



## FINAL REPORT

# AIRPORT MASTER PLAN

## May 2015

### Rifle Garfield County Airport

*As required by Paragraph 425.B(4) of FAA Order 5100.38C, Airport Improvement Program (AIP) Handbook:*

The preparation of this document may have been supported, in part, through the Airport Improvement Program financial assistance from the Federal Aviation Administration as provided under Title 49 U.S.C., Section 47104. The contents do not necessarily reflect the official views or policy of the FAA. Acceptance of this report by the FAA does not in any way constitute a commitment on the part of the United States to participate in any development depicted therein nor does it indicate that the proposed development is environmentally acceptable or would have justification in accordance with appropriate public laws.

**JVIATION®**

900 S. BROADWAY • SUITE 350 • DENVER, COLORADO 80209

PHONE: 303-524-3030 • FAX: 303-524-3031

• WWW.JVIATION.COM •

## Contents

<b>1.0</b>	<b>Introduction .....</b>	<b>1-1</b>
1.1	Study Goals.....	1-1
1.2	Local Information.....	1-2
1.3	Airport Management and Ownership Structure.....	1-2
1.4	Airport History and Activity .....	1-2
<b>2.0</b>	<b>Inventory .....</b>	<b>2-1</b>
2.1	Airport Reference Code & Aircraft Groupings.....	2-1
2.2	Airport Reference Point (ARP) .....	2-3
2.3	Runway Bearing and Magnetic Declination .....	2-3
2.4	Meteorological Data .....	2-3
2.4.1	Weather Observation Equipment .....	2-3
2.4.2	Wind Coverage .....	2-3
2.4.3	Temperature.....	2-6
2.4.4	Precipitation.....	2-7
2.5	Historical Aviation Activity .....	2-7
2.5.1	Operations and Based Aircraft .....	2-7
2.5.2	Fuel Sales.....	2-8
2.6	Financial Information.....	2-9
2.6.1	FAA AIP Grant History & Capital Improvement Plan (CIP) .....	2-9
2.6.2	Capital Improvement Plan.....	2-9
2.7	Regional Setting and Land Use.....	2-10
2.8	Community Planning Initiatives .....	2-10
2.9	Airport Airspace Usage & NextGen.....	2-10
2.9.1	Mountain Airspace.....	2-10
2.9.2	Airspace Classification .....	2-11
2.9.3	Airspace Congestion.....	2-13
2.9.4	Programs and Procedures to Relieve Airspace Congestion.....	2-14
2.9.5	Further Improvement & NextGen Technology .....	2-15
2.10	Instrument Approach Equipment and Procedures .....	2-16
2.10.1	Precision Instrument Landing System.....	2-16
2.10.2	Non-precision Approach Systems.....	2-17
2.11	Noise Abatement Procedures .....	2-17
2.12	Obstructions to Air Navigation.....	2-17
2.13	Airfield .....	2-18
2.13.1	Runways .....	2-18
2.13.2	Taxiways .....	2-18
2.13.3	Aprons .....	2-19
2.13.4	Pavement Condition.....	2-20
2.13.5	Lighting, Marking, and Signage of Runway and Taxiways.....	2-21
2.13.6	Visual and Navigational Airport Aids.....	2-21
2.14	General Aviation Facilities.....	2-22
2.14.1	Fixed Base Operator.....	2-22

2.14.2	Airport Hangars .....	2-22
2.14.3	Development Areas.....	2-23
2.15	Surface Transportation.....	2-24
2.15.1	Airport Access Road Network.....	2-24
2.15.2	Access Roads.....	2-24
2.15.3	Parking Areas.....	2-25
2.16	Support Facilities.....	2-26
2.16.1	Airport Administration ARFF/SRE/Maintenance Building .....	2-26
2.16.2	Aircraft Fuel Storage .....	2-26
2.17	Airport Equipment .....	2-27
2.17.1	Aircraft Rescue and Fire Fighting Equipment (ARFF).....	2-27
2.17.2	Snow Removal Equipment (SRE) .....	2-28
2.18	Utilities.....	2-28
<b>3.0</b>	<b>Aviation Activity Forecasts .....</b>	<b>3-1</b>
3.1	Data Sources.....	3-1
3.1.1	FAA Terminal Area Forecast (TAF).....	3-1
3.1.2	FAA Advisory Circular 150/5070-7 .....	3-1
3.1.3	FAA Form 5010-1 .....	3-1
3.1.4	Airport Cooperative Research Program Report: Counting Aircraft Operations at Non-Towered Airports.....	3-1
3.1.5	ACRP Report: Airport Aviation Activity Forecasting.....	3-2
3.1.6	Forecasting Aviation Activity by Airport .....	3-2
3.1.7	FAA Aerospace Forecasts, Fiscal Years 2012-2032 .....	3-2
3.1.8	FAA Advisory Circular 150/5070-7B, <i>Airport Master Plans</i> .....	3-2
3.1.9	Woods & Poole Economics.....	3-2
3.2	Forecasting General Aviation Activity Measures and Metrics .....	3-2
3.2.1	Aircraft Operations.....	3-2
3.2.2	Based Aircraft .....	3-3
3.2.3	Demographic and Economic Factors.....	3-3
3.3	National Aviation OutLook .....	3-4
3.3.1	FAA Aerospace Forecast.....	3-4
3.3.2	General Aviation Manufacturers Association (GAMA) .....	3-4
3.4	Historical Aviation Activity .....	3-6
3.4.1	FAA Terminal Area Forecasts (TAFs) .....	3-6
3.4.2	Atlantic Aviation Records.....	3-8
3.5	Review of Existing Forecasts .....	3-9
3.5.1	Previous Master Plan Forecast.....	3-9
3.5.2	CDOT System Plan Forecast.....	3-9
3.5.3	FAA TAF .....	3-10
3.6	Forecasting Methodologies.....	3-10
3.6.1	Times Series Analysis .....	3-10
3.6.2	Regression Analysis .....	3-10
3.6.3	Market Share Analysis .....	3-11
3.7	Aircraft Operations Forecast.....	3-11
3.7.1	Air Taxi/Commuter Operations .....	3-11
3.7.2	General Aviation Operations .....	3-13
3.7.3	Local/Itinerant Operations .....	3-15

3.7.4	Military Operations.....	3-15
3.7.5	Preferred Aircraft Operations Forecast Summary.....	3-15
3.8	Design Hour Operations .....	3-16
3.9	Annual Instrument Operations.....	3-17
3.10	Based Aircraft Forecast.....	3-17
3.10.1	Selected Based Aircraft Forecast .....	3-18
3.11	Critical Aircraft.....	3-19
3.12	Comparison to Existing FAA TAF.....	3-21
3.12.1	Aircraft Operations Forecast.....	3-21
3.12.2	Based Aircraft Forecast.....	3-21
3.13	Factors that May Create Changes in the Forecast.....	3-22
3.14	Summary of Preferred Forecasts .....	3-22
<b>4.0</b>	<b>Facility Requirements and Demand/Capacity Analysis .....</b>	<b>4-1</b>
4.1	Regional Airport System Role.....	4-1
4.2	Airside Requirements .....	4-1
4.2.1	FAA Design Standards.....	4-1
4.3	Runways .....	4-4
4.3.1	Airfield Capacity Analysis .....	4-4
4.3.2	Runway Orientation .....	4-5
4.3.3	Runway Length .....	4-5
4.3.4	Runway Width.....	4-9
4.3.5	Runway Line of Sight .....	4-9
4.3.6	Runway Strength .....	4-9
4.3.7	Runway Surface .....	4-10
4.3.8	Runway Shoulders and Blast Pads.....	4-10
4.4	Taxiways.....	4-11
4.5	Navigational Aids.....	4-12
4.6	Airspace Requirements.....	4-12
4.6.1	Obstructions .....	4-14
4.7	General Aviation .....	4-14
4.7.1	Transient Aircraft Parking Apron .....	4-15
4.7.2	Based Aircraft Parking Aprons .....	4-16
4.7.3	Apron Pavement.....	4-17
4.7.4	Aircraft Storage Requirements .....	4-17
4.7.5	Fixed Base Operator (FBO) Facility Needs.....	4-18
4.8	Airport Support Facilities .....	4-18
4.8.1	Airport Administration/ARFF/SRE/Maintenance Building .....	4-18
4.8.2	Aircraft Rescue and Fire Fighting (ARFF).....	4-19
4.8.3	Snow Removal Equipment (SRE) .....	4-19
4.8.4	Airport Perimeter Fence and Access Control .....	4-19
4.8.5	Fuel Storage Requirements – 100LL, Jet-A, and Self-Fueling .....	4-19
4.8.6	Deicing Facilities .....	4-21
4.9	Utilities.....	4-22
4.10	Landside Requirements.....	4-22
4.10.1	Regional Transportation Network .....	4-22
4.10.2	On-Airport Circulation Roadways .....	4-23
4.10.3	Auto Parking.....	4-23

4.11	Facility Requirements Summary .....	4-24
<b>5.0</b>	<b>Alternatives Analysis .....</b>	<b>5-1</b>
5.1	Development Goals.....	5-1
5.2	Identified Airside & Landside Alternatives.....	5-1
5.3	Evaluation Criteria.....	5-2
5.4	Extension of Runway 8/26 .....	5-2
5.4.1	Overview .....	5-2
5.4.2	Assumptions .....	5-3
5.4.3	Runway Extension Considerations .....	5-4
5.4.4	Preliminary Runway Extension Alternatives.....	5-4
5.4.5	Airside Alternative 1 – Extend Runway 500 Feet East.....	5-5
5.4.6	Recommendation.....	5-7
5.5	Transient & GA Apron Expansion.....	5-8
5.5.1	Transient Apron Expansion.....	5-8
5.5.2	GA Apron Expansion.....	5-8
5.5.3	Preferred Alternative Chosen.....	5-12
5.6	Southeast Hangar Development.....	5-12
5.6.1	Southeast Hangar Development Alternative 1 .....	5-12
5.6.2	Southeast Hangar Development Alternative 2.....	5-13
5.6.3	Southeast Hangar Development Alternative 3.....	5-14
5.6.4	Recommendation for the Southeast Hangar Development .....	5-15
5.6.5	Preferred Alternative for the Southeast Hangar Development .....	5-16
5.7	Auto Parking and circulation.....	5-16
5.7.1	Alternative 1.....	5-16
5.7.2	Alternative 2.....	5-17
5.7.3	Alternative 3.....	5-18
5.7.4	Recommendation.....	5-19
5.7.5	Preferred Alternative .....	5-20
5.8	Summary.....	5-20
<b>6.0</b>	<b>Environmental Overview .....</b>	<b>6-1</b>
6.1	Air Quality.....	6-1
6.2	Compatible Land Use.....	6-1
6.3	Department of Transportation Act: Section 4(f) .....	6-2
6.4	Farmlands.....	6-2
6.5	Fish, Wildlife, and Plants .....	6-3
6.6	Floodplains.....	6-4
6.7	Hazardous Materials, Pollution Prevention, and Solid Waste .....	6-4
6.8	Historical, Architectural, Archeological, and Cultural Resources .....	6-5
6.9	Light Emissions and Visual Impacts.....	6-5
6.10	Natural Resources and Energy Supply .....	6-6
6.11	Noise.....	6-6
6.12	Socioeconomic Impacts, Environmental Justice, and Children's Environmental Health and Safety Risks.....	6-6
6.13	Water Quality.....	6-7
6.14	Wetlands.....	6-7
6.15	Wild and Scenic Rivers.....	6-7

<b>7.0      Airport Plans .....</b>	<b>7-1</b>
7.1      Airport Layout Plan.....	7-1
7.1.1 Runway System.....	7-1
7.1.2 Taxiway System .....	7-1
7.2      Airspace Plan .....	7-5
7.3      Inner Portion of the Approach Surface Drawings .....	7-11
7.4      Departure Surface Drawings.....	7-11
7.5      Terminal Area Plan.....	7-16
7.6      Land Use Drawing.....	7-16
7.7      Exhibit 'A' Airport Property Map .....	7-16
<b>8.0      Financial Implementation Plan.....</b>	<b>8-1</b>
8.1      RIL Financial Information .....	8-1
8.1.1 Revenues .....	8-2
8.1.2 Expenditures.....	8-2
8.2      Contributed Capital/ Funding Sources .....	8-3
8.2.1 FAA Airport Improvement Program (AIP) .....	8-3
8.2.2 CDOT Division of Aeronautics Discretionary Aviation Grant Program.....	8-4
8.2.3 Colorado State Infrastructure Bank Loan Program.....	8-5
8.2.4 Private Investment.....	8-6
8.3      Grant History .....	8-6
8.4      Capital Improvement Plan (CIP).....	8-6
8.5      Phase I – 5 Year CIP (2014-2018).....	8-7
8.6      Phase II – 5 to 10 Year CIP (2019-2023).....	8-8
8.7      Phase III – 11 to 20 Year CIP (2024-2034) .....	8-9

## Tables

Table 1-1 – Surrounding Communities .....	1-2
Table 2-1 – Aircraft Approach Category.....	2-1
Table 2-2 – Airplane Design Group (ADG) .....	2-1
Table 2-3 – Allowable Crosswind Component Per Runway Design Code (RDC).....	2-4
Table 2-4 – Rifle Garfield County Airport Temperature Summary.....	2-7
Table 2-5 – Rifle Garfield County Airport Precipitation Summary .....	2-7
Table 2-6 – Based Aircraft.....	2-7
Table 2-7 – RIL FBO Fuel Sales 2006-2013 .....	2-9
Table 2-8 – FAA Grant History 2000-2013 .....	2-9
Table 2-9 – RIL Instrument Approaches and Minimums.....	2-17
Table 2-10 – Airport Fuel Storage .....	2-27
Table 2-11 – Airport Snow REmoval Equipment.....	2-28
Table 2-12 – Airport Utility Services .....	2-28
Table 3-1 – 2012 Based Aircraft.....	3-3
Table 3-2 – General Aviation Operations (in Thousands) at Towered Airports.....	3-6
Table 3-3 – TAF: Historical Based Aircraft .....	3-8
Table 3-4 – Adjusted Historical Operations Counts.....	3-9

Table 3-5 – 2003 Airport Master Plan Forecast.....	3-9
Table 3-6 – 2011 Colorado Aviation System Plan Forecast for RIL .....	3-9
Table 3-7 – FAA TAF Forecast for RIL.....	3-10
Table 3-8 – Air Taxi/Commuter Operations Socioeconomic Variables' Correlation Coefficients .....	3-11
Table 3-9 – Air Taxi/Commuter Operations Forecast.....	3-13
Table 3-10 – GA Operations Socioeconomic Variables' Correlation Coefficients .....	3-13
Table 3-11 – GA Operations Forecast .....	3-14
Table 3-12 – GA Operations Forecast Distribution Summary .....	3-15
Table 3-13 – Aircraft Operations Forecast Summary .....	3-16
Table 3-14 – Design Hour Operations Forecast .....	3-16
Table 3-15 – Instrument Operations Forecast.....	3-17
Table 3-16 – Based Aircraft Socioeconomic Variables' Correlation Coefficients .....	3-18
Table 3-17 – Based Aircraft Forecast .....	3-19
Table 3-18 – Based Aircraft Forecast Distribution Summary.....	3-19
Table 3-19 – Aircraft Operations by RDC Type in 2011 .....	3-20
Table 3-20 – RDC Aircraft Forecast .....	3-20
Table 3-21 – FAA Template for Comparing Airport Planning and TAF Forecasts .....	3-21
Table 4-1 – FAA Design Standards .....	4-2
Table 4-2 – Recommended Runway Lengths for RIL .....	4-7
Table 4-3 – Runway Design Standards.....	4-9
Table 4-4 – Runway Weight Capacity.....	4-10
Table 4-5 – Taxiway Design Standards .....	4-11
Table 4-6 – Transient Aircraft Apron Requirements .....	4-16
Table 4-7 – Based Aircraft Apron Requirements .....	4-17
Table 4-8 – Based Hangared Aircraft Requirements.....	4-18
Table 4-9 – Jet-A Fuel Storage Capacity .....	4-21
Table 4-10 – AvGas Fuel Storage Capacity .....	4-21
Table 4-11 – Facility Requirements Summary.....	4-25
Table 5-1 – GA Apron Development Alternatives Comparison Matrix .....	5-12
Table 5-2 – Southeast Hangar Development Matrix.....	5-16
Table 5-3 – Auto Parking & Improved Circulation Alternatives Matrix.....	5-19
Table 5-4 – RIL Recommended Facility Improvements .....	5-20
Table 6-1 – DOT Section 4(f) Properties .....	6-2
Table 6-2 – Candidate, Threatened, & Endangered Species .....	6-4
Table 6-3 – National Register of Historic Places - Rifle .....	6-5
Table 8-1 – RIL Financial Summary .....	8-1
Table 8-2 – RIL Grant History .....	8-6
Table 8-3 – RIL 20-Year Development Plan Estimated Project Cost Summary.....	8-7
Table 8-4 – Phase I Estimated Project Cost Summary .....	8-8
Table 8-5 – phase II Estimated Project Cost Summary.....	8-9
Table 8-6 – Phase III Estimated Project Cost Summary.....	8-10

## Figures

Figure 2-1 – Aircraft Groupings.....	2-2
Figure 2-2 – All Weather Wind Rose.....	2-5

Figure 2-3 – IFR Wind Rose.....	2-6
Figure 2-4 – IFR Flight Plans Filed To/From RIL.....	2-8
Figure 2-5 – Airspace Classifications .....	2-12
Figure 2-6 – RIL & Surrounding Mountain Airspace .....	2-13
Figure 2-7 – Colorado WAM Sensor Locations .....	2-15
Figure 2-8 – Runway 8/26 .....	2-18
Figure 2-9 – Taxiway System .....	2-19
Figure 2-10 – Apron Areas.....	2-20
Figure 2-11 – 2010 Pavement Condition Index.....	2-20
Figure 2-12 – FBO Facilities.....	2-22
Figure 2-13 – Airport Hangars .....	2-23
Figure 2-14 – Future Small Aircraft Hangar & Apron Development .....	2-23
Figure 2-15 – Future Large Aircraft Hangar & Apron Development .....	2-24
Figure 2-16 – Airport Access Roads.....	2-25
Figure 2-17 – Airport Parking.....	2-25
Figure 2-18 – Airport Support Buildings .....	2-26
Figure 2-19 – Aircraft Fuel Storage.....	2-27
Figure 3-1 – GA Airplane Deliveries.....	3-5
Figure 3-2 – RIL TAF Historical Operations.....	3-7
Figure 3-3 – Air Taxi/Commuter Operations Linear Analysis.....	3-12
Figure 3-4 – Air Taxi/Commuter Operations Forecast .....	3-12
Figure 3-5 – GA Operations Forecast.....	3-14
Figure 3-6 – Based Aircraft Forecast.....	3-18
Figure 4-1 – Impacts to Runway Length.....	4-6
Figure 4-2 – Business Jet Runway Length Requirements (100% Useful Load) .....	4-8
Figure 4-3 – Part 77 Surfaces .....	4-14
Figure 4-4 – Transient Aircraft Parking Apron.....	4-15
Figure 4-5 – Regional Access .....	4-23
Figure 4-6 – Existing Airport Parking .....	4-24
Figure 5-1 – Business Jet Runway Length Requirements .....	5-3
Figure 5-2 – Airside Alternative 1 - Extend Runway 500 Feet East.....	5-6
Figure 5-3 – Transient Apron Alternative.....	5-8
Figure 5-4 – GA Development Apron Alternative 1 .....	5-10
Figure 5-5 – GA Development Alternative 2.....	5-11
Figure 5-6 – Southeast Hangar Development Alternative 1 .....	5-13
Figure 5-7 – Southeast Hangar Development Alternative 2 .....	5-14
Figure 5-8 – Southeast Hangar Development Alternative 3 .....	5-15
Figure 5-9 – Auto Parking & Circulation Improvement Alternative 1.....	5-17
Figure 5-10 – Auto Parking & Circulation Improvement Alternative 2 .....	5-18
Figure 5-11 – Auto Parking & Circulation Improvement Alternative 3 .....	5-19
Figure 6-1 – Existing Farmlands .....	6-3
Figure 7-1 – ALP Cover Sheet.....	7-2
Figure 7-2 – Airport Layout Plan .....	7-3
Figure 7-3 – Airport Layout Plan Data Sheet.....	7-4
Figure 7-4 – Airport Airspace Drawing – Part 77 .....	7-6
Figure 7-5 – Airport Airspace Obstruction Table .....	7-7
Figure 7-6 – Airport Airspace Drawing Runway 8/26 Profile .....	7-10

Figure 7-7 – Runway 8 Inner Approach Plan & Profile .....	7-12
Figure 7-8 – Runway 26 Inner Approach Plan & Profile.....	7-13
Figure 7-9 – Runway 8 Departure Plan & Profile.....	7-14
Figure 7-10 – Runway 26 Departure Plan & Profile .....	7-15
Figure 7-11 – Terminal Area Plan.....	7-17
Figure 7-12– Airport Land Use Plan .....	7-18
Figure 7-13 – Exhibit ‘A’ Airport Property Map .....	7-19
Figure 8-1 – Airport Development Plan .....	8-11

## Appendices

- Appendix A – Aviation Glossary of Terms
- Appendix B – City of Rifle and Garfield County Zoning and Land Use Exhibits
- Appendix C – RIL Instrument Approach Analysis
- Appendix D – RIL Preliminary Cost Estimates