

Duluth International Airport Vision 2040 Master Plan

Duluth Airport Authority Board Retreat

December 2, 2021



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Agenda

- Master Plan overview
- Public Involvement Plan
- Inventory
- Environmental Overview
- **Break**
- Airside Facility Recommendations
- **Lunch**
- Landside Facility Recommendations
- CIP and Financial Implementation



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Master Plan Overview, Goals and Objectives



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What is a Master Plan?

Comprehensive study of an airport that describes short-, medium-, and long-term development plans.

The goal of a Master Plan is to provide the framework needed to guide future development that will cost-effectively satisfy aviation demand, while considering potential environmental and socioeconomic impacts.



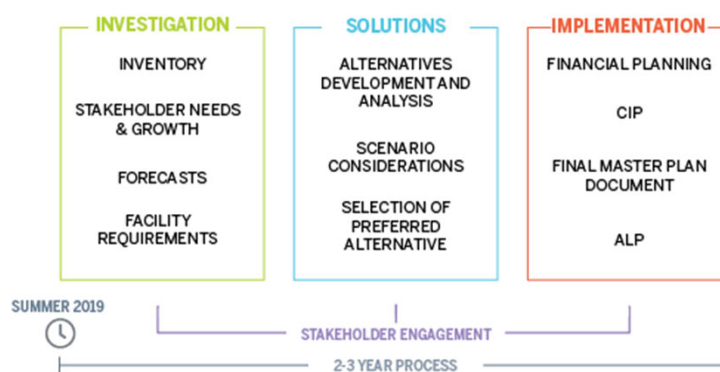
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What influences a Master Plan?

- FAA and MnDOT standards
- Aviation demand
- Environmental considerations
- Infrastructure constraints
- Financial feasibility
- Community goals and input
- Stakeholder input

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Master Plan Process



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Vision 2040

***DLH will maximize its economic impact,
meet growing demands of air commerce
and maintain its infrastructure by
completing
DLH Vision 2040.***



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- **At the conclusion of DLH Vision 2040 the Duluth Airport Authority will:**
 - Provide opportunities for businesses to grow and or relocate
 - Anticipate the evolving demand for air service in our region
 - Better respond to the needs of general aviation
 - Improve agility in responding to tomorrow's opportunities and challenges
 - Complement its neighboring communities
 - Maintain the DAA's financial sustainability



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Vision 2040 – Process Objectives

- Develop a decision tree that guides short, medium and long term land use planning while allowing for flexibility in a dynamic environment
- To provide a graphic representation of existing airport features, future airport development and anticipated land use.
- Identify development zones and site packets
- To establish a realistic schedule for implementation of the proposed development.
- To identify a realistic financial plan to support the development.
- Develop a comprehensive Capital Improvement Plan (CIP) document; Airport CIP is only a subcomponent.
- Technically and procedurally validate the plan through investigation of concepts and alternatives on technical, economic and environmental grounds.
- Prepare and present the plan to the public after seeking their input that adequately addresses all relevant issues and satisfies local, state and federal regulations.

Project Deliverables

- Master Plan Report
- Executive Summary Report
- Airport Layout Plan (ALP)
- Website and outreach materials

Master Plan Report

- Chapter 1 – Introduction and Public Involvement Plan
- Chapter 2 – Inventory
- Chapter 3 – Aviation Activity Forecasts
- Chapter 4 – Airside Facility Alternatives and Recommendations
- Chapter 5 – Landside Facility Alternatives and Recommendations
- Chapter 6 – Environmental Overview
- Chapter 7 – CIP and Financial Implementation Plan



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Master Plan Appendices

- Appendix A – Public Involvement Plan
- Appendix B – Sign and Marking Plan
- Appendix C – Building Condition Assessment
- Appendix D – Passenger Boarding Bridge Assessment
- Appendix E – Landside Pavement Assessment
- Appendix F – Airport Zoning
- Appendix G – Exhibit A Property Map
- Appendix H – FAA Forecast Approval
- Appendix I – Architectural History Reconnaissance Survey
- Appendix J – Part 150 Noise Exposure Map
- Appendix K – Secure Area Planning Recommendations Report
- Appendix L – Airport Layout Plan (ALP)



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Facility Recommendations

4 Airside Facility Recommendations and Alternatives Analysis

This section identifies airfield (airside) facilities needed to satisfy the 20-year forecast of aviation demand at the Duluth International Airport (DLH). Airport facilities are developed in accordance with FAA airport design standards and airspace criteria.

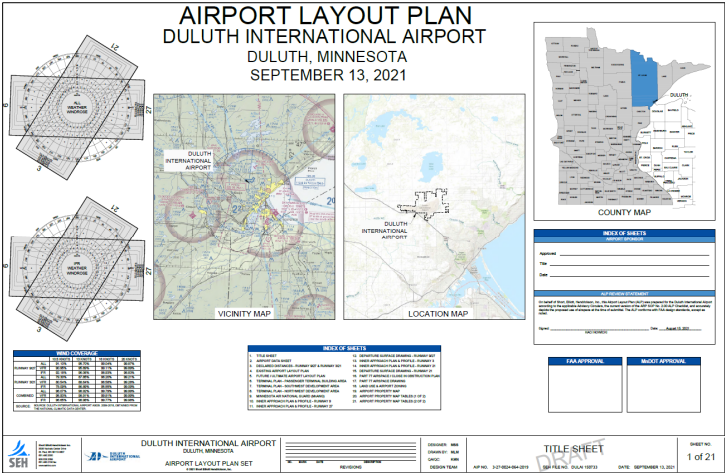
This study intends to develop realistic recommendations for the planning period. The planning period of this study covers through 2040. Whether the recommendations for the future development will be implemented depends on the actual demand, ability of the Airport to accommodate the development, environmental impacts and available financial and other resources of the local, state and federal decision-makers to meet that demand.

Frequent and rapid changes can occur in the aviation industry as well as increased frequency of regulatory changes within the FAA. It is equally important that an ongoing process of evaluation of changing conditions, needs and near-term trends be implemented to assure the validity of the contents and recommendations of this Master Plan.

The recommendations for this chapter are summarized below. Additional details of the recommendations can be found in the body of this chapter.

- Runway 9/27 Facility Recommendations
 - Runway 9/27 should be designed to RDC D-V standards with a critical aircraft of RDC C-III with approach minimums of less than 1/2 of a mile. (See Section 4.3.1)
 - Routine maintenance, such as joint repair and crack/sealing should be performed on a scheduled basis to extend the life of the pavement. No other surface improvements to Runway 9/27 are recommended over the planning period. (See Section 4.3.2.5)
 - Shoulder pavement should be reconstructed around 2030 as it is expected to reach the end of its useful life within the 10-year planning term. (See Section 4.3.2.5)
 - The sign system should be updated to LED lighting as signs are replaced. The non-LED signage should be replaced as part of the Taxiway A reconstruction project. (See Section 4.3.2.6)
 - HIRL lighting system should be rehabilitated or replaced when it reaches the end of its useful life or timed to coincide with the shoulder pavement replacement project. This is expected to occur after year 2031 (See Section 4.3.2.6)
 - It is recommended that the Runway 27 PAPI be replaced in the near term. The Runway 27 PAPI also does not provide a coincident glide path with the ILS glide slope. The new location and slope of the PAPI should provide for a coincident glide path. (See Section 4.3.2.7)
 - It is recommended that FAA TechOps evaluate alternative locations that provide a standard localizer stiling location and commence with moving the relocation to ensure that the localizer and ILS are reliable and usable by users of the airport. (See Section 4.3.2.8)









Airport Layout Plan (ALP)



Public Involvement Plan

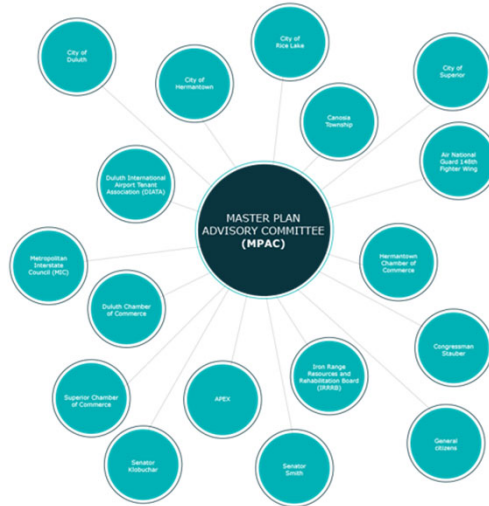
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Stakeholder Outreach Overview

-  Newsletters
-  Website blog posts
-  Social media posts
-  Public Open House
-  Master Plan Advisory Committee
-  One-on-one stakeholder meetings
-  Technical Advisory Committees (TACs)
 - Runway 3/21
 - Taxiway network and aircraft parking
 - Economic Development
 - Air Traffic Control Tower
-  Stakeholder presentations and events

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Master Plan Advisory Committee (MPAC)



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Master Plan Advisory Committee (MPAC)

- Represented the broad range of stakeholders
- Reviewed and share project updates
- Provided input and serve as a voice for key stakeholders
- Validated the overall process and DAA progress on commitments for stakeholder outreach



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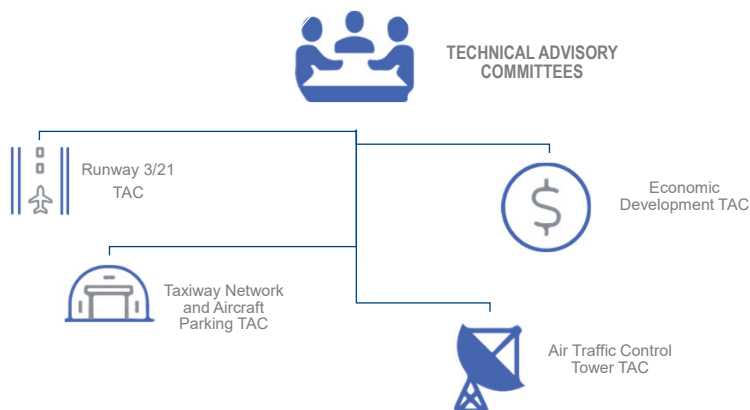


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Technical Advisory Committees (TACs)



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Summary of Engagement Efforts

Master Plan Advisory Committee (MPAC)

- Meeting #1 - June 17, 2019
- Meeting #2 – December 18, 2019
- Meeting #3 – June 17, 2020
- Meeting #4 – December 16, 2020
- Meeting #5 – June 30, 2021
- Meeting #6 – October 20, 2021

Runway 3/21 TAC

- Meeting #1 – July 25, 2019
- Meeting #2 – October 4, 2019
- Meeting #3 – June 21, 2021

Taxiway and Building Area TAC

- Meeting #1 – December 3, 2019
- Meeting #2 – March 9, 2020
- Meeting #3 – June 30, 2020
- Meeting #4 – August 12, 2020
- Meeting #5 – December 2, 2020
- Meeting #6 – June 28, 2021
- Meeting #7 – October 13, 2021

Air Traffic Control Tower TAC

- Meeting #1 – August 11, 2020
- Meeting #2 – August 31, 2020
- Meeting #3 – November 12, 2020

Economic Development TAC

- Meeting #1 – April 9, 2020
- Meeting #2 – September 22, 2020
- Meeting #3 – September 10, 2021

Public Meetings

- Open House #1 – September 17, 2019
- Part 150 Noise Study Open House #1 – October 2, 2019
- Part 150 Noise Study Open House #2 – August 26, 2020
- Part 150 Noise Study Open House #3 – February 3, 2021
- Part 150 Noise Study Open House #4 – November 2, 2021
- Open House #2 – 2022 Date TBD



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Inventory

Airfield Pavement




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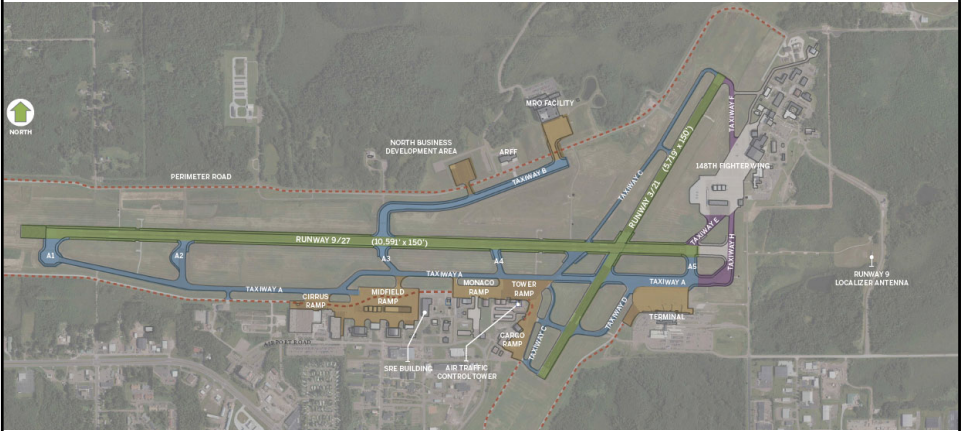
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Airfield Overview






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Airside paved infrastructure

75+ miles of City street

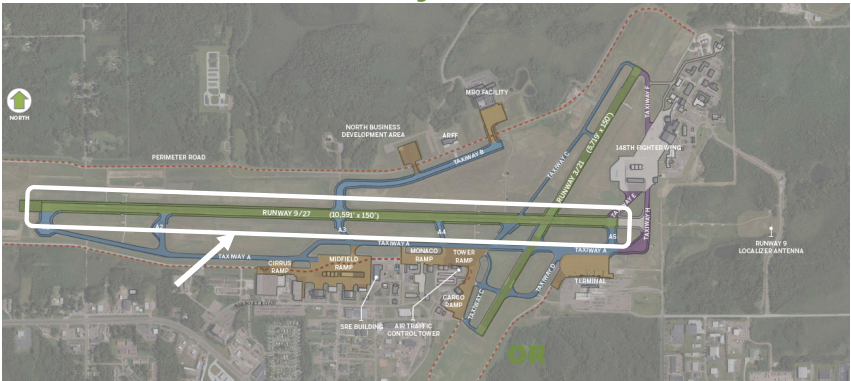
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Runway Pavement

Runway 9/27

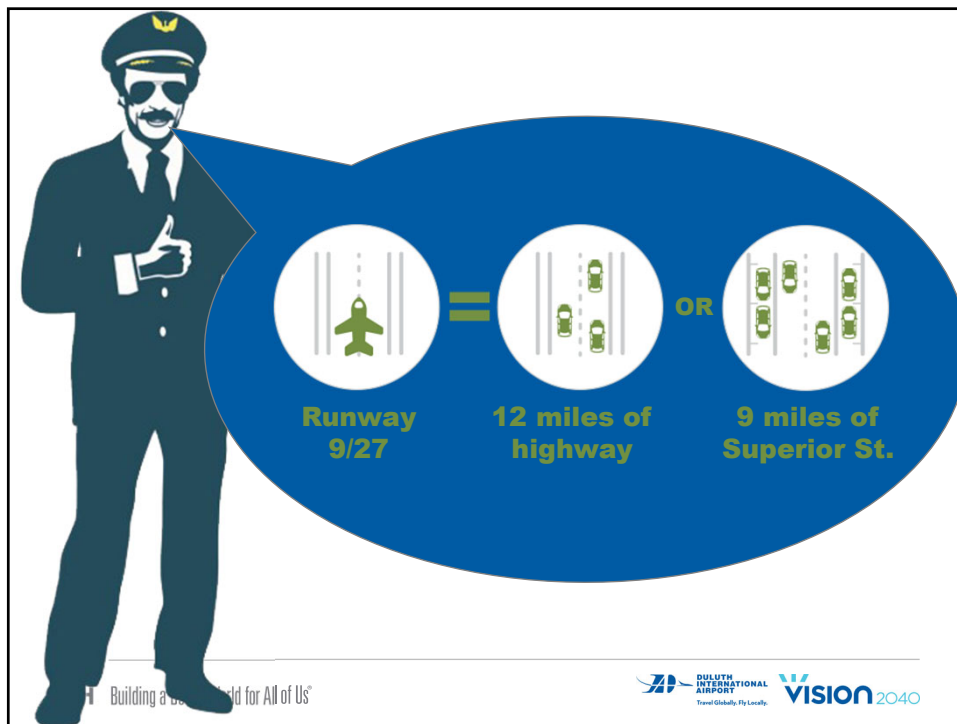


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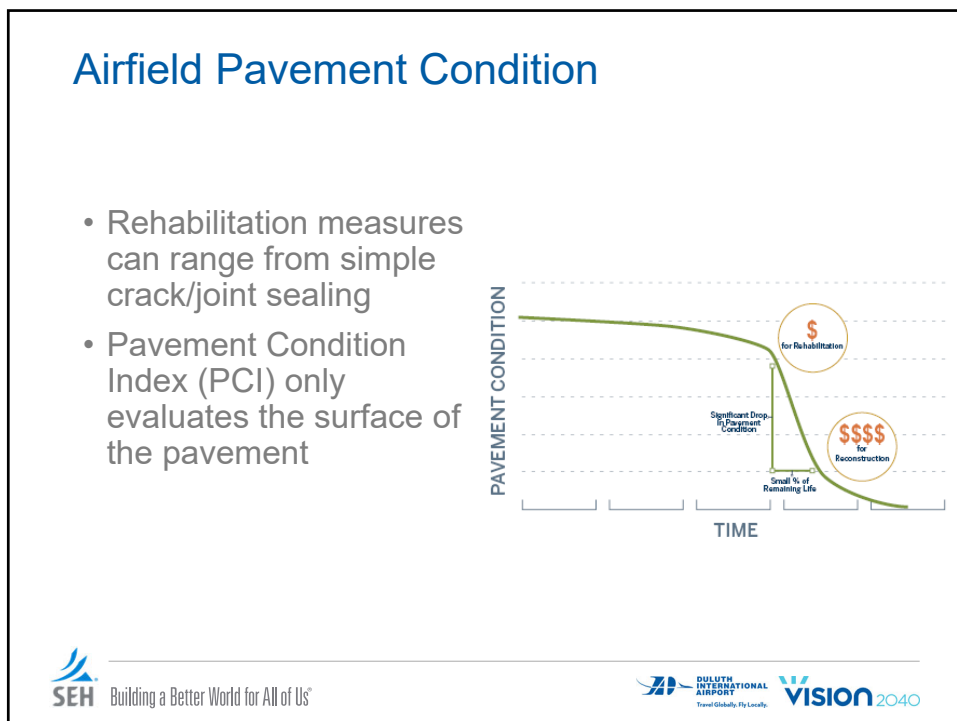
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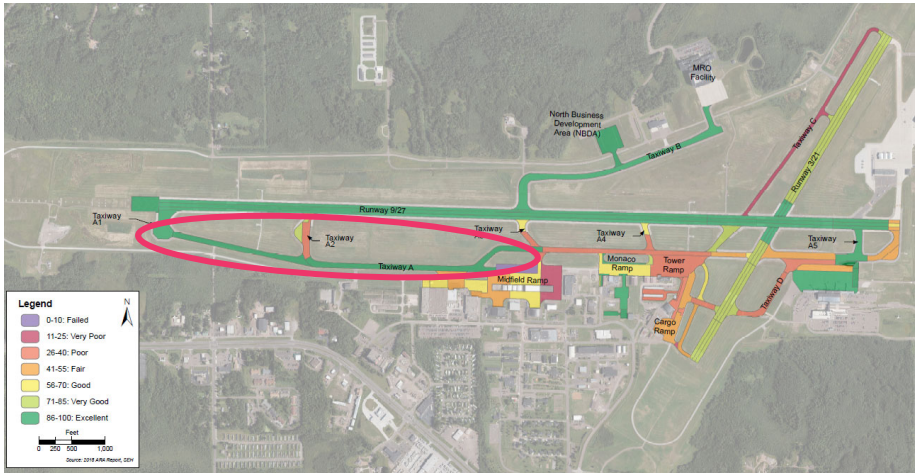


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Airfield Pavement Condition Index



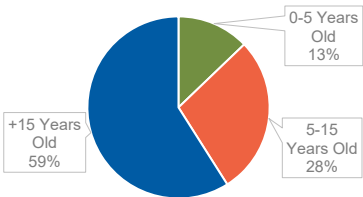
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Recommended Timing of Pavement Maintenance

Bituminous Pavement

Maintenance – 0-5 years, ongoing
Rehabilitation – 5-15 years
Reconstruction – 15+ years

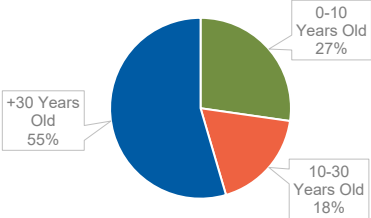
Age of Bituminous pavement at DLH



Concrete Pavement

Maintenance – 0-10 years, ongoing
Rehabilitation – 10-30 years
Reconstruction – 30+ years

Age of concrete pavement at DLH



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Bituminous Pavement



Maintenance



Rehabilitation



Reconstruction

Concrete Pavement



Maintenance

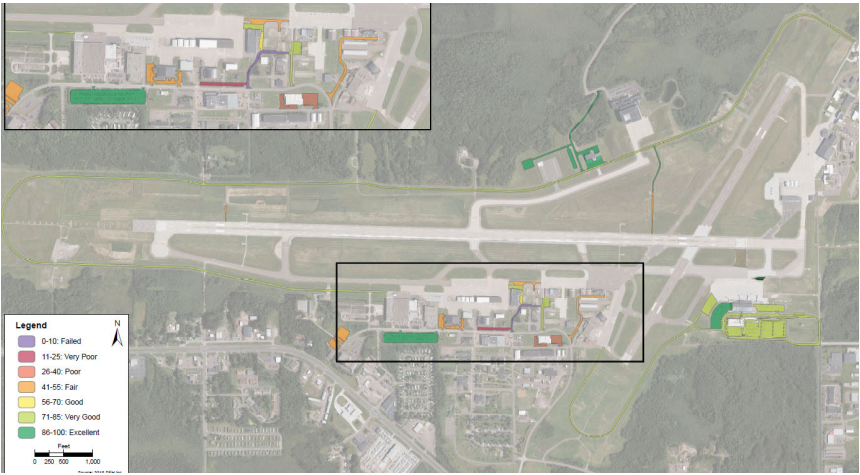


Rehabilitation



Reconstruction

Landside Pavement Condition Index



Inventory

Taxiway Network

Goals of Taxiway Design

- Good design practices keep taxiway intersections simple.
- Complex layouts increase the possibility of pilot error.
- Three-node concept – A pilot has no more than 3 choices at an intersection – ideally, left, right and straight ahead.
- Intersection angles – Design turns to be 90 degrees wherever possible.

Design to Reduce Runway Incursions

- Increase situational awareness, keep taxiway systems simple
- Avoid wide expanses of pavement
- Limit runway crossings
- Avoid “dual purpose” pavements
- Avoid “high energy” intersections (middle 1/3 of the runway)
- Avoid direct access to runways
- Increase visibility – Right angle intersections provide the best visibility



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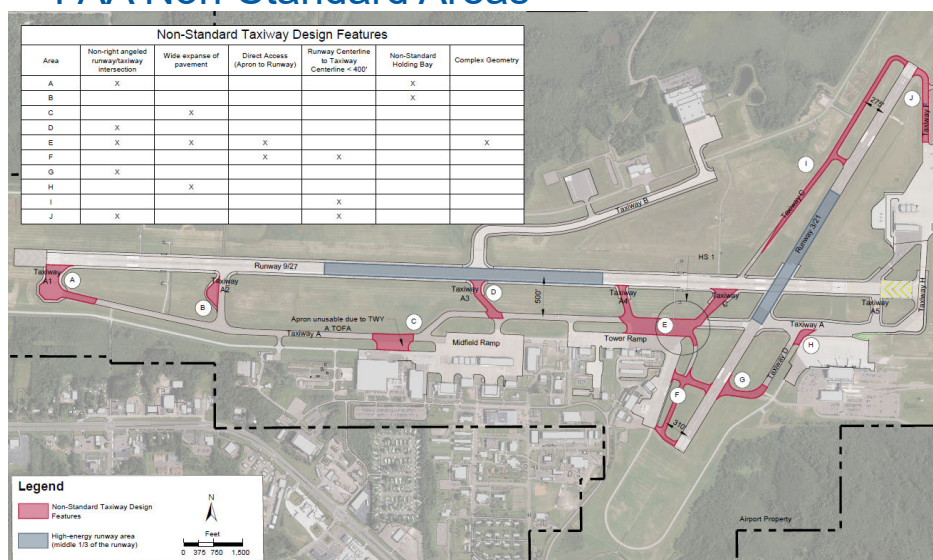


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FAA Non-Standard Areas



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Air Traffic Control Tower

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Air Traffic Control Tower



- The Tower is approximately 60 years old – constructed in the mid 1950's
- Owned and maintained by the DAA
- Does not meet FAA standards for line-of-sight requirements and is in deteriorating condition
- \$500,000 in life, health and safety improvements made by the DAA since 2015

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Air Traffic Control Tower – Building Assessment Summary



Architectural

- Exterior windows and doors in poor condition
- Cracks/deterioration of bricks and masonry
- Concrete panel joints need re-sealing
- Water intrusion in lower-level mechanical room

Structural

- No structural deficiencies other than noted in architectural

Mechanical

- Replacement of steam boiler system
- Replacement of original stormwater lift station

Electrical

- Replacement of electrical service equipment
- Replacement of fire alarm equipment



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- Constructed in 1951, while the Airport was under the jurisdiction of the United States Air Force
- The building served as the original terminal to the Duluth International Airport
- An addition to the building was constructed sometime between 1972 and 1981, slightly compromising the historical integrity of the structure.

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Inventory

Airfield Buildings



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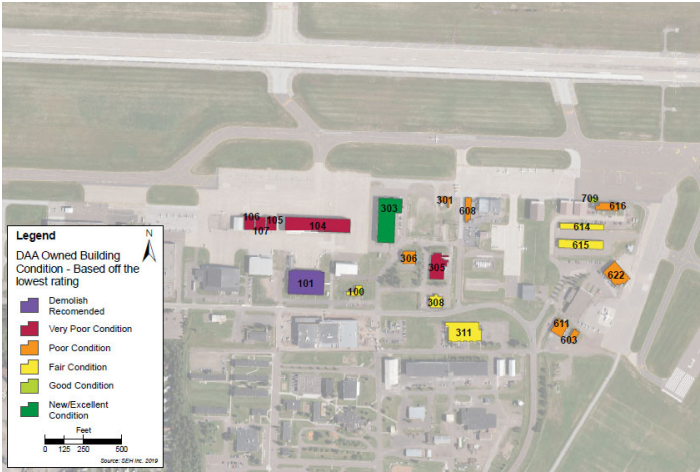
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Building Condition Assessment – DAA Owned






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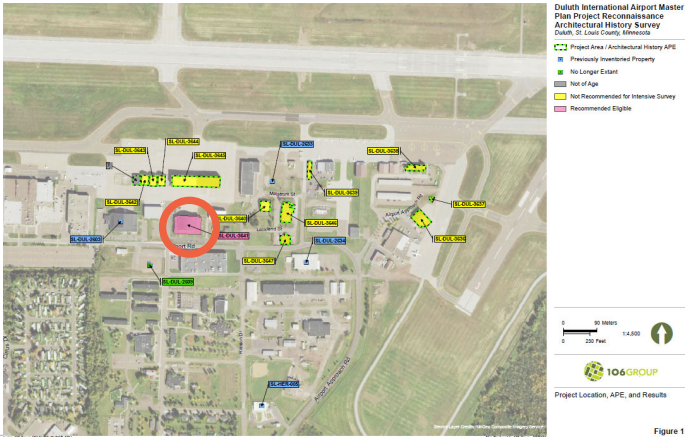


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Architectural History Study

- A reconnaissance architectural history survey was conducted for buildings over 50 years old
- Hangar 101 was the only building recommended for listing on the National Register of Historic Places (NRHP)



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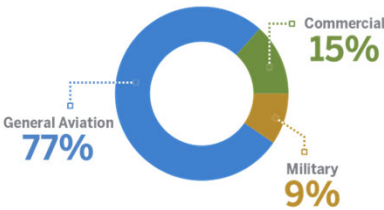


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Aviation Activity

- Commercial Airlines
- Military
- General Aviation
- Education and Training
- CBP Services
- Cargo
- Manufacturing and R&D
- Aircraft Maintenance
- UAS and Drones
- Medical Transport



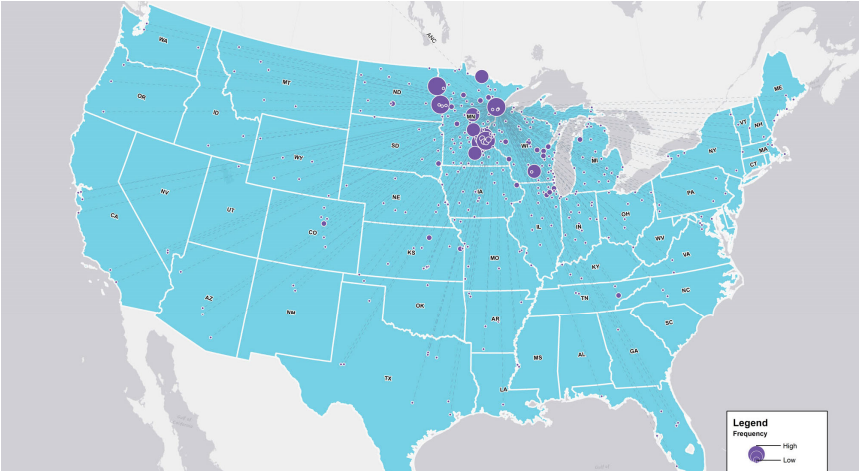
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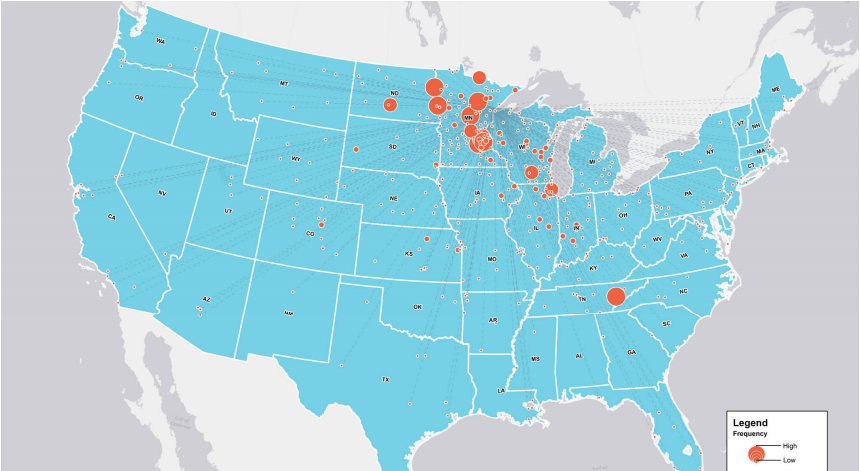
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General Aviation (GA) Traffic – Flying to DLH from...



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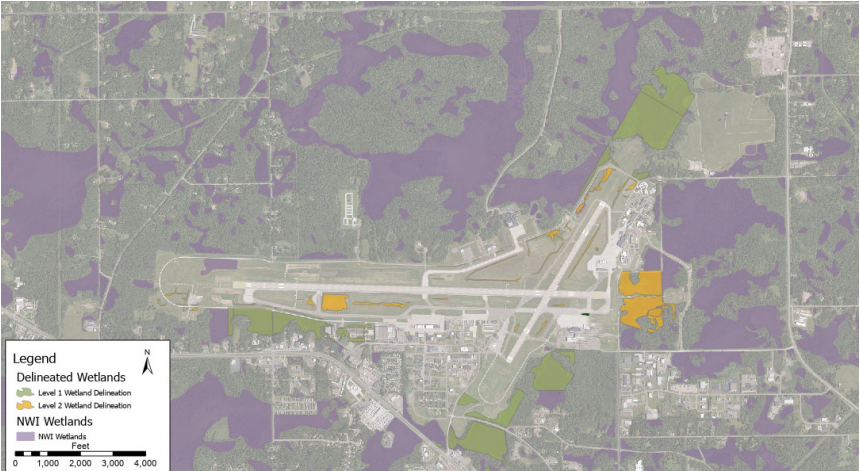
General Aviation (GA) Traffic – Departing from DLH going to...



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Environmental Overview

Wetlands



Project Impacts to NEPA

Several areas of environmental concern are considered during the master planning process, including:

- Air Quality
- Coastal Resources
- Section 3(f)
- Farmlands
- Floodplains
- Fish and Wildlife Resources
- Rare, Threatened and Endangered Species
- Water Quality
- Wetlands
- Hazardous Material, Pollution Prevention and Solid Waste



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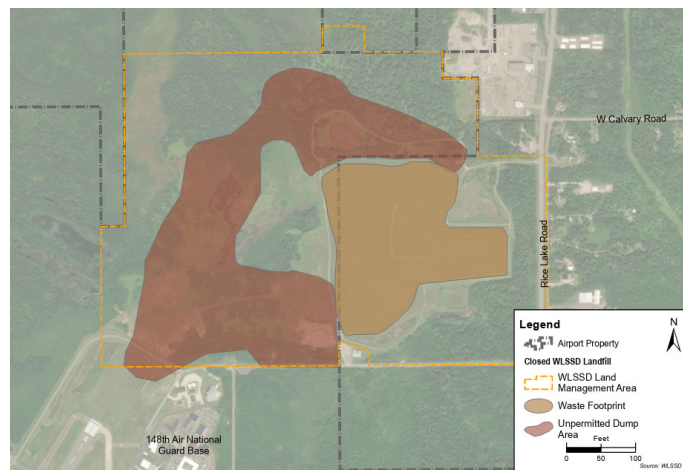


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Closed WLSSD Landfill



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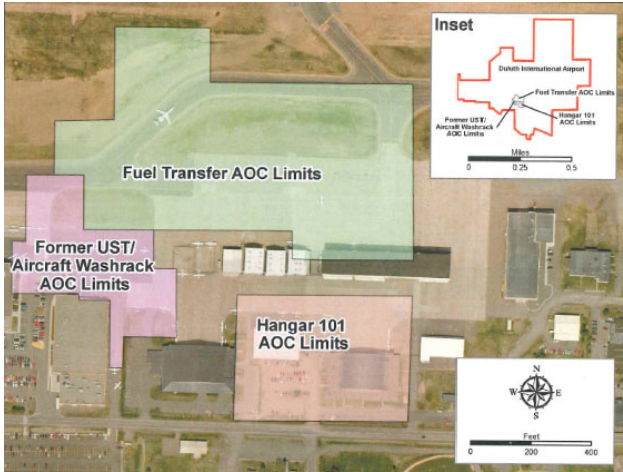


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Midfield Ramp and Hangar 101 Area of Concern (AOC)



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Break

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Airside Recommendations and Alternatives

Runway 9/27 and Runway 3/21



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Runway 9/27 Recommendations

- Runway Length/Pavement
 - **Runway length should be maintained.**
Meets the needs of the 148th and the critical aircraft (Airbus A319)
 - **Routine maintenance**, such as joint repair and crack sealing should be performed on a scheduled basis to extend the life of the pavement.
 - **Shoulder pavement should be reconstructed** around 2030
- Electrical/Lighting
 - **HIRL lighting system should be rehabilitated** or replaced around 2030
 - The sign system should be **updated to LED signs**



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Runway 9/27 Recommendations

- NAVAIDs
 - Relocate and **replace Runway 27 PAPI** in the near term.
 - **Relocate Runway 27 glide slope** antenna
 - Correct the non-standard Threshold Crossing Height for Runway 27 (once glide slope and PAPI are relocated). This will improve instrument approach minimums on the Runway 27 end
 - FAA TechOps should **relocate the localizer** to a location that would provide a more reliable signal (closer to Runway 27 end).



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Runway 9 Localizer



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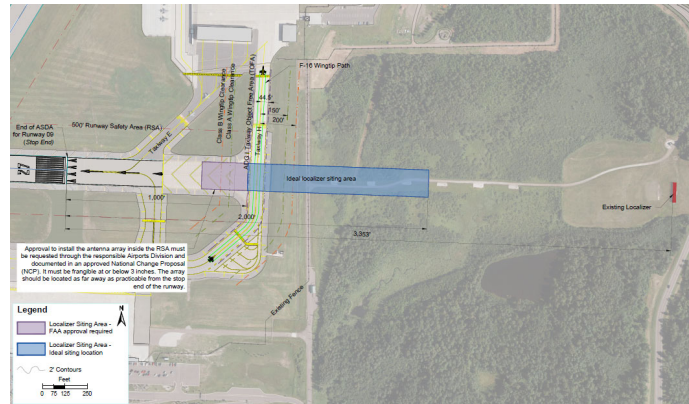


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Runway 9 Localizer



- FAA owned NAVAID
- Provides lateral guidance to aircraft landing on Runway 9.
- Currently at a non-standard distance from Runway 27 end
- Wooden support structure was re-installed in 2016



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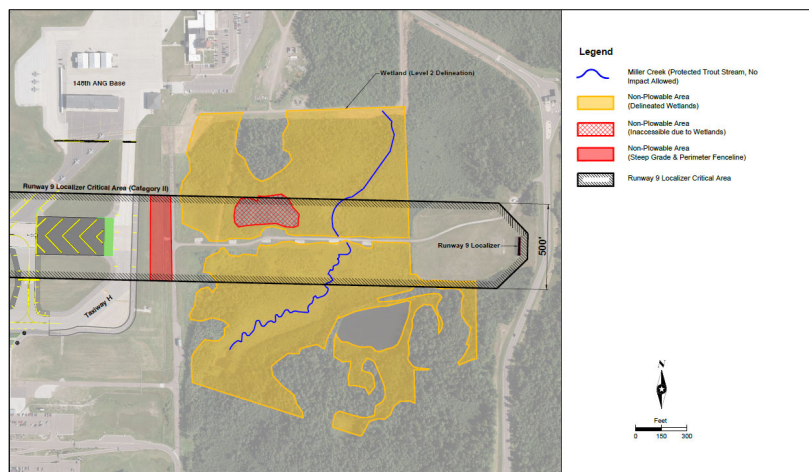


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Localizer Critical Area – Restricted Plowing Area



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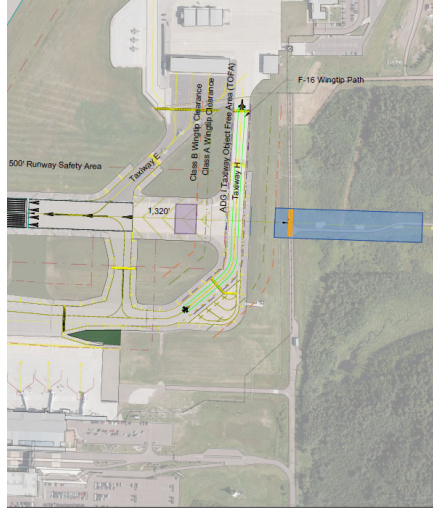
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Runway 9 Localizer

- Recommended to be relocated to 1,000' to 2,000' from runway end
 - Proposed location (orange) is 1,320' from runway end.
- Potential funding for project in infrastructure bill



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Runway 3/21 TAC Members

- | | |
|---|----------------------------------|
| • City of Duluth | • ALLETE |
| • City of Hermantown | • 148 th Fighter Wing |
| • City of Rice Lake | • FAA Air Traffic Control Tower |
| • Canosia Township | • FAA ADO |
| • Lake Superior College | • MnDOT Office of Aeronautics |
| • General aviation tenants | • Envoy/American Airlines |
| • Duluth International Airport Tenant Association (DIATA) | • Unify/Delta/United |
| • Citizens Committee for Environmental Concern (CCEC) | • Bemidji Aviation |
| • FedEx | • Hermantown Chamber of Commerce |
| • DLH Joint Airport Zoning Board (JAZB) | |



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Stakeholder Outreach – Runway 3-21

- Meeting #1 - July 25, 2019 – Inventory of Runway 3/21 and discussion of needs and goals for Runway 3/21
- Meeting #2 - October 4, 2019 – Preliminary alternatives presented to the TAC and gather TAC member feedback on presented alternatives
- Meeting #3 - June 21, 2021 – Presented preferred alternative to the TAC and asked for any additional feedback

The Part 150 Noise Study and the JAZB Airport Zoning Ordinance development process concurrently considered the runway extension as part of their separate efforts during this time.



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Runway 3/21 - Stakeholder feedback

Runway length:

- 148th Fighter Wing:
 - 7,000 feet as an emergency runway
 - 8,000 feet for a secondary use runway.
 - Arresting gear is needed on the departure end.
 - Runway and connecting taxiway network must meet UFC Class B standards
- Commercial Air Service:
 - 7,800 feet for current fleet
- General Aviation
 - 7,900 feet for critical aircraft
- Training and R&D Flights
 - Operations would benefit from a longer runway



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Runway 3/21 - Stakeholder feedback

Instrument approaches:

- Stakeholders indicated that improved instrument approaches would add value to Runway 3/21.
- Types of approaches
 - The 148th currently cannot utilize GPS approaches but may be able to in the future.
 - The 148th's weather minimums for training are 1-mile visibility
- Approach lighting to one or both ends would add value

Runway 3/21 - Stakeholder feedback

Environmental and Land Use:

- Environmental and land use impacts of alternatives should be considered and minimized.
- The JAZB proposed airport zoning ordinance should be considered when developing the alternatives.
 - Proposed zoning ordinance plans for 1-mile visibility minimums
- Impacts of improvements to Runway 3/21 may have on aircraft parking and building areas should be considered in the alternatives

Initial Runway 3/21 Alternatives

Runway Dimension	Runway 3 Approach Minimums	Runway 21 Approach Minimums	Wetland Impacts	Cost Estimate
5,719' x 150'	1-Mile	1-Mile	-	\$0
	1-Mile	1-Mile	-	\$23 Million
8,000' x 150'	1-Mile	1-Mile	34.2 Acres	\$72 Million
	1-Mile	¾ - Mile	34.2 Acres	\$75 Million
	1-Mile	½ - Mile	38.1 Acres	\$77.5 Million
7,000' x 150'	1-Mile	1-Mile	9.3 Acres	\$55 Million
	1-Mile	¾ - Mile	9.3 Acres	\$58 Million
	1-Mile	½ - Mile	13.2 Acres	\$60.5 Million



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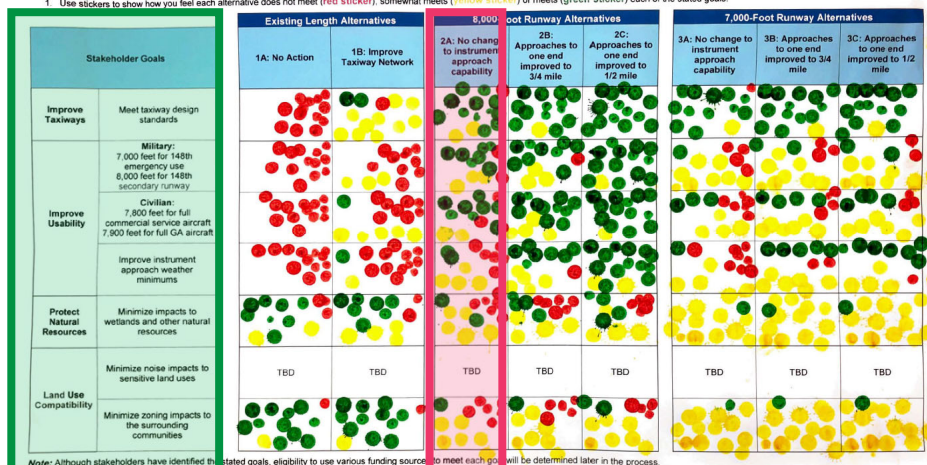
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Stakeholder Feedback (Oct. 2019 TAC Mtg)

Instructions:

1. Use stickers to show how you feel each alternative does not meet (red sticker), somewhat meets (yellow sticker) or meets (green sticker) each of the stated goals.



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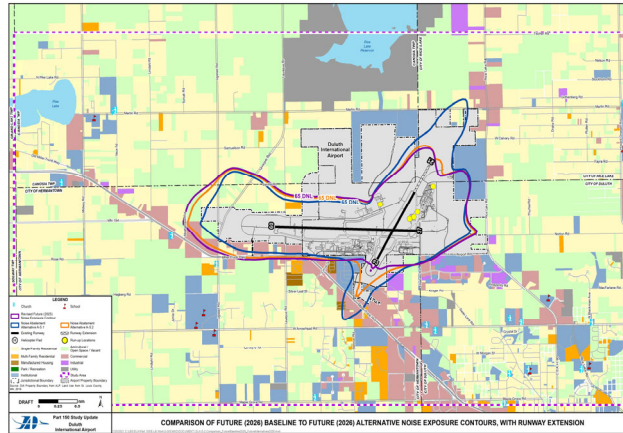
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Noise Impacts – Considered as part of ongoing Part 150 Study

- Future baseline (**purple**)
- Alt. A-5.1(**blue**)
– 20% F-16 ops. on Rwy. 03/21 (0% night departures)
- Alt. A-5.2 (**orange**) – 10% F-16 ops. on Rwy. 21 only (0% night departures)



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Runway 3/21 Extension - Next steps

1. Identify funding source
 - FAA – Not justified for funding
 - Bonding
 - Air National Guard
 - Other
2. NEPA review
3. Wetland permitting
4. Design
 - FAA reimbursable agreements
5. Multi-year construction
 - Align with related taxiway projects

Note: Because there is no identified funding source, no related projects are included in the Master Plan 20 Year CIP



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Runway 3/21 – MPAC Feedback

The planning process thus far for Runway 3/21 has followed the key process objectives outlined for Vision 2040



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Runway 3/21 20-year Planning Period Recommendations

- Runway Length/Pavement
 - **Routine maintenance**, such as joint repair and crack sealing should be performed on a scheduled basis to extend the life of the pavement.
 - A **rehabilitation** project should be completed by 2027.
 - **Reconstruction** of Runway 3/21 should be completed around 2040.
- Electrical/Lighting
 - **Lighting system should be replaced** in the near-term
 - The runway sign and runway light systems should be **updated to LED**



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Runway 3/21 20-year Planning Period Recommendations

- NAVAIDs
 - Coordinate with the FAA TechOps to determine if the **Runway 3 REILs should be replaced** as part of the Runway 3/21 lighting replacement project.
 - Continue to coordinate with FAA Tech Ops to **plan for future replacement of the PAPIs** when they reach the end of their useful life.



REIL Assembly Unit



REIL Power/Control Cabinet



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Airside Recommendations and Alternatives

Taxiway Network



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Taxiway Network Analysis

- The Taxiway TAC and multiple 1:1 stakeholder meetings influenced the development of the taxiway network plan.
- A TAC was also initiated to provide feedback on aircraft parking, building area development and ATCT siting.
- These TACs combined for multiple meetings at the end of the process to combine the analysis into a comprehensive look at taxiways and building areas.

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TDG requirements by aircraft type

	Civilian Aircraft Requirements				UFC / Military Aircraft		
	TDG 2 CRJ-700	TDG 3 A-319	TDG 4 MD-90	TDG 5 A-330	Class A UC-35	Class B F-16	Class B C-5
Pavement Width	35'	50'	50'	75'	50'	75'	75'
Paved Taxiway Shoulder Required	No	Recommended	Yes	Yes	N/A ¹	Yes ¹	Yes ²
Paved Taxiway Shoulder Width	15'	20'	20'	30'	- ¹	10' ¹	25' ²
Total pavement width	65'	90'	90'	135'	50'	95'	125'

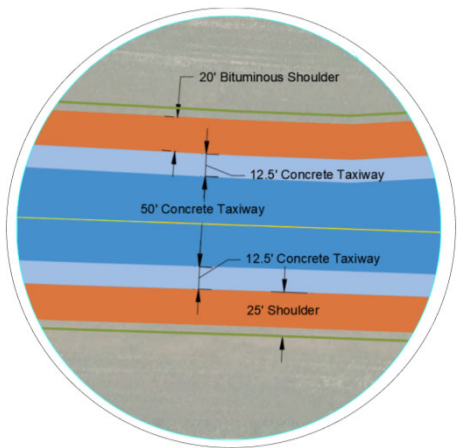
Notes:

¹Air Force taxiways devoted exclusively for fighter and trainer aircraft

²Army and Air Force airfields

74

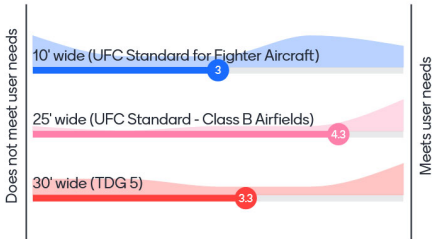
Taxiway Design Standards



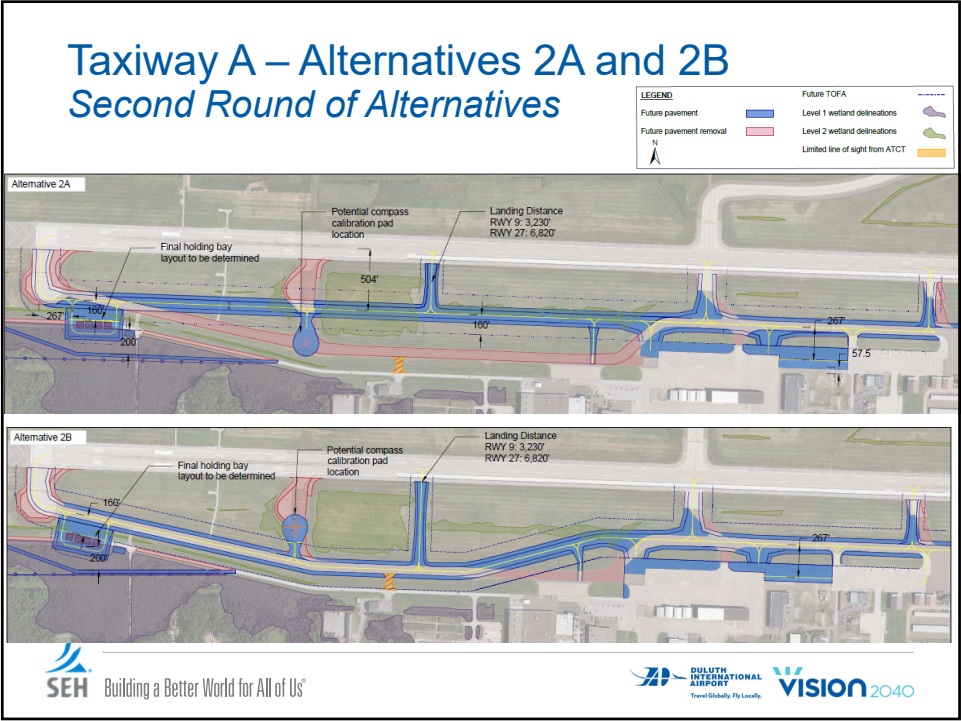
Taxiway A Stakeholder Feedback

Taxiway A Shoulder Width

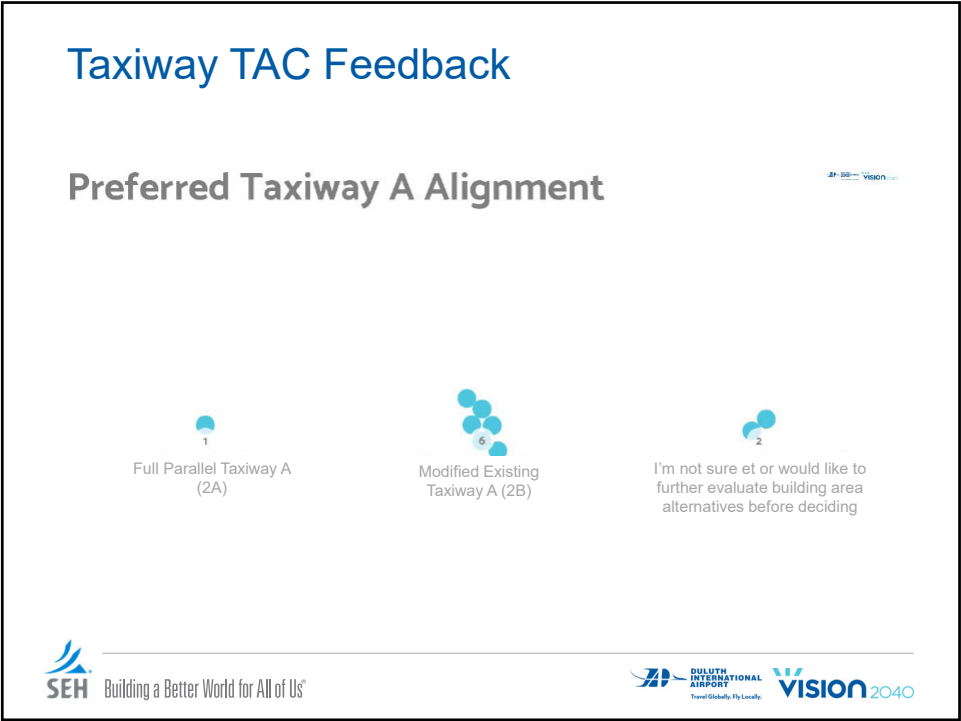
Mentimeter



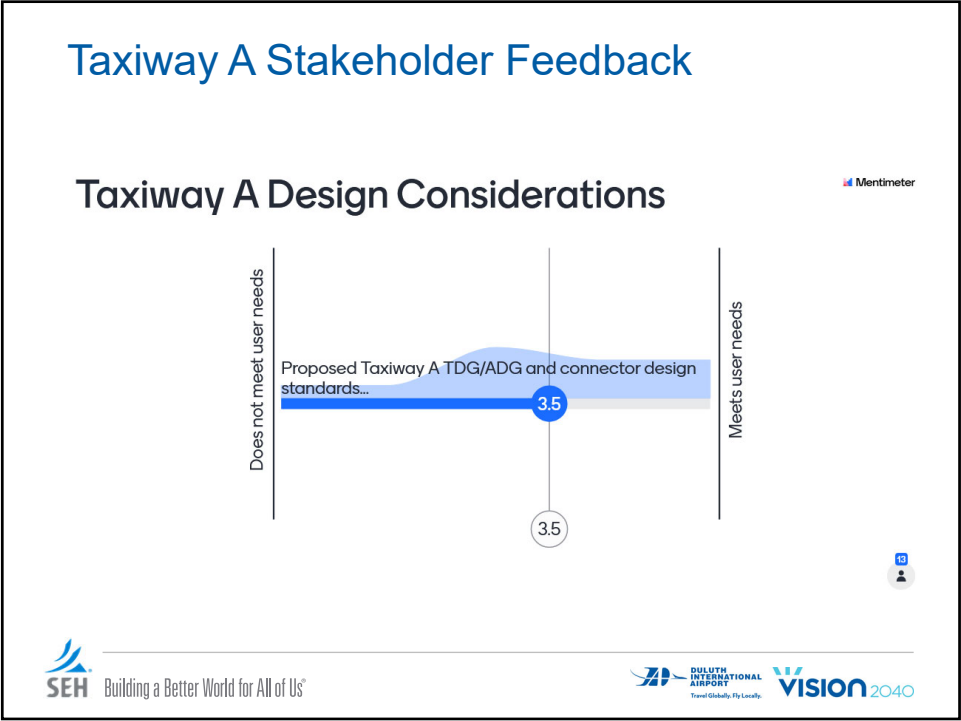
The 148th indicated that 25' wide shoulders aligns with their design standards and fully supports their mission



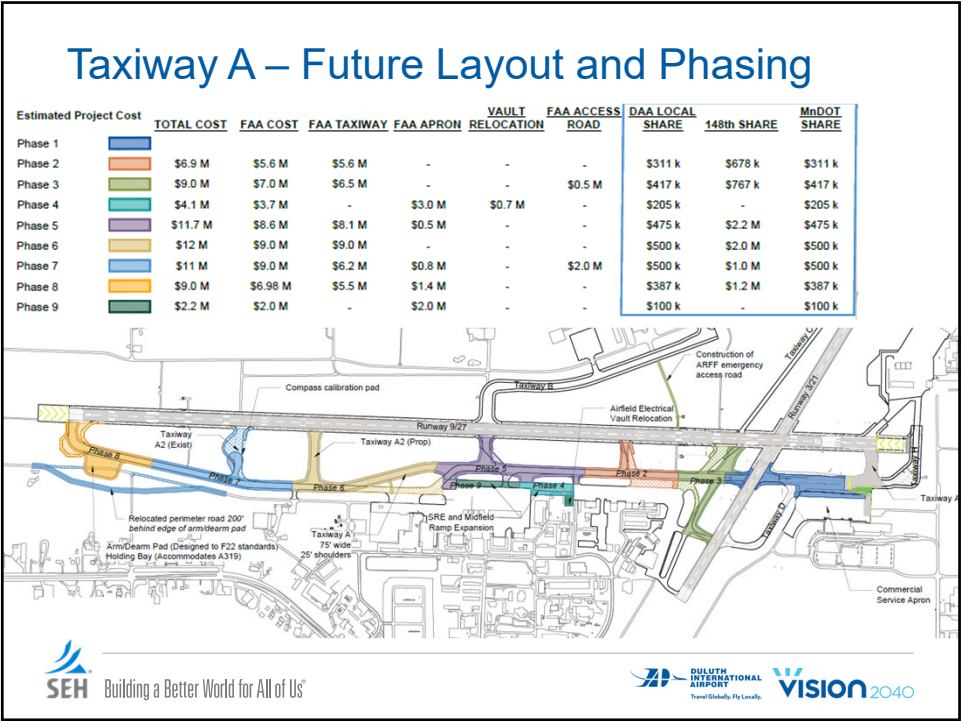
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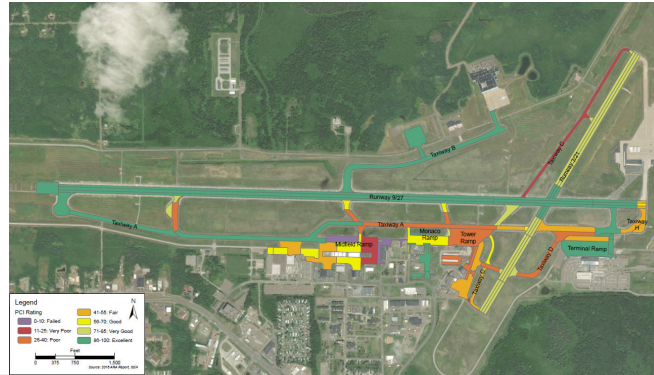
79



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Taxiway C

- Taxiway C is in very poor condition north of Runway 9-27 (2018 Report).
- Pavement reconstruction of both Runway 3/21 and Taxiway C is needed in the near-term



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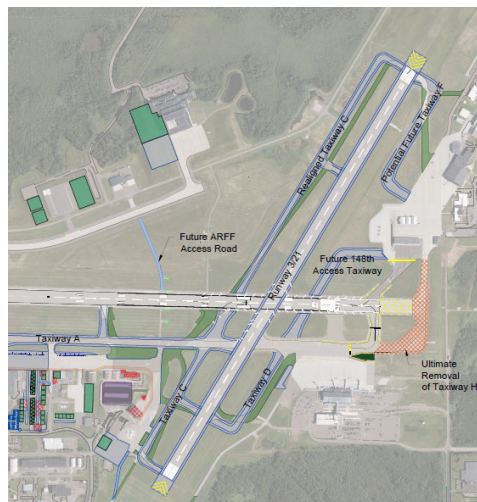


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Proposed Runway 3/21 Taxiway Network



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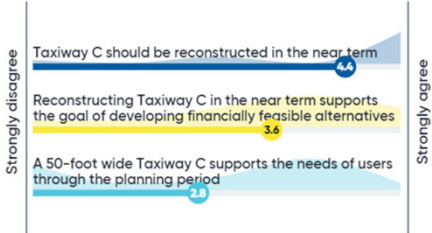
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October 2021 TAC Feedback



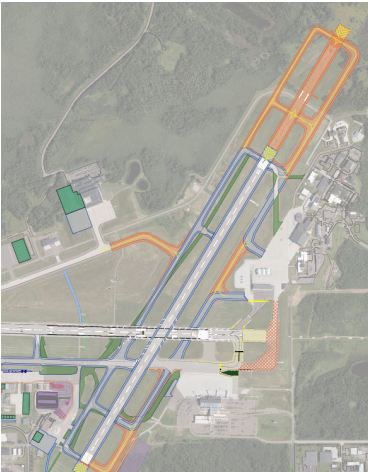
Rate the following statements for future Taxiway C, with Runway 3-21 at its' current length



Press S to show image

Ultimate Runway 3/21 Taxiway Network (20+ years, triggered by runway extension)

Full length Taxiway D and C



Full-length Taxiway D



Full-Length Taxiway Alternatives for Runway 3/21

Taxiway C Full-length

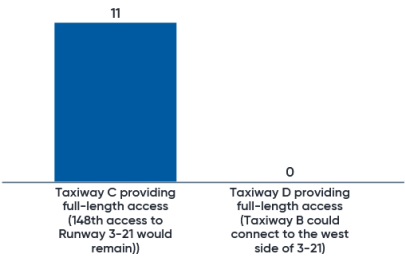
- Designed for critical aircraft
 - Large aircraft would need to back-taxi on Runway 3 to the Guard Ramp
- Does not meeting current design standards for runway to taxiway separation. Requires taxiway shift.
- Poor pavement condition, requires reconstruction in the near term
- Control Tower identified a better traffic flow with a full-length on the west side

Taxiway D Full-length

- Could potentially be built in the long term (20+ years)
- Could be triggered by the ultimate Runway 3-21 extension
- Additional funding opportunities if it becomes the parallel taxiway to Runway 3/21


Full-Length Taxiway Alternatives for Runway 3/21

If Runway 3-21 is extended to 8,000 feet, which full length taxiway do you prefer (assuming a taxiway is only provided on one side)?




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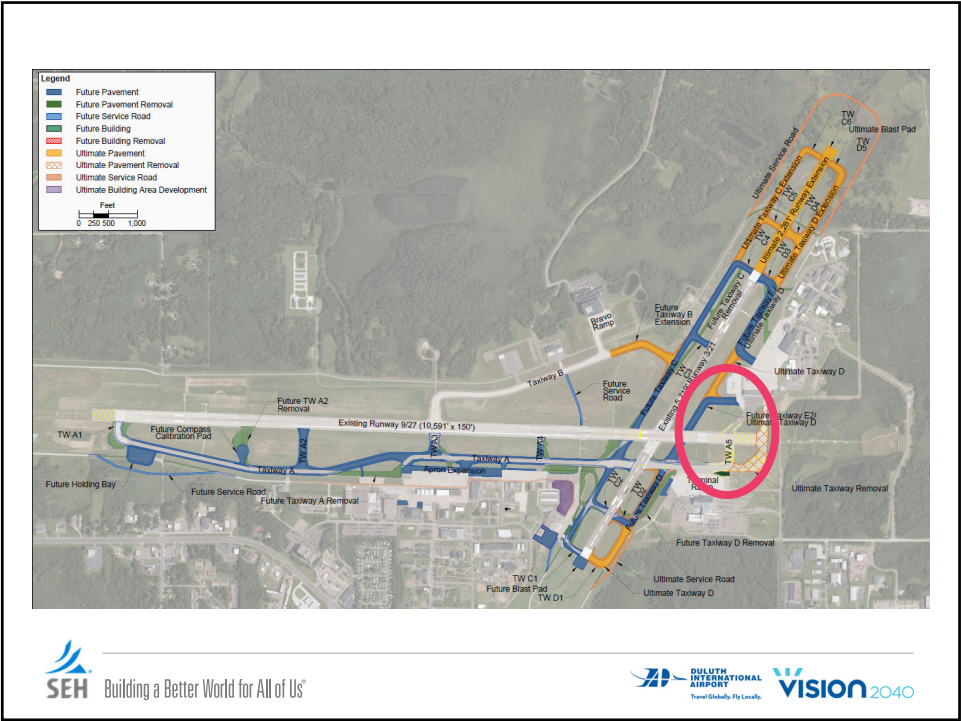
- LED Lights are ~50% to 75% more efficient than incandescent
- LED lights last 10x as long
 - Incandescent runway lights - average life of 1,000 hrs
 - LED runway lights - average life of 100,000 hrs

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Airside Recommendations and Alternatives

Aircraft Parking and Hangar Development



89

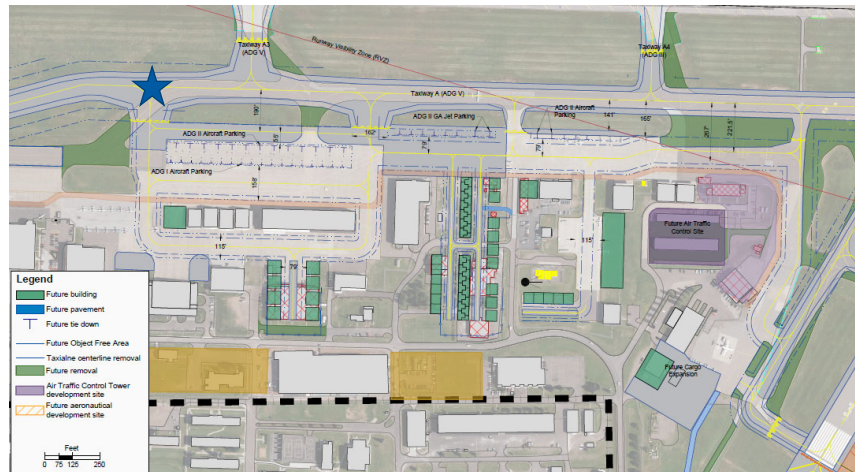
Goals of the Aircraft Parking Apron

- Designated helicopter area
 - 3 to 4 helicopter parking spots
 - Large box hangar(s)
- Group development by use and similar sized aircraft
- Remove aircraft parking in Runway Visibility Zone (RVZ)
- Eliminate existing ATCT line of sight challenges and avoid future line of sight limitations
- Aeronautical manufacturing expansion space
- Larger hangars
- Ranch and T-hangars
- Adequate aircraft parking including for large aircraft



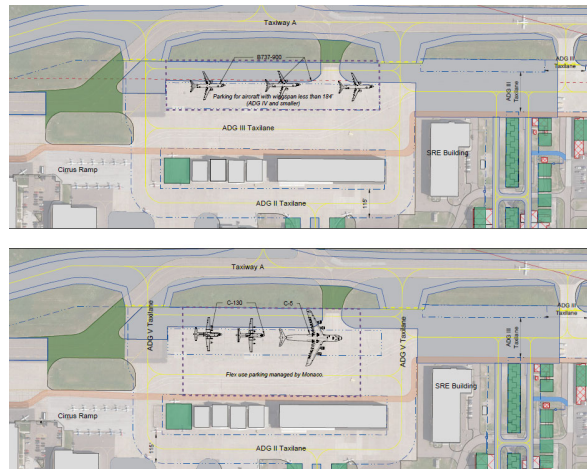
90

Aircraft Parking Aprons



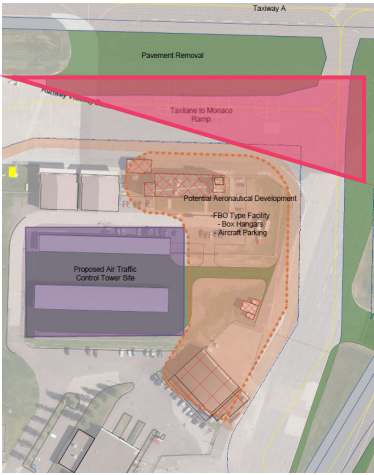
91

Midfield Ramp – Large Aircraft Flex Parking



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Tower Ramp



Future Building Area Layout



Ultimate (long-term) Building Area Expansion

- East of Runway 3/Southwest of terminal
 - Area could be developed for small or large GA, cargo, helicopter or other specialized use
 - Development timing and use dependent upon needs



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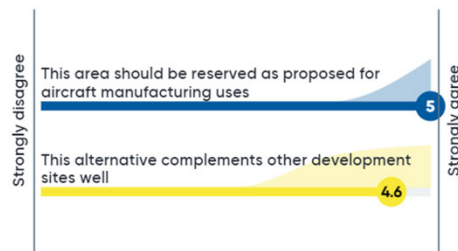
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October 2021 Taxiway TAC Feedback



Rate the following statements below for the area west of Cirrus



Press 5 to show image



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October 2021 Taxiway TAC Feedback

Considering the proposed building area development, rate these statements



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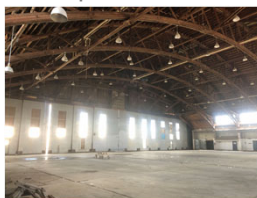
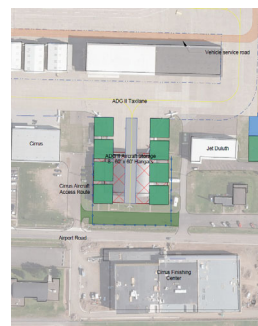
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Hangar 101 Demolition

- **Hangar is Eligible for Listing on the National Register of Historic Places**
- An Environmental Assessment is required prior to demolition
- Evaluation of subsurface contamination (USACE will evaluate) is needed after structure is removed. Presence and levels of any contamination and future use of site will impact next steps and timing prior to availability of the site for development.



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- Hangar 101 hangar was designed using a crescent arch support system, a commonly used truss system stemming from material shortages during World War II.
- Hangar 101 is remarkably similar in design to a now demolished Readiness Hangar at Ellsworth Air Force Base.



Hangar at Ellsworth Air Force Base

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Airside Recommendations and Alternatives

Air Traffic Control Tower



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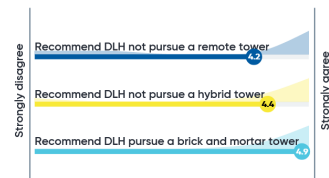
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Air Traffic Control Tower TAC

- Committee members were given a presentation on a remote tower pilot program by the Colorado Division of Aeronautics and Northern Colorado Regional Airport
- The applicability of the remote tower concept was evaluated by the committee members
- Committee did not recommend further evaluation of a remote tower

Do you support the following recommendations for the ATCT replacement?



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Air Traffic Control Tower Siting Criteria

- Limit potential impacts on instrument approaches and their protected surfaces
- Limit impacts on potential communication, navigation and surveillance equipment
- Unobstructed view of all movement area
- Control Tower Orientation
- Economic considerations



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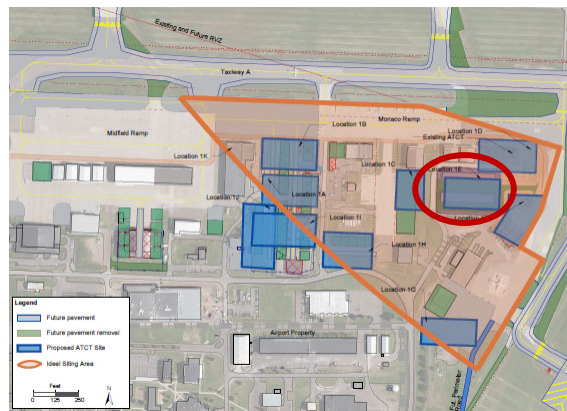
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	Location	Approximate Cab Height (AGL)	Building area height restrictions	Meets minimum FAA Standards	
Southwest Quadrant	Alternative 1A	South of the existing vault	100'	20' to 30'	Yes
	Alternative 1B	Aligned with the vault between Monaco and the SRE	85'	25' to 30'	Yes
	Alternative 1C	South of Monaco ramp along taxiway to the fuel farm	85'	20' to 30'	Yes
	Alternative 1D	Existing tower location	85'	30'	Yes
	Alternative 1E	Existing ranch and t-hanger area location	110'	35' to 40'	Yes
	Alternative 1F	North of FedEx along tower ramp	120'	55' to 70'	Yes
	Alternative 1G	South of FedEx	180'	35' to 40'	Potential impacts to Runway 3/21 instrument approach and departure procedures
	Alternative 1H	Immediately south of the fuel farm	130'	30' to 55'	Yes
	Alternative 1I	Hydrosolutions Site	110'	25' to 55'	Yes
	Alternative 1J	West of Hydrosolutions	110'	25' to 55'	Probability of identifying objects at the Runway 21 end is below minimum threshold
	Alternative 1K	Located on top of the SRE building	130"	25' to 30'	Yes
Northwest Quadrant	Alternative 2A	East of the ARFF Station	100'	-	A southern orientated tower is least preferred where snow accumulates
	Alternative 2B	North of the ARFF Station	100'	-	A southern orientated tower is least preferred where snow accumulates

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Preferred Air Traffic Control Tower Site



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Air Traffic Control Tower - Next steps



1. FAA Siting Study

- FAA reimbursable agreements – Will require a funding source to cover costs
- DAA is initiating coordination with FAA



2. Identify funding source for ATCT design and construction



3. NEPA review



4. Design



5. Multi-year construction

- Site preparation including T-hangar relocation
- Tower construction



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Lunch Break



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Landside Recommendations and Alternatives



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Passenger Boarding Bridge Assessment

- Four total boarding bridges
- 1 gate was purchased new; the other 3 were refurbished
- Minimum useful life is ~20 years for Passenger Boarding Bridges

Gate Number	Bridge Age
Gate 1	9 years
Gate 2	17 years
Gate 3	12 years
Gate 4	12 years



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Passenger Boarding Bridge Assessment

- Preventive maintenance tasks should continue to extend the useful life
 - Painting
 - Carpet replacement
 - Upgrade lighting to LED
 - Repair canopy / replace metal trim
- Potential replacement timeline
 - Gate 1 as early as 2030
 - Gate 2 as early as 2026
 - Gate 3 as early as 2026
 - Gate 4 as early as 2026
- Ongoing maintenance can often prolong the usable life



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Terminal Secure Area

- Existing seating capacity: **391 seats**
- As Gates 1 and 4 are used by larger aircraft (ie. Sun Country), increased capacity may be needed.
 - Redistribution of the gate hold seating layout can increase seating to **476 seats**, an increase of 151 seats.
 - Based on forecasted load factors (70%-85%, on average), this should provide sufficient space throughout the planning term.
 - Expansion of the terminal is possible to add gates, if needed, long-term.



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Terminal Secure Area

Scenarios with 4 gates in use at the same time:

2 737-800s (Sun Country), EMB-175 and CRJ-900

- 100% Load Factors: 582 Passengers
- 80% Load factors: 466 Passengers

EMB-175, CRJ-700, A-319/320 and CRJ-900

- 100% Load Factors: 452 Passengers
- 80% Load factors: 362 Passengers

1 737-800 (Sun Country), EMB-175, and 2 CRJ-900

- 100% Load Factors: 485 Passengers
- 80% Load factors: 388 Passengers



111

Gate Area Layouts

Figure 1 - Existing Gate Hold Exhibit:



Figure 2 - Option 1: Gate Hold Redistribution Exhibit:



112

Vehicle Parking Recommendations

Replace and upgrade the parking management system technology. Options that can be considered include:

- A varied rate system for the two parking products (garage and paved surface lot)
- A transition to a fully cashier-less exit lane
- Pay-on-foot options
- Credit card in/out systems
- Technology to provide parking space availability to customers for both the parking garage and surface lot

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Vehicle Parking Recommendations



Electric Vehicle charger stations should be installed in a paid parking lot – rebates may be available through Minnesota Power and additional opportunities may come from Infrastructure Bill



Valet parking is a service that could be considered seasonally when the parking ramp and lots are at higher capacity and when winter weather makes walking to and from a car less desirable



The airport should consider the value of dedicated parking spaces for travelers with small children

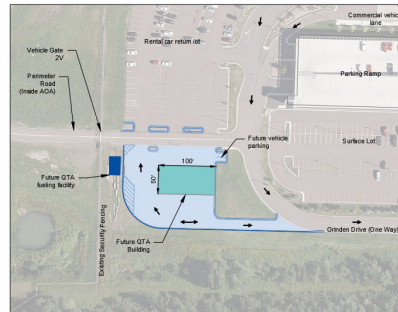


Construct a TNC shelter and designated pickup location with appropriate wayfinding in the commercial vehicle lane

114

Quick Turnaround Facility (QTA)

- Rental car agencies currently take vehicles off the airport to clean and fuel
 - Increased vehicle turnaround time
 - Increased staffing needs
- A quick-turn-around (QTA) facility provides on-site servicing and fueling of vehicles
 - Common use facility (available to all rental agencies)
 - Potential to be funded with CFCs
 - Owned by DAA and paid for through CFCs and user fees



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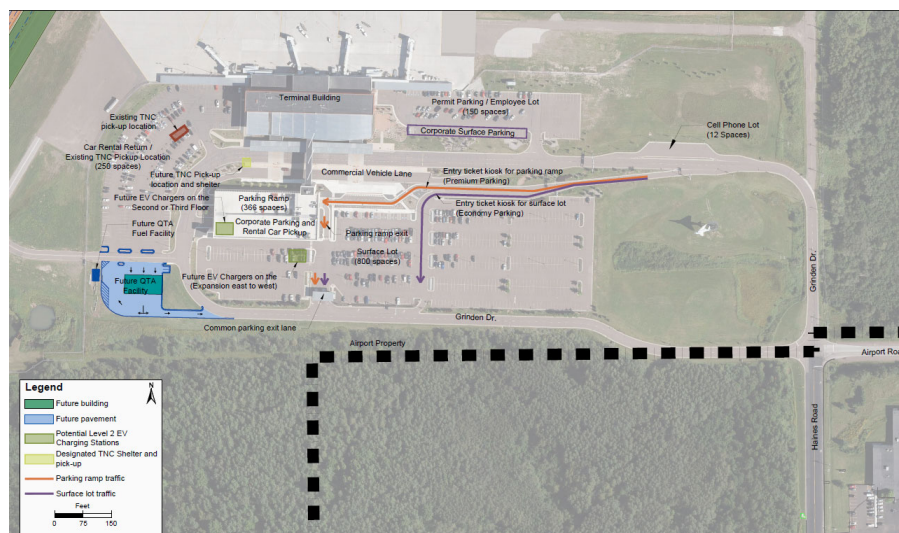


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Terminal Landside Future Layout



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SRE Equipment Replacement

Airport Owned Snow Removal Equipment (SRE)							
Unit	Equipment Type	Brand	Model	Manufacturing Year	Funding Source	Grant Number	Planned Replacement Year
13	Plow	Oshkosh	HB237	1997	90% / 10%		2029
16	Plow	Oshkosh	P2525-SP	1987	90% / 10%	AIP-07	2026
17	Grader	Caterpillar	163H	2005	PFC 6		2034
18	Grader	Caterpillar	163H	1997	90% / 10%		2030
19	Grader	Caterpillar	163M3AWD	2015	90%/5%/5%	AIP-58 / SP-182	2037
20	Blower	Oshkosh	H2723B	2008	100% Federal		2028
22	Blower	Oshkosh	H2718B	2001	PFC 4		2024
28	Loader	Caterpillar	IT62G	2005	PFC 6		2026
29	Sander	Chevrolet	4500 Kodiak	1999	90% / 10%	AIP-26	2035
30	Loader	Caterpillar	972M	2015	90%/5%/5%	AIP-58 / SP-182	2038
36	Multi-purpose	Oshkosh	HT2926	2014	70%/15%/15%	AIP-57 / SP-179	2025
37	Sweeper	Oshkosh	HB2723	2005	95% / 5%	AIP-37	2025 (Multi) 2039
42	Sander	GMC	8000	1979			2021
43	Loader	Caterpillar	930G	2005			2031



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SRE Equipment

- FAA funds replacement after 10-years.
- Can be useful for ~15 years depending on maintenance
- Airport has developed an SRE Vehicle Replacement Plan
- Near-Term recommended SRE Acquisitions:
 - 2023: Multi-Purpose Unit (plow and broom)
 - 2024: Replace Blower #22
 - 2025: Multi-Purpose Unit (plow and broom)
 - 2026: Batwing Plow #16, Loader #28
 - 2027: Sweeper #37
 - 2028: Blower #20
 - 2029: Batwing Plow #13

FAA Eligible SRE Maintenance Equipment	
Type	Eligible for FAA (AIP) Funding
Rotary Plow	3
Displacement Plow	6
Sweeper	6
Hopper Spreader	6
Front End Loader	1



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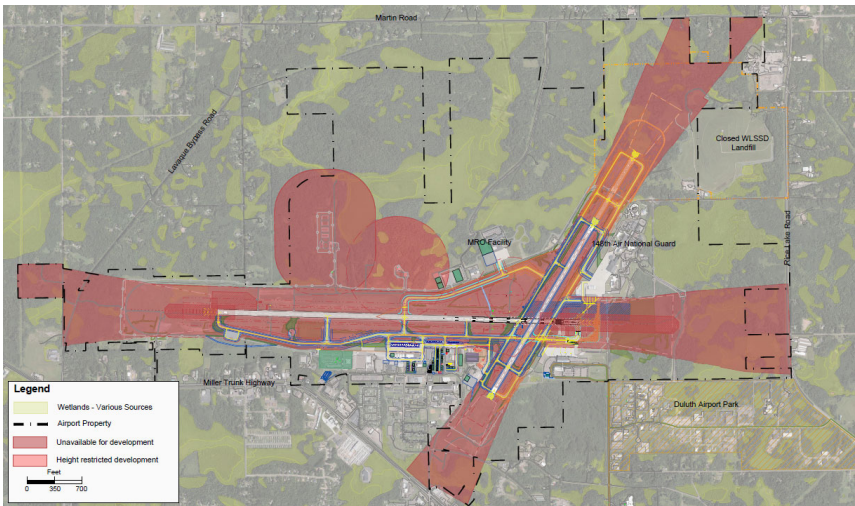
Landside Recommendations and Alternatives

Non-Aeronautical Development Sites



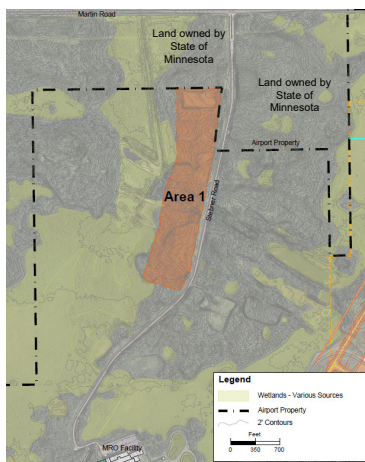
119

Restricted Development Areas



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Potential Development Area 1 Stebner Road



Non-Aeronautical Use

~ 35 Acres

Zoning: Commercial (St. Louis County)

Timeline: Requires FAA Land Release

Opportunities

- Road Access
- Potential to avoid wetlands
- Adjacent public land – Owned by State of Minnesota

Challenges

- No existing utilities
- Tree clearing
- Narrower site to avoid wetlands (500' deep)
- Topographic / ground elevation (20' decrease from Stebner Road towards wetlands)



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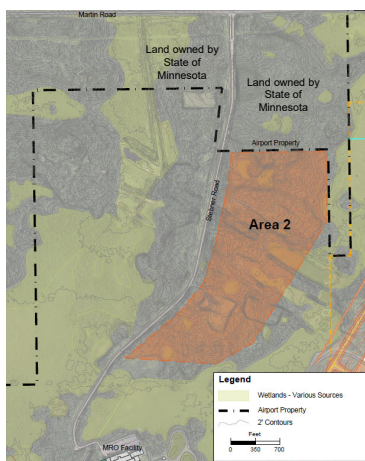


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Potential Development Area 2 Stebner Road



Non-Aeronautical Use

~ 90 Acres

Zoning: Commercial (St. Louis County)

Timeline: Requires FAA Land Release

Opportunities

- Road Access
- Large site
- Adjacent public land – Owned by State of Minnesota

Challenges

- No existing utilities
- Tree clearing
- Scattered wetlands – ability to avoid
- Topographic / ground elevation changes



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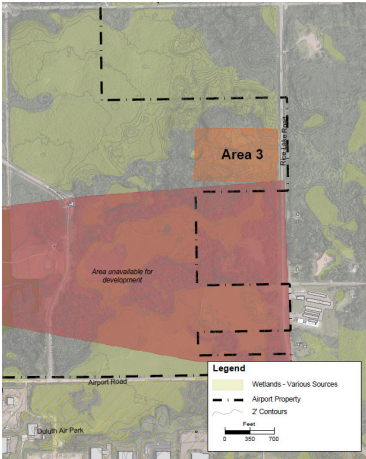
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Potential Development Area 3

Rice Lake Road



Non-Aeronautical Use

~ 28 Acres

Zoning: Mixed Use Business (City of Duluth)

Timeline: Requires FAA Land Release

Opportunities

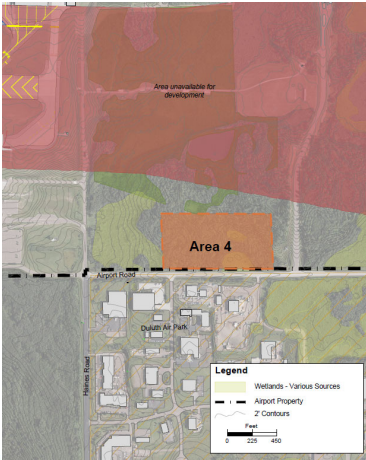
- Road Access
- Large site
- Ability to avoid wetlands

Challenges

- Tree clearing
- Topographic / ground elevation changes

Potential Development Area 4

Airport and Haines Road



Non-Aeronautical Use

~ 10 Acres

Zoning: Rural Residential (City of Duluth)

Timeline: Requires FAA Land Release

Opportunities

- Road Access
- Busy roadway
- Nearby utilities
- Minimal Wetland impacts / potential to avoid

Challenges

- Tree clearing
- Building out utilities to site
- Topography / Ground elevation

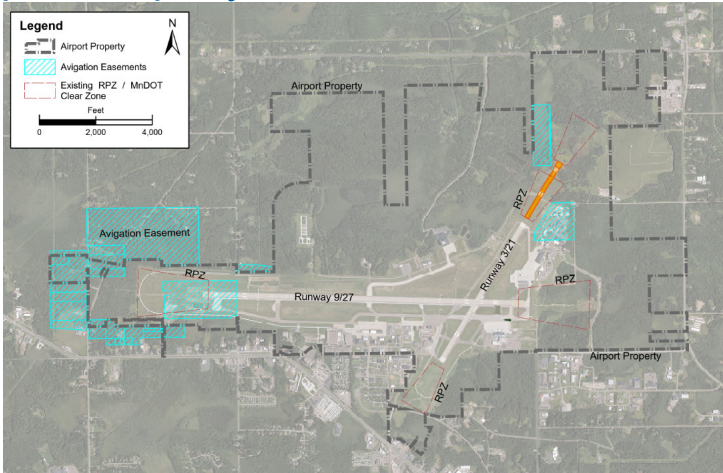
Landside Recommendations and Alternatives

Airport Property Overview



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Airport Property



Approximately 3,200 Acres owned in fee



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Airport Property Overview

- A significant portion of airport land was transferred from the United States of America (military) to the City/DAA.
- Documentation and data has been tough to gather that fulfills FAA requirements.
- FAA review of this deliverable will likely take 6+ months.



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Environmental Review



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NEPA Environmental Review

Categorical Exclusions (CatEx) Projects categorically excluded are those actions that have been found under normal circumstances to have no potential for significant environmental impact.

Environmental Assessment (EA) Actions that have been found by experience to sometimes have significant environmental impacts.

Environmental Impact Statement (EIS) The purpose of an EA is to determine whether or not a project will have significant impacts. Based on the results reported in an EA, the FAA then prepares either a finding of no significant impact (FONSI) or an EIS. An EIS further investigates a project's potential environmental impacts.



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Expected NEPA Review for CIP Projects

CatEx

- The majority of the projects on the CIP

Environmental Assessment

- Hangar 101 Demolition
- ATCT replacement
- Taxiway A Reconstruction Phases 7-8 and Holding Bay/Arm-Dearm Pad Construction
- Runway 3/21 extension (once it is a viable project)

EIS

- None



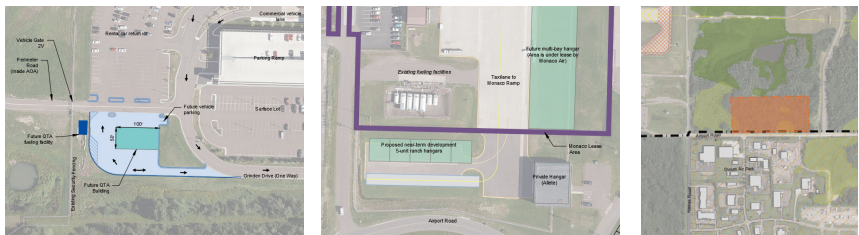
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CIP and Financial Implementation

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Recommended Near-Term Revenue Generating Opportunities

- Replace parking management system
- QTA facility
- Ranch hangars
- Airport Road development



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Overview

- Chapter defines the potential sources and uses of funds to support the Master Plan CIP to determine the financial feasibility of funding the Master Plan.
- There are two major near-term projects with significant financial requirements that are keys to the Master Plan:
 - Taxiway A reconstruction
 - Replacement of the Air Traffic Control Tower
- Plan includes non-aeronautical revenue generating development.
- Financial feasibility includes use of “other” funds (i.e. Customer Facility Charges, military related grants, and airport generated revenues) to supplement traditional sources.
- For forecasting purposes, a conservative 1.18% growth factor was applied to prevent revenue projection that way not be accomplishable if industry volatility continues.

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Summary of Financial Chapter Deliverables

- 20-Year CIP and financial chapter narrative
- Debt service forecasting
- Defined use of available CARES/CRSSA/ARPA funds to support development
- Rates and charges analysis and recommendations
- Identification of funding sources and uses
- PFC and CFC use strategy and projections
- Pro-formas for non-aeronautical development opportunities
- Cost per enplanement forecasting

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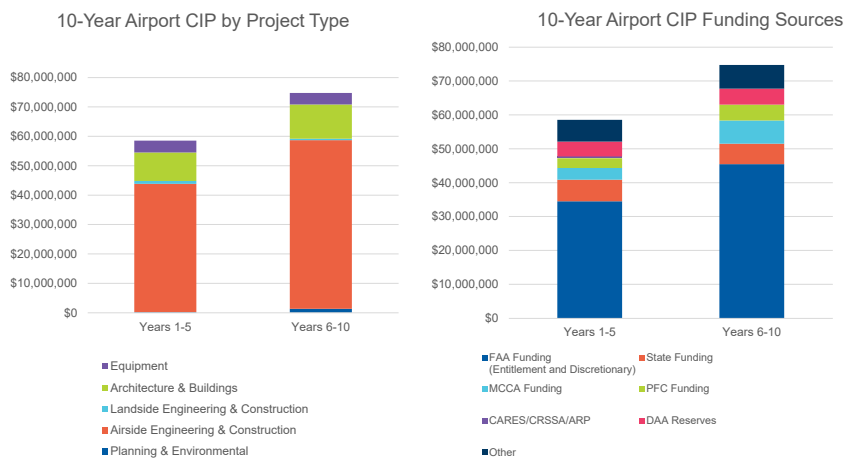
Primary Sources of Funding

- AIP Entitlement
- AIP Discretionary
- Passenger Facility Charge (PFC) - \$4.50
- CARES/CRSSA/ARP pandemic related grants
- Military Construction Cooperative Agreement (MCCA)
- MnDOT Aeronautics
- State Bond Funding
- Customer Facility Charges (CFC) – Rental Cars @ \$4.00
- Airport reserves/discretionary revenues
- New incremental aeronautical, non- aeronautical development revenue, and scheduled rates & charges increases
- Third Party Funding



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10 Year CIP Summary



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Feasibility Overview

Debt position substantially improves in 2027 as terminal bonds are paid off. This will have a substantial positive impact on use of discretionary revenue.

- **Short term (2021-2025)** the projects and funding are substantially defined. The funding for the Taxiway A and Air Traffic Control Tower replacement are dependent on State bonding, AIP discretionary funding, and MCCA funding.
- **Intermediate term (2026-2030)** includes the completion of the Tower and later phases of the Taxiway A replacement. Other projects are more fluid and could be adjusted depending on funding feasibility and other unanticipated priorities.
- **Long term (2031-2039)** are more flexible as to timing and scope. There is more uncertainty in this planning term.



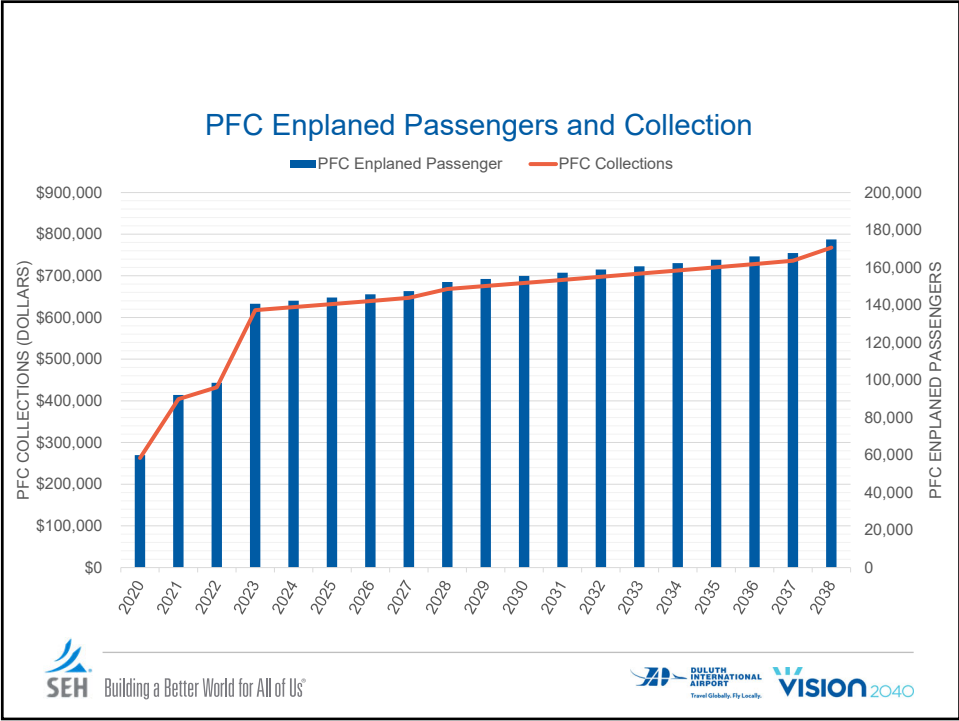
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Summary

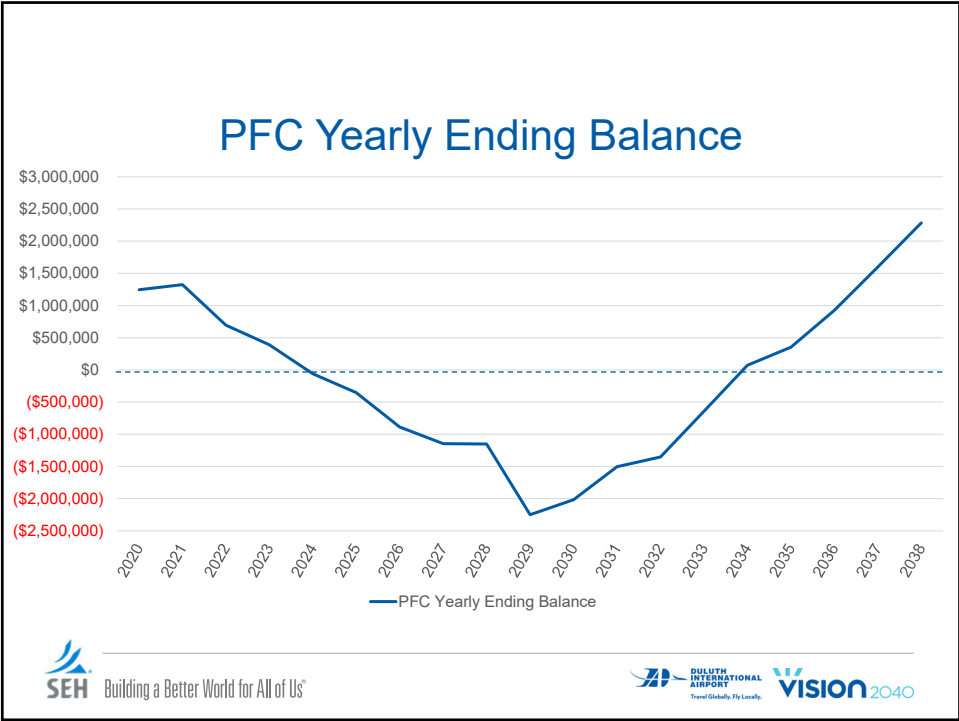
- In 2027 the debt position of DAA will be significantly improved which positively impacts the Master Plan financial feasibility.
- The scope of project definition becomes less defined in the later years which can result in modification to support the funding capacity at that time.
- There is a focus on including revenue producing projects in the short term to generate increased discretionary revenue.
- The sources and uses of funds are designed to minimize the potential that capital costs would be funded through rates and charges.
- Some CARES/CRISSA/ARP funds will be used to support general aviation related development and make cost recovery rates more competitive.



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PFC Projections

ESTIMATED PFC COLLECTIONS AND PFC FUND BALANCE

		Actual 2020	Forecast 2021	Forecast 2022	Forecast 2023	Forecast 2024	Forecast 2025	Forecast 2026	Forecast 2027	Forecast 2028	Forecast 2029	Forecast 2030
ANNUAL PFC COLLECTIONS												
Enplaned Passengers (000s)		66,117	101,549	108,669	155,150	156,981	158,833	160,707	162,604	167,936	169,738	171,561
% Enplaned Passengers paying PFCs		90.6%	90.6%	90.6%	90.6%	90.6%	90.6%	90.6%	90.6%	90.6%	90.6%	90.6%
PFC Enplaned Passengers	[A]	59,935	92,054	98,508	140,643	142,303	143,982	145,681	147,400	152,234	153,867	155,520
PFC Rate		\$4.50	\$4.50	\$4.50	\$4.50	\$4.50	\$4.50	\$4.50	\$4.50	\$4.50	\$4.50	\$4.50
Less: Admin. Fee		0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
Adjusted PFC Rate	[B]	\$4.39	\$4.39	\$4.39	\$4.39	\$4.39	\$4.39	\$4.39	\$4.39	\$4.39	\$4.39	\$4.39
PFC Collections	[C=A*B]	\$263,115	\$404,119	\$432,450	\$617,424	\$624,710	\$632,081	\$639,540	\$647,086	\$668,306	\$675,477	\$682,733
PFC FUND												
Beginning Balance	[D]	\$1,431,839	\$1,461,262	\$1,323,281	\$696,231	\$388,929	(\$59,356)	(\$354,553)	(\$887,303)	(\$1,145,981)	(\$1,151,833)	(\$2,247,979)
Annual PFC Collections		\$263,115	\$404,119	\$432,450	\$617,424	\$624,710	\$632,081	\$639,540	\$647,086	\$668,306	\$675,477	\$682,733
Interest Earnings		\$1,316	\$2,021	\$2,162	\$3,087	\$3,124	\$3,160	\$3,198	\$3,235	\$3,342	\$3,377	\$3,414
Total PFC Collections	[E]	\$264,430	\$406,140	\$434,612	\$620,511	\$627,833	\$635,242	\$642,738	\$650,322	\$671,648	\$678,855	\$686,147
PFC Uses												
City Loan 1 - GO Bonds Issued		\$322,331	\$326,038	\$324,163	\$321,813	\$323,619	\$324,769	\$325,238	\$909,000	\$677,500	\$1,775,000	\$455,000
PFC Pay-As-You-Go Project Costs		\$129,000	\$218,083	\$737,500	\$606,000	\$752,500	\$605,670	\$850,250				
Total Uses	[F]	\$451,331	\$544,120	\$1,061,663	\$927,813	\$1,076,119	\$930,439	\$1,175,488	\$909,000	\$677,500	\$1,775,000	\$455,000
Ending PFC Balance	[G=D+E-F]	\$1,244,938	\$1,323,281	\$696,231	\$388,929	(\$59,356)	(\$354,553)	(\$887,303)	(\$1,145,981)	(\$1,151,833)	(\$2,247,979)	(\$2,016,832)



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PFC Projections (continued)

Forecast 2031	Forecast 2032	Forecast 2033	Forecast 2034	Forecast 2035	Forecast 2036	Forecast 2037	Forecast 2038
173,406	175,272	177,161	179,072	181,005	182,961	184,941	192,946
90.6%	90.6%	90.6%	90.6%	90.6%	90.6%	90.6%	90.6%
157,192	158,884	160,596	162,328	164,081	165,854	167,649	174,905
\$4.50	\$4.50	\$4.50	\$4.50	\$4.50	\$4.50	\$4.50	\$4.50
0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
\$4.39	\$4.39	\$4.39	\$4.39	\$4.39	\$4.39	\$4.39	\$4.39
\$690,074	\$697,502	\$705,018	\$712,622	\$720,316	\$728,101	\$735,977	\$767,834
(\$2,016,832)	(\$1,503,307)	(\$1,352,317)	(\$643,775)	\$72,410	\$351,328	\$923,069	\$1,597,726
\$690,074	\$697,502	\$705,018	\$712,622	\$720,316	\$728,101	\$735,977	\$767,834
\$3,450	\$3,488	\$3,525	\$3,563	\$3,602	\$3,641	\$3,680	\$3,839
\$693,525	\$700,990	\$708,543	\$716,185	\$723,917	\$731,741	\$739,657	\$771,674
\$180,000	\$550,000	\$-	\$-	\$445,000.00	\$160,000.00	\$65,000.00	\$85,000.00
\$180,000	\$550,000	\$0	\$0	\$445,000	\$160,000	\$65,000	\$85,000
(\$1,503,307)	(\$1,352,317)	(\$643,775)	\$72,410	\$351,328	\$923,069	\$1,597,726	\$2,284,400



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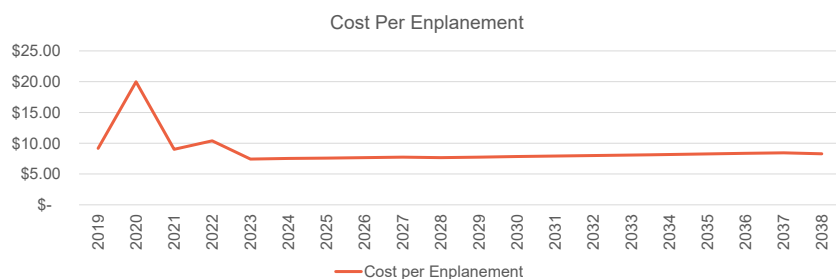


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Cost per Enplanement Projections



	Actual 2019	Actual 2020	Budget 2021	Budget 2022	Forecast 2023	Forecast 2024	Forecast 2025	Forecast 2026	Forecast 2027	Forecast 2028	Forecast 2029	Forecast 2030
Airline Landing Fees	\$354,728	\$217,925	\$183,674	\$192,858	\$198,643	\$204,603	\$210,741	\$217,063	\$223,575	\$230,282	\$237,191	\$244,306
Airline Terminal Rents	\$1,112,405	\$1,103,885	\$730,297	\$937,574	\$956,326	\$975,452	\$994,961	\$1,014,860	\$1,035,157	\$1,055,861	\$1,076,978	\$1,098,517
Total Airline Revenues	\$1,467,133	\$1,321,809	\$913,971	\$1,130,432	\$1,154,969	\$1,180,055	\$1,205,702	\$1,231,923	\$1,258,732	\$1,286,143	\$1,314,168	\$1,342,824
Airline Enplanements	160212	66117	101549	108669	155150	156981	158833	160707	162604	167936	169738	171561
Airline Cost per Enplanement	\$9.16	\$19.99	\$9.00	\$10.40	\$7.44	\$7.52	\$7.59	\$7.67	\$7.74	\$7.66	\$7.74	\$7.83



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Summary

- There are other potential sources of revenue that may become available that are not factored into the financial feasibility so that the CIP is not dependent on highly speculative funding sources.
- If unexpected sources are obtained, the financial feasibility should be adjusted with the objective of maximizing reserves.
- Additional funding from general aviation projects should be sought to reduce the cost basis and keep cost recovery rates as competitive as possible for new facilities.



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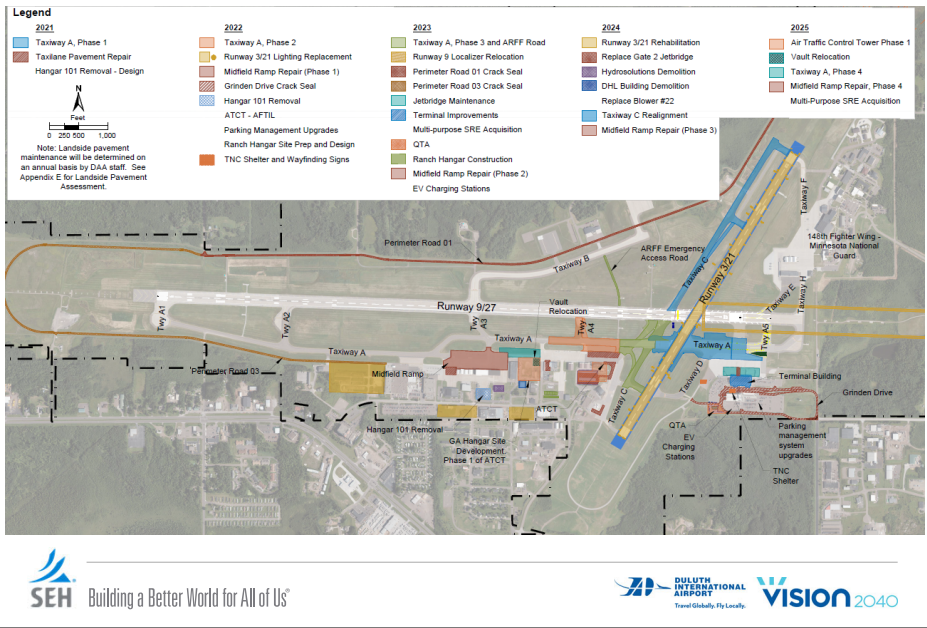
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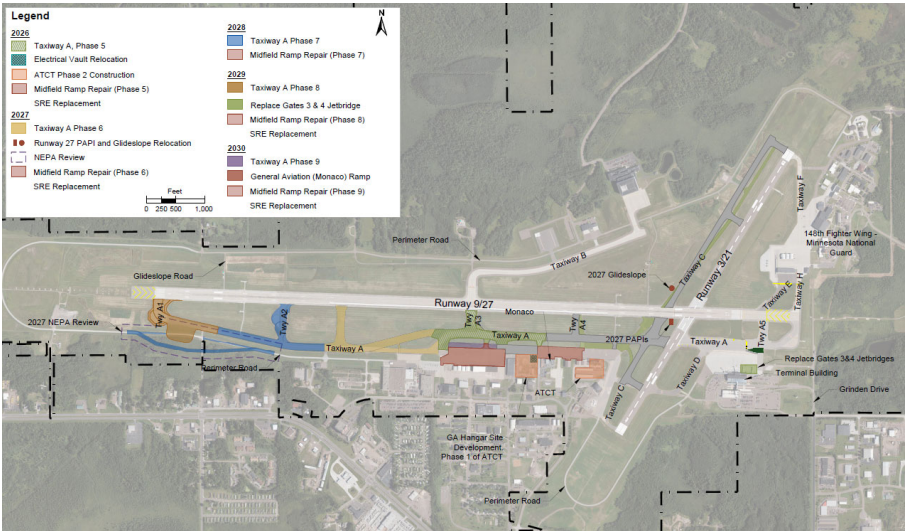
Summary (Continued)

- The ability to fund the Taxiway A replacement and the Tower are heavily dependent on State and Federal funding. If those funding sources materialize, the financial feasibility of the Master Plan CIP is manageable.
- Recommendations
 - The DAA consider adopting a policy on fund management to provide a cushion to support unanticipated capital needs.
 - Rates for revenue producing facilities should be reviewed annually and adjusted to balance fair market prices with funding requirements. To not do so, will be a lost opportunity that could impact the overall financial feasibility.

1-5 Years



5-10 Years

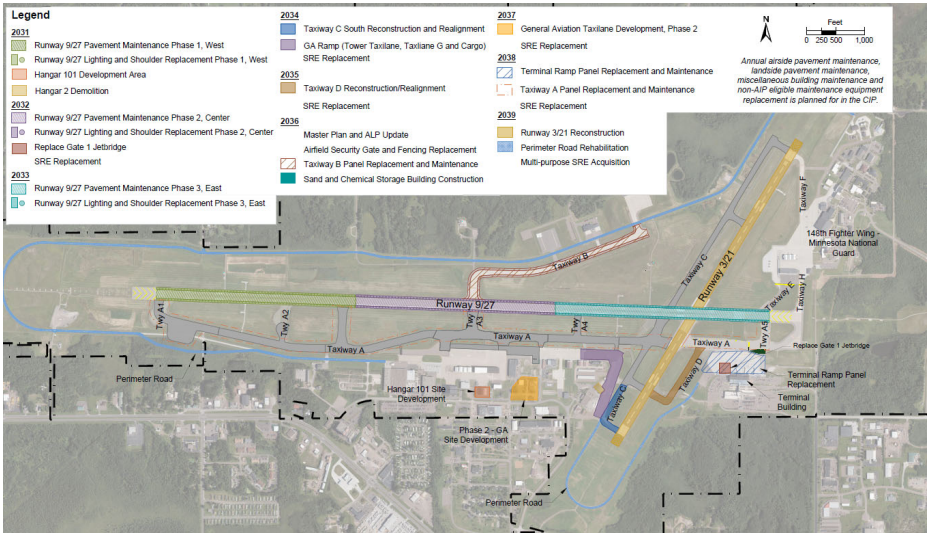


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10-20 Years



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Master Plan Advisory Committee (MPAC) Process Feedback

Mentimeter Results



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MPAC Meeting – Feedback

Do you feel the DLH Vision 2040 Master Plan has followed the process objectives identified at the beginning of the plan?



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