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MEMORANDUM

TO: DLH Master Plan - Runway 3/21 Technical Advisory Committee

FROM: Kaci Nowicki

DATE: June 20, 2021

RE: Runway 3/21 Proposed Alternative
SEH No. DULAI 150733 14.00

This memo summarizes the selected preferred alternative for Runway 3/21. The preliminary alternatives were developed based on initial stakeholder feedback for user needs. The input was gathered at the beginning of the Master Planning process during previous Runway 3/21 Technical Advisory Committee (TAC) Meetings (TAC Meetings #1 and #2).

ASSUMPTIONS AND GOALS:

The following assumptions and goals, based on stakeholder feedback, were considered in the development and ultimate selection of the preferred Runway 3/21 alternative that will be documented in the Master Plan and depicted on the Airport Layout Plan (ALP):

Runway Length:

- 148th Fighter Wing: The 148th Runway length requirements are 7,000 feet as an emergency runway and 8,000 feet for a secondary use runway. Arresting gear is needed on the departure end of a runway.
- Commercial Air Service: The preliminary runway length needed to serve existing air service aircraft is 7,800 feet.
- General Aviation: The runway length needed to serve the existing critical general aviation aircraft is 7,900 feet.
- Cirrus indicated that a longer Runway 3/21 would be beneficial to their operations at DLH.
- A longer Runway 3/21 would provide value for those, including Lake Superior College, who conduct flight training operations at DLH.

Instrument Approaches:

- Improvements to instrument approaches were considered. Wind analysis indicated that improved approach minimums would have limited added benefit as the wind typically favors Runway 9/27 during poor weather conditions.
- It was indicated that instrument approach lighting would be beneficial for published approaches as they provide an extra navigational aid to pilots. However, they would not be used to lower visibility minimums to a runway end in this case.
- The 148th currently cannot utilize GPS approaches, but general aviation and many commercial service aircraft can. Future 148th aircraft may have GPS capabilities.
 - The 148th's weather minimums for training are 1-mile visibility (equal to the current weather minimums on Runway 3/21).

Taxiway Network:

- The taxiway network for Runway 3/21 should be improved.
- The separation of Taxiway C from Runway 3/21 should be widened. It is currently too close to the runway.
- Taxiway C at the Runway 3 end and the Runway 9/27 intersections has non-standard geometry and should be redesigned when pavement is reconstructed.
- Taxiway D should intersect Runway 3/21 at 90 degrees.
- Taxiway F currently does not connect to Runway 3/21 at a standard angle and is unavailable for fighter jet use because it exceeds grade standards.
- If Runway 3/21 is extended to serve the needs of the 148th, a UFC Class B taxiway system (75' wide taxiway) is needed to connect the ANG facilities to Runway 3/21. This could be accomplished via improved Taxiway F, Taxiway D or Taxiway C.

Environmental and Land Use:

- Environmental and land use impacts of the proposed alternatives should be considered and minimized.
- Improvements to Runway 3/21 may impact aircraft parking and building areas and was considered in the selection of the preferred alternative.

ULTIMATE RUNWAY 3/21 GOALS:

The following goals were ranked, in order of importance, by the TAC.

1. Meet military runway length needs
2. Meet taxiway design standards
3. Meet civilian runway length needs
4. Improve instrument approach minimums
5. Minimize zoning impacts to surrounding communities
6. Minimize impacts to natural resources

PRELIMINARY ALTERNATIVES:

The following preliminary alternatives were developed for discussion at the beginning of the Master Plan. The various alternatives and impacts are also compared in **Table 1**. The figures showing the alternatives listed below are available for view in the Runway 3/21 TAC Meeting #2 materials on the [project website](#).

Existing Runway Length (5,719 feet) Alternatives:

Alternative 1A - No Action Alternative

Alternative 1B – Existing runway length with only improvements to the taxiway network

8,000-foot Runway Alternatives

Alternative 2A – Extend 3/21 to the north to 8,000 feet with no improvements to instrument approaches

Alternative 2B – Extend 3/21 to the north to 8,000 feet and improve Runway 21 approaches to minimums of ¾ mile.

Alternative 2C – Extend 3/21 to the north to 8,000 feet and improve Runway 21 approaches to minimums of ½ mile.

.7,000-foot Runway Alternatives

Alternative 3A – Extend 3/21 to the north to 7,000 feet with no improvements to instrument approaches

Alternative 3B – Extend 3/21 to the north to 7,000 feet and improve Runway 21 approaches to minimums of ¾ mile.

Alternative 3C – Extend 3/21 to the north to 7,000 feet and improve Runway 21 approaches to minimums of ½ mile.

Additional considerations for preferred alternatives are listed below.

Extension to Runway 3: Any extension to the south would shift the Runway Protection Zone (RPZ) over Air Base Road. Roads are not an allowed use in an RPZ and the road would require relocation. In addition, depending on the amount of extension, relocation of Airport Approach Road may also be needed. Additionally, RPZs should be owned in fee by the airport and property acquisition would be required with any extension amount.

Improved instrument approaches: Any improvement to instrument approaches to Runway 3 would increase the size of the RPZ, requiring the relocation of Air Base Rd and at least a small portion of Airport Approach Road. Often, a displaced threshold can be considered in lieu of relocating roads when there are incompatible land uses in an RPZ. In the case of the Runway 3 end, a displaced threshold to remove the roads from the southern-most areas of the RPZ unfortunately pulls additional segments of Airport Approach Rd into the RPZ and may also limit the use of the FedEx cargo ramp.

Weather and Wind Analysis: A seasonal and monthly wind and weather analysis was conducted to evaluate the benefits of improved instrument approach procedures to Runway 3/21. This analysis concluded that when DLH has poor visibility and weather, Runway 9/27 is the preferred runway for aircraft operations (winds favor 9/27 or are in periods of low wind speed such as fog). Additionally, Runway 9/27 has ILS approaches and approach lighting systems on both runway ends.

Table 1 - Runway 3/21 Alternative Evaluation

	Runway Dimensions	RWY 3 Approach Minimums	RWY 21 Approach Minimums	NAVAIDs	Wetland Impacts	Cost Estimate
Alternative 1A	5,719' x 150'	1-Mile	1-Mile	-	-	\$0.00
Alternative 1B	5,719' x 150'	1-Mile	1-Mile	-	-	\$23,000,000
Alternative 2A	8,000' x 150'	1-Mile	1-Mile	-	34.2	\$72,000,000
Alternative 2B	8,000' x 150'	1-Mile	3/4-Mile	-	34.2	\$75,000,000
Alternative 2C	8,000' x 150'	1-Mile	1/2-Mile	MALSR	38.1	\$77,500,000
Alternative 3A	7,000' x 150'	1-Mile	1-Mile	-	9.3	\$55,000,000
Alternative 3B	7,000' x 150'	1-Mile	3/4-Mile	-	9.3	\$58,000,000
Alternative 3C	7,000' x 150'	1-Mile	1/2-Mile	MALSR	13.2	\$60,500,000

RUNWAY 3/21 PREFERRED ALTERNATIVE

Following the evaluation of the alternatives listed above in **Table 1**, the preferred Runway 3/21 alternative that has been chosen for the Master Plan is Alternative 2A. **Figure A**, included in this packet, shows the selected alternative. This alternative extends Runway 3/21 to the northeast to a total length of 8,000' while maintaining the existing 1-mile approach minimums. The runway length was selected to meet the needs of both the 148th Air National Guard and the civilian critical aircraft, which is represented by the Airbus A319. Although this alternative does not plan to improve visibility minimums, approach lighting could still be added if funding is available.

The Joint Airport Zoning Board (JAZB) recently sent a custom zoning ordinance to MnDOT Office of Aeronautics for their review and approval. The JAZB worked with local communities to ensure that an adequate level of safety was maintained for the area surrounding the airport. This effort evaluated conditions of airport infrastructure and based the custom zoning ordinance around Runway 3/21 ultimately being extended to 8,000' and maintaining its 1-mile approaches. The JAZB efforts are separate from the master plan project and additional information can be found on the [Airport's website](#).

The Taxiway and Apron Technical Advisory Committee (TAC) is still evaluating and selecting the final taxiway network alternatives. The taxiway network for Runway 3/21 will ensure that both civilian and military aircraft have adequate access to the ultimate Runway 3/21. The selected taxiway network will also ensure that large military aircraft have safe access to the 148th Guard Ramp.

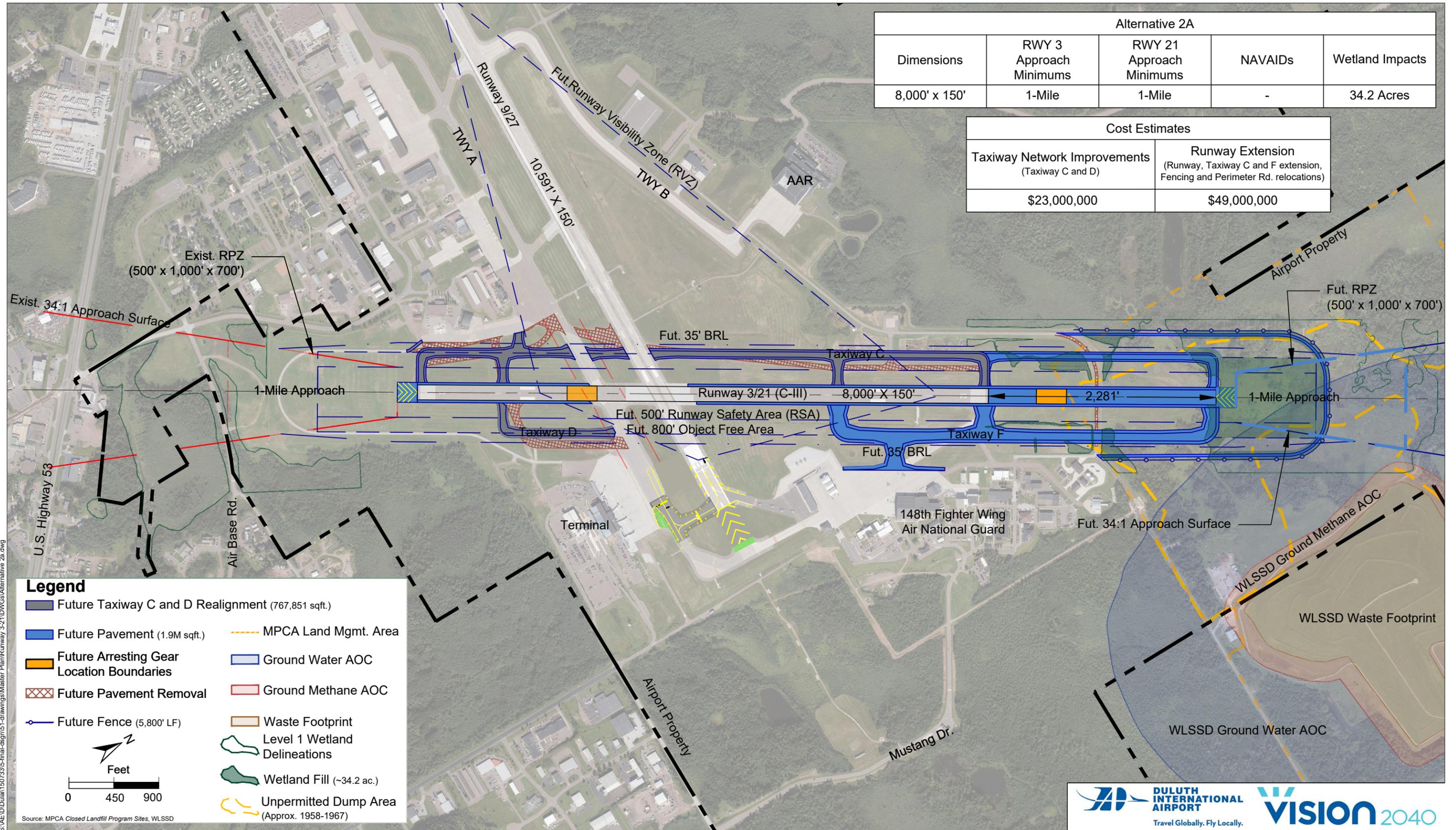
RUNWAY 3/21 IMPLEMENTATION NEXT STEPS

The preferred alternative for Runway 3/21 will be depicted in the Master Plan and ALP. The proposed improvements are not currently justified for FAA Airport Improvement Program (AIP) funding. Therefore, alternative funding sources will need to be secured prior to project implementation. Potential funding sources included State of Minnesota Bond funding or the Air National Guard. Once funding is secured, several additional steps are required prior to project completion. These include environmental review under the National Environmental Policy Act (NEPA), environmental permitting, project design and a multi-year construction process. Additionally, the Runway 3/21 improvements will require coordination with the associated taxiway improvements including Taxiway C, D and F. It is likely that several phases of taxiway improvement projects will be needed prior to the ultimate extension of Runway 3/21.

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Attachments

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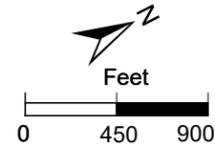


Alternative 2A				
Dimensions	RWY 3 Approach Minimums	RWY 21 Approach Minimums	NAVAIDs	Wetland Impacts
8,000' x 150'	1-Mile	1-Mile	-	34.2 Acres

Cost Estimates	
Taxiway Network Improvements (Taxiway C and D)	Runway Extension (Runway, Taxiway C and F extension, Fencing and Perimeter Rd. relocations)
\$23,000,000	\$49,000,000

Legend

- Future Taxiway C and D Realignment (767,851 sqft.)
- Future Pavement (1.9M sqft.)
- Future Arresting Gear Location Boundaries
- Future Pavement Removal
- Future Fence (5,800' LF)
- MPCA Land Mgmt. Area
- Ground Water AOC
- Ground Methane AOC
- Waste Footprint
- Level 1 Wetland Delineations
- Wetland Fill (~34.2 ac.)
- Unpermitted Dump Area (Approx. 1958-1967)



Source: MPCA Closed Landfill Program Sites, WLSSD

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