Meeting Agenda

• Chair Opening/Remarks
• Approval of Minutes from August 29, 2019 Meeting
• JAZB Formation Items
• Presentation of Custom Standard Zoning Factors
• Example Custom Zone for Discussion
• Public Comments
• Board Discussion on Custom Zoning Factors and Example
• Establish Next Meeting Date
• Adjourn
JAZB Overview

Through a collaborative process, the JAZB seeks to develop an airport zoning ordinance that achieves a balance between providing for a reasonable level of safety while allowing for compatible community development.

JAZB Goals

• Develop an Airport Zoning Ordinance for review and approval by the MnDOT Commissioner of Transportation
• Develop an Airport Zoning Ordinance that achieves a balance between providing for a reasonable level of safety while allowing for compatible community development
• Ensure that the Airport Zoning Ordinance is developed in a manner that includes meaningful stakeholder engagement
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JAZB Formation Items

- JAZB Member Resolutions
- Ratification of JAZB Actions from June 25 and August 29, 2019 meetings
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Custom Standard Factors

1. Location of the airport, the surrounding land uses, and the character of neighborhoods in the vicinity of the airport
2. Airport's type of operations and how the operations affect safety surrounding the airport
3. Accident rate at the airport compared to a statistically significant sample, including an analysis of accident distribution based on the rate with a higher accident incidence
4. Planned land uses within an airport hazard area, including any applicable platting, zoning, comprehensive plan, or transportation plan
5. Any other information relevant to safety or the airport
Custom Standard Factors

1. Location of the airport, the surrounding land uses, and the character of neighborhoods in the vicinity of the airport

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5. Any other information relevant to safety or the airport
Location, Character of Surrounding Land Uses

(1) the location of the airport, the surrounding land uses, and the character of neighborhoods in the vicinity of the airport, including:

(i) the location of vulnerable populations, including schools, hospitals, and nursing homes, in the airport hazard area;
(ii) the location of land uses that attract large assemblies of people in the airport hazard area;
(iii) the availability of contiguous open spaces in the airport hazard area;
(iv) the location of wildlife attractants in the airport hazard area;
(v) airport ownership or control of the federal Runway Protection Zone and the department's Clear Zone;
(vi) land uses that create or cause interference with the operation of radio or electronic facilities used by the airport or aircraft;
(vii) land uses that make it difficult for pilots to distinguish between airport lights and other lights, result in glare in the eyes of pilots using the airport, or impair visibility in the vicinity of the airport;
(viii) land uses that otherwise inhibit a pilot's ability to land, take off, or maneuver the aircraft;
(ix) airspace protection to prevent the creation of air navigation hazards in the airport hazard area; and
(x) the social and economic costs of restricting land uses;
Location, Character of Surrounding Land Uses

• Airport Hazard Area
  • Any area of land or water upon which an airport hazard might be established if not prevented
  • The Airport Hazard Area is represented by the extent of the FAA airspace protection surfaces for Lake Elmo Airport

“Airport Hazard” means any structure, object of natural growth, or use of land, which obstructs the air space required for the flight of aircraft in landing or taking off at any airport or is otherwise hazardous to such landing or taking off.
(1) the location of the airport, the surrounding land uses, and the character of neighborhoods in the vicinity of the airport, including:

(i) the location of vulnerable populations, including schools, hospitals, and nursing homes, in the airport hazard area;
(ii) the location of land uses that attract large assemblies of people in the airport hazard area;

• Vulnerable populations: Arbor Glenn Senior Living, Lake Elmo Early Learning Center, Children’s Farm School, Lake Elmo Elementary School, Stillwater High School (property only)
• Places of public assembly: Municipal Buildings, Churches, Fairgrounds
(1) the location of the airport, the surrounding land uses, and the character of neighborhoods in the vicinity of the airport, including:

(iii) the availability of contiguous open spaces in the airport hazard area;

- Land guided as Public/Semi-Public (PSP) in the City of Lake Elmo
- Land guided as Park/Open Space (Park) in the City of Lake Elmo
- Land guided as Agricultural Preserve in Baytown Township
- Major Roadway and Railway right-of-ways
- Open Water

- Large bands of low-density residential development with 2.5 or more acres per dwelling unit
Location, Character of Surrounding Land Uses

(1) the location of the airport, the surrounding land uses, and the character of neighborhoods in the vicinity of the airport, including:

(iv) the location of wildlife attractants in the airport hazard area;

- Open water / wetland areas
- Fairgrounds
- Golf course
- No wastewater treatment facilities, landfills, or waste transfer stations
Location, Character of Surrounding Land Uses

(1) the location of the airport, the surrounding land uses, and the character of neighborhoods in the vicinity of the airport, including:

(v) airport ownership or control of the federal Runway Protection Zone and the department's Clear Zone;

- Runway Protection Zone (RPZ)
  - Existing – 4.7 acres extend off-airport
  - Future – Fully contained on airport

- MnDOT Clear Zone
  - Existing – 8.2 acres extend off-airport
  - Future – 0.2 acres extend off-airport
(1) the location of the airport, the surrounding land uses, and the character of neighborhoods in the vicinity of the airport, including:

(vi) land uses that create or cause interference with the operation of radio or electronic facilities used by the airport or aircraft;
(vii) land uses that make it difficult for pilots to distinguish between airport lights and other lights, result in glare in the eyes of pilots using the airport, or impair visibility in the vicinity of the airport;
(viii) land uses that otherwise inhibit a pilot's ability to land, take off, or maneuver the aircraft;
(ix) airspace protection to prevent the creation of air navigation hazards in the airport hazard area;
Location, Character of Surrounding Land Uses

(1) the location of the airport, the surrounding land uses, and the character of neighborhoods in the vicinity of the airport, including:

- Airport Overlay District (Airport Zone)
  - Prohibits growth, construction, maintenance, or alteration of trees and structures above airspace surfaces.
  - This zone has been effective in preventing air navigation hazards.

- Airport Overlay District (Qualified Land Use Zone)
  - Prohibits structures or uses that will cause assembly of persons, manufacturing or storage of materials which will explode on contact, or the storage of flammable liquid above ground.
  - Further prohibits educational, institutional, amusement, and recreational uses as well as any use that would result in electrical interference with radio communications, airport light interference, or impaired visibility.
  - This zone has been effective in preventing interfering land uses.
Location, Character of Surrounding Land Uses

(1) the location of the airport, the surrounding land uses, and the character of neighborhoods in the vicinity of the airport, including:

(x) the social and economic costs of restricting land uses;

Social and Economic Cost Considerations:

- Opportunity for building development
  - Residential
  - Commercial
  - Land Value
- Property tax generation
- Employment potential
Custom Standard Factors

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5. Any other information relevant to safety or the airport
### Safety Risk Analysis

#### 25-Year Historical Accident Rate (per 100k aircraft operations)

**Lake Elmo Airport (1994-2018)**
- 10 accidents associated with airport operations
- 0.84 accidents/100k operations

**State of Minnesota (1994-2018)**
- 502 accidents associated with airport operations
- 0.89 accidents/100k operations
Safety Risk Analysis

Accident Location Data

- Studied General Aviation aircraft accident locations with off-airport land use compatibility implications
- Different data sets based on runway length
  - < 4,000-foot runway length data set for Lake Elmo Airport
    - Proposed runway lengths at Lake Elmo Airport are 3,500 feet (primary) and 2,750 feet (crosswind)
Safety Risk Analysis

Accident Potential Distribution

- Accident locations from California Study superimposed on Lake Elmo runway ends
  - Arrivals – blue circles
  - Departures – red squares
- Shows locations where accidents have occurred nationwide
  - NOT actual accidents at Lake Elmo!
Safety Risk Analysis

Accident Potential Distribution

- Accident locations from source study superimposed on Lake Elmo runway ends
  - Arrivals – blue circles
  - Departures – red squares
- Shows locations where accidents have occurred nationwide
  - NOT actual accidents at Lake Elmo!
- Used to calculate accident probability in areas around the airport
  - “Spread” accident locations over a grid system
    - 300 x 300-foot grid (2+ acres)
    - Avoids an implication of precision
Safety Risk Analysis

Lake Elmo Runway Use %

<table>
<thead>
<tr>
<th>Runway</th>
<th>% Arrivals</th>
<th>% Departures</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>27%</td>
<td>33%</td>
</tr>
<tr>
<td>32</td>
<td>48%</td>
<td>43%</td>
</tr>
<tr>
<td>04</td>
<td>5%</td>
<td>8%</td>
</tr>
<tr>
<td>22</td>
<td>19%</td>
<td>16%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Normalized Lake Elmo Runway Use

<table>
<thead>
<tr>
<th>Runway</th>
<th>Aircraft Operations</th>
<th>Accident Data Set</th>
<th>Final Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Arrivals</td>
<td>Departures</td>
<td>Arrival Points</td>
</tr>
<tr>
<td>14</td>
<td>3,629</td>
<td>4,403</td>
<td>153</td>
</tr>
<tr>
<td>32</td>
<td>6,426</td>
<td>5,744</td>
<td>153</td>
</tr>
<tr>
<td>04</td>
<td>718</td>
<td>1,061</td>
<td>153</td>
</tr>
<tr>
<td>22</td>
<td>2,537</td>
<td>2,101</td>
<td>153</td>
</tr>
<tr>
<td>Total</td>
<td>13,310</td>
<td>13,309</td>
<td>612</td>
</tr>
</tbody>
</table>

Runway Use

- Runway use percentages
- “Normalize” accident location data to account for runway use patterns
Safety Risk Analysis

Calculated Accident Probability per Grid Region

- Sum of all grid probabilities is “100%”
Safety Risk Analysis

Calculated Accident Frequency per Grid Region

- Expressed in terms of “years between” accidents
- Based on accident rate per 100k operations (0.89)
Custom Standard Factors

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Planned Land Uses

**FUTURE LAND USE**

**Met Council Future Land Use**
- Agricultural Preserve (1 du per 40 acres)
- Open Water
- Public
- Railway
- Single Family Residential (1 unit per 2.5 acres or more)
- Undeveloped / Agriculture

**Lake Elmo 2040 Future Land Use**
- Commercial (C)
- Public / Semi-Public (PSP)
- Park
- Rural Area Development (RAD), .1 units per acre
- Right of Way (ROW)
- Rural Single Family (RSF), 0.1 - 2.0 units per acre
- Village Low Density Residential (V-LDR), 1.5 - 3.0 units per acre
- Village Medium Density Residential (V-MDR), 3.0 - 8.0 units per acre
Planned Land Uses

- **Steady-State Land Use Areas**
  - Fixed land use patterns, unlikely to change based on future land use guidance
    - Residential areas to the northeast, southeast, and southwest
    - Zoned for low-density single-family residence @ 1 dwelling unit per 2.5 acres (or greater)
    - Land use pattern not guided to change
Planned Land Uses

- **Steady-State Land Use Areas**
  - Fixed land use patterns, unlikely to change based on future land use guidance
  - Residential areas to the northeast, southeast, and southwest
  - Zoned for low-density single-family residence @ 1 dwelling unit per 2.5 acres (or greater)
  - Land use pattern not guided to change

- **Transitional Land Use Areas**
  - Land use patterns are guided to transition from rural-type uses to more densely developed residential and commercial uses
  - Area to the northwest is guided to transition from rural to urban uses
Custom Standard Factors

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Example Custom Zone

Example Custom Zone Criteria

• Maximize use of airport-owned property and off-airport property guided for non-occupant uses
  • Airport-owned property
    • Outside perimeter fence
    • Under approach surfaces (existing and future)
    • Not guided for Non-Aeronautical development
  • Township Agricultural Preserve
  • City Public/Semi-Public (PSP)
  • Roadway & Railroad right-of-way
Example Custom Zone Criteria

- Maximize use of airport-owned property and off-airport property guided for non-occupant uses
  - Airport-owned property
    - Outside perimeter fence
    - Under approach surfaces (existing and future)
    - Not guided for Non-Aeronautical development
  - Township Agricultural Preserve
  - City Public/Semi-Public (PSP)
  - Roadway & Railroad right-of-way
Example Custom Zone Only Accident Probability

- ~37.2% Accident Probability captured within Example Custom Zone
  - If an accident occurs at Lake Elmo Airport, there is a 37% chance it will be in the Example Custom Zone
- ~9.6 Years Between Accidents within Example Custom Zone
  - Overall accident frequency probability is one every four years
• ~38.8% Accident Probability captured within FCM JAZB Zones

• If an accident occurs at Flying Cloud Airport, there is a 39% chance it will be in the JAZB Zones

• ~2.6 Years Between Accidents within FCM JAZB Zones

• Overall accident frequency probability is one per year
Example Custom Zone

Example Custom Zone + Airport Property Accident Probability

- ~76.0% Accident Probability captured within Example Custom Zone and airport property line
  - There is a 76% chance that an accident will be in the Example Custom Zone or on airport property
  - Leaves a 24% chance that an accident will be elsewhere
- ~4.7 Years Between Accidents within Example Custom Zone and airport property line
  - Overall accident frequency probability is one every four years
Flying Cloud JAZB Zones

- **~72.8% Accident Probability captured within FCM JAZB Zone and FCM property line**
  - If an accident occurs at Flying Cloud Airport, there is a 73% chance it will be in the JAZB Zones or on airport property
  
- **~1.4 Years Between Accidents within FCM JAZB Zones or on FCM property**
  - Overall accident frequency probability is one per year
Example Custom Zone

Accident Probability Outside of Example Custom Zone Area

• Under the approach surface for the length of the runway

<table>
<thead>
<tr>
<th>Runway End</th>
<th>Accident Probability</th>
<th>Years Between Accidents</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>1.0%</td>
<td>352</td>
</tr>
<tr>
<td>32</td>
<td>1.8%</td>
<td>200</td>
</tr>
<tr>
<td>4</td>
<td>1.1%</td>
<td>326</td>
</tr>
<tr>
<td>22</td>
<td>0.2%</td>
<td>1,556</td>
</tr>
<tr>
<td>Total</td>
<td>4.1%</td>
<td>87 Years</td>
</tr>
</tbody>
</table>

A reasonable level of safety?
Example “Non-Interference Zone”

Black ellipsoid line

- Based on FAA/MnDOT Horizontal Airspace Zone
- Less restrictive land use zone
- General prohibitions against land uses that would:
  - Create or cause interference with the operations of radio or electronic facilities
  - Create or causes interference with radio or electronic communications between airport and aircraft
  - Make it difficult for pilots to distinguish between Airport lights and other lights
  - Result in glare in the eyes of pilots using the airport
  - Impair visibility in the vicinity of the airport
  - Otherwise endanger the landing, taking off, or maneuvering of aircraft in the runway approach areas.
Airspace Zoning

Height limitations
Based on FAA Airspace criteria

- Limits the height of structures and vegetation under Lake Elmo Airport airspace surfaces.
- Penetrations to the Airspace Zones will require a variance issued by a Board of Adjustment
Airspace Zoning

Height limitations
Based on FAA Airspace criteria

- Uses 1-foot airspace contours and ground elevation contours
- Heights are expressed above ground level
- Exceeding the Maximum Construction Height Without Permit will require an Airport Zoning Permit from the Local Zoning Administrator
- In most cases, the airport zoning height limitations are expected to be less restrictive than maximum heights allowed in municipal zoning codes
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Meeting Outlook

Meeting 1 (June 25, 2019):
- Welcome and Agenda Overview
- Board Member Introductions
- JAZB Overview
- Selection of Chairperson

Meeting 2 (August 29, 2019):
- Presentation and Work Session – Custom vs. Commissioner’s Standards
- Board member input on zoning standard selection

Meeting 3:
- Presentation of Custom Zoning Factors and Methodology
- Presentation of Example Custom Zone for Discussion

Meeting 4:
- Discuss Options/Outline for Draft Lake Elmo Airport Zoning Ordinance
- Timeline for Approval of Draft Lake Elmo Airport Zoning Ordinance for Public Hearing #1

CUSTOM STANDARD

PUBLIC HEARING
Meeting Outlook

JAZB Steps After Public Hearing

Review Public Hearing comments and responses

JAZB Approval to submit Draft Airport Zoning Ordinance to MnDOT

Receive/Review MnDOT comments

MnDOT Approval/Revisions Not Needed

• Presentation of Final Airport Zoning Ordinance
• Adoption of Final Airport Zoning Ordinance
• Municipal/Township Incorporation and Administration

MnDOT Disapproval/Revisions Needed

• Presentation of Proposed Revisions
• Approval of Supplemental Public Hearing
• Supplemental Public Hearing
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