

# TABLE OF CONTENTS

**CHAPTER E - EXECUTIVE SUMMARY..... E-1**

Introduction.....E-1

Goals and Objectives.....E-1

The Master Planning Process.....E-2

Aviation Activity Forecasts .....E-3

FAA Forecast and Flight School Impact .....E-3

Facility Requirements.....E-4

Master Plan Recommendations.....E-5

Implementation & Financial Plan.....E-9

Airport Capital Improvement Program – Project Funding..... E-21

Environmental Considerations ..... E-21

  

**CHAPTER 0 - AIRPORT MASTER PLAN INTRODUCTION ..... 0-1**

Study Introduction .....0-1

Airport Background.....0-1

What is an Airport Master Plan?.....0-2

Master Plan Elements.....0-2

**Plan Participation.....0-3**

Agency Coordination .....0-4

Stakeholder Working Group (SWG).....0-4

Technical Advisory Committee (TAC) .....0-4

Public Outreach .....0-5

**Master Plan Goals & Objectives .....0-5**

  

**CHAPTER 1 - INVENTORY OF EXISTING CONDITIONS ..... 1-1**

**Airport Inventory .....1-1**

**Introduction.....1-1**

Chapter Purpose and Organization .....1-1

**Background.....1-2**

Historical Overview.....1-2

Airport Ownership and Management .....1-2

Airport Location.....1-2

**Table of Contents – Volume I**

---

**Airport Role .....1-5**

**Area Airports .....1-6**

**Airport Facilities Inventory.....1-9**

Airside Facilities ..... 1-9

Runway System..... 1-13

Instrument Approaches ..... 1-13

Taxiway System ..... 1-14

Pavement Condition ..... 1-14

Federal Aviation Administration Identified Hot Spots..... 1-19

Aprons ..... 1-19

Pavement Marking, Lighting, and Signage..... 1-20

*Airfield Marking* ..... 1-20

*Airfield Lighting*..... 1-20

Navigational Aids (NAVAIDs) ..... 1-21

*Electronic NAVAIDs* ..... 1-21

Terminal Area ..... 1-22

*Terminal Building* ..... 1-22

*GA Services*..... 1-22

*Aircraft Hangars*..... 1-22

*Taxiway and Taxilane*..... 1-23

*Fuel* ..... 1-23

*Joint Use Fire Facility*..... 1-23

*Airport Maintenance and Storage Facilities*..... 1-23

*ATCT*..... 1-23

Airspace Surfaces..... 1-27

*Special Use Airspace – Military Operations Areas (MOA)* ..... 1-27

*Wilderness Areas* ..... 1-27

Airfield Grading, Drainage, and Stormwater Management..... 1-33

**Landside Facilities ..... 1-37**

Airport Tenant Buildings and Ground Facilities ..... 1-37

Airport Property Interests ..... 1-37

Vehicle Parking and Circulation ..... 1-37

*Airport Entrance Roadways, Access Points, and Circulation* ..... 1-37

*Airfield Vehicle Access Routes*..... 1-37

*Vehicle Parking Lots* ..... 1-38

*Perimeter Fencing and Gates*..... 1-38

Non-Aeronautical ..... 1-41

*Buildings and Uses* ..... 1-41

*Vacant Land* ..... 1-43

**Utilities ..... 1-43**

Electrical ..... 1-43

Water ..... 1-49

Telecommunications/Fiber Optics..... 1-49

Natural Gas ..... 1-49



Wastewater ..... 1-49

**Wind Analysis ..... 1-55**

**Environmental Overview ..... 1-59**

Air Quality ..... 1-60

Biological Resources ..... 1-60

Climate ..... 1-62

U.S. Department of Transportation, Section 4(f) ..... 1-62

Farmland ..... 1-63

Hazardous Materials, Solid Waste, and Pollution Prevention ..... 1-69

*Hazardous Materials* ..... 1-69

*Underground Storage Tanks* ..... 1-70

*Ryan Airfield Landfill* ..... 1-70

*Solid Waste and Pollution Prevention* ..... 1-71

Historical, Architectural, Archaeological, and Cultural Resources ..... 1-71

Land Use ..... 1-71

*Pima County Comprehensive Plan* ..... 1-72

*Applicable General Plan Policies* ..... 1-72

*Economic Element* ..... 1-75

*Rezoning Policies: Ryan Airfield-Area Mixed Use Employment Center* ..... 1-75

*Airport Zoning* ..... 1-75

Natural Resources and Energy Supply ..... 1-76

Noise and Noise-Compatible Land Use ..... 1-77

Socioeconomics, Environmental Justice, and Children’s Environmental Health and Safety Risks ..... 1-77

*Socioeconomics* ..... 1-77

*Children’s Environmental Health and Safety Risks* ..... 1-77

*Environmental Justice* ..... 1-78

*Visual Effects (Light Emissions / Visual Resources)* ..... 1-79

*Water Resources* ..... 1-80

**Inventory Summary ..... 1-86**

**References ..... 1-89**

**CHAPTER 2 - AVIATION ACTIVITY FORECASTS ..... 2-1**

**Introduction ..... 2-1**

Forecast Summary ..... 2-1

Introduction to Forecasts ..... 2-2

**Community Profile ..... 2-3**

Population ..... 2-4

Employment and Economic Development ..... 2-4

Gross Regional Product (GRP) ..... 2-9

Catchment Areas and Competition ..... 2-9

**Aviation Activity Profile ..... 2-13**

General Aviation ..... 2-13

**Table of Contents – Volume I**

---

*Itinerant Operations*..... 2-13  
*Local Operations* ..... 2-14  
Military ..... 2-16  
Based Aircraft ..... 2-16  
Federal Aviation Administration Terminal Area Forecast ..... 2-17  
**General Aviation Forecasts**..... **2-19**  
Forecasting Techniques ..... 2-19  
Itinerant General Aviation Operations ..... 2-20  
*Methods*..... 2-20  
*Preferred and TAF Comparison* ..... 2-21  
Local Operations ..... 2-22  
*Methods*..... 2-22  
*Preferred and TAF Comparison* ..... 2-24  
Based Aircraft ..... 2-25  
*Methods*..... 2-25  
*Preferred and TAF Comparison* ..... 2-27  
**Peak Forecasts and Critical Aircraft** ..... **2-28**  
Peak Period Forecasts..... 2-28  
Critical Aircraft..... 2-29  
**Flight School Impact Assessment**..... **2-31**  
**Forecast Summary and FAA Forecast Tables** ..... **2-34**  
  
**CHAPTER 3 - FACILITY REQUIREMENTS** ..... **3-1**  
**Introduction**..... **3-1**  
**Airside facilities** ..... **3-1**  
Airport and Runway Classifications ..... 3-1  
Critical Aircraft..... 3-3  
Runway Requirements ..... 3-3  
*Airport Operational Capacity* ..... 3-3  
*Runway Utilization Based on Wind Coverage* ..... 3-5  
*Runway Length Analysis* ..... 3-6  
Five-Step Process for Runway Length Analysis..... 3-7  
*Step 1: Select the Critical Aircraft*..... 3-7  
*Step 2: Find the Appropriate Runway Length Assessment Method* ..... 3-8  
*Step 3: Input the Factors that Influence Runway Length* ..... 3-8  
*Step 4: Determine the Recommended Runway Length* ..... 3-8  
*Step 5: Assess the Existing Runway Length and Gauge the Benefit of Extension* ..... 3-12  
*Runway Length Recommendations*..... 3-13  
*Hot Spots*..... 3-13  
Runway Pavement Strength ..... 3-13  
Pavement Condition Index ..... 3-14  
*Pavement Strength Recommendations*..... 3-14  
Runway Design Surfaces..... 3-14

Primary Runway 6R/24L..... 3-15

Secondary Runway 6L/24R..... 3-16

Crosswind Runway 15/33 at B-I (Small) – VIS ..... 3-16

Runway Design Recommendation ..... 3-17

Runway Protection Zones..... 3-17

    RPZ Recommendations: ..... 3-18

Taxiway System Requirements..... 3-21

    Taxiway Design Principles..... 3-21

    Limit Runway Crossing ..... 3-21

    Limit Direct Access ..... 3-21

    Taxiway Design Group ..... 3-21

    Taxiway Standards..... 3-22

    Taxiway System Recommendations..... 3-24

Navigational Aids (NAVAIDs) ..... 3-24

    Pavement Markings, Lighting, and Signage..... 3-25

    Instrument Approach Procedures (IAP)..... 3-26

    Weather Reporting Equipment ..... 3-26

    Communications Equipment..... 3-26

    Airfield Vehicle Access Route ..... 3-27

    Airspace Surfaces..... 3-27

FAR Part 77 Analysis - General..... 3-28

    FAR Part 77 Recommendations..... 3-29

**Landside Facilities ..... 3-30**

Air Traffic Control Tower (ATCT)..... 3-30

    ATCT Recommendation..... 3-30

Aircraft Hangars..... 3-33

    Existing and Future Hangar Square Feet Demand ..... 3-33

Tie Downs ..... 3-33

Aircraft Fuel Storage and Dispensing System ..... 3-34

    Fuel Storage Recommendation..... 3-35

Joint Use Fire Station ..... 3-35

    Joint Use Fire Station Recommendation ..... 3-35

Airport Maintenance Materials Storage..... 3-35

    Airport Maintenance Materials Storage Recommendation ..... 3-35

Fencing..... 3-35

    Fencing Recommendation..... 3-36

TAA Office and Pilots’ Lounge..... 3-36

    TAA Office Recommendation ..... 3-36

**Aeronautical Use Facilities ..... 3-36**

Flight Training Operator ..... 3-36

Fixed Base Operator (FBO) ..... 3-37

Specialized Aviation Service Operation (SASO) ..... 3-37

Apron and Aircraft Servicing Areas..... 3-38

    Flight School Need for Hangars and Tiedown Apron Space ..... 3-38

Maintenance Repair and Overhaul (MRO) Facilities ..... 3-38

Aeronautical Use Facilities Recommendation ..... 3-38

<b>Non-Aeronautical Use Facilities</b> .....	<b>3-39</b>
Target Industry Selection Factors .....	3-43
<i>Existing Employment Sectors</i> .....	3-43
<i>Growth Outlook</i> .....	3-43
<i>Suitability of Site and Land Inventory</i> .....	3-43
<i>Stakeholder Feedback</i> .....	3-43
Quadrant Utilities .....	3-43
<i>Sewer</i> .....	3-43
<i>Water</i> .....	3-44
<i>Electric</i> .....	3-44
<i>Telecommunication</i> .....	3-44
<i>Gas</i> .....	3-44
<i>Drainage</i> .....	3-44
Development Quadrants .....	3-45
<i>East Quadrant</i> .....	3-45
<i>West Quadrant</i> .....	3-49
<i>North Quadrant</i> .....	3-53
<i>South Quadrant</i> .....	3-57
<i>Airport Quadrant</i> .....	3-61
<b>Summary</b> .....	<b>3-61</b>
Airside Facilities .....	3-61
<i>Runway Design Recommendations</i> .....	3-61
<i>Taxiway Design Recommendations</i> .....	3-62
<i>Runway Length Recommendations</i> .....	3-62
<i>Airfield Lighting Recommendations</i> .....	3-62
<i>Instrument Approach Recommendations</i> .....	3-63
Landside Aeronautical Use Facilities .....	3-63
<i>ATCT Recommendations</i> .....	3-63
<i>Flight School, FBO, SASO, and Joint Use Fire Station Recommendations</i> .....	3-63
Landside Non-Aeronautical Use Facilities .....	3-63
 <b>CHAPTER 4 - DEVELOPMENT ALTERNATIVES</b> .....	 <b>4-1</b>
<b>Chapter Summary</b> .....	<b>4-1</b>
<b>Introduction</b> .....	<b>4-3</b>
<b>Airport Development Objectives</b> .....	<b>4-3</b>
Airside Planning .....	4-4
Landside Planning .....	4-4
<b>Alternatives Development Process</b> .....	<b>4-4</b>
Airport Master Plan Input Committees .....	4-5
<b>Evaluation Categories</b> .....	<b>4-5</b>
Performance Requirements .....	4-5
Operational Capabilities .....	4-6
Land Use Compatibility .....	4-6

Environmental Impacts.....4-6

Stakeholder Feedback .....4-7

Constructability .....4-7

**Evaluation Process .....4-7**

**Airport Development Alternatives.....4-8**

Airfield Development Alternatives .....4-8

*Airfield Development Alternative 1*.....4-9

*Airfield Development Alternative 2*.....4-10

*Airfield Development Alternative 3*.....4-11

*Summary Evaluation of Airfield Development Alternatives*.....4-17

Maintenance, Repair, and Overhaul (MRO) Facility Alternatives.....4-19

*MRO Facility Alternative 1* .....4-19

*MRO Facility Alternative 2* .....4-19

*Summary Evaluation of MRO Facility Alternatives*.....4-23

Airport Facilities Alternatives .....4-25

*Airport and Community Fire Station Alternatives* .....4-25

*Summary Evaluation of Airport and Community Fire Station Alternatives* .....4-33

*TAA Administrative Building Alternatives* .....4-34

*Summary Evaluation of TAA Administrative Building Alternatives* .....4-41

*Airport Traffic Control Tower (ATCT) Alternatives* .....4-42

*Summary Evaluation of ATCT Facility Alternatives* .....4-51

Flight School/General Aviation Alternatives.....4-55

*Institutional Flight School (FAR Part 141) Alternatives* .....4-55

*Summary Evaluation of Institutional Flight School (FAR Part 141) Alternatives* .....4-63

*Flight School (FAR Part 61) Alternatives*.....4-64

*Summary Evaluation of Flight School (FAR Part 61) Alternatives* .....4-69

*Common Use Helicopter Parking Pad Alternatives* .....4-70

*Summary Evaluation of the Common Use Helicopter Parking Pad Alternatives* .....4-75

*Aircraft Storage Alternatives*.....4-76

*Summary Evaluation of Aircraft Storage Alternatives* .....4-81

Airport Land Development Alternatives.....4-82

*Airport Land Development Alternative 1*.....4-82

*Airport Land Development Alternative 2*.....4-83

*Summary Evaluation of Airport Land Development Alternatives*.....4-87

**Recommended Conceptual Development Plan .....4-89**

*Airfield Development Improvements* .....4-89

*Airport Facility Improvements*.....4-89

*Flight Schools/GA Facility Improvements*.....4-89

*Airport Land Development Improvements*.....4-90

**CHAPTER 5 - AIRPORT LAYOUT PLAN NARRATIVE ..... 5-1**

**Introduction.....5-1**

Index Sheet .....5-2

Airport Layout Plan.....5-2

**Table of Contents – Volume I**

---

Airport Data .....5-2

Part 77 Airspace Plan .....5-3

Inner/Outer Approach Plans and Runway Centerline Profiles .....5-4

Departure Surfaces .....5-4

Building Area Plan .....5-4

Land Use Plan .....5-5

Airport Property Map and Property Data .....5-5

Draft Airport Layout Plan - Disclaimer .....5-5

**Airport Layout Plan .....5-6**

Index .....5-1

Airport Layout Plan .....5-2

Airport Data .....5-3

Part 77 Airspace Plan .....5-4

Runway 6R Outer Approach Plan .....5-5

Part 77 Airspace Profiles .....5-6

Runway 6R/24L Inner Approaches - Existing .....5-7

Runway 6L/24R Inner Approaches - Existing .....5-8

Runway 15/33 Inner Approaches - Existing .....5-9

Runway 6R/24L Inner Approaches - Future .....5-10

Runway 6L/24R Inner Approaches - Future & Ultimate .....5-11

Runway 15/33 Inner Approaches - Future .....5-12

Runway 6R/24L Inner Approaches - Ultimate .....5-13

Runway 15/33 Inner Approaches - Ultimate .....5-14

Runway 6R/24L Departure Surface - Existing .....5-15

Runway 6R/24L Departure Surface - Future .....5-16

Runway 6L/24R Departure Surface - Future .....5-17

Runway 15/33 Departure Surfaces - Future .....5-18

Runway 6R/24L Departure Surface - Ultimate .....5-19

Runway Centerline Profiles .....5-20

Building Area Plan .....5-21

Land Use Plan .....5-22

Exhibit “A” Airport Property Inventory Map .....5-23

Exhibit “A” Airport Property Data .....5-24

**CHAPTER 6 - FINANCIAL IMPLEMENTATION PLAN ..... 6-1**

**Introduction .....6-1**

Implementation Schedule and Project List .....6-1

Cost Estimates .....6-2

Capital Improvement Program (CIP) .....6-6

Phasing Plan .....6-6

Sources of Capital Funding .....6-9

Summary – Master Plan Capital Improvement Program .....6-9





Environmental Action Plan .....6-9

**CHAPTER 7 - FINANCIAL FEASIBILITY ..... 7-1**

**Introduction.....7-1**

**Financial Feasibility Approach .....7-1**

**Funding Sources.....7-1**

**Federal .....7-2**

Entitlements .....7-2

Discretionary.....7-2

**Arizona Department of Transportation – Aeronautics Division (State) .....7-3**

**Arizona Department of Transportation – Federal Aid Highway Program (State).....7-3**

**Local .....7-3**

**Financial Plan.....7-4**

**Historical Review .....7-4**

**Grant History .....7-5**

**Cost Estimates and Phasing Plan .....7-6**

**Improvement Program – Project Funding Summary.....7-10**

**Summary .....7-11**

# TABLES

## CHAPTER E - EXECUTIVE SUMMARY ..... E-1

Table E-1:	FAA-Approved Aircraft Operations and Based Aircraft Forecast.....	E-3
Table E-2:	Forecasted Aircraft Operations + Based Aircraft with Both Part 61 and 141 Flight Schools .....	E-4
Table E-3:	Phase-I (0 to 5 Years) Development Program Project Costs.....	E-10
Table E-4:	Phase-II (6 to 10 Years) Development Program Project Costs.....	E-11
Table E-5:	Phase-III (11 to 20 Years) Development Program Project Costs.....	E-12
Table E-6:	Phase-IV (20+ Years) Development Program Project Costs.....	E-13
Table E-7:	Phase-I (0 to 5 Years) Estimated Capital Costs and Funding Sources .....	E-17
Table E-8:	Phase-II (6 to 10 Years) Estimated Capital Costs and Funding Sources .....	E-18
Table E-9:	Phase-III (11 to 20 Years) Estimated Capital Costs and Funding Sources .....	E-19
Table E-10:	Phase-IV (20+ Years) Estimated Capital Projects .....	E-20
Table E-11:	Sources and Uses of Capital Funding.....	E-20

## CHAPTER 0 - AIRPORT MASTER PLAN INTRODUCTION ..... 0-1

## CHAPTER 1 - INVENTORY OF EXISTING CONDITIONS ..... 1-1

Table 1-1:	Airport Attributes .....	1-5
Table 1-2:	Ryan Airfield FAA Airport Improvement Grants Since 2010.....	1-9
Table 1-3:	Instrument Approach Summary .....	1-14
Table 1-4:	Apron System Summary .....	1-20
Table 1-5:	Markings, Lighting, and Signage .....	1-21
Table 1-6:	Airport Buildings .....	1-41
Table 1-7:	Existing Available Utilities Near the Airport .....	1-44
Table 1-8:	Wind Coverages.....	1-56
Table 1-9:	Allowable Crosswind Component.....	1-56
Table 1-10:	Species of Concern on and Near the Airport .....	1-61
Table 1-11:	Hazardous Waste Sites .....	1-69
Table 1-12:	Economic Element Goals and Policies Applicable to Ryan Airfield.....	1-75
Table 1-13:	Household Income and Benefits for Pima County, Arizona.....	1-79

## CHAPTER 2 - AVIATION ACTIVITY FORECASTS ..... 2-1

Table 2-1:	Forecast Summary .....	2-2
Table 2-2:	Description of Data Sources .....	2-3
Table 2-3:	Tucson MSA Population.....	2-4
Table 2-4:	Tucson MSA Employment.....	2-5
Table 2-5:	Tucson MSA Top 5 Industries by Employment and Sales (2008-2018) .....	2-7
Table 2-6:	Tucson MSA Top 5 Industries by Employment and Sales (2018-2038) .....	2-8



Table 2-7: Tucson MSA Gross Regional Product.....2-9

Table 2-8: Regional General Aviation Airports .....2-13

Table 2-9: Itinerant General Aviation Operations .....2-14

Table 2-10: Local General Aviation Operations .....2-15

Table 2-11: Military Operations.....2-16

Table 2-12: RYN Based Aircraft.....2-17

Table 2-13: FAA TAF Summary .....2-18

Table 2-14: 2018 Airport Management Records and TAF Comparison .....2-19

Table 2-15: Itinerant General Aviation Operations Forecast.....2-20

Table 2-16: Itinerant General Aviation Operations Forecast - TAF Comparison .....2-22

Table 2-17: Local General Aviation Operations Forecast .....2-24

Table 2-18: Local General Aviation Operations Forecast – TAF Comparison .....2-25

Table 2-19: Based Aircraft Forecast.....2-26

Table 2-20: Based Aircraft Forecast – TAF Comparison.....2-28

Table 2-21: Preferred Based Aircraft Forecast by Aircraft Type .....2-28

Table 2-22: Peak Period Operations Forecast .....2-29

Table 2-23: 2018 Itinerant Operations by ARC.....2-30

Table 2-24: ARC Design Standards Comparison .....2-30

Table 2-25: Training Operations per Based Aircraft by Aircraft Type.....2-32

Table 2-26: Total Operations Forecast with Flight Training Operations.....2-33

**CHAPTER 3 - FACILITY REQUIREMENTS ..... 3-1**

Table 3-1: Runway Design Code Classification Systems .....3-2

Table 3-2: Critical Aircraft and Applicable Design Criteria.....3-3

Table 3-3: Runway Length Findings by Useful Load .....3-9

Table 3-4: Pavement Strength.....3-14

Table 3-5: Runway 6R/24L Design Standards Compliance .....3-15

Table 3-6: Existing Runway 6L/24R Design Standards Compliance .....3-16

Table 3-7: Crosswind Runway 15/33 Design Standards Compliance .....3-17

Table 3-8: RPZ Dimensions Standards .....3-18

Table 3-9: Taxiway System ADG II & TDG 2 .....3-23

Table 3-10: Taxiway System ADG I & TDG IA.....3-23

Table 3-11: Departure Surface Dimensions.....3-28

Table 3-12: Primary Surface Dimensions.....3-29

Table 3-13: Forecast Hangar Demand .....3-34

Table 3-14: Minimum Requirements for Aircraft Storage Operator .....3-34

Table 3-15: Flight Training Operator .....3-37

Table 3-16: Flight School Hangar Space.....3-37

Table 3-17: Fixed Based Operator .....3-37

Table 3-18: Aircraft Maintenance Operator.....3-38

**CHAPTER 4 - DEVELOPMENT ALTERNATIVES ..... 4-1**

Table 4-1: Summary Evaluation Matrix of Airfield Alternatives .....4-18

Table 4-2: Summary Evaluation Matrix of MRO Alternatives.....4-24

Table 4-3: Summary Evaluation Matrix of Airport and Community Fire Station Alternatives .....4-33

Table 4-4: Summary Evaluation Matrix of TAA Administration Building Alternatives .....4-41

Table 4-5: Summary Evaluation Matrix of ATCT Facility Alternatives .....4-53

Table 4-6: Summary Evaluation Matrix of Institutional Flight School (FAR Part 141) Alternatives.....4-63

Table 4-7: Summary Evaluation Matrix of Flight School (FAR Part 61) Alternatives .....4-69

Table 4-8: Summary Evaluation Matrix of Common Use Helicopter Parking Alternatives.....4-75

Table 4-9: Summary Evaluation Matrix of Aircraft Storage Alternatives .....4-81

Table 4-10: Summary Evaluation Matrix of Airport Land Development Alternatives .....4-88

**CHAPTER 5 - AIRPORT LAYOUT PLAN NARRATIVE ..... 5-1**

**CHAPTER 6 - FINANCIAL IMPLEMENTATION PLAN ..... 6-1**

Table 6-1: Phase-I (0-5 Years) Development Program Project Costs.....6-3

Table 6-2: Phase-II (6-10 Years) Development Program Project Costs.....6-4

Table 6-3: Phase-III (11-20 Years) Development Program Project Costs.....6-5

Table 6-4: Phase-IV (20+ Years) Post Planning Period Project Costs .....6-6

Table 6-5: Anticipated NEPA Actions.....6-13

**CHAPTER 7 - FINANCIAL FEASIBILITY ..... 7-1**

Table 7-1: RYN Historical and Current Operating Budget Summary .....7-5

Table 7-2: RYN Federal and State Five-Year Grant History.....7-5

Table 7-3: Phase-I (0-5 Years) Development Costs and Funding Participation .....7-7

Table 7-4: Phase-II (6-10 Years) Development Costs and Funding Participation .....7-8

Table 7-5: Phase-III (11-20 Years) Development Cost and Funding Participation .....7-9

Table 7-6: Sources and Uses of Capital Funding.....7-10

# FIGURES

<b>CHAPTER E - EXECUTIVE SUMMARY.....</b>	<b>E-1</b>
Figure E-1: Master Planning Process .....	E-2
Figure E-2: Conceptual Development Plan .....	E-7
Figure E-3: Project Phasing Plan .....	E-15
<b>CHAPTER 0 - AIRPORT MASTER PLAN INTRODUCTION .....</b>	<b>0-1</b>
<b>CHAPTER 1 - INVENTORY OF EXISTING CONDITIONS .....</b>	<b>1-1</b>
Figure 1-1: Location .....	1-3
Figure 1-2: Local Airports.....	1-7
Figure 1-3: Airport Facilities.....	1-11
Figure 1-4: Airfield Pavement Condition Index.....	1-17
Figure 1-5: Terminal Area .....	1-25
Figure 1-6: (a) Airspace for Ryan Airfield .....	1-29
Figure 1-6: (b) Airspace Classifications .....	1-31
Figure 1-7: Drainage Utilities .....	1-35
Figure 1-8: Parking, Circulation & Gates.....	1-39
Figure 1-9: Available Land & Roadway Frontage.....	1-45
Figure 1-10: Comprehensive Airport Utilities .....	1-46
Figure 1-11: Electrical Utilities .....	1-47
Figure 1-12: Water Utilities.....	1-51
Figure 1-13: Telecommunications/Fiber Optics.....	1-52
Figure 1-14: Natural Gas Utilities.....	1-53
Figure 1-15: Wastewater Utilities .....	1-54
Figure 1-16: All Weather & IFR Wind Rose .....	1-57
Figure 1-17: Section 4(f) Resources .....	1-65
Figure 1-18: Soil Classifications.....	1-67
Figure 1-19: Land Use Intensity & Aircraft Noise Exposure .....	1-73
Figure 1-20: Pima County Population by Race.....	1-79
Figure 1-21: Surface Water & Floodplains.....	1-83
<b>CHAPTER 2 - AVIATION ACTIVITY FORECASTS .....</b>	<b>2-1</b>
Figure 2-1: RYN and Nearby Airport Service Areas .....	2-11
Figure 2-2: Itinerant General Aviation Operations .....	2-14
Figure 2-3: Local General Aviation Operations .....	2-15
Figure 2-4: RYN Based Aircraft.....	2-17
Figure 2-5: Itinerant General Aviation Operations Forecast.....	2-21

## Table of Contents – Volume I

---

Figure 2-6:	Local General Aviation Operations Forecast .....	2-24
Figure 2-7:	Based Aircraft Forecast.....	2-27
Figure 2-8:	OPSNET Historic Monthly Operations .....	2-29
Figure 2-9:	Preferred Civil Local Operations Forecast with Flight Training Operations.....	2-32
Figure 2-10:	Forecast/TAF Comparison .....	2-35
Figure 2-11:	Forecast/TAF Comparison – (Forecast Levels & Growth Rates) .....	2-37

### CHAPTER 3 - FACILITY REQUIREMENTS ..... 3-1

Figure 3-1:	ASV Demand/Capacity Percent .....	3-5
Figure 3-2:	Runway Wind Coverage.....	3-6
Figure 3-3:	75 Percent of Fleet at 60 or 90 Percent Useful Load (100°F) .....	3-9
Figure 3-4:	Small Airplanes Having 10 or More Passenger Seats.....	3-10
Figure 3-5:	Small Airplanes with Fewer than 10 Passenger Seats .....	3-11
Figure 3-6:	Temperature Effects on Runway Length for Large GA Aircraft Under 60,000 pounds .....	3-12
Figure 3-7:	RYN Identified Hot Spot.....	3-13
Figure 3-8:	Airfield Considerations .....	3-19
Figure 3-9:	RPZ Considerations.....	3-20
Figure 3-10:	TDG Dimensions .....	3-22
Figure 3-11:	Part 77 Surfaces Isometric View .....	3-29
Figure 3-12:	ATCT Blind Spot .....	3-31
Figure 3-13:	Airport Development Quadrants.....	3-41
Figure 3-14:	East Quadrant Infrastructure.....	3-47
Figure 3-15:	West Quadrant Infrastructure .....	3-51
Figure 3-16:	North Quadrant Infrastructure .....	3-55
Figure 3-17:	South Quadrant Infrastructure .....	3-59

### CHAPTER 4 - DEVELOPMENT ALTERNATIVES ..... 4-1

Figure 4-1:	Typical Alternatives Development Process .....	4-5
Figure 4-2:	Airfield Development Alternative 1.....	4-13
Figure 4-3:	Airfield Development Alternative 2.....	4-14
Figure 4-4:	Airfield Development Alternative 3.....	4-15
Figure 4-5:	Maintenance, Repair, and Overhaul Alternative 1 .....	4-21
Figure 4-6:	Maintenance, Repair, and Overhaul Alternative 2 .....	4-22
Figure 4-7:	Airport and Community Fire Station Alternative 1.....	4-29
Figure 4-8:	Airport and Community Fire Station Alternative 2.....	4-30
Figure 4-9:	Airport and Community Fire Station Alternative 3.....	4-31
Figure 4-10:	TAA Administrative Building Alternative 1 .....	4-37
Figure 4-11:	TAA Administrative Building Alternative 2 .....	4-38
Figure 4-12:	TAA Administrative Building Alternative 3 .....	4-39
Figure 4-13:	ATCT Facility Alternative 1.....	4-45
Figure 4-14:	ATCT Facility Alternative 2.....	4-46
Figure 4-15:	ATCT Facility Alternative 3.....	4-47

Figure 4-16: ATCT Facility Alternative 4 .....4-48

Figure 4-17: ATCT Facility Alternative 5 .....4-49

Figure 4-18: Institutional Flight School (FAR Part 141) Alternative 1 .....4-59

Figure 4-19: Institutional Flight School (FAR Part 141) Alternative 2 .....4-60

Figure 4-20: Institutional Flight School (FAR Part 141) Alternative 3 .....4-61

Figure 4-21: Flight School (FAR Part 61) Alternative 1.....4-67

Figure 4-22: Flight School (FAR Part 61) Alternative 2.....4-68

Figure 4-23: Common Use Helicopter Parking Alternative 1 .....4-73

Figure 4-24: Common Use Helicopter Parking Alternative 2.....4-74

Figure 4-25: Aircraft Storage Alternative 1 .....4-79

Figure 4-26: Aircraft Storage Alternative 2.....4-80

Figure 4-27: Airport Land Development Alternative 1 .....4-85

Figure 4-28: Non-Aeronautical Alternative 2.....4-86

Figure 4-29: Recommended Conceptual Development Plan.....4-91

**CHAPTER 5 - AIRPORT LAYOUT PLAN NARRATIVE ..... 5-1**

**CHAPTER 6 - FINANCIAL IMPLEMENTATION PLAN..... 6-1**

Figure 6-1: Project Phasing Plan .....6-7

**CHAPTER 7 - FINANCIAL FEASIBILITY ..... 7-1**