AIRPORT LAYOUT PLAN TRIGGERING EVENT NARRATIVE REPORT

Terry Airport (8U6)

Terry, Montana

Prairie County Airport Authority (Airport Sponsor)

March 2018

This project was funded by the Prairie County Airport Authority and the Federal Aviation Administration (FAA) through Airport Improvement Program (AIP) grant number 3-30-0075-007-2017

ADDENDUM

Narrative Report and ALP Dated March 2018

The Triggering Event Narrative Report and ALP Update were prepared according to the FAA's ARP SOP 2.00 and current advisory circulars, however after submittal and review[1] by the FAA, *Engineering Brief No. 99, Changes to Tables 3-2 and 3-4 of Advisory Circular 150/5300-13A, Airport Design* was released. This Engineering Brief, released on September 20, 2018, modifies Table 3-2 Approach/Departure Standards Table. This modification eliminates the option to use FAA Advisory Circular 150/5300-13A Table 3-2, line 3; instrument minimums ≥ 1 statute mile (day only). **Figure 1** and **Figure 2** show the changes made to Table 3-2.

The outcome of the narrative report identified an instrument approach as plausible, but the change included in Engineering Brief No. 99 makes the analysis too close to tell with available data. Due to the obstacles that exist and the close proximity to the proposed approach and departure surfaces, we would recommend an aeronautical survey meeting the requirements in Advisory Circulars 150/5300-16A, 17C, and 18B be conducted to determine the feasibility of instrument approach procedures at Terry Airport (K8U6). Please note that prior to development of an instrument approach procedure, the FAA requires an aeronautical survey be conducted following the requirements of the advisory circulars listed above.

[1] Terry Airport Airspace Case # 2018-ANM-237-NRA, Final Determination, April 30, 2018

Figure 1 – AC 150/5300-13A, Table 3-2

Table 3-2. Approach/departure standards table

	Runway Type	DIMENSIONAL STANDARDS* Feet (Meters) A	B	C	D	E	Slope/ OCS
1	Approach end of runways expected to serve small airplanes with approach speeds less than 50 knots. (Visual runways only, day/night)	0 (0)	120 (37)	300 (91)	500 (152)	2,500 (762)	15:1
2	Approach end of runways expected to serve small airplanes with approach speeds of 50 knots or more. (Visual runways only, day/night)	0 (0)	250 (76)	700 (213)	2,250 (686)	2,750 (838)	20:1
3	Approach end of runways expected to serve large airplanes (Visual day/night); or instrument minimums ≥ 1 statute mile (1.6 km) (day only).	0 (0)	400 (122)	1000 (305)	1,500 (457)	8,500 (2591)	20:1
4	Approach end of runways expected to support instrument night operations, serving approach Category A and B aircraft only. [1]	200 (61)	400 (122)	3,800 (1158)	10,000 [2] (3048)	0 (0)	20:1
5	Approach end of runways expected to support instrument night operations serving greater than approach Category B aircraft. [1]	200 (61)	800 (244)	3,800 (1158)	10,000 [2] (3048)	0 (0)	20:1
6	Approach end of runways expected to accommodate instrument approaches having visibility minimums ≥ 3/4 but <1 statute mile (≥ 1.2 km but < 1.6 km), day or night.	200 (61)	800 (244)	3,800 (1158)	10,000 [2] (3048)	0 (0)	20:1
7	Approach end of runways expected to accommodate instrument approaches having visibility minimums < 3/4 statute mile (1.2 km).	200 (61)	800 (244)	3,800 (1158)	10,000 [2] (3048)	0 (0)	34:1
8[3,5,6,7]	Approach end of runways expected to accommodate approaches with vertical guidance (Glide Path Qualification Surface [GQS]).	0 (0)	Runway width + 200 (61)	1520 (463)	10,000 [2] (3048)	0 (0)	30:1
9	Departure runway ends for all instrument operations.	0 [4] (0)	See Figure 3-4.				40:1

* The letters are keyed to those shown in Figure 3-2.

Notes:

1. Marking and lighting of obstacle penetrations to this surface or the use of a Visual Guidance Slope Indicator (VGSI), as defined by Order 8260.3, may avoid displacing the threshold.
2. 10,000 feet (3048 m) is a nominal value for planning purposes. The actual length of these areas is dependent upon the visual descent point position for 20:1 and 34:1, and DA point for the 30:1.
3. When objects exceed the height of the GQS, an approach with vertical guidance is not authorized. Refer to Table 3-4 and its footnote 4 for further information on GQS.
4. Dimension A is measured relative to TODA (to include clearway).
5. Surface dimensions / OCS slope represent a nominal approach with 3 degree Glide Path Angle (GPA), 50 feet (15 m) TCH, < 500 feet (152 m) HATh. For specific cases, refer to Order 8260.3. The OCS slope (30:1) supports a nominal approach of 3 degrees (also known as the GPA). This assumes a TCH of 50 feet (15 m). Three degrees is commonly used for ILS systems and VGSI aiming angles. This approximates a 30:1 approach slope that is between the 34:1 and the 20:1 approach surfaces of Part 77. Surfaces cleared to 34:1 should accommodate a 30:1 approach without any obstacle clearance problems.
6. For runways with vertically guided approaches the criteria in row 8 is in addition to the basic criteria established within the table, to ensure the protection of the GQS.
7. For planning purposes, determine a tentative DA based on a 3 degree GPA and a 50-foot (15 m) TCH.

Source: FAA AC 150/5300-13A, Change 1

Figure 2– Engineering Brief No. 99, Table 3-2

Table 3-2. Approach and Departure Standards Table [1, 2]

	Runway Type	DIMENSIONAL STANDARDS* Feet (Meters) A	B	C	D	E	Slope
1	Approach end of runways expected to serve small airplanes with approach speeds less than 50 knots. (Visual runways only, day/night).	0 (0)	120 (37)	300 (91)	500 (152)	2,500 (762)	15:1
2	Approach end of runways expected to serve small airplanes with approach speeds of 50 knots or more. (Visual runways only, day/night).	0 (0)	250 (76)	700 (213)	2,250 (686)	2,750 (838)	20:1
3	Approach end of runway expected to serve large airplanes. (Visual runways only, day/night).	0 (0)	400 (122)	1,000 (305)	1,500 (457)	8,500 (2591)	20:1
4	Approach end of runways expected to accommodate instrument approaches having visibility greater than or equal to 3/4 statute mile. [3]	200 (61)	400 (122)	3,400 (1036)	10,000 [4] (3048)	0 (0)	20:1
5	Approach end of runways expected to accommodate instrument approaches having visibility minimums less than 3/4 statute mile.	200 (61)	800 (244)	3,400 (1036)	10,000 [4] (3048)	0 (0)	34:1
6 [5]	Approach end of runways expected to accommodate instrument approaches with vertical guidance.	0 (0)	Runway width + 200 (61)	1520 (463)	10,000 [4] (3048)	0 (0)	30:1
7	Departure runway ends used for any instrument operations.	0 [6] (0)	See Figure 3-4.				40:1

* The letters are keyed to those shown in Figure 3-2 of AC 150/5300-13A.

General Notes:

1. This table presents the dimensional standards applicable to varying runway types based on normal conditions (e.g. standard 3-degree glidepath angle). Meeting the requirements of this table will protect the use of the runway in both visual and instrument meteorological conditions near the airport while ensuring maximum runway utility. Final published visibility minimums are determined, in part, by applying the criteria described in FAA Order 8260.3.
2. For planning purposes, objects must remain clear of the surfaces provided in this table. The FAA Flight Procedures Team must mitigate existing obstacles that penetrate instrument procedures that cannot be removed, relocated, or lowered. A modification of standards is not issued for the surfaces described in this table, in accordance with FAA Order 5300.1.
3. Marking and lighting of obstacle penetrations to this surface or the use of a Visual Guidance Slope Indicator (VGSI), may avoid displacing the threshold. Contact the Flight Procedures Team if existing obstacles penetrate this surface.
4. 10,000 feet (3048 m) represents a nominal value for planning purposes. For runways with only straight-in approaches, the length is dependent on the TERPS visual descent point or DA point. For runways with both circling and straight-in approaches, the length is the greater of 10,000 feet or the TERPS visual descent point/DA point.
5. The criteria in Row 6 is required in addition to the applicable approach surface established within the table. Applicable to ILS, GLS, LPV, LNAV/VNAV, and RNP lines of minima.
6. Dimension A is measured relative to the TODA (to include clearway).

EB No. 99 FAA Airport Engineering Division Page 4 of 6

Source: [FAA Engineering Brief No. 99]

TABLE OF CONTENTS

Executive Summary 3
Introduction 4
Existing Conditions 6
Background 6
Airfield Facilities 6
Navigational Aids & Airspace 10
General Aviation 12
Support Facilities & Other 12
Land Use 13
Environmental 13
Aviation Activity Forecasts 15
Introduction 15
Based Aircraft 16
Operations 17
Critical Design Aircraft 18
Facility Requirements 19
Planning Activity Levels (PAL) 19
Airside Facilities 20
Landside Facilities 28
Alternatives Analysis 29
Introduction 29
Evaluation Criteria 29
Airfield Improvements 30
Implementation 45
Capital Improvement Plan 46

APPENDIX

Appendix A: RPZ Analysis

Appendix B: Wildlife Study

Appendix C: Airport Layout Plan

NARRATIVE REPORT

Executive Summary

This Triggering Event Narrative Report and Airport Layout Plan update for the Terry Airport (8U6) serves as a guide identifying future development necessary to accommodate existing and future aviation demand. Specific areas of 8U6 have changed functionality since the last planning effort was completed in 1975. The following primary triggers were identified for this study requiring solutions:

- Based on discussions with the FAA, the airport does not have sufficient runway protection zones (RPZ) due to roads operating through the RPZ. In finding a solution for the RPZ, a review of runway orientation based on existing wind conditions and runway length was desired by the airport.
- The Airport would like to explore the ability for instrument approaches.
- Construction of a wildlife fence to deter wildlife in and around the airport. The current property boundary will not allow a taller wildlife fence to be installed without penetrating the FAR Part 77 airspace.

The forecasts developed for the Terminal Area Forecast (FAA TAF) were reviewed and because forecasts do not drive the items in the triggering master plan, the TAF numbers were determined to fit the future demand. An RPZ Analysis (**Appendix A**) was conducted to evaluate the incompatible land uses for Runway 8-26. Additionally, several alternatives were evaluated for runway length and orientation. Advantages and disadvantages were identified to help the Airport Authority decide on a preferred development direction. It was determined through discussions with the Airport Authority and the Helena Airports District Office that all of these alternatives could not be implemented based on either cost or environmental factors. It was determined that the runway and RPZ would remain as existing. Preferred development to help solve the study triggering events include:

- Construct a wildlife fence surrounding the airport
- Request instrument approach procedure to Runway 8-26

The implementation plan provides an overview of the planned projects, actions, and financial resources for the preferred development options.

The Airport Layout Plan (ALP), located in **Appendix C**, has been updated with the following significant changes; however, the update does not include obstruction analysis through the airport geographical information systems (AGIS) nor did it include updating the Exhibit “A map; these efforts will take place in a follow-up phase.

Introduction

The information presented in this report represents the study findings for the 2017 Terry Airport Triggering Event Narrative Report and associated Airport Layout Plan (ALP) Update prepared for the Prairie County Airport Authority, the airport owner. Airport Master Plans are prepared in accordance with Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5070-6B, *Airport Master Plans*. This planning report for the Terry Airport (8U6) will serve as an updated guide identifying future development necessary to accommodate existing and future aviation demands.

Specific areas of 8U6 have changed functionality due to triggering events that have occurred since the last Master Plan study was initiated in 1975 and the ALP Update completed in 2001. Triggering events for this study include:

- Construction of a wildlife fence to deter wildlife in and around the airport. The current property boundary will not allow a taller wildlife fence to be installed without penetrating the FAR Part 77 airspace.
- Based on discussions with the FAA the airport does not have sufficient runway protection zones (RPZ) due to roads operating through the RPZ.
- A desire by the Airport to explore instrument approaches (currently the Airport is served by visual approaches only).
- Bring the current ALP up to FAA SOP 2.0 Standards. This project will not however include obstruction analysis through the airport geographical information systems (AGIS) nor will it include updating the Exhibit "A" map. These efforts could take place after the preferred alternative has been chosen in a separate phase.
- Explore a realistic implementation and financing plan to address short-term airport development needs including pavement rehabilitation, airfield safety, and hangar infrastructure improvements.

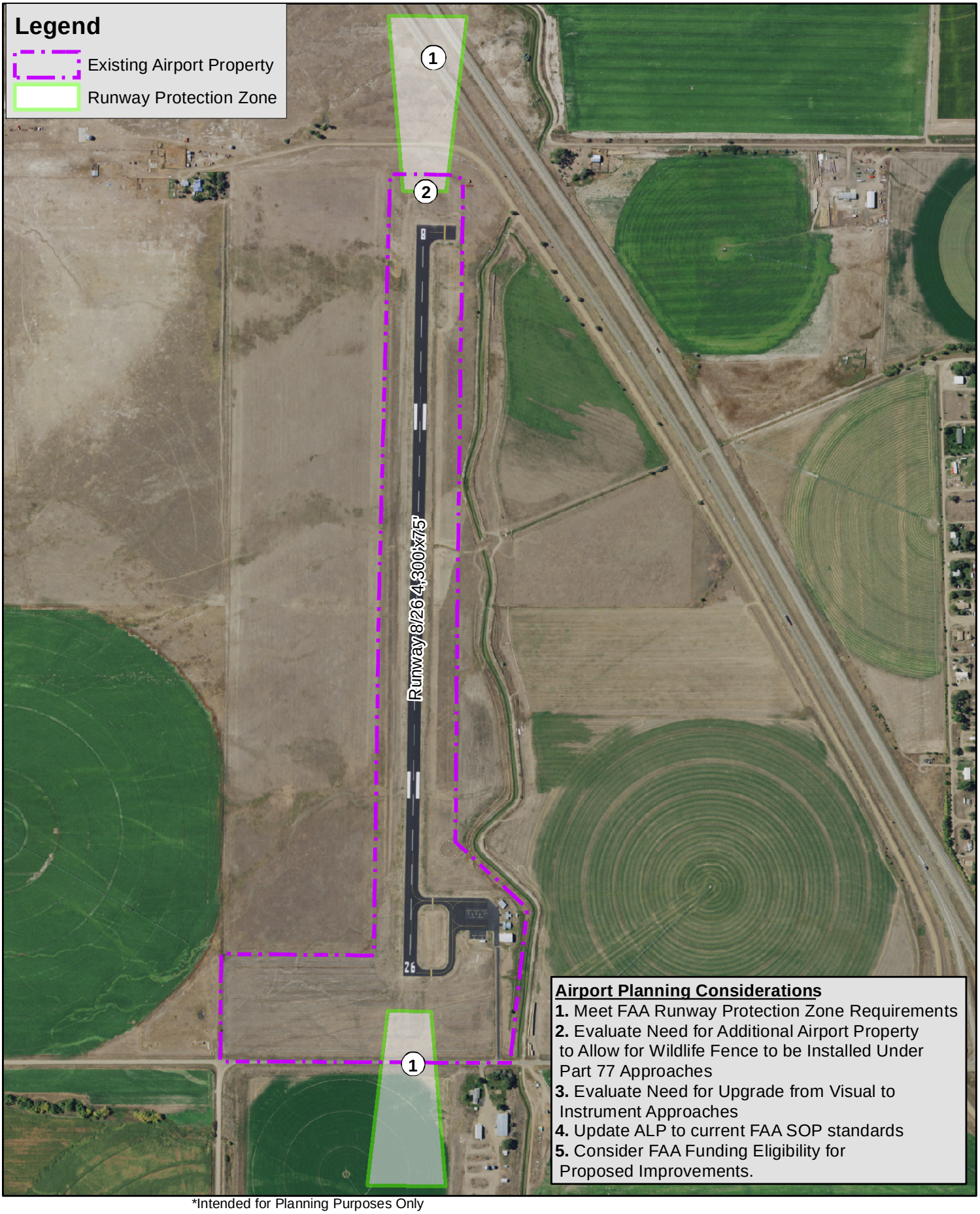
The study areas are shown graphically in **Figure 1.**

The primary objective of the project is to update the ALP to determine the proper runway length and alignment of the runway. Key planning elements to be reviewed include:

- Basic Aviation Activity Forecasts
- Facility Requirements (Runway Length and Orientation)
- Alternatives Analysis (Runway Length and Orientation)
- Environmental Review
- Implementation & Financial Plan

This study consists of a concise narrative report containing the study analysis and conclusions pertaining to the runway. The study also includes a wildlife site visit and runway protection zone analysis. The planning study and ALP update were adopted by the Prairie County Airport Authority at the Airport Board meeting in February (2018).

This study will provide the airport sponsor with a usable guidance document to assist with airport capital improvements decision making to meet aviation demands for the near future. Assumptions made are subject to change due to unpredictable internal and external events. For this reason, airport planning should be reviewed periodically to verify that the project scope and triggering events are still valid and meet the airport's needs.



P:\Airport\MT\Terry\Projects\2517107-Master Plan\GIS\MP_Maps\PlanningConsiderations.mxd TLG 6/28/2017

*Intended for Planning Purposes Only

N

0 250 500 1,000
Feet

Figure 1
Terry Airport
Planning Considerations

Existing Conditions

The Existing Conditions section of this study provides the baseline framework to evaluate existing airport facilities. This inventory data collection will be used to compare the existing conditions to the airport needs determined in future sections of the plan. An overview map of existing conditions is shown in **Figure 2**.

Background

Terry is located in northeastern Montana approximately 40 miles northeast of Miles City and 40 miles southwest of Glendive; it is the county seat of Prairie County. The Airport is located 1 mile south of the City of Terry; just south of Interstate 94. The Airport is used by the agricultural industry to support crop maintenance. The Airport was constructed shortly after World War II by Prairie County, with two turf runways; both Runway 16-34 and Runway 8-26 were 60 feet wide by 2,600 feet long. The main runway, Runway 8-26, was aligned in a due east-west heading. In 1972 Interstate 94 was constructed between the Airport and the City of Terry, which provides regional access to the Airport. Runway 8-26 was paved in 1977 and reconstructed in 2001. Runway 16-34 was abandoned in the early 1980's.

The airport currently features a paved Runway 8-26 and a short partial parallel taxiway that connects Runway 26 to the hangar area. As of August 2017, there are 3 validated based aircraft at 8U6. The airport is designed to accommodate aircraft up to Airport Reference Code (ARC) B-II and up to 12,500 pounds.

Terry Airport is a general aviation airport, meaning it accommodates aviation activities other than scheduled commercial air service. The Terry Airport is included in the National Plan of Integrated Airport Systems (NPIAS) by the Federal Aviation Administration. NPIAS airports link the community to the national air transportation system. 8U6 is categorized as a basic general aviation airport. Basic airports support general aviation activities such as emergency services, charter or critical passenger services, cargo operations, flight training, and personal flying. These airports typically accommodate mostly single-engine propeller aircraft. They may be located in, and provide service to, remote areas of the United States with limited or no surface transportation options, and therefore may be critical to the transportation of goods required for local day-to-day life. 8U6 is classified as a general aviation airport (Level 3) facility by the 2015 Montana State Aviation System Plan.

Airfield Facilities

RUNWAYS

Runway 8-26 is the primary runway at 8U6 for takeoffs and landings. It is a bituminous paved surface 4,300 feet long and 75 feet wide. The runway is designed to meet FAA Runway Design Code (RDC) B-II Small standards with visual approaches. There is no full parallel taxiway but there is a partial parallel taxiway, off the Runway 26 end. The runway serves "small" aircraft with a maximum takeoff weight of less than 12,500 pounds. The runway underwent major reconstruction in 2001 and has not had other upgrades since then. The pavement has a 2015 Pavement Condition Index (PCI) value of 82, which indicates the runway should just have preventive maintenance over the next 10 years. There are no published instrument procedures at 8U6.

Runway 8-26

TAXIWAYS & TAXILANES

8U6 is served by a system of taxiways to facilitate the movement of aircraft from the runway environment to other airport facilities including hangars and parking aprons.

Taxiway A is located off the Runway 26 end and provides access to the apron. This taxiway is 40 feet wide and meets ADG-II and TDG-2 standards.

Taxiway B provides access from the aircraft apron and hangars areas to the runway environment. This taxiway is 40 feet wide and meets ADG-II and TDG-2 standards.

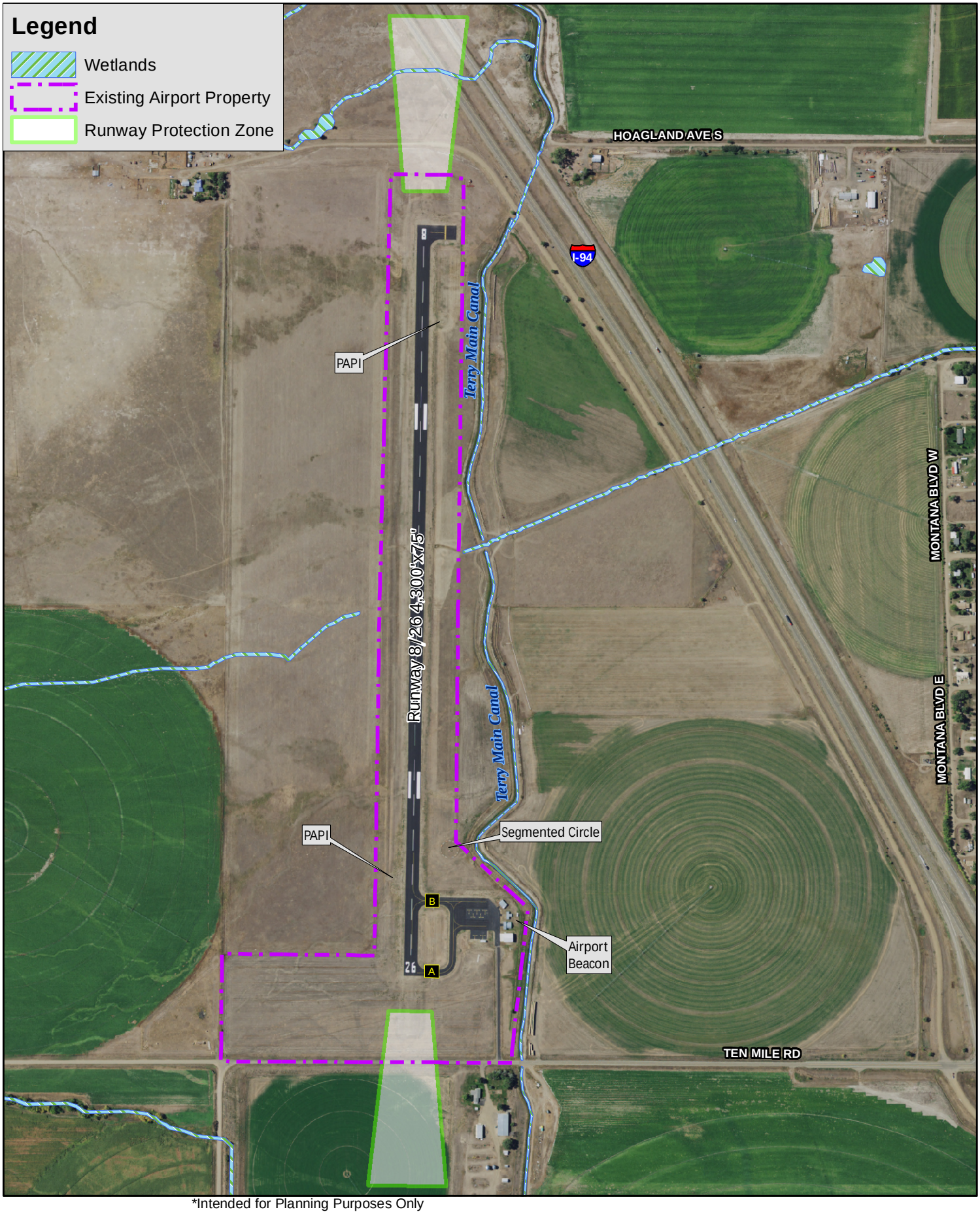
The hold lines for both taxiways are located 125 feet from Runway 8-26 centerline. The PCI value for taxiway pavements is 78.

A Taxilane provides access to the tiedowns and northern portion of the hangar area. This taxilane is 40 feet wide and serves ADG-I aircraft. This pavement is in very poor to poor condition with PCI values ranging from 60-65.

Apron Area

APRON AREA

The apron area serves the loading, unloading, and parking needs for general aviation aircraft. The apron is 3,500 SY in size and has 7 aircraft tie-downs in a nested configuration. The apron is not lighted. The pavement is in good condition with a PCI value of 74.



P:\Airport\MT\Terry\Projects\2517107-Master Plan\GIS\MP_Maps\ExistingConditions.mxd TLG 6/29/2017

*Intended for Planning Purposes Only

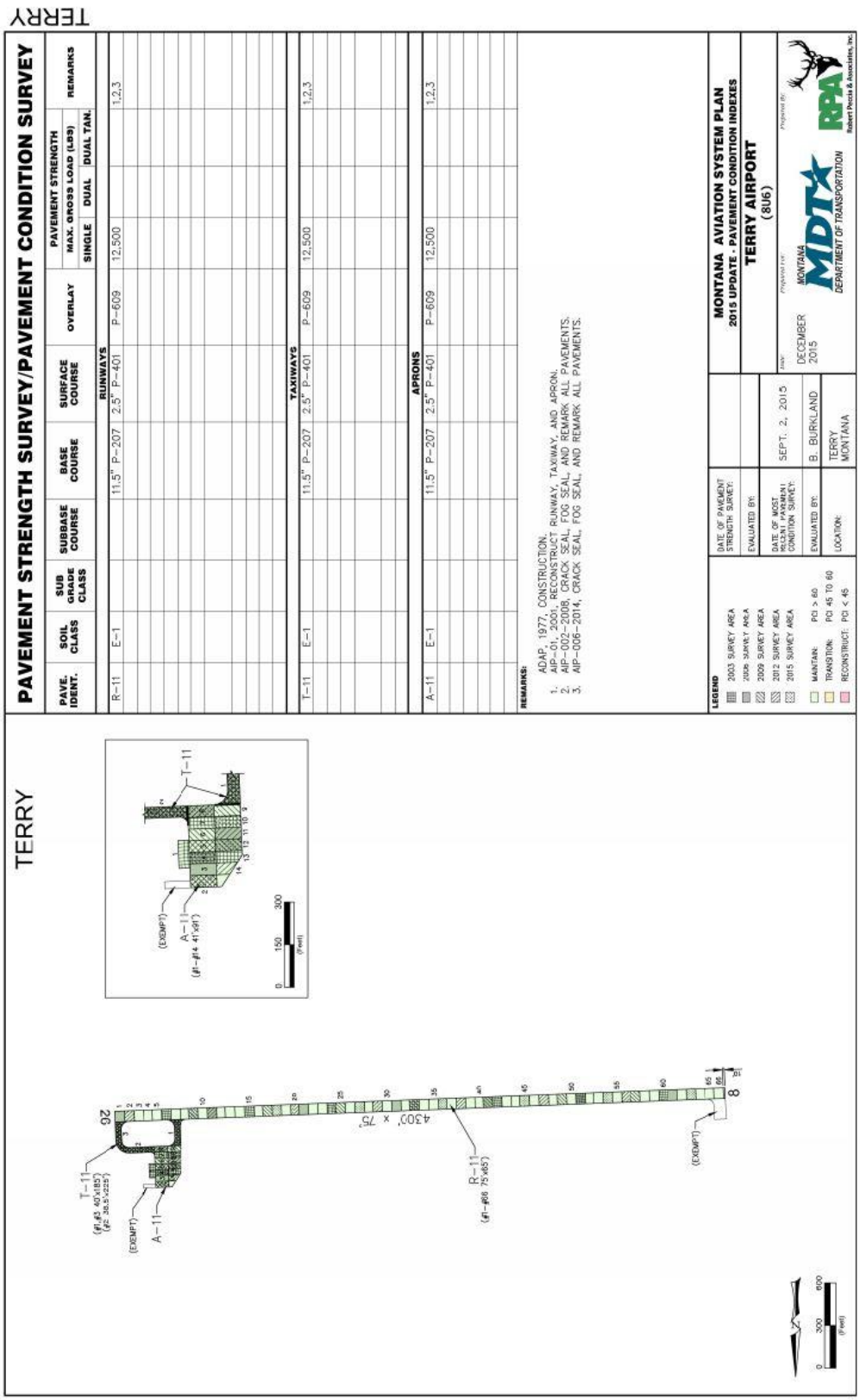
KLJ

N

0 250 500 1,000 Feet

Figure 2
Terry Airport
Existing Conditions

Figure 3 – Pavement Condition Index (2015)



Source: MDT Office of Aeronautics

Navigational Aids & Airspace

Navigational aids (NAVAIDs) provide visual and electronic guidance to pilots enabling the airport to safely, efficiently, and effectively accommodate arriving and departing flights. Airspace is a resource that is necessary to allow flights to safely operate and maneuver in the airport environment.

VISUAL

Runway 8-26 features Medium Intensity Runway Lights (MIRL) along its edge, which are pilot activated. Visual glide path approach lighting is provided by 2 box Precision Approach Path Indicator (PAPI) lights serving the Runway 8 and 26 ends. Runway 8-26 has visual runway markings.

Taxiway A and B are marked with taxiway edge reflectors.

8U6 has a green-white rotating beacon located behind the hangar complex. The segmented circle and wind cone are located west of the apron area.

Airport Rotating Beacon

COMMUNICATIONS

Communication facilities allow aircraft to transmit and receive clearances to air traffic control while safely and effectively navigating the national airspace system. 8U6 is an uncontrolled airport not served by a local Airport Traffic Control Tower (ATCT). Individual aircraft are responsible for announcing their position and stating their intentions over an air-ground Common Traffic Advisory Frequency (CTAF- 122.9).

AIRSPACE

8U6 is located within uncontrolled Class G Airspace (surface up to 1,200 feet).

APPROACH/DEPARTURE PROCEDURES

Aircraft operate under either Visual Flight Rules (VFR) or Instrument Flight Rules (IFR) depending on weather conditions and/or operational standards. Under VFR, pilots are advised to use a standard rectangular left-hand traffic pattern around the runway to approach or depart an airport; there currently are no IFR procedures at the Airport.

AIRSPACE OBSTRUCTIONS

Airspace is an important resource around airports that is very important for safe flight operations. There are established standards to identify airspace obstructions around airports. Title 14 CFR (Code of Federal Regulations): Part 77 Safe, Efficient Use, and Preservation of the Navigable Airspace establishes various airspace surfaces near airports.

The Airport Master Record (5010 form) states that a 35-foot powerline pole is located 1,075 feet from the Runway 8 end. The approach slope to clear is 25:1.

Telephone Pole Obstruction

General Aviation

General Aviation (GA) elements include facilities that serve aeronautical needs of the flying public beyond those needed for commercial airlines. Facilities include those necessary for the movement of passengers as well as parking, service, and storage of aircraft.

AIRCRAFT STORAGE HANGARS

8U6 has 3 validated based aircraft; all aircraft are stored in privately owned hangars. The hangars combine to provide approximately 5,000 square feet of aircraft storage space; one of the hangars does not have a door. While this study does not identify the needs of individual hangars the study recommends that a door be installed to prevent birds and mammals from entering the hangar. There is ample space along the existing apron area for more hangar development.

Hangar Complex

AIRCRAFT PARKING APRON

The Airport has seven (7) tiedown spaces in the apron area and serves itinerant aircraft.

COMMERCIAL OPERATORS

There are no commercial operators based at the Airport.

Support Facilities & Other

FUELING FACILITIES

There are no public fueling facilities located at the Airport.

AIRPORT MAINTENANCE

A 2,400-square foot enclosed building provides cover for snow removal equipment and airport maintenance equipment. There are three (3) vehicle bays. The building is located just east of the aircraft hangars.

GROUND ACCESS, CIRCULATION & PARKING

There is no specific automobile parking located at the airport. A 1,200-foot-long paved access road provides access from Ten Mile Road to the airport's hangar area. Pavement is in fair condition. Interstate 94 is located one (1) mile north of the airport. There is no wildlife fence/fencing at the Airport.

Land Use

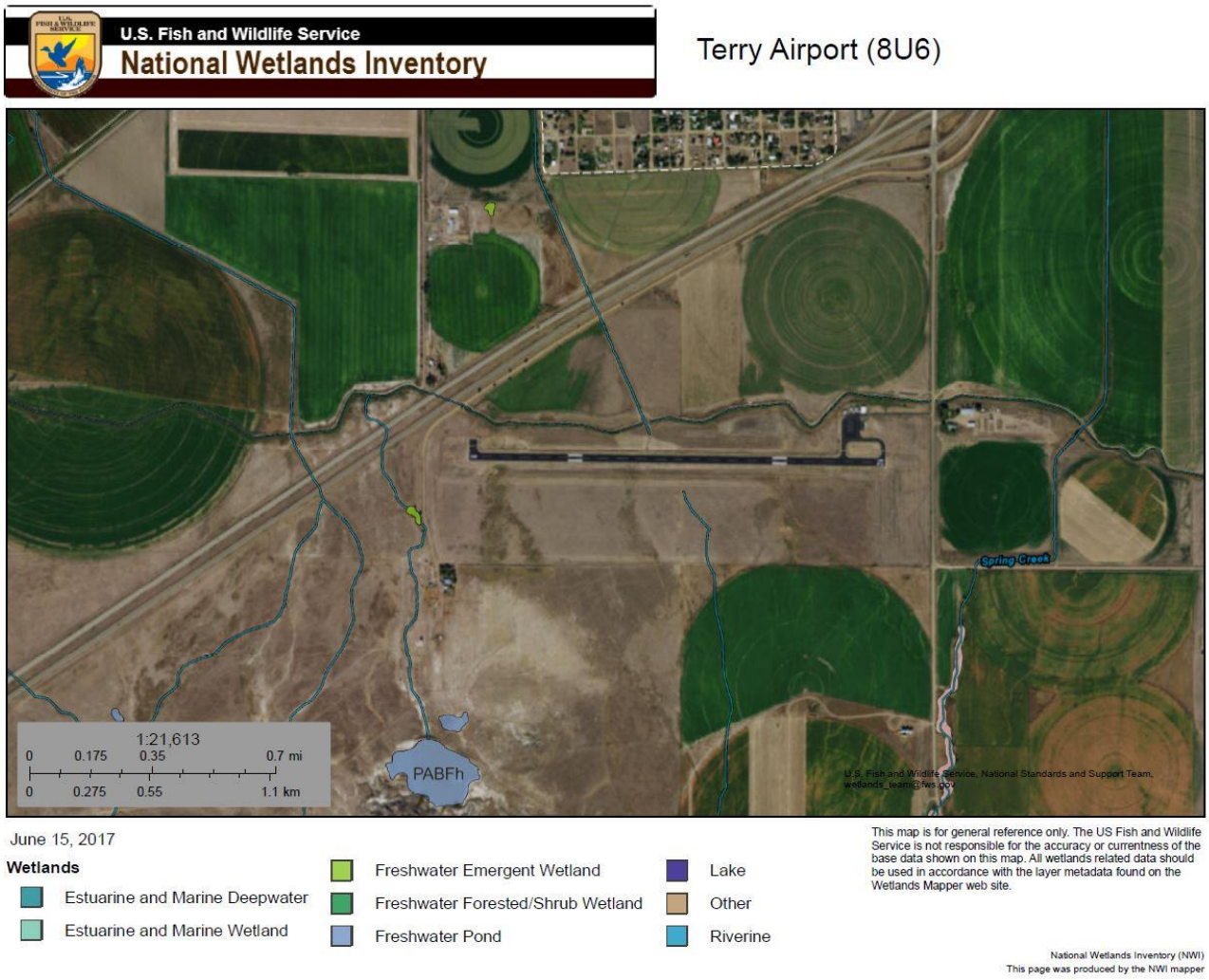
The 2001 ALP shows the airport sponsor owns 73.2 acres of land in fee title and controls 13.53 acres through an airspace and/or land use avigation easement or lease. The airport facility is located in an agricultural area with a farm located to the east and west of the Airport.

There are no land use zones in the Terry area.

Environmental Overview

As seen in **Figure 4** there are no large expanses of wetlands on or near the existing Airport property per the National Wetland Inventory (NWI).

Figure 4 – National Wetland Inventory

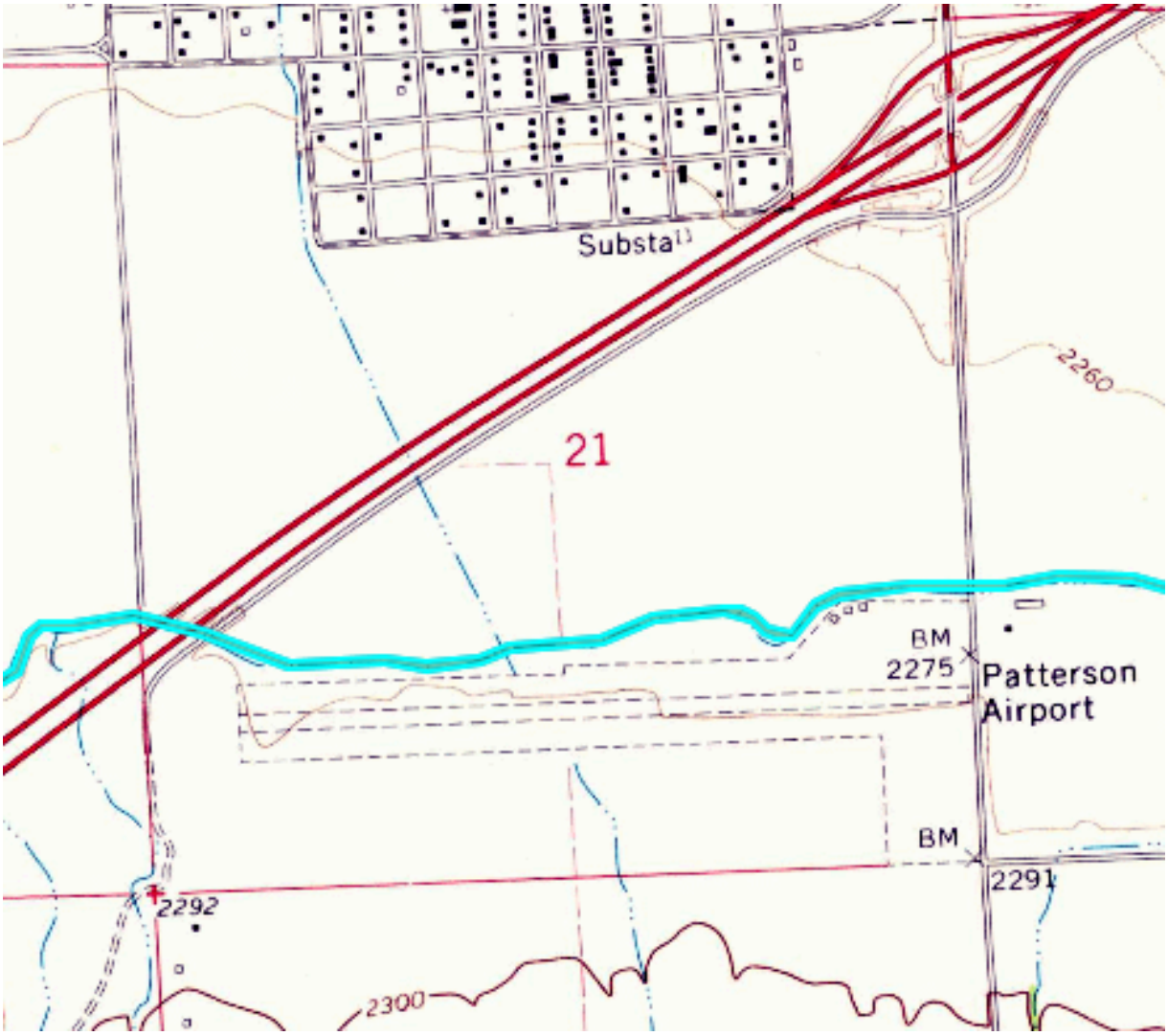


Source: U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory, KLJ Analysis

According to a records search, there is one property previously identified on the National Register of Historic Places (NRHP) within 1 mile of airport property. The Buffalo Rapids Irrigation Canal (Terry Main Canal) is identified below, as the blue line.

An environmental evaluation as it relates to proposed improvements is presented in the Environmental Review section of this report.

Figure 5 – Terry Main Canal



Source: MT SPHO, KLJ Analysis

Aviation Activity Forecasts

Introduction

Aviation Activity Forecasts analyze current and future airport activity at 8U6. Forecasting assists an Airport in determining existing and planned future facility needs based on airport activity level estimates and projections.

The FAA's Terminal Area Forecast (TAF) model referenced for this report is from the 2016 FAA TAF published in January 2017. Fiscal year 2016 has been used as the baseline for existing data and applied to most of the aviation forecast projections. Forecasts for this study were prepared in July 2017.

The airport forecasts prepared in this study assume an unconstrained scenario where facilities are available for use to meet demand. Time periods include short-term (5-year), mid-term (10-year) and long-term (20-year) resulting in forecasts for the horizon years 2021, 2026, and 2036.

Various methodologies are used to develop aviation forecasts including trend lines, market share analysis, and professional judgement. Forecasts should not be considered predictions of the future but rather an educated expectation of future activity.

Runway 8-26

Based Aircraft

A based aircraft is an operational and airworthy aircraft claiming an airport as its home base for most of the year. FAA identifies a based aircraft to be a single-engine, multi-engine, jet or helicopter aircraft. Ultralight and other aircraft are not counted for FAA records. Based aircraft drive the need for aircraft storage space at an airport.

ACTIVITY & TRENDS

Per the National Based Aircraft Inventory records last edited in April 2010, 8U6 has three (3) validated based single engine aircraft. The FAA TAF records one (1) based aircraft.

According to the FAA TAF the airport had four (4) aircraft in 1990, two (2) aircraft from 1991 to 2005 and one (1) aircraft from 2006 to 2016.

Nationwide, the total number of general aviation aircraft has declined an average of 0.3% annually since 2001. In the future, 2016 FAA Aerospace Forecasts show a modest 0.2% growth through year 2036. The highest growth sectors are in rotorcraft, turboprop, turbojet, and sport aircraft.

According to the City of Terry Growth Policy the population of the City of Terry has been on decline since the 1950's, peaking at 1,191 in 1950 and declining to 605 in 2010. Not only is the population declining, the population in Terry is much older than both the State of Montana and Country as a whole. This is of particular interest as an aging population has different needs from a younger population with regard to disposable income and employment (1 out of every 2 people in Terry is not in the workforce). Based on this information the population of Terry is anticipated to remain the same at 600 throughout the planning period.

FORECAST

Since airport activity and the City of Terry population is either flat or has been declining over the past several years and considering the primary objectives of this triggering event report (RPZ incompatible uses and instrument approach development) are not affected by the number of based aircraft, it was decided the TAF flat line projections for based aircraft would be used while the National Based Aircraft website data would be used for the number of based aircraft.

Table 1 – 8U6 Based Aircraft Forecast

Metric	2016	2021	2026	2036
Single-Engine	3	3	3	3
Multi-Engine	0	0	0	0
Jet	0	0	0	0
Helicopter	0	0	0	0
FAA Based Aircraft	**3**	**3**	**3**	**3**
Other	0	0	0	0
Total Based Aircraft	**3**	**3**	**3**	**3**

Source: KLJ Analysis

Operations

An operation is an aircraft landing or a takeoff. Aircraft operations are categorized as local or itinerant. Local operations are performed by aircraft that remain in the local traffic pattern and stay within a 20−mile radius of the airport. These operations typically include practice landings, touch-and-go operations, practice approaches and maneuvering within the local area. Itinerant operations are performed by a landing aircraft arriving from outside the airport area or a departing aircraft that leaves the airport area.

Commercial aviation consists of civil aviation that involves operating an aircraft for hire to transport passengers or cargo. General Aviation operations are non-commercial operations.

ACTIVITY & TRENDS

At non-towered airports like 8U6, FAA estimates operations and classifies them as commercial (Air Taxi), civil or military. They are further classified as local or itinerant. Since 2001 the FAA TAF, has shown that the airport has had 800 total operations. In 2015 there was an increase in itinerant operations from 300 to 400 operations for a total of 900 operations.

8U6 is a rural general aviation airport. There is no FBO or regular flight instruction offered at 8U6. As mentioned previously the airport is used primarily for agricultural operations that generate both itinerant and local operations.

Nationwide, the total number of general aviation hours flown has declined an average of 1.1% annually since 2001.

FORECAST

The airport does not supply fuel, has no instrument approaches, and is generally located between Miles City and Glendive airports, both of which have fuel and instrument approaches to all runways (primary and crosswind). Based on these facts itinerant operations are not expected to grow over the course of the planning period.

As mentioned in the based aircraft section the population of Terry is in decline and aging. This trend is not anticipated to change; therefore the local operations projections are anticipated to remain flat.

Based on the items mentioned above, the TAF number and projections are anticipated to remain flat throughout the planning period.

Table 2 – 8U6 Operations Forecast

Metric	2016	2021	2026	2036
Itinerant Operations				
Air Carrier	0	0	0	0
Air Taxi	100	100	100	100
General Aviation	400	400	400	400
Military	0	0	0	0
Itinerant Total	500	500	500	500
Local Operations				
Civil	400	400	400	400
Military	0	0	0	0
Local Total	400	400	400	400
Total Annual Operations	**900**	**900**	**900**	**900**

Source: KLJ Analysis

ANNUAL INSTRUMENT APPROACHES

Annual instrument approaches (AIAs) are defined as an approach to an airport conducted in actual instrument meteorological conditions. For purposes of this definition, an approach initiated when the observed visibility is less than 3 miles or the cloud ceiling is less than the final approach fix. AIA figures are a required element to an FAA forecast. There are no instrument approaches to 8U6 however pilots have occasionally filed an IFR flight plan to Terry and completed the flight on a visual approach to the airport. According to the FAA Operational Database in 2016 there were 27 instrument procedures filed, 23 instrument procedures in 2015, 20 instrument procedures in 2014, and 35 instrument procedures in 2013.

PEAK ACTIVITY

Peak demand periods help quantify aviation activity during busy periods. Time periods evaluated include the peak month, design day, and design hour operations. Peak activity is important when planning the size of facilities with fixed capacities.

Based on the extremely low existing and forecasted operational levels, there are no peak activity levels forecasted.

Critical Design Aircraft

The critical design aircraft is identified as the most demanding aircraft or family of aircraft to regularly use the airport. A critical design aircraft type or family must operate at least 500 annual operations at the airport to be considered "regular" use by FAA for improvements to be justified for funding.

EXISTING

A review of the FAA Traffic Flow Management System (TFMS) data was completed to aid in determining the design aircraft. At 8U6 a fleet mix including turboprop are the largest aircraft types to operate to the airport. Aircraft typically arrive to 8U6 under IFR but often do not depart under IFR. Arrival data was evaluated. Historical IFR arrivals data is shown below in **Table 3**.

Table 3 – Historical 8U6 IFR Procedures

Aircraft Type	AAC-ADG-TDG	Instrument Flight Rules (IFR) Arrivals				
		2012	2013	2014	2015	2016
Cessna Citation Jet (or similar)	B-II-2	0	0	0	0	1
Beechcraft King Air B200/B350	B-II-2	13	23	20	21	22
Beechcraft Baron	B-II-1A	0	1	0	1	2
Pilatus 12	B-II-1A	3	9	4	2	3
Cirrus SR22	B-I-1A	0	3	0	0	2

Source: FAA Traffic Flow Management System, KLJ Analysis

It was determined that the majority of the aircraft that file the IFR flight plans are using "life flight services" to provide medical transportation from Terry to Billings.

Since the airport does not sell fuel and there are limited operations by B-II aircraft the overall existing critical design airplane is a single engine aircraft representative of a B-II Beech Super King Air. This airplane has an FAA Airport Reference Code (ARC) of B-II made up of FAA Aircraft Approach Category (AAC) B and Airplane Design Group (ADG) II. The design aircraft has a wingspan of 57 feet with an approach speed of 103 knots (1.3 times stall speed dirty). The taxiway design group (TDG) is TDG-2 and the taxiway width standard for TDG-2 is 35 feet.

The design aircraft has a maximum gross takeoff weight of 12,500 pounds and is considered a "small" airplane and it is anticipated that this aircraft will remain the critical aircraft for the foreseeable future.

Facility Requirements

This section of the planning study analyzes the existing and anticipated future facility needs. Proposed requirements are based on a review of existing conditions, capacity levels, activity demand forecasts, and airport design standards using FAA guidance and industry standards. Although several elements are important for comprehensive airport planning, this targeted study will focus on the RPZ issues, runway orientation and length, and development of instrument approaches at 8U6.

Planning Activity Levels (PAL)

There are various airport activity measures used to determine facility requirements at general aviation airports including based aircraft, total operations, and critical design aircraft annual operations. For this study, Planning Activity Levels (PALs) are used to identify activity demand thresholds for recommended facility improvements. PALs are tied to activity measures including operations, based aircraft, and design aircraft from the FAA-approved aviation activity forecasts in this study.

Airport activity can be sensitive to industry changes, national, and local economic conditions. The demand forecasts developed in this study correspond to an estimated planning level calendar year from the forecasts.

- PAL 1 = Calendar Year 2021
- PAL 2 = Calendar Year 2026
- PAL 3 = Calendar Year 2031
- PAL 4 = Calendar Year 2036

Implementation is based on actual demonstrated need for the next five years. Facility needs shown for PAL 1 should be considered now for a future project.

Airside Facilities

DESIGN STANDARDS

FAA design standards, determined by the design aircraft characteristics, relates the physical and operational characteristics of an aircraft to the design and safety separation distances of the airfield facility. FAA airfield design classifications include:

- **Aircraft Approach Category (AAC):** A grouping of aircraft based on approach reference speed, typically 1.3 times the stall speed. Approach speed drives the dimensions and size of runway safety and object free areas.
- **Airplane Design Group (ADG)**: A classification of aircraft based on wingspan and tail height. When the aircraft wingspan and tail height fall in different groups, the higher group is used. Wingspan drives the dimensions of taxiway and apron object free areas, as well as apron and parking configurations.
- **Taxiway Design Group (TDG):** A classification of airplanes based on Main Gear Width (MGW) and Cockpit to Main Gear (CMG) distance. TDG relates directly to taxiway/taxilane pavement width and fillet design at intersections.

Coding systems are then developed based on the design classifications. They include:

- **Airport Reference Code (ARC):** An airport designation that represents the AAC and ADG. The ARC is used for planning and design only and does not limit the aircraft that may be able to operate safely on the airport.
- **Runway Design Code (RDC):** A code signifying the design standards to which the overall runway is to be planned and built, typical based on the design aircraft and approach visibility minimums for a particular runway.
- **Runway Reference Code (RRC):** A code signifying the current operational capabilities of each specific runway end and adjacent parallel taxiway. RRC is split into Approach Reference Code (APRC) and Departure Reference Codes (DPRC) for each phase of flight.
- **Approach Visibility Minimums:** These distances relate to the minimum distance pilots must be able to see the runway or lighting from the runway for landing.

More information on FAA airport design standards can be found in FAA AC 150/5300-13A, *Airport Design*.

DESIGN AIRCRAFT

Aircraft characteristics relate directly to the design standards on an airport. Planning airport improvements requires the selection of a "design aircraft." The design aircraft is the most demanding aircraft or family or aircraft operating or forecast to operate at the airport on a regular basis. Each design aircraft relates back to the FAA coding system to determine airfield design standards.

Beech Super King Aircraft

Projects are eligible for FAA funding if they are needed for the design aircraft. The minimum threshold is 500 annual itinerant operations.

Aviation activity forecasts show the overall existing and future design aircraft at 8U6 will continue to be Airport Reference Code (ARC) B-II, Small Aircraft (Maximum

takeoff weight 12,500 pounds or less). This applies to Runway 8-26 and the overall taxiway and apron system. Taxiways and taxilanes currently meet TDG-2 standards.

The Sponsor desires to maintain taxiways to TDG-2 standards. Historically there have been 23 documented operations of TDG-2 aircraft in 2016. Operations do not exceed the FAA's substantial use threshold for TDG-2 design. Historically, the FAA's Helena Airports District Office (ADO) has supported TDG-2 standards at Montana general aviation airports. Because there have been demonstrated uses by larger TDG-2 aircraft it is recommended specific routes accommodate TDG-2 airplanes to reduce risk of landing gear leaving pavement.

METEOROLOGICAL CONSIDERATIONS

Local weather conditions are a significant factor in the design and development of airport facilities since they affect aircraft performance. Temperature affects runway length, wind direction and speed affect runway orientation, and visibility and cloud ceiling conditions determine the need for runway navigational aids and lighting. Over the last 30 years (1981-2010) the average maximum temperature at Terry in the hottest month has been 87.2 degrees Fahrenheit (July).

A runway's wind coverage is determined by an aircraft's ability to operate with a "direct" crosswind, which is defined as a crosswind that is 90 degrees to the direction of travel. Crosswind or tailwind conditions can be hazardous to aircraft operations if they exceed the operational capabilities of the airplane or flight crew. The smallest aircraft are typically the most affected operationally by crosswinds.

For planning purposes the FAA has defined the maximum direct crosswind for small aircraft as 12 miles per hour (10.5 knots); for increasingly larger aircraft, a 15-mile per hour (13 knot) direct crosswind is used up through 23-mile per hour (20 knots) for the largest aircraft. Aircraft are able to operate safely in progressively higher wind speeds as the crosswind angle decreases and the wind direction aligns more closely with the opposing direction of flight. In addition, some aircraft are designed to safely operate with higher crosswind components. Ideally, an aircraft will take off and land directly into the wind or with a light crosswind. The FAA recommends that primary runways accommodate at least 95 percent of local wind conditions; when this level of coverage is not provided, the FAA recommends development of a secondary (crosswind) runway.

Prevailing winds in the area are from the west and northwest and are generally aligned with the airport's runway configuration. In the 1975 Airport Master Plan for Terry the decision-making process for the orientation of the primary runway was discussed. With a lack of weather information, the runway orientation was based on information obtained from an airport board meeting. During the meeting, it was pointed out that the airport is in the Yellowstone River valley which runs east and west near Terry, with bluffs and high hills to the north. Apparently, this topography alters the prevailing eastern Montana wind from a northwest direction to a more westerly direction. The airport board concluded that a due east-west alignment will handle approximately ninety percent of the aircraft operations.

Buffalo Rapids, near Terry Montana Agrimet Station July - 2017

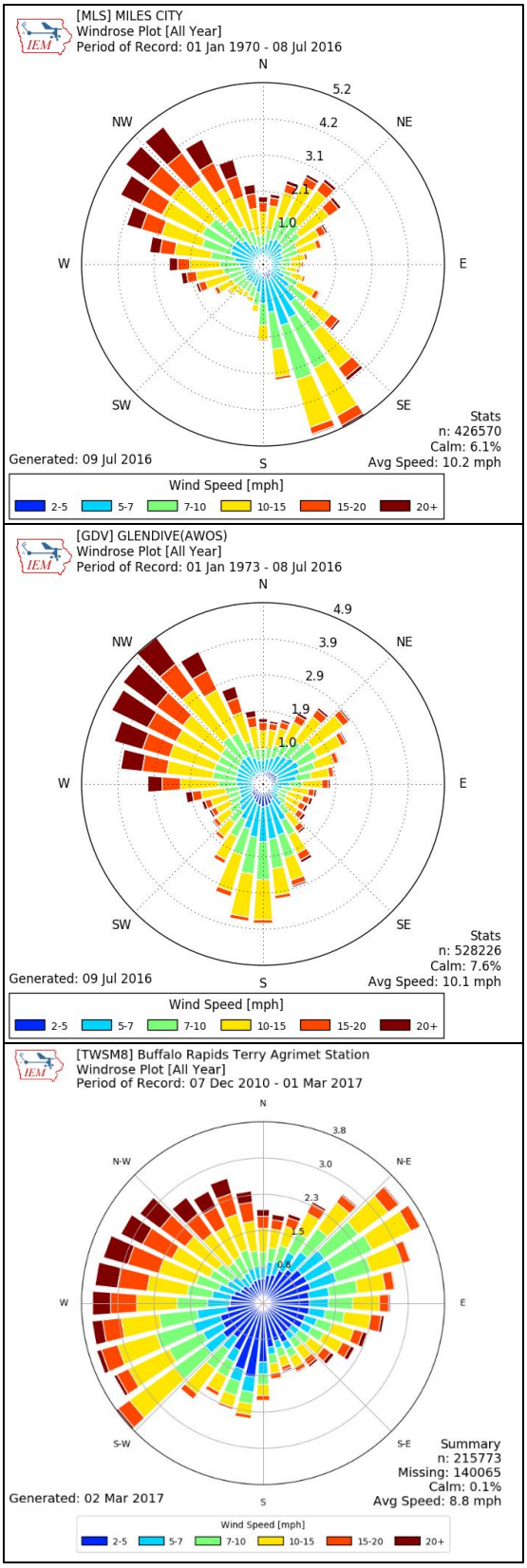
Terry Airport currently does not have weather observation equipment on the airfield so an off-airport weather source was used for wind analysis. The selection of aviation weather stations in the area were the Glendive Airport (30 miles NE) and Miles City – Frank Wiley Field (31 miles SW). Both of these locations feature a different geographic setting and

runway alignment than Terry Airport and may not accurately depict the wind experienced at Terry. An agricultural weather source located next to the airport that observes and reports wind data was also considered. This source is an Agrimet station (TWSM8/BRTM) called Buffalo Rapids near Terry, Montana that is owned and operated by the US Bureau of Reclamation – Great Plains Region. This station is located across 10 Mile Road (east of the airport) on the neighboring farm land. The proximity to the runway and similar geographic setting is ideal however the station does not have the equipment to support an IMC analysis and only 7 years of observations could be found from online sources.

Wind roses depicting yearly averages of the three stations from the Iowa Mesonet are presented for a visual comparison of the three sites. Additionally, a review of the all-weather wind coverage using observations[1] from Glendive and Miles City with Terry's Runway 8-26 revealed 86.93 and 84.93 percent respectively. Glendive and Miles City airports are both situated on the hills west of the river bank and show a prevailing wind from the northwest whereas Terry, which is located in the river valley low lands depicts a prevailing wind from a westerly heading. The airport and its users have indicated that an east-west runway alignment best captures the areas prevailing wind.

The proximity to the runway and similar geographic setting, supplemented by input from airport users, made the Terry Agrimet station the preferred weather source for conducting the all-weather wind coverage analysis. Based on Terry's runway design, the maximum crosswind component for Runway 8-26 is 10.5 knots.

When collecting the data for the Buffalo Rapids, near Terry, Montana Agrimet station it was discovered that the wind speed recorded was not average wind speed but peak wind speed within the hour. Using this number would have inaccurately shown a strong wind environment. The US Bureau of Reclamation (Agrimet station owner) was contacted and a full 10 years of hourly observations was provided that reported the average wind speed per hour as well as the wind direction at the time of the observation. This data was used to run All Weather wind coverages for 10.5 and 13 knot crosswind components. The wind coverage for Terry's runway alignment exceeded the 95 percent threshold.



Source: Iowa Mesonet

[1] *FAA Airport GIS* - GDV AWOS and MLS ASOS (2007-2016)

It is important to note the winds reported from the Agrimet station were generally lighter than expected and every runway orientation tested achieved greater than 95 percent coverage with the lowest wind coverage being 96.04 percent. It is possible the wind speeds in the river lowlands are consistently lower than surrounding geographies. Other possible explanations could be that the Agrimet stations report wind differently than aviation sources or that Agrimet siting criteria is different than ASOS/AWOS siting criteria and vegetation/structures are affecting observations. The strongest wind coverage orientation was 125˚/305˚ at 98.81 percent wind coverage.

Table 4– All-Weather Wind Coverage

Terry Runway 8-26	Crosswind Component (Wind Speed)	
	10.5 knots	13.0 knots
BRMT	98.03%	99.11%

Source: US Bureau of Reclamation data from BRMT Agrimet Station (2007-2016; hourly)

Pilots are able to fly with visual reference to the ground and other aircraft during most weather conditions. This is known as Visual Meteorological Conditions (VMC). Pilots are required to reference flight instruments and be on an FAA Instrument Flight Rules (IFR) flight plan when the cloud ceiling is less than 1,000 feet above the ground or the flight visibility is less than 3 statute miles. These conditions are known as Instrument Meteorological Conditions (IMC) and require a pilot to be instrument rated. Wind coverage during IMC is evaluated to determine the ideal alignment for instrument approaches to an airport's runway.

The Buffalo Rapids near Terry Agrimet station does not measure cloud ceiling and visibility so this station was not available for IMC wind coverage analysis. To analyze IMC wind coverage and meteorological conditions the observations from the Glendive AWOS were reviewed as this was the closest IMC capable facility and whose wind coverage was slightly more aligned to Terry than Miles City. The wind data for Glendive was retrieved from the National Climatic Data Center (NCDC) which contained 10 full years (2007-2016) of hourly observations. IMC wind coverages were generated for both 10.5 and 13 knots crosswind components and were additionally broken down by runway end. **Table 5 IMC Wind Coverage** summarizes the results. The current IMC wind coverage is 77.97 percent for design aircraft with a 10.5-knot crosswind component, which falls short of the FAA recommended 95 percent threshold.

Table 5– IMC Wind Coverage

Runway	Crosswind Component (Wind Speed)	
	10.5 knots	13.0 knots
Runway 8 - 26	77.97%	85.65%
Runway 8 Only	52.97%	57.33%
Runway 26 Only	34.16%	37.48%

Source: National Climatic Data Center data from GDV AWOS (2007-2016; hourly)

According to the hourly weather data from Glendive, the airport experiences VMC weather conditions 95.36 percent of the time or 348.1 days per year. The airport has weather conditions below current visual approach weather minimums a total of 10.4 days per year. If a GPS approach were available at Terry with a 500-foot cloud ceiling and 1-mile visibility minimums, the number of days the airport would not be usable for landings would be 6.5 days.

Table 6– Meteorological Analysis

Weather Condition	Percentage	Days per Year	Hours per Year
VMC	95.36%	348.1	8,354
Usable IMC*	2.85%	10.4	250
Usability	**98.21%**	**358.5**	**8,603**
Below Weather Minimums*	1.79%	6.5	157
Total	**100.00%**	**365**	**8,760**

Source: National Climatic Data Center data from GDV AWOS (2007-2016; hourly)
**Estimated IFR weather minimums of 500-foot cloud ceiling and 1-mile flight visibility*

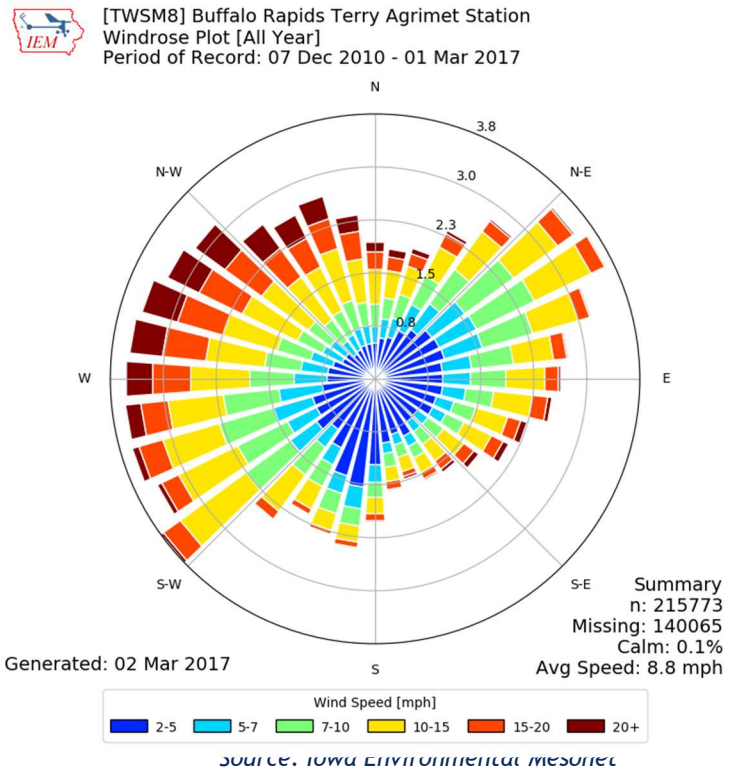
RUNWAYS

The Runway Design Code (RDC) for Runway 8-26 is B/II(S)/VIS for visibility minimums with no APRC or DPRC. The RDC standards apply to the existing and ultimate runway configurations. The runway is classified as "utility" to accommodate small aircraft 12,500 pounds and less.

Based on the meteorological analysis, the existing runway alignment meets the FAA recommended 95 percent wind coverage and realignment of the runway is not recommended.

The Runway Protection Zone (RPZ) is a trapezoidal land use area at ground level whose purpose is to enhance the protection of people and property on the ground. RPZs should be controlled by the airport sponsor and avoid new development. The RPZs for all existing and ultimate "small aircraft" runways begin 200 feet from the runway end and are 250' (inner width) x 450' (outer width) x 1,000' (length) in size.

The following incompatible land uses are within the existing approach/departure RPZs at Terry:



Source: Iowa Environmental Mesonet

- **Runway 8:** Interstate 94 (I-94) is an interstate highway that starts in Michigan and ends in Montana. It is located west of Runway 8 and impacts approximately 2 acres (400 linear feet) of the Runway 8 RPZ.
- **Runway 26:** Ten Mile Road is a paved two-lane road oriented north-south, it impacts Runway 26 RPZ for approximately .3 acres (300 linear feet) through the central portion of the RPZ.

Because of the incompatible land uses within the Runway 8-26 RPZs, a detailed RPZ analysis is being completed as a part of this planning effort. That detailed study can be found in **Appendix A: Runway Protection Zone Analysis**.

There is no recommended change to the length of Runway 8-26. The primary runway length of 4,300 feet meets standards for a small aircraft with less than 10 passenger seats at 95 percent of fleet as identified in FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*. Runway widths meet FAA standards.

The existing barbwire fence is located inside the existing ROFA and should be relocated as soon as practicable. It should be noted that any B-II aircraft inside the RSA would have adequate wingtip clearances from fence.

As **Table 7** identifies the basic 8U6 runway design standards to meet existing and future needs.

Table 7 – 8U6 Runway Design Standards

Design Standard	Runway 8-26 Existing	Runway 8-26 Ultimate
Runway Design Code	B/II(S)/VIS	B/II(S)/5000
Runway Classification	Utility	Utility
Runway Surface Type	Asphalt	Asphalt
Runway Dimensions	4,300' x 75'	4,300' x 75'
Approach Type	VISUAL	NPI/LPV
Visibility Minimums	N/A	1 mile
FAA Runway Protection Zone	250' x 450' x 1,000'	250' x 450' x 1,000'
FAR Part 77 Code	A(V)	A(NP)
FAR Part 77 Dimensions	500' x 1,250' x 5,000'	500' x 2,000' x 5,000'
FAR Part 77 Slope	20:1	20:1

Source: FAA AC 150/5300-13A, Change 1, KLJ Analysis
VIS = Visual, NPI = Non-Precision Instrument

AIRSPACE

Title 14 CFR (Code of Federal Regulations) Part 77 *Safe, Efficient Use, and Preservation of the Navigable Airspace* is used to determine whether man-made or natural objects penetrate these "imaginary" three-dimensional airspace surfaces and become obstructions.

Ultimate changes to FAR Part 77 airspace standards are related to the recommendation to implement a straight-in instrument approach to Runway 8-26. This change would increase the outer width of the FAR Part 77 approach from 1,250 to 2,000 feet. All other FAR Part 77 airspace standards would remain the same as they exist today.

FAA also identifies sloping approach surfaces that must be cleared at an absolute minimum for safety for landing and departing aircraft. These surfaces are identified in Table 3-2 of FAA AC 150/5300-13A (Change 1), *Airport Design*. A 20:1 surface must remain clear for Runway 8-26. When the airport is ready to develop instrument approaches, an aeronautical survey in accordance with FAA AC 150/5300-18B (Change 1), General Guidance and Specifications for Submission of Aeronautical Surveys to NGS: Field Data Collection and Geographic Information System (GIS) Standards will need to be conducted and approach surfaces evaluated to current standards. If needed, the airport could consider utilizing declared distances to maintain a clear 20:1 slope. For any vertically-guided approaches a 30:1 surface must also be clear.

8U6 currently has a 35-foot powerline located approximately 1,075 feet from the extended centerline on Runway 8 end and as such the approach ratio is 25:1. Runway 26 meets FAA approach surface airspace standards for the existing runway design standards.

Also identified in Table 3-2 of FAA AC 150/5300-13A, *Airport Design*, the FAA identifies a 40:1 Departure Surface beginning at the departure end of instrument runways. Once Runway 8-26 is upgraded to an instrument approach this surface will need to be cleared.

Table 8 – FAA Approach/Departure Surfaces

Table 3-2. Approach/departure standards table

Runway Type		DIMENSIONAL STANDARDS* Feet (Meters)					Slope/ OCS
		A	B	C	D	E	
1	Approach end of runways expected to serve small airplanes with approach speeds less than 50 knots. (Visual runways only, day/night)	0 (0)	120 (37)	300 (91)	500 (152)	2,500 (762)	15:1
2	Approach end of runways expected to serve small airplanes with approach speeds of 50 knots or more. (Visual runways only, day/night)	0 (0)	250 (76)	700 (213)	2,250 (686)	2,750 (838)	20:1
3	Approach end of runways expected to serve large airplanes (Visual day/night); or instrument minimums ≥ 1 statute mile (1.6 km) (day only).	0 (0)	400 (122)	1000 (305)	1,500 (457)	8,500 (2591)	20:1
4	Approach end of runways expected to support instrument night operations, serving approach Category A and B aircraft only. [1]	200 (61)	400 (122)	3,800 (1158)	10,000 [2] (3048)	0 (0)	20:1
5	Approach end of runways expected to support instrument night operations serving greater than approach Category B aircraft. [1]	200 (61)	800 (244)	3,800 (1158)	10,000 [2] (3048)	0 (0)	20:1
6	Approach end of runways expected to accommodate instrument approaches having visibility minimums ≥ 3/4 but <1 statute mile (≥ 1.2 km but < 1.6 km), day or night.	200 (61)	800 (244)	3,800 (1158)	10,000 [2] (3048)	0 (0)	20:1
7	Approach end of runways expected to accommodate instrument approaches having visibility minimums < 3/4 statute mile (1.2 km).	200 (61)	800 (244)	3,800 (1158)	10,000 [2] (3048)	0 (0)	34:1
8[3,5,6,7]	Approach end of runways expected to accommodate approaches with vertical guidance (Glide Path Qualification Surface [GQS]).	0 (0)	Runway width + 200 (61)	1520 (463)	10,000 [2] (3048)	0 (0)	30:1
9	Departure runway ends for all instrument operations.	0 [4] (0)	See Figure 3-4.				40:1

* The letters are keyed to those shown in Figure 3-2.

Source: FAA AC 150/5300-13A, Change 1, KLJ Analysis

NAVIGATIONAL AIDS

Airfield NAVAIDs are any ground or satellite based electronic or visual device to assist pilots with airport operations. Additional visual and instrument navigational aids (NAVAID) recommended at 8U6 include:

- Install Runway End Identifier Light (REIL) for Runway 8-26 to support circling or future straight-in instrument approach operations
    - Implement prior to Runway 8-26 instrument approach establishment over the planning period.

TAXIWAYS/TAXILANES

Taxiway design standards vary based on individual aircraft geometric and landing gear characteristics. The Taxiway Design Group (TDG) and Airplane Design Group (ADG) identified for the design aircraft using a particular taxiway. **Table 9** and **Table 10** describe the specific FAA taxiway/taxilane design standards at 8U6.

Table 9– FAA Taxiway/Taxilane Design Standards Matrix (ADG)

Design Standard	Existing/Ultimate
Airplane Design Group (ADG)	**ADG-II**
Associated Runway	**Runway 8-26**
Taxiway Safety Area	79 feet
Taxiway Object Free Area	131 feet
Taxilane Object Free Area	115 feet
Taxiway Centerline to Parallel Taxiway/Taxilane Centerline	105 feet
Taxilane Centerline to Parallel Taxiway/Taxilane Centerline	65 feet
Taxiway Centerline to Fixed or Movable Object	65.5 feet
Taxilane Centerline to Fixed or Movable Object	57.5 feet
Taxiway Wingtip Clearance	26 feet
Taxilane Wingtip Clearance	18 feet

Source: FAA AC 150/5300-13A, Change 1, KLJ Analysis
NOTE: Areas serving exclusively small aircraft should be designed to ADG-I standards. The existing and future overall airport design aircraft requires ADG-II standards to be met.

Table 10 – FAA Taxiway Design Standards Matrix (TDG)

Design Standard	Existing/Ultimate
Taxiway Design Group (TDG)	**TDG-2**
Associated Runway	**Runway 8-26**
Taxiway Width	35 feet
Taxiway Edge Safety Margin (TESM)	7.5 feet
Taxiway Shoulder Width	15 feet
Centerline Turn Radius (90 degrees)	25 feet

Source: FAA AC 150/5300-13A, Change 1, KLJ Analysis
NOTE: Areas serving exclusively ADG-I aircraft are to be designed to TDG-1A standards.

Taxiway and taxilane pavement should continue to accommodate regular use of aircraft weighing up to 12,500 pounds.

APRON

General aviation (GA) aircraft parking is used by transient and based aircraft. Transient aircraft require parking for a period ranging from a few minutes to a few days. Itinerant aircraft will require either covered aircraft storage (based or transient) or apron parking space.

Apron size is driven by the number and size of maneuvering and parked aircraft. Since the airport does not have fuel the amount of transient or itinerant aircraft using the airport is expected to remain similar to what occurs now. It is recommended that space for additional apron pavement be planned even though a change in demand is not expected during the planning period. This would allow the airport the flexibility to accommodate users when airport activity changes in the future.

AIRCRAFT STORAGE

Aircraft storage requirements are driven by operational requirements, aircraft size, local climate, and owner preferences. For based aircraft, the harsh winters in the eastern portion of Montana drive all owners to seek aircraft storage facilities rather than outdoor parking on an aircraft parking apron. Below are the aircraft storage facilities at Terry:

- Hangar: 45’ x 30’ storage area (1,350 SF)
- T-style Hangar: 44’ x 30’ storage area (930 SF)

- Hangar: 35’ x 40’ storage area (1,400 SF)

The hangar requirements, based on a flat forecast, do not show a need for additional aircraft storage at Terry. However, since aircraft storage is demand driven and since the airport has space to accommodate growth on the existing apron several new hangar locations will be shown on the future ALP.

OTHER FACILITIES

A 2,400-square foot enclosed building provides cover for snow removal equipment and airport maintenance equipment. There are three (3) vehicle bays. The building is located just east of the aircraft hangars.

There is no arrival/departure (A/D) building located on the airfield.

There are no fuel facilities at the airport, but it is recommended that the airport install at least Av Gas at the Airport.

Landside Facilities

There is no specific automobile parking located at the airport. A 1,200-foot-long paved access road provides access from Ten Mile Road to the airport’s hangar area. Automobile parking is available either in front of buildings or behind them and this is adequate for existing and future needs.

Alternatives Analysis

Introduction

This section of the study discusses airport development alternatives considered in the planning process for 8U6. The objective of this chapter is to clearly document the recommended airport development that meets the needs of airport users and the strategic vision of the airport sponsor.

Alternatives formulated in this chapter are based primarily on the wind analysis and runway length calculations previously identified in this study. A wide range of alternatives were evaluated to determine the best solution for the airport to meet facility needs. FAA AC 150/5070-6B, *Airport Master Plans* identifies an alternatives analysis process to progressively screen alternatives to identify a recommended development plan. The process includes these steps:

1. **Identify** the functional airport elements that will be analyzed and develop concepts.
2. **Evaluate** each alternative to determine the ability for each to meet basic evaluation criteria.
3. **Select** preferred alternative(s) that best meet the needs of the airport based on anticipated strengths and weaknesses.

The alternatives evaluated in this section review alternatives to address the RPZ incompatible uses, runway orientation, and development of instrument approaches.

Evaluation Criteria

Evaluation criteria are developed to determine the relative strengths and weaknesses of the alternatives. The alternative evaluation criteria used for this study are as follows:

OPERATIONAL PERFORMANCE

This factor evaluates how well the airport operates as a functional system. These include:

- **Capacity** to meet forecasted activity demands within and beyond the planning horizon
- **Capability** to meet FAA design standards to safely accommodate the critical design aircraft
- **Efficiency** to accommodate alternative elements as a combined airport system

BEST PLANNING TENETS AND OTHER FACTORS

This factor involves determining the relative strengths and weaknesses of the alternatives. The following tenets are typically reviewed:

- Conformance to industry best practices for safety and security
- Conforms to the intent of FAA design standards and other guidelines
- Provides for the highest and best on- and off-airport land use
- Allows for growth beyond the planning horizon
- Provides flexibility to react to unforeseen changes
- Conforms to the airport sponsor's strategic vision
- Conforms to appropriate local, regional and state transportation and other plans
- Technically feasible, constructible and implementable
- Socially and politically feasible
- Satisfies airport user needs

ENVIRONMENTAL FACTORS

The potential effects of the alternatives upon the natural and built environment is an important consideration. These factors are evaluated early in the process to determine whether alternatives are likely trigger impacts to comply with the National Environmental Policy Act (NEPA). The following environmental resource categories applicable to this study at 8U6 include:

- Compatible Land Use
- Historical and Cultural Resources
- Wetlands

FISCAL FACTORS

A fiscal analysis is necessary to determine if the alternative fits within the financial resources of the airport, as well as potential federal and state funding partners. Evaluating the ability for the airport sponsor to finance each alternative is also important as it will provide an indication of the feasibility of proposed development. Fiscal factors to be reviewed in this study include:

- Total Relative Project Cost
- Ability to Receive FAA and/or State funding
- Ability to Fund Local Share

Airfield Improvements

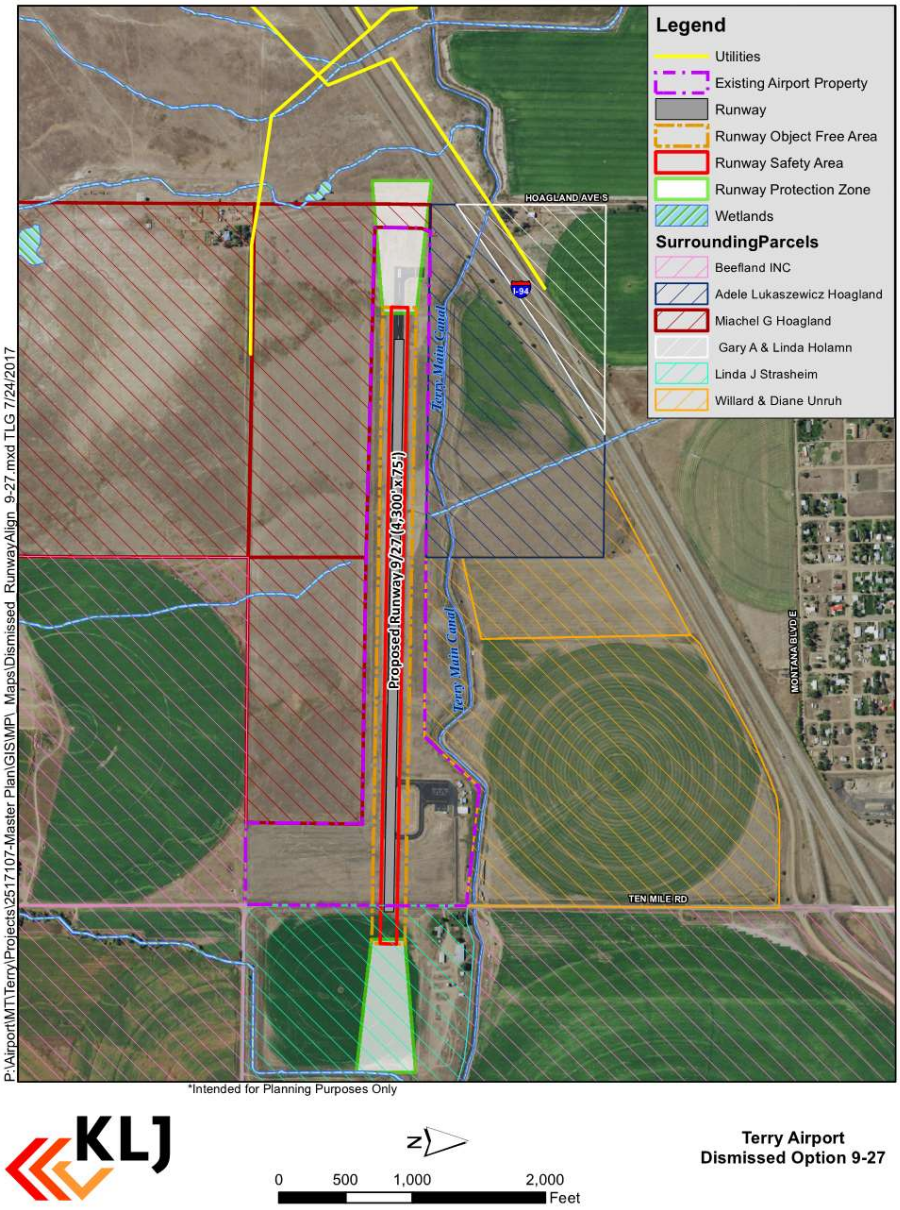
RUNWAY ORIENTATION

Proper orientation of the runway is a high priority for the airport as the airport would like to ensure that the airport is properly situated to be able to handle existing and future operations. The airport would also like to attain an instrument flight procedure with the lowest minimums achievable given the terrain and existing and reasonably achievable based on the available resources. Alternatives were developed based on the following:

- Wind conditions
- Runway Length
- Ability to attain an Instrument Approach
- Avoiding Runway Protection Zone issues
- Avoiding Water Pivot Areas (farming)
- Avoiding Farm Land and Associated Housing
- Avoiding Wetlands
- Avoiding Cultural Areas (Buffalo Prairie Canal)

During the July 10, 2017 Airport Board meeting several alternatives were presented. The Airport Board dismissed all but three because they impacted one or more of the areas, which the Board thought were too impactful. They also asked for one more alternative to be developed. The following alternatives were dismissed:

Figure 6 – Option 1 -Runway 8-26



Source: KLJ Analysis

Option 1

Option 1 shifts Runway 8 RPZ off of I-94 by relocating the Runway 8 End 550 feet to the east and shifts Runway 26 End and RPZ the same distance.

Main advantages of this alternative include:

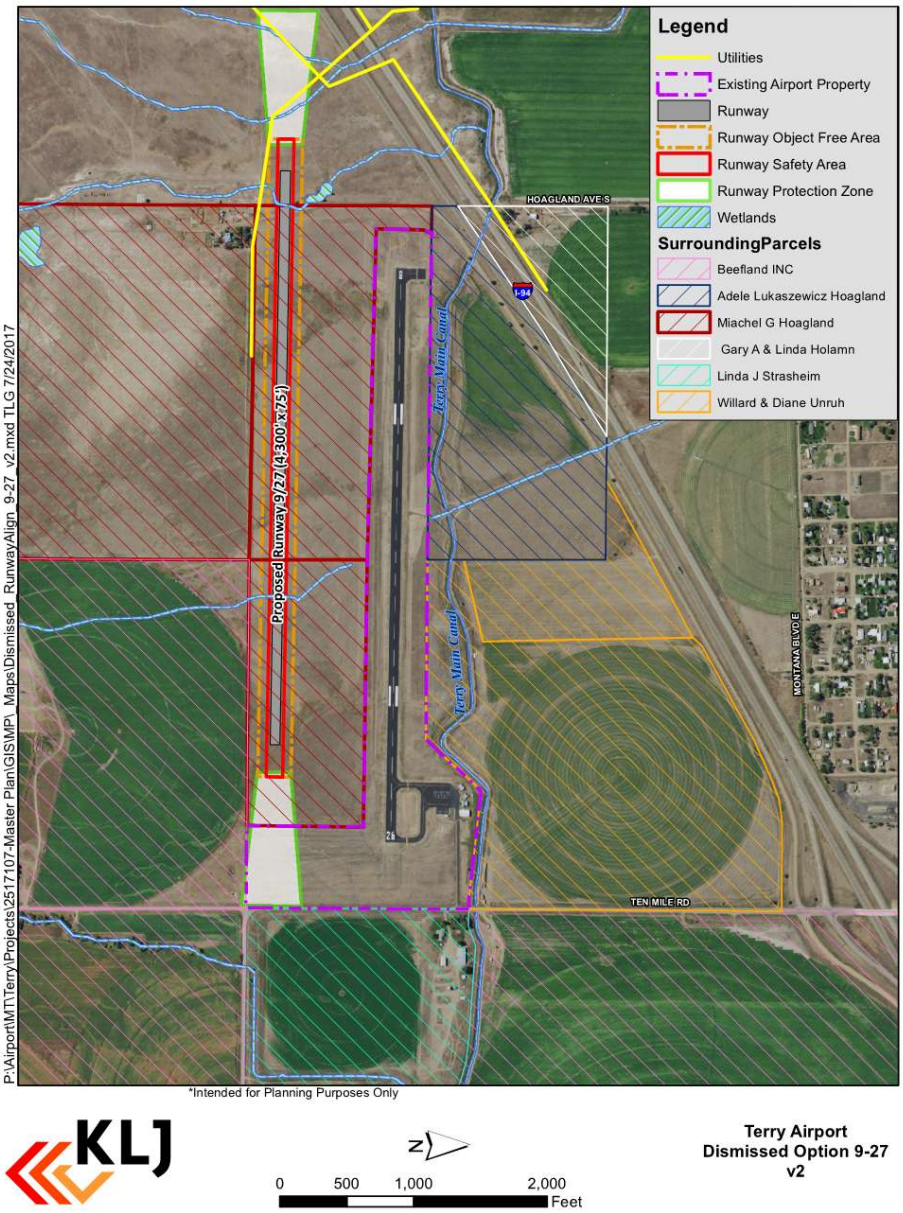
- Meets long-term facility requirements
- Avoids culturally sensitive areas

Main disadvantages of this alternative include:

- Ten Mile Road would be closed and relocated
- Irrigated area east of existing Ten Mile Road would be affected.
- Acquisition of 2 acres of land in fee
- Acquisition of 12 acres of land in easement

Cost estimate = $3.8 million

Figure 7 – Option 2 -Runway 8-26



Source: KLJ Analysis

Option 2

Option 2 shifts Runway 8-26 400 feet to the south and relocates both Runway 8 End and Runway 26 End to avoid the RPZ's impacting I-94 and Ten Mile Road.

Main advantages of this alternative include:

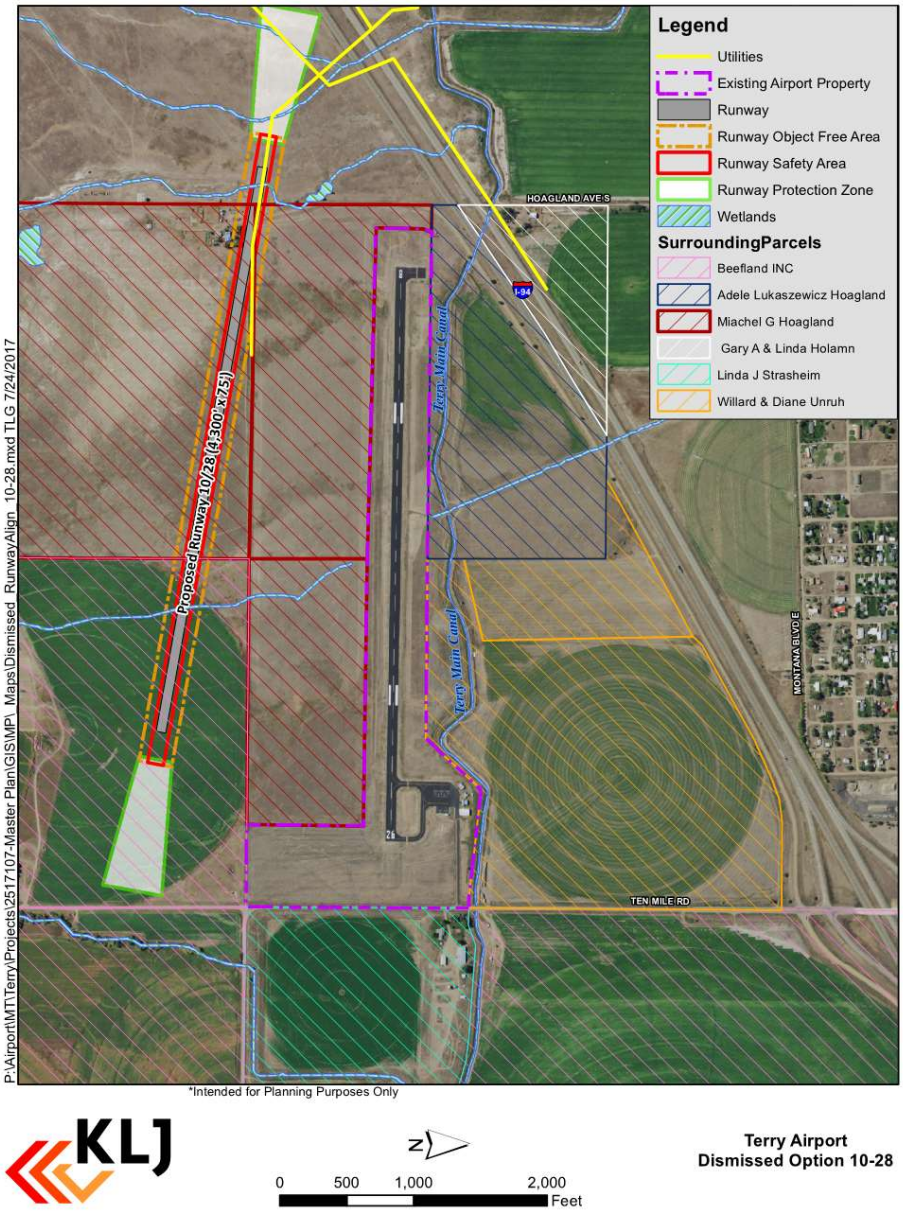
- Meets long-term facility requirements
- Ten Mile Road does not need to be closed
- Irrigated areas would not be affected

Main disadvantages of this alternative include:

- Two wetland areas would be impacted
- Approximately 30 acres would need to be acquired in fee
- Approximately 16 acres would need to be acquired in easement
- Relocation of the access road to farm area off Runway 8 End

Cost estimate = $5.2 million

Figure 8 – Option 3 – Runway 10-28



Source: KLJ Analysis

Option 3

Option 3 creates a new runway alignment, Runway 10-28 approximately 1,400 feet to the south.

Main advantages of this alternative include:

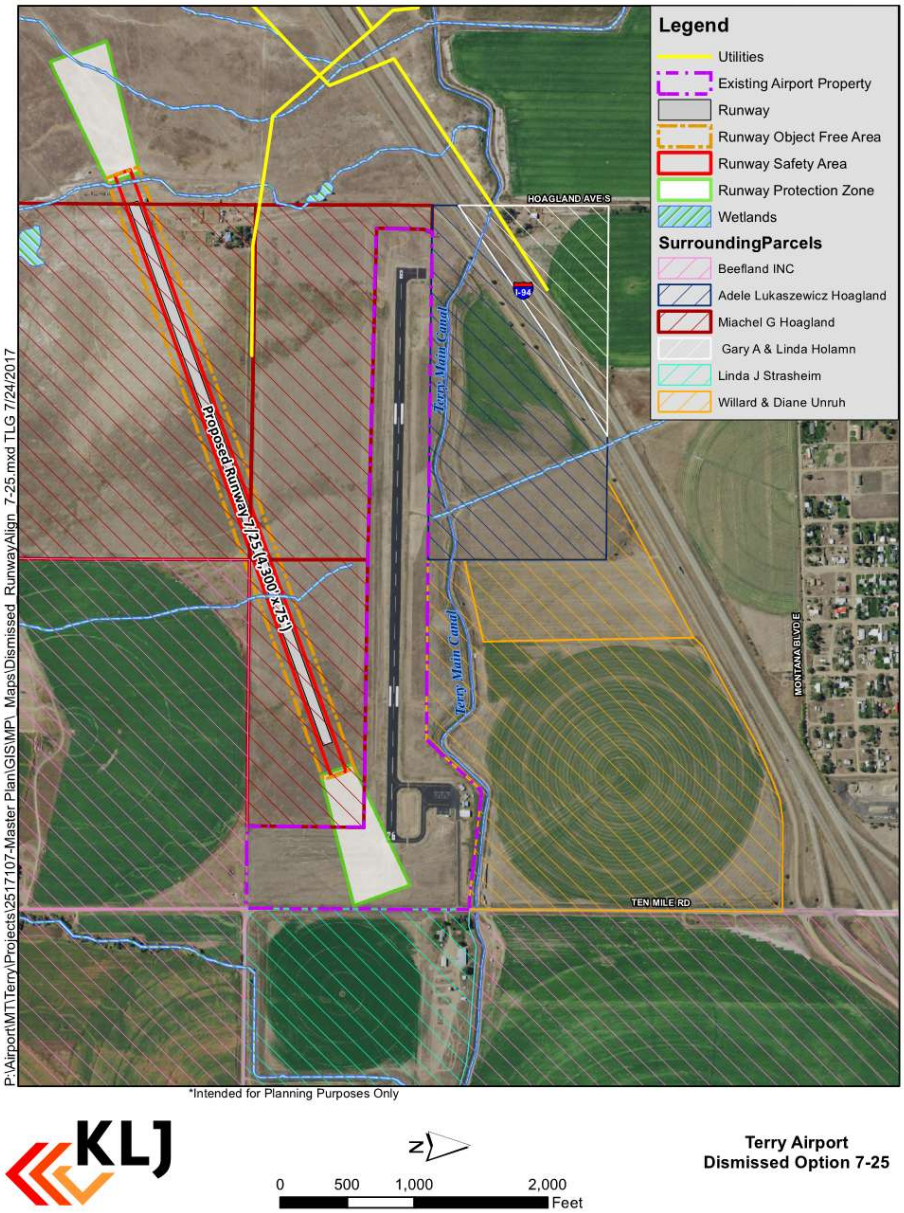
- Meets long-term facility requirements
- Ten Mile Road does not need to be closed

Main disadvantages of this alternative include:

- Two wetland areas would be impacted
- Approximately 150 acres would need to be acquired in fee
- Approximately 16 acres would need to be acquired in easement
- Relocation of the access road to farm area off Runway 8 End
- Powerlines would need to be relocated
- Irrigated areas would be affected.

Cost estimate = $6.9 million

Figure 9 – Option 4 -Runway 7-25



Source: KLJ Analysis

Option 4

Option 4 creates a new runway alignment, Runway 7-25 approximately 1,400 feet to the south.

Main advantages of this alternative include:

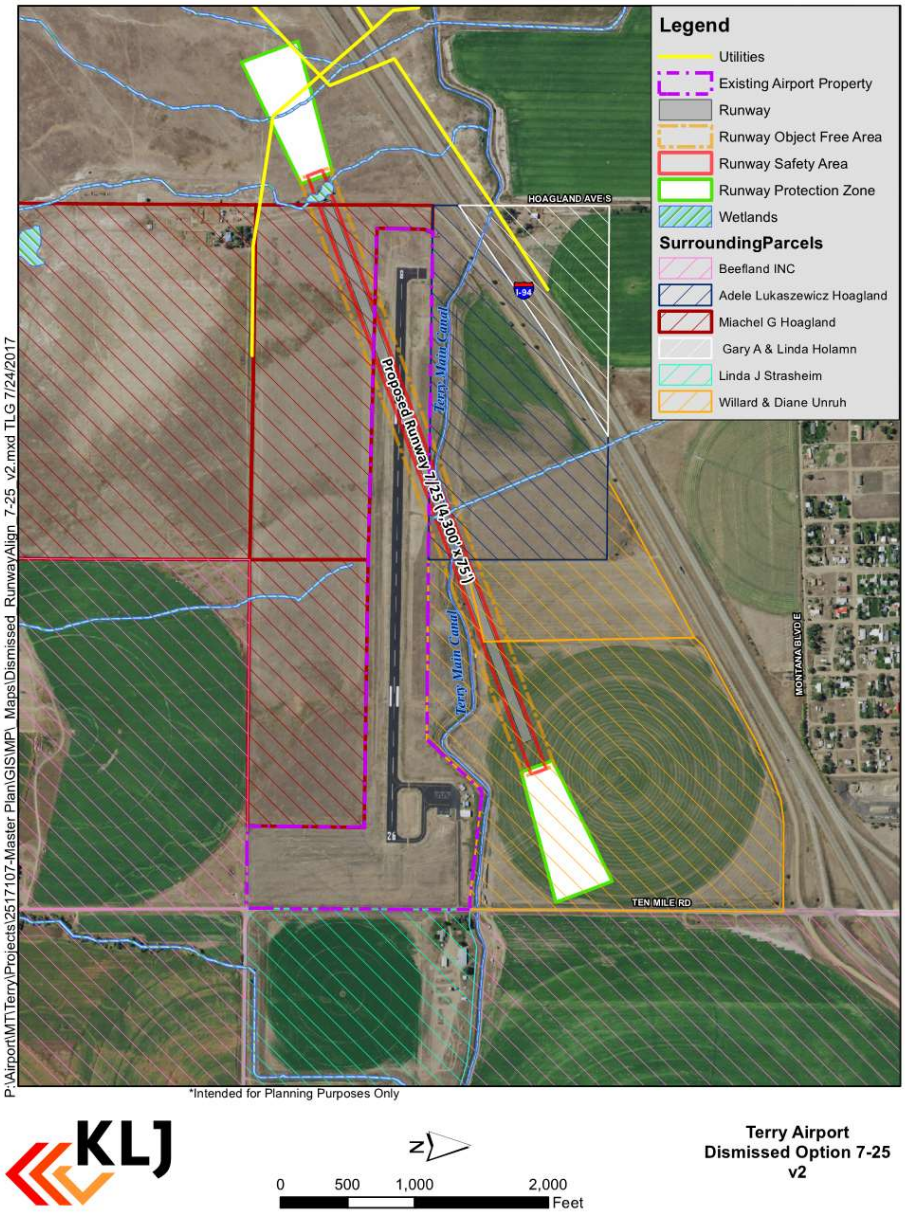
- Meets long-term facility requirements
- Ten Mile Road does not need to be closed
- Irrigated areas would not be affected
- One property owner for acquisition

Main disadvantages of this alternative include:

- Two wetland areas would be impacted
- Approximately 100 acres would need to be acquired in fee
- Approximately 16 acres would need to be acquired in easement

Cost estimate = $5.9 million

Figure 10 – Option 5 -Runway 7-25



Source: KLJ Analysis

Option 5

Option 5 creates a new runway alignment, Runway 7-25 that crosses the existing runway approximately 1,000 from Runway End 8 and heading north paralleling I-94.

Main advantages of this alternative include:

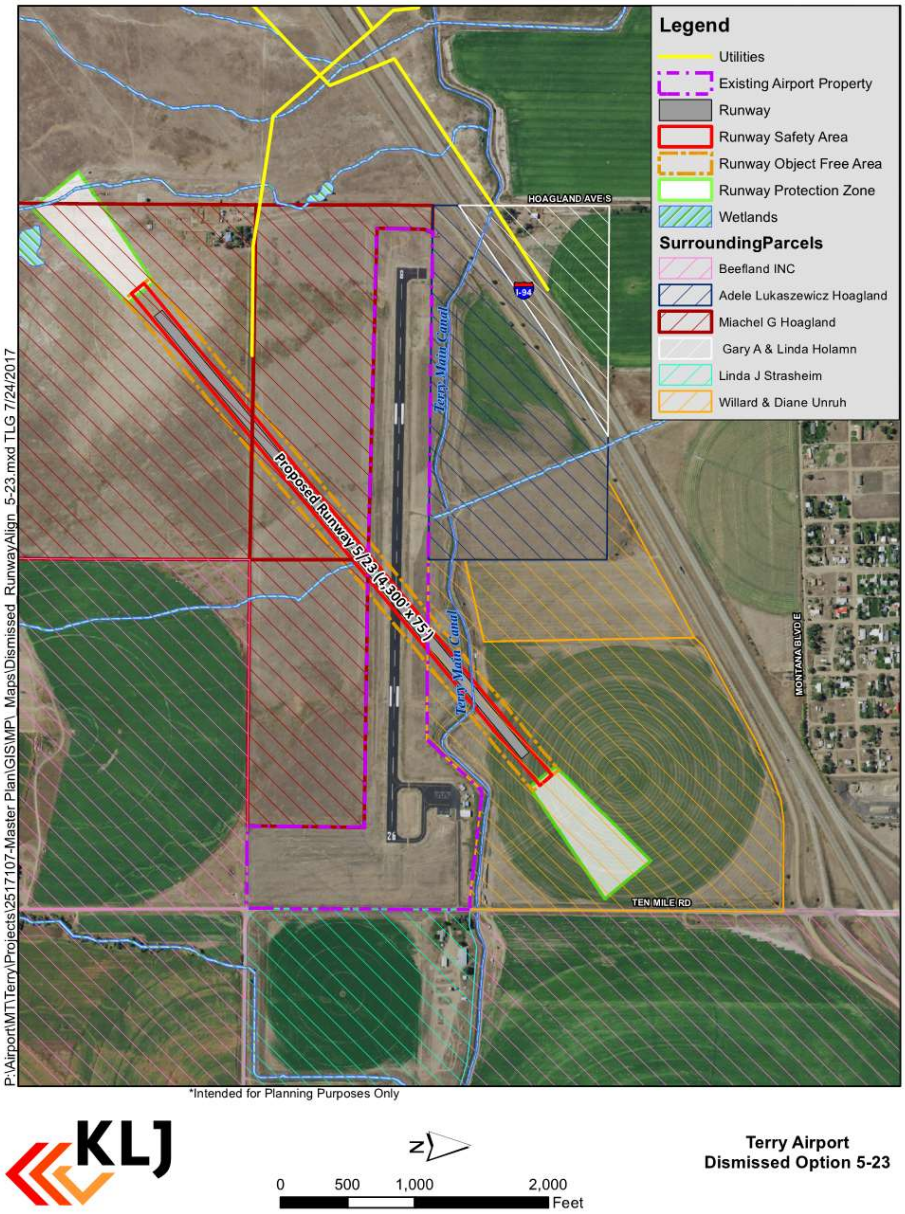
- Meets long-term facility requirements
- Ten Mile Road does not need to be closed

Main disadvantages of this alternative include:

- Two wetland areas would be impacted and one culturally sensitive site would be impacted
- Approximately 30 acres would need to be acquired in fee
- Approximately 16 acres would need to be acquired in easement
- Irrigated area is affected

Cost estimate = $5.3 million

Figure 11 – Option 6 -Runway 5-23



Source: KLJ Analysis

Option 6

Option 6 creates a new runway alignment, Runway 5-23 that crosses the existing runway approximately 1,500 feet from the end of Runway 26 End and runs parallel to I-94.

Main advantages of this alternative include:

- Meets long-term facility requirements
- Ten Mile Road does not need to be closed

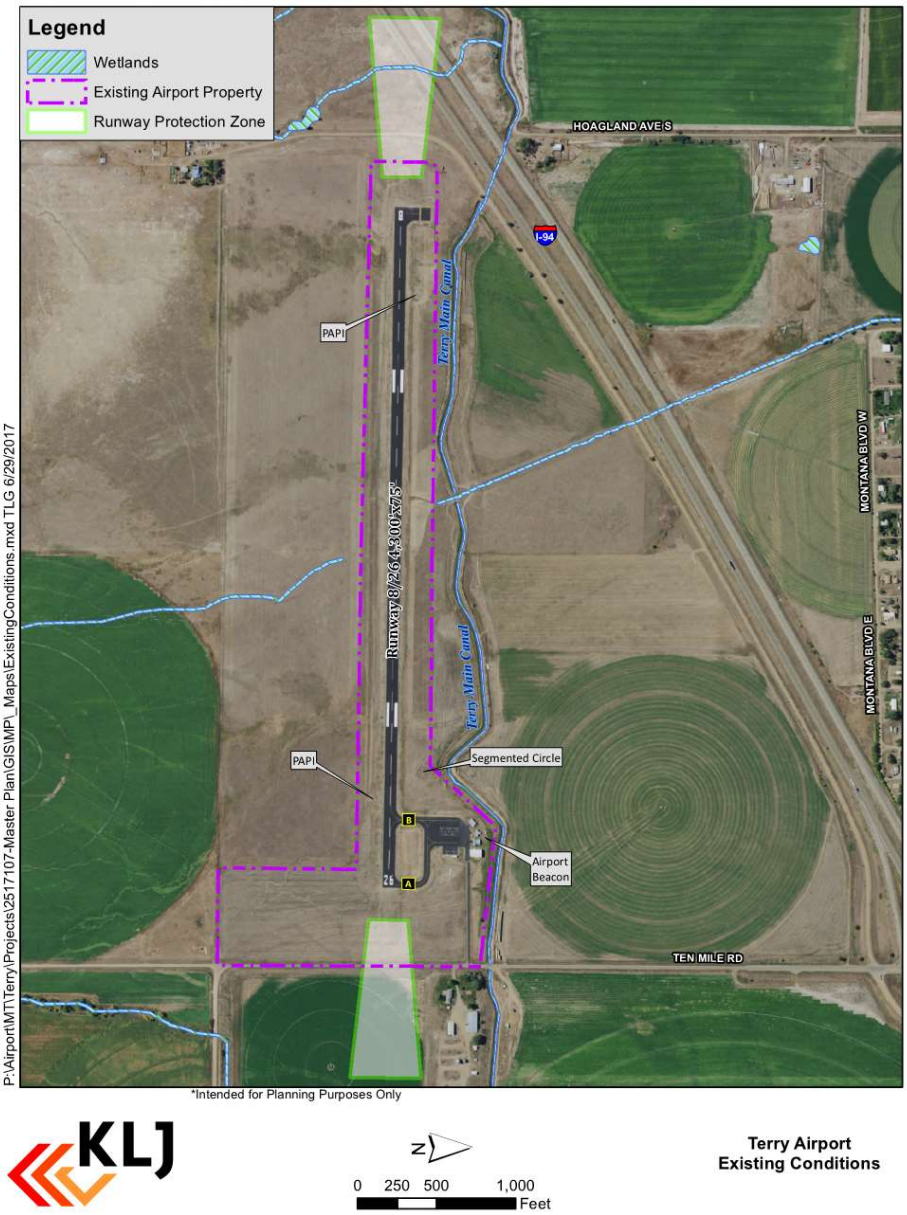
Main disadvantages of this alternative include:

- Two wetland areas would be impacted and one culturally sensitive site would be impacted
- Approximately 30 acres would need to be acquired in fee
- Approximately 16 acres would need to be acquired in easement
- Irrigated area is affected

Cost estimate = $5.3 million

Based on the Airport Board meeting, five alternatives were worthy of additional analysis in addition to the No Build Alternative; these alternatives are discussed below:

Figure 12 – No Build



Source: KLJ Analysis

No Build

This alternative proposes not to build anything to correct the inefficiencies

Main advantages of this alternative include:

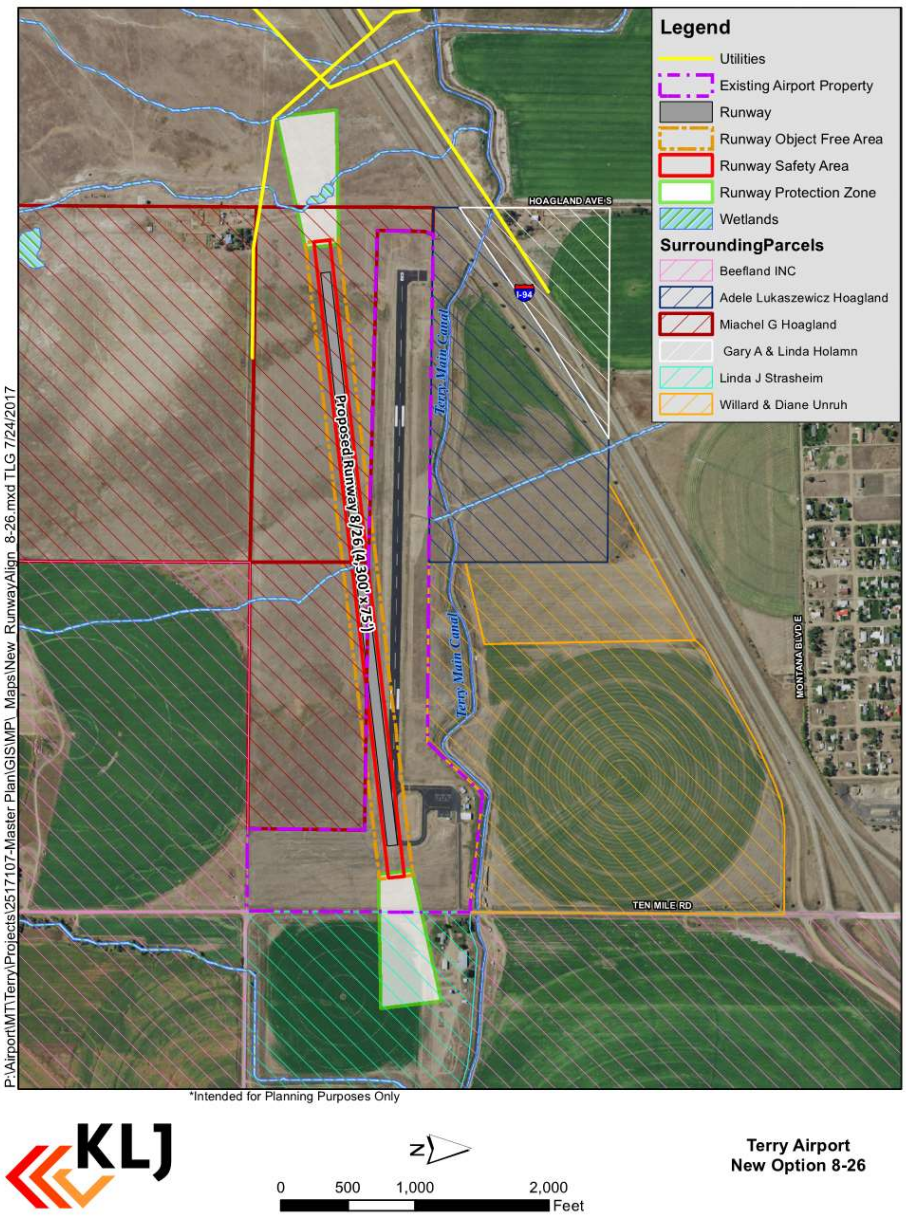
- No acquisition of land
- No environmental or cultural impacts
- Ten Mile Road does not need to be closed

Main disadvantages of this alternative include:

- RPZ is not under full control of the airport

Cost estimate = typical cost to maintain the runway

Figure 13 – Option 8 – Runway 8-26



Source: KLJ Analysis

Option 8

Option 8 creates a new runway alignment, Runway 8-26 that crosses the existing Runway 26 End and runs parallel to I-94.

Main advantages of this alternative include:

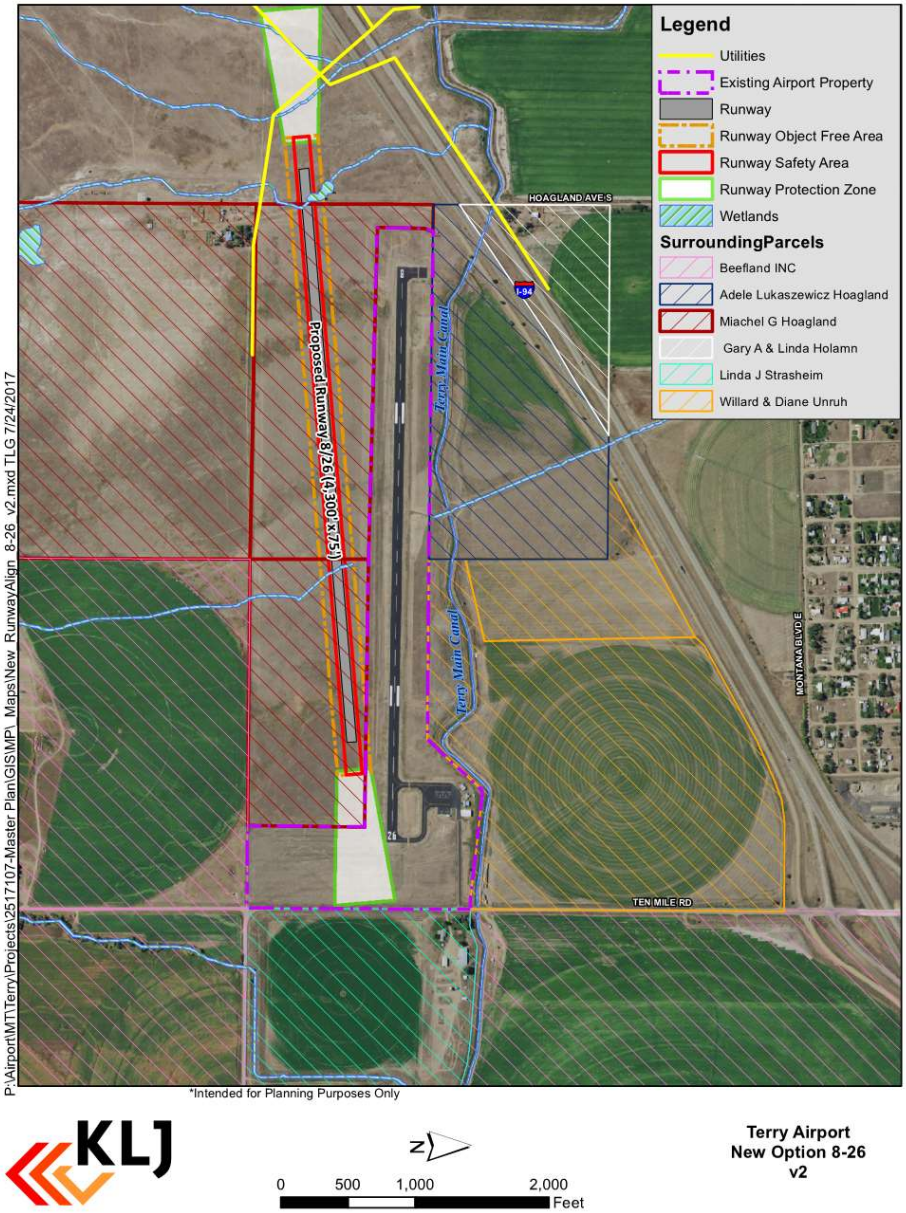
- Meets long-term facility requirements
- Does not require irrigated lands to be affected

Main disadvantages of this alternative include:

- One wetland area would be impacted
- Approximately 20 acres would need to be acquired in fee
- Approximately 10 acres would need to be acquired in easement

Cost estimate = $4.6 million

Figure 14 – Option 9 – Runway 8-26



Source: KLJ Analysis

Option 9

Option 9 creates a new runway alignment, Runway 8-26, with an orientation of 85˚/265˚ that crosses the existing runway close to the end of Runway 26 End and runs parallel to I-94.

Main advantages of this alternative include:

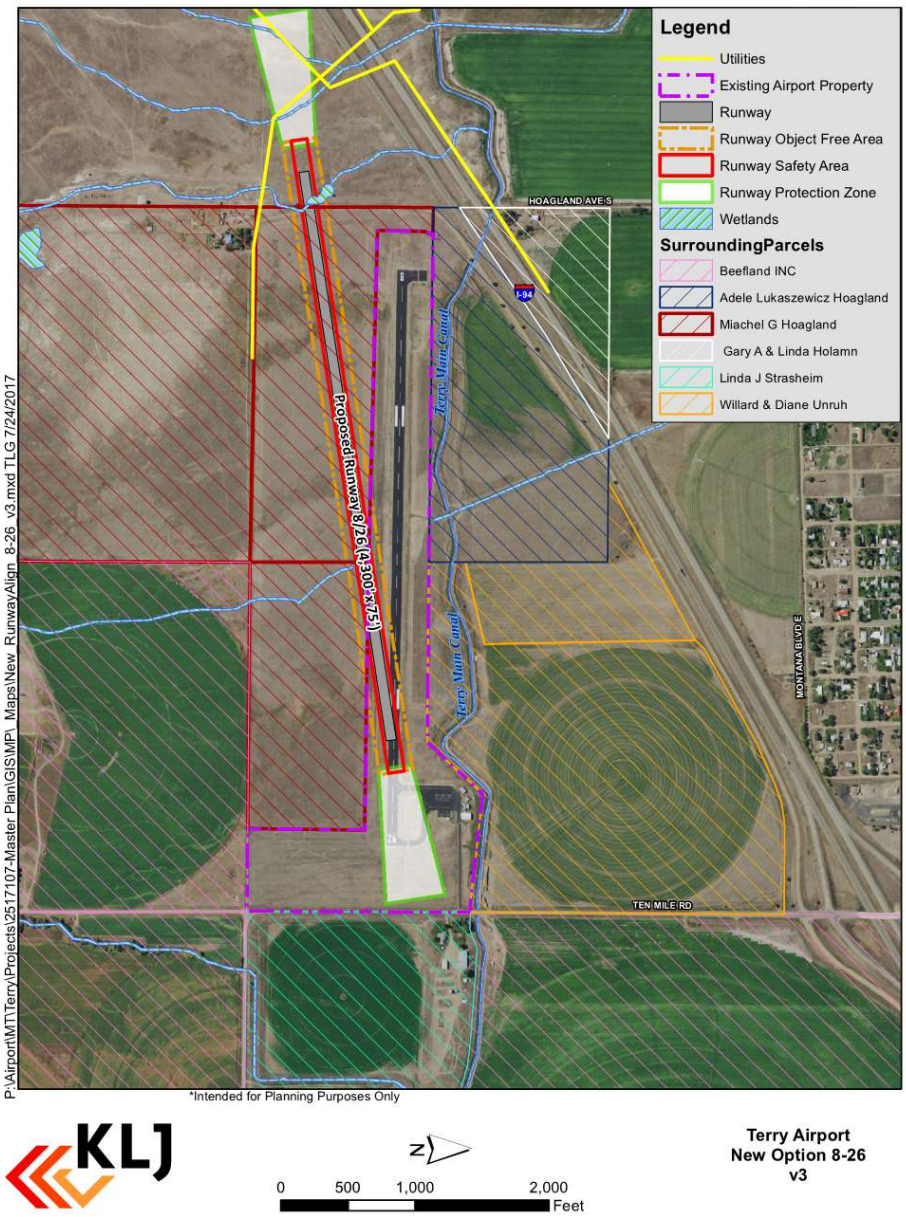
- Meets long-term facility requirements
- Does not require irrigated lands to be affected

Main disadvantages of this alternative include:

- Two wetland areas would be impacted
- Approximately 50 acres would need to be acquired in fee
- Approximately 8 acres would need to be acquired in easement

Cost estimate = $5.2 million

Figure 15 – Option 10 – Runway 8-26



Source: KLJ Analysis

Option 10

Option 10 creates a new runway alignment, Runway 8-26, with an orientation of 81˚/261˚ that crosses the existing runway close to the end of Runway 26 End.

Main advantages of this alternative include:

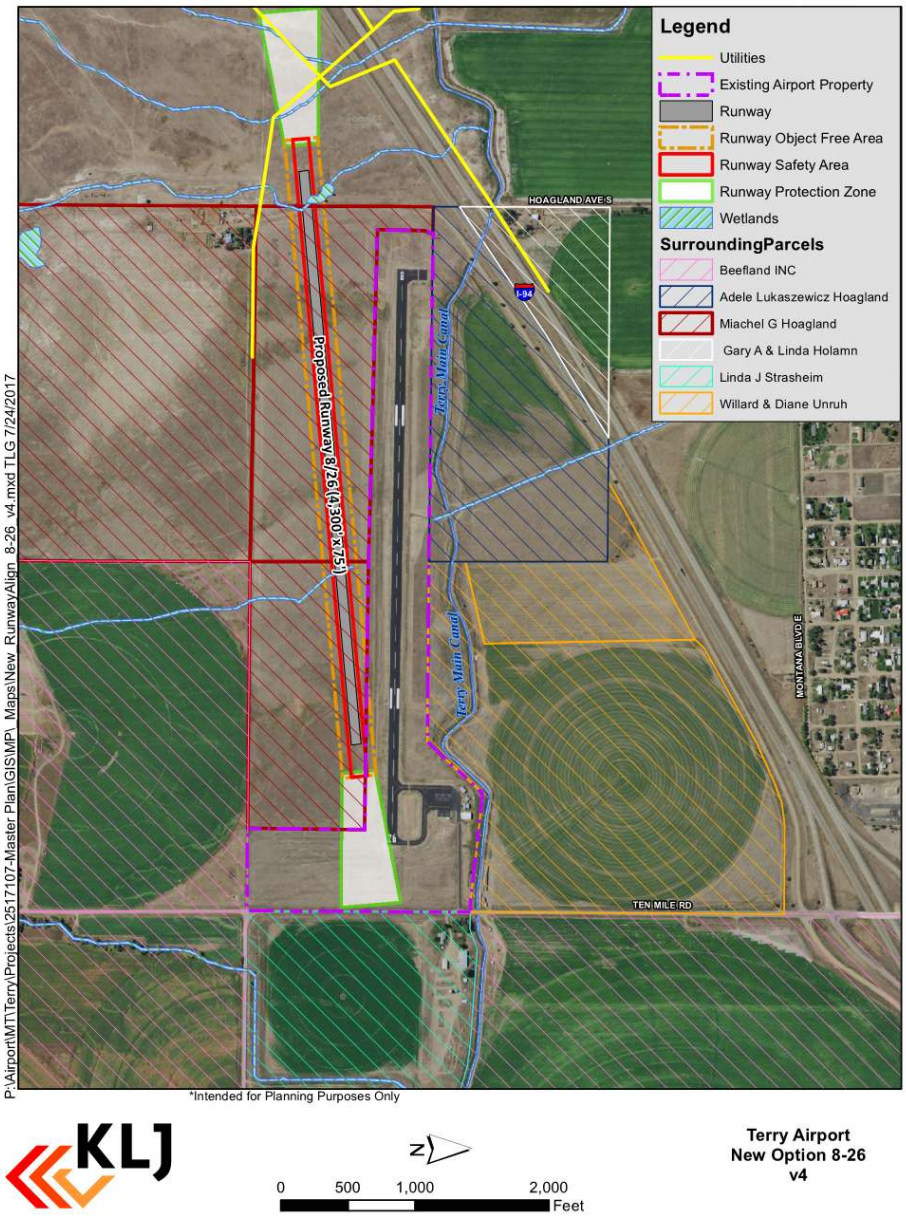
- Meets long-term facility requirements
- Does not require irrigated lands to be affected
- Does not require Ten Mile Road to be relocated

Main disadvantages of this alternative include:

- Two wetland areas would be impacted
- Approximately 10 acres would need to be acquired in fee
- Approximately 10 acres would need to be acquired in easement

Cost estimate = $4.8 million

Figure 16 – Option 11-Runway 8-26



Source: KLJ Analysis

Option 11

Option 11 creates a new runway alignment, Runway 8-26, with an orientation of 84˚/264˚ that does not cross the existing runway but tries to limit the purchasing of land while meeting long term goals.

Main advantages of this alternative include:

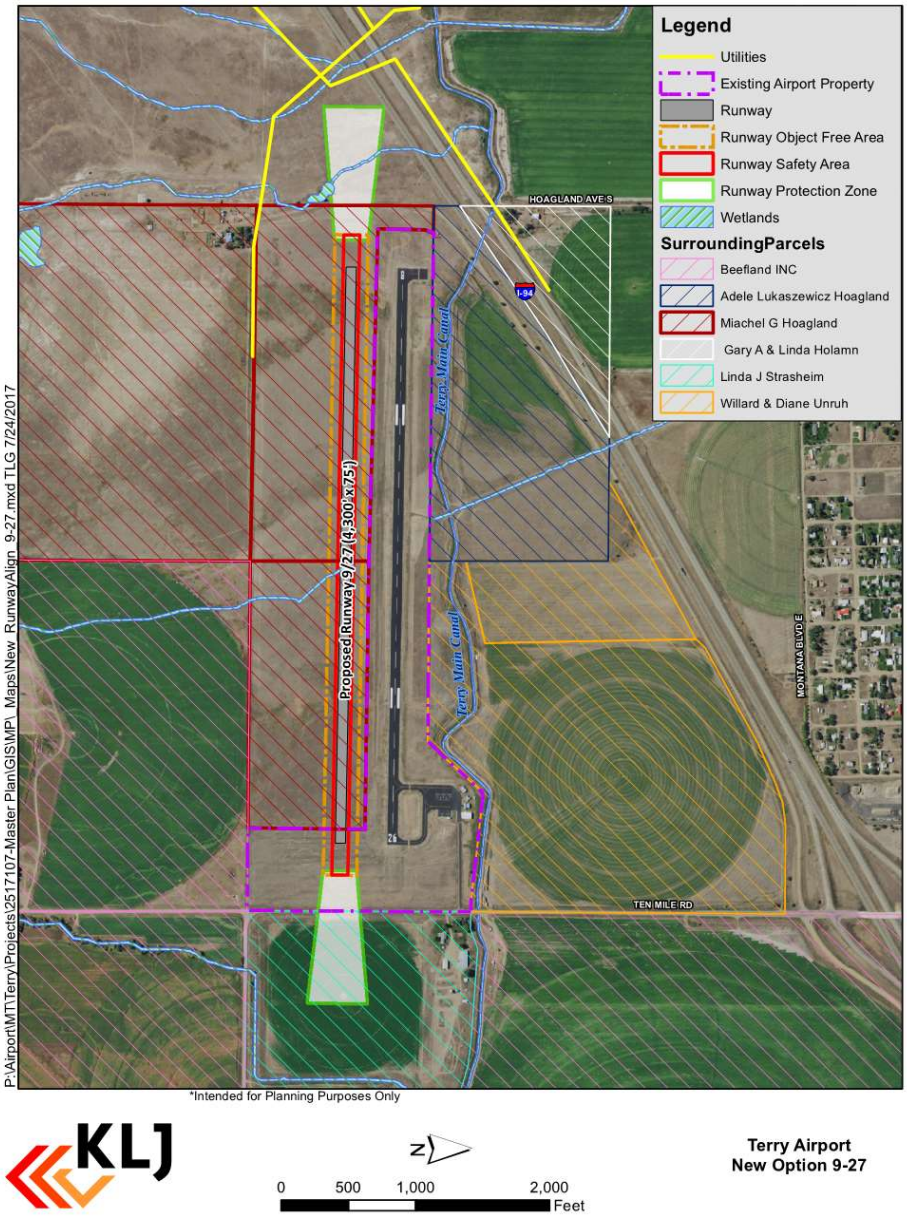
- Meets long-term facility requirements
- Ten Mile Road does not need to be closed
- No irrigated areas are affected

Main disadvantages of this alternative include:

- Two wetland areas would be impacted
- Approximately 8 acres would need to be acquired in fee
- Approximately 8 acres would need to be acquired in easement

Cost estimate = $4.9 million

Figure 17 – Option 12-Runway 9-27



Source: KLJ Analysis

Option 12

Option 12 creates a new runway, Runway 9-27 that is located 400 feet from the existing runway.

Main advantages of this alternative include:

- Meets long-term facility requirements
- Avoids irrigated area

Main disadvantages of this alternative include:

- One wetland area would be impacted
- Approximately 25 acres would need to be acquired in fee
- Approximately 16 acres would need to be acquired in easement
- Requires Ten Mile Road to be relocated

Cost estimate = $4.9 million

Table 11 – Runway Options Summary

Factor	No Change	Option 8	Option 9	Option 10	Option 11	Option 12
Proposed Action	Runway Length Remains at 4,300'	Creates a new runway alignment, Runway 8-26 that crosses the existing runway close to the end of Runway 26 End and runs parallel to I-94.	Creates a new runway alignment, Runway 85-265 that crosses the existing runway close to the end of Runway 26 End and runs parallel to I-94.	Creates a new runway alignment, Runway 81-261 that crosses the existing runway close to the end of Runway 26 End.	Creates a new runway alignment, Runway 84-264 that does not cross the existing runway but tries to limit the purchasing of land while meeting long term goals	Creates a new runway, Runway 9-27 that is located 400 feet from the existing runway.
Meets Long term Requirements	Yes	Yes	Yes	Yes	Yes	Yes
Safety & Standards	2 acres of Runway 8 RPZ currently outside of airport property and on Interstate 94 and 0.3 acres of Runway 26 RPZ currently outside of airport property and on Ten Mile Road	None	None	None	None	None
Environmental	None	Wetlands and Farmlands Affected	Wetlands and Farmlands Affected	Wetlands and Farmlands Affected	Wetlands and Farmlands Affected	Wetlands and Farmlands Affected
Fiscal	No Cost	$3.9 Million	$4.6 Million	$5.2 Million	$4.8 Million	$4.8 Million
Preferred Alternative	**YES**	No	No	No	No	No

Note: Jurisdictional wetlands will require further environmental review.
Source: KLJ Analysis

Runway Conclusion

On August 22, 2017, the alternatives that were considered viable (Alternatives 8-12) were discussed with the Airport Authority and the FAA. Based on the costs for any of the development alternatives it was determined that none of the development alternatives would be viable for the sponsor. The FAA recommended an RPZ analysis to be completed, please see Appendix-A.

Landside Improvements

WILDLIFE FENCE

As part of this planning effort a wildlife site visit was conducted in August 2017. The complete site visit report is included in Appendix B; recommendations from the report are located below:

- Follow the grass habitat management guidelines in this report (maintaining grass height between six and twelve inches) and work towards establishing a dense grass habitat on the airfield that contains minimal non-grass species (i.e. alfalfa, shrubs, weeds);
- Continue to mow alfalfa in the fall, as needed, until it is eliminated from the airport;
- Enclose the airfield with an effective deer proof perimeter fence;
- Clean up any unnecessary storage piles;
- Enclose the open hangar.

Implementation

Based on the results from the Facility Requirements, Alternatives, and Appendix B (Wildlife Study) the airport needs to install a wildlife fence in the next five (5) years. It is anticipated that the cost of the wildlife fence will be $662,000.

This includes:

1. Environmental Assessment
2. Land Acquisition
3. Construction of the Wildlife Fence

The airport will also need to continue to maintain the existing pavement (partial taxiway, runway, and apron area). Based on the current PCI report (2015) the airport is only anticipated to need preventative maintenance over the next 10 years. The maintenance is estimated to cost $179,000.

Finally, in order to get an instrument approach a vertically guided survey will be required. This survey is estimated to cost $100,000.

The implementation plan considers the airport's ability to fund the projects identified in this planning study. Projects in the short-term and mid-term are discussed in more detail for realistic project sequencing based on identified needs, airport priorities, and available funding. Financial feasibility is a major consideration in developing the implementation plan and Capital Improvement Plan (CIP).

Airport funding for projects is derived from many sources. Funding sources can be categorized into three main categories:

- Federal funding
- State funding
- Local or Private funding

A realistic project implementation plan must consider financial resources. This financing strategy identifies the plan to provide sufficient federal, state and local funding for future airport improvements.

FEDERAL, STATE, LOCAL FUNDING

Federal Airport Improvement Program (AIP) funding provides financing for the majority of the airport improvements proposed at the Terry Airport. A summary of total Federal funding needs is outlined in **Table12**.

Table 12 – Total Federal Funding

Phase	Cost	FAA Entitlement	FAA Discretionary	State/Local
Wildlife Fencing	$662,000	$595,800	$0	$66,200
Pavement Maintenance	$179,000	$161,100	$0	$17,900
Vertically Guided Survey-Instrument Approach	$100,000	$90,000	$0	$10,000
TOTAL	**$941,000**	**$846,900**	**$0**	**$94,100**

Source: KLJ Analysis

The Montana Department of Transportation, Office of Aeronautics (MTDOT Aeronautics) manages the State Airports Fund and administers a number of grant and loan programs for eligible airports. These programs include the airport construction grant program, airport operations and maintenance program, navigational aids, and the hangar loan revolving account program. Recently, MTDOT Aeronautics has also offered a 5 percent match for AIP funded projects to maximize the use of Federal grants in Montana. This funding source has been factored into future AIP-funded projects at Terry.

A total need of $94,100 in State and Local funding is identified for projects at Terry.

Capital Improvement Plan

The CIP is a key element in the implementation plan. This is a separate document specifically listing the planned airport projects and funding. The official CIP for the airport is updated annually by the airport and FAA. The CIP identifies the project title, year, estimated costs, and anticipated funding for airport improvements. Larger projects are often divided into smaller elements that reflect how projects are approved, designed, and constructed. Each project is requested through the CIP project programming and grant application process. The CIP is updated by the airport sponsor and submitted to the FAA annually in order to program Federal and State grant funding.

The proposed updated Terry CIP identifies nearly $941,000 in airport improvements over the next five (5) years. A copy of the updated 5-year CIP is located below.

5-YEAR CAPITAL IMPROVEMENT PLAN FOR (8U6 TERRY AIRPORT) **DATE:** October, 2018

FY-2018

Project Description	FEDERAL FUNDS			LOCAL FUNDS		Start	Finish
(by Project in Priority Order)	St. Aprmnt	NPE	Discretionary	Other	Total $	Date	Date
Completing Master Plan and ALP Update	0.00	0.00	0.00	0.00	0.00		
	0.00	0.00	0.00	0.00	0.00		
	0.00	0.00	0.00	0.00	0.00		
	0.00	0.00	0.00	0.00	0.00		
	0.00	0.00	0.00	0.00	0.00		
	0.00	0.00	0.00	0.00	0.00		
TOTAL FY 2018	$0.00	$0.00	$0.00	$0.00	0.00		

FY-2019

Project Description	FEDERAL FUNDS			LOCAL FUNDS		Start	Finish
(by Project in Priority Order)	St. Aprmnt	NPE	Discretionary	Other	Total $	Date	Date
Environmental Assessment for Short-Term Improvements	0.00	67,500.00	0.00	7,500.00	75,000.00		
	0.00	0.00	0.00	0.00	0.00		
	0.00	0.00	0.00	0.00	0.00		
	0.00	0.00	0.00	0.00	0.00		
	0.00	0.00	0.00	0.00	0.00		
	0.00	0.00	0.00	0.00	0.00		
TOTAL FY 2019	$0.00	$67,500.00	$0.00	$7,500.00	75,000.00		

FY-2020

Project Description	FEDERAL FUNDS			LOCAL FUNDS		Start	Finish
(by Project in Priority Order)	St. Aprmnt	NPE	Discretionary	Other	Total $	Date	Date
Acquire Property for RPZ and OFA (Approximately 33 Acres)	0.00	183,600.00	0.00	20,400.00	204,000.00		
Land Cost (33 Acres at $4,000 = $132,000)	0.00	0.00	0.00	0.00	0.00		
Appraisals and Review Appraisals ($12,000)	0.00	0.00	0.00	0.00	0.00		
Land Acquisition Services ($35,000)	0.00	0.00	0.00	0.00	0.00		
Legal Surveys ($25,000)	0.00	0.00	0.00	0.00	0.00		
	0.00	0.00	0.00	0.00	0.00		
TOTAL FY 2020	$0.00	$183,600.00	$0.00	$20,400.00	$204,000.00		

FY-2021

Project Description	FEDERAL FUNDS			LOCAL FUNDS		Start	Finish
(by Project in Priority Order)	St. Aprmnt	NPE	Discretionary	Other	Total $	Date	Date
No Project	0.00	0.00	0.00	0.00	0.00		
	0.00	0.00	0.00	0.00	0.00		
	0.00	0.00	0.00	0.00	0.00		
	0.00	0.00	0.00	0.00	0.00		
	0.00	0.00	0.00	0.00	0.00		
	0.00	0.00	0.00	0.00	0.00		
TOTAL FY 2021	$0.00	$0.00	$0.00	$0.00	0.00		

FY-2022

Project Description	FEDERAL FUNDS			LOCAL FUNDS		Start	Finish
(by Project in Priority Order)	St. Aprmnt	NPE	Discretionary	Other	Total $	Date	Date
Construct Wildlife Perimeter Fence (Approximately 15,000 lf)	0.00	270,000.00	0.00	30,000.00	300,000.00		
Pavement Maintenance Runway	0.00	144,000.00	0.00	16,000.00	160,000.00		
Pavement Maintenance Taxiways	0.00	54,000.00	0.00	6,000.00	60,000.00		
Pavement Maintenance Apron	0.00	16,200.00	0.00	1,800.00	18,000.00		
	0.00	0.00	0.00	0.00	0.00		
	0.00	0.00	0.00	0.00	0.00		
TOTAL FY 2022	$0.00	$484,200.00	$0.00	$53,800.00	538,000.00		

FY-2023

Project Description	FEDERAL FUNDS			LOCAL FUNDS		Start	Finish
(by Project in Priority Order)	St. Aprmnt	NPE	Discretionary	Other	Total $	Date	Date
No Project	0.00	0.00	0.00	0.00	0.00		
	0.00	0.00	0.00	0.00	0.00		
	0.00	0.00	0.00	0.00	0.00		
	0.00	0.00	0.00	0.00	0.00		
	0.00	0.00	0.00	0.00	0.00		
	0.00	0.00	0.00	0.00	0.00		
TOTAL FY 2023	$0.00	$0.00	$0.00	$0.00	0.00		

FY-2024

Project Description	FEDERAL FUNDS			LOCAL FUNDS		Start	Finish
(by Project in Priority Order)	St. Aprmnt	NPE	Discretionary	Other	Total $	Date	Date
AGIS Survey for Approach Development	0.00	135,000.00	0.00	15,000.00	150,000.00		
	0.00	0.00	0.00	0.00	0.00		
	0.00	0.00	0.00	0.00	0.00		
	0.00	0.00	0.00	0.00	0.00		
	0.00	0.00	0.00	0.00	0.00		
	0.00	0.00	0.00	0.00	0.00		
TOTAL FY 2024	$0.00	$135,000.00	$0.00	$15,000.00	150,000.00		

TOTAL FY 2019-2024	$0.00	$870,300.00	$0.00	$96,700.00	$967,000.00		

Appendix A

Runway Protection Zone Analysis

APPENDIX A: RUNWAY PROTECTION ZONE ANALYSIS

Introduction

This appendix is specific to the request made by the FAA regarding the Runway 8 and 26 Runway Protection Zones (RPZ) at Terry Airport. The appendix follows the same format, page numbering and figures as the Master Plan so the appendix can be incorporated into the final document. The end of this appendix will include the response from the FAA.

RPZ Analysis Report Submitted for FAA Review

Report Date: November 22, 2017

To: Scott Eaton, Planner, FAA Helena ADO

From: Benjamin Mello, Senior Aviation Planner, KLJ

Subject: Runway Protection Zone Analysis for Runway 8-26
Terry Airport (8U6), Terry, Montana

Terry is completing a Master Plan update ("project") and identified early in the project that there were existing incompatible uses within both ends of 8-26 in the RPZs. The master plan identified that the current runway length and width is adequate for the foreseeable future/planning period; however the airport is pursuing instrument approaches to Runway 8-26. Since the airport is not planned to change critical aircraft throughout the planning period and will stay a A/B-II Small Aircraft airport throughout the planning period the RPZ will not change (250' x 450' x 1,000'). See **Figure A-1 Runway 8-26 RPZ**.

Request

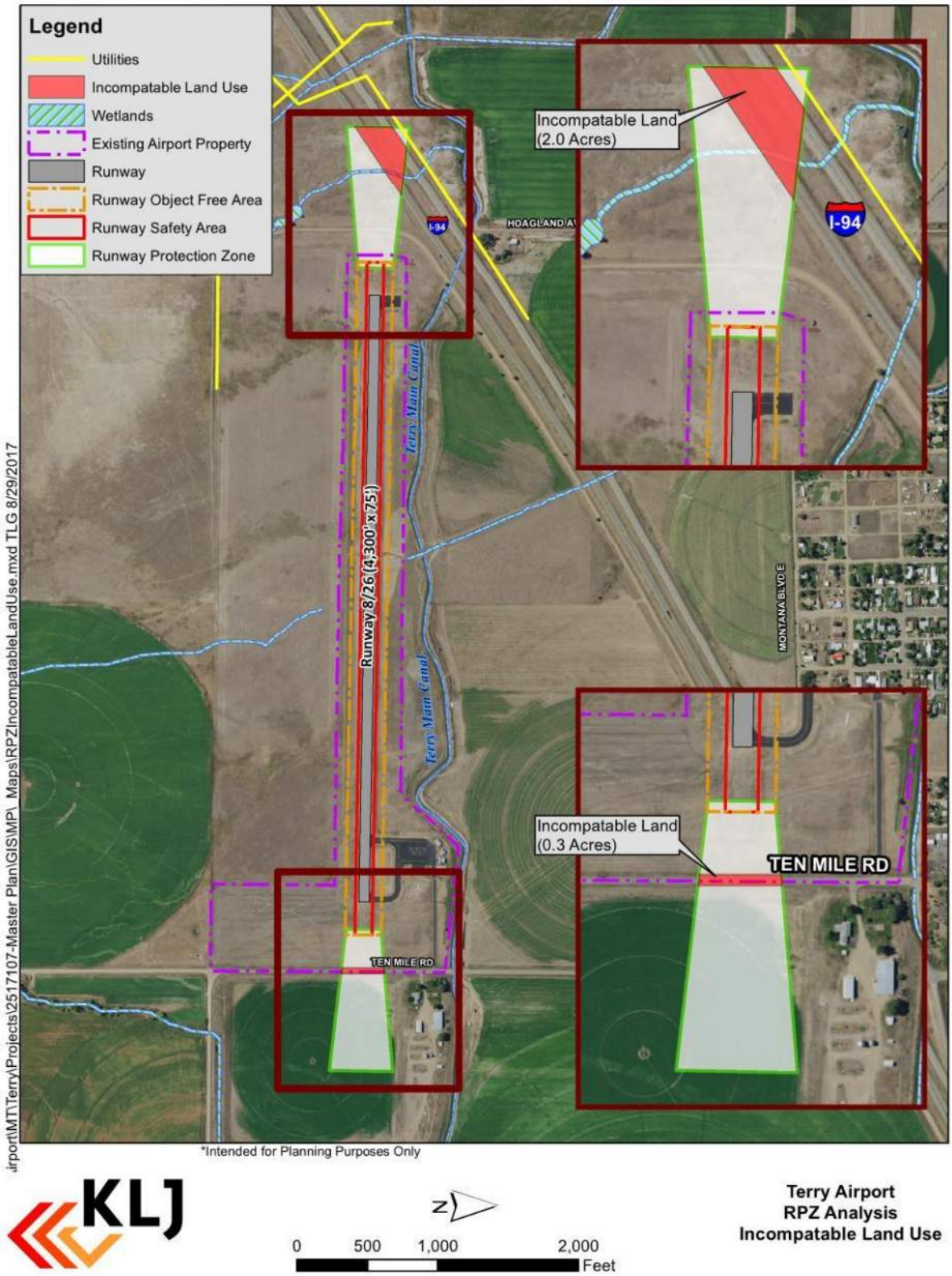
The Airport Authority requests that the FAA allow the Runway 8-26 RPZs to remain in the current locations. Currently Runway 8 RPZ is impacted by Interstate 94 and Runway 26 is impacted by 10 Mile Road. These are the only incompatible land uses within the RPZs.

Background

The Terry Airport is a Basic Airport in the FAA's National Plan of Integrated Airport Systems. The current runway at Terry is 75' x 4,300' with a Runway Design Code (RDC) B-II(S)-Visual. The scope of the Master Plan was limited to evaluating the runway configuration that could be completed on the existing site, therefore no other sites were considered in the RPZ analysis.

Through the Master Plan it has been determined that **Figure 2-1** from *Small Airplanes with Fewer than 10 Passenger Seats* from Advisory Circular 150/5325-4B would be used to determine runway length needs for existing and future runway length. Based on this table the current length of 4,300 feet is adequate for the existing and future needs of the airport and community.

Figure A-1 Existing Conditions



SOUTHERN CONSTRAINTS

As depicted in **Figure A-1 Runway 26 RPZ**, Ten Mile Road is within the current and future RPZ.

NORTHERN CONSTRAINTS - RAILROAD LAND

As depicted in **Figure A-1 Runway 8 RPZ**, Interstate 94 is within the current and future RPZ.

Runway 8-26 RPZ Analysis

As stated previously Runway 8-26 will remain in the current location and the RPZ will remain the same size.

Alternatives Analysis for Runway 8-26 RPZs

There were several alternatives examined to contend with the incompatible uses within the Runway 8-26; these alternatives were presented in the master plan and it was determined through discussions with the Helena Airports District Office and the Airport Authority that all of these alternatives could not be implemented based on either cost or environmental factors (pages 30-42 of the Triggering Event Master Plan).

Vehicle and Aircraft Operations Information for the Existing Runway Conditions

An analysis was completed regarding the probability of an accident based on aircraft operations and vehicle/pedestrian activity.

Aircraft Operations

Yearly operations based on the Terminal Area Forecast (TAF) and used in the Airport Master Plan were used in order to determine Yearly Aircraft Operations and Peak Hour for the Airport. KLJ then determined the percentage of usage for runway end based discussions with airport users. Runway usage is shown as follows (totals 100 percent):

Runway 8—35.0% Runway 26—65.0%

Finally, KLJ estimated that it takes a Cessna 182 traveling at 70 knots approximately 0.375 seconds to fly through the road which is in the RPZ. This aircraft was chosen as it represents one of the slower moving aircraft on approach and therefore represents the worst-case scenario for aircraft on approach.

Vehicle Traffic on Ten Mile Road (Runway 26) and Interstate 94 (Runway 8)

Ten Mile Road is a paved two lane road oriented north-south, it impacts Runway 26 RPZ for approximately .3 acres (300 linear feet) through the central portion of the RPZ as shown in **Figure A-1**. Interstate 94 (I94) is an interstate highway that starts in Michigan and ends in Montana. It is located west of Runway 8 and impacts approximately 2 acres (400 linear feet) of the Runway 8 RPZ as shown in **Figure A-1**. The Montana Department of Transportation provides traffic counts for Ten Mile Avenue and I94. The traffic counts from 2012-2016 showed an average of 1,335 vehicles using Ten Mile Road and 4,749 vehicles using I94 daily.

Detailed Information Ten Mile Road (Runway 26)

Table A-1 Breakout of Aircraft, Vehicle, & Pedestrian Traffic for Runway 26 RPZ identifies the amount of operations and vehicle traffic which could potentially occur in the RPZ off of Runway 26 during an average day.

Table A-1 Breakout of Aircraft, Vehicle, & Pedestrian Traffic for Runway 26 RPZ

	2016	2021	2026	2036
Yearly Aircraft Operations	900	900	900	900
Peak Hour Operations	0.154	0.154	0.154	0.154
Peak Hour Operations – Runway 26	0.054	0.054	0.054	0.054
Average Daily Vehicles – Ten Mile Road	1,335	1,362	1,388	1,416
Average Hourly Vehicles – Ten Mile Road	83	85	86	88

Source: MT DOT Traffic Counts of 1,335 as averaged over 2012-2106; Hourly Vehicles based on 16 hour day

Table A-2 General Aviation Aircraft Accident Rates for Runway 26 depicts the probability of an aircraft incident occurring based on the conditions shown in **Table A-1. Tables A-3 Vehicle Activity for Ten Mile Road in the Runway 26 RPZ. Table A-4 Total Accident Potential in the Runway 26 RPZ** summarizes the total accident potential with the data from **Tables A-2 and A-3.**

Table A-2 General Aviation Aircraft Accident Rates for Runway 26

	2016	2021	2026	2036
Probability of Aircraft Operation over RPZ Object	0.000089%	0.000089%	0.000089%	0.000089%
Probability of an Aircraft Accident per Flight Hour	0.0072%	0.0072%	0.0072%	0.0072%
Probability of an Aircraft Accident over RPZ Object	0.00000000087%	0.00000000092%	0.00000000098%	0.00000000108%
Odds of Incident (:1)	15,636,327,964	15,636,327,964	15,636,327,964	15,636,327,964

Source: http://www.ntsb.gov/investigations/data/pages/aviation_stats.aspx

Table A-3 Vehicle Activity Rates for Ten Mile Road in the Runway 26 RPZ

	2016	2021	2026	2036
Probability of a Car on Road in RPZ	13.64%	14.45%	15.26%	16.88%
Probability of Aircraft Accident in RPZ when Car in RPZ	0.0000000009%	0.0000000009%	0.0000000010%	0.0000000011%
Odds of Incident (:1)	114,666,405,074	108,224,472,204	102,467,851,342	92,615,173,329

Source: KLJ Analysis

Detailed Information for Interstate 94 (Runway 8)

Table A-4 Breakout of Aircraft, Vehicle, & Pedestrian Traffic for Runway 8 RPZ identifies the amount of operations and vehicle traffic which could potentially occur in the RPZ off of Runway 8 during an average day.

Table A-4 Breakout of Aircraft, Vehicle, & Pedestrian Traffic for Runway 8 RPZ

	2016	2021	2026	2036
Yearly Aircraft Operations	900	900	900	900
Peak Hour Operations	0.154	0.154	0.154	0.154
Peak Hour Operations – Runway 6	0.100172	0.100172	0.100172	0.100172
Average Daily Vehicles – I94	4,749	4,844	4,940	5,140
Average Hourly Vehicles – I94	297	313	329	364

Source: MT DOT Traffic Counts of 4,749 as averaged over 2012-2106; Hourly Vehicles based on 16 hour day

Table A-2 General Aviation Aircraft Accident Rates for Runway 8 depicts the probability of an aircraft incident occurring based on the conditions shown in **Table A-4. Tables A-5 Vehicle Activity for Interstate 94 in the Runway 8 RPZ. Table A-5 Total Accident Potential in the Runway 8 RPZ** summarizes the total accident potential with the data from **Tables A-5 and A-6.**

Table A-5 General Aviation Aircraft Accident Rates for Runway 8

	2016	2021	2026	2036
Probability of Aircraft Operation over RPZ Object	0.000089%	0.000089%	0.000089%	0.000089%
Probability of an Aircraft Accident per Flight Hour	0.0072%	0.0072%	0.0072%	0.0072%
Probability of an Aircraft Accident over RPZ Object	0.00000000180%	0.00000000190%	0.00000000199%	0.00000000220%
Odds of Incident (:1)	15,636,327,964	15,636,327,964	15,636,327,964	15,636,327,964

Source: http://www.ntsb.gov/investigations/data/pages/aviation_stats.aspx

Table A-6 Vehicle Activity Rates for Ten Mile Road in the Runway 8 RPZ

	2016	2021	2026	2036
Probability of a Car on Road in RPZ	28.13%	29.64%	31.16%	34.47%
Probability of Aircraft Accident in RPZ when Car in RPZ	0.0000000018%	0.0000000019%	0.0000000020%	0.0000000022%
Odds of Incident (:1)	55,595,832,763	52,753,873,260	50,188,335,351	45,362,533,875

Source: KLJ Analysis

Conclusion

Terry Airport is a Basic Airport in the FAA's National Plan of Integrated Airport Systems. It will always be challenging to allocate FAA and State funding to meet the needs at Terry. With the constraints that exist, the option recommended is to allow Ten Mile Road and Interstate 94 to remain in the RPZs.

This is recommended as the best that can be achieved.

Appendix B

Wildlife Studies

WILDLIFE HAZARD SITE VISIT

TERRY AIRPORT
Terry, Montana
October 16, 2017
AIP-3-30-0075-007-2017

Prepared by Tim Pugh
Qualified Airport Wildlife Biologist
Midwest Wildlife Services

In Cooperation with
Kadrmas, Lee & Jackson Inc.

DRAFT

Table of Contents

I. Introduction **1**
A. Background 1
B. Site Description 1
C. Objectives 2
D. Wildlife Strike History 2
E. Current Wildlife Hazard Management 2
II. Site Visit **3**
A. Study Methods 3
B. Birds 3
a. Waterfowl and Gulls 3
b. Blackbirds and Starlings 5
c. Hawks 6
d. Crows 6
e. Pigeons and Doves 6
f. Swallows 7
g. Game Birds 7
h. Killdeer and Small Perching Birds 7
C. Mammals 8
a. Large Mammals 8
b. Medium Sized Mammals 8
c. Rodents and Rabbits 8
D. Airfield Habitats 9
a. Asphalt Runway and Paved Surfaces 9
b. Grass Management 9
c. Trees and Shrubs 12
d. Structures 12
e. Wetlands 13
E. General Zone Attractants 14
a. Agricultural Land 14
b. Wetlands 14
III. State and Federal Species Status **15**
IV. Recommendations **16**
V. Conclusion **16**
Appendix
Appendix A. **Existing Identified Habitats of the 8U6 Airfield (August 2017)**
Appendix B. **Select 8U6 General Zone Habitats**

DRAFT

I. Introduction

Midwest Wildlife Services (MWS) conducted a wildlife hazard site visit at the Terry Airport (8U6) on August 7th, 8th and 9th, 2017. The site visit was conducted by Timothy Pugh, a Qualified Airport Wildlife Biologist meeting the requirements of the Federal Aviation Administration (FAA) Aircraft Circular 150/5200-36A (Qualifications for Wildlife Biologist Conducting Wildlife Hazard Assessments). This study was funded in part by the FAA's Airport Improvement Program under grant number AIP 3-30-0075-007-2017.

A site visit is a brief analysis of the wildlife activity at an airport. It attempts to identify potential wildlife hazards so that the airport can expedite the mitigation of those hazards. Wildlife activity can be highly variable throughout the seasons of the year, and from one year to another. A biologist with sound knowledge of area wildlife, along with an understanding of wildlife life history and behavior, should be able to make fairly accurate predictions of how wildlife will utilize various airport habitats through the different seasons of the year. Since habitat is the key to wildlife activity, habitat is the primary focus of a site visit. The biologist attempts to identify the airfield habitats, predict how wildlife are likely to use these habitats, and provides recommendations on how to best minimize the hazards that they create. The biologist also considers any anecdotal information gathered from airport personnel, pilots or others who may have first-hand knowledge of airport wildlife activity throughout all seasons of the year.

During a site visit, an attempt is made to identify all airfield wildlife attractants and potential hazards, regardless of their level of significance. Some attractants may pose critical threats to aircraft safety, while others may have a minimal influence. All are important to be aware of and should be addressed as funding and resources are available. Hopefully, with the information gained from a site visit, an airport will have the information needed to prioritize and address all potential wildlife threats.

During this site visit, the airport manager was able to provide some information and insight into the current management of the airfield and the wildlife activity of the area. A search of the FAA National Wildlife Strike Database indicated that no aircraft/wildlife strikes have been reported at 8U6 since 1990.

A. Background

8U6 is a general aviation airport that is used for recreational flying, agricultural crop spraying, air ambulance services, search and rescue, flight training and wildland firefighting. Located one mile southeast of the city of Terry, the area is host to a multitude of both avian and mammalian wildlife species that could potentially pose a threat to safe aircraft travel. 8U6 is in the process of developing a new Airport Master Plan. As part of these planning efforts, FAA has requested that 8U6 conduct a wildlife hazard site visit (WHSV).

B. Site Description

8U6 is owned by the City of Terry and Prairie County in eastern Montana, and operated by the Prairie County Airport Authority. It is approximately 80 acres in size and has a single asphalt runway - Runway 8/26 (4300' x 75'). In addition to the safety areas that are maintained as short grass, the remainder of the airfield is utilized as a grass hay crop. The airport currently has a three-foot woven wire perimeter fence, topped with three strands of barbed wire.

At the time of the site visit, the region of Montana that includes Terry was experiencing a severe drought. With high temperatures and a lack of normal precipitation, most airfield vegetation was very dry, brittle, and appeared brown or yellow, with minimal green color.

For the twelve-month period ending August 4th, 2015, 8U6 supported an average of seventy-five aircraft operations (takeoffs and landings) per month. Eleven percent of 8U6 operations consist of air taxi while the remaining operations involve local and transient general aviation (AirNav.com).

The climate of the Terry area is characterized by having long, cold winters and warm summers. Monthly average high temperatures range from 28°F in January to 87°F in July, while low temperatures range from 5°F in January to 57°F in July. Snowfall occurs mostly in light to moderate amounts during the winter, with an annual average total of 29 inches. Average rainfall is 12.02 inches annually and is concentrated in the warmer months (USClimatedata.com).

USDA Soil Surveys indicate that the 8U6 airfield consists primarily of silty clay and silty clay loam soil types. These soil types are very deep, well drained, and vary in their suitability as farmland.

C. Objectives

The primary goal of this site visit was to identify the potential wildlife hazards associated with 8U6. The five primary objectives were:

1. Identify species of concern and their daily/seasonal patterns.
2. Identify current wildlife population parameters such as species composition, abundance, activity and habitat use.
3. Identify current wildlife hazards to airport operations.
4. Identify features and activities on or near 8U6 that potentially contribute to wildlife hazards to aircraft using the 8U6 airfield.
5. Provide management recommendations for reducing wildlife hazards at 8U6.

D. Wildlife Strike History

An aircraft wildlife strike is considered to have occurred if any of the following occur:

1. A pilot reports a strike
2. Aircraft maintenance personnel identifies damage as having been caused by a bird or mammal strike
3. Personnel on the ground report seeing an aircraft strike one or more birds or mammals
4. Bird or mammal remains, in whole or part, are found on any airside pavement area or within 250 feet of a runway, unless another reason for the bird's or mammal's death is identified.

While no strikes at 8U6 have been reported to the FAA National Strike Database between 1990 and the present, the airport manager indicated that he is aware of at least one goose strike that has occurred in the past.

E. Current Wildlife Hazard Management

Currently, 8U6 has a part time volunteer Airport Manager that conducts the airport maintenance duties. Most wildlife management at 8U6 is conducted through habitat manipulation, primarily mowing. Safety areas are mowed short. Edges of the runway are sprayed with an herbicide to prevent vegetation

growth. The airfield is hayed once annually in the summer. The airport manager again mows the airfield each fall, primarily to cut the regrowth of alfalfa which is an attractant to geese during the fall and winter months. Although one hangar does not have a door and is always open, most buildings are constructed or modified in such a manner that discourages nesting and roosting by birds. There is no other active wildlife control activity being implemented at the airport.

II. Site Visit

A. Study Methods

During the site visit, wildlife surveys were conducted on the 8U6 airfield three times per day (morning, mid-day & evening) over a two-day period. Each survey consisted of four survey points on the airfield, which were selected to best sample all airfield habitats. At each survey point, observations were made for a five-minute period. With the aid of 10X40 binoculars, wildlife observed from each survey point was recorded.

In addition to airfield point counts, any notable wildlife observed while traveling between survey stations or at other times during the site visit was also recorded. All habitats on the airfield were walked and explored in an effort to find any sign (tracks, scat, burrows, etc.) that would indicate the presence of wildlife species or their use of the airfield.

The following discussions, conclusions and recommendations are based on several items including: the observations made during this site visit, personal communications with Willis Bartholomay (Airport Manager), and the biologist's general knowledge of local and regional wildlife populations and their predicted movements and behavior.

B. Birds

a. Waterfowl and Gulls

Ducks and geese were the main waterfowl types in the Terry area during the site visit. The airport manager indicated that pelicans have also been known to use the area. Waterfowl activity at 8U6 appears to be influenced primarily by the Yellowstone River that flows to the west and north of the city of Terry. Wastewater treatment ponds to the northeast of the city also provide an attractive, non-flowing wetland, for area waterfowl (Appendix B).

Geese. Because of their large size and flocking behavior, geese are one of the most hazardous birds to aircraft. While no geese were observed at 8U6 during the site visit, Canada geese are common in the Terry area through most of the year with influxes during the spring and fall migratory seasons. The airport manager indicated that a resident population of Canada geese was established in the Terry area several years ago. The geese nest in the

area, most likely along the Yellowstone River and are attracted to the alfalfa on the airfield, especially in the fall and winter months. For that reason, the airport manager mows the alfalfa in the fall to reduce its attractiveness to geese.

Keeping geese off the airfield is best done through habitat management. While geese are highly attracted to croplands in the spring and fall, they are primarily grazers and will seek out grass and alfalfa areas to feed during most seasons of the year. They prefer short vegetation where their view of oncoming predators is unobstructed. To discourage geese from the 8U6 airfield, alfalfa should be discouraged and vegetation height should be maintained at six inches or higher wherever possible. Alfalfa appears to be the primary attractant of geese at 8U6. Alfalfa should be eliminated either by the use of herbicides or allowing it to die out over time. The annual fall mowing should continue until the alfalfa is eliminated from the airfield.

Whenever geese are present on the airfield they should be hazed. Any persistent geese that cannot be easily dissuaded from the airfield should be lethally removed. 8U6 should maintain an absolute "no tolerance" policy on geese at the airport, and NOTAMS should be issued when necessary to warn pilots of the extreme hazard these birds pose. Unless taken by legal hunters during hunting seasons, any lethal control of geese will require that 8U6 secure permits from the U.S. Fish and Wildlife Service (USFWS) and the Montana Department of Fish Wildlife and Parks (MFWP).

Ducks. Although ducks do not pose the same threat to aircraft that geese do, their large size and flocking characteristics make them a highly hazardous bird to aircraft as well. The Terry area attracts some ducks. Most ducks in the Terry area are likely attracted to the Yellowstone River, while some utilize the city water treatment ponds and the various wetlands in the area. Without any wetlands on the 8U6 airfield, it is unlikely that ducks would be attracted to the airport. No ducks were observed at 8U6 during the site visit. However, the irrigation canal that runs parallel to, and along the north side of the airport, did attract an occasional duck.

Without any wetlands on the 8U6 airfield and no significant wetlands adjacent to the airport, it does not appear that ducks create a significant bird/aircraft strike hazard. In the unlikely event that ducks do begin to use the airfield, as with geese, they too should be hazed and lethal control used when necessary.

Gulls. Due to their large size and flocking characteristics, gulls pose a high threat to aircraft. The wastewater treatment ponds and the Yellowstone River to the north of Terry likely attract various gull species to some extent throughout the non-winter months. Gulls are notorious for utilizing runways and pavement areas. Airports provide an open area with good visibility for loafing and watching for predators. They may provide warmth on a cool morning or worms

after a heavy rain. Gulls will often follow haying equipment as they feed on the exposed rodents or insects. For these reasons, it is possible that 8U6 may attract a few gulls on occasion.

Gulls were not present at 8U6 during the site visit. The airport manager indicated that he is not aware of gulls ever using the airfield. Without a putrescible waste landfill in the Terry area and with few significant wetlands adjacent to 8U6, gull activity at 8U6 is expected to be minimal. Gulls can be easy to scare away. If ever necessary, a hazing program involving pyrotechnics and lethal control should be employed.

Gulls and any waterfowl that utilize the 8U6 airfield during parts of the year should be managed. This is best accomplished with an effective harassment program. A successful harassment program will involve the use of non-lethal scare techniques that include a variety of visual and auditory tools to frighten birds away from the airfield In addition to hazing, lethal control is usually an integral part of a harassment program and necessary to reinforce the non-lethal tools. Since securing the proper permits for lethal control can take several weeks, it is best to have them in place before they are needed. USFWS and MFWP permits can be obtained at no cost and should be renewed annually. Information on the procedures to obtain the proper permits is provided below in the State and Federal Species Status section (Section III). Further information on conducting an effective hazing program can be found in the ACRP Synthesis 23 - Bird Harassment, Repellent, and Deterrent Techniques for Use on and Near Airports, which can be downloaded from the internet at http://www.trb.org/main/blurbs/163690.aspx.

b. Blackbirds and Starlings

Blackbirds and starlings are common and abundant flocking species that can pose a threat to aircraft when in large numbers. Blackbirds are highly attracted to cattail marshes for nesting and roosting. In the spring and fall, several hundred blackbirds may roost in a large wetland. Blackbirds often feed in cropland, especially ripening corn. Flocks of blackbirds and starlings will also feed in short grass, rooting through the vegetation in search of seeds and small insects. This site visit was conducted in early august when some of the early hatched blackbirds and starlings were starting to form small flocks. While the Terry area has several small pockets of cattails, the preferred nesting habitat of blackbirds, there are no large concentrations that would tend to provide for large local flocks. On a few occasions during the site visit, small groups of twenty to one hundred fifty blackbirds were seen flying in the area, sometimes across the 8U6 airfield to access the corn crop south of the airport. Avoiding crops on the airfield and managing airport vegetation as recommended in the grass management section below will help to keep threats from blackbirds and starlings to a minimum.

c. Hawks

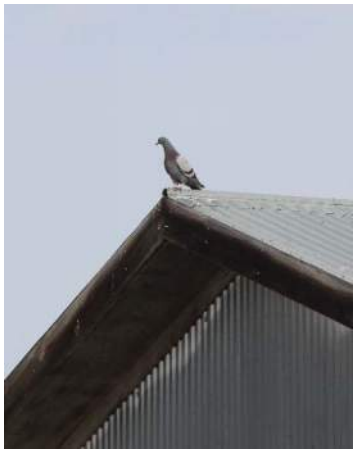
Due to their large size and their potential for damaging aircraft, the presence of hawks, owls and other large birds of prey at an airport should always be noted as a high-risk situation. Hawks are typically attracted to airports to prey on small rodents and rabbits. Suitable perch sites such as fence posts, trees or other structures will facilitate this activity. Hawks, eagles, vultures and owls are all common species in the Terry area. The only raptor species observed at 8U6 during the site visit were several turkey vultures that circled high above and perched on fenceposts near the southeast corner of the airport. There was no apparent reason for their presence. Without trees on the airfield to provide hunting perches, hawk activity at 8U6 should be relatively minimal. Maintaining proper vegetation management as described below in the section on grass management will typically keep rodent and rabbit populations low. Keeping these prey species from becoming abundant will further discourage large birds of prey from utilizing the airfield.

d. Crows

Crows are very social, boisterous birds of exceptional intelligence. They are larger blackbirds and will feed on a wide variety of foods including fruits, nuts, small animals, insects, and carrion. Activities such as plowing and mowing are very attractive to crows because of the insects that are exposed. Crows can also be attracted to trash and other refuse. They are medium to large-sized birds and can inflict severe damage to aircraft if struck.

Crows are common in the Terry area. The primary attractant of crows to the area is likely the abundance of hay and crop land. The presence of rodents and grasshoppers on 8U6 could occasionally attract crows. Maintaining grass height at greater than six inches where possible will be effective in keeping crow activity at 8U6 to a minimum. Crows can easily be hazed using pyrotechnics and visual repellents, but soon habituate to these devices if not supplemented with lethal shooting.

e. Pigeons and Doves



Pigeons and doves are powerful fliers with robust bodies, small heads and short beaks. Pigeons are non-native birds that commonly roost and nest in airport structures. Mourning doves are migratory and nest in trees near crops and grasslands. The flocking behavior of these species give them the potential to cause a multiple strike incident. Although they are not as large as many other species considered detrimental to air safety (e.g., waterfowl, gulls, and hawks), they are typically a concern because of their overall abundance, dense body structure and movements around the airfield. Both of these species are common in the Terry area. Mourning doves were still nesting at the time of the site visit. No flocks were observed at 8U6; however, individual doves were occasionally noted flying over the airfield. Dove numbers at 8U6 could increase during the fall when doves group up and seeds are more prevalent on the airfield. Proper vegetation management and keeping seed production to a minimum should keep mourning dove activity at 8U6 to a minimum.

A few pigeons were using the open hangar for roosting. Inside the hangar, the upper back side contained a ledge which provided an ideal nesting site for pigeons. While it appeared that only one nest was present, it has the potential for several more. Pigeon numbers can best be controlled at 8U6 by replacing the door on the open hangar. Periodic nest removal and lethal control of the pigeons by shooting or trapping will also help to minimize their activity.

f. Swallows

Swallows are slender aerialists with long, pointed wings. They feed on insects by flying in an erratic manner with their mouths gaping. Barn swallows build mud nests under eaves and bridges, whereas, the other swallows nest in banks, trees, and cavities of rocks. No swallows were observed at 8U6 during the site visit. Swallows may utilize the airport to some extent, however, without an abundance of wetlands nearby, swallow activity at 8U6 should be minimal.

g. Game Birds

Grouse, turkeys, pheasants and partridge are common game bird species of the Terry area that could potentially utilize the 8U6 airfield. These large upland birds can do considerable damage when struck by small planes or ingested into an engine. Sage grouse and partridge could be attracted to the grassland habitat of the airfield and the abundance of agricultural land adjacent to the airfield can be highly attractive to pheasants. Although there is little the airport can do to keep these species off the airfield, maintaining the vegetation height at between six and twelve inches should minimize their airfield activity.

h. Killdeer and Small Perching Birds

There are several small birds that are commonly attracted to the paved surfaces and short grass areas along airport runways. Killdeer, horned larks and meadowlarks are the three most common, all of which were observed at 8U6 during the site visit. These birds are attracted to these areas for the feeding opportunities that they provide, mainly windblown seeds and insects. Also, pavement provides warmth and a snow free area on cold wintery days. These birds are small in size, and rarely result in damage to an aircraft when they are struck. For these reasons, they are not considered a significant hazard. However, when in large flocks, there is an increased possibility of a damaging strike. Maintaining grass habitat at greater than six inches where possible, preventing seed production and minimizing weeds will reduce these species populations as much as possible.

C. Mammals

a. Large Mammals

Because of their large size, deer are considered to be the most hazardous wildlife species to aircraft. During the site visit deer tracks and feces was evident on the airfield, however, except for one track, none of it appeared to be recent. The airport manager indicated that deer on the airfield presented the biggest problem at 8U6. Typically, deer will seek cover in the large canyon to the south of the airfield. Their daily routine is to migrate north, across the 8U6 airfield to feed in the alfalfa fields north of the airport before returning across the airfield to the canyon area. Heavily used trails crossing the airfield can often be seen in the snow during the winter months.

Excluding deer from the airfield with adequate fencing is the only effective way to minimize the threat deer pose to aircraft. A perimeter wildlife fence is recommended and must be a minimum of ten feet in height to effectively exclude deer. The fence should be installed tight to the ground. Any large openings under the fence should be filled to prevent deer from crawling under. If holes under the fence cannot be kept closed, then a skirting should be attached to the bottom of those portions of the fence that cannot be maintained.

b. Medium Sized Mammals

Raccoon tracks inside the open hangar were the only medium sized mammal sign found on the 8U6 airfield during the site visit. Other species such as fox, coyote and badger are likely to utilize the airfield on at least an occasional basis.

All medium sized mammals can be a hazard to small aircraft. In addition to a direct strike, these species can distract a pilot, cause a pilot to veer off a runway or overcompensate in attempting to avoid a strike. Their activity on the airfield can be minimized by avoiding outdoor storage or junk piles, removing hay bales from the airfield immediately after baling, and following the recommended airfield vegetation management described below in the section on grass management. When these species become frequent on the airfield, they should be removed through trapping, shooting or other control methods.

c. Rodents and Rabbits

The main issue with rodents and rabbits on an airfield is that they attract predators such as coyote, fox, badgers and large birds of prey. Rodents are attracted to many habitats on an airfield but become especially abundant when associated with alfalfa or other plants that produce palatable vegetation, seeds or insects. Some areas of the 8U6 airfield contained several small holes and trails in the grass, indicating that the airfield contained a moderate level of rodent activity, primarily voles. The airfield also had a few dirt mounds indicating an occasional pocket gopher. Whenever rodent numbers on the airfield become high, they should be controlled with traps or toxicants.

No rabbits or rabbit sign was observed during the site visit. The airport manager indicated that it is rare to see a rabbit on the airfield. To keep rodent and rabbit numbers to a minimum, the vegetation recommendations discussed below should be followed. If necessary, jackrabbits can be controlled with traps or by spotlighting and shooting.

D. Airfield Habitats

All wildlife is dependent upon habitat (food, water and cover). All habitat is an attractant to wildlife at some point in time. At an airport, we try to manage and manipulate habitats so they are least attractive to those species that are most hazardous to aircraft. Wildlife are typically dependent upon several habitat types to meet their needs for survival. Therefore, the more habitats there are on an airfield, the more likely wildlife will be present. Another habitat consideration is "edge". "Edge" is referred to the area where two habitat types meet. Wildlife typically are more abundant in these areas because they provide two or more of an animals' required habitat needs in close proximity to each other. Therefore, the goal of an airport should be to work towards a single habitat type that is not attractive to wildlife, and has minimal edge areas.

This site visit addresses the habitats and structures on the airport property owned by the City of Terry. It also includes the habitats within 5 miles (General Zone) of the airport that are expected to influence wildlife activity near 8U6. Each of these habitats are discussed in detail below and recommendations to minimize their attractiveness to wildlife are provided.

a. Asphalt Runway and Paved Surfaces

Paved surfaces attract a wide variety of birds for a variety of reasons. Some birds will loaf on runways or warm themselves on the pavement on a cool day. Others may feed on worms, insects or windblown seeds that may present. Perching birds often use runway lights and other instruments. During the site visit, all 8U6 pavement appeared clean and did not have any noticeable indications of use by birds except for the presence of a few smaller birds (killdeer, horned larks, meadow larks & kingbirds) that were occasionally standing on the runway and apron areas. If hazardous birds or flocking birds (geese, gulls, swallows) do use the runways, they should be hazed away or lethally removed.

b. Grass Management

The edges of the 8U6 movement areas were mowed short (less than 4 inches). The vegetation that grows along the movement areas varied in density and consisted of various grass and weed species. Weeds along the edge of the movement areas are sprayed two to three times per year as needed. The rest of the airfield contains grass hay that receives one cutting per year. Additional mowing is done by the airport again in early fall.

Airfield grass consisted of a wide variety of grass species with crested wheat grass appearing to be the most dominate. The airfield also contained a high percentage and diversity of non-grass or weed species.

During the site visit, due to the drought that the area was experiencing, most airfield vegetation was either dead or dormant. In general, airfield vegetation was not very dense, exposing considerable bare ground and small rock. Airfield vegetation height varied considerably. Some plants and grasses were very low growing while others were at about ten or twelve inches. Some of the shrubs and alfalfa stood somewhat taller at heights up to thirty inches.

There are no firm guidelines for grass management at airports. The main principles to follow are to use a grass cover and mowing regime that does not result in the buildup of rodent numbers or the production of seeds, forage or insects desired by birds. Short grass (2-6 inches) is preferred by many bird species because it allows clear sight distances, provides forage for grazing birds and does not impede access to insects or other invertebrates. Geese, gulls, blackbirds, doves, horned larks, crows and small insectivorous birds prefer short grass because of these factors.

Longer grass heights (6-12 inches) are attractive to birds such as some species of ducks, meadowlarks, and some species of hawks and owls because of the food and cover provided. When a short grass regime (6 inches or less) is chosen, management ordinarily involves mowing when grass reaches the upper height limit. The advantages of short grass management are that it does not attract ground nesting birds or large numbers of small mammals and insects, and it reduces availability of seed for seed-eating birds. The disadvantages of short grass are that it exposes earthworms and insects for bird availability and provides an open view for loafing.

Grasses grown at heights between 6-12 inches reduce bird access to earthworms, insects and other small prey animals and denies good visibility to loafing birds. If the grass is allowed to grow higher than 12 inches, it may attract ground nesting birds and provide habitat for mice and voles which in turn may attract fox, coyotes, hawks and other predators. Additionally, tall grass that is permitted to develop seed heads is used as food by rodents, geese and other birds.

The type of grass used on the airfield should produce small or no seeds, but still be able to generate new growth or reseed itself to provide a thick, monotypic stand and prevent erosion. It needs to withstand drought, flooding, and other normal climatic conditions, and be somewhat unpalatable to grazers such as geese and deer.

In general, cool season grasses such as bromes, wheatgrass and blue grasses are not usually recommended as they typically have two growing seasons that vary considerably from year to year. If conditions are not just right, these areas often become weedy and can produce a lot of seed. However, if fertilized sufficiently to produce a dense stand, and mowed regularly to maintain proper height and prevent seed formation, these grass types can be managed to minimize their attraction to wildlife.

Western wheat grass greens up in the spring but typically does not grow after mid-summer. For an airport that chooses to plant cool season grass, western wheat grass is highly recommended by the U. S. Department of Agriculture's Natural Resource Conservation Service (NRCS). When sparse, it can produce a lot of seed. However, once established, seed is rarely produced. Western wheat grass is broadly adapted to a variety of environments and conditions and makes a good hay crop. Intermediate wheat grass has similar characteristics to western wheat grass but will produce seeds in a moist year. Fescues may be a good mix with western wheat grass however it does produce seeds and should be mowed regularly to prevent seed formation.

Warm season grasses (i.e. buffalo, grama, big bluestem and switch grass) have only one growing season each year which is more predictable. Warm season grasses typically do not begin to grow until June and mature in August, maintaining a short and predictable growing season. Big bluestem and switch grass are taller growing warm season grasses that will produce good hay crops. Buffalo, blue grama and side oats grama are native low growing grasses that require minimal mowing. Since warm season grasses remain dormant until approximately June, herbicides such as glyphosate (i.e. Roundup) can be applied to control broad-leafed weeds and other cool season grasses in the spring. NRCS plant materials specialists should be consulted before planting any new grasses on the airfield.

Preferred grass management at 8U6 should include: maintaining warm season grasses; a mowing regime that produces a dense cover while minimizing seed production; eliminates non-grass species; maintains a grass height between 6 and 12 inches; and discourages ground nesting birds.

Vegetation that does not get cut during the annual haying operations should be cut by other means to maintain proper grass height. This includes areas that might be too wet or too steep to mow, or along drainage ditches. Areas with terrain too rough or irregular to mow should be leveled and re-vegetated so that regular mowing can be accomplished.

Hay bales should be removed from the airfield immediately after baling and should never be stored on the airfield. Otherwise, they quickly become perches for hawks and attractants to rabbits and rodents.

c. Trees and Shrubs

Trees and shrubs can create attractive habitat for both birds and mammals. Birds utilize trees for roosting, perching and nesting. They often feed on the fruit, nuts and seeds associated with these woody plants. Mammals will use trees for many of the same reasons. Trees and shrubs also provide cover for birds and mammals. Even small shrubs can provide adequate cover to camouflage a jackrabbit or coyote on an airfield.

The airfield was free of trees but did have three trees that were just outside of the perimeter fence (See Appendix A). While these trees did not appear to be a significant bird attraction at this time, their removal, if the airport has the authority to remove them, would prevent them from being used by hazardous birds in the future.

Silver sage, along with some other shrub species were present on parts of the airfield. Any trees or woody plant material that develops on the airport, should be removed.

d. Structures

Wildlife are often attracted to and utilize airfield structures for perching, nesting, and loafing. Airfield structures such as runway lights, signs, and light poles are used as hunting and loafing perches for birds such as hawks and small perching birds. Hangars and maintenance buildings often attract roosting, nesting or loafing birds. Fence posts and hay bales on the airfield after haying can be used as perches by hawks and other birds. Man-made structures on airports are utilized by wildlife in many ways.

Airport Buildings. The airport contained three aircraft hangars, a maintenance building, a semi-trailer and a smaller building. All were located on the north-east side of the airport. All of the buildings were metal sided, and except for the hangar without a door, all were in relatively good repair. The vegetation around the buildings was well maintained and mowed short. However, as with much of the airfield, the vegetation was sparse in areas which revealed considerable gravel and bare ground. Overall, only the open hangar appeared to be a significant wildlife attraction.

The open hangar had considerable evidence of being utilized by several avian and mammal species. The upper inside of the back of the building provided an attractive ledge for pigeons to nest. At least one pair of pigeons were nesting in the hangar and were seen periodically perched on top of the buildings. The inside of the hangar was littered with bird feces and nesting material indicating that other birds have used the building for nesting and roosting. Signs of starlings, sparrows, and mourning doves were present. Additionally, the dirt floor of the hangar contained tracks of mammal species, including rodents, racoons, skunks and deer. Another hangar appeared to have some small depressions under the door indicating that some small mammal species have burrowed under the door to get into the hangar.

Except for the open hangar, overall wildlife use of the airport buildings was minor. While the open hangar attracted some birds and mammals, the hazard they pose to aircraft is minimal. The most significant issue associated with the open hangar is the real and potential damage, nuisance and health and safety issues that birds and wildlife can do to the aircraft and other contents stored in the building. It would be best to replace the door on this hangar so that birds and mammals cannot access it.

Outdoor Storage. There were a few storage piles on the airport consisting of a variety of materials. Storage piles can be attractive to species such as rabbits, rodents, skunks and snakes. To the east of the semi-trailer there were several concrete barriers laid out on the ground. A small amount of concrete rubble was piled along the side of the open hangar. Snow blower parts were stacked next to the small building and a few other piles that contained old lumber, telephone poles and metal sheeting were also stored on the airport. While only minor rodent activity was found around these storage piles, it would be best to tidy these areas up and eliminate any of the items that are no longer needed for airport operations.

Navigation Structures. The runway lights, signs and PAPI lights all contained a small amount of feces indicating that small perching birds use them on occasion. While these small birds pose a very minimal hazard, an anti-perch device should be used whenever birds are using one of these structures on a regular basis.

e. Wetlands

Wetlands are a magnet for wildlife. Their associated vegetation can provide food and cover for many wildlife species. Except for drainage ditches, there are no wetlands on the 8U6 airfield. However, there is an irrigation canal that runs along the north edge of the airfield, just outside of the airport. This narrow waterway contains water during part of the year. It was being used by two or three ducks during the site visit and may get slightly more use by ducks during the spring migration (if it contains water at that time of year). Overall, it is not likely to attract more than a few ducks and should pose a very minimal hazard to aircraft at 8U6.

E. General Zone Attractants

Three wildlife attractants within the 5 mile "general zone" surrounding the 8U6 airfield were noted (Appendix B). Identifying area attractants is important in understanding why certain hazardous bird species may be in the area, and determining if their movements are likely to pass over the airfield or through aircraft flight paths.

a. Agricultural Land

Agricultural cropland is a dominate land use in the Terry area. Crop, pasture or hay land borders 8U6 on all sides. Most crops and farming practices are attractive to a variety of hazardous bird and wildlife species. In the area around 8U6, agricultural land will likely attract some ducks, geese and blackbird species. While duck and blackbird activity is likely to be minimal, resident and migratory geese are more likely to utilize the area crop land in much the same way that they currently utilize the 8U6 airfield, posing hazards to aircraft in the fall and winter. Since cropland adjacent to 8U6 is not under the control of the airport, there is little the airport can do to influence its use. However, if any cropland adjacent to 8U6 becomes a significant attractant that causes hazards for aircraft, the airport should attempt to work with those landowners and develop a strategy that could minimize the threat.

b. Wetlands

The Terry area contains several wetlands throughout the 8U6 general zone, including creeks, canals, lakes and wastewater treatment ponds. The Yellowstone River is the most significant wetland in the area. It not only attracts birds to the area but also influences bird activity in the region. The large flocking birds associated with the river likely include ducks, geese, gulls, pelicans, herons and cormorants. While the number of these hazardous birds are likely to be minimal during most seasons of the year, their numbers in the Terry area may increase at times. Additionally, located to the north east of Terry, next to the Yellowstone River, the City of Terry has two wastewater treatment ponds consisting of about twelve acres. The ponds are located about one and a half miles north of 8U6 and contained about thirty-five mallards during the site visit. The ponds may contain gulls or other waterfowl at other times of the year.

While Canada geese do feed on area crops, including the alfalfa on the airport, there does not appear to be any other significant area attractant that will draw large flocking birds from the treatment ponds or the Yellowstone River to the vicinity of the airport. Except for geese, the airport manager indicated that he is not aware of any gulls or other large wetland related birds that have been a problem at the airport.

III. STATE AND FEDERAL SPECIES STATUS

The legal status of any wildlife species at 8U6 must be determined before any control is attempted. Federal wildlife laws are mainly administered by the U.S. Fish and Wildlife Service and primarily involve migratory birds and threatened & endangered (T&E) species. State wildlife laws are primarily administered by the Montana Department of Fish, Wildlife & Parks and include resident and migratory birds, mammals, reptiles, amphibians and protected species. Although some species can be controlled without permits, many will require either a federal permit, a state permit or both. Before conducting any wildlife control, 8U6 should determine the permit requirements. Table 1 below can help to determine when permits are required. If 8U6 has any questions concerning wildlife laws and regulations, or to obtain any needed state or federal permits, contact information is provided below. All federal permits will also require a Form 37, which can be obtained from the USDA Wildlife Services Office.

MT Dept of Fish Wildlife & Parks
Lauri Hanauska-Brown
Non-Game Biologist
PO Box 200701
Helena, MT 59620-0701
(406) 444-5209

U.S. Fish & Wildlife Service
Migratory Bird Permit Office
P.O. Box 25486
DFC (60154)
Denver, CO 80225-0486
(303) 236-8171

USDA Wildlife Services
John Steuber
State Director
P.O. Box 1938
Billings, MT 59103
(406) 657-6464

Table 1. Wildlife Permit Requirements for Montana Airports.

Category	Species	State Permit	Federal Permit
RESIDENT GAME BIRDS	Pheasant, grouse, partridge, and turkey	YES	NO
RESIDENT NONGAME BIRDS	Starlings, house sparrow, rock dove (feral pigeon)	NO	NO
MIGRATORY GAME BIRDS	Ducks, geese, swans, coots, snipe, sand hill crane, swan and mourning doves	YES	YES
MIGRATORY NONGAME BIRDS	All bird species except game birds, resident nongame birds, fully protected wildlife and feral, domestic & exotic birds	YES	YES
GAME MAMMALS	Deer, elk, antelope, bighorn sheep, mountain goat, bison, moose, black bear, wolf and mountain lion	YES	NO
FURBEARERS	Beaver, bobcat, fisher, marten, otter, mink muskrat, swift fox and wolverine	YES	NO
NONGAME MAMMALS	All species of mammals, except game mammals, furbearers and domestic mammals	NO	NO
FERAL DOMESTIC MAMMALS	Dogs, cats, livestock (Call local Animal Control)	NO	NO
REPTILES AND AMPHIBIANS	All reptiles and amphibians (threatened or endangered species require a separate permit)	NO	NO
FULLY PROTECTED WILDLIFE	Eagles, threatened and endangered species, (Canada lynx, grizzly bear, black-footed ferret, least tern, piping plover and whooping crane)	YES	YES

IV. RECOMMENDATIONS

Below is a review of the recommendations made in this report. For more detailed information on each of the recommendations listed below, please refer to the main text of this report.

Recommendation 1. *Follow the grass habitat management guidelines in this report (maintaining grass height between six and twelve inches) and work towards establishing a dense grass habitat on the airfield that contains minimal non-grass species (i.e. alfalfa, shrubs, weeds).*

Recommendation 2. Continue to mow alfalfa in the fall, as needed, until it is eliminated from the airport.

Recommendation 3. *Enclose the airfield with an effective deer proof perimeter fence.*

Recommendation 4. *Clean up any unnecessary storage piles.*

Recommendation 5. *Enclose the open hangar.*

V. CONCLUSION

Wildlife species and abundance vary considerably in the Terry area throughout the year. Likewise, habitats vary seasonally due to several factors (vegetation type, temperatures, precipitation, management etc.). The ideal wildlife hazard evaluation would involve wildlife and habitat observations throughout all twelve months of the year. Therefore, a three-day site visit such as this one has limitations. However, by identifying the habitats on an airfield and having a good knowledge of the area wildlife, most significant wildlife hazards can be identified.

At 8U6, the primary airfield habitat that influences hazardous wildlife is the vegetation species on the airfield. Eliminating the non-grass plant species, especially the alfalfa, and following the recommended vegetation management on the airfield will be the key to keeping the potential of a wildlife strike to a minimum. Additionally, a perimeter wildlife fence will minimize the potential for a deer strike. When hazardous wildlife is encountered on the airfield, it is best addressed through an effective harassment program. All other issues identified in this report are also important and should be addressed, as they will further improve safety at the airport.

Furthermore, if not being done so already, 8U6 should maintain an ongoing wildlife activity log. Any notable wildlife activity at 8U6 should be recorded in the log. This includes dead wildlife or wildlife parts found on the airfield, incidents where hazardous wildlife are using the airfield, the action taken to haze or remove hazardous wildlife, and the results of those actions. All dates, times, locations and personnel involved should be recorded. This will serve as a permanent record documenting wildlife activity at 8U6 and will prove to be helpful in identifying and managing future wildlife hazards.

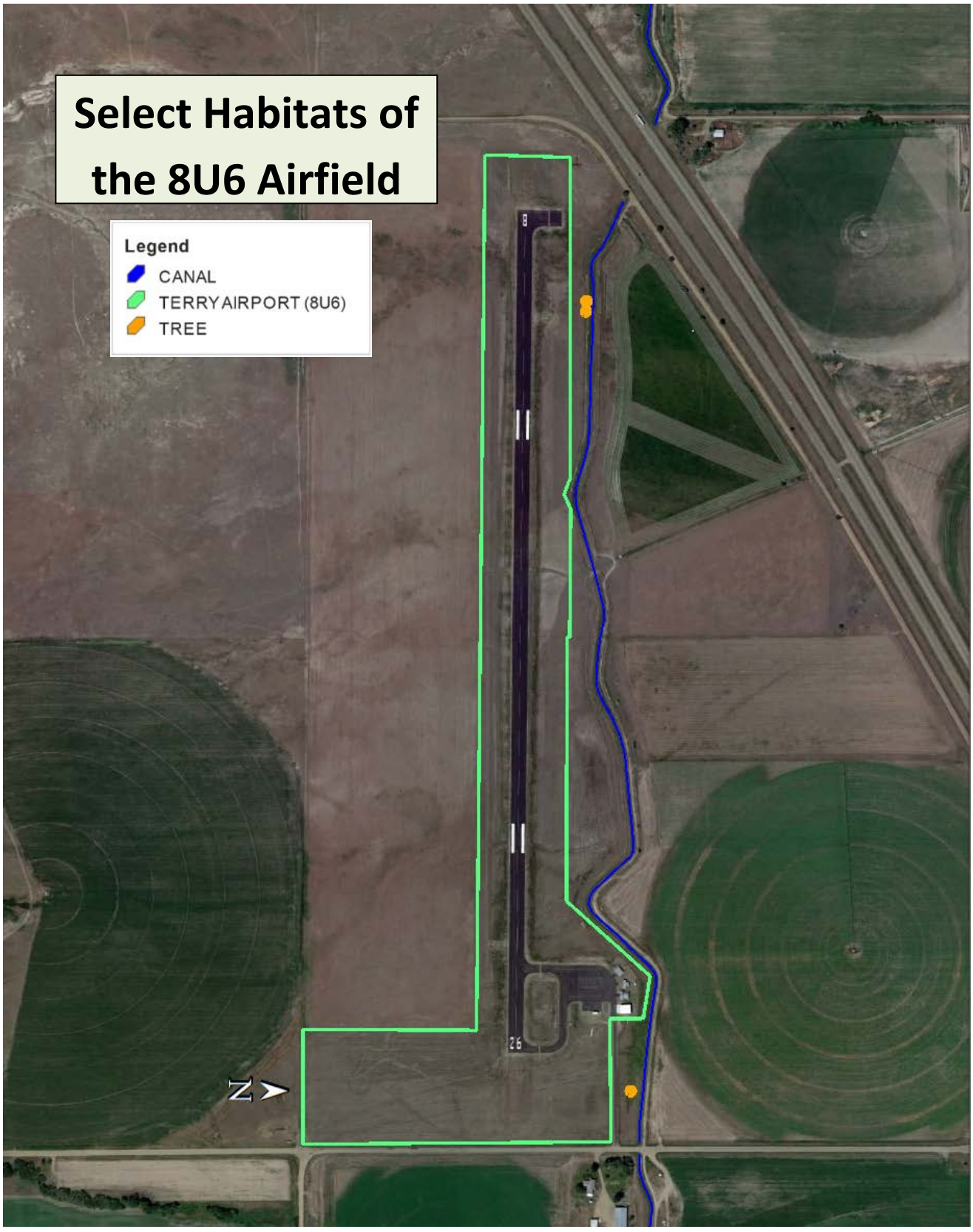
For further information on managing wildlife hazards at the airport, FAA has five publications that 8U6 should refer to. These are the 2005 edition of "Wildlife Hazard Management at Airports – A Manual for Airport Personnel" and four ACRP reports:

ACRP Synthesis 23 - Bird Harassment, Repellent, and Deterrent Techniques for Use on and Near Airports
ACRP Synthesis 32 – Guidebook for Addressing Aircraft/Wildlife Hazards at General Aviation Airports
ACRP Synthesis 39 – Airport Wildlife Population Management
ACRP Synthesis 52 – Habitat Management to Deter Wildlife at Airports.

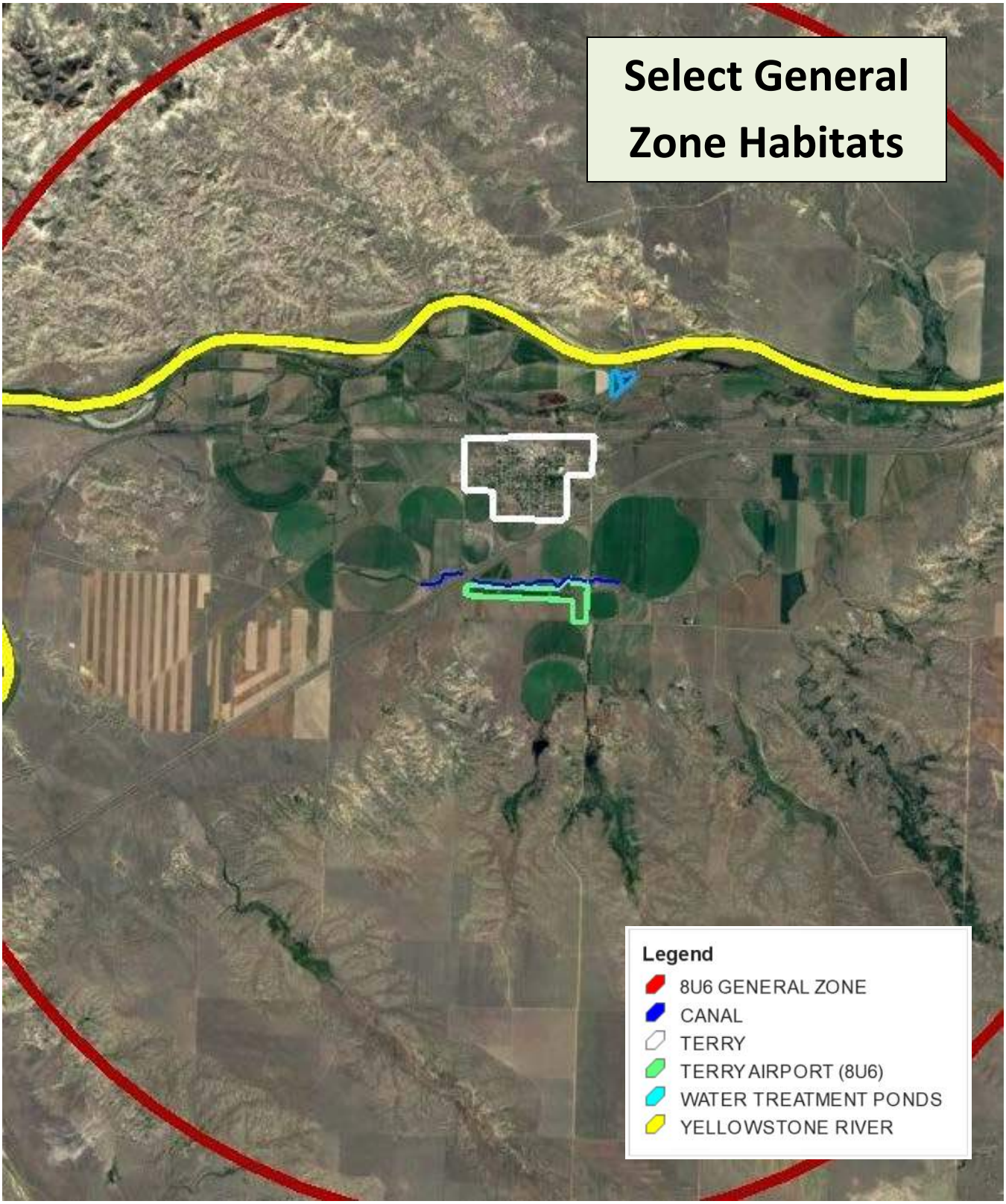
8U6 should have copies of these documents. If not, they can be downloaded from the FAA website at: http://www.faa.gov/airports/airport_safety/wildlife/resources/media/2005_FAA_Manual_complete.pdf and http://www.faa.gov/airports/airport_safety/wildlife/resources/.

If there are any questions about this report or if further information is needed about this site visit, please contact Timothy Pugh, Qualified Airport Wildlife Biologist, Midwest Wildlife Services, at 605-280-0704.

Appendix A. Existing Identified Habitats of the 8U6 Airfield (August 2017)



Appendix B. Select 8U6 General Zone Habitats



Appendix C

Airport Layout Plan

LOCATION MAP
(NO SCALE)

AIRPORT LAYOUT PLAN

FOR

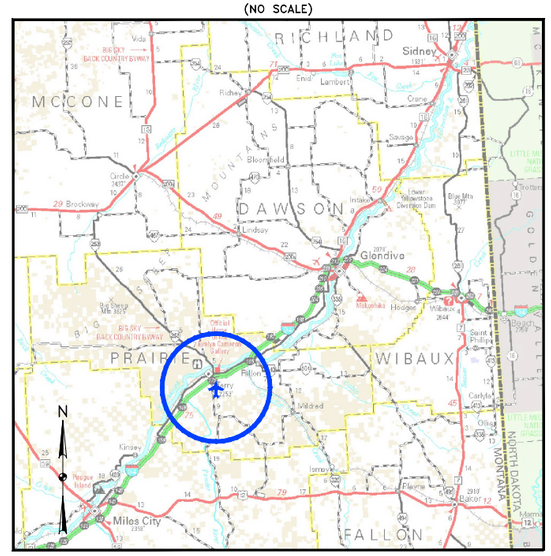
PRAIRIE COUNTY AIRPORT

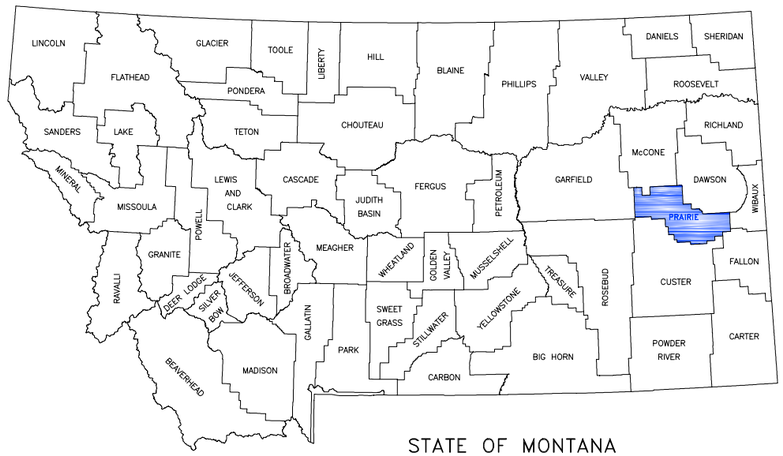
TERRY, PRAIRIE COUNTY, MONTANA

PRAIRIE COUNTY AIRPORT AUTHORITY (OWNER)

February 2018

VICINITY MAP
(NO SCALE)



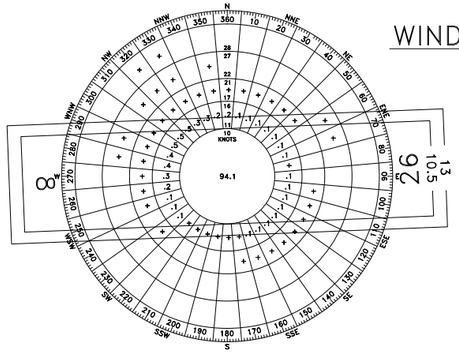


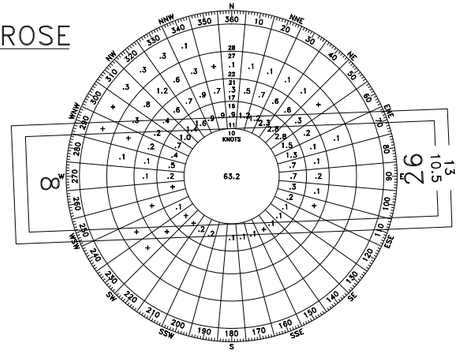
STATE OF MONTANA

SHEET INDEX

1. TITLE SHEET
2. AIRPORT DATA SHEET
3. AIRPORT LAYOUT PLAN
4. TERMINAL AREA DRAWING
5. INNER PORTION OF THE APPROACH SURFACE – RUNWAY 8 END
6. INNER PORTION OF THE APPROACH SURFACE – RUNWAY 26 END
7. AIRPORT AIRSPACE DRAWING (ULTIMATE)
8. RUNWAY DEPARTURE SURFACE
9. PROPERTY MAP

WINDROSE





ALL-WEATHER WIND COVERAGE		
CONFIGURATION	CROSSWIND COMPONENT	
	10.5 KNOTS	13 KNOTS
RUNWAY 8-26	98.03%	99.11%
SOURCE: BRMT AGRIMET (2007-2016, HOURLY) FROM US BUREAU OF RECLAMATION		
87,505 TOTAL OBSERVATIONS		

INSTRUMENT FLIGHT RULES (IFR) WIND COVERAGE		
CONFIGURATION	CROSSWIND COMPONENT	
	10.5 KNOTS	13 KNOTS
RUNWAY 8-26	77.97%	85.65%
RUNWAY 8	52.97%	57.33%
RUNWAY 26	34.16%	37.48%
SOURCE: GVD AWOS (2007-2016, HOURLY) FROM NATIONAL CLIMATIC DATA CENTER		
3,781 TOTAL OBSERVATIONS		
IFR = VISIBILITY LOWER THAN 3 MILES OR CEILING LOWER THAN 1,000 FEET		

PRAIRIE COUNTY AIRPORT — PROJECT #2517107

PRAIRIE COUNTY AIRPORT
PRAIRIE COUNTY AIRPORT AUTHORITY (OWNER)
TERRY, MONTANA

TO BE USED AS A COMPLETE DRAWING SET FOR PLANNING PURPOSES ONLY, NOT FOR CONSTRUCTION

TITLE SHEET

Rev.	Date	Description

DRAFTED MTK
REVIEWED BJM
PROJECT NUMBER 2517107
LAST REVISED DATE

SHEET 1

March 22, 2018 – 12:33 PM – P:\Airport\MT\Terry\Projects\2517107–Master Plan\CADD\ALP\2517107_Title.dwg (Title)

RUNWAY DATA TABLE				
ITEM	EXISTING (E)		ULTIMATE (U)	
RUNWAY DESIGNATION	8	26	8	26
RUNWAY DESIGN CODE (RDC)	B-II(S)-	B-II(S)-	B-II(S)-	B-II(S)-
APPROACH REFERENCE CODE (APRC)	-	-	-	-
DEPARTURE REFERENCE CODE (DPRC)	-	-	-	-
RUNWAY DIMENSIONS	4300' x 75'		4300' x 75'	
RUNWAY LENGTH CRITERIA	SMALL, <10 PX (95% FLEET)		SMALL, <10 PX (95% FLEET)	
CRITICAL AIRCRAFT (TYPE)	Beech Super King Air (250)		Beech Super King Air (250)	
CRITICAL AIRCRAFT (WINGSPAN)	57' 11"'		57' 11"'	
CRITICAL AIRCRAFT (TAIL HEIGHT)	14' 10'		14' 10'	
CRITICAL AIRCRAFT (APPROACH SPEED)	103 (Kts.)		103 (Kts.)	
MAXIMUM TAKEOFF WEIGHT (MTOW)	12500 (LBS.)		12500 LBS.	
RUNWAY END ELEVATION	2281.2'	2282.8'	2281.2'	2282.8'
TOUCHDOWN ZONE ELEVATION (TDZE)	2282.3'	2282.8'	2282.3'	2282.8'
RUNWAY GRADIENT	0.037%		0.037%	
MAX GRADE WITHIN RUNWAY LENGTH (%)	0.040%		0.040%	
RUNWAY LIGHTING	MIRL		MIRL	
PAVEMENT TYPE	BITUMINOUS		BITUMINOUS	
RUNWAY CATEGORY	UTILITY		UTILITY	
PAVEMENT STRENGTH (WHEEL-LOAD)	12500 LBS (SW)		12500 LBS (SW)	
PAVEMENT CLASSIFICATION NUMBER (PCN)	NA		NA	
PAVEMENT MARKINGS	VISUAL	VISUAL	NON-PRECISION	NON-PRECISION
SURFACE TREATMENT	NONE		NONE	
RUNWAY SAFETY AREA (RSA)	4900' x 150'		4900' x 150'	
RUNWAY OBJECT FREE AREA (OFA)	4900' x 500'		4900' x 500'	
RUNWAY OBSTACLE FREE ZONE (OFZ)	4700' x 250'		4700' x 250'	
14 CFR PART 77 APPROACH TYPE	VISUAL	VISUAL	NON-PRECISION	NON-PRECISION
14 CFR PART 77 APPROACH SLOPE	20:1	20:1	20:1	20:1
14 CFR PART 77 APPROACH DIMENSIONS	250 X 1250 X 5000	250 X 1250 X 5000	500 X 2000 X 5000	500 X 2000 X 5000
VISIBILITY MINIMUMS	VISUAL	VISUAL	1 MILE	1 MILE
THRESHOLD SITING SURFACE (TSS) CATEGORY	2	2	3	3
THRESHOLD SITING SURFACE (TSS) SLOPE	20:1	20:1	20:1	20:1
THRESHOLD SITING SURFACE (TSS) DIMENSIONS	STARTS AT THRESHOLD, 250' X 700' X 2250' X 2750'	STARTS AT THRESHOLD, 250' X 700' X 2250' X 2750'	STARTS AT THRESHOLD, 400' X 1000' X 1500' X 8500'	STARTS AT THRESHOLD, 400' X 1000' X 1500' X 8500'
GLIDEPATH QUALIFICATION SURFACE (GQS)	NONE	NONE	30:1	30:1
GLIDEPATH QUALIFICATION SURFACE (GQS) DIMENSIO	NONE	NONE	275' X 1520' X 10000'	275' X 1520' X 10000'
DEPARTURE SURFACE	NONE	NONE	40:1	40:1
DEPARTURE SURFACE DIMENSIONS	NONE	NONE	1000' X 6466' X 10200'	1000' X 6466' X 10200'
AERONAUTICAL SURVEY-TYPE REQUIRED	NON-VERT. GUIDED	NON-VERT. GUIDED	NON-VERT. GUIDED	NON-VERT. GUIDED
RUNWAY ORIENTATION (TRUE)	90.8°	270.8°	90.8°	270.8°
MAGNETIC DECLINATION (2017)	9° (E)	9° (E)	9° (E)	9° (E)
RUNWAY ORIENTATION (MAGNETIC)	81.8°	261.8°	81.8°	261.8°
VISUAL AND INSTRUMENT NAVAIDS (NAVAIDs)	PAPI	PAPI	PAPI	PAPI
DISPLACED THRESHOLD	0'	0'	0'	0'
TAKEOFF RUNWAY AVAILABLE (TORA)	4300'	4300'	4300'	4300'
TAKEOFF DISTANCE AVAILABLE (TODA)	4300'	4300'	4300'	4300'
ACCELERATED STOP DISTANCE AVAILABLE (ASDA)	4300'	4300'	4300'	4300'
LANDING DISTANCE AVAILABLE (LDA)	4300'	4300'	4300'	4300'
RPZ DIMENSIONS - APPROACH	250' X 450' X 1000'	250' X 450' X 1000'	250' X 450' X 1000'	250' X 450' X 1000'
RPZ DIMENSIONS - DEPARTURE	250' X 450' X 1000'	250' X 450' X 1000'	250' X 450' X 1000'	250' X 450' X 1000'

AIRPORT DATA TABLE		
ITEM	EXISTING (E)	ULTIMATE (U)
AIRPORT REFERENCE CODE (ARC)	B-II (SMALL)	B-II (SMALL)
AIRPORT OWNERSHIP	PUBLIC	PUBLIC
NPIAS SERVICE LEVEL	GENERAL AVIATION - OTHER	GENERAL AVIATION - OTHER
NPIAS ASSET CLASSIFICATION	BASIC	BASIC
STATE SYSTEM PLAN SERVICE LEVEL	GENERAL AVIATION	GENERAL AVIATION
AIRPORT ELEVATION (MSL)	2282.8'	2282.8'
AIRPORT REFERENCE POINT (ARP)	(N) 46° 46' 37.701"	(N) 46° 46' 37.701"
	(W) 105° 18' 47.200"	(W) 105° 18' 47.200"
MEAN MAX TEMPERATURE (MONTH)	87.4° (JUL.)	
AIRPORT NAVAIDS (FAA-OWNED)	-	-
AIRPORT NAVAIDS (SPONSOR-OWNED)	Airport Beacon, Lighted Windcone	Airport Beacon, Lighted Windcone
MISCELLANEOUS FACILITIES	-	-
MAGNETIC DECLINATION www.ngdc.noaa.gov/geomag-web/#declination	9° (E)	9° (E)
MAGNETIC DECLINATION DATE	2017	2017

MODIFICATION TO DESIGN STANDARDS				
APPROVAL DATE	AIRSPACE CASE #	LOCATION	STANDARD MODIFIED	DESCRIPTION
NONE REQUIRED				

COORDINATE SUMMARY TABLE			
Point	Elevation	Latitude (DD-MM-SS)	Longitude (DD-MM-SS)
ARP (E)	N/A	N 46 ° 46 ' 37.701 "	W 105 ° 18 ' 47.200 "
Rwy 8 End (E & U)	2281.2	N 46 ° 46 ' 38.000 "	W 105 ° 19 ' 18.100 "
Rwy 8 TDZE (E & U)	2282.3	N 46 ° 46 ' 37.582 "	W 105 ° 18 ' 34.976 "
Rwy 26 End (E & U)	2282.8	N 46 ° 46 ' 37.400 "	W 105 ° 18 ' 16.300 "
Rwy 26 TDZE (E & U)	2282.8	N 46 ° 46 ' 37.400 "	W 105 ° 18 ' 16.300 "
RWY = Runway TDZE = Touchdown Zone Elevation ARP = Airport Reference Point			

TAXIWAY DATA TABLE		
	EXISTING (E)	ULTIMATE (U)
HIGHEST TAXIWAY DESIGN GROUP (TDG)	2	2
TAXIWAY WIDTH	35'	35'
TAXIWAY SAFETY AREA WIDTH	79'	79'
TAXIWAY OBJECT FREE AREA WIDTH	131'	131'
TAXILANE WIDTH	35'	35'
TAXILANE OBJECT FREE AREA WIDTH	115'	115'
TAXIWAY LIGHTING	REFLECTORS	REFLECTORS
TAXILANE LIGHTING	REFLECTORS	REFLECTORS

NOTES:
1. DATA USED WITHIN THIS AIRPORT LAYOUT PLAN SET IS BASED ON:
   1. USGS NATIONAL ELEVATION DATASET AT 1 ARC SECOND.
   2. NOAA NATIONAL FLIGHT DATA CENTER DIGITAL OBSTACLE FILE FROM 07/16/2017.
   3. QUADRANGLE MAPS FROM USGS.
      (DATA IS ONLY AS ACCURATE AS THE SOURCES LISTED. ANY TOWERS, STRUCTURES, OR OBJECTS CONSTRUCTED AFTER THESE DATES ARE NOT REPRESENTED IN THIS AIRPORT LAYOUT PLAN SET.)
2. HORIZONTAL DATUM = (GRID) STATE PLANE, NAD 83, MT – FIPS 2500, INTERNATIONAL FEET.
3. VERTICAL DATUM = NAVD 88, U.S. SURVEY FEET.
4. COORDINATE VALUES BASED ON:
   1. AIRPORT IQ 5010 (http://www.gcr1.com/5010web/airport.cfm?Site=8U6&AptSecNum=3)
   2. AIRNAV.COM (http://www.airnav.com/airport/8U6)
   3. CALCULATIONS USING CORPSCON VERSION 6.0.1.

KLJ

PRAIRIE COUNTY AIRPORT
PRAIRIE COUNTY AIRPORT AUTHORITY (OWNER)
TERRY, MONTANA

TO BE USED AS A COMPLETE DRAWING SET FOR PLANNING PURPOSES ONLY, NOT FOR CONSTRUCTION

AIRPORT DATA SHEET

Rev.	Date	Description

DRAFTED MTK
REVIEWED BJM
PROJECT NUMBER 2517107
LAST REVISED DATE

SHEET 2

MODIFICATIONS TO FAA AIRPORT DESIGN STANDARDS TABLE PASTED HERE FROM ALP SETUP SPREADSHEET.

A.L.P. APPROVALS

FEDERAL AVIATION ADMINISTRATION

SIGNATURE:_____

NAME:_____

TITLE:_____

DATE: _____

AIRSPACE APPROVAL

A.L.P. AIRSPACE APPROVAL DATE: _____

CASE NO:_____

AIRPORT SPONSOR

SIGNATURE:_____

NAME:_____

TITLE:_____

DATE:_____

NOTES:
1. SEE SHEET 2 FOR AIRPORT & RUNWAY DATA TABLES.
2. SEE INNER APPROACH SHEETS FOR OBSTACLE DATA.

LEGEND

EXISTING (E)	ITEM	ULTIMATE (U)
	AIRSPACE EASEMENT	
BRL	BUILDING RESTRICTION LINE (BRL)	BRL
OFA	RUNWAY OBJECT FREE AREA (OFA)	OFA
RSA	RUNWAY SAFETY AREA (RSA)	RSA
TOFA	TAXIWAY OBJECT FREE AREA (TOFA)	TOFA
N/A	BUILDING/BUILDING LOT	NONE
ASPHALT CONCRETE	AIRSIDE PAVED SURFACE	
	LANDSIDE ROAD/PARKING	
	UNPAVED SURFACE (GRAVEL)	NONE
	BARBED WIRE FENCE	NONE
NONE	WILDLIFE FENCE	
E(O)	OVERHEAD ELECTRICAL CABLE	NONE
	POWER POLE/LIGHT POLE	NONE
	AIRPLANE TIEDOWN	
	RUNWAY LIGHT	NONE
	TAXIWAY REFLECTOR	NONE
	AIRPORT GUIDANCE SIGN	NONE
N/A	BUILDING/PAVEMENT TO BE REMOVED	

INTERSTATE I-90 WESTBOUND
INTERSTATE I-90 EASTBOUND
10 MILE ROAD
BROADVIEW BENCH ROAD
BEACON
AIRPORT PROPERTY
AIRPORT ACCESS ROAD
GA APARON
AIRCRAFT TIEDOWN AREA
LIGHTED WINDCONE & SEGMENTED CIRCLE
ARP (E & U)
90.80° (TRUE AZIMUTH)
4,300x75' PAVED RWY 8-26
PAPI
25' BRL
10' WILDLIFE FENCE (U)
AIRPORT PROPERTY (U)
THRESHOLD SURFACE (E) 250'x700'x2,250'& 700'x700'x2,750@20:1
APPROACH SURFACE (E) 250'x1,250'x5,000'@20:1
RPZ (E) 250'x450'x1,000'
GQS SURFACE (U) 275'X1,520'X10,000'@30:1
APPROACH SURFACE (U) 500'x2,000'x5,000'@20:1
THRESHOLD SURFACE (U) 400'x1,000'x1,500x8,500'@20:1
DEPARTURE SURFACE (U) 1,000'x6,466'x10,200'@40:1
PRIVATE ROAD TO BE RELOCATED (U)
RELOCATED PRIVATE ROAD (U)
8 END (E & U) (LOW POINT) EL 2281.2'
8 TDZE (E & U) EL 2282.3'
26 END (E & U) 26 TDZE (E & U) APT ELEV (E & U) (HIGH POINT) EL 2282.8'
IRRIGATION PIVOT
T12N R5E 21 22 28 27
T12N R5E 20 21 29 28
TRUE NORTH
MAGNETIC DECLINATION 9°E (2017)
300 0 300 600
scale feet

FAA APPROVAL STAMP

PRAIRIE COUNTY AIRPORT

PRAIRIE COUNTY AIRPORT AUTHORITY (OWNER)

TERRY, MONTANA

AIRPORT LAYOUT PLAN

Rev.	Date	Description

DRAFTED MTK
REVIEWED BJM
PROJECT NUMBER 2517107
LAST REVISED DATE

SHEET 3

THIS DRAWING IS INTENDED TO BE USED AS A COMPLETE DRAWING SET FOR PLANNING PURPOSES ONLY, NOT FOR CONSTRUCTION

March 26, 2018 – 12:05 PM – P:\Airport\MT\Terry\Projects\2517107–Master Plan\CADD\ALP\2517107_Plan.dwg (Plan)

LEGEND

EXISTING (E)	ITEM	ULTIMATE (U)
—/—	AIRSPACE EASEMENT	—///—
—BRL—	BUILDING RESTRICTION LINE (BRL)	—BRL—
—OFA—	RUNWAY OBJECT FREE AREA (OFA)	—OFA—
—RSA—	RUNWAY SAFETY AREA (RSA)	—RSA—
—TOFA—	TAXIWAY OBJECT FREE AREA (TOFA)	—TOFA—
N/A	BUILDING/BUILDING LOT	NONE
ASPHALT / CONCRETE	AIRSIDE PAVED SURFACE	
	LANDSIDE ROAD/PARKING	
	UNPAVED SURFACE (GRAVEL)	NONE
—x—	BARBED WIRE FENCE	NONE
NONE	WILDLIFE FENCE	—□□—
	POWER POLE/LIGHT POLE	NONE
	AIRPLANE TIEDOWN	
	RUNWAY LIGHT	NONE
△	TAXIWAY REFLECTOR	NONE
	AIRPORT GUIDANCE SIGN	NONE
N/A	BUILDING/PAVEMENT TO BE REMOVED	

NOTES:
1. SEE SHEET 2 FOR AIRPORT & RUNWAY DATA TABLES.
2. SEE INNER APPROACH SHEETS FOR OBSTACLE DATA.

TAXIWAY DATA TABLE		
	EXISTING (E)	ULTIMATE (U)
HIGHEST TAXIWAY DESIGN GROUP (TDG)	2	2
TAXIWAY WIDTH	40'	40'
TAXIWAY SAFETY AREA WIDTH	79'	79'
TAXIWAY OBJECT FREE AREA WIDTH	131'	131'
TAXILANE WIDTH	40'	40'
TAXILANE OBJECT FREE AREA WIDTH	115'	115'
TAXIWAY LIGHTING	REFLECTORS	REFLECTORS
TAXILANE LIGHTING	REFLECTORS	REFLECTORS

BUILDING IDENTIFICATION TABLE (E)			
ID	DESCRIPTION	OBSTRUCTION LIGHTING	DISPOSITION
1	HANGAR	-	TO REMAIN
2	HANGAR	-	TO REMAIN
3	EQUIPMENT BUILDING	-	TO REMAIN
4	HANGAR	-	TO REMAIN
5	HANGAR	-	TO REMAIN

TRUE NORTH
MAGNETIC DECLINATION 9°E (2017)

50 0 50 100
scale feet

PRAIRIE COUNTY AIRPORT

PRAIRIE COUNTY AIRPORT AUTHORITY (OWNER)

TERRY, MONTANA

TO BE USED AS A COMPLETE DRAWING SET FOR PLANNING PURPOSES ONLY, NOT FOR CONSTRUCTION

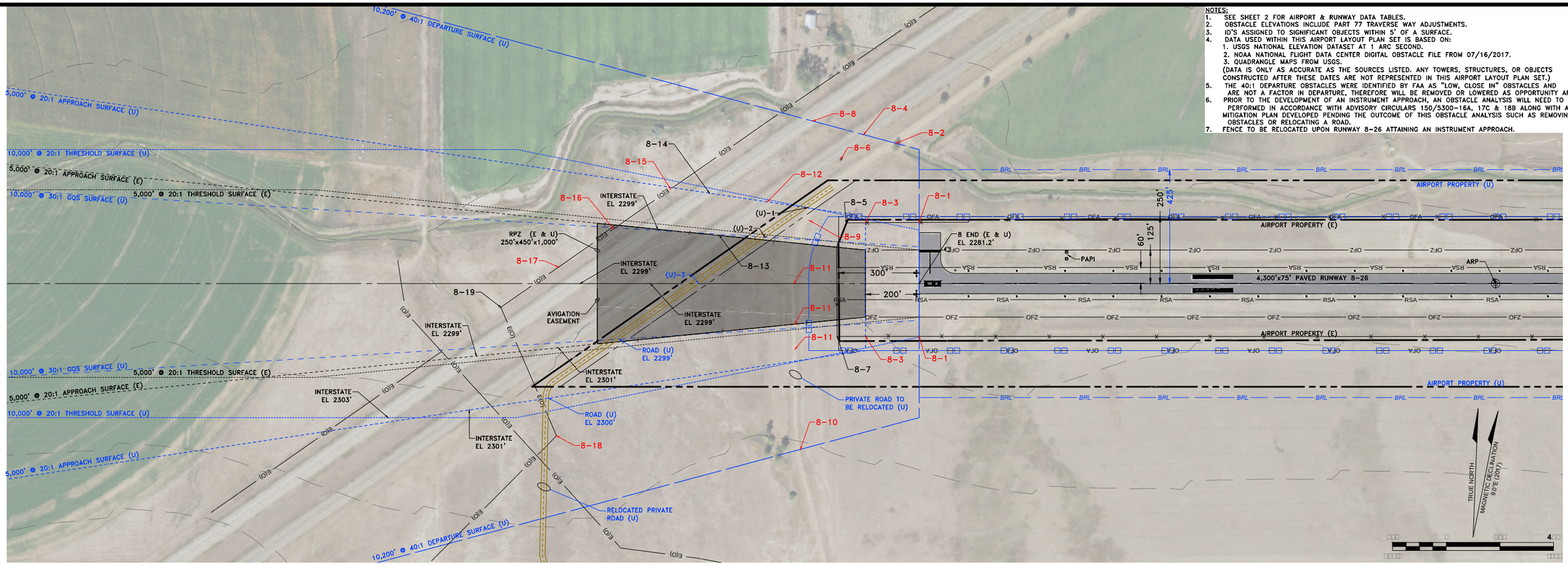
TERMINAL AREA DRAWING

Rev.	Date	Description

DRAFTED MTK
REVIEWED BJM
PROJECT NUMBER 2517107
LAST REVISED DATE

SHEET 4

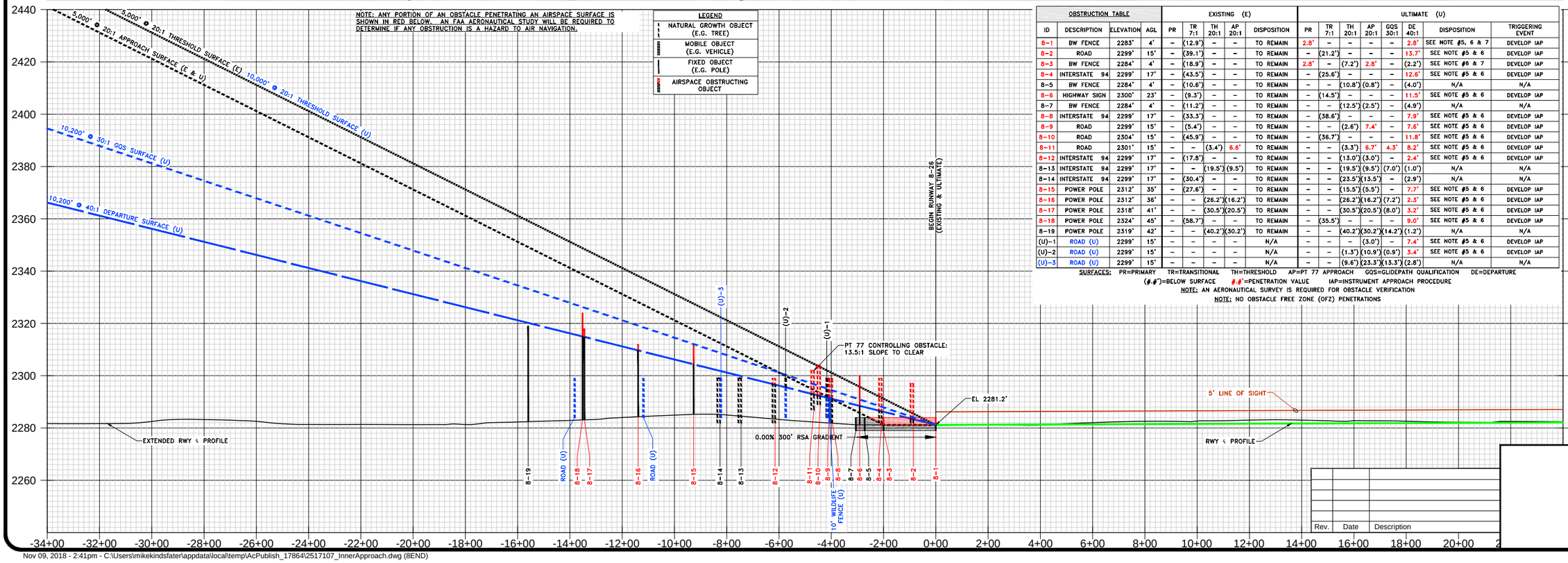
March 22, 2018 – 2:16 PM – P:\Airport\MT\Terry\Projects\2517107-Master Plan\CADD\ALP\2517107_Terminal.dwg ((E))



NOTES:
1. SEE SHEET 2 FOR AIRPORT & RUNWAY DATA TABLES.
2. OBSTACLE ELEVATIONS INCLUDE PART 77 TRAVERSE WAY ADJUSTMENTS.
3. ID'S ASSIGNED TO SIGNIFICANT OBJECTS WITHIN 5' OF A SURFACE.
4. DATA USED WITHIN THIS AIRPORT LAYOUT PLAN SET IS BASED ON:
   1. USGS NATIONAL ELEVATION DATASET AT 1 ARC SECOND.
   2. NOAA NATIONAL FLIGHT DATA CENTER DIGITAL OBSTACLE FILE FROM 07/16/2017.
   3. QUADRANGLE MAPS FROM USGS.
   (DATA IS ONLY AS ACCURATE AS THE SOURCES LISTED. ANY TOWERS, STRUCTURES, OR OBJECTS CONSTRUCTED AFTER THESE DATES ARE NOT REPRESENTED IN THIS AIRPORT LAYOUT PLAN SET.)
5. THE 40:1 DEPARTURE OBSTACLES WERE IDENTIFIED BY FAA AS "LOW, CLOSE IN" OBSTACLES AND ARE NOT A FACTOR IN DEPARTURE, THEREFORE WILL BE REMOVED OR LOWERED AS OPPORTUNITY ARISES.
6. PRIOR TO THE DEVELOPMENT OF AN INSTRUMENT APPROACH, AN OBSTACLE ANALYSIS WILL NEED TO BE PERFORMED IN ACCORDANCE WITH ADVISORY CIRCULARS 150/5300-16A, 17C & 18B ALONG WITH A MITIGATION PLAN DEVELOPED PENDING THE OUTCOME OF THIS OBSTACLE ANALYSIS SUCH AS REMOVING OBSTACLES OR RELOCATING A ROAD.
7. FENCE TO BE RELOCATED UPON RUNWAY 8-26 ATTAINING AN INSTRUMENT APPROACH.

NOTE: ANY PORTION OF AN OBSTACLE PENETRATING AN AIRSPACE SURFACE IS SHOWN IN RED BELOW. AN FAA AERONAUTICAL STUDY WILL BE REQUIRED TO DETERMINE IF ANY OBSTRUCTION IS A HAZARD TO AIR NAVIGATION.

LEGEND	
	NATURAL GROWTH OBJECT (E.G. TREE)
	MOBILE OBJECT (E.G. VEHICLE)
	FIXED OBJECT (E.G. POLE)
	AIRSPACE OBSTRUCTING OBJECT



OBSTRUCTION TABLE				EXISTING (E)					ULTIMATE (U)							
ID	DESCRIPTION	ELEVATION	AGL	PR	TR 7:1	TH 20:1	AP 20:1	DISPOSITION	PR	TR 7:1	TH 20:1	AP 20:1	GQS 30:1	DE 40:1	DISPOSITION	TRIGGERING EVENT
8-1	BW FENCE	2283'	4'	–	(12.9')	–	–	TO REMAIN	2.8'	–	–	–	–	2.8'	SEE NOTE #5, 6 & 7	DEVELOP IAP
8-2	ROAD	2299'	15'	–	(39.1')	–	–	TO REMAIN	–	(21.2')	–	–	–	13.7'	SEE NOTE #5 & 6	DEVELOP IAP
8-3	BW FENCE	2284'	4'	–	(18.9')	–	–	TO REMAIN	2.8'	–	(7.2')	2.8'	–	(2.2')	SEE NOTE #6 & 7	DEVELOP IAP
8-4	INTERSTATE 94	2299'	17'	–	(43.5')	–	–	TO REMAIN	–	(25.6')	–	–	–	12.6'	SEE NOTE #5 & 6	DEVELOP IAP
8-5	BW FENCE	2284'	4'	–	(10.6')	–	–	TO REMAIN	–	–	(10.8')	(0.8')	–	(4.0')	N/A	N/A
8-6	HIGHWAY SIGN	2300'	23'	–	(9.3')	–	–	TO REMAIN	–	(14.5')	–	–	–	11.5'	SEE NOTE #5 & 6	DEVELOP IAP
8-7	BW FENCE	2284'	4'	–	(11.2')	–	–	TO REMAIN	–	–	(12.5')	(2.5')	–	(4.9')	N/A	N/A
8-8	INTERSTATE 94	2299'	17'	–	(33.3')	–	–	TO REMAIN	–	(38.6')	–	–	–	7.9'	SEE NOTE #5 & 6	DEVELOP IAP
8-9	ROAD	2299'	15'	–	(5.4')	–	–	TO REMAIN	–	–	(2.6')	7.4'	–	7.6'	SEE NOTE #5 & 6	DEVELOP IAP
8-10	ROAD	2304'	15'	–	(45.9')	–	–	TO REMAIN	–	(36.7')	–	–	–	11.8'	SEE NOTE #5 & 6	DEVELOP IAP
8-11	ROAD	2301'	15'	–	–	(3.4')	6.6'	TO REMAIN	–	–	(3.3')	6.7'	4.3'	8.2'	SEE NOTE #5 & 6	DEVELOP IAP
8-12	INTERSTATE 94	2299'	17'	–	(17.8')	–	–	TO REMAIN	–	–	(13.0')	(3.0')	–	2.4'	SEE NOTE #5 & 6	DEVELOP IAP
8-13	INTERSTATE 94	2299'	17'	–	–	(19.5')	(9.5')	TO REMAIN	–	–	(19.5')	(9.5')	(7.0')	(1.0')	N/A	N/A
8-14	INTERSTATE 94	2299'	17'	–	(30.4')	–	–	TO REMAIN	–	–	(23.5')	(13.5')	–	(2.9')	N/A	N/A
8-15	POWER POLE	2312'	35'	–	(27.6')	–	–	TO REMAIN	–	–	(15.5')	(5.5')	–	7.7'	SEE NOTE #5 & 6	DEVELOP IAP
8-16	POWER POLE	2312'	36'	–	–	(26.2')	(16.2')	TO REMAIN	–	–	(26.2')	(16.2')	(7.2')	2.3'	SEE NOTE #5 & 6	DEVELOP IAP
8-17	POWER POLE	2318'	41'	–	–	(30.5')	(20.5')	TO REMAIN	–	–	(30.5')	(20.5')	(8.0')	3.2'	SEE NOTE #5 & 6	DEVELOP IAP
8-18	POWER POLE	2324'	45'	–	(58.7')	–	–	TO REMAIN	–	(35.5')	–	–	–	9.0'	SEE NOTE #5 & 6	DEVELOP IAP
8-19	POWER POLE	2319'	42'	–	–	(40.2')	(30.2')	TO REMAIN	–	–	(40.2')	(30.2')	(14.2')	(1.2')	N/A	N/A
(U)-1	ROAD (U)	2299'	15'	–	–	–	–	N/A	–	–	–	(3.0')	–	7.4'	SEE NOTE #5 & 6	DEVELOP IAP
(U)-2	ROAD (U)	2299'	15'	–	–	–	–	N/A	–	–	(1.3')	(10.9')	(0.9')	3.4'	SEE NOTE #5 & 6	DEVELOP IAP
(U)-3	ROAD (U)	2299'	15'	–	–	–	–	N/A	–	–	(9.6')	(23.3')	(13.3')	(2.8')	N/A	N/A

SURFACES: PR=PRIMARY TR=TRANSITIONAL TH=THRESHOLD AP=PT 77 APPROACH GQS=GLIDEPATH QUALIFICATION DE=DEPARTURE
(#.#')=BELOW SURFACE #.#'=PENETRATION VALUE IAP=INSTRUMENT APPROACH PROCEDURE
NOTE: AN AERONAUTICAL SURVEY IS REQUIRED FOR OBSTACLE VERIFICATION
NOTE: NO OBSTACLE FREE ZONE (OFZ) PENETRATIONS

PRAIRIE COUNTY AIRPORT

PRAIRIE COUNTY AIRPORT AUTHORITY (OWNER)

TERRY, MONTANA

TO BE USED AS A COMPLETE DRAWING SET FOR PLANNING PURPOSES ONLY, NOT FOR CONSTRUCTION

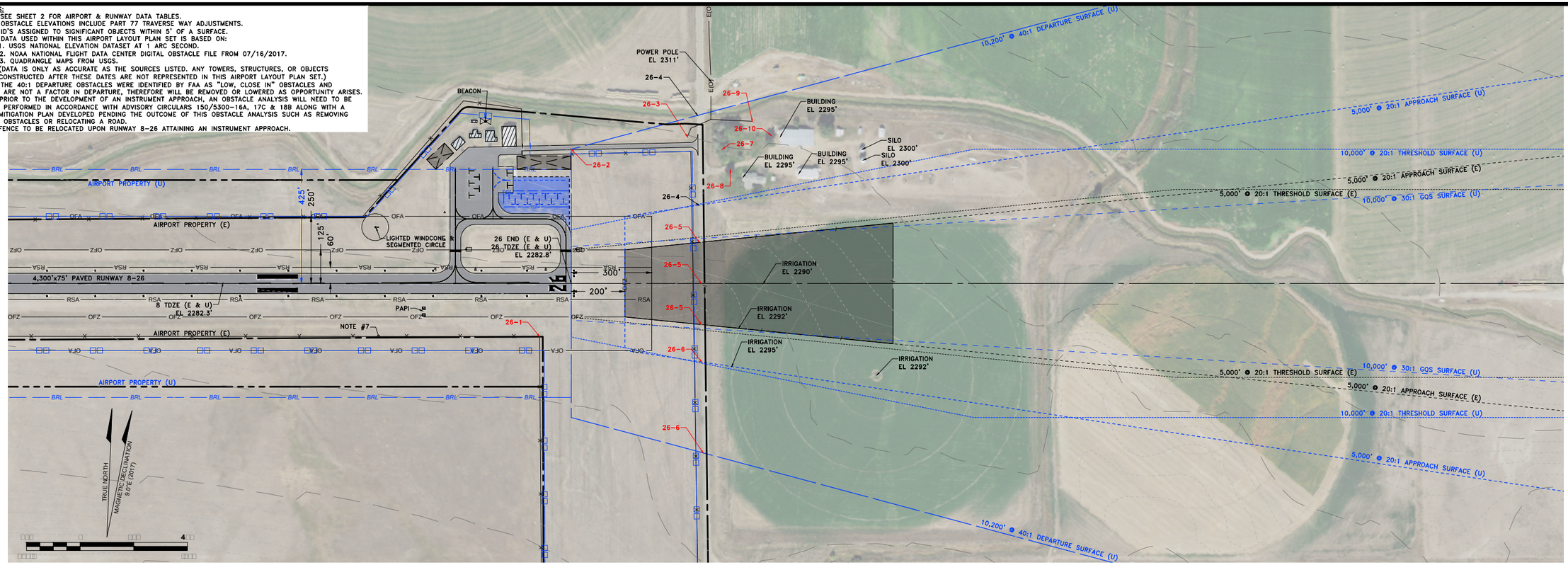
INNER PORTION OF THE APPROACH SURFACE RUNWAY 8 END

Rev.	Date	Description

DRAFTED: MTK
REVIEWED: BJM
PROJECT NUMBER: 2517107
LAST REVISED DATE:
SHEET:

Nov 09, 2018 - 2:41pm - C:\Users\mikekindsfater\appdata\local\temp\AcPublish_17864\2517107_InnerApproach.dwg (8END)

NOTES:
1. SEE SHEET 2 FOR AIRPORT & RUNWAY DATA TABLES.
2. OBSTACLE ELEVATIONS INCLUDE PART 77 TRAVERSE WAY ADJUSTMENTS.
3. ID'S ASSIGNED TO SIGNIFICANT OBJECTS WITHIN 5' OF A SURFACE.
4. DATA USED WITHIN THIS AIRPORT LAYOUT PLAN SET IS BASED ON:
   1. USGS NATIONAL ELEVATION DATASET AT 1 ARC SECOND.
   2. NOAA NATIONAL FLIGHT DATA CENTER DIGITAL OBSTACLE FILE FROM 07/16/2017.
   3. QUADRANGLE MAPS FROM USGS.
   (DATA IS ONLY AS ACCURATE AS THE SOURCES LISTED. ANY TOWERS, STRUCTURES, OR OBJECTS CONSTRUCTED AFTER THESE DATES ARE NOT REPRESENTED IN THIS AIRPORT LAYOUT PLAN SET.)
5. THE 40:1 DEPARTURE OBSTACLES WERE IDENTIFIED BY FAA AS "LOW, CLOSE IN" OBSTACLES AND ARE NOT A FACTOR IN DEPARTURE, THEREFORE WILL BE REMOVED OR LOWERED AS OPPORTUNITY ARISES.
6. PRIOR TO THE DEVELOPMENT OF AN INSTRUMENT APPROACH, AN OBSTACLE ANALYSIS WILL NEED TO BE PERFORMED IN ACCORDANCE WITH ADVISORY CIRCULARS 150/5300-16A, 17C & 18B ALONG WITH A MITIGATION PLAN DEVELOPED PENDING THE OUTCOME OF THIS OBSTACLE ANALYSIS SUCH AS REMOVING OBSTACLES OR RELOCATING A ROAD.
7. FENCE TO BE RELOCATED UPON RUNWAY 8-26 ATTAINING AN INSTRUMENT APPROACH.

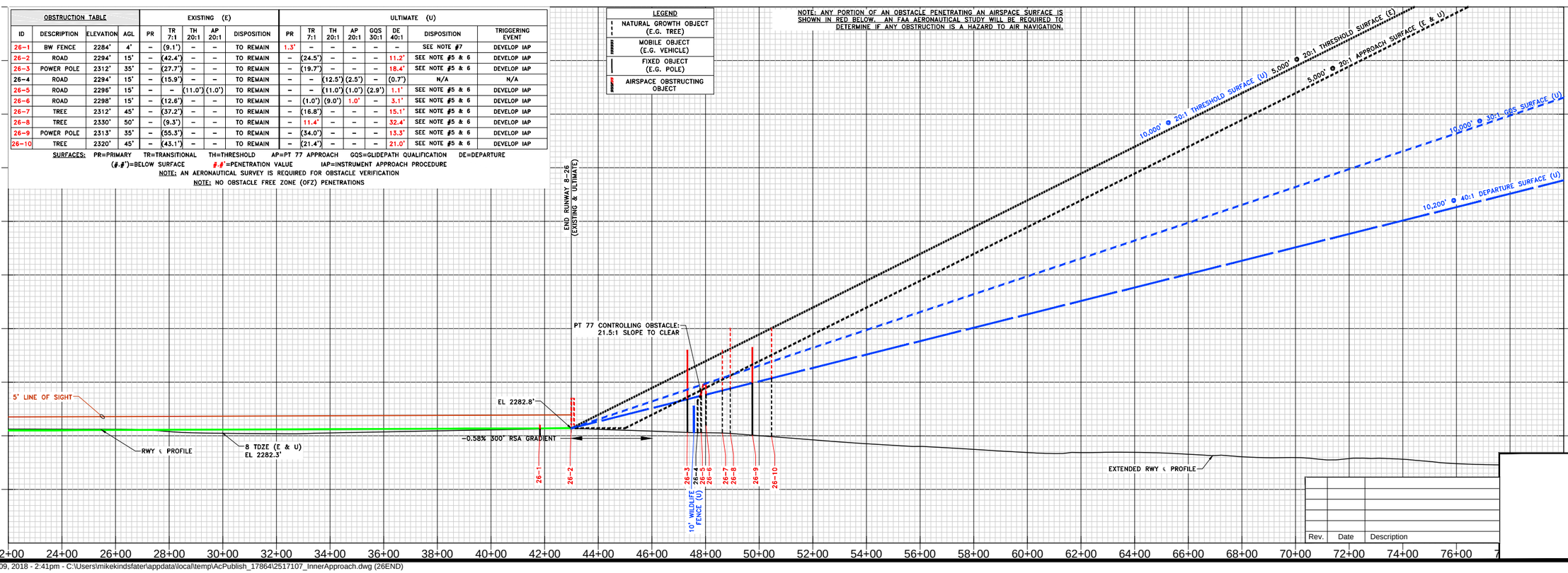


OBSTRUCTION TABLE				EXISTING (E)					ULTIMATE (U)							
ID	DESCRIPTION	ELEVATION	AGL	PR	TR 7:1	TH 20:1	AP 20:1	DISPOSITION	PR	TR 7:1	TH 20:1	AP 20:1	GQS 30:1	DE 40:1	DISPOSITION	TRIGGERING EVENT
26-1	BW FENCE	2284'	4'	–	(9.1')	–	–	TO REMAIN	1.3'	–	–	–	–	–	SEE NOTE #7	DEVELOP IAP
26-2	ROAD	2294'	15'	–	(42.4')	–	–	TO REMAIN	–	(24.5')	–	–	–	11.2'	SEE NOTE #5 & 6	DEVELOP IAP
26-3	POWER POLE	2312'	35'	–	(27.7')	–	–	TO REMAIN	–	(19.7')	–	–	–	18.4'	SEE NOTE #5 & 6	DEVELOP IAP
26-4	ROAD	2294'	15'	–	(15.9')	–	–	TO REMAIN	–	–	(12.5')	(2.5')	–	(0.7')	N/A	N/A
26-5	ROAD	2296'	15'	–	–	(11.0')	(1.0')	TO REMAIN	–	–	(11.0')	(1.0')	(2.9')	1.1'	SEE NOTE #5 & 6	DEVELOP IAP
26-6	ROAD	2298'	15'	–	(12.6')	–	–	TO REMAIN	–	(1.0')	(9.0')	1.0'	–	3.1'	SEE NOTE #5 & 6	DEVELOP IAP
26-7	TREE	2312'	45'	–	(37.2')	–	–	TO REMAIN	–	(16.8')	–	–	–	15.1'	SEE NOTE #5 & 6	DEVELOP IAP
26-8	TREE	2330'	50'	–	(9.3')	–	–	TO REMAIN	–	11.4'	–	–	–	32.4'	SEE NOTE #5 & 6	DEVELOP IAP
26-9	POWER POLE	2313'	35'	–	(55.3')	–	–	TO REMAIN	–	(34.0')	–	–	–	13.3'	SEE NOTE #5 & 6	DEVELOP IAP
26-10	TREE	2320'	45'	–	(43.1')	–	–	TO REMAIN	–	(21.4')	–	–	–	21.0'	SEE NOTE #5 & 6	DEVELOP IAP

SURFACES: PR=PRIMARY TR=TRANSITIONAL TH=THRESHOLD AP=PT 77 APPROACH GQS=GLIDEPATH QUALIFICATION DE=DEPARTURE
(#.#')=BELOW SURFACE #.#'=PENETRATION VALUE IAP=INSTRUMENT APPROACH PROCEDURE
NOTE: AN AERONAUTICAL SURVEY IS REQUIRED FOR OBSTACLE VERIFICATION
NOTE: NO OBSTACLE FREE ZONE (OFZ) PENETRATIONS

LEGEND
- NATURAL GROWTH OBJECT (E.G. TREE)
- MOBILE OBJECT (E.G. VEHICLE)
- FIXED OBJECT (E.G. POLE)
- AIRSPACE OBSTRUCTING OBJECT

NOTE: ANY PORTION OF AN OBSTACLE PENETRATING AN AIRSPACE SURFACE IS SHOWN IN RED BELOW. AN FAA AERONAUTICAL STUDY WILL BE REQUIRED TO DETERMINE IF ANY OBSTRUCTION IS A HAZARD TO AIR NAVIGATION.



Rev.	Date	Description

PRAIRIE COUNTY AIRPORT

PRAIRIE COUNTY AIRPORT AUTHORITY (OWNER)

TERRY, MONTANA

TO BE USED AS A COMPLETE DRAWING SET FOR PLANNING PURPOSES ONLY, NOT FOR CONSTRUCTION

INNER PORTION OF THE APPROACH SURFACE RUNWAY 26 END

DRAFTED: MTK
REVIEWED: BJM
PROJECT NUMBER: 2517107
LAST REVISED DATE:
SHEET:

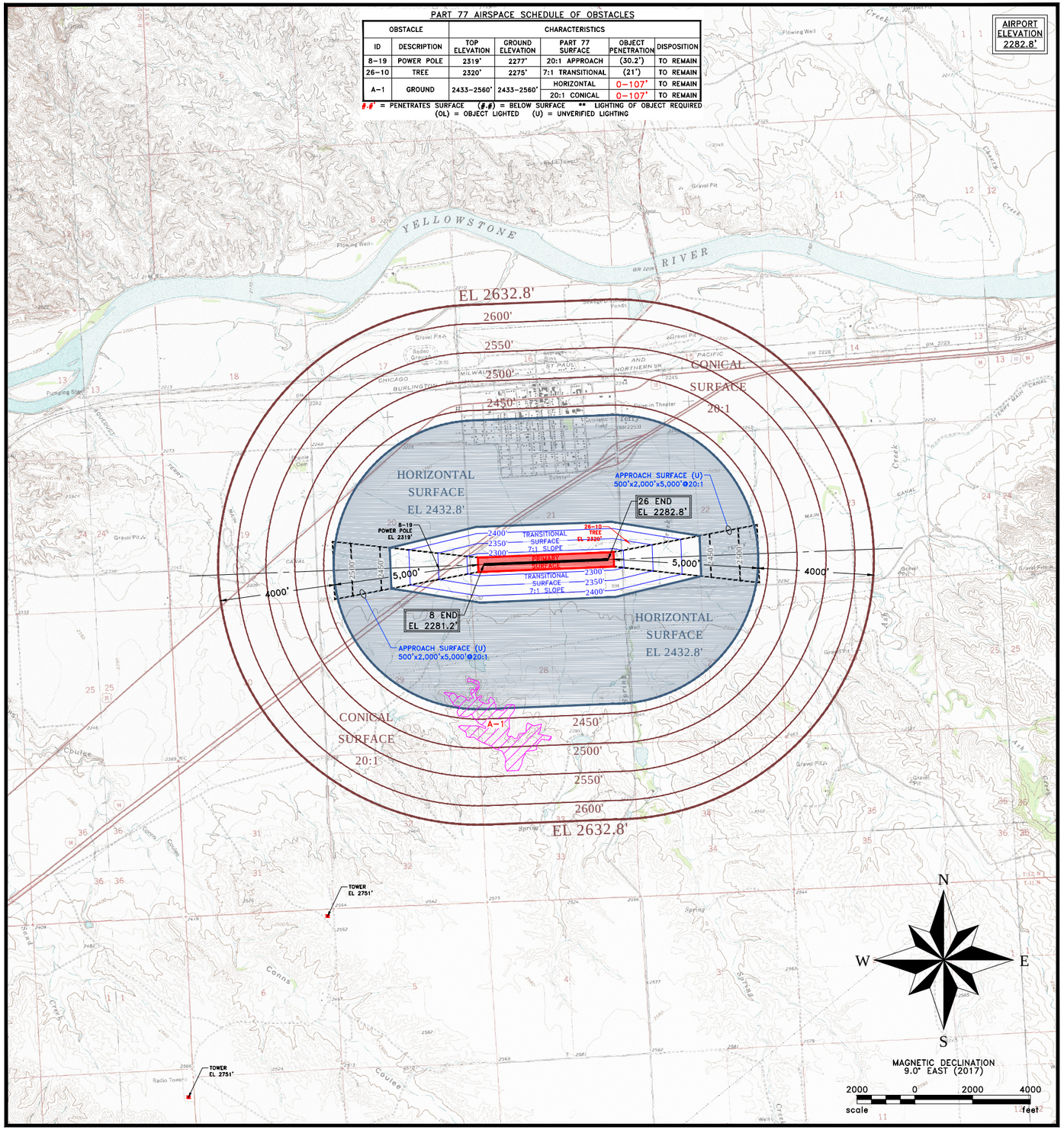
Nov 09, 2018 - 2:41pm - C:\Users\mikekindsfater\appdata\local\temp\AcPublish_17864\2517107_InnerApproach.dwg (26END)

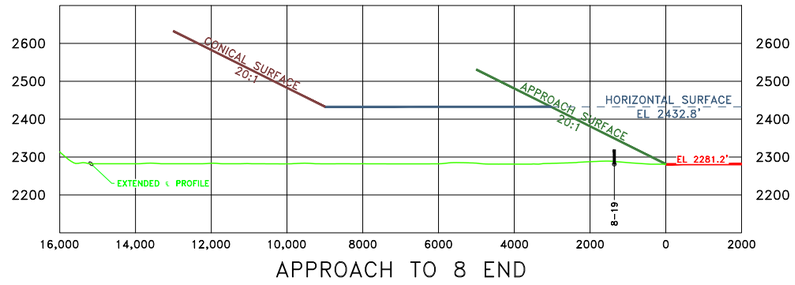
PART 77 AIRSPACE SCHEDULE OF OBSTACLES

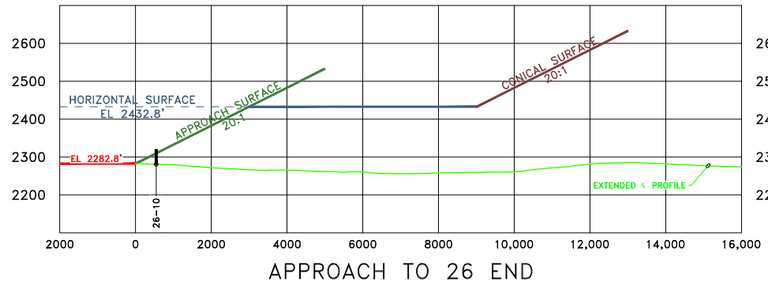
OBSTACLE		CHARACTERISTICS				
ID	DESCRIPTION	TOP ELEVATION	GROUND ELEVATION	PART 77 SURFACE	OBJECT PENETRATION	DISPOSITION
8–19	POWER POLE	2319'	2277'	20:1 APPROACH	(30.2')	TO REMAIN
26–10	TREE	2320'	2275'	7:1 TRANSITIONAL	(21')	TO REMAIN
A–1	GROUND	2433–2560'	2433–2560'	HORIZONTAL	0–107'	TO REMAIN
				20:1 CONICAL	0–107'	TO REMAIN

#.# = PENETRATES SURFACE (#.#) = BELOW SURFACE ** LIGHTING OF OBJECT REQUIRED
(OL) = OBJECT LIGHTED (U) = UNVERIFIED LIGHTING

AIRPORT ELEVATION 2282.8'

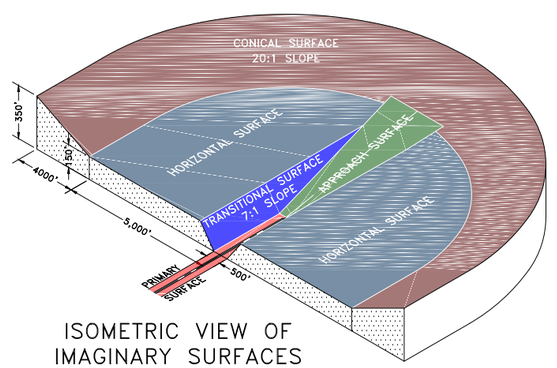






NOTES:
1. SEE ALP SHEET 2 FOR AIRPORT & RUNWAY DATA TABLES.
2. SEE INNER PORTION OF THE APPROACH SURFACE SHEETS FOR CLOSE–IN RUNWAY AIRSPACE OBSTACLES.
3. AIRSPACE APPLIED TO THIS DRAWING IS BASED ON PART 77 OF THE F.A.R.'s.
4. OBSTACLE ELEVATIONS INCLUDE PART 77 TRAVERSE WAY ADJUSTMENTS.
5. ID'S ASSIGNED TO SIGNIFICANT OBJECTS WITHIN 5' OF A SURFACE.
6. DATA USED WITHIN THIS AIRPORT LAYOUT PLAN SET IS BASED ON:
   1. USGS NATIONAL ELEVATION DATASET AT 1 ARC SECOND.
   2. NOAA NATIONAL FLIGHT DATA CENTER DIGITAL OBSTACLE FILE FROM 07/16/2017.
   3. QUADRANGLE MAPS FROM USGS.
   (DATA IS ONLY AS ACCURATE AS THE SOURCES LISTED. ANY TOWERS, STRUCTURES, OR OBJECTS CONSTRUCTED AFTER THESE DATES ARE NOT REPRESENTED IN THIS AIRPORT LAYOUT PLAN SET.)
7. HORIZONTAL DATUM = (GRID) STATE PLANE, NAD 83, MT – FIPS 2500, INTERNATIONAL FEET.
8. VERTICAL DATUM = NAVD 88, U.S. SURVEY FEET.
9. COORDINATE VALUES BASED ON:
   1. AIRPORT IQ 5010 (http://www.gcr1.com/5010web/airport.cfm?Site=8U6&AptSecNum=3)
   2. AIRNAV.COM (http://www.airnav.com/airport/8U6)
   3. CALCULATIONS USING CORPSCON VERSION 6.0.1.
10. PRIOR TO THE DEVELOPMENT OF AN INSTRUMENT APPROACH, AN OBSTACLE ANALYSIS WILL NEED TO BE PERFORMED IN ACCORDANCE WITH ADVISORY CIRCULARS 150/5300–16A, 17C & 18B ALONG WITH A MITIGATION PLAN DEVELOPED PENDING THE OUTCOME OF THIS OBSTACLE ANALYSIS SUCH AS REMOVING OBSTACLES OR RELOCATING A ROAD.

GROUND PENETRATION AREA



ISOMETRIC VIEW OF IMAGINARY SURFACES

PRAIRIE COUNTY AIRPORT

PRAIRIE COUNTY AIRPORT AUTHORITY (OWNER)

TERRY, MONTANA

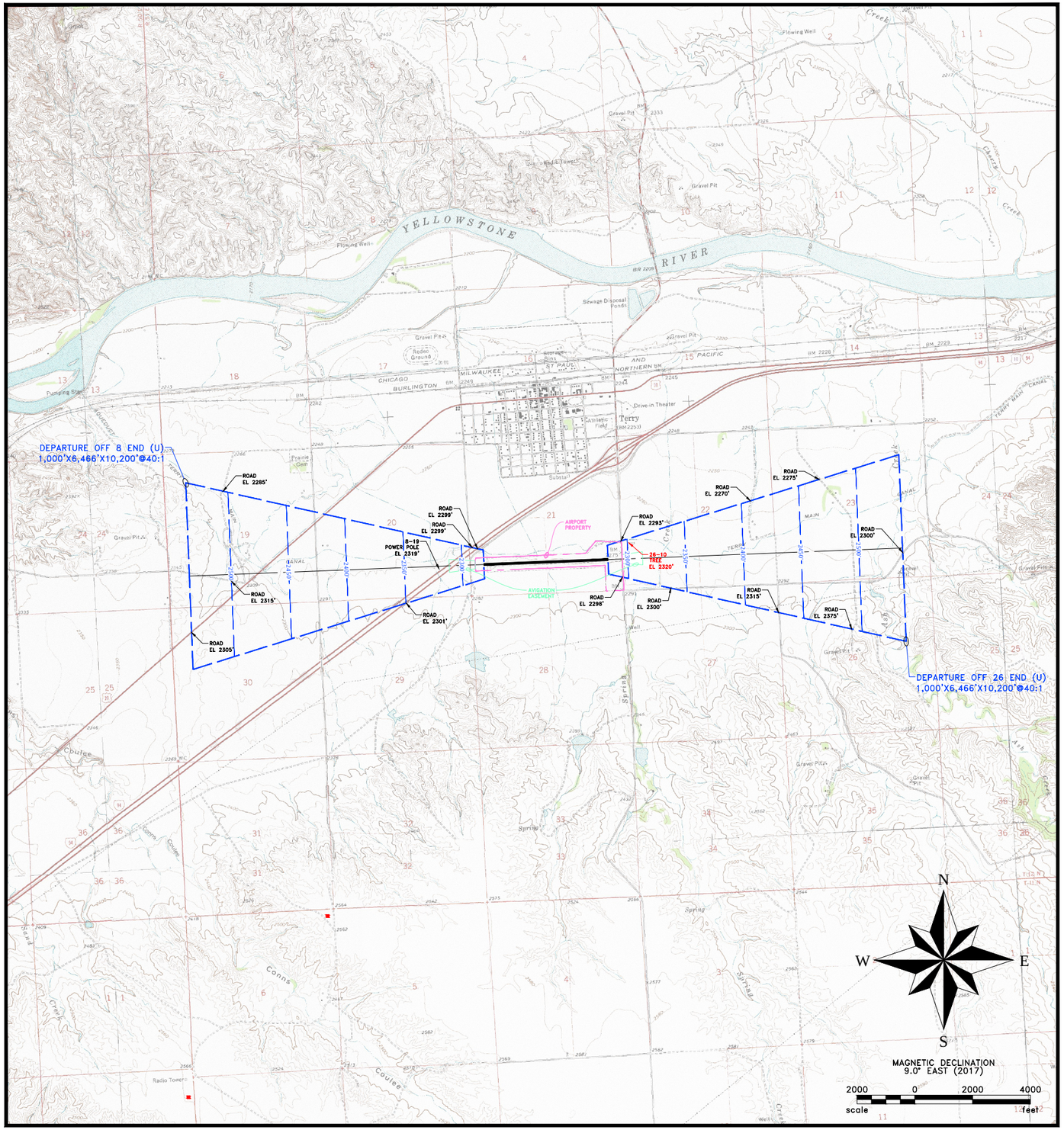
A COMPLETE DRAWING SET FOR PLANNING PURPOSES ONLY, NOT FOR CONSTRUCTION TO BE USED AS A

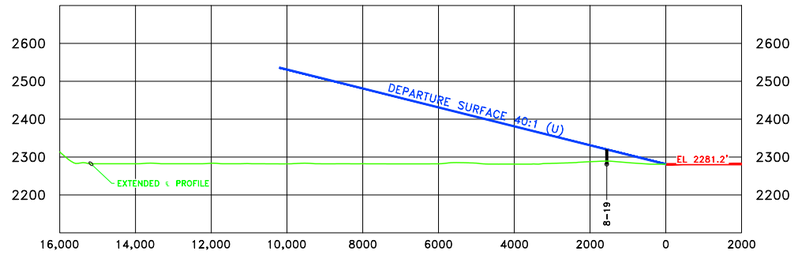
AIRPORT AIRSPACE DRAWING (ULTIMATE)

Rev.	Date	Description

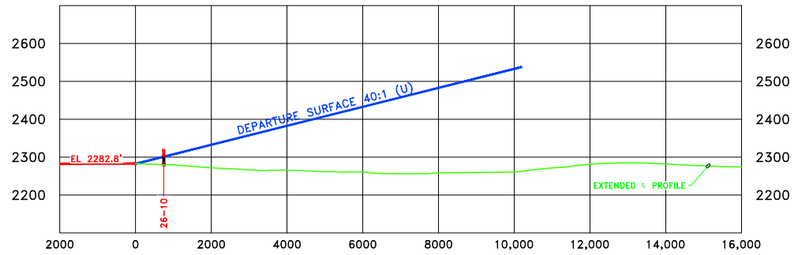
DRAFTED MTK
REVIEWED BJM
PROJECT NUMBER 2517107
LAST REVISED DATE
SHEET

November 12, 2018 – 10:13 AM – P:\Airport\MT\Terry\Projects\2517107–Master Plan\CADD\ALP\2517107_Zone.dwg (PT–77)





DEPARTURE OFF 8 END



DEPARTURE OFF 26 END

NOTES:
1. SEE ALP SHEET 2 FOR AIRPORT & RUNWAY DATA TABLES.
2. SEE INNER PORTION OF THE APPROACH SURFACE SHEETS FOR CLOSE-IN RUNWAY AIRSPACE OBSTACLES.
3. OBSTACLE ELEVATIONS INCLUDE PART 77 TRAVERSE WAY ADJUSTMENTS.
4. ID'S ASSIGNED TO SIGNIFICANT OBJECTS WITHIN 5' OF A SURFACE.
5. DATA USED WITHIN THIS AIRPORT LAYOUT PLAN SET IS BASED ON:
   1. USGS NATIONAL ELEVATION DATASET AT 1 ARC SECOND.
   2. NOAA NATIONAL FLIGHT DATA CENTER DIGITAL OBSTACLE FILE FROM 07/16/2017.
   3. QUADRANGLE MAPS FROM USGS.
      (DATA IS ONLY AS ACCURATE AS THE SOURCES LISTED. ANY TOWERS, STRUCTURES, OR OBJECTS CONSTRUCTED AFTER THESE DATES ARE NOT REPRESENTED IN THIS AIRPORT LAYOUT PLAN SET.)
6. HORIZONTAL DATUM = (GRID) STATE PLANE, NAD 83, MT - FIPS 2500, INTERNATIONAL FEET.
7. VERTICAL DATUM = NAVD 88, U.S. SURVEY FEET.
8. COORDINATE VALUES BASED ON:
   1. AIRPORT IQ 5010 (http://www.gcr1.com/5010web/airport.cfm?Site=8U6&AptSecNum=3)
   2. AIRNAV.COM (http://www.airnav.com/airport/8U6)
   3. CALCULATIONS USING CORPSCON VERSION 6.0.1.
9. THE 40:1 DEPARTURE OBSTACLES WERE IDENTIFIED BY FAA AS "LOW, CLOSE IN" OBSTACLES AND ARE NOT A FACTOR IN DEPARTURE, THEREFORE WILL BE REMOVED OR LOWERED AS OPPORTUNITY ARISES.
10. PRIOR TO THE DEVELOPMENT OF AN INSTRUMENT APPROACH, AN OBSTACLE ANALYSIS WILL NEED TO BE PERFORMED IN ACCORDANCE WITH ADVISORY CIRCULARS 150/5300-16A, 17C & 18B ALONG WITH A MITIGATION PLAN DEVELOPED PENDING THE OUTCOME OF THIS OBSTACLE ANALYSIS SUCH AS REMOVING OBSTACLES OR RELOCATING A ROAD.

DEPARTURE OFF 8 END OBSTACLES (U)

OBSTACLE		CHARACTERISTICS				
ID	DESCRIPTION	PEAK ELEVATION	HEIGHT AGL	OBJECT PENETRATION	FUTURE DISPOSITION	TRIGGERING EVENT
8-19	POWER POLE	2319'	45'	(1.2')	SEE NOTE #9	DEVELOP IAP

(#.#)=BELOW SURFACE #.#'=PENETRATION VALUE

DEPARTURE OFF 26 END OBSTACLES (U)

OBSTACLE		CHARACTERISTICS				
ID	DESCRIPTION	PEAK ELEVATION	HEIGHT AGL	OBJECT PENETRATION	FUTURE DISPOSITION	TRIGGERING EVENT
26-10	TREE	2320'	42'	21.0'	SEE NOTE #9	DEVELOP IAP

(#.#)=BELOW SURFACE #.#'=PENETRATION VALUE

KLJ

PRAIRIE COUNTY AIRPORT
PRAIRIE COUNTY AIRPORT AUTHORITY (OWNER)
TERRY, MONTANA

A COMPLETE DRAWING SET FOR PLANNING PURPOSES ONLY, NOT FOR CONSTRUCTION TO BE USED AS A COMP

RUNWAY DEPARTURE SURFACE

Rev.	Date	Description

DRAFTED MTK
REVIEWED BJM
PROJECT NUMBER 2517107
LAST REVISED DATE
SHEET

TABLE OF LAND PARCELS (EXISTING)

PARCEL	AREA (ACRES)	ACQUIRED FROM (GRANTOR)	TYPE OF ACQUISITION	ACQUIRED UNDER PROJECT NO.	YEAR ACQUIRED	RECORDED INFORMATION
A	47.54±	PRAIRIE COUNTY	FEE	N/A	11/03/1976	QUIT CLAIM DEED BK 27, PG 139
B	20.17±	HOAGLAND	FEE	N/A	–	COS No. 6 BK 26, PG 976
C	5.50±	HOAGLAND	FEE	N/A	–	COS No. 7 BK 27, PG 139
1	4.24±	HOAGLAND	AVIGATION EASEMENT	N/A	01/09/1976	CLEAR ZONE AVIGATION EASEMENT
2	3.16±	HOAGLAND	AVIGATION EASEMENT	N/A	01/09/1976	CLEAR ZONE AVIGATION EASEMENT
3	0.03±	HOAGLAND	AVIGATION EASEMENT	N/A	01/09/1976	CLEAR ZONE AVIGATION EASEMENT
4	6.10±	STRASHEIM	AVIGATION EASEMENT	N/A	01/09/1976	CLEAR ZONE AVIGATION EASEMENT

TABLE OF LAND PARCELS (ULTIMATE)

PARCEL	AREA (ACRES)	TYPE OF ACQUISITION	TRIGGERING EVENT
D	42.0±	FEE	RWY 8–26 ATTAINING NON–PRECISION APPROACH
5	2.0±	60' PRIVATE ROAD ROW EASEMENT	RWY 8–26 ATTAINING NON–PRECISION APPROACH

INTERSTATE I–90 WESTBOUND

INTERSTATE I–90 EASTBOUND

10 MILE ROAD

BROADVIEW BENCH ROAD

SECTION LINE

SECTION LINE

SECTION LINE

A PORTION OF PARCELS 1 & 2 TO BE INCLUDED IN THE PURCHASE OF PARCEL D

T12N R5E 20 21 29 28

T12N R5E 21 22 28 27

LEGEND

- EXISTING EASEMENT
- (1) PARCEL DESIGNATION
- EXISTING PROPERTY BOUNDARY
- ULTIMATE PROPERTY BOUNDARY

TRUE NORTH

MAGNETIC DECLINATION 9°E (2017)

300 0 300 600

scale feet

KLJ

PRAIRE COUNTY AIRPORT

PRAIRE COUNTY AIRPORT AUTHORITY (OWNER)

TERRY, MONTANA

THIS IS A COMPLETE DRAWING SET FOR PLANNING PURPOSES ONLY, NOT FOR CONSTRUCTION TO BE USED AS A COMPLETE DRAWING SET

PROPERTY MAP

Rev.	Date	Description

DRAFTED MTK

REVIEWED BJM

PROJECT NUMBER 2517107

LAST REVISED DATE

SHEET 9

March 26, 2018 – 11:39 AM – P:\Airport\MT\Terry\Projects\2517107–Master Plan\CADD\ALP\2517107_Pmap.dwg (PropMap)