

Airport Layout Plan

Missoula International Airport Master Plan Update

Prepared for
Missoula County Airport Authority

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Attachments

1 MSO Airport Layout Plan	
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ALP Narrative

6.1 Introduction

The Missoula International Airport (MSO) Master Plan Update (MPU) has evolved through the analysis in previous chapters, associated efforts such as the Study Resource Committee (SRC) meetings, Public Outreach meetings, and discussions with the Missoula County Airport Authority (MCAA). This chapter presents the resulting Airport Layout Plan (ALP) in a set of detailed drawings called the airport plans set.

The proposed 20-year development plan for the MSO ALP is a graphic depiction of existing and ultimate airport facilities that are projected to be required to accommodate forecast demand. In addition, facilities that are anticipated to be needed post planning period are shown for land reservation and planning purposes. The drawings were prepared in accordance with Federal Aviation Administration (FAA) guidelines as defined in FAA Advisory Circular 150/5070-6B, *Airport Master Plans*, and Advisory Circular 150/5300-13, *Airport Design*. In addition, the FAA Northwest Mountain Region ALP Checklist was used as a guide to ensure the correct depiction of airport facilities and design standards. Furthermore, the plan set contains both airport and airfield facility data and design criteria which is required to define relationships with applicable planning and design standards. Upon FAA approval, the plan set becomes the official planning guidance drawings for MSO.

FAA approval of the ALP means that the proposed projects are reasonable and comply with FAA planning and airspace standards. However, it does not necessarily mean that projects are eligible for federal funding or can be implemented without environmental review.

6.2 Airport Design Standards

FAA AC 150/5300-13 provides guidance on airport design standards, which are defined by the Airport Reference Code (ARC). The ARC is a coding system used by the FAA to relate airport design criteria to the operational and physical characteristics of the largest aircraft expected to regularly operate at the airport. The ARC has two components: Aircraft Approach Category (Category A through E) reflecting aircraft speed; and Airplane Design Group (Group I through VI) reflecting aircraft size.

Chapter 2, *Airfield Demand Capacity and Facility Requirements*, details the existing and future ARC requirements for MSO. The design of all future facilities should be in accordance with ARC C-III standards¹. The previous MPU identified C-IV standards as the Airport Reference Code. Changes in aircraft utilization over the years since that time, however has reduced the need for these higher standards now and for the planning period. It is

¹ ARC C-III refers to aircraft with up to 118-foot wingspan and tail heights up to 45 feet, such as the Boeing 737 and MD-80.

recommended that the current ARC C-IV separation between existing facilities be maintained.

Most aircraft using Runway 7/25 weigh less than 12,500 pounds, therefore the ARC was B-I Small-Aircraft-Only. However, because MSO is an air carrier airport, the FAA recommends that B-I standard be used instead of B-I Small-Aircraft-Only, or A-I. For this reason, Runway 7/25 should be maintained as B-I Standard. The change to B-I standard causes the hold lines on taxiways that cross the runway to be relocated 200 feet from the centerline or requires a modification to standards.

6.3 Airport Layout Plan

Existing and proposed facilities detailed within the previous chapters are included in the airport plans set within the following drawings:

1. ***Title Sheet and Data Sheet:*** Includes pertinent information about the Airport, including an airport location map, vicinity map, existing and proposed runway design standards, runway weight limitations, navigational aids (NAVAIDs), and wind coverage.
2. ***Existing Airport Layout Plan:*** Graphic depiction of existing facilities on airport property, including representation of applicable design standards².
3. ***Future Airport Layout Plan:*** Graphic depiction of facilities proposed within the 20 year planning period to meet forecast demand, including applicable design standards. In the case of MSO, the Future ALP also depicts post planning period features such as a parallel runway for the purpose of airspace protection and land use planning within the planning period.
4. ***Terminal Area Plan:*** Enlarged view of the existing and future terminal area including parking lots and the on-airport roadway network.
5. ***Airspace and Inner Airspace Plans:*** Shows the Federal Aviation Regulations (FAR) Part 77 Imaginary Surfaces, including a list of current known obstructions to the imaginary surfaces. The Airspace Plan is also used to determine if a proposed structure will penetrate any existing, future, or post planning period airspace surface. Obstructions were identified based on previous obstruction studies, obstruction charts, aerial photography, and digital USGS Quad maps to identify terrain issues located in the outer airspace surfaces. USGS maps for the MSO area were last updated in the 1970's, and were retrieved from USGS/Beartooth Mapping Inc. Terrain contours are shown only to reflect general terrain features
6. ***Existing and Future Runway Approach Plan and Profiles:*** These sheets depict a large-scale view of the interior portion of the approach surface for each existing and proposed runway end based on Part 77.

² United States Geological Survey terrain elevation information differs significantly from surveyed Runway 11/29 elevations. Therefore, NGS terrain contours are shown only to reflect general terrain features.

7. ***Airport Property Map:*** Depicts parcels of land that constitute the airport property, including date acquired, acreage, source, and the Airport's interest in the property (such as whether the property is owned as fee-simple or as an easement).
8. ***Airport Land Use Plan:*** Depicts existing and proposed on-airport land use.

6.4 Airside Facilities

This section discusses the ALP sheets pertaining to airside facilities, including existing runway and taxiway systems, apron area needs, and pavement conditions.

6.4.1 Existing Runway System

The MSO runway system consists of two intersecting runways: main Runway 11/29 at 9,501 feet long by 150 feet wide, and crosswind Runway 7/25 at 4,612 feet long by 75 feet wide.

Runway 11 is a precision instrument runway with 50:1 approach surface and Runway 29 is a nonprecision runway with a 34:1 approach. The runway is marked as a precision runway and is most often used during VFR weather. Runway 29 is recommended to be upgraded to an ANA-LPV approach that has an inner approach slope of 50:1 followed by a 40:1 slope. The length of an ANA-LPV approach slope is shorter than typical precision approaches and, when evaluated, the LPV approach slope is not obstructed by terrain surrounding MSO.

The Runway 11/29 centerline profile line of sight (LOS) is violated by approximately 0.78 feet. The violation should be remedied at the time of a future project, such as full-depth reconstruction of Runway 11/29.

Runway 7/25 is a visual runway and, due to terrain and low use, it is not recommended that the approaches are upgraded within the 20-year planning period. The runway serves small, general aviation aircraft. Per FAA recommendation, the runway should be maintained at its current width of 75 feet (B-II).

6.4.2 Runway Capacity

Although airfield capacity of the existing runway system was determined to be adequate to accommodate demand through 2028, it is anticipated that MSO will require additional capacity beyond the planning period. The preferred post planning runway alternative is an air carrier runway south and parallel to Runway 11/29, at a runway centerline separation distance of approximately 2,800 feet with a length up to the existing Runway 11/29 length of 9,501 feet. This tentative separation allows for independent aircraft arrivals and departures, and allows for potential future stagger of runway thresholds. Future studies will further justify and refine the runway use and final design. At this time, no additional property acquisition is recommended. The post planning period runway is shown to reserve space for aviation and nonaviation development, and to protect airspace and encourage adjacent compatible land uses.

6.4.3 Taxiway System

Taxiway A, the parallel taxiway serving Runway 11/29, exceeds FAA standards for ARC C-III separation between runway centerline and taxiway centerline but will be maintained at this separation through the planning period.

The middle segment of Taxiway G is recommended to be widened to the FAA-recommended 60 feet and realigned perpendicular to Runway 11/29. The north segment of Taxiway G is also proposed to be widened to 60 feet. Also, high speed taxiway exits from Runway 11/29 are recommended in the long-term to assist tanker operations. Finally, based on *Engineering Brief No. 75: Incorporation of Runway Incursion Prevention into Taxiway and Apron Design (EB-75)*, Taxiway E is proposed to be relocated away from the intersection with Runway 7/25 and Taxiway A, as shown in the Future ALP sheet.

6.4.4 Pavement Condition

The airfield pavement is generally in good condition, with the exception of Taxiway G, and Taxiway E, which are scheduled for upgrades in the airport capital improvement plan (CIP). Additionally, Runway 7/25 shoulder rehabilitation remains on-going. The Pavement Condition Evaluation, shown in **Appendix D**, includes a short-term (0 to 5 years) and medium-term (5 to 10 years) pavement management schedule.

6.4.5 Runway Approach Aids and Lighting

Runway 11 has a precision instrument approach with a localizer and glideslope antenna for Category (CAT) I ILS approaches. Runway 11 also has an ILS (Special) approach available to pilots who have been granted permission by the FAA to use it. Runway 11 is equipped with a Medium-Intensity Approach Lighting with Runway Alignment Indicators (MALSR) and is also served by an RNAV GPS nonprecision approach. The runway is also equipped with high intensity runway edge lighting (HIRL) and a Precision Approach Path Indicator (PAPI) system. Runway 7/25 is equipped with medium intensity runway edge lighting (MIRL) system and is classified as visual only.

Satellite-based RNAV (LPV) and RNP approaches are scheduled for August, 2009 publication on Runway 11 and Runway 29. This technology should duplicate, and over time, possibly replace older technology. Runway 29 should also be equipped with a MALSR or similar approach lighting system (to allow lowest possible minimums) with the RNAV/RNP approach.

6.4.6 Air Traffic Control Tower

Construction of a new tower located approximately 1,400 feet from the centerline of Runway 11/29 is planned within the next 5 years and is shown on the Future ALP sheet. An environmental assessment (EA) of this project is underway. The existing Air Traffic Control Tower (ATCT) will be decommissioned within the planning period.

6.4.7 General Aviation Facilities

MSO's two existing full-service FBOs, Minuteman and Northstar/Neptune, are in need of additional hangar space and apron expansions to accommodate demand through the planning period. Areas for future FBO expansion are defined around the existing FBO sites.

Actual development will be defined at the time of actual demand. Space required to double the size of Homestead Helicopters is also shown. A spot designated for helicopter refueling, parking, and staging, is shown on the east and west side GA development areas. Actual development will be defined at the time of actual demand.

To accommodate GA needs in the long-term, a midfield location is identified for GA expansion and a possible third FBO. T-hangars to replace the T-hangars lost through the expansion of the parking and access improvements are under construction near Runway 25.

6.5 Landside Facilities

The Landside Facilities ALP sheets provide a description of the terminal building and landside access exhibits.

6.5.1 Terminal Building

The MPU examined the needs of the existing terminal building, located north of the airfield, to meet demand through the planning period. The existing passenger terminal building expansion shown on the ALP accommodates existing need. The expansion reserves the ability to be flexible. Additionally, the terminal apron area is reserved for possible expansion near the existing terminal.

The terminal improvements are designed to provide MSO with the greatest amount of flexibility in future growth by keeping development options open. The area surrounding the terminal has been reserved for expansions within the planning period. The midfield area has been reserved for potential future terminal use beyond the planning period and is shown on the ALP for land use planning purposes.

6.5.2 Landside Access

Landside access will be improved along with expansion and reconfiguration of the terminal parking area. The proposed layout to accommodate demand within the planning period is shown. Also recommended in the Landside Master Plan (shown in Appendix C) is the realignment of the terminal entrance and exit roadway loop to provide easier access to the terminal arrival and departure curbs and short- and long-term parking. The proposed alignment is depicted on the ALP.

6.6 Airspace

The airport airspace drawings are based on Part 77. The drawing identifies imaginary surfaces which protect the runway approaches and the airport environment. The drawings are based on the ultimate planned runway length as well as the ultimate planned approaches to each runway end. (As noted previously, post planning period Runway 11R/29L is shown to protect airspace and encourage land use compatibility.)

Also provided are Plan and Profile drawings depicting the individual runway inner approach surfaces that identify potential obstructions, again based on ultimate runway length and ultimate planned approaches. Where penetrated, the sheets identify objects as obstructions and recommends appropriate action. These drawings are intended to facilitate

identification of roadways, utility lines, railroads, structures, and other possible obstructions that may lie within or pass through the confines of the inner approach surface area. The approach slopes for each runway are described below:

- ➔ Runway 11/29 is based on a 50:1 precision approach.
- ➔ Runway 7/25 is based on a 20:1 approach.

Few obstructions were identified on airport property, including fences and signs, which should be removed or relocated. Numerous obstructions were identified on the mountain to the northeast of the airport that fall within the inner horizontal surface. These obstructions cannot be removed and no action is recommended.

6.7 Land Considerations

Land considerations identify issues affecting the environment of the land surrounding the Airport, including present land use and any needs for land acquisition.

6.7.1 Future Land Acquisition

Land acquisition is not proposed within the planning period. Additional land may be required in the future to accommodate the post planning period runway and its safety areas. Should the airport move forward with the post planning period runway, at that time, the length and location will be reevaluated to determine if land acquisition is necessary.

6.7.2 Land Use

Existing and future land uses within the airport's property limits are shown on the Airport Land Use Plan sheet. Noise contours for the existing runway are from the MSO FAR Part 150 Study conducted in 2004 and approved by the FAA in 2005. Additionally, noise contours are not shown for the post planning period runway since implementation is not anticipated within the 20-year planning period.

6.8 Project Phasing

The projects identified within this Master Plan to meet the forecast demand are summarized in the following implementation schedule shown in **Table 6-1**. Projects are organized into the following phases:

- ➔ Short-term - Representative of projects implemented up to five years
- ➔ Interim - Representative of projects implemented in 6 to 10 years
- ➔ Long-term - Representative of projects implemented 11 to 20 years
- ➔ Post planning period - Representative of projects implemented beyond the 20-year planning period

Specific years and cost estimates are shown through 2014 that correlate to projects in the current Capital Improvement Plan (CIP), developed January 2009. Cost estimates are intended for preliminary planning purposes, and will be updated closer to project implementation. Additionally, projects shown on Table 7-1 are physical projects that are shown on the ALP.

Table 6-1
Phasing Plan

Project Description	Programmed CIP Year	Programmed CIP Amount
<u>Short-term (0-5 years)</u>		
Reconstruct TW E (Pavement and Electrical)	2009	\$1,750,500
Rehabilitate RW 7/25, Install PAPIs and Upgrade Signs	2009	\$310,000
Rehabilitate TW A & TWs A2, A3, A4, A5, A6, F, G Center	2009	\$400,000
Rehabilitate TWs A3, D East-West and North G, Phase I (Design)	2009	\$105,000
Supplement the ILS on RW 11 and add capability to RW 29 with satellite-based technology	2009	-
Construct Northstar/Neptune Ramp - Phase II (Construct)	2010	\$1,161,500
Reconstruct Apron ACA-1	2010	\$928,500
Design East GA Apron/GA-3/Northstar Ramp and Drainage Improvements - Phase I (Design)	2010	\$737,000
Construct Security Improvements Phase II, Gates	2010	\$862,500
Design Terminal Area Safety Enhancements (TASE) Phase I	2010	\$162,490
Construct Air Traffic Control Tower (ATCT) - Phase II (Construct)	2010	\$8,200,000
Rehabilitate RW 7/25, Install PAPIs and Upgrade Signs - Phase II (Construct)	2011	\$2,456,000
Rehabilitate TW A & TWs A2, A3, A5, A6, F, G Center; Upgrade Electrical	2011	\$2,996,250
Bid and Construct Storm Water Detention Pond	2011	\$675,000
Design and Construct Access Road and Parking Expansion - Phase I (Construct)	2011	\$4,425,500
Construct Security Improvements - Phase III	2011	\$800,000
Construct Terminal Area Safety Enhancements (TASE Phase II) (Construct)	2011	\$202,410
Rehabilitate TW A & TWs A2, A3, A5, A6, F, G Center; Upgrade Electrical	2012	\$2,996,250
Expand Access Road and Parking - Phase II (Construct)	2012	\$1,608,000
Expand Access Road and Parking - Phase III (Construct)	2012	\$1,790,300
Construct Security Improvements - Phase III (Construct)	2012	\$630,000
Construct East GA Apron/GA-3 and Drainage Improvements Phase II (Construct)	2013	\$9,211,675
Rehabilitate Air Carrier Apron - Phase I	2013	\$180,000
Rehabilitate GA West - 1/TL West Apron & TW - Phase I (Design)	2013	\$147,000
Relocate Glideslope	2013	\$100,000
Rehabilitate TWs A3, D and North G, Phase II (Construct)	2013	\$1,462,000
Obtain complete topographic information of airport property	-	-
Construct 1,000 square yards apron for Homestead Helicopters, Inc.	-	-
<u>Interim (6-10 years)</u>		
Rehabilitate GA West - 1/TL West Apron & TW - Phase II	2014	\$2,362,500
Rehabilitate Air Carrier Apron - Phase II	2014	\$2,890,000
Rehabilitate Northstar Apron - NSA-2 - Phase I	2014	\$150,000
Expand SRE Building	2014	\$2,718,000
Expand Terminal	2014	\$31,000,000
Remove the shed in the RPZ on the RW 11 approach	-	-
Relocate service roads outside of the RPZs on RW's 7, 11, and 29	-	-
Relocate the service road outside of the TW A OFA	-	-
Relocate obstructions out of RW 11 and 29	-	-

Notes: CIP information updated as of January 2009.

1/ Land acquisition shown on the Future ALP is not recommended for the RPZs on RW 10/28 because

2/ Projects shown are physical projects shown on the ALP. Other projects (training, etc) have been removed and are not shown.

NCA - No costs associated with the airport. Private funding.

Table 6-1
Phasing Plan

Project Description	Programmed CIP Year	Programmed CIP Amount
<u>Long-term (11-20 years)</u>		
Reconstruct RW 11/29 to fix the five-foot LOS violation	-	-
Construct a MALSR or other similar approach lighting for RW 29	-	-
Construct landside access to the Minuteman development area	-	-
Construct 43,288 square yards of apron in the Minuteman area	-	-
Construct 48,000 square yards of apron for Northstar/Neptune	-	-
Expand FBO fuel farm facilities	-	NCA
Expand Minuteman GA Development Area (hangars, maintenance, helicopter landing zones, etc.)	-	NCA
Expand Northstar/Neptune GA Development Area (hangars, maintenance, etc.)	-	NCA
Construct Terminal Alternative 1A	-	-
<u>Post Planning Period (beyond 20 years)</u>		
Construct RW 11R/29L and supporting infrastructure 1/	-	-
Develop access roadways to the Nonaviation Development area south of RW 11/29	-	-
Expand GA development facilities (taxiways, roadways, security, etc.) south of RW 11/29	-	-
Expand GA facilities south of RW 11/29 (hangars, parking, etc.)	-	NCA
Expand terminal and supporting development south of RW 11/29	-	-
<u>Undertermined/As Available</u>		
Acquire the property within the RW 25 RPZ.	-	-
Relocate Highway 10W from the RW 25 RPZ	-	-

Notes: CIP information updated as of January 2009.

1/ Land acquisition shown on the Future ALP is not recommended for the RPZs on RW 10/28 because shortening of the RW is anticipated .

2/ Projects shown are physical projects shown on the ALP. Other projects (training, etc) have been removed and are not shown.

NCA - No costs associated with the airport. Private funding.