Duluth Airport Master Plan

Taxiway Network and Apron Parking Technical Advisory Committee (TAC) Meeting #6

June 28, 2021

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Meeting Agenda

- Air Traffic Control Tower preferred location
- Taxiway design and preferred taxiway network layout
- Apron and building areas preferred alternatives
- Master Plan next steps

<u>Meeting Goals:</u>

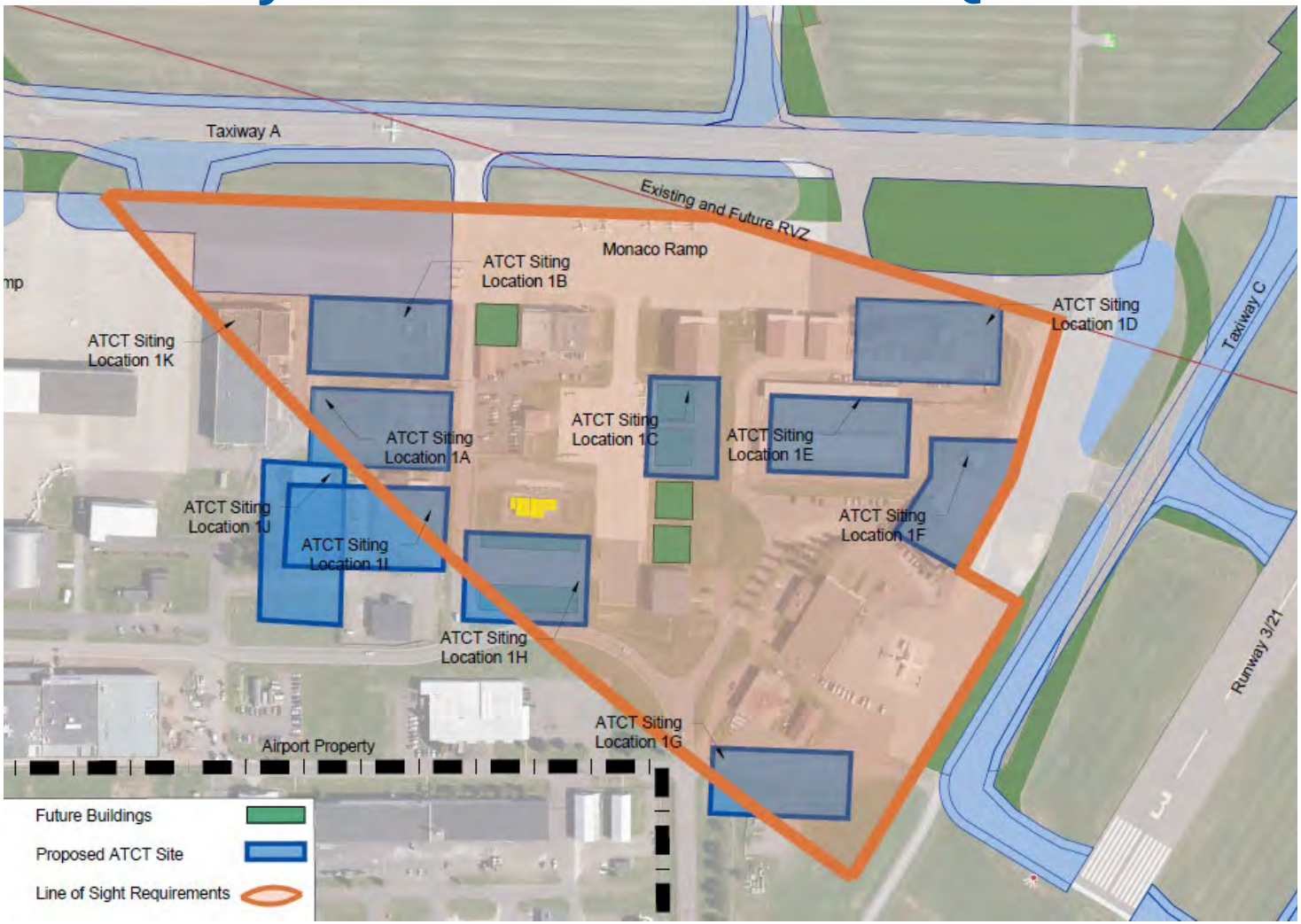
- Present selected preferred alternatives and receive feedback

Air Traffic Control Tower Siting Analysis and Preferred Alternative

Air Traffic Control Siting Criteria

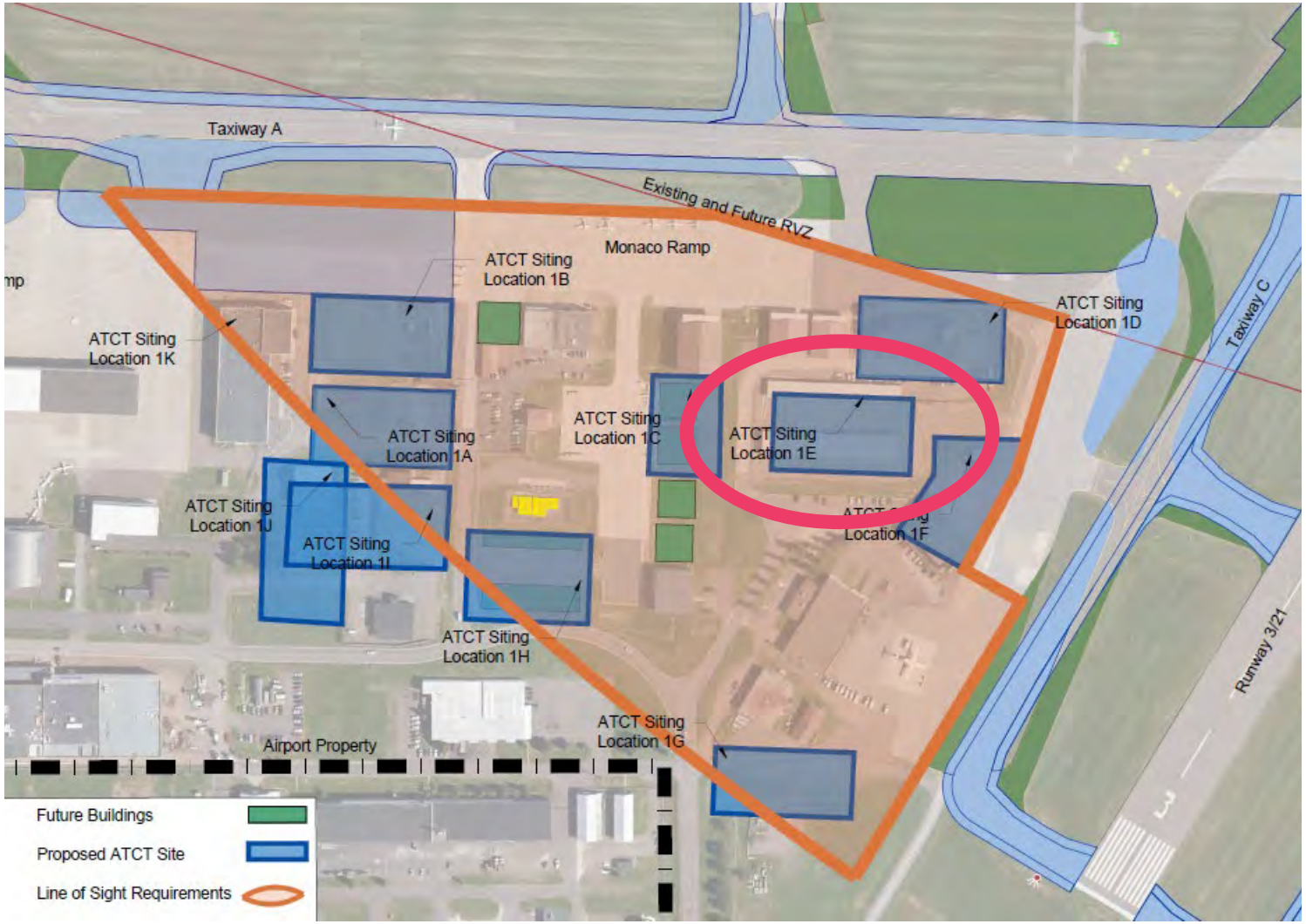
- Control Tower Orientation
  - Must be orientated where the primary view faces north or alternately east, west and finally south
  - In areas where snow accumulates, a southern orientation should be avoided.
  - Airport surfaces
- Economic considerations
  - Height, utilities, site access, etc.
  - Limit impacts to potential development and redevelopment sites
- *FAA will determine final siting and height of ATCT through an FAA study prior to project implementation.*

Preliminary Tower Sites – SW Quadrant



See ATCT TAC Meeting #3 materials on the [project webpage](#) for overview of full analysis and sites considered in each quadrant.

Preferred Tower Site



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

Taxiway Network

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’**

TDG 3 Eligible for FAA Funding

Notes:

[1]Air Force taxiways devoted exclusively for fighter and trainer aircraft

[2]Army and Air Force airfields

Taxiway Design

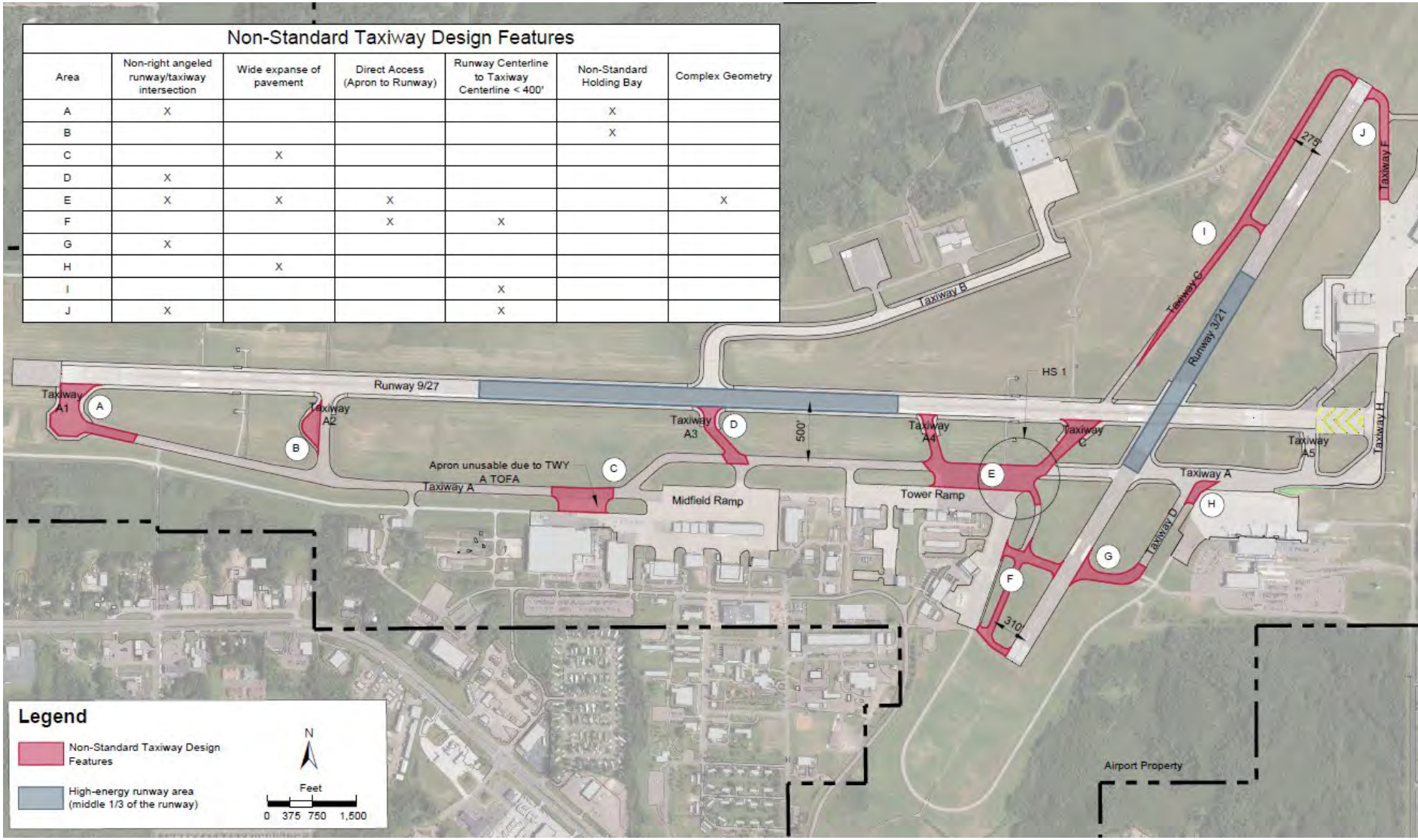
- Good design practices keep taxiway intersections simple.
- Complex layouts increase the possibility of pilot error.
- Three-node concept – A pilot has no more than 3 choices at an intersection – ideally, left, right and straight ahead.
- Intersection angles – Design turns to be 90 degrees wherever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

Design to Reduce Runway Incursions

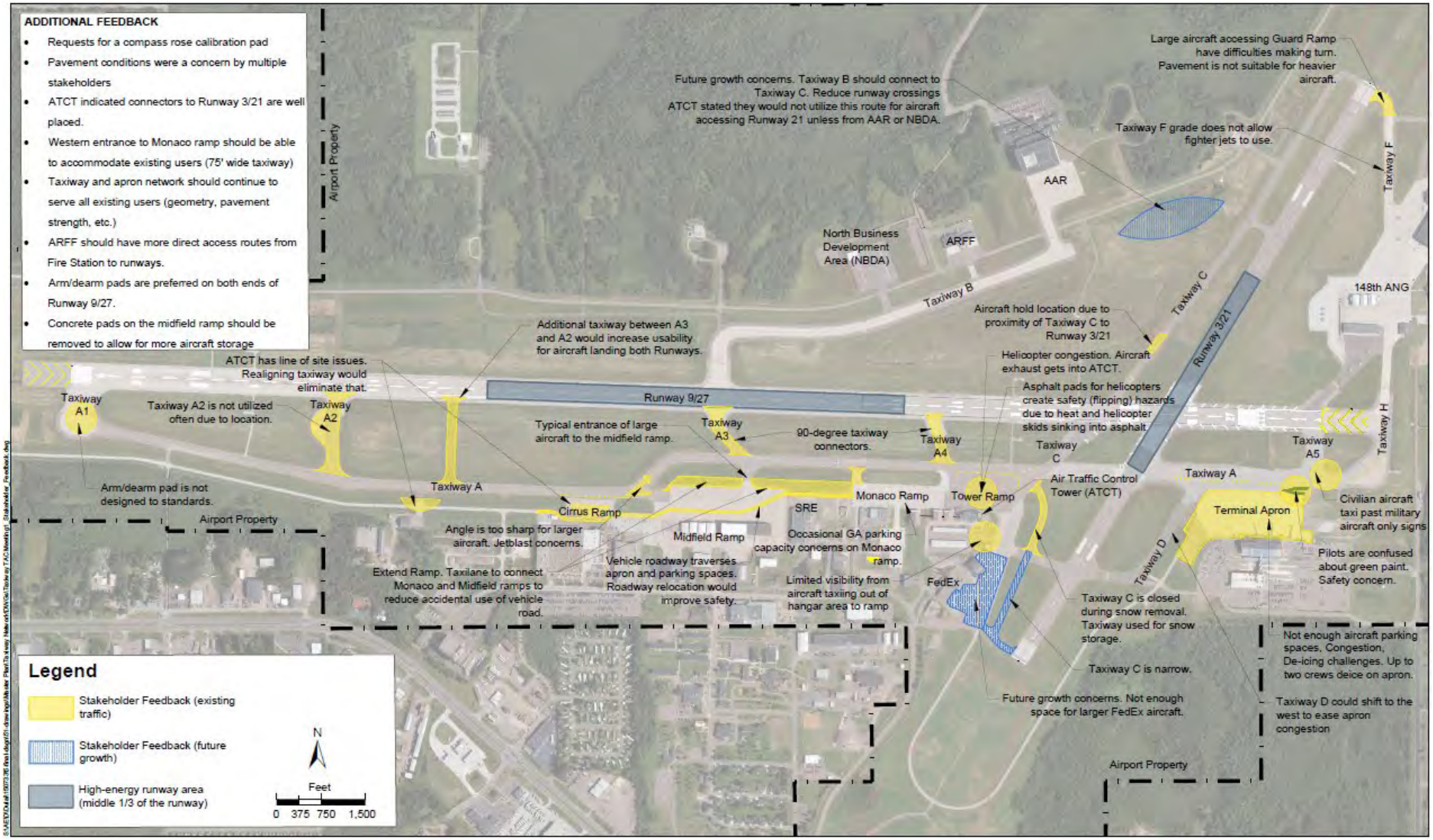
- Increase situational awareness, keep taxiway systems simple.
- Avoid wide expanses of pavement.
- Limit runway crossings.
- Avoid “dual purpose” pavements
- Avoid “high energy” intersections (middle 1/3 of the runway).
- Avoid direct access to runways
- Increase visibility – Right angle intersections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

FAA Non-Standard Areas (See figure in meeting packet)

Non-Standard Taxiway Design Features						
Area	Non-right angeled runway/taxiway intersection	Wide expanse of pavement	Direct Access (Apron to Runway)	Runway Centerline to Taxiway Centerline < 400'	Non-Standard Holding Bay	Complex Geometry
A	X				X	
B					X	
C		X				
D	X					
E	X	X	X			X
F			X	X		
G	X					
H		X				
I				X		
J	X			X		



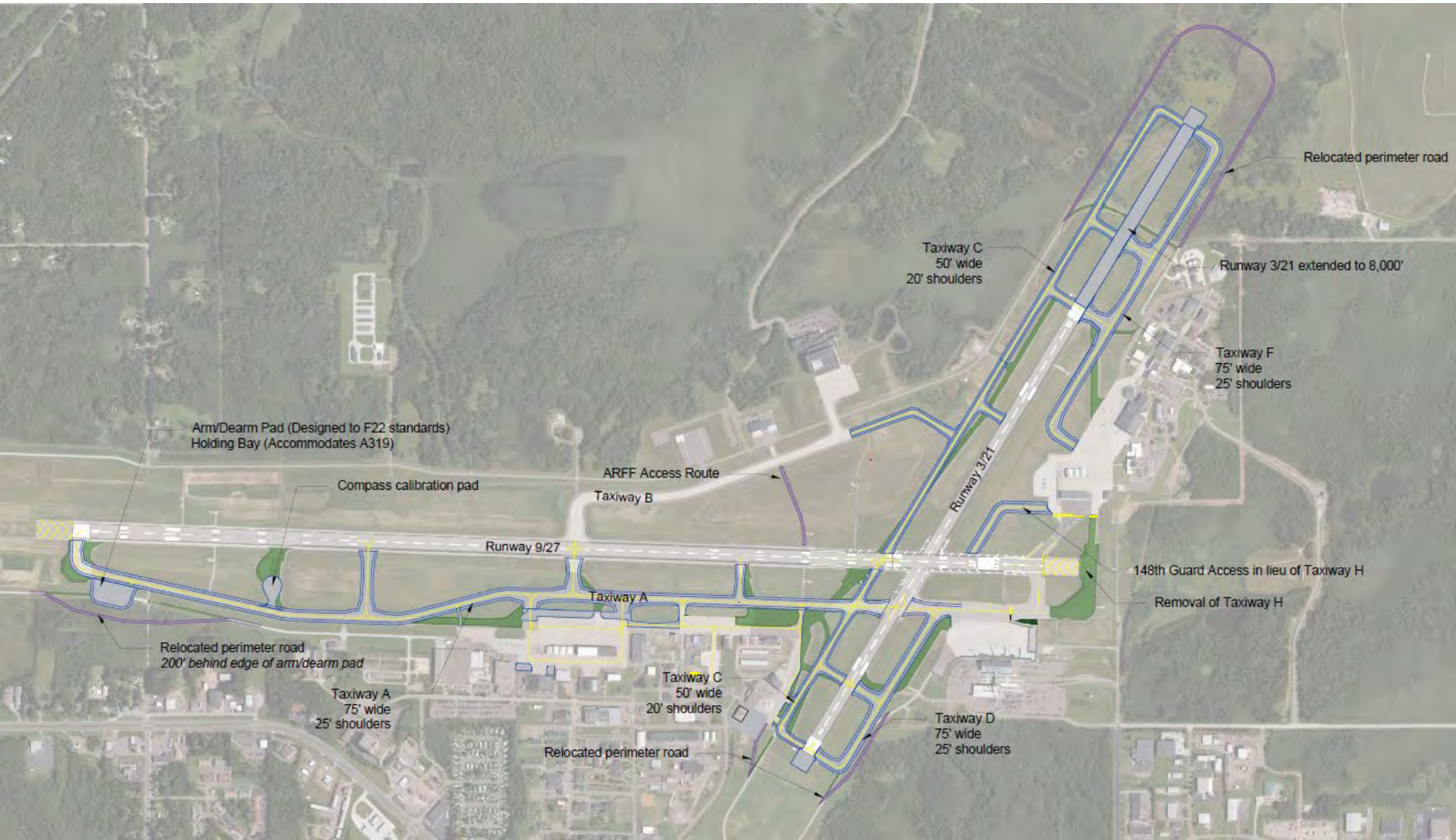
User Feedback (See figure in meeting packet)



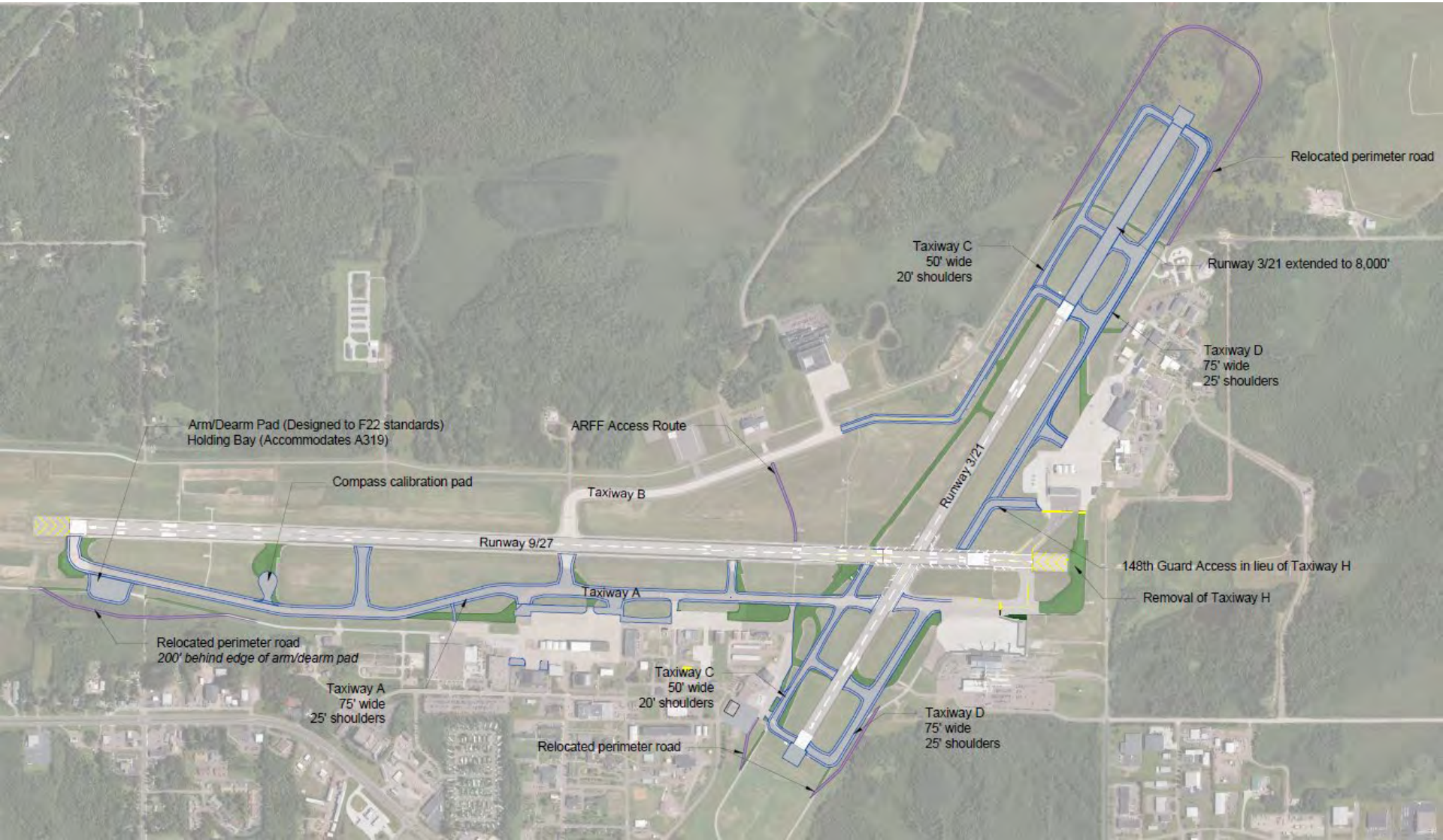
Taxiway Network Design Standards

	Pavement Width	Shoulder Width	Accommodates
Taxiway A	75’	25’	Meets 148th needs / exceeds critical aircraft
Taxiway B (West of MRO)	75’	25’	Meets 148th needs / exceeds critical aircraft
Taxiway B (East of MRO)	50’	20’	Critical Aircraft (A319)
Runway 9/27 Connectors	75’	25’	Meets 148th needs / exceeds critical aircraft
Taxiway A4	50’	20’	Critical Aircraft (A319)
Taxiway C	50’	20’	Critical Aircraft (A319)
Taxiway C and connectors	50’	20’	Critical Aircraft (A319)
Taxiway D and connectors	75’	25’	Meets 148th needs / exceeds critical aircraft
Taxiway F/E	75’	25’	Meets 148th needs

Preferred Taxiway Network – Alternative 1A
Taxiway C full-length



Preferred Taxiway Network – Alternative 1B
Taxiway D full-length

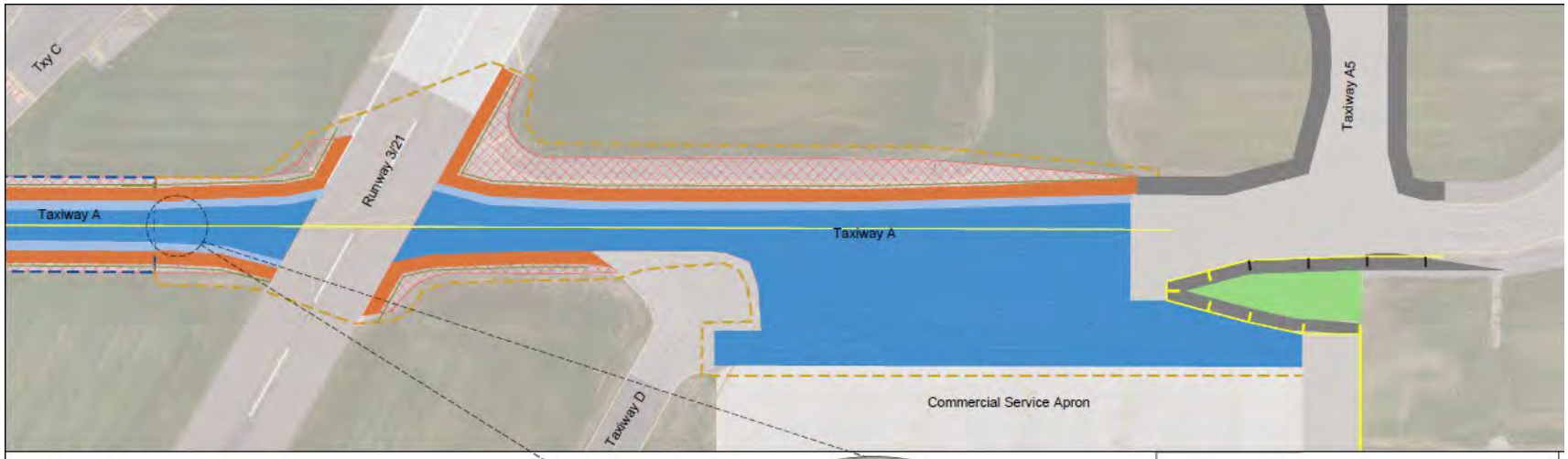


Mentimeter

Menti.com

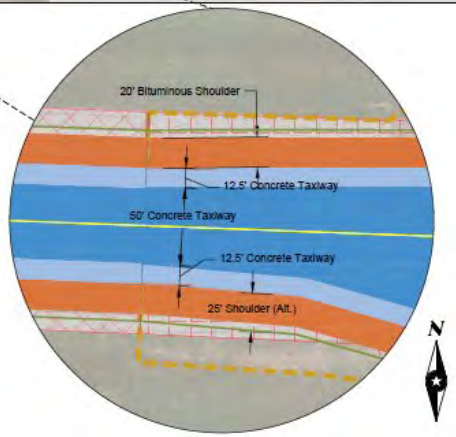
Code:

Next Steps – Taxiway A Phase 1



Phase 1 Preliminary Cost Estimate

- **Construction Total : $9,000,000**
- **FAA ineligible costs for 25ft of taxiway pavement: $1,000,000**
- Includes anticipated engineering costs for design and construction administration
- Includes concrete pavement for Taxiway A (75' width) and apron portion
- Bituminous Shoulders
- Includes assumed full electrical/lighting replacement, including all circuitry (approx. $225,000)
- Full subsurface drainage replacement
- Assumed drainage structure replacements within project area.



LEGEND

- Proposed Concrete Pavement
- FAA Ineligible Concrete
- Proposed Bituminous (20' Shoulder Assumed)
- 25' Shoulder Alt.
- Pavement Removals
- Phase 1 Project Area (Construction antic. 2022)
- Phase 2 Limits
- Phase 3 Limits

Planned construction in Summer of 2022

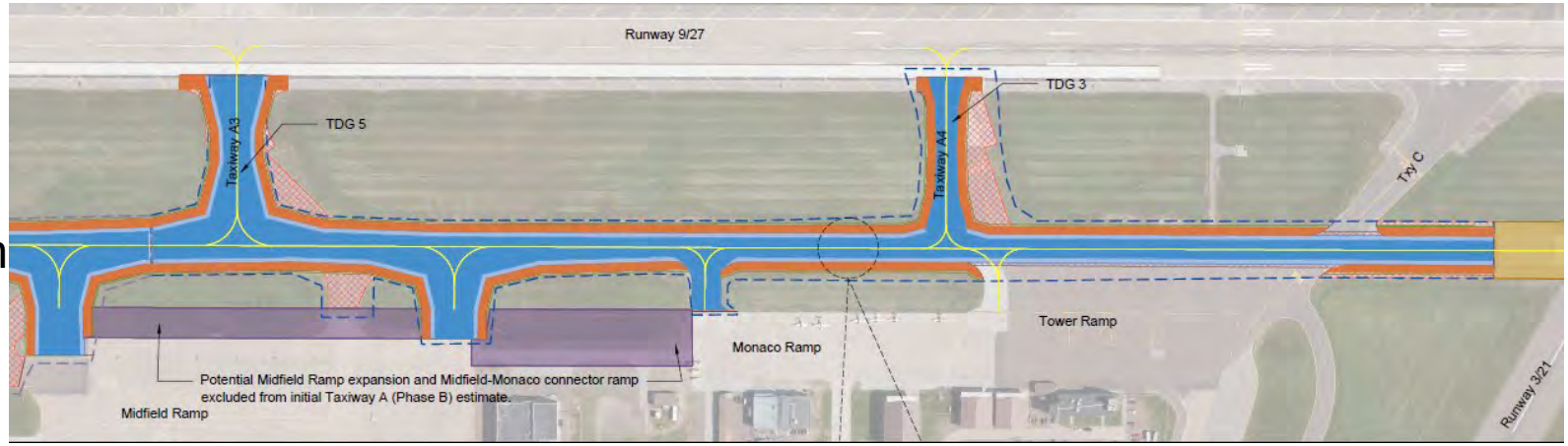
Next Steps – Taxiway A Phase 1 Funding

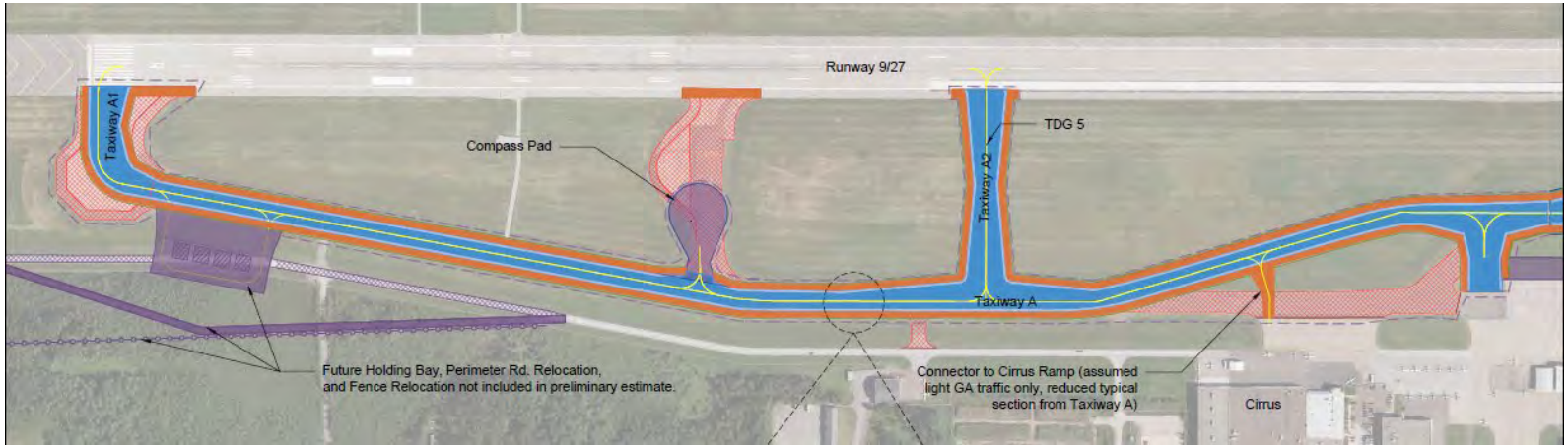
	Funding Sources			
	148th ANG	FAA (100% Funding)	MnDOT	Airport
Taxiway A Reconstruction	$796,000	$6.8 Million	-	-
Design	$16,800	$442,500	-	-
Construction Administration	$95,000	$800,000	-	-

Numbers are rounded

Next Steps – Taxiway A

Phase 2 – Planned construction in 2023



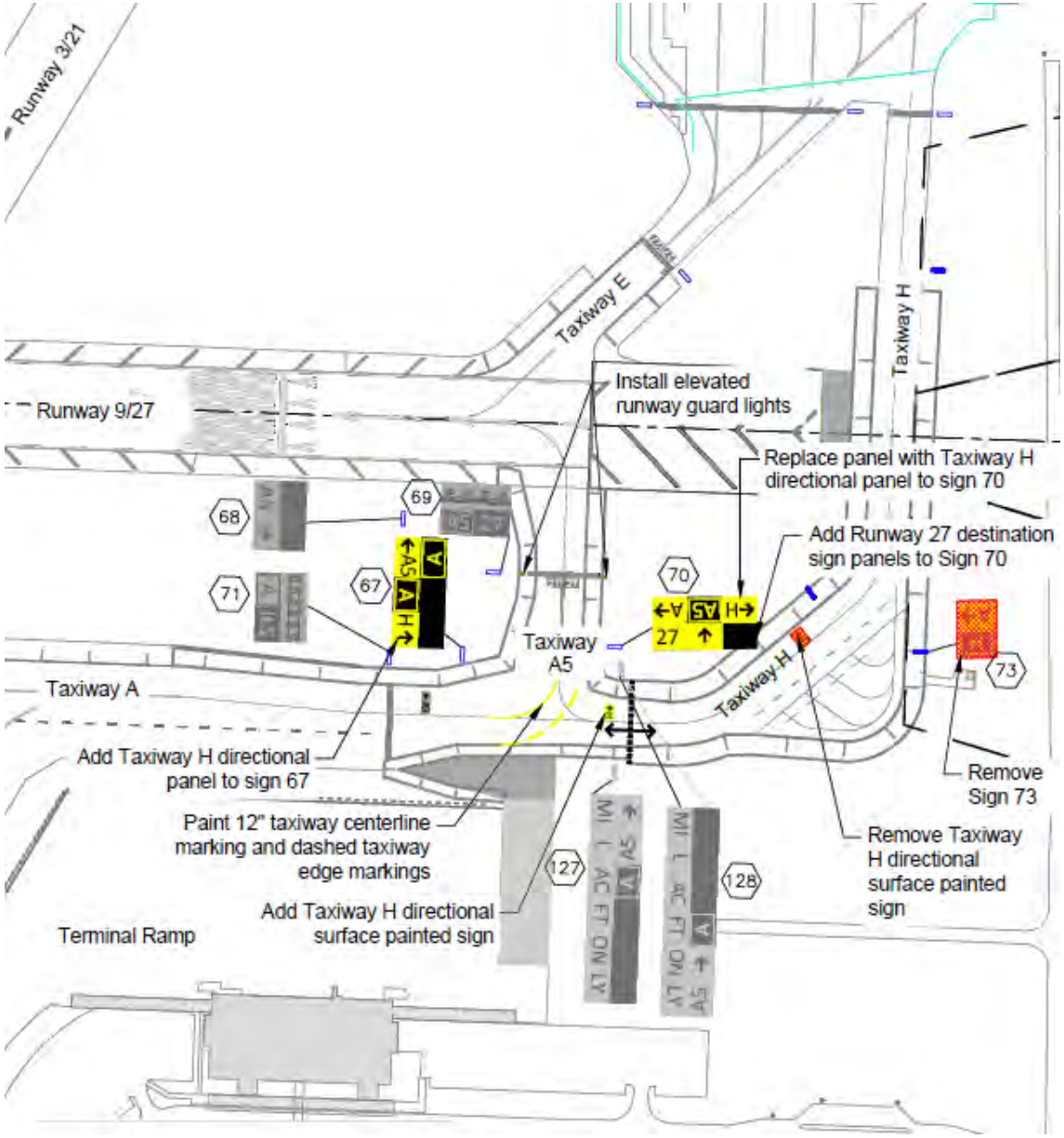


Phase 3
Could be done in two phases

Taxiway A5 and H intersection

- Completed Actions
  - ✓Demarcation of Taxiway H and military area with hatched area in AF/D
  - ✓FAA publication of SPARKs page

- First step actions (cost-effective)
  - ATIS statement (RSAT recommendation)
  - Add additional information to the AF/D describing military only taxiway
  - 12” centerline marking (wider than existing) leading from TWY A to A5

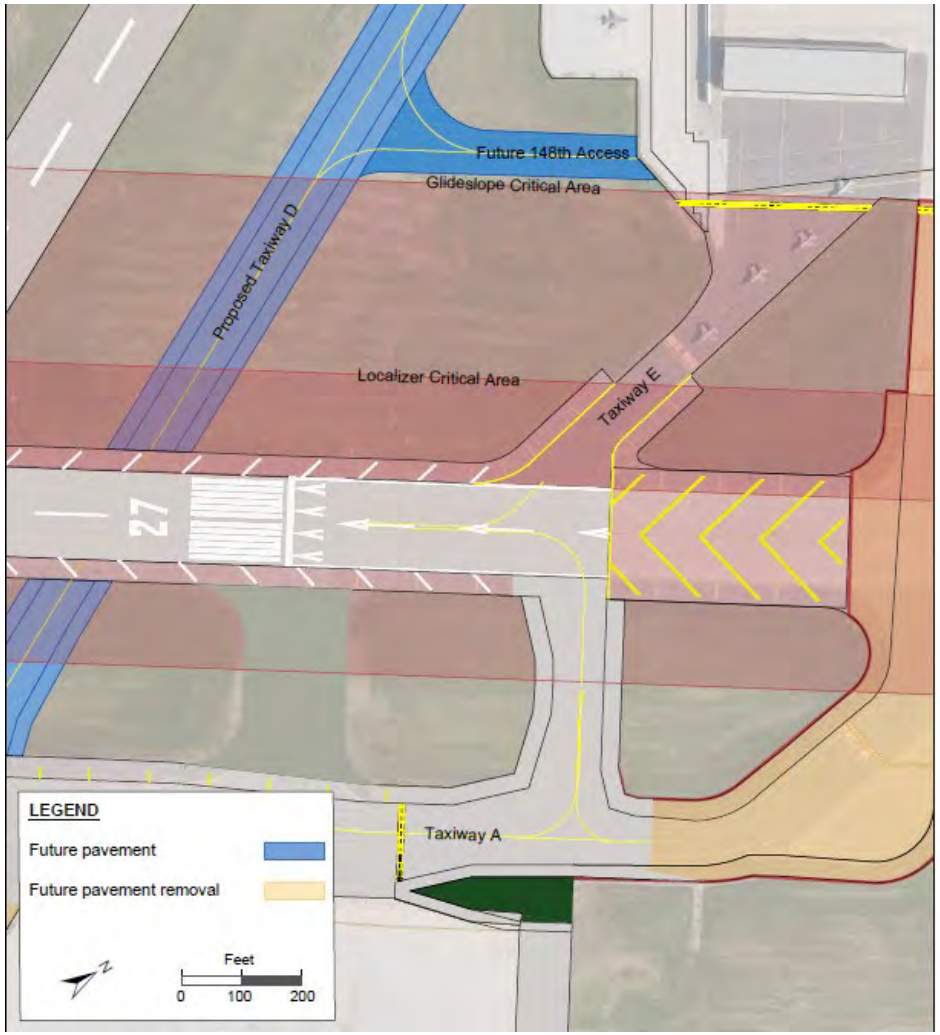

Runway 3/21
Runway 9/27
Taxiway E
Taxiway H
Install elevated runway guard lights
Replace panel with Taxiway H directional panel to sign 70
Add Runway 27 destination sign panels to Sign 70
68
69
67
71
70
73
127
128
Taxiway A5
Taxiway H
Taxiway A
Add Taxiway H directional panel to sign 67
Paint 12" taxiway centerline marking and dashed taxiway edge markings
Add Taxiway H directional surface painted sign
Remove Sign 73
Remove Taxiway H directional surface painted sign
Terminal Ramp

Taxiway A5 and H intersection

- Potential Secondary Actions
  - Added signage including taxiway and destination signage
  - Install Runway Guard Lights (RGL) at the Taxiway A5 and Runway 27 intersection (on A5)

- Potential Tertiary Actions (most complex/costly)
  - Removal of Taxiway H and construction of an additional 148th Access Route to ramp

Taxiway A5 and H Intersection – Removal of H



Future Runway 3/21 Taxiway Network Considerations

1. Taxiway improvements should be completed prior to or concurrent with a runway extension project
2. Taxiway network could be designed to ADG III/TDG 3 standards initially, and segments (serving military) could be improved when Runway 3/21 is extended.
   - Taxiway segments serving military should be designed to ADG V/TDG 5/UFC Class B standards

Building Area Layout and Aircraft Parking

Aeronautical Building Area Needs

- ~25 tiedowns
- Designated helicopter area
  - 3 to 4 helicopter parking spots
  - Large box hangar(s)
- Remove aircraft parking in Runway Visibility Zone (RVZ)
- Eliminate existing ATCT line of sight challenges and avoid future line of sight limitations
- Group development by use and similar sized aircraft
- Provide:
  - Aeronautical manufacturing expansion space
  - Larger hangars
  - Ranch and T-hangars

Aeronautical Building Area Needs Cont.

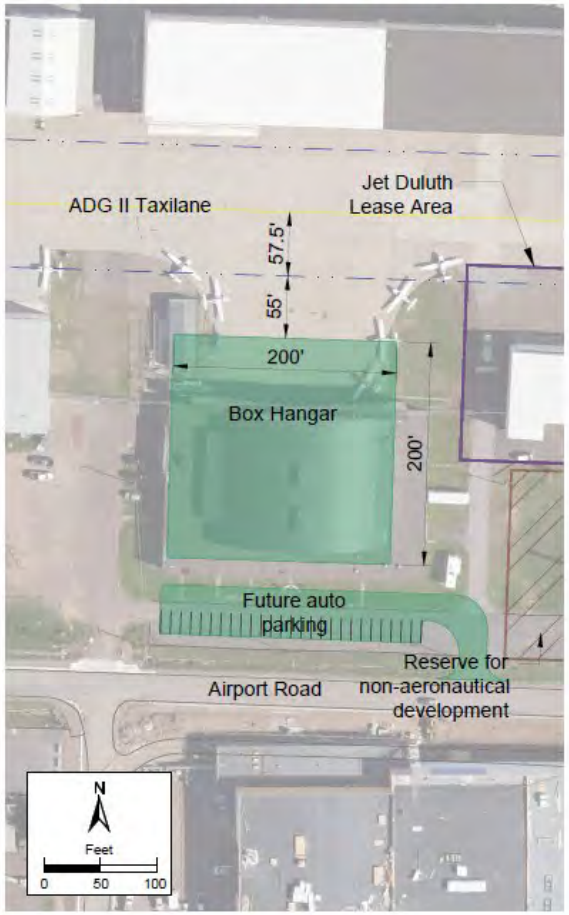
- Improve ability to move aircraft between Monaco and midfield ramp
  - A future taxilane between the Monaco and Midfield ramps would allow aircraft to transition between ramps while outside of the movement area
- Maximize aeronautical development and preserve the best use spaces for aeronautical use
- Consider snow storage needs when developing and evaluating alternatives

Building Area Alternatives

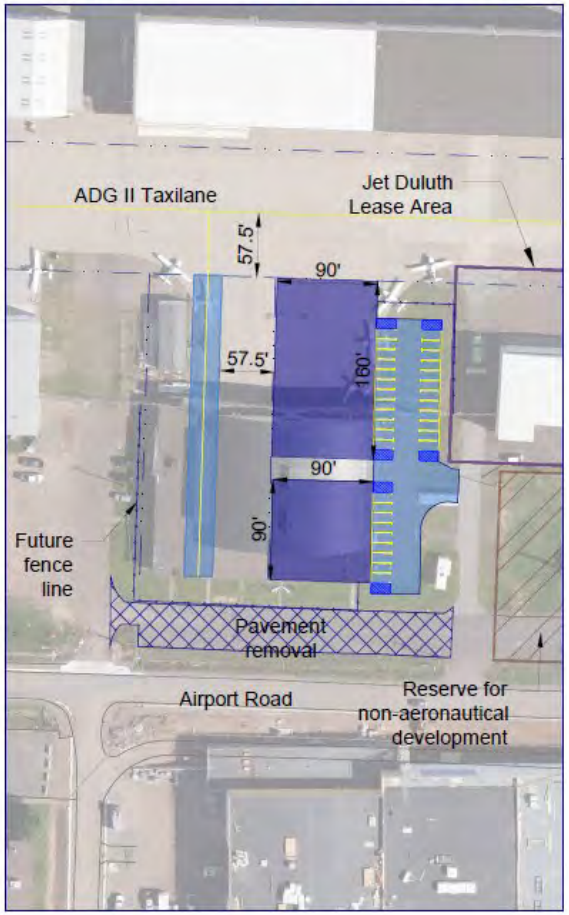
- Following feedback at today's meeting, detailed planning will be completed for the selected alternative in each area.
- Selected alternative for each area will be depicted on the Airport Layout Plan (ALP)
  - The ALP does not limit hangar development to the exact size/type of hangar shown
  - The Master Plan will document alternative layouts that can be considered in each area. If future demand results in the need for a different layout, an ALP sheet update can be completed to document an alternate layout.

Hangar 101

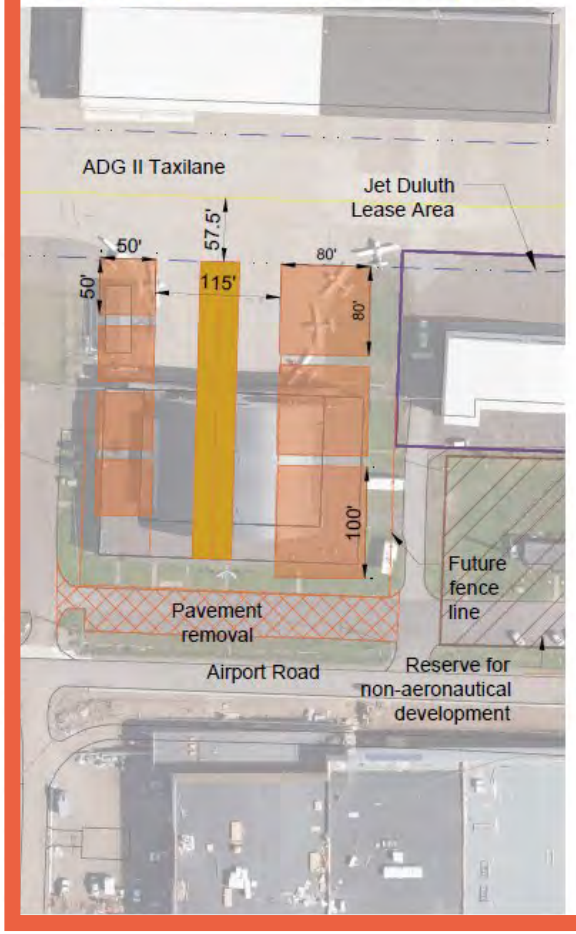
Option 1: Large Box Hangar



Option 2: ADG II Box Hangars

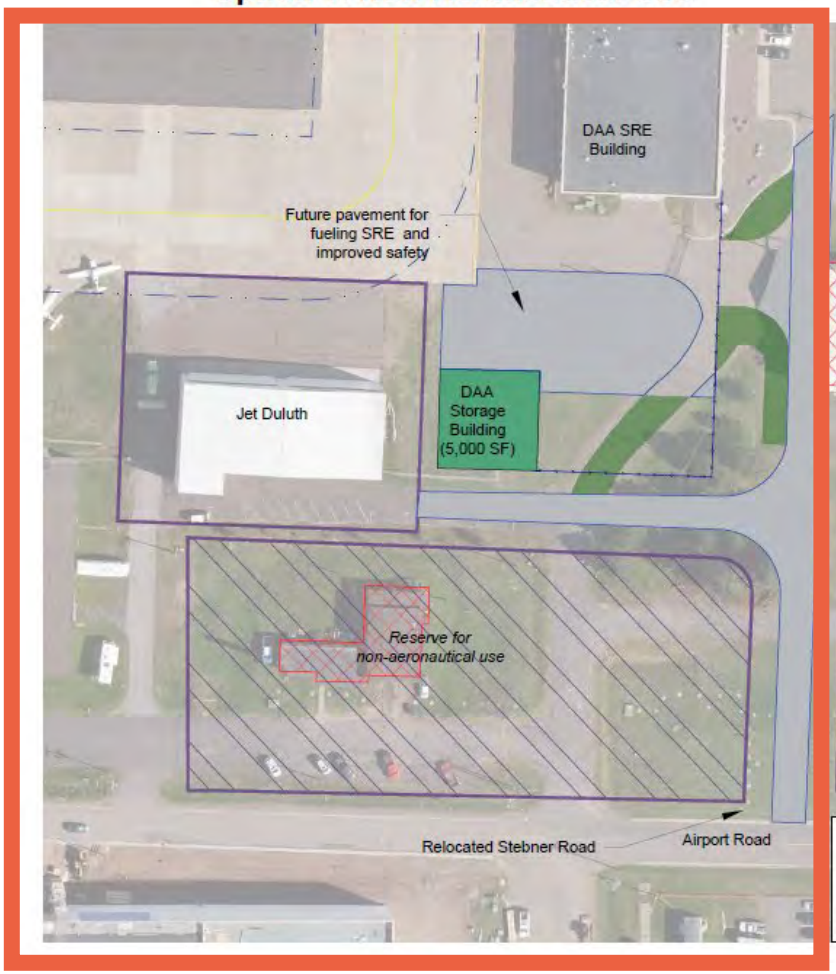


Option 3: ADG I and II Hangars

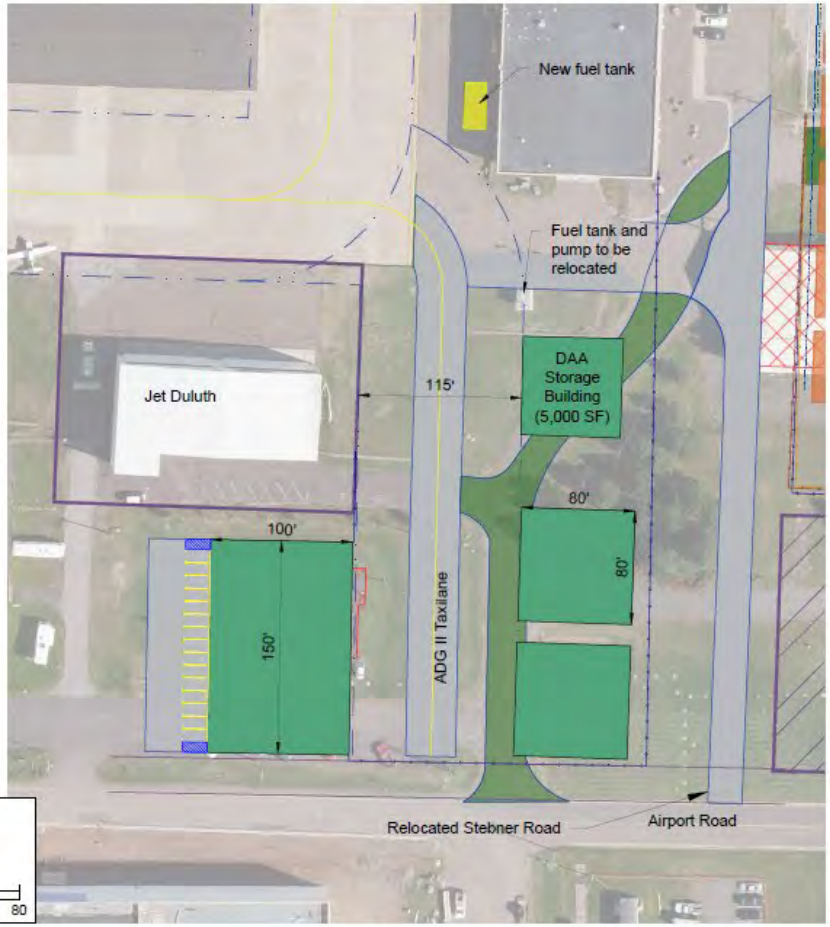


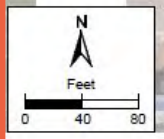
South of the SRE

Option 1: Non-Aeronautical Use



Option 2: ADG II Box Hangars



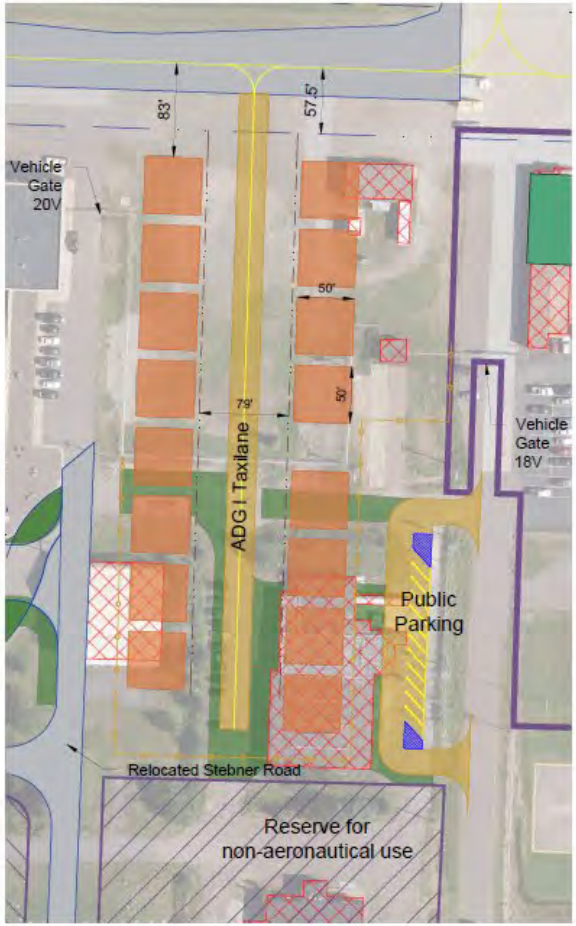


Between Monaco and the SRE

Between Monaco and the SRE

Option 1: ADG I T-Hangars

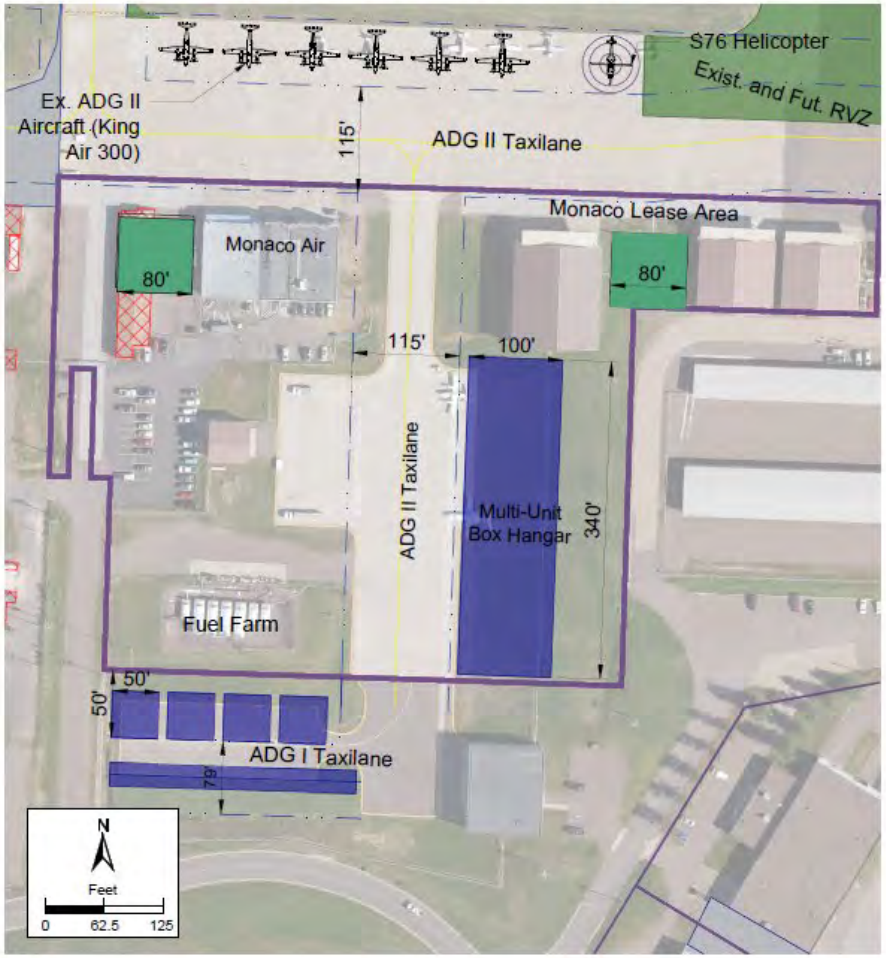
Option 2: ADG I Box Hangars



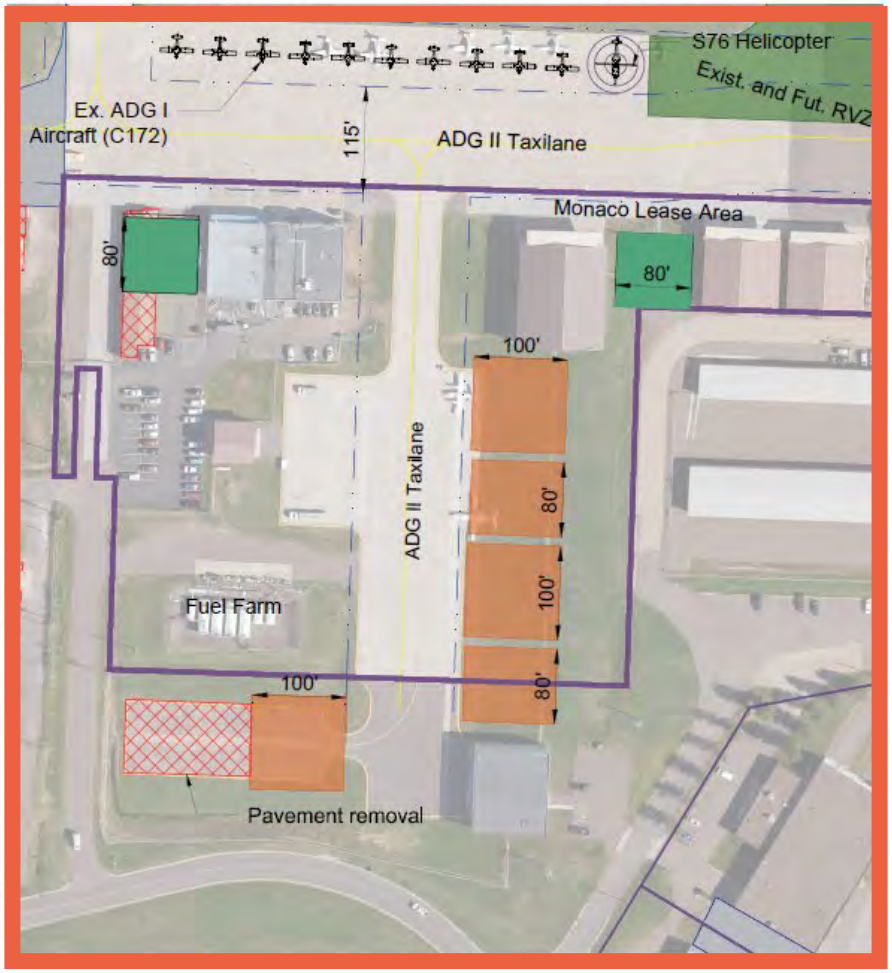
Option 3: Large Box Hangar and ADG I and II Hangars

South of Monaco

Option 1: ADG I Box Hangars

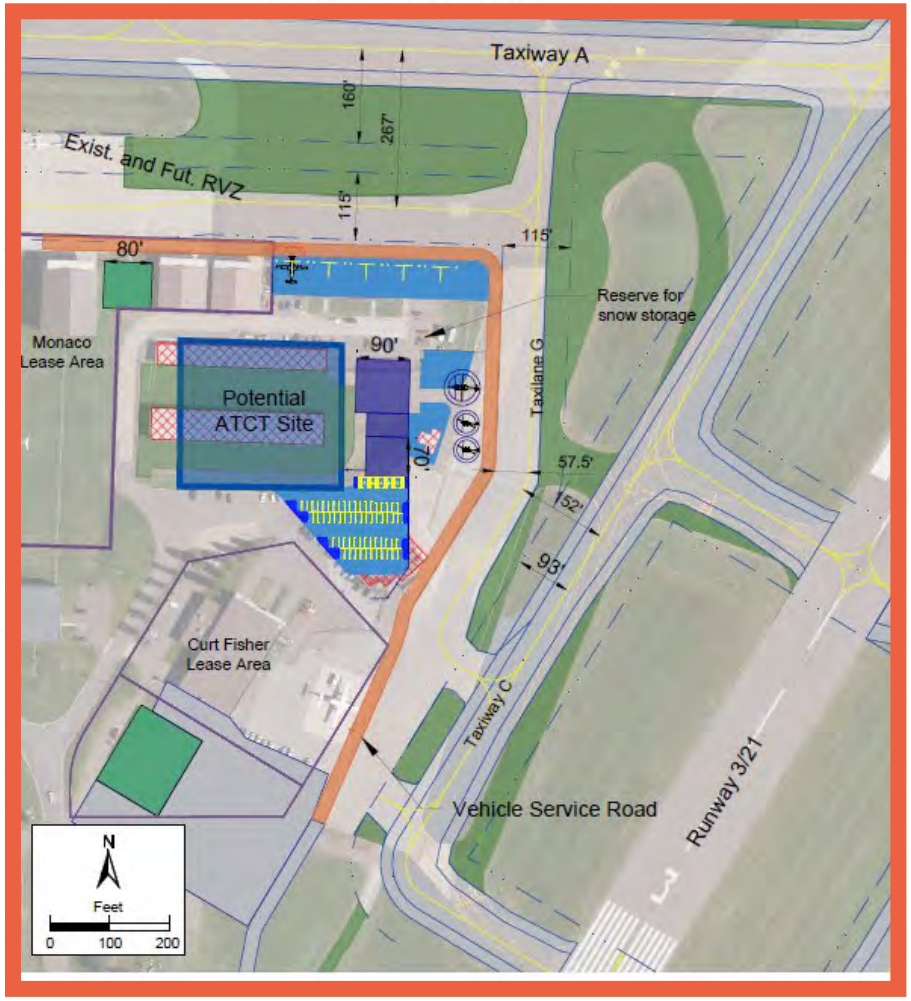


Option 2: ADG II Box Hangars



Tower and Cargo Ramps

Option 1: Helicopter Area

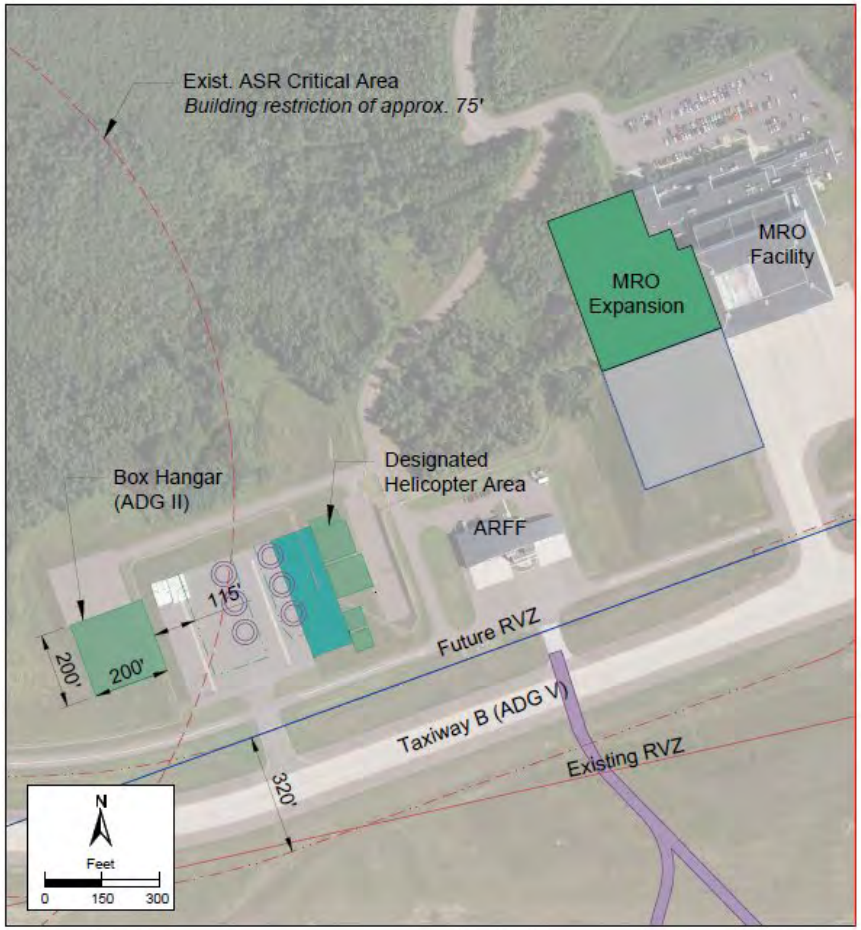


Option 2: ADG II Box Hangars

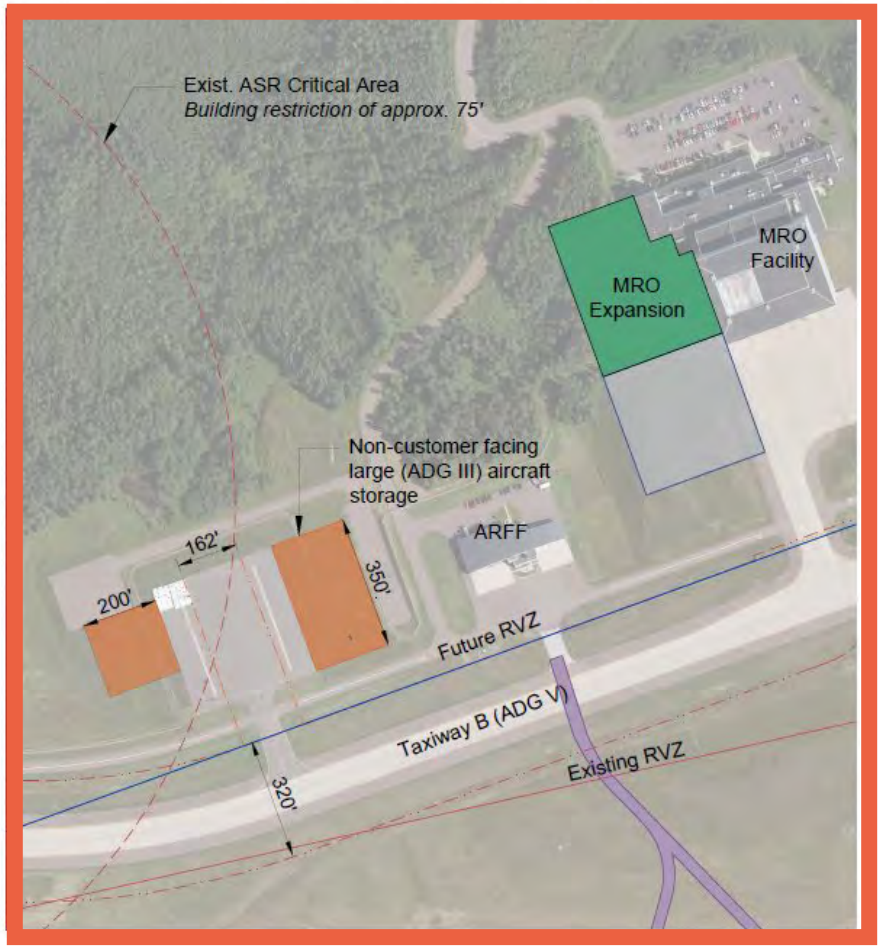
Building Area Potential Layout – SW Quadrant

North Business Development Area (NBDA)

Option 1: Helicopter Area and Box Hangar

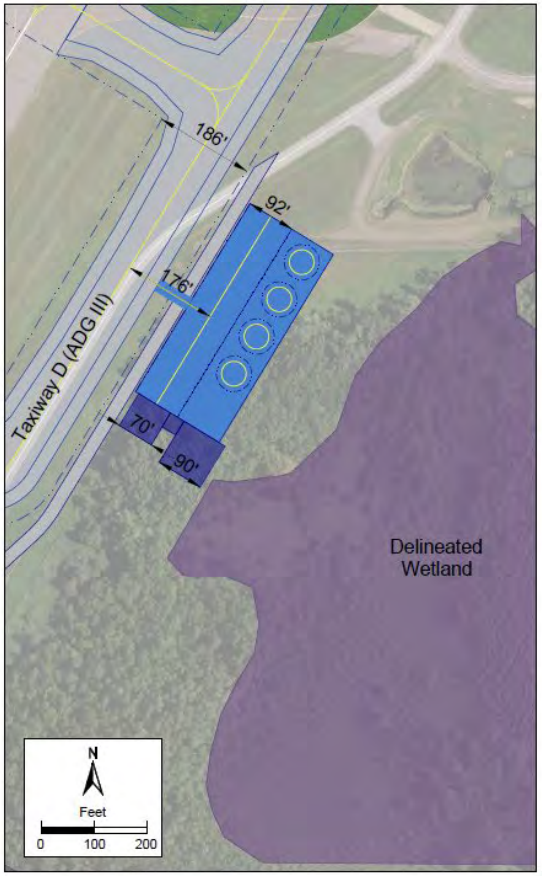


Option 2: Aircraft Storage

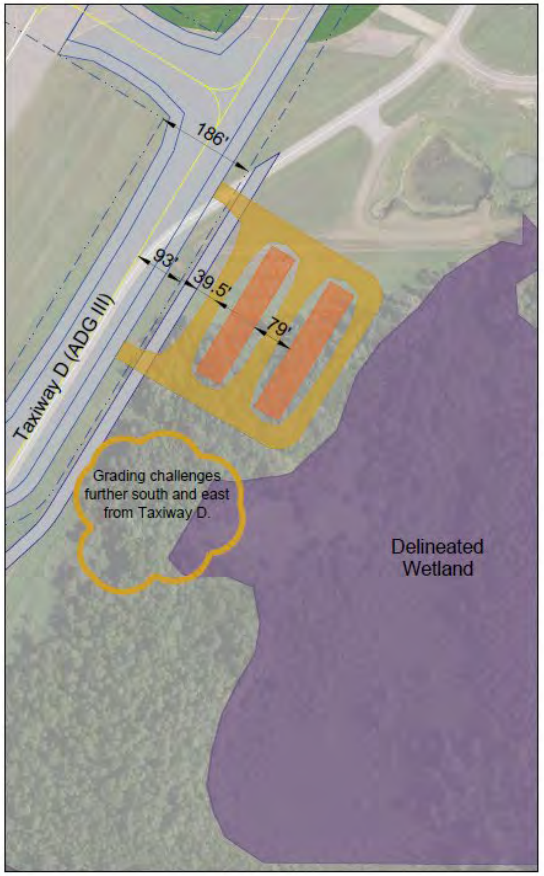


East of Runway 3-21

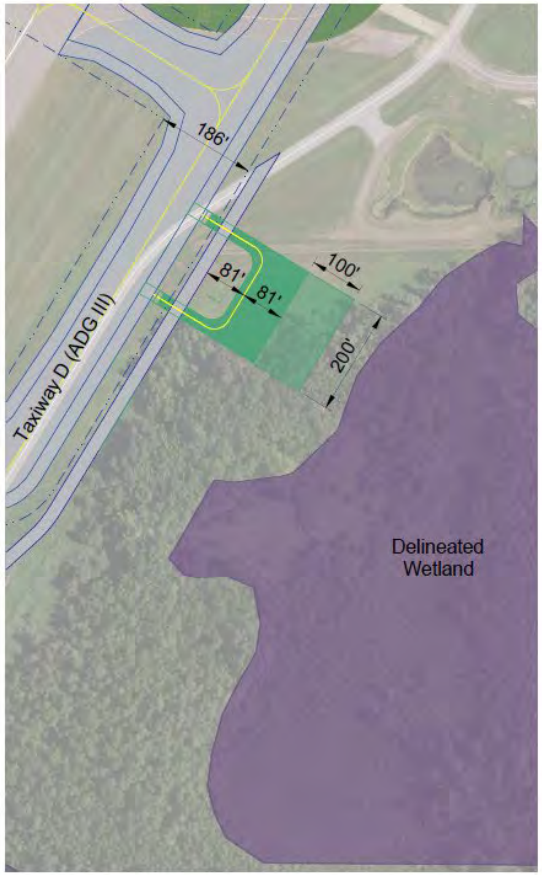
Option 1: Helicopter Area



Option 2: ADG I T-Hangars



Option 3: ADG III Hangar



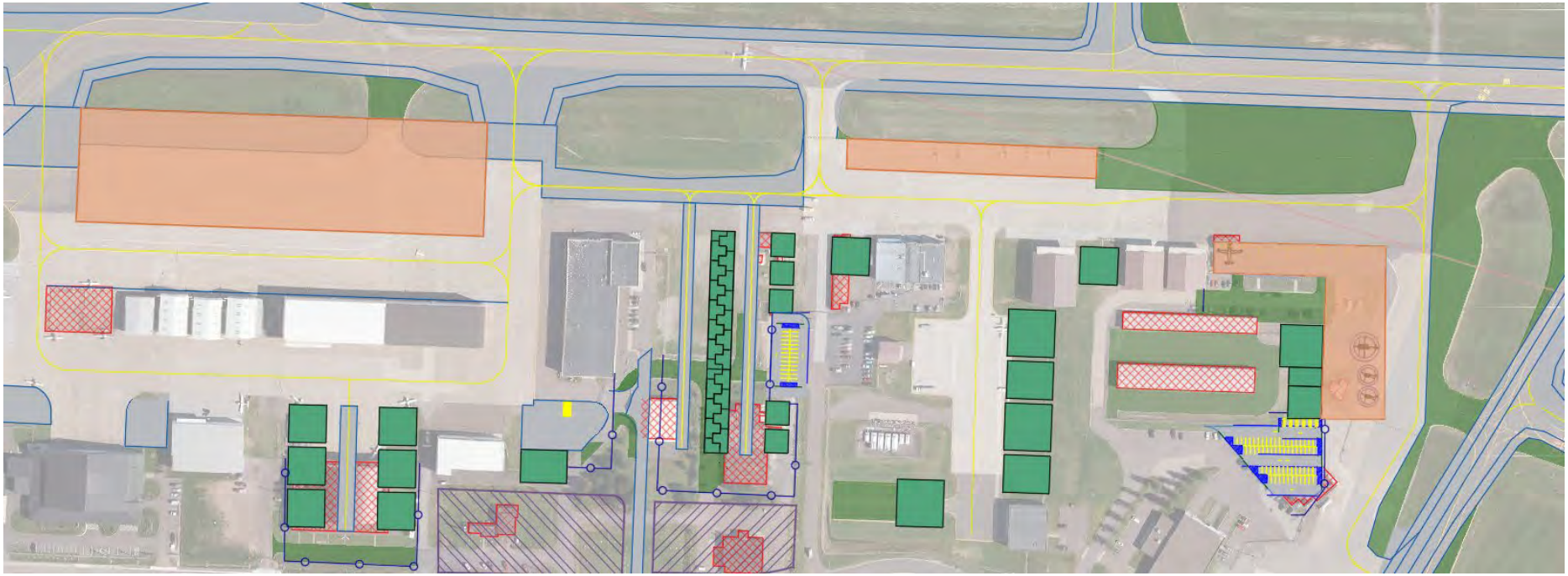
No alternatives we carried forward due to challenging site access, grading challenges and delineated wetlands

Building Area Alternatives - Reminders

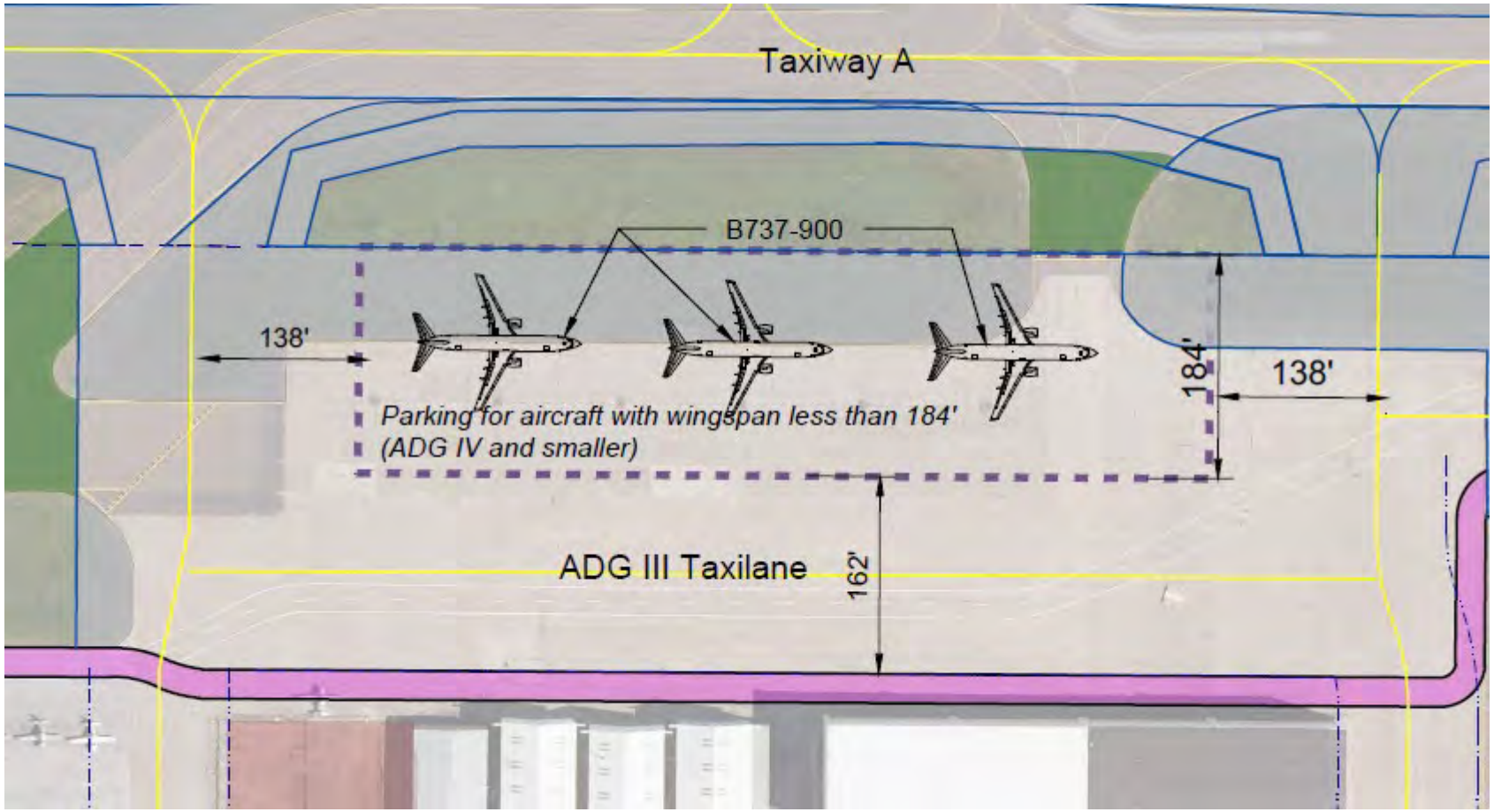
- Following today's meeting, detailed planning will be completed for the selected alternative in each area (July 2021)
- Selected alternative for each area will be depicted on the Airport Layout Plan (ALP)
  - The ALP does not limit hangar development to the exact size/type of hangar shown
  - The Master Plan will document alternative layouts that can be considered in each area. If future demand results in the need for a different layout, an ALP sheet update can be completed to document an alternate layout.

Aircraft Parking

- Orange areas depict future aircraft parking areas



Larger Aircraft Parking – ADG III (B737)



Master Plan Project Next Steps

- Summer 2021
  - Finalize facility recommendations and alternatives
  - Implementation Plan/CIP
  - Draft Airport Layout Plan

- Economic Development TAC

Thank You!