Boat Access
- Public Shoreline
- Municipal Road
- State Highway
- National Forest Boundary
- Washington County Boundary
- Hennepin County Boundary
- Dakota County Boundary
- Anoka County Boundary
- Ramsey County Boundary
- Wisconsin State Boundary
- Minnesota State Boundary
Appendix C. Historic Aerial Photography
Historic Aerial Imagery
LAKE ELMO AIRPORT
Proposed Runway 14-32 Runway Shift

Images are not to scale C-174
Historic Aerial Imagery
LAKE ELMO AIRPORT
Proposed Runway 14-32 Runway Shift

Images are not to scale
Historic Aerial Imagery
LAKE ELMO AIRPORT
Proposed Runway 14-32 Runway Shift

Images are not to scale

C-176
Historic Aerial Imagery
LAKE ELMO AIRPORT
Proposed Runway 14-32 Runway Shift

Legend

Airport Property Boundary

Project Information
T29N, R20W, S18 and S19
City of Lake Elmo
Washington County, MN
Area of Interest = 130.1 acres
Field work conducted:
June 5 - 9, 2017
Historic Aerial Imagery
LAKE ELMO AIRPORT
Proposed Runway 14-32 Runway Shift

Legend

Airport Property Boundary

Project Information
T29N, R20W, S18 and S19
City of Lake Elmo
Washington County, MN
Area of Interest = 130.1 acres
Field work conducted:
June 5 - 9, 2017
Historic Aerial Imagery
LAKE ELMO AIRPORT
Proposed Runway 14-32 Runway Shift

Legend

Project Information
T29N, R20W, S18 and S19
City of Lake Elmo
Washington County, MN
Area of Interest = 130.1 acres
Field work conducted: June 5 - 9, 2017

Image Date: 2013
Image Source: MnGEO Aerial Photography (2013 Washington)

Image Date: 2016
Image Source: MnGEO Aerial Photography (2016 color 7-county)
Appendix D. Offsite Hydrology Evaluation
### Wetland Hydrology from Aerial Imagery – Recording Form

**Project Name:** Lake Elmo Airport (21D)  
**Date:** 08/04/2017  
**County:** Washington

**Investigator:** Brauna Hartzell  
**Legal Description (T, R, S):** T29N, R20W, S18,19

#### Summary Table

<table>
<thead>
<tr>
<th>Date Image Taken (M-D-Y)</th>
<th>Image Source</th>
<th>Climate Condition (wet, dry, normal)</th>
<th>Image Interpretation(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Area: A</td>
<td>Area:</td>
</tr>
<tr>
<td>04/15/2016</td>
<td>MnGEO</td>
<td>Normal</td>
<td>SS</td>
</tr>
<tr>
<td>09/27/2015</td>
<td>NAIP</td>
<td>Normal</td>
<td>CS</td>
</tr>
<tr>
<td>10/11/2014</td>
<td>GoogleEarth</td>
<td>Dry</td>
<td>CS</td>
</tr>
<tr>
<td>05/15/2013</td>
<td>MnGEO</td>
<td>Wet</td>
<td>SS</td>
</tr>
<tr>
<td>07/18/2013</td>
<td>NAIP</td>
<td>Wet</td>
<td>CS</td>
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<tr>
<td>09/07/2012</td>
<td>GoogleEarth</td>
<td>Normal</td>
<td>CS</td>
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<tr>
<td>09/13/2010</td>
<td>NAIP</td>
<td>Wet</td>
<td>NV</td>
</tr>
<tr>
<td>04/2010</td>
<td>MnGEO</td>
<td>Dry</td>
<td>SS</td>
</tr>
<tr>
<td>08/18/2009</td>
<td>NAIP</td>
<td>Dry</td>
<td>NV</td>
</tr>
<tr>
<td>07/08/2008</td>
<td>NAIP</td>
<td>Normal</td>
<td>NC</td>
</tr>
<tr>
<td>07/15/2006</td>
<td>NAIP</td>
<td>Dry</td>
<td>NC</td>
</tr>
<tr>
<td>04/24/2004</td>
<td>MnGEO</td>
<td>Normal</td>
<td>NV</td>
</tr>
<tr>
<td>07/18/2003</td>
<td>NAIP</td>
<td>Wet</td>
<td>DO</td>
</tr>
<tr>
<td>09/2002</td>
<td>USGS</td>
<td>Wet</td>
<td>CS</td>
</tr>
<tr>
<td>05/01/2000</td>
<td>MnGEO</td>
<td>Dry</td>
<td>NV</td>
</tr>
<tr>
<td>04/14/1997</td>
<td>MnGEO</td>
<td>Normal</td>
<td>NV</td>
</tr>
<tr>
<td>10/10/1994</td>
<td>MnDNR</td>
<td>Wet</td>
<td>NC</td>
</tr>
</tbody>
</table>

**Normal Climate Condition**

| Number | 6 |
| Number with wet signatures | 4 |
| Percent with wet signatures | 66% |

#### KEY

- **WS** - wetland signature
- **SS** - soil wetness signature
- **CS** - crop stress
- **NC** - not cropped
- **AP** - altered pattern
- **NV** - normal vegetative cover
- **DO** - drowned out
- **SW** - standing water
- **NSS** – no soil wetness signature

*Other labels or comments:

- Use above key to label image interpretations. It is imperative that the reviewer read and understand the guidance associated with the use of these labels. If alternate labels are used, indicate in box above.

- If less than five (5) images taken during normal climate conditions are available, use an equal number of images taken during wet and dry climate conditions and use as many images as you have available. Describe the results using this methodology in your report.

---

1 Use [MN State Climatology website](https://www.mnstats.umn.edu) to determine climate condition when image was taken.
### Wetland Determination from Aerial Imagery – Recording Form

**Project Name:** Lake Elmo Airport (21D)  
**Date:** 08/04/2017  
**County:** Washington

**Investigator:** Brauna Hartzell  
**Legal Description (T, R, S):** T29N, R20W, S18,19

Use the Decision Matrix below to complete Table 1.

<table>
<thead>
<tr>
<th>Hydric Soils present&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Identified on NWI or other wetland man&lt;sup&gt;2&lt;/sup&gt;</th>
<th>Percent with wet signatures from Exhibit 1</th>
<th>Field verification required&lt;sup&gt;3&lt;/sup&gt;</th>
<th>Wetland?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Yes</td>
<td>&gt;50%</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Yes</td>
<td>Yes</td>
<td>30-50%</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Yes</td>
<td>Yes</td>
<td>&lt;30%</td>
<td>Yes</td>
<td>Yes, if other hydrology indicators present</td>
</tr>
<tr>
<td>Yes</td>
<td>No</td>
<td>&gt;50%</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Yes</td>
<td>No</td>
<td>30-50%</td>
<td>Yes</td>
<td>Yes, if other hydrology indicators present</td>
</tr>
<tr>
<td>Yes</td>
<td>No</td>
<td>&lt;30%</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>No</td>
<td>Yes</td>
<td>&gt;50%</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
<td>Yes</td>
<td>30-50%</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>No</td>
<td>Yes</td>
<td>&lt;30%</td>
<td>Yes</td>
<td>Yes, if other hydrology indicators present</td>
</tr>
<tr>
<td>No</td>
<td>No</td>
<td>30-50%</td>
<td>Yes</td>
<td>Yes, if other hydrology indicators present</td>
</tr>
<tr>
<td>No</td>
<td>No</td>
<td>&lt;30%</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

<sup>1</sup>The presence of hydric soils can be determined from the “Hydric Rating by Map Unit Feature” under “Land Classifications” from the Web Soil Survey. “Not Hydric” is the only category considered to not have hydric soils. Field sampling for the presence/absence of hydric soil indicators can be used in lieu of the hydric rating if appropriately documented by providing completed field data sheets.

<sup>2</sup>At minimum, the most updated NWI data available for the area must be reviewed for this step. Any and all other local or regional wetland maps that are publically available should be reviewed.

<sup>3</sup>Area should be reviewed in the field for the presence/absence of wetland hydrology indicators per the applicable 87 Manual Regional Supplement, including the D2 indicator (geomorphic position).

### Table 1.

<table>
<thead>
<tr>
<th>Area</th>
<th>Hydric Soils Present</th>
<th>Identified on NWI or other wetland man</th>
<th>Percent with wet signatures from Exhibit 1</th>
<th>Other hydrology indicators present&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Wetland?</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Yes (per field)</td>
<td>No</td>
<td>66%</td>
<td>Yes (per field)</td>
<td>Yes</td>
</tr>
</tbody>
</table>

<sup>1</sup>Answer “N/A” if field verification is not required and was not conducted.
Historic Aerial Imagery
LAKE ELMO AIRPORT
Proposed Runway 14-32 Runway Shift

Project Information
T29N, R20W, S18 and S19
City of Lake Elmo
Washington County, MN
Area of Interest = 130.1 acres
Field work conducted: June 5 - 9, 2017

Legend
Airport Property Boundary

MAP 1
Historic Aerial Imagery
LAKE ELMO AIRPORT
Proposed Runway 14-32 Runway Shift

Legend

Airport Property Boundary

Project Information
T29N, R20W, S18 and S19
City of Lake Elmo
Washington County, MN
Area of Interest = 130.1 acres
Field work conducted: June 5 - 9, 2017
**Historic Aerial Imagery**

**LAKE ELMO AIRPORT**

Proposed Runway 14-32 Runway Shift

**Project Information**

T29N, R20W, S18 and S19
City of Lake Elmo
Washington County, MN
Area of Interest = 130.1 acres
Field work conducted:
June 5 - 9, 2017

**Legend**

- Airport Property Boundary

**MAP 3**
Historic Aerial Imagery
LAKE ELMO AIRPORT
Proposed Runway 14-32 Runway Shift

Project Information
T29N, R20W, S18 and S19
City of Lake Elmo
Washington County, MN
Area of Interest = 130.1 acres
Field work conducted: June 5 - 9, 2017

Legend
- Airport Property Boundary

MAP 4
Historic Aerial Imagery
LAKE ELMO AIRPORT
Proposed Runway 14-32 Runway Shift

Project Information
T29N, R20W, S18 and S19
City of Lake Elmo
Washington County, MN
Area of Interest = 130.1 acres
Field work conducted:
June 5 - 9, 2017

Legend

Airport Property Boundary

MAP 5
Precipitation data for target wetland location:
- county: **Washington**
- township number: **29N**
- township name: **unnamed**
- range number: **21W**
- nearest community: **Lake Elmo**
- section number: **24**

Aerial photograph or site visit date: **Friday, April 15, 2016**

Score using 1981-2010 normal period

<table>
<thead>
<tr>
<th>values are in inches</th>
<th>first prior month: March 2016</th>
<th>second prior month: February 2016</th>
<th>third prior month: January 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>estimated precipitation total for this location:</td>
<td>2.22</td>
<td>0.87</td>
<td>0.44</td>
</tr>
<tr>
<td>there is a 30% chance this location will have less than:</td>
<td>1.48</td>
<td>0.51</td>
<td>0.54</td>
</tr>
<tr>
<td>there is a 30% chance this location will have more than:</td>
<td>2.13</td>
<td>0.99</td>
<td>1.24</td>
</tr>
<tr>
<td>type of month:</td>
<td>wet</td>
<td>normal</td>
<td>dry</td>
</tr>
<tr>
<td>monthly score</td>
<td>3 * 3 = 9</td>
<td>2 * 2 = 4</td>
<td>1 * 1 = 1</td>
</tr>
<tr>
<td>multi-month score:</td>
<td>6 to 9 (dry)</td>
<td>10 to 14 (normal)</td>
<td>15 to 18 (wet)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>14 (Normal)</td>
</tr>
</tbody>
</table>

Other Resources:
- retrieve daily precipitation data
- view radar-based precipitation estimates
- view weekly precipitation maps
- *Evaluating Antecedent Precipitation Conditions* (BWSR)
Precipitation Worksheet Using Gridded Database

Precipitation data for target wetland location:
county: Washington  township number: 29N
township name: Baytown  range number: 20W
nearest community: Lake Elmo  section number: 19

Aerial photograph or site visit date:
Sunday, September 27, 2015

Score using 1981-2010 normal period

<table>
<thead>
<tr>
<th>values are in inches</th>
<th>first prior month: August 2015</th>
<th>second prior month: July 2015</th>
<th>third prior month: June 2015</th>
</tr>
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<td>estimated precipitation total for this location:</td>
<td>3.30</td>
<td>7.79</td>
<td>5.24</td>
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<tr>
<td>there is a 30% chance this location will have less than:</td>
<td>3.32</td>
<td>2.65</td>
<td>3.68</td>
</tr>
<tr>
<td>there is a 30% chance this location will have more than:</td>
<td>5.39</td>
<td>4.73</td>
<td>5.74</td>
</tr>
<tr>
<td>type of month: dry  normal  wet</td>
<td>dry  wet  normal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>monthly score</td>
<td>3 * 1 = 3</td>
<td>2 * 3 = 6</td>
<td>1 * 2 = 2</td>
</tr>
<tr>
<td>multi-month score: 6 to 9 (dry)  10 to 14 (normal)  15 to 18 (wet)</td>
<td>11 (Normal)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Other Resources:
- retrieve daily precipitation data
- view radar-based precipitation estimates
- view weekly precipitation maps
- Evaluating Antecedent Precipitation Conditions (BWSR)
Precipitation Worksheet Using Gridded Database

Precipitation data for target wetland location:
- county: Washington
- township name: Baytown
- nearest community: Lake Elmo
- township number: 29N
- range number: 20W
- section number: 19

Aerial photograph or site visit date:
Saturday, October 11, 2014

Score using 1981-2010 normal period

<table>
<thead>
<tr>
<th>values are in inches</th>
<th>first prior month: September 2014</th>
<th>second prior month: August 2014</th>
<th>third prior month: July 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>estimated precipitation total for this location:</td>
<td>2.31</td>
<td>3.65</td>
<td>2.59</td>
</tr>
<tr>
<td>there is a 30% chance this location will have less than:</td>
<td>2.45</td>
<td>3.32</td>
<td>2.65</td>
</tr>
<tr>
<td>there is a 30% chance this location will have more than:</td>
<td>4.36</td>
<td>5.39</td>
<td>4.73</td>
</tr>
<tr>
<td>type of month: dry normal wet</td>
<td>dry</td>
<td>normal</td>
<td>dry</td>
</tr>
<tr>
<td>monthly score</td>
<td>3 * 1 = 3</td>
<td>2 * 2 = 4</td>
<td>1 * 1 = 1</td>
</tr>
<tr>
<td>multi-month score:</td>
<td>6 to 9 (dry)</td>
<td>10 to 14 (normal)</td>
<td>15 to 18 (wet)</td>
</tr>
</tbody>
</table>

Other Resources:
- retrieve daily precipitation data
- view radar-based precipitation estimates
- view weekly precipitation maps
- Evaluating Antecedent Precipitation Conditions (BWSR)
Precipitation Worksheet Using Gridded Database

Precipitation data for target wetland location:
county: Washington  township number: 29N
township name: Baytown  range number: 20W
nearest community: Lake Elmo  section number: 19

Aerial photograph or site visit date:
Wednesday, May 15, 2013

Score using 1981-2010 normal period

<table>
<thead>
<tr>
<th>values are in inches</th>
<th>estimated precipitation total for this location:</th>
<th>first prior month: April 2013</th>
<th>second prior month: March 2013</th>
<th>third prior month: February 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A 'R' following a monthly total indicates a provisional value derived from radar-based estimates.</td>
<td>5.42</td>
<td>2.28</td>
<td>1.32</td>
</tr>
<tr>
<td></td>
<td>there is a 30% chance this location will have less than:</td>
<td>2.06</td>
<td>1.47</td>
<td>0.50</td>
</tr>
<tr>
<td></td>
<td>there is a 30% chance this location will have more than:</td>
<td>3.19</td>
<td>2.10</td>
<td>0.95</td>
</tr>
<tr>
<td></td>
<td>type of month: dry normal wet</td>
<td>wet</td>
<td>wet</td>
<td>wet</td>
</tr>
<tr>
<td></td>
<td>monthly score</td>
<td>3 * 3 = 9</td>
<td>2 * 3 = 6</td>
<td>1 * 3 = 3</td>
</tr>
<tr>
<td></td>
<td>multi-month score</td>
<td>6 to 9 (dry)</td>
<td>10 to 14 (normal)</td>
<td>15 to 18 (wet)</td>
</tr>
</tbody>
</table>

Other Resources:
- retrieve daily precipitation data
- view radar-based precipitation estimates
- view weekly precipitation maps
- Evaluating Antecedent Precipitation Conditions (BWSR)
Precipitation Worksheet Using Gridded Database

Precipitation data for target wetland location:
- county: Washington
- township name: Baytown
- nearest community: Lake Elmo

Township number: 29N
Range number: 20W
Section number: 19

Aerial photograph or site visit date:
Thursday, July 18, 2013

Score using 1981-2010 normal period

<table>
<thead>
<tr>
<th>values are in inches</th>
<th>first prior month: June 2013</th>
<th>second prior month: May 2013</th>
<th>third prior month: April 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>estimated precipitation total for this location:</td>
<td>8.31</td>
<td>5.66</td>
<td>5.42</td>
</tr>
<tr>
<td>there is a 30% chance this location will have less than:</td>
<td>3.68</td>
<td>3.28</td>
<td>2.06</td>
</tr>
<tr>
<td>there is a 30% chance this location will have more than:</td>
<td>5.74</td>
<td>3.99</td>
<td>3.19</td>
</tr>
<tr>
<td>type of month:</td>
<td>wet</td>
<td>wet</td>
<td>wet</td>
</tr>
<tr>
<td>dry</td>
<td>normal</td>
<td>wet</td>
<td></td>
</tr>
<tr>
<td>monthly score</td>
<td>3 * 3 = 9</td>
<td>2 * 3 = 6</td>
<td>1 * 3 = 3</td>
</tr>
<tr>
<td>multi-month score:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 to 9 (dry)</td>
<td>10 to 14 (normal)</td>
<td>15 to 18 (wet)</td>
<td>18 (Wet)</td>
</tr>
</tbody>
</table>

Other Resources:
- retrieve daily precipitation data
- view radar-based precipitation estimates
- view weekly precipitation maps
- Evaluating Antecedent Precipitation Conditions (BWSR)

Precipitation Worksheet Using Gridded Database

Precipitation data for target wetland location:
- county: Washington
- township name: Baytown
- nearest community: Lake Elmo
- township number: 29N
- range number: 20W
- section number: 19

Aerial photograph or site visit date:
Sunday, September 15, 2013

Score using 1981-2010 normal period

<table>
<thead>
<tr>
<th>values are in inches</th>
<th>first prior month:</th>
<th>second prior month:</th>
<th>third prior month:</th>
</tr>
</thead>
<tbody>
<tr>
<td>estimated precipitation total for this location:</td>
<td>0.80</td>
<td>1.50</td>
<td>8.30</td>
</tr>
<tr>
<td>there is a 30% chance this location will have less than:</td>
<td>3.32</td>
<td>2.65</td>
<td>3.68</td>
</tr>
<tr>
<td>there is a 30% chance this location will have more than:</td>
<td>5.39</td>
<td>4.73</td>
<td>5.75</td>
</tr>
<tr>
<td>type of month:</td>
<td>dry</td>
<td>normal</td>
<td>wet</td>
</tr>
<tr>
<td>monthly score</td>
<td>3 * 1 = 3</td>
<td>2 * 1 = 2</td>
<td>1 * 3 = 3</td>
</tr>
<tr>
<td>multi-month score:</td>
<td>6 to 9 (dry)</td>
<td>10 to 14 (normal)</td>
<td>15 to 18 (wet)</td>
</tr>
</tbody>
</table>

Other Resources:
- retrieve daily precipitation data
- view radar-based precipitation estimates
- view weekly precipitation maps
- Evaluating Antecedent Precipitation Conditions (BWSR)
Precipitation Worksheet Using Gridded Database

Precipitation data for target wetland location:
- county: Washington
- township name: Baytown
- nearest community: Lake Elmo
- township number: 29N
- range number: 20W
- section number: 19

Aerial photograph or site visit date:
Friday, September 07, 2012

Score using 1981-2010 normal period

<table>
<thead>
<tr>
<th>values are in inches</th>
<th>first prior month: August 2012</th>
<th>second prior month: July 2012</th>
<th>third prior month: June 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>estimated precipitation total for this location:</td>
<td>1.47</td>
<td>5.18</td>
<td>3.31</td>
</tr>
<tr>
<td>there is a 30% chance this location will have less than:</td>
<td>3.32</td>
<td>2.65</td>
<td>3.68</td>
</tr>
<tr>
<td>there is a 30% chance this location will have more than:</td>
<td>5.39</td>
<td>4.73</td>
<td>5.75</td>
</tr>
<tr>
<td>type of month: dry normal wet</td>
<td>dry</td>
<td>wet</td>
<td>dry</td>
</tr>
<tr>
<td>monthly score</td>
<td>3 * 1 = 3</td>
<td>2 * 3 = 6</td>
<td>1 * 1 = 1</td>
</tr>
<tr>
<td>multi-month score: 6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet)</td>
<td>10 (Normal)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Other Resources:
- retrieve daily precipitation data
- view radar-based precipitation estimates
- view weekly precipitation maps
- Evaluating Antecedent Precipitation Conditions (BWSR)
Precipitation Worksheet Using Gridded Database

Precipitation data for target wetland location:
- county: Washington
township name: Baytown
- nearest community: Lake Elmo

Township number: 29N
Range number: 20W
Section number: 19

Aerial photograph or site visit date:
Monday, September 13, 2010

Score using 1981-2010 normal period

<table>
<thead>
<tr>
<th>values are in inches</th>
<th>first prior month:</th>
<th>second prior month:</th>
<th>third prior month:</th>
</tr>
</thead>
<tbody>
<tr>
<td>August 2010</td>
<td>July 2010</td>
<td>June 2010</td>
<td></td>
</tr>
<tr>
<td>estimated precipitation total for this location:</td>
<td>5.92</td>
<td>5.26</td>
<td>5.73</td>
</tr>
<tr>
<td>there is a 30% chance this location will have less than:</td>
<td>3.33</td>
<td>2.66</td>
<td>3.69</td>
</tr>
<tr>
<td>there is a 30% chance this location will have more than:</td>
<td>5.38</td>
<td>4.74</td>
<td>5.76</td>
</tr>
<tr>
<td>type of month: dry normal wet</td>
<td>wet</td>
<td>wet</td>
<td>normal</td>
</tr>
<tr>
<td>monthly score</td>
<td>3 * 3 = 9</td>
<td>2 * 3 = 6</td>
<td>1 * 2 = 2</td>
</tr>
</tbody>
</table>

multi-month score:
- 6 to 9 (dry)
- 10 to 14 (normal)
- 15 to 18 (wet)

17 (Wet)

Other Resources:
- retrieve daily precipitation data
- view radar-based precipitation estimates
- view weekly precipitation maps
- Evaluating Antecedent Precipitation Conditions (BWSR)
Precipitation Worksheet Using Gridded Database

Precipitation data for target wetland location:
county: Washington  township number: 29N
township name: Baytown  range number: 20W
nearest community: Lake Elmo  section number: 19

Aerial photograph or site visit date:
Thursday, April 15, 2010

Score using 1981-2010 normal period

<table>
<thead>
<tr>
<th>values are in inches</th>
<th>first prior month: March 2010</th>
<th>second prior month: February 2010</th>
<th>third prior month: January 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>estimated precipitation total for this location:</td>
<td>0.62</td>
<td>0.88</td>
<td>0.63</td>
</tr>
<tr>
<td>there is a 30% chance this location will have less than:</td>
<td>1.47</td>
<td>0.50</td>
<td>0.54</td>
</tr>
<tr>
<td>there is a 30% chance this location will have more than:</td>
<td>2.10</td>
<td>0.95</td>
<td>1.20</td>
</tr>
<tr>
<td>type of month: dry normal wet</td>
<td>dry</td>
<td>normal</td>
<td>normal</td>
</tr>
<tr>
<td>monthly score</td>
<td>3 * 1 = 3</td>
<td>2 * 2 = 4</td>
<td>1 * 2 = 2</td>
</tr>
<tr>
<td>multi-month score:</td>
<td>6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet)</td>
<td></td>
<td>9 (Dry)</td>
</tr>
</tbody>
</table>

Other Resources:
- retrieve daily precipitation data
- view radar-based precipitation estimates
- view weekly precipitation maps
- Evaluating Antecedent Precipitation Conditions (BWSR)
Precipitation Worksheet Using Gridded Database

Precipitation data for target wetland location:
- county: Washington
- township number: 29N
- township name: Baytown
- range number: 20W
- nearest community: Lake Elmo
- section number: 19

Aerial photograph or site visit date:
Tuesday, August 18, 2009

Score using 1981-2010 normal period

<table>
<thead>
<tr>
<th>Month</th>
<th>July 2009</th>
<th>June 2009</th>
<th>May 2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated</td>
<td>2.59</td>
<td>4.19</td>
<td>0.80</td>
</tr>
<tr>
<td>precipitation total for this location:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>there is a 30% chance this location will have less than:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>there is a 30% chance this location will have more than:</td>
<td>4.73</td>
<td>5.74</td>
<td>3.99</td>
</tr>
</tbody>
</table>

- type of month: dry normal wet
- monthly score: 3 * 1 = 3 2 * 2 = 4 1 * 1 = 1
- multi-month score: 6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet) 8 (Dry)

Other Resources:
- retrieve daily precipitation data
- view radar-based precipitation estimates
- view weekly precipitation maps
- Evaluating Antecedent Precipitation Conditions (BWSR)
Precipitation Worksheet Using Gridded Database

Precipitation data for target wetland location:
- county: Washington
- township number: 29N
- township name: Baytown
- range number: 20W
- nearest community: Lake Elmo
- section number: 19

Aerial photograph or site visit date:
Tuesday, July 08, 2008

Score using 1981-2010 normal period

<table>
<thead>
<tr>
<th>values are in inches</th>
<th>first prior month:</th>
<th>second prior month:</th>
<th>third prior month:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>June 2008</td>
<td>May 2008</td>
<td>April 2008</td>
</tr>
<tr>
<td>estimated precipitation total for this location:</td>
<td>4.36</td>
<td>3.18</td>
<td>4.39</td>
</tr>
<tr>
<td>There is a 30% chance this location will have less than:</td>
<td>3.68</td>
<td>3.28</td>
<td>2.06</td>
</tr>
<tr>
<td>There is a 30% chance this location will have more than:</td>
<td>5.74</td>
<td>3.99</td>
<td>3.19</td>
</tr>
<tr>
<td>type of month:</td>
<td>dry</td>
<td>normal</td>
<td>wet</td>
</tr>
<tr>
<td>monthly score</td>
<td>3 * 2 = 6</td>
<td>2 * 1 = 2</td>
<td>1 * 3 = 3</td>
</tr>
</tbody>
</table>

multi-month score: 11 (Normal)

Other Resources:

- retrieve daily precipitation data
- view radar-based precipitation estimates
- view weekly precipitation maps
- Evaluating Antecedent Precipitation Conditions (BWSR)
Precipitation Worksheet Using Gridded Database

Precipitation data for target wetland location:
- county: Washington
township number: 29N
township name: Baytown
range number: 20W
nearest community: Lake Elmo
section number: 19

Aerial photograph or site visit date:
Saturday, July 15, 2006

Score using 1981-2010 normal period

<table>
<thead>
<tr>
<th>values are in inches</th>
<th>first prior month:</th>
<th>second prior month:</th>
<th>third prior month:</th>
</tr>
</thead>
<tbody>
<tr>
<td>estimated precipitation total for this location:</td>
<td>2.26</td>
<td>3.20</td>
<td>3.55</td>
</tr>
<tr>
<td>there is a 30% chance this location will have less than:</td>
<td>3.68</td>
<td>3.28</td>
<td>2.06</td>
</tr>
<tr>
<td>there is a 30% chance this location will have more than:</td>
<td>5.74</td>
<td>3.99</td>
<td>3.19</td>
</tr>
<tr>
<td>type of month:</td>
<td>dry</td>
<td>normal</td>
<td>wet</td>
</tr>
<tr>
<td>monthly score</td>
<td>3 * 1 = 3</td>
<td>2 * 1 = 2</td>
<td>1 * 3 = 3</td>
</tr>
<tr>
<td>multi-month score:</td>
<td>6 to 9 (dry)</td>
<td>10 to 14 (normal)</td>
<td>15 to 18 (wet)</td>
</tr>
</tbody>
</table>

Other Resources:
- retrieve daily precipitation data
- view radar-based precipitation estimates
- view weekly precipitation maps
- Evaluating Antecedent Precipitation Conditions (BWSR)
Precipitation data for target wetland location:
- county: **Washington**
- township number: **29N**
- township name: **Baytown**
- range number: **20W**
- nearest community: **Lake Elmo**
- section number: **19**

Aerial photograph or site visit date: **Saturday, April 24, 2004**

Score using 1981-2010 normal period

<table>
<thead>
<tr>
<th>values are in inches</th>
<th>first prior month: March 2004</th>
<th>second prior month: February 2004</th>
<th>third prior month: January 2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>estimated precipitation total for this location:</td>
<td>2.07</td>
<td>1.59</td>
<td>0.48</td>
</tr>
<tr>
<td>there is a 30% chance this location will have less than:</td>
<td>1.47</td>
<td>0.50</td>
<td>0.54</td>
</tr>
<tr>
<td>there is a 30% chance this location will have more than:</td>
<td>2.10</td>
<td>0.95</td>
<td>1.20</td>
</tr>
<tr>
<td>type of month: dry normal wet</td>
<td>normal</td>
<td>wet</td>
<td>dry</td>
</tr>
<tr>
<td>monthly score</td>
<td>3 * 2 = 6</td>
<td>2 * 3 = 6</td>
<td>1 * 1 = 1</td>
</tr>
</tbody>
</table>

multi-month score: 6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet) 13 (Normal)

Other Resources:
- retrieve daily precipitation data
- view radar-based precipitation estimates
- view weekly precipitation maps
- Evaluating Antecedent Precipitation Conditions (BWSR)
Precipitation Worksheet Using Gridded Database

Precipitation data for target wetland location:
- county: **Washington**
- township number: **29N**
- township name: **Baytown**
- range number: **20W**
- nearest community: **Lake Elmo**
- section number: **19**

Aerial photograph or site visit date: **Friday, July 18, 2003**

Score using 1981-2010 normal period

<table>
<thead>
<tr>
<th>values are in inches</th>
<th>first prior month:</th>
<th>second prior month:</th>
<th>third prior month:</th>
</tr>
</thead>
<tbody>
<tr>
<td>A 'R' following a monthly total indicates a provisional value derived from radar-based estimates.</td>
<td><strong>June 2003</strong></td>
<td><strong>May 2003</strong></td>
<td><strong>April 2003</strong></td>
</tr>
<tr>
<td>estimated precipitation total for this location:</td>
<td>5.80</td>
<td>7.20</td>
<td>2.04</td>
</tr>
<tr>
<td>there is a 30% chance this location will have less than:</td>
<td>3.68</td>
<td>3.28</td>
<td>2.06</td>
</tr>
<tr>
<td>there is a 30% chance this location will have more than:</td>
<td>5.74</td>
<td>3.99</td>
<td>3.19</td>
</tr>
<tr>
<td>type of month:</td>
<td>dry</td>
<td>normal</td>
<td>wet</td>
</tr>
<tr>
<td>monthly score</td>
<td>3 * 3 = 9</td>
<td>2 * 3 = 6</td>
<td>1 * 1 = 1</td>
</tr>
<tr>
<td>multi-month score:</td>
<td>6 to 9 (dry) 10 to 14 (normal) 15 to 18 (wet)</td>
<td><strong>16 (Wet)</strong></td>
<td></td>
</tr>
</tbody>
</table>

Other Resources:
- retrieve daily precipitation data
- view radar-based precipitation estimates
- view weekly precipitation maps
- **Evaluating Antecedent Precipitation Conditions** (BWSR)
Precipitation Worksheet Using Gridded Database

Precipitation data for target wetland location:
- county: **Washington**
- township number: **29N**
- township name: **Baytown**
- range number: **20W**
- nearest community: **Lake Elmo**
- section number: **19**

Aerial photograph or site visit date:
**Sunday, September 15, 2002**

Score using 1981-2010 normal period

<table>
<thead>
<tr>
<th>values are in inches</th>
<th>first prior month: August 2002</th>
<th>second prior month: July 2002</th>
<th>third prior month: June 2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>estimated precipitation total for this location:</td>
<td>6.03</td>
<td>5.71</td>
<td>8.98</td>
</tr>
<tr>
<td>there is a 30% chance this location will have less than:</td>
<td>3.32</td>
<td>2.65</td>
<td>3.68</td>
</tr>
<tr>
<td>there is a 30% chance this location will have more than:</td>
<td>5.39</td>
<td>4.73</td>
<td>5.74</td>
</tr>
<tr>
<td>type of month:</td>
<td>dry</td>
<td>normal</td>
<td>wet</td>
</tr>
<tr>
<td>monthly score</td>
<td>3 * 3 = 9</td>
<td>2 * 3 = 6</td>
<td>1 * 3 = 3</td>
</tr>
<tr>
<td>multi-month score:</td>
<td>6 to 9 (dry)</td>
<td>10 to 14 (normal)</td>
<td>15 to 18 (wet)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>18 (Wet)</td>
</tr>
</tbody>
</table>

Other Resources:
- retrieve daily precipitation data
- view radar-based precipitation estimates
- view weekly precipitation maps
- Evaluating Antecedent Precipitation Conditions (BWSR)
## Precipitation Worksheet Using Gridded Database

Precipitation data for target wetland location:
- **County:** Washington
- **Township number:** 29N
- **Township name:** Baytown
- **Range number:** 20W
- **Nearest community:** Lake Elmo
- **Section number:** 19

**Aerial photograph or site visit date:**
**Tuesday, May 02, 2000**

**Score using 1981-2010 normal period**

<table>
<thead>
<tr>
<th></th>
<th>first prior month:</th>
<th>second prior month:</th>
<th>third prior month:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>April 2000</td>
<td>March 2000</td>
<td>February 2000</td>
</tr>
<tr>
<td>estimated precipitation total for this location:</td>
<td>1.48</td>
<td>1.24</td>
<td>1.27</td>
</tr>
<tr>
<td>there is a 30% chance this location will have less than:</td>
<td>2.06</td>
<td>1.47</td>
<td>0.50</td>
</tr>
<tr>
<td>there is a 30% chance this location will have more than:</td>
<td>3.19</td>
<td>2.10</td>
<td>0.95</td>
</tr>
<tr>
<td>type of month:</td>
<td>dry</td>
<td>normal</td>
<td>wet</td>
</tr>
<tr>
<td>monthly score</td>
<td>3 * 1 = 3</td>
<td>2 * 1 = 2</td>
<td>1 * 3 = 3</td>
</tr>
</tbody>
</table>

**Multi-month score:**

| 6 to 9 (dry) | 10 to 14 (normal) | 15 to 18 (wet) | **8 (Dry)** |

**Other Resources:**
- retrieve daily precipitation data
- view radar-based precipitation estimates
- view weekly precipitation maps
- **Evaluating Antecedent Precipitation Conditions** (BWSR)
Precipitation data for target wetland location:
- county: Washington
- township number: 29N
- township name: Baytown
- range number: 20W
- nearest community: Lake Elmo
- section number: 19

Aerial photograph or site visit date:
- Monday, April 14, 1997

Score using 1981-2010 normal period

<table>
<thead>
<tr>
<th>values are in inches</th>
<th>first prior month: March 1997</th>
<th>second prior month: February 1997</th>
<th>third prior month: January 1997</th>
</tr>
</thead>
<tbody>
<tr>
<td>estimated precipitation total for this location:</td>
<td>1.48</td>
<td>0.19</td>
<td>1.76</td>
</tr>
<tr>
<td>there is a 30% chance this location will have less than:</td>
<td>1.47</td>
<td>0.50</td>
<td>0.54</td>
</tr>
<tr>
<td>there is a 30% chance this location will have more than:</td>
<td>2.10</td>
<td>0.95</td>
<td>1.20</td>
</tr>
<tr>
<td>type of month:</td>
<td>dry</td>
<td>normal</td>
<td>wet</td>
</tr>
<tr>
<td>monthly score</td>
<td>3 * 2 = 6</td>
<td>2 * 1 = 2</td>
<td>1 * 3 = 3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>multi-month score:</th>
<th>6 to 9 (dry)</th>
<th>10 to 14 (normal)</th>
<th>15 to 18 (wet)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>11 (Normal)</td>
</tr>
</tbody>
</table>

Other Resources:
- retrieve daily precipitation data
- view radar-based precipitation estimates
- view weekly precipitation maps
- Evaluating Antecedent Precipitation Conditions (BWSR)
Precipitation Worksheet Using Gridded Database

Precipitation data for target wetland location:
county: Washington  township number: 29N
township name: Baytown  range number: 20W
nearest community: Lake Elmo  section number: 19

Aerial photograph or site visit date:
Monday, October 10, 1994

Score using 1981-2010 normal period

<table>
<thead>
<tr>
<th>values are in inches</th>
<th>first prior month: September 1994</th>
<th>second prior month: August 1994</th>
<th>third prior month: July 1994</th>
</tr>
</thead>
<tbody>
<tr>
<td>estimated precipitation total for this location:</td>
<td>4.53</td>
<td>4.80</td>
<td>4.74</td>
</tr>
<tr>
<td>there is a 30% chance this location will have less than:</td>
<td>2.45</td>
<td>3.32</td>
<td>2.65</td>
</tr>
<tr>
<td>there is a 30% chance this location will have more than:</td>
<td>4.36</td>
<td>5.38</td>
<td>4.73</td>
</tr>
<tr>
<td>type of month: dry  normal  wet</td>
<td>wet</td>
<td>normal</td>
<td>wet</td>
</tr>
<tr>
<td>monthly score</td>
<td>$3 \times 3 = 9$</td>
<td>$2 \times 2 = 4$</td>
<td>$1 \times 3 = 3$</td>
</tr>
<tr>
<td>multi-month score:</td>
<td>6 to 9 (dry)  10 to 14 (normal)  15 to 18 (wet)</td>
<td>16 (Wet)</td>
<td></td>
</tr>
</tbody>
</table>

Other Resources:

- retrieve daily precipitation data
- view radar-based precipitation estimates
- view weekly precipitation maps
- Evaluating Antecedent Precipitation Conditions (BWSR)
Appendix E. WETS Analysis and Climatic Data
Precipitation Worksheet Using Gridded Database

Precipitation data for target wetland location:
- County: Washington
- Township number: 29N
- Township name: Baytown
- Range number: 20W
- Nearest community: Lake Elmo
- Section number: 18

Aerial photograph or site visit date:
Monday, June 05, 2017

Score using 1981-2010 normal period

<table>
<thead>
<tr>
<th>Estimated precipitation total for this location:</th>
<th>5.51R</th>
<th>3.55</th>
<th>0.88</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is a 30% chance this location will have less than:</td>
<td>3.25</td>
<td>2.09</td>
<td>1.45</td>
</tr>
<tr>
<td>There is a 30% chance this location will have more than:</td>
<td>4.05</td>
<td>3.19</td>
<td>2.09</td>
</tr>
<tr>
<td>Type of month:</td>
<td>dry</td>
<td>normal</td>
<td>wet</td>
</tr>
<tr>
<td>Monthly score</td>
<td>3 * 3 = 9</td>
<td>2 * 3 = 6</td>
<td>1 * 1 = 1</td>
</tr>
<tr>
<td>Multi-month score</td>
<td>6 to 9 (dry)</td>
<td>10 to 14 (normal)</td>
<td>15 to 18 (wet)</td>
</tr>
</tbody>
</table>

Other Resources:
- Retrieve daily precipitation data
- View radar-based precipitation estimates
- View weekly precipitation maps
- Evaluating Antecedent Precipitation Conditions (BWSR)
WETS Analysis Worksheet

Project Name: Lake Elmo Airport (21D) Runway 14/32 Relocation
Period Of Interest: March - May
Station: MINNEAPOLIS/ST PAUL AP, MN
County: Washington, MN

Long-term rainfall records (from WETS table)

<table>
<thead>
<tr>
<th>Site</th>
<th>Rainfall</th>
<th>Condition</th>
<th>Condition**</th>
<th>Month</th>
<th>Weight</th>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
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* Normal precipitation with 30% to 70% probability of occurrence
**Condition value: 6 to 9 then period has been drier than normal
Normal = 2 10 to 14 then period has been normal
Wet = 3 15 to 18 then period has been wetter than normal

Precipitation data source:
http://www.ncdc.noaa.gov/cdo-web/datatools

Reference:
# WETS Table

**WETS Station:** MINNEAPOLIS/ST PAUL AP, MN  
**Requested years:** 1971 - 2010

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<th>Avg number days precip 0.10 or more</th>
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## GROWING SEASON DATES

- **Years with missing data:** 24 deg = 0, 28 deg = 0, 32 deg = 0
- **Years with no occurrence:** 24 deg = 0, 28 deg = 0, 32 deg = 0
- **Data years used:** 24 deg = 40, 28 deg = 40, 32 deg = 40
- **Probability**
  - 24 F or higher
  - 28 F or higher
  - 32 F or higher
- **50 percent ***
  - 4/5 to 11/4: 213 days
  - 4/13 to 10/19: 189 days
  - 4/28 to 10/8: 163 days
- **70 percent ***
  - 4/1 to 11/9: 222 days
  - 4/8 to 10/24: 199 days
  - 4/24 to 10/12: 171 days

* Percent chance of the growing season occurring between the Beginning and Ending dates.

## STATS TABLE - total precipitation (inches)

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Summary: 0.83

The "*" flags in Preliminary indicate the data have not completed processing and quality control and may not be identical to the original observation. Empty, or blank, cells indicate that a data observation was not reported.

"Ground Cover: 1=Grass; 2=Fallow; 3=Bare Ground; 4=Brome grass; 5=Sod; 6=Straw mulch; 7=Grass muck; 8=Bare muck; 9=Unknown"

"~" This data value failed one of NCDC’s quality control tests.

"T" values in the Precipitation category above indicate a TRACE value was recorded.

"A" values in the Precipitation Flag or the Snow Flag column indicate a multiday total, accumulated since last measurement, is being recorded.

Data value inconsistency may be present due to rounding calculations during the conversion process from SI metric units to standard imperial units.
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Summary: 3.94

The "T" flags in Preliminary indicate the data have not completed processing and quality control and may not be identical to the original observation. Empty, or blank, cells indicate that a data observation was not reported.

"G" for Ground Cover:
1=Grass; 2=Fallow; 3=Bare Ground; 4=Brome grass; 5=Sod; 6=Straw mulch; 7=Grass muck; 8=Bare muck; 9=Unknown

"#" This data value failed one of NODC's quality control tests.

"T" values in the Precipitation category above indicate a TRACE value was recorded.

"A" values in the Precipitation Flag or the Snow Flag column indicate a multiday total, accumulated since last measurement, is being used.

Data value inconsistency may be present due to rounding calculations during the conversion process from SI metric units to standard imperial units.
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Summary: 7.03

The "F" flags in Preliminary indicate the data have not completed processing and quality control and may not be identical to the original observation. Empty, or blank, cells indicate that the data observation was not reported.

*Ground Cover: 1=Grass; 2=Fallow; 3=Bare Ground; 4=Brome grass; 5=Sod; 6=Straw mulch; 7=Grass muck; 8=Bare muck; 9=Unknown

"*" This data value failed one of NCDC's quality control tests.

"T" values in the Precipitation category above indicate a TRACE value was recorded.

"A" values in the Precipitation Flag or the Snow Flag column indicate a midday total, accumulated since last measurement, is being reported.

Data value inconsistency may be present due to rounding calculations during the conversion process from SI metric units to standard imperial units.
Appendix F.  Wetland Boundary Maps
Wetland Boundary Map
Sheet Key

LAKE ELMO AIRPORT
Proposed Runway 14-32 Runway Shift

Legend
- Map Sheet
- Wetland Boundary
- Wetland within AOI
- Outside AOI
- Area of Interest
- Airport Property Boundary

<table>
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<th>Description</th>
<th>Circular 39 Type</th>
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<td>Type 2</td>
</tr>
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<td>6</td>
<td>Fresh (wet) Meadow (Ditch Wetland)</td>
<td>Type 2</td>
</tr>
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<td>7</td>
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</tr>
<tr>
<td>8</td>
<td>Fresh (wet) Meadow/Deep Marsh</td>
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<tr>
<td>9</td>
<td>Fresh (wet) Meadow/Shallow Marsh</td>
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<table>
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<th>Area within AOI (acres)</th>
<th>Area within AOI (sq. ft)</th>
<th>Area outside AOI (acres)</th>
<th>Area outside AOI (sq. ft)</th>
<th>Total Area (acres)</th>
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Project Information
T29N, R20W, S18 and S19
City of Lake Elmo
Washington County, MN
Area of Interest = 130.1 acres
Field work conducted:
June 5 - 9, 2017

Image Source: MnGEO WMS Image Service, Washington County (2016 color 7-county)
Project Information

T29N, R20W, S18 and S19
City of Lake Elmo
Washington County, MN
Area of Interest = 130.1 acres
Field work conducted:
June 5 - 9, 2017

Image Source: MnGEO WMS Image Service,
Washington County (2016 color 7-county)
Contour Source:
Minnesota Geospatial Commons,
Minnesota Elevation Mapping Project
Twin Cities Metro Region 2011

Legend
- Photo Location
- Data Point Location
- Wetland Boundary
- Wetland within AOI
- Wetland outside AOI
- Culvert End Location
- Flow Direction
- Ditch/Swale Flow
- Area of Interest
- Airport Property Boundary

Elevation contour interval is 2 feet

Map 1 of 6
Project Information

T29N, R20W, S18 and S19
City of Lake Elmo
Washington County, MN
Area of Interest = 130.1 acres
Field work conducted:
June 5 - 9, 2017

Image Source: MnGEO WMS Image Service, Washington County (2016 color 7-county)
Contour Source: Minnesota Geospatial Commons, Minnesota Elevation Mapping Project, Twin Cities Metro Region 2011
Wetland Boundary Map

LAKE ELMO AIRPORT
Proposed Runway 14-32 Runway Shift

Project Information
T29N, R20W, S18 and S19
City of Lake Elmo
Washington County, MN
Area of Interest = 130.1 acres
Field work conducted:
June 5 - 9, 2017

Image Source: MnGEO WMS Image Service, Washington County (2016 color 7-county)
Contour Source: Minnesota Geospatial Commons, Minnesota Elevation Mapping Project Twin Cities Metro Region 2011

Legend
- Photo Location
- Data Point Location
- Wetland Boundary
- Wetland within AOI
- Wetland outside AOI
- Culvert End Location
- Flow Direction
- Ditch/Swale Flow
- Area of Interest
- Airport Property Boundary

Elevation contour interval is 2 feet

Map 4 of 6
Wetland Boundary Map

LAKE ELMO AIRPORT

Proposed Runway 14-32 Runway Shift

Project Information
T29N, R20W, S18 and S19
City of Lake Elmo
Washington County, MN
Area of Interest = 130.1 acres
Field work conducted:
June 5 - 9, 2017

Image Source: MnGEO WMS Image Service, Washington County (2016 color 7-county)
Contour Source: Minnesota Geospatial Commons, Minnesota Elevation Mapping Project Twin Cities Metro Region 2011

Map 5 of 6

Legend
- Photo Location
- Data Point Location
- Wetland Boundary
- Wetland within AOI
- Wetland outside AOI
- Culvert End Location
- Flow Direction
- Ditch/Swale Flow
- Area of Interest
- Airport Property Boundary

Elevation contour interval is 2 feet
Wetland Boundary Map
LAKE ELMO AIRPORT
Proposed Runway 14-32 Runway Shift

Legend
- Photo Location
- Data Point Location
- Wetland Boundary
- Wetland within AOI
- Wetland outside AOI
- Culvert End Location
- Flow Direction
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Project Information
T29N, R20W, S18 and S19
City of Lake Elmo
Washington County, MN
Area of Interest = 130.1 acres
Field work conducted:
June 5 - 9, 2017

Image Source: MnGEO WMS Image Service,
Washington County (2016 color 7-county)
Contour Source:
Minnesota Geospatial Commons,
Minnesota Elevation Mapping Project
Twin Cities Metro Region 2011

Map 6 of 6
Appendix G.  Data Sheets with Field Photographs
**VEGETATION - Use scientific names of plants**

<table>
<thead>
<tr>
<th>Tree Stratum (Plot size: _____)</th>
<th>Absolute % Cover</th>
<th>Dominant Species?</th>
<th>Indicator Status</th>
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<tr>
<td>2.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
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<tr>
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</tr>
<tr>
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<tr>
<td><strong>Herb Stratum (Plot size: 5 ft)</strong></td>
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<tr>
<td>1. <em>Phalaris arundinacea</em></td>
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<td>FACW</td>
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</tr>
<tr>
<td>2. <em>Urtica dioica</em></td>
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<td>FAC</td>
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<tr>
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<tr>
<td><strong>Woody Vine Stratum (Plot size: _____)</strong></td>
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</table>

**Hydrophytic Vegetation**

- **Is the Sampled Area within a Wetland?** Yes [X] No [ ]
- **Hydric Soil Present?** Yes [X] No [ ]
- **Wetland Hydrology Present?** Yes [X] No [ ]
- **Hydrophytic Vegetation Present?** Yes [X] No [ ]

**Remark:** Hydrophytic vegetation is present. Data point is located within the wetland fringe at about same elevation as Data Point 2 (upland) and about 20 feet to the east.

**Prevalence Index worksheet:**

- Total % Cover of.
  - Multiply by:
    - OBL species [X] =
    - FACW species [X] =
    - FAC species [X] =
    - FACU species [X] =
    - UPL species [X] =

**Column Totals:**

- **Prevalence Index** = B/A = 2.05

**Hydrophytic Vegetation Indicators:**

- Rapid Test for Hydrophytic Vegetation
- Dominance Test is >50%
- Prevalence Index is <3.0
- Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet)
- Problematic Hydrophytic Vegetation' (Explain)

**Definitions of Vegetation Strata:**

- **Tree** – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
- **Sapling/shrub** – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.
- **Herb** – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
- **Woody vines** – All woody vines greater than 3.28 ft in height.

**Hydrophytic Vegetation Present?**

- Yes [X] No [ ]
### Profile Description:
(Describe to the depth needed to document the indicator or confirm the absence of indicators.)

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<th>Depth (inches)</th>
<th>Color (moist)</th>
<th>%</th>
<th>Color (moist)</th>
<th>%</th>
<th>Type</th>
<th>Loc</th>
<th>Texture</th>
<th>Remarks</th>
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<td>2.5YR 4/6</td>
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<td>PL</td>
<td>Silt loam</td>
<td>PL = oxidized rhizospheres</td>
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<td>C</td>
<td>C, PL</td>
<td>Silt loam</td>
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</tr>
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</table>

1Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.  2Location: PL=Pore Lining, M=Matrix.

### Hydric Soil Indicators:
- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)

1Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

### Restrictive Layer (if observed):
Type: ______
Depth (inches): ______

Hydric Soil Present? Yes ☑ No □

Remarks: Hydric soils are present. Meets hydric soils criteria Depleted Below Dark Surface (A11) and Redox Dark Surface (F6).

### HYDROLOGY

#### Wetland Hydrology Indicators:
Primary Indicators (minimum of one is required; check all that apply)
- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)

Secondary Indicators (minimum of two required)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

#### Field Observations:
- Surface Water Present? Yes ☑ No ☐ Depth (inches): ______
- Water Table Present? Yes ☑ No ☐ Depth (inches): ______
- Saturation Present? Yes ☑ No ☐ Depth (inches): ______

(includes capillary fringe)

Indicators of Wetland Hydrology Present? Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring, well, aerial photos, previous inspections), if available:

Remarks: Wetland hydrology is present. Data point in a concave surface within wetland fringe vegetation of a shallow marsh.

Photo: C-226
Data Point 1

Photo 1. View to the east.

Photo 2. General site, view to the east.
WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Lake Elmo airport (21D) Runway 14/32 Relocation     City/County: Washington     Sampling Date: 6/5/2017
Applicant/Owner: Metropolitan Airports Commission     State: Minnesota     Sample Point: DP2
Investigator(s): Brauna Hartzell and Kim Shannon, Mead & Hunt, Inc.     Section, Township, Range: Section 19, T29N, R20W

Landform (hillslope, terrace, etc.): footslope     Local relief (concave, convex, none): concave     Slope (%): <1%
Subregion (LRR or MLRA): K/153     Lat: 44.9917° N     Long: 92.8529° W     Datum: WGS 84
Soil Map Unit Name: Crystal Lake silt loam, 1 to 3 percent slopes

Are climatic hydrologic conditions on the site typical for this time of year? Yes ☐ No ☒
Are Vegetation, Soil, or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes ☐ No ☒
Are Vegetation, Soil, or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ☐ No ☒
Hydric Soil Present? Yes ☐ No ☒
Wetland Hydrology Present? Yes ☐ No ☒

Is the Sampled Area within a Wetland? Yes ☐ No ☒
If yes, optional Wetland Side ID:

Remarks: (Explain alternative procedures here or in a separate report.) A WETS analysis of the antecedent precipitation indicates the hydrologic conditions on the site were wetter than normal range at the time of investigation. Data point located in a plowed, recently planted field with beans.

VEGETATION - Use scientific names of plants

<table>
<thead>
<tr>
<th>Stratum</th>
<th>Absolute Cover</th>
<th>Dominant Species</th>
<th>Indicator Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tree Stratum (Plot size: _____)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td></td>
<td></td>
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<td>2.</td>
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<td>3.</td>
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<td>4.</td>
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<tr>
<td>5.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Cover</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sapling/Shrub Stratum (Plot size: _____)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>1.</td>
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<td></td>
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<tr>
<td>2.</td>
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<td>3.</td>
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<td>4.</td>
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<tr>
<td>5.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Cover</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Herb Stratum (Plot size: 5 ft)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glycine max</td>
<td>5 X FACU</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
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<tr>
<td>4.</td>
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<tr>
<td>5.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Cover</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Woody Vine Stratum (Plot size: _____)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Cover</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

50/20 Thresholds: 20% 50%

<table>
<thead>
<tr>
<th>Stratum</th>
<th>% Cover</th>
<th>Species</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tree Stratum</td>
<td>20%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sapling/Shrub Stratum</td>
<td>20%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Herb Stratum</td>
<td>20%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Woody Vine Stratum</td>
<td>20%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Dominance Test worksheet:
Number of Dominant Species
That Are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBI, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:
Total % Cover of OBL species x 1 =  
FACW species x 2 =  
FAC species x 3 =  
FACU species x 4 =  
UPL species x 5 =  
Column Totals:  
Prevalence Index = B/A = 4.0

Hydrophytic Vegetation Indicators:
☐ Rapid Test for Hydrophytic Vegetation
☐ Dominance Test is >50%
☐ Prevalence Index is <3.0
☐ Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet)
☐ Problematic Hydrophytic Vegetation

Definitions of Vegetation Strata:
Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.
Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ☐ No ☒
Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

<table>
<thead>
<tr>
<th>Depth (inches)</th>
<th>Color (moist)</th>
<th>%</th>
<th>Color (moist)</th>
<th>%</th>
<th>Type1</th>
<th>Loc2</th>
<th>Texture</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-4</td>
<td>10YR 3/2</td>
<td>99</td>
<td>7.5YR 4/6</td>
<td>1</td>
<td>C</td>
<td>M</td>
<td>Silt loam</td>
<td></td>
</tr>
<tr>
<td>4-10</td>
<td>10YR 3/2</td>
<td>90</td>
<td>7.5YR 4/6</td>
<td>10</td>
<td>C</td>
<td>M</td>
<td>Silt loam</td>
<td></td>
</tr>
<tr>
<td>11-16</td>
<td>10YR 5/2</td>
<td>94</td>
<td>7.5YR 4/6</td>
<td>6</td>
<td>C</td>
<td>M</td>
<td>Silt loam</td>
<td></td>
</tr>
<tr>
<td>16-20</td>
<td>10YR 4/4</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Silt loam</td>
<td></td>
</tr>
</tbody>
</table>

1Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.  2Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators:**
- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)
- Dark Surface (S7) *(LRR R, MLRA 149B)*
- Polyvalue Below Surface (S8) *(LRR R, MLRA 149B)*
- Loamy Mucky Mineral (F1) *(LRR K, L)*
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Redox Depressions (F8)
- Hydrogen Sulfide Odor (C1)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

**Indicators for Problematic Hydric Soils:**
- 2 cm Muck - *(LRR K, L, MLRA 149B)*
- 5 cm Peat or Mucky Peat *(LRR K, L, MLRA 149B)*
- Dark Surface *(LRR K, L)*
- Polyvalue Below Surface *(LRR K, L)*
- Thin Dark Surface *(LRR K, L)*
- Iron-Manganese Masses *(F12)* *(LRR K, L)*
- Piedmont Floodplain Soils *(F19)* *(MLRA 149B)*
- Red Parent Material *(F21)*
- Very Shallow Dark Surface *(TF12)*
- Other (Explain in Remarks)

**Restrictive Layer (if observed):**
- Type: ______
- Depth (inches): ______
- Hydric Soil Present? Yes ☒ No ☐

Remarks: Hydric soils are present. Meets hydric soils criteria Depleted Below Dark Surface (A11) and Redox Dark Surface (F6).

**HYDROLOGY**

**Wetland Hydrology Indicators:**
- Primary Indicators (minimum of one is required; check all that apply)
  - Surface Water (A1)
  - High Water Table (A2)
  - Saturation (A3)
  - Water Marks (B1)
  - Sediment Deposits (B2)
  - Drift Deposits (B3)
  - Algal Mat or Crust (B4)
  - Iron Deposits (B5)
  - Inundation Visible on Aerial Imagery(B7)
  - Sparsely Vegetated Concave Surface (B8)
  - Water-Stained Leaves (B9)
  - Aquatic Fauna (B13)
  - Marl Deposits (B15)
  - Hydrogen Sulfide Odor (C1)
  - Oxidized Rhizospheres on Living Roots (C3)
  - Presence of Reduced Iron (C4)
  - Recent Iron Reduction in Tilled Soils (C6)
  - Thin Muck Surface (C7)
  - Other (Explain in Remarks)

- Secondary Indicators (minimum of two required)
  - Surface Soil Cracks (B6)
  - Drainage Patterns (B10)
  - Moss Trim Lines (B15)
  - Dry-Season Water Table (C2)
  - Crayfish Burrows (C8)
  - Saturation Visible on Aerial Imagery (C9)
  - Stunted or Stressed Plants (D1)
  - Geomorphic Position (D2)
  - Shallow Aquitard (D3)
  - FAC-Neutral Test (DS)
  - Microtopographic Relief (D4)

Field Observations:
- Surface Water Present? Yes ☒ No ☐ Depth (inches): ______
- Water Table Present? Yes ☒ No ☐ Depth (inches): ______
- Saturation Present? Yes ☒ No ☐ Depth (inches): ______

Remarks: Wetland hydrology is neither present nor indicated. Some collection of corn cobs and stalks adjacent to wetland vegetation but random nature indicates not a result of water flow, perhaps more a result of wind.

Photo: [C-229]
Data Point 2

Photo 3. View to the east.

Photo 4. Wetland 1, view to the north.
Project/Site: Lake Elmo airport (21D) Runway 14/32 Relocation
City/County: Washington
Applicant/Owner: Metropolitan Airports Commission
State: Minnesota
Sample Date: 6/5/2017
Sample Point: DP3
Investigator(s): Brauna Hartzell and Kim Shannon, Mead & Hunt, Inc.
Section, Township, Range: Section 19, T29N, R20W
Landform (hillslope, terrace, etc.): depression
Local relief (concave, convex, none): concave
Slope (%): <1%
Subregion (LRR or MLRA): K/153 ____________
Lat: 44.9922° N Long: 92.8525° W Datum: WGS 84
Soil Map Unit Name: Comstock silt loam
NWI classification: PEM1A
Are climatic hydrologic conditions on the site typical for this time of year? Yes __ No __
(Is no, explain in Remarks.)
Are Vegetation, Soil, or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes __ No __
Are Vegetation, Soil, or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)
SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

<table>
<thead>
<tr>
<th>Hydrophytic Vegetation Present?</th>
<th>Yes ☑ No ☐</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydric Soil Present?</td>
<td>Yes ☑ No ☐</td>
</tr>
<tr>
<td>Wetland Hydrology Present?</td>
<td>Yes ☑ No ☐</td>
</tr>
</tbody>
</table>

Is the Sampled Area within a Wetland? Yes __ No __
If yes, optional Wetland Side ID: 1

Remarks: (Explain alternative procedures here or in a separate report.)
A WETS analysis of the antecedent precipitation indicates the hydrologic conditions on the site were wetter than normal range at the time of investigation. Absence of vegetation due to inundation/ponding and long-term cultivation. Field recently planted to soybeans.

VEGETATION - Use scientific names of plants

<table>
<thead>
<tr>
<th>Tree Stratum (Plot size: _____)</th>
<th>Absolute % Cover</th>
<th>Dominant Species?</th>
<th>Indicator Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
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<td>2.</td>
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<td>3.</td>
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<td>4.</td>
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<tr>
<td>5.</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sapling/Shrub Stratum (Plot size: _____)</th>
<th>= Total Cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
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<tr>
<td>2.</td>
<td></td>
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<tr>
<td>3.</td>
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<tr>
<td>4.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Herb Stratum (Plot size: 5ft)</th>
<th>= Total Cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
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<tr>
<td>2.</td>
<td></td>
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<tr>
<td>3.</td>
<td></td>
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<tr>
<td>4.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Woody Vine Stratum (Plot size: _____)</th>
<th>= Total Cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
</tbody>
</table>

50/20 Thresholds

- Tree Stratum: 20% 50%
- Sapling/Shrub Stratum:      
- Herb Stratum:        
- Woody Vine Stratum:       

Dominance Test worksheet:

- Number of Dominant Species: (A)
- Total Number of Dominant Species Across All Strata: (B)
- Percent of Dominant Species: (A/B)
- That Are OBI, FACW, or FAC: (A/B)

Prevalence Index worksheet:

- Total % Cover of: Multiply by:
  - OBL species × 1 =
  - FACW species × 2 =
  - FAC species × 3 =
  - FACU species × 4 =
  - UPL species × 5 =
- Column Totals: (A) (B)
- Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- Rapid Test for Hydrophytic Vegetation
- Dominance Test is >50%
- Prevalence Index is <3.0
- Morphological Adaptations’ (Provide supporting data in Remarks or on a separate sheet)
- Problematic Hydrophytic Vegetation’ (Explain)

1Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

- Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
- Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.
- Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
- Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present?

Yes ☑ No ☐
### Profile Description:
Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

<table>
<thead>
<tr>
<th>Depth (inches)</th>
<th>Matrix</th>
<th>Redox Features</th>
<th>Color (moist)</th>
<th>%</th>
<th>Color (moist)</th>
<th>%</th>
<th>Type</th>
<th>Loc</th>
<th>Texture</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10</td>
<td>10YR 3/2</td>
<td>96</td>
<td>7.5YR 5/6</td>
<td>4</td>
<td>C</td>
<td>M</td>
<td>Silt loam</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10-16</td>
<td>10YR 5/2</td>
<td>65</td>
<td>7.5YR 5/6</td>
<td>34</td>
<td>C</td>
<td>M</td>
<td>Silt loam</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7.5YR 2.5/1</td>
<td>1</td>
<td>C</td>
<td>PL</td>
<td>Silt loam</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16-18</td>
<td>10YR 4/4</td>
<td>50</td>
<td>Silt loam</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10YR 5/8</td>
<td>50</td>
<td>Silt loam</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

1Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. 2Location: PL=Pore Lining, M=Matrix.

#### Hydric Soil Indicators:
- [ ] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5)
- [x] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)

#### Indicators for Problematic Hydric Soils:
- [ ] 2 cm Muck - (A10) (LRR K, L, MLRA 149B)
- [ ] 5 cm Peat or Mucky Peat (S3) (LRR K, L, R)
- [ ] Dark Surface (S7) (LRR K, L)
- [ ] Polyvalue Below Surface (S8) (LRR K, L)
- [ ] Thin Dark Surface (S9) (LRR K, L)
- [ ] Iron-Manganese Masses (F12) (LRR K, L, R)
- [ ] Piedmont Floodplain Soils (F19) (MLRA 149B)
- [ ] Mesic Spodic (T6) (MLRA 144A, 145, 149B)
- [x] Red Parent Material (F21)
- [ ] Other (Explain in Remarks)

1Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

#### Restrictive Layer (if observed):
- Type: 
- Depth (inches): 

Hydric Soil Present? Yes [x] No

Remarks: Hydric soils are present. Meets hydric soils criterion Depleted Below Dark Surface (A11).

### HYDROLOGY

#### Wetland Hydrology Indicators:
**Primary Indicators (minimum of one is required; check all that apply):**
- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [ ] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [x] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [x] Sparsely Vegetated Concave Surface (B8)
- [ ] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres on Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (Explain in Remarks)

**Secondary Indicators (minimum of two required):**
- [ ] Surface Soil Cracks (B6)
- [ ] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Stunted or Stressed Plants (D1)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] FAC-Neutral Test (D5)
- [ ] Microtopographic Relief (D4)

#### Field Observations:
- Surface Water Present? Yes [x] No [ ] Depth (inches): 
- Water Table Present? Yes [x] No [ ] Depth (inches): 
- Saturation Present? Yes [x] No [ ] Depth (inches): 

**Indicators of Wetland Hydrology Present?** Yes [x] No [ ]

Describe Recorded Data (stream gauge, monitoring, well, aerial photos, previous inspections), if available:

Remarks: Wetland hydrology is indicated. Dry, cracked soil surface; old corn stalks water stained; drifting corn debris pushed against wetland fringe vegetation; planted soy beans dead or stressed within boundary; soil sparsely vegetated; wet signatures on historical aerial photography in 60% of images.

Photo:
Data Points 3 and 4

Photo 5. View to the southeast.

Photo 6. Drift deposits near Data Point 3. View to the east.
Photo 7. Bare and cracked soils near culvert outlet under 30th Street. View to the east.

Photo 8. Wetland 1, view to the south. View taken within wetland boundary.
Project/Site: Lake Elmo Airport (21D) Runway 14/32 Relocation  
City/County: Washington  
Sampling Date: 6/5/2017

Applicant/Owner: Metropolitan Airports Commission  
State: Minnesota  
Sample Point: DP4

Investigator(s): Brauna Hartzell and Kim Shannon, Mead & Hunt, Inc.  
Section, Township, Range: Section 19, T29N, R20W

Landform (hillslope, terrace, etc.): foothill  
Local relief (concave, convex, none): none  
Slope (%): <1%

Subregion (LRR or MLRA): K/153  
Lat: 44.9922° N  
Long: 92.8526° W  
Datum: WGS 84

Soil Map Unit Name: Comstock silt loam  
NWI classification: 

Are climatic hydrologic conditions on the site typical for this time of year?  Yes  
No (If no, explain in Remarks.)

Are Vegetation, Soil, or Hydrology significantly disturbed? Are "Normal Circumstances" present?  Yes  
No  
(If needed, explain any answers in Remarks.)

Are Vegetation, Soil, or Hydrology naturally problematic?  
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?  Yes __  No __

Hydric Soil Present?  Yes __  No __

Wetland Hydrology Present?  Yes __  No __

If yes, optional Wetland Side ID: ____________________________

Hydrophytic Vegetation Indicators:  
Rapid Test for Hydrophytic Vegetation  
Dominance Test is >50%

Prevalence Index worksheet:  
Total % Cover of OBL species 2 x 1 = 2  
FACW species x 2 =  
FAC species 1 x 3 = 3  
FACU species x 4 =  
UPL species 6 x 5 = 30  
Column Totals: 9 (A)  
35 (B)  
Prevalence Index = B/A = 3.89

Definitions of Vegetation Strata:  
Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.  
Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.  
Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.  
Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present?  Yes __  No __

Vegetation – Use scientific names of plants

<table>
<thead>
<tr>
<th>Stratum (Plot size: _____)</th>
<th>Absolute % Cover</th>
<th>Dominant Species?</th>
<th>Indicator Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tree Stratum</td>
<td>50/20 %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sapling/Shrub Stratum</td>
<td>50/20 %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Herb Stratum</td>
<td>50/20 %</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Woody Vine Stratum</td>
<td>50/20 %</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Dominance Test worksheet:

Number of Dominant Species
That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of OBL species 2 x 1 = 2  
FACW species x 2 =  
FAC species 1 x 3 = 3  
FACU species x 4 =  
UPL species 6 x 5 = 30  
Column Totals: 9 (A)  
35 (B)  
Prevalence Index = B/A = 3.89

Hydrophytic Vegetation Indicators:  
Rapid Test for Hydrophytic Vegetation  
Dominance Test is >50%

Prevalence Index is <3.01

Morphological Adaptations’ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation’ (Explain)

1Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Remarks: (Include photo numbers here or on a separate sheet.) Farmed field; no stressed vegetation; no cracking soil; no drift lines; soy beans present. About 30 feet separates data point from paired wetland data point (DP 3) with very slight elevation change between; Fails Prevalence Index at 3.89.
### SOIL

**Profile Description:** (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

<table>
<thead>
<tr>
<th>Depth (inches)</th>
<th>Color (moist)</th>
<th>%</th>
<th>Color (moist)</th>
<th>%</th>
<th>Type¹</th>
<th>Loc²</th>
<th>Texture</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10</td>
<td>10YR 3/2</td>
<td>96</td>
<td>7.5YR 4/6</td>
<td>4</td>
<td>C</td>
<td>M</td>
<td>Silt loam</td>
<td></td>
</tr>
<tr>
<td>10-16</td>
<td>10YR 5/2</td>
<td>90</td>
<td>7.5YR 4/6</td>
<td>4</td>
<td>C</td>
<td>M</td>
<td>Silt loam</td>
<td></td>
</tr>
<tr>
<td>16-18</td>
<td>10YR 4/4</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Silt loam</td>
<td></td>
</tr>
</tbody>
</table>

³Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ⁴Location: PL=Pore Lining, M=Matrix.

#### Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S5)
- Slightly Mucky Mineral (S6)
- Redox Depressions (F8)

#### Indicators of problematic hydric soils:

- 2 cm Muck - (A10) ([LRR K, MLRA 149B](#))
- 5 cm or Mucky Peat - (S3) ([LRR K, L, R](#))
- Dark Surface - (S7) ([LRR K, L](#))
- Polyvalue Below Surface - (S8) ([LRR K, L](#))
- Thin Dark Surface - (S9) ([LRR K, L](#))
- Iron-Manganese Masses - (F12) ([LRR K, L, R](#))
- Piedmont Floodplain Soils - (F19) ([MLRA 149B](#))
- Mesic Spodic - (TA6) ([MLRA 144A, 145, 149B](#))
- Red Parent Material - (F21)
- Very Shallow Dark Surface - (TF12)
- Other (Explain in Remarks)

#### Restrictive Layer (if observed):

- **Type:**
- **Depth (inches):**
- **Hydric Soil Present?** Yes [ ] No [ ]

#### Remarks:

Wetland hydrology is neither present nor indicated.

### HYDROLOGY

#### Wetland Hydrology Indicators:

**Primary Indicators (minimum of one is required; check all that apply)**

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

**Secondary Indicators (minimum of two required)**

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- FAC-Neutral Test (D5)
- Microtopographic Relief (D4)

#### Field Observations:

| Surface Water Present? | Yes [ ] No [ ] Depth (inches): |
| Water Table Present?   | Yes [ ] No [ ] Depth (inches): |
| Saturation Present?    | Yes [ ] No [ ] Depth (inches): |

**Describe Recorded Data (stream gauge, monitoring, well, aerial photos, previous inspections), if available:**

**Remarks:** Wetland hydrology is neither present nor indicated.

**Photo:**
Photo 5. View to the southeast.
See additional photos on Data Point 3.
Project/Site: Lake Elmo airport (21D) Runway 14/32 Relocation     City/County: Washington     Sampling Date: 6/5/2017
Applicant/Owner: Metropolitan Airports Commission     State: Minnesota     Sample Point: DP5
Investigator(s): Brauna Hartzell and Kim Shannon, Mead & Hunt, Inc.       Section, Township, Range: Section 19, T29N, R20W
Landform (hillslope, terrace, etc.): depression   Local relief (concave, convex, none): concave  Slope (%): 1%
Subregion (LRR or MLRA): K/153 ____________  Lat: 44.9906° N     Long: 92.8499° W     Datum: WGS 84
Soil Map Unit Name: Aquolls and Histosols, ponded     NWI classification: PEMA
Are climatic hydrologic conditions on the site typical for this time of year?  Yes  No (If no, explain in Remarks.)
Are Vegetation, Soil, or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes  No
Are Vegetation, Soil, or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)
SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.
Hydric Soil Present? Yes  No
Wetland Hydrology Present? Yes  No
Is the Sampled Area within a Wetland? Yes  No
Hydrophytic Vegetation Present? Yes  No

VEGETATION - Use scientific names of plants

<table>
<thead>
<tr>
<th>Tree Stratum (Plot size: _____)</th>
<th>Absolute % Cover</th>
<th>Dominant Species?</th>
<th>Indicator Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sapling/Shrub Stratum (Plot size: _____)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
<tr>
<td>4.</td>
</tr>
<tr>
<td>5.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Herb Stratum (Plot size: 5ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Phalaris arundinacea</td>
</tr>
<tr>
<td>2. Persicaria amphibia</td>
</tr>
<tr>
<td>3. Cirsium arvense</td>
</tr>
<tr>
<td>4. Urtica dioica</td>
</tr>
<tr>
<td>5.</td>
</tr>
<tr>
<td>6.</td>
</tr>
<tr>
<td>7.</td>
</tr>
<tr>
<td>8.</td>
</tr>
<tr>
<td>9.</td>
</tr>
<tr>
<td>10.</td>
</tr>
<tr>
<td>11.</td>
</tr>
<tr>
<td>12.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Woody Vine Stratum (Plot size: _____)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
</tr>
</tbody>
</table>

Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation is present. Data Point in fringe vegetation of shallow marsh; also *Typha angustifolia* present 15 ft to west. About 40 feet separates this data point and its paired upland point (DP 6) and is about 3 feet lower in elevation.
### Profile Description:
(Describe to the depth needed to document the indicator or confirm the absence of indicators.)

<table>
<thead>
<tr>
<th>Depth (inches)</th>
<th>Color (moist)</th>
<th>%</th>
<th>Color (moist)</th>
<th>%</th>
<th>Type</th>
<th>Loc</th>
<th>Texture</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-4</td>
<td>10YR 3/2</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Silt loam</td>
<td></td>
</tr>
<tr>
<td>4-12</td>
<td>10YR 4/1</td>
<td>95</td>
<td>7.5YR 4/6</td>
<td>5</td>
<td>C</td>
<td>PL</td>
<td>Silt loam</td>
<td>PL = oxidized rhizospheres</td>
</tr>
<tr>
<td>12-16</td>
<td>10YR 5/1</td>
<td>70</td>
<td>5YR 4/6</td>
<td>30</td>
<td>C</td>
<td>M</td>
<td>Silt loam</td>
<td></td>
</tr>
</tbody>
</table>

1^Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.  
2^Location: PL=Pore Lining, M=Matrix.

### Hydric Soil Indicators:
- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)

### Indicators for Problematic Hydric
- 2 cm Muck - (LRR K, MLRA 149B)
- 5 cm Peat or Mucky Peat - (LRR K, L, R)
- Deep Dark Surface - (LRR K, L, R)
- Polyvalue Below Surface - (LRR K, L)
- Thin Dark Surface - (LRR K, L)
- Iron-Manganese Masses - (F12)
- Piedmont Floodplain Soils - (F19)
- Mesc Spodic - (MLRA 144A, 145, 149B)
- Red Parent Material - (F21)
- Very Shallow Dark Surface - (TF12)
- Other (Explain in Remarks)

### Restrictive Layer (if observed):
Type: ______
Depth (inches): ______

Hydric Soil Present? Yes ☑️ No ☐

Remarks: Hydric soils are present. Meets hydric soils criteria Depleted Below Dark Surface (A11) and Depleted Matrix (F3).

### HYDROLOGY

#### Wetland Hydrology Indicators:
- Primary Indicators (minimum of one is required; check all that apply)
  - Surface Water (A1)
  - High Water Table (A2)
  - Saturation (A3)
  - Water Marks (B1)
  - Sediment Deposits (B2)
  - Drift Deposits (B3)
  - Algal Mat or Crust (B4)
  - Iron Deposits (BS)
  - Inundation Visible on Aerial Imagery (B7)
  - Sparsely Vegetated Concave Surface (B8)

- Secondary Indicators (minimum of two required)
  - Water-Stained Leaves (B9)
  - Aquatic Fauna (B13)
  - Marl Deposits (B15)
  - Hydrogen Sulfide Odor (C1)
  - Oxidized Rhizospheres on Living Roots (C3)
  - Presence of Reduced Iron (C4)
  - Recent Iron Reduction in Tilled Soils (C6)
  - Thin Muck Surface (C7)
  - Other (Explain in Remarks)
  - Surface Soil Cracks (B6)
  - Drainage Patterns (B10)
  - Moss Trim Lines (B16)
  - Dry-Season Water Table (C2)
  - Crayfish Burrows (C8)
  - Saturation Visible on Aerial Imagery (C9)
  - Stunted or Stressed Plants (D1)
  - Geomorphic Position (D2)
  - Shallow Aquitard (D3)
  - FAC-Neutral Test (DS)
  - Microtopographic Relief (D4)

#### Field Observations:
- Surface Water Present? Yes ☑️ No ☐ Depth (inches): ______
- Water Table Present? Yes ☑️ No ☐ Depth (inches): ______
- Saturation Present? Yes ☑️ No ☐ Depth (inches): ______
- (includes capillary fringe)

<table>
<thead>
<tr>
<th>Indicators of Wetland Hydrology Present?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes ☑️ No ☐</td>
</tr>
</tbody>
</table>

Describe Recorded Data (stream gauge, monitoring, well, aerial photos, previous inspections), if available:

Remarks: Wetland hydrology is indicated. Data point in wetland fringe of depressional shallow marsh.

Photo: C-239
Photo 9. View to the west.
Hydrophytic Vegetation Present? Yes ☐ No ☒

Hydric Soil Present? Yes ☐ No ☒

Wetland Hydrology Present? Yes ☐ No ☒

Are Vegetation, Soil, or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes ☐ No ☒

Are Vegetation, Soil, or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Remarks: (Explain alternative procedures here or in a separate report.) A WETS analysis of the antecedent precipitation indicates the hydrologic conditions on the site were wetter than normal range at the time of investigation. Vegetation disturbed due to long-term cultivation. Farm field planted to soybeans.

VEGETATION - Use scientific names of plants

Tree Stratum (Plot size: _____)

<table>
<thead>
<tr>
<th>Absolute % Cover</th>
<th>Dominant Species?</th>
<th>Indicator Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sapling/Shrub Stratum (Plot size: _____)

<table>
<thead>
<tr>
<th>= Total Cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
<tr>
<td>4.</td>
</tr>
<tr>
<td>5.</td>
</tr>
</tbody>
</table>

Herb Stratum (Plot size: 5ft)

<table>
<thead>
<tr>
<th>= Total Cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Glycine max</td>
</tr>
<tr>
<td>2. Acer negundo</td>
</tr>
<tr>
<td>3.</td>
</tr>
<tr>
<td>4.</td>
</tr>
<tr>
<td>5.</td>
</tr>
</tbody>
</table>

Woody Vine Stratum (Plot size: _____)

<table>
<thead>
<tr>
<th>= Total Cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
</tr>
</tbody>
</table>

Remarks: Hydrophytic vegetation is not present. Also immature milkweed (Asclepias syriaca) is present just outside of sampling area. About 40 feet separates this data point and its paired wetland point (DP 5); data point 6 is about 3 feet higher in elevation.
Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

<table>
<thead>
<tr>
<th>Depth (inches)</th>
<th>Color (moist)</th>
<th>%</th>
<th>Color (moist)</th>
<th>%</th>
<th>Type</th>
<th>Loc</th>
<th>Texture</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-16</td>
<td>10YR 3/3</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Silt loam</td>
<td></td>
</tr>
</tbody>
</table>

**SOIL Sampling Point: DP6**

1Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.  
2Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators:**
- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)

**Indicators for Problematic Hydric**
- 2 cm Muck - (A10) (LRR K, L, MLRA 149B)
- 5 cm Peat or Mucky Peat (S3) (LRR K, L, R)
- Dark Surface (S7) (LRR K, L)
- Polyvalue Below Surface (S8) (LRR K, L)
- Thin Dark Surface (S9) (LRR K, L)
- Iron-Manganese Masses (F12) (LRR K, L, R)
- Piedmont Floodplain Soils (F19) (MLRA 149B)
- Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- Red Parent Material (F21)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

1Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type:  
Depth (inches):  

Remarks: Hydric soils are not present. Does not meet hydric soils criteria.

**HYDROLOGY**

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)
- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)
- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- FAC-Neutral Test (D5)
- Microtopographic Relief (D4)

**Field Observations:**

<table>
<thead>
<tr>
<th>Indicators of Wetland Hydrology Present?</th>
<th>Yes ☐ No ☒</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface Water Present?</td>
<td>Yes ☐ No ☒</td>
</tr>
<tr>
<td>Water Table Present?</td>
<td>Yes ☐ No ☒</td>
</tr>
<tr>
<td>Saturation Present?</td>
<td>Yes ☐ No ☒</td>
</tr>
</tbody>
</table>

Depth (inches):  
(include capillary fringe)

Describe Recorded Data (stream gauge, monitoring, well, aerial photos, previous inspections), if available:

Remarks: Wetland hydrology is neither present nor indicated.

Photo: C-242

C-242 Northcentral and Northeast Region – Final Version 2.0
Photo 10. Soils at data point 6.
**WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region**

**Project/Site:** Lake Elmo airport (21D) Runway 14/32 Relocation  
**City/County:** Washington  
**Sampling Date:** 6/6/2017  
**Applicant/Owner:** Metropolitan Airports Commission  
**State:** Minnesota  
**Sample Point:** DP7  
**Investigator(s):** Brauna Hartzell and Kim Shannon, Mead & Hunt, Inc.  
**Section, Township, Range:** Section 19, T29N, R20W  
**Landform (hillslope, terrace, etc.):** basin/depression  
**Local relief (concave, convex, none):** concave  
**Slope (%):** <1%  
**Subregion (LRR or MLRA):** K/153  
**Lat:** 44.9895° N  
**Long:** 92.8433° W  
**Datum:** WGS 84  
**Soil Map Unit Name:** Chetek sandy loam, 12 to 25 percent slopes  
**NWI classification:** PEMB  
**Are climatic hydrologic conditions on the site typical for this time of year?** Yes  
**Are Vegetation, Soil, or Hydrology significantly disturbed? Are "Normal Circumstances" present?** Yes  
**Are Vegetation, Soil, or Hydrology naturally problematic?** (If needed, explain any answers in Remarks.)

**SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.**

<table>
<thead>
<tr>
<th>Hydrophytic Vegetation Present?</th>
<th>Is the Sampled Area within a Wetland?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

**Hydric Soil Present?**  
**Wetland Hydrology Present?**

**Remarks:** (Include photo numbers here or on a separate sheet.) A WETS analysis of the antecedent precipitation indicates the hydrologic conditions on the site were wetter than normal range at the time of investigation. Vegetation is dominated by invasive species.

**VEGETATION - Use scientific names of plants**

<table>
<thead>
<tr>
<th>Tree Stratum (Plot size: _____)</th>
<th>Absolute % Cover</th>
<th>Dominant Species?</th>
<th>Indicator Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
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<tr>
<td>3.</td>
<td></td>
<td></td>
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<tr>
<td>4.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Total Cover**  
**Sapling/Shrub Stratum (Plot size: _____)**

<table>
<thead>
<tr>
<th>Herb Stratum (Plot size: 5ft)</th>
<th>= Total Cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. <em>Phalaris arundinacea</em></td>
<td>100</td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
</tr>
</tbody>
</table>

**50/20 Thresholds**  
**Tree Stratum**  
**Sapling/Shrub Stratum**  
**Herb Stratum**  
**Woody Vine Stratum**

**Dominance Test worksheet:**
- Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
- Total Number of Dominant Species Across All Strata: 1 (B)
- Percent of Dominant Species That Are OBI, FAC, or FAC: 100 (A/B)

**Prevalence Index worksheet:**
- Total % Cover of OBL species x 1 =  
- FACW species 100 x 2 = 200  
- FAC species ______ x 3 = ______  
- FACU species ______ x 4 = ______  
- UPL species ______ x 5 = ______  
- Column Totals: 100 (A) 200 (B)  
- Prevalence Index = B/A = 2.0

**Hydrophytic Vegetation Indicators:**
- Rapid Test for Hydrophytic Vegetation
- Dominance Test is >50%
- Prevalence Index is <3.01
- Morphological Adaptations’ (Provide supporting data in Remarks or on a separate sheet)

1Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Vegetation Strata:**
- **Tree** – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
- **Sapling/shrub** – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.
- **Herb** – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
- **Woody vines** – All woody vines greater than 3.28 ft in height.

**Hydrophytic Vegetation Present?**

**Remarks:** (Explain alternative procedures here or in a separate report.)
### Profile Description:
(Describe to the depth needed to document the indicator or confirm the absence of indicators.)

<table>
<thead>
<tr>
<th>Depth (inches)</th>
<th>Color (moist)</th>
<th>%</th>
<th>Color (moist)</th>
<th>%</th>
<th>Type</th>
<th>Loc</th>
<th>Texture</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-6</td>
<td>7.5YR 3/1</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>loam</td>
<td></td>
</tr>
<tr>
<td>6-16</td>
<td>7.5YR 3/1</td>
<td>98</td>
<td>7.5YR 3/3</td>
<td>2</td>
<td>C</td>
<td>M</td>
<td>Loam</td>
<td>With small gravel present</td>
</tr>
<tr>
<td>16-22</td>
<td>10YR 4/3</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Loam</td>
<td></td>
</tr>
</tbody>
</table>

1Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.  
2Location: PL=Pore Lining, M=Matrix.

### Hydric Soil Indicators:
- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- sandy Redox (S5)

### Hydric Soil Present?
- Yes ☑️
- No ☐

### HYDROLOGY

### Primary Indicators (minimum of one is required; check all that apply)
- □ Surface Water (A1)
- ☑● High Water Table (A2)
- ☑● Saturation (A3)
- □ Water Marks (B1)
- □ Sediment Deposits (B2)
- □ Drift Deposits (B3)
- □ Algal Mat or Crust (B4)
- □ Iron Deposits (B5)
- □ Inundation Visible on Aerial Imagery (B7)
- □ Sparsely Vegetated Concave Surface (B8)

### Secondary Indicators (minimum of two required)
- □ Surface Soil Cracks (B6)
- □ Drainage Patterns (B10)
- □ Moss Trim Lines (B16)
- □ Dry-Season Water Table (C2)
- □ Crayfish Burrows (C8)
- □ Saturation Visible on Aerial Imagery (C9)
- □ Geomorphic Position (D2)
- □ Shallow Aquitard (D3)
- □ FAC-Neutral Test (D5)
- □ Microtopographic Relief (D4)

### Field Observations:
- Surface Water Present? Yes ☑️ No ☐ Depth (inches): ______
- Water Table Present? Yes ☑● No ☐ Depth (inches): 10
- Saturation Present? Yes ☑● No ☐ Depth (inches): 2

### Indicators of Wetland Hydrology Present?
- Yes ☑● No ☐

### Remarks:
Wetland hydrology is present and indicated. Dead standing tree about 15ft away indicates vegetative stress. Data point located in shallow depressional basin.

Photo: C-245

---

Hydric soils are present. Meets hydric soils criterion Redox Dark Surface (F6).
Data Point 7

Photo 11. View to the south.

Photo 12. Data Points 7, 8 and 9. View to the south.
Photo 13. View to the south.
hydrophytic vegetation present? yes  no
hydric soil present? yes  no
wetland hydrology present? yes  no

summary of findings - attach site map showing sampling point locations, transects, important features, etc.

hydrophytic vegetation present?  yes  no

50/20 thresholds

<table>
<thead>
<tr>
<th>50/20 Thresholds</th>
<th>20%</th>
<th>50%</th>
</tr>
</thead>
<tbody>
<tr>
<td>tree stratum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>sapling/shrub stratum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>herb stratum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>woody vine stratum</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

dominance test worksheet:

<table>
<thead>
<tr>
<th>number of dominant species</th>
<th>that are obl, facw, or fac</th>
</tr>
</thead>
<tbody>
<tr>
<td>total number of dominant species across all strata</td>
<td></td>
</tr>
<tr>
<td>percent of dominant species that are obl, facw, or fac</td>
<td></td>
</tr>
</tbody>
</table>

prevalence index worksheet:

<table>
<thead>
<tr>
<th>total % cover of</th>
<th>multiply by</th>
</tr>
</thead>
<tbody>
<tr>
<td>obl species</td>
<td>x 1 = x 200</td>
</tr>
<tr>
<td>facw species</td>
<td>x 3 = x 200</td>
</tr>
<tr>
<td>fac species</td>
<td>x 4 = x 200</td>
</tr>
<tr>
<td>facu species</td>
<td>x 5 = x 200</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>column totals</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>obl species</td>
<td>100</td>
</tr>
<tr>
<td>facw species</td>
<td>100</td>
</tr>
<tr>
<td>facu species</td>
<td>100</td>
</tr>
<tr>
<td>prevalence index = b/a = 2.0</td>
<td></td>
</tr>
</tbody>
</table>

hydrophytic vegetation indicators:

rapid test for hydrophytic vegetation

prevalence index is >50%

morphological adaptations (provide supporting data in remarks or on a separate sheet)

hydrophytic vegetation present? yes  no

definitions of vegetation strata:

tree - woody plants 3 in. (7.6 cm) or more in diameter at breast height (dbh), regardless of height.
sapling/shrub - woody plants less than 3 in. dbh and greater than 3.28 ft (1 m) tall.
herb - all herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
woody vines - all woody vines greater than 3.28 ft in height.

hydrophytic vegetation present? yes  no
### SOIL

**Profile Description:** (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

<table>
<thead>
<tr>
<th>Depth (inches)</th>
<th>Color (moist)</th>
<th>%</th>
<th>Color (moist)</th>
<th>%</th>
<th>Type¹</th>
<th>Loc²</th>
<th>Texture</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10</td>
<td>7.5YR 3/1</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>loam</td>
<td></td>
</tr>
<tr>
<td>10-20</td>
<td>7.5YR 3/1</td>
<td>99</td>
<td>7.5YR 3/3</td>
<td>1</td>
<td></td>
<td></td>
<td>loam</td>
<td></td>
</tr>
</tbody>
</table>

¹Type:  C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.   ²Location:  PL=Pore Lining, M=Matrix.

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- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S5)

**Indicators for Problematic Hydric**
- 2 cm Muck - (A10) (LRR K, MLRA 149B)
- 5 cm Peat or Mucky Peat - (S3) (LRR K, L, R)
- Dark Surface - (S7) (LRR K, L)
- Polyvalue Below Surface - (S8) (LRR K, L)
- Thin Dark Surface - (S9) (LRR K, L)
- Iron-Manganese Masses - (F12) (LRR K, L, R)
- Piedmont Floodplain Soils - (F19) (MLRA 149B)
- Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- Red Parent Material - (F21)
- Very Shallow Dark Surface - (TF12)
- Other (Explain in Remarks)

**Restrictive Layer (if observed):**
- Type:  
- Depth (inches):  

**Remarks:** Does not meet hydric soils criteria

### HYDROLOGY

**Wetland Hydrology Indicators:**
- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)

**Secondary Indicators (minimum of two required):**
- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- FAC-Neutral Test (D5)
- Microtopographic Relief (D4)

**Field Observations:**
- Surface Water Present? Yes ☑️ No ☧  Depth (inches):  
- Water Table Present? Yes ☑️ No ☧  Depth (inches):  
- Saturation Present? Yes ☑️ No ☧  Depth (inches):  

Indicators of Wetland Hydrology Present? Yes ☑️ No ☧

Describe Recorded Data (stream gauge, monitoring, well, aerial photos, previous inspections), if available:

Remarks: Wetland hydrology is present. Soil saturated to 8 inches in depth but no water table present.

Photo: See photos on data sheet for data point 7 (wetland).
WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Lake Elmo airport (21D) Runway 14/32 Relocation  City/County: Washington  Sampling Date: 6/6/2017
Applicant/Owner: Metropolitan Airports Commission  State: Minnesota  Sample Point: DP9
Investigator(s): Brauna Hartzell and Kim Shannon, Mead & Hunt, Inc.  Section, Township, Range: Section 19, T29N, R20W
Landform (hillslope, terrace, etc.): basin slope  Local relief (concave, convex, none): convex  Slope (%): 3%
Subregion (LRR or MLRA): K/153 ____________  Lat: 44.9897° N  Long: 92.8435° W  Datum: WGS 84
Soil Map Unit Name: Chetek sandy loam, 12 to 25 percent slopes  NWI classification:

Are climatic hydrologic conditions on the site typical for this time of year?  Yes [ ]  No [x]  (If no, explain in Remarks.)
Are Vegetation [x], Soil [x], or Hydrology [x] significantly disturbed?  Are "Normal Circumstances" present?  Yes [x]  No [ ]  (If needed, explain any answers in Remarks.)
Are Vegetation [x], Soil [x], or Hydrology [x] naturally problematic?  (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?  Yes [x]  No [ ]
Hydric Soil Present?  Yes [x]  No [ ]
Wetland Hydrology Present?  Yes [x]  No [ ]

Remarks: (Explain alternative procedures here or in a separate report.)  A WETS analysis of the antecedent precipitation indicates the hydrologic conditions on the site were wetter than normal range at the time of investigation. Vegetation dominated by invasive species.

VEGETATION - Use scientific names of plants

<table>
<thead>
<tr>
<th>Stratum</th>
<th>Plot Size</th>
<th>% Cover</th>
<th>Dominant Species</th>
<th>Indicator Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tree Stratum</td>
<td>_____</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>2.</td>
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<tr>
<td>3.</td>
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<td>4.</td>
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<tr>
<td>5.</td>
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<td></td>
</tr>
<tr>
<td>Sapling/Shrub Stratum</td>
<td>_____</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td></td>
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<td></td>
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<tr>
<td>2.</td>
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<tr>
<td>3.</td>
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<td>4.</td>
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<tr>
<td>5.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Herb Stratum</td>
<td>5ft</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Phalaris arundinacea</td>
<td>98</td>
<td>X</td>
<td>FACW</td>
<td></td>
</tr>
<tr>
<td>2. Bromus inermis</td>
<td>1</td>
<td></td>
<td>UPL</td>
<td></td>
</tr>
<tr>
<td>3. Poa pratensis</td>
<td>1</td>
<td></td>
<td>FACU</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Woody Vine Stratum</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50/20 Thresholds</td>
<td>20%</td>
<td>50%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tree Stratum</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sapling/Shrub Stratum</td>
<td>20</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Herb Stratum</td>
<td>50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Woody Vine Stratum</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dominance Test worksheet:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Number of Dominant Species</td>
<td>1 (A)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Species Across All Strata:</td>
<td>1 (B)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent of Dominant Species</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>That Are OBI, FACW, or FAC:</td>
<td>100 (A/B)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prevalence Index worksheet:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total % Cover of</td>
<td>Multiply by:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OBL species</td>
<td>x 1 =</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FACW species</td>
<td>98 x 2 = 196</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FAC species</td>
<td>___ x 3 = ___</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FACU species</td>
<td>1 x 4 = 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UPL species</td>
<td>___ x 5 = ___</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Column Totals:</td>
<td>100 (A) 205 (B)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prevalence Index = B/A = 2.05</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydrophytic Vegetation Indicators:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rapid Test for Hydrophytic Vegetation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dominance Test is &gt;50%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prevalence Index is &lt;3.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problematic Hydrophytic Vegetation' (Explain)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Definitions of Vegetation Strata:
Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.
Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present?  Yes [x]  No [ ]
Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches) | Matrix | Redox Features |
---|---|---|
| | Color (moist) | % | Color (moist) | % | Type | Loc | Texture | Remarks |
0-16 | 10YR 3/4 | 100 |

1Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:
- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)

1Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):
Type: 
Depth (inches): 

Remarks: Hydric soils are not present. Does not meet hydric soils criteria.

HYDROLOGY

Wetland Hydrology Indicators:
Primary Indicators (minimum of one is required; check all that apply)
- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery(B7)
- Sparsely Vegetated Concave Surface (B8)

Secondary Indicators (minimum of two required)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Field Observations:
Surface Water Present? Yes [x] No [ ] Depth (inches): 
Water Table Present? Yes [x] No [ ] Depth (inches): 
Saturation Present? Yes [x] No [ ] Depth (inches): 

Indicators of Wetland Hydrology Present? Yes [x] No [ ]

Photo: See photos on data sheet for data point 7 (wetland).
Hydrophytic Vegetation Present? Yes ☑ No ☐

Hydric Soil Present? Yes ☑ No ☐

Wetland Hydrology Present? Yes ☑ No ☐

If yes, optional Wetland Side ID: 3

Remarks: (Explain alternative procedures here or in a separate report.) A WETS analysis of the antecedent precipitation indicates the hydrologic conditions on the site were wetter than normal range at the time of investigation.

### VEGETATION - Use scientific names of plants

#### Tree Stratum (Plot size: _____)

<table>
<thead>
<tr>
<th>Species</th>
<th>% Cover</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rununculus acris</td>
<td>35</td>
<td>FAC</td>
</tr>
<tr>
<td>Equisetum arvense</td>
<td>60</td>
<td>FAC</td>
</tr>
<tr>
<td>Carex scoparia</td>
<td>30</td>
<td>FACW</td>
</tr>
<tr>
<td>Prunella vulgaris</td>
<td>5</td>
<td>FAC</td>
</tr>
<tr>
<td>Juncus tenuis</td>
<td>3</td>
<td>FAC</td>
</tr>
<tr>
<td>Poa pratensis</td>
<td></td>
<td>FACU</td>
</tr>
<tr>
<td>Stellaria graminea</td>
<td>1</td>
<td>UPL</td>
</tr>
</tbody>
</table>

#### Sapling/Shrub Stratum (Plot size: _____)

<table>
<thead>
<tr>
<th>Species</th>
<th>% Cover</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rapunculus acris</td>
<td>35</td>
<td>FAC</td>
</tr>
<tr>
<td>Equisetum arvense</td>
<td>60</td>
<td>FAC</td>
</tr>
<tr>
<td>Carex scoparia</td>
<td>30</td>
<td>FACW</td>
</tr>
<tr>
<td>Prunella vulgaris</td>
<td>5</td>
<td>FAC</td>
</tr>
<tr>
<td>Juncus tenuis</td>
<td>3</td>
<td>FAC</td>
</tr>
<tr>
<td>Poa pratensis</td>
<td>2</td>
<td>FACU</td>
</tr>
<tr>
<td>Stellaria graminea</td>
<td>1</td>
<td>UPL</td>
</tr>
</tbody>
</table>

#### Herb Stratum (Plot size: 5ft)

<table>
<thead>
<tr>
<th>Species</th>
<th>% Cover</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rapunculus acris</td>
<td>35</td>
<td>FAC</td>
</tr>
<tr>
<td>Equisetum arvense</td>
<td>60</td>
<td>FAC</td>
</tr>
<tr>
<td>Carex scoparia</td>
<td>30</td>
<td>FACW</td>
</tr>
<tr>
<td>Prunella vulgaris</td>
<td>5</td>
<td>FAC</td>
</tr>
<tr>
<td>Juncus tenuis</td>
<td>3</td>
<td>FAC</td>
</tr>
<tr>
<td>Poa pratensis</td>
<td>2</td>
<td>FACU</td>
</tr>
<tr>
<td>Stellaria graminea</td>
<td>1</td>
<td>UPL</td>
</tr>
</tbody>
</table>

#### Woody Vine Stratum (Plot size: _____)

<table>
<thead>
<tr>
<th>Species</th>
<th>% Cover</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rapunculus acris</td>
<td>35</td>
<td>FAC</td>
</tr>
<tr>
<td>Equisetum arvense</td>
<td>60</td>
<td>FAC</td>
</tr>
<tr>
<td>Carex scoparia</td>
<td>30</td>
<td>FACW</td>
</tr>
<tr>
<td>Prunella vulgaris</td>
<td>5</td>
<td>FAC</td>
</tr>
<tr>
<td>Juncus tenuis</td>
<td>3</td>
<td>FAC</td>
</tr>
<tr>
<td>Poa pratensis</td>
<td>2</td>
<td>FACU</td>
</tr>
<tr>
<td>Stellaria graminea</td>
<td>1</td>
<td>UPL</td>
</tr>
</tbody>
</table>

### 50/20 Thresholds

<table>
<thead>
<tr>
<th>Stratum</th>
<th>20%</th>
<th>50%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tree</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sapling/Shrub</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Herb</td>
<td>27</td>
<td>68</td>
</tr>
<tr>
<td>Woody Vine</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Dominance Test worksheet:

- Number of Dominant Species That Are OBI, FACW, or FAC: 3 (A)
- Total Number of Dominant Species Across All Strata: 3 (B)
- Percent of Dominant Species That Are DBI, FACW, or FAC: 100 (A/B)

#### Prevalence Index worksheet:

<table>
<thead>
<tr>
<th>Species</th>
<th>% Cover</th>
<th>Multiply by</th>
</tr>
</thead>
<tbody>
<tr>
<td>OBL species</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>FACW species</td>
<td>30</td>
<td>x 2 = 60</td>
</tr>
<tr>
<td>FAC species</td>
<td>103</td>
<td>x 3 = 309</td>
</tr>
<tr>
<td>FACU species</td>
<td>2</td>
<td>x 4 = 8</td>
</tr>
<tr>
<td>UPL species</td>
<td>1</td>
<td>x 5 = 5</td>
</tr>
<tr>
<td>Column Totals:</td>
<td></td>
<td>136 (A)</td>
</tr>
<tr>
<td>Prevalence Index = B/A = 2.80</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Hydrophytic Vegetation Indicators:

- Rapid Test for Hydrophytic Vegetation: ☑
- Dominance Test is >50%: ☑
- Prevalence Index is <3.0: ☑
- Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet): ☑
- Problematic Hydrophytic Vegetation' (Explain): ☑

Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

### Definitions of Vegetation Strata:

- **Tree** – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
- **Sapling/shrub** – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.
- **Herb** – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
- **Woody vines** – All woody vines greater than 3.28 ft in height.

### Hydrophytic Vegetation Present?

Yes ☑ No ☐
Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

<table>
<thead>
<tr>
<th>Depth (inches)</th>
<th>Color (moist)</th>
<th>%</th>
<th>Color (moist)</th>
<th>%</th>
<th>Type¹</th>
<th>Location²</th>
<th>Texture</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-4</td>
<td>5YR 3/1</td>
<td>97</td>
<td>5YR 4/6</td>
<td>3</td>
<td>C</td>
<td>PL</td>
<td>Sandy loam</td>
<td></td>
</tr>
<tr>
<td>4-16</td>
<td>5YR 4/2</td>
<td>96</td>
<td>5YR 4/6</td>
<td>4</td>
<td>C</td>
<td>M</td>
<td>Sand</td>
<td></td>
</tr>
</tbody>
</table>

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:
- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)

Hydric Soil Present? Yes ☒ No ☐

Restrictive Layer (if observed):
Type: ______
Depth (inches): ______

Remarks: Hydric soils are present. Meets hydric soils criteria Sandy Redox (S5) and Redox Dark Surface (F6).

HYDROLOGY

Primary Indicators (minimum of one is required; check all that apply)
- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)
- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- FAC-Neutral Test (D5)
- Microtopographic Relief (D4)

Field Observations:
- Surface Water Present? Yes ☐ No ☒ Depth (inches): ______
- Water Table Present? Yes ☐ No ☒ Depth (inches): ______
- Saturation Present? Yes ☒ No ☐ Depth (inches): 0 (includes capillary fringe)

Indicators of Wetland Hydrology Present? Yes ☒ No ☐

Remarks: Wetland hydrology is present and indicated. Data point located in depressional area at base of slope.

Photo: C-253
Data Points 10 and 11

Photo 14. View to the west.

Photo 15. Wetland 3, view to the north.
Project/Site: Lake Elmo airport (21D) Runway 14/32 Relocation
City/County: Washington
Sampling Date: 6/7/2017
Applicant/Owner: Metropolitan Airports Commission
State: Minnesota
Sample Point: DP11

Investigator(s): Brauna Hartzell and Kim Shannon, Mead & Hunt, Inc.

Landform (hillslope, terrace, etc.): footslope
Local relief (concave, convex, none): none
Slope (%): ~ 10%

Subregion (LRR or MLRA): K/153
Lat: 45.0016° N
Long: 92.8511° W
Datum: WGS 84

Soil Map Unit Name: Antigo silt loam, 2 to 6 percent slopes

Are climatic hydrologic conditions on the site typical for this time of year? Yes No
(If no, explain in Remarks.)

Are Vegetation, Soil, or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes No

Hydric Soil Present? Yes No

Wetland Hydrology Present? Yes No

If yes, optional Wetland Side ID:

Remarks: (Explain alternative procedures here or in a separate report.)

A WETS analysis of the antecedent precipitation indicates the hydrologic conditions on the site were wetter than normal range at the time of investigation. Vegetation is mown and managed periodically.

VEGETATION - Use scientific names of plants

<table>
<thead>
<tr>
<th>Tree Stratum (Plot size: ______)</th>
<th>Absolute % Cover</th>
<th>Dominant Species?</th>
<th>Indicator Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sapling/Shrub Stratum (Plot size: ______)</th>
<th>Total Cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Herb Stratum (Plot size: 5ft)</th>
<th>Total Cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Poa pratensis</td>
<td>60 x FACU</td>
</tr>
<tr>
<td>2. Stellaria graminea</td>
<td>25 x UPL</td>
</tr>
<tr>
<td>3. Trifolium repens</td>
<td>12 FACU</td>
</tr>
<tr>
<td>4. Ranunculus acris</td>
<td>10 FAC</td>
</tr>
<tr>
<td>5. Leucanthemum vulgare</td>
<td>8 UPL</td>
</tr>
<tr>
<td>6. Prunella vulgaris</td>
<td>5 FAC</td>
</tr>
<tr>
<td>7. Trifolium pratense</td>
<td>3 FACU</td>
</tr>
<tr>
<td>8. Plantago lanceolata</td>
<td>2 FACU</td>
</tr>
<tr>
<td>9.</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td></td>
</tr>
<tr>
<td>125</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Woody Vine Stratum (Plot size: ______)</th>
<th>Total Cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>50/20 Thresholds</th>
<th>20%</th>
<th>50%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tree Stratum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sapling/Shrub Stratum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Herb Stratum</td>
<td>25</td>
<td>62</td>
</tr>
<tr>
<td>Woody Vine Stratum</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBI, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:
Total % Cover of OBL Multiply by:
OBL species x 1 =
FACW species x 2 =
FAC species x 3 = 45
FACU species x 4 = 308
UPL species x 5 = 165

Column Totals: 125 (A) 518 (B)
Prevalence Index = B/A = 4.14

Hydrophytic Vegetation Indicators:
- Rapid Test for Hydrophytic Vegetation
- Dominance Test is >50%
- Prevalence Index is <3.01
- Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet)
- Problematic Hydrophytic Vegetation' (Explain)

1Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:
- Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
- Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.
- Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
- Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present?
Yes No

Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation is not present. DP11 is about 2 to 3 feet higher upslope than its paired wetland data point (DP 10) and about 15-18 feet to the east.
SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

<table>
<thead>
<tr>
<th>Depth (inches)</th>
<th>Color (moist)</th>
<th>%</th>
<th>Color (moist)</th>
<th>%</th>
<th>Type¹</th>
<th>Loc²</th>
<th>Texture</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-4</td>
<td>SYR 2.5/2</td>
<td>100</td>
<td>SYR 4/4</td>
<td>5</td>
<td>C</td>
<td>M</td>
<td>Sandy loam</td>
<td>Small pebbles present</td>
</tr>
<tr>
<td>4-6</td>
<td>SYR 2.5/2</td>
<td>94</td>
<td>SYR 4/4</td>
<td>5</td>
<td>C</td>
<td>M</td>
<td>Sandy loam</td>
<td></td>
</tr>
<tr>
<td>6-16</td>
<td>SYR 4/4</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>sand</td>
<td></td>
</tr>
</tbody>
</table>

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S5)
- Sandy Redox (S5)

Indicators for Problematic Hydric Soils:

- Stripped Matrix (S6)
- Dark Surface (S7) (LRR R, MLRA 149B)
- Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- Loamy Mucky Mineral (F1) (LRR K, L)
- Depleted Matrix (F3)
- Redox Surface (F6)
- Depleted Dark Surface (F7)
- Loamy Gleyed Matrix (F2)
- Thin Mucky Surface (C7)
- Redox Depressions (F8)

Restrictive Layer (if observed):

| Type: ______ | Depth (inches): ______ | Hydric Soil Present? | Yes [ ] No [x] |

Remarks: Hydric soils are not present. Does not meet hydric soils criteria.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- FAC-Neutral Test (D5)
- Microtopographic Relief (D4)

Field Observations:

Surface Water Present? Yes [ ] No [x] Depth (inches): ______
Water Table Present? Yes [ ] No [x] Depth (inches): ______
Saturation Present? Yes [ ] No [x] Depth (inches): ______

Indicators of Wetland Hydrology Present? Yes [x] No [ ]

Remarks: Wetland hydrology is neither present nor indicated. Appears to be an isolated basin receiving upslope runoff from south and east. Culvert to the west does not appear to connect.

Photo: C-256
Photo 14. View to the west.
### WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

**Project/Site:** Lake Elmo airport (21D) Runway 14/32 Relocation  
**City/County:** Washington  
**Sampling Date:** 6/7/2017  
**Applicant/Owner:** Metropolitan Airports Commission  
**State:** Minnesota  
**Sample Point:** DP12

- **Investigator(s):** Brauna Hartzell and Kim Shannon, Mead & Hunt, Inc.  
- **Section, Township, Range:** Section 18, T29N, R20W

### General Information
- **Landform (hillslope, terrace, etc.):** toeslope  
- **Local relief (concave, convex, none):** convex  
- **Slope (%):** 1-3%  
- **Subregion (LRR or MLRA):** K/153

### Sampling Point Information
- **Soil Map Unit Name:** Antigo silt loam, 2 to 6 percent slopes  
- **WNI classification:**

### Hydrophytic Vegetation
- **Are climatic hydrologic conditions on the site typical for this time of year?** Yes
- **Are Vegetation, Soil, or Hydrology significantly disturbed?** Yes
- **Are Vegetation, Soil, or Hydrology naturally problematic?** Yes

### SUMMARY OF FINDINGS
- **Are Vegetation, Soil, or Hydrology present?** Yes  
- **Are the Sampled Area within a Wetland?** Yes

### VEGETATION - Use scientific names of plants

<table>
<thead>
<tr>
<th>Stratum</th>
<th>% Cover</th>
<th>Species</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tree Stratum</strong> (Plot size: _____)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
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<tr>
<td>2.</td>
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<td>3.</td>
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<tr>
<td>4.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sapling/Shrub Stratum</strong> (Plot size: ____ )</td>
<td>= Total Cover</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2.</td>
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<tr>
<td>4.</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Herb Stratum</strong> (Plot size: 5ft)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. <em>Poa pratensis</em></td>
<td>45</td>
<td>X</td>
<td>FACU</td>
</tr>
<tr>
<td>2. <em>Stellaria graminea</em></td>
<td>35</td>
<td>X</td>
<td>UPL</td>
</tr>
<tr>
<td>3. <em>Trifolium repens</em></td>
<td>10</td>
<td></td>
<td>FACU</td>
</tr>
<tr>
<td>4. <em>Taraxacum officinale</em></td>
<td>5</td>
<td></td>
<td>FACU</td>
</tr>
<tr>
<td>5. <em>Trifolium pratense</em></td>
<td>5</td>
<td></td>
<td>FACU</td>
</tr>
<tr>
<td>6. <em>Glechoma hederacea</em></td>
<td>2</td>
<td></td>
<td>FACU</td>
</tr>
<tr>
<td>7. <em>Equisetum arvense</em></td>
<td>1</td>
<td></td>
<td>FAC</td>
</tr>
<tr>
<td>8.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>10.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Woody Vine Stratum</strong> (Plot size: _____ )</td>
<td>= Total Cover</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Hydrophytic Vegetation Indicators:**
- Rapid Test for Hydrophytic Vegetation
- Dominance Test is >50%
- Prevalence Index is <3.0
- Morphological Adaptations’ (Provide supporting data in Remarks or on a separate sheet)
- Problematic Hydrophytic Vegetation’ (Explain)

### Definitions of Vegetation Strata:
- **Tree** – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
- **Sapling/shrub** – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.
- **Herb** – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
- **Woody vines** – All woody vines greater than 3.28 ft in height.

### Prevalence Index Worksheet:
- Total % Cover of OBL species: Multiply by: 1
- Total % Cover of FACW species: Multiply by: 2
- Total % Cover of FAC species: Multiply by: 3
- Total % Cover of FACU species: Multiply by: 4

### 50/20 Thresholds:

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Tree Stratum</th>
<th>Sapling/Shrub Stratum</th>
<th>Herb Stratum</th>
</tr>
</thead>
<tbody>
<tr>
<td>20%</td>
<td></td>
<td></td>
<td>21</td>
</tr>
<tr>
<td>50%</td>
<td></td>
<td></td>
<td>52</td>
</tr>
</tbody>
</table>

### Remarks:
- Hydrophytic vegetation is not present. Data point located at base of hill slope, 10 feet to the east from paired wetland data point (DP13) and about 1 foot higher in elevation than DP13.
- A WETS analysis of the antecedent precipitation indicates the hydrologic conditions on the site were wetter than normal range at the time of investigation.
- Mown earlier in season, vegetation regrowing.
### SOIL

**Profile Description:** (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

<table>
<thead>
<tr>
<th>Depth (inches)</th>
<th>Matrix</th>
<th>Redox Features</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-3</td>
<td>5YR 4/2</td>
<td>100</td>
<td>Sandy loam</td>
</tr>
<tr>
<td>3-12</td>
<td>5YR 4/4</td>
<td>100</td>
<td>Sandy loam</td>
</tr>
</tbody>
</table>

1\(^{\text{Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.}}\) 2\(^{\text{Location: PL=Pore Lining, M=Matrix.}}\)

### Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S5)

**Indicators for Problematic Hydric Soils**

- 2 cm Muck - (A10) (LRR K, MLRA 149B)
- 5 cm Peat or Mucky Peat (S3) (LRR K, L, R)
- Dark Surface (S7) (LRR K, L)
- Polyvalue Below Surface (S8) (LRR K, L)
- Thin Dark Surface (S9) (LRR K, L)
- Iron-Manganese Masses (F12) (LRR K, L, R)
- Piedmont Floodplain Soils (F19) (MLRA 149B)
- Red Parent Material (F21)
- Very Shallow Dark Surface (TF12)

Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

### Restrictive Layer (if observed):

<table>
<thead>
<tr>
<th>Type:</th>
<th>Depth (inches):</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Remarks: Hydric soils are not present. Does not meet hydric soils criteria. Soils very hard and dry; dug to refusal.

### HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)

Secondy Indicators (minimum of two required)

- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Depostis (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

**Field Observations:**

- Surface Water Present? Yes ☐ No ☑ Depth (inches): ______
- Water Table Present? Yes ☐ No ☑ Depth (inches): ______
- Saturation Present? Yes ☐ No ☑ Depth (inches): ______

( includes capillary fringe)

Describe Recorded Data (stream gauge, monitoring, well, aerial photos, previous inspections), if available:

Remarks: Wetland hydrology is not present nor indicated. Ground very hard and dry.

Photo: C-259
Data points 12 and 13

Photo 16. View to the north.
C-261

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Lake Elmo airport (21D) Runway 14/32 Relocation
City/County: Washington
State: Minnesota
Applicant/Owner: Metropolitan Airports Commission
Sample Point: DP13
Investigator(s): Brauna Hartzell and Kim Shannon, Mead & Hunt, Inc.
Section, Township, Range: Section 18, T29N, R20W
Landform (hillslope, terrace, etc.): Basin
Local relief (concave, convex, none): concave
Subregion (LRR or MLRA): K/153
Lat: 45.0018° N
Long: 92.8499° W
Datum: WGS 84
Soil Map Unit Name: Antigo silt loam, 2 to 6 percent slopes
NWI classification: PEMB

Are climatic hydrologic conditions on the site typical for this time of year? Yes
Soil Map Unit Name: Antigo silt loam, 2 to 6 percent slopes
Subregion (LRR or MLRA): K/153
Lat: 45.0018° N
Long: 92.8499° W
Datum: WGS 84
Are Vegetation, Soil, or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes
Are Vegetation, Soil, or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)
Are Vegetation, Soil, or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes
Are Vegetation, Soil, or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

<table>
<thead>
<tr>
<th>Hydrophytic Vegetation Present?</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydric Soil Present?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Wetland Hydrology Present?</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

Hydrophytic Vegetation Indicators:
- Rapid Test for Hydrophytic Vegetation
- Prevalence Index is > 3.0
- Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)
- Problematic Hydrophytic Vegetation (Explain)

Definitions of Vegetation Strata:
- Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
- Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.
- Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
- Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes

Vegetation - Use scientific names of plants

<table>
<thead>
<tr>
<th>Tree Stratum (Plot size: _____)</th>
<th>Absolute % Cover</th>
<th>Dominant Species?</th>
<th>Indicator Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
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<tr>
<td>2.</td>
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<tr>
<td>3.</td>
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<td></td>
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<tr>
<td>4.</td>
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<td></td>
<td></td>
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<tr>
<td>5.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sapling/Shrub Stratum (Plot size: _____)</td>
<td>= Total Cover</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
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<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Herb Stratum (Plot size: 5ft)</td>
<td>= Total Cover</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Juncus tenuis</td>
<td>40 X FAC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Glyceria grandis</td>
<td>25 X OBL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Carex lasiocarpa</td>
<td>10 X FAC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Rumex crispus</td>
<td>2 X FAC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Equisetum arvense</td>
<td>3 X FAC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Phalaris arundinacea</td>
<td>3 X FACW</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Trifolium repens</td>
<td>1 FAC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Carex scoparia</td>
<td>1 FACW</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Woody Vine Stratum (Plot size: _____) | = Total Cover |
| 1. |                  |               |
| 2. |                  |               |

50/20 Thresholds

<table>
<thead>
<tr>
<th>Tree Stratum</th>
<th>20%</th>
<th>50%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sapling/Shrub Stratum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Herb Stratum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Woody Vine Stratum</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Dominance Test worksheet:

Number of Dominant Species

| Total Number of Dominant Species Across All Strata | 2 (A) |
Percent of Dominant Species

| That Are OBI, FACW, or FAC: 2 (B) |

Prevalence Index worksheet:

| That Are OBI, FACW, or FAC: 100 (A/B) |

| Total % Cover of. Multiply by: |
|--------------------------------__|
| OBL species | 35 | x 1 = 35 |
| FACW species | 4 | x 2 = 8 |
| FAC species | 45 | x 3 = 135 |
| FACU species | 1 | x 4 = 4 |
| UPL species | 1 | x 5 = 5 |
| Column Totals: 85 (A) | 182 (B) |

Prevalence Index = (B/A) = 2.14

Hydrophytic Vegetation Present? Yes

Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation is present. Large area of matted vegetation due to inundation and some mowing on west side. Low area situated between two hills; probably remnant surface before runway construction/grading. Cattails (Typha sp.) present just outside 5 ft sample area.
**SOIL**

**Sampling Point:** DP13

**Profile Description:** (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

<table>
<thead>
<tr>
<th>Depth (inches)</th>
<th>Color (moist)</th>
<th>%</th>
<th>Color (moist)</th>
<th>%</th>
<th>Type¹</th>
<th>Loc²</th>
<th>Texture</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-2</td>
<td>5YR 3/2</td>
<td>100</td>
<td>5YR 3/2</td>
<td>100</td>
<td>Sand</td>
<td></td>
<td>With organic material</td>
<td></td>
</tr>
<tr>
<td>2-6</td>
<td>5YR 4/4</td>
<td>100</td>
<td></td>
<td></td>
<td>Sand</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6-12</td>
<td>5YR 4/1</td>
<td>97</td>
<td>5YR 4/6</td>
<td>3</td>
<td>Sandy loam</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12-18</td>
<td>5YR 3/1</td>
<td>90</td>
<td>5YR 5/6</td>
<td>10</td>
<td>Sandy loam</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators:**
- [ ] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5)
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S5)

**Indicators for Problematic Hydric Soils:**
- [ ] Stripped Matrix (S6)
- [ ] Dark Surface (S7) (LRR R, MLRA 149B)
- [ ] Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- [ ] Loamy Mucky Mineral (F1) (LRR K, L)
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Redox Depressions (F8)
- [ ] 2 cm Muck - (A10) (LRR K, L, MLRA 149B)
- [ ] 5 cm Peat or Mucky Peat (S3) (LRR K, L, R)
- [ ] Dark Surface (S7) (LRR K, L)
- [ ] Polyvalue Below Surface (S8) (LRR K, L)
- [ ] Thin Dark Surface (S9) (LRR K, L)
- [ ] Iron-Manganese Masses (F12) (LRR K, L, R)
- [ ] Piedmont Floodplain Soils (F19) (MLRA 149B)
- [ ] Red Parent Material (F21)
- [ ] Very Shallow Dark Surface (TF12)
- [ ] Other (Explain in Remarks)

**Restrictive Layer (if observed):**

<table>
<thead>
<tr>
<th>Hydric Soil Present?</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

**Type:**

<table>
<thead>
<tr>
<th>Depth (inches):</th>
<th></th>
</tr>
</thead>
</table>

**Remarks:**

Hydric soils are present. Meets hydric soil criterion Depleted Matrix (F3). Despite nearby soil profile disturbance from rutting, profile appears intact here.

**HYDROLOGY**

**Wetland Hydrology Indicators:**

**Primary Indicators (minimum of one is required; check all that apply)**
- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [ ] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)

**Secondary Indicators (minimum of two required)**
- [ ] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres on Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (Explain in Remarks)

**Field Observations:**

<table>
<thead>
<tr>
<th>Surface Water Present?</th>
<th>Yes</th>
<th>No</th>
<th>Depth (inches):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Table Present?</td>
<td>Yes</td>
<td>No</td>
<td>Depth (inches):</td>
</tr>
<tr>
<td>Saturation Present?</td>
<td>Yes</td>
<td>No</td>
<td>Depth (inches):</td>
</tr>
</tbody>
</table>

(Indicators of Wetland Hydrology Present?)

| Yes | No |

**Describe Recorded Data (stream gauge, monitoring, well, aerial photos, previous inspections), if available:**

**Remarks:**

Wetland hydrology is present and indicated. Data point in low area situated between knolls. An aerial photo review indicated saturation was visible on a number of photos. See report for discussion.

**Photo:**

C-262
Data points 12 and 13

Photo 16. View to the north.

Photo 17. Soil disturbance north of data point locations.
Project/Site: Lake Elmo airport (21D) Runway 14/32 Relocation  City/County: Washington    Sampling Date: 6/7/2017
Applicant/Owner: Metropolitan Airports Commission    State: Minnesota    Sample Point: DP14
Investigator(s): Brauna Hartzell and Kim Shannon, Mead & Hunt, Inc.    Section, Township, Range: Section 18, T29N, R20W
Landform (hillslope, terrace, etc.): bench    Local relief (concave, convex, none): none    Slope (%): <1%
Subregion (LRR or MLRA): K/153 ____________ Lat: 45.001802° N     Long: 92.84905° W     Datum: WGS 84
Soil Map Unit Name: Auburndale silt loam    NWI classification:

Are climatic hydrologic conditions on the site typical for this time of year?  Yes __  No __ (If no, explain in Remarks.)
Are Vegetation, Soil, or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes __  No __
Are Vegetation, Soil, or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes __  No __
Hydric Soil Present? Yes __  No __
Wetland Hydrology Present? Yes __  No __

Hydrophytic Vegetation Indicators:
- Rapid Test for Hydrophytic Vegetation
- Dominance Test is >50%
- Prevalence Index is <3.0
- Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet)
- Problematic Hydrophytic Vegetation' (Explain)

Definitions of Vegetation Strata:
- Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
- Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.
- Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
- Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present?
- Yes __  No __
Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

<table>
<thead>
<tr>
<th>Depth (inches)</th>
<th>Matrix</th>
<th>Redox Features</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Color (moist)</td>
<td>%</td>
<td>Color (moist)</td>
</tr>
<tr>
<td>0-16</td>
<td>5YR 3/2</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>16-32</td>
<td>5YR 4/4</td>
<td>50</td>
<td></td>
</tr>
</tbody>
</table>

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:
- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)

Restrictive Layer (if observed):
Type: 
Depth (inches): 

Hydric Soil Present? Yes ☐ No ☒

Remarks: Hydric soils are not present. Does not meet hydric soils criteria.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)
- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)

Secondary Indicators (minimum of two required)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Field Observations:
Surface Water Present? Yes ☐ No ☒ Depth (inches): 
Water Table Present? Yes ☐ No ☒ Depth (inches): 
Saturation Present? Yes ☐ No ☒ Depth (inches): 
(includes capillary fringe)

Indicators of Wetland Hydrology Present? Yes ☐ No ☒

Remarks: Wetland hydrology is neither present nor indicated.

Photo: [C-265]
Data points 14 and 15

Photo 18. View to the south.
Project/Site: Lake Elmo airport (21D) Runway 14/32 Relocation
Applicant/Owner: Metropolitan Airports Commission
Investigator(s): Brauna Hartzell and Kim Shannon, Mead & Hunt, Inc.

City/County: Washington
State: Minnesota
Sampling Date: 6/7/2017
Sample Point: DP15
Section, Township, Range: Section 18, T29N, R20W
Landform (hillslope, terrace, etc.): basin
Local relief (concave, convex, none): concave
Slope (%): <1%
Subregion (LRR or MLRA): K/153
Lat: 45.00175° N
Long: 92.849016° W
Datum: WGS 84
Soil Map Unit Name: Auburndale silt loam
NWI classification: PEMB

Are climatic hydrologic conditions on the site typical for this time of year? Yes [ ] No [ ]
(If no, explain in Remarks.)
Are Vegetation [ ], Soil [ ], or Hydrology [ ] significantly disturbed? Are "Normal Circumstances" present? Yes [ ] No [ ]
(If needed, explain any answers in Remarks.)
Are Vegetation [ ], Soil [ ], or Hydrology [ ] naturally problematic? (If needed, explain any answers in Remarks.)
SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes [ ] No [ ]
Hydric Soil Present? Yes [ ] No [ ]
Wetland Hydrology Present? Yes [ ] No [ ]
If yes, optional Wetland Side ID: 5

Remarks: (Explain alternative procedures here or in a separate report.) A WETS analysis of the antecedent precipitation indicates the hydrologic conditions on the site were wetter than normal range at the time of investigation. Vegetation dominated by invasive species.

VEGETATION - Use scientific names of plants

<table>
<thead>
<tr>
<th>Tree Stratum (Plot size: ______)</th>
<th>Absolute % Cover</th>
<th>Dominant Species?</th>
<th>Indicator Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sapling/Shrub Stratum (Plot size: ______)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
<tr>
<td>4.</td>
</tr>
<tr>
<td>5.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Herb Stratum (Plot size: 5ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Phalaris arundinacea</td>
</tr>
<tr>
<td>2. Persicaria amphibia</td>
</tr>
<tr>
<td>3.</td>
</tr>
<tr>
<td>4.</td>
</tr>
<tr>
<td>5.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Woody Vine Stratum (Plot size: ______)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
</tr>
</tbody>
</table>

Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation is present. Dead, matted Persicaria stalks from previous year inhibiting Reed canary grass growth. Data point located in closed depressional basin about 4-5 feet lower than paired upland point (DP 14) and about 20 feet to the south.
### SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

<table>
<thead>
<tr>
<th>Depth (inches)</th>
<th>Color (moist)</th>
<th>%</th>
<th>Color (moist)</th>
<th>%</th>
<th>Type</th>
<th>Depth (inches)</th>
<th>Texture</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-4</td>
<td>10YR 4/1</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Silt loam</td>
<td></td>
</tr>
<tr>
<td>4-8</td>
<td>10YR 4/1</td>
<td>90</td>
<td>5YR 4/4</td>
<td>10</td>
<td>C M</td>
<td></td>
<td>Silt loam</td>
<td>Very crumbly</td>
</tr>
<tr>
<td>8-12</td>
<td>7.5YR 2.5/1</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Silt loam</td>
<td></td>
</tr>
<tr>
<td>12-16</td>
<td>10YR 4/1</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Silt loam</td>
<td></td>
</tr>
</tbody>
</table>

1 Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

### HYDROCIC SOIL INDICATORS:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- sandy Redox (S5)

### HYDROLOGICAL INDICATORS:

#### HYDROLOGY

Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)

Secondary Indicators (minimum of two required)

- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

### HYDROLOGY INDICATORS:

Indicators of Wetland Hydrology Present?

Yes ☒ No ☐

Surface Water Present? Yes ☒ No ☐ Depth (inches): ______

Water Table Present? Yes ☒ No ☐ Depth (inches): 3

Saturation Present? Yes ☒ No ☐ Depth (inches): 0

Includes capillary fringe

Describe Recorded Data (stream gauge, monitoring, well, aerial photos, previous inspections), if available:

Remarks: Wetland hydrology is present and indicated.

Photo: C-268
Data points 14 and 15

Photo 18. View to the south.
Project/Site: Lake Elmo airport (21D) Runway 14/32 Relocation          City/County: Washington              Sampling Date: 6/8/2017
Applicant/Owner: Metropolitan Airports Commission           State: Minnesota                Sample Point: DP16
Investigator(s): Brauna Hartzell and Kim Shannon, Mead & Hunt, Inc.          Section, Township, Range: Section 18, T29N, R20W
Landform (hillslope, terrace, etc.): terrace          Local relief (concave, convex, none): none          Slope (%): <1%
Subregion (LRR or MLRA): K/153 ____________  Lat: 44.9955° N          Long: 92.85074° W              Datum: WGS 84
Soil Map Unit Name: Chetek sandy loam, 0 to 6 percent slopes
Are climatic hydrologic conditions on the site typical for this time of year?  Yes □ No ☑ (If no, explain in Remarks.)
Are Vegetation ☑, Soil ☑, or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☑ No ☑
Are Vegetation ☑, Soil ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ☑ No ☐
Is the Sampled Area ☑ within a Wetland? Yes ☑ No ☐
If yes, optional Wetland Side ID: ____________

Hydric Soil Present? Yes ☑ No ☐

Wetland Hydrology Present? Yes ☑ No ☐

Remarks: (Explain alternative procedures here or in a separate report.) A WETS analysis of the antecedent precipitation indicates the hydrologic conditions on the site were wetter than normal range at the time of investigation. Data point 16 located about 30 south of paired wetland data point (DP17) and about 4 feet higher in elevation. Topo break at wetland boundary.

VEGETATION - Use scientific names of plants

<table>
<thead>
<tr>
<th>Tree Stratum (Plot size: _____)</th>
<th>Absolute % Cover</th>
<th>Dominant Species?</th>
<th>Indicator Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
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<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Cover = 50/20 Thresholds

<table>
<thead>
<tr>
<th>Sapling/Shrub Stratum (Plot size: _____)</th>
<th>Total Cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
</tr>
</tbody>
</table>

Herb Stratum (Plot size: 5ft)          

<table>
<thead>
<tr>
<th>Species</th>
<th>% Cover</th>
<th>Indicator Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solidago canadensis</td>
<td>5</td>
<td>FACU</td>
</tr>
<tr>
<td>Arctium minus</td>
<td>4</td>
<td>FACU</td>
</tr>
<tr>
<td>Ambrosia trifida</td>
<td>3</td>
<td>FAC</td>
</tr>
<tr>
<td>Asclepias syrica</td>
<td>3</td>
<td>FACU</td>
</tr>
<tr>
<td>Glycine max</td>
<td>3</td>
<td>UPL</td>
</tr>
<tr>
<td>Chenopodium album</td>
<td>1</td>
<td>FACU</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total = 19</td>
</tr>
</tbody>
</table>

Woody Vine Stratum (Plot size: _____)

<table>
<thead>
<tr>
<th>Species</th>
<th>% Cover</th>
<th>Indicator Status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total =</td>
</tr>
</tbody>
</table>

Hydrophytic Vegetation Indicators:
- Rapid Test for Hydrophytic Vegetation
- Dominance Test is >50%
- Prevalence Index is <3.0
- Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet)
- Problematic Hydrophytic Vegetation' (Explain)

Definitions of Vegetation Strata:
- Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
- Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.
- Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
- Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present?
Yes ☑ No ☐
### Soil Sampling Point: DP16

#### Profile Description:
(Describe to the depth needed to document the indicator or confirm the absence of indicators.)

<table>
<thead>
<tr>
<th>Depth (inches)</th>
<th>Matrix</th>
<th>Redox Features</th>
<th>Texture</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-16</td>
<td>5YR 3/3</td>
<td>100</td>
<td>Sandy loam</td>
<td></td>
</tr>
</tbody>
</table>

#### SOIL

1. **Matrix:**
   - **Loc**: Location
   - **Type**: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

#### Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)

#### Restrictive Layer (if observed):

Type: ________

Depth (inches): ________

Remarks: Hydric soils are not present. Does not meet hydric soil criteria.

#### HYDROLOGY

#### Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)

#### Secondary Indicators (minimum of two required)

- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

#### Field Observations:

- Surface Water Present? Yes [ ] No [x] Depth (inches): ________
- Water Table Present? Yes [ ] No [x] Depth (inches): ________
- Saturation Present? Yes [ ] No [x] Depth (inches): ________

#### Describe Recorded Data (stream gauge, monitoring, well, aerial photos, previous inspections), if available:

#### Remarks:
Wetland hydrology is neither present nor indicated.

#### Photo:

C-271
Photo 22. View to the north.
WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Lake Elmo airport (21D) Runway 14/32 Relocation
City/County: Washington
Sampling Date: 6/8/2017
Applicant/Owner: Metropolitan Airports Commission
State: Minnesota
Sample Point: DP17
Investigator(s): Brauna Hartzell and Kim Shannon, Mead & Hunt, Inc.
Section, Township, Range: Section 18, T29N, R20W

Are climatic hydrologic conditions on the site typical for this time of year? Yes __ No __

Soil Map Unit Name: Auburndale silt loam     NWI classification: PEMB

Subregion (LRR or MLRA): K/153 ____________  Lat: 44.9956° N     Long: 92.85066° W     Datum: WGS 84

Landform (hillslope, terrace, etc.): basin Local relief (concave, convex, none): concave Slope (%): <1%

Subregion (LRR or MLRA): K/153 ____________  Lat: 44.9956° N     Long: 92.85066° W     Datum: WGS 84

Hydric Soil Present? Yes __ No __

Are Vegetation __ Soil __, or Hydrology __ significantly disturbed? Are "Normal Circumstances" present? Yes __ No __

Are Vegetation __ Soil __, or Hydrology __ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes __ No __

Is the Sampled Area within a Wetland? Yes __ No __

If yes, optional Wetland Side ID: 8

Remarks: (Explain alternative procedures here or in a separate report.) A WETS analysis of the antecedent precipitation indicates the hydrologic conditions on the site were wetter than normal range at the time of investigation. Vegetation (herb stratum) dominated by invasive species.

Hydrophytic Vegetation Indicators:

- Rapid Test for Hydrophytic Vegetation
- Dominance Test is >50%
- Prevalence Index is <3.0¹
- Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)
- Problematic Hydrophytic Vegetation (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:
- Tree = Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
- Sapling/shrub = Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.
- Herb = All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
- Woody vines = All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present?
Yes __ No __
SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

<table>
<thead>
<tr>
<th>Depth (inches)</th>
<th>Color (moist)</th>
<th>%</th>
<th>Color (moist)</th>
<th>%</th>
<th>Type¹</th>
<th>Loc²</th>
<th>Texture</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-18</td>
<td>5YR 2.5/2</td>
<td>90</td>
<td>2.5YR 3/6</td>
<td>10</td>
<td>C</td>
<td>PL</td>
<td>Loam</td>
<td>PL= oxidized rhizospheres</td>
</tr>
</tbody>
</table>

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.  
²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:
- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)

Indicators for Problematic Hydric:
- Stripped Matrix (S6)
- Dark Surface (S7) (LRR R, MLRA 149B)
- Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- Thin Dark Surface (S9) (LRR R, MLRA 149B)
- Loamy Mucky Mineral (F1) (LRR K, L)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Redox Depressions (F8)

Restrictive Layer (if observed):
Type: _____
Depth (inches): _____

Hydric Soil Present? Yes ☒ No ☐
Remarks: Hydric soils are present. Meets hydric soils criteria Redox Dark Surface (F6) and Redox Depressions (F8)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)
- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)
- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- FAC-Neutral Test (D5)
- Microtopographic Relief (D4)

Field Observations:

Surface Water Present? Yes ☒ No ☐ Depth (inches): 2
Water Table Present? Yes ☒ No ☐ Depth (inches): 8
Saturation Present? Yes ☒ No ☐ Depth (inches): 0

Indicators of Wetland Hydrology Present?
Yes ☒ No ☐

Remarks: Wetland hydrology is present and indicated; surface water 3 ft to the north. Data point at edge of closed depressional pond. Historic aerial imagery shows this area to be consistently inundated.

Photo: C-274
Data Point 17

Photo 23. Soil pit.

Photo 24. Wetland 8, view to the north.
WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Lake Elmo airport (21D) Runway 14/32 Relocation
City/County: Washington
Sampling Date: 6/8/2017
Applicant/Owner: Metropolitan Airports Commission
State: Minnesota
Sample Point: DP18
Investigator(s): Brauna Hartzell and Kim Shannon, Mead & Hunt, Inc.
Section, Township, Range: Section 18, T29N, R20W

Are climatic hydrologic conditions on the site typical for this time of year? Yes
Soil Map Unit Name: Antigo silt loam, 2 to 6 percent slopes
Subregion (LRR or MLRA): K/153 Lat: 44.99334° N Long: 92.8523° W Datum: WGS 84
Landform (hillslope, terrace, etc.): hillslope
Local relief (concave, convex, none): none
Slope (%): 1%

Applicant/Owner: Metropolitan Airports Commission
State: Minnesota
Sample Point: DP18
Project/Site: Lake Elmo airport (21D) Runway 14/32 Relocation
City/County: Washington
Sampling Date: 6/8/2017

Are Vegetation __ __, Soil __ __, or Hydrology __ __ significantly disturbed? Yes __ No __
Are Vegetation __ __, Soil __ __, or Hydrology __ __ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ☐ No ☒
Hydric Soil Present? Yes ☐ No ☒
Is the Sampled Area within a Wetland? Yes ☐ No ☒
Wetland Hydrology Present? Yes ☐ No ☒
If yes, optional Wetland Side ID:
Remarks: (Explain alternative procedures here or in a separate report.) A WETS analysis of the antecedent precipitation indicates the hydrologic conditions on the site were wetter than normal range at the time of investigation. In an area mowed infrequently but data point at edge of unmown.

VEGETATION - Use scientific names of plants

<table>
<thead>
<tr>
<th>Stratum (Plot size: _____)</th>
<th>Absolute % Cover</th>
<th>Dominant Species?</th>
<th>Indicator Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tree Stratum</td>
<td>50/20 Thresholds</td>
<td>20%</td>
<td>50%</td>
</tr>
<tr>
<td>1. Tree Stratum</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Tree Stratum</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>3. Tree Stratum</td>
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<td></td>
<td></td>
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<tr>
<td>4. Tree Stratum</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Tree Stratum</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sapling/Shrub Stratum (Plot size: _____)</td>
<td>= Total Cover</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Sapling/Shrub Stratum</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2. Sapling/Shrub Stratum</td>
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<tr>
<td>3. Sapling/Shrub Stratum</td>
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<tr>
<td>4. Sapling/Shrub Stratum</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Sapling/Shrub Stratum</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Herb Stratum (Plot size: 5ft)</td>
<td>= Total Cover</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Poa pratensis</td>
<td>70 X FACU</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Plantago major</td>
<td>20 FACU</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Stellaria graminea</td>
<td>2 UPL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Stellaria media</td>
<td>2 FACU</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Taraxacum officinale</td>
<td>7 FACU</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Trifolium pretense</td>
<td>3 FACU</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Persicaria amphibia</td>
<td>2 OBL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Lotus corniculatus</td>
<td>2 FACU</td>
<td></td>
<td></td>
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<tr>
<td>9.</td>
<td></td>
<td></td>
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<tr>
<td>10.</td>
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<td></td>
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<tr>
<td>11.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Woody Vine Stratum (Plot size: _____)</td>
<td>= Total Cover</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Woody Vine Stratum</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Woody Vine Stratum</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Hydrophytic Vegetation Indicators:
☐ Rapid Test for Hydrophytic Vegetation
☐ Dominance Test is >50%
☐ Prevalence Index is <3.0
☐ Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet)
☐ Problematic Hydrophytic Vegetation' (Explain)

Definitions of Vegetation Strata:
Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.
Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present?
Yes ☐ No ☒

Remarks: (Include photo numbers here or on a separate sheet.) Hydrophytic vegetation not present. Persicaria amphibia appears to be spreading rhizomatically. DP18 is separated from its paired wetland data point (DP 19) by about 30 feet and is about 1-2 feet higher in elevation.
SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

<table>
<thead>
<tr>
<th>Depth (inches)</th>
<th>Color (moist)</th>
<th>%</th>
<th>Color (moist)</th>
<th>%</th>
<th>Type¹</th>
<th>Loc²</th>
<th>Texture</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-8</td>
<td>5YR 4/2</td>
<td>99</td>
<td>5YR 4/4</td>
<td>1</td>
<td>C</td>
<td>M</td>
<td>loam</td>
<td></td>
</tr>
<tr>
<td>8-16</td>
<td>5YR 5/6</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Loamy sand</td>
<td></td>
</tr>
</tbody>
</table>

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)

Indicators for Problematic Hydric

- 2 cm Muck - (A10) (LRR K, MLRA 149B)
- 5 cm Peat or Mucky Peat - (S3) (LRR K, L, R)
- Dark Surface - (S7) (LRR K, L)
- Polyvalue Below Surface - (S8) (LRR K, L)
- Thin Dark Surface - (S9) (LRR K, L, R)
- Iron-Manganese Masses - (F12) (LRR K, L, R)
- Piedmont Floodplain Soils - (F19) (MLRA 149B)
- Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- Red Parent Material - (F21)
- Very Shallow Dark Surface - (TF12)
- Other (Explain in Remarks)

Restrictive Layer (if observed):

Type: 
Depth (inches): 

Hydric Soil Present?  Yes [ ] No [ ]

Remarks: Hydric soils are not present. Does not meet hydric soil criteria.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Depositions (B5)
- Inundation Visible on Aerial Imagery(B7)
- Sparsely Vegetated Concave Surface (B8)

Secondary Indicators (minimum of two required)

- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Field Observations:

Surface Water Present? Yes [ ] No [ ] Depth (inches): __________
Water Table Present? Yes [ ] No [ ] Depth (inches): __________
Saturation Present? Yes [ ] No [ ] Depth (inches): __________

Indicators of Wetland Hydrology Present? Yes [ ] No [ ]

Remarks: Wetland hydrology is not present nor indicated.

Photo: C-277
Data points 18 and 19

Photo 25. View to the east.
**WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region**

**Project/Site:** Lake Elmo airport (21D) Runway 14/32 Relocation  
**City/County:** Washington  
**Sampling Date:** 6/8/2017  
**Applicant/Owner:** Metropolitan Airports Commission  
**State:** Minnesota  
**Sample Point:** DP19  
**Investigator(s):** Brauna Hartzell and Kim Shannon, Mead & Hunt, Inc.  
**Section, Township, Range:** Section 18, T29N, R20W  
**Landform (hillslope, terrace, etc.):** basin  
**Local relief (concave, convex, none):** concave  
**Slope (%):** <1%  
**Subregion (LRR or MLRA):** K/153  
**Lat:** 44.99334° N  
**Long:** 92.8522° W  
**Datum:** WGS 84  
**Soil Map Unit Name:** Aquolls and Histosols, ponded  
**NWI classification:** PEMB  
**Are climatic hydrologic conditions on the site typical for this time of year?** Yes

**Are Vegetation, Soil, or Hydrology significantly disturbed? Are “Normal Circumstances” present?** Yes

**Are Vegetation, Soil, or Hydrology naturally problematic?** (If needed, explain any answers in Remarks.)

**SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.**

<table>
<thead>
<tr>
<th>Hydrophytic Vegetation Present?</th>
<th>Yes ☒ No ☐</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydric Soil Present?</td>
<td>Yes ☒ No ☐</td>
</tr>
<tr>
<td>Wetland Hydrology Present?</td>
<td>Yes ☒ No ☐</td>
</tr>
</tbody>
</table>

**Is the Sampled Area within a Wetland?** Yes ☒ No ☐

**If yes, optional Wetland Side ID:** 9

**Remarks:** (Explain alternative procedures here or in a separate report.) A WETS analysis of the antecedent precipitation indicates the hydrologic conditions on the site were wetter than normal range at the time of investigation. Vegetation is dominated by reed canary grass.

**VEGETATION - Use scientific names of plants**

<table>
<thead>
<tr>
<th>Tree Stratum (Plot size: _____)</th>
<th>Absolute % Cover</th>
<th>Dominant Species?</th>
<th>Indicator Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
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<tr>
<td>2.</td>
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<td>3.</td>
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<td>4.</td>
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<tr>
<td>5.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sapling/Shrub Stratum (Plot size: _____)</th>
<th>= Total Cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
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<tr>
<td>3.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Herb Stratum (Plot size: 5ft)</th>
<th>= Total Cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Phalaris arundinacea</td>
<td>80 X FACW</td>
</tr>
<tr>
<td>2. Onoclea sensibilis</td>
<td>25 X FACW</td>
</tr>
<tr>
<td>3. Persicaria amphibia</td>
<td>10 OBL</td>
</tr>
<tr>
<td>4. Parthenocissus quinquefolia</td>
<td>1 FACU</td>
</tr>
<tr>
<td>5.</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td></td>
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<tr>
<td>9.</td>
<td></td>
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<tr>
<td>10.</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Woody Vine Stratum (Plot size: _____)</th>
<th>= Total Cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>50/20 Thresholds</th>
<th>20%</th>
<th>50%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tree Stratum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sapling/Shrub Stratum</td>
<td>23</td>
<td>58</td>
</tr>
<tr>
<td>Herb Stratum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Woody Vine Stratum</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dominance Test worksheet:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)</td>
</tr>
<tr>
<td>Total Number of Dominant Species Across All Strata: 2 (B)</td>
</tr>
<tr>
<td>Percent of Dominant Species That Are OBI, FACW, or FAC: 100 (A/B)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prevalence Index worksheet:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total % Cover of. Multiply by:</td>
</tr>
<tr>
<td>OBL species 10 x 1 = 10</td>
</tr>
<tr>
<td>FACW species 105 x 2 = 210</td>
</tr>
<tr>
<td>FAC species ___ x 3 = ___</td>
</tr>
<tr>
<td>FACU species 1 x 4 = 4</td>
</tr>
<tr>
<td>UPL species ___ x 5 = ___</td>
</tr>
<tr>
<td>Column Totals: 116 (A) 234 (B)</td>
</tr>
<tr>
<td>Prevalence Index = B/A = 2.02</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hydrophytic Vegetation Indicators:</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Rapid Test for Hydrophytic Vegetation</td>
</tr>
<tr>
<td>☐ Dominance Test is &gt;50%</td>
</tr>
<tr>
<td>☐ Prevalence Index is &lt;3.0 1</td>
</tr>
<tr>
<td>☐ Morphological Adaptations’ (Provide supporting data in Remarks or on a separate sheet)</td>
</tr>
<tr>
<td>☐ Problematic Hydrophytic Vegetation’ (Explain)</td>
</tr>
</tbody>
</table>

1Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Definitions of Vegetation Strata:**

- **Tree** – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
- **Sapling/shrub** – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.
- **Herb** – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
- **Woody vines** – All woody vines greater than 3.28 ft in height.

**Hydrophytic Vegetation Present?**

Yes ☐ No ☐
### Profile Description:
(Describe to the depth needed to document the indicator or confirm the absence of indicators.)

<table>
<thead>
<tr>
<th>Depth (inches)</th>
<th>Color (moist)</th>
<th>Color (moist)</th>
<th>Type¹</th>
<th>Loc²</th>
<th>Texture</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-16</td>
<td>5YR 3/1</td>
<td>5YR 4/6</td>
<td>C</td>
<td>M, PL</td>
<td>loam</td>
<td></td>
</tr>
<tr>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

### Hydric Soil Indicators:
- [ ] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5)
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)

Indicators for Problematic Hydric
- [ ] 2 cm Muck - (LRR K, L, MLRA 149B)
- [ ] 5 cm Peat or Mucky Peat - (LRR K, L, R)
- [ ] Dark Surface - (LRR K, L)
- [ ] Polyvalue Below Surface - (LRR K, L, MLRA 149B)
- [ ] Thin Dark Surface - (LRR K, L)
- [ ] Iron-Manganese Masses - (F12, LRR K, L, R)
- [ ] Piedmont Floodplain Soils - (MLRA 149B)
- [ ] Mesic Spodic - (TA6, MLRA 144A, 145, 149B)
- [ ] Red Parent Material - (F21)
- [ ] Very Shallow Dark Surface - (TF12)
- [ ] Other (Explain in Remarks)

### Restrictive Layer (if observed):
Type: ________
Depth (inches): ________

**Hydric Soil Present?** Yes [ ] No [ ]

Remarks: Hydric soils are present. Meets hydric soils criteria Redox Dark Surface (F6). Also, meets NYCHS criteria 3 (long-duration flooding or saturation) as below.

### HYDROLOGY

#### Wetland Hydrology Indicators:

**Primary Indicators** (minimum of one required; check all that apply)
- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [ ] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)

**Secondary Indicators** (minimum of two required)
- [ ] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres on Living Roots (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (Explain in Remarks)

**Field Observations:**
- **Surface Water Present?** Yes [ ] No [ ] Depth (inches): ________
- **Water Table Present?** Yes [ ] No [ ] Depth (inches): ________
- **Saturation Present?** Yes [ ] No [ ] Depth (inches): ________

(.includes capillary fringe)

**Indicators of Wetland Hydrology Present?**
Yes [ ] No [ ]

Describe Recorded Data (stream gauge, monitoring, well, aerial photos, previous inspections), if available:

Remarks: Wetland hydrology is present and indicated. Standing water 6-8 feet to east. Data point located in closed depressional basin. Historic aerial imagery shows this area to be consistently inundated. Also, area experiences long-duration flooding or saturation.

Photo: C-280

US Army Corps of Engineers
Northcentral and Northeast Region – Final Version 2.0
Data points 18 and 19

Photo 25. View to the east.

Photo 26. Wetland 9 from the west side, view to the east.
Photo 27. Wetland 9 from east side, view to the west.

Photo 28. Wetland 9 from the south, view to the north.
Additional Photos


Photo 20. Wetland 6. At Culvert, view to the west.
Appendix H. MNRAM Functional Assessment Forms
# Wetland Functional Assessment Summary

## 21D - Lake Elmo Airport

<table>
<thead>
<tr>
<th>Wetland Name</th>
<th>WS</th>
<th>SA</th>
<th>Location</th>
<th>Hydrogeomorphology</th>
<th>Maint. of Hydrologic Regime</th>
<th>Flood/ Stormwater/ Attenuation</th>
<th>Downstream Water Quality</th>
<th>Maint. of Wetland Water Quality</th>
<th>Shoreline Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wetland 1</td>
<td>37</td>
<td>6</td>
<td>82-029-20-19-007-B</td>
<td>Depressional/Flow-through (apparent inlet and outlet), Depressional/Flow-through (apparent inlet and outlet)</td>
<td>Moderate</td>
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# Wetland Functional Assessment Summary

## 21D - Lake Elmo Airport

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<td>Combination Discharge, Recharge</td>
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<tr>
<td>Wetland 9</td>
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<td>Discharge</td>
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MnRAM: Site Response Record
For Wetland: Wetland 1
Location: 82-029-20-19-007-B

21D - Lake Elmo Airport

<table>
<thead>
<tr>
<th>Plant Community:</th>
<th>Seasonally Flooded Ba</th>
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</thead>
<tbody>
<tr>
<td>Cowardin Classification:</td>
<td>Circular 39: PEM1A</td>
</tr>
</tbody>
</table>

| 4 | Listed, rare, special species? | No |
| 5 | Rare community or habitat? | No |
| 6 | Pre-European-settlement condition? | No |

**Hydrogeomorphology / topography:**

| 7 | Depressional/FlowThru |
| 8-1 | Maximum water depth | 0 inches |
| 8-2 | % inundated | 0% |
| 9 | Immediate drainage–local WS | 178.5 acr |
| 10 | Estimated size/existing site: | (see #66) |

| 11-Upland Soil | Crystal Lake silt loam, 1 to 3 percent |
| 11-Wetland Soil | Comstock silt loam |

| 12 | Outlet for flood control | B |
| 13 | Outlet for hydro regime | A |
| 14 | Dominant upland land use | B |
| 15 | Wetland soil condition | C |
| 16 | Vegetation (% cover) | 0% |
| 17 | Emerg. veg. flood resistance | C |
| 18 | Sediment delivery | B |
| 19 | Upland soils (soil group) | B |
| 20 | Stormwater runoff | B |
| 21 | Subwatershed wetland density | A |
| 22 | Channels/sheet flow | B |
| 23 | Adjacent buffer width | 50 feet |

**Adjacent area management**

| 24-A | Full | 30% |
| 24-B | Manicured | 0% |
| 24-C | Bare | 70% |

**Adjacent area diversity/structure**

| 25-A | Native | 10% |
| 25-B | Mixed | 80% |
| 25-C | Sparse | 10% |

**Adjacent area slope**

| 26-A | Gentle | 60% |
| 26-B | Moderate | 40% |
| 26-C | Steep | 0% |

**Groundwater-specific questions**

| 27 | Downstream sens./WQ protect. | B |
| 28 | Nutrient loading | B |
| 29 | Shoreline wetland? | No |
| 30 | Wetland in-water width | 0 feet |
| 31 | Wetland vegetation cover | 0% |
| 32 | Emerg. veg. erosion resistance | NA |
| 33 | Erosion potential of site | NA |
| 34 | Upslope veg./bank protection | No |
| 35 | Rare wildlife? | No |
| 36 | Scare/Rare/S1/S2 community | No |
| 37 | Vegetative cover | NA |
| 38 | Veg. community interspersion | C |
| 39 | Wetland detritus | B |
| 40 | Interspersion on landscape | B |
| 41 | Wildlife barriers | B |
| 42 | Hydroperiod adequacy | Inadequate |
| 43 | Fish presence | B |
| 44 | Overwintering habitat | B |
| 45 | Wildlife species (list) | NA |
| 46 | Fish habitat quality | NA |
| 47 | Fish species (list) | NA |
| 48 | Unique/rare opportunity | No |
| 49 | Wetland visibility | B |
| 50 | Proximity to population | Yes |
| 51 | Public ownership | A |
| 52 | Public access | B |
| 53 | Human influence on wetland | C |
| 54 | Human influence on viewshed | C |
| 55 | Spatial buffer | B |
| 56 | Recreational activity potential | C |
| 57 | Commercial crop–hydro impact | C |

**Additional information**

| 64 | Restoration potential | No |
| 65 | LO affected by restoration | 0.187 |
| 66 | Existing size | 0 feet |
| 67 | Restorable size | 0 |
| 68 | Potential new wetland | 0 |
| 69 | Average width of pot. buffer | 0 feet |
| 70 | Ease of potential restoration | 0 |
| 71 | Stormwater sensitivity | C |
| 72 | Additional treatment needs | B |

Watershed: St. Croix (Stillwater)
WS# 37  Service Area: 6

For functional ratings, please run the Summary tab report.
This report printed on: 10/26/2017
### Wetland Functional Assessment Summary

<table>
<thead>
<tr>
<th>Wetland Name</th>
<th>Hydrogeomorphology</th>
<th>Maintenance of Hydrologic Regime</th>
<th>Flood/Stormwater Attenuation</th>
<th>Downstream Water Quality</th>
<th>Maintenance of Wetland Water Quality</th>
<th>Shoreline Protection</th>
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</thead>
<tbody>
<tr>
<td>Wetland 1</td>
<td>Depressional/Flow-through (apparent inlet and outlet), Depressional/Flow-through (apparent inlet and outlet)</td>
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#### Additional Information

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### Wetland Community Summary

#### Vegetative Diversity/Integrity

<table>
<thead>
<tr>
<th>Community</th>
<th>Wetland Proportion</th>
<th>Individual Community Rating</th>
<th>Highest Wetland Rating</th>
<th>Average Wetland Rating</th>
<th>Weighted Average Wetland Rating</th>
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</thead>
<tbody>
<tr>
<td>Cowardin Classification</td>
<td>Circular Plant 39 Community</td>
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| | | | | | | |
| | | | | | | |
| | | | | | | |

- Denotes incomplete calculation data.
MnRAM: Site Response Record
For Wetland: Wetland 2
Location: 82-029-20-19-005-B

21D - Lake Elmo Airport

Plant Community: Fresh (Wet) Meadow
Cowardin Classification: Circular 39: Type 2

4  Listed, rare, special species?  No
5  Rare community or habitat?  No
6  Pre-European-settlement condition?  No

Hydrogeomorphology/topography:
7  Depressional/Isolated
8-1  Maximum water depth  0 inches
8-2  % inundated  0%
9  Immediate drainage—local WS  7.3 acres
10  Estimated size/existing site:  (see #66)

11-Upland Soil  Chetek sandy loam, 12 to 25 percent slopes
11-Wetland Soil  Antigo silt loam, 0 to 2 percent slopes

12  Outlet for flood control  A
13  Outlet for hydro regime  A
14  Dominant upland land use  B
15  Wetland soil condition  A
16  Vegetation (% cover)  100%
17  Emerg. veg. flood resistance  B
18  Sediment delivery  B
19  Upland soils (soil group)  B
20  Stormwater runoff  C
21  Subwatershed wetland density  A
22  Channels/sheet flow  B
23  Adjacent buffer width  30 feet

Adjacent area management
24-A  Full  90%
24-B  Manicured  0%
24-C  Bare  10%

Adjacent area diversity/structure
25-A  Native  0%
25-B  Mixed  90%
25-C  Sparse  10%

Adjacent area slope

26-A  Gentle  35%
26-B  Moderate  60%
26-C  Steep  5%

27  Downstream sens./WQ protect.  B
28  Nutrient loading  B

29  Shoreline wetland?  No

Shoreline Wetland
30  Rooted veg., % cover  0%
31  Wetland in-water width  0 feet
32  Emerg. veg. erosion resistance  
33  Erosion potential of site  
34  Upslope veg./bank protection  No
35  Rare wildlife?  No
36  Scare/Rare/S1/S2 community  
37  Vegetative cover  NA
38  Veg. community interspersion  B
39  Wetland detritus  
40  Interspersion on landscape  B
41  Wildlife barriers  

Amphibian-breeding potential
42  Hydroperiod adequacy  Inadequate
43  Fish presence  A
44  Overwintering habitat  
45  Wildlife species (list)  
46  Fish habitat quality  NA
47  Fish species (list)  

48  Unique/rare opportunity  No
49  Wetland visibility  B
50  Proximity to population  Yes
51  Public ownership  A
52  Public access  C
53  Human influence on wetland  
54  Human influence on viewseshed  
55  Spatial buffer  B
56  Recreational activity potential  C

57  Commercial crop–hydro impact  NA

Groundwater-specific questions
58  Wetland soils  Recharge
59  Subwatershed land use  Discharge
60  Wetland size/soil group  Discharge
61  Wetland hydroperiod  Recharge
62  Inlet/Outlet configuration  Recharge
63  Upland topo relief  Discharge

Additional information
64  Restoration potential  No
65  LO affected by restoration  
66  Existing size  0.117
67  Restorable size  0
68  Potential new wetland  0

69  Average width of pot. buffer  0 feet
70  Ease of potential restoration  
71  Stormwater sensitivity  B
72  Additional treatment needs  A

Watershed  St. Croix (Stillwater)
WS#  37  Service Area: 6

For functional ratings, please run the Summary tab report.
This report printed on: 10/26/2017
## Wetland Functional Assessment Summary

<table>
<thead>
<tr>
<th>Wetland Name</th>
<th>Hydrogeomorphology</th>
<th>Maintenance of Hydrologic Regime</th>
<th>Flood/Stormwater Attenuation</th>
<th>Downstream Water Quality</th>
<th>Maintenance of Wetland Water Quality</th>
<th>Shoreline Protection</th>
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### Additional Information

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<th>Maintenance of Characteristic Wildlife Habitat Structure</th>
<th>Maintenance of Characteristic Fish Habitat</th>
<th>Vegetative Diversity/Integrity</th>
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<tr>
<td>Wetland 2</td>
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<td>Cowardin Classification: PEM1B, Circal Plant Community: Fresh (Wet) Meadow</td>
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### Wetland Community Summary

<table>
<thead>
<tr>
<th>Wetland Name</th>
<th>Location</th>
<th>Vegetative Diversity/Integrity</th>
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### Vegetative Diversity/Integrity

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<th>Wetland Name</th>
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<th>Cowardin Classification</th>
<th>Circal Plant Community</th>
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- Denotes incomplete calculation data.
**MnRAM: Site Response Record**  
For Wetland: Wetland 3  
Location: 82-029-20-18-011-A

**21D - Lake Elmo Airport**

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<th>Plant Community:</th>
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<tbody>
<tr>
<td>Cowardin Classification:</td>
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</tr>
</tbody>
</table>

**Hydrogeomorphology / topography:**

| 4 | Listed, rare, special species? | No |
| 5 | Rare community or habitat? | No |
| 6 | Pre-European-settlement condition? | No |

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<thead>
<tr>
<th>7</th>
<th>Depressional/Isolated</th>
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<tr>
<td>8-1</td>
<td>Maximum water depth</td>
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<tr>
<td>8-2</td>
<td>% inundated</td>
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<tr>
<td>9</td>
<td>Immediate drainage--local WS</td>
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<tr>
<td>10</td>
<td>Estimated size/existing site:</td>
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**Upland Soil**  
Antigo silt loam, 2 to 6 percent slopes

**Wetland Soil**  
Antigo silt loam, 2 to 6 percent slopes

**Groundwater-specific questions**

| 58 | Wetland soils | Recharge |
| 59 | Subwatershed land use | Discharge |
| 60 | Wetland size/soil group | Discharge |
| 61 | Wetland hydroperiod | Recharge |
| 62 | Inlet/Outlet configuration | Recharge |
| 63 | Upland topo relief | Discharge |

**Additional information**

| 64 | Restoration potential | No |
| 65 | LO affected by restoration |
| 66 | Existing size | 0.11 |
| 67 | Restorable size | 0 |
| 68 | Potential new wetland | 0 |

**Watershed**  
St. Croix (Stillwater)

| WS# | 37 | Service Area: 6 |

For functional ratings, please run the Summary tab report.

This report printed on: 10/26/2017

**Amphibian-breeding potential**

| 42 | Hydroperiod adequacy | Adequate |
| 43 | Fish presence |
| 44 | Overwintering habitat |
| 45 | Wildlife species (list) |
| 46 | Fish habitat quality |
| 47 | Fish species (list) |
| 48 | Unique/rare opportunity | No |
| 49 | Wetland visibility | Yes |
| 50 | Proximity to population |
| 51 | Public ownership |
| 52 | Public access |
| 53 | Human influence on wetland |
| 54 | Human influence on viewseshd |
| 55 | Spatial buffer |
| 56 | Recreational activity potential |
| 57 | Commercial crop--hydro impact | NA |
### Wetland Functional Assessment Summary

<table>
<thead>
<tr>
<th>Wetland Name</th>
<th>Hydrogeomorphology</th>
<th>Maintenance of Hydrologic Regime</th>
<th>Flood/Stormwater Attenuation</th>
<th>Downstream Water Quality</th>
<th>Maintenance of Wetland Water Quality</th>
<th>Shoreline Protection</th>
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<tbody>
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<td>Wetland 3</td>
<td>Depressional/Isolated (no discernable inlets or outlets)</td>
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<td>0.66</td>
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#### Additional Information

- **Combination Discharge, Recharge**
  - Ground-Water Interaction: 0.00
  - Wetland Restoration Potential: 0.50
  - Wetland Sensitivity to Stormwater and Urban Development: 0.60
  - Additional Stormwater Treatment Needs: Not Applicable

### Wetland Community Summary

<table>
<thead>
<tr>
<th>Community</th>
<th>Wetland Proportion</th>
<th>Individual Community Rating</th>
<th>Highest Wetland Rating</th>
<th>Average Wetland Rating</th>
<th>Weighted Average Wetland Rating</th>
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<td>Cowardin Classification</td>
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<td>PEMB</td>
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- **Denotes incomplete calculation data.**

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C-293
**MnRAM: Site Response Record**

**For Wetland: Wetland 4**

**Location: 82-029-20-18-008-B**

**21D - Lake Elmo Airport**

<table>
<thead>
<tr>
<th><strong>Plant Community:</strong></th>
<th>Fresh (Wet) Meadow</th>
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<tbody>
<tr>
<td><strong>Cowardin Classification:</strong></td>
<td>Circular 39: Type 2</td>
</tr>
<tr>
<td><strong>PEMB Type:</strong></td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Hydrogeomorphology / topography:</strong></th>
<th>Depressional/Isolated</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>8-1 Maximum water depth</strong></td>
<td>1 inches</td>
</tr>
<tr>
<td><strong>8-2 % inundated</strong></td>
<td>10%</td>
</tr>
<tr>
<td><strong>9 Immediate drainage—local WS</strong></td>
<td>102 acres</td>
</tr>
<tr>
<td><strong>10 Estimated size/existing site:</strong></td>
<td>(see #66)</td>
</tr>
</tbody>
</table>

| **Upland Soil** | Antigo silt loam, 2 to 6 percent slopes |
| **Wetland Soil** | Antigo silt loam, 2 to 6 percent slopes |

| **Outlet for flood control** | A |
| **Outlet for hydro regime** | A |
| **Dominant upland land use** | B |
| **Wetland soil condition** | C |
| **Vegetation (% cover)** | 80% |
| **Emerg. veg. flood resistance** | C |
| **Sediment delivery** | B |
| **Upland soils (soil group)** | B |
| **Stormwater runoff** | B |
| **Subwatershed wetland density** | A |
| **Channels/sheet flow** | B |
| **Adjacent buffer width** | 50 feet |

| **Adjacent area management** | A |
| **Adjacent area diversity/structure** | A |
| **Adjacent area slope** | A |

| **Groundwater-specific questions** | |
| **58 Wetland soils** | Recharge |
| **59 Subwatershed land use** | Discharge |
| **60 Wetland size/soil group** | Discharge |
| **61 Wetland hydroperiod** | Recharge |
| **62 Inlet/Outlet configuration** | Recharge |
| **63 Upland topo relief** | Discharge |

| **Additional information** | |
| **64 Restoration potential** | No |
| **65 LO affected by restoration** | |
| **66 Existing size** | 0.167 |
| **Restorable size** | 0 |
| **Potential new wetland** | 0 |
| **67 Average width of pot. buffer** | 0 feet |
| **68 Ease of potential restoration** | 0 |
| **69 Hydrologic alterations** | B |
| **70 Potential wetland type** | B |
| **71 Stormwater sensitivity** | B |
| **72 Additional treatment needs** | B |

| **Watershed** | St. Croix (Stillwater) |
| **WS#** | 37 |
| **Service Area:** | 6 |

For functional ratings, please run the Summary tab report.

This report printed on: 10/26/2017
## Wetland Functional Assessment Summary

<table>
<thead>
<tr>
<th>Wetland Name</th>
<th>Vegetative Diversity/Integrity</th>
<th>Maintenance of Hydrologic Regime</th>
<th>Flood/Stormwater/Attenuation</th>
<th>Downstream Water Quality</th>
<th>Maintenance of Wetland Water Quality</th>
<th>Shoreline Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wetland Name</td>
<td>Cowardin Classification</td>
<td>Circular Plant Community</td>
<td>Wetland Proportion</td>
<td>Individual Community Rating</td>
<td>Highest Wetland Rating</td>
<td>Average Wetland Rating</td>
</tr>
<tr>
<td>Wetland 4</td>
<td>PEMB</td>
<td>Type 2</td>
<td>Fresh (Wet) Meadow</td>
<td>100</td>
<td>0.50</td>
<td>0.50</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Additional Information**
  - Ground-Water Interaction: Combination Discharge, Recharge
  - Wetland Restoration Potential: 0.00
  - Wetland Sensitivity to Stormwater and Urban Development: 0.50
  - Additional Stormwater Treatment Needs: 0.53

### Wetland Community Summary

<table>
<thead>
<tr>
<th>Wetland Name</th>
<th>Location</th>
<th>Community</th>
<th>Vegetative Diversity/Integrity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wetland 4</td>
<td>82-029-20-18-008-B</td>
<td>PEMB Type 2 Fresh (Wet) Meadow</td>
<td>100 0.50 0.50 0.50 Moderate Moderate Moderate</td>
</tr>
</tbody>
</table>

- **Denotes incomplete calculation data.**
MnRAM: Site Response Record
For Wetland: Wetland 5
Location: 82-029-20-18-008-C

21D - Lake Elmo Airport

<table>
<thead>
<tr>
<th>Plant Community:</th>
<th>Fresh (Wet) Meadow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cowardin Classification:</td>
<td>Circular 39: Type 2</td>
</tr>
</tbody>
</table>

| 4 | Listed, rare, special species? | No |
| 5 | Rare community or habitat? | No |
| 6 | Pre-European-settlement condition? | No |

Hydrogeomorphology / topography:

| 7 | Depressional/Isolated |
| 8-1 | Maximum water depth | 3 inches |
| 8-2 | % inundated | 20% |
| 9 | Immediate drainage--local WS | 102 acres |
| 10 | Estimated size/existing site: | (see #66) |

11-Upland Soil | Antigo silt loam, 2 to 6 percent slopes |
11-Wetland Soil | Auburndale silt loam |

| 12 | Outlet for flood control | A |
| 13 | Outlet for hydro regime | A |
| 14 | Dominant upland land use | B |
| 15 | Wetland soil condition | B |
| 16 | Vegetation (% cover) | 100% |
| 17 | Emerg. veg. flooding resistance | C |
| 18 | Sediment delivery | B |
| 19 | Upland soils (soil group) | B |
| 20 | Stormwater runoff | B |
| 21 | Subwatershed wetland density | A |
| 22 | Channels/sheet flow | B |
| 23 | Adjacent buffer width | 10 feet |

Adjacent area management

| 24-A | Full | 20% |
| 24-B | Manicured | 0% |
| 24-C | Bare | 80% |

Adjacent area diversity/structure

| 25-A | Native | 0% |
| 25-B | Mixed | 20% |
| 25-C | Sparse | 80% |

Adjacent area slope

| 26-A | Gentle | 40% |
| 26-B | Moderate | 60% |
| 26-C | Steep | 0% |

| 27 | Downstream sens./WQ protect. | B |
| 28 | Nutrient loading | B |
| 29 | Shoreline wetland? | No |

Shoreline Wetland

| 30 | Wetland in-water width | 0% |
| 31 | Emerg. veg. flooding resistance | 0% |
| 32 | Erosion potential of site | No |
| 33 | Upslope veg./bank protection | No |
| 34 | Wetland detritus | B |
| 35 | Interception on landscape | B |
| 36 | Wildlife barriers | B |

Amphibian-breeding potential

| 42 | Hydroporphic adequacy | Adequate |
| 43 | Fish presence | A |
| 44 | Overwintering habitat | C |
| 45 | Wildlife species (list) | |
| 46 | Fish habitat quality | C |
| 47 | Fish species (list) | |
| 48 | Unique/rare opportunity | No |
| 49 | Wetland visibility | C |
| 50 | Proximity to population | Yes |
| 51 | Public ownership | A |
| 52 | Public access | B |
| 53 | Human influence on wetland | C |
| 54 | Human influence on viewseshed | C |
| 55 | Spatial buffer | B |
| 56 | Recreational activity potential | C |
| 57 | Commercial crop--hydro impact | NA |

Groundwater-specific questions

| 58 | Wetland soils | Recharge |
| 59 | Subwatershed land use | Discharge |
| 60 | Wetland size/soil group | Recharge |
| 61 | Wetland hydroperiod | Recharge |
| 62 | Inlet/Outlet configuration | Discharge |
| 63 | Upland topo relief | Discharge |

Additional information

| 64 | Restoration potential | No |
| 65 | LO affected by restoration | |
| 66 | Existing size | 0.094 acres |
| 67 | Restorable size | 0 bolts |
| 68 | Potential new wetland | 0 |

Watershed: St. Croix (Stillwater)
WS# 37 Service Area: 6

For functional ratings, please run the Summary tab report.
This report printed on: 10/26/2017
## Wetland Functional Assessment Summary

<table>
<thead>
<tr>
<th>Wetland Name</th>
<th>Hydrogeomorphology</th>
<th>Maintenance of Hydrologic Regime</th>
<th>Flood/Stormwater Attenuation</th>
<th>Downstream Water Quality</th>
<th>Maintenance of Wetland Water Quality</th>
<th>Shoreline Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wetland 5</td>
<td>Depressional/Isolated (no discernable inlets or outlets)</td>
<td>0.63</td>
<td>0.66</td>
<td>0.56</td>
<td>0.37</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Moderate</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>

### Additional Information

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Wetland 5</td>
<td>Combination Discharge, Recharge</td>
<td>0.00</td>
<td>0.10</td>
<td>0.37</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Wetland Name</th>
<th>Maintenance of Characteristic Wildlife Habitat Structure</th>
<th>Maintenance of Characteristic Fish Habitat</th>
<th>Aesthetics/Recreation/Education/Cultural</th>
<th>Commercial Uses</th>
<th>Ground-Water Interaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wetland 5</td>
<td>0.42</td>
<td>0.33</td>
<td>0.30</td>
<td>0.42</td>
<td>0.00</td>
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<tr>
<td></td>
<td>Moderate</td>
<td>Low</td>
<td>Low</td>
<td>Moderate</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>

## Wetland Community Summary

<table>
<thead>
<tr>
<th>Wetland Name</th>
<th>Location</th>
<th>Cowardin Classification</th>
<th>Circular Plant 39</th>
<th>Community</th>
<th>Wetland Proportion</th>
<th>Individual Community Rating</th>
<th>Highest Wetland Rating</th>
<th>Average Wetland Rating</th>
<th>Weighted Average Wetland Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wetland 5</td>
<td>82-029-20-18-008-C</td>
<td>PEMB</td>
<td>Type 2</td>
<td>Fresh (Wet) Meadow</td>
<td>100</td>
<td>0.1</td>
<td>0.10</td>
<td>0.10</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
</tbody>
</table>

Denotes incomplete calculation data.

Thursday, October 26, 2017
## MnRAM: Site Response Record

For Wetland: Wetland 6  
Location: 82-029-20-18-012-A

### 21D - Lake Elmo Airport

<table>
<thead>
<tr>
<th>Plant Community: Fresh (Wet) Meadow</th>
<th>Cowardin Classification: Circular 39: Type 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Listed, rare, special species?</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rare community or habitat?</td>
<td>No</td>
</tr>
<tr>
<td>Pre-European-settlement condition?</td>
<td>No</td>
</tr>
</tbody>
</table>

**Hydrogeomorphology / topography:**

<table>
<thead>
<tr>
<th>8-1 Maximum water depth</th>
<th>0 inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>8-2 % inundated</td>
<td>0%</td>
</tr>
<tr>
<td>9 Immediate drainage–local WS</td>
<td>71 acres</td>
</tr>
<tr>
<td>10 Estimated size/existing site:</td>
<td>(see #66)</td>
</tr>
</tbody>
</table>

**Upland Soil**

- Crystal Lake silt loam, 1 to 3 percent slopes

**Wetland Soil**

- Crystal Lake silt loam, 1 to 3 percent slopes

<table>
<thead>
<tr>
<th>11-Upland Soil</th>
<th>Crystal Lake silt loam, 1 to 3 percent slopes</th>
</tr>
</thead>
<tbody>
<tr>
<td>11-Wetland Soil</td>
<td>Crystal Lake silt loam, 1 to 3 percent slopes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>12 Outlet for flood control</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>13 Outlet for hydro regime</td>
<td>A</td>
</tr>
<tr>
<td>14 Dominant upland land use</td>
<td>B</td>
</tr>
<tr>
<td>15 Wetland soil condition</td>
<td>A</td>
</tr>
<tr>
<td>16 Vegetation (% cover)</td>
<td>80%</td>
</tr>
<tr>
<td>17 Emerg. veg. flood resistance</td>
<td>C</td>
</tr>
<tr>
<td>18 Sediment delivery</td>
<td>B</td>
</tr>
<tr>
<td>19 Upland soils (soil group)</td>
<td>B</td>
</tr>
<tr>
<td>20 Stormwater runoff</td>
<td>A</td>
</tr>
<tr>
<td>21 Subwatershed wetland density</td>
<td>A</td>
</tr>
<tr>
<td>22 Channels/sheet flow</td>
<td>B</td>
</tr>
<tr>
<td>23 Adjacent buffer width</td>
<td>10 feet</td>
</tr>
</tbody>
</table>

**Adjacent area management**

<table>
<thead>
<tr>
<th>24-A Full</th>
<th>0%</th>
</tr>
</thead>
<tbody>
<tr>
<td>24-B Manicured</td>
<td>100%</td>
</tr>
<tr>
<td>24-C Bare</td>
<td>0%</td>
</tr>
</tbody>
</table>

**Adjacent area diversity/structure**

<table>
<thead>
<tr>
<th>25-A Native</th>
<th>0%</th>
</tr>
</thead>
<tbody>
<tr>
<td>25-B Mixed</td>
<td>95%</td>
</tr>
<tr>
<td>25-C Sparse</td>
<td>5%</td>
</tr>
</tbody>
</table>

**Adjacent area slope**

### Groundwater-specific questions

<table>
<thead>
<tr>
<th>58 Wetland soils</th>
<th>Recharge</th>
</tr>
</thead>
<tbody>
<tr>
<td>59 Subwatershed land use</td>
<td>Discharge</td>
</tr>
<tr>
<td>60 Wetland size/soil group</td>
<td>Discharge</td>
</tr>
<tr>
<td>61 Wetland hydroperiod</td>
<td>Recharge</td>
</tr>
<tr>
<td>62 Inlet/Outlet configuration</td>
<td>Recharge</td>
</tr>
<tr>
<td>63 Upland topo relief</td>
<td>Recharge</td>
</tr>
</tbody>
</table>

**Additional information**

<table>
<thead>
<tr>
<th>64 Restoration potential</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>65 LO affected by restoration</td>
<td></td>
</tr>
<tr>
<td>66 Existing size</td>
<td>0.009</td>
</tr>
<tr>
<td>67 Restorable size</td>
<td>0</td>
</tr>
<tr>
<td>68 Average width of pot. buffer</td>
<td>0 feet</td>
</tr>
<tr>
<td>69 Ease of potential restoration</td>
<td>0</td>
</tr>
<tr>
<td>70 Potential wetland type</td>
<td>0</td>
</tr>
<tr>
<td>71 Stormwater sensitivity</td>
<td>B</td>
</tr>
<tr>
<td>72 Additional treatment needs</td>
<td>A</td>
</tr>
</tbody>
</table>

**Watershed**

- St. Croix (Stillwater)  
  - Service Area: 6  
  - WS# 37  
  - Service Area: 6

For functional ratings, please run the Summary tab report.  
This report printed on: 10/26/2017
### Wetland Functional Assessment Summary

<table>
<thead>
<tr>
<th>Wetland Name</th>
<th>Hydrogeomorphology</th>
<th>Maintenance of Hydrologic Regime</th>
<th>Flood/Stormwater Attenuation</th>
<th>Downstream Water Quality</th>
<th>Maintenance of Wetland Water Quality</th>
<th>Shoreline Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wetland 6</td>
<td>Depressional/Flow-through (apparent inlet and outlet), Depressional/Flow-through (apparent inlet and outlet)</td>
<td>0.65</td>
<td>0.66</td>
<td>0.58</td>
<td>0.33</td>
<td>0.00</td>
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<tr>
<td></td>
<td></td>
<td>Moderate</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>

### Additional Information

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Wetland 6</td>
<td>Combination Discharge, Recharge</td>
<td>0.00</td>
<td>0.10</td>
<td>0.33</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Moderate</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
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</table>

### Wetland Community Summary

<table>
<thead>
<tr>
<th>Wetland Name</th>
<th>Location</th>
<th>Community</th>
<th>Vegetative Diversity/Integrity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wetland 6</td>
<td>82-029-20-18-012-A</td>
<td>Cowardin Classification Circular Plant Community Wetland Proportion Individual Community Rating Highest Wetland Rating Average Wetland Rating Weighted Average Wetland Rating</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PEMB Type 2 Fresh (Wet) Meadow 100 0.1 0.10 0.10 0.10</td>
<td>Low Low Low</td>
<td></td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>0.1</td>
<td>0.10</td>
</tr>
</tbody>
</table>

- Denotes incomplete calculation data.
MnRAM: Site Response Record
For Wetland: Wetland 7
Location: 82-029-20-18-013-A

21D - Lake Elmo Airport

Plant Community: Fresh (Wet) Meadow
Cowardin Classification: Circular 39:
PEMB Type 2

For functional ratings, please run the Summary tab report.

This report printed on: 10/26/2017

Watershed: St. Croix (Stillwater)
WS# 37 Service Area: 6

Groundwater-specific questions
58 Wetland soils Recharge
59 Subwatershed land use Discharge
60 Wetland size/soil group Discharge
61 Wetland hydroperiod Recharge
62 Inlet/Outlet configuration Recharge
63 Upland topo relief Recharge

Additional information
64 Restoration potential No
65 LO affected by restoration
66 Existing size 0.013
67 Average width of pot. buffer 0 feet
68 Ease of potential restoration
69 Hydrologic alterations 0
70 Potential wetland type 0
71 Stormwater sensitivity B
72 Additional treatment needs A

For functional ratings, please run the Summary tab report.

This report printed on: 10/26/2017

C-300
### Wetland Functional Assessment Summary

<table>
<thead>
<tr>
<th>Wetland Name</th>
<th>Hydrogeomorphology</th>
<th>Maintenance of Hydrologic Regime</th>
<th>Flood/Stormwater Attenuation</th>
<th>Downstream Water Quality</th>
<th>Maintenance of Wetland Water Quality</th>
<th>Shoreline Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wetland 7</td>
<td>Depressional/Flow-through (apparent inlet and outlet), Depressional/Flow-through (apparent inlet and outlet)</td>
<td>0.65</td>
<td>0.66</td>
<td>0.58</td>
<td>0.33</td>
<td>0.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
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</tr>
</thead>
<tbody>
<tr>
<td>Wetland 7</td>
<td>0.39</td>
<td>0.00</td>
<td>0.00</td>
<td>0.47</td>
<td>0.00</td>
<td>Combination Discharge, Recharge</td>
<td>0.00</td>
<td>0.10</td>
<td>0.33</td>
</tr>
</tbody>
</table>

Moderate  Not Applicable  Not Applicable  Moderate  Not Applicable  Not Applicable  Moderate  Moderate

### Wetland Community Summary

<table>
<thead>
<tr>
<th>Wetland Name</th>
<th>Location</th>
<th>Community</th>
<th>Cowardin Classification</th>
<th>Circular Plant 39</th>
<th>Wetland Proportion</th>
<th>Individual Community Rating</th>
<th>Highest Wetland Rating</th>
<th>Average Wetland Rating</th>
<th>Weighted Average Wetland Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wetland 7</td>
<td>82-029-20-18-013-A</td>
<td>Fresh (Wet) Meadow</td>
<td>PEMB</td>
<td>Type 2</td>
<td>100</td>
<td>0.1</td>
<td>0.1</td>
<td>0.10</td>
<td>0.10</td>
</tr>
</tbody>
</table>

Low  Low  Low

100  0.10  0.10  0.10

☑ Denotes incomplete calculation data.
## MnRAM: Site Response Record
### For Wetland: Wetland 8
### Location: 82-029-20-18-003-B

### 2D - Lake Elmo Airport

### Plant Community: Fresh (Wet) Meadow
- **Cowardin Classification:** Circular 39: PEMB Type 2

### Plant Community: Deep Marsh
- **Cowardin Classification:** Circular 39: PAB2F Type 4

### Hydrogeomorphology / topography:
- **8-1 Maximum water depth:** 24 inche
- **8-2 % inundated:** 40%
- **9 Immediate drainage—local WS:** 102 acres
- **10 Estimated size/existing site:** (see #66)

### Upland Soil:
- Chetek sandy loam, 0 to 6 percent slopes

### Wetland Soil:
- Auburndale silt loam

### Outlet for flood control
- A

### Outlet for hydro regime
- A

### Dominant upland land use
- B

### Wetland soil condition
- A

### Vegetation (% cover)
- 90%

### Emerg. veg flood resistance
- A

### Sediment delivery
- B

### Upland soils (soil group)
- B

### Stormwater runoff
- B

### Subwatershed wetland density
- A

### Channels/sheet flow
- B

### Adjacent buffer width
- 50 feet

### Adjacent area management:
- **24-A Full:** 90%
- **24-B Manicured:** 0%
- **24-C Bare:** 10%

### Adjacent area diversity/structure:
- **25-A Native:** 0%
- **25-B Mixed:** 90%

### 25-C Sparse

### Adjacent area slope:
- **26-A Gentle:** 90%
- **26-B Moderate:** 10%
- **26-C Steep:** 0%

### Downstream sens./WQ protect.
- B

### Nutrient loading
- B

### Shoreline wetland?
- No

### Shoreline Wetland:
- **30 Rooted veg., % cover:** 0%
- **31 Wetland in-water width:** 0 feet
- **32 Emerg. veg. erosion resistance:**
- **33 Erosion potential of site:**
- **34 Upslope veg./bank protection:**
- **35 Rare wildlife?** No
- **36 Scare/Rare/S1/S2 community** No
- **37 Vegetative cover:** B
- **38 Veg. community interspersion:** C
- **39 Wetland detritus**
- **40 Interspersion on landscape:** B
- **41 Wildlife barriers** A

### Amphibian-breeding potential:
- **Hydroperiod adequacy:** Adequate
- **43 Fish presence:** A
- **44 Overwintering habitat:**
- **45 Wildlife species (list):**
- **46 Fish habitat quality:** C
- **47 Fish species (list):**

### Unique/rare opportunity
- No

### Wetland visibility
- C

### Proximity to population
- Yes

### Public ownership
- A

### Public access
- C

### Human influence on wetland
- B

### Human influence on viewshed
- C

### Spatial buffer
- A

### Recreational activity potential

### Hydroperiod adequacy:

### Water level:

### Restoration potential
- No

### LO affected by restoration
- No

### Average width of pot. buffer
- 0 feet

### Ease of potential restoration
- 0

### Hydrologic alterations

### Potential wetland type
- B

### Stormwater sensitivity
- B

### Hydroperiod adequacy
- Adequate

### Fish presence
- A

### Overwintering habitat

### Wildlife species (list)

### Fish habitat quality
- C

### Fish species (list)

### Unique/rare opportunity
- No

### Wetland visibility
- C

### Proximity to population
- Yes

### Public ownership
- A

### Public access
- C

### Human influence on wetland
- B

### Human influence on viewshed
- C

### Spatial buffer
- A

### Recreational activity potential

### Groundwater-specific questions:
- **57 Commercial crop—hydro impact** NA

### Restoration potential
- No

### LO affected by restoration
- No

### Average width of pot. buffer
- 0 feet

### Ease of potential restoration
- 0

### Hydrologic alterations

### Potential wetland type
- B

### Stormwater sensitivity
- B

### Hydroperiod inadequacy

### Fish presence
- A

### Overwintering habitat

### Wildlife species (list)

### Fish habitat quality
- C

### Fish species (list)

### Unique/rare opportunity
- No

### Wetland visibility
- C

### Proximity to population
- Yes

### Public ownership
- A

### Public access
- C

### Human influence on wetland
- B

### Human influence on viewshed
- C

### Spatial buffer
- A

### Recreational activity potential

### Watershed:
- St. Croix (Stillwater)

### WS#: 37 Service Area: 6

### For functional ratings, please run the Summary tab report.

### This report printed on: 10/26/2017

---

C-302
### Wetland Functional Assessment Summary

<table>
<thead>
<tr>
<th>Wetland Name</th>
<th>Hydrogeomorphology</th>
<th>Maintenance of Hydrologic Regime</th>
<th>Flood/Stormwater Attenuation</th>
<th>Downstream Water Quality</th>
<th>Maintenance of Wetland Water Quality</th>
<th>Shoreline Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wetland 8</td>
<td>Depressional/Isolated (no discernable inlets or outlets)</td>
<td>0.75</td>
<td>0.77</td>
<td>0.68</td>
<td>0.53</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Moderate</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>

#### Additional Information

<table>
<thead>
<tr>
<th>Wetland Name</th>
<th>Ground-Water Interaction</th>
<th>Wetland Sensitivity to Stormwater and Urban Development</th>
<th>Additional Stormwater Treatment Needs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wetland 8</td>
<td>Combination Discharge, Recharge</td>
<td>0.00</td>
<td>1.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Not Applicable</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

### Wetland Community Summary

#### Vegetative Diversity/Integrity

<table>
<thead>
<tr>
<th>Wetland Name</th>
<th>Location</th>
<th>Cowardin Classification</th>
<th>Circular Plant 39</th>
<th>Community</th>
<th>Wetland Proportion</th>
<th>Individual Community Rating</th>
<th>Highest Wetland Rating</th>
<th>Average Wetland Rating</th>
<th>Weighted Average Wetland Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wetland 8</td>
<td>82-029-20-18-003-B</td>
<td>PEMB Type 2</td>
<td>Fresh (Wet) Meadow</td>
<td>60</td>
<td>0.1</td>
<td>1.00</td>
<td>0.55</td>
<td>0.46</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>PAB2F Type 4</td>
<td>Deep Marsh</td>
<td>40</td>
<td>1</td>
<td>1.00</td>
<td>0.55</td>
<td>0.46</td>
<td></td>
</tr>
</tbody>
</table>

☑️ Denotes incomplete calculation data.
### MnRAM: Site Response Record
For Wetland: Wetland 9
Location: 82-029-20-18-002-B

#### 2D - Lake Elmo Airport

**Plant Community:** Fresh (Wet) Meadow
Cowardin Classification: Circular 39: PEMB Type 2

**Plant Community:** Shallow Marsh
Cowardin Classification: Circular 39: PEMC Type 3

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Listed, rare, special species?</td>
<td>No</td>
</tr>
<tr>
<td>5</td>
<td>Rare community or habitat?</td>
<td>No</td>
</tr>
<tr>
<td>6</td>
<td>Pre-European-settlement condition?</td>
<td>No</td>
</tr>
</tbody>
</table>

#### Hydrogeomorphology / topography:

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Depressional/FlowThru</td>
<td></td>
</tr>
</tbody>
</table>

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>8-1</td>
<td>Maximum water depth</td>
<td>12 inche</td>
</tr>
<tr>
<td>8-2</td>
<td>% inundated</td>
<td>10%</td>
</tr>
</tbody>
</table>

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Immediate drainage—local WS</td>
<td>108.8 acr</td>
</tr>
<tr>
<td>10</td>
<td>Estimated size/existing site: (see #66)</td>
<td></td>
</tr>
</tbody>
</table>

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>11-Upland Soil</td>
<td>Antigo silt loam, 2 to 6 percent slopes</td>
<td></td>
</tr>
<tr>
<td>11-Wetland Soil</td>
<td>Aquolls and Histosols, ponded</td>
<td></td>
</tr>
</tbody>
</table>

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>Outlet for flood control</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Outlet for hydro regime</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Dominant upland land use</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Wetland soil condition</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Vegetation (% cover)</td>
<td>90%</td>
</tr>
<tr>
<td>17</td>
<td>Emerg. veg flood resistance</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Sediment delivery</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Upland soils (soil group)</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Stormwater runoff</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Subwatershed wetland density</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Channels/sheet flow</td>
<td></td>
</tr>
</tbody>
</table>

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>Adjacent buffer width</td>
<td>10 feet</td>
</tr>
</tbody>
</table>

#### Adjacent area management:

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>24-A</td>
<td>Full</td>
<td>10%</td>
</tr>
<tr>
<td>24-B</td>
<td>Manicured</td>
<td>0%</td>
</tr>
<tr>
<td>24-C</td>
<td>Bare</td>
<td>90%</td>
</tr>
</tbody>
</table>

#### Adjacent area diversity/structure:

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>25-A</td>
<td>Native</td>
<td>0%</td>
</tr>
<tr>
<td>25-B</td>
<td>Mixed</td>
<td>10%</td>
</tr>
</tbody>
</table>

#### Adjacent area slope:

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>26-A</td>
<td>Gentle</td>
<td>80%</td>
</tr>
<tr>
<td>26-B</td>
<td>Moderate</td>
<td>20%</td>
</tr>
<tr>
<td>26-C</td>
<td>Steep</td>
<td>0%</td>
</tr>
</tbody>
</table>

#### Shoreline Wetland:

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>27</td>
<td>Downstream sens./WQ protect.</td>
<td>B</td>
</tr>
<tr>
<td>28</td>
<td>Nutrient loading</td>
<td>B</td>
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</tbody>
</table>

#### Shoreline wetland?

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>29</td>
<td>No</td>
<td></td>
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#### Shoreline Wetland:

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<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>Rooted veg., % cover</td>
<td>0%</td>
</tr>
<tr>
<td>31</td>
<td>Wetland in-water width</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>Emerg. veg. erosion resistance</td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>Erosion potential of site</td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>Upslope veg./bank protection</td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>Rare wildlife?</td>
<td>No</td>
</tr>
<tr>
<td>36</td>
<td>Rare/Rare/S1/S2 community</td>
<td></td>
</tr>
<tr>
<td>37</td>
<td>Vegetative cover</td>
<td></td>
</tr>
<tr>
<td>38</td>
<td>Veg. community interspersion</td>
<td></td>
</tr>
<tr>
<td>39</td>
<td>Wetland detritus</td>
<td></td>
</tr>
<tr>
<td>40</td>
<td>Interspersion on landscape</td>
<td></td>
</tr>
<tr>
<td>41</td>
<td>Wildlife barriers</td>
<td></td>
</tr>
</tbody>
</table>

#### Amphibian-breeding potential:

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>42</td>
<td>Hydroperiod adequacy</td>
<td>Adequate</td>
</tr>
<tr>
<td>43</td>
<td>Fish presence</td>
<td></td>
</tr>
<tr>
<td>44</td>
<td>Overwintering habitat</td>
<td></td>
</tr>
<tr>
<td>45</td>
<td>Wildlife species (list)</td>
<td></td>
</tr>
<tr>
<td>46</td>
<td>Fish habitat quality</td>
<td></td>
</tr>
<tr>
<td>47</td>
<td>Fish species (list)</td>
<td></td>
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</tbody>
</table>

#### Unique/rare opportunity

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>48</td>
<td>No</td>
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#### Hydroperiod adequacy

<p>| | | |</p>
<table>
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<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>49</td>
<td>Wetland visibility</td>
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#### Additional information:

<p>| | | |</p>
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<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>64</td>
<td>Restoration potential</td>
<td>No</td>
</tr>
<tr>
<td>65</td>
<td>LO affected by restoration</td>
<td></td>
</tr>
<tr>
<td>66</td>
<td>Existing size</td>
<td>2.614</td>
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<tr>
<td>67</td>
<td>Restorable size</td>
<td>0</td>
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<tr>
<td>68</td>
<td>Potential new wetland</td>
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#### Additional treatment needs

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<table>
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<tr>
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<tbody>
<tr>
<td>71</td>
<td>Stormwater sensitivity</td>
<td></td>
</tr>
<tr>
<td>72</td>
<td>Additional treatment needs</td>
<td></td>
</tr>
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#### Watershed:

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>73</td>
<td>St. Croix (Stillwater)</td>
<td></td>
</tr>
</tbody>
</table>

WS# 37 Service Area: 6

For functional ratings, please run the Summary tab report.

This report printed on: 10/26/2017

---

C-304
# Wetland Functional Assessment Summary

<table>
<thead>
<tr>
<th>Wetland Name</th>
<th>Hydrogeomorphology</th>
<th>Maintenance of Hydrologic Regime</th>
<th>Flood/Stormwater Attenuation</th>
<th>Downstream Water Quality</th>
<th>Maintenance of Wetland Water Quality</th>
<th>Shoreline Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wetland 9</td>
<td>Depressional/Flow-through (apparent inlet and outlet)</td>
<td>0.63</td>
<td>0.61</td>
<td>0.49</td>
<td>0.37</td>
<td>0.00</td>
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<tr>
<td></td>
<td></td>
<td>Moderate</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Not Applicable</td>
</tr>
</tbody>
</table>

## Additional Information

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<thead>
<tr>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Wetland 9</td>
<td>0.30</td>
<td>0.45</td>
<td>0.15</td>
<td>0.47</td>
<td>0.00</td>
<td>Discharge</td>
<td>0.00</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>Moderate</td>
<td>Low</td>
<td>Moderate</td>
<td>Not Applicable</td>
<td>Not Applicable</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
</tbody>
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# Wetland Community Summary

<table>
<thead>
<tr>
<th>Wetland Name</th>
<th>Location</th>
<th>Community</th>
<th>Wetland Proportion</th>
<th>Individual Community Rating</th>
<th>Highest Wetland Rating</th>
<th>Average Wetland Rating</th>
<th>Weighted Average Wetland Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wetland 9</td>
<td>82-029-20-18-002-B</td>
<td>PEMB Type 2 Fresh (Wet) Meadow</td>
<td>65</td>
<td>0.1</td>
<td>0.10</td>
<td>0.10</td>
<td>0.10</td>
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<tr>
<td></td>
<td></td>
<td>PEMC Type 3 Shallow Marsh</td>
<td>35</td>
<td>0.1</td>
<td>0.10</td>
<td>0.10</td>
<td>0.10</td>
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<tr>
<td></td>
<td></td>
<td>Sum</td>
<td>100</td>
<td>0.1</td>
<td>0.10</td>
<td>0.10</td>
<td>0.10</td>
</tr>
</tbody>
</table>

- Denotes incomplete calculation data.
Appendix I. Delineator Qualifications
BRAUNA HARTZELL, GISP
GEOGRAPHIC INFORMATION SYSTEM (GIS)/IMAGE PROCESSING ANALYST

EXPERIENCE (GIS)

Brauna Hartzell has more than 20 years of experience applying GIS software and database design techniques to support wetlands and water resources, historic preservation, community planning, transportation, aviation and military planning, and municipal infrastructure and storm water management. She has worked extensively with GIS and mapping software including ArcGIS desktop and has specialized experience with 3D Analyst, Network Analyst and Spatial Analyst. She also collects environmental field data using hand-held GPS units and post-processes information for inclusion in databases and use in spatial analyses. Brauna collaborates with personnel from multiple disciplines to solve complex spatial problems through scripting and spatial analysis to deliver results and data for project-specific needs. She utilizes geoprocessing models, Python, and VBA to meet analytical needs of projects.

Brauna is experienced with GIS-related data submittal requirements associated with the Federal Energy Regulatory Commission (FERC) and the Federal Aviation Administration (FAA) data standardization initiatives. She has extensive experience developing Geodatabases with the Spatial Data Standards for Facility, Infrastructure, and Environment (SDSFIE) standard and creating Federal Geographic Data Committee (FGDC)-compliant metadata.

Brauna has specialized experience with using 3D data formats for spatial analysis, contour generation and manipulation, and geospatial modeling. She is adept in the use of LiDAR-derived data and DTMs in support of hydrology and hydraulic analyses. Additionally, she has extensive experience with SSURGO databases and the National Hydrography Dataset.

EXPERIENCE (WETLAND/ENVIRONMENTAL)

Brauna Hartzell has more than ten years of experience in wetland delineation, wetland permitting, and restoration projects. She performs wetland and field delineations conforming to current United States Army Corps of Engineers (USACE) including the Northcentral and Northeast Regional Supplement and State standards, designs custom field data collection applications, collects field data using hand-held Global Positioning Systems (GPS) data collectors and tablets, and prepares National Environmental Policy Act (NEPA) documentation. Brauna has successfully guided numerous projects through the Section 404 permitting process.

Brauna has performed numerous wetland delineations in the Upper Midwest. She conducts wetland mitigation site monitoring according to established site-specific assessment protocols, performs vegetation surveys, and analyzes and presents field collected data in graphical and tabular form. She also assists in mitigation site design and construction specifications development.

Areas of Expertise
- Geographic Information Systems (GIS)
- Remote-sensing image processing
- Digital mapping
- Database design
- Programming
- Wetland delineation and permitting

Education
- MS, Environmental Monitoring, 1994, University of Wisconsin, Madison
- BS, Biological Science, 1982, Florida State University, Tallahassee, Florida

Registration/Certification
- Certified GIS Professional (GISP), GIS Certification Institute

Training and Seminars
- Building Web Applications Using the ArcGIS API for Flex, ESRI
- Geodatabase Design Concepts, ESRI
- Vascular Flora of Wisconsin, University of Wisconsin – Madison, Spring 2002
- Wetlands Ecology, University of Wisconsin – Madison, Spring 2003
- Grasses: Identification and Ecology Workshop, University of Wisconsin – Milwaukee workshop, 2002
- GPS Field Collection Techniques Training Workshop for Trimble GeoXH, Seiler Instruments
- Basic Wetland Delineation Workshop, University of Wisconsin–LaCrosse, 2002
- Basic Hydric Soil Identification Workshop, University of Wisconsin – LaCrosse, 2005
- Advanced Wetland Delineation Workshop, University of Wisconsin – LaCrosse, 2007
- Wildlife Inventory and Monitoring, University of Wisconsin – Milwaukee workshop, 2015
BRAUNA HARTZELL, GISP (CONTINUED)

RELATED PROJECTS (WETLANDS)

Wetland Delineations
Various Clients
Midwest USA
Brauna performed wetland delineations in accordance with the Routine On-Site Method of 1987 United States Army Corps of Engineers (USACE) wetland delineation manual at various sites in Wisconsin and Minnesota. Work included conducting the delineation, documenting field investigations and site conditions, creating wetland boundary maps, and report writing. Delineations were performed for the following projects:

- Pellet Subdivision – Middleton, Wisconsin, 2002
- Potter’s Creek Subdivision – Green Bay, Wisconsin, 2003
- Oak Street Bridge Design – La Crosse, Wisconsin, 2003
- State Trunk Highway (STH) 29 – Marathon County, Wisconsin, 2003
- Hampton Heights Subdivision – Ledgeview, Wisconsin, 2004
- County Trunk Highway (CTH) W – Oconto County, Wisconsin, 2004
- Town of Rockland Preliminary Plat – Brown County, Wisconsin, 2004
- Mourning Dove Subdivision – Oconto County, Wisconsin, 2004
- Cinnamon Ridge Subdivision – Suamico, Oconto County, Wisconsin, 2004
- Kenosha Regional Airport – Kenosha, Wisconsin, 2005
- County Trunk Highway (CTH) A – Lincoln County, Wisconsin
- CTH D – Vernon County, Wisconsin, 2006
- Burton Street – Beloit, Wisconsin, 2006
- Central Wisconsin Airport – Mosinee, Marathon County, Wisconsin, 2008
- State Trunk Highway (STH) 67, Fond du Lac County, Wisconsin, 2011
- Interstate Highway 90/94 Corridor Study, 2014 & 2015
- Ontonagon County Airport, Ontonagon County, Michigan, 2016
- Central Wisconsin Airport – Mosinee, Marathon County, Wisconsin, 2016
- Little Rock Lake, Vilas County, Wisconsin, 2016

Past Employment
- Information Management Systems, Inc.
- Adult Communities Total Services, Inc.
- Archeological Assessments, Inc.
- University of Wisconsin – Madison

No. of Years With Mead & Hunt
- Hired 08/28/1992

No. of Years With Other Firms
- Four

Ontonagon County Airport, 2016
Michigan Bureau of Aeronautics
Ontonagon County, Michigan
Brauna served as the lead wetland delineator in support of permitting and on-site mitigation activities related to proposed wetland disturbance in another area of the airport. The area of interest is approximately 19.4 acres in size and resulted in the delineation of 11 wetlands in areas previously in agricultural production. Brauna also performed groundwater well monitoring and data analysis in support of mitigation site design.

Central Wisconsin Airport, 2016
Wisconsin Bureau of Aeronautics
Mosinee, Marathon County, Wisconsin
Brauna served as the lead wetland delineator in support of master planning activities related to determining the viability of shifting Runway 17/35 to the south. The area of interest is approximately 70 acres in size and resulted in the delineation of three large wetlands on airport property and two off-site. The three on-site wetlands experience regular mowing and other maintenance activities as well as show evidence of
groundwater contact on a sloping terrain with a seasonal high-water table; off-site wetlands consisted of an alder and a hardwood swamp.

**Little Rock Lake Wetland Survey, 2016**  
**National Ecological Observatory Network (NEON), Boulder, CO**  
**Vilas County, Wisconsin**  
Brauna served as the lead wetland scientist in support of site equipment layout investigations for long-term ecological monitoring. A total of four wetlands were delineated within the area of interest at this mesotrophic seepage lake covering about 39 acres. Each proposed equipment installation site was surveyed and wetlands delineated in close proximity to any proposed location.

**Interstate Highway (IH) 90/94 Corridor Study, 2013-2017**  
**Wisconsin Department of Transportation (WisDOT) Southwest Region**  
**Portage, Juneau, Sauk, and Columbia Counties, Wisconsin**  
Mead & Hunt is leading a team that is conducting a corridor study of IH 90/94 from US12/WIS 16 to IH39. The project consists of evaluating operational and safety issues, review of the interchanges and ramps within the corridor, and evaluating possible expansion. Environmental studies are being conducted and include; cultural resources surveys, endangered species surveys, contaminated material investigations, noise analysis and wetland delineations. Brauna is a wetland scientist assisting in the delineation, wetland field data collection and mapping. Cost: $210 million

**STH 67 Resurfacing Design and Environmental Documentation, 2011**  
**Wisconsin Department of Transportation (WisDOT) Northeast Region**  
**Fond du Lac County, Wisconsin**  
Mead & Hunt lead redesign of this 20 mile corridor of STH 67 spanning Fond du Lac County through both rural and developed sections. In support of environmental documentation, a wetland delineation was performed within the right-of-way for the 20 mile corridor. Wetland types encountered include: shallow marsh, fresh wet meadows, shrub swamps, and riparian wetlands. In total, 69 wetlands were delineated. Brauna assisted with wetland delineation and survey, mapping and data management.

**Wetland Mitigation, Runway 14/32 Safety Area, 2004-2011**  
**WisDOT Bureau of Aeronautics**  
**Madison, Wisconsin**  
Brauna served as project scientist for this reconstruction of a runway safety area and railroad within a state natural area. 140 acres of fen and sedge meadow were restored and enhanced, and 6,000 feet of Starkweather creek was restored with an annually flooded riparian corridor. The project also included restoration of ten acres of swamp forest and 35 acres of upland buffer, plus negotiation of annual management and monitoring to enhance rare plant habitats within Cherokee Fen. The mitigation cost was more than $1.5 million, with a total project construction cost of $25 million. Brauna assisted with wetland monitoring and collection of botanical and hydrologic data for compliance. She also monitored for invasive species.

**Wetland Permit Application, 2003-2008**  
**Tulip City Airport**  
**Holland, Michigan**  
The purpose of the project was to increase the capacity of the main runway and correct unsafe conditions in the approaches to the airport. Four project alternatives were addressed in the permit application, as well as wetland avoidance and impact minimization. Special considerations included the minimization of wildlife habitat
potential for airport safety reasons and the location of the mitigation site “offsite” within three miles of the airport. In 2003, Brauna designed a riparian wetland mitigation site in the City of Holland. The project included construction plans and sections, an examination of existing site conditions, vegetative reestablishment and expected hydrology, and a monitoring protocol including performance stands. Monitoring in 2008 showed that site has achieved full performance in terms of wetland function and area.

Voges Road, Road Reconstruction Permit Application
City of Madison
Madison, Wisconsin
The proposed reconstruction of Voges Road, a vital corridor connection between Madison and McFarland, necessitated the submission of a Section 404 permit application. The proposed improvements included widening the road and upgrading to an urban curb-and-gutter section to accommodate increased traffic volumes and improve drainage along the road.
KIMBERLY SHANNON
ENVIRONMENTAL SCIENTIST

Kimberly Shannon is an environmental scientist with over a decade of experience. Over the years she has gained professional experience in coordinating and completing a variety of project types including oil and gas, electric transmission, nuclear, transportation, commercial development, and local government. She has honed her regulatory and technical skills while providing excellent service to diverse clients. Her technical expertise and strongest skills as a consultant include the identification, mapping, and delineation of streams and wetlands; 404 permitting and compensatory mitigation; United States Army Corps of Engineers (USACE) coordination, and assisting various clients through the 404 permitting process. Kimberly also has professional experience in the preparation and coordination of environmental assessment and categorical exclusion documents in support of the National Environmental Policy Act (NEPA) process, habitat evaluation for threatened and endangered species, proposal writing and pricing, technical writing and editing, training junior staff, and working with project managers, colleagues and clients to achieve project goals and objectives in a timely and cost effective manner. She coordinates with subcontractors and science/environmental staff in offices across the country to complete field work, reports, permits, and data deliverables.

RELATED PROJECTS

Mitigation Coordination for Oklahoma Department of Transportation (ODOT) with Multiple Agencies, EC 1660, 2015-present

ODOT Statewide, Oklahoma

Kimberly is assisting ODOT with the coordination of various mitigation projects across Oklahoma. As part of this contract she is working directly with the USACE, other consultants, and the Oklahoma Chapter of The Nature Conservancy, a key mitigation partner for ODOT. Assisting TNC with production of a mitigation master plan for TNC’s Oka’ Yanahli Preserve in Pontotoc County, OK.

Kimberly’s years of various environmental project experience includes:

- Waters re-evaluations and mitigation plans – ODOT
- Mitigation plan for Durant Bypass – ODOT
- Local government contract for statewide county road and bridge projects – ODOT
- BNSF Railroad separation EA – ODOT
- Delineations, 404 permitting, and mitigation planning in Texas and Oklahoma – QuikTrip
- Natural gas liquids trunk line right of way assessments, reports and 404 permitting in OK, KS, TX, CO included over 400 miles and 1,000 waterbodies assessed – DCP Midstream, LLC
- Wetland delineations and site spot checks in Uintah Basin, Utah; Senior delineator for site-specific survey on Ute and Ouray Reservation – Constellation Energy Partners (CEP)
- Section 7 consultation and biological assessment (BA) for the American Burying Beetle in Tulsa, OK – Tulsa Botanic Garden

Areas of Expertise

- Permitting and licensing
- NEPA
- Public involvement
- Regulatory compliance
- Environmental Assessments
- Environmental Reports
- Stream and wetland delineation

LinkedIn url

https://www.linkedin.com/pub/kimberly-shannon/29/412/a38

Education

- MS, Applied and Natural Science, Oklahoma State University, 1997
- BS, Biology, Oklahoma State University, 1994
- Certificate, GIS, Tulsa Community College, 2010

Training and Seminars

- “Contractor Orientation Safety Course,” Burlington Northern Santa Fe Railroad (BNSF), Union Pacific Railroad (UPRR), 2009
- “Regional Supplement Seminar,” Wetland Training Institute, 2008

Presentations

- NEPA Updates for Oklahoma, Wallace Engineering, 2009
- Panel Presentation: Landowner Relationships, Natural Areas Associations Conference, 2004

Past Employment

6-27-17
KIMBERLY SHANNON (CONTINUED)

- Delineations, habitat assessments, vegetation mapping, aquatic ecology surveys, and NRC site audits in support of COL application and ER Luminant Generation Company – Comanche Peak Nuclear Power Plant, Glen Rose, TX
- Coordinated staff for weeks of biological monitoring of seismic drilling and receiver line crews at Tishomingo – NWR Chesapeake Energy

**Ontonagon County Airport, 2016**
**Michigan Bureau of Aeronautics**
**Ontonagon County, Michigan**
Kim served as a wetland delineator in support of permitting and on-site mitigation activities related to a proposed wetland disturbance in another area of the airport. The area of interest spans approximately 19.4 acres and resulted in the delineation of 11 wetlands in areas previously in agricultural production. Kim also assisted groundwater well monitoring in support of mitigation site design.

**Waters Re-Evaluations and Mitigation, 2009-January 2010**
**Oklahoma Department of Transportation (ODOT)**
**Statewide, Oklahoma**
Kimberly assisted with multiple re-evaluations of potentially jurisdictional waterbodies related to bridge replacement projects across Oklahoma. Delineation reports, 404 permits, and mitigation plans were prepared for the ODOT. This project was completed while Kimberly was employed with another firm.

**Mitigation Projects, 2009-2015**
**Oklahoma Department of Transportation (ODOT)**
**Statewide, Oklahoma**
Kimberly prepared compensatory mitigation plans for 404 Permit Applications in support of ODOT road and bridge improvement projects across Oklahoma. She conducted and coordinated site assessments, site selection, landowner correspondence and coordination, site planning, agency coordination, and monitoring plans for multiple mitigation projects.

**Mitigation Plan, Durant Bypass, May 2010-2015**
**Oklahoma Department of Transportation (ODOT)**
**Durant, Oklahoma**
Kimberly prepared a compensatory mitigation plan for a 404 permit in support of the ODOT’s bypass loop around US70 in Durant, Oklahoma. She coordinated with the United States Army Corps of Engineers (USACE), ODOT, subcontractors, and the City of Durant during the project.

**Delineation, Reporting, and 404 Permitting, November 2011-April 2012**
**QuikTrip**
**Dallas/Fort Worth Metroplex, Texas**
Kimberly led and completed multiple delineations, protected species habitat evaluations, reporting efforts, and 404 permitting (NWP39) including mitigation bank and agency coordination for the client. This project was completed while Kimberly was employed with another firm.
KIMBERLY SHANNON (CONTINUED)

Delineation, Reporting, and 404 Permitting for 72-TC, May 2014-September 2014
QuikTrip Corporation
 Muskogee, Oklahoma
Kimberly coordinated and completed the delineation, protected species habitat evaluations, reporting efforts, and 404 permitting (NWP39) including mitigation plan preparation and agency coordination for the client. *This project was completed while Kimberly was employed with another firm.*

Local Government Contract for Statewide County Road and Bridge Projects
Oklahoma Department of Transportation (ODOT)
Statewide Oklahoma
These similar county-level projects included the delineation of potentially jurisdictional waterbodies, assessment of potential habitat for federally protected species, reporting efforts, the completion of project specific National Environmental Policy Act (NEPA) clearance documents, tribal coordination, and coordination with Oklahoma Department of Transportation (ODOT) contacts and county commissioners. Kimberly assisted with the coordination and completion of field assessments and related reports in support of the Categorical Exclusion (CE) documents. She also coordinated report review with ODOT and preparation of the CE report. *This project was completed while Kimberly was employed with another firm.*

Southern Hills Natural Gas Liquids Trunk Line ROW Assessments, Reports and 404 Permitting, December 2011-July 2012
DCP Midstream, LLC
 Meade County, Kansas and Beaver, Harper, Woodward, Major, Blaine, Kingfisher, Logan, Oklahoma, Lincoln, and Pottawatomie Counties, Oklahoma
Kimberly reviewed and classified over 500 waterbodies along approximately 260 miles of pipeline right-of-way. She reviewed all right-of-way feature maps and coordinated field data for the presence of potentially jurisdictional waters and potential threatened and endangered species habitat for a large trunk line pipeline in Oklahoma. Kimberly classified and coordinated mapping efforts with GIS professionals and the client to assist with horizontal directional drilling (HDD) boring locations in order to avoid or minimize impacts to jurisdictional waterbodies. These data were used to complete delineation reports, 404 permitting (NWP12) and to prepare engineering alignment sheets. As appropriate, Kimberly coordinated directly with the Tulsa and Fort Worth District Regulatory Branch of the United States Army Corps of Engineers for the timely completion and issuance of NWP12. She worked directly with the client’s environmental project manager to assist with reroutes and attended alignment sheet review meetings. *This project was completed while Kimberly was employed with another firm.*

Southern Hills Natural Gas Liquids Lateral Lines Right-of-Way Assessments, Reports and 404 Permitting, March-August 2012
DCP Midstream, LLC
 Woodward, Woods, Major, Logan, and Lincoln Counties, Oklahoma
Kimberly classified over 300 waterbodies along approximately 88 miles of pipeline right-of-way. She reviewed all right-of-way feature maps and coordinated field data for the presence of potentially jurisdictional waters and potential threatened and endangered species habitat for multiple lateral pipelines in Oklahoma. Kimberly classified and coordinated mapping efforts with GIS professionals and the client to assist with horizontal directional drilling (HDD) boring locations in order to avoid or minimize impacts to jurisdictional waterbodies. These data were used to complete delineation
KIMBERLY SHANNON (CONTINUED)

reports, 404 permitting (NWP12) and to prepare engineering alignment sheets. As appropriate, Kimberly coordinated directly with the Tulsa and Fort Worth District Regulatory Branch of the United States Army Corps of Engineers for the timely completion and issuance of NWP12. She worked directly with the client’s environmental project manager to assist with reroutes and attended alignment sheet review meetings. This project was completed while Kimberly was employed with another firm.

Chitwood/Sholem Lateral Pipeline Right-of-Way Assessments, Reports and 404 Permitting, April-August 2012
DCP Midstream, LLC
Jefferson County, Oklahoma and Clay and Jack Counties, Texas
Kimberly classified over 189 waterbodies along approximately 31.5 miles of pipeline right-of-way. She reviewed all right-of-way feature maps and coordinated field data for the presence of potentially jurisdictional waters and potential threatened and endangered species habitat for multiple pipelines in Oklahoma and Texas. Kimberly classified and coordinated mapping efforts with GIS professionals and the client to assist with horizontal directional drilling (HDD) boring locations in order to avoid or minimize impacts to jurisdictional waterbodies. These data were used to complete delineation reports, 404 permitting (NWP12) and to prepare engineering alignment sheets. As appropriate, Kimberly coordinated directly with the Tulsa and Fort Worth District Regulatory Branch of the United States Army Corps of Engineers for the timely completion and issuance of NWP12. She worked directly with the client’s environmental project manager to assist with reroutes and attended alignment sheet review meetings. This project was completed while Kimberly was employed with another firm.

Wetland Delineations and Site Spot Checks, May-September 2014
Constellation Energy Partners (CEP)
Uintah Basin, Utah
Kimberly worked in the Uintah Basin in northeast Utah on multiple occasions to assist as a Senior Delineator for site-specific waters and wetlands delineations, section block (square mile) surveys, and site spot checks for waterbodies on the Ute and Ouray Reservation. This project was completed while Kimberly was employed with another firm.

Biological Assessment (BA) for the American Burying Beetle, 2007-2008
Tulsa Botanic Garden
Tulsa, Oklahoma
In response to a federal nexus via a nationwide permit application for the construction of a dam at the Oklahoma Centennial Botanical Gardens, Kimberly prepared a biological assessment in response to Formal Section 7 Consultation with United States Fish and Wildlife Service for the American Burying Beetle. This project was completed while Kimberly was employed with another firm.

Wetland Inventory, 2006-2007
Camp Gruber Maneuver Training Center
Muskogee County, Oklahoma
As directed by EO 11990, Kimberly was part of a team that assessed the Camp Gruber site for new wetlands and verification of previously identified wetlands, including delineation of waterbodies subject to the jurisdiction of the United States Army Corps of Engineers (USACE). This project was completed while Kimberly was employed with another firm.
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STATE HISTORIC PRESERVATION OFFICE

December 28, 2017

Mr. Josh Fitzpatrick
Environmental Protection Specialist
Federal Aviation Administration
Dakota – Minnesota Airports District Office
6020 28th Avenue South, Room 102
Minneapolis, MN 55450

RE: Lake Elmo Airport Improvement Project
Baytown Twp & West Lakeland Twp, Washington County, MN
SHPO Number: 2018-0345

Dear Mr. Fitzpatrick:

Thank you for the opportunity to comment on the above project. Information received in our office on 1 December 2017 has been reviewed pursuant to the responsibilities given the State Historic Preservation Officer by Section 106 of the National Historic Preservation Act of 1966 and implementing federal regulations at 36 CFR 800.

We have reviewed the documentation included with your November 21, 2017 cover letter, a submittal which included the following reports: Phase I Archaeological Identification Survey of Proposed Changes to Portions of the Lake Elmo Airport, Washington County, Minnesota (August 2017, Mississippi Valley Archaeology Center); and Phase I Reconnaissance Survey Report, Lake Elmo Airport (November 2017, Mead & Hunt) with associated inventory forms. Our comments are provided below.

Area of Potential Effects
We have completed our review of your correspondence along with the documentation provided in regards to your agency’s determination of the area of potential effect (APE) for the Federal undertaking. We agree that this APE determination is generally appropriate to take into account the potential direct and indirect effects of the proposed undertaking as we currently understand it. As the project’s scope of work is further defined, or if it is significantly altered from the current scope, additional consultation with our office may be necessary in order to revise the current APE.

Identification of Historic Properties
Archaeology
As a result of the investigations, two archaeological sites were identified within the APE for this project, 21WA0119 and 21WA0120. These sites have not been evaluated to determine their eligibility for listing in the National Register of Historic Places (NRHP). As long as the trees and vegetation are hand-cut within the site areas, and there is no ground disturbance and no use of heavy machinery in the site areas, this project should have no effect on archaeological resources. If impacts to these sites cannot be avoided, Phase II evaluation will be needed.
History/Architecture Properties
Thirteen history/architecture properties were identified within the APE for this project. We agree with your agency’s determination that the following twelve properties are not eligible for listing in the NRHP: Edward Flynn House (WA-BYT-004), house at 3245 Neal Ave. N (WA-BYT-008), house at 3101 Neal Ave. N (WA-BYT-009), house at 13030 30th St. N (WA-BYT-010), house at 13100 30th St. N (WA-BYT-011), house at 12905 40th St. N (WA-BYT-012), house at 12805 40th St. N (WA-BYT-013), house at 12689 40th St. N (WA-BYT-014), house at 12657 40th St. N (WA-BYT-015), Lake Elmo Airport (WA-BYT-016), house at 2925 Neal Ave. N (WA-WLK-006), and house at 2933 Manning Ave. N (WA-WLK-007). We agree that the remaining property, the St. Paul, Stillwater and Taylor’s Falls Railroad Corridor (XX-RRD-044), needs further evaluation to determine its eligibility for listing in the NRHP.

Assessment of Effects
Provided that impacts to sites 21WA0119 and 21WA0120 are avoided as stated, and that all project activities occur outside the boundaries of the St. Paul, Stillwater and Taylor’s Falls Railroad Corridor Historic District, we concur with your agency’s determination that no historic properties will be affected by this project.

Implementation of the undertaking in accordance with this finding, as documented, fulfills the agency’s responsibilities under Section 106. If the project is not constructed as proposed, including, but not limited to, a situation where engineering/design changes to the currently proposed project diverts substantially from what was presented at the time of this review, or engineering/design changes involving undisturbed new rights-of-way or easements are made for the undertaking following completion of this review, the agency will need to reopen Section 106 consultation with our office.

Please contact Kelly Gragg-Johnson, Review and Compliance Specialist, at (651) 259-3455 if you have any questions regarding our review of this project.

Sincerely,

Sarah J. Beimers, Manager
Government Programs and Compliance
1. DESCRIPTION OF THE UNDERTAKING
The Lake Elmo Airport (Airport) has undertaken an environmental assessment (EA) with the Federal Aviation Administration (FAA) for Airport improvements including:
   1. Relocate Runway 14/32 to the northeast and extend to the southeast, including all necessary grading, clearing, and runway lighting.
   2. Construct cross-field taxiway to serve new Runway 14 end.
   3. Convert existing Runway 14/32 to a partial parallel taxiway and construct other taxiways as needed to support the relocated runway, including taxiway lighting and/or reflectors.
   4. Extend Runway 04/22 to the northeast and add necessary lighting and taxiway connectors.
   5. Realign 30th Street North around the new Runway 14/32 runway protection zone to reconnect with Neal Avenue North.
   6. Construct a connector road.
   7. Establish non-precision instrument approach procedures to all four runway ends.
   8. Remove approximately 20 acres of trees.

A map identifying project features can be found in Appendix A.

2. AREA OF POTENTIAL EFFECT
The Area of Potential Effect (APE) is the area within which an undertaking may affect an historic property or cultural resource, either directly or indirectly. The APE for this project encompasses all areas proposed for disturbance and the view shed (the area which the project may visually impact) of the project (Appendix B).

3. EFFORTS TO IDENTIFY HISTORIC PROPERTIES
Qualified historians from Mead & Hunt worked with the FAA to delineate the Area of Potential Effect (APE), which was defined to include the Lake Elmo Airport and first-tier properties, those that are directly adjacent to airport property, with structures that are 45 years in age or older. Where project activities are more extensive and have additional direct and indirect effects, such as at the southeast end of Runway 32 and proposed 30th Street realignment areas, the APE was expanded to include second tier properties,
those adjacent to first tier properties. The APE takes into account direct and indirect effects to resources based on the proposed project activities. A map of the APE is included in Appendix B.

Prior to fieldwork, the project team conducted a literature review at the Minnesota State Historic Preservation Office (SHPO) to identify any previously surveyed architecture/history properties within the APE. One property within the APE, the Edward Flynn House (WA-BYT-004), was previously identified.

Mead & Hunt historians conducted Phase I fieldwork on May 30, 2017 (Appendix C). In addition to the previously identified Edward Flynn House, historians identified 12 historic-age resources, which are defined as constructed in or before 1972. Of the 13 surveyed properties, 12 are recommended not eligible for listing in the National Register of Historic Places (NRHP) and no further work is required.

The remaining property, the Union Pacific Railway—historically the St. Paul, Stillwater, & Taylor’s Falls (StPS&TF) Railroad—is recommended for further study if future actions were to impact the line. The line may have significance under the Railroads in Minnesota, 1862-1956 Multiple Property Documentation Form (MPD), applying NRHP Criterion A: Transportation as an early connection between the manufacturing/commerce nodes of Stillwater and the Twin Cities, and as an important component of Minnesota’s railroad network that provided an early link between the Twin Cities, Stillwater, and wider markets.

Project activities, however, are located on airport property, outside the railroad right-of-way and potential historic boundary (as outlined in the MPD, the historic boundary will be the historic right-of-way of the company that built the line) and have a minimal potential for impact to the railroad corridor. Project related tree removal, will not alter any character-defining features of the potential StPS&TF Railroad Corridor Historic District or diminish its potential significance. Furthermore, the tree removal will have a limited impact on the overall setting and visual appearance from the railroad corridor itself. The loss of a relatively small number of trees along the entire rail corridor (which currently extends from St. Paul to Stillwater) will not drastically change the railroad’s overall visual appearance, setting, or feeling.

In addition, there is no potential for indirect visual effects to the railroad corridor as changes to the runways, lighting, and navigational aids proposed adjacent to the railroad will not drastically alter current views from along the corridor. Similarly, there are no anticipated noise impacts to the railroad. Aircraft size and type will not change from what is currently landed on the runways adjacent to the railroad corridor. There will be no discernable change to noise levels experienced on railroad property. As such, it was determined that no further work is required for this property at this time. Should project activities change to potentially impact the railroad, then a reexamination of their effects on the StPS&TF Railroad would be completed.
The Mississippi Valley Archaeology Center (MVAC) conducted a Phase I archaeological survey (Appendix D) for the proposed Lake Elmo Airport in Washington County, Minnesota on June 1, and July 12, and 13, 2017.

A total of approximately 126 acres was surveyed. Survey methods included pedestrian survey in plowed fields with excellent surface visibility, and shovel testing within portions of the current airport grounds and wooded areas within and adjacent to the plowed fields with no surface visibility.

Two new historic sites were identified. 21WA0119 consists of historic foundations with one structure consisting of a limestone foundation with a concrete addition, and a second foundation made of concrete and cinderblock. There are also some concrete slabs of unknown use. Based on historical documentation, these structures were erected sometime between 1874 and 1901, and were present until possibly the early 1980’s. 21WA0120 consists of two historic foundations made of concrete. Based on historical research, the structures were erected sometime between 1874 and 1901, and were present until at the least the mid to late 1960’s.

Historical maps and deed research indicate that from 1933 to 1946, the foundations associated with both of these sites, and the land surrounding them, were owned by the Jacob Schmidt Brewing Company. It is unknown if the buildings at these two sites were used in any of the manufacturing or storage for the brewery which during the 1930’s and 1940’s, was the seventh largest in the nation. The intact foundations indicate integrity, and the relationship to the Jacob Schmidt Brewing Company could indicate significance. These two sites may be potentially eligible for listing on the NRHP under Criteria D, as they could yield important information about the past. However, since ultimately ground disturbing activities will be able to avoid these sites, the sites were not formally evaluated for eligibility for the NRHP. The only action in the site areas is the groves of trees they are located in will be clear cut.

No other cultural material was identified within the project area, therefore no further work is recommended for the remainder of the project. However, if in the future ground disturbing activities are planned in the locations of WA0119 and WA0120, the SHPO will be consulted to see if further evaluations are necessary.

4. BASIS FOR FINDING
The FAA has therefore determined that a finding of No Historic Properties Affected is appropriate for the project. The FAA respectfully requests that the Lower Sioux Indian Community THPO, Upper Sioux Indian Community THPO, Prairie Island Indian Community THPO, Mille Lacs Band of Ojibwe THPO, the Shakopee Mdewakanton Sioux Community, and SHPO provide written concurrence with this Section 106 finding within 30 days of receipt.
ATTACHMENTS
Appendix A  Project Exhibit
Appendix B  APE & Phase I Reconnaissance Survey Sites
Appendix C  Phase I Reconnaissance Survey
Appendix D  Phase I Archeological Survey

Josh Fitzpatrick
Environmental Protection Specialist
Federal Aviation Administration
Dakota-Minnesota Airport District Office

20 October 2017
Date
Attachment A
1. Relocate Runway 14/32 to the northeast and extend to the southeast, including all necessary grading, clearing, and runway lighting.
2. Construct cross-field taxiway to serve new Runway 14 end.
3. Convert existing Runway 14/32 to a partial parallel taxiway and construct other taxiways as needed to support the relocated runway, including taxiway lighting and/or reflectors.
4. Extend Runway 04/22 to the northeast and add necessary lighting and taxiway connectors.
5. Realign 30th Street North around the new Runway 14/32 runway protection zone to reconnect with Neal Avenue North.
6. Construct a connector road.
7. Establish non-precision instrument approach procedures to all four runway ends.
8. Remove approximately 20 acres of trees (pink areas).
Attachment B
From: Fitzpatrick, Joshua (FAA)
Sent: Friday, October 20, 2017 10:33 AM
To: Cheyanne St. John <cheyanne.stjohn@lowersioux.com>
Subject: Section 106 Determination of Effect for the Lake Elmo Airport Improvement Project

Dear Ms. St. John:

The Federal Aviation Administration (FAA) determined that a Section 106 finding of a No Historic Properties Affected is applicable for the Lake Elmo Airport Improvement Project. The FAA respectfully requests the Lower Sioux THPO to provide written concurrence with the Section 106 determination of No Historic Properties Affected within 30 days of receipt.

I have placed a hard copy in the mail to President Pendleton as well. Do you want me to continue to do that?

If you have any comments, questions, or concerns regarding the analyses and conclusions used to determine the potential effects of the proposed project on historic, cultural, and archaeological resources, or have any questions regarding the project, please do not hesitate to contact me.

Sincerely,

Josh Fitzpatrick
Environmental Protection Specialist
FAA Dakota-Minnesota Airport District Office
Joshua.Fitzpatrick@faa.gov
(612) 253-4639
Dear Ms. Weyaus:

The Federal Aviation Administration (FAA) determined that a Section 106 finding of a No Historic Properties Affected is applicable for the Lake Elmo Airport Improvement Project. The FAA respectfully requests the Mille Lacs Band of Ojibwe THPO to provide written concurrence with the Section 106 determination of No Historic Properties Affected within 30 days of receipt.

If you have any comments, questions, or concerns regarding the analyses and conclusions used to determine the potential effects of the proposed project on historic, cultural, and archaeological resources, or have any questions regarding the project, please do not hesitate to contact me.

Sincerely,

Josh Fitzpatrick
Environmental Protection Specialist
FAA Dakota-Minnesota Airport District Office
Joshua.Fitzpatrick@faa.gov
(612) 253-4639
Dear Mr. White:

The Federal Aviation Administration (FAA) determined that a Section 106 finding of a No Historic Properties Affected is applicable for the Lake Elmo Airport Improvement Project. The FAA respectfully requests the Prairie Island Indian Community THPO to provide written concurrence with the Section 106 determination of No Historic Properties Affected within 30 days of receipt.

If you have any comments, questions, or concerns regarding the analyses and conclusions used to determine the potential effects of the proposed project on historic, cultural, and archaeological resources, or have any questions regarding the project, please do not hesitate to contact me.

Sincerely,

Josh Fitzpatrick
Environmental Protection Specialist
FAA Dakota-Minnesota Airport District Office
Joshua.Fitzpatrick@faa.gov
(612) 253-4639
From: Fitzpatrick, Joshua (FAA)  
Sent: Friday, October 20, 2017 10:46 AM  
To: Leonard Wabasha <leonard.wabasha@shakopeedakota.org>  
Subject: Section 106 Determination of Effect for the Lake Elmo Airport Improvement Project

Dear Mr. Wabasha:

The Federal Aviation Administration (FAA) determined that a Section 106 finding of a No Historic Properties Affected is applicable for the Lake Elmo Airport Improvement Project. The FAA respectfully requests the Shakopee Mdewakanton Sioux Community to provide written concurrence with the Section 106 determination of No Historic Properties Affected within 30 days of receipt.

If you have any comments, questions, or concerns regarding the analyses and conclusions used to determine the potential effects of the proposed project on historic, cultural, and archaeological resources, or have any questions regarding the project, please do not hesitate to contact me.

Sincerely,

Josh Fitzpatrick
Environmental Protection Specialist
FAA Dakota-Minnesota Airport District Office
Joshua.Fitzpatrick@faa.gov
(612) 253-4639
Dear Ms. Odegard:

The Federal Aviation Administration (FAA) determined that a Section 106 finding of a No Historic Properties Affected is applicable for the Lake Elmo Airport Improvement Project. The FAA respectfully requests the Upper Sioux THPO to provide written concurrence with the Section 106 determination of No Historic Properties Affected within 30 days of receipt.

I have placed a hard copy in the mail to your Chairman as well. Do you want me to continue to do that?

If you have any comments, questions, or concerns regarding the analyses and conclusions used to determine the potential effects of the proposed project on historic, cultural, and archaeological resources, or have any questions regarding the project, please do not hesitate to contact me.

Sincerely,

Josh Fitzpatrick
Environmental Protection Specialist
FAA Dakota-Minnesota Airport District Office
Joshua.Fitzpatrick@faa.gov
(612) 253-4639
Phase I
(Reconnaissance Survey) Report

Lake Elmo Airport

Prepared for
Metropolitan Airports
Commission

Prepared by
Mead & Hunt
www.meadhunt.com

Co-principal investigators Katherine Haun Schuring and Kathryn Ohland

Project Managers Emily Pettis and Evan Barrett

November 2017
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Executive Summary

The Metropolitan Airports Commission (MAC) recently completed a Long-Term Comprehensive Plan (LTCP) for the Lake Elmo Airport, which was approved by the MAC Board in September 2016. The key planning objectives of the LTCP include: addressing failing end-of-life infrastructure, enhancing safety, and improving operational capacity for design aircraft family. To meet these objectives, the MAC, owner of the Lake Elmo Airport, retained Mead & Hunt, Inc. (Mead & Hunt) to develop plans for a proposed airport update project. The overall project activities include:

- Relocating Runway 14/32 to the northeast and extending it to the southeast, including all necessary grading, clearing, and runway lighting.

- Constructing a new cross-field taxiway to serve the new Runway 14 end, including taxiway lighting and/or reflectors.

- Converting the existing Runway 14/32 to a partial parallel taxiway and constructing other taxiways as needed to support the relocated runway, including taxiway lighting and/or reflectors.

- Establishing a new non-precision approach to the Runway 14 end.

- Extending Runway 4/22 to the northeast and adding necessary lighting and taxiway connectors.

- Upgrading existing Runway 4 approach to RNAV (GPS).

- Realigning 30th Street N. around the new Runway 14/32 Runway Protection Zone to reconnect with Neal Avenue.

The project will use Federal Aviation Administration (FAA) funding and therefore must comply with Section 106 of the National Historic Preservation Act of 1966 (Section 106), as amended, and its implementing regulations, 36 CFR 800.

Qualified historians from Mead & Hunt worked with the FAA to delineate the Area of Potential Effects (APE), which was defined to include the Lake Elmo Airport and first-tier properties, those that are directly adjacent to airport property, with structures that are 45 years in age or older. Where project activities are more extensive and have additional direct and indirect effects, such as at the southeast end of Runway 32 and proposed 30th Street realignment areas, the APE was expanded to include second tier properties, those adjacent to first tier properties. The APE takes into account direct and indirect effects to resources based on the proposed project activities. A map of the APE is included in Appendix A.

Prior to fieldwork, the project team conducted a literature review at the Minnesota State Historic Preservation Office (SHPO) to identify any previously surveyed architecture/history properties within the APE. One property within the APE, the Edward Flynn House (WA-BYT-004), was previously identified.

Mead & Hunt historians Katherine Haun-Schuring and Kathryn Ohland conducted Phase I fieldwork on May 30, 2017. In addition to the previously identified Edward Flynn House, historians identified 12...
historic-age resources, which are defined as constructed in or before 1972. A survey map identifying all surveyed properties and Minnesota Architecture/History Inventory Forms are included in Appendix B. Of the 13 surveyed properties, 12 are recommended not eligible for listing in the National Register of Historic Places (National Register) and no further work is required. The remaining property, the Union Pacific Railway—historically the St. Paul, Stillwater, & Taylor’s Falls (StPS&TF) Railroad—is recommended for further study. The line may have significance under the *Railroads in Minnesota, 1862-1956 Multiple Property Documentation Form* (MPD), applying National Register *Criterion A: Transportation* as an early connection between the manufacturing/commerce nodes of Stillwater and the Twin Cities, and as an important component of Minnesota’s railroad network that provided an early link between the Twin Cities, Stillwater, and wider markets.¹ Project activities, however, are located on airport property, outside the railroad right-of-way and potential historic boundary (as outlined in the MPD, the historic boundary will be the historic right-of-way of the company that built the line) and have a minimal potential for impact to the railroad corridor. As such, it was determined, in consultation with the FAA, that no further work is required for this property at this time. Should project activities change, a reexamination of their effects on the StPS&TF Railroad should be completed.

1. Introduction

A. Location and purpose of project

The Metropolitan Airports Commission (MAC) proposes substantial updates to the Lake Elmo Airport in order to adhere to the Long Term Comprehensive Plan (LTCP), developed and approved by the MAC in September 2016, and to meet current FAA safety requirements. A description of project activities is included in Section 1.B. The approximately 630-acre airport is located on multiple parcels within both Baytown and West Lakeland Townships and is roughly bounded by Manning Avenue on the west; the Union Pacific Railway, historically the St. Paul, Stillwater & Taylor’s Falls (StPS&TF) Railroad, on the north; Neal Avenue on the east; and 30th Street on the south (see Figure 1). The land around the airport is a mixture of rural and suburban, with farmsteads dating to the late nineteenth century, residences from the early and mid-twentieth century, and modern development present.

The project will receive Federal Aviation Administration (FAA) funding; therefore, it must comply with Section 106 of the National Historic Preservation Act of 1966 (Section 106), as amended, and its implementing regulations, 36 CFR 800. In March 2017 Mead & Hunt, Inc. (Mead & Hunt) was retained by the MAC to complete Phase I survey in order to identify properties that may be eligible for listing in the National Register of Historic Places (National Register) and to facilitate compliance with Section 106 review.

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2 For the purposes of this report, the historic name of the railroad will be used throughout.
Figure 1. Map showing the project location. The star indicates the approximate location of the Lake Elmo Airport within Washington County, highlighted within the red boundary.
B. **Project description**

The proposed project will relocate the primary runway (Runway 14/32) 615 feet to the northeast and increase the runway length from 2,850 feet to 3,500 feet to the southeast. The existing Runway 14/32 will be converted to a partial parallel taxiway; additional taxiways are proposed as needed to support the relocated runway. To accommodate the runway relocation and provide necessary safety clearances within the Runway Projection Zones (RPZ), groves of trees on airport property will be removed, including along the STPS&TF Railroad corridor and adjacent to the relocated Runway 14/32. Additionally, the crosswind runway (Runway 4/22) will be extended 254 feet to an overall length of 2,750 feet. Taxiways, lighting, and navigational aids for both runways will also be added or upgraded throughout the airport. To accommodate the Runway 14/32 RPZ, 30th Street N. is proposed for realignment. Beginning at the intersection with Neal Avenue N., a portion of the roadway will be curved to the south on existing airport property around the new runway before meeting with the existing alignment. An overview map of the project activities is presented in Figure 2.
Figure 2. Map of proposed project activities.
C. **Area of Potential Effects**

In consultation with the FAA, the Area of Potential Effects (APE) for architecture/history was defined to include the Lake Elmo Airport and adjacent first-tier properties. Where project activities are more extensive and have additional direct and indirect effects, such as at the southeast end of Runway 32 and proposed 30th Street realignment areas, the APE was expanded to include second-tier properties. The APE encompasses direct effects, such as those areas affected by ground disturbance activities for runway, taxiway, and road construction and tree removals. Additionally, the APE takes into consideration indirect visual and noise impacts. The APE is illustrated on the map in Appendix A.
Section 2
Survey Methodology and Research Design

2. Survey Methodology and Research Design

The objective of the architectural history survey was to identify historic-age properties, defined as 45 years or older, in the APE that meet the National Register Criteria for Evaluation. Prior to fieldwork, the project team conducted a literature review at the Minnesota State Historic Preservation Office (SHPO) to identify any previously surveyed architecture/history properties in the APE. One property, the Edward Flynn House (WA-BYT-004) at 13131 40th Street N., was previously identified as part of a 1980 county-wide survey; the property was not formally evaluated at that time.

Professional historians from Mead & Hunt, who exceed the Secretary of the Interior’s Professional Qualification Standards for history and/or architectural history, as outlined in 36 CFR Part 61, conducted the Phase I fieldwork on May 30, 2017. The field investigation was limited to historic-age resources identified from the public right-of-way in West Lakeland and Baytown Townships, as well as the Lake Elmo Airport. Mead & Hunt assessed the significance and historic integrity of these properties to make a recommendation for listing in the National Register (see Section 4 for recommendations).

Based on properties identified in the APE, project research focused on the themes of agricultural development and transportation within Washington County. Surveyed properties directly relate to the statewide historic thematic context *Historic Context Study of Minnesota Farms (1820-1960)* and the *Railroads in Minnesota, 1862-1956 Multiple Property Documentation Form (MPD)*, which provides contextual information and National Register registration requirements for railroads within the state.

Repositories consulted to obtain historical information include:

- Minnesota Historical Society
- Washington County Historical Society
- Lake Elmo Airport
- Metropolitan Airport Commission
- Stillwater Public Library

Primary and secondary sources include:

- SHPO inventory forms
- County and city histories
- County assessment records
- Plat maps and aerial images
- Stillwater Public Library subject files
- MAC Lake Elmo files
- Online resources
- Personal communication with property owner
3. **Historic Overview**

The purpose of this historic overview is to provide a context in which to identify important historic themes and to evaluate historic-age properties in the APE.

**A. Washington County**

Located in eastern Minnesota, Washington County is bordered by the St. Croix and Mississippi Rivers on the east and south, respectively; Ramsey and Anoka Counties on the west; and Chisago County on the north. Historically, Washington County contained prairie lands with timber stands growing along rivers, creeks, and lakes. It possessed abundant fur, timber, and mineral resources that became the source of the county’s earliest industries. Due to its proximity to rivers, the county was also well-suited for early agricultural development.

Though the earliest European explorers traveled through the area in 1680, permanent settlement began in the late 1830s. Washington County was established on October 27, 1849, as one of the nine original counties in Minnesota Territory. The county remained largely rural with the majority of its land cultivated for crops or used for livestock production until the mid-twentieth century, when suburban development changed the landscape.

While a rural atmosphere is retained in large portions of the county, certain areas are decidedly suburban, such as those nearest St. Paul and Stillwater. Within Baytown and West Lakeland Townships, suburban residential development began in the mid-to-late twentieth century, with Ranch, Split-level, and Rambler houses constructed on large lots. More recently, housing subdivisions are under development to the immediate west of the airport.

**B. Agriculture**

Agriculture has been a primary industry within the county since its initial Euro-American settlement. The number of farms rose continuously during the ensuing decades, with 85 percent of Washington County land utilized for farming by 1900. During this period the primary crops were wheat, corn, oats, barley, rye, hay, and potatoes. During the latter decades of the nineteenth century advancements in cultivation machinery and farm diversification revolutionized agriculture and allowed for increased yields, particularly in oats and corn. County exports also increased with the construction of multiple railroad lines in the late nineteenth century, which provided access to new markets. Dairying was also a popular industry, with 52 percent of farms producing milk, butter, and cheese by 1910. Examples of late-nineteenth-century

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6 Zellie, *Washington County Historic Contexts*, 166.

Section 3
Historic Overview

farms can be found in Lake Elmo and Baytown and West Lakeland Townships, including the c.1880 Edward Flynn Farm, which is located adjacent to the Lake Elmo Airport.

Washington County remained predominantly rural well into the twentieth century. Fruit growers and nurseries joined established crop farms during the post-World War II (postwar) period, though 80 percent of the land was still farmed with corn and soybeans. Although farming remained prominent during the 1960s and continues today as evidenced by the cultivated farm fields adjacent to the airport, farms are slowly being replaced by suburban residential development. Currently, the county’s agricultural products include tree and fruit nurseries, sod farms, and corn, with sheep, goats, and horses as the prevalent livestock.

C. Transportation

The early Washington County transportation network consisted of Indian trails, steamboats on the St. Croix and Mississippi Rivers, and territorial and military roads. Beginning in the late 1860s railroads surpassed all previous modes of transportation in use and importance. The St. Paul & Chicago (later Chicago, Milwaukee, & St. Paul) Railroad, constructed in 1869, served as the first line through the county. Soon after, additional railroad companies established several lines, ultimately creating freight and passenger connections to Minneapolis, St. Paul, Duluth, and wider markets. The StPS&TF (currently the Union Pacific Railway) was constructed through the county in 1872. It provided freight and passenger transportation between the Twin Cities and Chicago to the southeast and Omaha, Nebraska, to the southwest. The railroad corridor currently serves as the northern border of the Lake Elmo Airport property.

At the turn of the twentieth century emphasis shifted from the railroad to roads, catalyzed by the Good Roads Movement. Early vehicular roads through the county were primitive, but road improvements, including paving, started in earnest in the 1920s following the creation of the Trunk Highway System. Over the following decades travel by rail declined significantly as more Minnesotans chose the automobile as their primary mode of transportation. By the 1960s most rail passenger service within Washington County ended.

D. Aviation in Washington County

During the twentieth century air travel became another noteworthy mode of transportation within Washington County, with numerous airfields developed on converted farmland. Early airfields within the county included the Luchsinger farm in Lakeland and the Northport airstrip in Grant Township (both nonextant). During World War II the U.S. Army and Navy actively used these and other airfields in Washington County to train pilots. Notably, the Northport airstrip, formally established as an airport

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8 Zellie, Washington County Historic Contexts, 167.
12 Zellie, Washington County Historic Contexts, 133.
c.1939, served as the chief training field for the government-sponsored War Training Service (formerly the Civilian Pilot Training program). In order to support training activities, the Army Air Corps leased several farm fields, including the Edward Flynn Farm, where glider pilots could land.

Recognizing the future importance of air transportation in the state and with the hope of making the Twin Cities a leader in aviation within the upper Midwest, the Minnesota State Legislature created the MAC in 1943. The MAC was designed to take a regional approach to air service, discourage competition between Minneapolis and St. Paul, and promote air transportation and commerce in the seven-county Twin Cities metro area. To meet these goals, the MAC established a system of airports, with the primary airport being Wold-Chamberlain Field (which became Minneapolis-St. Paul International Airport in 1948) and six reliever airports to accommodate smaller aircraft traffic.

In 1949 the MAC decided that one of the six reliever airports would be located within the eastern suburbs of St. Paul. It purchased 160 acres of farmland near the community of Lake Elmo in Baytown Township for development as the Lake Elmo Airport. In 1951 the airport officially opened and featured two runways and a small number of privately owned hangars. Over the coming decades, the MAC expanded the airport property and constructed support buildings, including a maintenance building. Private development continued with the construction of Fixed Base Operators (FBOs) and hangars. Today the airport encompasses more than 600 acres and features more than 150 buildings supporting and housing 189 aircraft as of October 2016. It is currently used by local businesses and private pilots, as well as the Civil Air Patrol.

Currently there are two airports, Lake Elmo Airport and Daniel A. DePonti Memorial Airport, and a handful of private airfields within Washington County. The DePonti Airport (originally called the Journey’s End Airport) was privately developed during the 1950s but was sold to the City of Forest Lake in 1998 for continued use as an airport. All of the other previously established airfields, such as Northport, are nonextant, with the land reused for development.


4. Results and Recommendations

Historians identified and documented 13 historic-age properties within the APE, including the previously identified Edward Flynn House (see Table 1). Twelve properties are recommended not eligible for listing in the National Register as they do not appear to possess a significant association with an important historic theme or person, and do not possess architectural significance. No further work is recommended for these properties. New or updated inventory forms have been prepared for these resources and are included in Appendix B.

<table>
<thead>
<tr>
<th>Inventory No.</th>
<th>Name</th>
<th>Address</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>WA-WLK-006</td>
<td>House</td>
<td>2925 Neal Avenue N.</td>
<td>Not Eligible</td>
</tr>
<tr>
<td>WA-BYT-004</td>
<td>Edward Flynn House</td>
<td>13131 40th Street N.</td>
<td>Not Eligible</td>
</tr>
<tr>
<td>WA-BYT-008</td>
<td>House</td>
<td>3245 Neal Avenue N.</td>
<td>Not Eligible</td>
</tr>
<tr>
<td>WA-BYT-009</td>
<td>House</td>
<td>3101 Neal Avenue N.</td>
<td>Not Eligible</td>
</tr>
<tr>
<td>WA-BYT-010</td>
<td>House</td>
<td>13030 30th Street N.</td>
<td>Not Eligible</td>
</tr>
<tr>
<td>WA-BYT-011</td>
<td>House</td>
<td>13100 30th Street N.</td>
<td>Not Eligible</td>
</tr>
<tr>
<td>WA-BYT-012</td>
<td>House</td>
<td>12905 40th Street N.</td>
<td>Not Eligible</td>
</tr>
<tr>
<td>WA-BYT-013</td>
<td>House</td>
<td>12805 40th Street N.</td>
<td>Not Eligible</td>
</tr>
<tr>
<td>WA-BYT-014</td>
<td>House</td>
<td>12689 40th Street N.</td>
<td>Not Eligible</td>
</tr>
<tr>
<td>WA-BYT-015</td>
<td>House</td>
<td>12657 40th Street N.</td>
<td>Not Eligible</td>
</tr>
<tr>
<td>WA-BYT-016</td>
<td>Lake Elmo Airport</td>
<td>3275 Manning Avenue N.</td>
<td>Not Eligible</td>
</tr>
<tr>
<td>WA-WLK-007</td>
<td>House</td>
<td>2933 Manning Avenue N.</td>
<td>Not Eligible</td>
</tr>
<tr>
<td>XX-RRD-044</td>
<td>StIPS&amp;TF Railroad</td>
<td>N/A</td>
<td>Further study recommended</td>
</tr>
</tbody>
</table>

The final property, the StIPS&TF Railroad (XX-RRD-044), is recommended for further study for its association with railroad transportation in Minnesota and Washington County. Completed in 1872, the StIPS&TF Railroad connected St. Paul with Stillwater. The line was largely used to transport lumber and was a major carrier of passengers and freight in and out of the Twin Cities to wider markets, such as...
Section 4
Results and Recommendations

Chicago.\(^{20}\) Per the *Railroads in Minnesota, 1862-1956 Multiple Property Documentation Form* (MPD), the railroad may have significance under National Register Criterion A as a Railroad Corridor Historic District under Significance Requirement 2 as it provided a connection between the manufacturing/commerce nodes at Stillwater and the Twin Cities, and/or Significance Requirement 3 as an important component of Minnesota’s railroad network that provided an important early link between the Twin Cities, Stillwater, and wider markets.\(^{21}\)

Based on a review of the proposed project activities, there are limited potential impacts to the railroad corridor. All ground disturbance associated with the relocation and extension of the runways and construction of taxiways will be located on airport property, outside the railroad right-of-way and potential historic boundary (see Figure 2; as outlined in the MPD, the historic boundary will be the historic right-of-way of the company that built the line). Additionally, to accommodate the relocated Runway 14/32 RPZ and meet current FAA safety regulations, groups of trees located in the northwestern quadrant of the airport property, adjacent to the railroad corridor boundary, will be removed. However, the tree removal, will not alter any character-defining features of the potential StPS&TF Railroad Corridor Historic District or diminish its potential significance. Furthermore, the tree removal will have a limited impact on the overall setting and visual appearance from the railroad corridor itself. The loss of a relatively small number of trees along the entire rail corridor (which currently extends from St. Paul to Stillwater) will not drastically change the railroad’s overall visual appearance, setting, or feeling (see Figure 3 and 4).


Figure 3. Tree removal areas adjacent to the StPS&TF Railroad.
Figure 4. Tree removal area along StPS&TF Railroad corridor near Manning Avenue. Trees nearest the road are subject to removal.

In addition, there is no potential for indirect visual effects to the railroad corridor as changes to the runways, lighting, and navigational aids proposed adjacent to the railroad will not drastically alter current views from along the corridor. Similarly, there are no anticipated noise impacts to the railroad. Aircraft size and type will not change from what is currently landed on the runways adjacent to the railroad corridor. As such, there will be no discernable change to noise levels experienced on railroad property.

As project activities have a limited potential for impact on the railroad property, an intensive-level review of the corridor is not warranted at this time and compliance with Section 106 is complete. Should project activities change, a reexamination of the project and its effects on railroad property should be completed.


Appendix A. Area of Potential Effects Map
Appendix B. Result Map and Inventory Forms
Description, including alterations
The buildings on this property are largely obscured by vegetation. The following description is based on limited field review and aerial imagery. The one-and-one-half-story vernacular house with a rectangular footprint was constructed in 1914. It is clad in horizontal wood siding and has an asphalt-shingled, front-gable roof with an eave overhang. An interior brick chimney is located at the roof ridgeline. The front (north) facade is largely covered by a one-story, flat-roof addition. Grouped replacement windows are located on the west elevation. Windows are replacement, one-over-one, double-hung sash with metal storms.

A modern pole building is located north of the house.

Historical Narrative
N/A

Significance
The property was evaluated under Criterion C: Architecture. Research and field survey identified no evidence of distinctive characteristics of a type, method, or period of construction; the work of a master; high artistic value; or the collective representation of a significant and distinguishable entity related to a trend of history. Therefore, the property lacks significance under Criterion C. Based on the results of the literature review, the property does not appear to be significant to any trend of local, state, or national history. Thus, the property is not eligible under Criterion A: History. The property does not appear to qualify under Criterion B: Significant Person. It is recommended not eligible for the National Register. No further work is recommended.

Area of Significance
N/A

Period of Significance
N/A

Integrity
N/A

National Register Eligibility Recommendation
Not Eligible
Identification

Historic Name: House
Current Name: House
Address: 3245 Neal Avenue N
City/Twp: Baytown Twp.
County: Washington
PIN: 1702920330004

Description, including alterations

The buildings on this property are largely obscured by vegetation. The following description is based on limited field review and aerial imagery. This one-and-one-half-story vernacular house with a rectangular footprint was constructed in 1901. It is clad in vinyl siding and has an asphalt-shingled, front-gable roof. The front (south) facade features a modern wood deck and a bay window with replacement, one-over-one, double-hung sash. A second bay window with replacement, one-over-one, double-hung sash is located on the side (west) elevation. Windows are replacement, one-over-one, double-hung sash.

Three modern outbuildings are located on the property, including a detached garage and two sheds. The detached, two-stall garage is located southeast of the house. One shed is located east of the house and the other to the south.

Historical Narrative

N/A

Significance

The property was evaluated under Criterion C: Architecture. Research and field survey identified no evidence of distinctive characteristics of a type, method, or period of construction; the work of a master; high artistic value; or the collective representation of a significant and distinguishable entity related to a trend of history. Therefore, the property lacks significance under Criterion C. Based on the results of the literature review, the property does not appear to be significant to any trend of local, state, or national history. Thus, the property is not eligible under Criterion A: History. The property does not appear to qualify under Criterion B: Significant Person. It is recommended not eligible for the National Register. No further work is recommended.

Area of Significance

N/A

Period of Significance

N/A

Integrity

N/A

National Register Eligibility Recommendation

Not Eligible
Description, including alterations

This one-story Ranch house with a rectangular footprint was constructed in 1971. It rests on a concrete block foundation, is clad in brick veneer and vertical wood siding, and has an asphalt-shingled, side gable roof with an eave overhang. The front (west) facade features a front gable projection, recessed porch supported by square columns, brick planter, and integral two-stall garage. An interior brick chimney is located at the roof ridgeline. Windows are replacement, vinyl casements; sliding; and one-over-one, double-hung sash.

There are three outbuildings located on the property. Two sheds are located at the north end of the property and the third outbuilding is located east of the house in the rear yard. All three are clad in vertical wood siding and have asphalt-shingled gable roofs.

Historical Narrative

N/A

Significance

The property was evaluated under Criterion C: Architecture. Research and field survey identified no evidence of distinctive characteristics of a type, method, or period of construction; the work of a master; high artistic value; or the collective representation of a significant and distinguishable entity related to a trend of history. Therefore, the property lacks significance under Criterion C. Based on the results of the literature review, the property does not appear to be significant to any trend of local, state, or national history. Thus, the property is not eligible under Criterion A: History. The property does not appear to qualify under Criterion B: Significant Person. It is recommended not eligible for the National Register. No further work is recommended.

Area of Significance

N/A

Period of Significance

N/A

Integrity

N/A

National Register Eligibility Recommendation

Not Eligible
Lake Elmo Airport, Lake Elmo, Washington County
Minnesota Historic/Architecture Inventory Form

3101 Neal Avenue N.

3101 Neal Avenue N.
Description, including alterations
This Split-level house with a rectangular footprint was constructed in 1971. It rests on an elevated concrete block foundation, is clad in replacement aluminum siding, and has an asphalt-shingled, front-gable roof. The front (south) facade features an upper-story overhang, a one-story wing with an entrance and simple concrete stoop, and a slightly projecting, two-stall garage on the west end. An exterior brick chimney is located on the side (east) elevation. A three-season porch with an exterior brick chimney is located on the rear (north) elevation. Windows are original sliding, casements, and one-over-one, double-hung sash.

A modern pole building is located north of the house in the rear yard. It is clad in metal and has a side gable metal roof. It features a sliding metal door and original sliding windows on the front (south) facade.

Historical Narrative
N/A

Significance
The property was evaluated under Criterion C: Architecture. Research and field survey identified no evidence of distinctive characteristics of a type, method, or period of construction; the work of a master; high artistic value; or the collective representation of a significant and distinguishable entity related to a trend of history. Therefore, the property lacks significance under Criterion C. Based on the results of the literature review, the property does not appear to be significant to any trend of local, state, or national history. Thus, the property is not eligible under Criterion A: History. The property does not appear to qualify under Criterion B: Significant Person. It is recommended not eligible for the National Register. No further work is recommended.

Area of Significance
N/A

Period of Significance
N/A

Integrity
N/A

National Register Eligibility Recommendation
Not Eligible
13030 30th Street N.
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Description, including alterations

This one-story Ranch house with a rectangular footprint was constructed in 1972. It is clad in replacement vinyl siding and has an asphalt-shingled, side-gable roof with an eave overhang. The front (south) facade features grouped original casement windows, brick veneer under the water table, and a projecting front-gable, two-stall garage on the east end. The entrance on the front facade has a simple concrete stoop that is covered by an extension of the front gable roof and is supported by a wrought iron support. A second entrance with a concrete stoop is located on the side (east) elevation. An interior brick chimney is located at the roof ridge line. Windows are replacement sliding, original casements, and original fixed-over-awning.

A pole building is located north of the house in the rear yard.

Historical Narrative

N/A

Significance

The property was evaluated under Criterion C: Architecture. Research and field survey identified no evidence of distinctive characteristics of a type, method, or period of construction; the work of a master; high artistic value; or the collective representation of a significant and distinguishable entity related to a trend of history. Therefore, the property lacks significance under Criterion C. Based on the results of the literature review, the property does not appear to be significant to any trend of local, state, or national history. Thus, the property is not eligible under Criterion A: History. The property does not appear to qualify under Criterion B: Significant Person. It is recommended not eligible for the National Register. No further work is recommended.

Area of Significance

N/A

Period of Significance

N/A

Integrity

N/A

National Register Eligibility Recommendation

Not Eligible
Lake Elmo Airport, Lake Elmo, Washington County
Minnesota Historic/Architecture Inventory Form

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Previous National Register Status
__ NRHP    __ CEF   __ SEF   __ DOE   __ Locally Des.

Description, including alterations

There are five buildings on this property: a c.1880 house, c.1960 side-gable house, c.1945 concrete block outbuilding, c.1955 Quonset, and c.1930 outbuilding. Some buildings on this property are largely obscured by vegetation. The following descriptions are based on limited field review and aerial imagery.

The two-story vernacular house with a rectangular footprint was constructed c.1880. It is composed of two blocks: a two-story hip roof main block, and a one-and-one-half-story side-gable wing. This house is clad in brick and features two-over-two, double-hung windows with segmental arches and stone sills. The front (south) facade of the main block features a large multi-light, replacement, picture window with five-light sidelights and an entrance with an arched transom and simple concrete stoop. The c.1895 wing features gable wall dormers and a second entrance with an arched lintel and simple stoop. A one-story porch is located on the south (rear) elevation. Windows are replacement, two-over-two, double-hung and fixed sash. The front porch has been removed.

A c.1960, one-story, side-gable house with a rectangular footprint is located to the west of the c.1880 house. It rests on a concrete block foundation, is clad in wood siding, and has an asphalt-shingled, side gable roof. The front (west) facade features a large, multi-light, fixed window and central entrance with a simple wood stoop. An interior brick chimney is located at the roof ridgeline and vertical wood siding is located in the gable ends. Windows are original, one-over-one, double-hung sash.

A c.1945 concrete block outbuilding is located between the two houses. The building has an asphalt-shingled, front-gable roof with wood siding in the gable end. The front (north) elevation features a double-leaf sliding wood door. Windows are fixed sash.

A c.1930 outbuilding is located south of the c.1880 house and c.1955 Quonset. It has a side-gable roof.

Historical Narrative

Irish immigrants Edward and Patrick Flynn purchased this parcel of land in Washington County in 1861 to establish a farm. Edward Flynn, who retained ownership of the property throughout the ensuing years, built the farmhouse’s two-story main block c.1880 and, according to the current homeowner, the one-and-one-half-story wing in 1895. Veronica Flynn, one of Edward’s five children, obtained ownership of the property after her father’s death in 1898. Although Veronica owned the property for many years, she did
not farm and moved to Lake Elmo in the 1930s, while retaining ownership of the family farmstead. According to the current owner, the front porch was removed sometime in the early twentieth century, during Veronica’s ownership. During World War II the farmhouse and adjacent farm fields were used by the Military’s War Training Service in conjunction with the Northport airport for pilot training. Officers involved with the program resided in the Flynn farmhouse.

In 1940, just prior to her death, Veronica gave the farmstead to her youngest brother. He sold it to George Kern in 1944. During his approximately 25-year ownership, Kern converted the land into a sod farm and added the picture window to the farmhouse facade. He also constructed the c.1945 outbuilding and c.1960 side-gable house on the west end side of the property for use by a hired worker. The Quonset was also added to the property. Following Kern, the property was owned by the Kirby family, who made no significant alterations. Ownership then passed to the current resident, Kenneth Hannah, in the mid-1980s. According to Mr. Hannah, the barn on the property was recently removed and transported to North Carolina for reuse as a church. Currently, the c.1945 outbuilding and c.1960 side-gable house are located on a different parcel but remain associated with the larger farmstead.¹

Significance

The property was evaluated under Criterion C: Architecture. Research and field survey identified no evidence of distinctive characteristics of a type, method, or period of construction; the work of a master; high artistic value; or the collective representation of a significant and distinguishable entity related to a trend of history. The house also has diminished integrity due to the loss of the front porch and replacement of original windows, most notably the addition of a large picture window on the facade. Therefore, the property lacks significance under Criterion C. Based on available research the property does not appear to be significant to any trend of local, state, or national history. The property does not appear to have been significant in the context of Washington County agriculture. Although the property was used temporarily by the military to train pilots, it was not significant within the context of overall military operations or the war effort in Washington County and Minnesota. Therefore, the property lacks significance within the context of Washington County or Minnesota aviation. Thus, the property is not eligible under Criterion A: History. The early owners of the property, Edward and Veronica Flynn, do not appear to have been significant in the history of Washington County, nor do any of the subsequent owners. As such, the property does not appear to qualify under Criterion B: Significant Person. The property is recommended not eligible for the National Register. No further work is recommended.

Area of Significance
N/A

Period of Significance
N/A

Integrity
N/A

National Register Eligibility Recommendation
Not Eligible

13131 40th Street N.  Aerial images for this property are not current; the red X denotes the barn that was recently removed from the property.
Lake Elmo Airport, Lake Elmo, Washington County  
Minnesota Historic/Architecture Inventory Form

Identification

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Description, including alterations

The St. Paul, Stillwater & Taylor’s Falls Railroad/Chicago, St. Paul, Minneapolis & Omaha Railway/Chicago & North Western Railway/Union Pacific Railway (referred to by its original moniker throughout: StPS&TF) extends on a southwest to northeast axis at the northern edge of the Lake Elmo Airport. It enters the project area just east of the corridor’s intersection with Manning Avenue and travels approximately 1.11 miles before exiting the project area at its intersection with 40th Street N. The corridor’s single track with wood rail ties rests on a raised ballast bed. Grassy areas line the railroad bed on both sides, with groves of deciduous trees largely located at the edge of the grassy area. A guarded at-grade crossing is located at the intersection with 40th Street N. and Manning Avenue. No other rail features are located along the corridor in the Area of Potential Effect (APE).

Historical Narrative

The StPS&TF Railroad was incorporated in 1869 by officers of the St. Paul & Sioux City Railroad Company. They intended to build a railroad from St. Paul to Taylor’s Falls via Stillwater with a branch connecting to Hudson, Wisconsin. The line was completed from St. Paul to Stillwater, passing through Lake Elmo, in 1872. In 1880 the company consolidated with others to form the Chicago, St. Paul, Minneapolis & Omaha Railway Company (CStPM&O), which was commonly known as the “Omaha.” In 1882 the Chicago & North Western Railway acquired control of the CStPM&O but the line continued to operate as the “Omaha.” The StPS&TF line was largely used to transport lumber and was a major carrier of passengers and freight in an out of the Twin Cities.¹ The line is currently owned and operated by Union Pacific Railway.

Significance

The StPS&TF may have significance for its association with railroad transportation in Minnesota and Washington County.

The StPS&TF Railroad may have significance for its association with railroad transportation in Minnesota and Washington County. Completed in 1872, the railroad was an early connection between St. Paul and Stillwater that was used to transport timber as well as passengers and freight in and out of the Twin Cities to wider markets, such as Chicago.² Per the Railroads in Minnesota, 1862-1956 Multiple Property Documentation Form, the railroad may have significance applying Criterion A under significance requirement 2, as it provided a connection between the manufacturing/commerce nodes at Stillwater and the Twin Cities, and/or requirement 3, as an important component of Minnesota’s railroad network that provided an important early link between the Twin Cities, Stillwater, and wider markets.³ For the purpose of the project, however, further evaluation of the corridor is not recommended at this time as proposed project activities are limited to tree clearing outside the railroad right-of-way, resulting in limited potential for impact on the corridor. See Phase I (Reconnaissance Survey) Report: Lake Elmo Airport on file at SHPO for further details regarding project activities.

Area of Significance
Transportation

Period of Significance
Further study required

Integrity
N/A

National Register Eligibility Recommendation
Further study required

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St. Paul, Stillwater & Taylor’s Falls Railroad at intersection with Manning Avenue N.

St. Paul, Stillwater & Taylor’s Falls Railroad at intersection with 40th Street N.
Lake Elmo Airport, Lake Elmo, Washington County
Minnesota Historic/Architecture Inventory Form

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Description, including alterations

This Split-level house with rectangular footprint was constructed c.1970. It rests on a raised concrete foundation, is clad in original wide-lap wood siding, and has an asphalt-shingled, side gable roof. The front (north) facade features a central entrance with a simple wood stoop and grouped, replacement, one-over-one, double-hung and sliding windows.

A c.1970 garage is located west of the house. It is clad in original wide-lap wood siding and has an asphalt-shingled, front-gable roof.

Historical Narrative

N/A

Significance

The property was evaluated under Criterion C: Architecture. Research and field survey identified no evidence of distinctive characteristics of a type, method, or period of construction; the work of a master; high artistic value; or the collective representation of a significant and distinguishable entity related to a trend of history. Therefore, the property lacks significance under Criterion C. Based on the results of the literature review, the property does not appear to be significant to any trend of local, state, or national history. Thus, the property is not eligible under Criterion A: History. The property does not appear to qualify under Criterion B: Significant Person. It is recommended not eligible for the National Register. No further work is recommended.

Area of Significance

N/A

Period of Significance

N/A

Integrity

N/A

National Register Eligibility Recommendation

Not Eligible
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Description, including alterations
This Split-level house with a rectangular footprint was constructed in 1965. It rests on an elevated concrete block foundation, is clad in vertical wood siding, and has an asphalt-shingled, side-gable roof with a wide eave overhang. The front (north) facade features a central entrance with transom and side light, a group of fixed-over-awning windows, and a partial upper-story overhang over the elevated basement. An interior brick chimney is located at the roof ridgeline. Windows are the original casements and fixed-over-awning sash.

A large, two-stall detached garage with vertical wood siding and asphalt-shingled, shed roof are located east of the house. The garage features an interior brick chimney at the roof ridgeline and a large addition on the rear (south) elevation.

Historical Narrative
N/A

Significance
The property was evaluated under Criterion C: Architecture. Research and field survey identified no evidence of distinctive characteristics of a type, method, or period of construction; the work of a master; high artistic value; or the collective representation of a significant and distinguishable entity related to a trend of history. Therefore, the property lacks significance under Criterion C. Based on the results of the literature review, the property does not appear to be significant to any trend of local, state, or national history. Thus, the property is not eligible under Criterion A: History. The property does not appear to qualify under Criterion B: Significant Person. It is recommended not eligible for the National Register. No further work is recommended.

Area of Significance
N/A

Period of Significance
N/A
Integrity
N/A

National Register Eligibility Recommendation
Not Eligible

12805 40th Street N.

12805 40th Street N.
Description, including alterations

There are four buildings on this property: a c.1880 house, modern barn, modern pole building, and modern gazebo. This two-story Queen Anne house with an irregular footprint was constructed c.1880. It is clad in wood siding and has an asphalt-shingled, irregular roof. The front (west) facade features a two-story, projecting front-gable bay with a fixed window and replacement fish-scale shingles in the gable end. A second two-story projecting bay with replacement decorative shingles is located on the side (east) elevation. The entrance is located on the side (west) elevation and is covered by a portico supported by brackets. Windows are replacement, one-over-one, double-hung and fixed sash.

A c.1985 barn is located southwest of the house. It is clad in wood siding and has a front-gable roof. The side (north) elevation features two gable wall dormers. Windows are replacement, one-over-one, double-hung and sliding sash.

A modern pole building is located southwest of the house and a modern gazebo is located to the south in the rear yard.

Historical Narrative

N/A

Significance

The property was evaluated under Criterion C: Architecture. Research and field survey identified no evidence of distinctive characteristics of a type, method, or period of construction; the work of a master; high artistic value; or the collective representation of a significant and distinguishable entity related to a trend of history. Therefore, the property lacks significance under Criterion C. Based on the results of the literature review, the property does not appear to be significant to any trend of local, state, or national history. Thus, the property is not eligible under Criterion A: History. The property does not appear to qualify under Criterion B: Significant Person. It is recommended not eligible for the National Register. No further work is recommended.

Area of Significance

N/A

Period of Significance
N/A

**Integrity**
N/A

**National Register Eligibility Recommendation**
Not Eligible
Lake Elmo Airport, Lake Elmo, Washington County
Minnesota Historic/Architecture Inventory Form

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Previous National Register Status

NRHP __  CEF __  SEF __  DOE __  Locally Des.

Description, including alterations

This one-story Ranch house with a rectangular footprint was constructed in 1968. It rests on a concrete block foundation, is clad in replacement vinyl siding, and has an asphalt-shingled, side-gable roof with an eave overhang. The front (north) facade features a simple concrete stoop, slightly projecting bay on the west end, and a bay window with replacement fixed and one-over-one, double-hung sash. An interior brick chimney is located at the roof ridgeline. Windows are original, one-over-one, double-hung and replacement sliding sash. An original attached garage may have been incorporated into the massing at an unknown time.

A modern two-stall detached garage with wide-lap wood siding and an asphalt-shingled, side-gable roof is located south of the house.

Historical Narrative

N/A

Significance

The property was evaluated under Criterion C: Architecture. Research and field survey identified no evidence of distinctive characteristics of a type, method, or period of construction; the work of a master; high artistic value; or the collective representation of a significant and distinguishable entity related to a trend of history. Therefore, the property lacks significance under Criterion C. Based on the results of the literature review, the property does not appear to be significant to any trend of local, state, or national history. Thus, the property is not eligible under Criterion A: History. The property does not appear to qualify under Criterion B: Significant Person. It is recommended not eligible for the National Register. No further work is recommended.

Area of Significance

N/A

Period of Significance

N/A

Integrity

N/A

National Register Eligibility Recommendation

Not Eligible

SHPO Inventory No. WA-BYT-015

Review and Compliance No.

Project No.

Survey No. FN11

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Resource Type Building

Style Ranch

Construction Date 1968

Date Source Assessor Data

Original Use Domestic- single dwelling

Current Use Domestic- single dwelling

Historical Context Urban Centers 1870-1940
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Description, including alterations

The approximately 630-acre Lake Elmo Airport is located on multiple parcels within Baytown and West Lakeland Townships and is roughly bounded by Manning Avenue on the west, the Union Pacific (historically the St. Paul, Stillwater, & Taylor’s Falls Railroad) on the north, Neal Avenue on the east, and 30th Street on the south. Residences, dating from the late nineteenth century to the 2000s, are adjacent to the airport along with a handful of late-nineteenth-century farmsteads. Three access roads provide entry to the airport: two off of Manning Avenue and the third off of 30th Street. The main access road is located off of Manning Avenue and is signed as 33rd Avenue N., in the approximate center of the airport property.

The airport features two runways: a primary runway (Runway 14-32) extending in a northwest-southeast orientation and a cross wind runway (Runway 4-22) extending in a northeast-southwest orientation. Taxiways, lights, and navigational aids are located along both runways. There are three groups of hangars on the airport, identified as Hangar Areas 1-3 in Figure 1. Hangar Areas 1 and 2, which consist of historic-age and modern hangars, are located adjacent to Manning Avenue and are separated by 33rd Avenue N. Hangar Area 3 consists of modern hangars, constructed from 1990 to the present, and is located in the northwest quadrant adjacent to the Union Pacific rail line.
The airport features several modern and historic-age aviation support buildings called out in Figure 2. The following brief building descriptions are organized by support buildings and Hangar Areas 1-3.
Located at the north end of the property near the railroad corridor, Valters Aviation serves as the airport’s fixed-base operator (FBO) (see Figure 3). The c.1990, one-story building rests on a concrete block foundation, is clad in standing-seam metal siding, and has a shallow, front-gable, standing-seam metal roof. It features a large, vertical, bi-fold door on the south elevation and metal, fixed sash windows. A c.2000, one-story, shed-roof addition is located on the north elevation.
The c.1980, one-story Lake Elmo Metropolitan Airports Commission (MAC) maintenance building is located at the east end of the airport’s main access road (see Figure 4). The concrete block building rests on a poured concrete foundation and has a flat roof with metal coping and metal fixed sash windows. It features seven bays, each with an overhead door, on the front (west) facade. The southern two bays are slightly higher than the remainder of the building. A one-story, c.2000 addition wraps around the side (north) and rear (east) elevation and features a band of fixed frame windows.

A c.1960, irregularly shaped, one-story building, possibly a former FBO building, is located southwest of the maintenance building (see Figure 5). It rests on a poured-concrete foundation, is clad in vertical metal siding, and has flat metal roof. The front (north) facade features an overhead door, casement windows, and polygonal projecting bay on the southeast end. A large vertical bi-fold door is located on side (southeast) elevation.
A c.1970, one-story maintenance building is located near the southern end of the property and is accessed via 30th Street (see Figure 6). It rests on a poured-concrete foundation, is clad in standing-seam metal siding, and has a shallow front-gable roof that is covered in standing-seam metal. The front (northeast) facade features a large overhead metal door. Windows are three-part sliding sash.

The airport has approximately 128 hangars constructed from the 1950s to the present. The historic-age hangars, dating to the 1950s and 1960s, are located in Hangar Areas 1 and 2. These hangars consist of a mixture of box and T-hangars and Quonsets (see Figures 7-10). They vary in type and size; feature
alterations, including replacement siding, windows, and doors; and do not appear to be planned as a cohesive group. The historic-age box and T-hangars commonly rest on poured-concrete foundations, are clad in metal, and have front- or side-gable roofs. They feature sliding or vertical bi-fold doors and some have sliding or fixed windows. The Quonsets rest on poured-concrete foundations, are clad in metal siding, and have arched metal roofs. They also feature sliding or vertical bi-fold metal doors. Modern box hangars are interspersed with historic-age hangars in Hangar Areas 1 and 2.

Figure 7. Historic-age T-hangar, view facing south.

Figure 8. Historic-age Box and Quonset hangars, view facing south.
Modern box hangars, constructed from c.1990 to the present, are located in Hangar Area 3 (see Figures 11 and 12). They rest on poured-concrete foundations, are clad in vertical metal siding, and have metal front- or side-gable roofs. The hangars feature a large vertical bi-fold door often with an adjacent single-leaf entry door. Some have sliding or fixed windows.
Historical Narrative
During World War II the Minnesota State Legislature recognized the future importance of air transportation in the state. With the hope of making the Twin Cities a leader in aviation within the upper Midwest, the legislature created the Metropolitan Airports Commission (MAC) in 1943 with the aim of promoting air transportation and commerce in the seven-county Twin Cities metro area. The MAC was designed to take a regional approach to air service and discourage competition between Minneapolis and St. Paul. As a result, the MAC established a system of airports with the primary airport being Wold-Chamberlain Field (which became Minneapolis-St. Paul International Airport in 1948) and six reliever airports to accommodate smaller aircraft traffic.\footnote{Metropolitan Airports Commission, “Metropolitan Airports Commission,” 2015, https://metroairports.org/Airport-Authority/Metropolitan-Airports-Commission/Administration/Administration.aspx.} The organization decided that one reliever airport would
be located within the eastern suburbs of St. Paul. As such, in 1949 it purchased 160 acres of farmland near the community of Lake Elmo in Baytown Township for development as the Lake Elmo Airport. At its officially opening in 1951, the Lake Elmo Airport had two runways: a northwest-southeast 2,300-foot-long paved runway (Runway 13-31) and a northeast-southwest 2,400-foot-long sod runway (Runway 3-21).\(^2\)

Not long after its construction, private individuals and small companies began developing hangars and support buildings on-site (see Figure 13). Hangars, including the nine original T-hangars, were constructed in Hangar Area 1, off of Manning Avenue (see Figure 2). The first FBO at the airport, operated by A.R. Metzger, opened in 1951.\(^3\)

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\(^2\) The runway numbers were changed in 1999 to 14-32 and 04-22, respectively.


\(^4\) “Historical Aerial Photograph, Washington County,” 1953, available in the Borchert Map Library, University of Minnesota.
In 1966 the MAC expanded the Lake Elmo Airport by purchasing an additional 470 acres of farmland in Baytown and West Lakeland Townships. In the following year it lengthened Runway 13-31 to 2,600 feet and relocated, extended, and paved Runway 3-21 to 2,500 feet. In the coming decade MAC constructed support buildings, including a maintenance facility and navigational aids. Private hangar and FBO development continued on the west side of the airport (see Figures 14 and 15). Throughout the 1970s and 1980s the airport supported two FBOs, Elmo Aero and Mayer Aviation, which replaced the original Metzger FBO. A third FBO, Lake Elmo Flight Services, also operated for a time and constructed a combined hangar and office facility near the northern edge in 1990.

Figure 14. 1957 aerial photograph Lake Elmo Airport.

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By the 1990s development shifted to the northern quadrant of the airport (Hangar Area 3). Several modern box hangars were built in this area at that time to accommodate growing demand for aircraft storage. Former FBOs dissolved, leaving Mayer Aviation as the sole FBO. The company was subsequently replaced by the current FBO, Valters Aviation, in 2003. The most recent MAC-initiated airport improvements came in in the early 1990s when it extended Runway 13-31 to its current length of 2849 feet.

Today, the Lake Elmo Airport is one of two airports within Washington County, the other being the Daniel A. DePonti Memorial Airport. It is over 600 acres in size; remains under MAC ownership; is used by local businesses, private pilots, and the Civil Air Patrol; supports 150 buildings; and houses 189 aircraft as of October 2016.

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7 “Historical Aerial Photograph, Washington County,” 1964, available in the Borchert Map Library, University of Minnesota.


Significance
The Lake Elmo Airport, including its collection of support buildings and hangars, was evaluated under Criteria A, B, and C. Criterion D, which deals with potential information sources, was evaluated by the Mississippi Valley Archaeology Center under another cover. The archaeology report will be on file at SHPO.

Research and field survey identified no evidence of distinctive characteristics of a type, method, or period of construction; the work of a master; high artistic value; or the collective representation of a significant and distinguishable entity related to a trend of history within Criterion C in the areas of Architecture or Engineering. Based on a review of aerial photography, airport histories, and expansion studies, the Lake Elmo Airport does not exhibit a planned development pattern. It was constructed over the course of 40 years and represents a mix of MAC- and privately constructed support buildings and hangars, which are typical box, T-, and Quonset hangar types found in regional airports statewide and do not represent a significant method of construction, nor do they represent a significant or cohesive collection of a building type. Additionally, many of the support buildings and historic-age hangars have been altered to varying degrees through replacement siding, windows, and doors. Therefore, the property lacks significance under Criterion C.

Based on the results of the literature review, the Lake Elmo Airport does not appear to be significant to any trend of local, state, or national history. While it is a reliever airport within the MAC system, the airport is not significant within the history or development of that system. It is not distinct or extraordinary in comparison to the other reliever airport within the MAC system or regionally, nor is it important within the overall history of aviation in Minnesota or Washington County. Thus, the property is not eligible under Criterion A: History.

Research did not reveal any notable individuals associated with MAC, the airport or its operations, regional aviation, or aviation activities within the state. As such, the property does not appear to qualify under Criterion B: Significant Person.

The Lake Elmo Airport is recommended not eligible for the National Register. No further work is recommended.

Area of Significance
N/A

Period of Significance
N/A

Integrity
N/A

National Register Eligibility Recommendation
Not Eligible
Identification

Historic Name: House

Current Name: House

Address: 2933 Manning Avenue N.

City/Twp: West Lakeland Twp.

County: Washington

PIN: 1902920220010

Previous National Register Status

__ NRHP  __ CEF  __ SEF  __ DOE  __ Locally Des.

Description, including alterations

The buildings on this property are not visible from the public right-of-way. Aerial images indicate that the property has three buildings that are largely surrounded by mature trees. The primary structure is a gable-ell house that appears to feature a bay window on the front (south) facade. County Assessor records indicate it was constructed in 1901. Two gable-roof outbuildings are located to the west of the house. Both appear to be modern.

Historical Narrative

N/A

Significance

The property was evaluated under Criterion C: Architecture. Research and field survey identified no evidence of distinctive characteristics of a type, method, or period of construction; the work of a master; high artistic value; or the collective representation of a significant and distinguishable entity related to a trend of history. Therefore, the property lacks significance under Criterion C. Based on the results of the literature review, the property does not appear to be significant to any trend of local, state, or national history. Thus, the property is not eligible under Criterion A: History. The property does not appear to qualify under Criterion B: Significant Person. It is recommended not eligible for the National Register. No further work is recommended.

Area of Significance

N/A

Period of Significance

N/A

Integrity

N/A

National Register Eligibility Recommendation

Not Eligible
Phase I Archaeological Identification Survey of Proposed Changes to Portions of the Lake Elmo Airport, Washington County, Minnesota

Prepared for:
Mead and Hunt
7900 West 78th Street
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Minneapolis, MN 55439-2572

Principal Investigator and Report Prepared by:
Vicki L. Twinde-Javner

Mississippi Valley Archaeology Center
University of Wisconsin-La Crosse
Reports of Investigations No. 1113
August 2017
At the request of Mead and Hunt, on June 1, and July 12 and 13, 2017, personnel from
the Mississippi Valley Archaeology Center (MVAC) led by the Principal Investigator conducted
a Phase I archaeological survey for a proposed expansion to the Lake Elmo Airport in
Washington County, Minnesota. The project is within Sections 18 and 19 of Township 29 North,
Range 20 West in Baytown and West Lakeland Townships in Minnesota Archaeological Region
4e. This work was done for the Metropolitan Airports Commission to be in compliance with the
National Environmental Policy Act (NEPA) and Council on Environmental Quality (CEQ) as
part of the Federal Aviation Administration (FAA) policies and procedures as detailed in FAA
Order 1050.IF.

A total of approximately 126 acres was surveyed. Survey methods included pedestrian
survey in plowed fields with excellent surface visibility, and shovel testing within portions of the
current airport grounds and wooded areas within and adjacent to the plowed fields with no
surface visibility.

Two new historic sites were identified. 21WA0119 consists of historic foundations with
one structure consisting of a limestone foundation with a concrete addition, and a second
foundation made of concrete and cinderblock. There is also some concrete slabs of unknown use.
Based on historical documentation, these structures were erected sometime between 1874 and
1901, and were present until possibly the early 1980’s. 21WA0120 consists of two historic
foundations made of concrete. Based on historical research, the structures were erected sometime
between 1874 and 1901, and were present until at the least the mid to late 1960’s.

Historical maps and deed research indicate that from 1933 to 1946, the foundations
associated with both of these sites, and the land surrounding them, were owned by the Jacob
Schmidt Brewing Company. It is unknown if the buildings at these two sites were used in any of
the manufacturing or storage for the brewery which during the 1930’s and 1940’s, was the
seventh largest in the nation. The intact foundations indicate integrity, and the relationship to the
Jacob Schmidt Brewing Company could indicate significance. These two sites may be
potentially eligible for listing on the National Register of Historic Places (NRHP) under Criteria
D, as they could yield important information about the past. However, since ultimately ground
disturbing activities will be able to avoid these sites, the sites were not formally evaluated for
eligibility for the NRHP. The only action in the site areas is the groves of trees they are located
in will be clear cut.

No other cultural material was identified within the project area, therefore no further
work is recommended for the remainder of the project. However, if in the future, ground
disturbing activities are planned in the locations of WA0119 and WA0120, the State Historic
Preservation Office should be consulted to see if further evaluations are necessary.
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INTRODUCTION AND PROJECT DESCRIPTION

In June and July 2017, personnel from the Mississippi Valley Archaeology Center (MVAC) led by the Principal Investigator performed a Phase I archaeological identification survey for a proposed expansion to the Lake Elmo Airport in Washington County, Minnesota (Figure 1). This work was done at the request of the Metropolitan Airports Commission (MAC) for compliance with the National Environmental Policy Act (NEPA) and Council on Environmental Quality (CEQ) as part of the Federal Aviation Administration (FAA) policies and procedures as detailed in FAA Order 1050.IF. The MAC has developed a number of previous planning studies, and prepared the first long-term comprehensive plan for the Lake Elmo Airport in 1966 with updates in 1976, 1992, 2008, and 2016. The current proposed expansion is one part of this plan to update existing infrastructure and improve safety and provide appropriate facilities for the types of aircraft currently using this airport (Airport Development and Environment Departments 2016: 1-1). The MAC, owner of the Lake Elmo Airport, is proposing to:

- Build a new 3,500 foot replacement runway for the existing 2,850 foot primary runway, Runway 14/32. This will include shifting the runway 615 feet to the northeast and will include all necessary grading, clearing, and runway lighting.
- Realign 30th Street North along the new Runway 32 Runway Protection Zone (RPZ) and reconnect to the existing intersection with Neal Avenue.
- Construct a new cross field taxiway to serve the new Runway 14 end, including taxiway lighting and/or reflectors.
- Convert existing Runway 14/32 to a partial parallel taxiway and construct with other taxiways as needed to support the relocated runway, including taxiway lighting and/or reflectors.
- Reconstruct Runway 4/22 and extend to 2,750 feet, including necessary lighting and taxiway connectors.
- Establish a new non-precision approach to new Runway 14 and upgrade existing Runway 4 approach to RNAV (GPS).
- Add a new connector road from the existing service road for better access to the hangars north of the main entrance driveway to the airport.
- Add an additional compass point east of Runway 14/32.

The Area of Potential Effect (APE) for the project will include any proposed areas of ground disturbance related to the actions described above. The project consisted of survey of approximately 126 acres of both agricultural land, wooded areas, and portions of the existing airfield. Since the project area has not been previously surveyed, and no known sites were in the project area, the purpose of the survey was to identify any cultural resources in the APE.

The project is within Sections 18 and 19 of Township 29 North, Range 20 West in Baytown and West Lakeland Townships (Figures 2 and 3). The survey outline is an amorphous shape and representative UTM coordinates for this project can be found in Figure 2.
Figure 1. Approximate location of project area in Minnesota.
Figure 2. Approximate location of project area shown with UTM coordinates.
Figure 3. Aerial view of project area provided by Mead and Hunt.
RESEARCH DESIGN

The research design for the airport expansion project sought to identify cultural resources that might be impacted by planned construction activities. Methods involved: pre-field investigation to identify known sites; review of historic aerial photos and plat maps; and survey of areas that may be affected by the proposed changes to the airport and realignment of a portion of 30th Street North. Since no previous surveys have taken place in the project area, and the area is closer to water sources indicating a higher probability of cultural resources, the entire project area was surveyed. The survey included both pedestrian survey and shovel testing. The extent of the APE included all proposed area of potential ground disturbance. Any cultural resources identified during the survey were to be mapped, GPS coordinates recorded, and site forms filled out for the Minnesota Historical Society as applicable.

LITERATURE SEARCH

ENVIRONMENTAL SETTING

The APE includes: the current grounds of the Lake Elmo Airport facility which is east of Manning Avenue, north of 30th Street North, and west of Neal Avenue North; new runway areas south of the existing airport grounds encompassing portions of existing farm fields north and south of 30th Street North; realignment of 30th Street North encompassing plowed fields south of 30th Street North; and, some minor improvements along Neal Avenue North as a result of the realignment of 30th Street North.

The project lies in the Central Lake Deciduous Region. The topography of this region includes moraines, till plans and outwash plains. Numerous lakes are found throughout the region and the Mississippi River flows through the regions eastern and central part. In early historic times, the vegetation in the southern and western parts of the region would have been dominated by Big Woods species with numerous large inclusions of prairie and wood oak (Anfinson 1990: 147-148). The original vegetation cover of the project area would have consisted of brushland (oak openings and barrens with scatter trees and groves of oaks of scruffy form with some brush and thickets and occasionally with pines (Marschner 1930). The project area is within what is considered the Eastern Broadleaf Forest Province. This province covers nearly 12 million acres of the central and southeastern portion of Minnesota, and serves as a transition between semiarid portions of the state that were historically prairie and semi-humid mixed conifer-deciduous forests to the northeast (Minnesota DNR 2017).

The bedrock geology of the project area is part of the Mille Lacs-Highland Moraine Association with glacial end deposits (Hobbs and Goebel 1982). The soils within this region generally have medium to coarse textures with prairie soils in the south and west, and forest soils in the north and east. Outcrops of bedrock are limited to occasional granitic rock exposures in the
region’s center and eastern edge (Anfinson 1990: 148). Due to the size of the project area, it contains various types of soils (Table 1) (Natural Resource Conservation Service 2017).

Table 1. Soil types in project area.
Antigo silt loam, 0 to 6 percent slopes
Antigo silt loam, 2 to 6 percent slopes
Campia silt loam, 0 to 8 percent slopes
Chetek sandy loam, 0 to 6 percent slopes
Chetek sandy loam, 6 to 12 percent slopes
Comstock silt loam
Crystal Lake silt loam, 1 to 3 percent slopes
Freer silt loam
Santiago silt loam, 2 to 6 percent slopes

REGIONAL CULTURAL CONTEXT

Prehistoric

The project lies in what has been classified as the Central Lake Deciduous Region. The prehistory of this area has been divided into three periods: Early, Middle, and Late Prehistoric. Technology and cultural changes interpreted in the archaeological record are used to define these periods. Within these periods, Johnson (1988) has identified Paleoindian, Eastern Archaic, Woodland and Mississippian cultural traditions.

Early Prehistoric Period (before 6000 B.C. - 1000 B.C.): Paleoindians maintained a hunting-gathering subsistence, traveling in small bands. Large Pleistocene mammals such as the woolly mammoth and mastodon were supported by a vast Boreal conifer forest (Wright 1974). Clovis and Folsum fluted points of the Early Prehistoric Period are representative of this period and have been recovered in southern and southwestern Minnesota (Anfinson 1997). During the latter phases of the Paleoindian tradition, it appears that human populations began spreading throughout the state based on projectile point finds (Johnson 1988: 6-9).

Eastern Archaic people (6000 - 800 B.C.) continued hunting and gathering, and the appearance of groundstone technology suggests a shift to greater use of plant resources (Wright 1974). Early Archaic peoples focused on bison hunting, and later on deer and elk. In the latter half of the Eastern Archaic Period copper became an important resource material in the production of utilitarian items. Stemmed points became popular during this time period and chipped stone scrapers, knives, punches, and drills were utilized. During this time period, techniques for making ground and pecked stone tools was established (Johnson 1988: 10-14).

Middle Prehistoric Period (800 B.C. - A.D. 900): The beginning of the Middle Prehistoric Period is marked by the appearance of pottery and burial mound construction, mainly identified
as the Woodland tradition. Woodland pottery contained grit, a crushed rock or sand, which was used to temper the clay during firing. The thin-walled pottery often displayed decorated impressions. Conical and linear mounds were mainly utilized for burial mounds, as very few effigy mounds along the Wisconsin border from the Twin Cities southward Woodland peoples still relied on seasonal hunting and gathering, but developed a more sedentary lifestyle. Projectile points varied in form with side and corner notched points becoming popular. The use of copper lessens during this time, but it continues to be used for awls or piercing tools and ornaments. Ground stone tools, including the popular grooved maul, were utilized (Johnson 1988: 15-19). Increasing population growth, intensification of regional identity and local groups, increasing efficient use of local raw materials and food sources, and intrusion of ideas, materials, and technology from other regions are major trends identified in Minnesota during this time period (Benchley et al. 1997a: 124).

Late Prehistoric Period (A.D. 900-1650): In southern Minnesota this period is identified with the appearance of the Mississippian culture and the introduction of corn horticulture. Mississippian culture was based upon intensive agriculture including the cultivation of maize or corn, beans, squash, sunflowers and tobacco. Although intensive agriculture was important, hunting and fishing remained essential, with Bison an important food staple. Large semi-permanent villages were maintained. Chipped stone technology continued including side-notched and unnotched triangular points, double pointed knives, trapezoidal forms of hide scrapers, along with drills and punches. Ground stone tools also were continued to be used, along with bone tools. Eastern Minnesota pottery was tempered with crushed shell and included wide or narrow incised geometric decoration. The use of burial mounds continued in some areas, and in the southern part of Minnesota, some of the mounds are more distinctive than their Woodland counterparts in that the exterior was covered in limestone slabs (Johnson 1988: 24-27).

**Historic**

With the coming of the Europeans to the area, European items and disease came into Minnesota from the east and south. Eastern tribes began to push to the west, displacing the original habitants. At the beginning of the contact period, the largest and possibly most widespread group was the Eastern Dakota, who occupied most of the Lake-forest biome of the central and northern Minnesota. They were displaced from the Lake-forest biome into the prairies, mainly by the Ojibway during the Chippewa (Ojibway)-Dakota wars, which lasted from the 1730’s until 1854. Other Native groups were present in Minnesota during the early historic time period, including the Iowa, Oto, and possibly the Assiniboine (Benchley et al. 1997b: 203-207).

The construction of Fort Snelling on the west side of the Mississippi River brought Euro-American civilization to Minnesota (Anfinson 1989: 20). Washington County was established on October 27, 1849. This was one of the nine original counties into which Minnesota was divided in 1849, although it is smaller than originally mapped. The county was named after George
Washington (Upham 2001: 615). Baytown Township was organized in May of 1858 (Upham 2001: 616). Lakeland Township (which West Lakeland Township was part of originally), was settled in 1839 and organized on October 20, 1858. West Lakeland Township was named as such in 1951 when Lakeland Township incorporated (Upham 2001: 607, 620).

**PREVIOUS SITES AND SURVEYS**

This project is located in SHPO region 4e. A literature review request was submitted to the Minnesota Historical Society (MHS) for the Township, Range, and Sections that the project area passes through and the Sections that would be within one mile of the existing project area. The Principal Investigator also visited the State Historic Preservation Office (SHPO) on May 10, 2017, to look through the maps, and previous site and survey files housed at that facility.

According to information provided by and researched at the Minnesota SHPO, one previously recorded site is within one mile of the project area. 21Waa, called Bass Lake Station, is located in Township 29 North, Range 21 West, Section 13. This site is a historic depression. The topographic maps at the SHPO office did not have this site mapped, but according to a list of sites provided by the SHPO office, the site is located in the southwest quarter of Section 13, which would put it at least a half mile to the west of the project area. Additionally, there is one historic cemetery located a quarter to a half mile northwest of the project along Stillwater Boulevard North. No previous recorded sites overlap the current project area.

Based on the list of reports for Washington County provided by the SHPO, and a review of reports in the Washington County drawer at the SHPO during the May 2017 visit, there has been no previous field surveys in the project area. A cultural resource assessment for the Lake Elmo Village area, which included the area just west of Manning Avenue opposite the airport grounds, was completed in 2007. However, this assessment included a literature review, background information, and recommendations for future work in the area, but did not include field survey (Boden and Mathis 2007).

**LAND USE HISTORY**

Various maps and atlases were researched to establish a general pattern of development along the project area and land use history. Online resources were used along with maps and atlases found at the MHS library. Mead and Hunt assisted MVAC with some of this research. Minnesota Historic Contexts applicable to this project include Early Agriculture and River Settlement (1840-1870).

According to the General Land Office (GLO) Records map from the Bureau of Land Management for this area, a 1854 original survey map (actual field survey dates to 1847) does not have any indications of cultural features, mounds, old roads or trails within either Sections 18
or 19 of Township 29 North, Range 20 West. The map and associated notes do not have any information regarding potential archaeological sites in these sections (Bureau of Land Management 2017, Field Notes Volume 130).

Historic maps of the area including plat maps and topographic maps were reviewed. Andreas’ (1874) map of the area does not exhibit any structures or cultural features within the project area. One structure is noted near the very northwest corner of the current airport property near the railroad tracks. Since there is no scale on the map, it is unclear if this structure is within the project area. The only project action in this part of the airport is for a new access road. A structure is noted in the center of Section 19, but is it is out of the project area (Figure 4).

The 1901 plat map of the area does show two structures in the project area, both north and south of 30th Street North (Blackwoods Avenue) (Northwest Publishing Company 1901) (Figure 5). The 1916 plat map of the area does not exhibit structures in the project area, but this map does very few structures within the two townships and appears to be more of a map showing property ownership boundaries (Hixson 1916). The case is similar with the 1938 plat map (Hudson Map Company 1938) of the area.

Based on historic aerial photos, the land where the current facility is located and the proposed expansion area was plowed fields back until at least 1938. Two clusters of structures are noted both north and south of 30th Street North on the 1938 through 1964 aerial photos (Regents of the University of Minnesota 2017) which are currently in groves of trees that were shovel tested as part of this project. These locations match the approximate locations of the structures on the historic plat maps. The 1938 aerial photo also shows that there were a few other ponds or what appear to be water sources in the northeast portion of the project area that are no longer apparent. See Results section of this report for historic aerial photos and further discussion.

The Lake Elmo Airport was opened in 1951. The first airfield near the current facility was opened in 1939 between the cities of White Bear Lake and Stillwater, and was known as Northport. During World War II, the Army used Northport to train pilots under the Civilian Piolet Training Program. The Army also leased the Flynn Farm to the east of the current airport and established a landing area to train glider pilots. After the war, the Flynn Farm airfield was closed and the land was once again used for agricultural purposes. After World War II, the MAC saw a need for an airport east of the Twin Cities, and in 1949, approximately 160 acres of land was purchased and the Lake Elmo Airport opened in 1951. At this time, draining, grading, and surfacing began for the single 75 foot wide by 2300 foot long paved runway that runs northwest-southeast. Since 1951, the runway was extended to 2850 feet with a full lighting system, and a second 2400 foot paved runway was added that runs northeast-southwest. The airport has a full taxiway system, an automated weather station, and two areas for instrument approach procedures. In 1966, an additional 470 acres was purchased for expansion of the airport, which includes all of the current project area except the area immediately east of Neal Avenue (Airport Development and Environment Departments 2016: 1-3, and Foster 2013: 3).
Figure 4. Andreas (1874) map of project area.

Figure 5. Northwest Publishing Company (1901) map of project area.
METHODOLOGY/WORK SUMMARY

On June 1, and July 12 and 13th, 2017, an MVAC field crew led by the Principal Investigator conducted a Phase I archaeological investigative survey of the proposed project area in Minnesota Archaeological Region 4e. The APE for the project included all areas of proposed ground disturbance which included portions in the existing airport facility north of 30th Street North and east of Manning Avenue, plowed fields and a small amount of wooded areas north of 30th Street North between Manning Avenue and Neal Avenue North, plowed fields and a small amount of wooded area south of 30th Street between Manning Avenue and Neal Avenue North, and approximately 840 feet north to south on the east side of Neal Avenue North, approximately 50 feet from the centerline of the road. There were no previously recorded sites within the project area, so the objective of the Phase I survey was to look for new sites.

The portions of the project north and south of 30th Street North, outside of the existing airport facility grounds, mainly consisted of plowed fields with a few wooded areas. At the time of the June 1 survey, the plowed fields contained soybeans that were 4 to 6 inches in height. Although there was some remnant corn stalks from previous harvests in the fields, the surface visibility was, in general, excellent with most areas in the plowed fields exceeding 95 percent surface visibility. The fields were walked on a warm sunny day which made the visibility optimal. To include various alternatives for the realignment of 30th Street North, some additional area was pedestrian surveyed south of 30th Street North in July when the soybeans had grown to more than a foot in height, but the surface visibility between the rows was still excellent. Pedestrian survey was carried out within the plowed fields in 12 to 15 meter intervals (Figures 6 and 7).

The proposed realignment of a portion of 30th Street North would possibly impact a small portion of Neal Ave, and the survey parameters were indicated to be 50 feet from centerline along the road for approximately 840 feet to cover any potential work. Once Gopher One marked the utilities along Neal Avenue, the east side of the road was shown to be saturated with utilities, therefore was not surveyed (Figure 8). The west side of the road had utilities near the road edge, and then was sloped up to the end of the plowed field that was pedestrian surveyed by MVAC. Therefore, this grassy area on the west side of Neal Avenue was not surveyed. Since the plowed fields on either side of the portion of 30th Street North that is to be impacted were very close to the road edge, with only a small amount of grass and slope/ditch between the road and the plowed fields, no shovel testing was undertaken along 30th Street North since the pedestrian survey of the immediately adjacent plowed fields should have given adequate coverage.

Historic aerial photos and historic maps were reviewed prior to the survey. Historic aerial images from 1953 and 1964 show the runways, but since these aerials are in black and white, although some grading was apparent, it was hard to estimate the actual grading limits within the current airport facility verses what was plowed field at that time, therefore the entire APE was considered in the survey. Within the airport facility, shovel tests were placed in 15 meter
Figure 6. Example of field conditions in plowed fields south of 30th Street North. View facing north.

Figure 7. Example of field conditions in plowed fields north of 30th Street North. View facing north.
intervals in all areas that were not obviously disturbed by ditch or grading. One area between existing Runway 14/32 and the taxiway was not shovel tested due to the fact there was graded slope on both edges with a ditch line running down the center. An area just east of Runway 14/32 at its southeastern end was obviously graded with some steep slope. A small area at the northeastern end of the facility that had some wetland, ditch, and slope. MVAC made a reasonable and good faith effort to shovel test any of the other areas that could not be ruled out as obviously disturbed on the surface. This included most of the rest of the project area except areas of steep slope or wetland. Some of the shovel tests along the access driveway for the northernmost set of airplane hangars showed obvious disturbance within a few inches of the ground surface by previous grading. The area southwest of Runway 14/32 exhibited obvious disturbance by previous grading with a few inches of the surface. The portion of the open area north of the taxiway for Runway 4/22 exhibited some disturbance, while other shovel tests appeared to show developed soil for the area (Figures 9 through 12).

There were a few wooded areas north and south of 30th Street North in and immediately adjacent to the plowed fields, and shovel testing was undertaken in 15 meter intervals. A few small areas of wetland were located north of 30th Street North, and were not shovel tested.

All shovel tests were excavated into sterile subsoil, and all soil was screened through 1/4 inch mesh. In general, shovel tests ranged from 48 to 50 centimeters below the current ground surface, depending on location and terrain. Areas that were wetland, steep slope, had obvious
disturbance by road construction, or obvious grading or ditching from airport construction were not surveyed. Examples of shovel test profiles are below:

**Example Soil Profiles**
- 0-32 cm, 10YR 2/2 Very Dark Brown Silt
- 32-49 cm, 10YR 6/8 Brownish Yellow Silty Clay
- 0-37 cm, 10YR 3/1 Very Dark Grey Silt
- 37-52 cm, 10YR 6/6 Brownish Yellow Silty Clay
- 0-27 cm, 10YR Very Dark Brown Silt
- 27-34 cm, 10YR 4/4 Dark Yellowish Brown Silt
- 34 – 55 cm, 10YR 6/8, Brownish Yellow Silt

All sites were mapped and GPS points were taken to establish UTM coordinates. Sketch maps were drawn of each site, and general notes were taken on the surrounding terrain and other pertinent information. Historic debris found at the two historic sites identified during this survey were photographed as appropriate and were noted in the general field notes. However, due to the more recent nature of the historic debris at the sites, no material was collected. All field notes, photographs, and other documentation will be stored at MVAC.
Figure 9. Example of field conditions in existing airfield north of taxiway for Runway 4/22. View facing southwest.

Figure 10. Example of field conditions in existing airfield south of Runway 4/22. View facing northeast.
Figure 11. Example of field conditions in new compass point north of Runway 14/32. View facing northwest.

Figure 12. Example of field conditions northeast of Runway 4/22. View facing southeast.
RESULTS

Two new historic sites, 21WA0119 and 21WA0120, were identified while shovel testing in two groves of trees north and south of 30th Street North (Figure 13). These sites coincide with the foundations noted on the 1938 through 1960 aerial photos, and the 1901 and later plat maps.

21WA0119 - Lake Elmo Air Foundations 1

21WA0119, called Lake Elmo Air Foundations 1, is in the SW/14 of the SW1/4 of the SE1/4 of Section 18 in Township 29 North, Range 20 West in Baytown Township (see Figure 13). This site was found while shovel testing in a grove of trees north of 30th Street North, southeast of the existing Lake Elmo Airport facility. This site consists of foundations associated with two buildings and some concrete slabs of unknown origin. The first foundation was found approximately 420 feet north of 30th Street North, and had a limestone portion measuring 26 feet by 15 feet, with a later concrete block addition at its northwest corner measuring approximately 19 feet by 18 feet (Figures 14 and 15). The concrete addition had a metal waterspout, a copper pipe with electrical wire, and electrical plugs apparent. The area where these foundations were located was extremely overgrown and it was apparent that the foundations had been affected by downed and uprooted trees in the area. The depth of the foundations was approximately three feet.

Since this whole wooded area was extremely overgrown, it was hard to get accurate measurements between the foundations. However, measurements were estimated using GPS data. Approximately 113 feet to the west of the first foundation, a large concrete slab measuring approximately 50 feet long by 14.5 feet wide was identified. The purpose of this slab is unknown. Approximately 53 feet southwest of this concrete slab was the remnant of another concrete building. This building was approximately 77 feet long by 17 feet wide. The outsides of this foundation were made of concrete block/cinder block and there were 7 foot “rooms” or entrance areas made of cinderblock at the northern and eastern ends of the building (Figure 16). The interior of this building had three separate concrete slabs inside at different levels in height. The highest was at the northern end, with the second level approximately 12 inches lower in the middle, and then another transition sloping down approximately 4 inches at the southern end. This may have been some type of barn. To the west of this area, some concrete rubble was also noted in the thick undergrowth, but the purpose of it was unknown. Review of Lidar Imagery for the site did not appear to show further foundations to the west in the grove of trees (Minnesota Department of Natural Resources and MNGeo 2017).

No cultural material was found in any of the shovel tests in and surrounding the site area. Some historic debris noted on the surface in and around the foundations included mostly 1960/1970 debris including terracotta pots, plastic materials, a lawn chair, scrap metal, nails, container glass fragments, ceramic crockery, and metal pails. Notes were taken about the
Figure 13. Approximate locations of 21WA0119 and 21WA0120.
Figure 14. Sketch map of 21WA0119.

* Note: Due to thick vegetation at the time of discovery, the distance between the foundations was scaled using GPS coordinates.
Figure 15. View of limestone foundation at 21WA0119.

Figure 16. View of cinderblock foundation at 21WA0119.
debris and it was photographed as appropriate, but due to the more recent nature of the material, it was not collected.

Although the grove of trees was extremely overgrown, there were two areas at the southern end that were more “clear” with less trees than the rest of the area. It appears that this may have been the original yard or entrance areas to the two buildings. The 1938 aerial photo shows that the driveway for this site used to enter from 30th Street North (formerly Blackwoods Avenue) and go into area just west of the eastern most foundation (the one containing the limestone foundation) (Figure 17). There are more buildings on the western edge of the site in 1938 than the amount of foundations found by MVAC in 2017, but the 1947 aerial photo shows that some of these buildings (likely outbuildings) were gone (Figure 18). The 1953 and 1964 aerial photos (Figures 19 and 20) show only possibly three buildings at the site, and the structures that appeared to be on the western side of the site were no longer there. There appears to be a line of planted trees to the west of the foundations.

The 1874 plat does not exhibit structures in this area (Andreas 1874), but the 1901 plat map of the area does (Northwest Publishing Company 1901) (See Figures 4 and 5). The limestone foundation portion of this site would suggest a pre-1900 use for that portion of the site, so the limestone foundation was likely constructed post 1874 since it was not on the Andreas map. The 1964 aerial photos still shows structures in this location and a 1967 topographic map still has a structure symbol in this location. A structure is shown in this location up until the 1982-1983 plat maps, so it was just likely razed after that time.

Of interest to the history of this site is that the 1938 plat map indicates that the land the site is on and the land surrounding it was owned by the Jacob Schmidt Brewing Company (Figure 21). The Jacob Schmidt Brewing Company building was located at 882 West Seventh Street in downtown St. Paul. Jacob Schmidt first worked and established the North Star Brewing Company on the later 1800’s. With a partnership with Adolph and Otto Bremer, Schmidt worked to establish the North Star Brand into the late 1800’s. After a fire destroyed that brewery in 1900, Adolf Bremmer and Schmidt bought a brewery that was in financial trouble and reopened in 1901 as the Jacob Schmidt Brewing Company. Otto Bremer continued helping with the business, but his first interest was banking. In 1911, Schmidt died, but Adolph and Otto Bremer continued working together. The company continued to grow until 1919 when the 18th Amendment passed and breweries stopped brewing beer. During this time, the company produced a soft drink line that met with poor success until they started producing Schmidt’s Select, a non-alcoholic but “beery” flavored malt drink. By 1933, when beer was legalized again, Schmidts’ beer became popular again. The company continued to grow and Schmidt Beer became so popular that the brewery ranked seventh largest in the United States. After the death of the last of the original owners, by 1955 the company changed hands although still operating under the Jacob Schmidt brand name, until it was purchased by the G. Heileman Brewing Company in 1972 (Jacob Schmidt Brewing Company 1950 and 1972).
Figure 17. 1938 aerial photo of general project area and locations of 21WA0119 and 21WA0120 (Regents of the University of Minnesota 2017).
Figure 18. 1947 aerial photo of general project area and locations of 21WA0119 and 21WA0120 (Regents of the University of Minnesota 2017).
Figure 19. 1953 aerial photo of general project area and locations of 21WA0119 and 21WA0120 (Regents of the University of Minnesota 2017).
Figure 20. 1964 aerial photo of general project area and locations of 21WA0119 and 21WA0120 (Regents of the University of Minnesota 2017).
Figure 21. Plat map dating to 1938 showing Jacob Schmidt Brewing Company ownership of portions of project area and locations of sites 21WA0119 and 21WA0120 (Hudson Map Company 1938).
Mead and Hunt assisted MVAC with deed research for this site, and this research found that Otto Bremer purchased this land in 1928, and the land was officially deeded over to the Jacob Schmidt Brewing Company in 1933. The brewing company owned the property until 1946, and then sold it to George H. Halpin and Richard P. Carlton, copartners as Countryside Farms.

The Jacob Schmidt Brewing Company was significant to the brewing industry of the Twin Cities area during its time as one of the top ten brewing companies in the nation. Otto Bremer purchased the land surrounding the site in 1928 during prohibition, but when the brewing company was manufacturing various types of soda. The land was officially sold to the Jacob Schmidt Brewing Company in 1933, the year prohibition ended. Unfortunately, no information could be found in the company histories of why this land was purchased. Perhaps it was to harvest barley and hops for the brewery operation downtown at a time when the end of prohibition allowed for the manufacture of alcoholic beverages again. Perhaps the land was rented out. This is conjecture at this point, but the most relevant issue to 21WA0119 is what was the brewing company’s relationship to the structures identified at the site, if any? If the structures were used for company storage or in a process that aided in the brewing process for one of the ten top breweries in the nation, it could suggest a level of significance for the site. The 1938 plat map did not show the Schmidt Brewing Company owning any additional land in Baytown and West Lakeland Township, or in the Oakland Township to the west.

This site dates from circa pre-1901 to the early 1980’s. The limestone foundation component of the site indicates likely an early construction date with later concrete additions. The foundations show on plat maps up until the early 1980’s. The intact foundations indicate integrity, and the relationship to the Jacob Schmidt Brewery for thirteen years from the 1930’s to the 1940’s could suggest a level of significance. This site may be potentially eligible for listing on the National Register of Historic Places (NRHP) under Criteria D, as it could yield important information about the past. However, since ultimately ground disturbing activities will be able to avoid this site, it was not formally evaluated for eligibility for the NRHP. The only project action that will take place within the site area is that the grove of trees surrounding the site will be clear cut.

21WA0120 – Lake Elmo Air Foundations 2

21WA0120, called Lake Elmo Air Foundations 2, is in the NW/14 of the NE1/4 of the NE1/4 of Section 19 in Township 29 North, Range 20 West in West Lakeland Township (See Figure 13). This site was found while shovel testing in a grove of trees south of 30th Street North, southeast of the existing Lake Elmo Airport facility. This site consists of concrete foundations associated with two buildings spaced approximately 377 feet apart (Figure 22). The first foundation was approximately 20 feet inside the tree line in the northeast corner of the grove of trees, and 120 feet south of 30th Street North. This foundation measured 20 feet north to south
*Note: Due to thick vegetation at the time of discovery, distance between foundations was scaled using GPS coordinates.

Figure 22. Sketch map of 21WA0120.
and 29 feet east to west. A few pieces of historic debris were noted on the surface including an old broom, some broken post 1950’s bottles, and some metal fencing material. The broken bottles did not have enough present to be diagnostic.

This grove of trees was extremely overgrown and it was hard to measure the distance between the two buildings with a tape measure, but based on GPS coordinates, the second foundation is approximately 377 feet to the southwest. The second concrete foundation was located near the southwest corner of the grove of trees, close to the edge of the adjacent plowed field. This foundation measured 32 feet north to south and 18.5 feet east to west (See Figure 22 and 23). This foundation was divided into two rooms by a foundation piece 12 feet from the southern end of the building. Within a 50 to 60 foot radius of this foundation, there was a significant amount of discarded post 1950 debris and even more recent historic debris including bed or couch cushion springs, scrap metal and fencing material, several metal cans and buckets, plastic material, glass bottles, and a wood stove (Figure 24). Portions of a metal toy rifle were also present. Notes were taken about the debris and it was photographed as appropriate, but due to the more recent nature of the material, it was not collected. Only one small fragmentary piece of crockery was found in a shovel tests in this grove of trees, and it was not collected.

Based on the 1938 aerial photos of the area, it appears that the driveway for this property went from 30th Street North (Blackwoods Avenue) to the structure found at the southwest grove of trees, while the foundation found closest to 30th Street North appears to be an outbuilding. The 1938 aerial shows that there may have been another building south of the one closest to 30th Street North, but since no foundation relating to this was found by MVAC in 2017, this building may have not had a foundation, and it may have been some other type of temporary or portable structure. The 1947 aerial shows both structures, and it is not clear on the 1953 aerial photo if both structures are present. The 1964 aerial does not show the building closest to 30th Street North, so it is presumed to have been razed between 1953 and 1964. The 1964 aerial photo does show the structure furthest from 30th Street North (at the southwest corner of the grove of trees) (see Figures 17 through 20). A 1966 plat map shows a structure in this area (Rockford Map Publisher 1966), but the 1967 topographic map of the area does not have a structure shown in this area by the time, so it likely that both structures were razed prior to 1967. Lidar imagery reviewed for the site do no show additional structures in the grove of trees (Minnesota Department of Natural Resources and MNGeo 2017). There was a circular item east of the southern foundation noted on the Lidar map, but no cultural feature relating to it was identified by MVAC in the field in 2017.

Historic plat maps indicate that structures were not in this area in 1874 (Andreas 1874), but were in this area by 1901 (Northwest Publishing Company 1901). Historic map research and deed research for the site indicates that the foundations at 21WA0120 and the land surrounding them were also owned by Otto Bremer beginning in 1927, and the Jacob Schmidt Brewing Company from 1933 to 1946 (see Figure 19), and the land was then deeded over the Countryside Farms like the area north of 30th Street North. The same type of question applies to this site as at
Figure 23. View of southern most foundations at 21WA0120.

Figure 24. Example of historic debris near southern foundation at 21WA0120.
21WA0119. What was the relationship to these foundation to one of the top brewing companies in the nation right after prohibition?

This site dates from circa pre-1901 to the mid/late 1960’s. Although maps show a structure in this area in 1901, this would be a little early for concrete foundations, so there may have been some other type of limestone structure here originally that was razed or built over. MVAC did not find evidence of an earlier structure during the survey. The intact foundations indicate integrity, and the relationship to the Jacob Schmidt Brewery Company for thirteen years from the 1930’s to the 1940’s could suggest a level of significance. This site may be potentially eligible for listing on the National Register of Historic Places (NRHP) under Criteria D, as it could yield important information about the past. However, since ultimately ground disturbing activities will be able to avoid this site, it was not formally evaluated for eligibility for the NRHP. The only project action that will take place within the site area is that grove of trees will be clear cut.

RECOMMENDATIONS

Although from historical resource it is known that the Jacob Schmidt Brewery Company, at one point one of the top ten brewing companies in the nation, owned the land surrounding and including the foundations found at both 21WA0119 and 21WA0120, the relationship of the foundations to the brewery and its operations, if any, is unknown at this time. Company histories and deed research did not provide any details of why the company would have owned land at least twelve miles from the brewery. Due to their age, intact foundation material, and some type of relationship to the Jacob Schmidt Brewing Company, the two sites may be potentially eligible for listing the NRHP under Criteria D as they may provide important information about the past. However, since ground disturbing activities will be able to avoid the foundations, the sites were not formally evaluated for eligibility for the NRHP. The groves of trees surrounding the sites will be clear cut, and to avoid any inadvertent disturbance to the foundations, it is recommended that the trees in and immediately around the foundations be hand cut, and no heavy equipment drive near the foundations. If, in the future, ground disturbance is planned in the areas of the site locations, the SHPO should be consulted to see if further evaluation of the sites are necessary.

Aside from the 21WA0119 and 21WA0120, no other cultural material was identified during the survey. Therefore no further work is recommended for the remainder of the project area.
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Natural Resource Conservation Service 2017

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Rockford Map Publishers

Upham, Warren

Wright, H. E. Jr.
Appendix 1: Literature Review from MN SHPO.
### Archaeological Site Locations

<table>
<thead>
<tr>
<th>County</th>
<th>Site Number</th>
<th>Site Name</th>
<th>Twp</th>
<th>Range</th>
<th>Sec</th>
<th>Quarter Sections</th>
<th>Acres</th>
<th>Phase</th>
<th>Site Description</th>
<th>Tradition</th>
<th>Context</th>
<th>Reports</th>
<th>NR</th>
<th>CEF</th>
<th>DOE</th>
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<td>Washington</td>
<td>21Waaa</td>
<td>Bass Lake Station</td>
<td>29</td>
<td>21</td>
<td>13</td>
<td>SW</td>
<td>0</td>
<td>HD</td>
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*Monday, January 23, 2017*
<table>
<thead>
<tr>
<th>Content</th>
<th>Page</th>
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<tbody>
<tr>
<td>U.S. Fish &amp; Wildlife Services Section 7 Concurrence Email and Attachment December 7, 2017</td>
<td>E-1 thru E-14</td>
</tr>
</tbody>
</table>
Evan Barrett

From: Joshua.Fitzpatrick@faa.gov
Sent: Thursday, December 7, 2017 2:00 PM
To: Evan Barrett
Subject: FW: Lake Elmo Airport ESA Effect Determination
Attachments: OPHI - Presentation for ODOT FAA Workshop.pdf

Evan, below is Section 7 concurrence from USFWS. Please include and reference in EA. If acreages for tree removal increase then I will need to reinitiate consultation.

Also, per below the Service is asking if Lake Elmo would like to be a candidate site for rusty patched bumble bee reintroduction where they dedicate a portion of land to bumble bee restoration efforts. Perhaps we can talk about this at our Tuesday meeting?

Thank you,

Josh Fitzpatrick
Environmental Protection Specialist
FAA Dakota-Minnesota Airport District Office
Joshua.Fitzpatrick@faa.gov
(612) 253-4639

From: Horton, Andrew [mailto:andrew_horton@fws.gov]
Sent: Thursday, December 07, 2017 12:36 PM
To: Fitzpatrick, Joshua (FAA) <Joshua.Fitzpatrick@faa.gov>
Cc: Peter Fasbender <Peter_Fasbender@fws.gov>; Smith, Tamara <tamara_smith@fws.gov>
Subject: Re: Lake Elmo Airport ESA Effect Determination

Josh,

I have reviewed the proposed activities at the Lake Elmo Airport and agree with your determination that the project may affect, but is not likely to adversely affect the northern long-eared bat (Myotis septentrionalis). Impacts to the species from the removal of 20-acres of trees at this location are likely to be insignificant or discountable because they will be removed at a time when the northern long-eared bat is not present on the landscape, eliminating the risk of direct mortality. Regarding the rusty patched bumble bee (Bombus affinis), consultation is not necessary because the proposed action is located outside of a high potential zone. It is also unlikely that any portion of the airport currently has suitable foraging or nesting habitat. With that said, this property is located within 2-miles of recent rusty patched bumble bee observations and has a considerable land area that could be supportive of conservation efforts for the species. The Service would be interested in any possibility of the airport managing a portion of the property to encourage native flowering species that would provide nectar and pollen sources for populations that may be in the area. We would recommend this, of course, only if it was compatible with the safety requirements and did not interfere with airport operations. I would also like to add that other airports have taken this approach with success and this could be a great opportunity to have a local success story supporting endangered species. More information on one example I came across is included in the attachment.

This concludes consultation under Section 7 of the Endangered Species Act, as amended. Please contact our office if this project changes or new information reveals effects of the action to proposed or listed species or critical habitat to an extent not covered in your original request. Also, please reach out to us if you would like to take this opportunity to support the rusty patched bumble bee. Thank you.
The Lake Elmo Airport (Airport) has undertaken an environmental assessment (EA) with the Federal Aviation Administration (FAA) for Airport improvements including:

- Relocate Runway 14/32 to the northeast and extend to the southeast, including all necessary grading, clearing, and runway lighting.

- Construct cross-field taxiway to serve new Runway 14 end.

- Convert existing Runway 14/32 to a partial parallel taxiway and construct other taxiways as needed to support the relocated runway, including taxiway lighting and/or reflectors.

- Extend Runway 04/22 to the northeast and add necessary lighting and taxiway connectors.

- Realign 30th Street North around the new Runway 14/32 runway protection zone to reconnect with Neal Avenue North.

- Construct a connector road.

- Establish non-precision instrument approach procedures to all four runway ends.

- Remove approximately 20 acres of trees.

The attached exhibit illustrates all of the project elements identified in the proposed action.

Lake Elmo Airport is located in Washington County, Minnesota. As of September 18, 2017, there were six federally-listed species under the Endangered Species Act (ESA) with habitat in Washington County. Four of these species are freshwater mussels including the Higgins eye pearlymussel, the Snuffbox, the Spectaclecase, and the Winged mapleleaf. These species contain habitat in either the Mississippi or the St. Croix Rivers, and would not be affected by the proposed action. The FAA made a no effect determination to these four freshwater mussels on November 3, 2017.
The other two ESA listed species are the Northern long-eared bat (NLEB) (listed as threatened) and the Rusty patched bumble bee (listed as endangered).

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Federal Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern long-eared bat</td>
<td><em>Myotis septentrionalis</em></td>
<td>Threatened</td>
</tr>
<tr>
<td>Rusty patched bumble bee</td>
<td><em>Bombus affinis</em></td>
<td>Endangered</td>
</tr>
</tbody>
</table>

Based on the above, the NLEB and Rusty patched bumble bee have potential habitat at or near Lake Elmo Airport, and/or have been documented as occurring within a 2.5-mile radius of the project area. Characteristics, habitat, and mitigation measures associated with each of these species are discussed below.

**Northern long-eared bat**

The predominant threat to the NLEB is white-nose syndrome; a fungal disease which has eliminated up to 99 percent of NLEB populations in the northeastern United States. White-nose syndrome has been reported in Washington County. During summer, the NLEB typically roosts singly or in colonies under the bark, in cavities or in crevices of living and dead trees. Males and non-reproductive females may also roost in caves and mines during the summer; most hibernate during winter in caves and mines with constant temperatures, high humidity and no air currents. No critical habitat has been designated for this bat. Potential habitat for the NLEB is present within the proposed action area and may be present in areas in which trees will be removed.

The proposed action will require the removal of trees on Airport property for construction of the runway and clearance of associated approach and departure surfaces. Approximately 20 acres of deciduous trees will be cleared in association with the proposed action. The groups of multiple species range in age from saplings, with a diameter at breast height of less than three inches to large, mature trees of 40 feet or more in height. The trees are located along fence rows, within agricultural fields, or in surrounding wetlands. Standing and downed dead trees are also present within these areas. Trees and woody shrubs include, but are not limited to the species listed below.

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Height</th>
<th>Habit / Dominant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boxelder</td>
<td><em>Acer negundo</em></td>
<td>40-60 feet</td>
<td>Tree / Yes</td>
</tr>
<tr>
<td>Silver maple</td>
<td><em>Acer saccharinum</em></td>
<td></td>
<td>Tree / No</td>
</tr>
<tr>
<td>Redosier dogwood</td>
<td><em>Cornus sericea</em></td>
<td></td>
<td>Shrub / No</td>
</tr>
<tr>
<td>White ash</td>
<td><em>Fraxinus americana</em></td>
<td></td>
<td>Tree / No</td>
</tr>
<tr>
<td>Green ash</td>
<td><em>Fraxinus pennsylvanica</em></td>
<td>40 feet</td>
<td>Tree / No</td>
</tr>
<tr>
<td>Tree Name</td>
<td>Scientific Name</td>
<td>Height</td>
<td>Habit</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-------------------------------------------</td>
<td>--------</td>
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</tr>
<tr>
<td>Eastern cottonwood</td>
<td><em>Populus deltoides</em></td>
<td>Up to 80ft</td>
<td>Tree</td>
</tr>
<tr>
<td>Quaking aspen</td>
<td><em>Populus tremuloides</em></td>
<td>Up to 80ft</td>
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</tr>
<tr>
<td>Black cherry</td>
<td><em>Prunus serotina</em></td>
<td>Up to 15ft</td>
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<tr>
<td>Burr oak</td>
<td><em>Quercus macrocarpa</em></td>
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<tr>
<td>Pin oak</td>
<td><em>Quercus palustris</em></td>
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<td>Common buckthorn</td>
<td><em>Rhamnus cathartica</em></td>
<td>Up to 20 feet</td>
<td>Shrub</td>
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<tr>
<td>Missouri gooseberry</td>
<td><em>Ribes missouriense</em></td>
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<tr>
<td>Black willow</td>
<td><em>Salix nigra</em></td>
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<tr>
<td>American black elderberry</td>
<td><em>Sambucus nigra ssp. canadensis</em></td>
<td>Up to 12 feet</td>
<td>Shrub</td>
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<td>American elm</td>
<td><em>Ulmus americana</em></td>
<td>40-60 feet</td>
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</tr>
<tr>
<td>Slippery elm</td>
<td><em>Ulmus rubra</em></td>
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<td>Tree</td>
</tr>
<tr>
<td>Common pricklyash</td>
<td><em>Zanthoxylum americanum</em></td>
<td>8-10 feet</td>
<td>Shrub</td>
</tr>
</tbody>
</table>

The 4(d) rule for the NLEB stipulates that incidental take for projects inside the white-nose syndrome zone is not prohibited. The federal agency can rely upon the finding of the programmatic biological opinion for the final 4(d) rule to fulfill their project-specific Section 7 responsibilities. The following Avoidance and Minimization Measures (AMMs) from the *Range-Wide Biological Assessment for Transportation Projects for Indiana Bat and Northern Long-Eared Bat* (USFWS/USDOT, April 2015) are proposed for the tree removal activities.

**Tree Removal AMM 2** - To avoid and minimize impacts to the NLEB, tree clearing will be completed between October 1 and April 30, which is the dormant season for the bat at this latitude.

**Tree Removal AMM 3** - Tree removal will be limited to that specified in project plans. Tree removal limits will be clearly indicated in the field by bright orange flagging/fencing prior to any tree clearing to ensure contractors stay within clearing limits. Tree clearing limitations will be discussed with contractors at the pre-construction meeting to ensure that they understand clearing limits and how they are marked in the field.

*Rusty patched bumble bee*

Rusty patched bumble bees (*Bombus affinis*, (RPBB)) live in colonies that have an annual cycle. The bees gather pollen and nectar from a variety of flowering plants and prefer tallgrass prairie habitat. Historically its range included 28 states, the District of Columbia, and two provinces in Canada. Since 2000, the RPBB has been reported in only 13 states and one Canadian province. A combination of the loss of habitat and related diversity of flowering plants due to intense farming and general development, along with pesticide use, led to the listing of this species as endangered in January 2017. No critical habitat has been designated for the RPBB, and the airport is in a low potential habitat zone per the USFWS website. There are no areas of tallgrass prairie within the study area, and areas dominated by grasses and flowering forbs are mowed on a regular basis. Therefore, there are no potential vegetation types that provide habitat for the RPBB that would be affected by
the proposed action. The FAA utilized the IPAC website and the species was not identified to be present in the action area.

**Biological Resources (including fish, wildlife, and plants)**

During multiple days of field work in June 2017 conducted by two Mead & Hunt biologists to identify and delineate wetlands, a variety of plant and animal species were identified within the study area including insects, arachnids, birds, mammals, amphibians, and wetland and upland vegetation. Birds identified within the study area included, but were not limited to, American crows, red-winged blackbirds, bluejays, chickadees, vireos, swifts/swallows, and multiple sparrow species. One female white-tailed deer was observed and photographed. Frogs were observed in wetland areas. Wetland vegetation is documented in the wetland data sheets and related report completed in September 2017. Upland herbaceous vegetation was dominated by Kentucky bluegrass, red clover, dandelion, oxeye daisy, yarrow, thistle and plantains. Areas with these dominant plants are frequently mowed and maintained. No bald or golden eagles were observed during the field work.

Based on the information described above the FAA has made a may affect, not likely to adversely affect ESA determination to both the NLEB and RPBB. The FAA requests concurrence from the USFWS on both of these determinations.

If you have any questions or concerns, please let me know.

Thanks,

Josh Fitzpatrick

Environmental Protection Specialist

FAA Dakota-Minnesota Airport District Office

Joshua.Fitzpatrick@faa.gov

(612) 253-4639
Pollinator Habitat at Airports

Scott Lucas
Ohio Department of Transportation
presenting on behalf of:
Ohio Pollinator Habitat Initiative
What is the Ohio Pollinator Habitat Initiative?

- Ohio Pollinator Habitat Initiative (OPHI) began in 2015.
- The purpose of the initiative:
  - Create and improve pollinator habitat across the State of Ohio.
  - Increase and improve pollinator conservation and awareness.
- The motto is: “All you can, where you can.”
- The group has a large number of partners.
Partners

• Pheasants Forever
• Ohio Division of Wildlife
• US Fish and Wildlife Service
• Ohio Department of Agriculture
• Various Soil and Water Conservation Districts
• And many more…
Why would you want to plant pollinator habitat at an airport?

- Reduce the number of large bird strikes with planes
  - Large birds like Canada geese and different species of gulls tend to avoid tall grass
- Reduction in carbon footprint
  - Prairies absorb about 1 metric ton of carbon per acre according to experts.
- Save mowing costs
  - Once established, prairies only need mowed once a year
- Last but not least, create habitat for pollinators
What are the costs for establishing a warm season grass pasture?

The initial cost of establishing a warm season grass pasture per acre estimates:

- Seed costs: $240/acre
- Site prep (tillage): $8-20/acre (average = $14/acre)
- Site prep (herbicide): $3-13/acre (average = $8/acre)
- Seeding costs $10-50/acre (average = $30/acre)
- Weed management $8-27/acre (average = $18/acre)
- **TOTAL COSTS $310/acre**

---

16 Iowa State University Extension and Outreach, “Incorporating Prairies into Multifunctional Landscapes.” August 2011.

17 Estimated price of $240/acre for seed provided by Pheasants Forever.
Are there grants available for planting pollinator habitat?

Opportunities for receiving grants could be available through:

- NOAA’s grant program
  - https://grantsonline.rdc.noaa.gov/flows/home/Login/LoginController.jspf

- Partnerships with not-for-profit organizations
  - Not-for-profit organizations can apply for grants that for-profit organizations cannot apply for

- Ohio EPA Educational Program
  - http://www.epa.ohio.gov/oeeef/EnvironmentalEducation.aspx

- OPHI has resources available for project specific grant programs
  - http://www.ophi.info/
Who has planted pollinator plots at airports?

The Dayton International Airport has multiple plantings:

• 270 acres of tall Native Warm Season Grass Prairies
• Switchgrass Plots
• Agricultural fields
• Airfield turf
Who do I contact if I want to look into planting pollinator habitat at my airport?

Dayton International Airport plantings:
Mike Cross at 937-623-8343
MCross@flydayton.com

ODOT’s involvement in pollinator plantings:
Scott Lucas at 614-644-6603
Scott.Lucas@dot.ohio.gov

OPHI statewide:
Marci Lininger at 614-416-8993 ex: 27
Marci_Lininger@fws.gov
Thank you for your time.
<table>
<thead>
<tr>
<th>Content</th>
<th>Page</th>
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</thead>
<tbody>
<tr>
<td>Minnesota Department of Natural Resources NHIS Letter and Attachments</td>
<td>F-1 thru F-12</td>
</tr>
<tr>
<td>September 11, 2017</td>
<td></td>
</tr>
</tbody>
</table>
September 11, 2017

Correspondence # ERDB 20170278-0002

Mr. Evan Barrett
Mead & Hunt, Inc.
7900 West 78th Street, Suite 370
Minneapolis, MN  55439

RE: Natural Heritage Review of the proposed Lake Elmo Airport Improvements,
T29N R20W Sections 18 & 19; Washington County

Dear Mr. Barrett,

As requested, the Minnesota Natural Heritage Information System has been queried to determine if any rare species or other significant natural features are known to occur within an approximate one-mile radius of the proposed project. Based on this query, rare features have been documented within the search area (for details, please visit the Rare Species Guide at http://www.dnr.state.mn.us/rsg/index.html for more information on the biology, habitat use, and conservation measures of these rare species). Please note that the following rare features may be adversely affected by the proposed project:

State-listed Species

- Blanding’s turtles (Emydoidea blandingii), a state-listed threatened species, have been reported in the vicinity of the proposed project and may be encountered on site. Blanding’s turtles use wetlands as well as upland areas up to and over a mile distant from wetlands. Uplands are used for nesting, basking, periods of dormancy, and traveling between wetlands. Factors believed to contribute to the decline of this species include collisions with vehicles, wetland drainage and degradation, and the development of upland habitat. Any added mortality can be detrimental to populations of Blanding’s turtles, as these turtles have a low reproduction rate that depends upon a high survival rate to maintain population levels.

This project has the potential to impact this rare turtle through direct fatalities or habitat disturbance/destruction due to dewatering, excavation, fill, or other construction activities associated with the project. Actions to avoid or minimize disturbance to this state-protected turtle may include, but are not limited to, the following recommendations:

- Avoid Type 2 & 3 wetlands,
- To avoid any incidental takings, avoid filling or dewatering wetlands during the winter,
- Implement stringent sediment and erosion control methods,
- Use wildlife-friendly erosion control methods (see enclosed fact sheet),
- Monitor for turtles during construction and report any sightings to the DNR,
Refer to the first list of recommendations in the enclosed Blanding’s Turtle Fact Sheet. If greater protection for turtles is desired, the second list of recommendations can be implemented as well.

If further assistance is needed regarding the Blanding’s turtle, please contact the DNR Regional Nongame Specialist, Erica Hoaglund, at 651-259-5772 or Erica.Hoaglund@state.mn.us.

The attached flyer should be given to all contractors working in the area. If Blanding’s turtles are encountered on site, please remember that state law and rules prohibit the destruction of threatened or endangered species, except under certain prescribed conditions. If turtles are in imminent danger they must be moved by hand out of harm’s way, otherwise they are to be left undisturbed.

**Federally Protected Species**

- The rusty patched bumble bee (*Bombus affinis*), a federally-listed endangered species, was documented within two and a half miles of the proposed project. The rusty patched bumble bee typically occurs in grasslands and urban gardens with flowering plants from April through October. This species nests underground in abandoned rodent cavities or in clumps of grasses. Please reference the guidance at the following website to determine if the project has the potential to impact this protected species: [https://www.fws.gov/midwest/endangered/insects/rpbb/guidance.html](https://www.fws.gov/midwest/endangered/insects/rpbb/guidance.html).

**Environmental Review and Permitting**

- The Environmental Assessment Worksheet should address whether the proposed project has the potential to adversely affect the above rare features and, if so, it should identify specific measures that will be taken to avoid or minimize disturbance.

- Please include a copy of this letter in any state or local license or permit application. Please note that measures to avoid or minimize disturbance to the above rare features may be included as restrictions or conditions in any required permits or licenses.

The Natural Heritage Information System (NHIS), a collection of databases that contains information about Minnesota’s rare natural features, is maintained by the Division of Ecological and Water Resources, Department of Natural Resources. The NHIS is continually updated as new information becomes available, and is the most complete source of data on Minnesota’s rare or otherwise significant species, native plant communities, and other natural features. However, the NHIS is not an exhaustive inventory and thus does not represent all of the occurrences of rare features within the state. Therefore, ecologically significant features for which we have no records may exist within the project area. If additional information becomes available regarding rare features in the vicinity of the project, further review may be necessary.

For environmental review purposes, the results of this Natural Heritage Review are valid for one year; the results are only valid for the project location (noted above) and the project description provided on the NHIS Data Request Form. Please contact me if project details change or for an updated review if construction has not occurred within one year.

The Natural Heritage Review does not constitute review or approval by the Department of Natural Resources as a whole. Instead, it identifies issues regarding known occurrences of rare features and potential effects to these features.
rare features. If you have not done so already, please contact your DNR Regional Environmental Assessment Ecologist to determine whether there are other natural resource concerns associated with the proposed project (contact information available at http://www.dnr.state.mn.us/eco/ereview/erp_regioncontacts.html). Please be aware that additional site assessments or review may be required.

Thank you for consulting us on this matter, and for your interest in preserving Minnesota's rare natural resources. An invoice will be mailed to you under separate cover.

Sincerely,

Samantha Bump
Natural Heritage Review Specialist
Samantha.Bump@state.mn.us

Enc. Blanding’s Turtle Fact Sheet & Flyer
Wildlife Friendly Erosion Control
Rusty Patched Bumble Bee Fact Sheet

Cc: Becky Horton
    Leslie Parris
    Erica Hoaglund
Preventing Entanglement by Erosion Control Blanket

Plastic mesh netting is a common component in erosion control blanket. It is utilized to hold loose fibrous materials in place (EG straw) until vegetation is established. Erosion control blanket is being utilized extensively and is effective for reducing soil erosion, benefitting both soil health and water quality. Unfortunately there is a negative aspect of the plastic mesh component: It is increasingly being documented that its interaction with reptiles and amphibians can be fatal (Barton and Kinkead, 2005; Kapfer and Paloski, 2011). Mowing machinery is also susceptible to damage due to the long lasting plastic mesh.

Potential Problems:
- Plastic netting remains a hazard long after other components have decomposed.
- Plastic mesh netting can result in entanglement and death of a variety of small animals. The most vulnerable group of animals are the reptiles and amphibians (snakes, frogs, toads, salamanders, turtles). Ducklings, small mammals, and fish have also been observed entangled in the netting.
- Road maintenance machinery can snag the plastic mesh and pull up long lengths into machinery, thus binding up machinery and causing damage and/or loss of time cleaning it out.

Suggested Alternatives:
- Do not use in known locations of reptiles or amphibians that are listed as Threatened or Endangered species.
- Limit use of blanket containing welded plastic mesh to areas away from where reptiles or amphibians are likely (near wetlands, lakes, watercourses, or rock outcrops) or habitat transition zones (prairie – woodland edges, rocky outcrop – woodland edges, steep rocky slopes, etc.)
- Select products with biodegradable netting (preferably made from natural fibers, though varieties of biodegradable polyesters also exist on the market). Biodegradable products will degrade under a variety of moisture and light conditions.
- DO NOT use products that require UV-light to degrade (also called “photodegradable”) as they do not degrade properly when shaded by vegetation.

Solution: Most categories of erosion control blanket and sediment control logs are available in natural net options.
- Specify ‘Natural Netting’ for rolled erosion control products, per MnDOT Spec 3885. See Table 3885-1.
- Specify ‘Natural Netting’ for sediment control logs, per MnDOT Spec 3897

The plastic mesh component of erosion control blanket becomes a net for entrapment.

Literature Referenced
Blanding’s Turtle  
(*Emydoidea blandingii*)

**Endangered, Threatened, and Special Concern Species of Minnesota**

**HABITAT USE**
Blanding’s turtles need both wetland and upland habitats to complete their life cycle. The types of wetlands used include ponds, marshes, shrub swamps, bogs, and ditches and streams with slow-moving water. In Minnesota, Blanding’s turtles are primarily marsh and pond inhabitants. Calm, shallow water bodies (Type 1-3 wetlands) with mud bottoms and abundant aquatic vegetation (e.g., cattails, water lilies) are preferred, and extensive marshes bordering rivers provide excellent habitat. Small temporary wetlands (those that dry up in the late summer or fall) are frequently used in spring and summer -- these fishless pools are amphibian and invertebrate breeding habitat, which provides an important food source for Blanding’s turtles. Also, the warmer water of these shallower areas probably aids in the development of eggs within the female turtle. Nesting occurs in open (grassy or brushy) sandy uplands, often some distance from water bodies. Frequently, nesting occurs in traditional nesting grounds on undeveloped land. Blanding’s turtles have also been known to nest successfully on residential property (especially in low density housing situations), and to utilize disturbed areas such as farm fields, gardens, under power lines, and road shoulders (especially of dirt roads). Although Blanding’s turtles may travel through woodlots during their seasonal movements, shady areas (including forests and lawns with shade trees) are not used for nesting. Wetlands with deeper water are needed in times of drought, and during the winter. Blanding’s turtles overwinter in the muddy bottoms of deeper marshes and ponds, or other water bodies where they are protected from freezing.

**LIFE HISTORY**
Individuals emerge from overwintering and begin basking in late March or early April on warm, sunny days. The increase in body temperature which occurs during basking is necessary for egg development within the female turtle. Nesting in Minnesota typically occurs during June, and females are most active in late afternoon and at dusk. Nesting can occur as much as a mile from wetlands. The nest is dug by the female in an open sandy area and 6-15 eggs are laid. The female turtle returns to the marsh within 24 hours of laying eggs. After a development period of approximately two months, hatchlings leave the nest from mid-August through early-October. Nesting females and hatchlings are often at risk of being killed while crossing roads between wetlands and nesting areas. In addition to movements associated with nesting, all ages and both sexes move between wetlands from April through November. These movements peak in June and July and again in September and October as turtles move to and from overwintering sites. In late autumn (typically November), Blanding’s turtles bury themselves in the substrate (the mud at the bottom) of deeper wetlands to overwinter.

**IMPACTS / THREATS / CAUSES OF DECLINE**
- loss of wetland habitat through drainage or flooding (converting wetlands into ponds or lakes)
- loss of upland habitat through development or conversion to agriculture
- human disturbance, including collection for the pet trade* and road kills during seasonal movements
- increase in predator populations (skunks, raccoons, etc.) which prey on nests and young

*It is illegal to possess this threatened species.*
RECOMMENDATIONS FOR AVOIDING AND MINIMIZING IMPACTS

These recommendations apply to typical construction projects and general land use within Blanding’s turtle habitat, and are provided to help local governments, developers, contractors, and homeowners minimize or avoid detrimental impacts to Blanding’s turtle populations. **List 1** describes minimum measures which we recommend to prevent harm to Blanding’s turtles during construction or other work within Blanding’s turtle habitat. **List 2** contains recommendations which offer even greater protection for Blanding’s turtles populations; this list should be used *in addition to the first list* in areas which are known to be of state-wide importance to Blanding’s turtles (contact the DNR’s Natural Heritage and Nongame Research Program if you wish to determine if your project or home is in one of these areas), or in any other area where greater protection for Blanding’s turtles is desired.

<table>
<thead>
<tr>
<th>List 1. Recommendations for all areas inhabited by Blanding’s turtles.</th>
<th>List 2. Additional recommendations for areas known to be of state-wide importance to Blanding’s turtles.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GENERAL</strong></td>
<td></td>
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<tr>
<td>A flyer with an illustration of a Blanding’s turtle should be given to all contractors working in the area. Homeowners should also be informed of the presence of Blanding’s turtles in the area.</td>
<td>Turtle crossing signs can be installed adjacent to road-crossing areas used by Blanding’s turtles to increase public awareness and reduce road kills.</td>
</tr>
<tr>
<td>Turtles which are in imminent danger should be moved, by hand, out of harms way. Turtles which are not in imminent danger should be left undisturbed.</td>
<td>Workers in the area should be aware that Blanding’s turtles nest in June, generally after 4pm, and should be advised to minimize disturbance if turtles are seen.</td>
</tr>
<tr>
<td>If a Blanding’s turtle nests in your yard, do not disturb the nest.</td>
<td>If you would like to provide more protection for a Blanding’s turtle nest on your property, see “Protecting Blanding’s Turtle Nests” on page 3 of this fact sheet.</td>
</tr>
<tr>
<td>Silt fencing should be set up to keep turtles out of construction areas. It is critical that silt fencing be removed after the area has been revegetated.</td>
<td>Construction in potential nesting areas should be limited to the period between September 15 and June 1 (this is the time when activity of adults and hatchlings in upland areas is at a minimum).</td>
</tr>
<tr>
<td><strong>WETLANDS</strong></td>
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<tr>
<td>Small, vegetated temporary wetlands (Types 2 &amp; 3) should not be dredged, deepened, filled, or converted to storm water retention basins (these wetlands provide important habitat during spring and summer).</td>
<td>Shallow portions of wetlands should not be disturbed during prime basking time (mid morning to mid- afternoon in May and June). A wide buffer should be left along the shore to minimize human activity near wetlands (basking Blanding’s turtles are more easily disturbed than other turtle species).</td>
</tr>
<tr>
<td>Wetlands should be protected from pollution; use of fertilizers and pesticides should be avoided, and run-off from lawns and streets should be controlled. Erosion should be prevented to keep sediment from reaching wetlands and lakes.</td>
<td>Wetlands should be protected from road, lawn, and other chemical run-off by a vegetated buffer strip at least 50’ wide. This area should be left unmowed and in a natural condition.</td>
</tr>
<tr>
<td><strong>ROADS</strong></td>
<td></td>
</tr>
<tr>
<td>Roads should be kept to minimum standards on widths and lanes (this reduces road kills by slowing traffic and reducing the distance turtles need to cross).</td>
<td>Tunnels should be considered in areas with concentrations of turtle crossings (more than 10 turtles per year per 100 meters of road), and in areas of lower density if the level of road use would make a safe crossing impossible for turtles. Contact your DNR Regional Nongame Specialist for further information on wildlife tunnels.</td>
</tr>
<tr>
<td>Roads should be ditched, not curbed or below grade. If curbs must be used, 4 inch high curbs at a 3:1 slope are preferred (Blanding’s turtles have great difficulty climbing traditional curbs; curbs and below grade roads trap turtles on the road and can cause road kills).</td>
<td>Roads should be ditched, not curbed or below grade.</td>
</tr>
</tbody>
</table>
### ROADS cont.

<table>
<thead>
<tr>
<th>Culverts between wetland areas, or between wetland areas and nesting areas, should be 36 inches or greater in diameter, and elliptical or flat-bottomed.</th>
<th>Road placement should avoid separating wetlands from adjacent upland nesting sites, or these roads should be fenced to prevent turtles from attempting to cross them (contact your DNR Nongame Specialist for details).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wetland crossings should be bridged, or include raised roadways with culverts which are 36 in or greater in diameter and flat-bottomed or elliptical (raised roadways discourage turtles from leaving the wetland to bask on roads).</td>
<td>Road placement should avoid bisecting wetlands, or these roads should be fenced to prevent turtles from attempting to cross them (contact your DNR Nongame Specialist for details). This is especially important for roads with more than 2 lanes.</td>
</tr>
<tr>
<td>Culverts under roads crossing streams should be oversized (at least twice as wide as the normal width of open water) and flat-bottomed or elliptical.</td>
<td>Roads crossing streams should be bridged.</td>
</tr>
</tbody>
</table>

### UTILITIES

<table>
<thead>
<tr>
<th>Utility access and maintenance roads should be kept to a minimum (this reduces road-kill potential).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Because trenches can trap turtles, trenches should be checked for turtles prior to being backfilled and the sites should be returned to original grade.</td>
</tr>
</tbody>
</table>

### LANDSCAPING AND VEGETATION MANAGEMENT

<table>
<thead>
<tr>
<th>Terrain should be left with as much natural contour as possible.</th>
<th>As much natural landscape as possible should be preserved (installation of sod or wood chips, paving, and planting of trees within nesting habitat can make that habitat unusable to nesting Blanding’s turtles).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graded areas should be revegetated with native grasses and forbs (some non-natives form dense patches through which it is difficult for turtles to travel).</td>
<td>Open space should include some areas at higher elevations for nesting. These areas should be retained in native vegetation, and should be connected to wetlands by a wide corridor of native vegetation.</td>
</tr>
<tr>
<td>Vegetation management in infrequently mowed areas -- such as in ditches, along utility access roads, and under power lines -- should be done mechanically (chemicals should not be used). Work should occur fall through spring (after October 1st and before June 1st).</td>
<td>Ditches and utility access roads should not be mowed or managed through use of chemicals. If vegetation management is required, it should be done mechanically, as infrequently as possible, and fall through spring (mowing can kill turtles present during mowing, and makes it easier for predators to locate turtles crossing roads).</td>
</tr>
</tbody>
</table>

### Protecting Blanding’s Turtle Nests:

Most predation on turtle nests occurs within 48 hours after the eggs are laid. After this time, the scent is gone from the nest and it is more difficult for predators to locate the nest. Nests more than a week old probably do not need additional protection, unless they are in a particularly vulnerable spot, such as a yard where pets may disturb the nest. Turtle nests can be protected from predators and other disturbance by covering them with a piece of wire fencing (such as chicken wire), secured to the ground with stakes or rocks. The piece of fencing should measure at least 2 ft. x 2 ft., and should be of medium sized mesh (openings should be about 2 in. x 2 in.). It is very important that the fencing be removed before August 1st so the young turtles can escape from the nest when they hatch!

### REFERENCES


REFERENCES (cont.)
CAUTION

BLANDING’S TURTLES MAY BE ENCOUNTERED IN THIS AREA

The unique and rare Blanding’s turtle has been found in this area. Blanding’s turtles are state-listed as Threatened and are protected under Minnesota Statute 84.095, Protection of Threatened and Endangered Species. Please be careful of turtles on roads and in construction sites. For additional information on turtles, or to report a Blanding’s turtle sighting, contact the DNR Nongame Specialist nearest you: Bemidji (218-308-2641); Grand Rapids (218-327-4518); New Ulm (507-359-6033); Rochester (507-206-2820); or St. Paul (651-259-5772).

DESCRIPTION: The Blanding’s turtle is a medium to large turtle (5 to 10 inches) with a black or dark blue, dome-shaped shell with muted yellow spots and bars. The bottom of the shell is hinged across the front third, enabling the turtle to pull the front edge of the lower shell firmly against the top shell to provide additional protection when threatened. The head, legs, and tail are dark brown or blue-gray with small dots of light brown or yellow. A distinctive field mark is the bright yellow chin and neck.

BLANDING’S TURTLES DO NOT MAKE GOOD PETS
IT IS ILLEGAL TO KEEP THIS THREATENED SPECIES IN CAPTIVITY
SUMMARY OF RECOMMENDATIONS
FOR AVOIDING AND MINIMIZING IMPACTS
TO BLANDING’S TURTLE POPULATIONS
(see Blanding’s Turtle Fact Sheet for full recommendations)

- This flyer should be given to all contractors working in the area. Homeowners should also be informed of the presence of Blanding’s turtles in the area.
- Turtles that are in imminent danger should be moved, by hand, out of harm’s way. Turtles that are not in imminent danger should be left undisturbed to continue their travel among wetlands and/or nest sites.
- If a Blanding’s turtle nests in your yard, do not disturb the nest and do not allow pets near the nest.
- Silt fencing should be set up to keep turtles out of construction areas. It is critical that silt fencing be removed after the area has been revegetated.
- Small, vegetated temporary wetlands should not be dredged, deepened, or filled.
- All wetlands should be protected from pollution; use of fertilizers and pesticides should be avoided, and run-off from lawns and streets should be controlled. Erosion should be prevented to keep sediment from reaching wetlands and lakes.
- Roads should be kept to minimum standards on widths and lanes.
- Roads should be ditched, not curbed or below grade. If curbs must be used, 4" high curbs at a 3:1 slope are preferred.
- Culverts under roads crossing wetland areas, between wetland areas, or between wetland and nesting areas should be at least 36 in. diameter and flat-bottomed or elliptical.
- Culverts under roads crossing streams should be oversized (at least twice as wide as the normal width of open water) and flat-bottomed or elliptical.
- Utility access and maintenance roads should be kept to a minimum.
- Because trenches can trap turtles, trenches should be checked for turtles prior to being backfilled and the sites should be returned to original grade.
- Terrain should be left with as much natural contour as possible.
- Graded areas should be revegetated with native grasses and forbs.
- Vegetation management in infrequently mowed areas -- such as in ditches, along utility access roads, and under power lines -- should be done mechanically (chemicals should not be used). Work should occur fall through spring (after October 1st and before June 1st).
The U.S. Fish and Wildlife Service listed the rusty patched bumble bee as endangered under the Endangered Species Act. Endangered species are animals and plants that are in danger of becoming extinct. Identifying, protecting and recovering endangered species is a primary objective of the U.S. Fish and Wildlife Service’s endangered species program.

What is a rusty patched bumble bee?
Appearance: Rusty patched bumble bees live in colonies that include a single queen and female workers. The colony produces males and new queens in late summer. Queens are the largest bees in the colony, and workers are the smallest. All rusty patched bumble bees have entirely black heads, but only workers and males have a rusty reddish patch centrally located on the back.

Habitat: Rusty patched bumble bees once occupied grasslands and tallgrass prairies of the Upper Midwest and Northeast, but most grasslands and prairies have been lost, degraded, or fragmented by conversion to other uses. Bumble bees need areas that provide nectar and pollen from flowers, nesting sites (underground and abandoned rodent cavities or clumps of grasses), and overwintering sites for hibernating queens (undisturbed soil).

Reproduction: Rusty patched bumble bee colonies have an annual cycle. In spring, solitary queens emerge and find nest sites, collect nectar and pollen from flowers and begin laying eggs, which are fertilized by sperm stored since mating the previous fall. Workers hatch from these first eggs and colonies grow as workers collect food, defend the colony, and care for young. Queens remain within the nests and continue laying eggs. In late summer, new queens and males also hatch from eggs. Males disperse to mate with new queens from other colonies. In fall, founding queens, workers and males die. Only new queens go into diapause (a form of hibernation) over winter - and the cycle begins again in spring.

Feeding Habits: Bumble bees gather pollen and nectar from a variety of flowering plants. The rusty patched emerges early in spring and is one of the last species to go into hibernation.

Why conserve rusty patched bumble bees?
As pollinators, rusty patched bumble bees contribute to our food security and the healthy functioning of our ecosystems. Bumble bees are keystone species in most ecosystems, necessary not only for native wildflower reproduction, but also for creating seeds and fruits that feed wildlife as diverse as songbirds and grizzly bears.

Bumble bees are among the most important pollinators of crops such as blueberries, cranberries, and clover and almost the only insect pollinators of tomatoes. Bumble bees are more effective pollinators than honey bees for some crops because of their ability to “buzz pollinate.” The economic value of pollination services provided by native insects (mostly bees) is estimated at $3 billion per year in the United States.
It needs a constant supply and diversity of flowers blooming throughout the colony’s long life, April through September.

**Range:** Historically, the rusty patched bumble bee was broadly distributed across the eastern United States and Upper Midwest, from Maine in the U.S. and southern Quebec and Ontario in Canada, south to the northeast corner of Georgia, reaching west to the eastern edges of North and South Dakota. Its range included 28 states, the District of Columbia and 2 provinces in Canada. Since 2000, this bumble bee has been reported from only 13 states and 1 province: Illinois, Indiana, Iowa, Maine, Maryland, Massachusetts, Minnesota, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, Wisconsin – and Ontario, Canada.

**Why is the rusty patched bumble bee declining?**

**Habitat loss and degradation:** Most prairies and grasslands of the Upper Midwest and Northeast have been converted to monoculture farms or developed areas, such as cities and roads. Grasslands that remain tend to be small and isolated.

**Intensive farming:** Increases in farm size and technology advances improved the operating efficiency of farms but have led to practices that harm bumble bees: increased use of pesticides, loss of crop diversity resulting in flowering crops being available for only a short time, loss of hedgerows with flowering plants, and loss of legume pastures.

**Disease:** Pathogens and parasites may pose a threat, although their prevalence and effects in North American bumble bees are not well understood.

**Pesticides:** The rusty patched bumble bee may be vulnerable to pesticides. Pesticides are used widely on farms and in cities and have both lethal and sublethal toxic effects.

Bumble bees can absorb toxins directly through their exoskeleton and through contaminated nectar and pollen. Rusty patched bumble bees nest in the ground and may be susceptible to pesticides that persist in agricultural soils, lawns and turf.

**Global climate change:** Climate changes that may harm bumble bees include increased temperature and precipitation extremes, increased drought, early snow melt and late frost events. These changes may lead to more exposure to or susceptibility to disease, fewer flowering plants, fewer places for queens to hibernate and nest, less time for foraging due to high temperatures, and asynchronous flowering plant and bumble bee spring emergence.

**What is being done to conserve rusty patched bumble bees?**

**U.S. Fish and Wildlife Service:** Several Service programs work to assess, protect, and restore pollinators and their habitats. Also, the Service works with partners to recover endangered and threatened pollinators and pollinator-dependent plants. Concern about pollinator declines prompted formation of the North American Pollinator Protection Campaign, a collaboration of people dedicated to pollinator conservation and education. The Service has a Memorandum of Understanding with the Pollinator Partnership to work together on those goals. The Service is a natural collaborator because our mission is to work with others to conserve, fish, wildlife, and plants and their habitats.

**Other Efforts:** Trusts, conservancies, restoration groups and partnerships are supporting pollinator initiatives and incorporating native plants that support bees and other pollinators into their current activities. For example, the USDA Natural Resource Conservation Service is working with landowners in Michigan, Minnesota, Montana, North Dakota, South Dakota, and Wisconsin to make bee-friendly conservation improvements to their land. Improvements include the practices of planting cover crops, wildflowers, or native grasses and improved management on grazing lands.

**Research:** Researchers are studying and monitoring the impacts of GMO crops and certain pesticides on pollinators. Efforts by citizen scientists and researchers to determine the status of declining bee species are underway throughout the United States.

**What can I do to help conserve the rusty patched bumble bee?**

**Garden:** Grow a garden or add a flowering tree or shrub to your yard. Even small areas or containers on patios can provide nectar and pollen for native bees.

**Native plants:** Use native plants in your yard such as lupines, asters, bee balm, native prairie plants and spring ephemerals. Don’t forget spring blooming shrubs like ninebark and pussy willow! Avoid invasive non-native plants and remove them if they invade your yard. For more information on attracting native pollinators, visit www.fws.gov/pollinators/pdfs/PollinatorBookletFinalrevWeb.pdf.

**Natural landscapes:** Provide natural areas - many bumble bees build nests in undisturbed soil, abandoned rodent burrows or grass clumps. Keep some unmowed, brushy areas and tolerate bumble bee nests if you find them. Reduce tilling soil and mowing where bumble bees might nest. Support natural areas in your community, county and state.

**Minimize:** Limit the use of pesticides and chemical fertilizer whenever possible or avoid them entirely. Pesticides cause lethal and sublethal effects to bees and other pollinators.
## Appendix G – USDA NRCS Farmland Conversion Impact Rating Form AD-1006

<table>
<thead>
<tr>
<th>Content</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>USDA Natural Resources Conservation Service Email, Letter, and Form AD-1006 May 11, 2018</td>
<td>G-1 thru G-5</td>
</tr>
<tr>
<td>USDA Natural Resources Conservation Service Letter and Form AD-1006 November 14, 2017</td>
<td>G-6 thru G-11</td>
</tr>
</tbody>
</table>
R. Evan,

Please see the attached revised AD-1006 and response.

Dan Nath, CPSS
USDA/NRCS
Resource Soil Scientist
507 289 7454 x3583
1485 Industrial Dr. NW
Rochester, MN  55901

From: Evan Barrett [mailto:Evan.Barrett@meadhunt.com]
Sent: Wednesday, May 09, 2018 8:34 PM
To: Nath, Daniel - NRCS, Rochester, MN <daniel.nath@mn.usda.gov>
Subject: Lake Elmo Airport EA/EAW - Request for Updated Farmland Conversion Impact Rating

Mr. Nath,

Thank you for your attached November 14, 2017, letter enclosing two farmland conversion impact rating forms associated with proposed improvements at Lake Elmo Airport. The Federal Aviation Administration (FAA) and the Metropolitan Airports Commission (MAC) published a Draft EA/EAW for the project on February 26, 2018, which included the findings contained on these forms. The comment period for the Draft EA/EAW closed on April 19, 2018. MAC staff are considering comments received from government agencies and the general public on the Draft EA/EAW as the MAC makes its determination on the need for an EIS under the Minnesota Environmental Policy Act.

In response to the Draft EA/EAW, we received correspondence from the Minnesota Department of Agriculture stating the following:

“The MDA recommends that the EA/EAW address the acreage or impact of severed, triangulated or isolated farmland resulting from the proposed alignment of 30th Street potentially impacting the parcel located in southwest corner of 30th Street and Neal Avenue as indicated in Alternative B. The impact may be farming remnants that are difficult from a practical standpoint. There may be problems of getting to the field and once there, problems of maneuvering farm equipment on the field. Also, smaller fields that are oddly shaped may be less valuable than fields of typical dimension and size. The parcels of farmland should be identified by location and acreage. Any loss of that farmland should be included in the farmland conversion impact rating.”

To respond to the MDA’s comments, Mead & Hunt has recalculated the Site B acreages in Part III and the Site B site assessment criteria in Part IV on the attached revised Form AD-1006. Below is a summary of the changes Mead & Hunt made to Parts III and VI:
The total farmland acres to be converted indirectly under Part III have been increased from 7.59 to 28.82. The additional 21.23 acres encompass MAC-owned property currently in agricultural production south of the proposed realigned segment of 30th Street North. This area may not be suitable for row crop production following project implementation per MDA’s comment. The area has been added to the indirect farmland impact area shapefile in the zip file attached to this email.

The site assessment score for criterion 1 (Area in Non-Urban Use) under Part VI has been updated to reflect U.S. Census-designated urbanized areas within a one-mile radius of airport property.

The site assessment score for criterion 2 (Perimeter in Non-Urban Use) under Part VI has been updated to reflect land use designations depicted on 2016 Baytown Township and West Lakeland Township land use maps.

The site assessment score for criterion 8 (Creation of Non-Farmable Farmland) under Part VI has been updated to reflect the larger indirect conversion of 28.82 acres.

We request your assistance in re-calculating Parts II, IV, V, and VII for Site B so we may include updated scores in the final EA/EAW. Please complete the form and return to me via e-mail. Feel free to contact me directly if you have any questions regarding the project or the updated Form AD-1006. Thank you for your assistance!

R. Evan Barrett, AICP | Planner, Aviation Services
Mead & Hunt, Inc | 7900 West 78th Street, Suite 370 | Minneapolis, MN 55439
evans.barrett@meadhunt.com | www.meadhunt.com

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May 11th, 2018

R. Evan Barrett, AICP, Mead & Hunt, Inc
7900 West 78th St. Ste. 370
Minneapolis, MN 55439

Re: Farmland Conversion Impact Rating Form for Lake Elmo Airport

Dear Mr. Barrett,

Please see the revised AD-1006 for the Lake Elmo Airport expansion alternative b. Part V has changed along with others as I have received updated information since November.

If you have any questions, please contact me via e-mail or at the above number.

Daniel Nath
Dan Nath, CPSS
Resource Soil Scientist
Rochester, MN
# FARMLAND CONVERSION IMPACT RATING

**PART I** (To be completed by Federal Agency)

- **Date Of Land Evaluation Request:** 5/4/2018
- **Name of Project:** Lake Elmo Airport
- **Federal Agency Involved:** Federal Aviation Administration
- **Proposed Land Use:** Public Airport Runway
- **County and State:** Washington County, Minnesota

**PART II** (To be completed by NRCS)

- **Date Request Received By NRCS:** 5/9/2018
- **Person Completing Form:** D. Nath
- **Does the site contain Prime, Unique, Statewide or Local Important Farmland?**
  - YES [ ]
  - NO [X]
- **Acres Irrigated:** 3,504
- **Average Farm Size:** 134
- **Major Crop(s):** Corn, Soybeans
- **Farmland In Govt. Jurisdiction**
  - Acres: 66.32
  - %: 179,385
- **Amount of Farmland As Defined in FPPA**
  - Acres: 53.07
  - %: 143,548
- **Name of Land Evaluation System Used**
  - LE part of LESA
- **Name of State or Local Site Assessment System:** None
- **Date Land Evaluation Requested by NRCS:** 5/11/2018

**PART III** (To be completed by Federal Agency)

- **A. Total Acres To Be Converted Directly:** 42.27
- **B. Total Acres To Be Converted Indirectly:** 28.82
- **C. Total Acres In Site:** 71.09

**PART IV** (To be completed by NRCS) Land Evaluation Information

- **A. Total Acres Prime And Unique Farmland:** 56.15
- **B. Total Acres Statewide Important or Local Important Farmland:** 0.41
- **C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted:** 0.0315
- **D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value:** 33.33

**PART V** (To be completed by NRCS) Land Evaluation Criterion

- **Relative Value of Farmland To Be Converted (Scale of 0 to 100 Points):** 75

**PART VI** (To be completed by Federal Agency) Site Assessment Criteria

<table>
<thead>
<tr>
<th>Criteria</th>
<th>(Criteria are explained in 7 CFR 658.5 b. For Corridor project use form NRCS-CPA-106)</th>
<th>Maximum Points</th>
<th>Site A</th>
<th>Site B</th>
<th>Site C</th>
<th>Site D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Area In Non-urban Use</td>
<td>(15)</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Perimeter In Non-urban Use</td>
<td>(10)</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Percent Of Site Being Farmed</td>
<td>(20)</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Protection Provided By State and Local Government</td>
<td>(20)</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Distance From Urban Built-up Area</td>
<td>(15)</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Distance To Urban Support Services</td>
<td>(15)</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Size Of Present Farm Unit Compared To Average</td>
<td>(10)</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Creation Of Non-farmable Farmland</td>
<td>(10)</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Availability Of Farm Support Services</td>
<td>(5)</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Off-Farm Investments</td>
<td>(20)</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Effects Of Conversion On Farm Support Services</td>
<td>(10)</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Compatibility With Existing Agricultural Use</td>
<td>(10)</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL SITE ASSESSMENT POINTS</strong></td>
<td></td>
<td>160</td>
<td>0</td>
<td>61</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**PART VII** (To be completed by Federal Agency)

- **Relative Value Of Farmland (From Part V):** 100
- **Total Site Assessment (From Part VI above or local site assessment):** 160

- **TOTAL POINTS (Total of above 2 lines):** 260

**Site Selected:**

- **Date Of Selection:**

- **Was A Local Site Assessment Used?**
  - YES [ ]
  - NO [ ]

**Reason For Selection:**

**Name of Federal agency representative completing this form:**

(See Instructions on reverse side)

Form AD-1006 (03-02)
Step 1 - Federal agencies (or Federally funded projects) involved in proposed projects that may convert farmland, as defined in the Farmland Protection Policy Act (FPPA) to nonagricultural uses, will initially complete Parts I and III of the form. For Corridor type projects, the Federal agency shall use form NRCS-CPA-106 in place of form AD-1006. The Land Evaluation and Site Assessment (LESA) process may also be accessed by visiting the FPPA website, http://ffpa.nrcs.usda.gov/iesa/.

Step 2 - Originator (Federal Agency) will send one original copy of the form together with appropriate scaled maps indicating location(s) of project site(s), to the Natural Resources Conservation Service (NRCS) local Field Office or USDA Service Center and retain a copy for their files. (NRCS has offices in most counties in the U.S. The USDA Office Information Locator may be found at http://offices.usda.gov/scripts/nrlSAPL.dll/Zip_public/USA_map, or the offices can usually be found in the Phone Book under U.S. Government, Department of Agriculture. A list of field offices is available from the NRCS State Conservationist and State Office in each State.)

Step 3 - NRCS will, within 10 working days after receipt of the completed form, make a determination as to whether the site(s) of the proposed project contains prime, unique, statewide or local important farmland. When a site visit or land evaluation system design is needed, NRCS will respond within 30 working days.

Step 4 - For sites where farmland covered by the FPPA will be converted by the proposed project, NRCS will complete Parts II, IV and V of the form.

Step 5 - NRCS will return the original copy of the form to the Federal agency involved in the project, and retain a file copy for NRCS records.

Step 6 - The Federal agency involved in the proposed project will complete Parts VI and VII of the form and return the form with the final selected site to the servicing NRCS office.

Step 7 - The Federal agency providing financial or technical assistance to the proposed project will make a determination as to whether the proposed conversion is consistent with the FPPA.

INSTRUCTIONS FOR COMPLETING THE FARMLAND CONVERSION IMPACT RATING FORM

(For Federal Agency)

Part I: When completing the "County and State" questions, list all the local governments that are responsible for local land use controls where site(s) are to be evaluated.

Part III: When completing item B (Total Acres To Be Converted Indirectly), include the following:

1. Acres not being directly converted but that would no longer be capable of being farmed after the conversion, because the conversion would restrict access to them or other major change in the ability to use the land for agriculture.
2. Acres planned to receive services from an infrastructure project as indicated in the project justification (e.g. highways, utilities planned build out capacity) that will cause a direct conversion.

Part VI: Do not complete Part VI using the standard format if a State or Local site assessment is used. With local and NRCS assistance, use the local Land Evaluation and Site Assessment (LESA).

1. Assign the maximum points for each site assessment criterion as shown in § 658.5(b) of CFR. In cases of corridor-type project such as transportation, power line and flood control, criteria #5 and #6 will not apply and will, be weighted zero, however, criterion #8 will be weighed a maximum of 25 points and criterion #11 a maximum of 25 points.

2. Federal agencies may assign relative weights among the 12 site assessment criteria other than those shown on the FPPA rule after submitting individual agency FPPA policy for review and comment to NRCS. In all cases where other weights are assigned, relative adjustments must be made to maintain the maximum total points at 160. For project sites where the total points equal or exceed 160, consider alternative actions, as appropriate, that could reduce adverse impacts (e.g. Alternative Sites, Modifications or Mitigation).

Part VII: In computing the "Total Site Assessment Points" where a State or local site assessment is used and the total maximum number of points is other than 160, convert the site assessment points to a base of 160. Example: if the Site Assessment maximum is 200 points, and the alternative Site "A" is rated 180 points:

<table>
<thead>
<tr>
<th>Total points assigned Site A</th>
<th>180</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum points possible</td>
<td>200</td>
</tr>
<tr>
<td>180 X 160 = 144 points for Site A</td>
<td></td>
</tr>
</tbody>
</table>

For assistance in completing this form or FPPA process, contact the local NRCS Field Office or USDA Service Center.

NRCS employees, consult the FPPA Manual and/or policy for additional instructions to complete the AD-1006 form.
November 14th, 2017

R. Evan Barrett, AICP, Mead & Hunt, Inc
7900 West 78th St. Ste. 370
Minneapolis, MN  55439

Re: Farmland Conversion Impact Rating Form for Lake Elmo Airport

Dear Mr. Barrett,

The purpose of the Farmland Protection Policy Act (FPPA) as you are aware is to minimize the extent that federal programs contribute to the unnecessary and irreversible conversion of prime and important farmland to non-agricultural uses. The FPPA requires federal agencies involved in projects that may convert farmland to determine whether the proposed conversion is consistent with the FPPA.

Upon reviewing the area of this project, I found that there is Prime Farmland in the proposed project area. This project does not qualify for any exemptions. I contacted the national leader of the FPPA in D.C. questioning what level of conversion is considered a conversion under the FPPA. The map provided shows indirect conversion which is considered partial conversion as the area will no longer be used in row crop production, but will be used for hay production.

As per guidance, I am returning two AD1006’s. One considers the indirect sites as a conversion, and the other considers the indirect sites as not converted. Attached in the e-mail are shapefiles and below are maps showing the areas adapted from the ones that I received. Please take a look at them and ensure the change in footprint is accurate.

If you have any questions, please contact me via e-mail or at the above number.

DANIEL NATH

Digitally signed by DANIEL NATH
Date: 2017.11.14 11:35:09 -06'00'

Dan Nath, CPSS
Resource Soil Scientist, USDA-NRCS
Rochester, MN
U.S. Department of Agriculture
FARMLAND CONVERSION IMPACT RATING

PART I (To be completed by Federal Agency)
Name of Project: Lake Elmo Airport
Federal Agency Involved: Federal Aviation Administration
Proposed Land Use: Public Airport Runway, City/County Designation
County and State: Washington County, Minnesota

PART II (To be completed by NRCS)
Date Requested by NRCS: 11/2/2017
Person Completing Form: D. Nath

Does the site contain Prime, Unique, Statewide or Local Important Farmland? [ ] YES [ ] NO
Acreage Irrigated: 50,372
Average Farm Size: 246

Major Crop(s): Corn, Soybeans
Farmland in Govt. Jurisdiction: 66.32 % 179385

Name of Land Evaluation System Used: LE part of LESA
Name of State or Local Site Assessment System: None
Date Land Evaluation Returned by NRCS: 11/14/2017

PART III (To be completed by Federal Agency)

A. Total Acres To Be Converted Directly: 46.45
B. Total Acres To Be Converted Indirectly: 7.59
C. Total Acres In Site: 56.21

PART IV (To be completed by NRCS) Land Evaluation Information

A. Total Acres Prime And Unique Farmland: 50.86
B. Total Acres Statewide Important or Local Important Farmland: 1.32
C. Percentage Of Farmland in County Or Local Govt. Unit To Be Converted: 0.0291
D. Percentage Of Farmland in Govt. Jurisdiction With Same Or Higher Relative Value: 33.33

PART V (To be completed by NRCS) Land Evaluation Criterion
Relative Value of Farmland To Be Converted (Scale 0 to 100 Points):

<table>
<thead>
<tr>
<th>Site A</th>
<th>Site B</th>
<th>Site C</th>
<th>Site D</th>
</tr>
</thead>
<tbody>
<tr>
<td>75</td>
<td>77</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PART VI (To be completed by Federal Agency) Site Assessment Criteria
(Criteria are explained in 7 CFR 656.5b. For Corridor project use form NRCS-CPA-106)

<table>
<thead>
<tr>
<th>Maximum Points</th>
<th>Site A</th>
<th>Site B</th>
<th>Site C</th>
<th>Site D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Area in Non-urban Use</td>
<td>(15)</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>2. Perimeter in Non-urban Use</td>
<td>(10)</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>3. Percent Of Site Being Farmed</td>
<td>(20)</td>
<td>20</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>4. Protection Provided By State and Local Government</td>
<td>(20)</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>5. Distance From Urban Built-up Area</td>
<td>(15)</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>6. Distance To Urban Support Services</td>
<td>(15)</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>7. Size Of Present Farm Unit Compared To Average</td>
<td>(10)</td>
<td>10</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>8. Creation Of Non-farmable Farmland</td>
<td>(10)</td>
<td>5</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>9. Availability Of Farm Support Services</td>
<td>(5)</td>
<td>5</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>10. On-Farm Investments</td>
<td>(20)</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>11. Effects Of Conversion On Farm Support Services</td>
<td>(10)</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>12. Compatibility With Existing Agricultural Use</td>
<td>(10)</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>TOTAL SITE ASSESSMENT POINTS</td>
<td>160</td>
<td>44</td>
<td>43</td>
<td>0</td>
</tr>
</tbody>
</table>

PART VII (To be completed by Federal Agency)
Relative Value Of Farmland (From Part V): 100

<table>
<thead>
<tr>
<th>Site A</th>
<th>Site B</th>
<th>Site C</th>
<th>Site D</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL POINTS (Total of above 2 lines)</td>
<td>160</td>
<td>44</td>
<td>43</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Site A</th>
<th>Site B</th>
<th>Site C</th>
<th>Site D</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL POINTS (Total of above 2 lines)</td>
<td>260</td>
<td>119</td>
<td>120</td>
</tr>
</tbody>
</table>

Site Selected: Date Of Selection: Was A Local Site Assessment Used? [ ] YES [ ] NO
Reason For Selection: 

Name of Federal agency representative completing this form: Date:

(See instructions on reverse side)
Steps in the Processing the Farmland and Conversion Impact Rating Form

Step 1 - Federal agencies (or Federally funded projects) involved in proposed projects that may convert farmland, as defined in the Farmland Protection Policy Act (FPPA) to nonagricultural uses, will initially complete Parts I and II of the form. For corridor-type projects, the Federal agency shall use form NRCS-CPA-106 in place of form AD-1006. The Land Evaluation and Site Assessment (LESA) process may also be accessed by visiting the FPPA website, http://fppa.nrcs.usda.gov/leasa/.

Step 2 - Originator (Federal Agency) will send one original copy of the form together with appropriate scaled maps indicating location(s) of project site(s), to the Natural Resources Conservation Service (NRCS) local Field Office or USDA Service Center and retain a copy for their files. NRCS has offices in most counties in the U.S. The USDA Office Information Locator may be found at http://offices.usda.gov/scripts/isd/ISAPI.dll/maps_public/USA_map, or the offices can usually be found in the Phone Book under U.S. Government, Department of Agriculture. A list of field offices is available from the NRCS State Conservationist and State Office in each State.

Step 3 - NRCS will, within 10 working days after receipt of the completed form, make a determination as to whether the site(s) of the proposed project contains prime, unique, statewide or local importance farmland. When a site visit or land evaluation system design is needed, NRCS will respond within 30 working days.

Step 4 - For sites where farmland covered by the FPPA will be converted by the proposed project, NRCS will complete Parts II, IV and V of the form.

Step 5 - NRCS will return the original copy of the form to the Federal agency involved in the project, and retain a file copy for NRCS records.

Step 6 - The Federal agency involved in the proposed project will complete Parts VI and VII of the form and return the form with the final selected site to the servicing NRCS office.

Step 7 - The Federal agency providing financial or technical assistance to the proposed project will make a determination as to whether the proposed conversion is consistent with the FPPA.

Instructions for Completing the Farmland Conversion Impact Rating Form

(For Federal Agency)

Part I: When completing the "County and State" questions, list all the local governments that are responsible for local land use controls where site(s) are to be evaluated.

Part III: When completing item B (Total Acres To Be Converted Indirectly), include the following:

1. Acres not being directly converted but that would no longer be capable of being farmed after the conversion, because the conversion would restrict access to them or other major change in the ability to use the land for agriculture.
2. Acres planned to receive services from an infrastructure project as indicated in the project justification (e.g. highways, utilities planned build out capacity) that will cause a direct conversion.

Part VI: Do not complete Part VI using the standard format if a State or Local site assessment is used. With local and NRCS assistance, use the local Land Evaluation and Site Assessment (LESA).

1. Assign the maximum points for each site assessment criterion as shown in § 658.5(b) of CFR. In cases of corridor-type project such as transportation, power line and flood control, criteria #5 and #8 will not apply and will be weighted zero, however, criterion #8 will be weighted a maximum of 25 points and criterion #11 a maximum of 25 points.

2. Federal agencies may assign relative weights among the 12 site assessment criteria other than those shown on the FPPA rule after submitting individual agency FPPA policy for review and comment to NRCS. In all cases where other weights are assigned, relative adjustments must be made to maintain the maximum total points at 160. For projects sites where the total points equal or exceed 160, consider alternative actions, as appropriate, that could reduce adverse impacts (e.g. Alternative Sites, Modifications or Mitigation).

Part VII: In computing the "Total Site Assessment Points" where a State or Local site assessment is used and the total maximum number of points is other than 160, convert the site assessment points to a base of 160. Example: if the Site Assessment maximum is 200 points, and the alternative Site "A" is rated 180 points:

<table>
<thead>
<tr>
<th>Total points assigned Site A</th>
<th>180</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum points possible</td>
<td>200</td>
</tr>
<tr>
<td>X 160</td>
<td>144</td>
</tr>
</tbody>
</table>

For assistance in completing this form or FPPA process, contact the local NRCS Field Office or USDA Service Center.

NRCS employees consult the FPPA Manual and/or policy for additional instructions to complete the AD-1006 form.
U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I (To be completed by Federal Agency)
Name of Project: Lake Elmo Airport
Federal Agency Involved: Federal Aviation Administration
Proposed Land Use: Public Airport Runway, City/County Designation: County and State: Washington County, Minnesota

Date Of Evaluation Request: 10/19/2017

PART II (To be completed by NRCS)
Date Request Received By NRCS: 11/2/2017
Person Completing Form: D. Nath

<table>
<thead>
<tr>
<th>Does the site contain Prime, Unique, Statewide or Local Important Farmland?</th>
<th>YES</th>
<th>NO</th>
<th>Acres Irrigated</th>
<th>Average Farm Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>(If no, the FPPA does not apply - do not complete additional parts of this form)</td>
<td></td>
<td></td>
<td>50,372</td>
<td>246</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Major Crop(s)</th>
<th>Farmable Land In Gov't Jurisdiction</th>
<th>Amount of Farmland As Defined in FPPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn, Soybeans</td>
<td>Acres: 66.32 % 179385</td>
<td>Acres: 53.07 % 143548</td>
</tr>
</tbody>
</table>

Name of Land Evaluation System Used: None
Name of State or Local Site Assessment System: Date Land Evaluation Requested by NRCS: 11/14/2017

PART III (To be completed by Federal Agency)

<table>
<thead>
<tr>
<th>Alternative Site Rating</th>
<th>Site A</th>
<th>Site B</th>
<th>Site C</th>
<th>Site D</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Total Acres To Be Converted Directly</td>
<td>46.45</td>
<td>42.28</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B. Total Acres To Be Converted Indirectly</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C. Total Acres In Site</td>
<td>46.45</td>
<td>42.28</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

PART IV (To be completed by NRCS) Land Evaluation Information

| A. Total Acres Prime And Unique Farmland | 43.54 | 41.1 |
| B. Total Acres Statewide Important or Local Important Farmland | 1.32 | 0.41 |
| C. Percentage Of Farmland In County Or Local Gov't. Unit To Be Converted | 0.0250 | 0.0231 |
| D. Percentage Of Farmland In Gov't. Jurisdiction With Same Or Higher Relative Value | 31.63 | 23.16 |

PART V (To be completed by Federal Agency) Land Evaluation Criteria

<table>
<thead>
<tr>
<th>Relative Value of Farmland To Be Converted (Scale of 0 to 100 Points)</th>
<th>Maximum Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site A</td>
<td>Site B</td>
</tr>
<tr>
<td>1. Area In Non-urban Use</td>
<td>(15)</td>
</tr>
<tr>
<td>2. Perimeter In Non-urban Use</td>
<td>(10)</td>
</tr>
<tr>
<td>3. Percent Of Site Being Farmed</td>
<td>(20)</td>
</tr>
<tr>
<td>4. Protection Provided By State and Local Government</td>
<td>(20)</td>
</tr>
<tr>
<td>5. Distance From Urban Built-up Area</td>
<td>(15)</td>
</tr>
<tr>
<td>6. Distance To Urban Support Services</td>
<td>(15)</td>
</tr>
<tr>
<td>7. Size Of Present Farm Unit Compared To Average</td>
<td>(10)</td>
</tr>
<tr>
<td>8. Creation Of Non-farmable Farmland</td>
<td>(10)</td>
</tr>
<tr>
<td>9. Availability Of Farm Support Services</td>
<td>(15)</td>
</tr>
<tr>
<td>10. On-Farm Investments</td>
<td>(20)</td>
</tr>
<tr>
<td>11. Effects Of Conversion On Farm Support Services</td>
<td>(10)</td>
</tr>
<tr>
<td>12. Compatibility With Existing Agricultural Use</td>
<td>(10)</td>
</tr>
<tr>
<td>TOTAL SITE ASSESSMENT POINTS</td>
<td>160</td>
</tr>
</tbody>
</table>

PART VII (To be completed by Federal Agency)

Relative Value Of Farmland (From Part V) | 100 | 79 | 81 | 0 |
Total Site Assessment (From Part VI above or local site assessment) | 160 | 44 | 43 | 0 |
TOTAL POINTS (Total of above 2 lines) | 260 | 123 | 124 | 0 |

Site Selected: Date Of Selection: Was A Local Site Assessment Used? YES NO

Reason For Selection:

Name of Federal agency representative completing this form: Date:

(See Instructions on reverse side)
STEPS IN THE PROCESSING THE FARMLAND AND CONVERSION IMPACT RATING FORM

Step 1 - Federal agencies (or Federally funded projects) involved in proposed projects that may convert farmland, as defined in the Farmland Protection Policy Act (FPPA) to non-agricultural uses, will initially complete Parts I and II of the form. For corridor type projects, the Federal agency shall use form NRCS-CPA-106 in place of form AD-1006. The Land Evaluation and Site Assessment (LESA) process may also be accessed by visiting the FPPA website: http://fppa.nrcs.usda.gov/lesa.

Step 2 - Originator (Federal Agency) will send one original copy of the form together with appropriate scaled maps indicating location(s) of project site(s), to the Natural Resources Conservation Service (NRCS) Local Field Office or USDA Service Center and retain a copy for their files. NRCS has offices in most counties in the U.S. The USDA Office Information Locator may be found at http://offices.usda.gov/services/mlisapp.dll?isp_table/USA_map, or the offices can usually be found in the Phone Book under U.S. Government, Department of Agriculture. A list of field offices is available from the NRCS State Conservationist and State Office in each State.

Step 3 - NRCS will, within 10 working days after receipt of the completed form, make a determination as to whether the site(s) of the proposed project contains prime, unique, statewide or local important farmland. (When a site visit or land evaluation system design is needed, NRCS will respond within 30 working days.)

Step 4 - For sites where farmland covered by the FPPA will be converted by the proposed project, NRCS will complete Parts II, IV and V of the form.

Step 5 - NRCS will return the original copy of the form to the Federal agency involved in the project, and retain a file copy for NRCS records.

Step 6 - The Federal agency involved in the proposed project will complete Parts VI and VII of the form and return the form with the final selected site to the servicing NRCS office.

Step 7 - The Federal agency providing financial or technical assistance to the proposed project will make a determination as to whether the proposed conversion is consistent with the FPPA.

INSTRUCTIONS FOR COMPLETING THE FARMLAND CONVERSION IMPACT RATING FORM

(For Federal Agency)

Part I: When completing the "County and State" questions, list all the local governments that are responsible for local land use controls where site(s) are to be evaluated.

Part III: When completing item B (Total Acres To Be Converted Indirectly), include the following:

1. Acres not being directly converted but that would no longer be capable of being farmed after the conversion, because the conversion would restrict access to them or other major change in the ability to use the land for agriculture.
2. Acres planned to receive services from an infrastructure project as indicated in the project justification (e.g., highways, utilities planned build out capacity) that will cause a direct conversion.

Part VI: Do not complete Part VI using the standard format if a State or Local site assessment is used. With local and NRCS assistance, use the local Land Evaluation and Site Assessment (LESA).

1. Assign the maximum points for each site assessment criterion as shown in § 658.5(b) of CFR. In cases of corridor-type project such as transportation, power line and flood control, criteria 5 and 6 will not apply and will be weighted zero, however, criterion #8 will be weighed a maximum of 25 points and criterion #11 a maximum of 25 points.
2. Federal agencies may assign relative weights among the 12 site assessment criteria other than those shown on the FPPA rule after submitting individual agency FPPA policy for review and comment to NRCS. In all cases where other weights are assigned, relative adjustments must be made to maintain the maximum total points at 160. For project sites where the total points equal or exceed 160, consider alternative actions, as appropriate, that could reduce adverse impacts (e.g. Alternative Sites, Modifications or Mitigation).

Part VII: In computing the "Total Site Assessment Points" where a State or local site assessment is used and the total maximum number of points is other than 160, convert the site assessment points to a base of 160. Example: if the Site Assessment maximum is 200 points, and the alternative Site "A" is rated 180 points:

<table>
<thead>
<tr>
<th>Total points assigned Site A</th>
<th>Maximum points possible</th>
<th>= 180</th>
<th>x 160 = 144 points for Site A</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For assistance in completing this form or FPPA process, contact the local NRCS Field Office or USDA Service Center.

NRCS employees, consult the FPPA Manual and/or policy for additional instructions to complete the AD-1006 form.
<table>
<thead>
<tr>
<th>Content</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase I Environmental Site Assessment Report</td>
<td>H-1 thru H-218</td>
</tr>
<tr>
<td>September 2017</td>
<td></td>
</tr>
</tbody>
</table>
Phase I
Environmental Site Assessment

Runway 14/32 Relocation and Associated Improvements

Lake Elmo Airport (21D)
3275 Manning Avenue, Box 2
Lake Elmo, MN 55042

Prepared for
Metropolitan Airports Commission
6040 28th Avenue South
Minneapolis, MN 55450-2799

Prepared by
Mead & Hunt
www.meadhunt.com

September 2017
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Summary

Mead & Hunt, Inc. (Mead & Hunt) has completed a Phase I Environmental Site Assessment (ESA), according to American Society for Testing and Materials (ASTM) E 1527-13, for the proposed relocation and extension of the primary runway (Runway 14/32) and associated improvements on Lake Elmo Airport (Airport) property. This ESA was completed as part of a Federal Environmental Assessment (EA) in compliance with the National Environmental Policy Act (NEPA). Mead & Hunt services are authorized by the Metropolitan Airports Commission (MAC), the project sponsor, under Contract No. 111-1-027, Authorization No. 37377 PS. This summary is intended as an overview of the Phase I ESA for the convenience of the reader. The complete report must be reviewed in its entirety prior to making decisions regarding the Airport property.

A. Proposed Project Activities

Owned and operated by the MAC, the Airport is located in Washington County, approximately 12 miles east of the downtown Saint Paul business district. The Airport encompasses approximately 640 acres of land on 14 separate parcels within Baytown and West Lakeland Townships and is roughly bounded by Manning Avenue on the west, the Union Pacific Railroad on the north, Neal Avenue on the east, and 30th Street on the south. The Airport has two paved runways: a primary runway (Runway 14-32) is 2,849 feet long by 75 feet wide, and the crosswind runway (Runway 04-22) is 2,496 feet long by 75 feet wide. A location map illustrating the proposed project area is included in Appendix A.

The project proposes improvement of approximately 142 acres of existing airport property. Improvements include a new runway, extension of existing runways, relocation of 30th Street N., construction of a new connector road, and miscellaneous other airport improvements. Proposed improvements are depicted in Appendix B.

B. Findings

The following finding of an environmental nature associated with the existing Airport property were identified during the Phase I ESA:

- The Baytown Township groundwater, which exists below the Airport, is contaminated. The plume of contaminated groundwater is approximately 5 miles long and covers approximately 7 square miles. The area of the Site includes predominantly low-density residences and agricultural land, but also includes Lake Elmo Airport and parts of the cities of Lake Elmo and Bayport. The primary source of the contamination was a metal working facility that operated from 1940 to 1968 at 11325 Stillwater Boulevard N. in Lake Elmo, which is located within 1 mile to the west of the Airport.¹

This Site was listed on the State Superfund Permanent List of Priorities List in 1988 and added to the Federal National Priorities List in 1994. The site has been consistently monitored and regulated since the 1980s. Following an initial Remedial Investigation/Feasibility Study by the

MAC, the Minnesota Pollution Control Agency (MPCA) identified the primary source area and assumed responsibility for further work at the Site.

Groundwater is located more than 25 feet below the ground surface at the Airport. The dominant groundwater flow direction under the airport is east toward the St. Croix River. The contaminated groundwater plume is located primarily in the Prairie du Chien Aquifer, the Jordan Sandstone Aquifer and, in certain areas, the Tunnel City Aquifer, all located more than 50 feet below the ground surface. The proposed project is not expected to be impacted as a result.

C. Recommendations
Based on this Phase I ESA, Mead & Hunt recommends no additional investigation in regard to the proposed project.
1. Introduction

In 2016, the project sponsor completed a Long-Term Comprehensive Plan (LTCP) for the Airport, which identified key objectives to address failing infrastructure, enhance safety, and improve operational capacity at the Airport. Based on the nature of the proposed actions, implementation of the LTCP requires a Federal EA developed in accordance with Federal Aviation Administration (FAA) policies and procedures detailed in FAA Order 1050.1F (and related documents) for compliance with NEPA and Council on Environmental Quality (CEQ) regulations. Mead & Hunt conducted this Phase I ESA using ASTM E 1527-13, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process as part of the EA.

A. Purpose

The purpose of the Phase I ESA is to identify, pursuant to ASTM E 1527-13, recognized environmental conditions (RECs) in connection with the property.

ASTM defines the term recognized environmental condition as the presence or likely presence of hazardous substances or petroleum products on the property under conditions that are indicative of an existing release, a past release, or a material threat of a release of hazardous substances or petroleum products into the structures on the property or into the ground, groundwater, or surface water of the site. The term does not include de minimis conditions that generally do not present a material risk of harm to public health or the environment and that generally would not be the subject of enforcement action if brought to the attention of appropriate governmental agencies.

B. Detailed Scope of Services

This ESA was completed in accordance with ASTM International Standard E1527, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, and U.S. Environmental Protection Agency (USEPA) All Appropriate Inquires (AAI) regulations under 40 CFR Part 312.

This report summarizes the results of Mead & Hunt’s investigation of the proposed project area, visual non-invasive reconnaissance of the project area and adjoining properties, federal and state database reviews, and interviews, as applicable. Limitations, deviations, and significant gaps (if identified) are evident from reviewing the applicable scope of services and the report text. No other environmental issues will be assessed beyond the scope of ASTM E1527 in connection with this ESA.

C. Proposed Project Actions

The 2016 LTCP recommends implementation of the following proposed project actions:

- Relocate Runway 14/32 by shifting it 615 feet to the northeast and extending it 3,500 feet, including all necessary grading, clearing, and runway lighting.

- Realign 30th Street North around the new Runway 32 Runway Protection Zone (RPZ) and reconnect it to the existing intersection with Neal Avenue.
• Construct a new cross-field taxiway to serve the new Runway 14 end, including taxiway lighting and/or reflectors.

• Convert existing Runway 14/32 to a partial parallel taxiway and construct other taxiways as needed to support the relocated runway, including taxiway lighting and/or reflectors.

• Reconstruct Runway 4/22 and extend it to 2,750 feet, including necessary lighting and taxiway connectors.

• Establish a new non-precision approach to Runway 14 end and upgrade existing Runway 4 approach to RNAV (GPS).

Appendix C illustrates areas of proposed ground-disturbing activities.

D. Significant Assumptions
A significant assumption used in evaluating potential impacts to the subject property is that information acquired from the public record and interviews is accurate and reliable.

E. Limitations and Exceptions
This Phase I ESA was conducted using ASTM E 1527-13. The findings of this report are applicable and representative of conditions encountered at the property on the date of this assessment, and may not represent conditions at a later date.

The review of public records was limited to that information that was available to Mead & Hunt at the time this report was prepared. Interviews with local and state government authorities were limited to those people that Mead & Hunt was able to contact during the preparation of this report. Information was derived from reasonably ascertainable and practically reviewable sources in compliance with Mead & Hunt’s understanding of the standards set forth by ASTM E 1527-13.

The history of the property could not consistently be documented at approximately five-year intervals because standard historical sources with that information were not reasonably ascertainable.

F. Special Terms and Conditions
This Phase I ESA was conducted in accordance with Work Authorization #37633 PS with the MAC, dated March 1, 2017.

G. User Reliance
The resulting report is provided for the sole use of the Airport and its assignees. Use of this report by any third parties will be at such party’s sole risk except when granted under written permission by Mead & Hunt. Any such authorized use or reliance by third parties will be subject to the same work authorization under which the work was conducted for the Airport.
Additional party's use and reliance on the report will be subject to the same rights, obligations, and limitations imposed on the MAC by our Work Authorization. However, the total liability of Mead & Hunt to all parties of the Phase I ESA shall be limited to the remedies and amounts as provided in the Work Authorization as a single contract. The additional party's use and reliance on the report shall signify the additional party's agreement to be bound by the proposal and contract that make up the Work Authorization between Mead & Hunt and the MAC.

According to standards set forth by ASTM 1527-13, components of the Phase I ESA will expire 180 days from the date of completion of that component and may therefore require updating if the date of property acquisition exceeds this time period. The dates of completion for pertinent components are as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Date of Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site Reconnaissance</td>
<td>May and June 2017</td>
</tr>
<tr>
<td>Environmental Database Search</td>
<td>August 2017</td>
</tr>
</tbody>
</table>
2. **Physical Setting**

This section summarizes the physical environment in which the Airport operates that may be useful in determining potential RECs or the potential hazard posed by identified RECs.

A. **Location**

Lake Elmo Airport is located in Washington County, approximately 12 miles east of the downtown Saint Paul business district. The Airport encompasses approximately 640 acres of land on 14 separate parcels within Baytown and West Lakeland Townships and is roughly bounded by Manning Avenue on the west, the Union Pacific Railroad on the north, Neal Avenue on the east, and 30th Street on the south.

B. **Current Ownership and Use of the Property**

The property is currently owned and operated by the MAC. In 2014 the Airport had over 200 based aircraft and accommodated approximately 26,000 total aircraft operations.

C. **Site and Vicinity Description**

Residences, dating from the late nineteenth century to the 2000s, are adjacent to the airport along with a handful of late-nineteenth-century farmsteads. Three access roads provide entry to the airport: two from Manning Avenue and one from 30th Street. The main access road is located off Manning Avenue and is signed as 33rd Avenue N., in the approximate center of the airport property.

D. **Descriptions of Roads, Structures, and Other Improvements on the Site**

The airport features two runways: a primary runway (Runway 14-32) extending in a northwest-southeast orientation, and a cross wind runway (Runway 4-22) extending in a northeast-southwest orientation (see Figure 1). Taxiways, lights, and navigational aids are located along both runways.

The airport has approximately 128 hangars in three groups, identified as Hangar Areas 1-3 in Figure 1. Hangar Areas 1 and 2, which consist of historic-age and modern hangars, are located adjacent to Manning Avenue and are separated by 33rd Avenue N. Hangar Area 3 consists of modern hangars, constructed from 1990 to the present, and is located in the northwest quadrant adjacent to the Union Pacific rail line.

Valters Aviation serves as the airport's fixed-base operator (FBO) and is located in a one-story building at the north end of the property near the railroad corridor. The Lake Elmo MAC maintenance building is located at the east end of the airport's main access road, off Manning Avenue. An irregularly shaped one-story building is located southwest of the maintenance building. A one-story maintenance building is located near the southern end of the property and is accessed via 30th Street. Appendix D includes photographs of on-site structures.

---

E. Topography

Portions of the Airport property are under row-crop cultivation east of Runway 4/22. Scattered woodlands and wetlands appear in this area. Undeveloped infield areas to the west of Runway 4/22 consist of grasses and forbs mown or hayed on a regular basis. The airfield is generally flat with little elevation change; the eastern side is somewhat higher at approximately 930 feet (NAVD 1988), gently sloping to the west and south to about 920 feet at the Airport entrance on Manning Avenue. See Appendix E for a detailed topographic map.

F. Hydrogeology and Geology

Surface drainage flows generally from northeast to southwest as it moves under 30th Street and Manning Avenue via numerous culverts, and toward Lake Elmo, approximately 1 mile west of the Airport. Within Airport property, the main southerly drainage conveys flows to a depressional shallow marsh wetland and...
seasonally flooded basin near the Runway 32 end north of 30th Street. This wetland is connected hydrologically to a larger depressional shallow marsh south of 30th Street via a culvert. The area south of 30th Street is cultivated; however, prior to construction of the road these two wetlands were likely physically connected. A Federal Emergency Management Agency (FEMA) Firmette map indicating the floodplain is included in Appendix F.

Airport lands not in agricultural production are actively managed by regular mowing or periodic haying. On the west side (uncultivated areas) of the Airport most vegetation is dominated by a mix of grasses and forbs consisting of Kentucky blue grass, orchard grass, red clover, common yarrow, milkweed, and Canada thistle. Farm fields on the east side of Runway 4/22 and south of 30th Street were under cultivation. Isolated woodlands and depressional areas appeared undisturbed.

G. Soils Data
Most of the Airport is covered by three soils: well drained Antigo silt loams (0 to 2 percent slopes and 2 to 6 percent slopes) and moderately well drained Crystal Lake silt loam (1 to 3 percent slopes). Typical soil profiles for Antigo silt loams (49 and 49B) show a dark grayish brown (10YR 4/2) silt loam over a brown (10YR 5/3) silt loam. Crystal Lake silt loam (449) also shows a dark grayish brown (10YR 4/2) silt loam in the A horizon; however, underlying this is a light brownish gray (10YR 6/2) silt loam with few fine prominent yellowish red (5YR 4/6) masses of iron accumulation. Antigo silt loams and their minor components are non-hydric while Crystal Lake silt loam contains a minor component, Barronett silt loam at three percent, which is hydric.

Depressional areas are generally covered by hydric soils from the poorly drained Auburndale series and by ponded, very poorly drained Aquolls and Histosols. A very dark grayish brown (10YR 3/2) silt loam covers a grayish brown (10YR 5/2) silt loam with many medium prominent strong brown (7.5YR 5/8) masses of iron accumulation in a typical soil profile for the Auburndale series. Areas mapped as Aquolls and Histosols are rated as hydric.

Soils present in the project area are summarized in Table 1 and soils mapping is presented in Appendix G.

### Table 1. Summary of Soils Present

<table>
<thead>
<tr>
<th>Map unit symbol</th>
<th>Map unit name</th>
<th>Soil Unit Component Percentage</th>
<th>Landform</th>
<th>Hydric Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>49</td>
<td>Antigo silt loam, 0 to 2 percent slopes</td>
<td>Antigo/ minor comp. 80/20</td>
<td>Terraces, flats</td>
<td>No</td>
</tr>
<tr>
<td>49B</td>
<td>Antigo silt loam, 2 to 6 percent slopes</td>
<td>Antigo/ minor comp. 80/20</td>
<td>Terraces, flats, hillslopes</td>
<td>No</td>
</tr>
<tr>
<td>153B</td>
<td>Santiago silt loam, 2 to 6 percent slopes</td>
<td>Santiago/ minor comp. 90/10</td>
<td>Moraines</td>
<td>No</td>
</tr>
<tr>
<td>155B</td>
<td>Chetek sandy loam, 0 to 6 percent slopes</td>
<td>Chetek/ minor comp. 90/10</td>
<td>Outwash plains</td>
<td>No</td>
</tr>
<tr>
<td>155C</td>
<td>Chetek sandy loam, 6 to 12 percent slopes</td>
<td>Chetek/ minor comp. 90/10</td>
<td>Pitted outwash plains</td>
<td>No</td>
</tr>
</tbody>
</table>
Table 1. Summary of Soils Present

<table>
<thead>
<tr>
<th>Map unit symbol</th>
<th>Map unit name</th>
<th>Soil Unit Component Percentage</th>
<th>Landform</th>
<th>Hydric Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>155D</td>
<td>Chetek sandy loam, 12 to 25 percent slopes</td>
<td>Chetek/ minor comp. 90/10</td>
<td>Pitted outwash plains</td>
<td>No</td>
</tr>
<tr>
<td>189</td>
<td>Auburndale silt loam, 0 to 2 percent slopes</td>
<td>Auburndale/ minor comp. 85/15</td>
<td>Ground moraines</td>
<td>Yes</td>
</tr>
<tr>
<td>266</td>
<td>Freer silt loam</td>
<td>Freer/ minor comp. 90/10</td>
<td>Moraines</td>
<td>No</td>
</tr>
<tr>
<td>367B</td>
<td>Campia silt loam, 0 to 8 percent slopes</td>
<td>Campia/ minor comp. 90/10</td>
<td>Lake plains</td>
<td>No</td>
</tr>
<tr>
<td>449</td>
<td>Crystal Lake silt loam, 1 to 3 percent slopes</td>
<td>Crystal Lake/ minor comp. 90/10</td>
<td>Lake plains</td>
<td>No</td>
</tr>
<tr>
<td>452</td>
<td>Comstock silt loam</td>
<td>Comstock/ minor comp. 90/10</td>
<td>Lake plains</td>
<td>No</td>
</tr>
<tr>
<td>1055</td>
<td>Aquolls and Histosols, ponded</td>
<td>Histosols/Aquolls 50/50</td>
<td>Depressions on moraines</td>
<td>Yes</td>
</tr>
</tbody>
</table>
3. Site Reconnaissance

Environmental Professionals with Mead & Hunt conducted site reconnaissance in May and June 2017 to observe the current uses of the site, adjoining properties, and properties in the surrounding area, as well as the geologic, hydrogeologic, and topographic conditions of the site and the surrounding area. Photographs were taken of various portions of the subject site to document existing conditions (see Appendix D).

A. Methodology and Limiting Conditions

The property was observed by walking the perimeter and by systematically traversing the project area to provide an overlapping field of view where accessible.

A vehicular tour of the area was made to confirm the nearby land use. The tour involved viewing nearby properties from publicly accessible areas. Observation was limited to areas visible in the line of sight from the subject property or public roadways. Mead & Hunt did not enter adjacent properties.

B. Perimeter Observations

Land south of 30th Street is a mixture of agricultural land and wetland. Some farmsteads existing since at least the 1930s and some rural residential homes built between 1994 and 2003 are present along Manning Avenue south of 30th Street. Similar conditions exist east of Neal Avenue, where cultivated agricultural area and some wetland exists. Rural residential and agrarian land uses are present further east. North of the rail line, rural residences exist both north and south of 40th Street and some light manufacturing and warehousing exist to the northwest. West of Manning Avenue, a new single-family residential development is under construction. Very little to no commercial or non-residential or agricultural land uses exist within one-half mile of the airport property.

No evidence of underground storage tanks (USTs), aboveground storage tanks (ASTs), stained soils, stressed vegetation, landfilling, or foul odors were noted. No pits were identified on the property or immediate vicinity. No monitoring wells were found on the property.

C. On-Site Observations

On-site observations revealed two active fuel locations: one at the MAC maintenance building and one at the Valters Aviation building (see Appendix D for photos of on-site structures). Additionally, several monitoring wells and a used oil facility were located adjacent to the MAC maintenance building. The 1970s maintenance building, located off 30th Street, appears to have once had a fueling operation. Other observations include miscellaneous propane tanks associated with individual hangars, as well as miscellaneous septic tanks associated with individual buildings and hangars.
4. Records Review

A. Historical Use Development of the Airport and Periphery

In 1949 the MAC purchased 160 acres of farmland for development as the Lake Elmo Airport. At its officially opening in 1951, the Airport had two runways: a northwest-southeast 2,300-foot-long paved runway (Runway 13-31, which became Runway 14-32 in 1999), and a northeast-southwest 2,400-foot-long sod runway (Runway 3-21, which became Runway 04-22 in 1999). Not long after its construction, private individuals and small companies began developing hangars and support buildings on-site. Hangars, including the nine original T-hangars, were constructed in Hangar Area 1, off of Manning Avenue (see Figure 1 in Section 2.D).

In 1966 the MAC expanded the Airport by purchasing an additional 470 acres of farmland in Baytown and West Lakeland Townships. The following year it lengthened Runway 13-31 to 2,600 feet and relocated, extended, and paved Runway 3-21 to 2,500 feet. In the coming decade the MAC constructed support buildings, including a maintenance facility and navigational aids. Private hangar and FBO development continued on the west side of the Airport.

By the 1990s development shifted to the northern quadrant of the Airport (Hangar Area 3). Several modern box hangars were built in this area at that time to accommodate growing demand for aircraft storage. Former FBOs dissolved, leaving Mayer Aviation as the sole FBO. The company was subsequently replaced by the current FBO, Valters Aviation, in 2003. The most recent MAC-initiated Airport improvements came in in the early 1990s, when it extended Runway 13-31 to its current length of 2,849 feet.

Today the Airport is one of two airports within Washington County, the other being the Daniel A. DePonti Memorial Airport. The Lake Elmo Airport is used by local businesses, private pilots, and the Civil Air Patrol. It supports 150 buildings and houses 189 aircraft as of October 2016.

(1) Aerial Photographs

Aerial photography taken between 1938 and 2015 was reviewed to observe previous conditions and development of the property, as well as immediately adjacent properties. Images are included in Appendix H.

The earliest photograph of the area, taken in 1938, shows the general vicinity of the Airport mostly under cultivation, with Manning Avenue, 30th Street, and the railroad in their current configuration. Several farmsteads are located around the perimeter of present-day Airport property, located primarily south of 30th Street or north of the railroad. Two farmsteads were present at the northwest corner of the 30th Street and Neal Avenue intersection in 1938. These farmsteads were present in 1964 but abandoned by 1992, and reversion to forest had nearly closed the tree canopy in these locations.

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The Airport was constructed around 1951-1952 and, with the exception of the airfield area (located near the intersection of Manning Avenue and 30th Street), the surrounding lands remained largely in agricultural production in 1953. By 1957 hangars were being developed on the west side of the Airport with further hangar development seen in 1964, at which point the current configuration of runways and taxiways was all but set.

Between 1964 and 1992 development occurred to the north of 40th Street and south of 30th Street. The north side hangar development was well under way by the early 1990s and largely built out by 1992.

The pattern of agricultural use, both row cropping and forage production, in areas east of the airfield and south of 30th Street within Airport property, observed since the airport’s construction, continues to the present and reflects conditions encountered at the time of field work in 2017.

(2) Land Use
Washington County has adopted an overlay district for the Airport to control the type and extent of land development adjacent to and near the Airport. In general, the surrounding land uses are compatible with the Airport. Historical and existing land use is primarily agricultural. There has been residential development in recent years that is getting closer to Airport property, most recently the development of the agricultural property directly to the west of the airport with approximately 320 single-family residential homes at a density of approximately 2 to 2.5 units per acre. Other developing areas are primarily single-family estate (residential) with 16 dwelling units per 40 acres.5

By 1992 development north of 40th Street included some light manufacturing and warehousing as well as a gas station on the corner of Stillwater Boulevard and Manning Avenue. Little to no other types of land use development (e.g., commercial, industrial, office) have been observed around the immediate vicinity of the airport.

B. Standard Environmental Record Sources
Previously reported hazardous materials sites were identified based on a review of federal and state agency records and online databases for potential hazardous materials contamination sites in accordance with ASTM standards. The following databases were searched:

- Minnesota Pollution Control Agency
  - Closed Landfill Program
    - https://www.pca.state.mn.us/waste/closed-landfill-program
  - Storage tanks
    - https://www.pca.state.mn.us/waste/storage-tanks
  - Wastewater data browser
    - https://www.pca.state.mn.us/data/wastewater-data-browser
  - What's in My Neighborhood
    - https://www.pca.state.mn.us/data/whats-my-neighborhood

---

The following findings are based on data obtained from regulatory database searches and reviews of other available information. Federal and state database searches returned 14 records associated with parcels located on or within one-quarter mile of the Airport. Records for sites within one-quarter mile include registered ASTs and USTs, hazardous waste generators, brownfield sites, and stormwater permit sites. An additional three records within one mile of the Airport were determined to be outside of the project area and, based on the type of record, are not expected to be of significance for this report. A list of sites identified is included in Table 2. A corresponding map is included in Appendix I. Available site reports are provided in Appendix J.

### Table 2. Sites Located Within the Vicinity of Proposed Project Activities

<table>
<thead>
<tr>
<th>Site Number</th>
<th>Type</th>
<th>Status</th>
<th>Search Radius</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sewage Treatment Facility – Municipal SDS Permit</td>
<td>Active</td>
<td>0.5 mi</td>
<td>Bay-Lake Reserve WWTP</td>
</tr>
<tr>
<td>2</td>
<td>Construction Stormwater Permit</td>
<td>Active</td>
<td>0.25 mi</td>
<td>Heritage Farm</td>
</tr>
<tr>
<td>3</td>
<td>Hazardous Waste</td>
<td>Inactive</td>
<td></td>
<td>MAC – Lake Elmo Airport</td>
</tr>
<tr>
<td></td>
<td>Industrial Stormwater Permit</td>
<td>Inactive</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Industrial Stormwater Permit</td>
<td>Active</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aboveground Storage Tanks</td>
<td>Active</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Underground Storage Tanks</td>
<td>Active</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Hazardous Waste</td>
<td>Inactive</td>
<td></td>
<td>Valters Aviation Inc.</td>
</tr>
<tr>
<td></td>
<td>Petroleum Leak Site</td>
<td>Inactive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Underground Storage Tanks</td>
<td>Inactive</td>
<td></td>
<td>Valters Aviation</td>
</tr>
<tr>
<td>6</td>
<td>Brownfield Investigation and Cleanup</td>
<td>Active</td>
<td>0.25 mi</td>
<td>Village Park Preserve</td>
</tr>
<tr>
<td>7</td>
<td>Construction Stormwater Permit</td>
<td>Inactive</td>
<td></td>
<td>2009 Lake Elmo Airport Pavement Rehab</td>
</tr>
<tr>
<td>8</td>
<td>Industrial Stormwater Permit</td>
<td>Inactive</td>
<td></td>
<td>Lake Elmo Airport</td>
</tr>
<tr>
<td>9</td>
<td>Hazardous Waste</td>
<td>Inactive</td>
<td></td>
<td>Hangar 27E at Lake Elmo</td>
</tr>
<tr>
<td>10</td>
<td>Industrial Stormwater Permit</td>
<td>Active</td>
<td></td>
<td>Valters Aviation Service Station Inc.</td>
</tr>
<tr>
<td></td>
<td>Industrial Stormwater Permit</td>
<td>Inactive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Hazardous Waste</td>
<td>Active</td>
<td>Target Property</td>
<td>Walters Aviation</td>
</tr>
<tr>
<td>12</td>
<td>Petroleum Brownfield Investigation and Cleanup</td>
<td>Inactive</td>
<td>0.25 mi</td>
<td>River Country Coop Holiday</td>
</tr>
<tr>
<td></td>
<td>Petroleum Remediation Leak Site</td>
<td>Inactive</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 2. Sites Located Within the Vicinity of Proposed Project Activities

<table>
<thead>
<tr>
<th>Site Number</th>
<th>Type</th>
<th>Status</th>
<th>Search Radius</th>
<th>Reference</th>
</tr>
</thead>
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<tr>
<td>13</td>
<td>Underground Storage Tanks</td>
<td>Active</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Underground Storage Tanks</td>
<td>Inactive</td>
<td>0.25 mi</td>
<td>Abandoned Gas Station</td>
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<tr>
<td>15</td>
<td>Brownfield Investigation and Cleanup</td>
<td>Inactive</td>
<td>0.5 mi</td>
<td>Bruggeman</td>
</tr>
<tr>
<td></td>
<td>Brownfield Investigation and Cleanup</td>
<td>Active</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Brownfield Investigation and Cleanup</td>
<td>Active</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Stormwater Construction (Closed Landfill)</td>
<td>Inactive</td>
<td>1 mi</td>
<td>Washington County Landfill</td>
</tr>
<tr>
<td>17</td>
<td>Groundwater Contamination</td>
<td>Active</td>
<td>Target Property</td>
<td>Baytown Township GW Contamination Site</td>
</tr>
</tbody>
</table>
5. Interviews

A. Interview with Owner
An interview was conducted with the Airport maintenance manager. He confirmed the source of groundwater contamination to be known to be off-site. He also provided a history of some of the previous FBO’s on site but did not identify any other potentially hazardous materials concerns associated with those FBO’s or other sites. An interview memorandum is provided in Appendix K.

B. Interview with Occupants
The owner of Site 9 was interviewed regarding their hazardous waste permit. According to the owner, the permit was required when they purchased the site, which contained several barrels of used aluminum surface materials they were required to dispose of. The site was thus listed as a one-time generator. See Section 6.A for more information.

C. Interview with Local Government Officials
No individual local government officials were interviewed as no record results were determined to warrant additional information from local officials.

D. Interviews with Others
Interviews with individuals at the MPCA were conducted relating to individual site records. Aside from brief information provided on Site 4 (see Section 6), no information other than that readily obtainable through the online database was provided, so interview memorandums are not included in Appendix K.
6. Evaluation

A. Findings

The Phase I ESA was completed in accordance with ASTM International Standard E1527, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process and USEPA AAI regulations under 40 CFR Part 312. This report summarizes the results of Mead & Hunt’s investigation of the subject property and database review. No other environmental issues are assessed beyond the scope of ASTM E1527 in connection with this Phase I ESA.

Findings are listed below by site. Each site listed is an individual database record. Multiple records may exist for one location, for instance the general Airport property. However, each site was evaluated individually.

**Site 1**, Bay-Lake Reserve WWTP, is a domestic influent waste monitoring station with a State Disposal System permit. The site location is more than one-half mile from any proposed project activities. While this site is regulated, it has no records of previously reported hazardous materials incidents. No evidence of contamination from the site was identified. Therefore, no additional investigations are warranted at this location.

**Site 2** is listed as an active construction stormwater permit site for agricultural operations. The permit was issued in the late 1990s for creation of a pond on-site. Stormwater permits are required to control erosion and limit pollution (e.g., runoff of sediment) during and after construction. While this site is regulated, it has no records of previously reported hazardous materials incidents and is not expected to be impacted by proposed project activities. No evidence of contamination from the site was identified. Therefore, no additional investigations are warranted at this location.

**Site 3** is the MAC – Lake Elmo Airport. The site is listed for hazardous waste generation (inactive), an inactive industrial stormwater permit, an active stormwater permit, and both inactive and active ASTs and USTs. The inactive tanks were removed in the 1980s. The active tanks are a 2,500-gallon underground diesel tank and a 250-gallon aboveground used oil tank. Locations of these tanks can be seen in the photos in Appendix D. Monitoring stations surrounding these tank locations are also visible in the photos. This site is regulated and has no records of previously reported hazardous materials incidents. It is not expected to be impacted by proposed project activities. No evidence of contamination from the site was identified. Therefore, no additional investigations are warranted at this location.

**Site 4**, Valters Aviation, is listed as inactive for hazardous waste and an inactive petroleum remediation leak site. According to an interview with Stacy VanPatten with the MPCA, this site was closed in 1993 after remediation consisting of soil extraction and thermal treatment. The exact location could not be determined. This site has been closed and cleanup of the leak was completed. Residual contamination is not expected at this site, so no additional investigations are warranted at this location.

**Site 5**, Valters Aviation, is listed with USTs. The record indicates that two 4,000-gallon underground gasoline tanks were removed in 1995 and one 10,000-gallon underground tank containing aviation
gasoline remains active on site. It is assumed this tank is located on the terminal ramp adjacent to the Valters Aviation building, as seen in the site photos in Appendix D. This site is regulated and has no records of previously reported hazardous materials incidents. It is not expected to be impacted by proposed project activities. No evidence of contamination from the site was identified. Therefore, no additional investigations are warranted at this location.

Site 6 is the active Village Park Preserve Voluntary Brownfield Investigation and Cleanup site located within one-quarter mile to the west of the Airport. Voluntary sites are non-petroleum sites. This site was investigated and closed in 2014 for the purposes of sale, financing, or redevelopment. This site is regulated and has no records of previously reported hazardous materials incidents. It is not expected to be impacted by proposed project activities. No evidence of contamination from the site was identified. Therefore, no additional investigations are warranted at this location.

Site 7 is listed for a Construction Stormwater Permit for the 2009 pavement rehabilitation project at the Airport. The site is currently inactive. No additional investigations are warranted for this site.

Site 8 is the Lake Elmo Airport, which is listed as an Inactive Industrial Stormwater Permit for monitoring effluent from airport maintenance activities (e.g., runoff of de-icing materials). This site is regulated and no specific evidence of contamination from the site was identified. Therefore, no additional investigations are warranted for this site.

Site 9 is listed as an inactive hazardous waste site for Hanger 27E. A permit was obtained at the time of sale in regard to disposal of used surfacing materials containing aluminum. The permit was required and listed the site as a one-time generator. No additional hazardous materials concerns are associated with this site, and no evidence of contamination from the site was identified. Therefore, no additional investigations are warranted for this site.

Site 10 is Valters Aviation and corresponds with Sites 4 and 5. This site is listed as both active and inactive Industrial Stormwater Permits. The active permit is for monitoring effluent from airport maintenance activities (e.g., runoff of de-icing materials). This site is regulated and no specific evidence of contamination from the site was identified. Therefore, no additional investigations are warranted for this site.

Site 11 contains an active Hazardous Waste Generator, listed as Walters Aviation. Hazardous waste includes substances that are corrosive, explosive, toxic, and/or fire hazards. Very Small Quantity Generators produce 220 pounds or less of hazardous waste, and less than 2.2 pounds of acute hazardous waste per month. Businesses in this classification require a license. This site is regulated and no specific evidence of contamination from the site was identified. Therefore, no additional investigations are warranted for this site.

Sites 12 – 14 are associated with an active gas station located within one-quarter mile to the northwest of the Airport. This site contains six active USTs containing gasoline and diesel. No issues associated with the active tanks has been reported. This site also contains records for an inactive Petroleum Remediation Leak Site and a Petroleum Brownfield Investigation and Cleanup from a previous UST leak.
The previous leak was closed in 2001 after more than 10 years of remediation and investigation. The record of the leak, associated with sites 12-14, is located more than one-quarter mile from any proposed project activities. While it may be a potential source of contamination, there is no evidence that contamination from the site has extended beyond the parcel boundary. Based on the current project activities, no additional work is warranted.

**Site 15**, Bruggeman, is a Brownfield Investigation and Cleanup site located within one-half mile west of the Airport. Brownfields are potentially contaminated sites where the MPCA is helping buyers, sellers, developers, or local governments to voluntarily investigate and clean up land for sale, financing, or redevelopment. Bruggeman is a non-petroleum brownfield site associated with current and future residential development. No additional hazardous materials concerns are associated with this site, and no evidence of contamination from the site was identified. Therefore, no additional investigations are warranted for this site.

**Site 16** is associated with the closed Washington County Landfill site located more than 2 miles west of the Airport. This site is monitored for residual groundwater contamination which extends to within one mile of the Airport. Due to the depth of groundwater at the Airport, this site is not expected to pose a concern for proposed project activities. Therefore, no additional investigations are warranted for this site.

**Site 17** is listed as the Baytown Groundwater Contamination site, which covers the Airport. The site federally regulated Superfund Site consists of a contaminated groundwater plume covering about 7 square miles, including the Airport. A former metal working facility located more than a mile west of the Airport, in the city of Lake Elmo, is the primary source of the site’s contamination. Treatment of private and public drinking water, source area treatment, and groundwater monitoring are ongoing.

According to the USEPA’s Third Five-Year Review Report (see Appendix J) dated March 2017, Trichloroethylene (TCE) was found in groundwater in the area of the Lake Elmo Airport at concentrations up to 138 micrograms per liter (μg/L) in the Prairie du Chien Dolomite aquifer and up to 62 μg/L in the Jordan Sandstone aquifer. TCE was also found in residential drinking water wells, including at concentrations up to 86 μg/L in a residential well located approximately 700 feet east of the Airport. These levels exceeded the State drinking water standards and the Federal Maximum Contaminant Level (MCL) and present an unacceptable risk to those using groundwater as a source of drinking water. The Record of Decision (ROD) also documented the presence of low levels of carbon tetrachloride (CCl4) in groundwater at the Site.

In 2015 the MPCA investigated potential vapor intrusion risk of the site with the most potential for vapor intrusion risk. Two soil gas surveys, one located in the city of Bayport and one area located near the Airport, found very low levels of several volatile contaminants, which is common in many developed areas. However, the sampling confirmed that none exceeded MPCA or USEPA health-based screening levels for residential properties.

The Airport is located at approximately elevation 920 to 930. According to the USEPA’s report, groundwater is located at approximately elevation 875 to 885 in the area of the Airport. Furthermore, the Prairie du Chien Aquifer, the highest elevation of the contaminated aquifers, is located at a depth of
approximately elevation 850. Proposed project activities are not expected to reach a depth that would encounter groundwater. While the site poses potentially hazardous materials concerns for vapor intrusion, the site is regulated and monitored and recent sampling has confirmed that no volatile contaminants have exceeded State or Federal health-based screening levels. Previous Airport development has not been precluded as a result of known contamination. Therefore, no additional investigation is warranted.

B. Data Gaps
Historical sources were not reviewed in five-year intervals because the sources to achieve that level of documentation were not readily available. However, given the consistent land use between the available sources, this data gap is not considered to be significant.
7. Conclusions & Recommendations

Mead & Hunt has performed a Phase I ESA of the Lake Elmo Airport property located in Washington County, Minnesota, in conformance with our understanding of the scope and limitations of ASTM Practice E 1527-13. Any exceptions to, or deletions from, this practice are described in Section 1.D of this report. This assessment has revealed evidence of RECs in connection with the subject property.

Based upon information provided, and proposed project activities, Mead & Hunt recommends that no further environmental assessments are warranted.
Appendix A. Project Location Map
LAKE ELMO AIRPORT
Proposed Runway 14/32 Relocation and Associated Improvements

Project Location

LAKE ELMO AIRPORT

LRR Subregion: K
USACE Regional Supplement: NC/NE
Area = 130.1 acres

Map Source: National Geographic Society
Appendix B.  Proposed Project Activities Exhibit
Appendix C. Area of Ground Disturbance Exhibit
AREAS OF GROUND DISTURBANCE

CONNECTOR ROAD
COUNTY ROAD 15 (MANNING AVENUE N)
30TH ST N
NEAL AVENUE N
SERVICE ROAD

AREAS OF GROUND DISTURBANCE = 188 Ac.
Appendix D. Photographs of On-site Structures
Union Pacific Railroad at intersection with Manning Avenue N.

Union Pacific Railroad at intersection with 40th Street N.
Valters Aviation Building, view facing northeast.

UST and fuel pump at Valters Aviation Building.
c.1980 Lake Elmo MAC maintenance building, view facing southeast.

Diesel fuel pump and UST at MAC Maintenance Building.
Monitoring wells adjacent to MAC maintenance building and Diesel UST.

Used Oil Facility adjacent to MAC Maintenance Building.
c.1960 irregularly shaped building, possibly a former FBO building, view facing west.

c.1970 south maintenance building, view facing southwest.
Historic-age T-hangar, view facing south.

Historic-age Box and Quonset hangars, view facing south.
Historic-age Quonset hangars, view facing southwest.

Large c.1970 Quonset Hangar, view facing north.
Modern box hangars, view facing southeast.

Modern box hangar, view facing southwest.
Appendix E. Topography Map
Detailed Topography Map
LAKE ELMO AIRPORT
Proposed Runway 14-32 Runway Shift

Project Information
T29N, R20W, S18 and S19
City of Lake Elmo
Washington County, MN
Area of interest = 130.1 acres
Field work conducted:
June 5 - 9, 2017

Image Source: MnGEO WMS Image Service,
Washington County (2016 color 7-county)
Contour Source:
Minnesota Geospatial Commons,
Minnesota Elevation Mapping Project
Twin Cities Metro Region 2011

Legend
- Area of Interest
- Airport Property Boundary
Contour Elevation
- Index Contour
- Intermediate Contour

Note: Contour interval is 2 feet.
Appendix F. FEMA Floodplain Map
FEMA’s National Flood Hazard Layer (Official)

NFHL (click to expand)
- LOMRs
  - Effective
- LOMAs
- FIRM Panels
- Cross-Sections

Flood Hazard Boundaries
- Limit Lines
  - SFHA / Flood Zone Boundary
  - Other Boundaries

Flood Hazard Zones
- 1% Annual Chance Flood Hazard
- Regulatory Floodway
- Special Floodway
- Area of Undetermined Flood Hazard
- 0.2% Annual Chance Flood Hazard
- Future Conditions
- 1% Annual Chance Flood Hazard
- Area with Reduced Risk Due to Levee

Data from Flood Insurance Rate Maps (FIRMs) where available digitally. New NFHL FIRMette Print app available: http://tinyurl.com/j4xwp5e

USGS The National Map: Orthoimagery | National Geospatial-Intelligence Agency (NGA); Delta State University; Esri | Print here instead: http://tinyurl.com/j4xwp5e Support: FEMAMapSpecialist@riskmapcds.com | USGS The National Map: Orthoimagery
Appendix G. NRCS Soils Data
Hydric Rating by Map Unit—Washington County, Minnesota
(Lake Elmo Airport (21D))

MAP LEGEND

Area of Interest (AOI)

Transportation

Soils

Soil Rating Polygons

Hydric (100%)  
Hydric (66 to 99%)  
Hydric (33 to 65%)  
Hydric (1 to 32%)  
Not Hydric (0%)  
Not rated or not available

Hydric Rating Lines

Hydric (100%)  
Hydric (66 to 99%)  
Hydric (33 to 65%)  
Hydric (1 to 32%)  
Not Hydric (0%)  
Not rated or not available

Soil Rating Points

Water Features

Streams and Canals

Hydric Rating by Map Unit—Washington County, Minnesota

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: 
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Washington County, Minnesota
Survey Area Data: Version 11, Sep 19, 2016

Soil maps units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 16, 2012—Apr 26, 2012

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.
### Hydric Rating by Map Unit

<table>
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<tr>
<th>Map unit symbol</th>
<th>Map unit name</th>
<th>Rating</th>
<th>Acres in AOI</th>
<th>Percent of AOI</th>
</tr>
</thead>
<tbody>
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<td>49</td>
<td>Antigo silt loam, 0 to 2 percent slopes</td>
<td>0</td>
<td>166.4</td>
<td>17.8%</td>
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<td>Antigo silt loam, 2 to 6 percent slopes</td>
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<td>68.2</td>
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<td>49C</td>
<td>Antigo silt loam, 6 to 15 percent slopes</td>
<td>0</td>
<td>8.9</td>
<td>1.0%</td>
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<tr>
<td>120</td>
<td>Brill silt loam</td>
<td>5</td>
<td>5.4</td>
<td>0.6%</td>
</tr>
<tr>
<td>153B</td>
<td>Santiago silt loam, 2 to 6 percent slopes</td>
<td>0</td>
<td>11.3</td>
<td>1.2%</td>
</tr>
<tr>
<td>155B</td>
<td>Chetek sandy loam, 0 to 6 percent slopes</td>
<td>0</td>
<td>39.3</td>
<td>4.2%</td>
</tr>
<tr>
<td>155C</td>
<td>Chetek sandy loam, 6 to 12 percent slopes</td>
<td>0</td>
<td>21.7</td>
<td>2.3%</td>
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<tr>
<td>155D</td>
<td>Chetek sandy loam, 12 to 25 percent slopes</td>
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<td>Auburndale silt loam, 0 to 2 percent slopes</td>
<td>95</td>
<td>12.5</td>
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<tr>
<td>264</td>
<td>Freeon silt loam, 2 to 6 percent slopes</td>
<td>3</td>
<td>11.0</td>
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<tr>
<td>266</td>
<td>Freer silt loam</td>
<td>5</td>
<td>14.2</td>
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<tr>
<td>302C</td>
<td>Rosholt sandy loam, 6 to 15 percent slopes</td>
<td>0</td>
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<tr>
<td>367B</td>
<td>Campia silt loam, 0 to 8 percent slopes</td>
<td>2</td>
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<td>449</td>
<td>Crystal Lake silt loam, 1 to 3 percent slopes</td>
<td>3</td>
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<tr>
<td>452</td>
<td>Comstock silt loam</td>
<td>4</td>
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<td>456</td>
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<td>92</td>
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<td>1055</td>
<td>Aquolls and Histosols, ponded</td>
<td>100</td>
<td>31.4</td>
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<tr>
<td>1847</td>
<td>Barronett silt loam, sandy substratum</td>
<td>90</td>
<td>1.7</td>
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</table>

**Totals for Area of Interest**

|                |               |       | 935.5       | 100.0%        |
Description

This rating indicates the percentage of map units that meets the criteria for hydric soils. Map units are composed of one or more map unit components or soil types, each of which is rated as hydric soil or not hydric. Map units that are made up dominantly of hydric soils may have small areas of minor nonhydric components in the higher positions on the landform, and map units that are made up dominantly of nonhydric soils may have small areas of minor hydric components in the lower positions on the landform. Each map unit is rated based on its respective components and the percentage of each component within the map unit.

The thematic map is color coded based on the composition of hydric components. The five color classes are separated as 100 percent hydric components, 66 to 99 percent hydric components, 33 to 65 percent hydric components, 1 to 32 percent hydric components, and less than one percent hydric components.

In Web Soil Survey, the Summary by Map Unit table that is displayed below the map pane contains a column named 'Rating'. In this column the percentage of each map unit that is classified as hydric is displayed.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). Under natural conditions, these soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

References:


**Rating Options**

*Aggregation Method:* Percent Present

*Component Percent Cutoff: None Specified*

*Tie-break Rule:* Lower
Appendix H. Historic Aerials
Appendix I.  Potentially Hazardous Materials Sites Map
Potentially Hazardous Materials Site Locations

LAKE ELMO AIRPORT
Proposed Runway 14/32 Relocation and Associated Improvements

T29N, R20W, S18 and S19
Baytown and West Lakeland Townships
Washington County, MN
LRR Subregion: K
USACE Regional Supplement: NC/NE
Area = 130.1 acres
Appendix J. Database Search Results: Site Reports
Site 1
Bay Lake Reserve WWTP

| Location:         | 3280 Norman Ave N                                      |
|                  | Stillwater, MN 55082                                   |
|                  | Washington County                                      |
| Watershed:       | Lower St. Croix River (07030005)                       |
| Latitude:        | 44.99895                                                |
| Longitude:       | -92.83670                                               |
| Coordinate Collection Method: | Address Matching House Number |
Municipal wastewater facilities primarily process wastewater from sewage. These include city wastewater treatment, sanitary districts, wayside rest areas, national or state parks, mobile home parks, and resorts. Facilities that discharge directly to surface water require a NPDES/SDS permit, whereas those that do not may require an SDS permit.

### Events

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<td>06/18/04</td>
<td>07/30/13</td>
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<td>WW Compliance Evaluation Inspection</td>
<td>05/23/2006</td>
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<td>WW Compliance Evaluation Inspection</td>
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### Enforcement Activities

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<td>03/01/2016</td>
<td>04/15/2016</td>
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</table>

### Links to Additional Data Sources

- Wastewater data browser

### Contact
Records managers

Records managers are MPCA staff that will help you to access files relating to this site. To request their help, visit our information request page to learn about the process or simply fill out an information request form.

Program contacts

Contact these MPCA staff if you have more specific questions about these activities.

<table>
<thead>
<tr>
<th>Contact</th>
<th>Phone</th>
<th>Contact Description</th>
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<tr>
<td>Kaitlin Jamieson</td>
<td>651-757-2306</td>
<td>Wastewater Compliance Staff</td>
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<td>MN0067164</td>
<td>Wastewater Permit Number</td>
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Owners

Owner or Primary Contact:
Bay Lake Reserve Homeowner’s Association
Tony Grosso

Former Owner or Primary Contact:
Bay Lake Baytown LLC

Documents

These files do not necessarily represent the MPCA’s full set of public records for this site.

To request more records, visit our information request page to learn about the process or simply fill out an information request form.
Site 2
### Heritage Farm

| **Location:** | 30th St N & Manning Ave  
|              | Lake Elmo, MN 55042  
|              | Washington County |
| **Watershed:** | Lower St. Croix River (07030005) |
| **Latitude:** | 44.99210 |
| **Longitude:** | -92.86289 |
| **Coordinate Collection Method:** | Address Matching House Number |
| **Currently Active?** | Yes |
| **Institutional controls:** | No |

### Activity Overview
Stormwater

Construction Stormwater - C00004457

Heritage Farm

**Status: Active**

When stormwater drains off a construction site, it can carry sediment and pollutants that harm lakes, streams and wetlands. Stormwater permit requirements are designed to control erosion and limit pollution during and after construction.

---

**Events**

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<tr>
<th>Event</th>
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<td>08/01/2018</td>
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**Links to Additional Data Sources**

- CSW Online Permit Data - CSC00004457

---

**Contact**

**Records managers**

Records managers are MPCA staff that will help you to access files relating to this site. To request their help, visit our information request page to learn about the process or simply fill out an information request form.

---

**Program contacts**

*Contact these MPCA staff if you have more specific questions about these activities.*

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<thead>
<tr>
<th>Contact</th>
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<th>Contact Description</th>
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<tr>
<td>Rachel Parlin</td>
<td>651-757-2118</td>
<td>Const Stormwater Data Management</td>
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<td>Construction Stormwater Preferred ID</td>
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<td>5768</td>
<td>MPCA Agency Interest ID</td>
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</table>

 Owners

Owner or Primary Contact:
Donna Herzfeld
Herzfeld Inc

Former Owner or Primary Contact:
There are no records of former owner or primary contact names.

Documents

These files do not necessarily represent the MPCA's full set of public records for this site.

To request more records, visit our information request page to learn about the process or simply fill out an information request form.
Re: NPDES/SDS General Stormwater Permit for Construction Activity (MNR100001) Application
Permit ID Number: C00004457
Project Name: Heritage Farm

The Heritage Farm Protection CSW project has been granted coverage by the Minnesota Pollution Control Agency (MPCA) under the National Pollutant Discharge Elimination System (NPDES)/State Disposal System (SDS) Stormwater Permit (Permit) for Construction Activity. Permit coverage is effective for this project on Fri Sep 04, 1998.

You are required to comply with the terms of the Permit to prevent erosion and control sediment from your site with the procedures established in your Stormwater Pollution Prevention Plan (SWPPP). You are also required to upgrade your SWPPP and erosion prevention and sediment control Best Management Practices (BMPs) as site and weather conditions dictate throughout the entire term of the project.

Once all construction activity has been completed at this project, you must submit a Notice of Termination (NOT) form to the MPCA within 30 days of meeting the conditions outlined in Part II (C) of the permit. Please check the MPCA website (http://www.pca.state.mn.us/water/stormwater) or call to request an NOT form and fact sheet.

Please save this letter for your records. If you have any questions about permit coverage for this project, please contact the Construction Stormwater Program at 651-757-2119 or toll free at 800-657-3804.
Site 3
METROPOLITAN AIRPORT COMMISSION
3275 MANNING AVE N
LAKE ELMO, MN 55042-9681

*You can navigate within the map with your mouse.

EPA Facility Information
This query was executed on AUG-18-2017

RCRAInfo

HANDLER ID: MN0000448662

LIST OF NAICS CODES AND DESCRIPTIONS

<table>
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<tr>
<th>NAICS CODE</th>
<th>NAICS DESCRIPTION</th>
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<tbody>
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<td>481111</td>
<td>SCHEDULED PASSENGER AIR TRANSPORTATION</td>
</tr>
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HANDLER / FACILITY CLASSIFICATION

HANDLER TYPE: LAND DISPOSAL, INCINERATOR, BOILER AND OR INDUSTRIAL FURNACE, STORAGE, TREATMENT

HANDLER TYPE: Not in a universe

No Process Information is available for the facility listed above.

Additional Information can be obtained from Resource Conservation and Recovery Information RCRAInfo Search.
MAC - Lake Elmo Airport

**Location:** 3275 Manning Ave N
Lake Elmo, MN 55042
Washington County

**Watershed:** Lower St. Croix River (07030005)

**Latitude:** 44.99599

**Longitude:** -92.86326

**Coordinate Collection Method:** Address Matching House Number

**Currently Active?** Yes

**Industry Classification:** Scheduled Passenger Air Transportation

**Institutional controls:** No

Activity Overview
Hazardous Waste

Hazardous Waste - MN0000448662
MAC - Lake Elmo Airport
Status: Inactive

Events

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<tr>
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Links to Additional Data Sources

- HW Generator License Application Data - MN0000448662

---

Stormwater

Industrial Stormwater - A00000138
MAC - Lake Elmo Airport
Status: Inactive

At industrial sites, stormwater may come into contact with harmful pollutants such as toxic metals, oil, grease and de-icing salts. Industrial stormwater permits are designed to limit the contaminants that reach surface and groundwater.

Events

<table>
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<tr>
<th>Event</th>
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Links to Additional Data Sources

- ISW Online Permit Data - A00000138

---

Industrial Stormwater - MNR0539X5
MAC - Lake Elmo Airport
Status: Active
At industrial sites, stormwater may come into contact with harmful pollutants such as toxic metals, oil, grease and de-icing salts. Industrial stormwater permits are designed to limit the contaminants that reach surface and groundwater.

Events

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Links to Additional Data Sources

- ISW Online Permit Data - MNR0539X5

Tanks

Aboveground Tanks - TS0004289
MAC - Lake Elmo Airport

Status: Active
An aboveground storage tank site has at least one tank of a certain size on the premises. A tank site may have multiple tanks and these tanks may contain food products, petroleum products or other substances.
## Events

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<td>AT Inspection</td>
<td>12/22/2009</td>
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<tr>
<td>AT Inspection</td>
<td>08/21/2006</td>
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</table>

## Links to Additional Data Sources

There are no links for this activity. Contact the file manager or program contact to determine if additional information is available.

## Underground Tanks - TS0004289

MAC - Lake Elmo Airport

**Status: Active**

An underground storage tank site has at least one tank of a certain size on the premises. A tank site may have multiple tanks and these tanks may contain food products, petroleum products or other substances.
Events

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Inspections

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</table>

Links to Additional Data Sources

There are no links for this activity. Contact the file manager or program contact to determine if additional information is available.

Contact

Records managers

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Program contacts

Contact these MPCA staff if you have more specific questions about these activities.

<table>
<thead>
<tr>
<th>Contact</th>
<th>Phone</th>
<th>Contact Description</th>
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<tbody>
<tr>
<td>Chris Bashor</td>
<td>651-757-2215</td>
<td>Aboveground Tanks Compliance Staff</td>
</tr>
<tr>
<td>Regina Small</td>
<td>651-757-2382</td>
<td>Hazardous Waste Data Management</td>
</tr>
<tr>
<td>Melissa Wenzel</td>
<td>651-757-2816</td>
<td>Ind Stormwater Compliance Staff</td>
</tr>
<tr>
<td>Rachel Parlin</td>
<td>651-757-2118</td>
<td>Ind Stormwater Data Management</td>
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<tr>
<td>Jacob Mueller</td>
<td>651-757-2862</td>
<td>Underground Tanks Compliance Staff</td>
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Owners

Owner or Primary Contact:
Met Council Environmental Services
Metropolitan Airports Commission

Former Owner or Primary Contact:
Dick Keinz

Documents

These files do not necessarily represent the MPCA's full set of public records for this site.

To request more records, visit our information request page to learn about the process or simply fill out an information request form.
Facility Registry Service Links:

- Facility Registry Service (FRS) Overview
- FRS Facility Query
- FRS Organization Query
- EZ Query
- FRS Physical Data Model
- FRS Geospatial Model

**Facility Registry Service Links:**

- Facility Registry Service (FRS) Overview
- FRS Facility Query
- FRS Organization Query
- EZ Query
- FRS Physical Data Model
- FRS Geospatial Model

**Related Topics:** Envirofacts

**FRS Facility Detail Report**

**METROPOLITAN AIRPORT COMMISSION**

**EPA Registry Id:**
110006823880
3275 MANNING AVE N
LAKE ELMO, MN 55042-9681

**Facility Registry Service Links:**

- Facility Registry Service (FRS) Overview
- FRS Facility Query
- FRS Organization Query
- EZ Query
- FRS Physical Data Model
- FRS Geospatial Model

**Legend**

- Selected Facility
- EPA Facility of Interest
- State/Tribal Facility of Interest

The facility locations displayed come from the FRS Spatial Coordinates tables. They are the best representative locations for the displayed facilities based on the accuracy of the collection method and quality assurance checks performed against each location. The North American Datum of 1983 is used to display all coordinates.

**Environmental Interests**

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<th>Information System Id/Report Link</th>
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**Additional EPA Reports:**

MyEnvironment Enforcement and Compliance Site Demographics Facility Coordinates Viewer Environmental Justice Map Viewer Watershed R

https://iaspub.epa.gov/enviro/fii_query_dtl.disp_program_facility
### Standard Industrial Classification Codes (SIC)

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### Facility Codes and Flags

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### National Industry Classification System

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<td>SCHEDULED PASSENGER AIR</td>
</tr>
</tbody>
</table>

### Facility Mailing Address

**Facility Mailing Address:**

```
3275 MANNING AVENUE, LAKE ELMO
```

### Contacts

<table>
<thead>
<tr>
<th>Affiliation Type</th>
<th>Full Name</th>
<th>Office Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>REGULATORY CONTACT</td>
<td>GREG FRIES</td>
<td>6512244306</td>
</tr>
</tbody>
</table>

### Alternative Names

<table>
<thead>
<tr>
<th>Alternative Name</th>
<th>Source of Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAC LAKE ELMO AIRPORT</td>
<td>NOTIFICATION (RCRA)</td>
</tr>
</tbody>
</table>

### Organizations

No Organizations returned.

Query executed on: AUG-18-2017

Last updated on September 24, 2015
12/09/2015

Jeff Nawrocki

N/A, N/A N/A

RE: NPDES/SDS Industrial Stormwater General Permit Application

Permit ID Number: MNR0539X5
Facility Name: MAC - Lake Elmo Airport
Facility Address: 3275 Manning Ave N Lake Elmo, MN 55042

Dear ,

The Minnesota Pollution Control Agency (MPCA) has received and approved your application for permit authorization for industrial stormwater.

<table>
<thead>
<tr>
<th>Industrial Activity</th>
<th>Industrial Subsector</th>
<th>Industrial Sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>4581 Airports, Flying Fields, and Airport Terminal Services</td>
<td>S2 Airports using &lt; 100,000 gal. glycol-based de/anti-icing chemicals and/or annual. Avg.of &lt; 100 tons urea.</td>
<td>S Air Transportation Facilities</td>
</tr>
<tr>
<td>4581 Airports, Flying Fields, and Airport Terminal Services (S2)</td>
<td>S2 Airports using &lt; 100,000 gal. glycol-based de/anti-icing chemicals and/or annual. Avg.of &lt; 100 tons urea.</td>
<td>S Air Transportation Facilities</td>
</tr>
</tbody>
</table>

Read and follow all applicable permit requirements. For a copy of the permit in its entirety go to: www.pca.state.mn.us/industrialstormwater/. There is also additional information about the Industrial Stormwater Multi-Sector General Permit including Frequently Asked Questions, a SWPPP template and checklist, the BMP Guidebook, the Sampling Guidance Manual, and many more guidance materials there.

If you have questions contact the Industrial Stormwater Program by email: iswprogram.pca@state.mn.us or call the Stormwater Hotline at 651-757-2119 or 800-657-3804 (non-metro only).
MAC - Lake Elmo Airport

<table>
<thead>
<tr>
<th>Site ID</th>
<th>TS0004289</th>
</tr>
</thead>
</table>
| Location    | 3275 Manning Ave N  
Lake Elmo, Minnesota 55042  
Washington County |
| Tank Count  | 4 tanks are (or were) located at this site. |

<table>
<thead>
<tr>
<th>Tank number</th>
<th>Install date</th>
<th>Registration date</th>
<th>Tank capacity</th>
<th>Tank status</th>
<th>Stored product</th>
<th>Above or underground</th>
</tr>
</thead>
<tbody>
<tr>
<td>001</td>
<td>01/01/1976</td>
<td>05/07/1986</td>
<td>2000</td>
<td>Removed</td>
<td>Diesel</td>
<td>Underground</td>
</tr>
<tr>
<td>002</td>
<td>01/01/1976</td>
<td>05/07/1986</td>
<td>2000</td>
<td>Removed</td>
<td>Gasoline</td>
<td>Underground</td>
</tr>
<tr>
<td>001</td>
<td>11/01/1992</td>
<td>02/08/1993</td>
<td>250</td>
<td>Active</td>
<td>Used Oil</td>
<td>Aboveground</td>
</tr>
</tbody>
</table>
Valters Aviation Inc

| Location:          | 3275 Manning Ave N  
|                   | Lake Elmo, MN 55042  
|                   | Washington County  
| Watershed:       | Lower St. Croix River (07030005)  
| Latitude:        | 44.99599  
| Longitude:       | -92.86328  
| Coordinate Collection Method: | Address Matching House Number  
| Currently Active? | No  
| Industry Classification: | Other Support Activities for Air Transportation  
| Institutional controls: | No  

Activity Overview
Hazardous Waste

Hazardous Waste - MND077629509
Valters Aviation Inc
Status: Inactive

Events

<table>
<thead>
<tr>
<th>Event</th>
<th>Start</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>Notif of Regulated Waste</td>
<td>05/18/2017</td>
<td></td>
</tr>
</tbody>
</table>

Links to Additional Data Sources

- HW Generator License Application Data - MND077629509

Investigation and Cleanup

Petroleum Remediation - LS0004513 - Leak Site
Valters Aviation Inc
Status: Inactive

Leak sites are locations where a release of petroleum products has occurred from a tank system. Leak sites can occur from aboveground or underground tank systems as well as from spills at tank facilities.
Events

<table>
<thead>
<tr>
<th>Event</th>
<th>Start</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Information Reviewed</td>
<td>01/13/1993</td>
<td>01/15/1993</td>
</tr>
<tr>
<td>Site Closed</td>
<td>01/13/1993</td>
<td>01/15/1993</td>
</tr>
<tr>
<td>Thermal Treatment Soil Batch Approved</td>
<td>09/16/1992</td>
<td>09/16/1992</td>
</tr>
<tr>
<td>Excavation Report Reviewed</td>
<td>03/12/1992</td>
<td>03/13/1992</td>
</tr>
<tr>
<td>Soil Corrective Action Plan Reviewed</td>
<td>03/12/1992</td>
<td>03/13/1992</td>
</tr>
<tr>
<td>Responsible Party Determined</td>
<td>09/19/1991</td>
<td>09/19/1991</td>
</tr>
<tr>
<td>Leak Discovered</td>
<td>09/10/1991</td>
<td>09/10/1991</td>
</tr>
</tbody>
</table>

Inspections

<table>
<thead>
<tr>
<th>Inspection Type</th>
<th>Inspection Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>REM Field Work Notification</td>
<td>09/17/2014</td>
</tr>
</tbody>
</table>

Links to Additional Data Sources

There are no links for this activity. Contact the file manager or program contact to determine if additional information is available.

Contact

Records managers

Records managers are MPCA staff that will help you to access files relating to this site. To request their help, visit our information request page to learn about the process or simply fill out an information request form.

Program contacts

*Contact these MPCA staff if you have more specific questions about these activities.*

<table>
<thead>
<tr>
<th>Contact</th>
<th>Phone</th>
<th>Contact Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regina Small</td>
<td>651-757-2382</td>
<td>Hazardous Waste Data Management</td>
</tr>
</tbody>
</table>
Alternate Name

<table>
<thead>
<tr>
<th>Alternate Name or ID</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4513</td>
<td>Former Leak Site Preferred ID</td>
</tr>
<tr>
<td>MND077629509</td>
<td>Hazardous Waste Preferred ID</td>
</tr>
<tr>
<td>LS0004513</td>
<td>Leak Site Preferred ID</td>
</tr>
<tr>
<td>38032</td>
<td>MPCA Agency Interest ID</td>
</tr>
<tr>
<td>MND077629509</td>
<td>Previous Name</td>
</tr>
</tbody>
</table>

Owners

**Owner or Primary Contact:**
There are no records of owner or primary contact names.

**Former Owner or Primary Contact:**
Valters Aviation Inc

Documents

These files do not necessarily represent the MPCA’s full set of public records for this site.

To request more records, visit our information request page to learn about the process or simply fill out an information request form.
Site 5
### What's in My Neighborhood

**Valters Aviation**

| Location:      | 3275 Manning Ave N  
|                | Lake Elmo Airport  
|                | Lake Elmo, MN 55042  
|                | Washington County |
| Watershed:     | Lower St. Croix River (07030005) |
| Latitude:      | 45.00225          |
| Longitude:     | -92.86273         |
| Coordinate Collection Method: | Address Matching House Number |
| Currently Active? | No |
| Institutional controls: | No |

### Activity Overview
Underground Tanks - TS0019223

Valters Aviation

**Status:** Inactive

An underground storage tank site has at least one tank of a certain size on the premises. A tank site may have multiple tanks and these tanks may contain food products, petroleum products or other substances.

### Events

<table>
<thead>
<tr>
<th>Event</th>
<th>Start</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>UST Ten-Day Adv Notice</td>
<td>05/04/2007</td>
<td>05/04/2007</td>
</tr>
<tr>
<td>Registration Received</td>
<td>05/01/1997</td>
<td>05/01/1997</td>
</tr>
<tr>
<td>Registration Received</td>
<td>04/17/1995</td>
<td>04/17/1995</td>
</tr>
<tr>
<td>Registration Received</td>
<td>06/01/1988</td>
<td>06/01/1988</td>
</tr>
</tbody>
</table>

### Inspections

<table>
<thead>
<tr>
<th>Inspection Type</th>
<th>Inspection Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>UT Inspection</td>
<td>06/02/2016</td>
</tr>
<tr>
<td>UT Inspection</td>
<td>05/31/2013</td>
</tr>
<tr>
<td>UT Inspection</td>
<td>06/02/2010</td>
</tr>
<tr>
<td>UT Inspection</td>
<td>05/23/2007</td>
</tr>
<tr>
<td>UT Inspection</td>
<td>08/21/2006</td>
</tr>
<tr>
<td>UT Inspection</td>
<td>03/11/1998</td>
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</table>

### Enforcement Activities

<table>
<thead>
<tr>
<th>Case Type</th>
<th>Net Penalty</th>
<th>Discovery Date</th>
<th>Action Date</th>
<th>Closure Date</th>
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</thead>
<tbody>
<tr>
<td>Citation Warning</td>
<td>$0</td>
<td>06/02/2010</td>
<td>06/09/2010</td>
<td>07/15/2010</td>
</tr>
<tr>
<td>APO - Combination</td>
<td>$6,750</td>
<td>08/21/2006</td>
<td>12/08/2006</td>
<td>06/14/2007</td>
</tr>
</tbody>
</table>

### Links to Additional Data Sources

There are no links for this activity. Contact the file manager or program contact to determine if additional information is available.
Contact

Records managers

Records managers are MPCA staff that will help you to access files relating to this site. To request their help, visit our information request page to learn about the process or simply fill out an information request form.

Program contacts

Contact these MPCA staff if you have more specific questions about these activities.

<table>
<thead>
<tr>
<th>Contact</th>
<th>Phone</th>
<th>Contact Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jacob Mueller</td>
<td>651-757-2862</td>
<td>Underground Tanks Compliance Staff</td>
</tr>
</tbody>
</table>

Alternate Name

<table>
<thead>
<tr>
<th>Alternate Name or ID</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>111969</td>
<td>MPCA Agency Interest ID</td>
</tr>
<tr>
<td>19223</td>
<td>Previous Name</td>
</tr>
<tr>
<td>19223</td>
<td>Previous Name</td>
</tr>
<tr>
<td>TS0019223</td>
<td>Underground Tanks Preferred ID</td>
</tr>
</tbody>
</table>

Owners

Owner or Primary Contact:
Gatis Valters
Kurt A. Nowacki
Mayer Aviation
Valters Aviation

Former Owner or Primary Contact:
Edward Myer
Kurt A. Nowacki
Mayer Aviation

Documents
These files do not necessarily represent the MPCA’s full set of public records for this site.

To request more records, visit our information request page to learn about the process or simply fill out an information request form.
Leaks and tanks site dashboard

Valters Aviation

<table>
<thead>
<tr>
<th>Site ID</th>
<th>TS0019223</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location</td>
<td>3275 Manning Ave N</td>
</tr>
<tr>
<td></td>
<td>Lake Elmo, Minnesota 55042</td>
</tr>
<tr>
<td></td>
<td>Washington County</td>
</tr>
<tr>
<td>Tank Count</td>
<td>4 tanks are (or were) located at this site.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tank number</th>
<th>Install date</th>
<th>Registration date</th>
<th>Tank capacity</th>
<th>Tank status</th>
<th>Stored product</th>
<th>Above or underground</th>
</tr>
</thead>
<tbody>
<tr>
<td>001</td>
<td>07/01/1978</td>
<td>04/17/1995</td>
<td>4000</td>
<td>Removed</td>
<td>Gasoline</td>
<td>Underground</td>
</tr>
<tr>
<td>002</td>
<td>07/01/1978</td>
<td>04/17/1995</td>
<td>4000</td>
<td>Removed</td>
<td>Gasoline</td>
<td>Underground</td>
</tr>
<tr>
<td>003</td>
<td>06/01/1988</td>
<td>06/01/1988</td>
<td>10000</td>
<td>Active</td>
<td>Aviation gasoline</td>
<td>Underground</td>
</tr>
<tr>
<td>004</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Site 6
Village Park Preserve

| Location:                  | See location description  
|                           | Lake Elmo, MN 55042  
|                           | Washington County  
| Watershed:                | Lower St. Croix River (07030005)  
| Latitude:                 | 44.99443  
| Longitude:                | -92.86596  
| Coordinate Collection Method: | Digitized - MPCA internal mapping application  
| Currently Active?         | Yes  
| Institutional controls:   | No  

Activity Overview
Investigation and Cleanup

Brownfields - VP32130 - Voluntary Investigation and Cleanup

Village Park Preserve

**Status: Active**

Brownfields are potentially contaminated sites where the MPCA is helping buyers, sellers, developers or local governments to voluntarily investigate and clean up land for sale, financing or redevelopment. Sites may be petroleum brownfields, non-petroleum brownfields, or both. Non-petroleum brownfields are called Voluntary Investigation and Cleanup sites.

---

**Events**

<table>
<thead>
<tr>
<th>Event</th>
<th>Start</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site Closed</td>
<td>12/18/2014</td>
<td>12/18/2014</td>
</tr>
<tr>
<td>Technical Assistance Letter Issued</td>
<td>12/10/2014</td>
<td>12/18/2014</td>
</tr>
<tr>
<td>Application/Notification/Registration Received</td>
<td>12/10/2014</td>
<td>12/10/2014</td>
</tr>
<tr>
<td>Completeness Determined</td>
<td>12/10/2014</td>
<td>12/10/2014</td>
</tr>
</tbody>
</table>

---

**Links to Additional Data Sources**

There are no links for this activity. Contact the file manager or program contact to determine if additional information is available.

---

**Contact**

**Records managers**

Records managers are MPCA staff that will help you to access files relating to this site. To request their help, visit our information request page to learn about the process or simply fill out an information request form.

**Program contacts**

*Contact these MPCA staff if you have more specific questions about these activities.*

No program contact has been designated for this site.
Alternate Name

<table>
<thead>
<tr>
<th>Alternate Name or ID</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>VP32130</td>
<td>Brownfields Preferred ID</td>
</tr>
<tr>
<td>VP32130</td>
<td>Former Brownfields VIC Preferred ID</td>
</tr>
<tr>
<td>188829</td>
<td>MPCA Agency Interest ID</td>
</tr>
</tbody>
</table>

Owners

Owner or Primary Contact:
Village Park Preserve

Former Owner or Primary Contact:
There are no records of former owner or primary contact names.

Documents

These files do not necessarily represent the MPCA’s full set of public records for this site.
To request more records, visit our information request page to learn about the process or simply fill out an information request form.
2009 Lake Elmo Airport Pavement Rehab

| Location:       | 3275 Manning Ave N  
|                 | Lake Elmo Airport  
|                 | Lake Elmo, MN 55042  
|                 | Washington County  |
| Watershed:      | Lower St. Croix River (07030005) |
| Latitude:       | 44.99667 |
| Longitude:      | -92.86028 |
| Coordinate Collection Method: | GPS - Other |
| Currently Active?: | No |
| Institutional controls: | No |

Activity Overview
Stormwater

Construction Stormwater - C00027652

2009 Lake Elmo Airport Pavement Rehab

Status: Inactive

When stormwater drains off a construction site, it can carry sediment and pollutants that harm lakes, streams and wetlands. Stormwater permit requirements are designed to control erosion and limit pollution during and after construction.

Events

<table>
<thead>
<tr>
<th>Event</th>
<th>Start</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coverage Issuance</td>
<td>05/25/2009</td>
<td>04/02/2010</td>
</tr>
<tr>
<td>Coverage Termination</td>
<td>05/25/2009</td>
<td>04/02/2010</td>
</tr>
</tbody>
</table>

Links to Additional Data Sources

- CSW Online Permit Data - CSC00027652

Contact

Records managers

Records managers are MPCA staff that will help you to access files relating to this site. To request their help, visit our information request page to learn about the process or simply fill out an information request form.

Program contacts

*Contact these MPCA staff if you have more specific questions about these activities.*

<table>
<thead>
<tr>
<th>Contact</th>
<th>Phone</th>
<th>Contact Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rachel Parlin</td>
<td>651-757-2118</td>
<td>Const Stormwater Data Management</td>
</tr>
</tbody>
</table>

Alternate Name
**Owners**

**Owner or Primary Contact:**
There are no records of owner or primary contact names.

**Former Owner or Primary Contact:**
Metropolitan Airports Commission

**Documents**

These files do not necessarily represent the MPCA's full set of public records for this site.

To request more records, visit our information request page to learn about the process or simply fill out an information request form.
Site 8
# Lake Elmo Airport

| **Location:** | 3275 Manning Ave Box 2  
Lake Elmo, MN 55042  
Washington County |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Watershed:</strong></td>
<td>Lower St. Croix River (07030005)</td>
</tr>
<tr>
<td><strong>Latitude:</strong></td>
<td>44.99976</td>
</tr>
<tr>
<td><strong>Longitude:</strong></td>
<td>-92.85682</td>
</tr>
<tr>
<td><strong>Coordinate Collection Method:</strong></td>
<td>Digitized - Permit Application Map</td>
</tr>
<tr>
<td><strong>Currently Active?</strong></td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Institutional controls:</strong></td>
<td>No</td>
</tr>
</tbody>
</table>

## Activity Overview
Stormwater

Industrial Stormwater - MNR0534YY

Lake Elmo Airport

Status: Inactive

At industrial sites, stormwater may come into contact with harmful pollutants such as toxic metals, oil, grease and de-icing salts. Industrial stormwater permits are designed to limit the contaminants that reach surface and groundwater.

Events

<table>
<thead>
<tr>
<th>Event</th>
<th>Start</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coverage Issuance</td>
<td>08/06/2010</td>
<td>08/27/2017</td>
</tr>
</tbody>
</table>

Links to Additional Data Sources

- ISW Online Permit Data - MNR0534YY

Contact

Records managers

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Program contacts

Contact these MPCA staff if you have more specific questions about these activities.

<table>
<thead>
<tr>
<th>Contact</th>
<th>Phone</th>
<th>Contact Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melissa Wenzel</td>
<td>651-757-2816</td>
<td>Ind Stormwater Compliance Staff</td>
</tr>
<tr>
<td>Rachel Parlin</td>
<td>651-757-2118</td>
<td>Ind Stormwater Data Management</td>
</tr>
</tbody>
</table>

Alternate Name
## Alternate Name or ID
- MNR0534YY
- 138059

## Description
- Industrial Stormwater Preferred ID
- MPCA Agency Interest ID

## Owners

### Owner or Primary Contact:
Metropolitan Airports Commission

### Former Owner or Primary Contact:
There are no records of former owner or primary contact names.

## Documents

These files do not necessarily represent the MPCA’s full set of public records for this site.

To request more records, visit our information request page to learn about the process or simply fill out an information request form.
08/06/2010

Mike Harder
6040 28th Ave S
Minneapolis, MN 55450

RE: NPDES/SDS Industrial Stormwater General Permit Application
Permit ID Number: MNR0534YY
Facility Name: Lake Elmo Airport
Facility Address: 3275 Manning Ave Box 2 Lake Elmo, MN 55042

Dear,

The Minnesota Pollution Control Agency (MPCA) has received and approved your application for permit authorization for industrial stormwater.

**Industrial Activities authorized under this permit**

<table>
<thead>
<tr>
<th>Industrial Activity</th>
<th>Industrial Subsector</th>
<th>Industrial Sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>4581 Airports, Flying Fields, and Airport Terminal Services</td>
<td>S2 Airports using &lt; 100,000 gal. glycol-based de/anti-icing chemicals and/or annual. Avg. of &lt; 100 tons urea.</td>
<td>S Air Transportation Facilities</td>
</tr>
</tbody>
</table>

Read and follow all applicable permit requirements. For a copy of the permit in its entirety go to: [www.pca.state.mn.us/industrialstormwater/](http://www.pca.state.mn.us/industrialstormwater/). There is also additional information about the Industrial Stormwater Multi-Sector General Permit including Frequently Asked Questions, a SWPPP template and checklist, the BMP Guidebook, the Sampling Guidance Manual, and many more guidance materials there.

If you have questions contact the Industrial Stormwater Program by email: [iswprogram.pca@state.mn.us](mailto:iswprogram.pca@state.mn.us) or call the Stormwater Hotline at 651-757-2119 or 800-657-3804 (non-metro only).
Site 9
Envirofacts
Search Results

HANGAR 27 E AT LAKE ELMO
3275 MANNING AVE N HANGAR 27E
LAKE ELMO, MN 55042

*You can navigate within the map with your mouse.

EPA Facility Information
This query was executed on AUG-18-2017

RCRAInfo

HANDLER ID: MNS000305248

LIST OF NAICS CODES AND DESCRIPTIONS

<table>
<thead>
<tr>
<th>NAICS CODE</th>
<th>NAICS DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>336413</td>
<td>OTHER AIRCRAFT PARTS AND AUXILIARY EQUIPMENT MANUFACTURING</td>
</tr>
<tr>
<td>336411</td>
<td>AIRCRAFT MANUFACTURING</td>
</tr>
</tbody>
</table>

HANDLER / FACILITY CLASSIFICATION

HANDLER TYPE: LAND DISPOSAL | INCINERATOR | BOILER AND OR INDUSTRIAL FURNACE | STORAGE | TREATMENT

HANDLER TYPE
Conditionally Exempt Small Generator

No Process Information is available for the facility listed above.

Additional Information can be obtained from Resource Conservation and Recovery Information Search.
Hangar 27E @ Lake Elmo

**Location:**
3275 Manning Ave N Hangar 27E
Lake Elmo, MN 55042
Washington County

**Watershed:**
Lower St. Croix River (07030005)

**Latitude:**
45.00276

**Longitude:**
-92.85410

**Coordinate Collection Method:**
Digitized - Permit Application Map

**Currently Active?**
Yes

**Industry Classification:**
Aircraft Manufacturing
Other Aircraft Parts and Auxiliary Equipment Manufacturing

**Institutional controls:**
No

Activity Overview
Hazardous Waste

Hazardous Waste - MNS000305248
Hangar 27E @ Lake Elmo
Status: Inactive

Events

<table>
<thead>
<tr>
<th>Event</th>
<th>Start</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Application/Notification/Registration Received</td>
<td>07/08/2016</td>
<td>07/08/2016</td>
</tr>
</tbody>
</table>

Links to Additional Data Sources

- HW Generator License Application Data - MNS000305248

Contact

Records managers

Records managers are MPCA staff that will help you to access files relating to this site. To request their help, visit our information request page to learn about the process or simply fill out an information request form.

Program contacts

Contact these MPCA staff if you have more specific questions about these activities.

<table>
<thead>
<tr>
<th>Contact</th>
<th>Phone</th>
<th>Contact Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regina Small</td>
<td>651-757-2382</td>
<td>Hazardous Waste Data Management</td>
</tr>
</tbody>
</table>

Alternate Name
Alternate Name or ID
MNS000305248
213338

Description
Hazardous Waste Preferred ID
MPCA Agency Interest ID

Owners

Owner or Primary Contact:
Nicholas P Krueger

Former Owner or Primary Contact:
There are no records of former owner or primary contact names.

Documents

These files do not necessarily represent the MPCA’s full set of public records for this site.

To request more records, visit our information request page to learn about the process or simply fill out an information request form.
HANGAR 27 E AT LAKE ELMO

EPA Registry Id:
110069462021
3275 MANNING AVE
N HANGAR 27E
LAKE ELMO, MN
55042

Facility Registry Service Links:
- Facility Registry Service (FRS) Overview
- FRS Facility Query
- FRS Organization Query
- EZ Query
- FRS Physical Data Model
- FRS Geospatial Model

Facility Registry Service Links:

Legend
- Selected Facility
- EPA Facility of Interest
- State/Tribe Facility of Interest

The facility locations displayed come from the FRS Spatial Coordinates tables. They are the best representative locations for the displayed facilities based on the accuracy of the collection method and quality assurance checks performed against each location. The North American Datum of 1983 is used to display all coordinates.

Environmental Interests

<table>
<thead>
<tr>
<th>Information System</th>
<th>System Facility Name</th>
<th>Information System Id/Report</th>
<th>Environmental Interest Type</th>
<th>Data Source</th>
<th>Last Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>RESOURCE CONSERVATION AND RECOVERY ACT INFORMATION SYSTEM</td>
<td>HANGAR 27 E AT LAKE ELMO</td>
<td>MNR000305248</td>
<td>CESQG (Y)</td>
<td>RCRAINFO/0085</td>
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</table>

Additional EPA Reports: MyEnvironment Enforcement and Compliance Site Demographics Facility Coordinates Viewer Environmental Justice Map Viewer Watershed R
<table>
<thead>
<tr>
<th>Standard Industrial Classification Codes (SIC)</th>
<th>National Industry Classification System</th>
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<table>
<thead>
<tr>
<th>Facility Codes and Flags</th>
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<th>NAICS Code</th>
<th>Description</th>
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<td>RCRINFO336411</td>
<td>AIRCRAFT MANUFACTURING</td>
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<td>Duns Number:</td>
<td></td>
<td>RCRINFO336413</td>
<td>OTHER AIRCRAFT PARTS AND AUXILIARY MANUFACTURING</td>
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<tr>
<td>Congressional District Number:</td>
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<td></td>
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<tr>
<td>Legislative District Number:</td>
<td>04</td>
<td></td>
<td></td>
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<tr>
<td>HUC Code/Watershed:</td>
<td>07030005 / LOWER ST. CROIX</td>
<td>Facility Mailing Address</td>
<td></td>
</tr>
<tr>
<td>US Mexico Border Indicator:</td>
<td>NO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tribal Land:</td>
<td>NO</td>
<td></td>
<td></td>
</tr>
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</table>

<table>
<thead>
<tr>
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</table>

<table>
<thead>
<tr>
<th>Organizations</th>
<th>No Organizations returned.</th>
</tr>
</thead>
</table>

Query executed on: AUG-18-2017

Last updated on September 24, 2015
Site 10
Valters Aviation Service Station Inc.

| Location:           | 3275 Manning Ave N                      |
|                    | Lake Elmo, MN 55042                    |
|                    | Washington County                      |
| Watershed:         | Lower St. Croix River (07030005)       |
| Latitude:          | 45.00211                               |
| Longitude:         | -92.85785                              |
| Coordinate Collection Method: | Digitized - Permit Application Map |
| Currently Active?  | Yes                                    |
| Institutional controls: | No                             |

Activity Overview
Stormwater

Industrial Stormwater - MNR053C3J
Valters Aviation Service Station Inc.

**Status: Active**
At industrial sites, stormwater may come into contact with harmful pollutants such as toxic metals, oil, grease and de-icing salts. Industrial stormwater permits are designed to limit the contaminants that reach surface and groundwater.

**Events**

<table>
<thead>
<tr>
<th>Event</th>
<th>Start</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coverage Issuance</td>
<td>04/05/2015</td>
<td>04/05/2020</td>
</tr>
</tbody>
</table>

**Links to Additional Data Sources**

- ISW Online Permit Data - MNR053C3J

---

Industrial Stormwater - MNR0537TK
Valters Aviation Service Station Inc.

**Status: Inactive**
At industrial sites, stormwater may come into contact with harmful pollutants such as toxic metals, oil, grease and de-icing salts. Industrial stormwater permits are designed to limit the contaminants that reach surface and groundwater.
Events

<table>
<thead>
<tr>
<th>Event</th>
<th>Start</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coverage Issuance</td>
<td>10/24/2013</td>
<td>04/05/2015</td>
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</table>

Inspections

<table>
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<tr>
<th>Inspection Type</th>
<th>Inspection Date</th>
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</thead>
<tbody>
<tr>
<td>SW Facility Inspection</td>
<td>08/09/2013</td>
</tr>
<tr>
<td>ISW On Site Compliance Inspection</td>
<td>08/09/2013</td>
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</table>

Enforcement Activities

<table>
<thead>
<tr>
<th>Case Type</th>
<th>Net Penalty</th>
<th>Discovery Date</th>
<th>Action Date</th>
<th>Closure Date</th>
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<tr>
<td>APO - Combination</td>
<td>$4,700</td>
<td>08/09/2013</td>
<td>10/18/2013</td>
<td>02/14/2014</td>
</tr>
</tbody>
</table>

Links to Additional Data Sources

- ISW Online Permit Data - MNR0537TK

Contact

Records managers

Records managers are MPCA staff that will help you to access files relating to this site. To request their help, visit our information request page to learn about the process or simply fill out an information request form.

Program contacts

*Contact these MPCA staff if you have more specific questions about these activities.*

<table>
<thead>
<tr>
<th>Contact</th>
<th>Phone</th>
<th>Contact Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melissa Wenzel</td>
<td>651-757-2816</td>
<td>Ind Stormwater Compliance Staff</td>
</tr>
<tr>
<td>Rachel Parlin</td>
<td>651-757-2118</td>
<td>Ind Stormwater Data Management</td>
</tr>
</tbody>
</table>
## Alternate Name

<table>
<thead>
<tr>
<th>Alternate Name or ID</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>MNR0537TK</td>
<td>Industrial Stormwater Preferred ID</td>
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<tr>
<td>MNR053C3J</td>
<td>Industrial Stormwater Preferred ID</td>
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<tr>
<td>144980</td>
<td>MPCA Agency Interest ID</td>
</tr>
<tr>
<td>MNU000944</td>
<td>Project Number</td>
</tr>
</tbody>
</table>

## Owners

**Owner or Primary Contact:**

Gatis Valters

**Former Owner or Primary Contact:**

There are no records of former owner or primary contact names.

## Documents

These files do not necessarily represent the MPCA’s full set of public records for this site.

To request more records, visit our information request page to learn about the process or simply fill out an information request form.
10/24/2013

Gatis Valters
3275 Manning Ave N
Lake Elmo, MN 55042

RE: NPDES/SDS Industrial Stormwater General Permit Application
   Permit ID Number: MNR0537TK
   Facility Name: Valters Aviation Service Station Inc.
   Facility Address: 3275 Manning Ave N Lake Elmo, MN 55042

Dear ,

The Minnesota Pollution Control Agency (MPCA) has received and approved your application for permit authorization for industrial stormwater.

Read and follow all applicable permit requirements. For a copy of the permit in its entirety go to: www.pca.state.mn.us/industrialstormwater/. There is also additional information about the Industrial Stormwater Multi-Sector General Permit including Frequently Asked Questions, a SWPPP template and checklist, the BMP Guidebook, the Sampling Guidance Manual, and many more guidance materials there.

If you have questions contact the Industrial Stormwater Program by email: iswprogram.pca@state.mn.us or call the Stormwater Hotline at 651-757-2119 or 800-657-3804 (non-metro only).
Site 11
## Walters Aviation

| **Location:** | 3275 Manning Ave N Lot 33  
Lake Elmo, MN 55042-9681  
Washington County |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Watershed:</strong></td>
<td>Lower St. Croix River (07030005)</td>
</tr>
<tr>
<td><strong>Latitude:</strong></td>
<td>44.99599</td>
</tr>
<tr>
<td><strong>Longitude:</strong></td>
<td>-92.86328</td>
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<tr>
<td><strong>Coordinate Collection Method:</strong></td>
<td>Address Matching House Number</td>
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<tr>
<td><strong>Currently Active?</strong></td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Industry Classification:</strong></td>
<td>Other Airport Operations</td>
</tr>
<tr>
<td><strong>Institutional controls:</strong></td>
<td>No</td>
</tr>
</tbody>
</table>

## Activity Overview
Hazardous Waste - MNR000100388 - Very small quantity generator

Walters Aviation

**Status: Active**

Hazardous waste includes substances that are corrosive, explosive, toxic and/or fire hazards. Very Small Quantity Generators produce 220 pounds or less of hazardous waste, and less than 2.2 pounds of acute hazardous waste per month. Businesses in this classification require a license.

---

**Events**

<table>
<thead>
<tr>
<th>Event</th>
<th>Start</th>
<th>End</th>
</tr>
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<tbody>
<tr>
<td>Notif of Regulated Waste</td>
<td>05/18/2017</td>
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<tr>
<td>Annual Gen License Report</td>
<td>12/16/2013</td>
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<tr>
<td>Annual Gen License Report</td>
<td>01/28/2008</td>
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</table>

---

**Links to Additional Data Sources**

- HW Generator License Application Data - MNR000100388

---

**Contact**

**Records managers**

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**Program contacts**

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<table>
<thead>
<tr>
<th>Contact</th>
<th>Phone</th>
<th>Contact Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regina Small</td>
<td>651-757-2382</td>
<td>Hazardous Waste Data Management</td>
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</table>
Alternate Name

<table>
<thead>
<tr>
<th>Alternate Name or ID</th>
<th>Description</th>
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<tr>
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<tr>
<td>57922</td>
<td>MPCA Agency Interest ID</td>
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</table>

Owners

Owner or Primary Contact:
Metropolitan Airports Commission

Former Owner or Primary Contact:
There are no records of former owner or primary contact names.

Documents

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To request more records, visit our information request page to learn about the process or simply fill out an information request form.
WALTERS AVIATION
3275 MANNING AVE
LAKE ELMO, MN 55042-9681

*You can navigate within the map with your mouse.

**EPA Facility Information**
This query was executed on AUG-18-2017

**RCRAInfo**

HANDLER ID: MND077629509

**LIST OF NAICS CODES AND DESCRIPTIONS**

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<th>NAICS DESCRIPTION</th>
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<tbody>
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<td>48819</td>
<td>OTHER SUPPORT ACTIVITIES FOR AIR TRANSPORTATION</td>
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</table>

**HANDLER / FACILITY CLASSIFICATION**

<table>
<thead>
<tr>
<th>HANDLER TYPE</th>
<th>LAND DISPOSAL</th>
<th>INCINERATOR</th>
<th>BOILER AND OR INDUSTRIAL FURNACE</th>
<th>STORAGE</th>
<th>TREATMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Conditionally Exempt Small Generator</td>
</tr>
</tbody>
</table>

No Process Information is available for the facility listed above.

Additional Information can be obtained from Resource Conservation and Recovery Information (RCRAInfo) Search.
HANDLER ID: MNR000100388

No NAICS Codes are available for the facility listed above.

HANDLER / FACILITY CLASSIFICATION

<table>
<thead>
<tr>
<th>HANDLER TYPE</th>
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</thead>
<tbody>
<tr>
<td>LAND DISPOSAL</td>
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<tr>
<td>INCINERATOR</td>
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<tr>
<td>BOILER AND OR INDUSTRIAL FURNACE</td>
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<td>STORAGE</td>
</tr>
<tr>
<td>TREATMENT</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HANDLER TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conditionally Exempt Small Generator</td>
</tr>
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</table>

No Process Information is available for the facility listed above.

Additional Information can be obtained from Resource Conservation and Recovery Information (RCRAInfo) Search.
WALTERS AVIATION

EPA Registry Id:
110009411715
3275 MANNING AVE
LAKE ELMO, MN
55042-9681

Facility Registry Service Links:
- Facility Registry Service (FRS) Overview
- FRS Facility Query
- FRS Organization Query
- EZ Query
- FRS Physical Data Model
- FRS Geospatial Model

Facility Registry Service Links:

Legend
- Selected Facility
- EPA Facility of Interest
- State/Tribe Facility of Interest

The facility locations displayed come from the FRS Spatial Coordinates tables. They are the best representative locations for the displayed facilities based on the accuracy of the collection method and quality assurance checks performed against each location. The North American Datum of 1983 is used to display all coordinates.

Environmental Interests

<table>
<thead>
<tr>
<th>Information System</th>
<th>System Facility Name</th>
<th>Information System Id/Report Link</th>
<th>Environmental Interest Type</th>
<th>Data Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>MINNESOTA - PERMITTING, COMPLIANCE, AND ENFORCEMENT INFORMATION MANAGEMENT SYSTEM</td>
<td>WALTERS AVIATION INC</td>
<td>38032</td>
<td>STATE MASTER</td>
<td>MN-TEMPO</td>
</tr>
<tr>
<td>RESOURCE CONSERVATION AND RECOVERY ACT INFORMATION SYSTEM</td>
<td>WALTERS AVIATION INC</td>
<td>MND077629509</td>
<td>CESQG (Y)</td>
<td>RCRAINFAC</td>
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<td>RESOURCE CONSERVATION AND RECOVERY ACT INFORMATION SYSTEM</td>
<td>WALTERS AVIATION</td>
<td>MN0000100388</td>
<td>CESQG (Y)</td>
<td>RCRAINFAC</td>
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<td>MINNESOTA - PERMITTING, COMPLIANCE, AND ENFORCEMENT INFORMATION MANAGEMENT SYSTEM</td>
<td>WALTERS AVIATION</td>
<td>57922</td>
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<td>MN-TEMPO</td>
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Additional EPA Reports: MyEnvironment Enforcement and Compliance Site Demographics Facility Coordinates Viewer Environmental Justice Map Viewer Watershed
<table>
<thead>
<tr>
<th>Standard Industrial Classification Codes (SIC)</th>
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<tr>
<td>Data Source</td>
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<tr>
<td>MN-TEMPO</td>
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<table>
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<tr>
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<tbody>
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<td>Congressional District Number: 04</td>
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<tr>
<td>Legislative District Number: 39</td>
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<td>HUC Code/Watershed: 07030005 / LOWER ST. CROIX</td>
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<tr>
<td>US Mexico Border Indicator: NO</td>
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<tr>
<td>Federal Facility: NO</td>
</tr>
<tr>
<td>Tribal Land: NO</td>
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<table>
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<tr>
<th>Alternative Names</th>
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<tbody>
<tr>
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<tr>
<td>MAYER AVIATION</td>
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<tr>
<td>VALTERS AVIATION</td>
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<table>
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<th>Organizations</th>
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<td>Affiliation Type</td>
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<td>OWNER</td>
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</table>

Query executed on: AUG-18-2017

Last updated on September 24, 2015
Site 12
Leaks and tanks site dashboard

River Country Coop Holiday

<table>
<thead>
<tr>
<th>Site ID</th>
<th>TS0119761</th>
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</table>
| Location  | 4201 Manning Ave N  
  Lake Elmo, Minnesota 55042  
  Washington County |
| Tank Count | 4 tanks are (or were) located at this site. |

<table>
<thead>
<tr>
<th>Tank number</th>
<th>Install date</th>
<th>Registration date</th>
<th>Tank capacity</th>
<th>Tank status</th>
<th>Stored product</th>
<th>Above or underground</th>
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</thead>
<tbody>
<tr>
<td>001</td>
<td>05/23/2000</td>
<td>01/16/2001</td>
<td>12000</td>
<td>Active</td>
<td>Gasoline</td>
<td>Underground</td>
</tr>
<tr>
<td>002</td>
<td>05/23/2000</td>
<td>01/16/2001</td>
<td>7000</td>
<td>Active</td>
<td>Gasoline</td>
<td>Underground</td>
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<tr>
<td>002-2</td>
<td>05/23/2000</td>
<td>01/16/2001</td>
<td>5000</td>
<td>Active</td>
<td>Gasoline</td>
<td>Underground</td>
</tr>
<tr>
<td>003</td>
<td>05/23/2000</td>
<td>01/16/2001</td>
<td>7000</td>
<td>Active</td>
<td>Diesel</td>
<td>Underground</td>
</tr>
<tr>
<td>003-2</td>
<td>05/23/2000</td>
<td>01/16/2001</td>
<td>5000</td>
<td>Active</td>
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<tr>
<td>004</td>
<td>05/23/2000</td>
<td>01/16/2001</td>
<td>2000</td>
<td>Active</td>
<td>Diesel, Off Road</td>
<td>Underground</td>
</tr>
</tbody>
</table>
River Country Coop Holiday

Location: 4201 Manning Ave N
           4201 Stillwater Blvd
           Lake Elmo, MN 55042
           Washington County

Watershed: Lower St. Croix River (07030005)

Latitude: 45.00989
Longitude: -92.86446

Coordinate Collection Method: Address Matching House Number

Currently Active? Yes

Institutional controls: No

Activity Overview
Investigation and Cleanup

Brownfields - PB2356 - Petroleum Brownfield

River Country Coop Holiday

**Status:** Inactive

Brownfields are potentially contaminated sites where the MPCA is helping buyers, sellers, developers or local governments to voluntarily investigate and clean up land for sale, financing or redevelopment. Sites may be petroleum brownfields, non-petroleum brownfields, or both.

---

## Events

<table>
<thead>
<tr>
<th>Event</th>
<th>Start</th>
<th>End</th>
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<tbody>
<tr>
<td>Site Closed</td>
<td>01/01/2007</td>
<td>01/01/2007</td>
</tr>
</tbody>
</table>

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### Links to Additional Data Sources

There are no links for this activity. Contact the file manager or program contact to determine if additional information is available.

---

Petroleum Remediation - LS0000947 - Leak Site

River Country Coop Holiday

**Status:** Inactive

Leak sites are locations where a release of petroleum products has occurred from a tank system. Leak sites can occur from aboveground or underground tank systems as well as from spills at tank facilities.
<table>
<thead>
<tr>
<th>Event</th>
<th>Start</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closure Request Reviewed</td>
<td>05/04/2001</td>
<td>06/27/2001</td>
</tr>
<tr>
<td>Site Closed</td>
<td>05/04/2001</td>
<td>06/27/2001</td>
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Responsible Party Determined 02/16/1989 02/16/1989
Standard Letter Issued 02/16/1989 02/16/1989
Leak Reported 02/01/1989 02/01/1989

Links to Additional Data Sources

There are no links for this activity. Contact the file manager or program contact to determine if additional information is available.

Tanks

Underground Tanks - TS0119761
River Country Coop Holiday

Status: Active

An underground storage tank site has at least one tank of a certain size on the premises. A tank site may have multiple tanks and these tanks may contain food products, petroleum products or other substances.
Events

<table>
<thead>
<tr>
<th>Event</th>
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Inspections

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<td>UT Inspection</td>
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Links to Additional Data Sources

There are no links for this activity. Contact the file manager or program contact to determine if additional information is available.

Contact

Records managers

Records managers are MPCA staff that will help you to access files relating to this site. To request their help, visit our information request page to learn about the process or simply fill out an information request form.

Program contacts

Contact these MPCA staff if you have more specific questions about these activities.

<table>
<thead>
<tr>
<th>Contact</th>
<th>Phone</th>
<th>Contact Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jacob Mueller</td>
<td>651-757-2862</td>
<td>Underground Tanks Compliance Staff</td>
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## Alternate Name

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## Owners

**Owner or Primary Contact:**
- Kunz Oil Co
- River Country Cooperative
- Tom Boland
- Walter Kunz II

**Former Owner or Primary Contact:**
- River Country Coop
- River Country Cooperative

## Documents

These files do not necessarily represent the MPCA’s full set of public records for this site.

To request more records, visit our information request page to learn about the process or simply fill out an information request form.
Site 13
### Abandoned Gas Station

| Location:          | 40th St N & Stillwater Blvd  
|                   | Lake Elmo, MN 55042  
|                   | Washington County  |
| Watershed:        | Lower St. Croix River (07030005)  |
| Latitude:         | 45.00987  |
| Longitude:        | -92.86462  |
| Coordinate Collection Method: | Address Matching House Number  |
| Currently Active?: | No  |
| Institutional controls: | No  |

### Activity Overview
Tanks

Underground Tanks - TS0020466

Abandoned Gas Station

**Status:** Inactive

An underground storage tank site has at least one tank of a certain size on the premises. A tank site may have multiple tanks and these tanks may contain food products, petroleum products or other substances.

---

**Inspections**

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**Links to Additional Data Sources**

There are no links for this activity. Contact the file manager or program contact to determine if additional information is available.

---

**Contact**

**Records managers**

Records managers are MPCA staff that will help you to access files relating to this site. To request their help, visit our information request page to learn about the process or simply fill out an information request form.

**Program contacts**

*Contact these MPCA staff if you have more specific questions about these activities.*

<table>
<thead>
<tr>
<th>Contact</th>
<th>Phone</th>
<th>Contact Description</th>
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<tr>
<td>Jacob Mueller</td>
<td>651-757-2862</td>
<td>Underground Tanks Compliance Staff</td>
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**Alternate Name**

https://cf.pca.state.mn.us/wimn/siteInfo_print.cfm?siteid=146624

8/17/2017
Alternate Name or ID

146624
TS0020466

Description

MPCA Agency Interest ID
Underground Tanks Preferred ID

Owners

Owner or Primary Contact:
Owner Unknown

Former Owner or Primary Contact:
There are no records of former owner or primary contact names.

Documents

These files do not necessarily represent the MPCA's full set of public records for this site.
To request more records, visit our information request page to learn about the process or simply fill out an information request form.
Site 14
## Abandoned Service Station

| Location       | Highway 5 & Manning Ave  
|                | Lake Elmo, MN 55042  
|                | Washington County  
| Watershed      | Lower St. Croix River (07030005)  
| Latitude       | 45.00989  
| Longitude      | -92.86472  
| Coordinate Collection Method | Address Matching House Number  
| Currently Active? | No  
| Institutional controls | No  

### Activity Overview
Tanks

Underground Tanks - TS0020472
Abandoned Service Station

**Status:** Inactive

An underground storage tank site has at least one tank of a certain size on the premises. A tank site may have multiple tanks and these tanks may contain food products, petroleum products or other substances.

**Inspections**

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<td>UT Inspection</td>
<td>06/02/2010</td>
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**Links to Additional Data Sources**

There are no links for this activity. Contact the file manager or program contact to determine if additional information is available.

**Contact**

**Records managers**

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**Program contacts**

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<table>
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<tr>
<th>Contact</th>
<th>Phone</th>
<th>Contact Description</th>
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<td>Underground Tanks Compliance Staff</td>
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Alternate Name

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Owners

Owner or Primary Contact:
Owner Unknown

Former Owner or Primary Contact:
There are no records of former owner or primary contact names.

Documents

These files do not necessarily represent the MPCA's full set of public records for this site.

To request more records, visit our information request page to learn about the process or simply fill out an information request form.
Site 15
Bruggeman - Lake Elmo

| Location: | See location description
|          | Lake Elmo, MN 55042
|          | Washington County
| Watershed: | Lower St. Croix River (07030005)
| Latitude: | 45.00155
| Longitude: | -92.87046
| Coordinate Collection Method: | Public Land Survey-Two Quarter
| Currently Active? | Yes
| Institutional controls: | Yes

Activity Overview
Investigation and Cleanup

Brownfields - VP19780 - Voluntary Investigation and Cleanup

Bruggeman - Lake Elmo

Status: Inactive

Brownfields are potentially contaminated sites where the MPCA is helping buyers, sellers, developers or local governments to voluntarily investigate and clean up land for sale, financing or redevelopment. Sites may be petroleum brownfields, non-petroleum brownfields, or both. Non-petroleum brownfields are called Voluntary Investigation and Cleanup sites.
### Events

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### Links to Additional Data Sources

There are no links for this activity. Contact the file manager or program contact to determine if additional information is available.

### Brownfields - VP19782 - Voluntary Investigation and Cleanup

**Bruggeman - Lake Elmo**

**Status: Active**

Brownfields are potentially contaminated sites where the MPCA is helping buyers, sellers, developers or local governments to voluntarily investigate and clean up land for sale, financing or redevelopment. Sites may be petroleum brownfields, non-petroleum brownfields, or both. Non-petroleum brownfields are called Voluntary Investigation and Cleanup sites.
## Events

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## Links to Additional Data Sources

There are no links for this activity. Contact the file manager or program contact to determine if additional information is available.

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**Brownfields - VP19781 - Voluntary Investigation and Cleanup**

**Bruggeman - Lake Elmo**

**Status: Active**

Brownfields are potentially contaminated sites where the MPCA is helping buyers, sellers, developers or local governments to voluntarily investigate and clean up land for sale, financing or redevelopment. Sites may be petroleum brownfields, non-petroleum brownfields, or both. Non-petroleum brownfields are called Voluntary Investigation and Cleanup sites.
Events

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<td>Completeness Determined</td>
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Links to Additional Data Sources

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Contact

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<table>
<thead>
<tr>
<th>Contact</th>
<th>Phone</th>
<th>Contact Description</th>
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<tbody>
<tr>
<td>John Betcher</td>
<td>651-757-2226</td>
<td>Brownfields Hydrologist</td>
</tr>
<tr>
<td>Patrice Jensen</td>
<td>651-757-2465</td>
<td>Brownfields Project Manager</td>
</tr>
<tr>
<td>John Betcher</td>
<td>651-757-2226</td>
<td>Brownfields Project Manager</td>
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Alternate Name
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### Owners

**Owner or Primary Contact:**
- Anchor Bank NA
- Bruce Hutchinson
- Bruggeman Properties Representing Lake Elmo Development
- Elizabeth Sauve
- Unknown

**Former Owner or Primary Contact:**
There are no records of former owner or primary contact names.

### Documents

These files do not necessarily represent the MPCA's full set of public records for this site.

To request more records, visit our information request page to learn about the process or simply fill out an information request form.
Site 16
Washington County Landfill Reconstruction

| Location:            | See location description
|                     | Lake Elmo, MN 55042
|                     | Washington County
| Watershed:          | Lower St. Croix River (07030005)
| Latitude:           | 45.00778
| Longitude:          | -92.92111
| Coordinate Collection Method: | GPS - Other
| Currently Active?   | No
| Institutional controls: | No

Activity Overview
Stormwater

Construction Stormwater - C00027729

Washington County Landfill Reconstruction

**Status:** Inactive

When stormwater drains off a construction site, it can carry sediment and pollutants that harm lakes, streams and wetlands. Stormwater permit requirements are designed to control erosion and limit pollution during and after construction.

---

**Events**

<table>
<thead>
<tr>
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**Inspections**

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**Links to Additional Data Sources**

- CSW Online Permit Data - CSC00027729

---

**Contact**

**Records managers**

Records managers are MPCA staff that will help you to access files relating to this site. To request their help, visit our information request page to learn about the process or simply fill out an information request form.

**Program contacts**

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<table>
<thead>
<tr>
<th>Contact</th>
<th>Phone</th>
<th>Contact Description</th>
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<tbody>
<tr>
<td>Rachel Parlin</td>
<td>651-757-2118</td>
<td>Const Stormwater Data Management</td>
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https://cf.pca.state.mn.us/wimn/siteInfo_print.cfm?siteid=136619
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### Owners

**Owner or Primary Contact:**
There are no records of owner or primary contact names.

**Former Owner or Primary Contact:**
Minnesota Pollution Control Agency

### Documents

These files do not necessarily represent the MPCA's full set of public records for this site.

To request more records, visit our information request page to learn about the process or simply fill out an information request form.
Site 17
SITE BACKGROUND

The Baytown Township Ground Water Plume site is located in Washington County, Minnesota. It includes parts of Baytown Township, West Lakeland Township, the City of Bayport, and the City of Lake Elmo. The site consists of a contaminated groundwater plume located primarily in the Prairie du Chien Aquifer, the Jordan Sandstone Aquifer and, in certain areas, the Tunnel City Aquifer. The contaminated plume covers about seven square miles. A former metal working facility in Lake Elmo is the primary source of the site’s contamination. Treatment of private and public drinking water, source area treatment, and groundwater monitoring are ongoing.

The Minnesota Department of Health (MDH) first detected trichloroethylene (TCE) in private wells in 1987 and created a Special Well Construction Area to protect residents. The site was listed on the state's Permanent List of Priorities in 1988 and multiple state and local agencies collected thousands of samples from private wells. The site was listed on the National Priorities List (NPL) in 1994. Minnesota Pollution Control Agency (MPCA) leads cleanup of the site, with oversight by EPA.

In 2000, MPCA and EPA selected a remedy for the groundwater plume and private wells which requires plume monitoring and installation and maintenance of granular activated carbon (GAC) treatment units for...
private wells. In 2007, MPCA and EPA amended the remedy to add drinking water treatment for the City of Bayport Municipal Well #2 and treatment for the area that was the source of the contamination. These remedies have been operating since 2008. In 2015, MPCA and EPA amended the remedy to add an additional City of Bayport municipal well to the treatment system.

- EPA's Involvement at this Site
- Site Status
- Work to Protect Human Health and the Environment
- Site Risks

- Institutional Controls
- Redevelopment

Site Reports and Documents

Reports and Documents

No published Administrative Records currently available.

Information Repositories

Site Contacts

EPA Contacts

Community Involvement Coordinator (CIC)
Teresa Jones
(312) 886-0725

Remedial Project Manager (RPM)
Leah Evison
(651) 757-2898
Stay Updated

Public Participation Opportunities

Please contact Teresa Jones, Community Involvement Coordinator, at 312-886-0725 or jones.teresa@epa.gov.

Site Facts

NPL Status: Final
Street Address: 35TH STREET N, BAYTOWN TOWNSHIP, MN 55042
Congressional District: 04
EPA ID: MND982425209

Other Site Names
Site Contaminants
Operable Units (OU)
Performance Measures

AUGUST 21, 2017
Baytown TWP Groundwater Contamination

**Location:**
11325 Stillwater Blvd N
Lake Elmo, MN 55042
Washington County

**Watershed:**
Lower St. Croix River (07030005)

**Latitude:**
45.00342

**Longitude:**
-92.87614

**Coordinate Collection Method:**
Digitized - Permit Application Map

**Currently Active?**
Yes

**Industry Classification:**
Remediation and Other Waste Management Services

**Institutional controls:**
No

---

**Activity Overview**

**Hazardous Waste**

**Hazardous Waste - MNS000105718 - Small quantity generator**

**Baytown TWP Groundwater Contamination**

**Status: Active**

Hazardous waste includes substances that are corrosive, explosive, toxic and/or fire hazards. Small Quantity Generators produce between 220 and 2,200 pounds of hazardous waste per month, and less than 2.2 pounds of waste classified as acute hazardous waste. Businesses in this classification require a license.

### Events

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<tr>
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### Links to Additional Data Sources

- HW Generator License Application Data - MNS000105718

---

**Investigation and Cleanup**

**Brownfields - BF0000418 - Voluntary Investigation and Cleanup**

**Baytown TWP Groundwater Contamination**
**Status: Active**
Brownfields are potentially contaminated sites where the MPCA is helping buyers, sellers, developers or local governments to voluntarily investigate and clean up land for sale, financing or redevelopment. Sites may be petroleum brownfields, non-petroleum brownfields, or both. Non-petroleum brownfields are called Voluntary Investigation and Cleanup sites.

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**Links to Additional Data Sources**
- EPA CERCLIS Project Data - 0505340

**CERCLIS Site - MND982425209**
Baytown TWP Groundwater Contamination
**Status: Active**
CERCLIS sites are places that are listed in the federal Comprehensive Environmental Response, Compensation and Liability Information System. This means that they are or were suspected of being contaminated. After CERCLIS sites are investigated, they may be elevated to state or federal Superfund lists, or it may be determined that no action is necessary.

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**Links to Additional Data Sources**
- EPA CERCLIS Project Data - 0505340

**Superfund - SR0000084 - Federal Superfund project and State Superfund project**
Baytown TWP Groundwater Contamination
**Status: Active**
Superfund projects occur where known or suspected environmental contamination is or was a risk to public health or the environment. The Superfund program identifies, investigates and determines appropriate cleanup measures. Federal Superfund sites are on the US EPA's National Priority List (NPL), while State Superfund sites are on the Minnesota Permanent List of Priorities (PLP). Sites are delisted when contamination is cleaned up and risks to human and environmental health have been mitigated.

<table>
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MDH Well Advisory / Special Well Construction Area Established 06/05/2006 06/05/2006
Other Report Type Not Listed Reviewed 05/26/2006 10/17/2006
Remedial Design Reviewed 05/26/2006 05/26/2006
Work Plan Reviewed 05/15/2006 10/17/2006
Work Plan Reviewed 03/30/2006 03/30/2006
Phase II Work Plan Reviewed 03/28/2006 03/28/2006
Quality Assurance Project Plan (QAPP) Reviewed 03/28/2006 03/28/2006
Work Plan Reviewed 03/28/2006 03/28/2006
Work Plan Reviewed 03/03/2006 10/17/2006
Feasibility Study Reviewed 02/23/2005 03/28/2006
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Date of Discovery 08/15/2004 08/31/2004
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Annual or Semi Annual Report Reviewed 02/13/2004 03/28/2006
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Remedial Investigation Report Reviewed 05/01/2003 05/25/2016
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Drinking Water Advisory Issued 02/02/2002 05/25/2016
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Feasibility Study Reviewed 03/03/1999 04/01/1999
Feasibility Study Reviewed 06/10/1998 05/25/2016
Completeness Determined 06/10/1998 06/10/1998
Referred from MPCA Site Assessment 06/10/1998 06/10/1998
Remedial Investigation Report Reviewed 01/01/1998 12/30/2001
Site Listed on National Priorities List (NPL) 12/16/1994 12/16/1994
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Site Scored 09/30/1991 05/25/2016
Other Report Type Not Listed Reviewed 02/24/1989 03/28/2006
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MDH Well Advisory / Special Well Construction Area Established 05/06/1988 02/14/2002
Application/Notification/Registration Received 12/11/1980 12/11/1980

Links to Additional Data Sources

- EPA CERCLIS Project Data - 0505340

Water Quality

Wastewater - MNG790156 - Industrial NPDES/SDS Permit

Baytown TWP Groundwater Contamination

Status: Active

Industrial wastewater facilities may include factories, mines and other privately owned facilities, as well as drinking water treatment plants and city pesticide application activities. Facilities that discharge directly to surface water require a NPDES/SDS permit, whereas those that do not may require an SDS permit.
Events

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Links to Additional Data Sources

- Wastewater data browser

Contact

Records managers

Records managers are MPCA staff that will help you to access files relating to this site. To request their help, visit our information request page to learn about the process or simply fill out an information request form.

Program contacts

Contact these MPCA staff if you have more specific questions about these activities.

<table>
<thead>
<tr>
<th>Contact</th>
<th>Phone</th>
<th>Contact Description</th>
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<tbody>
<tr>
<td>Eric Pederson</td>
<td>651-757-2645</td>
<td>Brownfields Project Manager</td>
</tr>
<tr>
<td>Regina Small</td>
<td>651-757-2382</td>
<td>Hazardous Waste Data Management</td>
</tr>
<tr>
<td>Mark Elliott</td>
<td>218-302-6649</td>
<td>Superfund Hydrologist</td>
</tr>
<tr>
<td>Eric Pederson</td>
<td>651-757-2645</td>
<td>Superfund Project Manager</td>
</tr>
<tr>
<td>Kaitlin Jamieson</td>
<td>651-757-2306</td>
<td>Wastewater Compliance Staff</td>
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Alternate Name

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<td>MNG790156</td>
<td>WW MNG79 General Permit Number</td>
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Owners

Owner or Primary Contact:
Craig Dawson
MPCA
Mark C Elliott
Minnesota Pollution Control Agency
Unknown

Former Owner or Primary Contact:
Bill Hagberg
The Hand Spa

Documents

These files do not necessarily represent the MPCA's full set of public records for this site.

To request more records, visit our information request page to learn about the process or simply fill out an information request form.
BAYTOWN TOWNSHIP GW CONTAMINATION SITE

Handler ID: MNS000105718
SEE LOCATION DESCRIPTION
LAKE ELMO, MN 55042

County Name: WASHINGTON
Latitude: 44.996163
Longitude: -92.857842

Hazardous Waste Generator:
Owner Name: MINNESOTA POLLUTION CONTROL AGENCY

No BIENNIAL REPORT data is available for the facility listed above.

LIST OF FACILITY CONTACTS

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<th>STREET</th>
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<th>ZIP CODE</th>
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<tr>
<td>RICHARD BAXTER</td>
<td>520 LAFAYETTE RD N</td>
<td>ST. PAUL</td>
<td>MN</td>
<td>55155</td>
<td>651-297-8471</td>
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<td>RICHARD BAXTER</td>
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<td>MN</td>
<td>55155</td>
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<td>Permit</td>
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HANDLER / FACILITY CLASSIFICATION

Unspecified Universe for the facility listed above.

HANDLER TYPE
Not in a universe

No PROCESS INFORMATION is available for the facility listed above.

No NAICS Codes are available for the facility listed above.

No Waste Codes are available for the facility listed above.
THIRD FIVE-YEAR REVIEW REPORT FOR
BAYTOWN TOWNSHIP GROUNDWATER PLUME
SUPERFUND SITE
WASHINGTON COUNTY, MINNESOTA

Prepared by

U.S. Environmental Protection Agency
Region 5
Chicago, Illinois

Margaret M. Guerriero, Acting Director
Superfund Division
U.S. Environmental Protection Agency

3/28/2017 Date
### LIST OF ABBREVIATIONS & ACRONYMS

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<td>CERCLA</td>
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<td>CCl₄</td>
<td>Carbon Tetrachloride</td>
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<tr>
<td>CFR</td>
<td>Code of Federal Regulations</td>
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<td>cis 1,2-DCE</td>
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<td>DNAPL</td>
<td>Dense Non-Aqueous Phase Liquid</td>
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<td>EPA</td>
<td>United States Environmental Protection Agency</td>
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<td>ERD</td>
<td>Enhanced Reductive Dechlorination</td>
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<td>ESD</td>
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<td>EVO</td>
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<td>Focused Feasibility Study</td>
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<td>FYR</td>
<td>Five-Year Review</td>
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<td>GAC</td>
<td>Granular Activated Carbon</td>
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<td>HBV</td>
<td>Health-Based Value</td>
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<td>HRL</td>
<td>Health Risk Limit</td>
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<td>ICs</td>
<td>Institutional Controls</td>
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<td>IREL</td>
<td>Interim Recommended Exposure Limit</td>
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<td>ISCO</td>
<td>In-situ Chemical Oxidation</td>
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<td>LTS</td>
<td>Long-term Stewardship</td>
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<tr>
<td>MAC</td>
<td>Metropolitan Airports Commission</td>
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<td>MCL</td>
<td>Maximum Contaminant Level</td>
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<td>µg/L</td>
<td>Micrograms per liter</td>
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<td>MDH</td>
<td>Minnesota Department of Health</td>
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<td>MGS</td>
<td>Minnesota Geological Survey</td>
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<td>MPCA</td>
<td>Minnesota Pollution Control Agency</td>
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<td>MW</td>
<td>Monitoring Well</td>
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<td>National Oil and Hazardous Substances Pollution Contingency Plan</td>
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<td>NPL</td>
<td>National Priorities List</td>
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<td>Operation and Maintenance</td>
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<td>Remedial Action Plan</td>
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<td>Record of Decision</td>
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<td>TCE</td>
<td>Trichloroethylene</td>
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<td>UU/UE</td>
<td>Unlimited Use and Unrestricted Exposure</td>
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<td>VOC</td>
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I. INTRODUCTION

The purpose of a Five-Year Review (FYR) is to evaluate the implementation and performance of a remedy in order to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in FYR reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The United States Environmental Protection Agency (EPA) is preparing this FYR pursuant to Section 121 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), consistent with the National Contingency Plan (NCP)(40 C.F.R. Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the third FYR for the Baytown Township Groundwater Plume Superfund Site (Site).\(^1\) The triggering action for this statutory review is the completion date of the previous FYR. The FYR has been prepared due to the fact that hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The Site was originally managed as one operable unit (OU) but currently consists of three OUs, all of which are addressed in this FYR. OU1 concerns groundwater. OU2 concerns the City of Bayport municipal wells. OU3 concerns the source area. The Minnesota Pollution Control Agency (MPCA) is the lead agency managing cleanup of the Site. MPCA requested that EPA lead the FYR.

This FYR was led by Leah Evison, EPA Remedial Project Manager. Participants included Teresa Jones, EPA Community Involvement Coordinator, Eric Pederson, MPCA Project Leader, and Kurt Schroeder and Mark Elliott, MPCA Hydrogeologists. The review began on September 12, 2016.

MPCA concurs with the findings of this FYR, including the recommendations and protectiveness statements.

Site Background

The Site is located in central Washington County, Minnesota and extends from the eastern portion of the City of Lake Elmo through Baytown Township, West Lakeland Township and parts of the City of Bayport to the St. Croix River. The plume of contaminated groundwater is approximately five miles long and covers approximately seven square miles (Figure 1). The area of the Site includes predominantly low-density residences and agricultural land, but also includes the general aviation Lake Elmo Airport and parts of the cities of Lake Elmo and Bayport. The primary source of the contamination was a metal working facility that operated from 1940 to 1968 at 11325 Stillwater Boulevard N in Lake Elmo. The property is currently occupied by a convenience store and meat market (Hagberg's Country Market), a gasoline filling station, and other small businesses.

Groundwater at the Site is currently used as a drinking water source for rural residences and commercial buildings in the area and by the City of Bayport. The dominant groundwater flow direction is to the east toward the St. Croix River. A public water supply is available in portions of the cities of Lake Elmo and Bayport, but most of the plume area is served by private wells. The Site affects a large number of private wells and several public wells in the City of Bayport. The City of Lake Elmo drinking water wells are upgradient of the Site and not affected.

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\(^1\) This Site is tracked by MPCA as the Baytown Township Groundwater Contamination Site.
MPCA is the lead agency for remedial action at the Site and EPA is the support agency. The Site was previously included in the Enforcement Deferral Pilot Project described in a June 20, 1995, agreement between EPA and MPCA. EPA and MPCA subsequently agreed to remove the Site from the Project and to proceed under a State Superfund Contract dated March 26, 2008 and amended December 11, 2014.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION

<table>
<thead>
<tr>
<th>Site Name:</th>
<th>Baytown Township Groundwater Plume</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPA ID:</td>
<td>MND982425209</td>
</tr>
<tr>
<td>Region:</td>
<td>5</td>
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<td>State:</td>
<td>MN</td>
</tr>
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<td>City/County:</td>
<td>Baytown Township/Washington County</td>
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SITE STATUS

<table>
<thead>
<tr>
<th>NPL Status:</th>
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</thead>
<tbody>
<tr>
<td>Multiple OUs?</td>
<td>Yes</td>
</tr>
<tr>
<td>Has the site achieved construction completion?</td>
<td>No</td>
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REVIEW STATUS

<table>
<thead>
<tr>
<th>Lead agency:</th>
<th>EPA</th>
</tr>
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<tr>
<td>[If “Other Federal Agency”, enter Agency name]:</td>
<td></td>
</tr>
<tr>
<td>Author name (Federal or State Project Manager):</td>
<td>Leah Evison</td>
</tr>
<tr>
<td>Author affiliation:</td>
<td>US EPA</td>
</tr>
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<td>Review period:</td>
<td>9/12/2016 – 2/15/2017</td>
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<td>Date of site inspection:</td>
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<td>Due date (five years after triggering action date):</td>
<td>3/29/2017</td>
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II. RESPONSE ACTION SUMMARY

Basis for Taking Action

Trichloroethylene (TCE) was found in groundwater in the area of the Lake Elmo Airport at concentrations up to 138 micrograms per liter (µg/L) in the Prairie du Chien Dolomite aquifer and up to 62 µg/L in the Jordan Sandstone aquifer. TCE was also found in residential drinking water wells, including at concentrations up to 86 µg/L in a residential well located approximately 700 feet east of the Lake Elmo Airport. These levels exceeded the State drinking water standards.
and the Federal Maximum Contaminant Level (MCL) and presented an unacceptable risk to those using groundwater as a source of drinking water. The Record of Decision (ROD) also documented the presence of low levels of carbon tetrachloride (CCl4) in groundwater at the Site.

Response Actions

In 1988, the Minnesota Department of Health (MDH) created a Special Well Construction Area (now known as a Special Well and Boring Construction Area or SWBCA) for the Site to inform well owners and drillers about the potential for contaminated groundwater in the area, to prevent further degradation of the aquifers and to place special restrictions on the construction of new wells in the area. The Site was listed on the State Superfund Permanent List of Priorities List in 1988 and added to the Federal National Priorities List in 1994. MPCA assumed responsibility for regulatory oversight of the Site in 1995 through the MPCA Enforcement Deferral Pilot Project, under which the EPA deferred on-site decisions to the MPCA. Following an initial Remedial Investigation/Feasibility Study by the Metropolitan Airport Commission (MAC), MPCA identified the primary source area, that had no viable potentially responsible party, and assumed responsibility for further work at the Site. In 2008, the Site was removed from the Enforcement Deferral Pilot Project and became eligible for Fund-financing under a State Superfund Contract. MPCA remains the lead agency managing cleanup at the Site.

ROD

On May 25, 2000, MPCA signed a Site-wide ROD. EPA concurred with the ROD on March 3, 2008, following removal of the Site from the Enforcement Deferral Pilot Project. The Declaration section of the ROD describes the Remedial Action Objectives (RAOs) as follows:

- Prevent the use of groundwater that has concentrations exceeding the MDH Health Risk Limit (HRL); and
- Prevent further degradation of the aquifer.

The State of Minnesota drinking water standards applicable to private wells (HRLs) are cited by the ROD as an Applicable or Relevant and Appropriate Requirement (ARAR). At the time of the ROD, the HRL for TCE was 30 μg/L and the MCL for TCE was 5 μg/L. MPCA did not consider Federal drinking water standards (MCLs) as an ARAR to their action for treatment of private wells. Instead, in its response to comments, MPCA indicated that private well owners may choose privately to install treatment to meet MCLs. The trigger for treatment under the ROD was lowered in a later ROD Amendment and Explanation of Significant Difference (ESD), discussed further below.

The declaration section of the ROD describes the major remedial components as follows:

To implement the selected remedy, the MAC shall:

- Install and maintain granular activated carbon (GAC) units on private wells that have TCE and/or CCl4 concentrations that exceed MDH HRLs or the HRL additivity index. Provide GAC unit maintenance procedures and carbon change out when TCE or CCl4 is detected in GAC effluent. GAC unit maintenance and effluent sampling schedules shall be specified in a Response Action Plan prepared by MAC and approved by MPCA;
- Conduct long-term monitoring of private water supply wells and monitoring wells to evaluate the need for treatment, and clearly define the north and south...
edges of the plume. Provide groundwater monitoring to evaluate how the plume responds to any new residential and municipal demand. The monitoring locations and frequency shall be specified in a Remedial Action Plan (RAP) prepared by MAC and approved by the MPCA;

- Conduct long-term monitoring of private water supply wells and monitoring wells to record TCE/CCl$_4$ plume behavior, and prepare an annual report to discuss the results, including whether the plume has migrated vertically or horizontally. If the plume has migrated, the report will discuss the impacts of the migration and what actions, if any, are required to control migration. If additional measures are required, the MAC will implement them upon MPCA approval;

- Continue to closely monitor wells with increasing TCE concentrations approaching the HRL, but not yet exceeding it, in anticipation of possible HRL exceedances, and be prepared to install GAC units on these wells. The monitoring schedule and GAC unit installation schedule pertaining to this item shall be specified in a RAP prepared by MAC and approved by the MPCA;

- Maintain ongoing evaluation of existing and emerging technologies that may provide source location and removal, or control. Provide annual summary reports evaluating the feasibility of these technologies in bringing about reduced remediation needs and/or expediting site delisting. Implement such technologies if they are feasible based on the criteria established in the April, 1999, Feasibility Study and the MPCA’s recommendation;

- Remove pump, inspect, sample and abandon the unused irrigation well located on the Schiltgen property. Details of the abandonment procedure will be presented in the RAP. The MPCA, MDH, and the Minnesota Geological Survey (MGS) shall be notified two weeks prior to this action so that arrangements may be made for logging the borehole prior to abandonment;

- Evaluate the need for, and install if necessary, down-gradient monitoring points. Details of this evaluation shall be specified in a RAP prepared by MAC and approved by the MPCA;

- Develop a groundwater model in cooperation with the MPCA and MDH or modify an existing groundwater model, as determined and approved by the MPCA, to evaluate future chemical fate and transport scenarios, especially the potential for further horizontal and vertical migration of the Baytown plume due to future local and regional groundwater supply demands. The results of this evaluation will be used by MPCA to identify the need for additional measures that may be necessary to mitigate future migration of contaminants. The criteria in the April, 1999, Feasibility Study and the MPCA Risk Based Guidance will be used to determine the need for additional measures. A schedule for completion of the groundwater model will be specified in the RAP prepared by MAC and approved by the MPCA;

- Maintain the MDH Special Well Construction Advisory. Provide driller standby fees when MDH and/or the MGS log selected pre-1990 wells during homeowner initiated pump maintenance/replacement procedures. In the
annual report, discuss the adequacy of the SWCA and whether or not additional measures are needed; and

- Remain current with the latest TCE health risk information, specifically EPA’s pending revisions of the toxicity values for TCE ingestion, inhalation and dermal exposure. If new information warrants it, MDH may consider a revision to the current TCE HRL. If the HRL is revised in a direction that results in additional private wells exceeding the revised HRL, MAC shall provide carbon filtration systems for these additional residences. If a pending downward revision to the HRL is drafted by the MDH, but not yet finalized, MAC shall identify the additional residences which will qualify for GAC units, and be prepared to have the new GAC units installed and operating no later than 30 days after the revised HRL is finalized.

The remedy was intended mainly to address TCE. Only two residential wells exceeded the HRL for CCl₄, both by small amounts, and these two wells also exceeded the HRL for TCE.

ROD Amendment

Between 2003 and 2006, MPCA conducted additional investigations at the Site and determined that the major source area lay upgradient of the airport. This led to a remedy modification and a change from MAC to State implementation of the remedy.

On July 13, 2007, MPCA signed a ROD Amendment modifying the remedy for the Site. In a letter dated March 3, 2008, EPA notified MPCA of its intention to remove the Site from the enforcement deferral pilot and proceed under a State Superfund Contract. In the same letter, EPA concurred with the ROD Amendment and the ROD.

The ROD Amendment addressed the entire Site and served to clarify the original remedy, in addition to documenting changes to the remedy. The ROD Amendment separates the Site into three OUs:

- OU1 – Private wells and groundwater plume
- OU2 – City of Bayport municipal wells
- OU3 – Source area

RAOs stated in the ROD Amendment include:

- Minimize migration of the contaminant plume;
- Restore the aquifer to drinking water standards; and
- Reduce the time for down-gradient private wells to remain on GAC filters.

The ROD Amendment did not explicitly specify a change in ARARs, but did change the trigger for treatment of private drinking water to a new Interim Recommended Exposure Limit (IREL) issued by MDH that was the same value as the MCL for TCE (5 µg/L). The ROD Amendment also cited MCL exceedances as the trigger for adding additional treatment for a City of Bayport municipal well.

The Declaration section of the ROD Amendment describes the amended selected remedy as follows:

OU1: Continue monitoring of private wells, sampling of private water supply wells, and installation, change out, maintenance and removal of GAC filter systems as previously designated in the ROD. (In addition, the Site History
section of the ROD Amendment explains that the responsibility for implementing the OU1 remedy was transferred from the MAC to MPCA.)

**OU2:** Design and installation of an air stripping treatment system at Bayport Municipal Well #2. The City of Bayport is responsible for ongoing Operation and Maintenance (O&M) of the Municipal Well #2 air stripper as designated in the April 5, 2006, Grant Agreement and September 26, 2006, Grant Agreement Amendment.

**OU3:** Containment and treatment of the primary source area—a former metal working shop located at 11325 Stillwater Boulevard in Lake Elmo. A two prong approach will be implemented for OU3 as follows:

1. **Containment (hydraulic barrier)**

   The MPCA will install a hydraulic barrier to contain the TCE plume and prevent off-site migration. The MPCA has completed the final design of a hydraulic barrier near the eastern OU3 property boundary. This barrier controls the groundwater gradient such that high concentrations of contamination are unable to continue to migrate to the east. It will consist of four extraction wells which pump groundwater to an air stripper to remove TCE from the water phase. The MPCA is currently evaluating options for disposal of the treated groundwater. Two options merit further review: infiltration just below the surface and injection at depth. One of these options will be selected to manage the treated water based on additional pre-design studies.

2. **Source treatment**

   Groundwater beneath the source zone will be treated using a treatment train approach consisting of in-situ technologies such as: physically extracting the volatile TCE by venting (multiphase extraction); biologically degrading the TCE by injecting carbon substrates and nutrients; and/or chemically destroying the TCE by injecting additives (chemical oxidation). The optimal treatment method will be determined by pre-remedial design bench-scale lab studies and pilot tests. Further, vapor control mitigation may be necessary based on ongoing assessments.

For OU1, the ROD Amendment changed the trigger for installation of GAC treatment for residential wells from the HRL to the State’s newly-established IREL of 5 μg/L for TCE. The HRL continued to be an ARAR for the OU1 action.

For OU2, the ROD Amendment cited exceedances of the MCL for TCE (5 μg/L) as the trigger for treatment of City of Bayport municipal drinking water. The MCL is the regulatory standard for municipal drinking water.

For OU3, the ROD Amendment did not specify a groundwater cleanup level, although the RAO to return the aquifer to drinking water standards is a Site-wide RAO. Part I (F) of the ROD Amendment described the cleanup level for OU3 as follows:

Cleanup levels at 11325 Stillwater Boulevard (source area) will be evaluated during the primary source area feasibility study. Residual concentrations of TCE in groundwater will be evaluated at 100; 1,000 and 10,000 μg/L, respectively. Allowing for natural attenuation, the goal is to achieve the IREL residential
drinking water standard in the down-gradient dissolved-phase plume by Manning Avenue.

While the timeframe to treat the source area may be relatively short (months to five years), the MPCA anticipates the hydraulic barrier system will be operated for a longer period (5 to 15 years).

Part II (O) of the ROD Amendment documented the possible outcome of the source area remedy as follows:

Identification of the primary source area of the TCE contamination has made reduction and possibly complete elimination of the primary source area possible. Reduction of the primary source area could make restoration of the aquifer quality, with respect to TCE concentrations, possible. As a result, use of GAC filters and the SWCA may ultimately become obsolete.

Explanation of Significant Differences

On July 14, 2015, MPCA signed an ESD further modifying the remedy for the Site. EPA signed the ESD on July 21, 2015. As explained in the ESD, a modification of the OU2 remedy was needed in order to protect public drinking water in the City of Bayport by connecting Municipal Well #3 to the existing water treatment facility. The ESD also served to document selected treatment methods, disposal methods, and the interim remediation goal for OU3 (source area). The ESD did not change the remedy for OU1.

The ESD modified the OU2 (City of Bayport municipal wells) remedy to require connection of Bayport Municipal Well #3 to the existing air stripper treatment system at Bayport Municipal Well #2, including:

- A pipeline conveyance system of roughly 3,000 feet from Well #3 to the existing treatment system at Well #2;
- Upgrades at Well #3 to facilitate conveyance, including well pump modifications, chemical feed modifications, and associated piping;
- Modifications to the existing air stripper treatment system and chemical feed system to accommodate Well #3 into the treatment process; and
- Modifications to add a backup generator for the air stripper system or, if more cost-effective, an interconnection to alternate backup water supply from the deeper Corrections Facility well.

The ESD documented the City of Bayport’s agreement to maintain the new conveyance system and to continue to operate and maintain the treatment system.

The ESD modified the OU3 (source area) remedy to select the following discharge and treatment requirements:

- Treated water removed by the hydraulic barrier containment system is discharged on-site by infiltration through horizontal wells above the water table;
- Groundwater in the source zone, and, if present and to the extent technically practicable, dense non-aqueous phase liquid (DNAPL), is treated using in-situ chemical oxidation (ISCO) in the main source area and enhanced reductive dechlorination (ERD) in the southern source area;
- The interim remedial goal for treatment is 25 μg/L TCE in groundwater at the source zone property line, as determined by MPCA in a Focused Feasibility Study (FFS) dated June 2013. Reasonable efforts will be made to achieve the interim remedial goal, or, if practicable, drinking water standards; and

- If treatment does not achieve drinking water standards, as is likely, MPCA plans to propose a further remedy modification. If the modification includes a fundamental change to the remedy, for example a proposed waiver of drinking water standards for the source area based on technical impracticability, the public will be invited to comment on the proposed modification.

**Status of Implementation**

Remedy implementation is summarized by OU below:

**OU1**

OU1 consists of the private wells and the groundwater plume at the Site. Early phases of the remedy were implemented by MAC under agreements with MPCA, including installation of GAC treatment systems for down-gradient homes with private wells that exceeded a TCE concentration of 30 μg/L, as required by the ROD. With the ROD Amendment in 2000, MPCA changed the trigger for installation of GAC treatment for residential wells from 30 μg/L to 5 μg/L to meet a newly-established State IREL for TCE.

In 2003, Baytown Township and West Lakeland Township established ordinances that placed the responsibility for GAC installation and maintenance for homes platted after April 9, 2002, on the homeowner. Following discovery of a new primary source area not related to MAC in 2004, the responsibility for remedy implementation overall was shifted to the State, operating under a State Superfund Contract with EPA. The township ordinances placing responsibility for GAC installation and maintenance for homes platted after April 9, 2002, on the homeowner remain in place.

In 2013, MDH established a Health-Based Value (HBV) for TCE in drinking water of 0.4 μg/L. HBVs are non-promulgated advisory levels that MDH plans to promulgate as HRLs in the future. At that time, MPCA made a policy decision to begin installing GAC units for homes with drinking water wells that may exceed the HBV. In December 2015, the State of Minnesota promulgated the value of 0.4 μg/L TCE as a HRL.

Currently, MPCA (via a State contractor) samples private water supply wells, and installs, changes out, maintains, and removes GAC filter systems for private wells that exceed or may exceed the HRL. Current O&M procedures are documented in MPCA’s Sampling and GAC Management Plan dated August 18, 2015. As of December 2016, MPCA maintains GAC filters in approximately 332 homes. There are an additional 24 homes with GAC filters that homeowners are responsible for maintaining because their properties were platted or subdivided and approved after April 9, 2002. (Four additional homeowners have chosen to voluntarily install GAC filters and have had no detection of TCE.)

MPCA also regularly monitors a network of approximately 43 groundwater monitoring wells in multiple aquifers. Most monitoring wells are near the source area, with the down-gradient areas of the plume monitored mainly through residential well sampling. Groundwater trends are discussed in the Data Review section of this FYR.
OU2

OU2 consists of the City of Bayport municipal drinking water wells. The City currently owns three drinking water production wells, #2, #3 and #4. All three wells draw water from the Tunnel City aquifer. Through the early 2000’s, TCE was detected at low levels in several of the City’s drinking water wells. Concentrations were rising most rapidly in Well #2 and by the mid-2000’s, were in danger of exceeding the MCL. Following a ROD Amendment in 2007, MPCA and the City added an air stripper to the water treatment plant to remove TCE from Well #2. The air stripper was designed to treat a maximum future TCE concentration of 10 µg/L, which is approximately the maximum measured TCE concentration in the aquifer upgradient of Well #2. MPCA conducted a new source evaluation of the projected air concentration at the maximum groundwater concentration and determined that the air stripper did not present a risk. Following construction of the air stripper, Well #2 became the primary water supply for the City.

In 2014, MPCA and EPA determined that water from Well #3 was also in danger of exceeding the MCL. In 2015, with the support of the City and funding from the State, MPCA added conveyance piping to connect Well #3 to the existing air stripper. Details are discussed in the Progress Since Last Review section of this FYR. Currently, wells #2 and #3 supply the City’s water, with Well #4 available for emergency backup. Currently Well #4 does not exceed the MCL for TCE, the regulatory level for municipal drinking water wells, although it does exceed the HRL.

OU3

OU3 consists of the source area at the Site, where higher concentrations of TCE are found in groundwater. DNAPL has not been found at the Site. In 2007, MPCA conducted a pilot study for treatment of source area groundwater using sodium permanganate injections for ISCO treatment. In 2008, MPCA installed and began operating a groundwater extraction and treatment system (hydraulic barrier) to contain source area groundwater. The hydraulic barrier system consists of four extraction wells, three located immediately downgradient of the source area and one located to the south, all at depths of approximately 80 feet. When the barrier is operating, the extracted groundwater is treated using a low-profile air stripper and solids filtration system and then discharged back to the ground using two horizontal infiltration pipes located at a depth of approximately 25 feet. The system treats extracted groundwater to a TCE concentration of 1 µg/L or less prior to discharge.

Between 2009 and 2014, MPCA conducted several rounds of additional soil probe sampling to better delineate the source area and installed five new monitoring wells in the source area. During this period, MPCA also conducted a FFS to evaluate additional in-situ treatment methods for the source area. In December 2014, MPCA shut down the hydraulic barrier system so that full-scale in-situ treatment of source area groundwater could be conducted without premature removal of the treatment materials. During shut-down, the wells were also rehabilitated.

MPCA began full-scale treatment of source area groundwater in 2015. MPCA conducted Phase 1 of source area treatment in January 2015 and Phase 2 treatment in May 2016. For Phase 1, MPCA tested two treatment methods, ISCO and ERD, and determined that ERD alone would be used for Phase 2. Results are discussed in the Data Review section of this FYR.

Prior to initiation of Phase 2 treatment, MPCA installed a vapor mitigation system for the commercial building overlying part of the source area. This was a precautionary measure to protect against potential contaminant vapors being released beneath the building during ERD treatment. Additional information about vapor intrusion investigations is available in the Data Review section of this FYR.
Institutional Controls

Institutional controls (ICs) are required by the ROD to restrict use of groundwater that exceeds the HRL and to assure the long-term protectiveness for groundwater which does not allow for UU/UE. ICs in place for the Site are listed in the table below. A map depicting the area of groundwater, which does not allow for UU/UE, is found in Figure 2.

Table 1: Institutional Controls Summary Table

<table>
<thead>
<tr>
<th>Media, engineered controls, and areas that do not support UU/UE based on current conditions</th>
<th>ICs Needed</th>
<th>ICs Called for in the Decision Document</th>
<th>Impacted Parcel(s)</th>
<th>IC Objective</th>
<th>Title of IC Instrument Implemented and Date</th>
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</thead>
<tbody>
<tr>
<td>Groundwater – current area that exceeds 0.4 µg/L TCE (current HRL)</td>
<td>Yes</td>
<td>Yes</td>
<td>See Figure 2</td>
<td>Prevent exposure to contaminated groundwater from private wells and prevent spread of contaminated groundwater through improperly sealed wells</td>
<td>Baytown-West Lakeland Special Well and Boring Construction Area (SWBCA) (Minn. Rules, part 4725.3650) Modified March 30, 2005</td>
</tr>
<tr>
<td>Groundwater – area within the SWBCA that exceeds 0.1 µg/L TCE or 0.2 µg/L CCl₄</td>
<td>Yes</td>
<td>Yes</td>
<td>See Figure 2</td>
<td>Ensure GAC treatment is installed, monitored, and maintained for private wells in portion of Town of Baytown within the Baytown-West Lakeland SWBCA</td>
<td>Baytown Township Ordinance #52, enacted September 12, 2011 Modified November 2, 2015</td>
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<tr>
<td>Groundwater – area within the SWBCA that exceeds 0.1 µg/L TCE or 0.2 µg/L CCl₄</td>
<td>Yes</td>
<td>Yes</td>
<td>See Figure 2</td>
<td>Ensure GAC treatment is installed, monitored, and maintained for private wells in portion of Town of West Lakeland within the Baytown-West Lakeland SWBCA</td>
<td>West Lakeland Township Town Code Section 14, enacted October 4, 2011 Modified April 14, 2014</td>
</tr>
<tr>
<td>Groundwater – current area that exceeds 0.4 µg/L TCE (current HRL)</td>
<td>Yes</td>
<td>Yes</td>
<td>See Figure 2</td>
<td>Before signing an agreement to sell property in Washington County that is not served by a municipal water system, the seller must state in writing to the buyer whether the property is located within a special well construction area. If the disclosure under Section 1031.235 states that there is an unsealed well on the property, the disclosure required under this clause must be made regardless of whether the property is served by a municipal water system.</td>
<td>Minnesota Statutes Section 1031.236 dated 2016</td>
</tr>
</tbody>
</table>
As explained further in the Issues/Recommendations section of this FYR, the area of the plume immediately downgradient of the source area could be a source of vapor intrusion risk if it were developed. Currently this area of the plume is in agricultural use; however, it is zoned for Urban Low Density Residential use and is also included in the Lake Elmo Comprehensive Plan for Village Urban Low Density use. The comprehensive plan defines this use as single family housing serviced by public sewer and water. This issue was raised in the 2011 FYR and is included again as an issue in this FYR.

**Current Compliance**

During the period of this FYR, MPCA and MDH have not noted any compliance issues regarding the SWBCA. MDH notifies first-time owners of newly developed properties within the SWBCA of the presence of the SWBCA. MPCA and MDH have also not noted any compliance issues regarding State regulations listed in Table 1 with the exception of the requirement under Minnesota Statutes Section 1031.236. This statute requires sellers of property in Washington County not served by a municipal water system or that has an unsealed well, to state in writing to the buyer, whether, to the seller’s knowledge, the property is located in a SWBCA. MDH and MPCA report that they receive approximately a half dozen calls each year from new homeowners that did not receive the required disclosure. When this occurs, MDH or MPCA explain the requirements of the SWBCA to the new homeowner.

Baytown Township and West Lakeland Township periodically update MDH regarding well sampling, GAC filter installation, and reminder notices for homeowners covered by the township ordinances. MDH has noted that updates during the period of this FYR have not been as regular as needed, and has noted some compliance issues. According to the most recent (2016) reports, approximately two dozen homes are affected in the townships. In Baytown Township, all affected homeowners have known TCE exceedances, and all have reported installation of GAC to the township; however, several appear to be more than one year behind in reporting required sampling and/or GAC changeout. In West Lakeland Township, MDH has recorded sample results for all known affected homes and none have detected TCE, so none have been required to install GAC. However, a significant percentage of homeowners (approximately one third) are more than one year late in reporting sampling. Both townships have sent reminder letters in the past, though not on a regular schedule. This has been added to the Issues and Recommendations section of this FYR.

**IC Follow up Actions Needed**

MPCA and MDH have discussed the issue of compliance with Minnesota Statutes Section 1031.236 and the township ordinances and plan to request follow-up meetings on both with the township boards. This is included in the Recommendations section of this FYR.

Long-term protectiveness requires continued compliance with the land and groundwater use restrictions to ensure that the remedy continues to function as intended. Long-term stewardship (LTS) will ensure that the ICs are maintained, monitored and enforced. Plans incorporating LTS procedures (for example, a LTS plan) should include the mechanisms and procedures for inspecting and monitoring compliance with the ICs as well as communications procedures. An annual letter report should be submitted to EPA to demonstrate: 1) that the Site was inspected to ensure no inconsistent uses have occurred; 2) that ICs remain in place and are effective; and 3) that any necessary contingency actions have been executed. Results of IC reviews should be provided to EPA in an annual ICs letter report and with a certification that the ICs remain in place and are effective.
Before signing an agreement to sell property, the seller must disclose information about the status and location of all known wells on the property.

| Groundwater – current area that exceeds 0.4 μg/L TCE (current HRL) | Yes | Yes | See Figure 2 | Minnesota Statutes Section 1031.235 dated 2016 |

On May 6, 1988, MDH issued a Well Advisory, the SWBCA, for parts of Baytown Township and parts of the City of Bayport. The SWBCA was revised in 2002 to include parts of West Lakeland Township (extending the SWBCA south to 20th Street North), and revised again in March 2005 to include a part of the City of Lake Elmo that included the newly-discovered source area. Under the current SWBCA, a property owner and a licensed well contractor must submit a written request to construct or permanently seal a well in the SWBCA. Before permission to construct a well is granted by MDH, the well owner must agree to pay for a volatile organic compound (VOC) analysis on the water and abide by conditions of the approval. Except for certain locations, a new well in unconsolidated deposits is not allowed. The Prairie du Chien aquifer is not allowed for new potable water use in the SWBCA. In the areas of the SWBCA that the deeper Franconia aquifer is present, MDH generally requires new drinking water wells to be completed in that aquifer. Where it is not present, generally MDH allows new wells to be completed in the Jordan aquifer, with a requirement for installation of a GAC filter.

The Baytown Township and West Lakeland Township have established ordinances that require homeowners within the area covered by the SWBCA to install GAC systems if the water from newly installed wells exceeds 0.1 μg/L TCE or 0.2 μg/L CCl₄. Both action levels are below the HRL for these contaminants. The township ordinances apply to homes within the SWCBA on properties that were platted or subdivided after April 9, 2002. (For properties platted prior to this date, MPCA conducts GAC installation and maintenance.) The ordinances require all wells with GAC systems that are covered by the ordinance to be inspected by a licensed plumber or licensed water conditioning contractor and require that carbon filters be replaced every three years, with proof of replacement reported to the Township. The ordinances also require that wells that currently do not have a GAC filter be tested every two years. Washington County currently offers VOC sample collection for residents for a fee. The samples are analyzed by the MDH Public Health Laboratory and homeowners are notified of the results by letter from MDH.

Status of Access Restrictions and ICs

ICs for groundwater are currently in place for the Site. As described above, the township ordinances have been updated during the period of this FYR. The SWBCA was last updated in 2005 and has not been updated since that time because it encompassed the contaminant plume. However, the change in the HRL for TCE from 5 μg/L to 0.4 μg/L in 2015 led to an expansion in the area of the plume that exceeds the HRL. (The MCL remains at 5 μg/L.) The location of the current 0.4 μg/L plume boundary in relation to the boundary of the SWBCA is shown on Figure 2. At three locations it is likely that the current plume boundary extends slightly outside of the SWBCA. One location, on the south edge of the plume, is a known exceedance. The other two locations (on the south-western edge and on the north-eastern edge) are likely exceedances, but there is some uncertainty because the boundaries are based on extrapolations between wells. There is no current risk in these areas because MDH and MPCA are aware of the issue and have sampled additional wells to delineate the plume; however, MDH is evaluating whether expansion of the SWBCA is warranted. This has been added to the Issues and Recommendations section of this FYR.
Long Term Stewardship

Since compliance with ICs is necessary to ensure the protectiveness of the remedy, planning for LTS is required to ensure that the ICs are maintained, monitored and enforced so that the remedy continues to function as intended. MDH is responsible for maintaining, monitoring and enforcing the SWBCA, in coordination with MPCA. Baytown Township and West Lakeland Township are responsible for maintaining, monitoring and enforcing the township ordinances, with oversight by MDH. At the Site, LTS of ICs is assured by actions of the townships, MPCA and MDH; however, no written plan exists. This has been added to the Issues and Recommendations section of this FYR.

A LTS plan will be developed containing procedures for inspecting and monitoring compliance with the ICs, and requiring that an annual report be submitted to EPA to demonstrate that the Site was inspected, that no inconsistent uses have occurred, that ICs remain in place and are effective, and that any necessary contingency actions have been executed.

Systems Operation/Operation & Maintenance

OU1

For properties platted and approved prior to April 9, 2002, GAC units are installed and maintained by an MPCA contractor. The GAC systems generally consist of two 90-pound GAC canisters connected in series. O&M procedures for the GAC units are documented in periodic reports entitled Program Review Residential Well Sampling and GAC Management, most recently updated in 2015. GACs are changed-out according to a schedule based on TCE concentration of the well water and metered water usage. For systems sampled and maintained by MPCA, GAC is changed out every three and one half to six years. For systems maintained by homeowners, township ordinances require change-out every three years. Prior to change-out, samples are collected before the lead canister and between the lead and polishing canister. The samples are analyzed for VOCs to determine the effectiveness of the system. At change-out, the polishing canister is moved to the lead position and a new GAC canister is placed in the polishing position.

The MPCA contractor provides periodic reports of change-outs and sampling results during the year. MPCA maintains a database of sampling and maintenance results. Results indicate the GAC units are working effectively to protect water well users from TCE and confirm that O&M for OU1 is effective in maintaining the remedy.

OU2

The City of Bayport operates and maintains the City's drinking water treatment system, including the air stripper installed as part of the Site's remedy. Quarterly, the City monitors water quality in actively-used wells (Well #2 and #3) both before and after treatment. Annually, the City monitors the emergency well (Well #4) and reports results to MPCA and MDH. Sampling during the period of this FYR confirms that O&M for OU2 is effective in maintaining the remedy. The City's current typical operation includes either Well #2 or Well #3; however, occasionally both wells will operate. The air stripper is designed to accommodate a maximum flow of 1,000 gallons per minute with both wells operating; however, maintenance issues are likely if that flow rate is sustained. The City of Bayport operates and maintains the treatment system, with oversight of sampling results by MPCA and MDH.
OU3

During most of the period of this FYR, MPCA operated two groundwater extraction wells (RW-2 and RW-3) downgradient of the source area, and the air stripper and discharge system. These two wells capture groundwater from the major source areas at the Site. Well RW-1 is held in standby if needed. In 2012, RW-4 was converted to a monitoring well. The extraction system was shut down during treatment phases and the wells rehabilitated for future use as needed. Sampling results continue to be entered into MPCA’s EQuIS database. Results during the period of this FYR are discussed in the Data Review section of this FYR and confirm that O&M for OU3 is effective in maintaining the remedy.

III. PROGRESS SINCE THE LAST REVIEW

This section includes the protectiveness determinations and statements from the last FYR as well as the recommendations from the last FYR and the current status of those recommendations.

Table 3: Protectiveness Determinations/Statements from the 2012 FYR

<table>
<thead>
<tr>
<th>OU #</th>
<th>Protectiveness Determination</th>
<th>Protectiveness Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>OU1</td>
<td>Short-term Protective</td>
<td>The remedy at OU1 currently protects human health and the environment in the short term because residential water wells are being treated at the point of use to acceptable levels and the plume does not cause a current vapor intrusion risk. However, in order for the remedy to be protective in the long-term, the following actions need to be taken: (1) Identify additional wells that will require treatment following the upcoming change in Minnesota HRL for TCE and assess need to provide for interim protective measures such as bottled water and (for the long-term) installation of GAC treatment units for additional residences; (2) Update vapor intrusion assessment if conditions change; (3) Assess whether source area remedy and natural attenuation are sufficient to return plume to drinking water standards in a reasonable timeframe considering site-specific circumstances; and (4) Evaluate existing ICs and assess whether additional ICs are needed to ensure long-term protection.</td>
</tr>
<tr>
<td>OU2</td>
<td>Short-term Protective</td>
<td>The remedy for OU 2 currently protects human health and the environment in the short-term because it treats TCE in the municipal drinking water well to acceptable levels. However, in order for the remedy to be protective in the long-term, the following actions need to be taken: (1) Monitor TCE concentrations in Municipal Wells #3 and #4 relative to MCL and develop action plan for future protection; and (2) Evaluate existing ICs and assess whether additional ICs are needed to ensure long-term protection.</td>
</tr>
</tbody>
</table>
The remedy for OU3 currently protects human health and the environment in the short-term because it contains groundwater that exceeds action levels and does not cause a vapor intrusion risk. However, in order for the remedy to be protective in the long-term, the following actions need to be taken: (1) When HRL is revised, modify containment compliance criteria as needed; (2) Complete FFS to further assess in-situ treatment options and consider need for ARARs waiver due to DNAPL; (3) Resample subslab and indoor air at Hagberg’s Country Market; and (4) Evaluate existing ICs and assess whether additional ICs are needed to ensure long-term protection.

Table 4: Status of Recommendations from the 2012 FYR

<table>
<thead>
<tr>
<th>OU #</th>
<th>Issue</th>
<th>Recommendations</th>
<th>Current Status</th>
<th>Current Implementation Status Description</th>
<th>Completion Date (if applicable)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OU1</td>
<td>1. Insufficient tracking of new wells requiring GAC systems</td>
<td>Develop a tracking system for notification of MPCA/MDH for GAC system installation and system performance in post-2002 homes</td>
<td>Completed</td>
<td>MDH tracks sampling and GAC installation for new wells in a database created in 2006. Since the last FYR, MPCA has requested tracking results from MDH. (See additional detail in the ICs section of this FYR.)</td>
<td>10/30/2006</td>
</tr>
<tr>
<td>OU1</td>
<td>2. Additional private wells will need treatment if HRL is revised</td>
<td>Identify additional wells with TCE exceeding new HRL; assess need for interim protective measures; install GAC treatment; modify ROD as needed</td>
<td>Completed</td>
<td>MDH finalized the HRL revision in December 2015. MPCA completed installation of GAC for private wells that exceeded the new HRL on April 25, 2016.</td>
<td>4/25/2016</td>
</tr>
<tr>
<td>OU1</td>
<td>3. Current groundwater remedy has not been demonstrated as sufficient to reach MCLs throughout plume (e.g., Monitored Natural Attenuation)</td>
<td>Complete FFS; modify remedy as appropriate</td>
<td>Completed</td>
<td>MPCA completed a FFS for OU1 in June 2013 and determined that the current remedial approach remains the best alternative. Monitoring suggests that the hydraulic barrier has substantially reduced TCE concentrations in the downgradient plume and in-situ treatment has reduced concentrations in the source zone. (See additional detail below.)</td>
<td>6/30/2013</td>
</tr>
<tr>
<td>OU2</td>
<td>4. Increasing TCE trend in Bayport Municipal Wells #3 and #4 may require treatment in five years, or sooner if MCL is lowered.</td>
<td>Monitor TCE concentration relative to MCL and develop action plan for future protection</td>
<td>Completed</td>
<td>MPCA modified the OU2 remedy in July 2015 to select hookup of Well #3 to the existing air stripper and continued monitoring of Well #4. Remedial Action was completed in September 2016. (See additional detail in Remedy Implementation section of this FYR.)</td>
<td>9/30/2016</td>
</tr>
<tr>
<td>OU3</td>
<td>5. Modification of HRL for TCE may affect containment compliance criteria</td>
<td>Monitor and modify compliance criteria as needed</td>
<td>Ongoing</td>
<td>MDH finalized revised HRL in December 2015. Need for re-start of containment system currently based on trends in treatment area. (See</td>
<td></td>
</tr>
<tr>
<td>Recommendation</td>
<td>Description</td>
<td>Status</td>
<td>Additional Information</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------</td>
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<td>------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>OU3 6. In-situ treatment not yet fully implemented.</strong></td>
<td>Complete FFS to further assess in-situ treatment and consider need for ARAR waiver due to DNAPL.</td>
<td>Ongoing</td>
<td>FFS completed June 2013 documented no evidence of DNAPL. ESD signed July 2015 clarified interim cleanup goals. Two phases of treatment completed. (See additional detail in Data Review section of this FYR.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>OU3 &amp; OU1 7. Vapor intrusion risk needs updating</strong></td>
<td>Resample subslab and indoor air at Hagberg’s Country Market; re-evaluate VI risk throughout plume if conditions change.</td>
<td>Completed</td>
<td>Additional sampling at Hagberg’s confirmed current lack of risk; however, vapor mitigation system installed as a precautionary measure in May 2016 prior to Phase 2 treatment of source area. Vapor risk study for other potential areas of plume completed and confirmed lack of risk. (See additional detail below.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>OU3 8. Potential redevelopment could result in unacceptable exposures to vapor intrusion</strong></td>
<td>Assess need for additional ordinances</td>
<td>Ongoing</td>
<td>Groundwater data show an area downgradient of the source area that may present a vapor intrusion risk if redeveloped without controls in place. MPCA plans to discuss this with the City of Lake Elmo. (See additional detail in IC section of this FYR.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Site-wide 9. IC review needed to ensure effective ICs are in place and long-term stewardship is conducted</strong></td>
<td>Prepare Institutional Controls Implementation and Assessment Plan</td>
<td>Considered But Not Implemented</td>
<td>MPCA, MDH, and local units of government coordinate regularly to ensure that ICs remain in place and are effective. MPCA, the lead agency implementing the remedy, determined that an Institutional Controls Implementation and Assessment Plan was not needed because its elements are already included in ongoing practice at the site, as described in the IC section of this FYR.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Supplemental information about the current implementation status of several recommendations is presented below.

**Recommendation 3**

In a FFS completed in June 2013, MPCA re-evaluated alternatives for supplying clean drinking water to rural residents affected by the Site. Alternatives evaluated by MPCA included continued treatment for individual homes using GAC treatment implemented through several different contracting mechanisms, and construction of a rural community water treatment and delivery system to replace treatment in individual homes. In the FFS, MPCA concluded that the current remedy and implementation method remains the best alternative. The FFS noted administrative concerns and high costs associated with implementation of a rural community water system.

The FFS did not include further evaluation of natural attenuation of the plume because source area treatment is not yet complete. Although mechanisms of monitored natural attenuation have not been demonstrated for the Site, continued groundwater monitoring suggests that contaminant concentrations are in general decreasing, as discussed in the Data Review section of this FYR.
Recommendation 4

In 2014, MPCA conducted a FFS to evaluate alternatives to address the City of Bayport Wells #3 and #4. The goal of the FFS was to evaluate alternatives to prevent exposure to the public from TCE contaminated municipal water with TCE concentrations exceeding the Federal MCL, State HRL or State HBV. In 2015, with the support of the City and funding from the State, MPCA added conveyance piping to connect Well #3 to the existing air stripper. The treatment goal for the air stripper currently is 0.2 µg/L TCE, which is 50 percent of the HBV for TCE (0.4 µg/L) and well below the MCL of 5 µg/L. At the same time, MPCA performed upgrades on Well #3 to facilitate conveyance, modified the air stripper system to accommodate the additional water, and installed a backup generator for the air stripper.

Recommendation 7

A building overlying the source area is occupied by several small businesses, including Hagberg’s Country Market. MPCA conducted additional subslab and indoor air testing for the building in 2015 and it is regularly re-tested. Results confirm the presence of volatile contaminants in the some subslab samples at levels above screening levels; however, no volatile contaminants are detected in indoor air. Due to a concern that ERD treatment of groundwater beneath the building could cause vapor intrusion risk, in June 2015, MPCA installed a sub-slab depressurization system for the building.

In 2015, MPCA conducted a vapor intrusion assessment for an area in the City of Bayport and an area near the Lake Elmo Airport where historical groundwater data indicated a potential vapor intrusion risk for residents. Soil gas sampling conducted in December 2015 included 16 monitoring points distributed throughout the identified area of the City of Bayport and two monitoring points near two residences adjacent to the Lake Elmo Airport. The sampling showed that a variety of volatile contaminants were present in the soil at very low levels, as is common in many developed areas; however, none of the contaminants exceeded MPCA or EPA health-based screening levels based on potential cancer and non-cancer risk for residential properties.

IV. FIVE-YEAR REVIEW PROCESS

Community Notification and Involvement

A public notice entitled EPA Begins Review of Baytown Township Groundwater Plume Superfund Site was published in the St. Paul Pioneer Press on January 15, 2017, stating that there was a FYR and inviting the public to submit comments to EPA. No comments were received as a result of the notice. The results of the review and the report will be made available at the offices of MPCA located at 520 Lafayette Road North, St. Paul, Minnesota and on MPCA’s and EPA’s websites.

During the FYR site inspection, the site team met with the owner of Hagberg’s Country Market and discussed the Site. A concern was raised about the placement of one of the vapor system pipes in the building. The pipe may interfere with plans for new market equipment. MPCA is following up with its contractor to address the concern.
Data Review

OU1

GAC Treatment

The enforceable standard for TCE in private drinking water, and the ARAR documented in the modified ROD for these wells, is the HRL of 0.4 μg/L. As of December 2016, GAC treatment is operating in approximately 356 homes with well water that exceeded the HRL for TCE. Of these, 332 were installed by MPCA and 24 were installed by homeowners. This is a substantial increase over the 180 GAC systems reported at the time of the last FYR. Many of the additional GAC systems were installed in response to the lowering of the HRL for TCE in private drinking water wells. In addition, the number reported in the last FYR did not include systems installed by homeowners.

In earlier years, a few residential wells slightly exceeded the HRL for CCl₄ and GAC systems were installed in those homes. However, the level of CCl₄ decreased over time and currently no homes have exceedances of the HRL.

Review of data tracked by MPCA and presented in annual reports indicates no evidence of exposure to TCE above the HRL in private drinking water wells monitored for the Site. The GAC remedy appears to be performing as intended to protect residents. However, there is a need to confirm this for systems installed by homeowners who did not report recent sampling or changeout in response to township ordinances. This is discussed further in the ICs section of this FYR and is included as a recommendation in the Recommendations section of this FYR.

Plume Boundaries

For this FYR, EPA and MPCA evaluated overall plume stability and trends in TCE concentration in all affected aquifers. Site-related groundwater contamination affects the shallow unconsolidated aquifer (Drift) and three deeper aquifers used for drinking water at the Site (Prairie du Chien, Jordan and Tunnel City aquifers). Groundwater contamination in the Drift aquifer is primarily present near the source area and is discussed under OU3 below. Through most of the rest of Site, groundwater contamination is present mainly in the Prairie du Chien and Jordan aquifers. The Prairie du Chien and Jordan aquifers are sources of drinking water for many private residences at the Site. There is little confining material between the two formations and, for the purpose of the FYR, they are analyzed together. Near the St. Croix River, where the Prairie du Chien and Jordan formations have largely been eroded away, the plume is present in the Tunnel City aquifer. The Tunnel City aquifer is the source of drinking water for the City of Bayport. Figure 3 shows a general cross-section of aquifers at the Site.

A map showing the location of the boundary of the TCE plume that exceeds a concentration of 0.4 μg/L TCE in the Prairie du Chien and Jordan aquifers from the most recent data (2014 to 2016) is shown in Figure 4. For this FYR, plume boundaries in these aquifers were compared to 2011 data and found to be predominantly stable. (The definition of the plume changed, due to the change in HRL for TCE in 2015, but the plume itself did not change significantly.) An example of how the plume boundary is delineated is shown in Figure 5, a detailed map of sampling locations in the Jordan aquifer showing 2015 to 2016 data.

A map showing the location of the contaminated groundwater plume in the Tunnel City aquifer in 2015 (most recent mapped data) is shown in Figure 6. Through most of the period of this FYR, the area of the plume near the City of Bayport that exceeds the MCL continued to expand eastward, leading to the need to treat an additional municipal well. This is discussed further under OU2 below.
At its eastern boundary, groundwater from the Tunnel City aquifer discharges to the St. Croix River. Pre-treatment monitoring data from the wells closest to the river, City Wells #3 and #4, show that TCE concentrations in this part of the aquifer range from 2 to 4 μg/L (see Table 4 below). The State of Minnesota designates the St. Croix River as an Outstanding Resource Value Water - restricted use, with a surface water quality chronic standard for TCE of 5 μg/L. Based on the data from City Wells #3 and #4, the current discharge of the plume to the river appears to be below the current chronic surface water quality standard for TCE. However, pre-treatment monitoring data from Well #2, only slightly further from the river, show TCE concentrations up to approximately 9 μg/L. Therefore, the possibility of an exceedance in the future has been added to the Issues and Recommendations section of this FYR.

**Groundwater Trends**

For this FYR, EPA and MPCA compared TCE concentrations in wells monitored at the Site that had consistent detections of TCE in the Prairie du Chien, Jordan, and Tunnel City aquifers during approximately the last five years. A comparison of changes in TCE concentrations for the 24 Prairie du Chien wells with consistent TCE detections shows a mean decrease in TCE concentration of 4.4 μg/L. For the 22 Jordan aquifer wells with consistent detections, there was overall no significant change in TCE concentration. Prairie du Chien wells are in general more highly contaminated than Jordan wells. Twenty-one of 24 Prairie du Chien wells had TCE concentrations greater than ten times the HRL (i.e., more than 4 μg/L TCE, a level approaching the MCL of 5 μg/L). Only five of 30 Jordan wells had TCE concentrations greater than 10 times the HRL.

Four Tunnel City wells showed increased concentrations during the period of the FYR, including several City of Bayport municipal wells, discussed further under OU2 below. However, three Tunnel City wells with decreases in TCE concentration are located up-gradient of the municipal wells, which suggests that concentrations may be expected to stabilize or decrease in the Tunnel City aquifer in the coming years.

Overall at the Site, TCE concentrations in the Prairie du Chien aquifer are generally decreasing, and concentrations in the Jordan and Tunnel City aquifers are generally stable. This is consistent with a conceptual site model of slow aquifer recovery.

**OU2**

The City of Bayport reports the results of pre- and post-treatment groundwater sampling for its municipal wells to MPCA and MDH. The enforceable standard, and the ARAR documented in the ROD, for the municipal drinking water wells is the MCL; however, MPCA and MDH recommend that municipal drinking water also meet the HRL for TCE. The MCL for TCE is 5 μg/L and the HRL is 0.4 μg/L.

Sampling results for the City of Bayport wells show that untreated groundwater pumped from Well #2 continues to be contaminated with TCE at concentrations above both the MCL and the HRL. Before treatment, groundwater pumped from Well #3 also exceeds the HRL but remains slightly below the MCL, although concentrations are increasing. These two wells are treated with air stripping, in addition to standard treatment. After treatment, TCE is not detected in drinking water from either well. The air stripper treatment system is performing as required. Well #4 is not connected to the air stripper. TCE is present in samples from this well at concentrations below the MCL but above the HRL. As explained in the Status of Implementation section of this FYR, the City uses Well #4 for emergency backup use only.

The table below provides a summary of the TCE concentrations in each of the Bayport municipal wells during the last five years, and the post-treatment results.
Table 1 – Bayport Municipal Well Sampling Results for TCE (µg/L)

<table>
<thead>
<tr>
<th>Date Collected</th>
<th>Well #2 Before Treatment*</th>
<th>Well #3 Before Treatment*</th>
<th>Well #4 Before Treatment**</th>
<th>Post-Air Stripper (Wells #2 &amp; #3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/19/2012</td>
<td>8.3</td>
<td>3.2</td>
<td>2.4</td>
<td>Non-detect</td>
</tr>
<tr>
<td>5/3/2012</td>
<td>9.0</td>
<td>3.1</td>
<td>2.5</td>
<td>Non-detect</td>
</tr>
<tr>
<td>7/24/2012</td>
<td>8.3</td>
<td>3.7</td>
<td>2.4</td>
<td>Non-detect</td>
</tr>
<tr>
<td>10/18/2012</td>
<td>8.1</td>
<td>3.1</td>
<td>2.1</td>
<td>Non-detect</td>
</tr>
<tr>
<td>1/29/2013</td>
<td>8.2</td>
<td>3.2</td>
<td>1.9</td>
<td>Non-detect</td>
</tr>
<tr>
<td>4/8/2013</td>
<td>7.7</td>
<td>2.8</td>
<td>2.3</td>
<td>Non-detect</td>
</tr>
<tr>
<td>7/11/2013</td>
<td>8.1</td>
<td>1.7</td>
<td>Non-detect</td>
<td></td>
</tr>
<tr>
<td>12/30/2013</td>
<td>7.1</td>
<td>3.3</td>
<td>1.4</td>
<td>Non-detect</td>
</tr>
<tr>
<td>2/11/2014</td>
<td>8.6</td>
<td>3.7</td>
<td>1.8</td>
<td>Non-detect</td>
</tr>
<tr>
<td>4/22/2014</td>
<td>6.5</td>
<td>2.3</td>
<td>1.2</td>
<td>Non-detect</td>
</tr>
<tr>
<td>7/23/2014</td>
<td>7.7</td>
<td>4.2</td>
<td>2.4</td>
<td>Non-detect</td>
</tr>
<tr>
<td>11/4/2014</td>
<td>7.4</td>
<td>3.8</td>
<td>2.2</td>
<td>Non-detect</td>
</tr>
<tr>
<td>1/12/2015</td>
<td>7.5</td>
<td>3.6</td>
<td>2.3</td>
<td>Non-detect</td>
</tr>
<tr>
<td>5/6/2015</td>
<td>6.8</td>
<td>3.4</td>
<td>2.2</td>
<td>Non-detect</td>
</tr>
<tr>
<td>7/21/2015</td>
<td>8.1</td>
<td>4.1</td>
<td>2.5</td>
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</tr>
<tr>
<td>11/19/2015</td>
<td>8.3</td>
<td>3.8</td>
<td>2.2</td>
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</tr>
<tr>
<td>2/18/2016</td>
<td>8.9</td>
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</tr>
<tr>
<td>5/17/2016</td>
<td>--</td>
<td>3.8</td>
<td>2.9</td>
<td>Non-detect</td>
</tr>
<tr>
<td>7/12/2016</td>
<td>7.8</td>
<td>3.7</td>
<td>--</td>
<td>Non-detect</td>
</tr>
<tr>
<td>11/9/2016</td>
<td>7.6</td>
<td>3.8</td>
<td>--</td>
<td>Non-detect</td>
</tr>
</tbody>
</table>

* Wells #2 and #3 receive air stripper and conventional treatment.
** Well #4 receives conventional treatment only.

The data above suggest that TCE concentrations in Well #2 and Well #3 have likely stabilized, but this is less clear for Well #4. It is possible that portions of the plume are continuing to expand near Well #4 (see Figure 6 for well locations).

OU3

The extraction wells were shut down during in-situ treatment in order to improve treatment effectiveness and avoid fouling of the wells.

Two phases of full-scale in-situ treatment were performed at the source area during the period of this FYR. For Phase 1, MPCA used ISCO treatment for the main source area and ERD treatment for the southern source area. For ISCO in the main source area, MPCA’s contractor injected sodium permanganate at 28 temporary injection points. Twenty-two of the injection points were located near and beneath the commercial building and were conducted at depths from 35 to 55 feet. The remaining six injection points were located just downgradient, at depths between 45 and 80 feet. MPCA’s contractor conducted ERD treatment in the southern source area by injecting emulsified vegetable oil (EVO) at 17 points. The EVO injection points were located at depths between 46 and 70 feet, in an area south of the commercial building and separated from the ISCO treatment area by a buffer zone. The use of two different treatment methods allowed MPCA to evaluate the effectiveness of both, while avoiding potential vapor issues for the commercial building that might be caused by ERD.

Monitoring results following Phase 1 treatment indicated that TCE concentrations decreased as a result of both treatment methods; however, TCE concentrations in the ISCO area rebounded significantly, likely due to additional desorption of TCE from soil into groundwater. The hydraulic barrier was restarted in mid-February 2016 to control the rebound. The ERD treatment
resulted in sustained decreases in TCE concentration, and corresponding increases in cis-dichloroethene and vinyl chloride, suggesting biological degradation of TCE in the ERD treatment area. Following data review, MPCA determined that ERD treatment alone should be used for Phase 2.

MPCA’s contractor conducted Phase 2 of source area treatment in May 2016 using injections of a lactate-EVO mixture for ERD treatment at 27 injection points. Treatment results to date varied across the source area, but were generally positive. As documented in the ESD, MPCA’s interim goal for source area treatment is to reduce TCE concentrations at the eastern Hagberg property boundary to 25 µg/L or less. MPCA chose this interim goal as a concentration that may allow natural attenuation of the downgradient plume to concentrations below the MCL and HRL within a reasonable time period.

Recent sampling results for the source area are shown on Figure 7. Results to date indicate that the interim treatment objective for TCE (25 µg/L) has been achieved in more than half of the source area monitoring locations (13 of 21 locations.) In addition, the MCL (5 µg/L) has been achieved at about one quarter of the locations (approximately 6 of 21 locations) and the HRL (0.4 µg/L) has been achieved at two locations (RW-4 and MW-27.) In addition, two of three monitoring wells located approximately 800 feet downgradient have achieved the interim treatment goal (MW-39 and MW-40) and an additional monitoring well located further downgradient (MW-10B) is also beginning to show a decline in TCE, although results remain several orders of magnitude above the HRL.

As of January 2017, the hydraulic barrier system remains shut down because TCE concentrations continue to decrease as a result of the treatment. If the extraction wells were restarted, it would decrease the residence time of treatment residuals. MPCA continues to monitor treatment results and plans to keep the barrier system shut down as long as treatment continues to lower the TCE concentration; however, written re-start criteria should be developed. This has been added to the Recommendations section of this FYR.

Vapor Intrusion Summary

During the period of this FYR, periodic sub-slab and indoor air monitoring for the commercial building (Hagberg’s Country Market) overlying the source area confirmed the lack of a complete vapor pathway. However, in 2015, MPCA installed a vapor mitigation system as a precaution against potential contaminant vapors being released during ERD treatment. The system is monitored regularly.

Also in 2015, MPCA investigated potential vapor intrusion risk in other areas of the Site with the most potential for vapor intrusion risk. Two soil gas surveys, one located in the City of Bayport and one area located near Lake Elmo Airport, found very low levels of several volatile contaminants, as is common in many developed areas. However, the sampling confirmed that none exceeded MPCA or EPA health-based screening levels for residential properties.

There may be a potential future vapor intrusion risk for an area down-gradient of the source area that is currently in agricultural use. This is discussed further in the IC Section of this FYR and is included in the Issues and Recommendations section.

Site Inspection

The inspection of the Site was conducted on January 4, 2017. Appendix C contains inspection photographs. Leah Evison, representing EPA, and Eric Pederson, Kurt Schroeder and Mark Elliott, representing MPCA, conducted the inspection. The purpose of the inspection was to assess the protectiveness of the remedy.
At the source area, the group inspected the vapor pressure manometers installed for the sub-slab vapor mitigation system at Hagberg’s Country Market. At the time of the inspection, five of six suction ports showed a negative pressure differential as desired. MPCA discussed the one inactive suction port with its contractor, who explained that it is designed to draw air from a pit beneath the building and is to be turned on if methane is detected during periodic monitoring. The suction port was inactive due to the lack of methane.

The inspection team also observed select monitoring wells and well-heads for the extraction well system which were found to be in good condition. The exterior of the air stripper treatment plant in Bayport was also viewed and found to be in good condition. The treatment equipment is inspected regularly by the City and was not included in the FYR inspection because data have consistently shown good water treatment results, as discussed above. Likewise, individual GAC systems in homes were not inspected for this FYR because this is done regularly by MPCA and its contractor.

The Site inspection confirmed the protectiveness of the remedy and no issues impacting current and/or future protectiveness were observed during the inspection.

V. TECHNICAL ASSESSMENT

QUESTION A: Is the remedy functioning as intended by the decision documents?

Yes.

Question A Summary:

The remedy is functioning as intended by the decision documents. Treatment remedies for private wells throughout the Site and for municipal wells in the City of Bayport are protecting residents from exposure to contaminated groundwater. Treatment of the source area is ongoing and appears to be working. The downgradient plume is generally stable and concentrations on the whole are slightly decreasing. ICs in the form of informational and governmental controls are in place for the Site. A recommendation to develop and implement LTS procedures has been added to this FYR to ensure ICs remain in place and are effective. MPCA and MDH are discussing whether the SWBCA should be expanded or other procedures should be put in place to address several small areas of the plume that extend beyond the SWBCA boundary. MPCA and MDH also plan to request meetings with the boards of affected townships to discuss means to improve compliance with township ordinances.

QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

Yes.

Question B Summary:

The exposure assumptions and toxicity data used at the time of selection of the modified remedy are still valid. The ROD does not establish final cleanup levels for groundwater, but does include a site-wide RAO of achieving drinking water standards. MPCA uses current HRLs, which are lower than MCLs for the contaminants present at the Site, for action levels at the Site. RAOs...
used at the time of remedy selection are still valid and no new exposure pathways have been identified. A vapor mitigation system has been installed for the building located at the source area, and soil gas surveys have confirmed the lack of vapor intrusion risk in other areas most likely to present unacceptable risk. One area of potential future vapor risk is addressed in the Issues and Recommendations section of this FYR.

QUESTION C: Has any other information come to light that could call into question the protectiveness of the remedy?

No.

Question C Summary:

No other information has come to light that could call into question the current protectiveness of the remedy; however, the distal portion of the groundwater plume discharges to the St. Croix River and an annual comparison to chronic surface water quality criteria is needed to document future protectiveness. This has been added as a recommendation below.

VI. ISSUES/RECOMMENDATIONS

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<thead>
<tr>
<th>OU(s) without Issues/Recommendations Identified in the Five-Year Review:</th>
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<tbody>
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<tr>
<th>OU1</th>
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<tbody>
<tr>
<td><strong>Issue</strong>: The current plume boundary extends outside of the SWBCA in several locations.</td>
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<tr>
<td><strong>Recommendation</strong>: Expand the SWBCA or establish written procedures to provide equivalent safeguards for an interim period while the plume boundary is further monitored.</td>
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<td><strong>Issue</strong>: Compliance issues with Township ordinances and State seller notification requirements have been noted.</td>
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<td><strong>Recommendation</strong>: Encourage townships to institute actions to improve compliance with ordinances and notification requirements.</td>
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<tr>
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<tr>
<td><strong>Issue</strong>: LTS procedures are needed to ensure that effective ICs are monitored, maintained and enforced.</td>
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<td><strong>Recommendation</strong>: Develop and implement a LTS plan which includes procedures for monitoring and tracking compliance with existing ICs, communicating with EPA, and providing an annual certification to EPA that the ICs remain in place and are effective.</td>
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<tr>
<td><strong>Issue</strong>: A comparison of distal plume groundwater data to surface water quality criteria is not routinely performed.</td>
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<td><strong>Recommendation</strong>: Compare distal plume groundwater data to surface water quality criteria annually.</td>
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<td><strong>Issue</strong>: Undeveloped area immediately downgradient of source area is included in a long-range plan for potential residential development and may present a future vapor intrusion risk.</td>
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<tr>
<td><strong>Recommendation</strong>: Evaluate potential for vapor intrusion risk and assess need for City of Lake Elmo IC to require vapor mitigation if area immediately downgradient of source area is developed, and implement IC if needed.</td>
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OU3

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<tr>
<td>Issue: ROD does not include a final cleanup goal for source-area groundwater.</td>
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<td>Recommendation: Following additional monitoring, and additional treatment if needed, select a final cleanup goal for source area groundwater.</td>
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<th>Issue Category: Remedy Performance</th>
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<tr>
<td>Issue: Re-start criteria for the hydraulic barrier system following treatment are unclear.</td>
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<td>Recommendation: Clarify re-start criteria for the hydraulic barrier system.</td>
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VII. PROTECTIVENESS STATEMENT

Operable Unit: OU1

Protectiveness Statement:
The remedy at OU1 currently protects human health and the environment because affected residential wells are receiving GAC treatment and ICs are in place and generally effective. However, in order for the remedy to be protective in the long-term, the following actions need to be taken to ensure protectiveness: expand the SWBCA or establish written procedures to provide equivalent safeguards for an interim period while the plume boundary is further monitored, encourage townships to institute actions to improve compliance with ordinances and notification requirements, develop and implement a LTS Plan, and compare distal plume groundwater data to surface water quality criteria annually.

Operable Unit: OU2

Protectiveness Statement:
The OU2 remedy at OU2 is protective of human health and the environment. Municipal drinking water is being effectively treated and RAOs continue to be met.
Operable Unit: OU3

Protectiveness Statement:
The remedy at OU3 currently protects human health and the environment because source area groundwater is receiving in-situ treatment, a hydraulic barrier system is in place and available if needed, and a vapor intrusion mitigation system is operating in the on-Site building. However, in order for the remedy to be protective in the long-term, the following actions need to be taken to ensure protectiveness: evaluate potential for vapor intrusion risk and assess need for City of Lake Elmo IC to require vapor mitigation if area immediately downgradient of source area is developed, and implement IC if needed; following additional monitoring, and additional treatment if needed, select a final cleanup goal for source area groundwater; and clarify re-start criteria for the hydraulic barrier system.

Site-wide Protectiveness Statement

Protectiveness Statement:
The remedy at the Site currently protects human health and the environment because affected residential and municipal drinking water wells are being treated, source-area groundwater is being treated, a vapor intrusion mitigation system is operating in a source-area building, and ICs for groundwater are in place and generally effective. However, in order for the remedy to be protective in the long-term, the following actions need to be taken to ensure protectiveness: expand the SWBCA or establish written procedures to provide equivalent safeguards for an interim period while the plume boundary is further monitored; encourage townships to institute actions to improve compliance with ordinances and notification requirements; evaluate potential for vapor intrusion risk and assess need for City of Lake Elmo IC to require vapor mitigation if area immediately downgradient of source area is developed, and implement IC if needed; develop and implement a LTS Plan; compare distal plume groundwater data to surface water quality criteria annually; select a final cleanup goal for source area groundwater; and clarify re-start criteria for the hydraulic barrier system.

VIII. NEXT REVIEW

The next FYR report for the Baytown Township Groundwater Plume Superfund Site is required no less than five years from EPA’s signature date of this review.
APPENDIX A – REFERENCE LIST

Record of Decision for Baytown Township Groundwater Contamination Site, MPCA, May 25, 2000

Record of Decision Amendment for Baytown Township Groundwater Contamination Site, MPCA, July 13, 2007

Explanation of Significant Differences for Baytown Township Groundwater Contamination Site, MPCA and EPA, July 21, 2015

Final Annual Reports 2012 through 2015, Terracon Consultants, Inc.

Design Report, Bayport - Well No. 3 Conveyance and TCE Treatment, AECOM, June 30, 2015

Second Five Year Review, Baytown Township Groundwater Contamination Site, MPCA and EPA, March 29, 2012

Figure 1. Site Location

(Dotted line shows location of >0.4 μg/L TCE plume in unconsolidated aquifer; blue dashed line shows location of same boundary in Prairie du Chien aquifer.)

City of Lake Elmo
Source Area
City of Bayport
Figure 2. Institutional Controls Map

(Dashed line shows location of >0.4 µg/L TCE plume in bedrock aquifers.)
Figure 3. Geologic Cross-section
(Source area to left, City of Bayport and St. Croix River to right)
Figure 4. Plume Boundary in Prairie du Chien and Jordan Aquifers  
(Based on exceedances of 0.4 μg/L TCE in 2016)
Figure 5. Boundary Delineation Detail

(Showing sampling locations from 2015 to 2016 in the Jordan aquifer. Red, yellow and green locations exceed HRL of 0.4 ug/L TCE; blue locations do not)
Trichloroethylene (TCE) Groundwater Concentrations in the Tunnel City Aquifer, Baytown Superfund Site, Washington County, Minnesota, 2015

Figure 6. TCE Concentrations in Tunnel City Aquifer (2015)

(Red and yellow locations exceed both MCL and HRL for TCE; green locations exceed HRL but not MCL; blue locations do not exceed HRL or MCL)
Figure 7. TCE Concentrations in Source Area Groundwater (2017)
(see Annual Report for additional information)
APPENDIX C – SITE INSPECTION PHOTOS
Building housing the source area air stripper (used to treat extracted source area groundwater; currently inactive to improve in-situ treatment effectiveness)

Monitoring wells along east edge of source area; view north

Source area extraction well (currently inactive to improve treatment effectiveness)

View east from source area (agricultural fields and homes along Manning Avenue)
City of Bayport treatment system building near Well #2

Vapor system monitor at building overlying source area, showing inactive pressure differential (currently unused port)

Vapor system monitor at building overlying source area, showing active pressure differential
Related Topics: Envirofacts

FRS Facility Coordinates

BAYTOWN TOWNSHIP GW CONTAMINATION SITE
SEE LOCATION DESCRIPTION LAKE ELMO, MN 55042 UNITED STATES
FRS Registry ID: 110020699975

Facility Registry Service Links:
- Facility Registry Service (FRS) Overview
- FRS Facility Query
- FRS Organization Query
- EZ Query
- FRS Physical Data Model
- FRS Geospatial Model

List of Facility Coordinates

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Last updated on September 24, 2015
Appendix K. Interview Memorandums
Brad and I had a discussion about the airport history and any previously known potentially hazardous materials that may impact or be impacted by proposed project activities. Specific questions discussed were as follows:

- Groundwater contamination – do they truck in water? Anything known about the site at all? Monitoring wells on site? Don’t expect to encounter, but vapor intrusion?

Brad indicated his knowledge of the groundwater contamination is that it’s not from the airport but from a metal working business and/or drycleaner located off-site nearby (This is consistent with research). Brad indicated there are groundwater monitoring wells on the airport and once a year, samples are taken from these (by a third party) and the airport is provided a copy of the reports.

- Valters Aviation Building – confirm location of tank on site.

As far as he knows, their only tank is an in-ground storage tank that’s visible on the terminal ramp and it’s not diesel since they don’t carry that. Not sure what’s inside, but believes it to be general airport maintenance and cleaning supplies and chemicals.

- Valters original location to east? Did they ever put a tank in the ground there?

Valters never did any other building. They used to own another hanger which was storage but it’s been sold.

- Former maintenance building (1970’s) in southwest corner accessed from 30th Street. - any tank there, previously?

This area was referred to as the Holiday Hangar as it’s a hangar building currently used by Mark Holiday. There was another FBO at this location previously and it is unknown if there was ever underground fuel at this facility. Previously, this hanger building was owned by Mark Holiday’s father and he did some maintenance out of it. Mark would be the best contact to determine the history of the site.
Other

There used to be another maintenance building to the north-northwest of the current maintenance building. A 1980’s tornado pretty much wiped that out. Brad did not know if there was fuel storage of any kind there. Mayer Aviation was previous FBO on site. The building is gone but the pad is visible to the northwest of the current maintenance on site. The space is currently used as storage for snow plows and commodities like salt, gravel, etc.
I spoke with Nick Krueger regarding the Hangar 27E site. Nick indicated at the time of purchase of the hangar, he was required to register with the EPA and Minnesota Pollution Control Agency as a one-time generator of hazardous waste in order to have two 90 gallon containers of phosphoric acid (aluminum aircraft part surfacing materials) removed and disposed of by Safety Clean, a hazardous waste disposal company.

Nick was unaware of any additional potentially hazardous materials sites but did indicate Valter’s Aviation previously attempted to build a well on site at a former location east of their current building but were unsuccessful because of groundwater contamination. In addition, Nick indicated the current Valter’s building contains signs that the water on site is not potable and that the fire department did or does truck in water for an onsite storage tank to be used on site. The groundwater contamination is consistent with other database search results reviewed for the Airport.
# Appendix I – Wildlife Hazard Site Visit Documentation &
USDA-APHIS Correspondence

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<td>USDA-APHIS Wildlife Services Letter</td>
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<td>January 3, 2018</td>
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<tr>
<td>Wildlife Field Survey Letter Report</td>
<td>I-2 thru I-7</td>
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January 3, 2018

Mr. R. Evan Barrett, AICP
Mead & Hunt, Inc.
257900 West 78th Street, STE 370
Minneapolis, MN 55439

Dear Mr. Barrett,

This letter is in response to your request to examine the potential wildlife hazards related to the proposed runway realignment and lengthening at Lake Elmo Airport (21D), Lake Elmo, Minnesota.

After reviewing the provided documents (USDA APHIS Letter 11.06.2017, Figure 3-10.PDF) and discussion, the proposed changes to the existing airport layout are unlikely to increase the wildlife hazards present at 21D. The changes proposed would have little effect on current hazardous wildlife use of the airport and surrounding area.

Feel free to contact the USDA Wildlife Services office at 651-224-6027 if you have any questions concerning these recommendations.

Sincerely,

[Signature]

Alan K. Schumacher
Wildlife Biologist

cc:
G. Nohrenberg, USDA-WS, St. Paul, MN
L. Bridges, Mead & Hunt, Minneapolis, MN
November 6, 2017

Mr. Alan K. Schumacher, Wildlife Biologist
USDA- Wildlife Services
644 Bayfield Street, STE. 215
Saint Paul, MN 55107

RE: Lake Elmo Airport (21D) Wildlife Attractants

Dear Mr. Schumacher,

Mead & Hunt is conducting an Environmental Assessment (EA) for airfield improvements at Lake Elmo Airport in Lake Elmo, Minnesota, on behalf of the Metropolitan Airports Commission (MAC). The proposed project would relocate the primary runway (Runway 14/32) to the northeast and increase the runway length from 2,849 feet to 3,500 feet, as shown in the attached Figure 1. It would also extend the crosswind runway (Runway 04/22) from 2,496 to 2,750 feet.

We would like to request your concurrence with our opinion of potential impacts related to hazardous wildlife associated with this project, which is detailed in this letter. Please review the following and provide your opinion regarding the validity of these findings, for inclusion as an appendix to the EA document.

Introduction
Two multiple day field surveys were completed related to wildlife habitat at Lake Elmo Airport. The first occurred in June 2017 to identify and delineate wetlands, and the second occurred in October 2017 to observe and characterize wildlife attractants. A variety of plant and animal species were identified within the proposed action area (see Figure 1) including insects, arachnids, birds, mammals, amphibians, and wetland and upland vegetation.

Birds identified in June 2017 included but were not limited to: American crow, red-winged blackbirds, blue jay, chickadee, vireo, swifts/swallows, and multiple sparrow species. One female white-tailed deer was observed and photographed. Frogs were observed in wetland areas. The wetland vegetation is well documented in wetland data sheets and a related wetland delineation and functional assessment report. The location of wetlands delineated during this visit are shown in Figure 2. Upland herbaceous vegetation was dominated by Kentucky bluegrass, alfalfa, red clover, dandelion, oxeye daisy, yarrow, thistle and plantains. Areas with these dominant plants are frequently mowed and maintained.

Wildlife attractants and birds observed in October 2017 included the American crow (4), eastern wood-pewee (12), Canada goose (400+) continuous morning flights traveling south to north, blue jay (5) and...
approximately 300 red-winged blackbirds. Survey points (see Figure 3) were selected based on the ability to observe 90 percent or more of the airfield.

Wildlife Attractants
Attractants on the airport include agricultural land and wetlands. Approximately 300 acres on the airport are leased for farming with soybean and/or corn on a rotating basis. Grass/Alfalfa hay is also harvested onsite in areas not planted with corn or soybeans. During wet periods of the year the wetlands located onsite support ducks, shorebirds, passerines and wildlife that are dependent on wetland habitats.

The area to be impacted by the runway extension includes approximately 40 acres of land currently in agricultural production. Thus from a wildlife attractant perspective there would be approximately 40 fewer acres of wildlife habitat at the airport following implementation of the project.

Wildlife currently observed at the airport as reported by Airport staff include deer, birds, and other wildlife. Conversation with Airport maintenance staff (Mr. Brad Lavala) in September 2017 indicated that deer have been observed on the airport, and that Canada geese are increasing in numbers due to suburban development near the airport, which includes a new stormwater detention pond and open space.

Mr. Lavala also indicated that most wildlife strikes during his tenure at the airport have been sparrows (seed eaters) and barn swallows (insect eaters) that nest in or near the hangars. Strike data recorded by Mr. Lavala indicated that, over a seven year period, two or three strike events included multiple birds per strike. Other strikes recorded indicate that single birds were struck. No more than six strikes have occurred during Mr. Lavala’s tenure.

Additional wildlife observed at the airport include fox, coyote, deer, 13-lined ground squirrel (numerous), gopher, red-tailed hawk, crow, killdeer, rock pigeon, and starlings.

Other attractants near the airport include the fairgrounds approximately one mile north, which attracts Canada geese. Most deer are observed during the daylight hours and tend to congregate north and northeast of the AOA near trees. No golf courses, wastewater treatment facilities, landfills or waste transfer station are within one mile of the airport.

Fencing at the airport consists of a partial 8-foot fence that includes non-security Gate A and B. Gate A is utilized for the operations and Gate B is utilized by the FBO. There is no fence along the railroad which extends along the north side of the airport for a length of three quarters (3/4) of a mile. The east fence is overgrown and no maintenance occurs there on a regular basis. In summary approximately 50% of the AOA is fenced and 50% is unfenced. The fence that is in place is not continuous and has access opening for agricultural operations.

Mowing of the airfield turf areas and hangar lands occurs approximately three days a week and encompasses 180 acres. Some mowing is outsourced to a local entity. All mowed areas are cut to within 2 inches in height.
Project Impacts
The expansion of the airfield and associated hardscapes and safety areas will reduce habitat for birds and wildlife at the airport. However, the dislocated deer will continue to congregate near the remaining treed areas to the N-NE. Most deer adjust to manmade activity and will relocate to nearby habitat. Should the airport construct a regulation fence with barbed wire outriggers the deer would be removed from the AOA. Agricultural crops will be reduced by approximately 40 acres which will reduce potential bird strikes (sparrows and swallows) near hardscapes and associated safety areas.

The project would not reduce Canada goose strike potential other than reducing risk by eliminating approximately 40 acres of agricultural crops.

Please feel free to contact Evan Barrett at 952-941-5619 or Lou Bridges at 970-250-0135 if you should have any questions or need additional information

____________________________     _________________________
Louis J Bridges, PhD, PWS, CWB®     Evan Barrett, AICP
Senior Environmental Professional     Project Manager

Attachments
   Figure 1: Ground Disturbance area
   Figure 2: Lake Elmo Wetlands
   Figure 3: October 2017 Survey/Photo Points
Lake Elmo Airport
Runway 14-32
Photo Point Locations

LAKE ELMO AIRPORT
Proposed Runway 14-32 Runway Shift

Project Information
T29N, R20W, S18 and S19
City of Lake Elmo
Washington County, MN
Field work conducted:
October 17, 2017

Image Source: MnGEO WMS Image Service, Washington County (2016 color 7-county)
# Appendix J – Aircraft Noise Analysis Report

<table>
<thead>
<tr>
<th>Content</th>
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<tbody>
<tr>
<td>FAA AEDT Aircraft Substitution Approval Letter and Associated Request</td>
<td>J-1 thru J-4</td>
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<td>August 24, 2017</td>
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<tr>
<td>AEDT Modeling Inputs and Outputs Technical Memorandum</td>
<td>J-5 thru J-17</td>
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Dear Josh,

The Office of Environment and Energy (AEE) has received the non-standard AEDT aircraft substitutions request memo, dated August 23rd 2017 referencing the Environmental Assessment for Lake Elmo Airport (21D) in Lake Elmo, Minnesota from Mead & Hunt Inc. on behalf of the Metropolitan Airports Commission.

Listed below are the AEE responses for the requested AEDT aircraft substitutions:

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<th>Aircraft Type</th>
<th>Aircraft Description</th>
<th>Proposed AEDT ANP Substitution</th>
<th>Required AEE AEDT ANP Substitution</th>
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<td>Single Engine Piston</td>
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<td>Twin Engine Piston</td>
<td>P-68 Observer</td>
<td>PA30</td>
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Please understand that this approval is limited to this particular request for the 2017 Environmental Assessment at Lake Elmo Airport for use with AEDT 2c SP2. All other non-standard AEDT inputs for this or any other project will require separate approval.

Sincerely,

[Signature]

Rebecca Cointin
Manager
AEE-100/Noise Division

cc: Airports Contact (Frank Smigelski, Jim Byers APP-400)
August 23, 2017

Joshua Fitzpatrick, Environmental Protection Specialist  
FAA Dakota-Minnesota Airports District Office, MSP-ADO-600  
6020 28th Avenue South, Room 102  
Minneapolis, MN 55450  

CC to:  
Sean Doyle, Environmental Protection Specialist AEE-100  
FAA Office of Environment and Energy  
800 Independence Avenue SW  
Washington, DC 20591

Subject: Lake Elmo Airport – Environmental Assessment Request for AEDT Non-Standard Aircraft Substitutions

Dear Josh,

We are writing to request review and concurrence from the Federal Aviation Administration (FAA) for use of substitution aircraft noise profiles to represent aircraft types for which the Aviation Environmental Design Tool (AEDT) does not identify a standard substitution aircraft noise profile.

Environmental Assessment – Background
Mead & Hunt is conducting an Environmental Assessment (EA) for airfield improvements at Lake Elmo Airport in Lake Elmo, Minnesota, on behalf of the Metropolitan Airports Commission (MAC). The proposed project would relocate the primary runway (Runway 14/32) to the northeast and increase the runway length from 2,849 feet to 3,500 feet. It would also extend the crosswind runway (Runway 04/22) from 2,496 to 2,750 feet. The design aircraft for both runways are small aircraft with fewer than 10 passenger seats and weighing less than 12,500 pounds.

Noise Modeling – Background
Mead & Hunt will prepare AEDT noise contours for three proposed development alternatives and a no action alternative to evaluate in the EA. The proposed alternative contours represent 24,261 general aviation annual operations at the Lake Elmo Airport under a 2025 forecast scenario after the runways are extended as planned. The annual operations are distributed as follows:

- Single-Engine Piston – 22,563
- Multi-Engine Piston – 607
- Turboprop – 243
- Jet – 26
- Helicopters – 825
August 23, 2017
Mr. Josh Fitzpatrick

Based on noise contours developed by the MAC for its Long Term Comprehensive Plan, it is not expected that the 65 dB DNL contour will extend off airport property in any of the future development alternatives.

**Noise Modeling – Proposed Grouping**

Based on the MAC’s flight track system data, we have identified six aircraft types which operated at the Airport and are not available in the AEDT. We propose the following substitutions to capture those operations:

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<th><strong>Single Engine Piston NOT in AEDT</strong></th>
<th><strong>Annual Operations</strong></th>
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<td>Rockwell Commander 112</td>
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**Twin Engine Piston NOT in AEDT**

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<tr>
<td>Cessna T-50 Bobcat</td>
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<tr>
<td>Diamond Twin Star DA42</td>
</tr>
<tr>
<td>Piper PA-44 Seminole</td>
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<tr>
<td>P-68 Observer</td>
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</table>

We respectfully request FAA AEE review/concurrence for the above substitutions for purposes of generating the noise contours for the Environmental Assessment for airfield improvements at Lake Elmo Airport.

Thank you for your assistance in this review. Please let me know if you require any additional information.

Sincerely,

Mead & Hunt, Inc.

Evan Barrett, AICP
Aviation Planner
This technical memorandum presents the process and modeling inputs used in the creation of the following noise contour scenarios for the Lake Elmo Airport Federal EA/State EAW using the FAA’s Aviation Environmental Design Tool (AEDT) Version 2c:

- 2016 Baseline Condition
- 2025 No-Action Alternative
- 2025 Alternatives B, B1 and B2

Per applicable FAA guidance, the environmental consequences section of an EA should include analysis of potential noise impacts of the proposed action and alternative(s) for each timeframe evaluated. Timeframes for this analysis were determined in consultation with the FAA Airports District Office in Minneapolis to represent appropriate baseline, no-action, and “with project” operational conditions. For aviation noise analyses, the FAA has determined that the cumulative noise energy exposure of individuals to noise resulting from aviation activities must be established in terms of Yearly Day-Night Average Sound Level (DNL), the FAA’s mandated noise metric for evaluating aircraft noise impacts and land use compatibility around US airports. This metric accounts for the noise levels of all individual aircraft events, the number of times those events occur, and the period of day/night in which they occur. The metric logarithmically averages aircraft sound levels at a location over a complete 24-hour period, with a 10-decibel (dB) adjustment added to those noise events occurring from 10:00 p.m. and up to 7:00 a.m. the following morning. This adjustment accounts for increased sensitivity to noise during normal nighttime hours and because ambient sound levels during nighttime are typically about 10 dB lower than during daytime hours.

The AEDT model was initially released in 2015 to replace a series of legacy tools, including the Integrated Noise Model (INM), which was previously used for noise modeling in the recently completed Long Term Comprehensive Plan (LTCP) for Lake Elmo Airport. According to FAA, there is an overlap in functionality and underlying methodologies between AEDT and the legacy tools, however updates were made in AEDT which result in differences when comparing outputs from AEDT and the legacy tools. The updates include smaller flight segments to more accurately model aircraft noise levels for a larger number of aircraft and positions and states along a flight path; a new standard (SAE-ARP-5534) for computing the effects of weather on noise; correcting misidentified aircraft engine mounted locations for three aircraft types; and moving from recursive grids to dynamic grids for noise contour generation.

Noise contours depict an annualized average day of aircraft noise impacts using model inputs, such as runway use, flight track use, aircraft fleet mix, aircraft performance and thrust settings, topography
Quantifying aircraft-specific noise characteristics in AEDT is accomplished through the use of a comprehensive noise database that has been developed under Federal Aviation Regulation Part 36. As part of the airworthiness certification process, aircraft manufacturers are required to subject aircraft to a battery of noise tests. Through the use of federally adopted and endorsed algorithms, this aircraft-specific noise information is used in the generation of DNL contours. Justification for such an approach is rooted in national standardization of noise quantification at airports.

Airport Operations
In coordination with MAC staff, Mead & Hunt developed 2016 baseline and 2025 forecast aircraft operations counts for the no-action and preferred alternative scenarios. The methodology for estimating these counts is explained in Appendix A, *Runway Length Needs Documentation*, which categorizes the operations according to specific aircraft make/model to each operation under the 2016 baseline scenario (see Table 14 in Appendix A), based on data provided from the FAA Traffic Management System Counts (TFMSC) and the MAC Noise and Operations Monitoring System (MACNOMS). For the 2025 forecast scenarios, the 2016 baseline distribution of flight track use for each aircraft make/model were applied to the 2025 forecasts (see Table 15 for 2025 No-Action (Base Case) forecast (Appendix A, Page A-14), and Table 18 for 2025 Extended Runway Scenario forecast (Appendix A, Page A-16)) for their respective engine type category to derive operations counts by specific aircraft make/model for the 2025 No-Action and Alternative B, B1, and B2 scenarios. *Tables 1, 2, and 3* attached to this memorandum present the daily baseline and forecast operations counts by aircraft type used to generate the AEDT inputs;

Runway Use
Specific 2016 baseline runway use and flight track distributions were estimated for each engine type category based on MACNOMS flight track data for which the aircraft type was known. The flight track distributions for operations to and from each runway end are the same in all scenarios, and the runway use distributions are the same in both the 2016 baseline and 2025 no-action scenarios. However, the runway use distributions were modified for the 2025 “with project” scenarios to account for runway improvements associated with the proposed action. *Tables 4 and 5* attached to this memorandum present the percentages used to distribute these daily operations among the four runway ends. Expected changes to runway use preference include the following:

- Piston aircraft are expected to use Runway 04/22 more often once the runway is extended and non-precision instrument approach procedures are established. Approximately 25% of piston operations occur on Runway 04/22 in the 2016 baseline and 2025 no-action scenarios, whereas approximately 35% occur on Runway 04/22 in the 2025 “with project” scenarios.
- Turboprop and jet aircraft are expected to use the Runway 14 end of the primary runway more often once an approach procedure is established. Approximately 30% of turboprop arrivals and no jet arrivals occur on Runway 14 in the 2016 baseline and 2025 no-action scenarios, whereas approximately 45% of turboprop arrivals and 33% of jet arrivals occur on Runway 14 in the 2025 “with project” scenarios. In all scenarios, all multi-engine turboprop and jet aircraft operations are expected to occur on the primary runway.
Approximately 4% of single-engine turboprop operations are expected to occur on Runway 04/22 in the 2025 "with project" scenarios, whereas there are no single-engine turboprop operations on this runway in the 2016 baseline and 2025 no-action scenarios.

Day/Night Split
The 2016 MACNOMS data indicate that approximately 4% of total operations at Lake Elmo Airport occur during nighttime hours. To estimate nighttime operations and apply the 10-dB nighttime noise sensitivity penalty within the AEDT model, this percentage was applied to all operations for all aircraft makes/models in all scenarios.

Flight Tracks
Flight tracks were developed based on MACNOMS flight tracks and are consistent with those used in the recently completed Long Term Comprehensive Plan (LTCP). The AEDT study used two arrival tracks (straight-in, and left turn arrivals) and three departure tracks (straight-out, left turn departure, and right turn departure) for each runway end. The image below depicts arrival, departure and touch-and-go tracks as drawn in AEDT.

- Red are arrival tracks
- Blue are departure tracks
- Magenta are touch-and-go tracks
Track utilization percentages used in the AEDT study are shown in Table 6 attached to this memorandum. It is worth noting that due to the low number of total operations, the locations of arrival and departure tracks, and track utilization percentages are not expected to impact the contour size and shape. The contours do not extend out to the point where tracks begin to make turns, therefore would not change with different percentage utilization. The primary drivers of where noise is located and distributed at this airport, is the runway end utilization percentages and aircraft types modeled.

Approval of Non-Standard Aircraft Substitutions
In a letter dated August 22, 2017, the FAA Office of Environment and Energy (AAE) approved use of specific aircraft noise profiles for this study, to represent aircraft types for which AEDT does not identify a standard substitution. These aircraft types and substitution aircraft noise profiles were as follows:

- Van’s RV-6/7/8/9/1012 and Rockwell Commander 112 substituted with GASEPV noise profile.
- Cessna T-50 Bobcat substituted with BEC58P noise profile.
- Diamond Twin Star DA42, Piper PA-44 Seminole, and P-68 Observer substituted with PA30 noise profile.

Weather
The weather data used in the noise study were acquired from the National Oceanic and Atmospheric Administration (NOAA) National Climatic Data Center, which are auto-populated in the AEDT model based on the Airport’s location. Two separate data sources were used from NOAA, 30-year normals for 1971-2000 and 10-year averages for 1994-2004. Because there was not a weather station present at Lake Elmo Airport during either of these historic periods, weather data from St. Paul Downtown Airport was substituted by the model. The following weather inputs were used within the AEDT model to represent average operating conditions at Lake Elmo Airport:

- Ambient temperature = 46° Fahrenheit
- Sea level pressure = 1016.150024 millibars
- Relative humidity = 70.63%
- Dew point = 36.58° Fahrenheit
- Headwind speed = 7.37 knots

Graphics depicting the 2016 baseline, 2025 no-action alternative, and 2025 preferred alternative (B1) noise contours are shown in Figures 5-1, 5-2, and 5-3, attached to this memorandum. These graphics are also included in the Environmental Consequences chapter of the EA/EAW.

As shown in the figures, the 65 DNL contour would be contained entirely on Airport property under all three scenarios. As a result, there are no significant noise impacts to mitigate for the no-action or preferred alternatives. Noise contours were developed for the 60 DNL for informational purposes only, as FAA does not consider the 60 DNL significant per FAA Orders. The 60 DNL extends west of Airport property in the Baseline 2016 and No Action 2025 scenarios, but is contained entirely on Airport property in the Preferred Alternative 2025 scenario.
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<td>COMSEP</td>
<td>2.771 0.118 2.889</td>
</tr>
<tr>
<td>Beech Bonanza 33/34/35/36</td>
<td>CNA208</td>
<td>1.801 0.077 1.878</td>
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<tr>
<td>Cessna 150</td>
<td>GASEPF</td>
<td>1.316 0.056 1.372</td>
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<tr>
<td>Cessna 205/206/210</td>
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<td>Mooney M-20 (various models)</td>
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*Totals may not add due to rounding
### Table 4: 2016 Baseline Condition & 2025 No-Action Alternative Average Annual Runway Use

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<th>Arrivals</th>
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<td>Jet</td>
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</tbody>
</table>

Note: Totals may not add to 100% due to rounding.
Source: MAC, Mead & Hunt
### Table 5: 2025 With Project Condition Average Annual Runway Use

| Aircraft Group | Rwy | Arrivals | | | Departures | | | Touch and Gos | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Day | Night | Total | Day | Night | Total | Day | Night | Total |
| Helicopter | 4 | 13% | 13% | 13% | 4% | 4% | 4% | 0% | 0% | 0% |
| | 14 | 34% | 34% | 34% | 23% | 23% | 23% | 0% | 0% | 0% |
| | 22 | 15% | 15% | 15% | 26% | 26% | 26% | 0% | 0% | 0% |
| | 32 | 39% | 39% | 39% | 47% | 47% | 47% | 0% | 0% | 0% |
| Single Piston | 4 | 10% | 3% | 10% | 15% | 27% | 15% | 15% | 17% | 15% |
| | 14 | 35% | 57% | 35% | 37% | 30% | 37% | 30% | 32% | 30% |
| | 22 | 22% | 3% | 21% | 18% | 14% | 18% | 27% | 22% | 26% |
| | 32 | 33% | 37% | 34% | 30% | 29% | 30% | 28% | 29% | 29% |
| Twin Piston | 4 | 10% | 2% | 8% | 24% | 17% | 22% | 0% | 0% | 0% |
| | 14 | 42% | 48% | 43% | 29% | 12% | 29% | 50% | 0% | 50% |
| | 22 | 15% | 2% | 14% | 18% | 2% | 18% | 0% | 0% | 0% |
| | 32 | 33% | 48% | 35% | 29% | 69% | 31% | 50% | 0% | 50% |
| Single Turboprop | 4 | 2% | 0% | 2% | 2% | 0% | 2% | 0% | 0% | 0% |
| | 14 | 48% | 50% | 48% | 55% | 50% | 55% | 0% | 0% | 0% |
| | 22 | 2% | 0% | 2% | 2% | 0% | 2% | 0% | 0% | 0% |
| | 32 | 48% | 50% | 48% | 41% | 50% | 41% | 0% | 0% | 0% |
| Twin Turboprop | 4 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | 14 | 40% | 40% | 40% | 40% | 40% | 40% | 0% | 0% | 0% |
| | 22 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | 32 | 60% | 60% | 60% | 60% | 60% | 60% | 0% | 0% | 0% |
| Jet | 4 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | 14 | 33% | 33% | 33% | 40% | 40% | 40% | 0% | 0% | 0% |
| | 22 | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | 32 | 67% | 67% | 67% | 60% | 60% | 60% | 0% | 0% | 0% |

Notes: All new twin turboprop and jet aircraft operations assigned to Runway 14/32 due to length requirements. Greater share of overall piston and single turboprop aircraft operations assigned to Runway 04/22 due to planned extension, lighting, and approach procedures. Greater share of 14/32 operations in all categories except helicopters assigned to 14 due to new approach procedure. Totals may not add to 100% due to rounding.

Source: MAC, Mead & Hunt
### Table 6: Flight Track Use Distribution (all scenarios and runway ends)

<table>
<thead>
<tr>
<th>Track</th>
<th>Helicopter</th>
<th>Single Piston</th>
<th>Twin Piston</th>
<th>Single Turboprop</th>
<th>Twin Turboprop</th>
<th>Jet</th>
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</table>

Note: Totals may not add to 100% due to rounding.

Source: Mead & Hunt
Note: Aircraft noise contour 60 DNL is shown for informational purposes only.

Lake Elmo Airport
Runway 14-32

2016 Baseline Aircraft Noise Contours
FIGURE 5-2
Lake Elmo Airport
Runway 14-32

2025 No Action Alternative Aircraft Noise Contours

Note: Aircraft noise contour 60 DNL is shown for informational purposes only.
Note: Aircraft noise contour 60 DNL is shown for informational purposes only.