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# APPENDIX C: MEETINGS & PUBLIC INVOLVEMENT

## Introduction

The Warren Municipal Airport (D37) understands the importance of public involvement in the Master Plan Update process. During the scoping meeting, the Airport and KLJ designed a transparent process that allows opportunities for stakeholders to be actively engaged. The Airport also believes that members of the public should have an opportunity to comment on decisions about actions that could affect their lives. This involvement took place in the form of public open houses, website information sessions, and stakeholder outreach efforts. The Airport appreciates that public participation improves the decision-making process by recognizing and communicating the needs and interests of all participants. As a result of the public participation process, we feel that the airport master plan offers a valuable path for developing the Belle Fourche Municipal Airport.

## Stakeholders

As part of the planning process the following groups/people were contacted for their insight into the Belle Fourche Municipal Airport:

1. Airport/Sponsor Staff
  - a. Aaron Peterson - Airport Manager
  - b. Shannon Mortenson - City Administrator/Clerk-Treasure
2. Local Government
  - a. Jarod Peterson - City of Warren Councilmember
  - b. Josh Johnston - Marshall County Emergency Management
3. Airport Users/Local Representatives
  - a. Phil Thompson - Warren Economic Development Authority
  - b. Julie Nowacki - Chamber of Commerce
  - c. Darla Waldner - Northwest Regional Development Commission
  - d. Jon Linnell - North Valley Health Center
  - e. Eric Bonn - Global Medical Response (flight department)
4. MnDOT Aeronautics
  - a. Matt Lebens - Airport Development Engineer
  - b. Kevin Carlson - Airport Planner
  - c. Jared Wedel – North Region Airport Operations

## Key Issues/Public Involvement Goals

This planning effort completed typical aspects of airport master plans from reviewing existing conditions to forecasts to alternative development but also focused on key issues which we learned from our scoping meeting. These issues were as follows:

1. Update Airport Layout Plan (ALP) that was approved in 2013 to meet current design standards.
2. Evaluate the planned parallel taxiway designed in the last ALP.
3. Review zoning to protect the airport (land use, height, and MnDOT Safety Zones).
4. Review terminal area layout to meet current and future needs of the airport.

From the scope meeting it was determined that documentation of existing conditions, forecasting future aviation activity levels, identifying future facility requirements, formulating and evaluating alternatives, preparing implementation plans and engaging the public and other government agencies were main goals for the future of D37.

The following table specifies the type of public outreach achieved along with a location of specific meeting materials located in this appendix.

*Table C-1 – Public Outreach Activities*

Date of Outreach	Type of Public Process	Attendance	Information Conveyed	Page in Appendix
12/15/2022	Master Plan Kickoff	11	Roles, master plan, planning, existing conditions, public involvement	C-3
4/11/2023	Forecast, Facility Requirements & Initial Alternatives Meeting	8	Existing conditions, forecast, facility requirements, current alternatives review	C-14
7/26/2023	Initial Alternatives Meeting (Virtual)	11	Airfield & apron alternatives review and input	C-27
8/02/2023	Final Alternatives Meeting	11	Review refined alternatives & initial cost estimates	C-39
11/01/2023	Public Open House	12	Have the public review the AMP so far and provide input	C-46

Source: KLJ



1

### Agenda

- > Introductions
- > Airport Master Planning
  - > What is it
  - > Why now
  - > Timeline
- > Existing Conditions
  - > Review Airfield
  - > Review Zoning
- > Items to consider for planning
  - > Wind Analysis
  - > Aircraft Operations
  - > Past Terminal Layouts
- > Open Discussion



2

1

## Introductions

- > Project Team
  - > Aviation Planner – Amber Channel
  - > Senior Aviation Planner – Kent Penney
  - > Aviation Planner – Andrew Zielike
  - > Airport Engineer – John Glesne
- > Warren Airport / City of Warren
  - > Airport Manager – Aaron Peterson
  - > City Administrator/Clerk-Treasurer – Shannon Mortenson
- > MnDOT Aeronautics
  - > Matt Lebens, Airport Development Engineer
  - > Kevin Carlson, Airport Planner
- > Planning Committee
  - > Jared Peterson – City Councilmember
  - > Josh Johnston – Marshall County Emergency Management
  - > Jon Linnell – North Valley Health Center
  - > Darla Waldner – Northwest Regional Development Commission
  - > Eric Bonn – Global Medical Response
  - > Phil Thompson – Warren Economic Development Authority
  - > Julie Nowacki – Warren Chamber of Commerce



3

## What is an Airport Master Plan

“An Airport Master Plan is a comprehensive study of an airport and usually describes the short-, medium- and long-term development plans to meet future aviation demand”



Federal Aviation Administration (FAA)  
Advisory Circular 150/5070-6B, Airport Master Plans

- > “Road Map” for meeting aviation demands
- > Preserves flexibility to respond to future
- > Allows airport to cost-effectively keep pace with aviation growth
- > Considers environmental and socioeconomic impact of development



4

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### Why is an Airport Master Plan Needed Now?

- Last Airport Layout Plan (ALP) was approved in 2013
- Evaluate planned Parallel Taxiway
- Evaluate and Forecast Airport Activity
- Review Zoning to protect the Airport (Land Use and Height)
- Review Terminal Area Layout
- ALP to current design standards



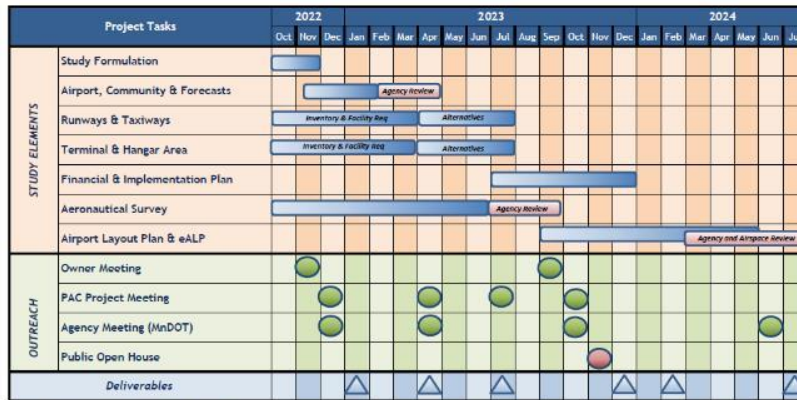
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### Warren Municipal: Airport Master Plan



Planning  
Timeline



\*Schedule depicts estimated FAA review periods

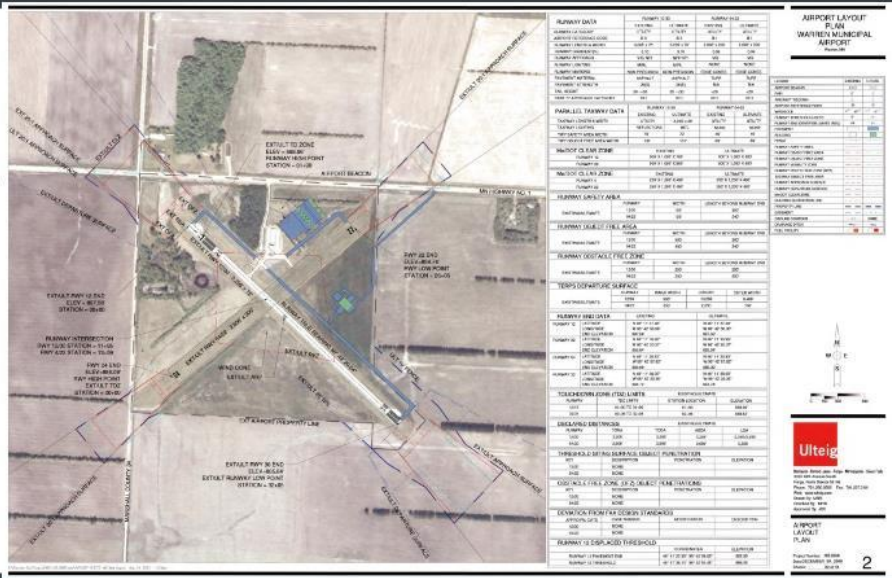
Updated: October 2022

- Project Meeting
- Public Meeting
- ▲ Document Deliverable

6

Master Plan Kickoff Meeting Continued – December 2022

Previous Airport Layout Plan (ALP) 2013



7

Existing Airfield

- ARC B-II
- Taxiways are 35' wide & taxilanes are 25' wide
- 6,000 SY apron
- Three hangar buildings
- Runway 30 End 1-mile visibility
- Runway 4-22 visibility approach

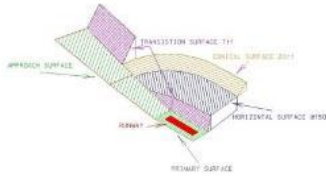


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### MnDOT Zoning Map for D37

- Zone A: All land within the approach zone & extends outwards from the end of the primary surface a distance equal to **two-thirds** of the planned length of the runway.
- Zone B: All land within the approach zones of the runway & extends outward from Zone A a distance equal to **one-third** of the planned runway length.
- Zone C: Enclosed within the perimeter of the horizontal zone which is not include in Zone A or B.



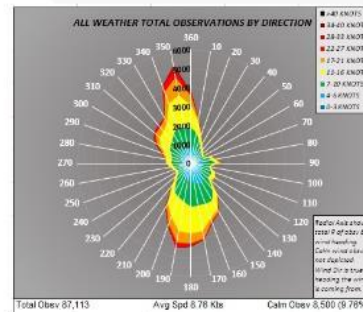
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### Wind Analysis

- 2013 ALP used Thief River Falls Regional Airport AWOS-III
- Decided to use Crookston Municipal Airport 29 miles south of Warren because of the similar terrain and elevation
- Found that there is a crosswind while using Runway 12-30 and both runways do not meet the recommended 95% wind coverage

CONFIGURATION	ALL-WEATHER WIND COVERAGE			
	CROSSWIND COMPONENT			
	10.5 KNOTS	13 KNOTS	16 KNOTS	20 KNOTS
RUNWAY 12-30	86.49%	93.44%	-	-
RUNWAY 4-22	81.01%	-	-	-
COMBINED	93.61%	93.44%	-	-

SOURCE: KCMV AWOS (2012-2021, HOURLY) FROM NATIONAL CLIMATIC DATA CENTER  
87,113 TOTAL OBSERVATIONS



10

5

## Aircraft Operations

- Estimated 19,000 Annual Operations – 5010 (2018)
  - 9,000 Local
  - 10,000 Itinerant
- Aircraft Types (2014-2021 TFMS)
  - Air Tractor 502 – A-II (Last design aircraft from updated terminal sheet)
  - Pilatus PC-12 – A-II
  - Cessna 172 – A-I
  - Cirrus SR-22 – A-I
  - Diamond Katana DA-40 – A-II
  - Beechcraft King Air 200 – B-II



11

## Terminal Area Layouts



12

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Master Plan Kickoff Meeting Continued – December 2022



13

Open Discussion



14

## Next Steps

- Complete Airport Inventory
- Draft Aviation Forecasting
- Draft Facility Requirements
  
- Next Meeting: Facility Requirements & Preliminary Alternatives
  
- Website: <https://warren.airportplan.net/>



15

## Questions/Comments

Amber Channel, Aviation Planner  
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605.600.3843 o

Andrew Zielike, Aviation Planner  
Andrew.zielike@kljeng.com  
612.314.6545 m  
651.726.5031 o



16



Existing Terminal Area



17

### Airport Reference Code

<b>ARC A-I/Small Aircraft</b> Cessna 150 Cessna 182 Piper Archer Piper Seneca		<b>ARC A-II/Small Aircraft</b> Cessna 208 Pilatus PC-12 Aero Commander Air Tractor 401B Air Tractor 502B	
<b>ARC B-I/Small Aircraft</b> Beech Baron 58 Cessna 421 Beech King Air 100 Cessna Mustang 510		<b>ARC B-II/Small Aircraft</b> Beech King Air 90 Beech King Air 200	
<b>ARC B-II</b> Air Tractor 802A Beech King Air 350 Cessna Citation CJ2 Swearingen Metro III		<b>ARC C-I, C-II, D-II</b> CRJ-200/700 Cessna Citation X Embraer 145 Learjet 35	

ADG	2012	2013	2014	2015	2016	2017	2018	2019
I	17	39	19	22	11	12	26	11
II	26	4	38	8	19	10	17	19
III	0	0	0	0	0	0	0	0
IV	0	0	0	0	0	0	0	0
V	0	0	0	0	0	0	0	0
VI	0	0	0	0	0	0	0	0
	43	43	57	30	30	22	43	30
AAC								
A	17	37	12	19	10	3	16	12
B	25	6	33	11	20	19	27	18
C	1	0	0	0	0	0	0	0
D	0	0	12	0	0	0	0	0
E	0	0	0	0	0	0	0	0
	43	43	57	30	30	22	43	30



18



## Meeting Minutes

**Date:** 12/15/2022

**Facilitator:** Amber Channel

**Time:** 09:45 AM

**Minutes:** AMP Kickoff Meeting

**Attendees:** Aaron Peterson - Airport Manager, Shannon Mortenson - City Administrator/Clerk-Treasure, Jon Linnell - North Valley Health Center/Pilot, Darla Waldner - NW Regional Development Commission, Eric Bonn - Guardian Flight, Julie Nowacki - Treasure for Warren Chamber of Commerce, Beth Driesen - Grate Interpreting, Kent Penney - KLJ, John Glesne - KLJ, Andrew Zielike - KLJ

### Agenda Topics

#### Airport Master Planning

1. An Airport Master Plan (AMP) is need now because the last Airport Layout Plan (ALP) was approved in 2013 and it needs to be brought up to current design standards, need to evaluate the planned parallel taxiway and forecasted airport activity, and need to review the state zoning requirements and terminal area layout.

*Action Items: None*

#### Existing Conditions

1. Went over MnDOT Airport Safety Zones, how there is a difference in height restrictions and safety zones and that any changes to thresholds will require new zoning.
2. A new wind analysis was evaluated using the Crookston Municipal Airport AWOS rather than Thief River Falls Regional Airport from the 2013 ALP for its proximity to Warren and similar terrain and elevation. Discovered there is a crosswind while using Runway 12-30 and both runways do not meet the 95% recommended wind coverage.
  - a. It was stated that the crosswind on Runway 12-30 is not a problem.
3. Aircraft operations were looked at to get annual operations and design aircraft.
  - a. The Air Tractor 502 was used as the last design aircraft, it will be changed to the Air Tractor 802
  - b. Only get about two private jet aircraft a year and usually around the size of a Citation Jet 1.
  - c. The group is currently unaware of any business owners flying except for Bremer Bank executive coming in occasionally.

*Action Items: Verify current number of operations to get an accurate forecast.*

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**Planning Considerations**

1. Reviewed the previously approved 2013 ALP and updated 2014 terminal area layouts and talked through if these are still on track for the future of Warren.
  - a. It is not necessary to plan for a spot for firefighting operations.
2. Discussed the north hangar, parking lot expansion, west taxiway and terminal building completion.
3. Asked about a fuel farm or possible fuel needs at the airport.
  - a. The airport manager gets his own fuel for the spray operations, medical flights fuel elsewhere, and there are currently only get requests about once a year around the last weekend in July (fair time).

*Action Items: Bring up land acquisition possibilities for the parallel taxiway. Talk to Curt about any information about the wetlands on the west side.*

**Other Notes or Information**

Details from the Medical Flight Operations:

- o Wind is not a problem.
- o Weather reporting is the limiting factor for using Warren because of Part 135 regulations.
- o Currently have PC-12s and Bell 407s. Stanford has KA200s & AirMed PC-12s.
- o Would like approach for 12 End.
- o Currently, they park in the middle of the ramp and that area can get tight with other aircraft especially the Air Tractor.
- o Visual aids are not limiting but would be desirable.

*Action Items: Ask if there is any plan to expand the medical center.*

**Next Meeting Information**

**Date:** Date  
**Time:** Time AM/PM

**Facilitator:** Name  
**Minutes:** Subject




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### Forecasting Notes

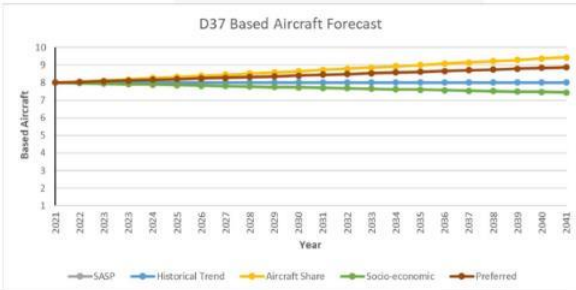
- Chapter 3 will cover the following in more details
- A forecast should be *“realistic based on the latest available data and reflect the current and anticipated future conditions at the airport”* (FAA Order 5090.5)
- Most recent data available from 2021 which will be the base year and will forecast for the next 20 years to 2041
- Data pulled from: FAA Aerospace Forecast, FAA TAF, 2012 & 2022 MnDOT SASP, Airport Master Record (Form 5010), & inventory from the airport



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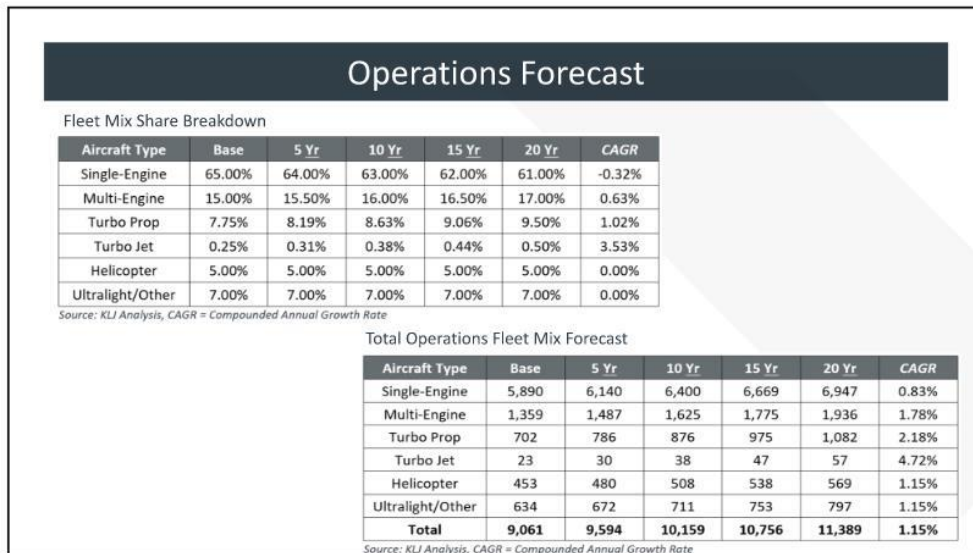
### Based Aircraft Forecast

- 7 single-engine
- 1 multi-engine
- Verified 8 total based aircraft
- Preferred data from 2022 SASP

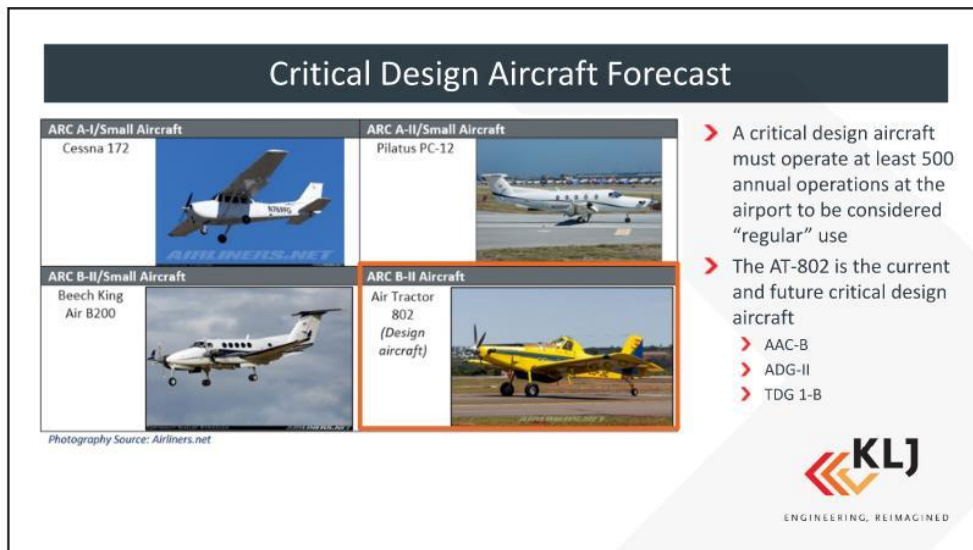


Aircraft	2021	2026	2031	2036	2041	CAGR
Single Engine	7	7	7	8	8	0.50%
Multi Engine	1	1	1	1	1	
Total	8	8	8	9	9	

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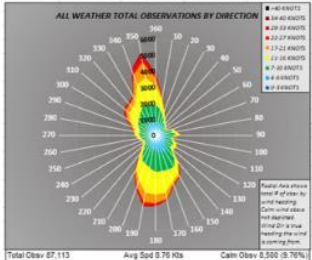
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### Runway Items

- > Runway 12-30 Dimensions: 3,199' x 75'
- > Runway 4-22 Dimensions: 2,578' x 200'
- > Current Runway 12-30 length meets most existing aircraft operation needs
  - > Current width meets the needs of design aircraft B-II
- > Current runway layout has a 93.61% coverage and does not meet the required 95% wind coverage




Total Obs: 67,113      Avg Spd: 9.78 Kts      Calm Obs: 6,592 (9.76%)

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### Wetlands Review

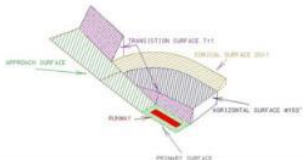

- > Six wetland sites making up 9.01 total acres of wetlands on the Runway 12 End
- > One is a freshwater pond that is present most of the year while the others are seasonal
- > Ditches along both sides of the runway on the 30 End with wetland characteristics



8

### MnDOT Safety Zoning

- > **Zone A:** No structures, assembly of people, anything to cause interference with aircraft communications, lighting that impairs pilots views
- > **Zone B:** No building site less than 3 acres, assembly of more than 15 people/Sq. acre, certain communication & lighting interference restrictions
- > **Zone C:** Nothing to interfere with aircraft communication or pilot views

**Warren Municipal Airport**  
Airport Safety Zones Date: 08/08/2018


**Legend**  
■ Zone A  
■ Zone B  
■ Zone C

DISCLAIMER: This is not an official zoning map. To view the official map and ordinance for this project, please visit the Warren Municipal Airport website. The State of Minnesota makes no representation or warranty, expressed or implied, with respect to the accuracy, currency, suitability, or reliability of the data for any purpose. The user accepts the data "as is." The State of Minnesota assumes no responsibility for losses, damages or costs as a result of any user's reliance on this data. All maps and other material provided herein are protected by copyright. Permission is granted to copy and use the information herein.

9

### MnDOT Clear Zones

- > Acres needed to be acquired as easement
  - > 4 End – 0 acres
  - > 22 End – 0 acres
  - > 12 End – 1.40 acres
  - > 30 End – 18.80 acres
  - > Total – 20.20 acres









**In Current Property**  
**Current Easements**  
**Needed Easements**

Google Earth  
2007 B

10

### Taxiway Design

- Taxiway Design Group (TDG) is a classification of a group of aircrafts undercarriage dimensions
- From current airport layout, the TDG is 2A and will continue to be used for the forecast period

ARC A-I/Small Aircraft	ARC A-II/Small Aircraft	ARC A-II/Small Aircraft	ARC A-II/Small Aircraft
Piper Archer TDG-1A		Pilatus PC-12 TDG-2A	
ARC B-I/Small Aircraft	ARC B-II Aircraft	ARC B-II Aircraft	ARC B-II Aircraft
Beech Baron 58 TDG-1A		Air Tractor 802 TDG-1B	
Cessna 421 TDG-2A		Beech King Air 200 TDG-2A	

11

### Taxiway Alternatives



Last ALP stated about 4.35 acres need to be acquired. The minimum acres needed to be acquired to meet safety standards is around 2.00



About 900' of runway would be used to taxi back

Google Earth


12

4/7/2023

### Typical Hangar Attributes

Typical Aircraft Hangar Attributes				
	T-Hangers	Small Storage Less than 6,000 sf	Large Storage More than 6,000 sf	FBO/SASO
Photo Examples				
Dedicated Apron	None	None	Equal to depth of hangar	Equal to depth of hangar (plus apron for services)
Airport Apron Access	No	No	No	Yes
Setbacks from Taxilanes	Yes - for Design Group (I or II)	Yes - for Design Group (I or II)	Yes plus Apron - for Design Group (II+)	Yes plus Apron - for Design Group (II+)
Airside Taxi Route	Yes - for Design Group (I or II)	Yes - for Design Group (I or II)	Yes - for Design Group (II+)	Yes - for Design Group (II+)
Public Road Access/Parking	No	Yes or No *	Yes*	Yes*

\* Any business/corporate hangar located on an airport should have public road access and parking for customers/passengers. Particularly those customers/passengers who are not trained in driving on an airport.

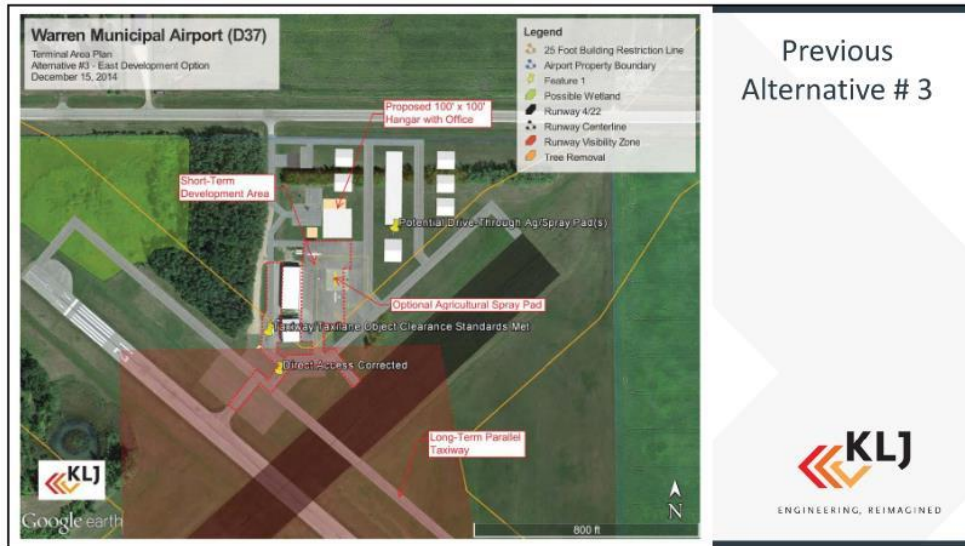


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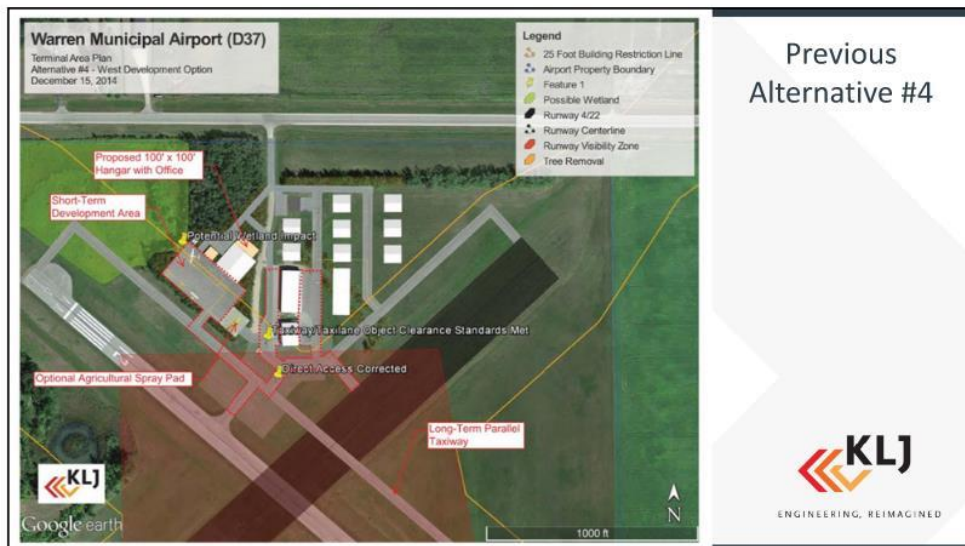


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16

Open Discussion



KLJ  
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The slide features a dark blue header with the text 'Open Discussion'. Below the header is a graphic consisting of several colorful speech bubbles (yellow, orange, red, blue, pink, green, and light blue) arranged in a cluster. Below the speech bubbles are two blue line-art icons of people, each with three circles representing heads. In the bottom right corner, there is the KLJ logo, which consists of three red chevrons pointing left, followed by the letters 'KLJ' in a bold, sans-serif font, and the tagline 'ENGINEERING, REIMAGINED' in a smaller font below it.

17

Next Steps

- > Finish Facility Requirements Chapter
- > Update alternatives
- > Start implementation plan
  
- > Next Meeting: Alternatives
  
- > Website: <https://warren.airportplan.net/>

KLJ  
ENGINEERING, REIMAGINED

The slide features a dark blue header with the text 'Next Steps'. Below the header is a list of five items, each preceded by a red chevron symbol. The items are: 'Finish Facility Requirements Chapter', 'Update alternatives', 'Start implementation plan', 'Next Meeting: Alternatives', and 'Website: <https://warren.airportplan.net/>'. In the bottom right corner, there is the KLJ logo, which consists of three red chevrons pointing left, followed by the letters 'KLJ' in a bold, sans-serif font, and the tagline 'ENGINEERING, REIMAGINED' in a smaller font below it.

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4/7/2023

Questions/Comments

Amber Channel, Aviation Planner amber.channel@kljeng.com 303.875.0357 m 605.600.3843 o	Andrew Zielike, Aviation Planner Andrew.zielike@kljeng.com 612.314.6545 m 651.726.5031 o
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19

10

Warren Municipal Airport - Forecast & Facility Requirements - April 11th, 2023				
ATTENDANCE LIST		Engineering Reimagined	KLJ	
		YEAR 2023	KLJENG.COM	
Name (please print)	Organization/Business	Phone	Email (optional)	
Andrew Zielke	KLJ	651-726-5031	andrew.zielke@kljeng.com	
John Glesne	KLJ	701-271-5026	john.glesne@kljeng.com	
Aaron Peters	Warren Airport	218-201-0672		
Jon Linnell	North Valley Health Center	218-201-3242	jon.linnell@northvalleyhealth.org	
Shannon Norstrom	City of Warren	218-745-5343	shannon@warrenminnesota.com	
Amber Channel (virtual)	KLJ	303-875-0358	amber.channel@kljeng.com	
Kent Penney (virtual)	KLJ	605-939-9335	Kent.penney@kljeng.com	
LeAnn Grate (virtual) - Interpreter	Grate Interpretation	605-906-7900	grateinterpretation@gmail.com	



## Meeting Minutes

**Date:** 4/11/2023 **Facilitator:** Amber Channel  
**Time:** 9:00 AM **Minutes:** Forecast & Facility Requirements  
**Attendees:** Aaron Peterson - Airport Manager, Shannon Mortenson - City Administrator/Clerk-Treasure, Jon Linnell - North Valley Health Center/Pilot, LeAnn Grate - Grate Interpreting, Kent Penney - KLJ, John Glesne - KLJ, Andrew Zielike - KLJ

### Agenda Topics

#### Forecast

1. Reviewed the based aircraft forecast, operations forecast and critical design aircraft forecast.
  - a. Was clarified that there are about 24 operations per day including five UND that probably make up five to ten operations a day.
  - b. Showed base operations forecast at 9,000 annual operations, the committee thought that number was too low and should be around 15,000 annual operations.
  - c. Discussed how the previous critical design aircraft was the Air Tractor 502 but because those have been sold and the Air Tractor 802 is now based at the airport, the AT-802 will be the forecasted design aircraft.

*Action Items: Change annual operations base year from 9,000 to 15,000. Get ahold of UND to verify operations.*

#### Facility Requirements

1. Discussed the current runway layout, dimensions, and instrument approaches.
  - a. Current runway 12-30 length meets the needs of most existing airport operations, and the width meets the needs of design aircraft B-II.
  - b. Per the last meeting the current layout does not meet the 95% required wind coverage but was confirmed the crosswind on the 12-30 runway was not a problem.
  - c. Asked if an instrument approach on the 12 was needed/desired.
2. Explained how the current wetlands should not affect any future plans though if the runway were to be extended then this would have to be re-evaluated.
  - a. It was brought to our attention that the wetlands over the 12 threshold can change winds by up to 10 knots.
3. Went over the MnDOT Clear Zones and how they are primarily based on the primary and approach surfaces and the dimensions are based on runway category, visibility minimums and most critical approach type.

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- a. A rough map was shown as to what is within current airport property, easements and what is needed to meet the state criteria for the clear zones.
  - b. Explained how the state requirements for clear zones was in the process of being updated and finalized and that we are still unsure of exactly needs to be acquired by the airport to meet the standards of the state.
4. Currently the airport has a Taxiway Design Group (TDG) of a 2A. Unfortunately the operations are not there to justify a TDG-2A (35' width) and that funding may only be available for a TDG-1B (25' width) though we will plan for 2A design standards.

*Action Items: Ask the medical flight operators if an instrument approach on the 12 would be desired. Talk to the state to get clarification about the updated requirements of the clear zones.*

#### Initial Alternative Feedback

1. Went over what is needed for a full parallel taxiway and partial parallel taxiway. Full parallel would require at least 2.00 acres of land, a partial parallel could be kept in the current property but would require about 900' of taxi back on the runway.
  - a. It was discussed that a partial parallel would only be a band aid solution and would still require a full parallel in the future. Would like to continue with the full parallel and do what is necessary to acquire the land sooner rather than later and even consider trade options.
2. Reviewed the last ALP update hangar layout and previous alternatives presented to understand what they like about it, want to change, or what is not necessary anymore.
  - a. An SRE building and Avgas fueling system is desired.
  - b. There is currently a waitlist for hangar space though no one is interested in building. T-hangars should be considered for the near term design while box hangars should be planned for later.
  - c. The agricultural spray area is no longer necessary, the current space is sufficient. But possibly look to the west of the terminal area for additional development.
  - d. More paved apron area and a paved driveway is desired.
  - e. It was pointed out they would like the connect taxiway to the turf runway 22 end removed from the plans.

*Action Items: Created alternatives.*

#### Next Meeting Information

**Date:** Date  
**Time:** Time AM/PM

**Facilitator:** Name  
**Minutes:** Subject



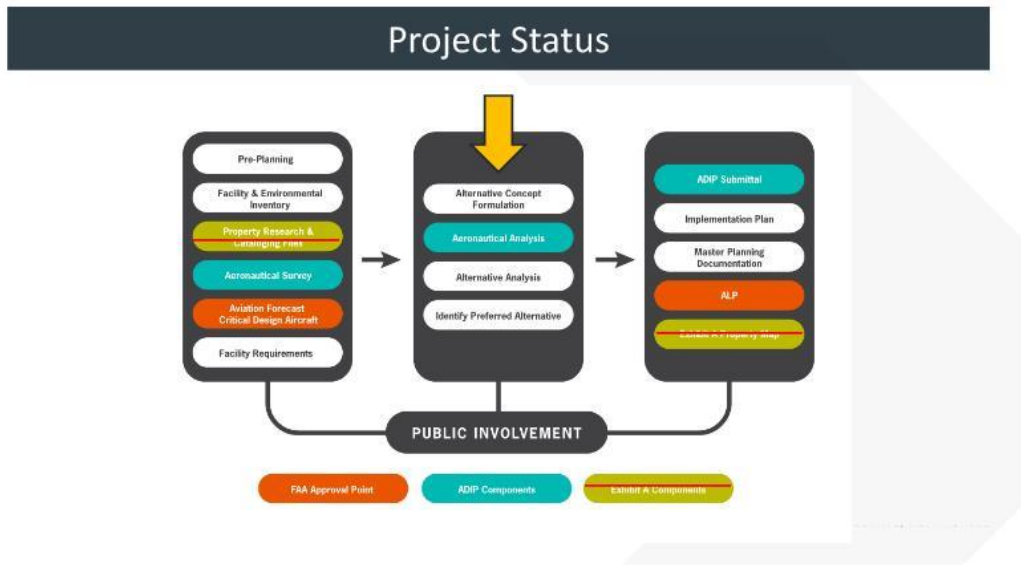
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### Agenda

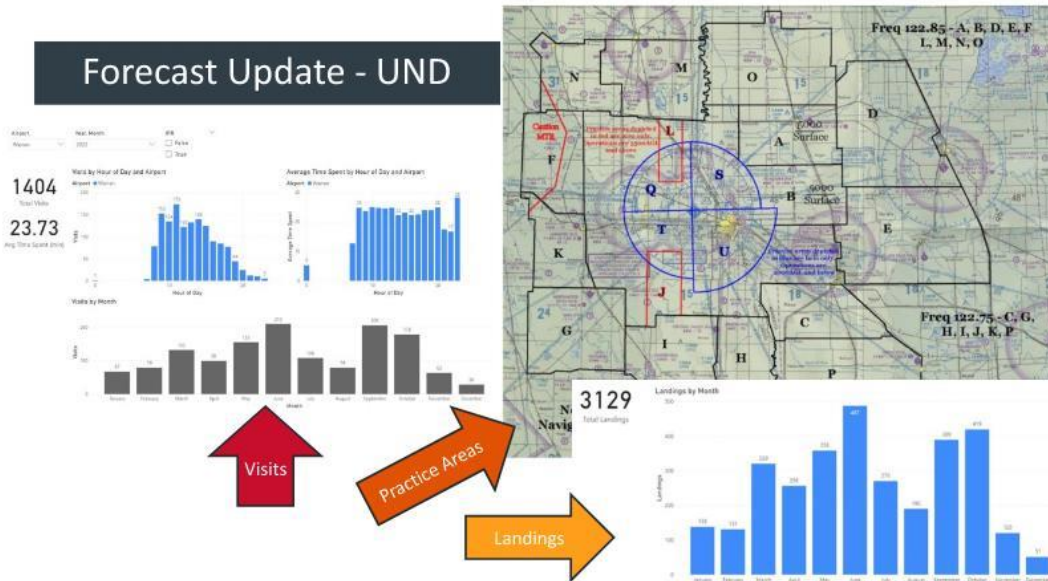
- > Introductions
- > Forecast Update
- > Airfield Facility Requirements
- > Airfield Alternative
- > Terminal/Hangar Area Alternatives
- > Next Steps

A collage of four photographs: a hangar, a runway, a terminal building, and a view of the airfield. The KLJ logo and "ENGINEERING, REIMAGINED" text are overlaid on the bottom right of the collage.

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## Forecast Update

- Previous data presented used the 2022 SASP numbers for baseline operations, this was changed to using the master record operations. CAGR is based on the 2022 SASP

Metric	2021	2026	2031	2036	2041	CAGR
Local Operations	9,000	9,530	10,090	10,684	11,313	1.15%
Itinerant Operations	10,000	10,588	11,211	11,871	12,569	1.15%
<b>Total Operations</b>	<b>19,000</b>	<b>20,118</b>	<b>21,302</b>	<b>22,555</b>	<b>23,882</b>	<b>1.15%</b>

**Table 3-5 – GA Operations Forecast**  
Source: KU Analysis, CAGR = Compounded Annual Growth Rate

**Table 3-8 – Total Operations Fleet Mix Forecast**  
Source: KU Analysis, CAGR = Compounded Annual Growth Rate

Aircraft Type	Base	5 Yr	10 Yr	15 Yr	20 Yr	CAGR
Single-Engine	12,350	12,875	13,420	13,984	14,568	0.83%
Multi-Engine	2,850	3,118	3,408	3,722	4,060	1.78%
Turbo Prop	1,473	1,647	1,837	2,044	2,269	2.18%
Turbo Jet	48	63	80	99	119	4.72%
Helicopter	950	1,006	1,065	1,128	1,194	1.15%
Ultralight/Other	1,330	1,408	1,491	1,579	1,672	1.15%
<b>Total</b>	<b>19,000</b>	<b>20,118</b>	<b>21,302</b>	<b>22,555</b>	<b>23,882</b>	<b>1.15%</b>

5

## Facility Requirements – Airfield

- Clear Zones
- Parallel taxiway for Runway 12-30
- Acquire land in fee simple for parallel taxiway, RPZs, clear zones, and safety surfaces
- Reserving a spot for the future weather reporting system
- Trees on the 30 End



6

### Clear Zones – Keeping Current Length



- > Would need 795 feet of pavement south
- > 300<sup>th</sup> Ave NW would still be in 30 End Clear Zone
- > Would need to acquire roughly 32 acres on the 30 End



7

### Clear Zones – No Roads in Clear Zones



- > Would be 2,995 feet long
- > 590 feet of pavement on the 30 End
- > Would need to acquire roughly roughly 30 acres on the 30 End



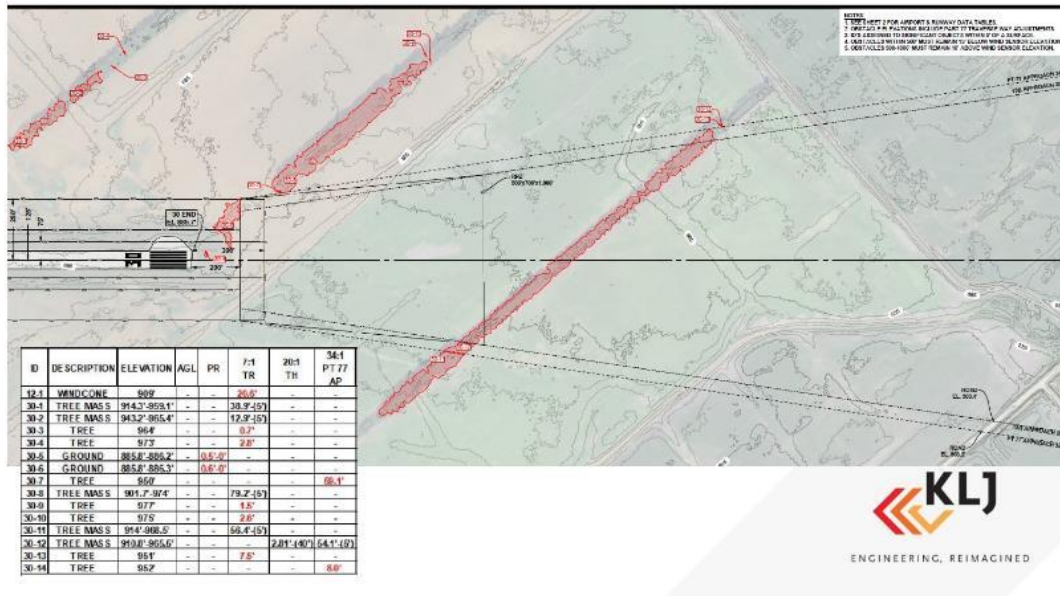
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**Land Trade**

- The following land should be considered to acquire in fee
  - 215 square yards for ROFA
  - 2.0 for taxiway
  - 3.15 acres on 30 End RPZ
  - Total = Roughly 5.20 acres



9



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### Items Considered for Terminal/Hangar Alternatives

- Additional Group I tiedown locations & apron space
- Group I T-Hangars near term & box hangars long term
- Group I taxiways/taxilanes and connectors
- New snow removal equipment (SRE) storage building
- Spot for future fuel farm
- Possible additional agriculture spray operator area
- Landside access



11



### Alternative Layout 1

- 7 tiedown spots
- Fuel farm on new apron
- SRE building north of current hangar row



12



### Alternative Layout 2



- 9 tiedown spots
- Fuel farm and large hangar on new western apron
- SRE building north of current hangar row

13



### Alternative Layout 3



- 4 additional tiedown spots
- Fuel farm on new corner apron
- SRE building on new west apron
- New large hangar north of current large hangar

14



- > Remove current hangar row
- > 10 tiedown spots
- > Fuel farm and two large hangars on new east apron
- > SRE on north of current/new apron

15

## Alternative Layout 4



## Open Discussion



16

### Next Steps

- > Refine alternatives
- > Implementation plan
- > Finish ALP
  
- > Next Meeting: Final Alternatives next Wednesday the 2<sup>nd</sup>
  
- > Website: <https://warren.airportplan.net/>



17

### Questions/Comments

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605.600.3843 o

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612.314.6545 m  
651.726.5031 o



18

## Next Steps


- Refined Alternatives
- ALP Development
- Implementation



19

## Questions/Comments

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<https://bellefourche.airportplan.net/>



20

10



## ◇ Meeting Minutes

**Date:** 7/26/2023

**Facilitator:** Amber Channel

**Time:** 9:00 AM

**Minutes:** Initial Alternatives

**Attendees:** Aaron Peterson - Airport Manager, Shannon Mortenson - City Administrator/Clerk-Treasure, Jon Linnell - North Valley Health Center/Pilot, Darla Waldner - NW Regional Development Commission, Phil Thompson - Warren Economic Development Authority, Kevin Carlson - MnDOT, Beth Driesen - Grate Interpreting, Kent Penney - KLJ, John Glesne - KLJ, Andrew Zielike - KLJ

### Agenda Topics

#### Airfield Requirements & Updates

1. Discussed worst case possible for future clear zones.
  - a. The state is still determining the plan for roads in the current clear zones.
  - b. Will need to have a Clear Zone Acquisition Plan to explain the future steps to be taken to acquire the land in the current clear zones.
2. Last meeting it was discussed to trade some of the airports current land for the future land needed for the parallel taxiway and runway safety requirements.
  - a. Explained it could be possible to trade 2.76 acres but will still need to purchase 2.44 acres for the 30 End RPZ.
3. Reminded the PAC that there is currently an airspace height zoning in the footprint of your safety zoning as a 40:1 slope ending at the end of the primary surface on the 30 End for the trees there currently.
  - a. Could look at acquiring easements for additional control.

*Action Items: Discuss the Clear Zone Acquisition Plan with the city.*

#### Alternative Layout 1 Review & Discussion

1. Determined that seven tiedown spots would be enough for the airport.
2. Like where the fuel farm location is.
3. Was mentioned that this hangar layout would be simple to phase in with a hangar row being able to be build right away with little additional pavement.

*Action Items: Keep the north-south hangar layout and fuel farm close to current apron.*

#### Alternative Layout 2 Review & Discussion

1. Was stated that this layout would be nice because it is very open.
2. The apron to the west of the current layout seems large for what is necessary.

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*Action Items: Remove excess apron space and keep the west-east hangar layout.*

**Alternative Layout 3 Review & Discussion**

1. Did like the second roadway access for vehicles.
2. Was not fond of having the fuel farm in this location for it gets very windy so during winter and would like to keep the re-fuel trucks off the apron.
3. Like the idea of keeping the agricultural operations together.

*Action Items: Keep the north 80'x80' agricultural hangar location and second vehicle access.*

**Alternative Layout 4 Review & Discussion**

1. Liked the idea of removing the current box and T-hangar row on the apron since they are old.
2. Did like how the agricultural operations area was separated from the rest of the airport tenants.
3. Also liked the additional access from the future parallel taxiway.

*Action Items: Keep the removal of the current box and T-hangar row, keep agricultural operations away from other tenants and keep the additional taxiway access.*

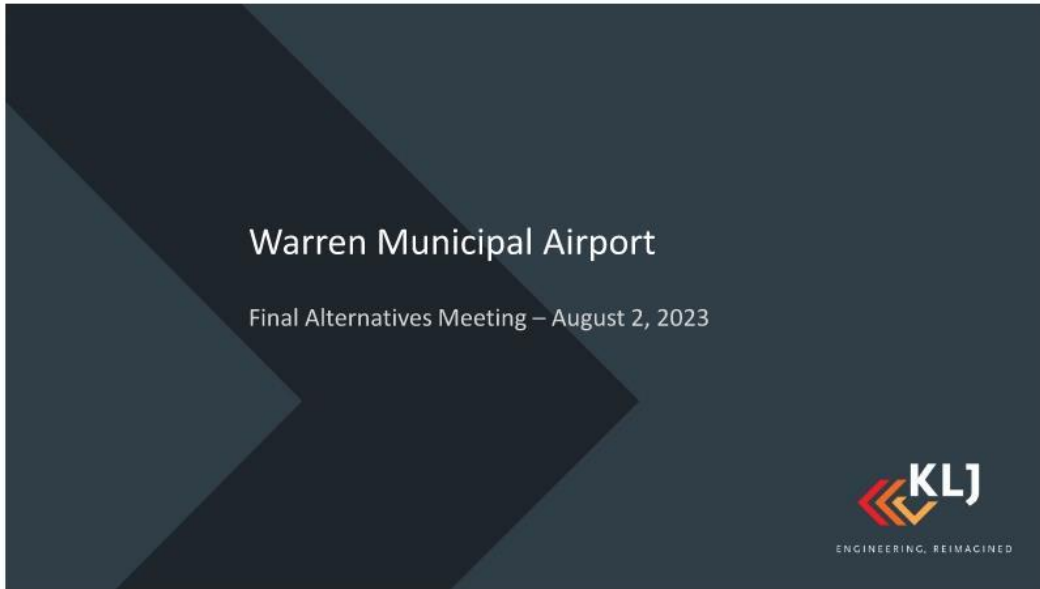
**Other Notes or Information**

Was mentioned that a future solar power AWOS would be nice if the state was willing to help pay for that.

**Next Meeting Information**

**Date:** 8/2/2023  
**Time:** 9:00 AM

**Facilitator:** Amber Channel  
**Minutes:** Final Alternative Meeting



1

## Agenda

- > Introductions
- > Last Meeting Review
- > Revised Alternatives
- > Initial Implementation
- > Next Steps



2

1

### Feedback Review of Initial Alternatives

Seven tiedown spots is enough.

Would like to keep fuel trucks off the apron and the fuel farm close to the terminal building.

Would like to keep the agricultural spray operations in a separate area.

Liked the option of an additional road access.

Liked the idea of removing the south box hangar and T-hangar row for that area to be used as apron space.

Would like to see a taxiway connector to the future parallel taxiway.

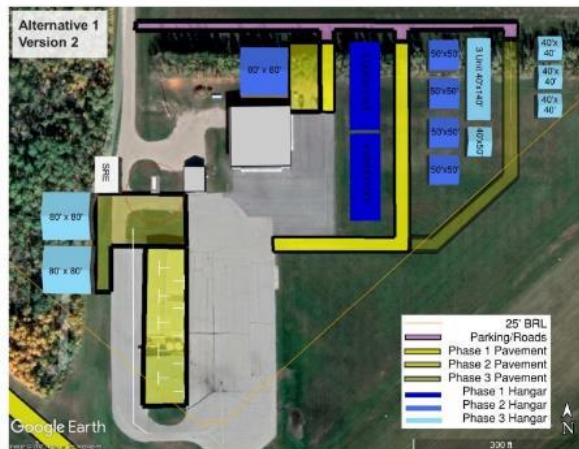
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### Alternative 1 Version 2

- > 10 tiedown spots
- > Fuel farm & SRE west of terminal building
- > Remove current hangar row

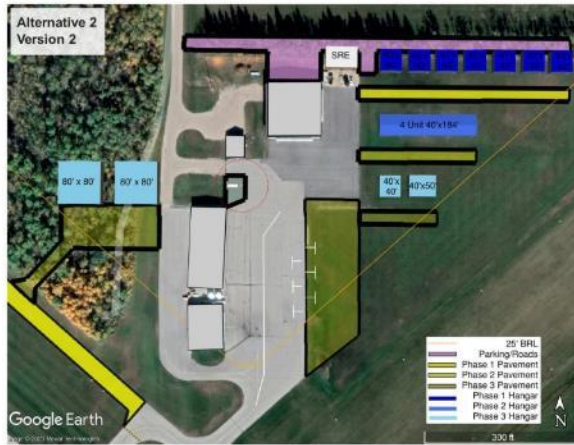


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Alternative 2 Version 2



- > 6 tiedown spots
- > Fuel farm south of terminal building
- > Parallel taxiway connector to new apron

5



Alternative 4 Version 2



- > 7 tiedown spots
- > Fuel farm & SRE on southwest of terminal building
- > Remove current hangar row

6

### Estimated Costs

- Parallel Taxiway: \$1,700,000
- Constructing the 40' x 60' SRE building: \$700,000
- Removal of current hangars\*: \$275,000
- Alternative 2 north taxilane (roughly 10,223SF): \$325,000
- Constructing a 40' x 40' hangar: \$500,000
- Constructing a 5,000 gallon fuel farm: \$475,000
- Constructing a 6-unit 50' x 150' nested T-hangar: \$1,700,000



7

### Open Discussion



8

4

## Next Steps

- Finish narrative report
- Finish implementation plan
- Finish ALP
  
- Website: <https://warren.airportplan.net/>



9

## Questions/Comments

Amber Channel, Aviation Planner  
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10

5

Warren Municipal Airport – Final Alternatives – Aug 2<sup>nd</sup>, 2023

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**ATTENDANCE LIST**

Engineering Reimagined

YEAR 2023



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Tim Finseth	NWRDC	218-745-9107	Tim@NWRDC.org
Phil Thompson	WEDA	218-201-0774	Phil@Pro-of-Warren.com
Jon Linnell	N. Valley Health		
Kevin Carlson	MnDOT		
Kent Penney	KLJ		
Andrew Zielike	KLJ		
John Glesne	KLJ		
Amber Channal	KLJ		
Beth Driesen	Grate Interpreting		



## Meeting Minutes

**Date:** 8/2/2023

**Facilitator:** Amber Channel

**Time:** 9:00 AM

**Minutes:** Final Alternatives

**Attendees:** Aaron Peterson - Airport Manager, Shannon Mortenson - City Administrator/Clerk-Treasure, Jon Linnell - North Valley Health Center/Pilot, Tim Finseth - NW Regional Development Commission, Phil Thompson - Warren Economic Development Authority, Kevin Carlson - MnDOT, Beth Driesen - Grate Interpreting, Kent Penney - KLJ, Andrew Zielike - KLJ, John Glesne - KLJ

### Agenda Topics

#### Alternative 1 Version 2 Layout Review & Discussion

1. Would like some more room between the new 80'x80' agricultural hangar and current 100'x100 hangar. This hangar could have visual problems in this location.
2. Asked if the connecting taxilane from the apron to the hangar row is necessary and could possibly go off the current apron.

*Action Items: Look at hangar row moving further north to remove connecting taxilane.*

#### Alternative 2 Version 2 Layout Review & Discussion

1. Still like how this layout offers visual of all the hangars.
2. Showed the fuel farm on the current apron and removing surrounding asphalt to determine needed space.

*Action Items: Look at moving two new 80'x80' hangars further north.*

#### Alternative 4 Version 2 Layout Review & Discussion

1. Still like the additional access to and from the future taxiway.
2. Some concern was brought up about developing to the west where the current trees are since it is swampy and winter months can affect it.

*Action Items: None*

### Other Notes or Information

*Action Items: Identify the safety concerns with the Runway 12 End vegetation. Help the city with new hangar lease agreements.*

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# NOVEMBER 1, 2023 WARREN MUNICIPAL AIRPORT OPEN HOUSE

## Airport Master Plan / Preferred Alternative

The City of Warren and KLJ Engineering and Planning would like to invite you to an open house to provide an overview of the Airport Master Plan Study to date and to receive comments and feedback as to the proposed development of the airport. There will be opportunity to ask questions and provide written comments.



**4:00 P.M to 6:00 P.M**

**Warren City Hall  
120 E. Bridge Ave.  
Warren, MN 56762**

**For more information,  
please visit  
[https://warren.airport  
plan.net/](https://warren.airportplan.net/)**

Any individuals with disabilities who will require a reasonable accommodation in order to participate in the meeting should submit a request to Amber Channel, KLJ at 605-600-3843.

Please request accommodations no later than two business days prior to the meeting in order to ensure accommodations are available.



1

### Why was an Airport Master Plan Needed?

- > Last Airport Layout Plan (ALP) was approved in 2013
- > Evaluate planned Parallel Taxiway
- > Evaluate and Forecast Airport Activity
- > Review Zoning to protect the Airport (Land Use and Height)
- > Review Terminal Area Layout
- > ALP to current design standards



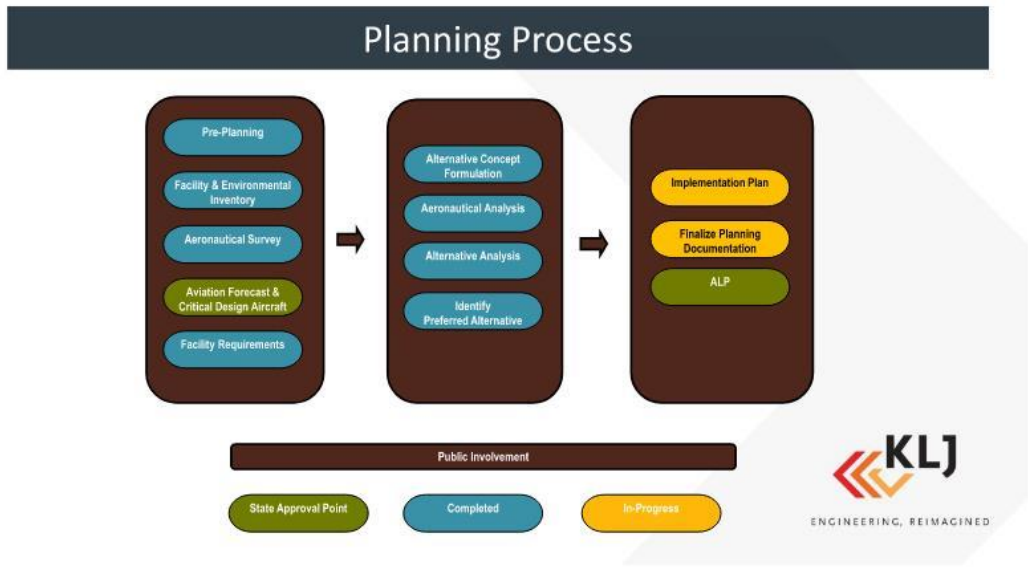
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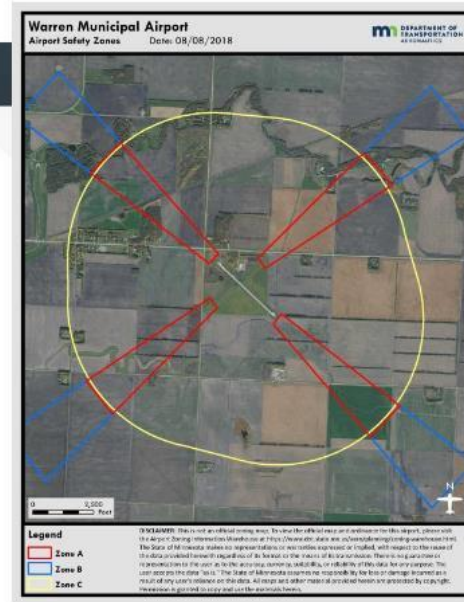
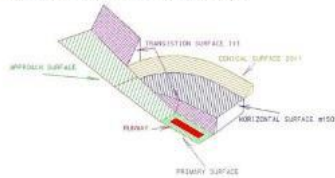
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## Warren Airport Zoning

### MnDOT Safety Zoning Standards

- **Zone A:** No structures, assembly of people, anything to cause interference with aircraft communications, lighting that impairs pilots views
- **Zone B:** No building site less than 3 acres, assembly of more than 15 people/Sq. acre, certain communication & lighting interference restrictions
- **Zone C:** Nothing to interfere with aircraft communication or pilot views



5

## Critical Design Aircraft

<b>ARC A-I/Small Aircraft</b> Cessna 172 	<b>ARC A-II/Small Aircraft</b> Pilatus PC-12 
<b>ARC B-II/Small Aircraft</b> Beech King Air B200 	<b>ARC B-II Aircraft</b> Air Tractor 802 (Design aircraft) 

Photography Source: Airlines.net

- A critical design aircraft must operate at least 500 annual operations at the airport to be considered "regular" use
- The AT-802 is the current and future critical design aircraft
  - AAC-B
  - ADG-II
  - TDG 1-B



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## Operations and Aircraft Forecast

### General Aviation Operations Forecast

Source: KJI Analysis, CAGR = Compounded Annual Growth Rate


Metric	2021	2026	2031	2036	2041	CAGR
Local Operations	9,000	9,530	10,090	10,684	11,313	1.15%
Itinerant Operations	10,000	10,588	11,211	11,871	12,569	1.15%
<b>Total Operations</b>	<b>19,000</b>	<b>20,118</b>	<b>21,302</b>	<b>22,555</b>	<b>23,882</b>	<b>1.15%</b>

### Based Aircraft Forecast

Source: KJI Analysis, CAGR = Compounded Annual Growth Rate

Aircraft	2021	2026	2031	2036	2041	CAGR
Single Engine	7	7	7	8	8	0.50%
Multi Engine	1	1	1	1	1	
<b>Total</b>	<b>8</b>	<b>8</b>	<b>8</b>	<b>9</b>	<b>9</b>	


7



Google Earth

Looked at an alternative without land purchase. About 900' of runway would be used to taxi back.

## Taxiway Alternatives



With land needed for the Runway Object Free Area (ROFA) and the taxiway safety areas, roughly around five acres (within the green line) will need to be purchased and/or traded.

8

4



### Airfield Alternative

- > AWOS to the South
- > Land Control for Runway Protection Zones and MnDOT Clear Zones
- > Land Acquisition/Trade needed on the Runway 30 End
  - > Current runway safety areas
  - > Future parallel taxiway



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### Terminal Alternative

- > "A" hangar area is intended for agricultural spray operations
- > 7 planned tiedown spots
- > Hangar row "C" is for immediate construction
- > Fuel farm conveniently located next to the terminal
- > Removal of current hangar row and south box hangar at the end of their useful life



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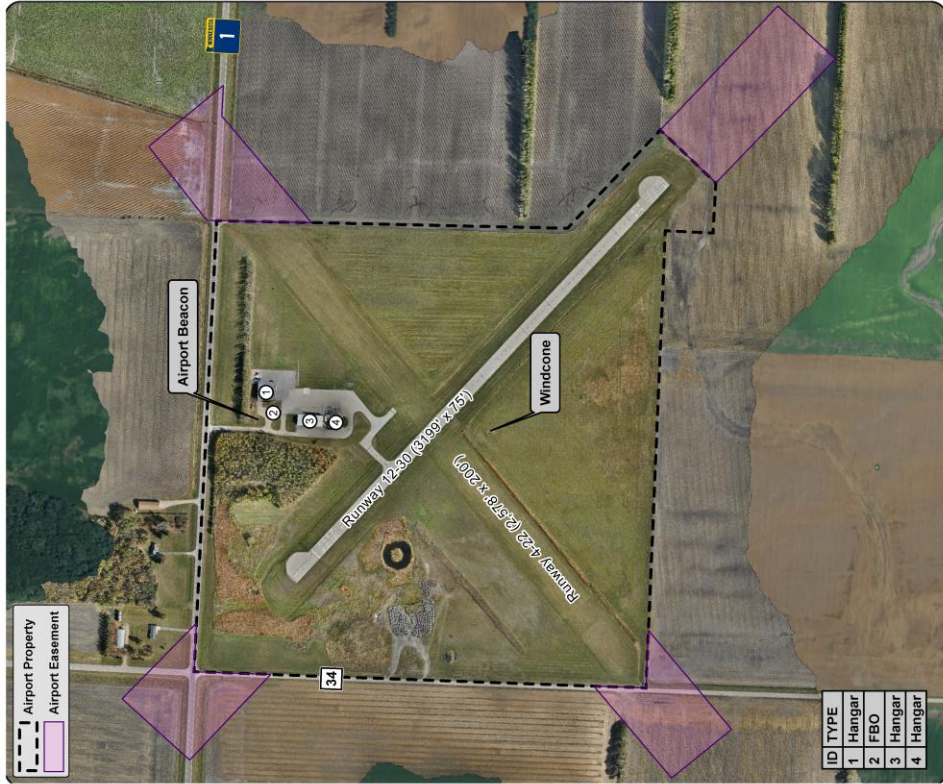
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Questions/Comments

Amber Channel, Aviation Planner amber.channel@kljeng.com 303.875.0357 m 605.600.3843 o	Andrew Zielke, Aviation Planner Andrew.zielke@kljeng.com 612.314.6545 m 651.726.5031 o
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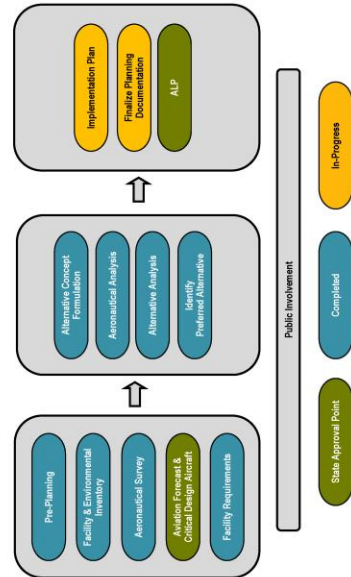


\*Intended for Planning Purposes Only

### Why is an Airport Master Plan Needed?

<p><b>Update Airport Layout Plan (ALP)</b></p> <ul style="list-style-type: none"> <li>Last ALP approved in 2013</li> <li>ALP needs to be brought to current design standards</li> </ul>	<p><b>Evaluate Parallel Taxiway</b></p> <ul style="list-style-type: none"> <li>Parallel taxiway reduces time that aircraft have to taxi on runway</li> <li>Current turn arounds are within runway safety area</li> </ul>
<p><b>Update Aircraft Activity Forecast</b></p> <ul style="list-style-type: none"> <li>Airport experiences heavy traffic from University of North Dakota (UND) aircraft for flight training which can contribute to congested airspace</li> </ul>	<p><b>Review Airport Zoning</b></p> <ul style="list-style-type: none"> <li>Current zoning ordinance exceeds standards</li> <li>Incompatible land uses within MnDOT clear zone</li> </ul>
<p><b>Update Terminal Area Layout</b></p> <ul style="list-style-type: none"> <li>Maximize hangar development space</li> <li>Taxiing routes and aircraft parking for larger turboprop aircraft</li> </ul>	<p><b>Weather Reporting Equipment</b></p> <ul style="list-style-type: none"> <li>Real time weather conditions valuable to arriving pilots, especially medical flight operators</li> <li>Locate site for future equipment</li> </ul>

### Planning Process



Warren Municipal Airport Master Plan  
Public Open House - November 1st, 2023

Warren Municipal Airport – Public Open House – Nov 1<sup>st</sup>, 2023


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**ATTENDANCE LIST**

Engineering Reimagined

YEAR 2023

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Andrew Zielike	KLJ		
John Glesne	KLJ		
Jack Vogt (virtual)	KLJ		
Amber Channel (virtual)	KLJ		

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***Public Open House Continued – November 2023***

No comments were made by the public