Boise Airport Master Plan Update

December 2019

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Master Plan Update

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1. INTRODUCTION

The Federal Aviation Administration (FAA) recommends that airport master plans be updated every 5 to 10 years, or as necessary, to keep them current. The Master Plan for Boise Airport (BOI or the Airport) was last updated in 2010. Since that time, several projects have been completed at the Airport and changes have occurred in the aviation industry, as well as in local airline service. Therefore, the City of Boise (the City), sponsor of the Airport, initiated a Master Plan Update (MPU) to evaluate the Airport's capacity and role, to forecast future aviation activity, and to plan for the timely development of new or expanded facilities required to accommodate that activity.

The primary objective of the MPU is to produce a long-term development plan that will yield a safe, efficient, economical, and environmentally compliant facility to accommodate the air transportation needs of Boise and the surrounding area. Using a base year of 2015 (for purposes of aviation activity forecasting), the MPU covers a 20-year planning period (through 2035). This document serves as a written record of the Master Plan Update process; it provides the background information and describes the technical analyses and assessments that formed the basis for the MPU recommendations.

1.1 ORGANIZATION OF THIS REPORT

This MPU is organized into eight sections. The remainder of this introductory section describes the process undertaken to execute the MPU, identifies applicable planning studies that were reviewed, and provides a summary of the MPU recommendations. Subsequent sections of this report consist of the following:

- **Section 2: Existing Conditions –** presents pertinent background information about the Airport, as well as an inventory of existing facilities and conditions at the Airport and its environs to provide a foundation for subsequent planning analyses
- **Section 3: Aviation Activity Forecasts –** describes the methods and assumptions used to forecast various measures of aviation activity at the Airport over the 20-year planning period
- **Section 4: Facility Requirements –** presents an evaluation of the adequacy of existing Airport facilities against applicable design standards and forecast aviation activity and identifies facility requirements for various functional areas of the Airport
- **Section 5: Development Concepts –** describes the formulation and evaluation of Airport development concepts based on the identified facility requirements
- **Section 6: Implementation Plan –** describes the projects included in the recommended long-term development plan, as well as the anticipated timeframe for implementation and estimated costs
- **Section 7: Financial Plan –** provides information about the existing financial structure of the Airport and identifies the sources of funds that may be used to pay for the projects contained in the recommended development plan
- **Section 8: Airport Layout Plan Narrative –** describes the sheets included in the required Airport Layout Plan (ALP) set that accompanies this report

Appendices provide additional detail and background information in support of various elements of the MPU.

1.2 MASTER PLAN UPDATE ELEMENTS AND PROCESS

FAA Advisory Circular (AC) 150/5070-6B, *Airport Master Plans*,[1] outlines the development of an airport master plan, providing guidance for preparing master plans for all types and sizes of airports. Key elements of a master planning process vary in complexity and level of detail depending on the size, function, and issues of a specific airport. For BOI, key elements of the MPU included the following:

- **Scoping:** A scoping meeting was held between the consultant team and Airport staff to help develop the process by which the MPU would be conducted and to identify key elements that should be evaluated through the study.
- **Stakeholder and public engagement:** Establishment of a stakeholder and public engagement program was one of the first tasks completed prior to initiating the technical aspects of the MPU. The program was designed to encourage information sharing and collaboration among Airport management, the consultant team, Airport tenants and users, resource agencies, public officials, and residents. The program included a Technical Advisory Committee (TAC), public workshops, City Council briefings, and a project website. These elements of the program are described in **Appendix A**.
- **Technical analyses:** Technical analyses conducted in support of the MPU follow a defined process consisting of several interrelated components, including aviation activity forecasting, facility requirements analysis, concept development and selection, and implementation/financial planning.
- **Key deliverables:** Two primary deliverables of the MPU process include the MPU report and the ALP set. This document presents the MPU report. The report is a local planning document that is reviewed, but not formally approved, by the FAA. The FAA does formally approve the aviation activity forecast that underlies the technical analyses conducted through the MPU process, as well as the ALP set, which provides a graphical representation of the recommended development plan described in the report. Additional information regarding the ALP set is provided in Section 8. The ALP set includes, under separate cover, a set of drawings comprising the Exhibit A property map for the Airport. The FAA approved the aviation activity forecasts for the Airport in April 2017. A Draft ALP set was submitted to the FAA for review in August 2018. The FAA approved the Final ALP set in May 2019.
- **Airports Geographic Information Systems (AGIS):** The AGIS program helps the FAA collect various airport and aeronautical data to meet the demands of the FAA's next generation national airspace system. Since these data had not previously been collected for BOI and input into the AGIS database, this task was required as part of the MPU. This task included the collection of imagery, photogrammetry, and obstruction information for the Airport; this was conducted in compliance with AGIS policies. The imagery and survey data collected through this task were used to help prepare the ALP drawing set, as well as various exhibits included in the MPU report. Data collection and the verification process for this task were undertaken pursuant to FAA guidance contained in the following ACs:
  - AC 150/5300-16A, *General Guidance and Specifications for Aeronautical Surveys: Establishment of Geodetic Control and Submission to the National Geodetic Survey*
  - AC 150/5300-17C, *Standards for Using Remote Sensing Technologies in Airport Surveys*
  - 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*

[1] Federal Aviation Administration, Advisory Circular 150/5070-6B (Change 2), *Airport Master Plans*, January 1, 2015.

1.3 PREVIOUS STUDIES

Numerous studies completed within the past 10 years either directly or indirectly affect the future development of the Airport; therefore, they were reviewed during the MPU process. The following list identifies and briefly describes key studies that pertain to the development of the Airport and/or its immediate environs. The list does not represent all documents or information that were reviewed as part of the MPU process.

1.3.1 NATIONWIDE AND STATEWIDE STUDIES

- **National Plan of Integrated Airport Systems (NPIAS):**[2] BOI is included in the NPIAS, a 5-year plan that is continually updated by the FAA, which lists public-use airports and their development programs. The NPIAS identifies all airports in the United States (U.S.) that are considered significant components of the national aviation network; it identifies the current state of development, technology, and repair at each airport; and it provides estimates of the funding needed to bring each airport up to current standards of design, technology, and capacity. The needs identified in the NPIAS are in the national interest and are eligible for federal financial planning and development assistance.
- **FAA Terminal Area Forecast (TAF):**[3] The TAF is the official aviation activity forecast for FAA facilities and includes active airports in the NPIAS. These forecasts are prepared to meet FAA budget and planning needs, and they provide information for use by state and local authorities, the aviation industry, and the public. The TAF includes historical data and 20-year forecasts for enplaned passengers, aircraft operations, and based aircraft.
- **FAA Aerospace Forecast:**[4] This document provides a long-range forecast of aviation activity specific to broad aviation segments, rather than specific airports. Segments included in the forecast include domestic and international commercial aviation markets, air cargo, the commercial aircraft fleet, and general aviation.
- **Idaho Airport System Plan:**[5] The Idaho Airport System Plan is the Idaho Transportation Department's (ITD's) comprehensive plan for linking statewide public-use airports with those of the nation and the world. It also guides the development of airports throughout Idaho. The system plan includes the following components:
  - Idaho Airport System Plan: This report presets an evaluation of the long-term needs of each included airport, including a recommended development plan that strategically improves airport facilities.
  - Economic impact analysis: The economic benefits of each included airport are quantified to show the importance of the airport to the state and local economy.
  - Compatible land use guidelines: This report promotes compatible land use planning around airports, and it aids land use planners and local governments that have an airport within their jurisdiction.

1.3.2 LOCAL/REGIONAL STUDIES

- **Blueprint Boise:**[6] Boise's comprehensive plan guides the management of growth in the City. Within the context of the plan, BOI is in the Airport Planning Area, comprising 3,618 acres, or 5.1 percent, of the City's land area.

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[2] Federal Aviation Administration, National Plan of Integrated Airport Systems (2019-2023), September 2018.

[3] Federal Aviation Administration, *Terminal Area Forecast, Fiscal Years 2018-2045*, January 2019.

[4] Federal Aviation Administration, *Aerospace Forecast, Fiscal Years 2019-2039*, September 2018.

[5] Wilbur Smith Associates and T-O Engineers, Inc., *Idaho Airport System Plan*, 2010.

[6] City of Boise, *Blueprint Boise—Boise's Comprehensive Plan*, November 29, 2011.

Specific goals identified in the City's comprehensive plan that pertain to the Airport include the following:

- Promote compatible industrial and Airport-related development.
- Promote regional retail uses adjacent to the Airport and I-84.
- Ensure the Airport area has a high degree of accessibility from all modes of transportation.
- Accommodate expansion of Airport operations over time.
- Support safe Airport operations.
- Accommodate expansion of the Idaho National Guard operations over time.
- Recognize the Airport as a major gateway to Boise and the state of Idaho.

- **LIV Boise:** The City's vision is to make Boise the most livable city in the U.S. LIV Boise is a City initiative that promotes livability across three strategic focus areas: **L**asting environments, **I**nnovative enterprises, and **V**ibrant communities. The City began publishing a livability report in 2015 to measure progress toward LIV Boise initiatives. The most recent version of the report was published in 2017. The City is striving to implement the LIV Boise concept through all departments by fostering a culture of One City, One Team.

  The Airport contributes to the LIV Boise vision through sustainable growth, exceptional air service, and superior customer experience. Some examples of how the Airport plays a key role in helping the City achieve its vision include:[7]

  - Lasting environments – airline electric vehicles and pre-conditioned air units
  - Innovative enterprises – SkyWest maintenance facility and economic impact
  - Vibrant communities – new concessions, eLibrary, and public art

- **Transportation Action Plan:**[8] This plan establishes the City's vision for a modern, well-balanced transportation system, and it is a LIV Boise initiative. The plan identifies high-level initiatives, called Mobility Moves, that advance the City's transportation values by listing specific infrastructure improvements, programs, and areas that would most benefit from these actions. One such "Move" is "Three Best-in-Class Transit Routes," whereby investment is focused on improving the frequency and quality of three premium-service routes served by Valley Regional Transit (VRT). One of these routes (VISTA #3) provides service to the Airport.

- **Communities in Motion 2040:**[9] The Community Planning Association of Southwest Idaho (COMPASS) Board of Directors adopted this plan as the new regional long-range transportation plan for Ada and Canyon Counties in July 2014. The plan is updated every four years by forecasting growth in the region, anticipating the transportation needs to accommodate that growth, and prioritizing projects to meet those needs.

[7] https://www.iflyboise.com/ (accessed April 13, 2019).

[8] City of Boise, *Boise Transportation Action Plan*, April 2016.

[9] Community Planning Association of Southwest Idaho, *Communities in Motion 2040—Regional Long-Range Transportation Plan for Ada and Canyon Counties, Idaho*, July 2014.

1.3.3 AIRPORT STUDIES

- **2010 Master Plan Update for Boise Airport:**[10] The previous update to BOI's master plan provided the framework on which this current MPU is based. Significant development projects described in the 2010 MPU include terminal expansion, runway and taxiway improvements, parking garage expansion, a consolidated cargo facility, and development of a third parallel runway.
- **Boise Airport Air Cargo Analysis:**[11] The purpose of this study was to analyze the Airport's near-term cargo development potential. It included a review of the air cargo industry, and it evaluated local cargo demand against the capacity of existing Airport cargo facilities. The study made the following recommendations regarding the development of future air cargo facilities at BOI:
  - The timing of future cargo facility development at the Airport should consider forecast growth in air cargo volumes, as well as coordinate with existing cargo operators to assess needed on-Airport capacity.
  - The recruitment of distribution operations of companies like Amazon that produce demand for air cargo transport could be an avenue to achieving air cargo growth at the Airport.
  - Cargo exporters and importers should be encouraged to have international shipments trucked in and cleared using Boise's Customs Port. The crediting of more international shipments to Boise would enhance the statistical basis for marketing to air cargo carriers and would help ensure the Boise market does not lose federal resources allocated based on those services.
- **Boise Airport Parking Analysis:**[12] Prior to expansion of the Airport's public parking garage, a study was undertaken to quantify existing parking capacity and demand and to identify and evaluate concepts to meet future parking demand for employees, rental cars, and the public.
- **Boise Airport Task 2 Report:**[13] This report examined the physical, infrastructure, and land use opportunities and constraints that impact potential development and use of the Airport's non-aviation-related properties, including the prioritization of opportunities for utilization of Airport property. The report also confirmed improving market conditions for the industrial real estate sector in the region and the Airport submarket. In addition, the report includes a detailed assessment of opportunities and constraints at the parcel level to develop detailed implementation strategies for future property development. Four overall strategies to increase Airport return on investment and to stimulate economic development were selected:
  - Sell/exchange low quality parcels and monetize unproductive assets.
  - Acquire strategic high-value properties.
  - Extend infrastructure to improve marketability of key assets.
  - Plan for future development to create value and to solve access and infrastructure constraints.
- **F-35A Training Basing Environmental Impact Statement (EIS):**[14] This document provides an environmental analysis of the U.S. Air Force proposal to base a Pilot Training Center with the beddown of F-35A training aircraft

[10] Ricondo & Associates, Inc., *Master Plan Update for Boise Airport*, April 2010.

[11] Mead & Hunt, Inc., and Webber Air Cargo, Inc., *Boise Airport Air Cargo Analysis*, May 2013.

[12] LeighFisher, Inc., *Boise Airport Parking Analysis*, September 2013.

[13] Colliers International, *Boise Airport Task 2 Report*, September 2013.

[14] United States Air Force, *Final Environmental Impact Statement for F-35A Training Basing*, June 2012.

at one or more existing Air Force or Air National Guard bases. BOI was evaluated as one of the alternative locations for the F-35A operation.

- **14 CFR Part 150 Study:**[15] A noise study was completed for the Airport pursuant to Title 14 Code of Federal Regulations (CFR) Part 150, *Airport Noise Compatibility Planning*. The study consisted of two primary elements: Noise Exposure Maps, which depict noise contours over land uses surrounding the Airport, and a Noise Compatibility Program, which details various noise abatement and land use measures for mitigating aircraft noise in the Airport environs.

1.4 SUMMARY OF KEY MASTER PLAN UPDATE RECOMMENDATIONS

The MPU recommends a long-term development plan involving all functional areas of the Airport, including runways and taxiways, passenger terminal, general aviation, support facilities, and ground access.

A primary area of focus in this MPU is the problematic geometry of various taxiways, including conditions that may increase the risk for runway incursions at the Airport. Recommended solutions to airfield issues at the Airport include the removal and/or relocation of various taxiways, as well as threshold relocation and extension of Runway 10R-28L, along with associated lighting and instrumentation.

Another area of primary focus in this MPU is the need for expanded passenger terminal facilities. Increased airline traffic has and will continue to constrain available gate positions at the existing concourses. The MPU identifies a recommended phased and flexible plan for expanding terminal facilities to provide future gates. The recommended plan requires the relocation of rental car and employee parking facilities prior to expansion of the terminal. As such, the MPU identifies future requirements and recommended locations for these facilities, as well as for future public parking and associated ground access facilities.

The provision of facilities to support general aviation operations and tenants at the Airport is also included in the MPU, with locations for future hangar facilities identified in the plan. The MPU also expands upon current planning efforts on the southeast section of the Airport regarding the implementation of a consolidated cargo facility and an additional airline maintenance facility.

The generation of nonaeronautical revenue is important to the financial sustainability of the Airport, and the MPU recommends various locations on the Airport for such development.

Future and ultimate development of the Airport's assault strip (third runway) is also addressed in the MPU, with considerations regarding airfield and vehicle access.

[15] HNTB Corporation, *Boise Airport 14 CFR Part 150 Study Update*, December 2015.

2. EXISTING CONDITIONS

This section presents pertinent background information about the Airport, as well as presents an inventory of existing facilities and conditions at the Airport and its environs. Existing conditions documented in this section were based on information obtained from prior studies, FAA and Airport records, and discussions with tenants and Airport staff. Existing conditions were initially compiled in late 2016 and were updated throughout the MPU process as updated information was needed or became available.

2.1 BACKGROUND

2.1.1 AIRPORT LOCATION

The Airport is in southwestern Idaho, approximately 3 miles south of downtown Boise, near Interchange No. 52 on US Interstate 84 (I-84), which serves as the principal highway corridor through the region. Boise serves as Idaho’s capital and the county seat of Ada County, and it is the largest metropolitan area in the state. Ada County also encompasses the cities of Eagle, Garden City, Kuna, Meridian, and Star.

From a regional perspective, the Airport is in the Boise City–Nampa Metropolitan Statistical Area (MSA), commonly known as the Treasure Valley, which includes Ada, Canyon, Gem, Owyhee, and Boise Counties. The Treasure Valley lies in a narrow part of the Lower Snake River Valley, approximately 40 miles wide and oriented in a northwest to southeast direction. The valley is rimmed by the Boise Mountains to the north and the Owyhee Range to the southwest, with the highest peaks at approximately 8,000 feet above mean sea level (MSL).

Exhibit 2-1 depicts the regional location of the Airport within Idaho; **Exhibit 2-2** shows the location of the Airport within Ada County and in relation to the surrounding communities and airports.

2.1.2 AIRPORT HISTORY

Boise’s first municipal airport was built in 1926 on a gravel bed at the current site of Boise State University. The first commercial airmail flight in the United States passed through this airfield on April 26, 1926, carried by Varney Airlines. Four years later, Varney Airlines constructed a steel hangar and began hauling passengers from Boise. This airfield also hosted Charles Lindbergh's Spirit of St. Louis on September 4, 1927. Varney Airlines ultimately joined with other airlines to form United Airlines. United Airlines was the first to bring jet service to Boise in 1964, flying Boeing 727s. United Airlines is recognized as the airline that has operated the longest out of Boise, 90 years as of 2016.

The current Airport dates to 1936 when Boise began buying and leasing land for the Airport. In the ensuing years, various development, modernization, and expansion projects for the terminal, airfield, and support facilities were completed. By 1938, Boise had the longest runway in the United States—8,800 feet. The steel hangar for Varney Airlines was moved to the present Airport in 1939. As aircraft size increased, the hangar could no longer accommodate modern aircraft and was converted into a passenger terminal. It was part of the modern terminal facility until the completion of the new terminal in 2003.

During World War II, the Army Air Corps leased the field for use as a training base—known as Gowen Field—for B-17 Flying Fortress and B-24 Liberator bomber crews. More than 6,000 people were stationed at Gowen Field during the war as part of the 303 Bomb Group of the 8th Air Force. In 1946 the field was turned over to the City, which subsequently formed the Boise Department of Aviation and Public Transportation that leased Gowen Field to the Idaho National Guard (IDNG), which still uses it today.

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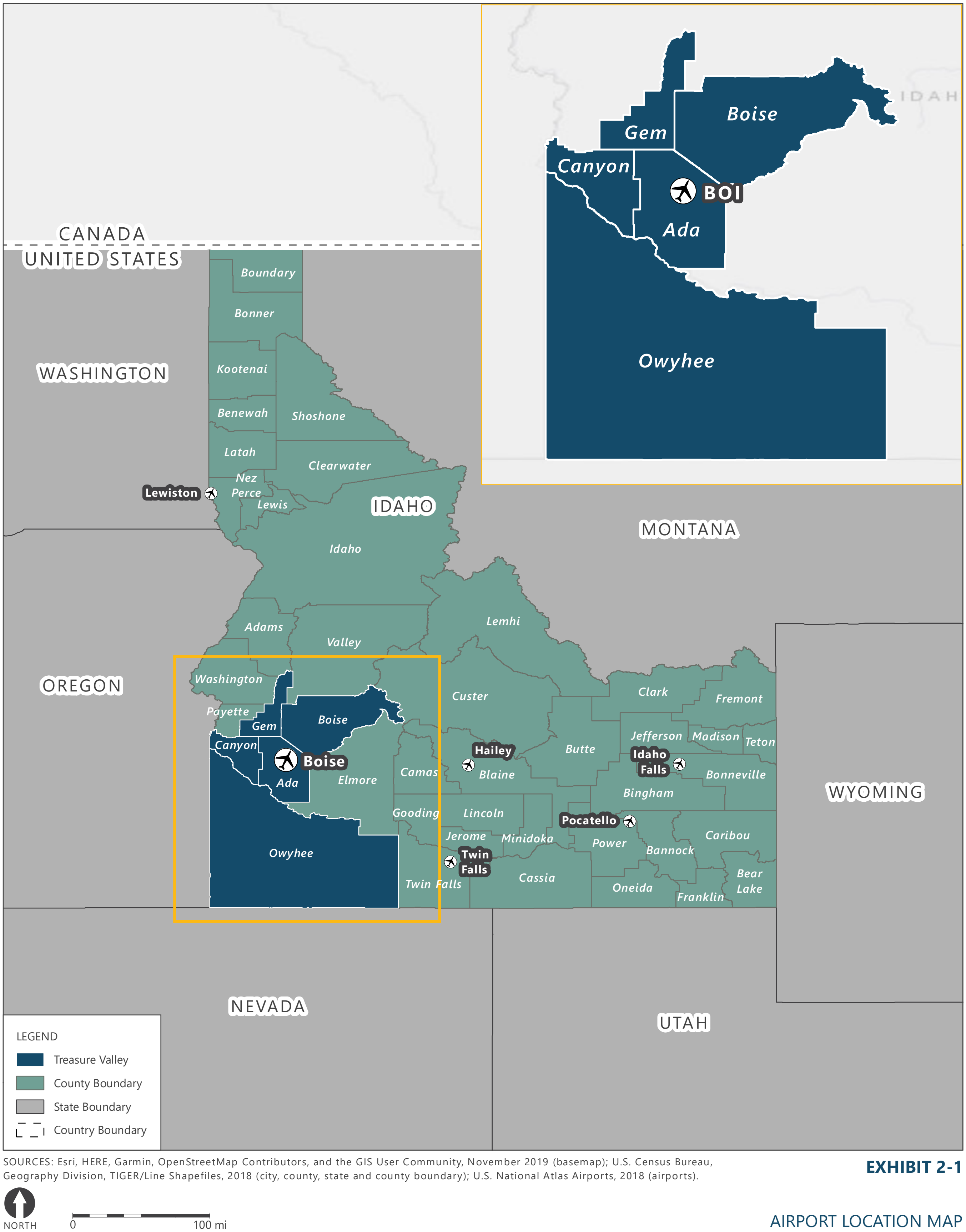

SOURCES: Esri, HERE, Garmin, OpenStreetMap Contributors, and the GIS User Community, November 2019 (basemap); U.S. Census Bureau, Geography Division, TIGER/Line Shapefiles, 2018 (city, county, state and county boundary); U.S. National Atlas Airports, 2018 (airports).

EXHIBIT 2-1

AIRPORT LOCATION MAP

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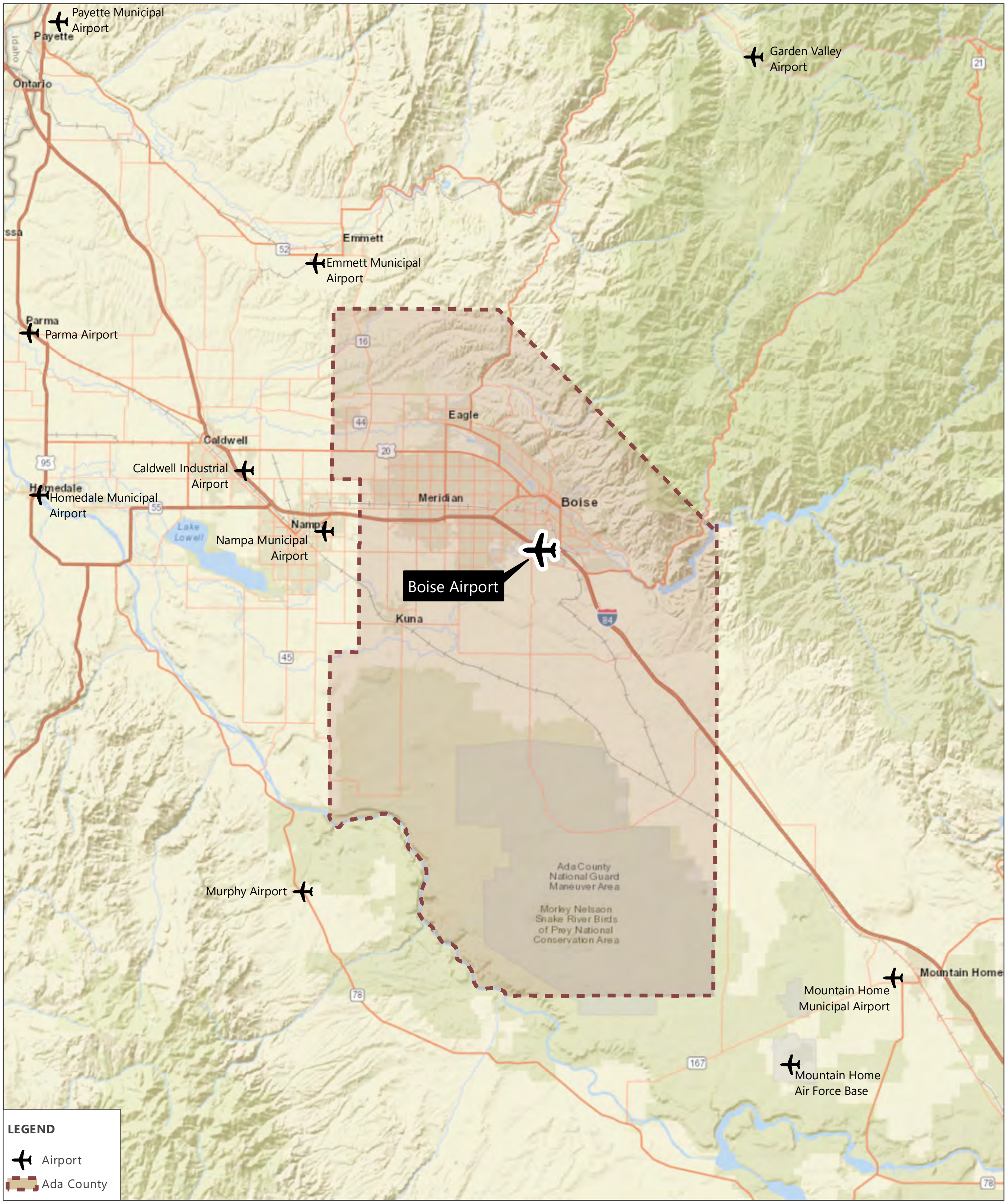

SOURCES: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community (basemap); FAA Aeronautical Data Delivery Service (airports).

EXHIBIT 2-2

AIRPORT VICINITY MAP

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In 1968 the Airport became home to the Boise Interagency Fire Center, which was created by a convergence of the Bureau of Land Management, US Forest Services, and National Weather Service firefighting operations. Other agencies joined, and the name was changed in 1993 to the National Interagency Fire Center (NIFC).

2.1.3 AIRPORT ADMINISTRATION AND CERTIFICATION

The City is the sponsor (owner) of the Airport; it also operates, maintains, and manages the Airport. The City has a mayor-council form of government. The Mayor manages the day-to-day operations of the City and provides leadership and policy direction to the six-member City Council. The Mayor and City Council members are elected at large by popular vote. The City Council serves as the City's legislative body with policy setting and budgetary authority.

The Airport is operated and managed through the City's Department of Aviation, one of 12 City departments. The Airport Director manages the day-to-day operations of the Airport under the supervision of an Airport Commission. With consent of the City Council, the Mayor appoints up to eight members of the Commission, each serving a 3-year term, including two members of the City Council, who participate as nonvoting members. The Airport Commission serves in an advisory role and meets monthly.

The Airport is certificated and maintained in accordance with 14 CFR Part 139, *Certification and Operations: Land Airports Serving Certain Air Carriers*, which establishes the standards for operating and maintaining air carrier airports. 14 CFR Part 139 requires the FAA to issue Airport Operating Certificates to operators of US airports that serve air carrier aircraft operations covered by the regulation. To obtain a certificate, an airport operator must agree to certain operational and safety standards and provide for such things as firefighting and rescue equipment. These requirements vary depending on the size of the airport and the type of operations served. BOI is a Class I airport under 14 CFR Part 139 and is required to be inspected annually by the FAA to retain its operating certificate. Class I airports serve all types of scheduled operations of air carrier aircraft designed for at least 31 passenger seats and any other type of scheduled or unscheduled air carrier aircraft operations.

2.1.4 AIRPORT ROLE AND CLASSIFICATION

2.1.4.1 NATIONAL ROLE

The FAA establishes a role for each airport included in the NPIAS. These roles are defined by one of four basic service levels, and they describe the type of service that the airport is expected to provide to the community by the end of the 5-year NPIAS planning period. BOI is categorized in the NPIAS as a Primary Commercial Service Airport. Commercial service airports are public airports that accommodate scheduled passenger service and have 2,500 or more annual enplaned passengers. Of these airports, those having more than 10,000 annual enplaned passengers are classified as primary airports.

The FAA further classifies Primary Commercial Service Airports as large hub, medium hub, small hub, or nonhub, based on the share of total annual enplaned passengers in the United States that are accommodated at the airport.[1] With more than 0.05 percent, but less than 0.25 percent, of total national enplaned passengers, BOI is classified as a **small-hub** airport. The NPIAS identifies 72 small-hub primary airports that together account for approximately

[1] A large-hub airport accounts for at least 1.0 percent of total US enplaned passengers. A medium-hub airport accounts for between 0.25 percent and 1.0 percent of total US enplaned passengers. A small-hub airport accounts for between 0.05 percent and 0.25 percent of total US enplaned passengers. Nonhub airports enplane fewer than 0.05 percent of all US enplaned passengers, but they have more than 10,000 annual enplaned passengers.

8.0 percent of all enplaned passengers, 7.0 percent of aircraft operations, and 5.0 percent of based aircraft in the United States. Based on enplaned passengers in 2017, BOI was ranked the 8th busiest small-hub airport and the 69th overall busiest airport in the United States.

2.1.4.2 STATEWIDE ROLE

The purpose of statewide airport system planning is to identify the general location and characteristics of new airports and the general expansion needs of existing facilities to meet statewide air transportation goals. In the Idaho Airport System Plan, BOI is identified as one of six commercial service airports (see Exhibit 2-1). The system plan defines commercial service airports as those that accommodate scheduled major/national or regional/commuter commercial airline service in addition to air cargo, business aviation, and all types of general aviation. **Table 2-1** compares the commercial service airports in Idaho based on various measures of aviation activity in 2017.

TABLE 2-1 COMPARISON OF IDAHO COMMERCIAL SERVICE AIRPORTS IN 2017

AIRPORT NAME	NPIAS CLASSIFICATION	ENPLANED PASSENGERS	AIRCRAFT OPERATIONS	BASED AIRCRAFT
Boise Airport	**Small hub**	**1,735,998**	**124,301**	**222**
Idaho Falls Regional Airport	Nonhub	146,352	28,497	168
Friedman Memorial Airport	Nonhub	83,480	24,144	157
Lewiston-Nez Perce County Airport	Nonhub	75,944	27,332	145
Joslin Field, Magic Valley Regional Airport	Nonhub	45,874	25,225	122
Pocatello Regional Airport	Nonhub	38,911	20,827	48

NOTE: NPIAS – National Plan of Integrated Airport Systems
SOURCE: Federal Aviation Administration, *Terminal Area Forecast, Fiscal Years 2018-2045*, January 2019.

2.1.4.3 LOCAL/REGIONAL ROLE

The Airport is an important transportation hub for southern Idaho, accommodating all facets of aviation, including general aviation, commercial airline service, military, and air cargo. As of May 2019, the Airport is served by seven airlines that offer nonstop flights to 20 destinations with connecting flights to thousands of cities worldwide.[2] The Airport is also a major US Forest Service aviation firefighting base, and it supports regional firefighting coordination through the NIFC.

Because of, and in addition to, the aircraft operations/services accommodated at the Airport, BOI also contributes significant economic benefits to the region. As part of the Idaho Airport System Plan, an economic impact study was conducted for each airport. Results of the economic impact study determined that 14,021 people are employed at or because of the Airport, resulting in a payroll of approximately $451.7 million. The total economic activity resulting from the Airport, which considers the dollars generated directly on-Airport and indirectly through off-Airport visitor activity, such as lodging, shopping, and dining, plus the associated multiplier effect, was determined to be approximately $1.26 billion annually for the local economy.[3]

[2] City of Boise, https://www.iflyboise.com/ (accessed May 3, 2019).

[3] Wilbur Smith Associates and T-O Engineers, Inc., *Idaho Airport System Plan*, 2010.

2.1.5 METEOROLOGICAL CONDITIONS

Boise and the Treasure Valley experience a four-season, high-desert climate. Meteorological conditions that have an important role in aircraft performance and airport planning include temperature, precipitation, visibility and cloud ceiling height, and wind. Temperature is a critical consideration in determining the runway length required for takeoff. A wet pavement suface affects the runway length required for landing. The amount of snow on the airfield also affects aircraft braking and helps determine requirements for snow removal equipment (SRE) and storage facilities at the Airport. **Table 2-2** summarizes temperature and precipitation data at the Airport from 1981 to 2010.

The prevalence of various combinations of visibility and cloud ceiling heights affects Airport capacity, the rules and procedures under which pilots are required to operate aircraft at and in the vicinity of the Airport, and the required instrumentation and signs/markings on the Airport's runways. Conditions related to visibility and cloud celing height are grouped into two categories: visual meteorological conditions (VMC) and instrument meteorological conditions (IMC). VMC is defined as a cloud ceiling height of at least 1,000 feet above ground level (AGL) and visibility greater than 3.0 statute miles. IMC is defined as a cloud ceiling height lower than 1,000 feet AGL and/or visibility less than 3.0 statute miles. Wind intensity and direction help determine which runway(s) should be used. On average, prevailing winds at the Airport are from the northwest or southeast.

TABLE 2-2 SUMMARY OF BOI METEOROLOGICAL CONDITIONS

TEMPERATURE AND PRECIPITATION (1981–2010)[1]						VISIBILITY AND CLOUD CEILING HEIGHTS (2007–2016)[2]					
MONTH	MEAN DAILY MAX TEMP °F	MEAN DAILY MIN TEMP °F	MEAN DAILY TEMP °F	MEAN PRECIP. (INCHES)	MEAN SNOW-FALL (INCHES)	% VMC	% IMC	IMC CAT I (% OF TOTAL)	IMC CAT I (% OF IMC)	IMC CAT II/III (% OF TOTAL)	IMC CAT II/III (% OF IMC)
January	37.8	24.7	31.3	1.24	5.1	81.0%	19.0%	14.1%	74.5%	4.8%	25.5%
February	44.7	28.3	36.5	0.99	2.8	93.7%	6.3%	4.3%	68.9%	2.0%	31.1%
March	54.6	34.4	44.5	1.39	1.3	98.5%	1.5%	1.0%	69.4%	0.4%	30.6%
April	62.3	39.3	50.8	1.23	0.3	99.3%	0.7%	0.6%	89.6%	0.1%	10.4%
May	71.6	46.5	59.1	1.39	0.0	99.5%	0.5%	0.4%	77.1%	0.1%	22.9%
June	81.3	53.7	67.5	0.69	0.0	99.6%	0.4%	0.3%	73.1%	0.1%	26.9%
July	91.2	60.4	75.8	0.33	0.0	99.9%	0.1%	0.1%	45.5%	0.1%	54.5%
August	89.7	59.6	74.7	0.24	0.0	99.6%	0.4%	0.4%	93.5%	0.0%	6.5%
September	78.8	51.0	64.9	0.58	0.0	99.7%	0.3%	0.3%	78.3%	0.1%	21.7%
October	64.8	40.9	52.8	0.75	0.1	98.1%	1.9%	1.4%	74.5%	0.5%	25.5%
November	48.2	31.9	40.0	1.35	2.6	95.6%	4.4%	3.7%	83.9%	0.7%	16.1%
December	37.5	24.0	30.7	1.55	7.0	87.4%	12.6%	9.1%	72.0%	3.5%	28.0%
Annual/Total	**63.5**	**41.2**	**52.4**	**11.73**	**19.2**	**96.0%**	**4.0%**	**3.0%**	**74.2%**	**1.0%**	**25.8%**

NOTES:
CAT – Category
VMC – Visual Meteorological Conditions
IMC – Instrument meteorological Conditions
1 National Oceanic and Atmospheric Administration, National Climatic Data Center, *Summary of Monthly Normals (1981-2010)*, (station: Boise Air Terminal).
2 Data obtained and analyzed from BOI's on-site automated surface observing system, with 87,104 hourly recorded observations from January 1, 2007, to December 31, 2016. VMC occurs when the cloud ceiling is greater than 1,000 feet and visibility is greater than 3 statute miles. IMC occurs when the cloud ceiling is less than 1,000 feet and/or visibility is less than 3 statute miles. CAT II/III IMC occurs when the cloud ceiling is less than approximately 250 feet or visibility is less than approximately 1 statute mile. For purposes of this table, CAT I IMC occurs during IMC when cloud ceiling heights and visibility are greater than CAT II/III.
SOURCES: As noted in footnotes 1 and 2 above.

2.2 INVENTORY OF EXISTING AIRPORT FACILITIES

This section describes the existing Airport facilities, including airfield, passenger terminal, tenant and support, ground access, and utilities and stormwater facilities. **Exhibit 2-3** depicts the extent of Airport property and the Airport layout. In total, the Airport encompasses approximately 5,100 acres.

2.2.1 AIRFIELD FACILITIES

The airfield includes those facilities necessary to support the movement and operation of aircraft, including runways, taxiways, and apron areas, along with associated markings, lighting systems, and instrumentation. **Exhibit 2-4** depicts these facilities. The Airport Reference Point is located at latitude 43° 33′ 51.71″ N and longitude 116° 13′ 22.28″ W; the Airport elevation (the highest point on any runway) is 2,871 feet above MSL.

2.2.1.1 RUNWAYS

The existing runway configuration consists of two parallel runways: Runway 10L-28R and Runway 10R-28L. The runways are oriented northwest–southeast and have a centerline-to-centerline separation of 700 feet.

- **Runway 10L-28R:** This runway is 10,000 feet long and consists of asphalt pavement over base and subbase material and is grooved to improve surface drainage and to increase aircraft braking action. The runway was last resurfaced in 2014.
- **Runway 10R-28L:** The primary runway at the Airport is 9,762 feet long; it consists of grooved asphalt pavement. The runway is adjacent to the IDNG apron but is used by all types of aircraft operators.
- **Assault Strip:** The 5,000-foot-long assault strip was constructed south of Gowen Road in 2002 with funding from the Department of Defense to support operations for C-130 crews associated with the Idaho Air National Guard (IDANG). Although owned and controlled by the City, the ING has preferential use of the assault strip. Civilian use of the strip is allowed by permission and typically consists of helicopter training activity.

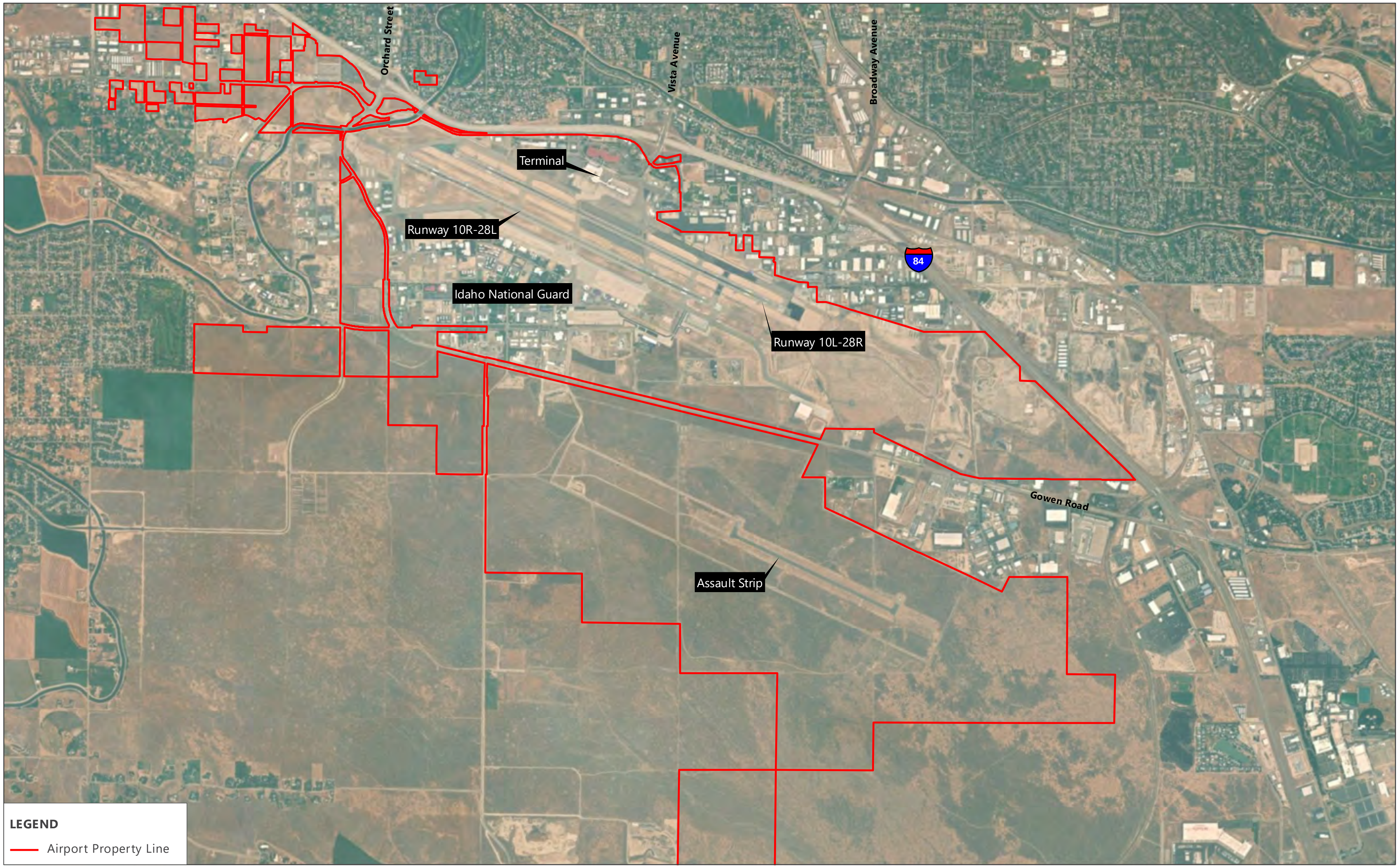
Air traffic control tower (ATCT) controllers assign runway use; they consider factors such as safety, weather, traffic demand, runway capacity, direction of flight, and prescribed runway-use procedures. Aircraft arrive and depart to the east (east flow) or to the west (west flow) depending on weather conditions. In general, runway use between the two runways is approximately even, with arrivals and departures to the east in the morning and to the west in the afternoon. **Table 2-3** summarizes the runway use at the Airport. In general, airline operations favor arrivals and departures on Runway 10L-28R due to the proximity of the runway to the passenger terminal and airline gates. Corporate jet aircraft use Runway 10R-28L more frequently. Military aircraft and helicopters primarily use Runway 10R-28L, which is located closer to the IDNG facilities on the south side of the Airport.

Table 2-4 summarizes the characteristics of the Airport's two runways and assault strip.

TABLE 2-3 ESTIMATED RUNWAY USE

CONFIGURATION	RUNWAY	% OF TOTAL OPERATIONS	% OF TOTAL FLOWS	CONFIGURATION	RUNWAY	% OF TOTAL OPERATIONS	% OF TOTAL FLOWS
East Flow Departures	10L	29%	52%	East Flow Arrivals	10L	26%	58%
	10R	23%			10R	32%	
West Flow Departures	28L	19%	48%	West Flow Arrivals	28L	19%	42%
	28R	29%			28R	23%	

SOURCE: HNTB Corporation, *Boise Airport 14 CFR Part 150 Study Update*, December 2015.



SOURCES: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community (aerial basemap); Power Engineers (Airport property line).

EXHIBIT 2-3

AIRPORT LAYOUT

NORTH 0 4,000ft

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SOURCES: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community (aerial basemap); Power Engineers (Airport property line); Quantum Spatial aerial data collection and planimetric base mapping, September 2016.

NORTH 0 850 ft

EXHIBIT 2-4

AIRFIELD FACILITIES

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TABLE 2-4 RUNWAY CHARACTERISTICS

RUNWAY CHARACTERISTICS	RUNWAY				
	10L	28R	10R	28L	ASSAULT STRIP
Dimensions (feet)	10,000 x 150		9,762 x 150		5,000 x 90
Surface	Asphalt/grooved, in good condition		Asphalt/grooved, in good condition		Asphalt
Weight Bearing Capacity[1]	PCN 105 /F/C/W/T		PCN 76 /F/B/W/T		--
Single Wheel (pounds)	100,000		100,000		--
Double Wheel (pounds)	210,000		210,000		--
Double Tandem (pounds)	446,000		430,000		--
Dual Double Tandem (pounds)	947,000		994,000		--
Runway Edge Lights	High Intensity		High Intensity		--
Elevation (feet above mean sea level)	2,830.6	2,871.7	2,824.2	2,858.3	--
Gradient	0.41%	0.41%	0.35%	0.35%	--
Blast Pad Width (feet)	200	200	200	200	--
Declared Distances (feet)[2]					
TORA	10,000	10,000	9,762	9,762	--
TODA	10,000	10,000	9,762	9,762	--
ASDA	10,000	10,000	9,762	9,762	--
LDA	10,000	10,000	9,762	9,762	--
Runway lighting					
High Intensity Runway Edge Lights	•		•		--
Centerline	--	--	•	•	--
Touchdown Zone	--	--	•	•	--
Approach Lighting[3]	REIL	--	ALSF-2	MALSR	--
RVR Equipment[4]	--		Touchdown, midfield, rollout		--
Markings[5]	Non-precision	Precision	Precision	Precision	Centerline
Visual Approach Aids[6]	4-light PAPI (3.00 degrees glide path)		4-box VASI (3.00 degrees glide path)		--
Navigational Aids/Instrument Approaches[7]	GPS, VOR, DME	ILS, LOC, GPS	ILS, LOC, GPS, VOR, DME, NDB	GPS, VOR, DME	--
Runway Centerline to Runway Centerline Separation (feet)	700				N/A
	N/A		5,450		

NOTES:
1 Runway pavement strength items: PCN – Pavement Classification Number; F/C/W/T – flexible pavement type with low strength and no tire pressure limits; F/B/W/T – flexible pavement type with medium strength and no tire pressure limits
2 Distances related to runway takeoff and landing requirements: TORA – Take-off Run Available; TODA – Take-off Distance Available; ASDA – Accelerate Stop Distance Available; LDA – Landing Distance Available
3 REIL – Runway End Identifier Lights; ALSF-2 – High Intensity Approach Lighting System with Sequenced Flashing Lights; MALSR – Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights
4 RVR – Runway Visual Range
5 Precision markings include designation, centerline, threshold, aiming point, touchdown zone, and side stripe markings. Non-precision markings lack touchdown zone markings.
6 PAPI – Precision Approach Path Indicator; VASI – Visual Approach Slope Indicator
7 GPS – Global Positioning System; VOR – Very High Frequency Omnidirectional Radio Range; DME – Distance Measuring Equipment; ILS – Instrument Landing System; LOC – Localizer; NDB – Nondirectional Radio Beacon

SOURCE: Federal Aviation Administration, Airport/Facility Directory, April 25, 2019.

2.2.1.2 TAXIWAYS

The taxiway system at the Airport, as depicted on Exhibit 2-4, consists primarily of two parallel taxiways and several connecting taxiways and taxilanes. **Table 2-5** lists the dimensions of each taxiway and taxilane.

TABLE 2-5 TAXIWAY CHARACTERISTICS

TAXIWAY	WIDTH	SHOULDER	TAXIWAY	WIDTH	SHOULDER	TAXIWAY	WIDTH	SHOULDER
Taxiway A	75′	25.0′	Taxiway B	75′	25′	Taxiway G	130′	25′
Taxilane A1	45′	N/A	Taxiway B1	130′	25′	Taxiway H	75′	10′
Taxilane A2	45′	N/A	Taxiway B2	75′	25′	Taxiway J	75′	20′
Taxilane A3	75′	10.0′	Taxiway B3	75′	25′	Taxilane K	75′	30′
Taxilane A4	75′	7.5′	Taxiway C	80′	25′	Taxiway M	130′	25′
Taxilane A5	50′	N/A	Taxiway D	75′	25′	Taxilane N	50′	10′
Taxilane A6	60′	N/A	Taxiway E	130′	25′	Taxiway S	50′	20′
Taxilane A7	60′	N/A	Taxiway F	75′	33′			

SOURCES: Ricondo & Associates, Inc., January 2017; Quantum Spatial, Inc., September 2016 (aerial data and planimetric base mapping).

Runway 10L-28R has a full-length parallel taxiway (Taxiway A) located north of the runway, with a centerline-to-centerline separation of 400 feet from the runway. This taxiway is constructed of asphalt pavement and provides access to the passenger terminal, general aviation (GA), NIFC, and cargo facilities on the north side of the airfield.

Runway 10R-28L has a partial parallel taxiway (Taxiway B) located south of the runway, with a centerline-to-centerline separation of 437.5 feet from the runway. Most of this taxiway is constructed of concrete pavement, and the taxiway provides access to the IDANG apron. A restricted access taxiway is located south of Taxiway B providing access to the IDNG helicopter apron. Taxiways F and K interconnect with Taxiway B to provide access to GA and cargo facilities on the southwest portion of the airfield. Taxiway S is the newest taxiway at the Airport, constructed in 2016 to provide airfield access to a SkyWest Airlines maintenance facility. This taxiway is constructed of asphalt pavement and extends from the east end of Taxiway B.

The FAA identifies hot spots as locations on an airfield with a history of potential risk of collisions or runway incursions and where heightened attention by pilots is necessary. Exhibit 2-4 depicts one FAA designated hot spot (HS-1) located at the intersection of Taxiways J and W. Aircraft taxiing along Taxiway A to Runway 10L have proceeded onto Taxiway J when given instructions to hold short of Taxiway J or Runway 10L.

2.2.1.3 APRONS

Major apron areas are depicted on Exhibit 2-4; they are predominantly associated with terminal and tenant facilities. The terminal apron surrounds the terminal building/concourses and provides for aircraft ground movements to and from gate positions, including remote parking areas. Large GA aprons are adjacent to fixed-base operator (FBO) facilities and provide aircraft tiedown and parking space. Several smaller pavement areas surround other GA tenants, and they may be used for parking or maneuvering aircraft to/from hangars. FedEx and UPS occupy the largest cargo aprons, with a smaller apron used by Western Air Express. Aprons used by the IDNG include the main aircraft apron (east and west) along Taxiway B, a helicopter apron, and arm/disarm pads.

Other than terminal and tenant-leased apron areas, two hold/deicing pads are located on the airfield: one near the Runway 28R threshold and one on the northwest corner of the airfield. Although these aprons can accommodate deicing operations, most deicing activity involving commercial aircraft occurs on the terminal apron. The deicing pads are more often used as aircraft holding or remote parking areas. The deice pad adjacent to the Runway 28R threshold is also used for the parking of aircraft utilizing US Customs and Border Protection (CBP) services.

2.2.1.4 PAVEMENT CONDITIONS

A pavement maintenance-management program has been implemented at the Airport to support decisions about the timing and type of maintenance and rehabilitation activities that should be completed on Airport pavements to maintain an acceptable surface operational condition and adequate load-carrying capacity. This program complies with FAA AC 150/5380-6A, *Guidelines and Procedures for Maintenance of Airport Pavements*, and FAA Grant Assurance Number 11, which requires airports to have a pavement maintenance-management program in place before federal funds will be allocated for pavement improvement projects.

2.2.1.5 AIRFIELD LIGHTING

Airfield lighting is necessary at all airports that accommodate aircraft operations during nighttime hours or during inclement weather conditions. Such lighting allows pilots to identify the airport from the air and helps them maneuver safely on the ground during reduced visibility conditions. This section describes the various airfield lighting components at the Airport:

- **Rotating beacon:** An airport's beacon universally indicates the location and presence of the airport at night or during low visibility conditions. The rotating beacon at BOI is located on top of the ATCT and is continuously operated during nighttime hours (between dusk and dawn) and during daytime hours under IMC.
- **Runway lighting:** Runway lights allow pilots to identify the edges of the runway, and they assist pilots in determining the runway length remaining during periods of darkness and reduced visibility. Table 2-4 indicates the runway lighting systems installed on each runway at the Airport. These systems include the following:
  - Threshold lighting: Each threshold of both runways is equipped with a colored split lens lighting system. The lens indicating the end of the runway for the pilot of a departing aircraft is red, while the other lens, which indicates the start of the runway for the pilot landing an aircraft, is green.
  - Edge lighting: Both runways are equipped with high intensity runway lights (HIRL), which allow pilots to identify the edges of the runway, and they assist pilots in determining the runway length remaining during periods of darkness and restricted visibility.
  - Approach lighting: Runway end identifier lights (REIL) provide positive identification of the approach end of Runway 10L to pilots; they consist of a pair of synchronized flashing lights located on each side of the runway threshold. Runway 10R is equipped with a high intensity approach lighting system with sequenced flashing lights (ALSF-2), which extends from the runway threshold out to 2,400 feet. It provides visual information on runway alignment, height perception, roll guidance, and horizontal references for Category II/III instrument approaches. Runway 28L has a medium intensity approach lighting system with runway alignment indicator lights (MALSR), an arrangement of white and red lights with crossbars sited at specific intervals along the approach path from the runway threshold out to 1,400 feet.
- **Taxiway and taxilane lighting:** All the major taxiways at the Airport are equipped with blue medium intensity taxiway lights (MITL). Although none of the existing taxilanes has a lighting system, overhead lighting fixtures in the primary ramp areas assist in visual guidance during nighttime operations.

2.2.1.6 AIRFIELD MARKINGS AND SIGNAGE

Airfield markings and signage provide useful information to both pilots and ground vehicle operators. Runway markings at BOI consist of precision and non-precision markings. Precision markings include designation, centerline, threshold, aiming point, touchdown zone, and side stripe markings. Non-precision markings lack touchdown zone markings. Runway 10L has non-precision markings, while all other runway ends have precision markings. All markings on both runways are reported to be in good condition. The assault strip has centerline markings.

- **Designation markings:** Runway numbers and letters are determined from the approach direction. The runway number is the whole number nearest one-tenth the magnetic azimuth of the centerline of the runway, measured clockwise from magnetic north.
- **Centerline markings:** The center of the runway is marked to provide alignment guidance during takeoff and landings. The centerline markings consist of a line of uniformly spaced stripes and gaps.
- **Threshold markings:** Runway thresholds at BOI consist of 12 longitudinal stripes located symmetrically about the runway centerline, indicating a runway with a width of 150 feet.
- **Aiming point markings:** Aiming point markings are also known as fixed-distance markers. They are found on runways longer than 4,000 feet and used by jet aircraft. Located 1,000 feet past the approach end of the runway, they mark the spot where a jet on a normal glidepath would touch down.
- **Touchdown zone markings:** Touchdown zone markings are a series of stripes spaced at 500-foot intervals, extending from the threshold of the runway to a point near the runway midpoint. They provide distance information to the pilot based on the number of parallel bars.
- **Side stripe markings:** Side stripe markings provide a visual contrast of the boundaries of the usable runway surface. These markings consist of one solid white line on each side of the runway.

Other markings on the airfield include taxiway and taxilane centerline markings, taxiway and runway hold position markings, apron markings, aircraft parking position markings, and helicopter landing area markings. In addition, a compass rose is painted on the east deice pad adjacent to the Runway 28R threshold, which allows aircraft to maneuver on and be aligned with the different magnetic headings marked on the pavement for purposes of calibrating magnetic compasses on aircraft.

Illuminated airfield signs at the Airport display instruction and guidance information to the operators of aircraft and ground vehicles. Standard airfield signage is used to indicate an intersection of or an entrance to a runway, taxiway, or other critical movement area. Other signage includes mandatory instruction signs and directional signs.

2.2.1.7 NAVIGATIONAL AIDS

A variety of equipment supports the safe and efficient navigation of aircraft to, from, and near the Airport, and equipment provides pertinent weather information to pilots operating at the Airport. This equipment consists of visual navigational aids, electronic navigational aids, and weather reporting equipment.

Visual Navigational Aids

Visual navigational aids provide important visual cues for pilots operating at the Airport; they do not require the use of onboard receiving instruments. Visual navigational aids available at the Airport include the following:

- **Wind cones:** Wind cones are the most basic navigational aid available at the Airport; they provide pilots with existing wind conditions and direction. Wind cones at BOI are located near the ends of the runways.

- **Visual slope indicators:** To aid pilots in judging the correct approach slope of the aircraft toward the touchdown zone of the runway, several effective visual slope indicators have been developed. Runway 10R-28L is equipped with a two-bar visual approach slope indicator (VASI) at each end consisting of two wingbars, each having two light units. The two wingbars are located on the left side of the runway approach end. Runway 10L-28R is equipped with a precision approach path indicator (PAPI) at each end consisting of four lights installed in a row perpendicular to the runway. Both VASI and PAPI systems operate by showing pilots a combination of red and white lights, which indicate the slope at which the aircraft is descending toward the touchdown point.

Electronic Navigational Aids

Electronic navigational aids are established to maintain accurate navigation using ground-based transmission facilities and onboard receiving instruments. Electronic navigational aids can be used for en route navigation, as well as for instrument approaches to a runway. The electronic navigational aids installed at or near the Airport include the following:

- **Instrument landing system:** Runways 28R and 10R are equipped with an instrument landing system (ILS) that provides both horizontal and vertical guidance to pilots making instrument approaches to the runway. The ILS projects a radio beam from the end of the runway that fans out along an aircraft's landing approach. The resultant path is a straight line to the runway, extending 5 to 7 miles from the threshold. It is set for a fixed vertical slope of approximately 3.0 degrees. The ILS includes the following primary components installed at the Airport:
  - Localizer: A localizer provides directional guidance along the extended centerline of a runway. Localizer antennas are installed off the approach ends of Runways 10L and 28L.
  - Glideslope: A glideslope provides vertical guidance toward the runway touchdown point, usually at a horizontal slope of approximately 3.0 degrees. Glideslope equipment is installed near the approach ends of Runways 10R and 28L.
  - Marker beacons: Marker beacons are located along the localizer approach path at fixed distances; they convey to the pilot precise distance location information from the runway threshold during the ILS approach.
- **VOR/VORTAC:** The very high frequency (VHF) omnidirectional radio range (VOR) is a navigational aid. A VOR ground transmitter radiates individual signals in all directions. Conventionally, 360 different tracks away from the VOR are used, each separated from the next by 1.0 degree, and each with its own direction related to magnetic north. Each of these 360 VOR courses is called a radial. Using an onboard VOR indicator coupled with a VHF navigation radio, a pilot can indicate the desired course and the angular deviation from that course, as well as navigate an aircraft directly to or from the VOR station along any of the 360 radials. Many civil VORs have distance measuring equipment (DME) capability and are known as VOR/DMEs.

  A VORTAC combines a VOR/DME ground station with a tactical air navigation system (TACAN), which is the military equivalent of a VOR. The result for a civil pilot using a VORTAC is the same as using a VOR/DME—both VOR and DME information is available. The Boise VORTAC is located at the Airport approximately 5,000 feet southeast of the Runway 28L threshold; it is used for both en route navigation and instrument approaches.

Weather Reporting Equipment

The availability of accurate and timely weather information at BOI is essential for enhancing the safety of aircraft operations at the Airport. This information is used by pilots, ATCT controllers, and Airport operations personnel. Weather reporting equipment installed at the Airport includes an automated surface observing system (ASOS), which is located south of the Runway 10R threshold and used to measure and record weather conditions by using a variety of sensors. The ASOS unit is operated and controlled cooperatively by the National Weather Service and the FAA, which distributes the information to pilots. The ASOS station records meteorological conditions, such as temperature, visibility, precipitation types and amounts, wind direction and speed, cloud ceiling, and barometric pressure, among other information.

2.2.2 TERMINAL AREA FACILITIES

Terminal area facilities at the Airport include the passenger terminal building and terminal apron, which are located adjacent to the center of the airfield, north of Runway 10L-28R and Taxiway A. Other facilities that support the terminal include the terminal curb and roadway, vehicle parking, and rental car staging areas. **Exhibit 2-5** depicts the BOI terminal area.

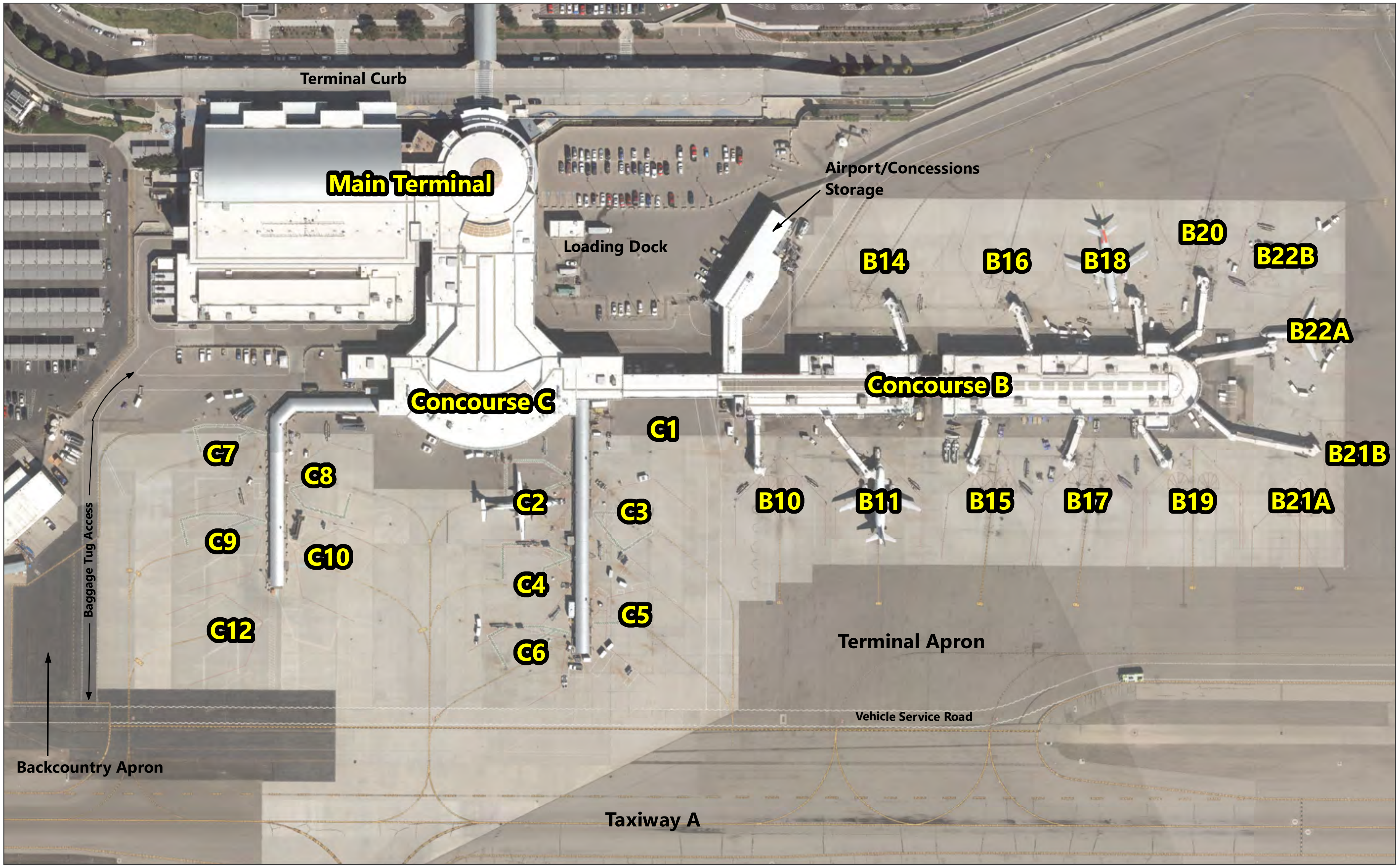
2.2.2.1 PASSENGER TERMINAL BUILDING

The passenger terminal building consists of three primary components—the main terminal, one connected concourse (Concourse B), and an integrated ground load concourse (Concourse C)—with a total area of approximately 418,000 square feet. **Table 2-6** presents the general space allocation of the terminal building. **Exhibit 2-6** depicts the general location of key facilities within the terminal building.

TABLE 2-6 PASSENGER TERMINAL SPACE ALLOCATION

	MAIN TERMINAL					CONCOURSE B			CONCOURSE C	
AREA USE	BASEMENT	LEVEL 1	LEVEL 2	LEVEL 3	TOTAL	LEVEL 1	LEVEL 2	TOTAL	TOTAL	TOTAL
Break rooms	1,077		1,774	211	3,062				855	3,917
Concessions	13,339	1,845	35,657		50,842		4,583	4,583	1,701	57,125
Concourse/holdrooms							37,560	37,560	15,305	52,864
Inbound baggage[1]		43,965			43,965					43,965
Mezzanine				4,699	4,699					4,699
Miscellaneous[2]	14,338	8,425	16,558	7,042	46,363	3,485	5,320	8,805	2,504	57,672
Offices[3]		8,117	22,312	24,243	54,672	9,777		9,777	791	65,240
Outbound baggage		23,197			23,197					23,197
Passenger lobby		14,760	36,651		51,411					51,411
Rental car lobby		6,844			6,844					6,844
Restrooms	405	1,934	3,160	699	6,198		2,340	2,340	1,251	9,789
Security		378	614		992					992
Systems[4]	14,686	3,052	2,575	6,249	26,561				2,036	28,597
Walkway		1,772	4,695	1,606	8,074		1,490	1,490	2,518	12,082
Total[5]	**43,845**	**114,288**	**123,997**	**44,749**	**326,879**	**13,262**	**51,292**	**64,554**	**26,961**	**418,395**

NOTES:
Areas are in square feet.
1 Inbound baggage includes baggage claim areas and inbound baggage makeup areas.
2 Miscellaneous area includes storage space, stairs, and service corridors.
3 Offices include airline, rental car, Airport administration, and operations offices.
4 Systems include mechanical, electrical, computer, and telecommunications support areas.
5 Totals may not add to the sum of the columns due to rounding.
SOURCE: CSHQA and HNTB Corporation, *Boise Air Terminal Project, Passenger Terminal Building—Schematic Design Manual*, February 15, 1999.



SOURCE: GeoTerra, Inc., September 2016 (aerial basemap).

EXHIBIT 2-5

TERMINAL AREA FACILITIES

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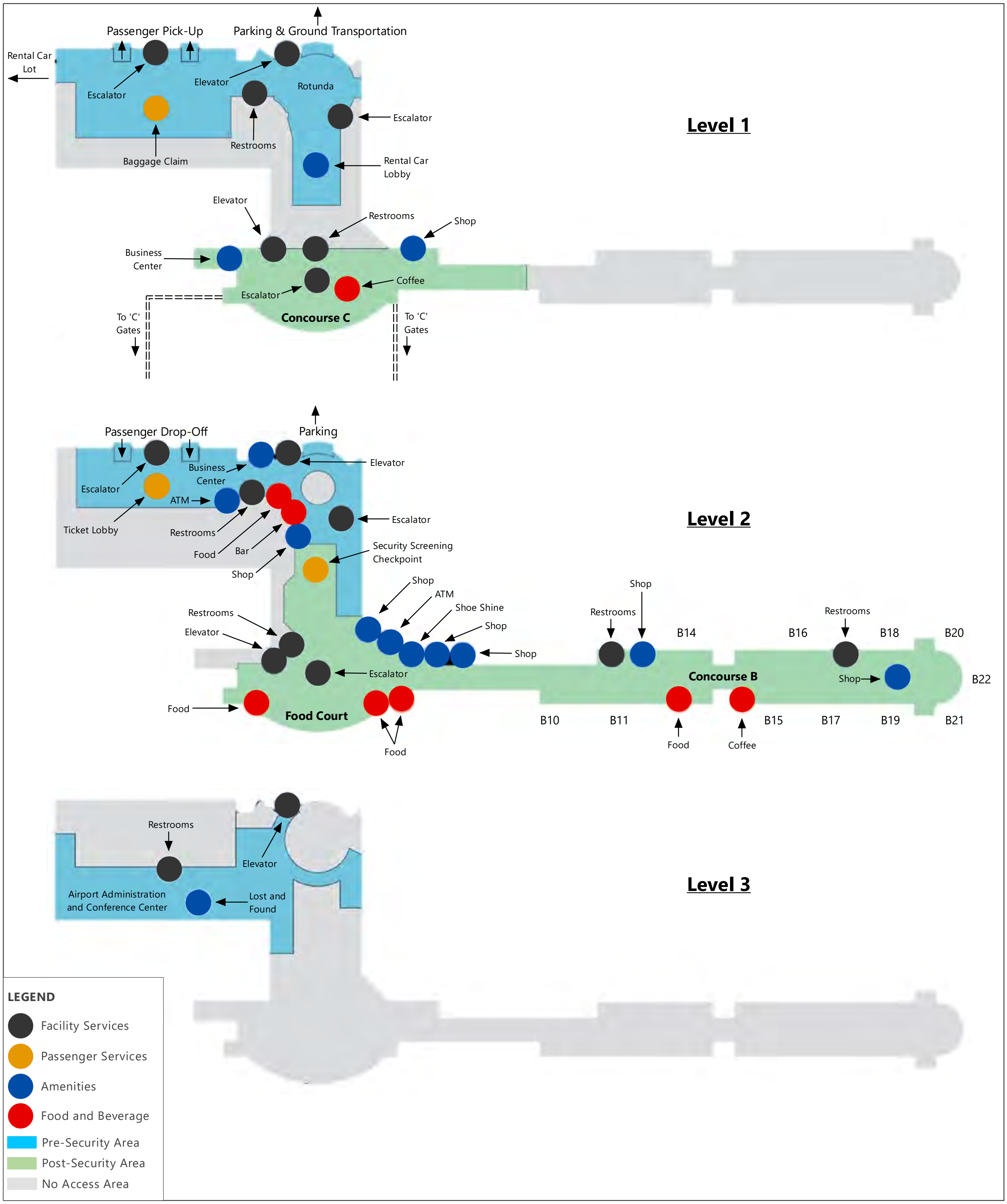

SOURCE: https://www.iflyboise.com/airport-guide/airport-map (accessed May 20, 2019).

NORTH 0 not to scale

EXHIBIT 2-6

INTERIOR TERMINAL MAP

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Main Terminal

The main terminal building opened in June 2003. Construction occurred during a time of changing security regulations and requirements, which allowed for the incorporation of the latest design and technological elements, resulting in a facility that was among the most modern and advanced airport terminal facilities in the United States at the time. The main terminal consists of approximately 327,000 square feet and includes three levels plus a basement level:

- **Basement level:** The basement level is approximately 44,000 square feet. It includes a large mechanical room; an electrical room; refrigeration equipment; heating, ventilation, and air-conditioning equipment; computer and telephone equipment; and an employee break room. It also includes space for storage, supplies, and offices.
- **First level:** The first level totals approximately 114,000 square feet. It includes baggage claim, the baggage handling and screening system, baggage makeup areas and sortation piers, concessions, car rental counters and offices, restrooms, storage, and mechanical equipment. The terminal is equipped with a fully automated inline baggage handling and screening system. The baggage claim lobby includes four large carousels and two oversize baggage slides. A backcountry terminal area is located adjacent to the baggage claim, currently occupied by Gem Air, McCall Air, and Salmon Air. Adjacent to the baggage claim lobby is the rental car lobby with associated counters and offices for the eight rental car companies operating at the Airport: Alamo, Avis, Budget, Dollar, Enterprise, Hertz, National, and Thrifty.
- **Second level:** The second level consists of approximately 124,000 square feet. It includes passenger ticketing, airline ticket offices, security screening, and a post-security food court. The ticket lobby includes airline ticket counter positions and passenger queuing space. One airline uses two baggage check positions on the adjacent curb. Most airlines provide self-serve kiosks either at the counter or within their queuing areas. Five passenger security screening checkpoint lanes are provided, with room for a sixth.
- **Third level:** The Airport operations center, Airport administrative offices, conference rooms, Transportation Security Administration (TSA) office space, and restrooms are located on the third level.

Concourse B

Concourse B was originally constructed in 1981; it was expanded in 1995 to meet the growing demand for more aircraft gates. The entire concourse was renovated in 2005, and it totals approximately 65,000 square feet. Level 1 of the concourse includes airline operations offices and ground support equipment (GSE) storage areas. Level 2 includes holdrooms for 11 gates, as well as concessions and restrooms. Loading bridges provide access between the concourse and aircraft parked at the concourse, and they are equipped with ground power, preconditioned air units, and potable water. Two of the 11 loading bridges are swing gates, allowing access to two aircraft parking positions.

Concourse C

Concourse C is located on the southern end of the main terminal building on the first floor under the second-level food court. The concourse consists of approximately 27,000 square feet, including six airline gate/desk positions, concessions, restrooms, and a business center. Alaska Airlines is the primary tenant of Concourse C. The concourse is located at apron level with two covered walkways provided for passenger safety and weather protection when accessing the 11 aircraft parking positions. One gate is equipped with a loading bridge.

Passenger Amenities

Key features available to travelers throughout the terminal building include the following:

- **Concessions:** A variety of concessions are available throughout the terminal building. A new concessions program was completed at the Airport in 2015. In coordination with the national concessionaire, Delaware North and Paradies Lagardère the concessions program included the remodeling or new construction of 13 food and beverage and news and gift concessions throughout the terminal building. Goals of the program included bringing in a more "local flavor" and increasing the energy efficiency of all concessions.
- **Curbside amenities**: Some airlines provide curbside baggage check-in and all airlines provide curbside wheelchair assistance.
- **Nursing room**: A Mamava lactation pod is located past the security checkpoint.
- **Pet relief area**: A pet relief area is located pre-security. As of August 2016, federal regulation requires airports that service more than 10,000 passengers each year to establish at least one service animal relief area (SARA) inside each terminal, along with guidelines and best practices regarding the location, size, and accessibility of such areas. The Airport currently has an exemption for the provision of a SARA, although full compliance is anticipated with future terminal modifications.
- **Digital library:** The Airport digital library is a collaboration between the Airport and the Boise Library; it is in Concourse B at Gate B16. The digital library allows passengers to check email, do research, and read online magazines held by the library. Boise residents can get a temporary library card to download an ebook, a magazine, or music prior to a flight.
- **Conference center:** The Airport's Snake River Conference Center is located on the third level of the main terminal; it provides six conference rooms that can be rented for full or half days. Rooms can include audio/visual equipment, free wireless internet, and on-site catering.
- **Business center:** A business center in Concourse C includes 10 partitioned desk positions and 8 circular tables. Another business center is located adjacent to the terminal rotunda and features 8 partitioned desk positions.
- **Arcades:** The "Game BOI Family Fun Center" is located on Concourse B; it features 12 arcade games. The arrivals lounge on the second level of the main terminal includes 6 arcade games.
- **Other amenities:** Vending machines, ATMs, shoe shine, luggage carts, and public payphones, including TTY payphones, are available in the terminal.

2.2.2.2 TERMINAL APRON

The terminal apron accommodates aircraft parking positions at the gates, along with space for aircraft maneuvering and GSE storage. The overall pavement area of the apron is approximately 1.1 million square feet. Approximately 600,000 square feet of the apron is paved with concrete to support aircraft parking and servicing.

Four designated remain overnight (RON) positions are also available: one on the terminal ramp and three on a separate RON/deice pad of approximately 70,000 square feet. According to Airport staff, all concourse gates are typically occupied at night, along with some of the RON positions. The east and west hold/deice pads can also accommodate airline aircraft. Aircraft parked at remote locations are towed to/from a concourse gate, as necessary.

Most gate/parking positions are leased to airlines on a preferential basis; although, Gates B16 and B19 are common-use gates. Alaska Airlines occupies gates in Concourse C, while all other airlines occupy space in Concourse B. Aircraft specifications, such as length, wingspan, and tail height, determine the types of aircraft that each gate/parking position can accommodate. Adequate wingtip clearance and height restrictions imposed by 14 CFR Part 77 airspace surfaces must be met.

All Concourse B apron positions, with the exception of Gate B14, can accommodate regional jet and narrowbody aircraft, such as the Boeing 737 and Airbus A319/A320. Gate B14 can only accommodate regional jet aircraft due to wingtip clearance from an adjacent fence. Boeing 757 aircraft can park at Gates B11, B19, B20, and B22B. Boeing 757 and Boeing 767 aircraft can park at Gate B22A if Gates B21B and B22B are not occupied.

Concourse C apron positions are primarily designed to accommodate regional jet and large turboprop aircraft. Gate C12 can also accommodate narrowbody aircraft up to a Boeing 737-900.

RON position R1 on the terminal apron can accommodate up to a Boeing 737-900. RON positions R2, R3, R4, and R5 can accommodate up to a Boeing 757-300. The east and west deice pads can accommodate up to a Boeing 767.

2.2.3 TENANT AND SUPPORT FACILITIES

A variety of tenants own, lease, and/or operate facilities at the Airport. Aviation tenants include those tenants that engage in flying or aircraft maintenance and have access to the airfield. Aviation tenant facilities include air cargo, GA, backcountry, airline maintenance, military, and other government facilities. Nonaviation tenant facilities are those that are located on Airport property but are not involved in an aviation-related business (e.g., hotels, manufacturing, warehousing, retail, and restaurants). **Exhibit 2-7** depicts the tenant and support facilities.

2.2.3.1 AIR CARGO FACILITIES

Air cargo facilities are located in three separate airfield locations. The north cargo area is east of the passenger terminal, with cargo sort buildings and support structures occupied by Federal Express (FedEx), United Airlines, Delta Air Lines, Horizon Air, and Southwest Airlines. The west cargo area is located along Taxiway J south of the Runway 10R threshold and is occupied solely by United Parcel Service (UPS). An area west of the passenger terminal is subleased by Western Air Express. The north and west cargo aprons can accommodate Airbus A300 aircraft, while Western Air Express operates twin engine turboprop aircraft. The cargo aprons also accommodate GSE and other cargo support equipment. **Table 2-7** summarizes the air cargo facilities at the Airport.

TABLE 2-7 AIR CARGO FACILITIES

TENANT/AREA	AIRCRAFT PARKING POSITIONS	VEHICLE PARKING SPACES	TOTAL APRON AREA	SORT BUILDING AREA	BUILDING ADMIN. AREA	VEHICLE PARKING AREA	TOTAL OCCUPIED SPACE
North Cargo Area							
Federal Express	2	107	190,000	37,000	575	50,500	278,075
Delta Air Lines				3,947			3,947
United Airlines				7,460			7,460
Horizon Air/Southwest Airlines				11,430			11,430
US Postal Service				14,650			14,650
West Cargo Area							
United Parcel Service	3	49	195,000	10,200	250	48,500	253,950
Other Area							
Western Air Express	1	4	550	250	100	1,100	2,000
Total	**6**	**160**	**385,550**	**84,937**	**925**	**100,100**	**571,512**

NOTE: All areas are in square feet.
SOURCE: Mead & Hunt, Inc., December 2016 (based on information provided by the City of Boise).

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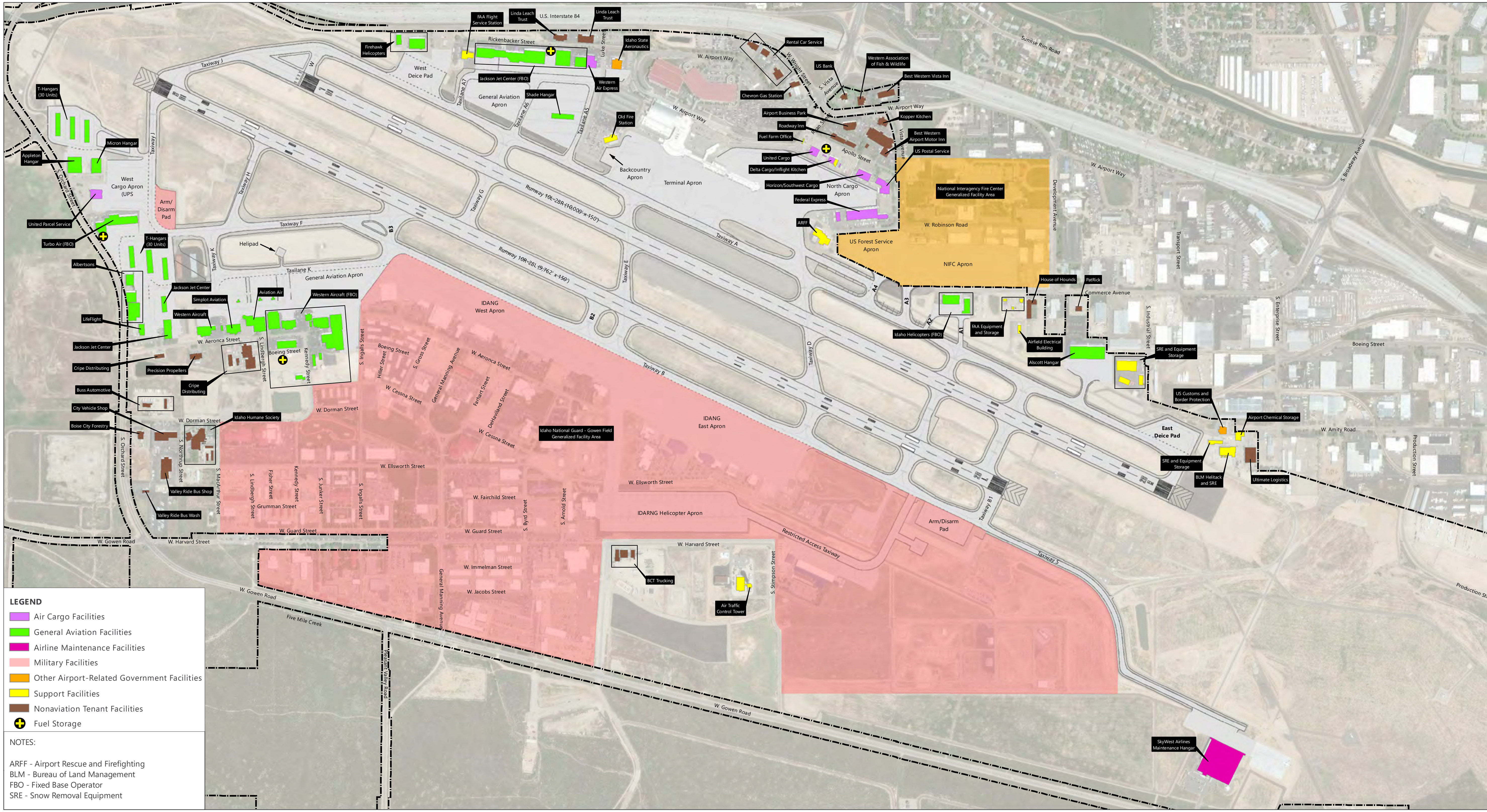

SOURCES: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community (aerial basemap); Power Engineers (Airport property line); Quantum Spatial aerial data collection and planimetric base mapping, September 2016.

NORTH 0 1,000 ft

EXHIBIT 2-7

TENANT AND SUPPORT FACILITIES

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FedEx aircraft operate six daily flights to three locations: Memphis, Tennessee (MEM); Casper, Wyoming (CPR); and Salt Lake City, Utah (SLC). The MEM route is served with a Boeing 757 aircraft, and the other routes are served with an Airbus A300. FedEx is in the process of replacing the Airbus A300 fleet with Boeing B767-300F aircraft and phasing out the MD-11 with the Boeing 767.

UPS primarily operates an A300 twice daily serving the following locations: Salt Lake City, Utah (SLC); Ontario, California (ONT); Louisville, Kentucky (SDF); St. Louis, Missouri (STL); and Cedar Rapids, Iowa (CID). UPS works in conjunction with Ameriflight and Gem Air with feeder services to Twin Falls, Idaho, and Burns, Oregon, respectively. Passenger airlines utilize facilities for sorting mail for transport in the baggage compartment of their aircraft.

2.2.3.2 GENERAL AVIATION FACILITIES

GA facilities at the Airport include FBOs, corporate hangars, T-hangars, aircraft shelters, and apron/tiedown parking.

General Aviation Buildings/Hangars

Table 2-8 lists the leased GA building areas, and **Table 2-9** summarizes the hangar types.

TABLE 2-8 GENERAL AVIATION BUILDING INVENTORY

TENANT	FACILITY TYPE	BUILDING AREA (SQUARE FEET)	TENANT	FACILITY TYPE	BUILDING AREA (SQUARE FEET)
Albertsons Aviation	Corporate Hangar	8,064	J.R. Simplot Company	Corporate Hangar	11,000
Albertsons Aviation	Corporate Hangar	10,720	Micron Technology	Corporate Hangar	15,000
Albertsons Aviation	Corporate Hangar	19,590	Turbo Air (Martin-Rico, Inc.)	FBO	40,380
Alscott	Corporate Hangar	61,505	Western Aircraft (Hangar 1)	FBO (Hangar)	25,000
Appleton AirSports, LLC	Private Hangar	26,445	Western Aircraft (Multiuse)	FBO (Offices)	12,000
Atwood Properties, LLC	Corporate Hangar	26,900	Western Aircraft (Hangar 2)	FBO (Maintenance)	14,500
Idaho Helicopters	FBO (Helicopter)	15,570	Western Aircraft (Hangar 3)	FBO (Hangar)	11,000
Idaho Helicopters	FBO (Helicopter)	9,500	Western Aircraft (Hangar 4)	FBO (Hangar)	11,000
Firehawk Helicopters	Corporate Hangar	12,098	Western Aircraft (Terminal/ FBO)	FBO (Terminal)	4,050
Firehawk Helicopters	Corporate Hangar	5,200	Western Aircraft (Hangar 5)	FBO (Hangar)	21,000
Jackson Jet Center	FBO	62,770	Western Aircraft (Hangar 6)	FBO (Hangar)	10,000
Jackson Jet Center	FBO	16,992	Western Aircraft (Modular)	FBO (Storage)	560
Jackson Jet Center	FBO	10,050	Western Aircraft	FBO (Storage)	14,000
Jackson Jet Center	FBO	6,400	Western Aircraft (Modular)	FBO (Storage)	1,680
Jackson Jet Center	FBO	16,700	Boise Airport	T-Hangars	69,600
Jackson Jet Center	Shade hangar	8,000	Boise Airport	Shade hangar	11,550
			Total		**588,824**

NOTE: FBO – Fixed-Base Operator
SOURCE: Mead & Hunt, Inc., December 2016 (based on information provided by the City of Boise).

TABLE 2-9 GENERAL AVIATION HANGAR SUMMARY

HANGAR TYPE	HANGAR CHARACTERISTICS	TOTAL HANGARS	TOTAL HANGAR AREA (SQUARE FEET)
Private/Corporate	Single-unit hangar accommodating one or more private/corporate aircraft	10	196,522
FBO	Large hangar accommodating several aircraft depending on aircraft size/type	14	270,862
T-Hangars	One T-hangar building contains multiple units that each accommodate one small single- or multi-engine aircraft	6 (10 units each)	69,600
Shade Hangar	Covered but not enclosed building with defined positions for small single- or multi-engine aircraft	2 (18 spaces total)	19,550
Total		**32**	**556,534**

NOTE: FBO – Fixed-Base Operator
SOURCE: Mead & Hunt, Inc., December 2016 (based on information provided by the City of Boise).

General Aviation Aprons

Several apron areas are located at the Airport; they provide tiedown positions and/or apron parking for all sizes and types of based and transient GA aircraft. In addition to accommodating GA aircraft, these aprons may also accommodate transient military aircraft, as well as firefighting aircraft during wildfire season.

Table 2-10 summarizes the GA apron area characteristics, which are depicted on Exhibit 2-6.

TABLE 2-10 GENERAL AVIATION APRON AREA SUMMARY

USER/TENANT	APRON DESIGNATION	RAMP AREA (SQUARE FEET)	PISTON PARKING POSITIONS	TURBINE PARKING POSITIONS	HELICOPTER PARKING POSITIONS	TOTAL MARKED PARKING POSITIONS
Jackson Jet Center	West Ramp	185,000	18	14	--	**32**
Jackson Jet Center	East Ramp	270,000	12	65	--	**77**
Jackson Jet Center	Single Ramp	90,000	26	--	--	**26**
Turbo Air	Single Ramp	50,000	6	1	--	**7**
Western Aircraft	West Ramp	130,000	26	--	--	**26**
Western Aircraft	East Ramp	150,000	--	22	--	**22**
Idaho Helicopters	Single Ramp	30,000	--	--	3	**3**
Firehawk Helicopters	Single Ramp	115,000	--	--	4	**4**
Total		**1,020,000**	**88**	**102**	**7**	**197**

SOURCE: Mead & Hunt, Inc., December 2016 (based on information provided by the City of Boise).

Fixed-Base Operator Facilities and Services

FBOs typically offer a broad range of GA services, such as maintenance, fuel sales, tiedown/hangar storage, flight instruction, and charter services. FBO facilities often include offices, hangars, aprons, and vehicle parking areas. Four FBOs currently maintain/lease/operate facilities at the Airport:

- Jackson Jet Center is a full-service FBO providing fueling, charter services, ground handling, maintenance, avionics repair shop, car rental, and flight instruction services. The FBO facilities include offices, conference rooms, hangars, a GA terminal, shade hangars, and aircraft parking. Jackson Jet Center serves both fixed-wing aircraft and helicopters. The FBO occupies a total of eight buildings on the airfield: five on the north side of the airfield and three on the south side.

- Turbo Air is a full-service FBO providing fueling, charter services, maintenance, and flight instruction services. The FBO facilities include offices, hangars, a GA terminal, and aircraft parking. Turbo Air serves a variety of piston, turboprop, and jet aircraft. Turbo Air occupies a single hangar on the southwest side of the airfield.
- Western Aircraft is a full-service FBO on the south side of the airfield. Western Aircraft provides fueling (civilian and military), charter services, maintenance, avionics, and car rental. The FBO facilities include offices, conference rooms, hangars, a GA terminal, and aircraft parking. The FBO occupies a total of nine permanent buildings on the airfield.
- Idaho Helicopters is a full-service helicopter FBO located on the northeast side of the airfield. Idaho Helicopters provides charter, firefighting, fueling, helicopter emergency medical services, avionics, and maintenance.

2.2.3.3 AIRLINE MAINTENANCE FACILITIES

In 2014, SkyWest Airlines selected BOI as the location for a new maintenance facility to service a variety of single- and dual-class regional jet aircraft. The maintenance facility was completed in 2015; it is located on the southeast side of the Airport. The facility features a 135,000-square-foot maintenance hangar, consisting of 101,000 square feet of hangar space and 34,000 square feet of additional shop, office, and service spaces. The hangar is the largest premanufactured clear-span metal building in the northwest. The 14-acre site includes the hangar, along with a surface parking lot with access from Gowen Road, and a concrete apron of approximately 107,000 square feet. In 2018, a 95,000-square-foot expansion of the apron was completed, along with site preparation for a future similar sized facility adjacent to the existing hangar. Taxiway S connects the maintenance facility to the existing airfield.

2.2.3.4 BACKCOUNTRY FACILITIES

Three backcountry operators—Gem Air, Salmon Air, and McCall Aviation—operate backcountry flights at the Airport. Gem Air serves the communities of Salmon, Stanley, and McCall with a fleet of Quest Kodiak, Britten-Norman Islander, Piper Seneca, and Piper Chieftain aircraft. Salmon Air and McCall Aviation provide backcountry flights with a fleet of Cessna 172, 206, and 210 aircraft. Ticket counters are located on the first floor of the terminal building adjacent to the baggage claim lobby. Passengers board aircraft on the ramp adjacent to the old Airport fire station southwest of the passenger terminal building.

2.2.3.5 MILITARY FACILITIES

Gowen Field was established in 1941 on the south side of the airfield. Gowen Field is home to the IDANG, Idaho Army National Guard (IDARNG), and reserve units of the Army, Navy, and Marines. The on-Airport area under exclusive military use is 577.5 acres; 354.13 acres are dedicated as Air Force exclusive use, and 223.37 acres are dedicated as Army exclusive use. The runway and taxiway system on the Airport is dedicated joint-use for both military and civilian operations. The IDNG adopted the Master Plan for Gowen Field in October 1997. The plan details the existing and potential needs of the facility and a plan for future development and growth in support of its mission.

Air National Guard

The IDANG is home to the 124th Fighter Wing. The 124th Fighter Wing currently operates a fleet of 21 A-10 Thunderbolt II "Warthog" aircraft. Gowen Field is currently one of several locations being considered across the United States as an alternate (not preferred option) to base the F-35 aircraft.

Army National Guard

The IDARNG has an active aviation component at Gowen Field. IDARNG operates 28 UH-60 Blackhawk Helicopters and one C-12 Huron. The National Guard Bureau (NGB) is in the process of reorganizing readiness centers nationwide. The 30-year plan is to condense 28 current readiness centers in the state of Idaho down to 9 mega-readiness centers. Gowen Field would be home to two of these mega-readiness centers. IDARNG currently self-performs snow removal operations and contracts out most building and site maintenance.

2.2.3.6 OTHER AIRPORT GOVERNMENT FACILITIES

In addition to the military, various other government agencies are tenants at the Airport. The NIFC, US CBP, and the ITD Division of Aeronautics have facilities at the Airport.

National Interagency Fire Center[4]

The Bureau of Land Management (BLM) maintains and operates the NIFC on 54 continuous acres (off-Airport) on the northeast side of the airfield. NIFC serves as a coordination center for fighting wildland fires across the nation and is home to eight federal agencies. NIFC employs 650 full-time employees with a maximum of 1,000 employees during fire season or heighted training sessions.

NIFC facilities include 23 buildings (warehouse, shop, and special use facilities). NIFC operates the aircraft ramp immediately adjacent to NIFC property. The apron is approximately 17 acres including air tanker retardant base and parking for fixed-wing aircraft. NIFC conducts routine maintenance on the apron, including pavement maintenance. During fire season the NIFC ramp is active with aerial firefighting activities, averaging 700 sorties per year. The total number of sorties and categories are highly dependent on the number and type of fires in the region, but they can generally be categorized as 43 percent Large Air Tanker, 49 percent Single Engine Air Tanker, and 8 percent Modular Airborne Firefighting Systems. Independent of the fire season operations, in 2016, 822 aircraft and 22 tons of cargo were processed on the apron.

Among the federal agencies operating at the NIFC, the US Forest Service utilizes approximately 258,000 square feet of apron on the western portion of the NIFC apron. This area accommodates three pits for fire retardant loading, aircraft parking, vehicle parking, a tank farm, and parking for office trailers.

The Boise BLM Helitack and Air Attack operate from a facility leased from the Airport at the east end of Runway 10L-28R, off of Enterprise Street. Additional helicopters and air attack aircraft that operate during periods of high fire activity utilize parking at the Western Aircraft or Jackson Jet Center FBOs, or any available and appropriate space.

US Customs and Border Protection

As a designated Port of Entry, BOI has a CBP facility. The Airport is a landing rights airport, meaning that permission must be obtained from a CBP officer prior to the landing of any international flight. Upon landing, a CBP officer inspects the aircraft and individual(s).

The current CBP facility is located off Enterprise Street and is adjacent to the east deice pad near the Runway 28R threshold. The facility opened in February 2011 and includes a 5,915-square-foot building on an approximately 25,000-square-foot site that also includes vehicle parking. The facility primarily serves international travelers on inbound private jets arriving from Canada or Mexico, and it is essentially a small terminal building with a passenger

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[4] Doug Marolf, Forest Aviation Officer, US Forest Service, "Square Footage Figures for Boise Airport," email to Jason Apt and Joe Birge, Ricondo & Associates, Inc., May 26, 2017.

waiting and processing area, offices, an interview room, a search and hold room, and support areas. The facility was designed to meet the then current edition of the Airport Technical Design Standards published by the US Department of Homeland Security. As an economic benefit to the region, the facility provides the Boise area with increased freight capabilities for trade importing and exporting.[5]

Idaho Transportation Department Division of Aeronautics

The ITD Division of Aeronautics maintains a building and aircraft ramp along Rickenbacker Street, adjacent to the Western Air Express cargo apron. The hangar is approximately 10,800 square feet with an adjacent apron of approximately 21,000 square feet, as well as space for vehicle parking.

2.2.3.7 SUPPORT FACILITIES

Support facilities include aircraft rescue and firefighting (ARFF) facilities, FAA and air traffic control (ATC) facilities, SRE facilities, catering facilities, and fueling facilities. **Table 2-11** summarizes various support facility buildings at the Airport.

TABLE 2-11 SUPPORT FACILITY BUILDINGS

USE	LOCATION	BUILDING AREA (SQUARE FEET)	VEHICLE PARKING SPACES	NOTES
Multipurpose and GSE Maintenance	2827 Apollo St.	7,460	11	Portion of United Cargo building subleased to Taylor GSE
Inflight Catering	2761 Apollo St.	3,802	9	Occupied by Boise Airport Inflight
ARFF	2855 Lockheed Lane	16,000	18	
ARFF Training	220 W. Gowen Rd.	3,128	N/A	
Maintenance/SRE Storage	4659 Enterprise St.	12,900	14	Main Building, 3 doors into storage
		5,184		Building G, 8 single bays
		23,100	15	Building A, 6 drive-through bays, 2 single bays
Maintenance/SRE Storage	4465 S. Industrial St.	5,964		Building B, 4 drive-through bays
		3,520		Building C, 4 single bays

NOTES: GSE – Ground Support Equipment; ARFF – Aircraft Rescue and Firefighting; SRE – Snow Removal Equipment
SOURCE: Mead & Hunt, Inc., December 2016 (based on information provided by the City of Boise).

Aircraft Rescue and Firefighting Facilities

The ARFF station is located in the northeast quadrant of the airfield at the terminus of West Lockheed Lane. In 2019, an expansion of the station was completed to meet the current and growing needs of the facility, and it brought the facility into full compliance with all applicable FAA and local codes and requirements. The ARFF station now totals approximately 16,000 square feet and includes two original and two new apparatus bays. An ARFF training facility is located southwest of the Airport. The training facility consists of 3,130 square feet of building space, including a classroom and observation tower on a 9-acre site.

[5] CSHQA, https://www.cshqa.com/content/uploads/2016/03/BOI-New-Customs-Bldg-2011.pdf (accessed February 2017).

The Airport is a 14 CFR Part 139 ARFF Index Category C, required to provide ARFF equipment and services for aircraft at least 126 feet but less than 159 feet in length. **Table 2-12** summarizes the ARFF equipment at the Airport, which meets the FAA response time requirement of 3 minutes to the midpoint of the farthest runway served by airlines.

TABLE 2-12 AIRCRAFT RESCUE AND FIREFIGHTING EQUIPMENT AND AGENTS

LOCATION	TYPE	YEAR	MAKE/ CONDITION	DISCHARGE RATE (GPM)	ARFF (GALLONS)	WATER (GALLONS)	DRY CHEMICAL (POUNDS)	STATUS
ARFF	Command Pickup	2014	New	N/A	N/A	N/A	N/A	Active
ARFF	Crash Truck	2012	Oshkosh (Excellent)	750	220	1,500	500	Active
ARFF	Crash Truck	2009	Oshkosh (Excellent)	1,000	420	3,000	500	Active
Burn Pit	Reserve Crash Truck	1997	Oshkosh (Fair)	750	210	1,500	450	Training/Reserve

NOTES: ARFF – Aircraft Rescue and Firefighting; GPM – Gallons per Minute
SOURCE: Boise Airport, *Boise Airport Certification Manual*, February 1, 2016.

The IDANG operates an ARFF facility adjacent to the military aircraft apron. The Airport maintains an agreement for mutual aid, whereby the Airport responds to civilian-related incidents and the IDANG Gowen Field Fire Department responds to military-related incidents. Each department can request assistance from the other if necessary.

Airport Equipment and Snow Removal Facilities

Maintenance and SRE facilities include the main complex on South Industrial Street and an additional location on Enterprise Street. Equipment is stored in five buildings between the two locations. Total building storage area is 50,668 square feet, with 22 total equipment bays. In addition, equipment is stored in open storage yards on the northeast side of the airfield. **Table 2-13** identifies the various SRE maintained at the Airport.

TABLE 2-13 (1 OF 2) SNOW REMOVAL EQUIPMENT INVENTORY

MAKE/MODEL	QUANTITY	YEAR(S)	DESCRIPTION
Snow Brooms			
MB-5	3	2016	MB Multifunction, MB-5, 22’ plow with 20’ broom
Sweepster	1	1999	20’ snow broom
M-B	1	2006	20’ snow broom
Wausau	1	2011	20’ snow broom
Snow Plows			
Peterbuilt 357	1	1992	10-yard dump truck with 22’ reversible plow
International P5000	4	1998, 1999, 2006, 2008	10-yard dump truck with 22’ reversible plow
Snow Blowers			
Oshkosh	1	2011	5,000-tons-per-hour snow blower
Kodiak	1	1994	3,000-tons-per-hour snow blower

TABLE 2-13 (2 OF 2) SNOW REMOVAL EQUIPMENT INVENTORY

MAKE/MODEL	QUANTITY	YEAR(S)	DESCRIPTION
Loaders with Ramp Plows			
Caterpillar 950K	1	2013	Loader with 10-yard snow bucket or 20′ push snow box "ramp plow"
John Deere 624J	1	2006	Loader with 10-yard snow bucket or 20′ push snow box "ramp plow"
John Deere 644G	1	1998	Loader with 10-yard snow bucket or 20′ push snow box "ramp plow"
John Deere 644C	1	1986	Loader with 10-yard snow bucket or 20′ push snow box "ramp plow"
Tractors with Plows and Snowbox			
Massy Ferguson 540	1	2007	Tractor with 14′ snow plow
New Holland TM 155	1	2004	Tractor with 19′ plow
New Holland T5070	1	2011	Tractor with 10′ snow plow
Chemical Applicators			
Kenworth C510	2	1986	3,500-gallon liquid deice sprayer / 12-yard dry chemical spreader
GMC Top Kick, Epoke	1	1991	6-yard dry chemical spreader with liquid pre-wet
Surface Friction Measuring Equipment			
Airport Surface Friction Tester	1	N/A	Continuous Friction Measuring Equipment
Bowmonk	1	N/A	Decelerometer
Vericom	1	N/A	Decelerometer

SOURCE: Boise Airport, *Boise Airport Certification Manual*, February 1, 2016.

In addition to SRE, the Airport operates a variety of equipment for maintaining the airfield and grounds. **Table 2-14** presents an inventory of Airport maintenance equipment.

TABLE 2-14 AIRPORT MAINTENANCE EQUIPMENT INVENTORY

EQUIPMENT TYPE	QUANTITY	EQUIPMENT TYPE	QUANTITY
Medium Duty Truck	15	Forklift	1
Heavy Duty Truck (single axle)	4	All-Terrain Vehicle	1
Heave Duty Truck (two axle)	4	Multiuse Loader (small)	3
Semi-Truck	2	Spray Truck	1
Wheel Loader	5	Trailer	12
Loader Backhoe	1	Miscellaneous equipment	32

SOURCE: Mead & Hunt, Inc., December 2016 (based on information provided by the City of Boise).

Multipurpose Facilities

Multipurpose and GSE storage and maintenance facilities are co-located in the United Cargo building (2827 Apollo Street) in the north cargo area. The building is primarily used for the storage and maintenance of GSE. **Table 2-15** summarizes the equipment supported by this facility.

TABLE 2-15 SUPPORT FACILITY EQUIPMENT INVENTORY

EQUIPMENT	LOCATION	QUANTITY	OWNERSHIP	NOTES
Jet Bridge	Terminal	11	Airport	(2) Two-position gates
Pre-Conditioned Air Unit	Terminal	9	Airport	
Pre-Conditioned Air Unit	Terminal	2	Southwest Airlines	
Pre-Conditioned Air Unit	North Cargo Apron	2	Airport	
Pre-Conditioned Air Unit	Terminal	N/A	Alaska Airlines	
Ground loading walkway	Terminal	2	Airport	(6) Doors each walkway
Ground Power Unit (mobile)	Terminal	1	Airport	
Ground Power Unit (mobile)	Terminal	N/A	Alaska Airlines	
Ground Power Unit (fixed)	North Cargo Apron	2	Airport	
Ground Power Unit (fixed)	Terminal (B10/B11)	1	SkyWest Airlines	
Car Charging Unit	Parking Garage	2	Airport	

SOURCE: Mead & Hunt, Inc., December 2016 (based on information provided by the City of Boise).

Inflight Catering

Inflight catering is co-located in the building with Delta Air Lines cargo on the north cargo area. Boise Airport Inflight occupies 3,802 square feet.

Airport Fueling Facilities

Various tenants at the Airport fuel both private and airline aircraft. Western Aircraft, the largest FBO at the Airport, is also the largest fuel provider. In addition to a fuel facility at its location on the southwest corner of the Airport, the company operates a fuel farm adjacent to the north cargo area. The underground tanks at this facility provide a 1-day supply of fuel for all the commercial aircraft at the Airport. Fuel is trucked in from an off-Airport facility, pumped into the underground storage tanks, and then pumped onto fuel trucks for delivery to aircraft. Average jet fuel demand at the Airport is approximately 50,000 to 70,000 gallons per day, and an average of eight daily truck deliveries to BOI meets fuel demand.[6] Fueling services are also provided by the other FBOs to their respective based and transient customers.

Federal Aviation Administration Facilities

The FAA provides ATC services to aircraft arriving at or departing from the Airport, or over-flying in the immediate area. In January 2008, construction began on a new ATCT. Construction was completed in 2010 and full activation of the new facility took place in October 2013. In addition to controlling local operations, the ATCT houses a Terminal Radar Approach Control (TRACON) to control regional air traffic. Implementation of the new tower is important for accommodating future growth at the Airport.

The height of the tower (255 feet) and the location south of the IDARNG helicopter apron eliminates many of the line-of-sight issues that existed with the old tower, which was demolished in 2014. The tower is topped by a 525-

[6] Armbrust Aviation Group, *Boise Airport Aviation Fuel Supply Report*, August 3, 2017.

square-foot cab with three air traffic controller positions and one supervisor position. With appropriate equipment and staffing, the ATCT could positively control aircraft operations on the assault strip/third runway.

The entire site of the ATCT facility is approximately 120,000 square feet; it includes the actual tower, an 11,000-square-foot base building housing the TRACON, equipment rooms, administrative offices, and parking and roadways.

In support of ATC functions, an FAA Flight Service Station facility is located on the Airport to assist pilots with services such as weather briefings, flight planning, and search and rescue operations.

2.2.4 AIRPORT GROUND ACCESS

This section presents an inventory of the Airport ground transportation system, including roadway access to the Airport, terminal roadway circulation and curbsides, existing automobile parking facilities, and public transportation.

2.2.4.1 REGIONAL ROADWAY ACCESS

Exhibit 2-8 depicts roadway access to and around the Airport. I-84 is the major east–west highway link in southwestern Idaho; it generally forms the northern and eastern boundaries of the Airport. Access to the Airport is provided by Orchard Street, Vista Avenue, Broadway Avenue, and Gowen Road. Each of these roadways, and their intersection with I-84, provides a critical link between the Airport and the regional transportation network.

Orchard Street is a north–south principal arterial roadway that generally forms the western boundary of the Airport. South of I-84, Orchard Street extends around the end of the runways and provides access to GA, cargo, and IDNG facilities before connecting with Gowen Road. North of I-84, Orchard Street extends to the west side of downtown Boise. About 300 feet south of I-84, Orchard Street intersects with Victory Road and Wright Street. Wright Street extends east from this intersection and provides access to GA and other tenant facilities on the northwestern edge of the airfield. Wright Street continues east and intersects with Vista Avenue to define the beginning of the terminal circulation system.

Vista Avenue is a north–south principal arterial roadway that provides direct access between the Airport and downtown Boise. The Vista Avenue/I-84 interchange serves as the primary access point for the Airport.

Broadway Avenue is a north–south principal arterial roadway that provides access between the Airport and the east end of downtown Boise. The Broadway Avenue/I-84 interchange is heavily used; although, little traffic is directly related to the Airport. South of the interchange, Broadway Avenue veers west and becomes Commerce Avenue, providing access to GA, support, and commercial/industrial facilities on the northeastern side of the airfield.

Gowen Road is a minor arterial roadway that runs roughly east–west; it generally forms the southern boundary of the Airport. The Gowen Road/I-84 interchange does not serve a significant volume of traffic destined for the Airport terminal. However, Gowen Road is the primary access roadway for the IDNG, and it also provides access to the SkyWest Airlines maintenance facility.

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SOURCES: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community (roadway basemap); Idaho Transportation Department and Ada County Highway District (planned roadway improvements)

NORTH 0 1mi

EXHIBIT 2-8

ROADWAY ACCESS
AND IMPROVEMENTS

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Exhibit 2-8 also depicts the locations of recent roadway improvements and planned improvements to Airport area roadways. Roadway improvements made since the Airport Master Plan was last updated include the following:

- **Interstate 84 Mainline Improvements:**
  - Sound walls were constructed on the north side of I-84 from the Orchard Street interchange east to the Broadway Avenue interchange.
  - The mainline segment from Cole Avenue to Vista Avenue was increased from four to eight lanes.
  - The mainline segment from Vista Avenue to Broadway Avenue was increased from four to eight lanes.
  - The mainline segment from Broadway Avenue to Eisenman Road was increased from two to three lanes in each direction.
- **Interstate 84 Interchange Improvements:**
  - The Orchard Street bridge that crosses over I-84 was relocated to allow the widening of the roadway and ramps to provide additional capacity and to meet design standards. The improved interchange includes an additional lane at the ramp intersections on Orchard Street and at the intersection of Victory Road and Orchard Street. The new layout also improved traffic signal timing.
  - At the Vista Avenue interchange, a single-point urban interchange (SPUI) was constructed to replace the former conventional diamond. A SPUI combines the two ramp terminals into one intersection, facilitating simultaneous left turns from the ramps and the arterial approaches. The ramps were also widened to provide additional capacity.
  - A SPUI replaced the former diamond at the Broadway Avenue interchange. The project involved construction of a new wider bridge structure and replacement of the existing ramps with wider ramps to increase capacity.
  - Improvements to the Gowen Road interchange involved removing and reconstructing the I-84 bridge structure, widening Gowen Road to five lanes, and reconstructing existing ramps to increase capacity.
- **Orchard Street Extension:** The regional transportation plan for Ada and Canyon Counties, *Communities in Motion 2040 2.0,* includes two funded projects relating to Orchard Street. Both projects are within the jurisdiction of the Ada County Highway District. The first project, completed in 2018, was a southward extension of Orchard Street from Gowen Road to Lake Hazel Road. The second project involves the relocation of Orchard Street from its current alignment along the west edge of the Airport. This project is planned for completion in 2023.[7]
- **Potential Future Improvements:** In addition to the planned Orchard Street relocation project, the Ada County Highway District has identified other potential future improvements to the regional roadway system around the Airport. Such improvements predominately center around the extension of Lake Hazel Road to ultimately connect with I-84. Numerous connector streets and related improvements would stem from this project to increase connectivity in southern Ada County.

[7] Community Planning Association of Southwest Idaho, *Communities in Motion 2040*, July 2014.

2.2.4.2 TERMINAL AREA GROUND ACCESS FACILITIES

Ground access facilities in the terminal area include the terminal loop roadway, curbsides, parking lots and garages, and rental car facilities. **Exhibit 2-9** depicts these facilities.

Terminal Roadway Circulation System

Primary access to the Airport is via Vista Avenue, with much of the traffic using the I-84/Vista Avenue interchange. Less than 200 feet south of the I-84 eastbound ramp/Vista Avenue intersection, the Wright Street/Vista Avenue intersection currently serves as the primary entrance to the Airport. Wright Street functions as a secondary access roadway, serving approximately 25 percent of terminal-bound traffic.[8]

The terminal loop roadway system was constructed as part of the terminal development project that was completed in 2003. Exhibit 2-8 depicts the general traffic circulation around the terminal area. Upon entering the terminal circulation system at the Wright Street/Vista Avenue intersection, traffic enters West Airport Way on a counterclockwise one-way circulation loop. Turnoffs along the north side of the loop allow access to public and employee parking and rental car return. Passenger departure traffic is directed to the upper-level roadway. Arrival traffic, along with commercial vehicles, proceed along the lower-level roadway, which is directly below the departure-level roadway. Traffic departing the garage and surface parking lots pass through a toll plaza before turning back onto West Airport Way for Airport exit or recirculation.

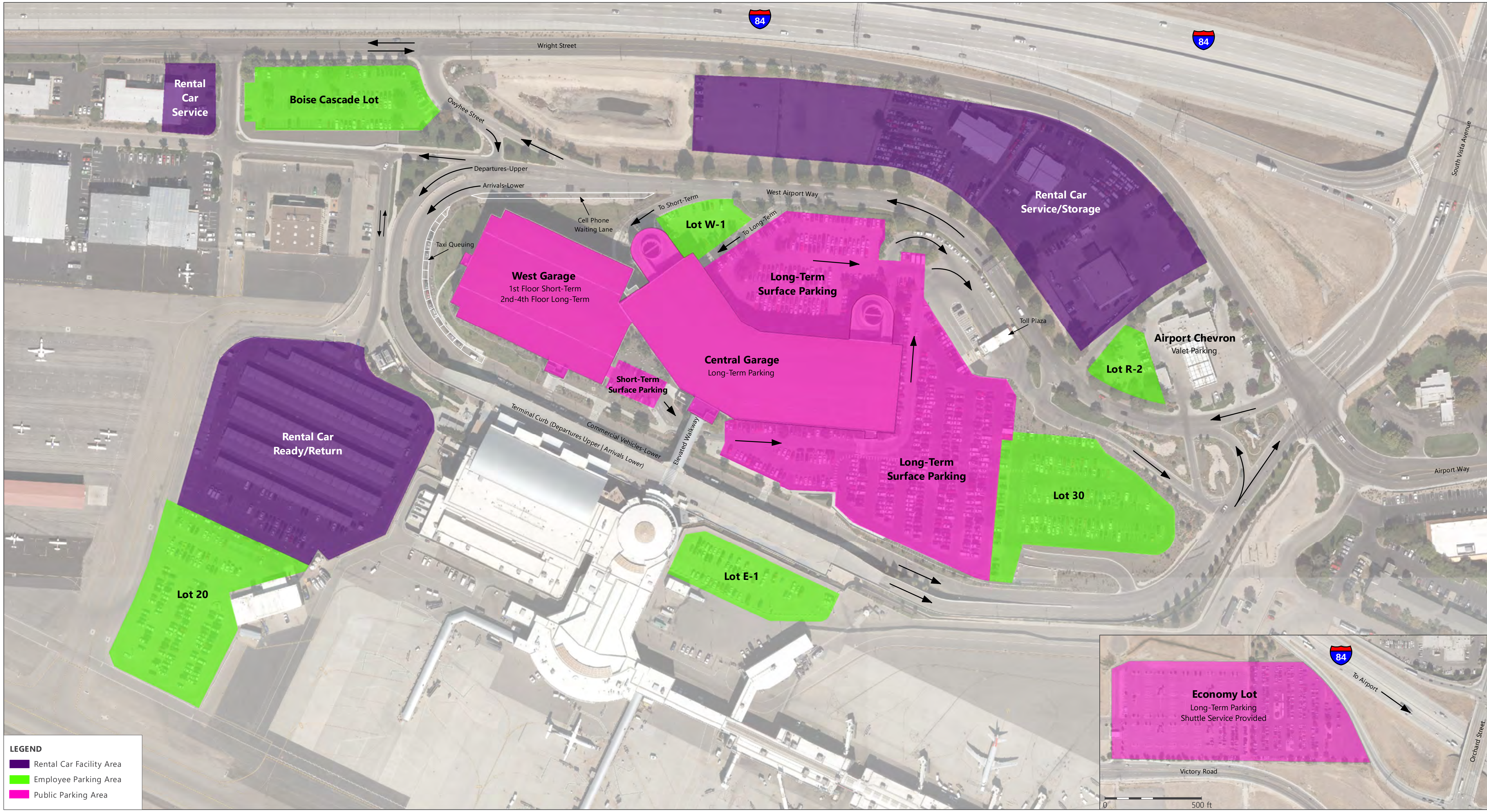
Terminal Curbsides

A two-level curbfront serves departing passengers on the upper level and arriving passengers on the lower level, each level providing approximately 800 linear feet of curb frontage. The upper level features four lanes: one for passenger unloading/drop-off and three for through traffic. The lower curb consists of one passenger loading/pick-up lane and three through lanes. A cell phone waiting lane with a capacity of 10 to 15 vehicles is available for vehicles to hold while waiting to pick up arriving passengers.

A lower commercial curb is separated from the arrival curb by a median. The commercial curb is served by taxis, courtesy shuttles, revenue shuttles, and buses, with designated pick-up locations marked by colored curbs. Taxis wait in a 10-vehicle holding lane until called to the curb for passenger pick-up. Other commercial vehicle operations are scheduled or on-demand. One pedestrian crossing is available on the upper level, which leads to a covered bridge that spans the lower level commercial vehicle lanes, providing access to the central parking garage.

Pedestrian crossings on the lower level lead to the commercial vehicle median and across the commercial vehicle lanes to the west parking garage and the short- and long-term parking lots.

[8] CSHQA and HNTB Corporation, *Draft Report: Boise Air Terminal Ground Transportation Master Planning*, September 1998.



SOURCES: GeoTerra, Inc., September 2016 (aerial basemap); City of Boise, Department of Aviation, April 2017 (parking facilities).

NORTH 0 200 ft

EXHIBIT 2-9

GROUND ACCESS FACILITIES AND CIRCULATION

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Parking Facilities

Public parking facilities at the Airport include garages and surface lots. A total of 2,935 public parking spaces are available within the terminal roadway circulation system (close-in). The central garage, a four-level facility constructed in 1996, accommodates long-term parking on all levels. The adjoining four-level west garage, completed in 2013, provides short-term parking on the first level, with long-term parking available on Levels 2, 3, and 4. Long-term surface parking is also available. Overflow long-term parking is provided in the Economy Lot located on Airport property along Victory Road, near the intersection of Victory Road/Wright Street and Orchard Street. This lot includes 1,313 spaces; it is opened when the close-in facilities have reached capacity. Customers using the Economy Lot are transported to and from the terminal building on a shuttle bus, which runs approximately every 15 minutes. The on-Airport Chevron station, located adjacent to the Airport entrance, provides valet-style parking for Airport passengers, with Chevron employees providing terminal drop-off and pick-up services.

Table 2-16 presents an inventory of public parking facilities at the Airport.

TABLE 2-16 PUBLIC PARKING FACILITIES

LOCATION/FACILITY	TOTAL SPACES	SUMMARY BY USE	TOTAL SPACES
Economy Lot (Long-Term/Off-Site)	1,313	Long-Term Surface	584
Short-Term Lot (West Garage Level 1)	274	Short-Term (Garage)	274
Garage Level 1 (Long-Term)	340	Long-Term Garage	2,077
Garage Level 2 (Long-Term)	558	Total Garage (Inc. Short-Term)	2,351
Garage Level 3 (Long-Term)	588	Total Long-Term (Close-in)	2,661
Garage Level 4 (Long-Term)	591	Total Economy (Long-Term)	1,313
Long-Term Surface Lot	584	Total Long-Term (Inc. Economy)	3,974
Total	**4,248**	Overall Total Without Economy	2,935

SOURCE: City of Boise, Department of Aviation, April 2017.

The Airport provides a total of 681 employee parking spaces. Several employee parking areas are located in proximity to the terminal building, with the majority of employees using one of three large surface lots. **Table 2-17** summarizes the employee parking facilities.

TABLE 2-17 EMPLOYEE PARKING FACILITIES

LOCATION/FACILITY	TOTAL SPACES	USE/DESCRIPTION
Lot 30	200	Transportation Security Administration and airline employees
Lot 20	197	Airlines, concessionaires, rental car employees, and some non-based parkers
Boise Cascade (BCC Lot)	132	Non-based airline employees
Lot E-1	81	Department of Aviation employees
Lot W-1	30	Transportation Security Administration fleet and some non-uniform employees
Lot R-2 (Chevron)	23	Rental car employees and non-based flight crews
Lot 45 (North Cargo Area)	18	Firefighters, FedEx station, and FedEx pilots
Total	**681**	

SOURCE: City of Boise, Department of Aviation, March 2017.

Rental Car Facilities

Eight rental car brands operate at the Airport: Avis, Alamo, Budget, Dollar, Enterprise, Hertz, National, and Thrifty. The companies share a 6,800-square-foot customer service lobby located on the first level of the passenger terminal, which includes counters, queuing space, and seating. Customers pick up rental cars from a ready/return lot outside the west end of the baggage claim lobby. The ready/return lot is approximately 175,000 square feet and contains 501 (mostly covered) parking spaces.

Rental car quick turnaround (QTA) service and storage facilities are located on Airport property between West Airport Way and Wright Street. The Economy Lot is also used for some rental car storage. When a customer returns a rented car, the car is transported to a QTA facility for service and then returned to the ready/return lot.

Table 2-18 presents an inventory of on-Airport rental car facilities.

TABLE 2-18 ON-AIRPORT RENTAL CAR FACILITIES

FACILITY ELEMENT	QUANTITY	FACILITY ELEMENT	QUANTITY
Customer Service Positions		QTA/Service Facilities	
Regular Counter Positions	32	Fueling Positions	11
Preferred Service Positions	10	Wash Bays	10
Ready/Return/Storage Spaces		Stacking and Staging Spaces	574
Ready Spaces	425	Maintenance Bays	19
Return Spaces	76	Administrative Area (square feet)	1,384
Storage Spaces	1,275		

NOTE: QTA – Quick Turnaround
SOURCE: Ricondo & Associates, Inc., May 2017 (compilation of rental car survey results).

Public Transportaiton

VRT is the regional public transportation authority for Ada and Canyon Counties. The primary responsibilities of VRT are to coordinate public transportation services in the two-county region and to develop a regional public transportation system. VRT owns and operates the public bus system in Boise and contracts for transit services for Nampa/Caldwell and between Ada and Canyon Counties. These services are operated under the name ValleyRide.

ValleyRide operates buses on three routes between the downtown Boise Main Street Station and the Airport (Route #2–Broadway, Route #3–Vista, Route #4–Roosevelt). On these routes, ValleyRide generally offers weekday service with buses running every 30 minutes during the peak morning and evening period and every 60 minutes during the midday period. Saturday service generally runs hourly.

The regional long-range transportation plan, *Communities in Motion 2040 2.0*, calls for enhancing public transportation services to connect communities in the Treasure Valley and providing access to more jobs and households; increasing the frequency of services; and encouraging land-use decisions that lead to transit-supportive corridors. The route from downtown Boise to the Airport is identified in the plan as a premium route, meaning the route is regionally significant with the potential for high-capacity transit, such as bus rapid transit or a rail-based fixed-guideway service. Goals for premium routes include increased service to 15-minute frequency, increased service span until past 9:00 p.m., and enhanced passenger amenities, including shelters, transit centers, park and rides, and real-time information.

2.2.5 UTILITIES AND STORMWATER

The utility companies/providers serving the Airport and its facilities are from both the public and private sectors. Information on Airport area utilities was compiled by HDR, Inc., through discussions with Airport and utility staff, as well as through assessments of Airport records and the City's GIS. **Exhibit 2-10** depicts utility services on and in the vicinity of the Airport.

2.2.5.1 DOMESTIC WATER

Suez is the owner and maintainer of the domestic water lines that serve the Airport. In relative terms, domestic water use at the Airport is minimal. The primary concern is related to fire protection. Airport fire protection usage puts large demand on water capacity. Suez has been tasked to meet demand for an instantaneous peak average demand; although, the Airport is currently at capacity for water for fire usage. The demand for fire protection is 4,000 gallons per minute for three hours of fire duration.

Water infrastructure includes a 16-inch main line that comes up from the southwest; it then turns north and west around the Airport property. A 12-inch main line comes from the southwest; it then turns north, but the loop is not closed in the Orchard Street/Victory Road area. Both lines are fed by 16-inch and 24-inch lines that draw from the Columbia Reservoir, located to the southeast of the Airport along S. Eisenman Road. The reservoir is served by three groundwater wells, and 7 miles of a 24-inch line are currently pulling off this source.

Suez has recently purchased a new 16-inch main, drawing off of the 24-inch main running from S. Amyx Road, located south of the intersection of Hollilynn Drive and S. Cole Road. This line will be brought north, likely through the Syringa Valley Development, and it will travel north to the Airport.

Regardless of the direction/location of future development at the Airport, improvements will need to be made to satisfy the fire protection needs of the Airport. The City has been cautioned of the use of high flows for fire protection in the Cole Road/Victory Road area and in the Gowen Field area with the current system, and there is currently no water service to the assault strip area to the south.

For any future Airport development to the northwest, the loop in the Orchard Street/W. Victory Road area would need to be closed. For future Airport development to the south and in the direction of the assault strip, it would be possible to bring the 24-inch main running along S. Amyx Road, fed by the Columbia Reservoir, down the hill to serve this area.

2.2.5.2 WASTEWATER

The City of Boise Public Works Department provides sewer services at the Airport. This department maintains the system, operates two wastewater treatment plants, and regulates industrial and commercial wastewater discharges into the sewer system through its pretreatment program.

Two sewer lines exist on Airport property to the west: a 24-inch line along W. Gowen Road and an 18-inch line off Cole Road, north of W. Victory Road. Two lines also exist on Airport property to the north: a 12-inch line along S. Owyhee Street and a 12-inch line along S. Curtis Road. An 18-inch line exists on the property to the east; it connects to a 30-inch line running along S. Federal Way. A 2012 report states there have been no downstream capacity issues and the property is well served.[9]

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9 Colliers International, *Boise Airport Task 2 Report*, September 2013.

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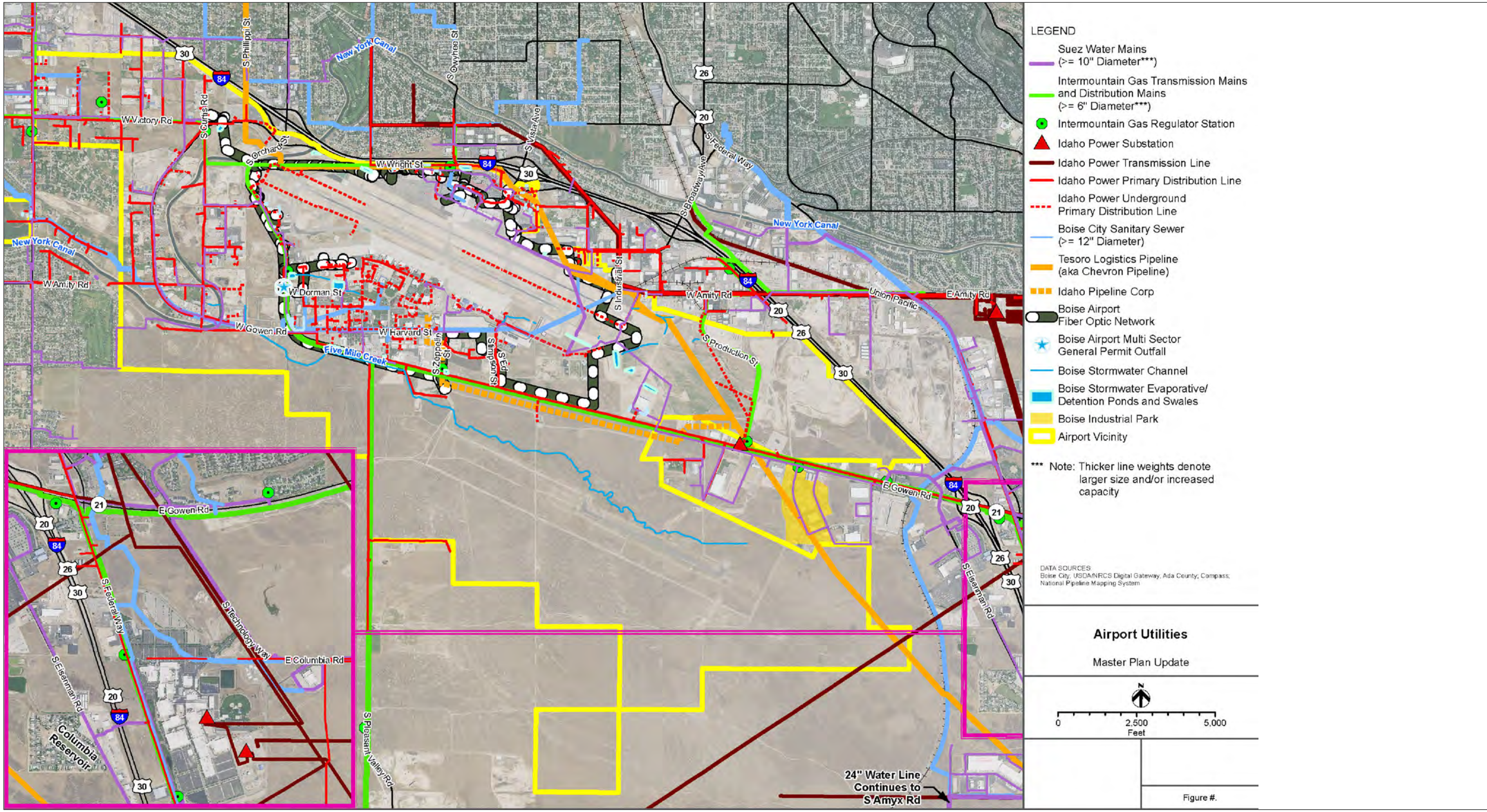

SOURCES: HDR, Inc., April 2017, using information obtained from the City of Boise, USDA/NRCS Digital Gateway, Ada County, COMPASS, and National Pipeline Mapping System.

NORTH 0 See Drawing for Scale

EXHIBIT 2-10

AIRPORT UTILITY MAP

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2.2.5.3 POWER/ELECTRICAL

Idaho Power provides electric power to the Airport that powers buildings and airfield lighting. Several generators are located throughout the terminal building to provide power in the event of power failure. Airfield lighting and other critical systems can be operated on 100 percent generator power.

One electrical substation is on Airport property, located at Production Street and W. Gowen Road. There is a substation to the northwest of the Airport near the intersection of W. Victory Road and S. Maple Grove Road, but there are no transmission lines entering Airport property from this substation. Three substations are on the east side of Airport property. A large substation exists along Amity Road with transmission lines that enter Airport property from the north and follow the general line of I-84. Two additional substations are near the southwest corner of Airport property. According to a 2012 report, Idaho Power did not have any upgrades planned in the Airport area for the next 20 years.

2.2.5.4 NATURAL GAS

Intermountain Gas Company is a privately owned company headquartered in Boise that supplies natural gas to more than 275,000 customers, including the Airport.

There is an 8-inch line along W. Gowen Road. The National Pipeline Mapping System shows this line and the lines running south along S. Federal Way and Pleasant Valley Road are gas transmission lines. There are several branches off the transmission line along W. Gowen Road. The line along W. Gowen Road runs to S. Orchard Street and branches to the east and west. It exits Airport property to the east along Wright Street, where it necks down to 6 inches and exits Airport property at S. Owyhee Street to the east. At Pleasant Valley Road, a 9-inch line begins to the south. On the northeast corner of Airport property, the line begins north at Production Street and exits the property at W. Amity Road. There are several regulator stations along the main 8-inch transmission line that runs along W. Gowen Road.

Though it is not located on Airport property, the main 8-inch transmission line leaving the property to the east along W. Gowen Road branches off to a 12-inch transmission line along S. Federal Way.

Correspondence with Intermountain Gas indicates there are no expected plans for expansion of the high-pressure pipeline system in the Airport vicinity. The existing facilities are sized correctly to handle current capacity and expected growth in the area for the next 5 years. Any expansion that might occur would depend on demands from new development by the City or the IDNG.

2.2.5.5 STORMWATER DRAINAGE

The general stormwater drainage pattern is north and south from the berm at the center of Runways 10L-28R and 10R-28L. Flow on the north travels to ponds along the north edge of Airport property and to the south along the "Base Ditch" from east to west.

The intent of the stormwater system on Airport property is to contain discharge on-site to satisfy monitoring requirements for permits. Currently, 15 detention ponds and 3 evaporation ponds are on Airport property. The major points are the "Tear Drop" pond, located at Wright Street, which intersects the New York Canal to the east, and the "Big Dig" or Lindbergh Pond, located at the corner of W. Dorman Street and Kennedy Street. There is one outfall, the 001 Dorman Outfall, located approximately one-quarter mile north of W. Gowen Road along S. Orchard Street.

Regarding contamination, the concerns are discharge of the Tear Drop pond into New York Canal and discharge at the 001 Dorman Outfall into a ditch that runs along the north and west sides of the remediated wastewater ponds at W. Gowen Road and S. Orchard Street. Tear Drop pond is bermed with the ability to berm higher, and it is monitored closely to prevent discharge into the New York Canal. There is no permit to discharge into the New York Canal. The 001 Dorman Outfall's last discharge was in 2007. The ponds have a high infiltration rate and rarely exhibit standing water for periods of time.

Gowen Field is under its own Stormwater Pollution Prevention Plan and Multi Sector General Permit (MSGP) MS4. Water must be sampled before entering the Lindbergh Pond.

For potential future expansion of facilities to the south, stormwater would need to be mitigated under the MSGP due to Three Mile Creek/Five Mile Creek. For any expansion of facilities to the west, tenants would be required to be "self-contained" with onsite infiltration under the MS4. There are decommissioned wastewater ponds at W. Gowen Road and S. Orchard Street that could be used for future expansion. These ponds have been remediated and are available for water retention under the MS4 permit. If more storage is required, land could be acquired, but it is the preference of Airport officials that land acquired be used for business operations rather than wastewater storage.

Capacity is determined on a case-by-case basis. The exact capacity of the stormwater ponds is unknown. The ponds on the north edge of the Airport, adjacent to I-84, were engineered, but calculations and documentation are unavailable. In 2014, a 150-year event did not exceed capacity, and in 2017, a 200-year event did not exceed capacity. Thus, it is determined that there is plenty of capacity, but the exact volume is unknown.

2.2.5.6 FIBER OPTIC

Fiber is used at the Airport to transmit telephone signals, internet communication, and cable television service. The City provides the fiber optic cable for Airport use. Since the last Master Plan Update, the loop has been completed around the southeast edge of the property. The loop comes south from the existing location along Industrial Street, then travels west along East Gowen Road, north along S. Stimpson Street, west along W. Harvard Street, then south along S. Zeppelin Street, to tie into an existing leg ending at E. Gowen Road and S. Zeppelin Street.

The City provides the fiber cable and leases use to providers, including Zayo, Syringa, Time Warner, and Cable One. These providers sell service to tenants. When a request for service is made, another fiber strand is dropped off the main lines to provide this service.

Capacity is currently being met, but there is a stretch from S. Orchard Street and W. Wright Street east to the terminal that could be improved with the addition of more cable. The City currently has no plans to expand the fiber system at the Airport since closing the loop around the Airport after 2012. Future expansion of the network would depend on the demands of the Airport.

If expansion were to occur at the south end of Airport property, then connectivity to the system would be required. A conduit pathway currently runs down Gowen Road to the Norco Plant, but there is no cable. The fiber that currently runs along this path is included in one 2-inch pipe, and more conduit would be required. Along with new pathways to accommodate more cable, power would also be needed to serve any additional access gates, as there is a 120-volt alternating current demand to run the motors and security controls required for controlled gates.

If expansion to the northwest were to occur, then more cable would need to be added to the current path along W. Victory Road.

The IDNG side is controlled by the IDNG, who manage its own systems, rather than the City. It is unknown to the City which gates they control and the current capacity and usage.

Communications

The City provides the communications services to the Airport with all services coming into the terminal. Private services are provided out of City Hall, and public wireless services are provided out of the Airport data center. Demand is currently being met with no issues of satisfying future growth. If more services are required, they can be ordered.

Public and Secure Wi-Fi

Current internal Wi-Fi services are meeting demand and performing well. There is possible need for external services, and discussions have focused on running mesh along the trench running down the middle of Runway 10L-28R and Runway 10R-28L to improve connectivity. There is also a discussion to upgrade access points for better signal in the smaller conference rooms located within the terminal.

Cable or Dish TV Services

Airport officials have decided to use cable instead of satellite for TV services, as satellite dishes and antennas create maintenance issues. While the City provides the use of the fiber optic cables, CableOne is the only provider available for cable TV services. The cable TV system at the Airport is currently at or beyond capacity and should be upgraded. There is currently adequate fiber for use, and upgrades to the system would require CableOne to expand its services. The current promised speeds are 50 megabits per second, but this is provided to the entire Airport, so anytime someone adds a router, the bandwidth is divided, reducing individual speeds to approximately 5 megabits per second. This concern is the issue of the provider, CableOne, to solve.

No copper facilities require repair, as this was done approximately two to three years ago. There is plenty of capacity. The only provider that currently uses copper facilities is Century Link, which offers services to larger, nationwide tenants such as SkyWest Airlines.

2.2.6 AIRSPACE AND AIR TRAFFIC CONTROL

This section describes the airspace surrounding the Airport and ATC facilities and the procedures in place to safely control aircraft flying to, from, or in the vicinity of the Airport.

Aircraft operating to or from an airport do so under either visual flight rules (VFR) or instrument flight rules (IFR). VFR governs the procedures for flying under VMC, when a pilot is able to safely navigate an aircraft by visual reference to the environment outside the cockpit. Conditions that do not meet the minimum requirements for VFR flight are IMC, under which a flight may only operate under IFR. IFR are a set of regulations and procedures for flying aircraft whereby navigation and obstacle clearance are maintained with reference to aircraft instruments only, while separation from other aircraft is provided by ATC.

2.2.6.1 AIRSPACE STRUCTURE

Airspace in the United States is generally classified as controlled or uncontrolled, and it is further classified as Class A, B, C, D, E, or G. **Exhibit 2-11** depicts the airspace structure and other aeronautical features near the Airport.

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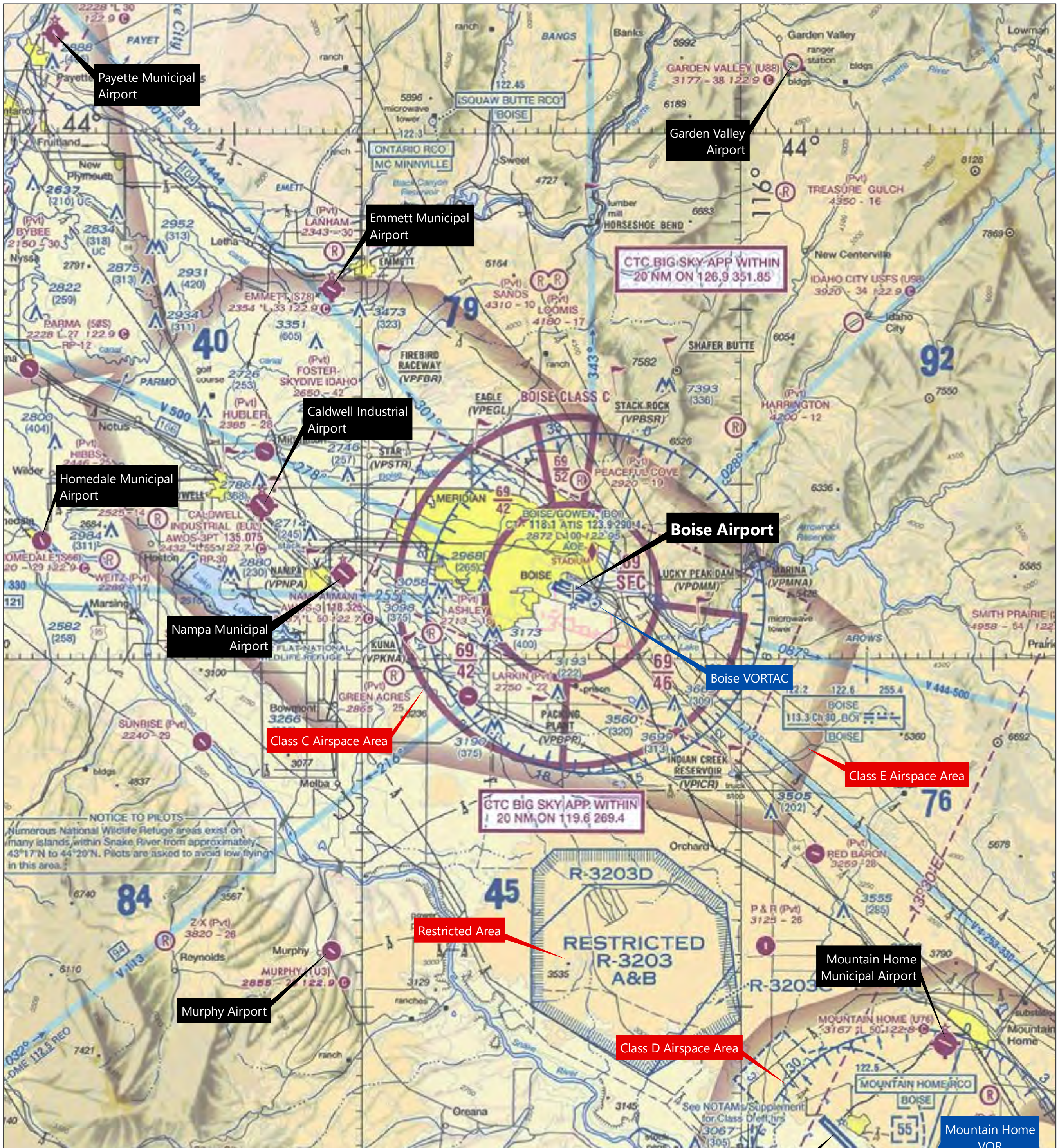

NOTES:

VOR - Very High Frequency Omnidirectional Radio Range
VORTAC - VOR and Distance Measuring Equipment (DME) with Tactical Air Navigation System (TACAN)

SOURCE: http://www.skyvector.com (accessed May 12, 2019), (Salt Lake City Sectional Chart).

EXHIBIT 2-11

AIRSPACE STRUCTURE AND FEATURES

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All airspace at and above 18,000 feet MSL in the vicinity of the Airport is classified as Class A, which is specified as IFR only. Class B airspace is established around the nation's largest airports (e.g., Salt Lake City International Airport) and is not found in the vicinity of BOI.

The airspace immediately surrounding the Airport is classified as Class C, which consists of a surface area with a 5-nautical-mile radius and an outer circle with a 10-nautical-mile radius. The surface area vertically extends to 69,000 feet above MSL, while the outer circle extends from 4,200 or 4,600 feet above MSL to 6,900 feet above MSL, depending on the airspace segment. The Boise Class C airspace area is depicted on Exhibit 2-10 between the two magenta rings encircling the Airport. VFR aircraft are separated from IFR aircraft within the airspace.

Mountain Home Air Force Base, located approximately 35 nautical miles southeast of the Airport, has Class D airspace that extends from the surface up to and including 5,500 feet above MSL. This airspace area is depicted on Exhibit 2-10 with a dashed blue circle around the Airport.

Exhibit 2-10 also shows areas of Class E airspace within a lower limit of either 700 feet or 1,200 feet AGL and an upper limit of either 18,000 feet above MSL or the lower limit of overlying airspace. Most of the country has a Class E lower limit of 1,200 feet AGL. Where it drops to 700 feet AGL is depicted by a broad magenta line with a faded side. The faded side is the side where the floor of Class E is 700 feet AGL, while the more defined side of the line indicates areas where the color of Class E rises to 1,200 feet. The Class E airspace areas in the vicinity of the Airport ensure IFR aircraft remain in controlled airspace while conducting instrument approaches into airports without Class D airspace, such as Caldwell Industrial Airport, Nampa Municipal Airport, and Mountain Home Municipal Airport.

Class G airspace is uncontrolled airspace. Only VFR aircraft can operate in Class G airspace. Class G airspace begins at the surface throughout much of the area surrounding the Airport, except for the areas where Class C or Class D airspace extends to the surface.

An additional classification of airspace in the vicinity of the Airport is special use airspace. As shown on Exhibit 2-10, Restricted Area R-3202 A&B is located 15 nautical miles south of the Airport. Restricted areas are a type of special use airspace that are identified by an area within which the flight of aircraft, while not wholly prohibited, is subject to restrictions. Restricted areas denote the existence of unusual, often invisible, hazards to aircraft, such as artillery firing, aerial gunnery, or guided missiles. Restricted Area A&B extends up to 22,000 feet above MSL, and aircraft may not enter the area unless permission has been obtained from the Salt Lake City Air Route Traffic Control Center (ARTCC).

2.2.6.2 AIR TRAFFIC CONTROL

Air traffic control in the United States (and at/in the vicinity of BOI) is generally managed by three primary types of facilities:

- **ATCT:** Tower controllers are responsible for separating aircraft in the air and on the ground, sequencing aircraft in the traffic pattern, expediting arrivals and departures from the Airport, and providing clearances and weather information to pilots. From the ATCT, FAA personnel maintain communications with pilots operating aircraft on the runways or within the Airport's Class C airspace.
- **TRACON:** The Boise TRACON facility is co-located with the Airport's ATCT facility. TRACON controllers are responsible for ensuring arriving aircraft can be safely and efficiently transitioned from the enroute environment to the approach control environment and from the approach control environment to the airfield. Likewise, TRACON controllers are responsible for ensuring departing aircraft can transition from the airfield to the departure control environment and ultimately to the enroute environment.

- **ARTCC:** The enroute phase of flight generally occurs when aircraft are operating between departure and destination TRACON/ATCT areas. The FAA's Salt Lake City ARTCC, located in Salt Lake City, Utah, is responsible for controlling aircraft across a multistate area, including Idaho, Montana, Utah, Nevada, and parts of Oregon, Wyoming, and North and South Dakota, making it the largest ARTCC area in the nation. ARTCC controllers provide separation services and traffic advisories to aircraft operating on IFR flight plans during the enroute phase of flight, as well as to VFR aircraft on request. Generally, aircraft are transitioned to and from ARTCC control near the boundary of the TRACON airspace at designated arrival and departure areas. A letter of agreement (LOA) delegates areas of control jurisdiction and establishes procedures for coordinating air traffic between the Salt Lake City ARTCC and related TRACON facilities (including Boise).

Departure Procedures

Pilots of aircraft departing from the Airport contact ATCT controllers for authorization to taxi to a particular runway and for clearance to take off. Under VFR, departing aircraft typically follow a pilot-requested or ATCT controller-assigned route away from the Airport. Under IFR, aircraft may be directed to follow a predetermined departure procedure, referred to as a standard instrument departure (SID). BOI currently has two published SIDs, which can be used for departures from any runway end. Once the aircraft is airborne, the controller will instruct the pilot to contact the Boise TRACON. Pursuant to the LOA between the Boise TRACON and the Salt Lake City ARTCC, once under TRACON control, aircraft are provided a radar vector or routing that will establish them on a cleared route prior to leaving the lateral boundaries of the TRACON airspace.

Arrival Procedures

Pilots of aircraft under Salt Lake City ARTCC control intending to land at the Airport are “handed off” to TRACON controllers prior to entering TRACON airspace. Arrival aircraft altitudes are established by the LOA. Aircraft not under ARTCC control are required to contract the Boise TRACON prior to entering the Airport's Class C airspace. Aircraft are then vectored by the TRACON to the appropriate arrival runway at the Airport. Pilots of aircraft operating under IFR will then execute an instrument approach procedure to the Airport, while pilots of aircraft operating under VFR will execute a visual approach. Once near the Airport, ATCT controllers will sequence aircraft and issue a landing clearance.

The US Department of Commerce publishes instrument approach procedures that describe in graphic and tabular form the headings and altitudes that pilots must observe when flying the approach procedure. These procedures allow pilots to land aircraft safely during poor weather conditions or when cloud cover is low and when visibility is limited. Both nonprecision and precision instrument approaches are published for the Airport.

A nonprecision instrument approach is one in which the pilot uses only horizontal navigational guidance to line the aircraft up with the runway. When flying such an approach, the pilot proceeds along the specified course and descends to the minimum decent altitude while locating the runway. If the runway (or runway lights) is in sight, then the pilot may land; otherwise, the pilot must execute a missed approach. Two types of nonprecision approaches are published for the Airport. Approaches using the Airport's VOR/DME equipment for horizontal guidance are published for Runways 10R, 10L, and 28R. Approaches using area navigation (RNAV), global positioning system (GPS), and required navigation performance (RNP) technology for horizontal guidance are published for all four runway ends. These technologies allow for the creation of electronic waypoints for an aircraft to fly point to point or on a curved route without having to overfly ground-based navigational aids.

A precision instrument approach provides both vertical and horizontal navigational guidance, typically using an ILS. Using an instrument in the cockpit that receives signals from the ground-based ILS equipment (localizer and glide slope), a pilot can position the aircraft on the proper glide path to the runway. The aircraft descends along the glide path to the published decision height, which is the height in feet above MSL at which a pilot must execute a missed approach procedure if the runway (or the runway lights) is not in sight. ILS procedures are currently published for Runways 10R and 28R. Precision approaches generally have lower published “minimums” than nonprecision approaches, meaning the approach can be used during periods when the combination of cloud ceiling and/or visibility present at the Airport is too low to allow a nonprecision approach to be executed. With an appropriately certified pilot and equipped aircraft, the Category II/III ILS approach procedure to Runway 10R allows for landing in low visibility conditions.

Aircraft operating under VFR conditions are instructed by the TRACON to contact the ATCT for instructions as to where and how the aircraft is to enter the local traffic pattern for landing. The traffic pattern consists of a downwind, base, and final approach leg. The Boise ATCT is responsible for ensuring aircraft operating in the traffic pattern are separated from other aircraft operating in the traffic pattern and from other arrival and departure aircraft.

Ground Operations

FAA controllers in the ATCT control ground movements of both civil and military aircraft at the Airport. However, IDANG operates a ramp tower to facilitate the movement of military aircraft on the IDANG apron. ATCT controllers assume positive control of military aircraft prior to any movement onto an active taxiway. Areas of the airfield that are controlled by ATCT controllers are known as movement areas. Movement areas generally include all active runways and taxiways where controllers have line-of-sight of aircraft. Non-movement areas typically include aprons and taxilanes. All aircraft and ground vehicles require clearance from an ATCT controller prior to entering a movement area at BOI. **Exhibit 2-12** presents the published diagram for the Airport that depicts movement and non-movement areas of the airfield.

To enhance taxiing capabilities in low visibility conditions and to reduce the potential for runway incursions, the Airport has implemented a Surface Movement Guidance and Control System (SMGCS). SMGCS is a strategy that requires a low visibility taxi plan for any airport with a published Category II/II instrument approach. This plan includes the improvement of taxiway and runway signs, markings, and lighting, as well as the development of a SMGCS low visibility taxi route chart. The chart specifically designates taxi routes to and from the SMGCS runway (Runway 10R-28L), and it applies to both pilots and airport vehicle operators. The SMGCS taxi route chart for the Airport is available from Jeppesen Sanderson, Inc.

2.3 SOCIOECONOMIC DATA

This section summarizes historical (through 2015) and forecast (through 2035) socioeconomic data for the Airport’s Air Trade Area, which is defined in Section 3 as the 10 Idaho counties of Ada, Adams, Boise, Canyon, Elmore, Gem, Owyhee, Payette, Valley, and Washington. These data help develop an understanding of the characteristics of the region and the change in these characteristics over time. The economic strength of the Air Trade Area provides the primary support for air transportation at the Airport.

The region’s economic character affects its potential to generate air traffic. This information is summarized in Section 3 for use in forecasting future aviation demand at the Airport. The economic indicators presented in **Table 2-19** through **Table 2-24** in this section include population, employment, earnings, gross domestic product (GDP), and per capita personal income. The primary source for this information is Woods & Poole Economics, Inc.[10]

[10] Woods & Poole Economics, Inc., is a data vendor located in Washington, D.C. that specializes in long-term economic and demographic projections for the 50 states and 3,091 counties in the United States. Its database contains approximately 900 variables for every U.S. county.

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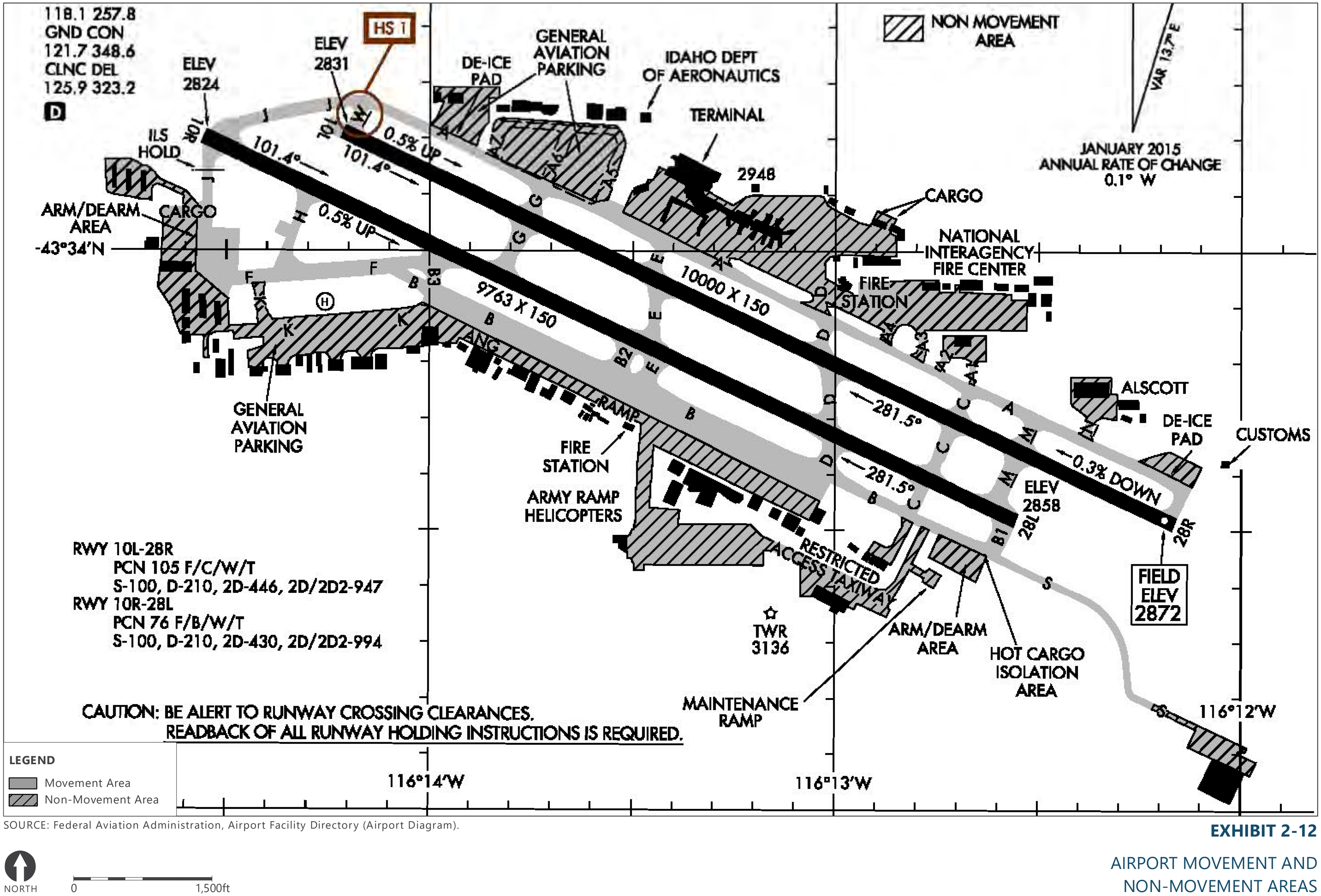

SOURCE: Federal Aviation Administration, Airport Facility Directory (Airport Diagram).

EXHIBIT 2-12

AIRPORT MOVEMENT AND NON-MOVEMENT AREAS

C:\Ricondo Projects\Active Projects\Boise\Master Plan Update\GIS\GIS Exhibits\02_Existing Conditions\Ex_2-12_MovementAreas.mxd

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TABLE 2-19 HISTORICAL AND PROJECTED POPULATION

YEAR	COUNTY										AIR TRADE AREA	STATE OF IDAHO	UNITED STATES
	ADA	ADAMS	BOISE	CANYON	ELMORE	GEM	OWYHEE	PAYETTE	VALLEY	WASHING-TON			
Historical													
2006	363,498	3,788	7,151	172,188	25,927	16,632	11,114	21,916	9,480	10,025	641,719	1,468,669	298,379,912
2007	375,368	3,949	7,229	179,645	26,595	16,833	11,255	22,437	9,929	10,027	663,267	1,505,105	301,231,207
2008	382,618	4,021	7,148	184,996	26,930	16,941	11,515	22,618	10,060	10,095	676,942	1,534,320	304,093,966
2009	388,577	4,000	7,051	187,357	26,769	16,809	11,547	22,665	9,975	10,173	684,923	1,554,439	306,771,529
2010	393,412	3,956	7,019	189,339	27,108	16,681	11,472	22,638	9,781	10,190	691,596	1,570,639	309,347,057
2011	401,100	3,982	7,011	191,386	26,187	16,727	11,403	22,550	9,606	10,134	700,086	1,583,780	311,721,632
2012	408,891	3,908	6,803	193,856	26,199	16,692	11,409	22,673	9,511	10,041	709,983	1,595,590	314,112,078
2013	416,556	3,831	6,744	199,040	26,156	16,694	11,423	22,591	9,586	9,954	722,575	1,612,843	316,497,531
2014	426,236	3,861	6,824	203,143	26,094	16,866	11,353	22,836	9,826	10,021	737,060	1,634,464	318,856,967
2015	433,293	3,879	6,905	206,060	26,180	16,984	11,407	22,972	9,951	10,050	747,681	1,654,403	321,545,081
Projected													
2020	471,984	3,984	7,352	222,045	26,709	17,644	11,722	23,748	10,639	10,232	806,059	1,764,518	336,690,447
2025	513,620	4,087	7,821	239,033	27,220	18,312	12,034	24,525	11,363	10,406	868,421	1,881,269	352,566,429
2030	557,826	4,185	8,302	256,812	27,687	18,968	12,329	25,277	12,113	10,563	934,062	2,002,979	368,838,293
2035	603,305	4,267	8,776	274,761	28,044	19,565	12,579	25,944	12,857	10,677	1,000,775	2,124,877	384,634,547
CAGR													
2006–2015	1.2%	0.2%	-0.2%	1.2%	0.1%	0.1%	0.2%	0.3%	0.3%	0.0%	1.0%	0.8%	0.5%
2015–2020	1.7%	0.5%	1.3%	1.5%	0.4%	0.8%	0.5%	0.7%	1.3%	0.4%	1.5%	1.3%	0.9%
2020–2025	1.7%	0.5%	1.2%	1.5%	0.4%	0.7%	0.5%	0.6%	1.3%	0.3%	1.5%	1.3%	0.9%
2025–2035	1.6%	0.4%	1.2%	1.4%	0.3%	0.7%	0.4%	0.6%	1.2%	0.3%	1.4%	1.2%	0.9%
2015–2035	1.7%	0.5%	1.2%	1.4%	0.3%	0.7%	0.5%	0.6%	1.3%	0.3%	1.5%	1.3%	0.9%

NOTE: CAGR – Compound Annual Growth Rate
SOURCE: Woods & Poole Economics, Inc., November 2016.

TABLE 2-20 HISTORICAL AND PROJECTED EMPLOYMENT

YEAR	COUNTY										AIR TRADE AREA	STATE OF IDAHO	UNITED STATES
	ADA	ADAMS	BOISE	CANYON	ELMORE	GEM	OWYHEE	PAYETTE	VALLEY	WASHING-TON			
Historical													
2006	272,399	2,463	2,656	80,157	14,116	6,647	4,389	9,691	7,388	4,756	404,662	900,718	176,123,546
2007	281,099	2,514	2,771	83,636	14,578	6,795	4,453	10,099	7,617	4,774	418,336	931,102	179,885,659
2008	279,959	2,377	2,670	80,372	14,354	6,556	4,398	10,044	7,063	4,811	412,604	923,376	179,639,866
2009	264,704	2,274	2,543	76,279	13,846	6,287	4,289	9,429	6,453	4,591	390,695	883,020	174,233,668
2010	260,715	2,294	2,542	75,251	13,480	6,204	4,246	9,423	6,159	4,557	384,871	868,673	173,034,656
2011	266,898	2,246	2,521	75,779	12,903	6,090	4,368	9,574	6,223	4,608	391,210	878,345	176,278,657
2012	270,798	2,231	2,518	76,763	12,659	6,058	4,293	9,339	6,304	4,650	395,613	882,028	179,081,633
2013	279,097	2,287	2,487	79,291	12,881	6,239	4,309	9,482	6,236	4,681	406,990	901,653	182,390,004
2014	286,010	2,346	2,524	82,027	13,054	6,427	4,438	9,785	6,416	4,554	417,581	922,992	185,798,752
2015	292,441	2,378	2,569	83,712	13,174	6,529	4,487	9,921	6,542	4,611	426,364	940,345	188,866,185
Projected													
2020	324,073	2,532	2,789	91,764	13,733	7,023	4,721	10,539	7,149	4,853	469,176	1,023,233	203,418,448
2025	356,606	2,682	3,015	99,799	14,270	7,506	4,929	11,105	7,752	5,068	512,732	1,105,453	217,670,718
2030	390,006	2,824	3,235	107,804	14,808	7,971	5,114	11,617	8,337	5,258	556,974	1,187,010	231,564,124
2035	423,934	2,958	3,454	115,751	15,334	8,417	5,274	12,079	8,907	5,422	601,530	1,267,262	244,922,886
CAGR													
2006–2015	0.5%	-0.2%	-0.2%	0.3%	-0.5%	-0.1%	0.1%	0.2%	-0.8%	-0.2%	0.3%	0.3%	0.5%
2015–2020	2.1%	1.3%	1.7%	1.9%	0.8%	1.5%	1.0%	1.2%	1.8%	1.0%	1.9%	1.7%	1.5%
2020–2025	1.9%	1.2%	1.6%	1.7%	0.8%	1.3%	0.9%	1.1%	1.6%	0.9%	1.8%	1.6%	1.4%
2025–2035	1.7%	1.0%	1.4%	1.5%	0.7%	1.2%	0.7%	0.8%	1.4%	0.7%	1.6%	1.4%	1.2%
2015–2035	1.9%	1.1%	1.5%	1.6%	0.8%	1.3%	0.8%	1.0%	1.6%	0.8%	1.7%	1.5%	1.3%

NOTE: CAGR – Compound Annual Growth Rate
SOURCE: Woods & Poole Economics, Inc., November 20

TABLE 2-21 AIR TRADE AREA EMPLOYMENT BY SECTOR

SECTOR	ANNUAL EMPLOYMENT			CAGR	
	HISTORICAL		PROJECTED	HISTORICAL	PROJECTED
	2006	2015	2035	2006–2015	2015–2035
Farm	10,138	10,913	10,925	0.7%	0.0%
Forestry, Fishing, and Related Activities	2,948	3,288	4,102	1.1%	1.1%
Mining	778	1,452	1,708	6.4%	0.8%
Utilities	771	1,483	2,234	6.8%	2.1%
Construction	38,443	26,711	35,993	-3.6%	1.5%
Manufacturing	35,931	30,064	33,318	-1.8%	0.5%
Wholesale Trade	14,119	15,622	20,298	1.0%	1.3%
Retail Trade	45,369	47,279	69,011	0.4%	1.9%
Transportation and Warehousing	10,091	11,084	13,845	0.9%	1.1%
Information	6,238	6,362	7,301	0.2%	0.7%
Finance and Insurance	16,008	19,997	33,496	2.2%	2.6%
Real Estate, Rental, and Lease	20,666	21,496	31,576	0.4%	1.9%
Professional and Technical Services	21,284	25,119	33,460	1.7%	1.4%
Management of Companies and Enterprises	6,096	4,531	4,631	-2.9%	0.1%
Administrative and Waste Services	29,347	30,016	42,683	0.2%	1.8%
Educational Services	6,557	8,334	14,345	2.4%	2.8%
Health Care and Social Assistance	37,032	49,470	88,817	2.9%	3.0%
Arts, Entertainment, and Recreation	7,135	9,316	16,956	2.7%	3.0%
Accommodating and Food Services	24,270	27,549	36,117	1.3%	1.4%
Other Services	18,923	20,558	28,556	0.8%	1.7%
Federal Civilian Government	7,136	7,216	7,551	0.1%	0.2%
Military	6,476	5,989	6,060	-0.8%	0.1%
State and Local Government	38,906	42,515	58,547	0.9%	1.6%
Total	404,662	426,364	601,530	0.5%	1.7%

NOTE: CAGR – Compound Annual Growth Rate
SOURCE: Woods & Poole Economics, Inc., November 2016.

TABLE 2-22 HISTORICAL AND PROJECTED EARNINGS

YEAR	COUNTY										AIR TRADE AREA	STATE OF IDAHO	UNITED STATES
	ADA	ADAMS	BOISE	CANYON	ELMORE	GEM	OWYHEE	PAYETTE	VALLEY	WASHINGTON			
Historical													
2006	$13,626	$58	$71	$2,718	$610	$158	$149	$312	$229	$129	$18,059	$36,084	$9,018,150
2007	$13,492	$54	$69	$2,777	$621	$156	$165	$317	$236	$129	$18,017	$36,737	$9,136,932
2008	$12,575	$50	$63	$2,566	$615	$144	$146	$314	$211	$131	$16,815	$35,208	$9,088,561
2009	$12,426	$50	$58	$2,415	$600	$132	$82	$277	$186	$125	$16,352	$33,854	$8,743,737
2010	$12,506	$52	$58	$2,439	$609	$140	$146	$313	$183	$129	$16,575	$34,216	$8,829,928
2011	$12,277	$51	$59	$2,449	$578	$133	$156	$336	$175	$134	$16,348	$34,303	$9,017,171
2012	$12,379	$54	$61	$2,491	$579	$137	$166	$335	$197	$134	$16,533	$34,529	$9,272,734
2013	$12,937	$56	$59	$2,581	$595	$140	$162	$352	$190	$145	$17,217	$35,866	$9,407,756
2014	$13,495	$58	$58	$2,690	$612	$147	$184	$368	$194	$142	$17,948	$36,934	$9,700,843
2015	$13,912	$55	$61	$2,836	$604	$156	$151	$351	$197	$138	$18,461	$37,967	$9,939,139
Projected													
2020	$15,958	$60	$67	$3,191	$655	$174	$161	$386	$223	$150	$21,026	$42,771	$11,123,567
2025	$18,144	$66	$74	$3,558	$710	$192	$170	$423	$251	$163	$23,751	$47,809	$12,362,572
2030	$20,497	$71	$81	$3,940	$769	$211	$179	$460	$280	$175	$26,664	$53,122	$13,660,204
2035	$23,025	$77	$88	$4,340	$832	$231	$187	$497	$310	$187	$29,774	$58,723	$15,017,264
CAGR													
2006–2015	0.1%	-0.3%	-1.0%	0.3%	-0.1%	0.0%	0.1%	0.8%	-1.0%	0.5%	0.1%	0.3%	0.7%
2015–2020	2.8%	1.9%	2.0%	2.4%	1.6%	2.1%	1.3%	2.0%	2.5%	1.8%	2.6%	2.4%	2.3%
2020–2025	2.6%	1.7%	2.0%	2.2%	1.6%	2.0%	1.1%	1.8%	2.4%	1.6%	2.5%	2.3%	2.1%
2025–2035	2.4%	1.6%	1.8%	2.0%	1.6%	1.9%	0.9%	1.6%	2.2%	1.4%	2.3%	2.1%	2.0%
2015–2035	2.6%	1.7%	1.9%	2.1%	1.6%	2.0%	1.1%	1.8%	2.3%	1.5%	2.4%	2.2%	2.1%

NOTES: In millions of 2009 dollars.
CAGR – Compound Annual Growth Rate
SOURCE: Woods & Poole Economics, Inc., November 2016.

TABLE 2-23 HISTORICAL AND PROJECTED GROSS DOMESTIC PRODUCT

YEAR	COUNTY										AIR TRADE AREA	STATE OF IDAHO	UNITED STATES
	ADA	ADAMS	BOISE	CANYON	ELMORE	GEM	OWYHEE	PAYETTE	VALLEY	WASHING-TON			
Historical													
2006	$20,525	$103	$111	$4,139	$905	$283	$213	$484	$359	$230	$27,352	$54,704	$14,548,185
2007	$20,827	$105	$112	$4,301	$958	$297	$222	$519	$376	$241	$27,958	$56,652	$14,820,647
2008	$19,945	$103	$110	$4,148	$983	$295	$238	$533	$353	$247	$26,954	$56,241	$14,617,100
2009	$19,603	$99	$98	$3,865	$960	$264	$216	$480	$309	$224	$26,116	$54,015	$14,320,111
2010	$19,734	$108	$102	$3,898	$966	$288	$238	$517	$304	$233	$26,388	$54,672	$14,618,135
2011	$19,447	$104	$103	$3,935	$926	$287	$250	$549	$296	$237	$26,134	$54,714	$14,792,276
2012	$19,709	$102	$103	$3,992	$909	$278	$236	$521	$324	$236	$26,409	$54,683	$15,116,011
2013	$20,425	$107	$102	$4,160	$914	$295	$249	$539	$311	$248	$27,349	$56,372	$15,384,326
2014	$21,278	$110	$101	$4,337	$925	$308	$256	$558	$318	$251	$28,441	$58,129	$15,894,995
2015	$21,955	$108	$104	$4,493	$929	$310	$250	$552	$324	$253	$29,278	$59,722	$16,302,781
Projected													
2020	$25,265	$120	$116	$5,079	$1,012	$348	$275	$607	$368	$269	$33,458	$67,361	$18,278,587
2025	$28,808	$132	$128	$5,691	$1,100	$389	$300	$663	$415	$285	$37,910	$75,394	$20,345,969
2030	$32,619	$145	$141	$6,330	$1,195	$431	$324	$720	$464	$303	$42,674	$83,880	$22,509,324
2035	$36,710	$159	$154	$7,001	$1,298	$475	$348	$778	$515	$323	$47,762	$92,836	$24,767,291
CAGR													
2006–2015	0.4%	0.3%	-0.4%	0.5%	0.2%	0.6%	1.1%	0.9%	-0.7%	0.6%	0.5%	0.6%	0.8%
2015–2020	2.8%	2.1%	2.1%	2.5%	1.7%	2.4%	1.9%	1.9%	2.6%	1.2%	2.7%	2.4%	2.3%
2020–2025	2.7%	2.0%	2.0%	2.3%	1.7%	2.2%	1.7%	1.8%	2.4%	1.2%	2.5%	2.3%	2.2%
2025–2035	2.5%	1.9%	1.9%	2.1%	1.7%	2.0%	1.5%	1.6%	2.2%	1.2%	2.3%	2.1%	2.0%
2015–2035	2.6%	2.0%	2.0%	2.2%	1.7%	2.2%	1.7%	1.7%	2.4%	1.2%	2.5%	2.2%	2.1%

NOTES: In millions of 2009 dollars
CAGR – Compound Annual Growth Rate
SOURCE: Woods & Poole Economics, Inc., November 2016.

TABLE 2-24 HISTORICAL AND PROJECTED PER CAPITA PERSONAL INCOME

YEAR	COUNTY										AIR TRADE AREA	STATE OF IDAHO	UNITED STATES
	ADA	ADAMS	BOISE	CANYON	ELMORE	GEM	OWYHEE	PAYETTE	VALLEY	WASHING-TON			
Historical													
2006	$44,787	$30,178	$30,027	$25,589	$30,129	$26,001	$25,156	$28,883	$38,114	$27,569	$37,055	$33,722	$40,266
2007	$43,202	$28,894	$29,718	$26,029	$29,580	$26,515	$26,816	$28,749	$37,539	$28,771	$36,279	$33,935	$41,010
2008	$40,063	$28,494	$29,791	$24,857	$29,499	$27,192	$25,126	$28,267	$35,504	$29,085	$34,108	$32,833	$41,055
2009	$38,553	$27,494	$29,135	$24,149	$28,481	$26,622	$19,120	$26,582	$33,975	$28,497	$32,825	$31,392	$39,376
2010	$38,785	$27,487	$29,360	$24,060	$28,219	$26,337	$24,802	$28,311	$33,890	$29,176	$33,093	$31,529	$39,622
2011	$38,505	$28,294	$29,590	$24,364	$29,057	$26,250	$26,644	$29,019	$34,761	$29,859	$33,170	$32,208	$40,762
2012	$39,241	$29,519	$30,608	$24,616	$29,152	$26,547	$27,160	$29,937	$39,326	$29,622	$33,815	$32,836	$41,713
2013	$39,422	$30,479	$31,394	$24,423	$30,081	$27,842	$26,962	$30,299	$38,483	$31,216	$33,955	$33,132	$41,310
2014	$40,088	$31,162	$32,119	$24,717	$31,078	$28,356	$29,093	$30,981	$38,859	$31,043	$34,553	$33,669	$42,207
2015	$40,788	$30,771	$32,967	$25,538	$30,963	$29,426	$26,604	$30,473	$39,384	$31,203	$35,178	$34,284	$42,928
Projected													
2020	$43,904	$33,912	$35,662	$27,618	$33,750	$32,407	$28,702	$33,360	$42,930	$34,358	$38,039	$36,923	$46,375
2025	$47,118	$37,299	$38,473	$29,780	$36,841	$35,575	$30,897	$36,378	$46,651	$37,657	$41,009	$39,624	$49,916
2030	$50,191	$40,576	$41,099	$31,777	$39,946	$38,602	$32,943	$39,252	$50,222	$40,790	$43,836	$42,137	$53,244
2035	$52,997	$43,529	$43,327	$33,443	$42,910	$41,264	$34,674	$41,797	$53,496	$43,550	$46,376	$44,326	$56,219
CAGR													
2006–2015	-0.6%	0.1%	0.6%	0.0%	0.2%	0.8%	0.4%	0.4%	0.2%	0.8%	-0.3%	0.1%	0.4%
2015–2020	1.5%	2.0%	1.6%	1.6%	1.7%	1.9%	1.5%	1.8%	1.7%	1.9%	1.6%	1.5%	1.6%
2020–2025	1.4%	1.9%	1.5%	1.5%	1.8%	1.9%	1.5%	1.7%	1.7%	1.9%	1.5%	1.4%	1.5%
2025–2035	1.2%	1.6%	1.2%	1.2%	1.5%	1.5%	1.2%	1.4%	1.4%	1.5%	1.2%	1.1%	1.2%
2015-2035	1.3%	1.7%	1.4%	1.4%	1.6%	1.7%	1.3%	1.6%	1.5%	1.7%	1.4%	1.3%	1.4%

NOTES: In millions of 2009 dollars.
CAGR – Compound Annual Growth Rate
SOURCE: Woods & Poole Economics, Inc., November 2016.

2.4 REGIONAL PLANNING AND DEVELOPMENT

Land development policies can influence the characteristics of the Airport and the surrounding area. This section identifies the political entities that have jurisdiction over land use and development in the vicinity of the Airport, and it describes the existing land use and zoning in the area.

2.4.1 POLITICAL JURISDICTIONS

2.4.1.1 CITY AND COUNTY JURISDICTIONS

The Airport lies at the southern edge of the City in Ada County. The City extends north and west of the Airport, while unincorporated Ada County surrounds the remaining area. In the state of Idaho, counties and municipalities each have individual control to amend their comprehensive plans and municipal zoning ordinances. Both the City and Ada County have developed comprehensive plans to manage development within their jurisdictions.

2.4.1.2 METROPOLITAN PLANNING ORGANIZATION

The federal government requires the formation of a Metropolitan Planning Organization (MPO) when an urban area reaches 50,000 people. The MPO for the greater Boise area is COMPASS, an association of local governments working together to plan for the future of the region, which includes northern Ada County and Canyon County.

COMPASS has served as the MPO for the greater Boise area since 1977 and for Canyon County (Nampa area) since early 2003. Northern Ada County became a "Transportation Management Area" when the population reached 200,000. This designation includes additional requirements for COMPASS to satisfy federal regulations, but it also entitles the region to federal funds earmarked for large urban areas.

2.4.1.3 NEIGHBORHOOD ASSOCIATIONS

There are 36 registered neighborhood associations in the City. The highest concentration of these civic groups is north of the Airport. In association with the Boise City Comprehensive Plan, each neighborhood association develops a Neighborhood Plan that serves as the long-term comprehensive policy guide for the social, environmental, and economic development of the neighborhood. The three neighborhood associations adjacent to the Airport are Hillcrest, Sunrise Rim, and Southeast Boise.

2.4.2 LAND USE AND ZONING

The City of Boise Comprehensive Plan identifies Airport Influence Areas (AIA) based on noise levels within the respective areas, and it establishes policies to protect the Airport from encroachment of incompatible uses.[11] Compatible land uses include commercial, industrial, office, grazing, agriculture, mining, and low-intensity recreational use. The Ada County Comprehensive Plan has adopted the same AIA and policies as the City plan, and Ada County coordinates with the City to ensure consistent city and county development regulations in the AIA.[12] **Exhibit 2-13** depicts the AIA.

Existing land use in the vicinity of the Airport was examined in detail in the 2015 14 CFR Part 150 Study Update. **Exhibit 2-14** presents a figure from that study depicting existing land use and the 2015 day-night average sound level (DNL) noise exposure contours.

[11] City of Boise, *Blueprint Boise—Boise's Comprehensive Plan*, November 29, 2011.

[12] Ada County, *Ada County Comprehensive Plan*, November 2016.

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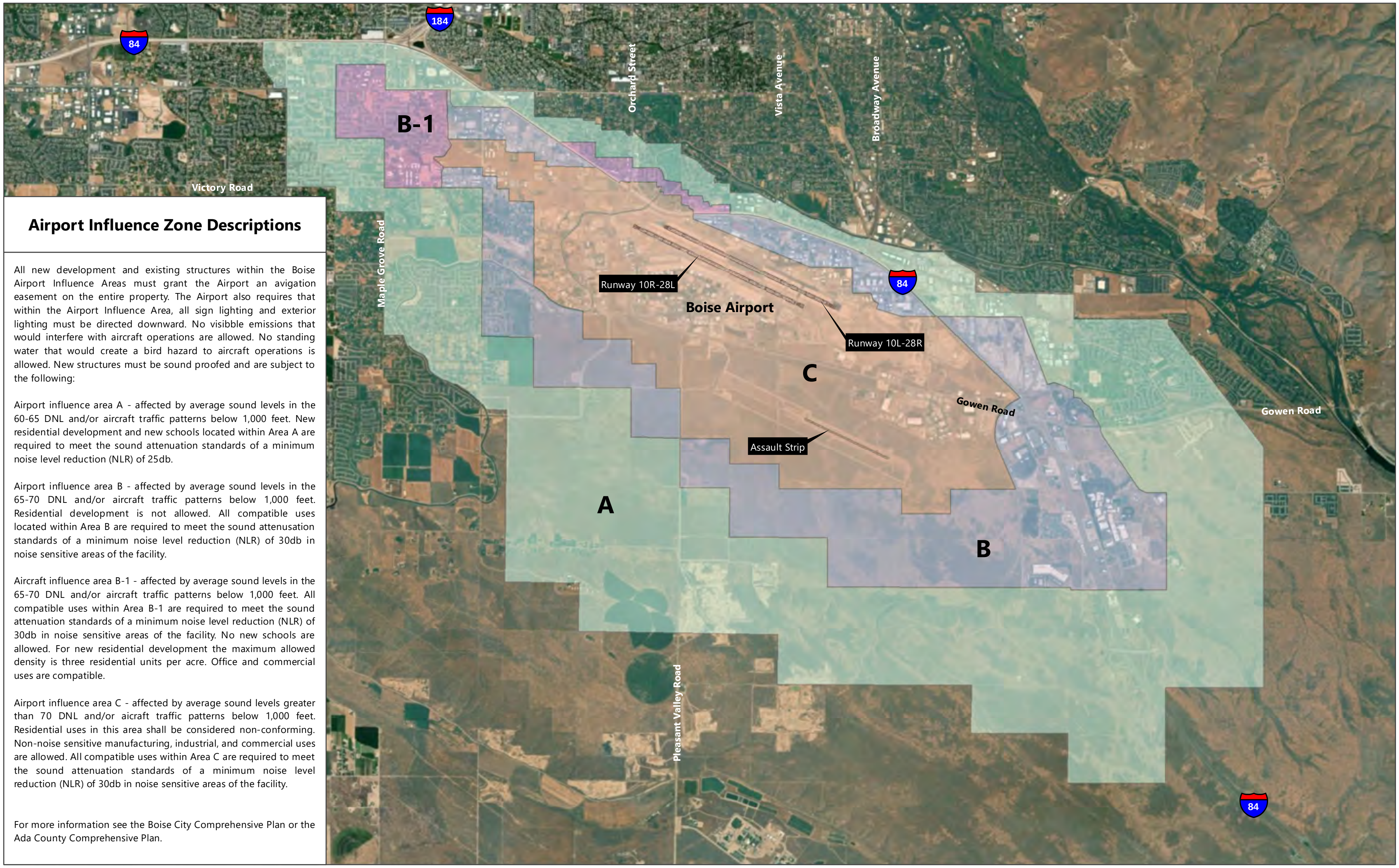

Airport Influence Zone Descriptions

All new development and existing structures within the Boise Airport Influence Areas must grant the Airport an avigation easement on the entire property. The Airport also requires that within the Airport Influence Area, all sign lighting and exterior lighting must be directed downward. No visibble emissions that would interfere with aircraft operations are allowed. No standing water that would create a bird hazard to aircraft operations is allowed. New structures must be sound proofed and are subject to the following:

Airport influence area A - affected by average sound levels in the 60-65 DNL and/or aircraft traffic patterns below 1,000 feet. New residential development and new schools located within Area A are required to meet the sound attenuation standards of a minimum noise level reduction (NLR) of 25db.

Airport influence area B - affected by average sound levels in the 65-70 DNL and/or aircraft traffic patterns below 1,000 feet. Residential development is not allowed. All compatible uses located within Area B are required to meet the sound attenuation standards of a minimum noise level reduction (NLR) of 30db in noise sensitive areas of the facility.

Aircraft influence area B-1 - affected by average sound levels in the 65-70 DNL and/or aircraft traffic patterns below 1,000 feet. All compatible uses within Area B-1 are required to meet the sound attenuation standards of a minimum noise level reduction (NLR) of 30db in noise sensitive areas of the facility. No new schools are allowed. For new residential development the maximum allowed density is three residential units per acre. Office and commercial uses are compatible.

Airport influence area C - affected by average sound levels greater than 70 DNL and/or aicraft traffic patterns below 1,000 feet. Residential uses in this area shall be considered non-conforming. Non-noise sensitive manufacturing, industrial, and commercial uses are allowed. All compatible uses within Area C are required to meet the sound attenuation standards of a minimum noise level reduction (NLR) of 30db in noise sensitive areas of the facility.

For more information see the Boise City Comprehensive Plan or the Ada County Comprehensive Plan.

SOURCES: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community (aerial basemap); Power Engineers (Airport Influence Area).

EXHIBIT 2-13

AIRPORT INFLUENCE AREA

NORTH 0 1.5 mi

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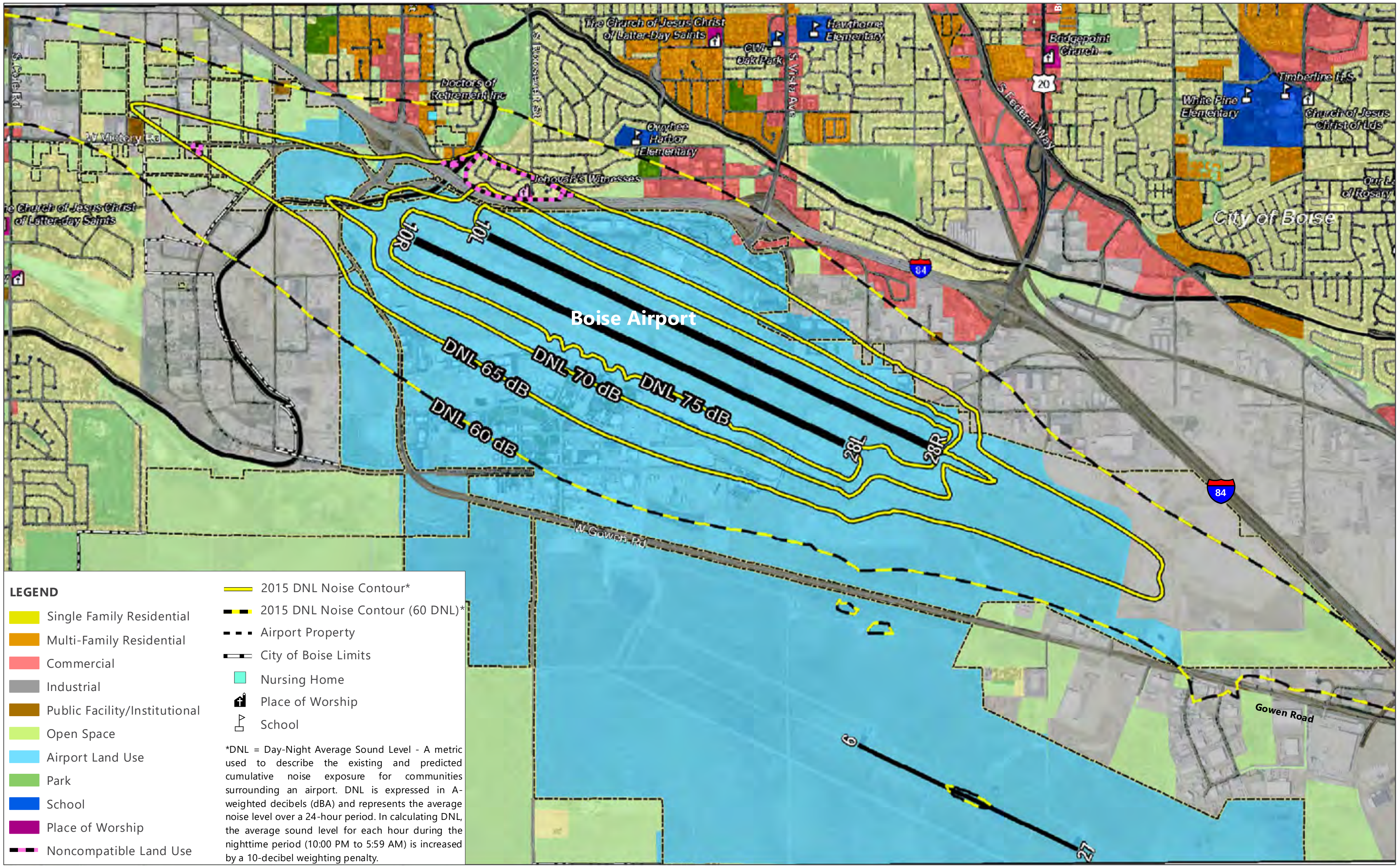

SOURCE: HNTB Corporation, Boise Airport 14 CFR Part 150 Study Update, December 2015.

NORTH 0 3,000 ft

EXHIBIT 2-14

2015 NOISE EXPOSURE CONTOURS OVER GENERALIZED EXISTING LAND USES

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As shown on Exhibit 2-14, the area north of the Airport is fully developed and contains residential housing and commercial businesses. The area east of the Airport is partially developed and is used primarily for industrial purposes. The area to the south of the Airport is sparsely developed rangeland/agricultural land with some industrial development. The area west of the Airport is partially developed and includes industrial development and open space.

Zoning in the vicinity of the Airport was identified using the City's interactive mapping system. The Airport and the area north lie within the City and have been zoned by the City, while the areas to the east, south, and west contain areas zoned by both the City and Ada County. The Airport itself is zoned for commercial, industrial, and open space. The area north of the Airport is zoned for commercial, limited office, light industrial, and residential. The area south of the Airport is primarily zoned for industrial, rural preservation, and open lands. Areas adjacent to the Airport to the west are zoned for Airport industrial usage and open lands, with small residential districts interspersed. The area east of the Airport is zoned for industrial and open lands. The 14 CFR Part 150 Study Update recommended measures to ensure long-term compatibility of the Airport with the surrounding area. It was subsequently approved in a Record of Approval by the FAA on August 24, 2016. **Table 2-25** lists the approved land use measures.

TABLE 2-25 APPROVED LAND USE MEASURES

CATEGORY	LAND USE MEASURE
AIA Planning	LU-1: Maintain current Airport Influence Area (AIA) boundaries
Zoning Measures	LU-3: Industrial and commercial zoning in AIA
	LU-4: Rezone Apple Street area
	LU-5: Rezone Gowen Road area
	LU-6: Encourage clustered residential development
	LU-7: Maintain large lot residential zoning
Avigation Easements	LU-11: Purchase of avigation easements within the 2015 DNL 65+ dB noise exposure contour
Residential	LU-15: Implement a sound-insulation program within the 2015 DNL 65+ dB noise exposure contour
Building Codes/NLR Construction Standards	LU-10: Adopt local building code amendments for noise level reduction (NLR) construction in the AIA
	LU-16: Amend building permit applications to document/require NLR compliance
Disclosure	LU-8: Fair disclosure of noise impacts in the AIA
Land Acquisition and Relocation	LU-9: Voluntary residential property acquisition within or adjacent to 2015 DNL 65+ dB noise exposure contour
	LU-10: Undeveloped property acquisition within the 2015 DNL 65+ dB noise exposure contour

NOTES:
DNL – Day-Night Average Sound Level
dB – Decibel
SOURCE: City of Boise, https://www.iflyboise.com/about-boi/noise-compatibility-program/ (accessed January 14, 2017).

2.5 ENVIRONMENTAL BASELINE

The environmental baseline was performed to evaluate the existing conditions of the Airport property and the surrounding community with the purpose of determining what, if any, environmental factors should be considered during the planning process. By considering environmental factors in the planning process, the City can better evaluate Airport development alternatives, minimize potential impacts, and provide information that will help expedite subsequent environmental processing pursuant to requirements of the National Environmental Policy Act (NEPA) of 1969. **Exhibit 2-15** depicts the locations with potential environmental constraints.

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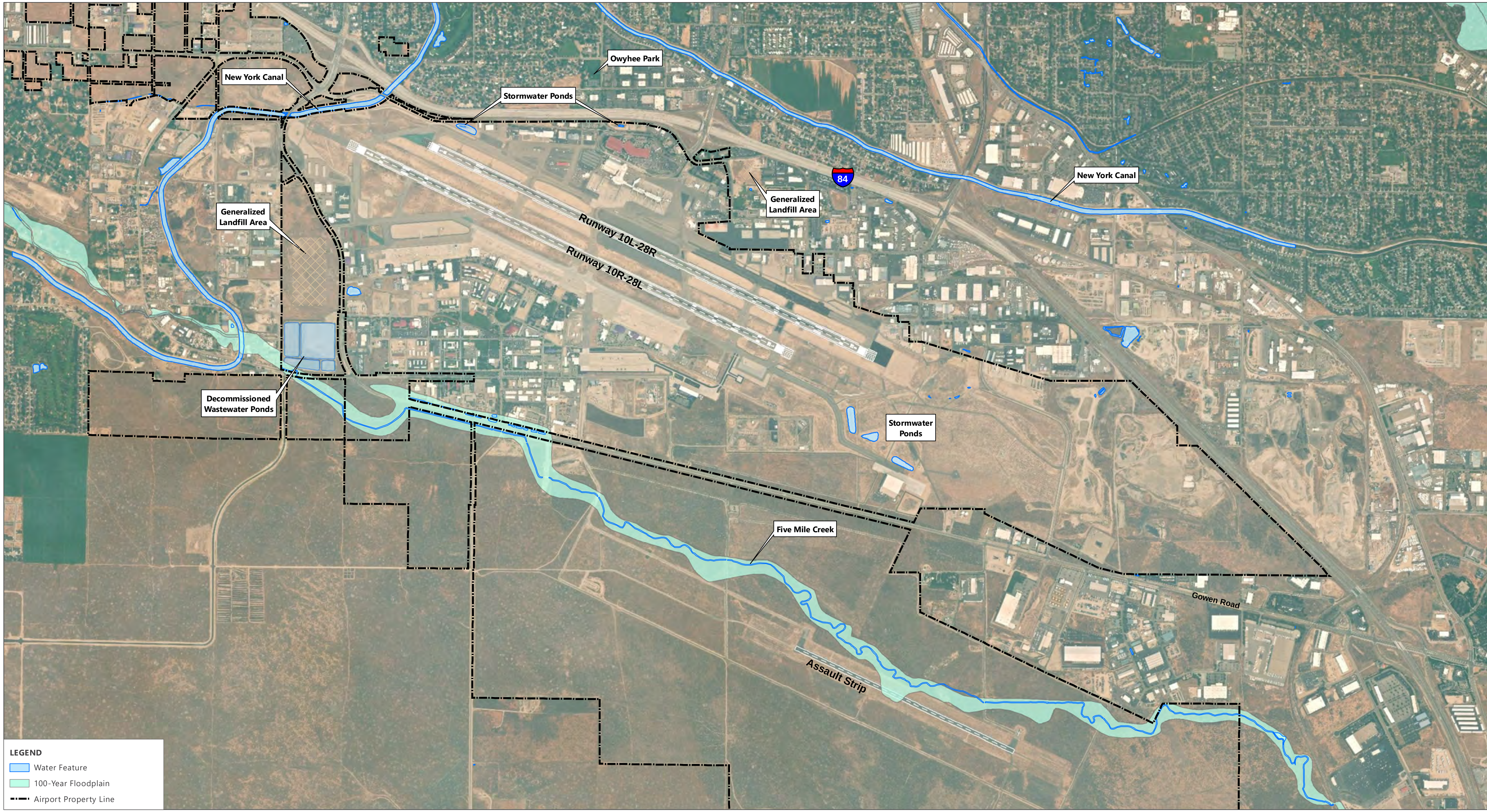

SOURCES: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community (aerial basemap); Power Engineers (Airport property line); Quantum Spatial aerial data collection and planimetric base mapping, September 2016 (water features); Federal Emergency Management Agency (floodplains); Ricondo & Associates, Inc., May 2017, based on discussions with Boise Airport Management (approximate landfill areas).

NORTH 0 2,000 ft

EXHIBIT 2-15

ENVIRONMENTAL RESOURCES

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With regard to airport development, NEPA is implemented through FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*.[13] FAA Order 1050.1F includes a comprehensive list of environmental impact categories that may apply to airport development projects (in general). This baseline is not intended to provide a comprehensive examination of all existing environmental conditions at the Airport pursuant to each of these impact categories. Such a review would typically be undertaken in a detailed NEPA environmental analysis (i.e., an Environmental Assessment or Environmental Impact Statement).

Information used to develop the environmental baseline was obtained from various sources, including previous studies (where applicable), various environmental mapping/database tools, the Idaho Department of Environmental Quality (IDEQ), and the US Environmental Protection Agency (EPA).

2.5.1 AIR QUALITY

The federal Clean Air Act (CAA) requires the EPA to establish National Ambient Air Quality Standards (NAAQS) for air pollutants that are considered harmful to the health of the public and the environment. There are NAAQS for six air pollutants that are referred to as the "criteria" pollutants.[14,15]

In accordance with the CAA, all areas within the United States are designated, with respect to the NAAQS, as attainment, nonattainment, maintenance, or unclassifiable. An area with air quality better than the NAAQS is designated attainment; an area with historical air quality conditions worse than the NAAQS is designated nonattainment. Maintenance areas are nonattainment areas that have been re-designated to attainment status. Currently, the Boise area within Ada County is in attainment of the NAAQS for all pollutants. In the past, northern Ada County did not attain the NAAQS for CO and PM_{10}. Due to a reduction in emissions caused by federal emission standards for new vehicles and a state vehicle emissions testing program, the region has attained the CO standards since December 31, 1995. However, northern Ada County was never classified under the CAA; therefore, the area is known as a "not-classified" CO nonattainment area. On October 27, 2003, the EPA approved the northern Ada County PM_{10} maintenance plan, and the region is therefore considered a maintenance area for PM_{10}.[16]

A state with a nonattainment area must prepare a State Implementation Plan (SIP) that sets forth the programs and requirements the state will implement to meet the NAAQS by the deadlines specified in the Clean Air Act Amendments (CAAA) of 1990 and the subsequent rules promulgated by the US EPA. In Idaho, the IDEQ has been delegated authority by the US EPA to issue air quality permits and to enforce air quality regulations. The IDEQ's air quality protection policies are designed to assure compliance with federal and state air quality standards. The IDEQ's air quality programs and policies are developed in the state office (in Boise) and implemented throughout the state by its regional offices.

The IDEQ is responsible for developing and maintaining Idaho's SIP, which was originally submitted in 1980, and has since undergone several revisions. The SIP includes the state's rules for controlling air pollution; a site-specific nonattainment area plan for various areas, including northern Ada County and the cities of Pinehurst, Sandpoint, and Pocatello; and facility permits limiting air pollutant emissions.

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[13] US Department of Transportation, Federal Aviation Administration, Order 1050.1F, *Environmental Impacts: Policies and Procedures*, July 16, 2015.

[14] The criteria pollutants include ozone (O_3), carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), particulate matter less than 10 microns in diameter (PM_{10}), particulate matter (fine particles) less than 2.5 microns in diameter ($PM_{2.5}$), and lead (Pb).

[15] The IDEQ has adopted ambient air quality standards that are the same as the NAAQS.

[16] United States Air Force, *Final Environmental Impact Statement for F-35A Training Basing*, June 2012.

2.5.2 NOISE

Noise, or unwanted sound, is one of the most intrusive environmental effects associated with airport activity. The effect of aircraft noise on existing and future noise-sensitive land uses is important in relation to the development and growth of the Airport and its environs. Aircraft noise originates from both the engines and the airframe of an aircraft; the engines are, by far, the most significant source of aircraft noise. Although noise from propeller-driven aircraft (mostly regional/commuter and GA aircraft) can be annoying to some people, jet aircraft are the primary source of disturbing noise from the Airport.

The DNL is the most common metric used to describe aircraft noise. DNL is expressed in A-weighted decibels (dBA)[17] and represents the average noise level over a 24-hour period. The FAA considers aircraft noise of DNL 75 and higher to be severe noise and DNL 65 to 75 to be significant noise for airport environs.

Noise exposure contours were developed for the Airport as part of the 2015 Part 150 Study Update, as depicted on Exhibit 2-14. The contour was based on 2015 aviation activity, totaling 128,546 aircraft operations. The Part 150 Study Update observed residences within noise exposure areas where noise levels are too loud (i.e., DNL 65 or higher) to be compatible with residential use. The Airport developed a Noise Compatibility Program, approved by the FAA in 2016, which contained several mitigation measures and recommendations, such as providing sound insulation for residents within areas of concern, as well as voluntary land acquisition (see Table 2-19).[18] An updated noise contour was not developed as part of this MPU.

2.5.3 AQUATIC FEATURES

This section identifies the significant aquatic features located on or in the vicinity of the Airport. Identification of these features is important, as the physical effects on or contamination of such features as a result of Airport operations or development may have negative effects on important habitats and water quality.

2.5.3.1 SURFACE WATER

The Airport is located in the Boise River Drainage Basin. The primary surface water features in the vicinity of the Airport include the Boise River and the New York Canal. The Boise River is approximately 2 to 3 miles north of the Airport, and drainage from the Airport eventually enters the river approximately 25 miles northeast of the City.[19]

The New York Canal parallels the Airport north of I-84, then meanders south and west, crossing Orchard Street at the northwest end of the Airport. The canal begins at the Boise River Diversion Dam, 7 miles southeast of the City, and it continues for 40 miles to Deer Flat Reservoir located southwest of the City. The canal is the main source of irrigation water for the areas west and north of the Airport, which are prime agricultural lands. No drainage from the Airport enters the canal.[20]

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[17] The decibel (dB) is a unit used to describe sound pressure levels. When written as "dBA", the "A" indicates the sound has been filtered to reduce the strength of very low and very high frequencies, much as the human ear does. Aircraft noise exposure analyses are typically based on this A-weighted scale of sound measurement.

[18] HNTB Corporation, *Boise Airport 14 CFR Part 150 Study Update*, December 2015.

[19] HNTB Corporation, Synergy Consultants, Inc., and Anchor Environmental, LLC, *Final Environmental Assessment of Proposed Airfield Improvements at Boise Airport*, July 2001.

[20] Ibid.

Five Mile Creek, which originates in the mountains 3 miles southeast of the Airport, is an intermittent stream that parallels the south side of the Airport. The creek, which is filled only during periods of heavy rainfall or snowmelt runoff, discharges into the New York Canal, approximately 1 mile downstream of the Airport. Five Mile Creek is not used for human consumption.[21]

With the exception of Five Mile Creek, the only surface water features present on the Airport are manmade; they were constructed for the purpose of controlling runoff. This comprehensive drainage system comprises several tributary ditches that receive runoff from roadside swales, building outfalls, and areas on the eastern end of the airfield. These tributary ditches feed into the centralized, westerly flowing drainage ditch that exits the Airport beneath S. Orchard Street.[22]

2.5.3.2 GROUNDWATER

Groundwater includes the subsurface hydrologic resources of the physical environment and is predominantly a safe and reliable source of fresh water for the general population. Groundwater is commonly used for potable water consumption, agricultural irrigation, and industrial applications.

Groundwater resources beneath the Airport include a shallow aquifer at a depth of 150 to 190 feet and a deep aquifer at a depth of 350 feet. The Boise River is the probable source of recharge for the deep aquifer, while irrigation activity is thought to be the primary recharge source for the shallow aquifer.[23]

2.5.3.3 WETLANDS

Wetlands are defined as those areas that are inundated by surface or groundwater at a frequency sufficient to support vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas, such as sloughs, wet meadows, river overflows, mud flats, and natural ponds. Wetlands also include estuarine areas, tidal overflows, and shallow lakes and ponds with emergent vegetation.

The National Wetlands Inventory Wetlands Mapper was used to search for wetlands in the vicinity of the Airport. No jurisdictional wetlands have been identified on the Airport. Potential wetland areas in the Airport vicinity include currently inactive wastewater ponds southwest of the Airport, two intermittent/ephemeral streams, Five Mile Creek, and a northern tributary of Five Mile Creek, which crosses the southern half of the Airport, and several small freshwater ponds south of Gowen Road. Most of these ponds are labeled as excavated, while another is labeled as diked/impounded, indicating they are the result of human activity.[24]

2.5.3.4 FLOODPLAINS

As defined in Executive Order 11988, *Floodplain Management*, floodplains are the lowland and relatively flat areas adjoining inland and coastal waters, including flood-prone areas of offshore islands. At a minimum, floodplains include any area subject to a 1.0 percent or greater chance of a flood in any given year (i.e., the area that would be

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[21] United States Air Force, *Final Environmental Impact Statement for F-35A Training Basing*, June 2012.

[22] Ibid.

[23] National Guard Bureau, *Environmental Assessment for the Implementation of the Base Realignment and Closure (BRAC) – Final Recommendations for the Mission Change and Construction Activities of the 124th Wing*, December 2007.

[24] HNTB Corporation, Synergy Consultants, Inc., and Anchor Environmental, LLC, *Final Environmental Assessment of Proposed Airfield Improvements at Boise Airport*, July 2001.

inundated by a 100-year flood). The Executive Order directs federal agencies to act to reduce the risk of flood loss; to minimize the impacts of floods on human safety, health, and welfare; and to restore and preserve the natural and beneficial value served by floodplains.

The Airport lies on a relatively flat terrace approximately 2.5 miles southwest of and 100 feet higher in elevation than the Boise River at its closest point. Five Mile Creek (along with a northern tributary) cross the southern side of the Airport and drain the Airport and surrounding area. The New York Canal is a concrete-lined channel with a capacity of 2,800 cubic feet per second of water at a depth of 8 feet. The Boise Project Board of Control manages flow/flood control in the New York Canal.

According to applicable Federal Emergency Management Agency Flood Insurance Rate Maps, the southern perimeter of the Airport is located within the 100-year floodplain of Five Mile Creek. The floodplain encompasses a firing range south of Gowen Road, as well as several other IDNG facilities immediately north of Gowen Road and west of Farman Street, including wash racks, parking yards, and a detention pond. No buildings are present within the 100-year floodplain.[25]

2.5.4 TERRESTRIAL FEATURES

This section documents various terrestrial features on and in the vicinity of the Airport to identify features/resources that may be affected by Airport development.

2.5.4.1 LANDFILLS

Discussions with Airport staff indicate the presence of former landfill areas on or underlying portions of the Airport and surrounding area that may otherwise be conducive to future Airport development. The approximate locations of these areas are depicted on Exhibit 2-15. Determination of the extent of the landfill areas, as well as appropriate remediation, if necessary, is recommended prior to construction in the vicinity of these sites.

2.5.4.2 FARMLANDS

Important farmlands generally include all pasturelands, croplands, and forests considered to be prime, unique, or statewide or locally important lands, as reported by the US Department of Agriculture, Natural Resource Conservation Service. Airport property and the surrounding area consist of lands rated as either "not prime farmland" or as "prime farmland if irrigated" under the Farmland Protection Policy Act. There is no indication of present irrigation or farming or historic irrigation within or adjacent to Airport property.[26]

2.5.4.3 ENDANGERED AND THREATENED SPECIES

The Endangered Species Act, as amended, protects federally listed species, and it protects against the deterioration of critical habitat. Section 7 of the Endangered Species Act mandates all federal agencies to consult with the US Fish and Wildlife Service regarding any federal action that may affect a federally listed species. The term "endangered species" means any member of the animal kingdom (mammal, fish, bird, etc.) or plant kingdom (seeds, roots, etc.) that is in danger of extinction throughout all or a significant portion of its range. "Threatened species" refers to those members of the animal or plant kingdom that are likely to become endangered within the foreseeable future.

[25] United States Air Force, *Final Environmental Impact Statement for F-35A Training Basing*, June 2012.

[26] SAGE Environmental, LLC, *Final Environmental Assessment – Instrument Landing System and Approach Lighting System Installation, Upgrade, and Operation*, June 2007.

The Airport environs consist of areas of urban development, undeveloped disturbed land, and undeveloped vacant land in its native desert state. The semi-arid, variable weather conditions of the local environs, combined with the exposed location of the Airport, support a community dominated by sagebrush and bunch grass. Sagebrush-dominated areas are those with Wyoming big sagebrush, cheatgrass, and tumblemustard as the main species. Bunch grass–dominated areas have cheatgrass, medusahead wildrye, tumblemustard, bur buttercup, rabbit brush, and Great Basin wild rye.[27]

Several animal species are known to use less-developed areas of the Airport property, particularly in the vicinity of the assault strip, including mice and other small rodents, black-tailed jackrabbits, coyotes, badgers, and mule deer. Birds commonly found in the vicinity of the Airport include the house sparrow, Brewer's blackbird, Common raven, and Western meadowlark, with occasional sightings of raptors, waterfowl, and upland game birds.[28] No perennial surface waters that support fish populations are located on Airport property.

Slickspot peppergrass (*Lepidium papilliferum*) is the only federally listed species known to occur on the Airport. This plant was listed as threatened under the Endangered Species Act in October 2009. Sightings of the plant have occurred in several locations on undeveloped land south of Gowen Road. No other known federally listed, proposed, or candidate threatened or endangered species are known or likely to occur on the Airport. Urban development, continuous human presence, vehicle and equipment noises, and efforts to keep vegetation controlled and wildlife away from flight areas have diminished the quality of Airport land to support plant species and, thus, the availability of quality wildlife habitats that may attract or support sensitive species.[29]

2.5.4.4 HISTORIC, ARCHITECTURAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

Historic, architectural, archaeological, and cultural resources are addressed pursuant to two main federal acts:

- National Historic Preservation Act (NHPA) of 1966: This act requires an initial review to determine if properties listed in the National Register of Historic Places (NRHP) or properties eligible for inclusion in the NRHP would be affected by a proposed project. Properties listed in the NRHP must be at least 50 years old, unless the property is deemed to be of exceptional historical or cultural significance.
- Archaeological and Historic Preservation Act of 1974: This act requires a survey, the recovery, and the preservation of historical and archaeological materials that may be destroyed or irreparably lost as the result of a federal, federally licensed, or federally funded action.

Impacts to historic, architectural, archaeological, and cultural resources can result from airport development and can include both direct (e.g., relocation or disruption of a site caused by construction) and indirect (e.g., noise, air pollution, water pollution) impacts.

In March 2019, a draft Cultural Resources Report was prepared at the request of the Idaho State Historic Preservation Office (SHPO) and the FAA to record cultural resources at the Airport as a whole for use in future development planning at the Airport.[30] The purpose of the report and the underlying investigation/survey was to identify and evaluate potential cultural resources in accordance with Section 110 of the NHPA. A reconnaissance archaeological

[27] HNTB Corporation, Synergy Consultants, Inc., and Anchor Environmental, LLC, *Final Environmental Assessment of Proposed Airfield Improvements at Boise Airport*, July 2001.

[28] Ibid.

[29] United States Air Force, *Final Environmental Impact Statement for F-35A Training Basing*, June 2012.

[30] Wright Consulting Services, LLC, and Preservation Solutions, LLC, *Boise Airport Cultural Resources Report—Draft*, March 2019.

study was completed across the full extent of Airport property, as well as an intensive-level survey of six locations where future development is most likely to occur. This included recordation of 107 aboveground resources, as well as separate documentation of those resources more than or nearing 50 years of age.

A file search was conducted at the Idaho SHPO in February 2018, in Boise, Idaho. **Table 2-26** summarizes the results of the file search, which revealed seven sites that have been recorded within 1 mile of the Airport.

TABLE 2-26 PREVIOUSLY RECORDED CULTURAL RESOURCES

SITE/RESOURCE TYPE	NRHP ELIGIBILITY PER SHPO
Historic Refuse Scatter; Cans, Glass, Lumber, Ceramics	Ineligible
Stone Masonry Dam, Probable Stock Pond	Undetermined
Three Military Bunkers, Historic Refuse; Glass, Metal, Wire	Undetermined
Historic Dump; Glass, Metal, Nails, Bone, Ceramics, Fabric, Leather, Wire, Cans, Wood, Rubber, etc.	Undetermined
Flake; Isolate	Undetermined
Two Flakes; Isolate	Undetermined
Five-Mile Creek Drain	Eligible

NOTES: NRHP – National Register of Historic Places; SHPO – State Historic Preservation Office
SOURCE: Wright Consulting Services, LLC, November 2019.

In conducting the field survey, no new archaeological findings (in addition to those listed in Table 2-26) were identified during the investigation. The aboveground investigation identified and/or documented a total of 18 historic (more than or nearing 50 years of age) resources, one of which had been previously recorded (the Five-Mile Creek Drain irrigation ditch listed in Table 2-26). Of these resources, some may be potentially eligible for listing on the NRHP. The FAA and the Idaho SHPO are responsible for the final determination of eligibility.[31]

2.5.4.5 DEPARTMENT OF TRANSPORTATION ACT, SECTION 4(F) LANDS

Section 4(f) of the US Department of Transportation (DOT) Act states the DOT Secretary shall not approve any project using publicly owned land that is considered to be of national, state, or local significance and is included in one or more of the following categories:

- publicly owned park or recreation area
- wildlife or waterfowl refuge
- historic and archaeological resources included on or eligible for listing on the NRHP

No publicly owned land used as public parks, recreation areas, wildlife or waterfowl refuges, or historic sites are located on the Airport. The closest City parks to the Airport are Owyhee Park at 2400 W. Elder Street and Shoshone Park at 2800 W. Canal Street, both located approximately 1 mile north of the Airport.[32]

[31] Wright Consulting Services, LLC, and Preservation Solutions, LLC, *Boise Airport Cultural Resources Report*—November 2019.

[32] SAGE Environmental, LLC, *Final Environmental Assessment – Instrument Landing System and Approach Lighting System Installation, Upgrade, and Operation*, June 2007.

2.6 SUSTAINABILITY

Sustainable Boise is a citywide LIV Boise initiative centered on strategies that create lasting environments, innovative enterprises, and vibrant communities. This initiative demonstrates the City's commitment to lead through policies and projects that ensure the sustainability of the Boise community, economy, and environment. The LIV Boise vision extends to Airport sustainability initiatives.

2.6.1 AIRPORT SUSTAINABILITY INITIATIVES

As a citywide initiative, LIV Boise, and its associated sustainability initiatives and goals, extends to the Airport. The Airport's commitment to sustainability spans each of the LIV Boise goals.

2.6.1.1 LASTING ENVIRONMENTS

The Airport's contribution to creating lasting environments includes initiatives to reduce energy and emissions.

Energy Reduction

The City has been taking strides to improve sustainability and energy efficiency at the Airport since 2005, with upgrades to lighting, HVAC, and other technologies. When the parking garage was expanded, older halide lighting technology was switched out for more efficient compact fluorescent lighting. According to Airport staff, power consumption for the structure was cut by more than 50 percent. With the expanded garage, the total facility footprint was nearly doubled, and the energy usage is still at or slightly less than the same level of the original footprint. The City has also installed energy-efficient appliances in new concessions at the Airport.

Emissions Savings

The FAA's Voluntary Airport Low Emissions (VALE) program was created in 2004 to help airport sponsors finance low-emission vehicles, refueling and recharging stations, gate electrification, and other airport air quality improvements. BOI has been an active participant in the VALE program, having received three program grants to date:

- **2010:** BOI received a VALE grant for approximately $770,000 for acquisition and installation of preconditioned air units for nine gates. These units are installed on loading bridges. When coupled with 400-hertz power units (as they are at BOI), these units eliminate the need for aircraft to run onboard auxiliary power units (essentially small jet engines) to power and heat/cool the aircraft when it is parked at the gate and the main engines are not running.
- **2015:** BOI received approximately $660,00 in VALE grant funding for two ground power/preconditioned air units. These units are electrically powered and replace four diesel-powered units that had been in use previously. Additionally, two diesel-powered mobile light units were replaced by two new electrically powered LED lights. The equipment was installed in 2016.
- **2016:** BOI received a VALE grant for approximately $190,000 for acquisition and installation of a solar power system to provide hot water for a portion of the passenger terminal. The system currently produces hot water for locations prior to the security checkpoint. Excess hot water that is produced can then be piped throughout the terminal in the colder months to assist with heating of the terminal. This is a pilot project for the Airport; one day the entire hot water system at the Airport could be converted to solar energy.

Other projects completed at the Airport that reduce emissions include electric car charging stations in the parking garage and the use of electric GSE by some airlines.

2.6.1.2 INNOVATIVE ENTERPRISES

The selection of BOI by SkyWest Airlines for a new airline maintenance facility in 2014 is an achievement of the goal to cultivate innovative enterprises through creativity and collaboration that promotes economic prosperity in the region. In July 2014, Idaho launched the Tax Reimbursement Incentive (TRI) program, offering a tax credit of up to 30 percent on income, payroll, and sales taxes for up to 15 years. The TRI is available for a broad range of industries, including aerospace, agriculture, food processing, and high-tech, and it is open to both existing Idaho businesses looking to expand and businesses new to Idaho. SkyWest Airlines was the first-ever recipient of the TRI and was approved to receive a TRI credit of 25 percent for a term of 12 years, as well as a community match from the City for more than $2.5 million through provision of infrastructure buildout and financing.[33]

The airline won the incentive by promising to hire 50 full-time benefited employees in 2015, with an estimated expansion to 100 employees over the 12-year term of the incentive. When fully staffed, the economic impact to Idaho is estimated to include total wages in excess of $5.4 million per year and new sales and income tax revenues for the state of approximately $350,000 per year.[34]

2.6.1.3 VIBRANT COMMUNITIES

Several projects/collaborations demonstrate how the Airport has helped achieve the goal of building vibrant communities.

- **New Concessions:** When the new concessions program was completed at the Airport in 2015, the goal included bringing a more "local flavor" to the Airport. The local restaurants and businesses that comprise the new concessions reflect the flavor, taste, and character of the City. With successful implementation of the concessions program, the Airport was awarded "Best Retail Program (Small Airport)" and "Best Food & Beverage Program (Small Airport)" by Airports Council International–North America.
- **Airport Digital Library:** The Boise Library has collaborated with the City to develop the Airport Digital Library, which is located in Concourse B. The digital library allows passengers to check email, do research, and read online magazines held by the library. Touch-screen computers offer access to selected library services, including animated picture books, digital magazines, web browsing, ebooks, and local news and weather. A reading and study area, along with charging stations, are also available.
- **Airport Art:** The Boise City Department of Arts and History has collaborated with Airport staff to integrate art into the Airport environment for the benefit of passengers and employees. Through this collaboration, the City's Arts and History Board chooses or commissions artwork for the Airport and curates the collection of art throughout the terminal, rotating pieces by local and regional artists.

2.6.2 ADDITIONAL SUSTAINABILITY CONSIDERATIONS

In 2016, the Airport Cooperative Research Program published a synthesis project on airport sustainability practices.[35] The report includes case studies with practice topics spanning issues relating to sustainability management, waste reduction, social responsibility, climate change, and water quality. **Table 2-27** summarizes these sustainability practices, some of which may warrant consideration for future implementation at the Airport.

[33] City of Boise, *Airport, City and State Collaborate to Land SkyWest Maintenance Facility*, September 2, 2014.

[34] Ibid.

[35] Airport Cooperative Research Program, *ACRP Synthesis 77, Airport Sustainability Practices—A Synthesis of Airport Practice*, 2016.

TABLE 2-27 SUSTAINABILITY PRACTICES CASE STUDIES

PRACTICE	CASE EXAMPLE	PRACTICE CATEGORY	SUMMARY OF PRACTICE ELEMENTS
Develop an Asset or Infrastructure Management Plan	Dallas Fort Worth International Airport	Economic Performance	▪ Input detailed data on each asset (asset system description, standard of service definition, asset performance, planned actions, costs, benefits, potential improvements) ▪ Track life cycles costs to inform decisions on repair and replacement and optimize return on investment
Develop and implement an Environmental Management System to track progress in improving environmental performance	Reno-Tahoe International Airport	Economic Performance	▪ Terminal-wide recycling program diverts 60 to 80 tons/year from landfills ▪ 100 percent recycling of demolished pavement ▪ Office supply reduction and green purchasing policy reduces paper usage
Integrate climate resilience considerations in airport development projects	Port Authority of New York and New Jersey	Economic Performance	▪ Identify critical infrastructure ▪ Identify flood risk and anticipated sea level rise ▪ Perform benefit/cost analysis of mitigation strategies ▪ Establish flood resilience criteria for incorporation into design
Tie sustainability goals and objectives into the operations and maintenance and capital improvement program budget process	San Diego International Airport	Energy and Climate	▪ Engage internal stakeholders to identify capital needs/wants ▪ Develop criteria to rate/prioritize asset needs with emphasis on sustainability ▪ Prioritized project list forms basis of capital plan to optimize investment schedule while accounting for sustainability commitments
Donate surplus equipment and other goods to charity	American Airlines	Engagement and Leadership	▪ Donates uniforms/coats to homeless veterans in Chicago ▪ Partners with organization that employees disabled adults, with payroll funded through e-waste collection and commoditization of waste streams, such as scrap metal and copper
Donate surplus food to charity	HMS Host	Engagement and Leadership	▪ Donates excess product to local food banks ▪ Trains management staff at airports to participate in food donation efforts
Develop an onsite materials recovery facility	Charlotte Douglas International Airport	Water and Waste	▪ On-airport facility receives, separates, and prepares recyclable materials for sale within the recycling market ▪ Given Federal Aviation Administration requirements about processing waste on airport property, proper containment and design considerations allow for compatibility at airports ▪ Organic waste is composted on-site with resulting fertilizer used on airport property
Use recovered glycol as a "feedstock" for reformulated aircraft deicing fluid, vehicle anti-freeze, aircraft lavatory fluid, coolants, coatings, and paints	Wayne County Airport Authority and Denver International Airport	Water and Waste	▪ Need to manage spent deicing fluid runoff (SADR) to protect nearby waterways ▪ Deicing recycling program allows SADR to be collected at remote deicing pads ▪ SADR is hauled to off-site recovery facility for evaporation and distillation, yielding 99.5 percent pure propylene glycol
Establish an Airport Composting Program	Vancouver International Airport	Water and Waste	▪ Terminal-wide waste diversion program to complement recycling program ▪ Provided composting kits to concessionaries ▪ Food court waste bins redesigned to accommodate organics
Upcycle materials from indoor advertising	United Airlines	Water and Waste	▪ Method for managing complex waste streams ▪ "Upcycled" old advertising banners into high-end travel bags

SOURCE: Airport Cooperative Research Program, *ACRP Synthesis 77, Airport Sustainability Practices—A Synthesis of Airport Practice*, 2016.

Other practices that may enhance the overall sustainability of the Airport are listed in this section. As evidenced by the Airport's current contributions to the LIV Boise vision, the City has already pursued several of these practices. Continuing to seek out opportunities to implement these practices will ensure the Airport maintains its status as a leader for sustainable practices both locally and among its peer airports.

- Waste Management (see Section 2.7)
- Energy (Electricity and Natural Gas)
  - Evaluate opportunities to offset BOI development impacts with Citywide renewable energy project(s).
  - Integrate renewable energy strategies into new development (e.g., rooftop solar) and examine potential for use of floating solar panel systems on retention ponds.
  - Provide electric vehicle charging infrastructure in new parking garages.
  - Market and brand solar renewable energy efforts at the Airport.
  - Develop an energy management program for monitoring, auditing, and reporting.
  - Define energy tracking metrics and initiate ongoing tracking, reporting, and messaging of energy use.
- Energy (Fuel)
  - Provide electrical infrastructure and fuel stations to support requirements for a zero-emission vehicle fleet.
  - Ensure ability of new parking facilities to support the increase in electric vehicles (consider incentivizing through parking priorities).
  - Convert fleet segments (e.g., shuttles, personal vehicles) to zero emission or hybrid/alternative fuel vehicles.
  - Establish a goal to convert to electric GSE fleet (tenant initiative).
- Water Conservation
  - Require some form of stormwater reuse in all new development (consider applicability to major and/or minor renovations).
  - Pursue water reuse opportunities, including use of nonpotable water (e.g., fixtures, cooling towers, and car washes), and expand rainwater-harvesting irrigation.
  - Establish minimum standards for incorporating native vegetation and landscaping to reduce or eliminate the need for irrigation.
  - Effectively communicate water conservation efforts to tenants and the public.
- Community
  - Consider demonstration/education opportunities of sustainable design strategies (e.g., local developers, community, students, etc.).
  - Effectively market ongoing and future sustainability programs, projects, and features (e.g., water reclamation, renewable energy, energy efficiency, recycling, and emissions reductions).
  - Enhance transportation amenities for Airport employees.
  - Maximize linkages with public transportation.

2.7 SOLID WASTE RECYCLING REVIEW

2.7.1 EXISTING PROGRAM AND CAPABILITIES

As an integration of the City's goal to increase and promote recycling, recycling practices have been implemented at the Airport:

- Receptacles are available throughout the terminal building that accept mixed recyclables (e.g., paper and plastics). The receptacles are generally co-located with trash receptacles.
- Old pavement (asphalt) from new paving projects is recycled/reused for paving/stabilizing areas of bare ground on the airfield. This practice reduces erosion from wind and jet blast, while also reducing field maintenance costs (i.e., less mowing, weeding).
- Food and beverage concessionaries are encouraged to donate excess food product.
- Other recycled materials include batteries, light bulbs, pallets and metals, and paper in Airport offices.

The Airport has five on-site compactors, one for recycling and four for trash. For trash, two 35-cubic-yard compactors are picked up twice per week, one 30-cubic-yard compactor is picked up once per week, and one 20-cubic-yard compactor is picked up one to two times per month. All compacted material that is dumped is picked up by Republic Services and taken to its processing facilities.

The recycling compactor is a 35-cubic-yard mixed-use recycling compactor, with mixed use classified as every recyclable (e.g., paper, plastic) except for glass. Before the recycling compactor was added to the facility, general trash was dumped three times per week. The facility continues to add recycling stations, which reduces the dumping frequency for trash. At one time, the recycling compaction was dumped once per month, but it is currently dumped two-and-a-half times per month.

The Airport currently has capacity for growth with respect to trash and recycling services, with the only limiting factor being the time available to add more compaction instances. It is not anticipated that another compactor would need to be added in the foreseeable future. Increased collection of recyclable material would continue to reduce costs associated with the dumping/hauling of trash.

2.7.2 OPPORTUNITIES FOR MINIMIZING SOLID WASTE

This section identifies opportunities for recycling and for minimizing the generation of Airport solid waste, consistent with FAA guidance.[36] Examples of practices/initiatives that other airports have instituted to enhance an existing recycling program and minimize solid waste are listed in this section for implementation consideration at BOI, as applicable.

- Consider space for recycling/reuse collection, sortation, and circulation needs during the design of new and expanded Airport facilities.
- Require contractors to develop waste management plans for construction projects at BOI. Plans should identify project goals for waste reduction, recycling, and reuse, as well as methods to track and report performance to Airport management. Integrate the new requirement into BOI design and construction bid documents.

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[36] US Department of Transportation, Federal Aviation Administration, *ACTION: Guidance on Airport Recycling, Reuse, and Waste Reduction Plans*, September 30, 2014.

- Evaluate low-maintenance landscaping options for BOI in Airport-managed areas. Engage tenants during design of tenant facilities to consider opportunities to reduce or eliminate landscaping waste.
- Share recycling, reuse, and reduction successes among Airport staff/stakeholders and tenants operating at the Airport:
  - If tenant meetings are regularly convened, add a waste minimization agenda item to meetings to encourage tenants to share best practices and to celebrate successes.
  - Include a discussion of waste minimization during periodic tenant site visits to evaluate opportunities.
  - Share tenant successes in a tenant newsletter, in a community newsletter, or on the Airport webpage to recognize successes and to encourage waste minimization practices at BOI.
- Purchase waste bags made from recycled materials.
- Administer a recycling program for gloves (e.g., those used by the TSA).
- Develop and maintain an ongoing recycling education and awareness program (training and signage) for Airport and tenant employees.
- Conduct periodic waste audits to verify effectiveness of the recycling program and to adjust the program, as needed, based on audit findings.
- Consider waste management partnership with airlines and tenants.
- Institute a paper-reduction policy that covers issues such as paperless meetings and double-sided printing.
- Obtain a zero-waste designation for the Airport (divert at least 90 percent of waste from landfills).
- Design new facilities to provide sufficient space for waste collection, sortation, and circulation.
- Establish a recycling level/goal for all construction projects.
- Track and report waste and recycling statistics for comparisons to peer airports and for right-sizing collection service levels as recycling increases.

3. AVIATION ACTIVITY FORECAST

3.1 EXECUTIVE SUMMARY

Aviation activity forecasts provide information related to future demand at the Airport in order to guide facility planning work. Forecasts are used in analyses to determine the Airport's ability to accommodate expected passenger and aircraft volumes, as well as to determine whether new or reconfigured facilities may be needed. For purposes of airport master planning, the most common types of aviation activity for which forecasts are developed include enplaned passengers, aircraft operations (combined takeoffs and landings), cargo volume, and based aircraft. This Executive Summary summarizes the methodologies used to develop these forecasts and presents a summary of the resulting forecast values that support the technical analyses described in subsequent sections of this MPU.

3.1.1 ENPLANED PASSENGERS

Historical aviation activity from 1993 through 2015 for BOI was used in conjunction with historical socioeconomic conditions from 1993 through 2015, and a consideration of the airlines operating at the Airport, to develop baseline forecasts of enplaned passengers, air cargo volumes, aircraft operations, and based aircraft for the period from 2016 through 2035.[1] In addition to the baseline forecast, two alternate forecasts—a high forecast and a low forecast—were developed. The high and low forecasts represent possible conditions that would result in a deviation from the baseline forecast: the high forecast considers the possibility of new service by a low-cost carrier (e.g., Frontier Airlines or Spirit Airlines) at the Airport, and the low forecast considers the effects of an economic downturn similar in magnitude and duration to recent economic recessions.

The forecasts were developed for both short-term and long-term time periods. The short-term forecasts (for the period from 2016 through 2017) were developed for passenger airline activity; they consider published schedule activity and the historical relationship between scheduled activity and actual enplaned passengers and passenger operations. The long-term forecasts (from 2018 through 2035) leverage a combination of socioeconomic regression analysis, market share analysis, and trend analysis to derive expected future aviation activity. The long-term forecast of enplaned passengers was conducted through the combination of several socioeconomic regression analyses. Socioeconomic regression analysis is a statistical technique that allows for the determination of relationships between socioeconomic variables and aviation activity at the Airport. For example, socioeconomic regression analysis for BOI suggested good correlation between local per capita personal income and enplaned passengers. Both local[2] and national socioeconomic variables (population, employment, total earnings, gross regional product/gross domestic product, and per capita personal income) were considered in the analyses. Independent forecasts of the socioeconomic variables that historically showed the best correlation with enplaned passengers at the Airport were used to forecast enplaned passengers, assuming the historical relationships continued. The combined result is a baseline forecast of approximately 2.4 million enplaned passengers in 2035, which represents a compound annual growth rate (CAGR) of 2.36 percent from the approximately 1.5 million enplaned passengers in 2015.

[1] The Federal Aviation Administration [approve the baseline forecast on DATE] for use in subsequent planning tasks at the Airport.

[2] The local area considered in the analyses consists of Ada, Adams, Boise, Canyon, Elmore, Gem, Owyhee, Payette, Valley, and Washington Counties in Idaho.

3.1.2 AIRCRAFT OPERATIONS AND CARGO VOLUME

Forecasts of passenger airline operations were developed based on trends in the size of aircraft used by passenger airlines at the Airport and industry wide, as well as the historical load factor[3] of operations at the Airport. In the baseline forecast, it is expected that the average seats per passenger airline operation at the Airport will increase from approximately 93 in 2015 to approximately 107 in 2035, and passenger airline operations will increase at a CAGR of 1.5 percent, from approximately 40,610 in 2015 to approximately 54,540 in 2035.

The forecast of air cargo volumes (measured in pounds) was conducted using socioeconomic regression analyses to examine the historical relationship between air cargo volumes at the Airport and local and national socioeconomic variables. Similar to the enplaned passenger forecast, independent forecasts of the socioeconomic variables with the best correlation to air cargo volumes were used to forecast air cargo volumes. The all-cargo operations (e.g., aircraft operations carrying cargo only, with no passengers) were forecast using the historical relationship between all-cargo operations and total air cargo volumes. In the baseline forecast, through 2035, air cargo volumes are forecast to increase at a CAGR of 2.2 percent, from approximately 89.8 million pounds in 2015 to approximately 137.5 million pounds in 2035. All-cargo operations are forecast to increase at a CAGR of 1.8 percent during the same period, from approximately 5,310 in 2015 to approximately 7,540 in 2035.

GA operations were forecast by analyzing the historical evolution of GA operations at the Airport relative to national GA operations, as well as by utilizing the relationship between the two with an independent forecast developed by the FAA to forecast GA operations by aircraft type (e.g., single-engine aircraft, multi-engine aircraft, jet aircraft, and helicopters). GA operations were further split into local and itinerant operations. According to the FAA, a local operation is an operation performed by an aircraft that is known to be departing for, or arriving from, within a 20-mile radius of the Airport, or operates in the local traffic pattern of the Airport, while all other operations are considered itinerant operations. In the baseline forecast, total GA operations are forecast to increase at a CAGR of 1.5 percent from 2015 through 2035, from approximately 64,450 in 2015 to approximately 86,695 in 2035.

Similar to GA operations, military operations are split into local and itinerant operations. Both local and itinerant forecast military operations are held constant at 2015 levels, consistent with the approach in the FAA TAF for the Airport, since military operations are mission-specific and have the potential for high variability depending on military needs. Further details on historical and forecast military operations can be found in the Boise Airport 14 CFR Part 150 Study Update.[4]

Overall, total aircraft operations at the Airport are forecast to increase a CAGR of 1.4 percent, from approximately 131,975 in 2015 to approximately 173,030 in 2035.

3.1.3 BASED AIRCRAFT

Based aircraft at the Airport were forecast using both national trends in based aircraft by engine type and historical operations per based aircraft at the Airport. The number of based aircraft at an airport can factor into an airport's eligibility for airport improvement projects, and based aircraft typically provide services to the local community, such as flight instruction. From 2015 through 2035, jet and helicopter based aircraft at the Airport are forecast to

3 Load factor is a measurement of capacity utilization that is calculated as the number of passengers divided by the number of seats. For example, a load factor of 1.0 indicates that the aircraft is 100 percent full and there are no empty seats, while a load factor of 0.75 indicates that the aircraft is 75 percent full.

4 The Boise Airport 14 CFR Part 150 Study Update can be found online at https://www.iflyboise.com/media/1148/cfr-part150-studyupdate1.pdf.

increase faster than single-engine and multi-engine non-jet aircraft. Overall, based aircraft at the Airport are forecast to increase from 222 in 2015 to 287 in 2035, a CAGR of 1.3 percent.

3.1.4 SUMMARY

Table 3-1 presents a summary of the enplaned passenger and aircraft operations forecasts developed for this MPU. Many of the factors influencing aviation demand cannot be readily quantified, and any forecast is subject to uncertainties. As a result, the forecast process should not be viewed as precise. Actual activity at the Airport may differ from the forecasts presented herein, because events and circumstances may not occur as expected, and these differences may be material.

TABLE 3-1 SUMMARY OF BASELINE FORECAST

	BASE YEAR	FORECAST YEARS			AVERAGE ANNUAL GROWTH FROM 2015		
	2015	2020	2025	2035	2020	2025	2035
Passenger Enplanements							
Total Enplanements	1,492,058	1,796,348	1,986,940	2,376,682	3.78%	2.91%	2.36%
Operations							
Passenger Airlines	40,607	46,140	49,402	54,540	2.59%	1.98%	1.49%
All-Cargo	5,312	5,620	6,305	7,541	1.13%	1.73%	1.77%
Local General Aviation							
General Aviation/Other Air Taxi[1]	69,706	73,723	78,687	94,598	1.13%	1.22%	1.54%
Local Military	6,302	6,302	6,302	6,302	0.00%	0.00%	0.00%
Itinerant Military	10,047	10,047	10,047	10,047	0.00%	0.00%	0.00%
Total Operations	131,974	141,832	150,742	173,028	1.45%	1.34%	1.36%
Based Aircraft							
Single Engine (Nonjet)	140	143	147	164	0.36%	0.51%	0.79%
Multi-Engine (Nonjet)	29	30	30	34	0.47%	0.50%	0.78%
Jet	36	40	44	59	2.03%	2.13%	2.46%
Helicopter	17	19	22	30	2.57%	2.58%	2.81%
Other	0	0	0	0	0.00%	0.00%	0.00%
Total Based Aircraft	222	232	243	287	0.89%	0.91%	1.29%
Cargo Volume							
Cargo/Mail (pounds)[2]	89,828,314	102,476,040	114,958,791	137,504,056	2.67%	2.50%	2.15%

NOTES: Totals may not sum due to rounding.

1 Other air taxi operations are nonscheduled passenger or cargo operations in aircraft with no more than 60 seats or a maximum payload capacity of 18,000 pounds.

2 Cargo/mail in total pounds (all-cargo carrier enplaned and deplaned).

SOURCES: City of Boise, Aviation Department, Traffic Reports, November 2016; U.S. Department of Transportation, T-100, November 2016; Federal Aviation Administration, OPSNET, November 2016; Federal Aviation Administration, Traffic Flow Management System Counts (TFMSC), November 2016; Federal Aviation Administration, Aerospace Forecast: Fiscal Years 2016-2036, November 2016; Innovata, December 2016; Federal Aviation Administration, 2016 Terminal Area Forecast, January 2017; Ricondo & Associates, Inc., January 2017 (forecast).

3.2 AVIATION ACTIVITY FORECASTS INTRODUCTION

This section presents historical aviation activity and trends at the Airport since 2006, and it also presents forecasts of aviation activity through 2035, the end of the planning period for the MPU. Forecasts were developed for enplaned passengers, cargo volumes, and passenger, cargo, air taxi, GA, and military aircraft operations. Projections were developed for the aircraft fleet mix serving the Airport. These forecasts and projections will provide the basis for determining facility requirements and for conducting the financial and other analyses necessary for preparing the MPU.

The forecasts were prepared in 2016, using calendar year 2015 as the base year, which is the latest year for which complete data were available at the time the forecasts were developed. While 2015 serves as the forecast base year, in order to most accurately represent the current state of the Airport at the time of this MPU, airline schedule data from 2016 were considered.[5] Published airline schedules for June 2016, the peak month at the Airport in 2016, provide the basis for presenting the airlines currently serving the Airport, the destinations served, and other relevant operational metrics.

The aviation activity forecasts presented in this section are based on assumptions about aviation activity in the Air Trade Area for the Airport. For the purposes of the MPU, the BOI Air Trade Area includes Ada, Adams, Boise, Canyon, Elmore, Gem, Owyhee, Payette, Valley, and Washington Counties in Idaho, as illustrated on **Exhibit 3-1**. The Airport is located in Ada County, Idaho, the largest county in Idaho by population, accounting for just over one-quarter of the state's total population.[6] There are only four other airports with scheduled commercial air service within a 4-hour drive of BOI—Friedman Memorial Airport (Hailey, Idaho), Pocatello Regional Airport (Pocatello, Idaho), Elko Regional Airport (Elko, Nevada), and Magic Valley Regional Airport (Twin Falls, Idaho)—the combination of which accounted for less than one-tenth of the total enplaned passengers at BOI in 2015, according to data from the United States Department of Transportation (U.S. DOT) T-100 data bank.[7]

Many of the factors influencing aviation demand cannot be readily quantified, and any forecast is subject to uncertainties. As a result, the forecast process should not be viewed as precise. Actual activity at the Airport may differ from the forecasts presented herein, because events and circumstances may not occur as expected, and these differences may be material.

3.3 HISTORICAL AVIATION ACTIVITY AND TRENDS

3.3.1 PASSENGER ACTIVITY AND OPERATIONS

The Airport is classified by the FAA as a small-hub airport, accounting for between 0.05 and 0.25 percent of total nationwide enplaned passengers. As depicted in **Table 3-2**, 1,492,058 passengers were enplaned and 131,974 aircraft operations were conducted at the Airport in 2015 (the base year for the forecast). Since 2006, the Airport experienced its greatest number of enplaned passengers and its greatest number of aircraft operations in 2007, with 1,680,554 enplaned passengers and 181,945 operations. While 2015 is the base year for the forecast, actual data for 2016 were released after the development of the forecast; enplaned passengers grew by 8.4 percent from 2015 to 2016, and total operations at the Airport increased by 0.2 percent during the same period.

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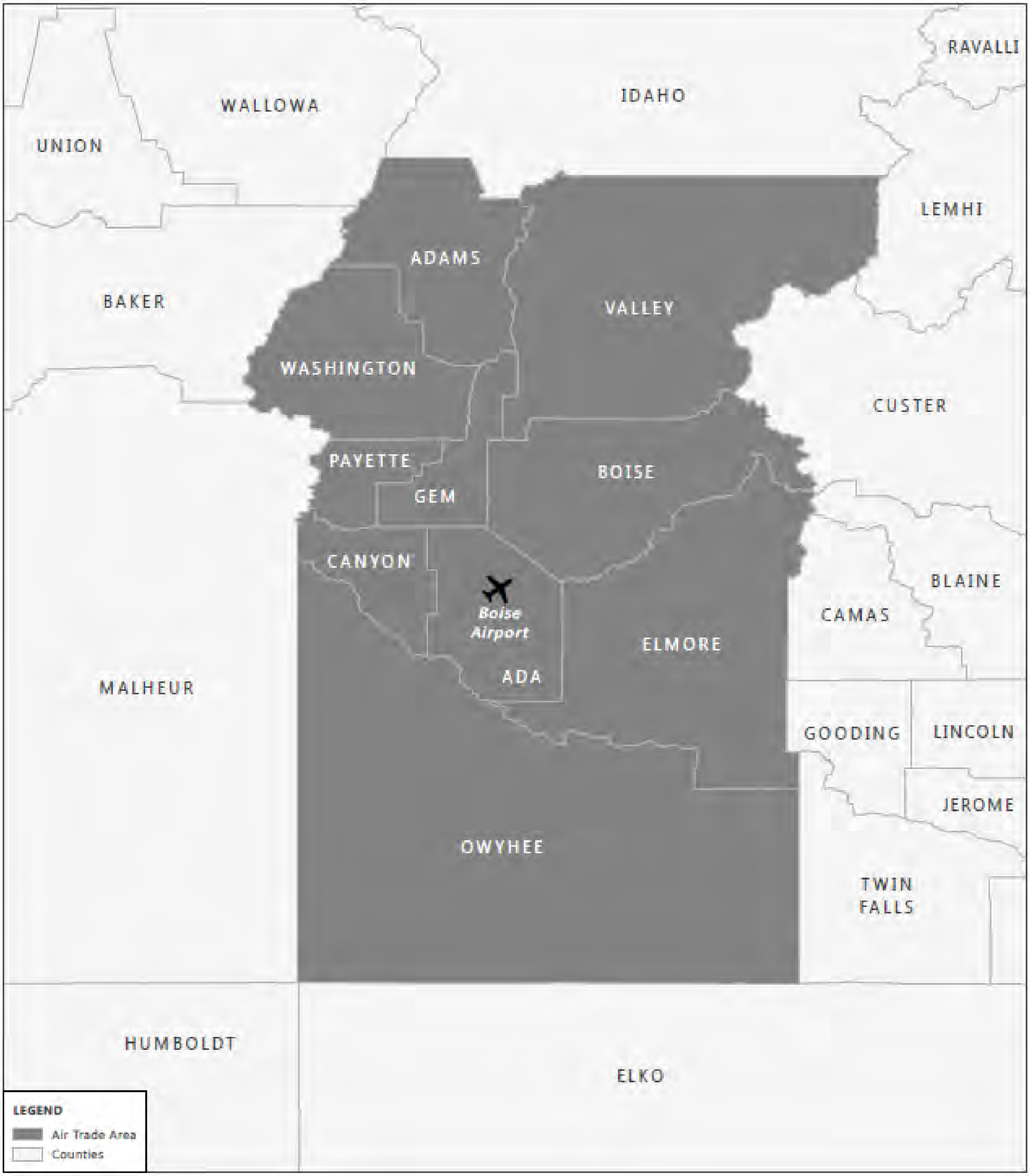
5 Airline schedules for 2016 were subject to change at the time the forecasts were prepared.

6 United States Census Bureau, http://www.census.gov/quickfacts/table/ (accessed November 7, 2016).

7 The Air Carrier Statistics database, also known as the T-100 data bank, contains domestic and international airline market and segment data. Certificated U.S. air carriers report monthly air carrier traffic information using Form T-100.

EXHIBIT 3-1 BOISE AIRPORT AIR TRADE AREA



SOURCES: 2016 TIGER/Line Shapefiles, January 2017 (county boundary); Ricondo & Associates, Inc., January 2017 (airport).

TABLE 3-2 HISTORICAL ENPLANED PASSENGERS AND OPERATIONS SUMMARY

YEAR	ENPLANED PASSENGERS	PASSENGER GROWTH	AIRCRAFT OPERATIONS	OPERATIONS GROWTH
2006	1,641,823		178,970	
2007	1,680,554	2.4%	181,945	1.7%
2008	1,586,774	(5.6%)	145,199	(20.2%)
2009	1,397,772	(11.9%)	129,004	(11.2%)
2010	1,404,289	0.5%	121,961	(5.5%)
2011	1,392,013	(0.9%)	121,810	(0.1%)
2012	1,305,581	(6.2%)	112,769	(7.4%)
2013	1,309,789	0.3%	114,556	1.6%
2014	1,377,507	5.2%	127,552	11.3%
2015	1,492,058	8.3%	131,974	3.5%
2016	1,616,787	8.4%	132,199	0.2%
CAGR				
2006–2009	(5.2%)		(10.3%)	
2009–2012	(2.2%)		(4.4%)	
2012–2015	4.6%		5.4%	
2006–2015	(1.1%)		(3.3%)	

NOTES:
CAGR – Compound Annual Growth Rate
Passenger totals do not include nonrevenue passengers or through passengers.
SOURCES: City of Boise Aviation Department, Traffic Reports, March 2017; Federal Aviation Administration, OPSNET, November 2016.

From 2006 to 2007, the Airport experienced a 2.4 percent growth in enplaned passengers and a 1.7 percent growth in operations. By comparison, national enplaned passengers increased 3.4 percent during the same period. ExpressJet Airlines began service under its own brand at the Airport, offering service to Ontario International (ONT) and San Diego International (SAN) Airports. Enplaned passengers increased each year to Los Angeles International Airport (LAX) as Delta Air Lines initiated service on the route on July 1, 2007, and United Airlines increased departures to LAX. Other new service contributing to the increases at the Airport included daily service to SAN provided by Alaska Air's regional partner, Horizon Air.[8]

From 2007 to 2008, enplaned passengers and operations at the Airport decreased by 5.6 percent and 20.2 percent, respectively. Enplaned passengers decreased more at the Airport than nationwide: national enplaned passengers decreased 3.4 percent from 2007 to 2008. Delta Air Lines reduced departures to Atlanta International Airport (ATL) in 2008, leading to a significant reduction in enplaned passengers on the route. The large decrease in operations was due to the cessation of operations by Big Sky Airlines, which provided Essential Air Service to many Montana cities with 19-seat Beechcraft 1900D aircraft. Big Sky Airlines' exit from BOI accounted for approximately one-third of the reduction in departures.

[8] Horizon Air and Alaska Airlines are subsidiaries of Alaska Air Group, and flights operated by either airline are treated as Alaska Airlines flights for the purposes of this study.

From 2008 to 2009, enplaned passengers and operations decreased by 11.9 percent and 11.2 percent, respectively. The decrease in enplaned passengers was more pronounced than the decrease in national enplanements, which decreased 5.3 percent from 2008 to 2009. Alaska Airlines, Southwest Airlines, United Airlines, and Delta Air Lines, the largest airlines at the Airport in 2008, decreased scheduled seat capacity and departures as the United States suffered the "worst recession the United States has experienced since the Great Depression."[9]

From 2009 to 2010, enplaned passengers at the Airport increased 0.5 percent, and operations decreased 5.5 percent. During the same period, national enplaned passengers increased 2.4 percent. Alaska Airlines again reduced scheduled seat capacity and departures at the Airport by 18.9 percent and 20.5 percent, respectively, but the other three largest airlines at the Airport—Southwest Airlines, United Airlines, and Delta Air Lines—increased scheduled seat capacity and scheduled departures, which included new daily service to Denver International Airport (DEN) by Southwest Airlines.

From 2010 to 2011, enplaned passengers and total operations at the Airport decreased 0.9 percent and 0.1 percent, respectively. The Airport's share of national enplaned passengers decreased as national enplaned passengers increased by 1.5 percent during the period. Alaska Airlines suspended service to LAX, Idaho Falls Regional Airport (IDA), and Friedman Memorial Airport (SUN) in August 2010. American Airlines added service to LAX in April 2011, and SeaPort Airlines added service to IDA in July 2011, lessening the impact of Alaska Airlines' suspended service on aviation activity at the Airport.

From 2011 to 2012, enplaned passengers and total operations at the Airport decreased by 6.2 percent and 7.4 percent, respectively. National enplaned passengers increased 0.7 percent from 2011 to 2012, leading to a decrease in the Airport's share of national enplaned passengers. Southwest Airlines ended service to Reno-Tahoe International (RNO), Seattle-Tacoma International (SEA), and Salt Lake City International (SLC) Airports in early January 2012; from 2011 to 2012, Southwest Airlines reduced scheduled seat capacity and scheduled departures. Frontier Airlines, which had served DEN as often as twice daily, ceased operations at the Airport, and Delta Air Lines reduced scheduled departures to SLC by nearly one-third, an average of two daily departures.

From 2012 to 2013, enplaned passengers and total operations at the Airport increased 0.3 percent and 1.6 percent, respectively. Nationwide, enplaned passengers increased 0.8 percent during the same period. Southwest Airlines continued to decrease operations at the Airport, ending service to Portland International Airport (PDX) and decreasing its total scheduled seat capacity and scheduled departures. Other airlines at the Airport increased scheduled seat capacity and scheduled departures, most notably Alaska Airlines, with new daily service to SAN. Allegiant Air initiated service at the Airport with two flights per week to Las Vegas McCarran International Airport (LAS) and nonstop service to Daniel K. Inouye International Airport (Honolulu, Hawaii).

From 2013 to 2014, enplaned passengers and total operations at the Airport increased 5.2 percent and 11.3 percent, respectively. The enplaned passenger growth at the Airport was greater than the 2.6 percent growth in national enplaned passengers during the same period, resulting in an increase in the Airport's share of national enplaned passengers. Four airlines added service to a total of four destinations in 2014, two of which were not served by any airline in 2013. Delta Air Lines and Southwest Airlines both commenced service to LAX[10]; United Airlines started service to George Bush Intercontinental Airport (IAH); Southwest Airlines began summer seasonal service to Chicago–Midway (MDW) International Airport; and Alaska Airlines started service to SLC.

[9] Alaska Air Group, *2009 Annual Report*, April 2010.

[10] Southwest Airlines' service to LAX operated Saturday only.

From 2014 to 2015, enplaned passengers and total operations at the Airport increased 8.3 percent and 3.5 percent, respectively. Enplaned passenger growth at the Airport was greater than national enplaned passenger growth, which was 4.6 percent during the same period. Airlines serving the Airport added four destinations from the Airport: Alaska Airlines added service to Spokane International Airport (GEG) and RNO; Delta Air Lines added service to SEA; and Allegiant Air started service to LAX.

Between 2006 and 2015, the compound annual growth rate (CAGR) of enplaned passengers at the Airport was negative 1.1 percent, which was less than the positive 0.8 percent CAGR of enplaned passengers in the United States as a whole. Over this time period, the Airport's share of total U.S. enplaned passengers decreased from 0.22 percent in 2006 to 0.19 percent in 2015, as illustrated in **Table 3-3**.

TABLE 3-3 HISTORICAL AIRPORT AND NATIONAL ENPLANED PASSENGERS COMPARISON

YEAR	AIRPORT ENPLANED PASSENGERS	AIRPORT GROWTH	U.S. TOTAL ENPLANED PASSENGERS	U.S. GROWTH	MARKET SHARE
2006	1,641,823		750,791,000		0.22%
2007	1,680,554	2.4%	775,989,000	3.4%	0.22%
2008	1,586,774	(5.6%)	749,242,000	(3.4%)	0.21%
2009	1,397,772	(11.9%)	709,290,000	(5.3%)	0.20%
2010	1,404,289	0.5%	726,545,000	2.4%	0.19%
2011	1,392,013	(0.9%)	737,393,000	1.5%	0.19%
2012	1,305,581	(6.2%)	742,822,000	0.7%	0.18%
2013	1,309,789	0.3%	748,537,000	0.8%	0.17%
2014	1,377,507	5.2%	768,119,000	2.6%	0.18%
2015	1,492,058	8.3%	803,575,000	4.6%	0.19%
CAGR					
2006–2009	(5.2%)		(1.9%)		
2009–2012	(2.2%)		1.6%		
2012–2015	4.6%		2.7%		
2006–2015	(1.1%)		0.8%		

NOTES:
CAGR – Compound Annual Growth Rate
Passenger totals do not include nonrevenue passengers. Enplaned passengers at BOI do not include through passengers.
SOURCES: City of Boise Aviation Department, Traffic Reports, November 2016; Bureau of Transportation Statistics, November 2016 (U.S. total enplaned passengers).

3.3.2 AIR SERVICE

Table 3-4 presents the base of airlines currently serving the Airport, which includes four mainline airlines, two low-cost airlines, and seven regional airlines operating on behalf of mainline airlines.[11] In addition, three all-cargo airlines operate at the Airport.

[11] For the purposes of this report, mainline airlines are defined to be large national or international airlines. Low-cost airlines are defined to be airlines with operating characteristics such as single-class planes, as well as extra costs for items included on mainline airlines that reduce

TABLE 3-4 AIRLINES CURRENTLY SERVING BOISE AIRPORT

LEGACY/MAINLINE CARRIERS (4)	LOW-COST CARRIERS (2)	REGIONAL CARRIERS (7)
Alaska Airlines	Allegiant Air	Mesa Airlines (d/b/a American Eagle)
American Airlines[1]	Southwest Airlines	SkyWest Airlines (d/b/a Alaska Airlines, Delta Connection, and United Express)
Delta Air Lines		Horizon Air (d/b/a Alaska Airlines)
United Airlines		Compass Airlines (d/b/a Delta Connection)
		GoJet Airlines (d/b/a United Express)
		Shuttle America (d/b/a United Express)
		Republic Airline (d/b/a United Express)
FOREIGN PASSENGER AIRLINES (0)	**ALL-CARGO AIRLINES (3)**	
	FedEx	
	United Parcel Service	
	Western Air Express	

NOTE:

1 American Airlines and US Airways merged on December 9, 2013. A single operating certificate was issued on April 8, 2015. For the purposes of this Master Plan Update, the airlines are combined.

SOURCES: City of Boise Aviation Department, Traffic Reports, November 2016; Innovata, November 2016.

As depicted in **Table 3-5**, American Airlines, Alaska Airlines, Delta Air Lines, United Airlines, Southwest Airlines, and their regional partners have served the Airport since 2006, while Allegiant Air began operating at the Airport in 2012.

TABLE 3-5 HISTORICAL SCHEDULED PASSENGER AIRLINE BASE

AIR CARRIER[1]	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
American Airlines[2]	●	●	●	●	●	●	●	●	●	●
Alaska Airlines	●	●	●	●	●	●	●	●	●	●
Delta Air Lines[3]	●	●	●	●	●	●	●	●	●	●
Frontier Airlines	●	●	●	●	●	●			●	
Allegiant Air							●	●	●	●
Big Sky Airlines	●	●	●							
SeaPort Airlines						●				
Salmon Air	●	●	●	●	●					
United Airlines[4]	●	●	●	●	●	●	●	●	●	●
Southwest Airlines	●	●	●	●	●	●	●	●	●	●
ExpressJet Airlines		●	●							

NOTES:

1 Includes regional partner airlines, where applicable.

2 American Airlines and US Airways merged on December 9, 2013; for the purposes of this Master Plan Update, the two airlines are combined.

3 Delta Air Lines and Northwest Airlines merged in 2009; for the purposes of this Master Plan Update, the two airlines are combined.

4 United Airlines and Continental Airlines merged in 2010; for the purposes of this Master Plan Update, the two airlines are combined.

SOURCES: City of Boise Aviation Department, Traffic Reports, November 2016; Innovata, November 2016.

their operating costs. Regional airlines are defined to be airlines operating on behalf of a mainline airline using their own operating certificate or smaller regional airlines operating on their own behalf.

The enplaned passengers and market share data in **Table 3-6** indicate that service at the Airport is mostly provided by four carriers, Alaska Airlines, Southwest Airlines, Delta Air Lines, and United Airlines, including their regional partners. For these airlines, the Airport generally serves as a spoke within their route networks, flying passengers from the Airport to connecting hubs or focus cities and enabling them to reach many destinations with one stop.

TABLE 3-6 HISTORICAL TOTAL ENPLANED PASSENGERS BY AIRLINE

AIRLINE[1]	2011 EPAX	2011 SHARE	2012 EPAX	2012 SHARE	2013 EPAX	2013 SHARE	2014 EPAX	2014 SHARE	2015 EPAX	2015 SHARE
Alaska Airlines	282,279	20.3%	335,125	25.7%	368,273	28.1%	402,182	29.2%	439,947	29.5%
Southwest Airlines	477,680	34.3%	373,535	28.6%	331,046	25.3%	333,622	24.2%	342,138	22.9%
Delta Air Lines[2]	246,525	17.7%	238,977	18.3%	232,360	17.7%	253,206	18.4%	311,103	20.9%
United Airlines[3]	259,241	18.6%	271,404	20.8%	272,724	20.8%	284,494	20.7%	281,525	18.9%
American Airlines[4]	92,041	6.6%	81,938	6.3%	83,015	6.3%	83,694	6.1%	93,107	6.2%
Allegiant Air	1,525	0.1%	3,230	0.2%	20,355	1.6%	18,392	1.3%	23,378	1.6%
Other Airlines	1,501	0.1%	1,372	0.1%	2,016	0.2%	821	0.1%	860	0.1%
Frontier Airlines	29,567	2.1%					1,096	0.1%		
SeaPort Airlines	1,654	0.1%								
Total[5]	**1,392,013**	**100.0%**	**1,305,581**	**100.0%**	**1,309,789**	**100.0%**	**1,377,507**	**100.0%**	**1,492,058**	**100.0%**

NOTES:
EPAX – Enplaned Passengers
Passenger totals do not include nonrevenue passengers.
1 Includes regional partner airlines, as applicable.
2 American Airlines and US Airways merged on December 9, 2013; for the purposes of this Master Plan Update, the two airlines are combined.
3 Includes nonscheduled passenger service.
4 Figures may not add to totals shown due to rounding.
5 Totals may not sum due to rounding.
SOURCE: City of Boise Aviation Department, Traffic Reports, November 2016.

Enplaned passenger market shares have fluctuated between 2011 and 2015. Southwest Airlines enplaned the most passengers at the Airport in 2011 and 2012, but Alaska Airlines surpassed Southwest Airlines in 2013, after Southwest Airlines reduced operations at the Airport and Alaska Airlines began serving some of Southwest Airlines' former routes. Alaska Airlines' share of enplaned passengers at the Airport has increased from 20.3 percent in 2011 to 29.5 percent in 2015; during the same period, Southwest Airlines' share of enplaned passengers has decreased from 34.3 percent to 22.9. Delta Air Lines has increased its share of passengers at the Airport from 17.7 percent in 2011 to 20.9 percent in 2015; United Airlines has increased its share from 18.6 percent in 2011 to 18.9 percent in 2015.

Exhibit 3-2 displays the destinations served nonstop from the Airport. As of March 2017, regularly scheduled service is provided to 20 domestic destinations, including major hubs or focus cities for Alaska Airlines (Portland and Seattle), American Airlines (Chicago-O'Hare,[12] Dallas-Ft. Worth, and Phoenix), Delta Air Lines (Los Angeles, Minneapolis/St. Paul, Salt Lake City, and Seattle), Southwest Airlines (Chicago-Midway, Denver, Las Vegas, Oakland, and Phoenix,), and United Airlines (Chicago-O'Hare, Denver, Houston-Bush Intercontinental, Los Angeles, and San Francisco).

[12] American Airlines was scheduled to begin daily service to Chicago-O'Hare International Airport in July 2017.

EXHIBIT 3-2 NONSTOP DESTINATIONS SERVED FROM THE AIRPORT

NOTE:
1 Service to Chicago (Midway) is summer seasonal; operates between June and August
SOURCE: Innovata, March 2017.

Table 3-7 presents the markets served nonstop from the Airport in June 2016 (the peak month for the Airport in 2016). In June 2016, there were an average of 64 daily departures scheduled from the Airport and an average daily departing seat capacity of 6,149 seats. Of the 20 destinations served from the Airport, one (Los Angeles) is served by three airlines, seven (Seattle, Salt Lake City, Denver, Spokane, Phoenix, Las Vegas, and Sacramento) are served by two airlines, and the remaining 12 are served by one airline, including any regional partners, where applicable.

Traffic at the Airport primarily comprises origination and destination (O&D) passengers, those who begin or end their journey at BOI. As provided in **Table 3-8**, the number of O&D passengers enplaned at the Airport grew from 1,280,657 in 2012 to 1,460,651 in 2015, a CAGR of 4.5 percent. The CAGR of O&D enplaned passengers at the Airport was negative 0.7 percent over the entire period from 2006 to 2015.

From 2006 to 2015, connecting traffic has accounted for no more than 5.6 percent of enplaned passengers, which occurred in 2006. The share of connecting enplaned passengers at the Airport has decreased from 5.6 percent in 2006 to 2.1 percent in 2015. This change is due in large part to changes in how the two airlines with the most connecting passengers at the Airport have changed their operations. Southwest Airlines' connecting passengers decreased from 5.7 percent of its total enplaned passengers in 2006 to 1.1 percent in 2015, as it increased connecting enplaned passengers at DEN and Las Vegas (McCarran International Airport). Alaska Airlines' connecting passengers decreased from 11.5 percent of its total enplaned passengers at the Airport in 2006 to 3.1 percent in 2015, as the airline increased connecting enplaned passengers to SEA and PDX. Given the Airport's use as a spoke in route networks, or for point-to-point service, it is not expected that the ratio of O&D to connecting passengers will differ significantly throughout the forecast period.

TABLE 3-7 SCHEDULED NONSTOP SERVICE IN JUNE 2016

DESTINATION	AVERAGE DAILY DEPARTURES	AVERAGE DAILY SEATS	NUMBER OF CARRIERS[1]
Seattle	13	961	2
Salt Lake City	7	757	2
Portland	7	512	1
Denver	6	695	2
San Francisco	4	253	1
Spokane	4	419	2
Phoenix	3	399	2
Minneapolis/St. Paul	3	373	1
Los Angeles	2	198	3
Las Vegas	2	330	2
Oakland	2	286	1
Chicago–O'Hare	2	147	1
Sacramento	2	200	2
San Jose	1	79	1
Lewiston	1	76	1
Reno	1	76	1
Houston–Bush Intercontinental	1	70	1
San Diego	1	70	1
Dallas–Ft. Worth	1	124	1
Chicago–Midway	1	124	1
Total Daily Average	**64**	**6,149**	

NOTES:
Average is calculated as the number of departures in the month of June divided by the number of days in the month (30).
1 Includes regional partner airlines, where applicable.
SOURCE: Innovata, November 2016.

TABLE 3-8 HISTORICAL O&D AND CONNECTION ENPLANED PASSENGER TRAFFIC

YEAR	O&D PASSENGERS	O&D PERCENT OF TOTAL	CONNECTION PASSENGERS	CONNECTION PERCENT OF TOTAL	TOTAL AIRPORT ENPLANED PASSENGERS
2006	1,549,297	94.4%	92,526	5.6%	1,641,823
2007	1,603,030	95.4%	77,524	4.6%	1,680,554
2008	1,525,335	96.1%	61,439	3.9%	1,586,774
2009	1,358,401	97.2%	39,371	2.8%	1,397,772
2010	1,364,567	97.2%	39,722	2.8%	1,404,289
2011	1,356,660	97.5%	35,353	2.5%	1,392,013
2012	1,280,657	98.1%	24,924	1.9%	1,305,581
2013	1,290,537	98.5%	19,252	1.5%	1,309,789
2014	1,357,936	98.6%	19,571	1.4%	1,377,507
2015	1,460,651	97.9%	31,407	2.1%	1,492,058
CAGR					
2006–2009	(4.3%)		(24.8%)		(5.2%)
2009–2012	(1.9%)		(14.1%)		(2.2%)
2012–2015	4.5%		8.0%		4.5%
2006–2015	(0.7%)		(11.3%)		(1.1%)

NOTES:
O&D – Origin and Destination
CAGR – Compound Annual Growth Rate
Passenger totals do not include nonrevenue passengers or through passengers.
SOURCES: City of Boise Aviation Department, Traffic Reports, November 2016; United States Department of Transportation, DB1B Survey, November 2016.

Table 3-9 presents the top domestic O&D markets at the Airport for the four quarters ending the third quarter of 2016 (September 30, 2016), measured as passengers per day, each way (PDEW). During this period, approximately 31 percent, or 1,212 PDEW, travelled between BOI and one of the top five domestic destinations. The top 25 markets comprised approximately 70 percent, or 2,718 PDEW, of the Airport's domestic O&D market. All of the top 11 and 17 of the top 25 markets are scheduled to be served nonstop from the Airport in 2017. In addition to passenger volume, O&D demand at the Airport can be measured by passenger revenue generated by the O&D passenger base. **Table 3-10** presents domestic O&D passenger revenue generated at the Airport (excluding taxes and fees).[13] While O&D passengers have decreased at a CAGR of 1.4 percent from 2006 to 2015, revenue has increased at a CAGR of 1.9 percent during the same period.

After declining by 13.5 percent in 2009 from 2008 levels, domestic O&D passenger revenue increased at a CAGR of 8.1 percent from 2009 to 2012, while domestic O&D enplaned passengers decreased at a CAGR of 1.8 percent. This period corresponds to the post-recession period, during which airlines began practicing more capacity discipline, limiting the capacity made available to only those passengers willing to pay fares high enough to meet their fiscal goals. From 2012 to 2015, domestic O&D passenger revenue grew at a CAGR of 3.5 percent, while domestic O&D enplaned passengers grew at a CAGR of 3.8 percent, as the average fare decreased from $176 to $175 over the three-year period.[14]

[13] Fees are non-ticket charges, such as security charges, facility charges, checked luggage, seat assignments, etc.

[14] The average fare is calculated as the domestic O&D passenger ticket revenue divided by the domestic O&D enplaned passengers. For 2012, this calculation shows $210,170,818 / 1,191,652 = $176.36; and for 2015, this calculation shows $233,131,883 / 1,331,734 = $175.06.

TABLE 3-9 FOUR QUARTERS ENDING SEPTEMBER 2016—TOP 25 DOMESTIC O&D MARKETS AT THE AIRPORT

RANK	DESTINATION	O&D PDEW[1]	AVERAGE FARE	NONSTOP SERVICE[2]	DESTINATION	O&D PDEW 1/	AVERAGE FARE
1	Seattle	398	$110	●	Top 5 Markets	1,212	$114
2	Portland	281	$112	●	Top 25 Markets	2,718	$141
3	Phoenix	184	$155	●	Other O&D Markets	1,149	$236
4	Las Vegas	177	$110	●	Total O&D	3,867	$169
5	Spokane	172	$85	●	U.S. Domestic	686,877	$171
6	Los Angeles	170	$121	●			
7	Denver	168	$167	●			
8	San Diego	126	$120	●			
9	Sacramento	112	$97	●			
10	Salt Lake City	100	$157	●			
11	Oakland	95	$165	●			
12	Orange County (CA)	81	$127				
13	San Jose	78	$123	●			
14	San Francisco	74	$205	●			
15	Minneapolis/St. Paul	61	$234	●			
16	Dallas–Fort Worth	59	$208	●			
17	Chicago–O'Hare	58	$258	●			
18	Orlando	48	$202				
19	Ontario (CA)	46	$135				
20	Atlanta	45	$243				
21	Anchorage	40	$201				
22	Boston	38	$231				
23	Burbank	38	$126				
24	Houston–Bush	35	$248	●			
25	Austin	34	$194				

NOTES:
1 Origin and Destination (O&D) Passengers per day each way (PDEW)
2 Based on Airport schedule for 2017.
SOURCE: U.S. Department of Transportation, DB1B Survey, March 2017.

For the period from 2009 to 2015, domestic O&D passenger revenue increased at a CAGR of 5.8 percent, compared to a 1.0 percent CAGR for domestic O&D passengers. While the higher growth of revenue relative to passengers since 2009 is primarily due to the capacity discipline exhibited throughout the industry, it also presents a possible indication of latent demand. As the economy continues to grow, a larger portion of the travelling public will have the ability to pay the higher fares demanded by the market. This will provide an opportunity for airlines to profitably introduce additional capacity into the marketplace.

TABLE 3-10 AIRPORT HISTORICAL DOMESTIC O&D PASSENGERS AND PASSENGER TICKET REVENUE

YEAR	DOMESTIC O&D ENPLANED PASSENGERS	DOMESTIC O&D PASSENGER GROWTH	DOMESTIC O&D PASSENGER TICKET REVENUE ($)[1]	DOMESTIC O&D REVENUE GROWTH
2006	1,511,818		197,059,128	
2007	1,537,874	1.7%	201,037,730	2.0%
2008	1,424,264	(7.4%)	192,315,539	(4.3%)
2009	1,257,451	(11.7%)	166,399,176	(13.5%)
2010	1,262,528	0.4%	183,223,067	10.1%
2011	1,253,656	(0.7%)	199,490,096	8.9%
2012	1,191,652	(4.9%)	210,170,818	5.4%
2013	1,201,070	0.8%	220,177,929	4.8%
2014	1,257,143	4.7%	223,803,330	1.6%
2015	1,331,734	5.9%	233,131,883	4.2%
CAGR				
2006–2009	(6.0%)		(5.5%)	
2009–2012	(1.8%)		8.1%	
2009–2015	1.0%		5.8%	
2012–2015	3.8%		3.5%	
2006–2015	(1.4%)		1.9%	

NOTES:
O&D – Origin and Destination
CAGR – Compound Annual Growth Rate
1 Excludes ancillary fees
SOURCE: U.S. Department of Transportation, DB1B Survey, November 2016.

3.3.3 AIRCRAFT OPERATIONS

Table 3-11 presents historical aircraft operations at the Airport from 2006 through 2015. Overall, the number of aircraft operations at the Airport decreased at a CAGR of 3.3 percent between 2006 and 2015. During this period, passenger airline operations decreased at a CAGR of 3.9 percent. Passenger airline operations in 2015 were only about 70 percent of their total operations in 2006, their highest level during the period from 2006 through 2015.

All-cargo operations decreased at a CAGR of 4.0 percent between 2006 and 2015, reaching a low in 2011 due in part to the economic recession. Since the low in 2011, cargo operations have consistently grown, increasing at a CAGR of 4.0 percent from 2012 to 2015.

GA/other air taxi operations declined at a CAGR of 3.9 percent between 2006 and 2015, compared to a 2.9 percent compound annual decline of GA traffic nationally. The decline in GA/other air taxi operations was most pronounced from 2006 to 2009, with a decrease at a CAGR of 12.6 percent, compared to a 6.2 percent average annual rate of decline nationally. From 2012 through 2015, GA/other air taxi operations increased at a CAGR of 3.4 percent, compared to a 0.5 percent average annual rate of decline nationally. One possible reason for the increase in GA/other air taxi operations is increased economic activity in the area; from 2006 to 2012, total earnings in the BOI Air Trade Area declined at a CAGR of 1.5 percent, compared to a CAGR of 0.5 percent for total national earnings.

From 2012 to 2015, earnings in the area increased at a CAGR of 3.7 percent, compared to an increase in national earnings at a CAGR of 2.3 percent.

Military operations at the Airport ranged from 9,867 in 2012 to 16,349 in 2015. Variability in military operations is due to multiple deployments.

TABLE 3-11 HISTORICAL AIRCRAFT OPERATIONS

YEAR	PASSENGER AIRLINE	ALL CARGO	GENERAL AVIATION/ OTHER AIR TAXI	MILITARY	TOTAL
2006	58,264	7,649	99,697	13,360	178,970
2007	57,844	6,404	105,392	12,305	181,945
2008	51,928	5,280	76,065	11,926	145,199
2009	44,199	4,740	66,628	13,437	129,004
2010	42,029	4,938	63,785	11,209	121,961
2011	41,243	4,342	64,277	11,948	121,810
2012	35,081	4,720	63,101	9,867	112,769
2013	35,311	5,304	62,524	11,417	114,556
2014	37,391	4,510	70,912	14,739	127,552
2015	40,607	5,312	69,706	16,349	131,974
CAGR					
2006–2009	(8.8%)	(14.7%)	(12.6%)	0.2%	(10.3%)
2009–2012	(7.4%)	(0.1%)	(1.8%)	(9.8%)	(4.4%)
2012–2015	5.0%	4.0%	3.4%	18.3%	5.4%
2006–2015	(3.9%)	(4.0%)	(3.9%)	2.3%	(3.3%)

NOTE:
CAGR – Compound Annual Growth Rate
SOURCES: City of Boise Aviation Department, Traffic Reports, November 2016; Federal Aviation Administration, OPSNET, November 2016.

Table 3-12 presents the share of passenger airline aircraft operations by airline at the Airport from 2011 through 2015. Alaska Airlines operated the most flights at BOI in 2015, accounting for 38.2 percent of all passenger airline operations at the Airport. Alaska Airlines has operated the most passenger flights at the Airport since 2012, after Southwest Airlines—which had the highest share of passenger airline operations in 2011, at 28.6 percent—began to decrease operations at the Airport. In 2015, United Airlines' share of passenger airline operations was 21.2 percent. Delta Air Lines' share of passenger airline operations has grown from 16.0 percent in 2011 to 19.6 percent in 2015. Nonscheduled or charter passenger airlines accounted for 0.1 percent of passenger airline operations at the Airport in 2015.

TABLE 3-12 HISTORICAL OPERATIONS SHARE BY PASSENGER AIRLINE

AIRLINE[1]	2011 SHARE	2012 SHARE	2013 SHARE	2014 SHARE	2015 SHARE
Alaska Airlines	22.7%	31.3%	33.8%	36.6%	38.2%
United Airlines[2]	22.9%	25.8%	26.2%	25.9%	21.2%
Delta Air Lines[3]	16.0%	15.2%	15.2%	15.0%	19.6%
Southwest Airlines	28.6%	22.4%	18.9%	17.3%	15.9%

American Airlines[4]	6.1%	4.8%	4.9%	4.4%	4.2%
Allegiant Air	0.0%	0.2%	0.8%	0.7%	0.9%
Other Airlines[5]	0.2%	0.3%	0.2%	0.1%	0.1%
Frontier Airlines	1.4%	0.0%	0.0%	0.1%	0.0%
SeaPort Airlines	2.0%	0.0%	0.0%	0.0%	0.0%
Airport Total[6]	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

NOTES:
1 Includes regional partner airlines
2 United Airlines and Continental Airlines merged in 2010; for the purposes of this Master Plan Update, the two airlines are combined.
3 Delta Air Lines and Northwest Airlines merged in 2009; for the purposes of this Master Plan Update, the two airlines are combined.
4 American Airlines and US Airways merged on December 9, 2013; for the purposes of this Master Plan Update, the two airlines are combined.
5 Includes nonscheduled passenger service
6 Figures may not add to totals shown due to rounding.
SOURCES: U.S. Department of Transportation, Form T-100, November 2016.

Table 3-13 presents the passenger airline aircraft operations by mainline and regional operations. Mainline operations accounted for 41.1 percent of total passenger airline aircraft operations, and total mainline and regional passenger airline operations combined accounted for 30.8 percent of total Airport operations in 2015. Mainline operations at the Airport have decreased at a CAGR of 3.7 percent from 2006 to 2015, while regional operations have decreased at a CAGR of 4.1 percent.

TABLE 3-13 HISTORICAL MAINLINE AND REGIONAL PASSENGER AIRLINE AIRCRAFT OPERATIONS

YEAR	MAINLINE OPERATIONS	SHARE OF PASSENGER AIRLINES	REGIONAL OPERATIONS	SHARE OF PASSENGER AIRLINES	TOTAL AIRLINE OPERATIONS	SHARE OF AIRPORT TOTAL	TOTAL AIRPORT OPERATIONS
2006	23,515	40.4%	34,749	59.6%	58,264	32.6%	178,970
2007	25,107	43.4%	32,737	56.6%	57,844	31.8%	181,945
2008	22,102	42.6%	29,826	57.4%	51,928	35.8%	145,199
2009	19,864	44.9%	24,335	55.1%	44,199	34.3%	129,004
2010	19,093	45.4%	22,936	54.6%	42,029	34.5%	121,961
2011	17,560	42.6%	23,683	57.4%	41,243	33.9%	121,810
2012	14,216	40.5%	20,865	59.5%	35,081	31.1%	112,769
2013	13,506	38.2%	21,805	61.8%	35,311	30.8%	114,556
2014	12,488	33.4%	24,903	66.6%	37,391	29.3%	127,552
2015	16,707	41.1%	23,900	58.9%	40,607	30.8%	131,974
CAGR							
2006–2009	(5.5%)		(11.2%)		(8.8%)		(10.3%)
2009–2012	(10.6%)		(5.0%)		(7.4%)		(4.4%)
2012–2015	5.5%		4.6%		5.0%		5.4%
2006–2015	(3.7%)		(4.1%)		(3.9%)		(3.3%)

NOTE: CAGR – Compound Annual Growth Rate
SOURCES: City of Boise Aviation Department, Traffic Reports, November 2016; Federal Aviation Administration, OPSNET, November 2016; U.S. Department of Transportation, T-100, November 2016.

Table 3-14 presents the historical landed weight by airline from 2011 through 2015. Alaska Airlines accounted for the largest share of landed weight at the Airport in 2015, at 23.0 percent, up from its 13.6 percent share in 2011. Historically, Southwest Airlines accounted for the highest share of landed weight, accounting for as much as 33.4 percent of landed weight in 2011. The combined landed weight of the all-cargo carriers (FedEx and UPS) accounted for 16.0 percent of landed weight in 2015, up from 14.8 percent in 2011.

TABLE 3-14 HISTORICAL LANDED WEIGHT BY AIRLINE

AIRLINE[1]	2011		2012		2013		2014		2015	
	LANDED WEIGHT	SHARE	LANDED WEIGHT	SHARE	LANDED WEIGHT	SHARE	LANDED WEIGHT	SHARE	LANDED WEIGHT	SHARE
Alaska Airlines	290,839	13.6%	340,119	18.1%	368,821	19.5%	425,584	21.5%	482,563	23.0%
Southwest Airlines	713,068	33.4%	480,580	25.5%	413,878	21.9%	403,624	20.4%	400,724	19.1%
Delta Air Lines[2]	293,502	13.7%	278,159	14.8%	281,314	14.9%	307,825	15.5%	359,042	17.1%
United Airlines[3]	315,576	14.8%	318,944	16.9%	318,024	16.8%	342,163	17.3%	319,751	15.2%
American Airlines[4]	122,994	5.8%	110,330	5.9%	117,814	6.2%	112,761	5.7%	115,878	5.5%
Allegiant Air	4,336	0.2%	5,859	0.3%	22,181	1.2%	20,449	1.0%	27,173	1.3%
Other Airlines[5]	38,865	1.8%	34,818	1.8%	47,909	2.5%	36,377	1.8%	60,345	2.9%
Frontier Airlines	37,365	1.7%	1,890	0.1%	1,748	0.1%	1,722	0.1%		
FedEx	232,271	10.9%	227,486	12.1%	233,395	12.3%	242,512	12.2%	245,782	11.7%
UPS	83,390	3.9%	84,768	4.5%	85,486	4.5%	89,283	4.5%	90,818	4.3%
SeaPort Airlines	4,286	0.2%								
Airport Total[6]	**2,136,492**	**100.0%**	**1,882,953**	**100.0%**	**1,890,569**	**100.0%**	**1,982,300**	**100.0%**	**2,102,075**	**100.0%**

NOTES:
1 Includes regional partner airlines
2 Delta Air Lines and Northwest Airlines merged in 2009; for the purposes of this Master Plan Update, the two airlines are combined.
3 United Airlines and Continental Airlines merged in 2010; for the purposes of this Master Plan Update, the two airlines are combined.
4 American Airlines and US Airways merged on December 9, 2013; for the purposes of this Master Plan Update, the two airlines are combined.
5 Includes nonscheduled passenger service
6 Figures may not add to totals shown due to rounding.
SOURCE: City of Boise Aviation Department, Traffic Reports, November 2016.

The historical all-cargo, GA, other air taxi, and military operations, with their respective shares of total operations, are presented in **Table 3-15**.

TABLE 3-15 HISTORICAL ALL-CARGO, GENERAL AVIATION, OTHER AIR TAXI, AND MILITARY AIRCRAFT OPERATIONS

YEAR	CARGO OPERATIONS	SHARE	GENERAL AVIATION OPERATIONS	SHARE	OTHER AIR TAXI OPERATIONS	SHARE	MILITARY OPERATIONS	SHARE	TOTAL AIRPORT OPERATIONS
2006	7,649	4.3%	90,469	50.5%	9,228	5.2%	13,360	7.5%	178,970
2007	6,404	3.5%	95,264	52.4%	10,128	5.6%	12,305	6.8%	181,945
2008	5,280	3.6%	66,309	45.7%	9,756	6.7%	11,926	8.2%	145,199
2009	4,740	3.7%	60,236	46.7%	6,392	5.0%	13,437	10.4%	129,004
2010	4,938	4.0%	57,463	47.1%	6,322	5.2%	11,209	9.2%	121,961
2011	4,342	3.6%	57,688	47.4%	6,589	5.4%	11,948	9.8%	121,810
2012	4,720	4.2%	57,350	50.9%	5,751	5.1%	9,867	8.7%	112,769
2013	5,304	4.6%	57,325	50.0%	5,199	4.5%	11,417	10.0%	114,556
2014	4,510	3.5%	65,584	51.4%	5,328	4.2%	14,739	11.6%	127,552
2015	5,312	4.0%	64,448	48.8%	5,258	4.0%	16,349	12.4%	131,974
CAGR									
2006–2009	(14.7%)		(12.7%)		(11.5%)		0.2%		(10.3%)
2009–2012	(0.1%)		(1.6%)		(3.5%)		(9.8%)		(4.4%)
2012–2015	4.0%		4.0%		(2.9%)		18.3%		5.4%
2006–2015	(4.0%)		(3.7%)		(6.1%)		2.3%		(3.3%)

NOTE:
CAGR – Compound Annual Growth Rate
SOURCES: City of Boise Aviation Department, Traffic Reports, November 2016; Federal Aviation Administration, OPSNET, November 2016.

3.4 FACTORS AFFECTING AVIATION DEMAND AT THE AIRPORT

This section discusses qualitative factors that could influence future aviation activity at the Airport. Data and information related to these factors have been either directly or indirectly incorporated into the development of activity forecasts for the Airport. Each of the seven qualitative factors considered in forecasting aviation activity at BOI are discussed in the following subsections. These factors include broad economic and industry influences that are recognized to have a potential to inhibit or induce growth in aviation activity. Each factor is unique and not dependent on any other. Therefore, each factor is discussed individually; however, multiple factors may influence future activity at the Airport at any point in time.

3.4.1 NATIONAL ECONOMY

Nationally, trends in airline travel demand, measured by either passenger volumes or passenger revenue, have been closely correlated with national economic trends, most notably changes in gross domestic product (GDP). Airport activity forecasts are based on projections of socioeconomic variables. If actual socioeconomic conditions vary from those projected, then Airport activity will also likely vary.

3.4.2 STATE OF THE AIRLINE INDUSTRY

In the aftermath of the terrorist attacks on September 11, 2001, the U.S. airline industry experienced a reduction in the demand for airline travel, which exacerbated problems for a U.S. airline industry already weakened by the slowing economy and rising labor and fuel costs. This resulted in operating losses between 2001 and 2004 that totaled more than $22 billion (excluding extraordinary charges and gains). From 2005 through 2007, the airline industry recovered, posting combined operating profits of $9.3 billion in 2007.[15] However, in 2008 and through the first half of 2009, the combination of record-high fuel prices, weakening economic conditions, and a weak dollar resulted in the worst financial environment for the United States network and low-cost airlines since September 11, 2001. Since 2009, the industry has improved with industry consolidation, capacity realignment, and a recovering economy, which has resulted in record industry profits in 2013 and 2014. North American airline members of the International Air Transport Association generated profits of $21.5 billion in 2015 and are forecast to generate $20.3 billion in profits in 2016,[16] after producing $11.2 billion in profits in 2014.[17]

3.4.3 AIRLINE MERGERS AND ACQUISITIONS

Since 2009, airlines have merged or acquired competitors in an attempt to become more competitive and cost efficient. In 2009, Delta Air Lines completed its merger with Northwest Airlines, initiating a wave of airline mergers and acquisitions. That same year, Republic Airways Holdings, a regional airline holding corporation, acquired Frontier Airlines of Denver and Midwest Airlines of Milwaukee. In 2010, United Airlines and Continental Airlines merged. In 2011, Southwest Airlines acquired AirTran Holdings, Inc., the former parent company of low-cost competitor AirTran Airways. In 2013, American Airlines and US Airways merged, creating what was the largest airline in terms of operating revenue and revenue passenger miles. And, most recently, on April 4, 2016, Alaska Airlines announced its acquisition of Virgin America, which received antirust approval on December 6, 2016. The consolidation that has taken place in the U.S. airline industry since 2005 is shown on **Exhibit 3-3**. These mergers and acquisitions have enabled airlines to reduce capacity and gain higher profitability. Additional consolidation in the U.S. airline industry could affect the amount of capacity offered to passengers industry-wide and at BOI.

3.4.4 CAPACITY DISCIPLINE – A CHANGE IN THE AIRLINE BUSINESS MODEL

In 2008, North American airline members of the International Air Transport Association recorded a $9.6 billion loss.[18] Shortly thereafter, many domestic airlines announced significant capacity reductions; increases in fuel surcharges, airfares, and fees; and other measures to address their financial challenges. These changes dramatically improved the financial conditions for the airlines. In contrast to earlier losses, North American International Air Transport Association airlines generated profits of $21.5 billion in 2015, after producing $11.2 billion in profit in 2014.[19] Strict control on capacity, primarily in the domestic market, referred to as capacity discipline, is the principal driver behind the financial turnaround experienced by the airline industry.[20]

Capacity discipline reflects a shift in the airline business model, from an environment where market-share targets were pursued to one where financial targets are pursued. The new business model resulted in a 7 percent decrease in U.S. domestic seat capacity between 2007 and 2015, as airlines shed less profitable capacity and passenger volumes not contributing toward the achievement of financial targets.

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[15] Airlines for America, *2009 Economic Report*, July 2009.

[16] International Air Transport Association, *Economic Performance of the Industry*, December 2016.

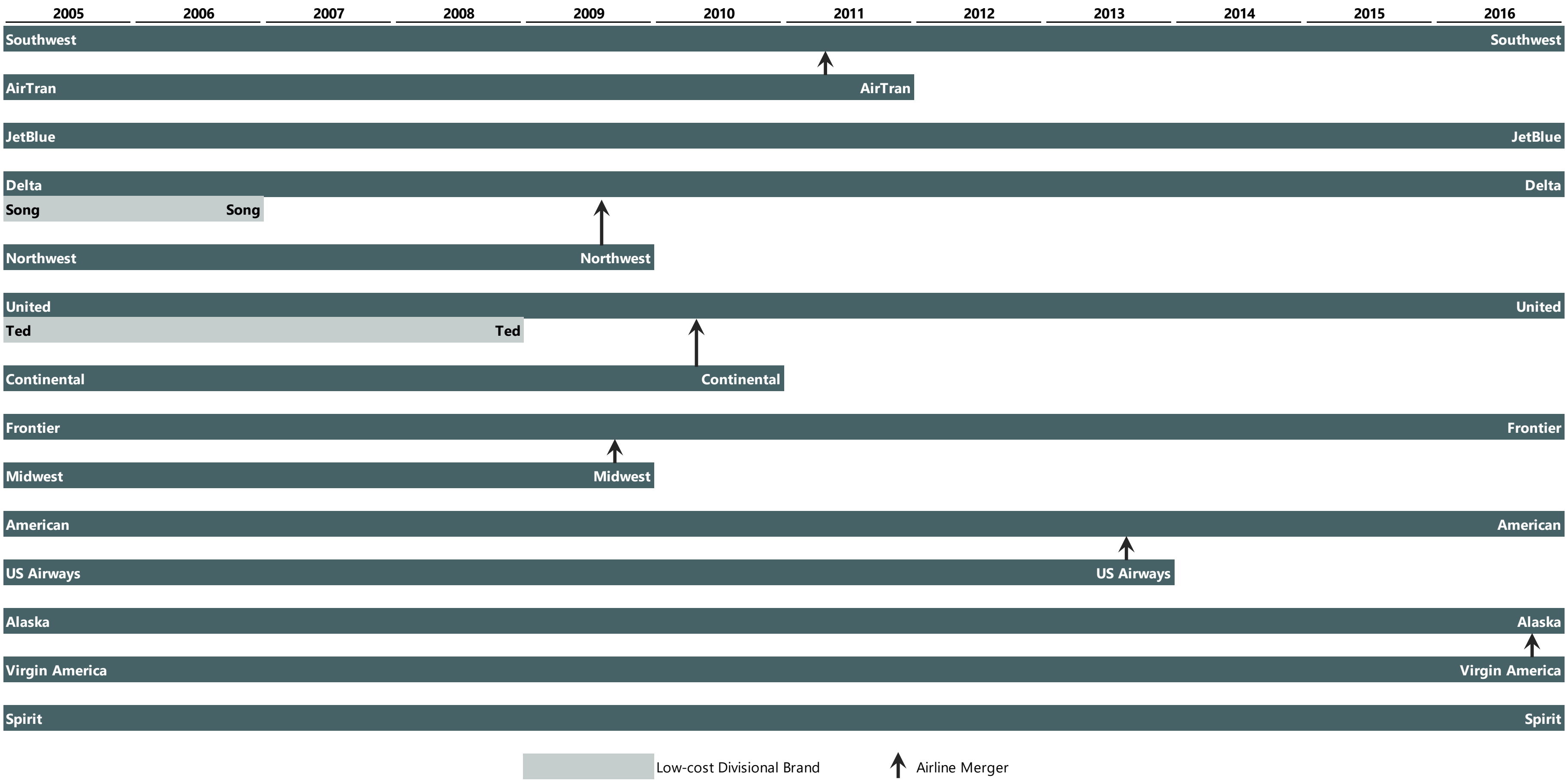
[17] International Air Transport Association, *Economic Performance of the Industry*, June 2016.

[18] International Air Transport Association, *Economic Performance of the Industry*, June 2010.

[19] International Air Transport Association, *Economic Performance of the Industry*, June 2016.

[20] With fuel prices at their lowest levels since 2007, capacity discipline is starting to erode as airlines add capacity that may not have been profitable in previous years, leading to some downward pressure on fares and revenue.

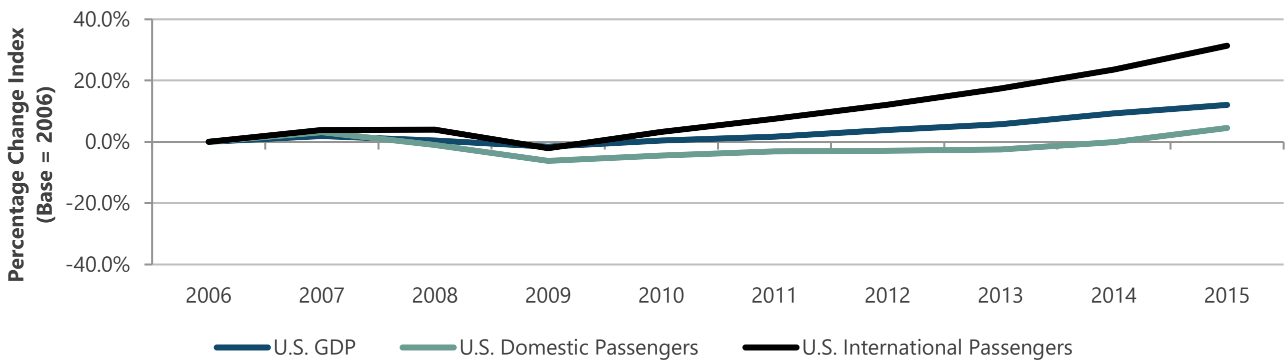
EXHIBIT 3-3 UNITED STATES AIRLINE INDUSTRY CONSOLIDATION



SOURCE: Ricondo & Associates, Inc., March 2017.

Exhibit 3-4 illustrates the change in U.S. airline industry passenger volumes since 2006 relative to the change in U.S. GDP, a driver of demand for air travel. Both domestic and international passenger volumes followed GDP trends until 2009, after which domestic passenger volumes remained largely unchanged until 2014, while GDP and international passenger volume growth resumed. More-profitable international passengers have continued to be accommodated by airlines, while lower-yield domestic passengers were not accommodated. The recent increase in both domestic and international passengers illustrates some loosening of capacity discipline in an environment with lower fuel prices.

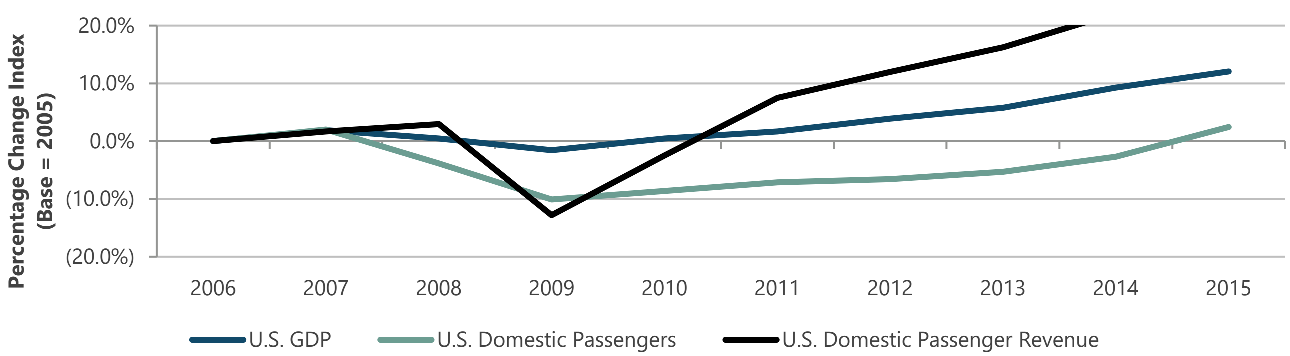
EXHIBIT 3-4 GROWTH TRENDS OF U.S. PASSENGERS AND GROSS DOMESTIC PRODUCT



NOTE: U.S. gross domestic product (GDP) is inflation-adjusted.
SOURCES: U.S. Department of Transportation, Form T-100, November 2016; Woods & Poole Economics, Inc., November 2016.

Exhibit 3-5 illustrates the change in U.S. domestic passenger volume, passenger revenues, and U.S. GDP since 2006. While domestic passenger volumes have lagged behind GDP trends since 2008, another measure of passenger demand—passenger revenues—has increased as U.S. airlines have focused on achieving financial targets through lower domestic passenger volumes and higher passenger fares.

EXHIBIT 3-5 GROWTH TRENDS OF U.S. DOMESTIC PASSENGER, PASSENGER REVENUE, AND GROSS DOMESTIC PRODUCT



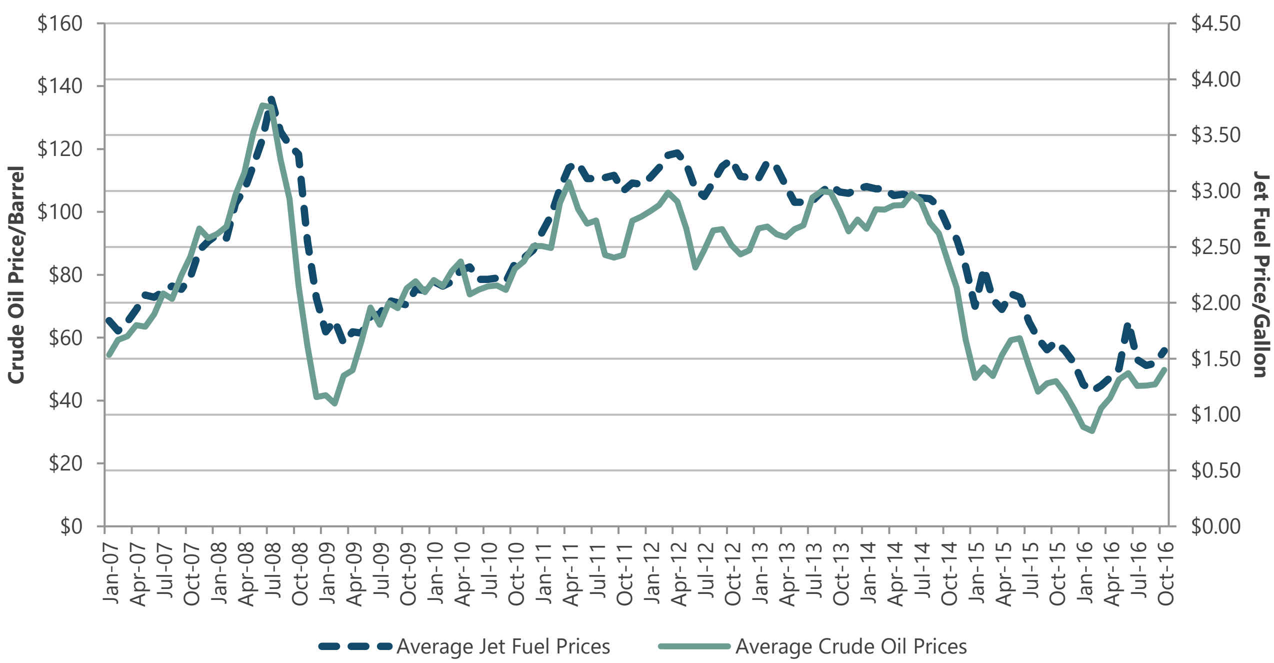
NOTE: U.S. gross domestic product (GDP) and U.S. domestic passenger revenue are inflation-adjusted.
SOURCES: United States Department of Transportation, DB1B Survey, November 2016; United States Bureau of Labor Statistics, http://www.bls.gov/cpi/cpid1608.pdf (accessed November 3, 2016); Woods & Poole Economics, Inc., November 2016.

3.4.5 COST OF AVIATION FUEL

The price of fuel is one of the most significant and volatile expenses for airlines. Historically, fuel has been the first- or second-largest operating expense for the airline industry, shifting with labor cost. As of the third quarter of 2016, despite decreasing fuel costs, fuel was the largest operating expense for the airline industry, representing 31.9 percent of total operating expenses.[21] **Exhibit 3-6** shows the quarterly average prices of jet fuel and crude oil from January 2007 through October 2016. Since 2007, the average monthly price of jet fuel fluctuated between a high of $3.82 per gallon in July 2008 to a low of $1.21 in February 2016.

Fluctuating fuel costs will continue to impact airline profitability, and this could lead to changes in air service as airlines restructure air service to address increases or decreases in the cost of fuel. It is noted that existing fuel facilities at the Airport only provide storage for a one-day supply of jet fuel for commercial aircraft. While this constraint could theoretically affect aircraft operations, the forecasts developed for the MPU are unconstrained demand forecasts.

EXHIBIT 3-6 HISTORICAL MONTHLY AVERAGES OF JET FUEL AND CRUDE OIL PRICES



SOURCES: U.S. Bureau of Transportation Statistics, December 2016 (average jet fuel prices); U.S. Energy Information Administration, December 2016 (average crude oil prices).

3.4.6 THREAT OF TERRORISM AND GEOPOLITICAL ISSUES

Since September 11, 2001, the recurrence of terrorism incidents against either domestic or world aviation remains a risk to achieving the activity forecasts contained in this report. Tighter security measures have restored the public's

[21] United States Department of Transportation, *Form 41 Equipment Expenses (P52) Report*, November 2016.

confidence in the safety of U.S. and world air travel. However, any terrorist incident aimed at aviation could impact demand for aviation services.

Additionally, geopolitical issues may affect aviation demand during the forecast period. Potential governmental or regional instability in certain countries or locations may affect access to, or demand for, aviation service in these places. Future governmental or regional instability could also impact demand for international aviation service at the Airport.

3.4.7 OPERATIONAL CAPACITY OF THE NATIONAL AIRSPACE SYSTEM

A significant concern of the FAA is how increased delays at busy airports impact the efficiency of the National Airspace System. In its January 2015 *Airport Capacity Needs in the National Airspace System* report, the FAA stated the need to address the delays that remain at key airports since its 2007 assessment and to implement NextGen airspace system improvements. The report emphasized the need to continue to invest in system improvements with airfield enhancements and NextGen capabilities.

3.5 PASSENGER AIRLINE ENPLANED PASSENGERS AND OPERATIONS FORECSTS

3.5.1 PASSENGER AIRLINE FORECAST OVERVIEW

BOI primarily serves the domestic aviation market and accounts for approximately 0.19 percent of total U.S. enplaned passengers. As stated in Section 3.3.1, the Airport is currently classified as a small–hub airport. In order for the Airport to be classified as a medium-hub airport, as defined by the FAA-accounting for between 0.25 and 1.0 percent of total nationwide enplaned passengers-enplaned passengers would be required to grow an average of nearly 3.3 percent per year through 2035[22]. Therefore, it is not expected that the Airport will be reclassified as a medium-hub airport during the forecast period.

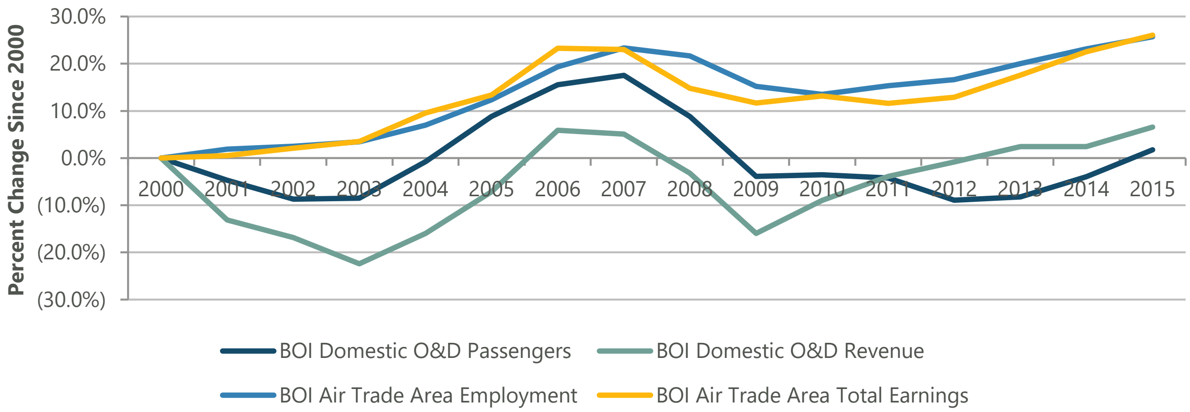
Throughout the last decade, the Airport has been characterized by a fragmented market share, with nonstop air service provided to hub airports of the various airlines serving BOI and to several regional markets. Traffic at the Airport is largely O&D, and BOI is the primary commercial service airport in the state of Idaho. In 2015, the Airport accounted for approximately 81 percent of all enplaned passengers at the six airports in Idaho with commercial service.[23]

It is expected that over the forecast period, BOI will continue to operate primarily as an O&D airport and that passenger demand growth will be accommodated by a combination of airline seat capacity and frequency growth, mainly to and from existing nonstop destinations. Demand growth is expected to materialize as a result of socioeconomic demand-related market forces, both locally and in the broader United States. **Exhibit 3-7** shows the Airport's domestic O&D demand since 2000, both in terms of passenger volume and passenger revenue, along with the BOI Air Trade Area employment and total earnings.

[22] This assumes the national forecast enplaned passengers from the 2016 FAA Terminal Area Forecast.

[23] Airports in Idaho with commercial service are Boise (BOI), Idaho Falls Regional (IDA), Lewiston–Nez Perce County (LWS), Pocatello/Arbon Valley (PIH), Friedman Memorial (SUN), and Magic Valley Regional (TWF) Airports.

EXHIBIT 3-7 DOMESTIC O&D PASSENGER VOLUME AND PASSENGER REVENUE TRENDS AT BOI



NOTES: BOI domestic origin and destination (O&D) revenue and BOI Air Trade Area total earnings are inflation-adjusted. Passenger volumes do not include nonrevenue passengers.
SOURCES: U.S. Department of Transportation, DB1B Survey, November 2016; Woods & Poole Economics, Inc., November 2016.

Except for a brief period from 2000 through 2002 following the September 11, 2001, terrorist attacks, domestic O&D revenue and passengers at the Airport have generally followed trends in employment and total earnings in the BOI Air Trade Area. From 2003 to 2007, domestic O&D revenue and passengers at the Airport increased, as did BOI Air Trade Area employment and total earnings. Domestic O&D revenue and passengers at the Airport both declined—along with BOI Air Trade Area total earnings—from 2006 to 2009, though at a faster rate. As the economy recovered after the recession, domestic O&D revenue and passengers also grew. During the period from 2011 to 2013, however, domestic O&D passengers at the Airport declined, while domestic O&D revenue and BOI Air Trade Area employment and total earnings continued to grow. This is indicative of the effects of airline industry capacity discipline in an improving economic environment. Since 2013, domestic O&D passengers at the Airport have resumed their growth, at a similar rate to BOI Air Trade Area employment and total earnings. Similar results were found with other socioeconomic variables.

As suggested by Exhibit 3–7, there was strong positive correlation between domestic O&D passengers and socioeconomic variables at the Airport, which was further validated by strong positive correlation between the same socioeconomic variables and domestic O&D revenue. Future passenger demand at the Airport was forecast based on projections of the socioeconomic variables most closely correlated with O&D passengers and the historic relationship between these variables and O&D passengers, determined through use of regression analysis. The projections of the socioeconomic variables were sourced from Woods & Poole Economics, Inc. In addition to the data from Woods & Poole Economics, Inc., population data provided by Community Planning Association of Southwest Idaho (COMPASS) were considered in the analyses.

The data provided by COMPASS included population and household data for Ada and Canyon Counties. The data included the 2010 population according to the United States Census and estimates of the number of households and population for 2016, 2020, and every five years through 2040. One limitation of the COMPASS data is that COMPASS does not include data for each county in the Air Trade Area; therefore, data from Woods & Poole Economics, Inc. were used for the population in the remaining eight counties. Another limitation of the COMPASS data is the five years between data points; in order to retrieve the estimates for each year required for the forecast methodology, the total population was assumed to change uniformly between forecast years. Furthermore, regression analyses using population did not result in significant correlation between population and enplaned passengers at the Airport (see Section 3.5.2.4), so the COMPASS data could not be used directly to forecast enplaned passengers. However, using forecast total personal income from Woods & Poole Economics, Inc. and dividing by the augmented forecast COMPASS population (COMPASS forecast population for Ada and Canyon Counties and Woods & Poole Economics, Inc. data for the remaining eight counties in the Air Trade Area) provides forecast total personal income, which did show a strong positive correlation with enplaned passengers at the Airport. Using these data, and combining the resulting forecast with the forecast derived using other analyses in a manner similar to what was done using Woods & Poole Economic, Inc. data, the result is a forecast of enplaned passengers that varies by at most 1.2 percent from the forecast using Woods & Poole Economics, Inc. data. Because of the insignificant differences between the two forecasts, and the limitations associated with the COMPASS data, the COMPASS data were considered, but ultimately not used for purposes of forecasting enplaned passengers.

3.5.2 PASSENGER AIRLINE FORECAST METHODOLOGY

Several methodologies were employed to forecast enplaned passengers, passenger aircraft operations, and the passenger aircraft fleet mix at the Airport. These methodologies are discussed for three time periods: the short-term (2016–2020), the medium-term (2021–2025), and the long-term (2026–2035).

3.5.2.1 SHORT-TERM METHODOLOGY (2016–2020)

Actual activity data were available from the Airport through October 2016. For the remainder of 2016, published airline schedules were analyzed and flight segment-level estimates of performance were developed based on airline-specific trends of load factors and completion rates (the number of flights scheduled compared to the number of flights completed). These load factors and completion rates were identified through an analysis of U.S. DOT enplanement and O&D data. Estimates of load factor and completion rates were applied to scheduled capacity in order to derive enplaned passenger and operations forecasts for November and December 2016, and they were added to the Airport data through October 2016 to develop the full-year 2016 forecasts of enplaned passengers and passenger airline operations.

For 2017, passenger airline schedules through May 2017 were analyzed and airline-specific trends of load factors and completion rates were used to forecast the enplaned passengers and passenger airline operations from January through May 2017. The historical share of enplaned passengers and passenger airline operations for January through May compared to the full year were then used to forecast the full-year 2017 enplaned passengers and passenger airline operations.

For the 2018 through 2020 period, passenger activity in 2017, both O&D and connecting passengers (a minimal component), was used as a baseline and grown using forecasts of growth derived through socioeconomic regression analysis.

3.5.2.2 MEDIUM-TERM METHODOLOGY (2021–2025)

Forecasts of underlying passenger demand for the period from 2021 through 2025 were developed using socioeconomic regression analyses. Historical socioeconomic data and originating passenger data from 1993 through 2015 were used in the analyses. Forecasts of passenger demand were combined with estimates of airline capacity deployment (such as airline per-departure seat capacity and average load factors), resulting in forecasts of passenger airline operations. The expectations of airline capacity deployment were developed through analysis of fleet plans, airline industry performance trend analysis, and an analysis of possible new air service opportunities.

3.5.2.3 LONG-TERM METHODOLOGY (2026–2035)

Similar to the approach taken for the medium-term period, underlying passenger demand forecasts were developed for the long-term period (2026–2035) using socioeconomic regression analysis. Forecasts of passenger demand were combined with estimates of airline capacity deployment, which resulted in forecasts of passenger airline operations. The expectations of airline capacity deployment were developed through analysis of fleet plans, airline industry performance trends, and an analysis of possible new air service opportunities.

3.5.2.4 SOCIOECONOMIC REGRESSION ANALYSIS TO ESTIMATE FUTURE GROWTH

Longer-term passenger demand growth rates at the Airport were derived using socioeconomic regression analysis. Socioeconomic regression analysis is used to identify correlational relationships between a dependent variable (e.g., passenger volume) and one or more independent variables (e.g., socioeconomic factors, such as population, employment, per capita personal income). These relationships, or regression models, can be used to forecast future growth in aviation activity using projections of independent variables. A standard measure of how well each socioeconomic variable explains passenger demand is the regression model's coefficient of determination, or R-squared. A result of 100 percent is the maximum value possible for a coefficient of determination, and it represents a perfect fit between the variables analyzed. For purposes of this analysis, an R-squared value of 70 percent or better was considered adequate.

Socioeconomic regression analyses were conducted to identify relationships between BOI passenger demand and socioeconomic variables at the national level and for the BOI Air Trade Area, using historical data from 1993 through 2015. Forecasts were developed using these regression models that incorporated independent projections of the relevant socioeconomic variables. The Airport primarily serves O&D passengers who reside in or visit the BOI Air Trade Area. In order to examine the effects of both local and national socioeconomic variables on passenger demand at the Airport, socioeconomic variables for the nation, the BOI Air Trade Area, and subsets of the BOI Air Trade Area were analyzed separately as independent variables in the regression analyses. The four socioeconomic variables that showed the most correlation with passenger demand at the Airport were total employment, total earnings, gross domestic or gross regional product, and total per capita personal income. Historical and projected data for these independent variables were obtained from Woods & Poole Economics, Inc. The forecasts resulting from the application of the top regression results to the projected socioeconomic variables were averaged to develop the baseline forecast of originating passengers. The share of connecting passengers was assumed to be equal to the average share of connecting passengers at the Airport for 2015 and the four quarters ending Q2 2016, the latest period for which data on connecting passengers were available at the time of the analysis.

The historical and projected socioeconomic data are shown in **Table 3-16**. Relationships between passenger volumes and the socioeconomic variables depicted in Table 3-16 were explored, and results of the regression analyses with R-squared values above 0.70 are presented in **Table 3-17**. More details on the regression analyses, including a discussion of the statistical measures of the analyses, can be found in Attachment B at the end of this section.

TABLE 3-16 (1 OF 2) HISTORICAL AND PROJECTED SOCIOECONOMIC CHARACTERISTICS

YEAR	UNITED STATES OF AMERICA					BOI AIR TRADE AREA				
	TOTAL POPULATION[1]	TOTAL EMPLOYMENT[1]	TOTAL EARNINGS[2]	TOTAL GDP[2]	TOTAL PCPI[2]	TOTAL POPULATION[1]	TOTAL EMPLOYMENT[1]	TOTAL EARNINGS[2]	TOTAL GDP[2]	TOTAL PCPI[2]
Historical										
2006	298,380	176,124	18,234	14,548,185	40,266	642	405	18,059	27,352	37,055
2007	301,231	179,886	18,184	14,820,647	41,010	663	418	18,017	27,958	36,279
2008	304,094	179,640	16,995	14,617,100	41,055	677	413	16,815	26,954	34,108
2009	306,772	174,234	16,548	14,320,111	39,376	685	391	16,352	26,116	32,825
2010	309,347	173,035	16,768	14,618,135	39,622	692	385	16,575	26,388	33,093
2011	311,722	176,279	16,534	14,792,276	40,762	700	391	16,348	26,134	33,170
2012	314,112	179,082	16,749	15,116,011	41,713	710	396	16,533	26,409	33,815
2013	316,498	182,390	17,410	15,384,326	41,310	723	407	17,217	27,349	33,955
2014	318,857	185,799	18,142	15,894,995	42,207	737	418	17,948	28,441	34,553
2015	321,545	188,866	18,675	16,302,781	42,928	748	426	18,461	29,278	35,178
Projected										
2016	324,507	191,871	19,184	16,696,645	43,613	759	435	18,971	30,107	35,747
2017	327,505	194,802	19,691	17,088,653	44,290	771	444	19,479	30,934	36,309
2018	330,535	197,685	20,200	17,481,744	44,973	782	452	19,989	31,766	36,874
2019	333,598	200,555	20,714	17,878,105	45,666	794	461	20,504	32,606	37,449
2020	336,690	203,418	21,235	18,278,587	46,375	806	469	21,026	33,458	38,039
2021	339,812	206,284	21,764	18,684,024	47,080	818	478	21,557	34,324	38,627
2022	342,963	209,148	22,300	19,094,025	47,796	831	486	22,095	35,203	39,226
2023	346,140	211,999	22,843	19,507,469	48,506	843	495	22,640	36,094	39,821
2024	349,344	214,840	23,393	19,924,726	49,204	856	504	23,192	36,996	40,408
2025	352,566	217,671	23,950	20,345,969	49,916	868	513	23,751	37,910	41,009

TABLE 3-16 (2 OF 2) HISTORICAL AND PROJECTED SOCIOECONOMIC CHARACTERISTICS

YEAR	UNITED STATES OF AMERICA					BOI AIR TRADE AREA				
	TOTAL POPULATION[1]	TOTAL EMPLOYMENT[1]	TOTAL EARNINGS[2]	TOTAL GDP[2]	TOTAL PCPI[2]	TOTAL POPULATION[1]	TOTAL EMPLOYMENT[1]	TOTAL EARNINGS[2]	TOTAL GDP[2]	TOTAL PCPI[2]
2026	355,802	220,486	24,514	20,770,866	50,611	881	522	24,318	38,837	41,597
2027	359,050	223,284	25,086	21,199,644	51,287	894	530	24,892	39,777	42,169
2028	362,304	226,065	25,666	21,632,335	51,953	907	539	25,475	40,729	42,735
2029	365,568	228,826	26,253	22,068,956	52,609	921	548	26,065	41,695	43,294
2030	368,838	231,564	26,848	22,509,324	53,244	934	557	26,664	42,674	43,836
2031	372,071	234,283	27,451	22,953,624	53,837	947	566	27,270	43,666	44,342
2032	375,265	236,976	28,061	23,401,405	54,418	961	575	27,884	44,671	44,837
2033	378,425	239,641	28,679	23,852,626	54,999	974	584	28,506	45,688	45,331
2034	381,548	242,288	29,305	24,307,766	55,592	987	593	29,136	46,718	45,839
2035	384,635	244,923	29,939	24,767,291	56,219	1,001	602	29,774	47,762	46,376
CAGR										
2015–2020	0.9%	1.5%	2.6%	2.3%	1.6%	1.5%	1.9%	2.6%	2.7%	1.6%
2021–2025	0.9%	1.4%	2.4%	2.2%	1.5%	1.5%	1.8%	2.5%	2.5%	1.5%
2026–2035	0.9%	1.2%	2.2%	2.0%	1.2%	1.4%	1.6%	2.3%	2.3%	1.2%
2015–2035	0.9%	1.3%	2.4%	2.1%	1.4%	1.5%	1.7%	2.4%	2.5%	1.4%

NOTES:
CAGR – Compound Annual Growth Rate
GDP – Gross Domestic Product;
PCPI – Per Capita Personal Income
1 In thousands.
2 In millions of 2009 U.S. Dollars.
3 In 2009 U.S. Dollars.
SOURCE: Woods & Poole Economics, Inc., November 2016.

TABLE 3-17 REGRESSION MODEL OUTPUTS AND FORECAST GROWTH RATES OF PASSENGERS AND PASSENGER REVENUES THROUGH 2035 COMPARED TO FEDERAL AVIATION ADMINISTRATION FORECASTS OF U.S. ENPLANEMENT GROWTH

DEMAND ELEMENT	INDEPENDENT VARIABLE	R-SQUARED (TIMES 100) 1/	DOMESTIC O&D REVENUE GROWTH (2015–2035 CAGR)	ENPLANED PASSENGER GROWTH (2015–2035 CAGR)
BOI Domestic O&D Enplaned Passengers	Boise Air Trade Area Total Employment	70.5	N/A	1.9%
	Boise Air Trade Area Total Earnings	72.2	N/A	2.3%
	Boise Air Trade Area Per Capita Personal Income	79.1	N/A	2.7%
	Boise Air Trade Area Gross Regional Product	70.3	N/A	2.2%
	Average2/		N/A	2.3%
BOI Domestic O&D Passenger Revenue3/	Average2/		4.7%	0.07%–2.70%
U.S. Passenger Enplanements (FAA Aerospace Forecast)				2.2%
U.S. Passenger Enplanements (FAA National Terminal Area Forecast)				1.9%

NOTES:
FAA – Federal Aviation Administration
CAGR – Compound Annual Growth Rate
N/A – Not Applicable
O&D – Origin and Destination

1 Adjusted R-squared values are shown, which adjust for over-fitting. Adjusted R-squared values greater than or equal to 70.0 are generally considered indications of acceptable model fit.
2 Average reflects the CAGR when the forecast results with suitable R-squared values are averaged.
3 Regressions between socioeconomic variables and domestic O&D passenger revenues were conducted to validate the results obtained from the passenger regression analyses, due to recent changes in airline operations in an era of capacity discipline. Forecast enplaned passengers were derived from resulting forecast revenue by analyzing how BOI and peer airports historically capture revenue increases, either through more passengers or higher fares. The range of CAGRs reflects the variance from more revenue growth due to increased fares (low enplaned passenger growth) to more revenue growth due to passenger growth (high enplaned passenger growth). The CAGR from the O&D enplaned passenger regression falls within the range from the revenue regression analyses, providing validation of the passenger forecast from the O&D enplaned passenger regression.

SOURCES: Woods & Poole Economics, Inc., November 2016; Ricondo & Associates, Inc., November 2016 (analysis); Federal Aviation Administration, 2015 Terminal Area Forecast, January 2016; Federal Aviation Administration, Aerospace Forecast Fiscal Years 2016-2036, March 2016.

Airline capacity discipline has resulted in fewer, yet higher, fare-paying passengers, since that business model was introduced during the economic recession. This environment has enabled airlines to improve their financial results by increasing passenger revenues without greatly increasing passenger volumes, as can be seen at BOI for the years from 2011 through 2013 in Exhibit 3-7. To verify the forecast passenger demand derived from regression analyses relating socioeconomic variables and O&D passenger volume demand, socioeconomic regression analysis was undertaken to identify correlational relationships between socioeconomic variables and domestic O&D passenger revenues. Overall, strong relationships between socioeconomic variables and domestic O&D revenue were found; 19 of the 25 analyses resulted in R-squared values of at least 0.70. When comparing the results for O&D passenger volumes and domestic passenger revenue, five of the analyses resulted in R-squared values of at least 0.70 in both the O&D passenger volume and domestic O&D passenger revenue regression analyses.

3.5.2.5 OTHER ASSUMPTIONS

Activity forecasts for the Airport are based on a number of other underlying assumptions of national aviation trends and national and regional economic conditions. In particular:

- The Airport will continue to primarily serve O&D passengers, with no airline developing a base of operations with the goal of serving a combination of O&D and connecting passenger demand.
- Competition with other airports in or near the BOI Air Trade Area is expected to remain stable, with no structural advantages or disadvantages occurring relative to other regional airports.
- Additional airline consolidation/mergers that may occur during the forecast period are not likely to negatively affect numbers of enplaned passengers at the Airport. New airline alliances, should they develop, would be restricted to code-sharing and joint frequent-flyer programs and would not reduce airline competition at the Airport.
- For this analysis, and similar to the FAA's nationwide forecasts, it was assumed that there will be no terrorist incidents during the forecast period that would have significant, negative, and prolonged effects on aviation demand at the Airport or nationwide.
- Economic disturbances will occur during the forecast period, causing year-to-year variations in airline traffic; however, long-term increases in nationwide and Airport traffic are forecast.
- It was assumed that no major "acts of God" that may disrupt the national or global airspace system, such as the 2010 volcanic eruption in Iceland, will occur during the forecast period that would negatively affect aviation demand.

Many of the factors influencing aviation demand cannot be readily quantified, and any forecast is subject to uncertainties; as a result, the forecast process should not be viewed as precise. Actual airline traffic at the Airport may differ from the forecasts presented herein, because events and circumstances may not occur as expected, and these differences may be material.

3.5.3 ENPLANED PASSENGER AND AIRLINE OPERATIONS FORECASTS

Table 3-18 presents historical and forecast enplaned passengers, with a focus on O&D and connecting passenger components. **Table 3-19** presents data on historical and forecast enplaned passengers for mainline airline and regional airline shares. **Table 3-20** presents historical and forecast enplaned passengers along with associated operations, average load factors, and average aircraft seat capacity.

Specific assumptions and points regarding enplaned passenger and passenger airline operations forecasts for the short-term (2016 to 2020), medium-term (2021 to 2025), and long-term (2026 to 2035) periods are discussed in the following subsections.

TABLE 3-18 HISTORICAL AND FORECAST O&D AND CONNECTION PASSENGERS

YEAR	O&D ENPLANED PASSENGERS	O&D PERCENT OF TOTAL[1]	PASSENGER CONNECTIONS	CONNECTION PERCENT OF TOTAL[2]	TOTAL AIRPORT ENPLANED PASSENGERS[3]
Historical					
2006	1,549,297	94.4%	92,526	5.6%	1,641,823
2007	1,603,030	95.4%	77,524	4.6%	1,680,554
2008	1,525,335	96.1%	61,439	3.9%	1,586,774
2009	1,358,401	97.2%	39,371	2.8%	1,397,772
2010	1,364,567	97.2%	39,722	2.8%	1,404,289
2011	1,356,660	97.5%	35,353	2.5%	1,392,013
2012	1,280,657	98.1%	24,924	1.9%	1,305,581
2013	1,290,537	98.5%	19,252	1.5%	1,309,789
2014	1,357,936	98.6%	19,571	1.4%	1,377,507
2015	1,460,651	97.9%	31,407	2.1%	1,492,058
Forecast					
2016	1,581,940	97.7%	37,888	2.3%	1,619,828
2017	1,647,146	97.7%	39,450	2.3%	1,686,596
2018	1,682,409	97.7%	40,294	2.3%	1,722,703
2019	1,718,076	97.7%	41,149	2.3%	1,759,225
2020	1,754,331	97.7%	42,017	2.3%	1,796,348
2021	1,790,850	97.7%	42,892	2.3%	1,833,742
2022	1,827,949	97.7%	43,780	2.3%	1,871,729
2023	1,865,198	97.7%	44,672	2.3%	1,909,870
2024	1,902,537	97.7%	45,566	2.3%	1,948,103
2025	1,940,465	97.7%	46,475	2.3%	1,986,940
2026	1,978,387	97.7%	47,383	2.3%	2,025,770
2027	2,016,236	97.7%	48,290	2.3%	2,064,526
2028	2,054,232	97.7%	49,200	2.3%	2,103,432
2029	2,092,384	97.7%	50,113	2.3%	2,142,497
2030	2,130,411	97.7%	51,024	2.3%	2,181,435
2031	2,167,967	97.7%	51,924	2.3%	2,219,891
2032	2,205,521	97.7%	52,823	2.3%	2,258,344
2033	2,243,355	97.7%	53,729	2.3%	2,297,084
2034	2,281,723	97.7%	54,648	2.3%	2,336,371
2035	2,321,091	97.7%	55,591	2.3%	2,376,682
CAGR					
2006–2015	(0.65%)		(11.31%)		(1.06%)
2015–2017	6.20%		12.08%		6.32%
2017–2020	2.12%		2.12%		2.12%
2021–2025	2.03%		2.03%		2.03%
2026–2035	1.79%		1.79%		1.79%
2015–2035	2.34%		2.90%		2.36%

NOTES: CAGR – Compound Annual Growth Rate; O&D – Origin and Destination; Passenger totals do not include nonrevenue passengers.

1 Forecast O&D passenger share is the average of the O&D passenger share at the Airport in 2015 and the four quarters ending Q2 2016.

2 Forecast connecting passenger share is the average of the connecting passenger share at the Airport in 2015 and the four quarters ending Q2 2016, the latest 12-month period for which data are available.

3 The short-term enplaned passenger forecast (2016–2020) includes considerations of route announcements and fleet announcements. The long-term enplaned passenger forecast (2020–2035) is based on the results of socioeconomic regression analyses.

SOURCES: City of Boise Aviation Department, Traffic Reports, November 2016; U.S. Department of Transportation, DB1B Survey, November 2016; Ricondo & Associates, Inc., November 2016 (forecast).

TABLE 3-19 HISTORICAL AND FORECAST MAINLINE AND REGIONAL AIRLINE ENPLANED PASSENGERS

YEAR	MAINLINE PASSENGERS	MAINLINE SHARE OF TOTAL[1]	REGIONAL AIRLINE PASSENGERS	REGIONAL SHARE OF TOTAL[2]	TOTAL AIRLINE ENPLANED PASSENGERS[3]
Historical					
2006	912,794	55.6%	729,029	44.4%	1,641,823
2007	916,524	54.5%	764,030	45.5%	1,680,554
2008	888,797	56.0%	697,977	44.0%	1,586,774
2009	744,246	53.2%	653,526	46.8%	1,397,772
2010	769,185	54.8%	635,104	45.2%	1,404,289
2011	811,851	58.3%	580,162	41.7%	1,392,013
2012	721,383	55.3%	584,198	44.7%	1,305,581
2013	695,534	53.1%	614,255	46.9%	1,309,789
2014	718,046	52.1%	659,461	47.9%	1,377,507
2015	691,381	46.3%	800,677	53.7%	1,492,058
Forecast					
2016	764,687	47.2%	855,141	52.8%	1,619,828
2017	810,887	48.1%	875,709	51.9%	1,686,596
2018	843,242	48.9%	879,461	51.1%	1,722,703
2019	876,432	49.8%	882,793	50.2%	1,759,225
2020	910,563	50.7%	885,785	49.3%	1,796,348
2021	934,505	51.0%	899,237	49.0%	1,833,742
2022	958,956	51.2%	912,773	48.8%	1,871,729
2023	983,691	51.5%	926,179	48.5%	1,909,870
2024	1,008,683	51.8%	939,420	48.2%	1,948,103
2025	1,034,196	52.0%	952,744	48.0%	1,986,940
2026	1,059,917	52.3%	965,853	47.7%	2,025,770
2027	1,085,811	52.6%	978,715	47.4%	2,064,526
2028	1,111,994	52.9%	991,438	47.1%	2,103,432
2029	1,138,474	53.1%	1,004,023	46.9%	2,142,497
2030	1,165,098	53.4%	1,016,337	46.6%	2,181,435
2031	1,191,675	53.7%	1,028,216	46.3%	2,219,891
2032	1,218,461	54.0%	1,039,883	46.0%	2,258,344
2033	1,245,610	54.2%	1,051,474	45.8%	2,297,084
2034	1,273,269	54.5%	1,063,102	45.5%	2,336,371
2035	1,301,702	54.8%	1,074,980	45.2%	2,376,682
CAGR					
2006–2015	(3.04%)		1.05%		(1.06%)
2017–2020	5.66%		2.04%		3.78%
2021–2025	2.57%		1.46%		2.03%
2026–2035	2.31%		1.20%		1.79%
2015–2035	3.21%		1.48%		2.36%

NOTES: CAGR – Compound Annual Growth Rate; Passenger totals do not include nonrevenue passengers. Charter service is included in the regional airline category.

1 Mainline enplaned passengers are passengers on flights operated by major carriers' main operating unit, typically on larger aircraft (more than 76 seats). The mainline passenger share of the total is based on the fleet mix forecast and industry-wide trends toward larger aircraft and more mainline operations.

2 Regional enplaned passengers are passengers on flights operated by major carriers' regional partners, typically on smaller aircraft (76 seats or fewer). The regional enplaned passenger share of the total is based on the fleet mix forecast and industry-wide trends toward larger aircraft and fewer regional operations.

3 The short-term enplaned passenger forecast (2016–2020) includes considerations of route announcements and fleet announcements. The long-term enplaned passenger forecast (2020–2035) is based on the results of socioeconomic regression analyses.

SOURCES: City of Boise Aviation Department, Traffic Reports, November 2016; U.S. Department of Transportation, T-100, November 2016; Ricondo & Associates, Inc., November 2016 (forecast).

TABLE 3-20 HISTORICAL AND FORECAST PASSENGER AIRLINE OPERATIONS

YEAR	ENPLANED PASSENGERS	GROWTH	AVERAGE LOAD FACTOR[1]	AVERAGE SEATS PER DEPARTURE[2]	PASSENGER AIRLINE OPERATIONS	GROWTH
Historical						
2006	1,641,823		73.3%	83.6	58,264	
2007	1,680,554	2.4%	71.9%	87.2	57,844	(0.7%)
2008	1,586,774	(5.6%)	69.4%	93.2	51,928	(10.2%)
2009	1,397,772	(11.9%)	71.3%	95.0	44,199	(14.9%)
2010	1,404,289	0.5%	73.4%	95.8	42,029	(4.9%)
2011	1,392,013	(0.9%)	75.4%	94.3	41,243	(1.9%)
2012	1,305,581	(6.2%)	80.1%	95.3	35,081	(14.9%)
2013	1,309,789	0.3%	79.9%	95.1	35,311	0.7%
2014	1,377,507	5.2%	78.3%	95.0	37,391	5.9%
2015	1,492,058	8.3%	80.4%	92.8	40,607	8.6%
Forecast						
2016	1,619,828	8.6%	79.9%	93.0	44,144	8.7%
2017	1,686,596	4.1%	81.8%	94.0	44,880	1.7%
2018	1,722,703	2.1%	81.0%	94.6	44,841	(0.1%)
2019	1,759,225	2.1%	81.0%	95.2	45,487	1.4%
2020	1,796,348	2.1%	81.0%	95.9	46,140	1.4%
2021	1,833,742	2.1%	81.0%	96.5	46,791	1.4%
2022	1,871,729	2.1%	81.0%	97.1	47,448	1.4%
2023	1,909,870	2.0%	81.0%	97.8	48,101	1.4%
2024	1,948,103	2.0%	81.0%	98.4	48,748	1.3%
2025	1,986,940	2.0%	81.0%	99.0	49,402	1.3%
2026	2,025,770	2.0%	81.5%	99.7	49,736	0.7%
2027	2,064,526	1.9%	81.5%	100.3	50,367	1.3%
2028	2,103,432	1.9%	81.5%	100.9	50,994	1.2%
2029	2,142,497	1.9%	81.5%	101.6	51,616	1.2%
2030	2,181,435	1.8%	81.5%	102.2	52,229	1.2%
2031	2,219,891	1.8%	81.5%	102.5	53,010	1.5%
2032	2,258,344	1.7%	81.5%	103.5	53,394	0.7%
2033	2,297,084	1.7%	81.5%	104.5	53,773	0.7%
2034	2,336,371	1.7%	81.5%	105.6	54,151	0.7%
2035	2,376,682	1.7%	81.5%	106.6	54,540	0.7%
CAGR						
2006–2015	(1.06%)			1.17%	(3.93%)	
2015–2020	3.78%			0.65%	2.59%	
2021–2025	2.03%			0.65%	1.37%	
2026–2035	1.79%			0.75%	1.03%	
2015–2035	2.36%			0.70%	1.49%	

NOTES:
CAGR – Compound Annual Growth Rate
Includes nonscheduled (charter) service. Passenger totals do not include nonrevenue passengers.
1 Load factor accounts for through passengers.
2 Average seats per departure are based on fleet mix projections, determined by the operating characteristics and aircraft orders of airlines operating at the Airport, and forecast passenger demand influences on aircraft size.
SOURCES: City of Boise Aviation Department, Traffic Reports, November 2016; U.S. Department of Transportation, T-100, November 2016; Innovata, November 2016; Ricondo & Associates, Inc., November 2016 (forecast).

3.5.3.1 FORECAST ENPLANED PASSENGERS AND AIRLINE OPERATIONS (2016–2020)

Enplaned passengers are forecast to grow an average of 6.3 percent annually between 2015 (the base year) and 2017, from 1,492,058 to 1,686,596 passengers. Between 2017 and 2020, the strong growth in enplaned passengers is forecast to slow to an average of 2.1 percent annually to a total 1,796,348 in 2020. Unlike passenger growth, operations are forecast to grow at a steadier rate. Between 2015 and 2020, passenger airline operations are forecast to grow an average of 2.6 percent annually, from 40,607 to 46,140 total operations.

Throughout the short-term period, passenger growth is forecast to be accommodated primarily through increased aircraft size. Average seat capacity is expected to grow for scheduled passenger airlines as they replace regional jet aircraft with small narrowbody aircraft on routes with sufficient demand, leading to an expected increase in overall average seat capacity from 92.8 seats per departure to 95.9 seats per departure.

Load factors are forecast to remain generally constant at approximately 81.0 percent. In the short-term period, the distribution of enplaned passengers served by mainline and regional airlines is forecast to change minimally, as the regional airlines' share declines from 53.7 percent in 2015 to 49.3 percent in 2020, due to an expected increase in mainline operations by United Airlines and Delta Air Lines to their major hubs.

3.5.3.2 FORECAST ENPLANED PASSENGERS AND AIRLINE OPERATIONS (2021–2025)

Enplaned passengers for the period from 2021 through 2025 are forecast to grow at an average annual rate of 2.0 percent per year, from 1,833,742 in 2021 to 1,986,940 in 2025. Associated passenger airline operations are forecast to grow by an average of 1.4 percent annually for the period, from 46,791 in 2021 to 49,402 in 2025.

Passenger growth in the medium-term period is forecast to be accommodated by growth in both passenger operations and average aircraft size. Similar to the short-term period, average load factors are expected to remain at approximately 81.0 percent. Average aircraft seats per departure are forecast to grow from 96.5 in 2021 to 99.0 in 2025 as airlines continue to replace regional jets with larger regional jets and small narrowbody aircraft.

3.5.3.3 FORECAST ENPLANED PASSENGERS AND AIRLINE OPERATIONS (2026–2035)

Enplaned passengers for the long-term period are forecast to grow at an average annual rate of 1.8 percent per year, from 2,025,770 in 2026 to 2,376,682 in 2035. Associated passenger airline operations are forecast to increase by 1.0 percent annually for the period, from 49,736 in 2026 to 54,540 in 2035.

Passenger growth in the long-term period is forecast to be accommodated mostly by increased average aircraft size as airlines transition to use the largest aircraft in their fleet that can be supported on each route. Average aircraft seat capacity is forecast to grow from 99.7 in 2026 to 106.6 in 2035. Overall, the forecast proportion of operations on aircraft with at least 101 seats is expected to be approximately 34 percent in 2035, up from approximately 27 percent in 2015. Similar to the short- and medium-term periods, average load factors are forecast to remain constant between 81.0 and 81.5 percent, as airlines are not expected to add capacity beyond the demand in the market. For the period from 2015 to 2035, enplaned passengers are forecast to increase at a CAGR of 2.36 percent, while airline operations are forecast to increase at a CAGR of 1.49 percent.

3.5.4 CRITICAL AIRCRAFT

The FAA's current Standard Operating Procedure (SOP) for the FAA Review and Approval of Airport Layout Plans (ALPs) defines the critical aircraft as ". . . the most demanding aircraft type, or grouping of aircraft with similar characteristics."[24] Federally funded projects require that the critical aircraft will make regular use of the airport in the planning period. Regular use means 500 or more annual itinerant operations or scheduled service.

Based on current operations at the Airport, the existing critical aircraft is the Airbus A300 series of jets. FedEx and UPS operate Airbus A300-600 freight aircraft at the Airport, and there were a total of 1,638 operations with this aircraft in 2015.[25] The Airbus A300 series of jets is classified as a D-IV, according to the FAA's Airplane Design Group (ADG) classifications. Based on the outer-to-outer main gear width (MGW) and cockpit-to-main-gear distance (CMG), the Taxiway Design Group (TDG) of the Airbus A300 series is TDG 5.[26]

Based on the projected fleet mix for the Airport, the future ADG and TDG, through 2035, are projected to remain ADG IV and TDG 5, comprised of a mix of Airbus A300-600 and Boeing 767-300F aircraft.

3.5.5 AIRCRAFT RESCUE AND FIREFIGHTING INDEX

According to Title 14 Code of Federal Regulations (CFR) 139.315, an airport Aircraft Rescue and Firefighting (ARFF) Index is determined by a combination of two factors, passenger aircraft length and average daily departures. If there are at least five average daily departures of the longest passenger aircraft serving an airport, then the ARFF Index of that aircraft is the airport's ARFF index. Otherwise, the ARFF Index is the next lower ARFF Index. The ARFF Indexes by aircraft length are as follows:

- Index A: aircraft length of fewer than 90 feet
- Index B: aircraft length of at least 90 feet but fewer than 126 feet
- Index C: aircraft length of at least 126 feet but fewer than 159 feet
- Index D: aircraft length of at least 159 feet but fewer than 200 feet
- Index E: aircraft length of at least 200 feet

The passenger aircraft with the highest ARFF Index serving the Airport is the Boeing 777-200, which operated one departure in both 2015 and 2016 according to FAA Traffic Flow Management System Counts (TFMSC) data and is an Index D aircraft. The current Airport ARFF Index is C, which is the ARFF Index of the Boeing 737 and Airbus A320 families of aircraft. Index C passenger aircraft account for more than 16 average daily departures at the Airport.

Based on the projected fleet mix for passenger operations at the Airport, the future ARFF Index is expected to remain Index C through 2035.

3.6 CARGO VOLUMES AND ALL-CARGO OPERATIONS FORECAST

The forecast of cargo volume was developed using socioeconomic regression analysis. Regression analysis was conducted to evaluate the relationship between total cargo volumes at the Airport and local (BOI Air Trade Area) and national (U.S.) socioeconomic variables. Three of the regressions between the socioeconomic variables and the total cargo volumes exhibited R-squared values greater than 0.70. These results were combined to develop the forecast average annual growth rate of total cargo volumes at BOI of 2.2 percent from 2015 through 2035.

[24] Federal Aviation Administration, Advisory Circular 150/5000-XX (Draft), September 2015.

[25] United States Department of Transportation, T-100, November 2016.

[26] Federal Aviation Administration, Advisory Circular 150-5300-13A, *Airport Design*, February 2014.

All-cargo operations at BOI were forecast assuming the average cargo volume per operation and the all-cargo portion of cargo volumes would remain constant throughout the forecast period. As provided in **Table 3-21**, total annual cargo volumes are forecast to grow from approximately 89.83 million pounds in 2015 to approximately 137.50 million pounds in 2035, a CAGR of 2.2 percent. Annual all-cargo operations are forecast to grow from 5,312 in 2015 to 7,541 in 2035, a CAGR of 1.8 percent. Currently, all-cargo airlines operate a combination of small widebody and narrowbody aircraft at the Airport, primarily the Airbus A300-600, Boeing 767-300F, and Boeing 757-200F. It is not expected that the size of the aircraft used by all-cargo airlines will change during the forecast period. However, specific aircraft may vary depending on future fleet configuration of the all-cargo airlines operating at the Airport.

3.7 OTHER AIRCRAFT OPERATIONS FORECASTS

This section describes forecasts of growth in operations for non-passenger and non-cargo airline elements, including GA, other air taxi, and military operations.

3.7.1 GENERAL AVIATION FORECAST

GA operations were forecast based upon the historical relationships between operations at the Airport and nationally, as well as the projected growth in GA hours flown from the FAA Aerospace Forecast for the United States for fiscal years 2016 to 2036. The forecast for GA hours flown was used as a proxy for GA operations, and operations of each aircraft type—piston, turbine, jet, and other—were forecast using their respective growth rates in the national forecast. While national trends in GA were adjusted based on local conditions and the historical relationship between national and local activity, the forecast of GA operations is unconstrained and does not directly consider actions or activity at nearby GA airports and any potential effects on GA activity at BOI. This produced a forecast 1.5 percent CAGR for total GA operations through the forecast period. Historical and forecast itinerant and local GA operations are presented in **Table 3-22**.

3.7.1.1 GENERAL AVIATION BASED AIRCRAFT PROJECTION

GA based aircraft at the Airport were projected using a combination of techniques. First, the historical relationships between based aircraft of each type (e.g., single-engine piston, multi-engine piston, jet) at the Airport and nationally were determined. Using these relationships and the projected growth in active GA aircraft from the FAA Aerospace Forecast for the United States for fiscal years 2016 to 2036, five different aircraft types—single-engine piston, multi-engine piston, jet, helicopter, and other—were projected. Active GA aircraft were used as a proxy for national based aircraft.

The second technique relied on the operations per based aircraft, as forecast in the 2016 TAF for the Airport. The total forecast operations were divided by the operations per based aircraft for each aircraft type forecast in the FAA TAF. In the third technique, based aircraft were projected for each aircraft type using the growth rates for active GA aircraft in the FAA Aerospace Forecast, with no adjustment for the historical relationship between local and national growth rates. The results from the three techniques were averaged to develop the projections for GA based aircraft, which are presented in **Table 3-23**.

TABLE 3-21 CARGO VOLUMES AND ALL-CARGO OPERATIONS

YEAR	TOTAL CARGO VOLUME (POUNDS)[1]	CARGO VOLUME GROWTH	ALL-CARGO OPERATIONS[2]	ALL CARGO OPERATIONS GROWTH
Historical				
2006	96,212,705		7,649	
2007	93,859,842	(2.4%)	6,404	(16.3%)
2008	86,392,072	(8.0%)	5,280	(17.6%)
2009	74,411,696	(13.9%)	4,740	(10.2%)
2010	80,030,258	7.6%	4,938	4.2%
2011	82,901,538	3.6%	4,342	(12.1%)
2012	86,329,043	4.1%	4,720	8.7%
2013	88,939,731	3.0%	5,304	12.4%
2014	90,176,977	1.4%	4,510	(15.0%)
2015	89,828,314	(0.4%)	5,312	17.8%
Forecast				
2016	92,838,363	3.4%	5,092	(4.1%)
2017	95,198,132	2.5%	5,221	2.5%
2018	97,576,961	2.5%	5,352	2.5%
2019	99,995,710	2.5%	5,484	2.5%
2020	102,476,040	2.5%	5,620	2.5%
2021	104,944,455	2.4%	5,756	2.4%
2022	107,465,047	2.4%	5,894	2.4%
2023	109,966,964	2.3%	6,031	2.3%
2024	112,433,790	2.2%	6,166	2.2%
2025	114,958,791	2.2%	6,305	2.2%
2026	117,431,585	2.2%	6,440	2.2%
2027	119,836,439	2.0%	6,572	2.0%
2028	122,214,305	2.0%	6,703	2.0%
2029	124,564,843	1.9%	6,832	1.9%
2030	126,837,704	1.8%	6,956	1.8%
2031	128,963,694	1.7%	7,073	1.7%
2032	131,039,691	1.6%	7,187	1.6%
2033	133,118,887	1.6%	7,301	1.6%
2034	135,246,531	1.6%	7,417	1.6%
2035	137,504,056	1.7%	7,541	1.7%
CAGR				
2006–2015	(0.8%)		(4.0%)	
2015–2020	2.7%		1.1%	
2021–2025	2.3%		2.3%	
2026–2035	1.8%		1.8%	
2015–2035	2.2%		1.8%	

NOTES:
CAGR – Compound Annual Growth Rate
1 Includes both belly cargo and all-cargo carrier volumes.
2 All-cargo operations only. Forecast all-cargo operations assume total cargo volumes per all-cargo operations remain at 2015 levels.
SOURCES: City of Boise Aviation Department, Traffic Reports, November 2016; U.S. Department of Transportation, T-100, November 2016; Innovata, November 2016; Ricondo & Associates, Inc., November 2016 (forecast).

TABLE 3-22 HISTORICAL AND FORECAST GENERAL AVIATION ITINERANT AND LOCAL OPERATIONS

YEAR	GENERAL AVIATION ITINERANT	ITINERANT SHARE[1]	GENERAL AVIATION LOCAL	LOCAL SHARE[2]	TOTAL GENERAL AVIATION OPERATIONS[3]
Historical					
2006	61,536	68.0%	28,933	32.0%	90,469
2007	63,845	67.0%	31,419	33.0%	95,264
2008	47,574	71.7%	18,735	28.3%	66,309
2009	40,381	67.0%	19,855	33.0%	60,236
2010	37,095	64.6%	20,368	35.4%	57,463
2011	37,156	64.4%	20,532	35.6%	57,688
2012	38,307	66.8%	19,043	33.2%	57,350
2013	39,063	68.1%	18,262	31.9%	57,325
2014	39,783	60.7%	25,801	39.3%	65,584
2015	39,676	61.6%	24,772	38.4%	64,448
Forecast					
2016	39,506	61.1%	25,140	38.9%	64,646
2017	39,814	61.1%	25,336	38.9%	65,150
2018	40,178	61.1%	25,567	38.9%	65,745
2019	40,593	61.1%	25,832	38.9%	66,425
2020	41,026	61.1%	26,107	38.9%	67,133
2021	41,521	61.1%	26,423	38.9%	67,944
2022	42,014	61.1%	26,736	38.9%	68,750
2023	42,545	61.1%	27,075	38.9%	69,620
2024	43,121	61.1%	27,441	38.9%	70,562
2025	43,752	61.1%	27,842	38.9%	71,594
2026	44,469	61.1%	28,298	38.9%	72,767
2027	45,236	61.1%	28,787	38.9%	74,023
2028	46,023	61.1%	29,287	38.9%	75,310
2029	46,881	61.1%	29,834	38.9%	76,715
2030	47,802	61.1%	30,420	38.9%	78,222
2031	48,765	61.1%	31,033	38.9%	79,798
2032	49,746	61.1%	31,656	38.9%	81,402
2033	50,772	61.1%	32,309	38.9%	83,081
2034	51,818	61.1%	32,975	38.9%	84,793
2035	52,980	61.1%	33,714	38.9%	86,694
CAGR					
2006–2015	(4.8%)		(1.7%)		(3.7%)
2015–2020	0.7%		1.1%		0.8%
2021–2025	1.3%		1.3%		1.3%
2026–2035	2.0%		2.0%		2.0%
2015–2035	1.5%		1.6%		1.5%

NOTES:
CAGR – Compound Annual Growth Rate
1 The forecast itinerant share of general aviation operations is based on the average itinerant share of general aviation operations in 2014 and 2015.
2 The forecast local share of general aviation operations is based on the average local share of general aviation operations in 2014 and 2015.
3 The forecast of total general aviation operations is based on the forecast of general aviation hours flown in the Federal Aviation Administration Aerospace Forecast for fiscal years 2016 to 2036, with adjustments to local conditions. Growth rates vary by general aviation aircraft type according to the national forecast and local conditions.

SOURCES: Federal Aviation Administration, OPSNET, November 2016; Federal Aviation Administration, Traffic Flow Management System Counts (TFMSC), November 2016; Federal Aviation Administration, *Aerospace Forecast Fiscal Years 2016-2036*, March 2016; Ricondo & Associates, Inc., November 2016 (forecast).

TABLE 3-23 HISTORICAL AND PROJECTED GENERAL AVIATION BASED AIRCRAFT

YEAR	SINGLE-ENGINE PISTON	MULTI-ENGINE PISTON	JET	HELICOPTER	OTHER[1]	TOTAL BASED AIRCRAFT
Historical						
2006	139	31	19	21	47	257
2007	166	29	19	27	45	286
2008	129	29	12	24	46	240
2009	166	38	21	20	46	291
2010	123	31	10	24	0	188
2011	150	31	22	17	0	220
2012	146	31	21	17	27	242
2013	140	29	36	17	42	264
2014	140	29	36	17	42	264
2015	140	29	36	17	0	222
Forecast						
2016	140	29	36	17	0	222
2017	140	29	37	18	0	224
2018	141	29	38	18	0	226
2019	142	29	39	19	0	229
2020	143	30	40	19	0	232
2021	143	30	41	20	0	234
2022	144	30	41	20	0	235
2023	145	30	43	21	0	239
2024	146	30	43	21	0	240
2025	147	30	44	22	0	243
2026	149	31	46	23	0	249
2027	150	31	47	23	0	251
2028	151	31	48	24	0	254
2029	153	32	50	25	0	260
2030	154	32	51	25	0	262
2031	156	32	52	26	0	266
2032	158	33	54	27	0	272
2033	160	33	55	28	0	276
2034	162	33	57	29	0	281
2035	164	34	59	30	0	287
CAGR						
2006–2015	0.1%	(0.7%)	7.4%	(2.3%)	(100.0%)	(1.6%)
2015–2020	0.4%	0.5%	2.0%	2.6%	0.0%	0.9%
2021–2025	0.7%	0.6%	2.3%	2.5%	0.0%	0.9%
2026–2035	1.1%	1.0%	2.8%	3.0%	0.0%	1.6%
2015–2035	0.8%	0.8%	2.5%	2.8%	0.0%	1.3%

NOTES: CAGR – Compound Annual Growth Rate. The projection of general aviation (GA) based aircraft is based on the projection of GA active aircraft in the Federal Aviation Administration (FAA) Aerospace Forecast (TAF) for fiscal years 2016 to 2036, as well as the FAA 2016 TAF for BOI, with adjustments to local conditions.

1 Historically, "Other" aircraft at the Airport, as reported in the FAA TAF, may include military aircraft, gliders, ultra-light aircraft, or any other aircraft not accounted for by other categories of based aircraft. For purposes of this forecast, based military aircraft are not projected since any military aircraft based at the Airport in the future would be based at the Air National Guard base and would not affect non-military facility requirements at the Airport. As of the time this forecast was conducted, there has been no indication of a change in military mission that would result in a change in military aircraft based aircraft at the Airport.

SOURCES: City of Boise Aviation Department, Traffic Reports, November 2016; U.S. Department of Transportation, T-100, November 2016; Federal Aviation Administration, OPSNET, November 2016; Federal Aviation Administration, *Aerospace Forecast: Fiscal Years 2016-2036*, Federal Aviation Administration, 2016 Terminal Area Forecast, January 2017; 2016; Ricondo & Associates, Inc., January 2017 (forecast).

Total GA based aircraft are projected to increase at a CAGR of 1.3 percent over the period, from 222 in 2015 to 287 in 2035. Consistent with national trends, the greatest growth is expected for jet aircraft, which are expected to increase at a CAGR of 2.5 percent over the 20-year period. Helicopters are also expected to grow at a high rate, similar to the expected national growth rate, increasing at a CAGR of 2.8 percent.

3.7.2 OTHER AIR TAXI OPERATIONS FORECAST

Other air taxi operations (non-scheduled passenger airline operations in aircraft with 60 or fewer seats and cargo operations with a payload of 18,000 pounds or fewer) were forecast by determining the historical proportion of air taxi and air carrier operations at the Airport composed of other air taxi operations. Exponential regression analysis was then used, with the year as the independent variable, and the resultant relationship was applied to future years to determine the forecast other air taxi operations at the Airport.

3.7.3 MILITARY OPERATIONS FORECAST

As of the time this forecast was conducted, there has been no indication of a change in military mission that would result in a change in military operations; military operations at the Airport were forecast to remain constant at their 2015 levels, which is consistent with the approach in the 2016 FAA TAF for the Airport. Further details on military operations at the Airport can be found in the Boise Airport 14 CFR Part 150 Study Update.[27]

3.7.4 SUMMARY OF TOTAL OPERATIONS FORECAST

Historical and forecast aircraft operations at the Airport are presented in **Table 3-24**. Operations across all aircraft categories are forecast to grow by an average of 1.4 percent annually over the forecast period, through 2035. After an initial period of average annual growth of 1.5 percent from 2015 through 2020, primarily due to increased passenger airline operations, growth is more heavily weighted in the longer term. This is primarily due to passenger airline operations and GA operations growth. Passenger airlines are expected to accommodate increased demand through increased operations in the short term, though they are expected to increase the size of aircraft used at the Airport in the long term. GA operations are expected to grow fastest for turbine aircraft at the Airport, consistent with national trends and the historical evolution of GA operations at the Airport.

3.7.5 AIRCRAFT OPERATIONS FLEET MIX

Table 3-25 presents BOI's historical (2015) and forecast aircraft operations fleet mix. Through 2020, it is expected that aircraft having 100 or fewer seats will comprise approximately 71 percent of total passenger airline operations, similar to the approximately 72 percent share of operations in 2015. Operations in aircraft with between 51 and 76 seats are expected to decline from approximately 65 percent in 2015 to about 64 percent in 2020, as mainline airlines replace regional jet operations with small narrowbody operations and the smaller regional airlines at the Airport continue to use aircraft with 50 or fewer seats.[28]

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[27] The Boise Airport 14 CFR Part 150 Study Update can be found online at https://www.iflyboise.com/media/1148/cfr-part150-studyupdate1.pdf.

[28] Aircraft with fewer than 50 seats are expected to continue to operate at the Airport even as commercial-service airlines replace small regional jets with larger regional jets or narrowbody aircraft, as many of the operations at the Airport using aircraft with 50 or fewer seats are small turboprop aircraft operating backcountry air service that is not expected to be served using aircraft with more than 50 seats in the future.

TABLE 3-24 HISTORICAL AND FORECAST AIRCRAFT OPERATIONS

YEAR	PASSENGER AIRLINES	ALL-CARGO	GENERAL AVIATION	OTHER AIR TAXI[1]	LOCAL MILITARY[2]	ITINERANT MILITARY[2]	TOTAL OPERATIONS
Historical							
2006	58,264	7,649	90,469	9,228	4,235	9,125	178,970
2007	57,844	6,404	95,264	10,128	3,252	9,053	181,945
2008	51,928	5,280	66,309	9,756	2,986	8,958	145,217
2009	44,199	4,740	60,236	6,392	4,595	8,842	129,004
2010	42,029	4,938	57,463	6,322	2,690	8,519	121,961
2011	41,243	4,342	57,688	6,589	3,098	8,850	121,810
2012	35,081	4,720	57,350	5,751	2,103	7,764	112,769
2013	35,311	5,304	57,325	5,199	2,307	9,110	114,556
2014	37,391	4,510	65,584	5,328	5,898	8,841	127,552
2015	40,607	5,312	64,448	5,258	6,302	10,047	131,974
Forecast							
2016	44,144	5,092	64,646	6,269	6,302	10,047	136,500
2017	44,880	5,221	65,150	6,379	6,302	10,047	137,979
2018	44,841	5,352	65,745	6,390	6,302	10,047	138,677
2019	45,487	5,484	66,425	6,490	6,302	10,047	140,235
2020	46,140	5,620	67,133	6,590	6,302	10,047	141,832
2021	46,791	5,756	67,944	6,690	6,302	10,047	143,530
2022	47,448	5,894	68,750	6,791	6,302	10,047	145,232
2023	48,101	6,031	69,620	6,892	6,302	10,047	146,993
2024	48,748	6,166	70,562	6,992	6,302	10,047	148,817
2025	49,402	6,305	71,594	7,092	6,302	10,047	150,742
2026	49,736	6,440	72,767	7,152	6,302	10,047	152,444
2027	50,367	6,572	74,023	7,249	6,302	10,047	154,560
2028	50,994	6,703	75,310	7,346	6,302	10,047	156,702
2029	51,616	6,832	76,715	7,442	6,302	10,047	158,954
2030	52,229	6,956	78,222	7,535	6,302	10,047	161,291
2031	53,010	7,073	79,798	7,650	6,302	10,047	163,880
2032	53,394	7,187	81,402	7,713	6,302	10,047	166,045
2033	53,773	7,301	83,081	7,776	6,302	10,047	168,280
2034	54,151	7,417	84,793	7,839	6,302	10,047	170,549
2035	54,540	7,541	86,694	7,904	6,302	10,047	173,028
CAGR							
2006–2015	(3.9%)	(4.0%)	(3.7%)	(6.1%)	4.5%	1.1%	(3.3%)
2015–2020	2.6%	1.1%	0.8%	4.6%	0.0%	0.0%	1.5%
2021–2025	1.4%	2.3%	1.3%	1.5%	0.0%	0.0%	1.2%
2026–2035	1.0%	1.8%	2.0%	1.1%	0.0%	0.0%	1.4%
2015–2035	1.5%	1.8%	1.5%	2.1%	0.0%	0.0%	1.4%

NOTES: CAGR – Compound Annual Growth Rate

1 Other air taxi operations are operations on passenger aircraft with fewer than 60 seats or cargo aircraft with a payload of fewer than 18,000 pounds and include charter and other non-scheduled passenger and cargo operations.

2 Forecast military operations are held constant at 2015 levels, consistent with the approach in the Federal Aviation Administration Terminal Area Forecast for the Airport. Historical itinerant and local military operations are from FAA Operations Network data for the Airport. There is no indication that the current military mission at the Airport will change and, therefore, no justification for increasing/decreasing the number/type of future military aircraft operations for this forecast.

SOURCES: City of Boise Aviation Department, Traffic Reports, November 2016; U.S. Department of Transportation, T-100, November 2016; Federal Aviation Administration, OPSNET, November 2016; Federal Aviation Administration, Traffic Flow Management System Counts (TFMSC), November 2016; Federal Aviation Administration, Aerospace Forecast Fiscal Years 2016-2036, March 2016; Ricondo & Associates, Inc., November 2016 (forecast).

TABLE 3-25 HISTORICAL AND FORECAST OPERATIONS FLEET MIX

AIRCRAFT CATEGORY	SEAT RANGE	REPRESENTATIVE AIRCRAFT [1/]	2015 OPS	2015 SHARE	2016 OPS	2016 SHARE	2020 OPS	2020 SHARE	2025 OPS	2025 SHARE	2035 OPS	2035 SHARE
Passenger [2/]												
Small Piston/ Turboprop/Regional Jet	<51	CRJ2	3,004	7%	3,208	7%	3,112	7%	3,008	6%	2,003	4%
Medium Regional Jet/Turboprop [3/]	51-76	DH8D, E170, CRJ7	26,457	65%	28,667	65%	29,570	64%	31,134	63%	33,815	62%
Large Regional Jet/Turboprop	77-100	E190	27	0%	29	0%	31	0%	34	0%	36	0%
Small Narrowbody	101-130	A319	2,382	6%	2,612	6%	2,824	6%	3,150	6%	3,756	7%
Medium Narrowbody	131-150	B737, A320	6,955	17%	7,583	17%	8,015	17%	8,702	18%	9,872	18%
Large Narrowbody/ Widebody	151+	MD83, B739	1,782	4%	2,045	5%	2,588	6%	3,374	7%	5,058	9%
Subtotal			40,607	100%	44,144	100%	46,140	100%	49,402	100%	54,540	100%
Cargo [4/]												
Small Piston/Turboprop		C206, C402, SW4	1,256	24%	1,204	24%	1,329	24%	1,491	24%	1,783	24%
Narrowbody		B733, B752	2,410	45%	2,311	45%	2,550	45%	2,861	45%	3,422	45%
Widebody		A306, A310	1,646	31%	1,577	31%	1,741	31%	1,953	31%	2,336	31%
Subtotal			5,312	100%	5,092	100%	5,620	100%	6,305	100%	7,541	100%
General Aviation/ Other Air Taxi [5/]												
Single Engine		PC12, C210, P28A	36,391	52%	36,571	52%	36,148	49%	36,629	47%	36,399	38%
Multi Engine		BE20, BE9L, C340	7,944	11%	8,296	12%	9,513	13%	11,079	14%	16,200	17%
Jet		C56X, C510, LJ45	9,995	14%	10,605	15%	12,842	17%	15,602	20%	26,399	28%
Helicopter		B06T, UH1	4,613	7%	4,761	7%	5,232	7%	5,879	7%	7,200	8%
Other			10,763	15%	10,682	15%	9,988	14%	9,497	12%	8,400	9%
Subtotal			69,706	100%	70,915	100%	73,723	100%	78,686	100%	94,598	100%
Military [6/]		A-10, UH-60, C-130, F-15	16,349	100%	16,349	100%	16,349	100%	16,349	100%	16,349	100%
Airport Total			**131,974**	**100%**	**136,500**	**100%**	**141,832**	**100%**	**150,742**	**100%**	**173,028**	**100%**

NOTES: Total may not sum due to rounding.

1 The representative aircraft indicated are not exhaustive and do not imply any particular aircraft will operate at the Airport in the future. They are provided as an example of aircraft operating at the Airport in 2015.

2 The passenger airline fleet mix forecasts are determined by the operating characteristics and aircraft orders of airlines operating at the Airport, as well as forecast passenger demand influences on aircraft size.

3 Alaska Airlines is expected to replace 76-seat Bombardier Dash 8-Q400 turboprop aircraft with 76-seat Embraer E175 regional jet aircraft on some routes from the Airport beginning in 2017.

4 The cargo aircraft fleet mix is forecast to remain at 2015 levels.

5 The general aircraft and other air taxi fleet mix forecasts are based on general aviation based aircraft and operations forecasts. General aviation based aircraft and operations are expected to evolve at different rates for different aircraft types.

6 The military operations are shown as a total only because military operations are mission-specific and the fleet mix operating at the Airport is subject to variation. The representative aircraft for military operations are examples of aircraft that operated at the Airport in 2015, according to the Boise Airport 14 CFR Part 150 Study from 2015.

SOURCES: City of Boise Aviation Department, Traffic Reports, November 2016; U.S. Department of Transportation, T-100, November 2016; Federal Aviation Administration, OPSNET, November 2016; Innovata, November 2016; Ricondo & Associates, Inc., November 2016 (forecast).

3.8 COMPARISON TO THE FAA TERMINAL AREA FORECAST

3.8.1 ENPLANED PASSENGER FORECAST COMPARISON

Table 3-26 presents a comparison of the enplaned passengers forecast for the BOI MPU and enplaned passengers forecast by the FAA in the 2016 TAF. **Exhibit 3-8** presents this information in graphic form.

TABLE 3-26 ENPLANED PASSENGER FORECAST COMPARISON

YEAR	MASTER PLAN UPDATE	2016 FAA TAF[1]	VARIANCE OF MASTER PLAN VS. 2016 TAF[2]
Historical			
2006	1,641,823	1,651,211	(0.6%)
2007	1,680,554	1,672,205	0.5%
2008	1,586,774	1,577,759	0.6%
2009	1,397,772	1,399,545	(0.1%)
2010	1,404,289	1,395,442	0.6%
2011	1,392,013	1,378,743	1.0%
2012	1,305,581	1,323,285	(1.3%)
2013	1,309,789	1,318,026	(0.6%)
2014	1,377,507	1,375,599	0.1%
2015	1,492,058	1,492,748	(0.0%)
Forecast			
2016	1,619,828	1,639,475	(1.2%)
2017	1,686,596	1,744,449	(3.3%)
2018	1,722,703	1,787,513	(3.6%)
2019	1,759,225	1,827,901	(3.8%)
2020	1,796,348	1,868,532	(3.9%)
2021	1,833,742	1,908,795	(3.9%)
2022	1,871,729	1,948,993	(4.0%)
2023	1,909,870	1,988,752	(4.0%)
2024	1,948,103	2,027,740	(3.9%)
2025	1,986,940	2,067,838	(3.9%)
2026	2,025,770	2,110,545	(4.0%)
2027	2,064,526	2,153,473	(4.1%)
2028	2,103,432	2,196,868	(4.3%)
2029	2,142,497	2,241,997	(4.4%)
2030	2,181,435	2,287,822	(4.7%)
2031	2,219,891	2,332,974	(4.8%)
2032	2,258,344	2,379,076	(5.1%)
2033	2,297,084	2,426,197	(5.3%)
2034	2,336,371	2,475,081	(5.6%)
2035	2,376,682	2,526,494	(5.9%)
CAGR			
2006–2015	(1.06%)	(1.11%)	
2015–2020	3.79%	4.59%	
2021–2025	2.03%	2.02%	
2026–2035	1.79%	2.02%	
2015–2035	2.36%	2.67%	

NOTES: CAGR – Compound Annual Growth Rate

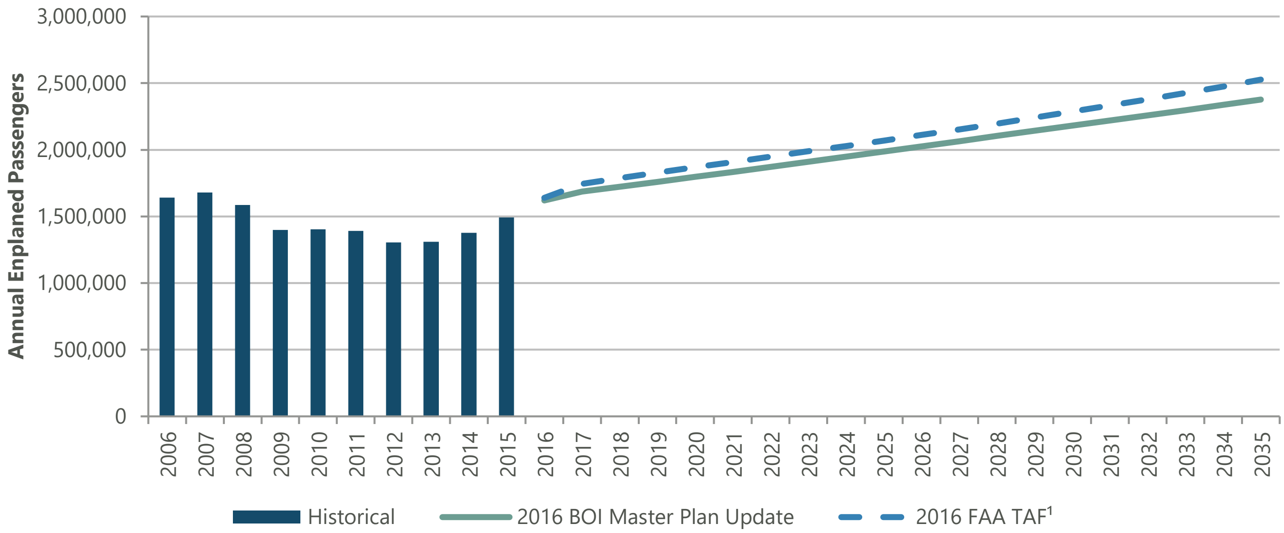
Federal Aviation Administration (FAA) Terminal Area Forecast (TAF) does not include nonrevenue passengers.

1 Adjusted to calendar year for comparison. The adjustment is based on the historical relative proportions of enplaned passengers in the first three quarters and the fourth quarter of each year. To determine enplaned passengers for the calendar year, the proportion of enplaned passengers in the fourth quarter is applied to the prior fiscal year, and the proportion of enplaned passengers in the first three quarters is applied to the current fiscal year.

2 The FAA requires forecasts to be within 10 percent of the TAF within 5 years of the base year and within 15 percent of the TAF within 10 years. Variances outside of these bounds require detailed documentation describing differences.

SOURCES: City of Boise Aviation Department, Traffic Reports, November 2016; U.S. Department of Transportation, T-100, November 2016; Federal Aviation Administration, 2016 Terminal Area Forecast, January 2017; Ricondo & Associates, Inc., November 2016 (forecast).

EXHIBIT 3-8 ENPLANED PASSENGER FORECAST COMPARISON



NOTES:
FAA Terminal Area Forecast (TAF) does not include nonrevenue passengers.
1 Adjusted to calendar year for comparison. The adjustment is based on the historical relative proportions of enplaned passengers in the first three quarters and the fourth quarter of each year. To calculate enplaned passengers for the calendar year, the proportion of enplaned passengers in the fourth quarter is applied to the prior fiscal year, and the proportion of enplaned passengers in the first three quarters is applied to the current fiscal year.
SOURCES: City of Boise Aviation Department, Traffic Reports, November 2016; U.S. Department of Transportation, T-100, November 2016; Federal Aviation Administration, 2016 Terminal Area Forecast, January 2017; Ricondo & Associates, Inc., November 2016 (forecast).

For comparison purposes, the FAA TAF has been adjusted from federal fiscal year to calendar year through the use of historical data, which show that, on average, 75.2 percent of annual enplaned passengers at the Airport occur in the first three calendar quarters, with the remaining 24.8 percent occurring in the fourth quarter. For the 2015 to 2035 period, the FAA has forecast annual enplaned passenger growth of 2.7 percent, compared to the BOI forecast of 2.4 percent. The MPU forecast remains within the variance tolerance levels specified by the FAA (within 10 percent over 5 years and within 15 percent over 10 years).[29] The greatest difference between the MPU forecast and the FAA TAF is in the forecast short-term growth; from 2015 to 2020, the MPU forecasts an average annual growth rate of 3.8 percent, compared to 4.6 percent in the 2016 FAA TAF. This difference is likely due to differing assumptions about the continuation of recent growth trends.

3.8.2 TOTAL OPERATIONS FORECAST COMPARISON

Table 3-27 presents a comparison of total Airport operations forecast in the BOI MPU and total Airport operations forecast by the FAA in the 2016 TAF. Table 3-27 includes estimated operations occurring in low-visibility conditions.

[29] Forecast tolerances are defined in FAA Advisory Circular 150/5070-6B.

TABLE 3-27 TOTAL OPERATIONS FORECAST COMPARISON

YEAR	MASTER PLAN UPDATE			2016 FAA TAF[3]	VARIANCE OF MASTER PLAN VS. 2016 TAF[4]
	IMC OPERATIONS[1]	IMC CAT II/III OPERATIONS[2]	TOTAL OPERATIONS	TOTAL OPERATIONS	
Historical					
2006	7,159	1,790	178,970	175,333	2.1%
2007	7,278	1,819	181,945	178,552	1.9%
2008	5,808	1,452	145,199	150,251	(3.4%)
2009	5,160	1,290	129,004	128,114	0.7%
2010	4,878	1,220	121,961	123,692	(1.4%)
2011	4,872	1,218	121,810	119,468	2.0%
2012	4,511	1,128	112,769	114,428	(1.4%)
2013	4,582	1,146	114,556	115,336	(0.7%)
2014	5,102	1,276	127,552	126,930	0.5%
2015	5,279	1,320	131,974	132,171	(0.1%)
Forecast	5,460	1,365	136,500	133,146	2.5%
2016	5,519	1,380	137,979	135,412	1.9%
2017	5,547	1,387	138,677	137,124	1.1%
2018	5,609	1,402	140,235	138,789	1.0%
2019	5,673	1,418	141,832	140,451	1.0%
2020	5,741	1,435	143,530	142,059	1.0%
2021	5,809	1,452	145,232	143,548	1.2%
2022	5,880	1,470	146,993	144,893	1.4%
2023	5,953	1,488	148,817	146,185	1.8%
2024	6,030	1,507	150,742	147,506	2.2%
2025	6,098	1,524	152,444	148,901	2.4%
2026	6,182	1,546	154,560	150,304	2.8%
2027	6,268	1,567	156,702	151,719	3.3%
2028	6,358	1,590	158,954	153,183	3.8%
2029	6,452	1,613	161,291	154,671	4.3%
2030	6,555	1,639	163,880	156,140	5.0%
2031	6,642	1,660	166,045	157,636	5.3%
2032	6,731	1,683	168,280	159,164	5.7%
2033	6,822	1,705	170,549	160,740	6.1%
2034	6,921	1,730	173,028	162,389	6.6%
2035					
CAGR					
2006–2015	(3.3%)	(3.3%)	(3.3%)	(3.1%)	
2015–2020	1.5%	1.5%	1.5%	1.2%	
2021–2025	1.2%	1.2%	1.2%	0.9%	
2026–2035	1.4%	1.4%	1.4%	1.0%	
2015–2035	1.4%	1.4%	1.4%	1.0%	

NOTES:

CAGR – Compound Annual Growth Rate

FAA TAF – Federal Aviation Administration Terminal Area Forecast

1 Instrument Meteorological Conditions (IMC) occur when the cloud ceiling is less than 1,000 feet or visibility is less than 3 statute miles. Approximately four percent of total operations at BOI occur during IMC.

2 Category II/III Instrument Meteorological Conditions (IMC CAT II/III) occur when the cloud ceiling is less than approximately 250 feet or visibility is less than approximately 1 statute mile. Approximately one percent of operations at BOI occur during IMC CAT II/III.

3 Adjusted to calendar year for comparison. The adjustment is based on the historical relative proportions of operations in the first three quarters and the fourth quarter of each year. To determine operations for the calendar year, the proportion of operations in the fourth quarter is applied to the prior fiscal year, and the proportion of operations in the first three quarters is applied to the current fiscal year.

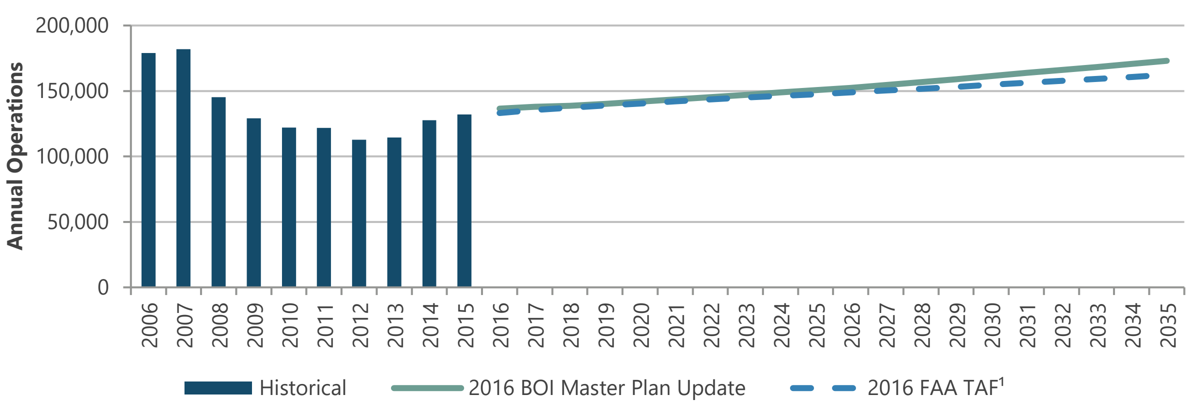
4 The FAA requires forecasts to be within 10 percent of the TAF within 5 years of the base year and within 15 percent of the TAF within 10 years. Variances outside of these bounds require detailed documentation describing differences.

SOURCES: City of Boise Aviation Department, Traffic Reports, November 2016; U.S. Department of Transportation, T-100, November 2016; Federal Aviation Administration, OPSNET, November 2016; Federal Aviation Administration, Traffic Flow Management System Counts (TFMSC), November 2016; Federal Aviation Administration, Aerospace Forecast Fiscal Years 2016-2036, March 2016; Federal Aviation Administration, 2016 Terminal Area Forecast, January 2017; Ricondo & Associates, Inc., November 2016 (forecast); Boise Airport Air Traffic Control Tower, June 2017 (IMC and IMC CAT II/III percentages).

Exhibit 3-9 presents this information in graphic form. Similar to the enplaned passenger forecast, for comparison purposes, the FAA TAF has been adjusted from federal fiscal year to calendar year through the use of historical data, which show that, on average, 77.4 percent of annual operations at the Airport occur in the first three calendar quarters, with the remaining 22.6 percent occurring in the fourth quarter. For the 2015 to 2035 period, average annual growth in operations is forecast to be 1.0 percent in the 2016 TAF, compared to an average annual growth of 1.4 percent in the MPU forecast. As with enplaned passengers, the MPU forecast of total operations remains within the FAA's variance tolerance levels (within 10 percent over 5 years and within 15 percent over 10 years).

While the BOI MPU enplaned passenger forecast is consistently lower than that forecast by the FAA TAF, the operations forecast is higher than the FAA TAF. One potential cause of this difference resides in average aircraft seat capacity assumptions for passenger airline operations; the BOI MPU forecast may assume a smaller average aircraft size than forecast in the FAA TAF. Another potential cause of the difference is in the general aviation operations forecast; general aviation operations are forecast to grow at a faster rate in the MPU forecast than in the FAA TAF.

EXHIBIT 3-9 TOTAL OPERATIONS FORECAST COMPARISON



NOTES: TAF – Terminal Area Forecast

1 Adjusted to calendar year for comparison. The adjustment is based on the historical relative proportions of operations in the first three quarters and the fourth quarter of each year. To calculate operations for the calendar year, the proportion of operations in the fourth quarter is applied to the prior fiscal year, and the proportion of operations in the first three quarters is applied to the current fiscal year.

SOURCES: City of Boise Aviation Department, Traffic Reports, November 2016; U.S. Department of Transportation, T-100, November 2016; Federal Aviation Administration, OPSNET, November 2016; Federal Aviation Administration, Traffic Flow Management System Counts (TFMSC), November 2016; Federal Aviation Administration, *FAA Aerospace Forecast Fiscal Years 2016-2036*, March 2016; Federal Aviation Administration, 2016 Terminal Area Forecast, January 2017; Ricondo & Associates, Inc., November 2016 (forecast).

3.8.3 FORECAST SCENARIO ANALYSES

The MPU forecast of enplaned passengers and aircraft operations is considered the baseline forecast, which represents the best estimate of activity at the Airport given the analyses conducted and the current knowledge of socioeconomic trends and characteristics of the airlines expected to operate at the Airport. In addition to the baseline forecast, two scenarios—a high forecast scenario and a low forecast scenario—were developed to explore possible variations in activity at the Airport resulting from changes in the socioeconomic environment or operating characteristics of airlines at the Airport. After discussions with Airport staff, it was determined that the high scenario forecast would consider the effects of additional service by carriers not currently serving the Airport, and the low scenario forecast would consider the effects of a recession similar in magnitude and duration to past recessions. The assumptions used in each scenario are described in the following subsections.

3.8.3.1 HIGH FORECAST SCENARIO

In the high forecast scenario, it was assumed that new service would be added by airlines not currently serving the Airport. It was assumed that a low-cost carrier (LCC) (e.g., Frontier Airlines or Spirit Airlines) would start twice-daily service at the Airport in 2018, operated on Airbus A319 aircraft or similar with 150 seats. This service is assumed to increase to three-times daily in 2020 and five-times daily in 2022, with an average load factor of 83.0 percent in 2018, increasing to 85.0 percent in 2028.[30] In addition to new LCC service, it was assumed that a small regional carrier, similar to Seaport Airlines or Big Sky Airlines—which operated at the Airport historically—would begin service at the Airport in 2019. It is assumed that BOI would function as a hub in this regional carrier's network, with a greater share of connecting passengers than other carriers at the Airport, and that the carrier would gradually increase service at the Airport up to levels similar to the service offered by Big Sky Airlines from 2002 to 2008. It was assumed that the airline would serve BOI using Pilatus PC-12 or equivalent aircraft with nine seats, increasing the aircraft size to Beechcraft 1900D or equivalent 19-seat aircraft in 2026. It was further assumed that the average load factor would be 50.0 percent in 2019, increasing to 55.0 percent in 2037. There was not assumed to be any change in cargo, other air taxi, or general aviation activity from the baseline in the high forecast scenario.

As a result of the new service in the high forecast scenario, enplaned passengers at the Airport are forecast to increase at a CAGR of 2.89 percent from 2015 through 2035, compared to a CAGR of 2.36 percent in the baseline forecast. Total operations in the high forecast scenario are forecast to increase at a CAGR of 1.6 percent, compared to 1.4 percent in the baseline forecast.

3.8.3.2 LOW FORECAST SCENARIO

In the low forecast scenario, an economic downturn, similar in magnitude and duration to recent recessions in the United States, was assumed to take place beginning in 2020. It was assumed that growth would recover to baseline forecast levels in 2026 for enplaned passengers and passenger and cargo operations. There were not assumed to be any changes in average seats per departure or load factor, and no change in general aviation operations was assumed. In the low forecast scenario, enplaned passengers at the Airport are forecast to increase at a CAGR of 1.45 percent from 2015 through 2035, compared to a CAGR of 2.36 percent in the baseline forecast. Total operations are forecast to increase at a CAGR of 0.9 percent, compared to 1.4 percent in the baseline forecast. **Table 3-28** presents the forecast enplaned passengers and the total operations for the low, baseline, and high forecasts. **Exhibit 3-10** and **Exhibit 3-11** show the forecast enplaned passengers and total operations, respectively, in graphical form.

[30] The 85.0 percent load factor represents the average LCC load factor at BOI and peer airports from 2010 through 2015. The peer airports used in the comparison are Spokane International (GEG), Clinton National (LIT), Gerald R. Ford International (GRR), Des Moines International (DSM), Tulsa International (TUL), El Paso International (ELP), Tucson International (TUS), Dayton International (DAY), Akron-Canton (CAK), Wichita Dwight D. Eisenhower National (ICT), and Dane County Regional (MSN) Airports.

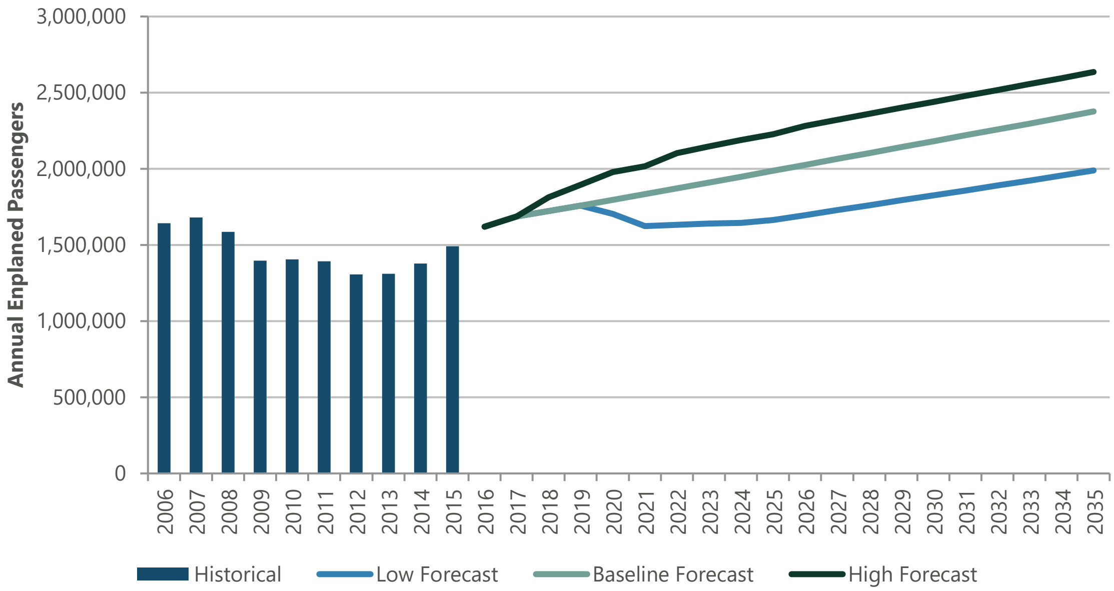
TABLE 3-28 FORECAST SCENARIOS—ENPLANED PASSENGERS AND TOTAL OPERATIONS COMPARISON

YEAR	ENPLANED PASSENGERS			TOTAL OPERATIONS		
	LOW FORECAST	BASELINE FORECAST	HIGH FORECAST	LOW FORECAST	BASELINE FORECAST	HIGH FORECAST
Historical						
2006	1,641,823	1,641,823	1,641,823	178,970	178,970	178,970
2007	1,680,554	1,680,554	1,680,554	181,945	181,945	181,945
2008	1,586,774	1,586,774	1,586,774	145,199	145,199	145,199
2009	1,397,772	1,397,772	1,397,772	129,004	129,004	129,004
2010	1,404,289	1,404,289	1,404,289	121,961	121,961	121,961
2011	1,392,013	1,392,013	1,392,013	121,810	121,810	121,810
2012	1,305,581	1,305,581	1,305,581	112,769	112,769	112,769
2013	1,309,789	1,309,789	1,309,789	114,556	114,556	114,556
2014	1,377,507	1,377,507	1,377,507	127,552	127,552	127,552
2015	1,492,058	1,492,058	1,492,058	131,974	131,974	131,974
Forecast						
2016	1,619,828	1,619,828	1,619,828	136,500	136,500	136,500
2017	1,686,596	1,686,596	1,686,596	137,979	137,979	137,979
2018	1,722,703	1,722,703	1,812,225	138,677	138,677	140,116
2019	1,759,225	1,759,225	1,894,890	140,235	140,235	142,862
2020	1,704,673	1,796,348	1,978,546	139,676	141,832	145,509
2021	1,623,355	1,833,742	2,016,627	137,769	143,530	147,522
2022	1,631,472	1,871,729	2,103,744	135,487	145,232	151,465
2023	1,639,629	1,909,870	2,145,973	136,487	146,993	154,748
2024	1,644,548	1,948,103	2,188,957	137,486	148,817	158,102
2025	1,663,084	1,986,940	2,227,794	138,446	150,742	160,017
2026	1,695,585	2,025,770	2,282,067	139,650	152,444	161,720
2027	1,728,024	2,064,526	2,321,532	141,600	154,560	163,836
2028	1,760,589	2,103,432	2,361,777	143,572	156,702	165,986
2029	1,793,286	2,142,497	2,400,382	145,657	158,954	168,229
2030	1,825,878	2,181,435	2,439,488	147,837	161,291	170,566
2031	1,858,066	2,219,891	2,478,114	150,245	163,880	173,155
2032	1,890,251	2,258,344	2,517,363	152,300	166,045	175,331
2033	1,922,677	2,297,084	2,555,644	154,417	168,280	177,554
2034	1,955,561	2,336,371	2,595,099	156,565	170,549	179,825
2035	1,989,301	2,376,682	2,635,579	158,906	173,028	182,303
CAGR						
2006–2015	(1.1%)	(1.1%)	(1.1%)	(3.3%)	(3.3%)	(3.3%)
2015–2020	2.7%	3.8%	5.8%	1.1%	1.5%	2.0%
2021–2025	0.6%	2.0%	2.5%	0.1%	1.2%	2.1%
2026–2035	1.8%	1.8%	1.6%	1.4%	1.4%	1.3%
2015–2035	1.4%	2.4%	2.9%	0.9%	1.4%	1.6%

NOTE: CAGR – Compound Annual Growth Rate

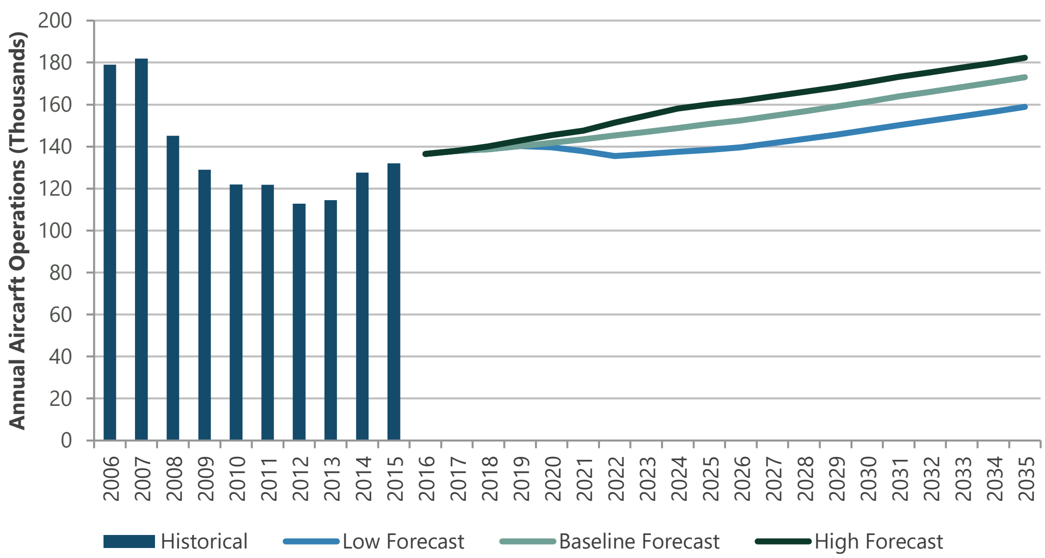
SOURCES: City of Boise Aviation Department, Traffic Reports, November 2016; U.S. Department of Transportation, T-100, November 2016; Federal Aviation Administration, OPSNET, November 2016; Federal Aviation Administration, Traffic Flow Management System Counts (TFMSC), November 2016; Federal Aviation Administration, *Aerospace Forecast: Fiscal Years 2016-2036*, November 2016; Innovata, December 2016; Federal Aviation Administration, *2016 Terminal Area Forecast*, January 2017; Ricondo & Associates, Inc., January 2017 (forecast).

EXHIBIT 3-10 FORECAST SCENARIOS ENPLANED PASSENGER COMPARISON



SOURCES: City of Boise, Aviation Department, Traffic Reports, November 2016; U.S. Department of Transportation, T-100, November 2016; Federal Aviation Administration, *Aerospace Forecast: Fiscal Years 2016-2036*, November 2016; Innovata, December 2016; Federal Aviation Administration, *2016 Terminal Area Forecast*, January 2017; Ricondo & Associates, Inc., January 2017 (forecast).

EXHIBIT 3-11 FORECAST SCENARIOS TOTAL OPERATIONS COMPARISON



SOURCES: City of Boise, Aviation Department, Traffic Reports, November 2016; U.S. Department of Transportation, T-100, November 2016; Federal Aviation Administration, OPSNET, November 2016; Federal Aviation Administration, Traffic Flow Management System Counts (TFMSC), November 2016; Federal Aviation Administration, *Aerospace Forecast: Fiscal Years 2016-2036*, November 2016; Innovata, December 2016; Federal Aviation Administration, *2016 Terminal Area Forecast, January 2017*; Ricondo & Associates, Inc., January 2017 (forecast).

3.9 DESIGN DAY FLIGHT SCHEDULES

3.9.1 OVERVIEW

In support of the assessment of future facility requirements, design day flight schedules (DDFSs) of passenger activity and all aircraft operations (passenger airline, cargo, and other air taxi/general aviation) at the Airport were developed. In this study, the design day represents activity on the peak month average weekday (PMAWD)[31] at the Airport. DDFS were developed for both the baseline forecast and the high scenario forecast.

The following sections describe the methodology and assumptions used in the development of the DDFS and the results of the forecast Airport DDFS for the base year (2015) and the future planning years of 2020, 2025, and 2035.

3.9.2 DESIGN DAY FLIGHT SCHEDULE DEVELOPMENT—PASSENGER AIRLINES

The DDFS represents aircraft operations and passenger activity anticipated at the Airport during the PMAWD. The DDFS includes information on airline, aircraft arrival time, aircraft departure time, aircraft origin and destination, equipment type, aircraft seat capacity, load factors, and arriving and departing passenger volumes specific to each flight. Passenger volumes are provided for both O&D and connecting passengers.

3.9.2.1 PASSENGER AIRLINES DESIGN DAY FLIGHT SCHEDULE—BASE YEAR (2015)

To develop the passenger airline DDFS, the scheduled monthly passenger seat capacity and operations for 2015 were reviewed to determine the peak month at the Airport. Based on an analysis of published schedules, June was identified as the peak month for passenger aircraft operations and seat capacity in 2015.

Airline schedule data from Innovata were reviewed for each weekday in June 2015, and June 16, 2015, was determined to be the PMAWD. Therefore, the passenger airline schedule for June 16, 2015, serves as the PMAWD baseline schedule.

Passenger volumes on each flight were calculated by applying flight-specific load factors—based on U.S. DOT T-100 data for June 2015—to the schedule data. The share of O&D and connecting passengers was determined based on the share of O&D and connecting passengers at the Airport in 2015, with flight-specific adjustments depending on the time of day (i.e., a flight departing at 5:00 a.m. would have no connecting passengers, because it departs before any arrivals and it is assumed passengers are not connecting overnight at the Airport).

3.9.2.2 PASSENGER AIRLINES DESIGN DAY FLIGHT SCHEDULE—FUTURE YEARS (2020, 2025, AND 2035)

Future year DDFSs were constructed based on both the baseline activity forecasts and the high activity forecasts presented earlier in this section. In the development of the DDFSs, it was assumed that the PMAWD-to-annual ratio of passengers and operations would remain stable from the base year through the planning horizon. In addition, any recently published service not reflected in the 2015 schedule was incorporated into the 2020 DDFS (e.g., American Airlines service to/from Dallas Fort Worth)

The base year DDFS was used in the development of the 2020, 2025, and 2035 DDFSs. An iterative process was used to determine future load factors and seat capacity. The steps in the process, which simulates an individual airline's changes in flight frequency and aircraft size in response to forecast growth, are as follows:

[31] The peak month average weekday is the weekday during the peak month of activity with activity levels nearest the average for all weekdays during the month.

- Passenger and aircraft operation growth rates, as developed in the forecasts, were applied to the base year schedule to establish “targets” of passenger and aircraft operation levels for each of the future DDFSs. These targets provide guidance for the number of additional aircraft operations and enplaned passengers expected in each of the future DDFSs.
- Forecast passenger growth rates were applied to the base year schedule on a route-by-route basis. If the resulting load factor was less than the flight-specific threshold (approximately 90 percent), then the aircraft assigned in the schedule remained unchanged. If the resulting load factor exceeded the flight-specific threshold, then one of three changes was made: the base year aircraft was increased in gauge, based on the airline’s expected fleet mix; a new flight was added to the airline-market combination, with passengers distributed evenly across the flights; or the flight was left unchanged in order to meet forecast operations and projected fleet mix targets. The last option was only considered if the load factor did not exceed 100 percent.
  - Sometimes, professional judgment was used to determine whether an increase in gauge and/or a new flight was added to the airline-market combination. These decisions were based on whether or not an airline currently has, or is expected to have, an aircraft that could reasonably operate in the market and whether or not the addition of a flight would be consistent with forecast growth of aircraft operations and projected fleet mix.
  - If an additional flight was added to an existing market, passengers were redistributed across all flights in that airline-market combination. Furthermore, any new arrival (departure) was matched with a new departure (arrival), and any new flights were assumed to return to their origin/destination (i.e., a new arrival from DEN would be assumed to be matched to a departure to DEN). Arrival and departure times for new flights to existing markets were established considering current flight times for the market and estimates of times airline travelers would typically want to arrive at and depart from the Airport, and the time between arrival and departure was based on typical airline-specific aircraft turn times for the fleet type used on the route.
- The process for the 2020 DDFS was repeated for the 2025 and 2035 DDFSs.

In the development of the DDFSs, it was assumed that the aircraft gauge would not decrease in future years, unless no larger aircraft were available in the specific airline’s fleet and the new additional flight in the airline-market combination resulted in unreasonably low load factors for the combination. For example, in a future schedule, capacity growth in a market currently served by a single daily Boeing 737-800 operation may have been accommodated through the simultaneous addition of a new daily Boeing 737-700 operation and a down-gauging of the current operation to a Boeing 737-700 to maintain reasonable load factors consistent with airline practices.

3.9.3 DESIGN DAY FLIGHT SCHEDULE SUMMARY—PASSENGER AIRLINES

Results and statistics for the base year (2015), 2020, 2025, and 2035 passenger airline schedules are shown in **Table 3-29** through **Table 3-38** and on **Exhibit 3-12** through **Exhibit 3-25**. The results for both the baseline forecast DDFS and the high scenario forecast DDFS are presented.

TABLE 3-29 DESIGN DAY METRICS—PASSENGER AIRLINES

	BASELINE FORECAST			HIGH SCENARIO FORCAST		
YEAR	DESIGN DAY	ANNUAL	RATIO	DESIGN DAY	ANNUAL	RATIO[1]
Enplaned Passengers						
2015	4,720	1,492,058	0.316%	4,720	1,492,058	0.316%
2020	5,656	1,796,348	0.315%	6,159	1,978,546	0.311%
2025	6,256	1,986,940	0.315%	6,974	2,227,794	0.313%
2035	7,483	2,376,682	0.315%	8,266	2,635,579	0.314%
CAGR						
2015–2035	2.33%	2.36%		2.84%	2.89%	
Passenger Airline Aircraft Operations						
2015	120	40,607	0.296%	120	40,607	0.296%
2020	136	46,140	0.295%	146	49,817	0.293%
2025	148	49,402	0.300%	172	58,677	0.293%
2035	166	54,540	0.304%	190	63,815	0.298%
CAGR						
2015–2035	1.6%	1.5%		2.3%	2.3%	

NOTES:
The design day is based on June 16, 2015.
CAGR – Compound Annual Growth Rate
1 The peak month average weekday-to-annual ratios for enplaned passengers and passenger airline aircraft operations are not assumed to be equal to 2015 levels throughout the planning horizon for the high scenario forecast due to the introduction of new service in the high scenario forecast.
SOURCES: Innovata, January 2017; U.S. Department of Transportation, T-100, January 2017; Ricondo & Associates, Inc., February 2017.

TABLE 3-30 DESIGN DAY ARRIVAL AND DEPARTURE SUMMARY—PASSENGER AIRLINES

YEAR	BASELINE FORECAST					HIGH SCENARIO FORECAST				
	ENPLANED PASSENGERS	SEATS	LOAD FACTOR	AVERAGE SEATS	OPERATIONS	ENPLANED PASSENGERS	SEATS	LOAD FACTOR	AVERAGE SEATS	OPERATIONS
Arrivals										
2015	4,801	5,782	83.0%	96.4	60	4,801	5,782	83.0%	96.4	60
2020	5,750	7,044	81.6%	103.6	68	6,138	7,510	81.7%	102.9	73
2025	6,360	7,778	81.8%	105.1	74	6,913	8,448	81.8%	98.2	86
2035	7,675	9,185	83.6%	110.7	83	8,262	9,893	83.5%	104.1	95
Departures										
2015	4,720	5,782	81.6%	96.4	60	4,720	5,782	81.6%	96.4	60
2020	5,656	7,044	80.3%	103.6	68	6,159	7,653	80.5%	104.8	73
2025	6,256	7,778	80.4%	105.1	74	6,974	8,591	81.2%	99.9	86
2035	7,483	9,185	81.5%	110.7	83	8,266	10,068	82.1%	106.0	95
Total										
2015	9,521	11,564	82.3%	96.4	120	9,521	11,564	82.3%	96.4	120
2020	11,406	14,088	81.0%	103.6	136	12,297	15,163	81.1%	103.9	146
2025	12,616	15,556	81.1%	105.1	148	13,887	17,039	81.5%	99.1	172
2035	15,158	18,370	82.5%	110.7	166	16,528	19,961	82.8%	105.1	190
CAGR										
2015–2035	2.36%	2.3%		0.7%	1.6%	2.8%	2.8%		0.4%	2.3%

NOTES:
The design day flight schedule is based on June 16, 2015.
CAGR – Compound Annual Growth Rate
SOURCES: Innovata, January 2017; U.S. Department of Transportation, T-100, January 2017; Ricondo & Associates, Inc., February 2017.

TABLE 3-31 DESIGN DAY FLEET MIX—PASSENGER AIRLINES DEPARTURES

AIRCRAFT	BASELINE FORECAST				HIGH SCENARIO FORECAST			
	2015	2020	2025	2035	2015	2020	2025	2035
Mainline								
Airbus A319	6	3	3	2	6	7	8	7
Airbus A320	2	3	3	7	2	3	3	7
Airbus A321	0	2	2	2	0	2	2	2
Boeing 717-200	0	0	1	0	0	0	1	0
Boeing 737-700	0	0	1	4	0	0	1	4
Boeing 737-800	0	2	2	4	0	2	2	4
Boeing 737-900	1	2	2	2	1	2	2	2
Boeing 737-300	1	0	0	0	1	0	0	0
Boeing 737-700	0	0	1	2	0	0	1	2
Boeing 737-800	0	7	8	6	0	7	8	6
Boeing 737-700 Winglets	9	5	6	11	9	5	6	11
McDonnell Douglas MD-90	2	0	0	0	2	0	0	0
Mainline Total	**21**	**24**	**29**	**40**	**21**	**28**	**34**	**45**
Mainline Share of Passenger Airline Total	35.0%	35.3%	39.2%	48.2%	35.0%	38.4%	39.5%	47.4%
Regional/Commuter								
Canadair RJ-700	10	10	12	11	10	10	12	11
Canadair RJ-900	1	3	3	2	1	3	3	2
Canadair RJ-200	3	0	0	0	3	0	0	0
DeHavilland Dash-8	21	20	18	16	21	20	18	16
Embraer 175	4	11	12	14	4	11	12	14
Pilatus PC-12	0	0	0	0	0	1	7	0
Beechcraft 1900D	0	0	0	0	0	0	0	7
Regional/Commuter Total	**39**	**44**	**45**	**43**	**39**	**45**	**52**	**50**
Regional/Commuter Share of Passenger Airline Total	65.0%	64.7%	60.8%	51.8%	65.0%	61.6%	60.5%	52.6%
Passenger Airline Total	**60**	**68**	**74**	**83**	**60**	**73**	**86**	**95**
Passenger Airline Share of Airport Total	31.7%	33.2%	33.6%	32.2%	31.7%	34.8%	37.1%	35.2%
Airport Total	**189**	**205**	**220**	**258**	**189**	**210**	**232**	**270**

NOTES:
The design day flight schedule is based on June 16, 2015.
CAGR – Compound Annual Growth Rate
SOURCES: Innovata, January 2017; U.S. Department of Transportation, T-100, January 2017; Ricondo & Associates, Inc., February 2017.

TABLE 3-32 BLOCK HOUR PROFILE—PASSENGER AIRLINES ARRIVALS, BASELINE FORECAST

	ARRIVALS							
	2015		2020		2025		2035	
BLOCK HOUR	PAX	OPS	PAX	OPS	PAX	OPS	PAX	OPS
00:00–00:59	183	2	208	2	215	2	176	2
01:00–01:59	0	0	0	0	0	0	0	0
02:00–02:59	0	0	0	0	0	0	0	0
03:00–03:59	0	0	0	0	0	0	0	0
04:00–04:59	0	0	0	0	0	0	0	0
05:00–05:59	0	0	0	0	0	0	0	0
06:00–06:59	0	0	0	0	0	0	0	0
07:00–07:59	0	0	0	0	46	1	154	2
08:00–08:59	139	2	214	3	221	3	294	3
09:00–09:59	89	1	128	1	141	1	148	1
10:00–10:59	278	4	333	4	299	4	402	4
11:00–11:59	418	5	566	6	599	6	643	7
12:00–12:59	255	2	271	2	451	4	528	4
13:00–13:59	430	5	488	5	511	5	622	6
14:00–14:59	108	2	218	4	242	4	401	4
15:00–15:59	373	5	386	5	421	5	461	5
16:00–16:59	262	3	271	3	369	4	523	6
17:00–17:59	229	3	240	3	214	3	236	3
18:00–18:59	285	5	300	5	316	5	415	6
19:00–19:59	372	4	592	7	639	8	678	8
20:00–20:59	203	3	212	3	193	3	174	3
21:00–21:59	415	6	509	7	547	7	716	8
22:00–22:59	246	3	252	3	317	3	430	5
23:00–23:59	518	5	560	5	617	6	673	6

NOTES:
The design day flight schedule is based on June 16, 2015.
PAX – Passengers
OPS – Operations
SOURCES: Innovata, January 2017; U.S. Department of Transportation, T-100, January 2017; Ricondo & Associates, Inc., February 2017.

TABLE 3-33 BLOCK HOUR PROFILE—PASSENGER AIRLINES ARRIVALS, HIGH SCENARIO FORECAST

BLOCK HOUR	ARRIVALS							
	2015		2020		2025		2035	
	PAX	OPS	PAX	OPS	PAX	OPS	PAX	OPS
00:00–00:59	183	2	208	2	215	2	176	2
01:00–01:59	0	0	0	0	0	0	0	0
02:00–02:59	0	0	0	0	0	0	0	0
03:00–03:59	0	0	0	0	0	0	0	0
04:00–04:59	0	0	0	0	0	0	0	0
05:00–05:59	0	0	0	0	0	0	0	0
06:00–06:59	0	0	0	0	0	0	0	0
07:00–07:59	0	0	6	1	52	2	168	3
08:00–08:59	139	2	214	3	221	3	294	3
09:00–09:59	89	1	128	1	141	1	148	1
10:00–10:59	278	4	333	4	433	6	544	6
11:00–11:59	418	5	566	6	605	7	656	8
12:00–12:59	255	2	271	2	451	4	528	4
13:00–13:59	430	5	488	5	517	6	636	7
14:00–14:59	108	2	218	4	242	4	401	4
15:00–15:59	373	5	386	5	428	6	475	6
16:00–16:59	262	3	271	3	369	4	523	6
17:00–17:59	229	3	365	4	348	5	378	5
18:00–18:59	285	5	425	6	450	7	558	8
19:00–19:59	372	4	592	7	639	8	678	8
20:00–20:59	203	3	212	3	193	3	174	3
21:00–21:59	415	6	509	7	547	7	716	8
22:00–22:59	246	3	377	4	444	4	559	6
23:00–23:59	518	5	685	6	744	7	801	7

NOTES:
The design day flight schedule is based on June 16, 2015.
PAX – Passengers
OPS – Operations
SOURCES: Innovata, January 2017; U.S. Department of Transportation, T-100, January 2017; Ricondo & Associates, Inc., February 2017.

TABLE 3-34 BLOCK HOUR PROFILE—PASSENGER AIRLINES DEPARTURES, BASELINE FORECAST

	DEPARTURES							
	2015		2020		2025		2035	
BLOCK HOUR	PAX	OPS	PAX	OPS	PAX	OPS	PAX	OPS
00:00–00:59	0	0	0	0	0	0	0	0
01:00–01:59	0	0	0	0	0	0	0	0
02:00–02:59	0	0	0	0	0	0	0	0
03:00–03:59	0	0	0	0	0	0	0	0
04:00–04:59	0	0	0	0	0	0	0	0
05:00–05:59	145	1	174	1	167	1	178	1
06:00–06:59	499	6	545	6	555	6	672	8
07:00–07:59	515	6	609	7	700	8	815	9
08:00–08:59	217	3	283	4	361	5	470	6
09:00–09:59	170	2	244	3	267	3	254	3
10:00–10:59	266	4	307	4	298	4	369	4
11:00–11:59	492	5	635	6	658	6	642	6
12:00–12:59	56	1	53	1	55	1	104	2
13:00–13:59	347	3	393	3	572	5	660	5
14:00–14:59	308	4	328	4	335	4	442	5
15:00–15:59	400	6	592	8	637	8	751	8
16:00–16:59	72	1	75	1	41	1	50	1
17:00–17:59	366	5	386	5	472	6	675	8
18:00–18:59	339	5	373	5	334	5	391	5
19:00–19:59	213	3	301	4	327	4	412	5
20:00–20:59	203	3	252	4	332	5	453	5
21:00–21:59	56	1	53	1	55	1	57	1
22:00–22:59	56	1	53	1	90	1	92	1
23:00–23:59	0	0	0	0	0	0	0	0

NOTES:
The design day flight schedule is based on June 16, 2015.
PAX – Passengers
OPS – Operations
SOURCES: Innovata, January 2017; U.S. Department of Transportation, T-100, January 2017; Ricondo & Associates, Inc., February 2017.

TABLE 3-35 BLOCK HOUR PROFILE—PASSENGER AIRLINES DEPARTURES, HIGH SCENARIO FORECAST

	DEPARTURES							
	2015		2020		2025		2035	
BLOCK HOUR	PAX	OPS	PAX	OPS	PAX	OPS	PAX	OPS
00:00–00:59	0	0	0	0	0	0	0	0
01:00–01:59	0	0	0	0	0	0	0	0
02:00–02:59	0	0	0	0	0	0	0	0
03:00–03:59	0	0	0	0	0	0	0	0
04:00–04:59	0	0	0	0	0	0	0	0
05:00–05:59	145	1	174	1	167	1	178	1
06:00–06:59	499	6	670	7	683	7	800	9
07:00–07:59	515	6	739	9	834	10	957	11
08:00–08:59	217	3	408	5	489	6	598	7
09:00–09:59	170	2	244	3	267	3	254	3
10:00–10:59	266	4	307	4	432	6	511	6
11:00–11:59	492	5	635	6	702	7	672	7
12:00–12:59	56	1	53	1	55	1	104	2
13:00–13:59	347	3	393	3	572	5	674	5
14:00–14:59	308	4	328	4	341	5	456	6
15:00–15:59	400	6	592	8	643	9	765	9
16:00–16:59	72	1	75	1	41	1	50	1
17:00–17:59	366	5	386	5	478	7	688	9
18:00–18:59	339	5	498	6	461	6	533	6
19:00–19:59	213	3	301	4	333	5	426	6
20:00–20:59	203	3	252	4	332	5	453	5
21:00–21:59	56	1	53	1	55	1	57	1
22:00–22:59	56	1	53	1	90	1	92	1
23:00–23:59	0	0	0	0	0	0	0	0

NOTES:
The design day flight schedule is based on June 16, 2015.
PAX – Passengers
OPS – Operations
SOURCES: Innovata, January 2017; U.S. Department of Transportation, T-100, January 2017; Ricondo & Associates, Inc., February 2017.

TABLE 3-36 BLOCK HOUR PROFILE—PASSENGER AIRLINES TOTALS, BASELINE FORECAST

	TOTAL							
	2015		2020		2025		2035	
BLOCK HOUR	PAX	OPS	PAX	OPS	PAX	OPS	PAX	OPS
00:00–00:59	183	2	208	2	215	2	176	2
01:00–01:59	0	0	0	0	0	0	0	0
02:00–02:59	0	0	0	0	0	0	0	0
03:00–03:59	0	0	0	0	0	0	0	0
04:00–04:59	0	0	0	0	0	0	0	0
05:00–05:59	145	1	174	1	167	1	178	1
06:00–06:59	499	6	545	6	555	6	672	8
07:00–07:59	515	6	609	7	746	9	969	11
08:00–08:59	356	5	497	7	583	8	763	9
09:00–09:59	259	3	372	4	408	4	402	4
10:00–10:59	544	8	640	8	597	8	770	8
11:00–11:59	909	10	1,202	12	1,257	12	1,284	13
12:00–12:59	311	3	324	3	506	5	632	6
13:00–13:59	777	8	881	8	1,083	10	1,282	11
14:00–14:59	416	6	546	8	577	8	843	9
15:00–15:59	774	11	978	13	1,058	13	1,212	13
16:00–16:59	333	4	346	4	411	5	573	7
17:00–17:59	595	8	626	8	686	9	910	11
18:00–18:59	624	10	673	10	650	10	806	11
19:00–19:59	585	7	893	11	966	12	1,090	13
20:00–20:59	406	6	464	7	525	8	627	8
21:00–21:59	471	7	562	8	603	8	772	9
22:00–22:59	302	4	305	4	407	4	523	6
23:00–23:59	518	5	560	5	617	6	673	6

NOTES:
The design day flight schedule is based on June 16, 2015.
PAX – Passengers
OPS – Operations
SOURCES: Innovata, January 2017; U.S. Department of Transportation, T-100, January 2017; Ricondo & Associates, Inc., February 2017.

TABLE 3-37 BLOCK HOUR PROFILE—PASSENGER AIRLINES TOTALS, HIGH SCENARIO FORECAST

	TOTAL							
	2015		2020		2025		2035	
BLOCK HOUR	PAX	OPS	PAX	OPS	PAX	OPS	PAX	OPS
00:00–00:59	183	2	208	2	215	2	176	2
01:00–01:59	0	0	0	0	0	0	0	0
02:00–02:59	0	0	0	0	0	0	0	0
03:00–03:59	0	0	0	0	0	0	0	0
04:00–04:59	0	0	0	0	0	0	0	0
05:00–05:59	145	1	174	1	167	1	178	1
06:00–06:59	499	6	670	7	683	7	800	9
07:00–07:59	515	6	745	10	886	12	1,125	14
08:00–08:59	356	5	622	8	710	9	892	10
09:00–09:59	259	3	372	4	408	4	402	4
10:00–10:59	544	8	640	8	864	12	1,055	12
11:00–11:59	909	10	1,202	12	1,306	14	1,328	15
12:00–12:59	311	3	324	3	506	5	632	6
13:00–13:59	777	8	881	8	1,089	11	1,309	12
14:00–14:59	416	6	546	8	583	9	857	10
15:00–15:59	774	11	978	13	1,071	15	1,240	15
16:00–16:59	333	4	346	4	411	5	573	7
17:00–17:59	595	8	751	9	826	12	1,066	14
18:00–18:59	624	10	922	12	911	13	1,090	14
19:00–19:59	585	7	893	11	972	13	1,104	14
20:00–20:59	406	6	464	7	525	8	627	8
21:00–21:59	471	7	562	8	603	8	772	9
22:00–22:59	302	4	429	5	534	5	651	7
23:00–23:59	518	5	685	6	744	7	801	7

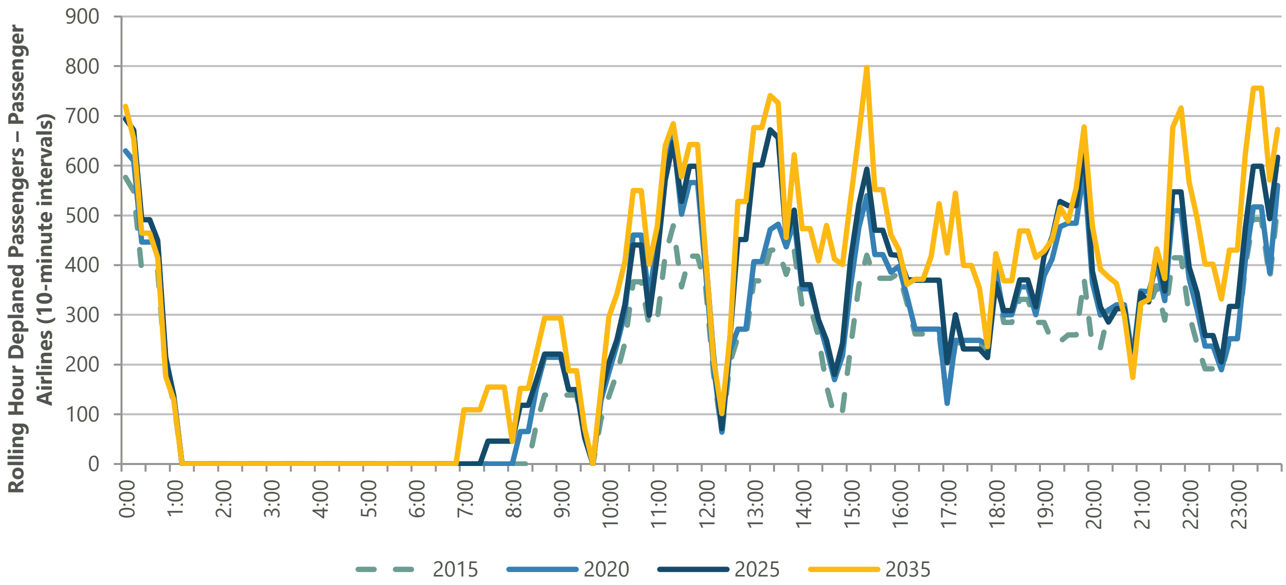
NOTES:
The design day flight schedule is based on June 16, 2015.
PAX – Passengers
OPS – Operations
SOURCES: Innovata, January 2017; U.S. Department of Transportation, T-100, January 2017; Ricondo & Associates, Inc., February 2017.

TABLE 3-38 PEAK ROLLING HOUR PROFILE—PASSENGER AIRLINES

	BASELINE FORECAST				HIGH SCENARIO FORECAST			
	2015	2020	2025	2035	2015	2020	2025	2035
Deplaned Passengers	576	659	694	798	576	766	854	1,013
Peak Rolling Hour–Deplaned Passengers	23:10–00:09	10:30–11:29	23:10–00:09	14:30–15:29	23:10–00:09	22:30–23:29; 22:40–23:39	22:30–23:29; 22:40–23:39	22:30–23:29; 22:40–23:39
Aircraft Arrivals	6	8	8	8	6	8	8	9
Peak Rolling Hour–Aircraft Arrivals	23:10–00:09; 14:30–15:29; 17:40–18:39; 17:50–18:49; 20:50–21:49; 21:00–21:59	14:30–15:29	14:30–15:29; 19:00–19:59	14:30–15:29; 19:00–19:59; 21:00–21:59	23:10–00:09; 14:30–15:29; 17:40–18:39; 17:50–18:49; 20:50–21:49; 21:00–21:59	14:30–15:29	14:30–15:29; 17:40–18:39; 18:30–19:29; 18:40–19:39; 19:00–19:59	17:50–18:49; 18:30–19:29; 22:20–23:19; 22:30–23:29; 22:40–23:39
Enplaned Passengers	774	886	925	957	774	1,010	1,053	1,085
Peak Rolling Hour–Enplaned Passengers	06:20–07:19	06:20–07:19	06:20–07:19	06:20–07:19	06:20–07:19	06:20–07:19	06:20–07:19	06:20–07:19
Aircraft Departures	8	9	9	10	8	10	10	11
Peak Rolling Hour–Aircraft Departures	06:20–07:19	06:20–07:19	06:20–07:19; 06:30–07:29; 06:40–07:39	06:20–07:19; 06:30–07:29	06:20–07:19	06:20–07:19	06:20–07:19; 06:30–07:29; 06:40–07:39; 07:00–07:59	06:20–07:19; 06:30–07:29; 07:00–07:59
Total Passengers	909	1,202	1,257	1,284	909	1,202	1,306	1,365
Peak Rolling Hour–Total Passengers	11:00–11:59	11:00–11:59	11:00–11:59	11:00–11:59	11:00–11:59	11:00–11:59	11:00–11:59	10:30–11:29
Total Aircraft Operations	11	13	13	14	11	14	16	18
Peak Rolling Hour–Total Aircraft Operations	15:00–15:59; 15:10–16:09; 17:40–18:39; 17:50–18:49	14:50–15:49; 15:00–15:59; 15:10–16:09	14:50–15:49; 15:00–15:59; 15:10–16:09	18:30–19:29	15:00–15:59; 15:10–16:09; 17:40–18:39; 17:50–18:49	18:30–19:29	18:30–19:29	18:30–19:29

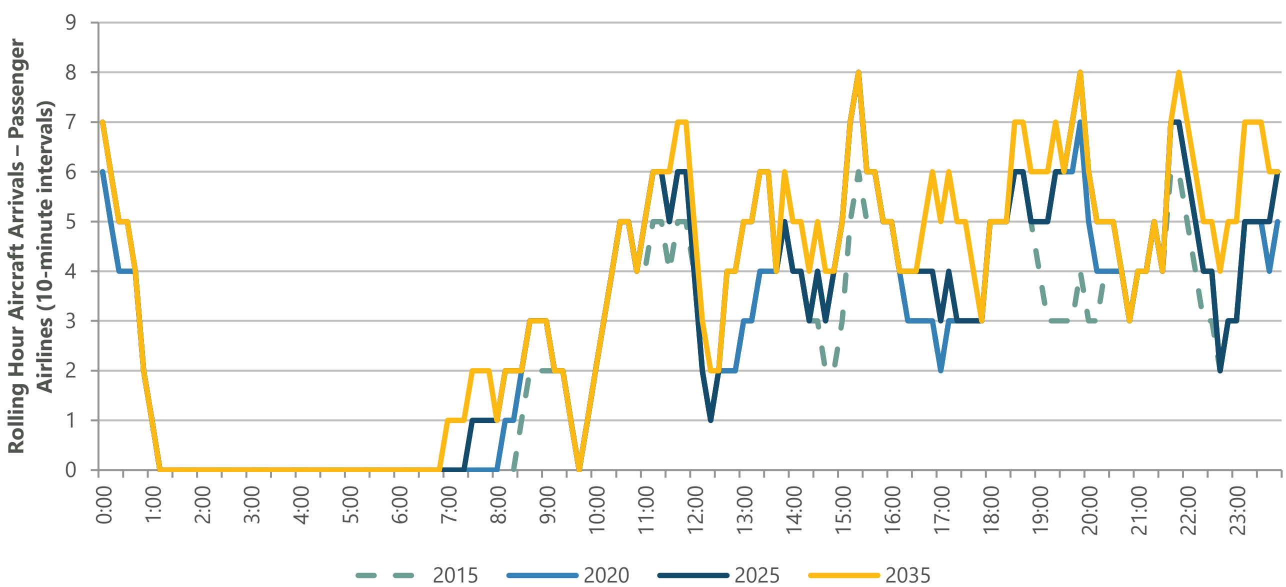
NOTE: The design day flight schedule is based on June 16, 2015.
SOURCES: Innovata, January 2017; U.S. Department of Transportation, T-100, January 2017; Ricondo & Associates, Inc., February 2017.

EXHIBIT 3-12 ROLLING HOUR DEPLANED PASSENGERS, BASELINE FORECAST



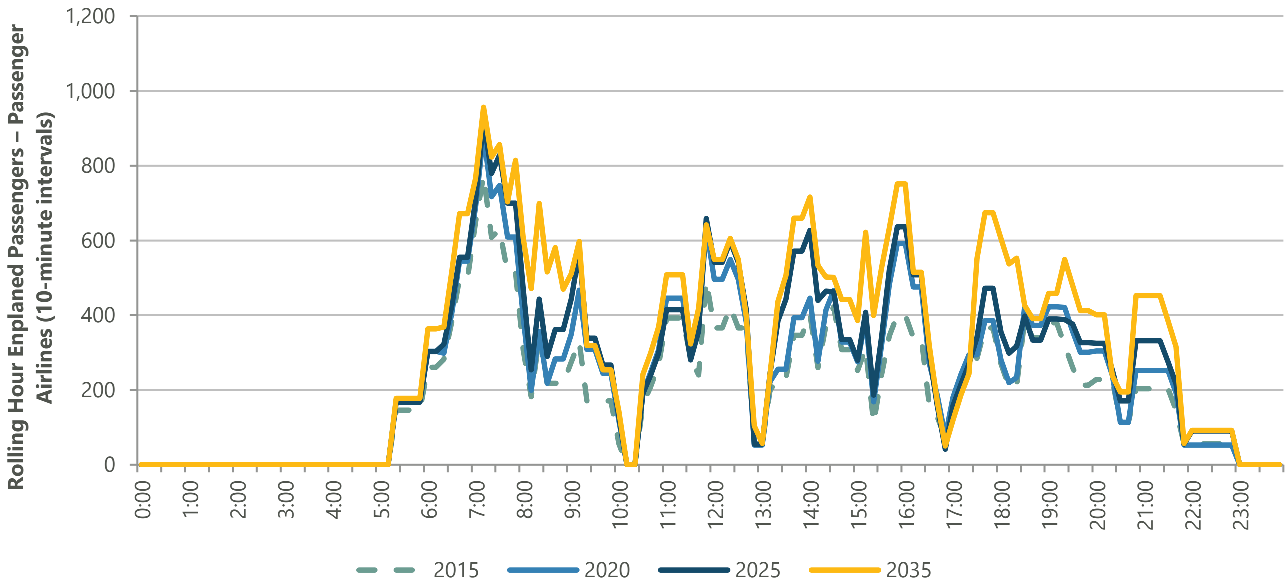
NOTE: The design day flight schedule is based on June 16, 2015.
SOURCES: Innovata, January 2017; U.S. Department of Transportation, T-100, January 2017; Ricondo & Associates, Inc., February 2017.

EXHIBIT 3-13 ROLLING HOUR AIRCRAFT ARRIVALS—PASSENGER AIRLINES, BASELINE FORECAST



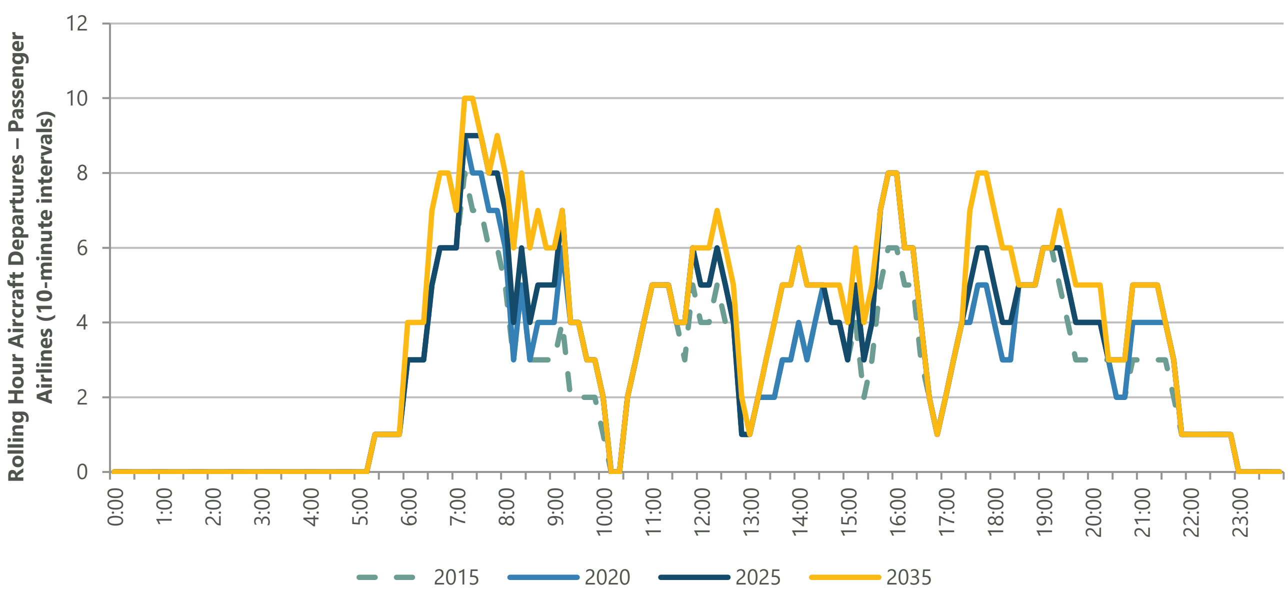
NOTE: The design day flight schedule is based on June 16, 2015.
SOURCES: Innovata, January 2017; U.S. Department of Transportation, T-100, January 2017; Ricondo & Associates, Inc., February 2017.

EXHIBIT 3-14 ROLLING HOUR ENPLANED PASSENGERS, BASELINE FORECAST



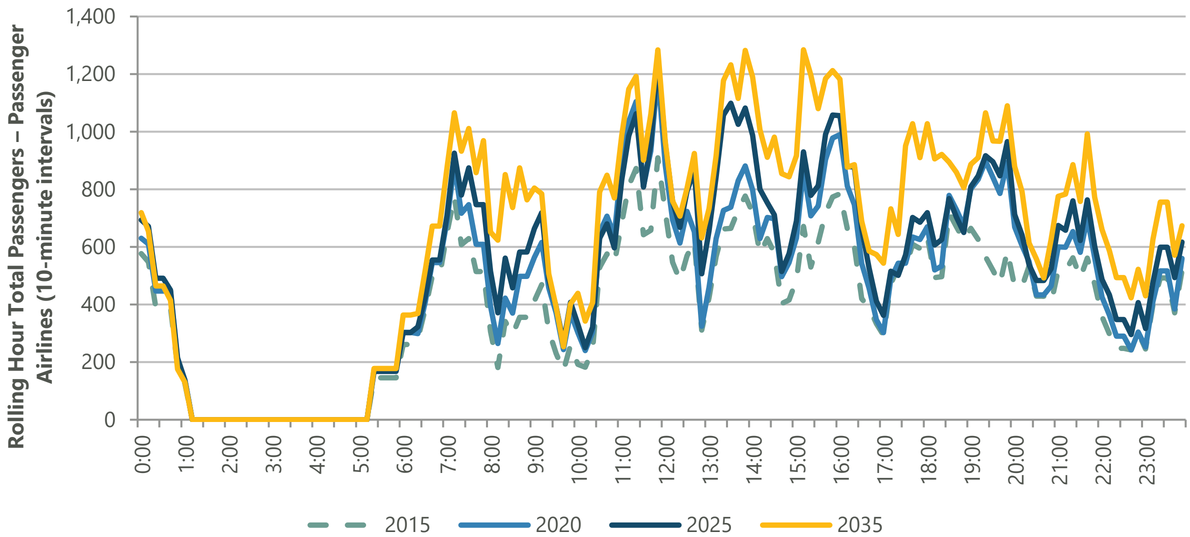
NOTE: The design day flight schedule is based on June 16, 2015.
SOURCES: Innovata, January 2017; U.S. Department of Transportation, T-100, January 2017; Ricondo & Associates, Inc., February 2017.

EXHIBIT 3-15 ROLLING HOUR AIRCRAFT DEPARTURES—PASSENGER AIRLINES, BASELINE FORECAST



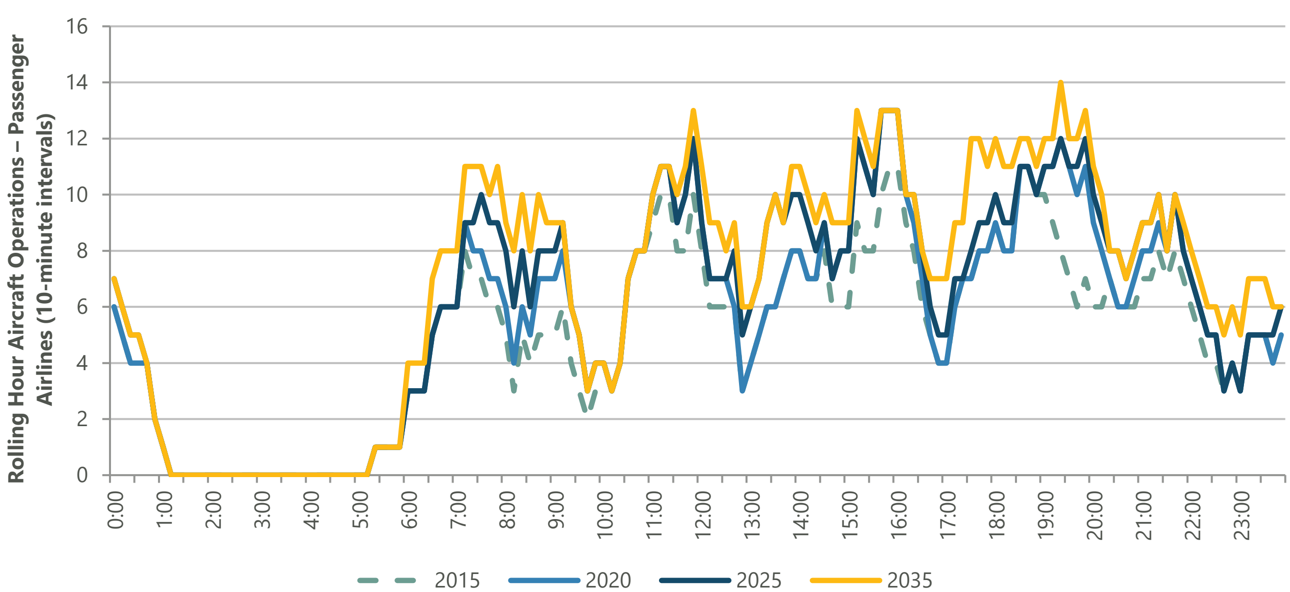
NOTE: The design day flight schedule is based on June 16, 2015.
SOURCES: Innovata, January 2017; U.S. Department of Transportation, T-100, January 2017; Ricondo & Associates, Inc., February 2017.

EXHIBIT 3-16 ROLLING HOUR TOTAL PASSENGERS, BASELINE FORECAST



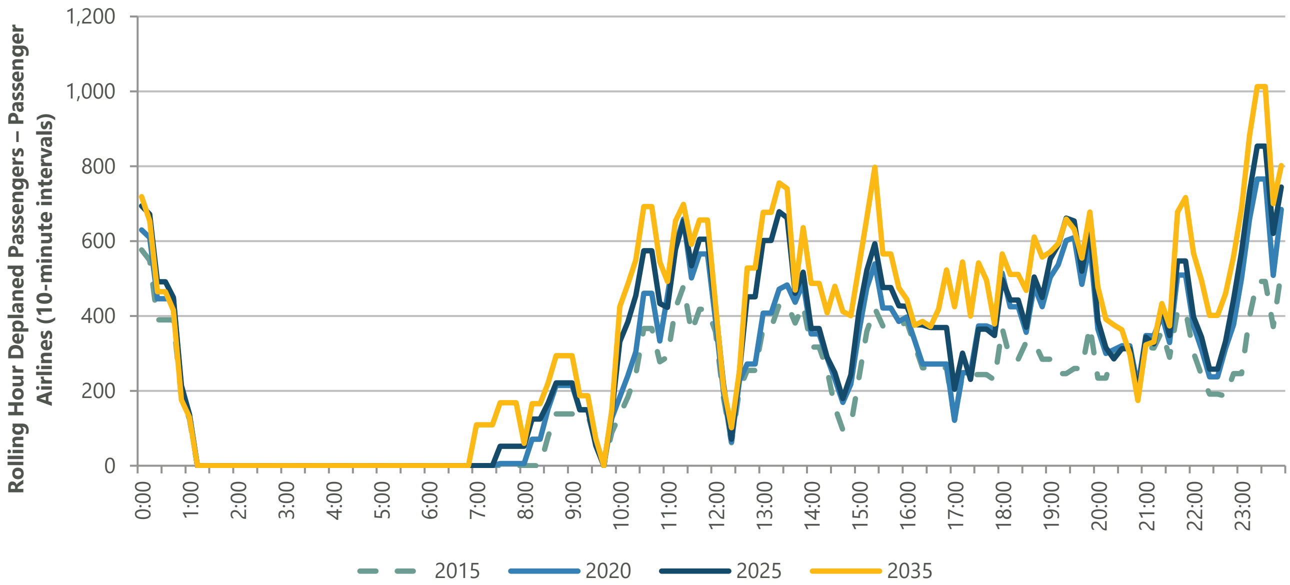
NOTE: The design day flight schedule is based on June 16, 2015.
SOURCES: Innovata, January 2017; U.S. Department of Transportation, T-100, January 2017; Ricondo & Associates, Inc., February 2017.

EXHIBIT 3-17 ROLLING HOUR AIRCRAFT OPERATIONS—PASSENGER AIRLINES, BASELINE FORECAST



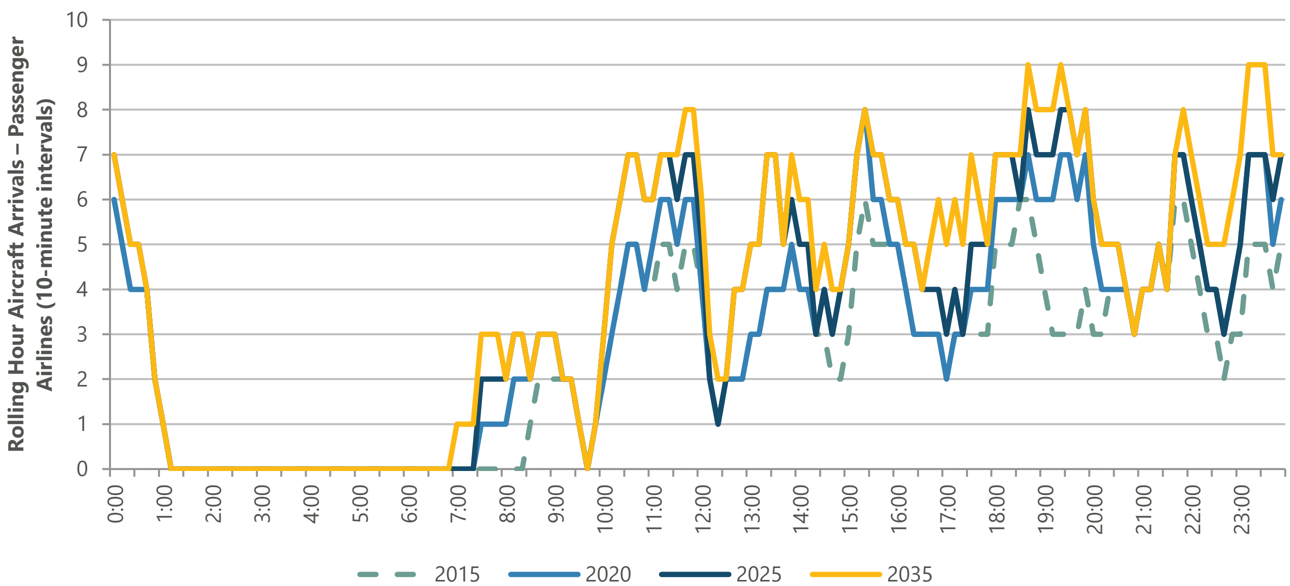
NOTE: The design day flight schedule is based on June 16, 2015.
SOURCES: Innovata, January 2017; U.S. Department of Transportation, T-100, January 2017; Ricondo & Associates, Inc., February 2017.

EXHIBIT 3-18 ROLLING HOUR DEPLANED PASSENGERS, HIGH SCENARIO FORECAST



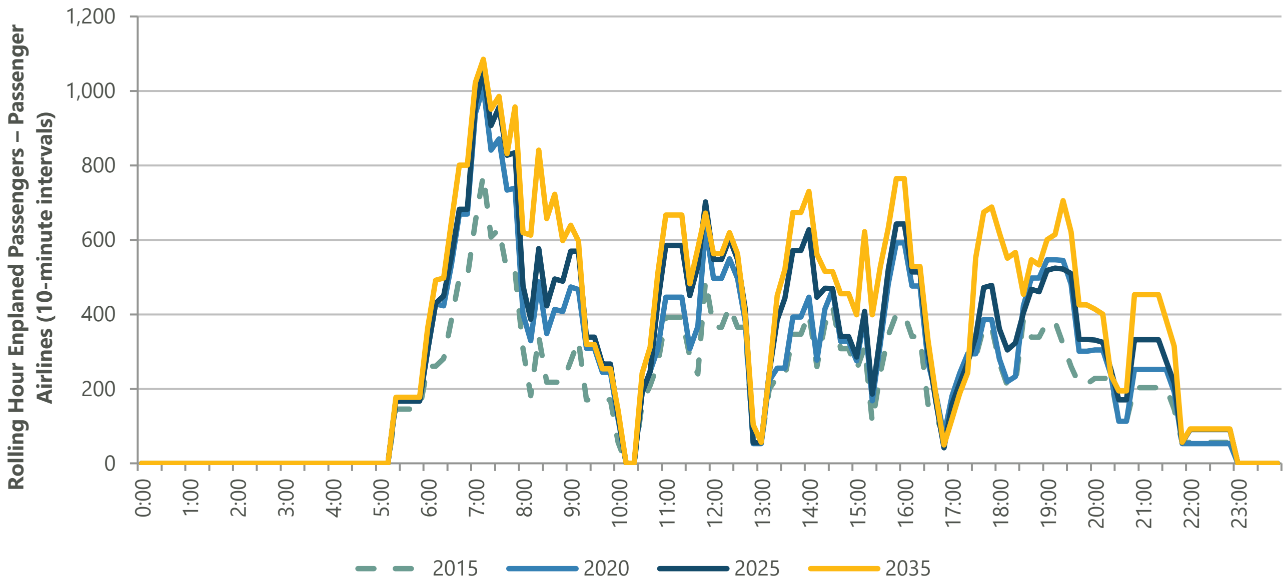
NOTE: The design day flight schedule is based on June 16, 2015.
SOURCES: Innovata, January 2017; U.S. Department of Transportation, T-100, January 2017; Ricondo & Associates, Inc., February 2017.

EXHIBIT 3-19 ROLLING HOUR AIRCRAFT ARRIVALS—PASSENGER AIRLINES, HIGH SCENARIO FORECAST



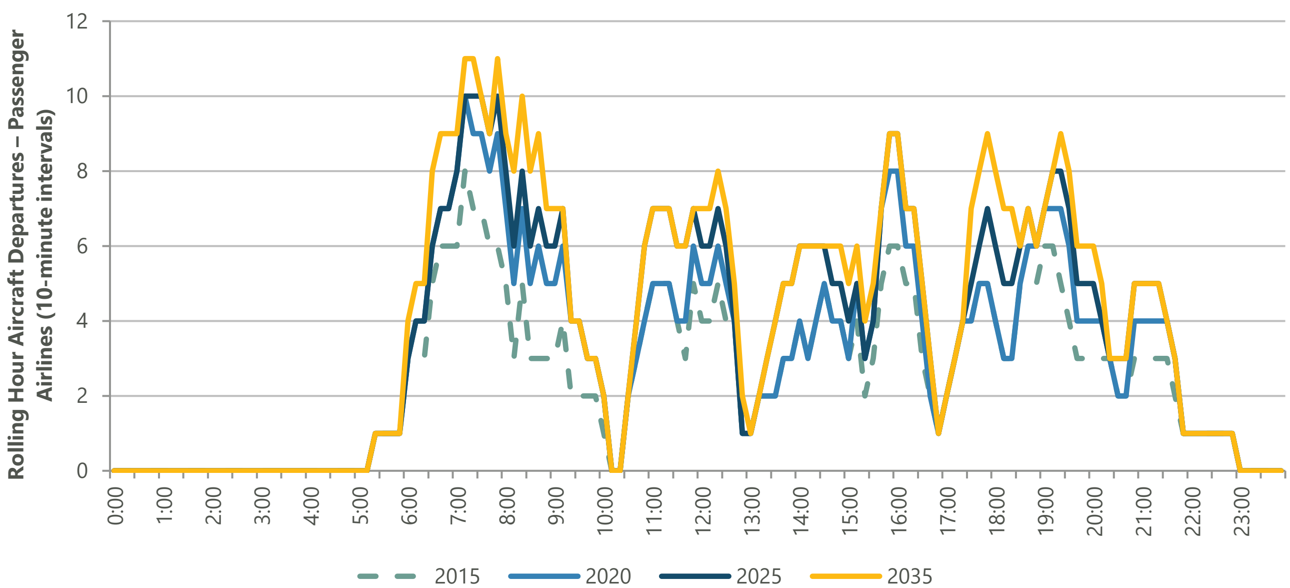
NOTE: The design day flight schedule is based on June 16, 2015.
SOURCES: Innovata, January 2017; U.S. Department of Transportation, T-100, January 2017; Ricondo & Associates, Inc., February 2017.

EXHIBIT 3-20 ROLLING HOUR ENPLANED PASSENGERS, HIGH SCENARIO FORECAST



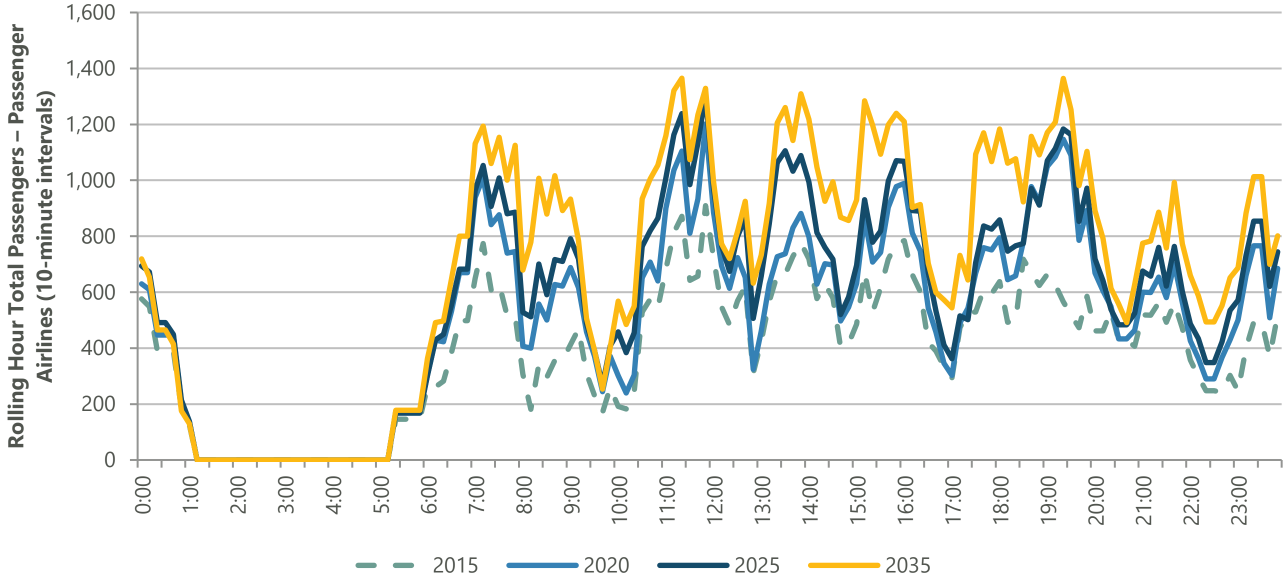
NOTE: The design day flight schedule is based on June 16, 2015.
SOURCES: Innovata, January 2017; U.S. Department of Transportation, T-100, January 2017; Ricondo & Associates, Inc., February 2017.

EXHIBIT 3-21 ROLLING HOUR AIRCRAFT DEPARTURES—PASSENGER AIRLINES, HIGH SCENARIO FORECAST



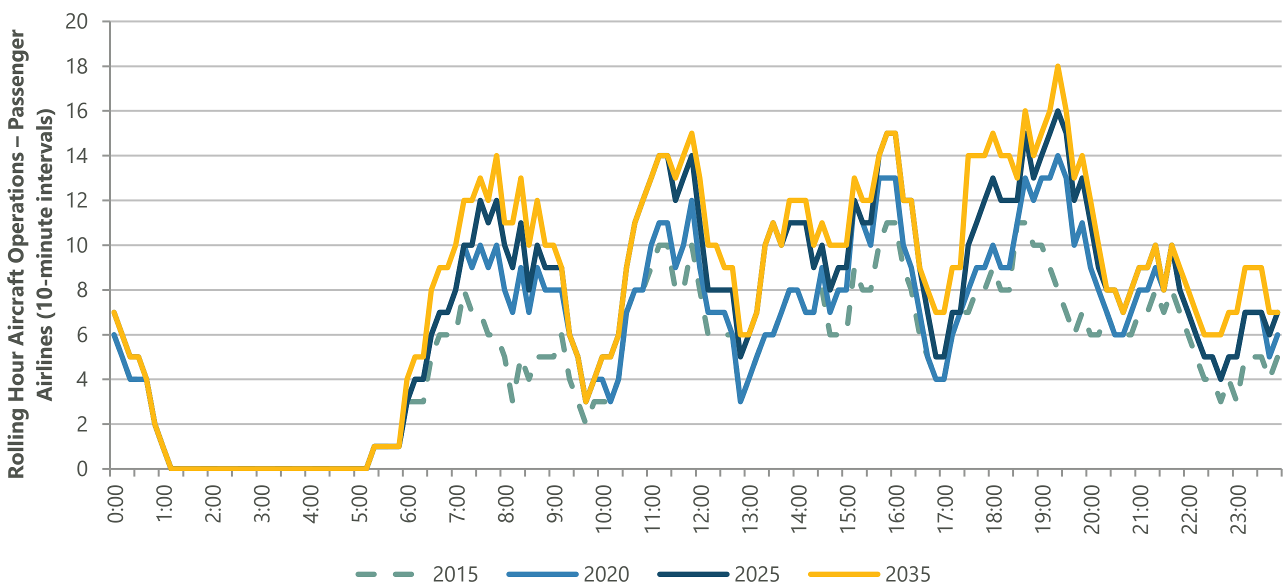
NOTE: The design day flight schedule is based on June 16, 2015.
SOURCES: Innovata, January 2017; U.S. Department of Transportation, T-100, January 2017; Ricondo & Associates, Inc., February 2017.

EXHIBIT 3-22 ROLLING HOUR TOTAL PASSENGERS, HIGH SCENARIO FORECAST



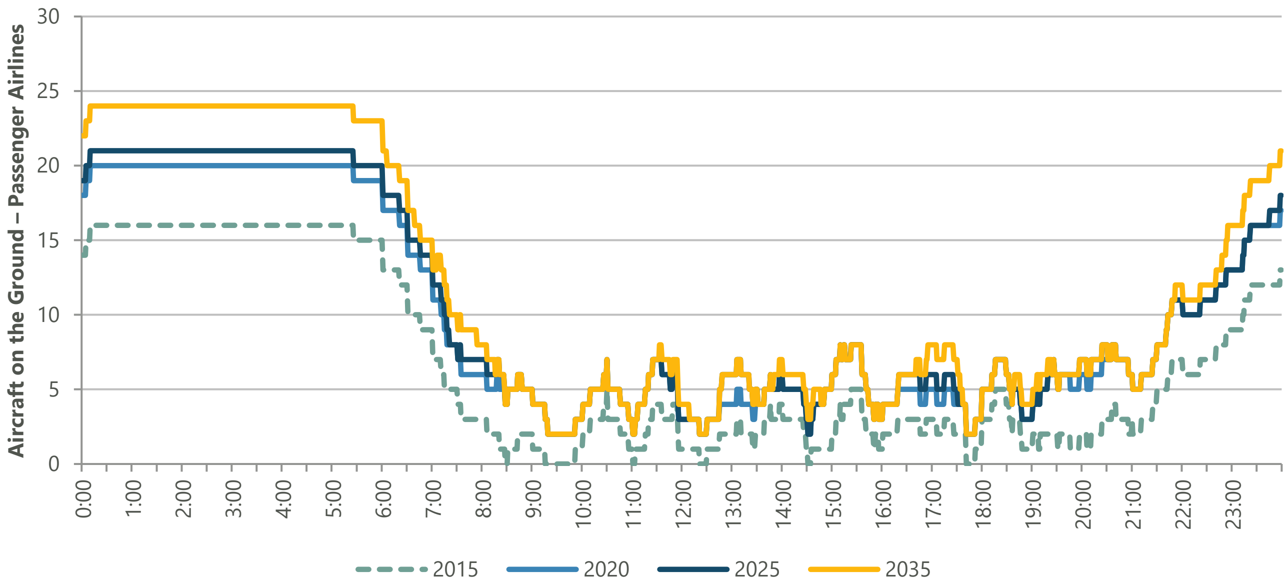
NOTE: The design day flight schedule is based on June 16, 2015.
SOURCES: Innovata, January 2017; U.S. Department of Transportation, T-100, January 2017; Ricondo & Associates, Inc., February 2017.

EXHIBIT 3-23 ROLLING HOUR AIRCRAFT OPERATIONS—PASSENGER AIRLINES, HIGH SCENARIO FORECAST



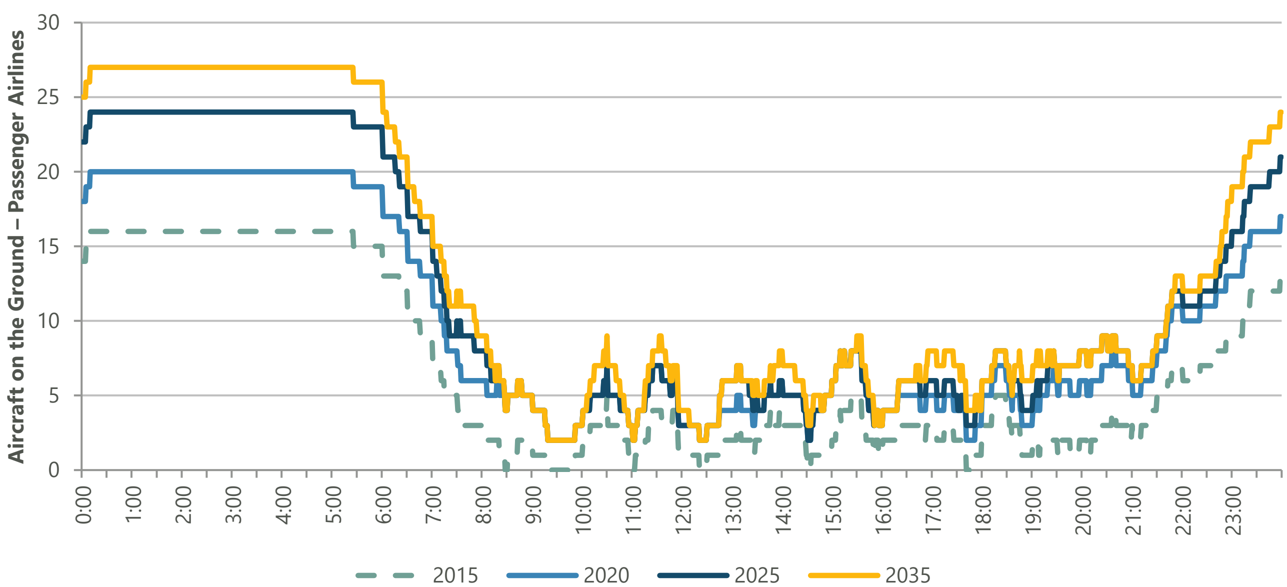
NOTE: The design day flight schedule is based on June 16, 2015.
SOURCES: Innovata, January 2017; U.S. Department of Transportation, T-100, January 2017; Ricondo & Associates, Inc., February 2017.

EXHIBIT 3-24 AIRCRAFT ON THE GROUND—PASSENGER AIRLINES, BASELINE FORECAST



NOTE: The design day flight schedule is based on June 16, 2015.
SOURCES: Innovata, January 2017; U.S. Department of Transportation, T-100, January 2017; Ricondo & Associates, Inc., February 2017.

EXHIBIT 3-25 AIRCRAFT ON THE GROUND—PASSENGER AIRLINES, HIGH SCENARIO FORECAST



NOTE: The design day flight schedule is based on June 16, 2015.
SOURCES: Innovata, January 2017; U.S. Department of Transportation, T-100, January 2017; Ricondo & Associates, Inc., February 2017.

3.9.4 DESIGN DAY FLIGHT SCHEDULE DEVELOPMENT—OTHER AIRCRAFT ACTIVITY

All cargo and other air taxi/general aviation DDFSs were based on data sourced from the FAA Traffic Flow Management System Counts (TFMSC), the FAA Operational Network (OPSNET), U.S. DOT Form T-100, and FlightAware. The annual operations growth from the Master Plan Update forecasts was used to guide the development of the DDFSs. Overall assumptions used in developing the other aircraft activity components of the DDFSs include the following:

- The design day-to-annual ratio of operations is expected to remain at or above the base year level throughout the forecast period. Furthermore, there is assumed to be an equal number of arrivals and departures for each type of operation.
- All cargo airlines are assumed to continue to serve the Airport throughout the forecast period.
- In an effort to capture the types of aircraft that operate at the Airport, aircraft types were based on those in the TFMSC data for June 2015 and on FlightAware data for two separate 1-week periods.
- Any operations occurring in the base year were assumed to occur in subsequent DDFSs, with no change in aircraft type. Additional operations were added considering the forecast change in fleet mix for other air taxi and general aviation operations.
- Arrival and departure times for other air taxi and general aviation operations were based on a percentage of aircraft operations in a block hour. The percentage assigned to a block hour was based on the percentage of operations in each block hour in June 2015. For example, if 8.0 percent of general aviation operations in June 2015 occurred in the block hour from 13:00 to 13:59, then 8.0 percent of general aviation aircraft operations were assigned to that hour. Times were assigned in the block hour based on actual observed arrival and departure times from FlightAware data.
- All cargo arrivals are assumed to be matched with a departure, whereas other air taxi and general aviation operations are not matched, under the assumption that these operations will typically have irregular ground times.

3.9.5 DESIGN DAY FLIGHT SCHEDULE SUMMARY—OTHER AIRCRAFT ACTIVITY

Results and statistics for other aircraft activity in 2015, 2020, 2025, and 2035 DDFSs are shown in **Table 3-39** and **Table 3-40** and on **Exhibit 3-26** through **Exhibit 3-30**. The other aircraft DDFS activity does not differ between the baseline forecast and the high scenario forecast.

3.9.6 DESIGN DAY FLIGHT SCHEDULE SUMMARY—TOTAL AIRPORT OPERATIONS

Results and statistics for the Airport's total activity in 2015, 2020, 2025, and 2035 are shown in **Table 3-41** through **Table 3-44** and on **Exhibit 3-31** through **Exhibit 3-40**. The results exclude military operations, which were not included in the design day. Results for both the baseline forecast and the high scenario forecast are presented.

TABLE 3-39 DESIGN DAY METRICS—OTHER AIRCRAFT ACTIVITY (OPERATIONS)

YEAR	ALL-CARGO	OTHER AIR TAXI/GENERAL AVIATION	OTHER AIRCRAFT ACTIVITY TOTAL
Design Day			
2015	18	240	258
2020	20	254	274
2025	22	270	292
2035	26	324	350
CAGR: 2015–2035	1.9%	1.5%	1.5%
Annual			
2015	5,312	69,706	75,018
2020	5,620	73,723	79,343
2025	6,305	78,687	84,992
2035	7,541	94,598	102,140
CAGR: 2015–2035	1.8%	1.5%	1.6%
Design Day-To-Annual Ration			
2015	0.339%	0.344%	0.344%
2020	0.356%	0.345%	0.345%
2025	0.349%	0.343%	0.344%
2035	0.345%	0.343%	0.343%

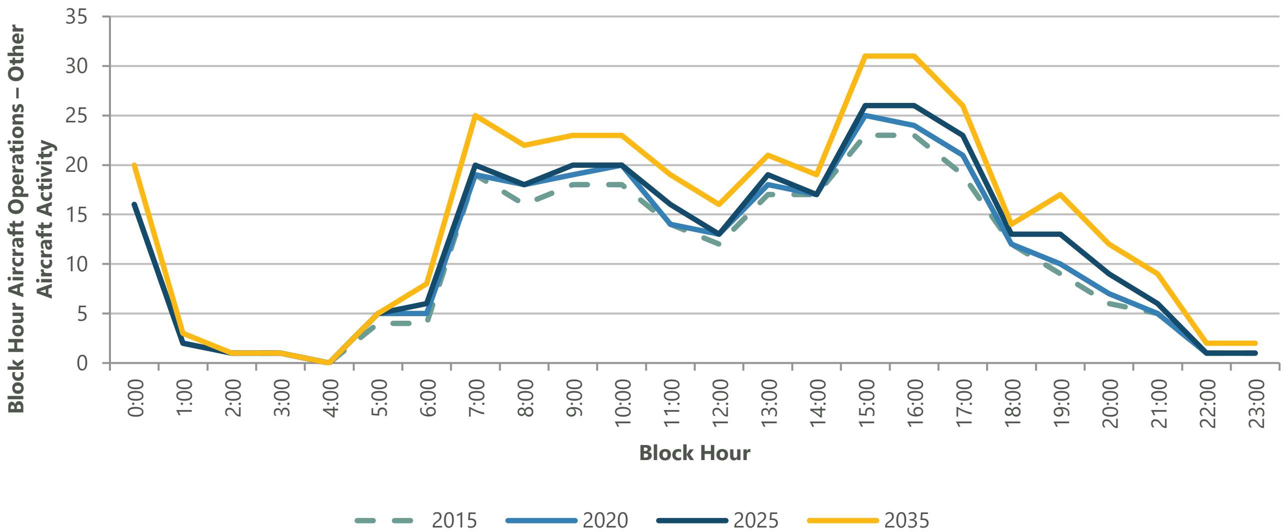
NOTES:
The design day flight schedule is based on June 16, 2015.
CAGR – Compound Annual Growth Rate
SOURCES: Federal Aviation Administration, Traffic Flow Management System Counts (TFMSC), January 2017; Federal Aviation Administration, Operations Network (OPSNET), January 2017; U.S. Department of Transportation, T-100, January 2017; FlightAware, January 2017; Ricondo & Associates, Inc., February 2017.

TABLE 3-40 DESIGN DAY FLEET MIX—OTHER AIRCRAFT ACTIVITY (OPERATIONS)

AIRCRAFT/TOTAL/SHARE	2015	2020	2025	2035
Cargo				
Small Piston/Turboprop	6	6	6	6
Narrowbody	2	2	2	4
Widebody	10	12	14	16
Cargo Total	18	20	22	26
Other Air Taxi/General Aviation				
Single-Engine	47	53	55	63
Multi-Engine	72	72	77	95
Jet	121	129	138	166
Other Air Taxi/General Aviation Total	240	254	270	324
Other Aircraft Activity Total	258	274	292	350
Share of Airport Total[1]	68.3%	66.8%	66.4%	67.8%
Airport Total[1]	378	410	440	516
Share of Airport Total[2]	68.3%	65.2%	62.9%	64.8%
Airport Total[2]	378	420	464	540

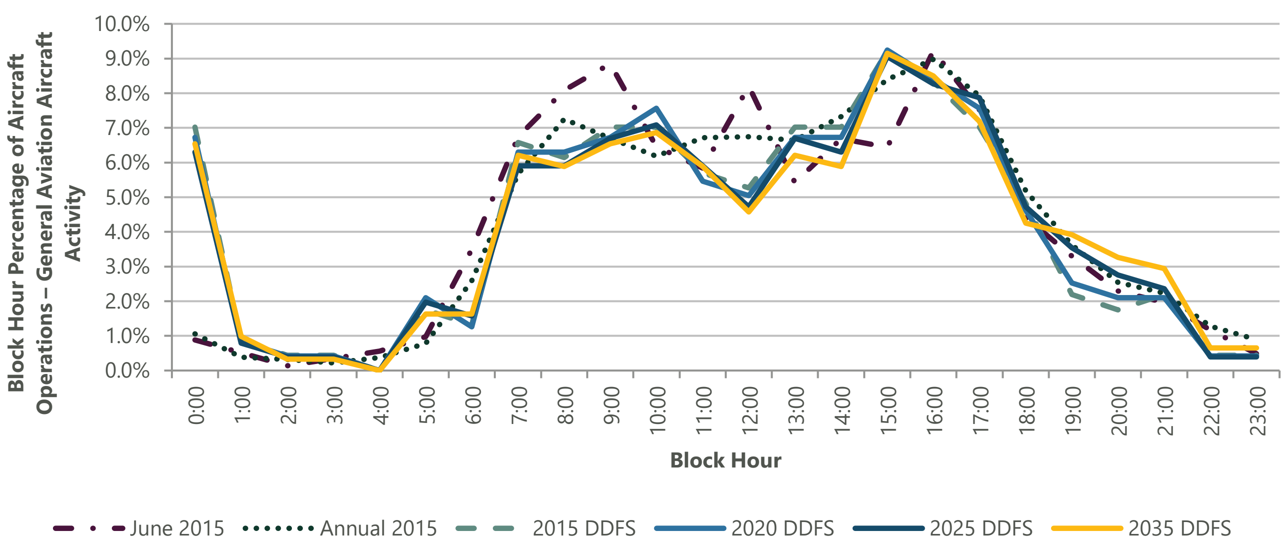
NOTES:
The design day flight schedule is based on June 16, 2015.
1 The Airport total for the baseline forecast.
2 The Airport total for the high scenario forecast.
SOURCES: Federal Aviation Administration, Traffic Flow Management System Counts (TFMSC), January 2017; Federal Aviation Administration, Operations Network (OPSNET), January 2017; U.S. Department of Transportation, T-100, January 2017; FlightAware, January 2017; Ricondo & Associates, Inc., February 2017.

EXHIBIT 3-26 DESIGN DAY BLOCK HOUR OPERATIONS—OTHER AIRCRAFT ACTIVITY



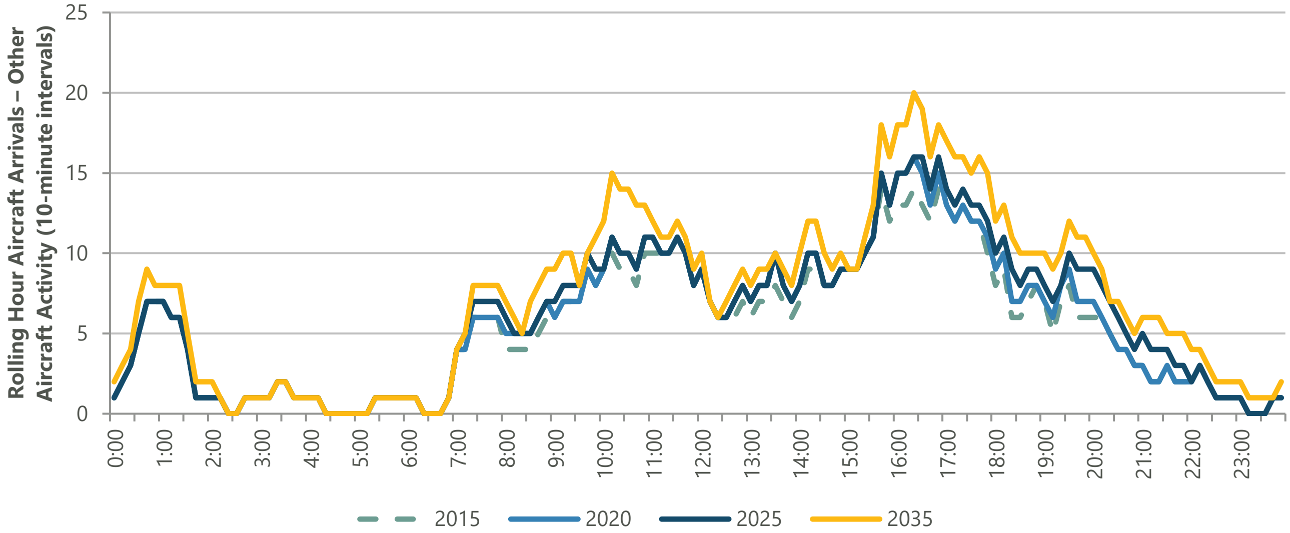
NOTE: The design day flight schedule is based on June 16, 2015.
SOURCES: Federal Aviation Administration, Traffic Flow Management System Counts (TFMSC), January 2017; Federal Aviation Administration, Operations Network (OPSNET), January 2017; U.S. Department of Transportation, T-100, January 2017; FlightAware, January 2017; Ricondo & Associates, Inc., February 2017.

EXHIBIT 3-27 BLOCK HOUR PERCENTAGE OF OPERATIONS COMPARISON—GENERAL AVIATION AIRCRAFT OPERATIONS



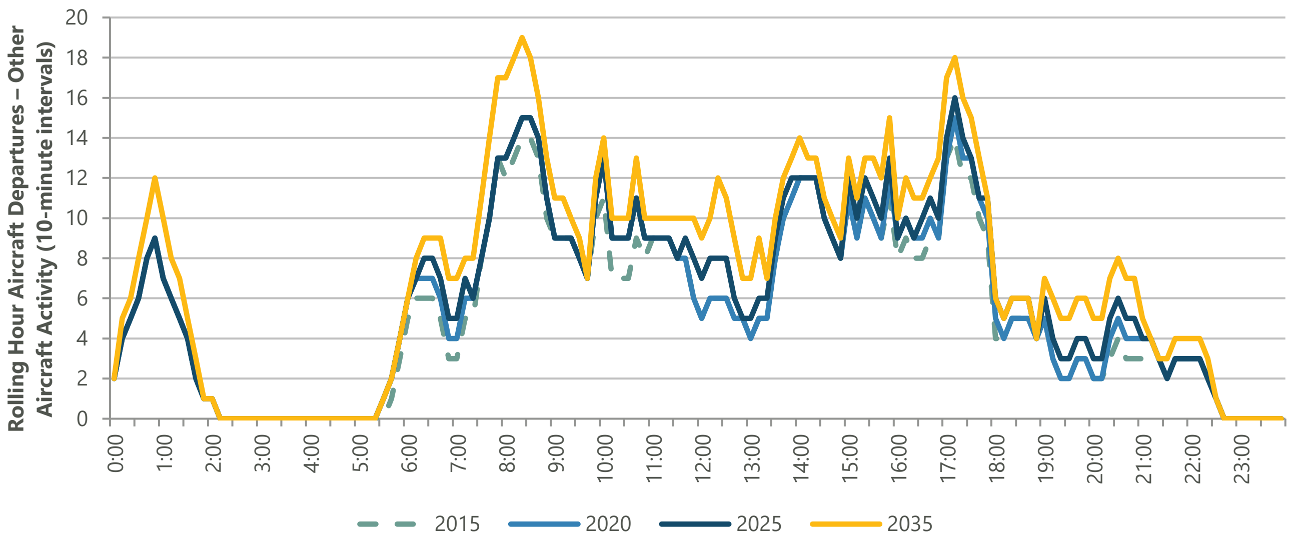
NOTE: The design day flight schedule (DDFS) is based on June 16, 2015.
SOURCES: Federal Aviation Administration, Traffic Flow Management System Counts (TFMSC), January 2017; Federal Aviation Administration, Operations Network (OPSNET), January 2017; U.S. Department of Transportation, T-100, January 2017; FlightAware, January 2017; Ricondo & Associates, Inc., February 2017.

EXHIBIT 3-28 ROLLING HOUR AIRCRAFT ARRIVALS—OTHER AIRCRAFT ACTIVITY



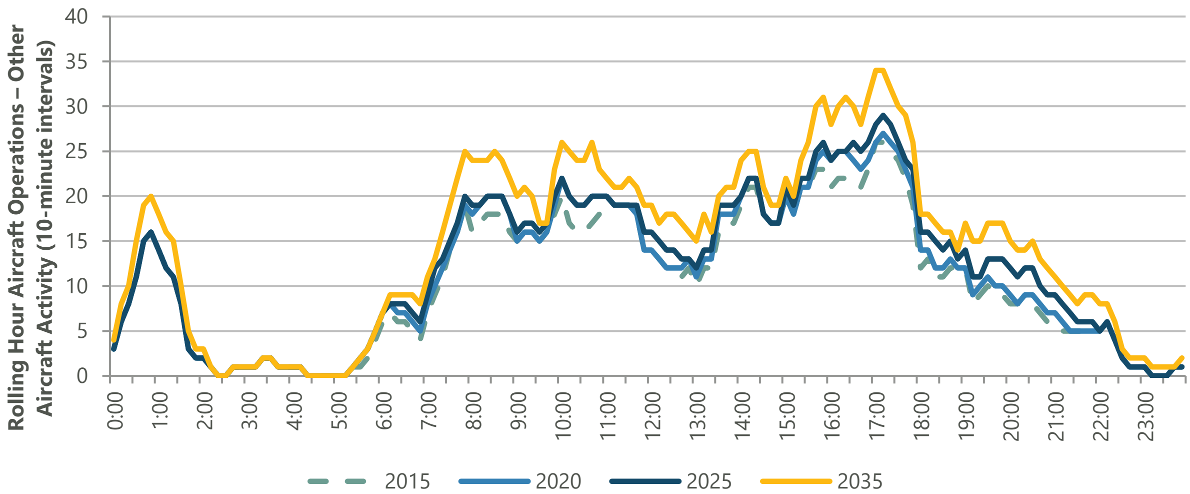
NOTE: The design day flight schedule is based on June 16, 2015.
SOURCES: Federal Aviation Administration, Traffic Flow Management System Counts (TFMSC), January 2017; Federal Aviation Administration, Operations Network (OPSNET), January 2017; U.S. Department of Transportation, T-100, January 2017; FlightAware, January 2017; Ricondo & Associates, Inc., February 2017.

EXHIBIT 3-29 ROLLING HOUR AIRCRAFT DEPARTURES—OTHER AIRCRAFT ACTIVITY



NOTE: The design day flight schedule is based on June 16, 2015.
SOURCES: Federal Aviation Administration, Traffic Flow Management System Counts (TFMSC), January 2017; Federal Aviation Administration, Operations Network (OPSNET), January 2017; U.S. Department of Transportation, T-100, January 2017; FlightAware, January 2017; Ricondo & Associates, Inc., February 2017.

EXHIBIT 3-30 ROLLING HOUR TOTAL AIRCRAFT OPERATIONS—OTHER AIRCRAFT ACTIVITY



NOTE: The design day flight schedule is based on June 16, 2015.

SOURCES: Federal Aviation Administration, Traffic Flow Management System Counts (TFMSC), January 2017; Federal Aviation Administration, Operations Network (OPSNET), January 2017; U.S. Department of Transportation, T-100, January 2017; FlightAware, January 2017; Ricondo & Associates, Inc., February 2017.

TABLE 3-41 DESIGN DAY METRICS—TOTAL AIRPORT AIRCRAFT OPERATIONS

	BASELINE FORECAST			HIGH SCENARIO FORCAST		
YEAR	DESIGN DAY	ANNUAL	RATIO	DESIGN DAY	ANNUAL	RATIO[1]
Enplaned Passengers						
2015	4,776	1,492,058	0.320%	4,776	1,492,058	0.320%
2020	5,732	1,796,348	0.319%	6,235	1,978,546	0.315%
2025	6,332	1,986,940	0.319%	7,050	2,227,794	0.316%
2035	7,566	2,376,682	0.318%	8,349	2,635,579	0.317%
CAGR: 2015–2035	2.3%	2.4%		2.8%	2.9%	
Total Aircraft Operations						
2015	378	131,974	0.286%	378	131,974	0.286%
2020	410	141,832	0.289%	420	145,509	0.289%
2025	440	150,742	0.292%	464	160,017	0.290%
2035	516	173,028	0.298%	540	182,303	0.296%
CAGR: 2015–2035	1.6%	1.4%		1.8%	1.6%	

NOTES:

The design day flight schedule is based on June 16, 2015. The aircraft operations exclude military operations.

CAGR – Compound Annual Growth Rate

1 The peak month average weekday-to-annual ratio for both enplaned passengers and aircraft operations are not assumed to be equal to 2015 levels throughout the planning horizon for the high scenario forecast due to the introduction of new service in the high scenario forecast.

SOURCES: Innovata, January 2017; Federal Aviation Administration, Traffic Flow Management System Counts (TFMSC), January 2017; Federal Aviation Administration, Operations Network (OPSNET), January 2017; U.S. Department of Transportation, T-100, January 2017; FlightAware, January 2017; Ricondo & Associates, Inc., February 2017.

TABLE 3-42 BLOCK HOUR PROFILE—TOTAL AIRPORT AIRCRAFT OPERATIONS, BASELINE FORECAST

	AIRCRAFT OPERATIONS											
	2015			2020			2025			2035		
BLOCK HOUR	ARR	DEP	TOT	ARR	DEP	TOT	ARR	DEP	TOT	ARR	DEP	TOT
00:00–00:59	9	9	18	9	9	18	9	9	18	10	12	22
01:00–01:59	1	1	2	1	1	2	1	1	2	2	1	3
02:00–02:59	1	0	1	1	0	1	1	0	1	1	0	1
03:00–03:59	1	0	1	1	0	1	1	0	1	1	0	1
04:00–04:59	0	0	0	0	0	0	0	0	0	0	0	0
05:00–05:59	1	4	5	1	5	6	1	5	6	1	5	6
06:00–06:59	1	9	10	1	10	11	1	11	12	1	15	16
07:00–07:59	6	19	25	6	20	26	8	21	29	10	26	36
08:00–08:59	8	13	21	10	15	25	10	16	26	12	19	31
09:00–09:59	9	12	21	9	14	23	10	14	24	12	15	27
10:00–10:59	14	12	26	15	13	28	15	13	28	17	14	31
11:00–11:59	13	11	24	14	12	26	14	14	28	16	16	32
12:00–12:59	9	6	15	10	6	16	12	6	18	13	9	22
13:00–13:59	11	14	25	12	14	26	12	17	29	14	18	32
14:00–14:59	11	12	23	13	12	25	13	12	25	14	14	28
15:00–15:59	17	17	34	18	20	38	18	21	39	21	23	44
16:00–16:59	17	10	27	18	10	28	20	11	31	24	14	38
17:00–17:59	13	14	27	14	15	29	15	17	32	18	19	37
18:00–18:59	13	9	22	13	9	22	14	9	23	16	9	25
19:00–19:59	10	6	16	14	7	21	17	8	25	19	11	30
20:00–20:59	6	6	12	6	8	14	7	10	17	8	12	20
21:00–21:59	8	4	12	9	4	13	10	4	14	13	5	18
22:00–22:59	4	1	5	4	1	5	4	1	5	7	1	8
23:00–23:59	6	0	6	6	0	6	7	0	7	8	0	8

NOTES:
The design day flight schedule is based on June 16, 2015. The aircraft operations exclude military operations.
ARR – Arrivals
DEP – Departures
TOT – Total
SOURCES: Innovata, January 2017; Federal Aviation Administration, Traffic Flow Management System Counts (TFMSC), January 2017; Federal Aviation Administration, Operations Network (OPSNET), January 2017; U.S. Department of Transportation, T-100, January 2017; FlightAware, January 2017; Ricondo & Associates, Inc., February 2017.

TABLE 3-43 BLOCK HOUR PROFILE—TOTAL AIRPORT AIRCRAFT OPERATIONS, HIGH SCENARIO FORECAST

BLOCK HOUR	AIRCRAFT OPERATIONS											
	2015			2020			2025			2035		
	ARR	DEP	TOT	ARR	DEP	TOT	ARR	DEP	TOT	ARR	DEP	TOT
00:00–00:59	9	9	18	9	9	18	9	9	18	10	12	22
01:00–01:59	1	1	2	1	1	2	1	1	2	2	1	3
02:00–02:59	1	0	1	1	0	1	1	0	1	1	0	1
03:00–03:59	1	0	1	1	0	1	1	0	1	1	0	1
04:00–04:59	0	0	0	0	0	0	0	0	0	0	0	0
05:00–05:59	1	4	5	1	5	6	1	5	6	1	5	6
06:00–06:59	1	9	10	1	11	12	1	12	13	1	16	17
07:00–07:59	6	19	25	7	22	29	9	23	32	11	28	39
08:00–08:59	8	13	21	10	16	26	10	17	27	12	20	32
09:00–09:59	9	12	21	9	14	23	10	14	24	12	15	27
10:00–10:59	14	12	26	15	13	28	17	15	32	19	16	35
11:00–11:59	13	11	24	14	12	26	15	15	30	17	17	34
12:00–12:59	9	6	15	10	6	16	12	6	18	13	9	22
13:00–13:59	11	14	25	12	14	26	13	17	30	15	18	33
14:00–14:59	11	12	23	13	12	25	13	13	26	14	15	29
15:00–15:59	17	17	34	18	20	38	19	22	41	22	24	46
16:00–16:59	17	10	27	18	10	28	20	11	31	24	14	38
17:00–17:59	13	14	27	15	15	30	17	18	35	20	20	40
18:00–18:59	13	9	22	14	10	24	16	10	26	18	10	28
19:00–19:59	10	6	16	14	7	21	17	9	26	19	12	31
20:00–20:59	6	6	12	6	8	14	7	10	17	8	12	20
21:00–21:59	8	4	12	9	4	13	10	4	14	13	5	18
22:00–22:59	4	1	5	5	1	6	5	1	6	8	1	9
23:00–23:59	6	0	6	7	0	7	8	0	8	9	0	9

NOTES:
The design day flight schedule is based on June 16, 2015.
The aircraft operations exclude military operations.
ARR – Arrivals
DEP – Departures
TOT – Total
SOURCES: Innovata, January 2017; Federal Aviation Administration, Traffic Flow Management System Counts (TFMSC), January 2017; Federal Aviation Administration, Operations Network (OPSNET), January 2017; U.S. Department of Transportation, T-100, January 2017; FlightAware, January 2017; Ricondo & Associates, Inc., February 2017.

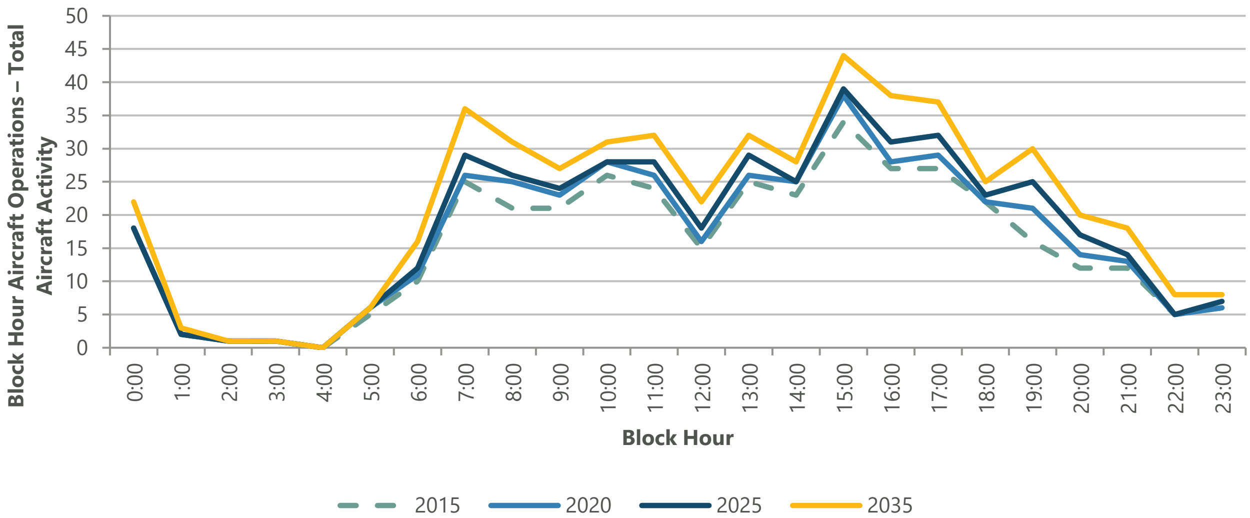
TABLE 3-44 PEAK ROLLING HOUR PROFILE—TOTAL AIRPORT

	BASELINE FORECAST				HIGH SCENARIO FORECAST			
	2015	2020	2025	2035	2015	2020	2025	2035
Deplaned Passengers	576	666	694	798	576	766	854	1,013
Peak Rolling Hour–Deplaned Passengers	23:10–00:09	10:30–11:29	23:10–00:09	14:30–15:29	23:10–00:09	22:30–23:29; 22:40–23:39	22:30–23:29; 22:40–23:39	22:30–23:29; 22:40–23:39
Aircraft Arrivals	19	21	21	24	19	21	22	25
Peak Rolling Hour–Aircraft Arrivals	14:50–15:49	14:50–15:49	14:50–15:49	14:50–15:49; 15:30–16:29; 16:00–16:59	14:50–15:49	14:50–15:49	14:50–15:49	15:30–16:29; 16:00–16:59
Enplaned Passengers	774	886	925	957	774	1,010	1,053	1,085
Peak Rolling Hour–Enplaned Passengers	06:20–07:19	06:20–07:19	06:20–07:19	06:20–07:19	06:20–07:19	06:20–07:19	06:20–07:19	06:20–07:19
Aircraft Departures	19	20	21	27	19	22	23	29
Peak Rolling Hour–Aircraft Departures	07:00–07:59; 07:30–08:29	07:00–07:59; 07:30–08:29; 15:00–15:59	07:00–07:59; 07:30–08:29; 15:00–15:59	07:00–07:59; 07:30–08:29	07:00–07:59; 07:30–08:29	07:00–07:59; 07:30–08:29	07:00–07:59; 07:30–08:29	07:30–08:29
Total Passengers	919	1,212	1,267	1,301	919	1,212	1,316	1,382
Peak Rolling Hour–Total Passengers	11:00–11:59	11:00–11:59	11:00–11:59	13:00–13:59	11:00–11:59	11:00–11:59	11:00–11:59	10:30–11:29
Total Aircraft Operations	34	38	39	44	34	38	41	46
Peak Rolling Hour–Total Aircraft Operations	15:00–15:59	15:00–15:59	15:00–15:59	15:00–15:59	15:00–15:59	15:00–15:59	15:00–15:59	15:00–15:59

NOTES: The design day flight schedule is based on June 16, 2015. The aircraft operations exclude military operations.

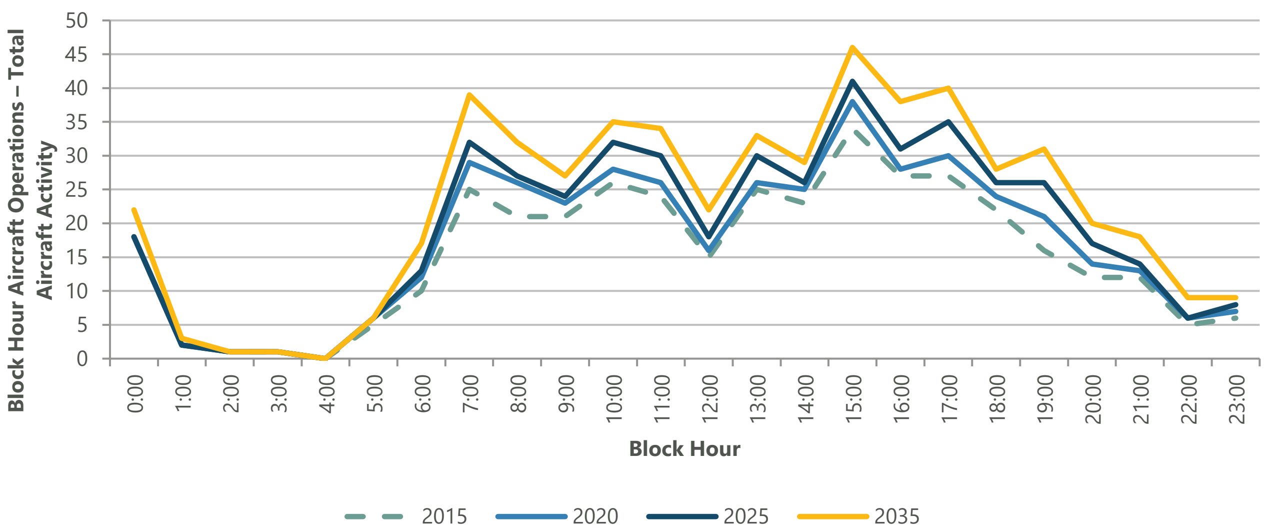
SOURCES: Innovata, January 2017; Federal Aviation Administration, Traffic Flow Management System Counts (TFMSC), January 2017; Federal Aviation Administration, Operations Network (OPSNET), January 2017; U.S. Department of Transportation, T-100, January 2017; FlightAware, January 2017; Ricondo & Associates, Inc., February 2017.

EXHIBIT 3-31 DESIGN DAY BLOCK HOUR AIRCRAFT OPERATIONS—TOTAL AIRPORT, BASELINE FORECAST



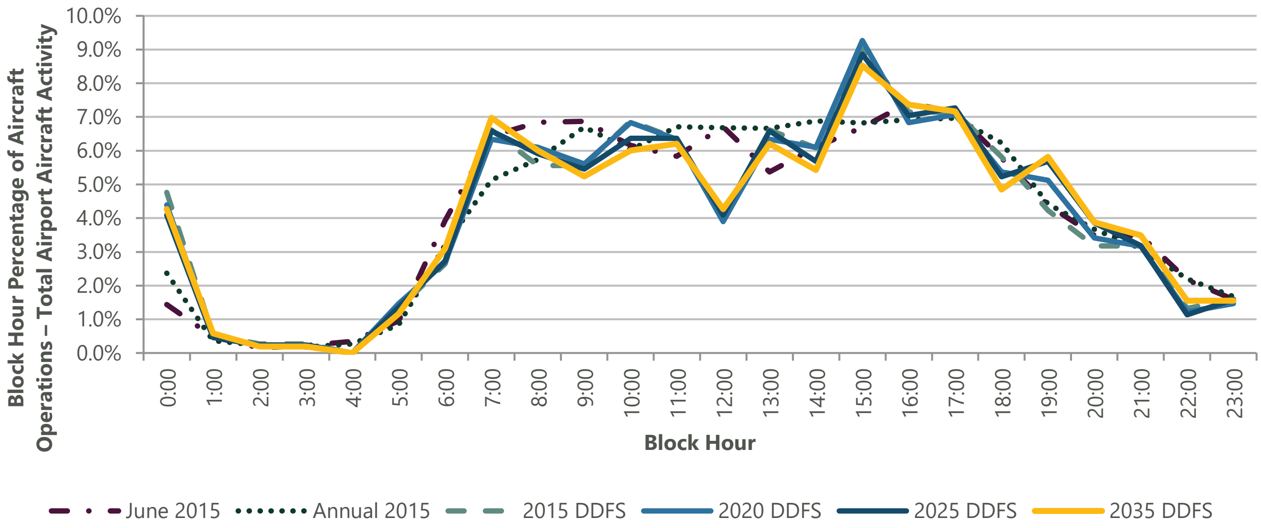
NOTES: The design day flight schedule is based on June 16, 2015. Aircraft activity excludes military operations.
SOURCES: Innovata, January 2017; Federal Aviation Administration, Traffic Flow Management System Counts (TFMSC), January 2017; Federal Aviation Administration, Operations Network (OPSNET), January 2017; U.S. Department of Transportation, T-100, January 2017; FlightAware, January 2017; Ricondo & Associates, Inc., February 2017.

EXHIBIT 3-32 DESIGN DAY BLOCK HOUR AIRCRAFT OPERATIONS—TOTAL AIRPORT, HIGH SCENARIO FORECAST



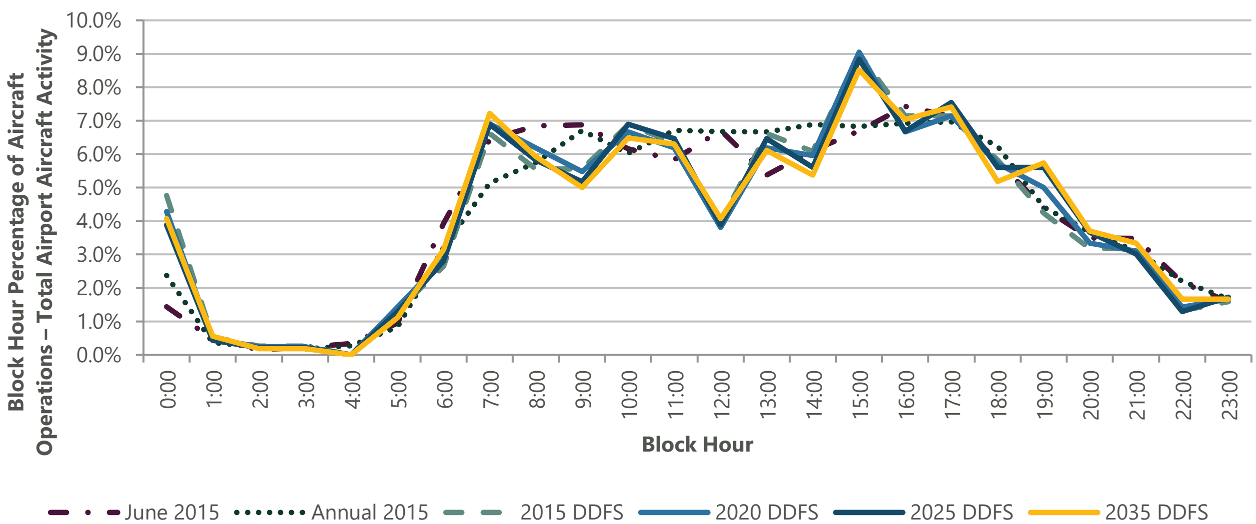
NOTES: The design day flight schedule is based on June 16, 2015. Aircraft activity excludes military operations.
SOURCES: Innovata, January 2017; Federal Aviation Administration, Traffic Flow Management System Counts (TFMSC), January 2017; Federal Aviation Administration, Operations Network (OPSNET), January 2017; U.S. Department of Transportation, T-100, January 2017; FlightAware, January 2017; Ricondo & Associates, Inc., February 2017.

EXHIBIT 3-33 BLOCK HOUR PERCENTAGE OF OPERATIONS COMPARISON—TOTAL AIRPORT, BASELINE FORECAST



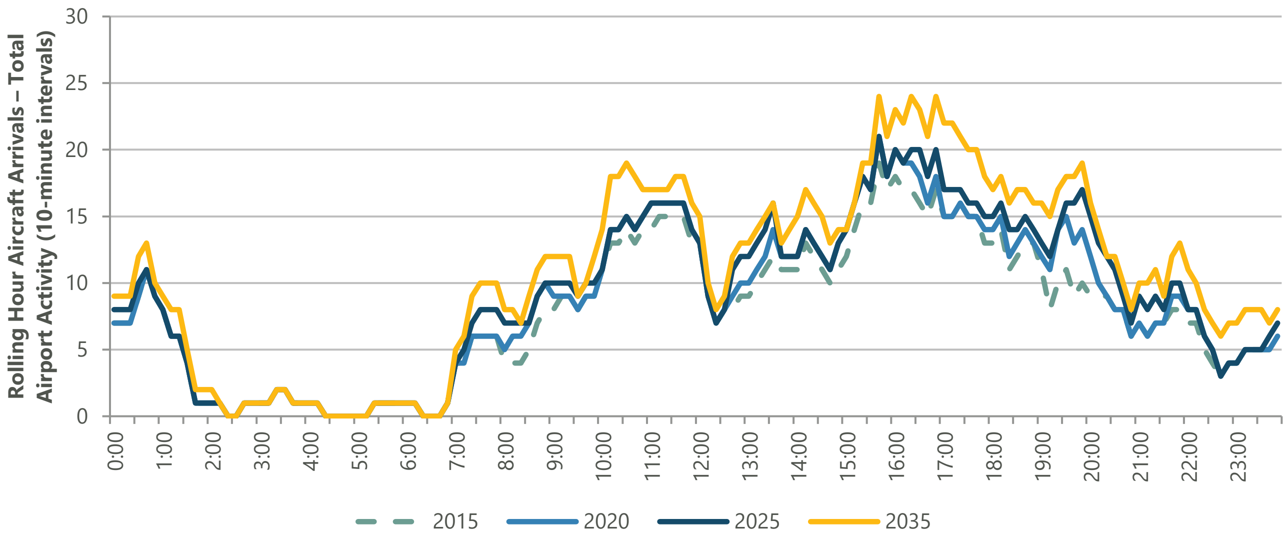
NOTES: The design day flight schedule (DDFS) is based on June 16, 2015. Aircraft activity excludes military operations.
SOURCES: Innovata, January 2017; Federal Aviation Administration, Traffic Flow Management System Counts (TFMSC), January 2017; Federal Aviation Administration, Operations Network (OPSNET), January 2017; U.S. Department of Transportation, T-100, January 2017; FlightAware, January 2017; Ricondo & Associates, Inc., February 2017.

EXHIBIT 3-34 BLOCK HOUR PERCENTAGE OF OPERATIONS COMPARISON —TOTAL AIRPORT, HIGH SCENARIO FORECAST



NOTES: The design day flight schedule (DDFS) is based on June 16, 2015. Aircraft activity excludes military operations.
SOURCES: Innovata, January 2017; Federal Aviation Administration, Traffic Flow Management System Counts (TFMSC), January 2017; Federal Aviation Administration, Operations Network (OPSNET), January 2017; U.S. Department of Transportation, T-100, January 2017; FlightAware, January 2017; Ricondo & Associates, Inc., February 2017.

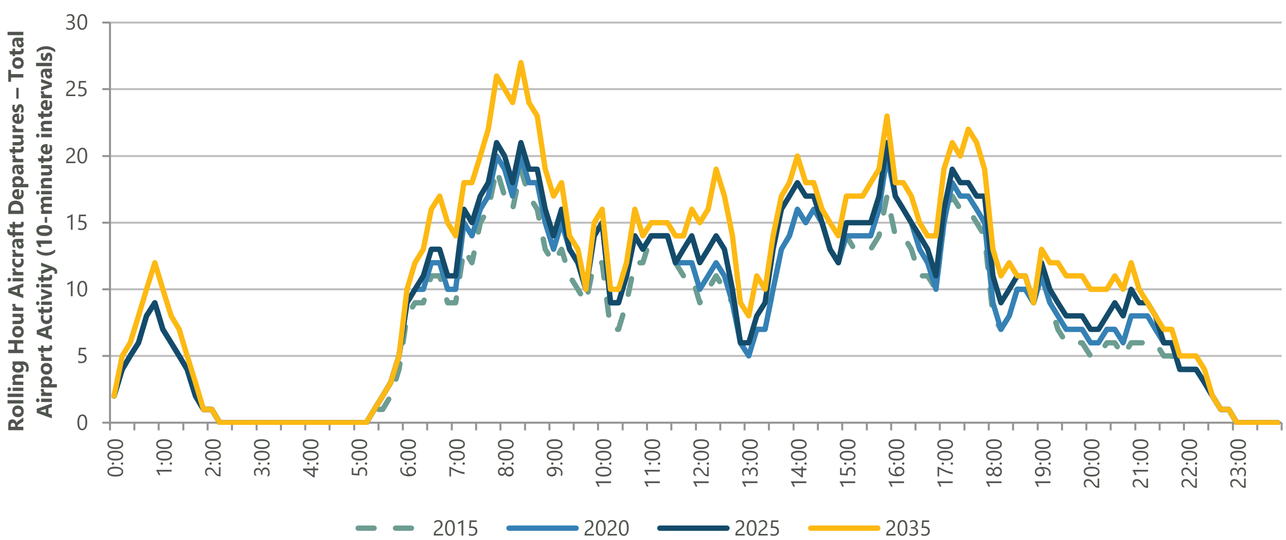
EXHIBIT 3-35 ROLLING HOUR AIRCRAFT ARRIVALS—TOTAL AIRPORT ACTIVITY, BASELINE FORECAST



NOTES: The design day flight schedule is based on June 16, 2015. Aircraft activity excludes military operations.

SOURCES: Innovata, January 2017; Federal Aviation Administration, Traffic Flow Management System Counts (TFMSC), January 2017; Federal Aviation Administration, Operations Network (OPSNET), January 2017; U.S. Department of Transportation, T-100, January 2017; FlightAware, January 2017; Ricondo & Associates, Inc., February 2017.

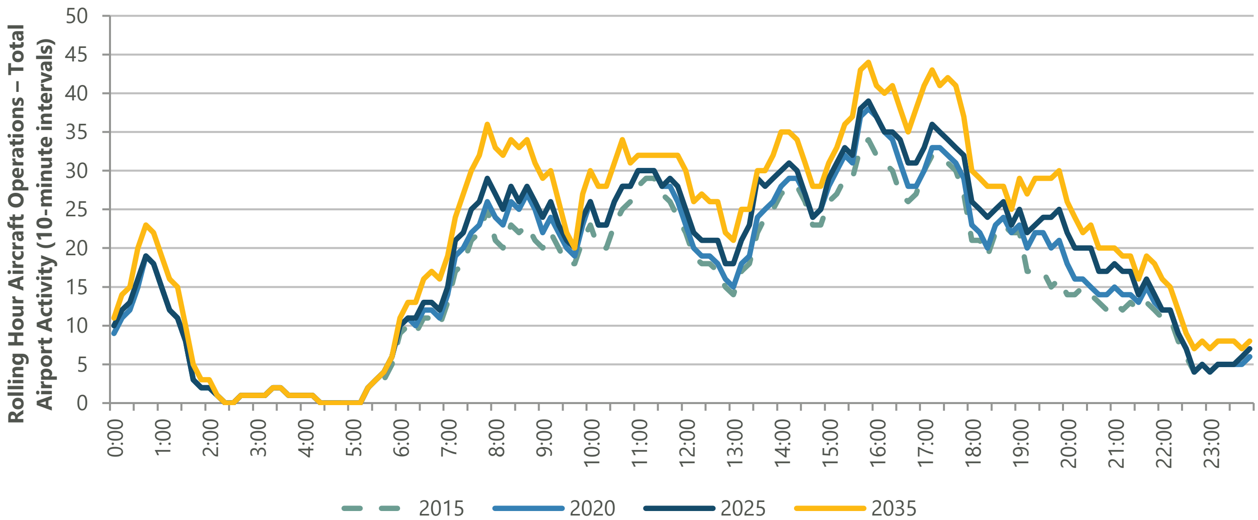
EXHIBIT 3-36 ROLLING HOUR AIRCRAFT DEPARTURES—TOTAL AIRPORT ACTIVITY, BASELINE FORECAST



NOTES: The design day flight schedule is based on June 16, 2015. Aircraft activity excludes military operations.

SOURCES: Innovata, January 2017; Federal Aviation Administration, Traffic Flow Management System Counts (TFMSC), January 2017; Federal Aviation Administration, Operations Network (OPSNET), January 2017; U.S. Department of Transportation, T-100, January 2017; FlightAware, January 2017; Ricondo & Associates, Inc., February 2017.

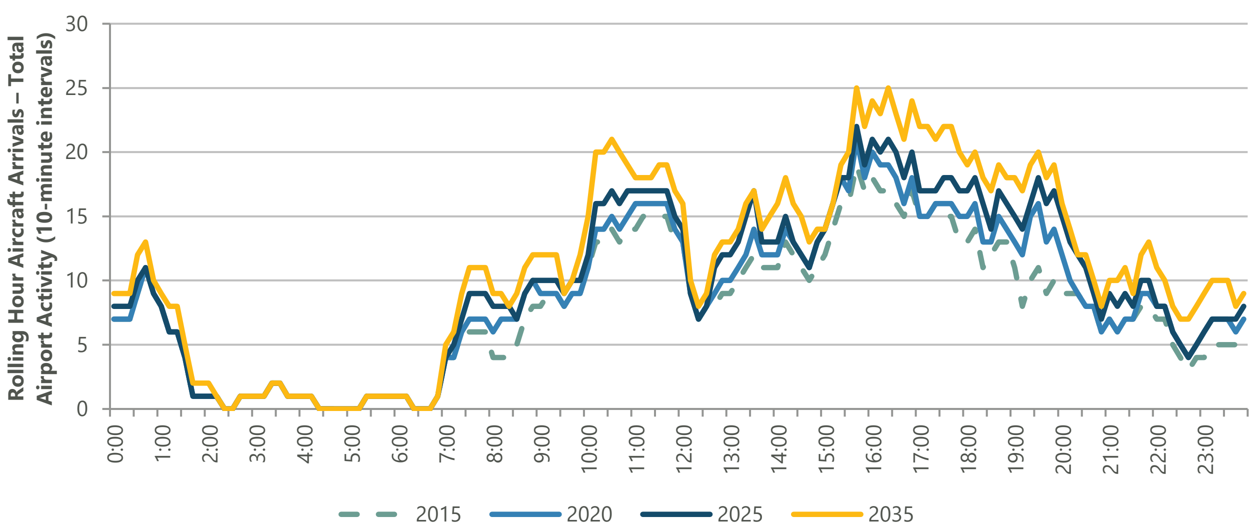
EXHIBIT 3-37 ROLLING HOUR AIRCRAFT OPERATIONS—TOTAL AIRPORT ACTIVITY, BASELINE FORECAST



NOTES: The design day flight schedule is based on June 16, 2015. Aircraft activity excludes military operations.

SOURCES: Innovata, January 2017; Federal Aviation Administration, Traffic Flow Management System Counts (TFMSC), January 2017; Federal Aviation Administration, Operations Network (OPSNET), January 2017; U.S. Department of Transportation, T-100, January 2017; FlightAware, January 2017; Ricondo & Associates, Inc., February 2017.

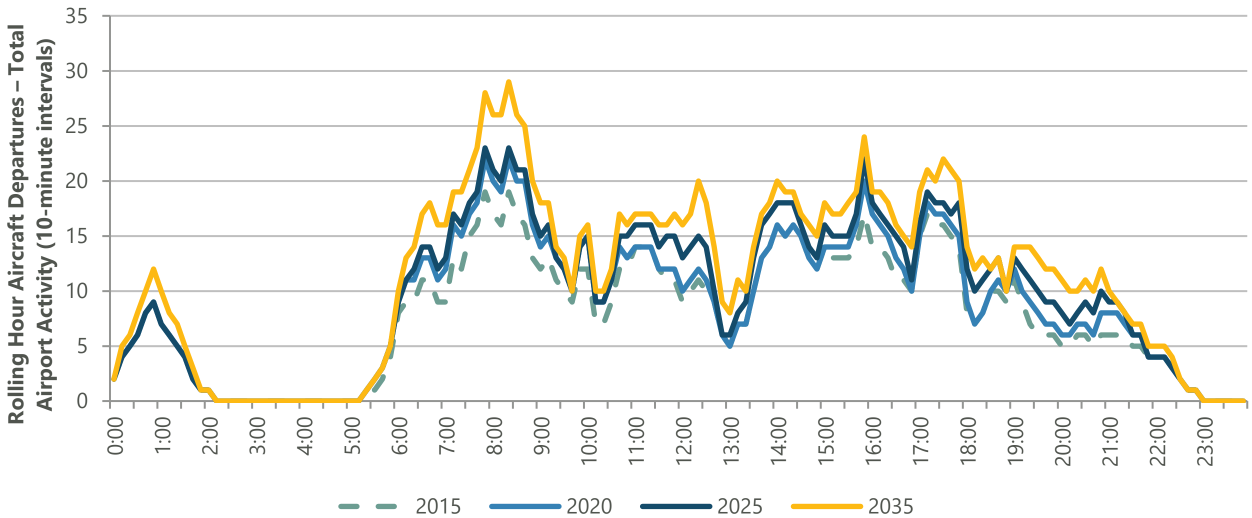
EXHIBIT 3-38 ROLLING HOUR AIRCRAFT ARRIVALS—TOTAL AIRPORT ACTIVITY, HIGH SCENARIO FORECAST



NOTES: The design day flight schedule is based on June 16, 2015. Aircraft activity excludes military operations.

SOURCES: Innovata, January 2017; Federal Aviation Administration, Traffic Flow Management System Counts (TFMSC), January 2017; Federal Aviation Administration, Operations Network (OPSNET), January 2017; U.S. Department of Transportation, T-100, January 2017; FlightAware, January 2017; Ricondo & Associates, Inc., February 2017.

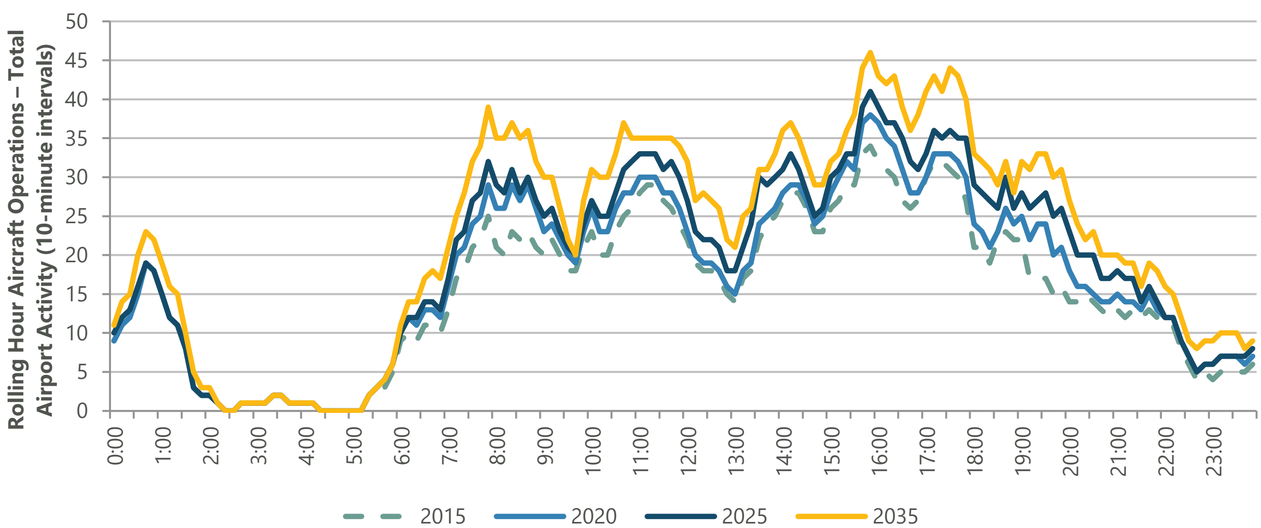
EXHIBIT 3-39 ROLLING HOUR AIRCRAFT DEPARTURES—TOTAL AIRPORT ACTIVITY, HIGH SCENARIO FORECAST



NOTES: The design day flight schedule is based on June 16, 2015. Aircraft activity excludes military operations.

SOURCES: Innovata, January 2017; Federal Aviation Administration, Traffic Flow Management System Counts (TFMSC), January 2017; Federal Aviation Administration, Operations Network (OPSNET), January 2017; U.S. Department of Transportation, T-100, January 2017; FlightAware, January 2017; Ricondo & Associates, Inc., February 2017.

EXHIBIT 3-40 ROLLING HOUR AIRCRAFT OPERATIONS—TOTAL AIRPORT ACTIVITY, HIGH SCENARIO FORECAST



NOTES: The design day flight schedule is based on June 16, 2015. Aircraft activity excludes military operations.

SOURCES: Innovata, January 2017; Federal Aviation Administration, Traffic Flow Management System Counts (TFMSC), January 2017; Federal Aviation Administration, Operations Network (OPSNET), January 2017; U.S. Department of Transportation, T-100, January 2017; FlightAware, January 2017; Ricondo & Associates, Inc., February 2017.

3.10 CONCLUSION

BOI experienced its greatest number of enplaned passengers and its greatest number of aircraft operations in 2007, followed by several years of reductions in service during the last recession in the United States. However, local and national socioeconomic conditions have stabilized and have begun to increase in recent years and are projected to increase through the end of the forecast period in 2035. Historically, enplaned passengers and air cargo volumes at the Airport have been positively correlated with socioeconomic variables, including employment, total earnings, per capita personal income, and gross regional product. Overall, the projected increase in socioeconomic conditions is expected to coincide with an increase in aviation activity at the Airport through 2035.

Three forecasts were developed to reflect the possible range of activity at the Airport. The low scenario assumes the occurrence of a recession, of similar magnitude and duration to past recessions in the United States, beginning in 2020. The high scenario assumes an LCC (e.g., Frontier Airlines, Spirit Airlines) begins service at the Airport in 2018 and a regional carrier begins service at the Airport in 2019, with BOI serving as a hub in its regional network.

Enplaned passengers at the Airport are forecast to increase from approximately 1.5 million in 2015 to between 2.0 and 2.6 million in 2035, with a baseline forecast of 2.4 million. Of these enplaned passengers, between approximately 97.5 and 97.7 percent are expected to be originating passengers, as opposed to connecting passengers transferring onto a departing flight after arriving from another airport.

Passenger airline operations are expected to grow at a slower pace than enplaned passengers, as the average aircraft size at the Airport is expected to increase over the forecast period from approximately 93 seats per departure in 2015 to approximately 107 seats per departure in 2035. Furthermore, load factors are assumed to remain relatively constant throughout the forecast period. The expected increase in aircraft size reflects an industry-wide trend toward larger aircraft and the retirement of many small regional jets.

Similar to enplaned passengers, cargo volumes and all-cargo operations have historically been positively correlated with socioeconomic variables, and both are expected to grow over the forecast period. General aviation and other air taxi aircraft operations are expected to increase; however, similar to passenger airline operations, there is a projected shift away from single-engine aircraft toward larger multi-engine or jet aircraft.

Overall, total operations are expected to increase from approximately 131,975 in 2015 to between approximately 158,900 and 182,300 in 2035, with a baseline forecast of approximately 173,030.

With the forecast increases, there is not expected to be a change in the share of annual operations and passengers occurring on the design day, and the overall profile of operations and passengers throughout the design day is not expected to change significantly throughout the forecast period.

3.11 ATTACHMENT A—FORECAST DATA FOR FAA REVIEW

Table 3-45 presents a summary of the forecast data provided for internal Federal Aviation Administration review. Data are presented in a template provided in the document *Forecasting Aviation Activity by Airport*.[1]

[1] GRA, Incorporated, *Forecasting Aviation Activity by Airport*, July 2001.

TABLE 3-45 (1 OF 2) FEDERAL AVIATION ADMINISTRATION FORECAST SUMMARY

BASE YEAR	A. FORECAST LEVELS AND GROWTH RATES					AVERAGE ANNUAL COMPOUND GROWTH RATES			
	BASE YEAR LEVEL	BASE YEAR + 1 YEAR	BASE YEAR + 5 YEARS	BASE YEAR + 10 YEARS	BASE YEAR + 20 YEARS	BASE YEAR + 1 YEAR	BASE YEAR + 5 YEARS	BASE YEAR + 10 YEARS	BASE YEAR + 20 YEARS
2015	**2015**	**2016**	**2020**	**2025**	**2035**	**2016**	**2020**	**2025**	**2035**
Passenger Enplanements									
Air Carrier	1,432,834	1,556,933	1,732,690	1,924,644	2,333,606	8.66%	3.87%	2.99%	2.47%
Commuter[1]	59,224	62,895	63,658	62,296	43,076	6.20%	1.45%	0.51%	(1.58%)
Total Enplanements	1,492,058	1,619,828	1,796,348	1,986,940	2,376,682	8.56%	3.78%	2.91%	2.36%
Operations									
Itinerant									
Air Carrier (incl. Air Cargo)	45,919	49,236	51,760	55,707	62,081	7.22%	2.42%	1.95%	1.52%
Commuter/Air Taxi	5,258	6,269	6,590	7,092	7,904	19.23%	4.62%	3.04%	2.06%
Total Commercial Operations	51,177	55,505	58,350	62,799	69,985	8.46%	2.66%	2.07%	1.58%
General Aviation	39,676	39,506	41,026	43,752	52,980	(0.43%)	0.67%	0.98%	1.46%
Military	10,047	10,047	10,047	10,047	10,047	0.00%	0.00%	0.00%	0.00%
Local									
General Aviation	24,772	25,140	26,107	27,842	33,714	1.49%	1.06%	1.18%	1.55%
Military	6,302	6,302	6,302	6,302	6,302	0.00%	0.00%	0.00%	0.00%
Total Operations	**131,974**	**136,500**	**141,832**	**150,742**	**173,028**	**3.43%**	**1.45%**	**1.34%**	**1.36%**
Instrument Operations	131,974	136,500	141,832	150,742	173,028	3.43%	1.45%	1.34%	1.36%
Peak Hour Operations	34	35	38	39	44	2.94%	2.25%	1.38%	1.30%
Cargo									
Cargo/Mail (pounds)	89,828,314	92,838,363	102,476,040	114,958,791	137,504,056	3.35%	2.67%	2.50%	2.15%

TABLE 3-45 (2 OF 2) FEDERAL AVIATION ADMINISTRATION FORECAST SUMMARY

BASE YEAR	A. FORECAST LEVELS AND GROWTH RATES					AVERAGE ANNUAL COMPOUND GROWTH RATES			
	BASE YEAR LEVEL	BASE YEAR + 1 YEAR	BASE YEAR + 5 YEARS	BASE YEAR + 10 YEARS	BASE YEAR + 20 YEARS	BASE YEAR + 1 YEAR	BASE YEAR + 5 YEARS	BASE YEAR + 10 YEARS	BASE YEAR + 20 YEARS
2015	**2015**	**2016**	**2020**	**2025**	**2035**	**2016**	**2020**	**2025**	**2035**
Based Aircraft									
Single Engine (non-jet)	140	140	143	147	164	(0.30%)	0.36%	0.51%	0.79%
Multi Engine (non-jet)	29	29	30	30	34	(0.63%)	0.47%	0.50%	0.78%
Jet Engine	36	36	40	44	59	0.87%	2.03%	2.13%	2.46%
Helicopter	17	17	19	22	30	2.44%	2.57%	2.58%	2.81%
Other	0	0	0	0	0	0.00%	0.00%	0.00%	0.00%
Total	**222**	**222**	**232**	**243**	**287**	**0.00%**	**0.89%**	**0.91%**	**1.29%**
	B. OPERATIONAL FACTORS								
Average Aircraft Size (seats)									
Air Carrier	89	90	91	93	95				
Commuter	50	50	50	50	50				
Average Enplaning Load Factor									
Air Carrier	80%	80%	81%	81%	81%				
Commuter	80%	80%	81%	81%	81%				
General Aviation Operations per Based Aircraft	290	291	289	295	302				

NOTES: Figures presented in calendar year.

1 Commuter as defined by the FAA. Commuter operations include takeoff and landings by aircraft with 60 or fewer seats that transport regional passengers on scheduled commercial flights.

2 Cargo/mail in total pounds (all-cargo carrier and belly cargo enplaned and deplaned).

SOURCES: Federal Aviation Administration, July 2001 (template); City of Boise Aviation Department, Traffic Reports, November 2016; U.S. Department of Transportation, T-100, November 2016; Federal Aviation Administration, OPSNET, November 2016; Ricondo & Associates, Inc., November 2016 (forecast).

3.12 ATTACHMENT B—DETAIL ON REGRESSION ANALYSES

As described in Section 3.5.2, socioeconomic regression analyses were used to forecast originating passengers at the Airport. This section includes statistical details on the analyses.

The regression analyses were conducted using historical data for socioeconomic variables and domestic originating passengers from 1993 through 2015, a total of 23 years. Historical and projected socioeconomic data from Woods & Poole, Inc. were used for the analyses, and the data for domestic originating passengers were from the U.S. DOT DB1B Survey. For the regression analyses, five socioeconomic variables and the year were chosen: population, total employment, total earnings, total personal income, per capita personal income, and gross regional product. The year was included to test for any temporal trends unrelated to socioeconomic variables, and the socioeconomic variables were selected to test a range of possible macroeconomic conditions that have been observed to affect aviation activity in other studies. For each of the socioeconomic variables, regression analyses were conducted based on the data for the United States, the Boise metropolitan statistical area[32], the Boise combined statistical area[33], and the BOI Air Trade Area.

Regression analysis is a statistical technique that attempts to find the relationship between one or more independent variables and a dependent variable given a functional form. For this forecast, the dependent variable is originating domestic passengers and the independent variables are the socioeconomic variables, and the functional form is linear, meaning that the relationship between the dependent and independent variables is hypothesized to be determined by a combination of multiples of the independent variables. The basic form of the model is:

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_p x_p + \epsilon,$$

where y is the dependent variable, $x_1, x_2, \ldots, x_p$ are the independent variables, $\beta_0, \beta_1, \ldots, \beta_p$ are unknown fixed parameters, called the regression coefficients, and ϵ is a random normally distributed error term with mean zero. In the analyses conducted as part of the forecast, only one independent variable was included in each model.[34] The regression coefficients can be interpreted as the expected average change in the dependent variable given in a unit change in the corresponding independent variable, holding all other variables constant.

In order to assess the validity of the model and how well the model fits the data, there are several statistics that are considered.

First, a basic model assumption of linear regression is that the error terms are normally distributed, with mean 0. The mean of the error terms can be determined and examined; if it is nearly zero (e.g., 1×10^{-8} or less), then the assumption of mean zero is considered satisfied. To test the normality, the Anderson-Darling test statistic is used to test the hypothesis that the error terms are normally distributed; if the resulting p-value is greater than the desired significance (typically 0.05 or 0.10), then the normality assumption is considered to be satisfied.

Next, the linear regression model assumes that the error is homoscedastic, meaning the error terms have the same variance in each observation and do not show increasing or decreasing variance. The Breusch-Pagan test is used to test the hypothesis that the error terms are homoscedastic; if the resulting p-value is greater than the desired

[32] A metropolitan statistical area is a region with close economic ties throughout the region surrounding an area with a relatively high population density in its core.

[33] A combined statistical area is composed of several metropolitan statistical areas with economic or social links.

[34] Later tests of regressions with multiple independent variables determined that the results did not differ significantly from the results obtained using one independent variable.

significance, then the homoscedasticity assumption is considered to be satisfied. Related to homoscedasticity is the assumption that errors are independent and not correlated across observations. In this case, the Durbin-Watson test statistic is used, and if the resulting p-value is greater than the desired significance, then the assumption of independent errors is considered to be satisfied. The homoscedasticity and independence assumptions for errors are often violated in the case of panel data, where multiple observations are taken of the same variable over time. This was the case in all of the regression analyses used to forecast domestic originating passengers at the Airport. However, the estimates of the regression coefficients are still consistent, meaning the overall results of the model hold, but there exist more efficient estimates of the regression coefficients, meaning that the estimates would converge to the true value of the model parameter with fewer data points relative to the case when the homoscedasticity and independence assumptions are violated.

Once the model assumptions are found to be satisfied, there are several statistics used to determine between models. First, the F-statistic is a measure of whether or not the model better predicts the dependent variable than simply using the mean of the dependent variable. If the resulting p-value of the F-statistic is less than the desired significance, then the model is considered statistically better at predicting the dependent variable than just using its mean.

Next, the R-squared statistic is a measure of how much of the variance in the dependent variable is explained by the independent variables. An R-squared value can range from 0 to 1, with a value of 0 indicating the independent variables do not explain any of the variance in the dependent variable and a value of 1 indicating the independent variables completely explain the variance in the dependent variable. Because of how the R-squared statistic is calculated, it always increases as the number of independent variables increases, so the adjusted R-squared value, which corrects for this increase, is used. Generally, an adjusted R-squared value of greater than 0.7 is considered to be an indication of satisfactory model fit, though the value can vary depending on the data.

Finally, the p-value of the regression coefficients determines whether the independent variables contribute to the explanation of the dependent variable. If the p-value of the regression coefficient of an independent variable is less than the desired significance, then it is considered to be statistically different from 0 and the independent variable is considered to explain some of the variance in the dependent variable.

Table 3-46 summarizes the results of the regression analyses using the independent variables for the United States and the BOI Air Trade Area. It includes the independent variable, x_1, in the model, mean of the error terms, the p-value of the Anderson-Darling test statistic, the p-value F-statistic for the model, the adjusted R-squared for the model, the constant term, β_0, the regression coefficient of the independent variable, β_1, and the p-value of β_1. The significance level for the test statistics and the regression coefficients was 0.05.

As shown in Table 3-46, all models satisfied the assumption of normally distributed error terms with mean 0. Similarly, the p-value of the F-statistic shows that all models were significantly better at predicting the dependent variable (domestic originating passengers) than using the mean of domestic originating passengers. The differences in the models, therefore, lie in the adjusted R-squared value, which is at least 0.7 for the models using BOI Air Trade Area total employment, BOI Air Trade Area total earnings, BOI Air Trade Area per capita personal income, and BOI Air Trade Area GRP. As shown in Table 3-17, these were the models chosen to form the basis of the enplaned passenger forecast.

TABLE 3-46 SUMMARY OF STATISTICAL RESULTS OF REGRESSION ANALYSES

INDEPENDENT VARIABLE	MEAN ERROR	ANDERSON-DARLING P-VALUE	F-STATISTIC P-VALUE	ADJUSTED R^2	CONSTANT, β_0	COEFFICIENT, β_1	β_1 P-VALUE
Year	0.0000	0.530	0.0003	0.441	-46,923,446	24,000.00	0.0003
U.S. Population[1]	0.0000	0.518	0.0001	0.480	-1,438,000,000	8.93	0.0001
BOI Air Trade Area Population[1]	0.0000	0.329	0.0001	0.498	164,098	1,684.70	0.0001
U.S. Total Employment[1]	0.0000	0.040	0.0000	0.679	-1,322,000	14.87	0.0000
BOI Air Trade Area Total Employment[1]	0.0000	0.436	0.0000	0.705	-175,454	3,780.30	0.0000
U.S. Total Earnings[2]	0.0000	0.118	0.0000	0.664	-110,400	0.16	0.0000
BOI Air Trade Area Total Earnings[2]	0.0000	0.529	0.0000	0.722	112,400	71.34	0.0000
U.S. Total Personal Income[2]	0.0000	0.261	0.0000	0.579	83,460	0.10	0.0000
BOI Air Trade Area Total Personal Income[2]	0.0000	0.134	0.0000	0.632	301,900	43.58	0.0000
U.S. PCPI[3]	0.0000	0.095	0.0000	0.673	-631,300	48.19	0.0000
BOI Air Trade Area PCPI[3]	0.0000	0.709	0.0000	0.791	-1,704,000	86.94	0.0000
U.S. GDP[2]	0.0000	0.226	0.0000	0.620	10,390	0.09	0.0000
BOI Air Trade Area GRP[2]	0.0000	0.349	0.0000	0.703	182,000	42.87	0.0000

NOTES:
GDP – Gross Domestic Product
GRP – Gross Regional Product
PCPI – Per Capita Personal Income
1 In thousands
2 In millions of 2009 U.S. Dollars
3 In 2009 U.S. Dollars
SOURCE: Woods & Poole Economics, Inc., November 2016; Ricondo & Associates, Inc., May 2017 (analysis).
PREPARED BY: Ricondo & Associates, Inc., May 2017.

The coefficients of the independent variables are all significantly different from 0, as shown by their p-value in Table B-1. The interpretation of the coefficients of the four models with the best fit is as follows:

- An increase in employment in the BOI Air Trade Area by 1,000 jobs would be expected to result in an increase in originating domestic passengers by approximately 3,780.
- An increase in BOI Air Trade Area total earnings by 1 million U.S. Dollars[35] would be expected to result in an increase in originating domestic passengers by approximately 71.
- An increase in BOI Air Trade Area per capita personal income by 1 U.S. Dollar[35] would be expected to result in an increase in originating domestic passengers by approximately 87.
- An increase in BOI Air Trade Area GRP by 1 million U.S. Dollars[35] would be expected to result in an increase in originating domestic passengers by approximately 43.

[35] In 2009 U.S. Dollars.

4. FACILITY REQUIREMENTS

This section identifies the airside and landside facility requirements for the Airport through the planning period (2035). Facility requirements were based on several factors, including the relationship between demand and capacity for various Airport systems/facilities, deficiencies identified through comparison of existing conditions to applicable planning/design standards, and functional/operational deficiencies identified through discussions with Airport management, tenants, and users.

The methodologies used to determine facility requirements are in accordance with industry standards, FAA guidance, and planning factors adjusted as appropriate to reflect actual Airport-use characteristics. This section is organized by functional element. The facility requirements for each element provide the foundation for the subsequent identification of alternative concepts to meet forecast demand over the planning horizon.

- **Airfield facilities.** These facilities include the runway and taxiway system, lighting, markings, navigational aids, and related safety and protection areas. The ability of the existing airfield to accommodate forecast operational demand, in terms of both runway capacity and design standards, was evaluated.
- **Terminal facilities.** These facilities include the terminal building, where enplaning and deplaning passenger demand defines the need for various areas, such as ticketing, baggage claim, security screening, and holdrooms, among other building spaces. Requirements for aircraft gates were also assessed.
- **Ground access facilities.** These facilities include ground transportation and circulations systems, such as terminal roadways and curbs, public parking, employee parking, and rental car facilities.
- **General aviation facilities.** These facilities serve GA tenants and users; they include apron areas and storage hangars.
- **Air cargo facilities.** These facilities include apron areas for aircraft parking, loading, and unloading, as well as facilities/buildings that support receiving, sorting, distribution, and administrative functions for air cargo tenants.
- **Other/support facilities.** These facilities include military, BLM/forest service, SRE, ARFF, fueling, and utilities.

4.1 AIRFIELD REQUIREMENTS

Planning and design of airport facilities are typically based on the role of the airport and the design/critical aircraft expected to operate on the airfield. The FAA provides planning and design guidance through published ACs, Orders, and other guidelines intended to promote airport safety, efficiency, and economy. FAA airfield planning and design standards governing the geometric layout of runways and taxiways are provided in AC 150/5300-13A, *Airport Design*.[1]

4.1.1 CRITICAL AIRCRAFT AND AIRFIELD DESIGN CRITERIA

The FAA defines an airport's critical aircraft as the most demanding aircraft type, or grouping of aircraft with similar characteristics, that make regular use of the airport, where regular use is defined as 500 annual operations; an operation is defined as a takeoff or landing. The critical aircraft sets the dimensional requirements for airfield

[1] Federal Aviation Administration, Advisory Circular 150/5300-13A (Change 1), *Airport Design*, February 26, 2014.

geometry and the size of certain areas protecting the safety of aircraft operations and passengers. The critical aircraft is used to determine the design codes to be used for planning:

- **Airport Approach Category (AAC).** A letter (A through E) signifying the approach speed of the critical aircraft, which is defined as 1.2 times the stall speed in landing configuration at the aircraft's maximum certificated weight.
- **Airplane Design Group (ADG).** A Roman numeral (I through VI) representing the wingspan of the critical aircraft.
- **Airport Reference Code (ARC).** The airport designation that signifies the highest AAC and ADG that one or more runway(s) at the airport can accommodate. The ARC is used for planning and design purposes, but it does not limit the aircraft that may be able to operate safely at an airport.
- **Runway Design Code (RDC).** The code signifying the design standards for a runway, consisting of the most demanding AAC and ADG that the runway is designed to accommodate, and approach visibility minimums expressed as Runway Visual Range (RVR) in feet.
- **Approach Reference Code.** The code signifying the landing capabilities of a runway and its associated parallel taxiway; it consists of three components: AAC, ADG, and RVR.
- **Departure Reference Code.** The code signifying the takeoff capabilities of a runway; it consists of the AAC and ADG.
- **Taxiway Design Group (TDG).** Design standards for taxiway pavement width, shoulder width, and edge safety margin are based on TDG.

As described in Section 3, the existing critical aircraft for the Airport is the Airbus 200 series of jets, currently flown by FedEx and UPS (cargo operators). The Airbus A300 series of jets is classified as AAC D-ADG IV (D-IV). Based on the outer-to-outer main gear width and cockpit-to-main-gear distance, the TDG of the Airbus 300 series is TDG 5. Based on the projected fleet mix for the Airport, the future ADG and TDG (through 2035) are projected to remain ADG IV and TDG 5, consisting of a mix of Airbus A300-600 and Boeing 767-300F aircraft. As such, areas of the airfield that can or may accommodate these aircraft, or aircraft of similar classification, should meet the corresponding planning/design standards. **Table 4-1** summarizes the applicable design codes and groups for the existing airfield.

TABLE 4-1 FUTURE DESIGN CODES

RUNWAY END	AIRPORT REFERENCE CODE[1]	RUNWAY DESIGN CODE[2]	APPROACH REFERENCE CODE[3]	DEPARTURE REFERENCE CODE[4]	TAXIWAY DESIGN GROUP
10L	D/IV	D/IV/4000	D/IV/4000	D/IV	5
28R		D/IV/4000	D/IV/4000	D/IV	5
10R		D/IV/1600	D/IV/1600	D/IV	5
28L		D/IV/1600	D/IV/1600	D/IV	5

NOTES
1 Airport Reference Code includes Airport Approach Category (AAC) and Airplane Design Group (ADG).
2 Runway Design Code includes AAC, ADG, and Runway Visual Range (RVR) in feet.
3 Approach Reference Code includes AAC, ADG, and RVR in feet.
4 Departure Reference Code includes AAC and ADG.
SOURCE: Ricondo & Associates, Inc., May 2017.

4.1.2 AIRFIELD CAPACITY ANALYSIS

The purpose of the airfield capacity analysis is to assess the capability of the airfield facilities at the Airport to accommodate existing and forecast aircraft operations. FAA AC 150/5060-5, *Airport Capacity and Delay*, defines the methodologies for estimating airfield capacity. Airfield capacity, sometimes referred to as throughput, is defined as the maximum number of aircraft operations that an airfield can accommodate during a specific period of time without incurring an unacceptable level of delay. Aircraft delays increase exponentially as the number of aircraft operations (aircraft demand) nears or exceeds aircraft capacity under specific operating conditions. The following terms, as defined by the FAA, were used in this analysis:

- **Peak-hour capacity.** Peak-hour capacity is defined as the maximum number of aircraft operations that can occur in 1 hour under specific operating conditions. Peak-hour capacity can only be estimated, as many factors that affect capacity are not constant. For example, aircraft demand is not usually constant throughout the peak period. Therefore, changes in peaking characteristics cause hourly capacity to fluctuate.
- **Annual service volume (ASV).** AC 150/5060-5 defines ASV as a reasonable estimate of an airport's capacity. ASV accounts for the hourly, daily, and seasonal variations in aircraft demand associated with the airfield and the occurrence of low visibility conditions during which ATC procedures for the Airport are modified to maintain operational safety.

Historically, the FAA's Airfield Capacity Model has been used to model airfield capacity based on the methodologies described in AC 150/5060-5. However, that model is dated, and the FAA has made available an airport capacity model called *runway*Simulator, which was developed by MITRE, for use in modeling airfield hourly capacity. The *runway*Simulator model simulates arriving and departing traffic at an airport, the decisions made about runway assignment and sequencing, and the flight operations themselves. The model generates a randomized traffic sample that reflects an airport's mix of aircraft types. FAA separation standards are built into the model. The runway configuration is set, and exceptions can be noted to prohibit use of specified runways by certain aircraft types or to set aside runways for exclusive use by certain types of operations. The model generates traffic such that there is constant demand on the runway system, and it does this for various arrival-departure mixes over several hundred hours. The average throughput is then recorded for each arrival-departure mix.

4.1.2.1 FACTORS AFFECTING AIRFIELD CAPACITY

The capacity of an airfield system, including the runways and associated exit taxiways, is not constant over time. The following is a description of the various factors that affect airfield capacity at the Airport, which were used as inputs to the *runway*Simulator model and the overall ASV calculation.

Airfield Geometry

The Airport has two parallel runways used by all aircraft and an assault strip primarily used for military training or some GA operations, by permission. For purposes of the airfield capacity analysis, it was assumed that only the two parallel runways affect airfield capacity. The assault strip is not available for commercial aircraft operations and is not connected to the airfield. Therefore, the assault strip does not currently contribute significantly to air carrier operational capacity on the two parallel runways.

Meteorological Conditions

Airfield capacity can vary significantly based on meteorological conditions. Prevailing winds dictate which runway can be used, as aircraft typically land and take off into the wind and can withstand limited crosswind and tailwind conditions. If the maximum crosswind or tailwind is exceeded, then the aircraft may not be able to operate safely on a particular runway. Therefore, wind conditions may prevent the use of a higher capacity airfield operating configuration.

Other meteorological conditions affecting airfield capacity include cloud ceiling height and visibility. Low cloud ceilings and low visibility conditions result in increased spacing between aircraft in the airspace surrounding the Airport. These conditions may also restrict which runways can be used, because arrivals in these conditions may require precision approach instrumentation (i.e., an ILS).

During IFR, both runways at BOI have the necessary instrumentation to support arrivals. However, only Runways 10R and 28R have precision approach capability, and only Runway 10R has precision approach capability when visibility is less than one-half mile, resulting in reduced airfield capacity when visibility is below minimum requirements for a nonprecision approach.

Based on an analysis of Airport weather data, as described in Section 2, VMC occurs approximately 96 percent of the time and IMC occurs approximately 4 percent of the time. These assumptions were included in the capacity analysis.

Aircraft Fleet Mix

The mix of aircraft operating at an airport is an important factor in determining airfield capacity. For the purpose of calculating capacity, aircraft are categorized according to their approach speed and weight. Operational capacity decreases as the diversity of approach speeds and aircraft weights increase. This is because aircraft following each other are spaced according to these differences in their air speeds and weights. Heavy aircraft create wake vortices that require greater spacing between large and small aircraft. The greater the difference in size and speed of the aircraft in the fleet, the greater the space required between aircraft and, therefore, the lower the operational capacity.

To capture the effects of aircraft weight and speed on airfield capacity, AC 150/5060-5 groups aircraft into the following four classes:

- **Class A.** Aircraft with a takeoff weight of 12,500 pounds or less and an estimated approach speed of 95 nautical miles per hour (knots). This includes small single-engine aircraft.
- **Class B.** Aircraft with a takeoff weight of 12,500 pounds or less and an estimated approach speed of 120 knots, such as small twin-engine piston/turboprop aircraft or corporate jets.
- **Class C.** Aircraft with a takeoff weight between 12,500 pounds and 300,000 pounds and an estimated approach speed of 130 knots, such as narrowbody jet airline aircraft.
- **Class D.** Aircraft with a takeoff weight of 300,000 pounds or more and an estimated approach speed of 140 knots, such as heavy/widebody airline or cargo aircraft.

Using the peak month average day fleet mix for the 2035 baseline forecast and the 2035 high forecast scenarios (see Section 2) and the application of the previously defined classifications, an overall mix index was calculated for VMC and IMC. The mix index is equal to: *percentage of Class C + 3 x percentage of Class D*.

To determine the aircraft fleet mix during IMC, it was necessary to account for the decrease in operations of smaller and less sophisticated aircraft. These aircraft may not have the type of equipment required to operate under IMC, or, if they do, pilots of such aircraft may choose not to fly in adverse weather conditions and cannot without an instrument rating. This results in a higher mix index during IMC when larger aircraft represent a greater share of total operations.

Airfield Operating Configurations

The Airport's two runways are operated in different combinations (configurations) depending on meteorological conditions and operational preferences. Runway use, as described in Section 2, slightly favors takeoffs and landings to the east (East Flow). Additionally, East Flow is predominant during IMC, with category II/III ILS capability on Runway 10R. Therefore, East Flow was assumed in the model to be most conservative, particularly during IMC.

4.1.2.2 PEAK-HOUR AIRFIELD CAPACITY ANALYSIS

The *runway*Simulator model was run for the Airport using the previously mentioned assumptions for airfield configurations and fleet mix (mix index). **Table 4-2** shows the individual runs that were modeled to obtain peak-hour capacity of the airfield under combinations of various parameters.

TABLE 4-2 PEAK-HOUR SIMULATION RUNS

VMC/ IMC	OPERATING MODE	VMC/ IMC	OPERATING MODE
2035 Baseline Forecast (East Flow)			
VMC	Mixed Mode (Arrivals and Departures on Runways 10L/10R)	IMC	Mixed Mode (Arrivals and Departures on Runways 10L/10R)
VMC	Segregated Mode (Arrivals on Runway 10R and Departures on Runway 10L with Runway Crossings)	IMC	Segregated Mode (Arrivals on Runway 10R and Departures on Runway 10L with Runway Crossings)
2035 High Forecast (East Flow)			
VMC	Mixed Mode (Arrivals and Departures on Runways 10L/10R)	IMC	Mixed Mode (Arrivals and Departures on Runways 10L/10R)
VMC	Segregated Mode (Arrivals on Runway 10R and Departures on Runway 10L with Runway Crossings)	IMC	Segregated Mode (Arrivals on Runway 10R and Departures on Runway 10L with Runway Crossings)

NOTES:
VMC – Visual Meteorological Conditions; IMC – Instrument Meteorological Conditions
Mixed Mode: Aircraft take off and land on both runways with locational preference (i.e., passenger airlines on the north runway; cargo and GA split between both runways).
Segregated Mode: Aircraft arrive on Runway 10R and depart on Runway 10L. Aircraft arriving on Runway 10R bound for areas on the north airfield (i.e., the passenger terminal) would need to cross Runway 10L and block any Runway 10L departures, which reduces hourly capacity.
SOURCE: Ricondo & Associates, Inc., March 2017.

Additional assumptions and notes regarding the simulation model runs include the following:

- Runways 10L-28R and 10R-28L are separated by 700 feet, which should allow for simultaneous arrival and departure operations in VMC.
- Runway 10R is equipped with an ILS with ALFS-2 approach lighting system, allowing for category II/III instrument approaches. Runway 28R is equipped with an ILS with no approach lighting system.
- Under the mixed mode, traffic is assigned based on origination point for departures and destination point for arrivals (i.e., commercial airline traffic primarily uses Runway 10L-28R located closest to the terminal).

4.1.2.3 ANNUAL SERVICE VOLUME

To calculate the Airport's ASV, the weighted hourly capacity of the airfield is used, as well as two additional factors: the ratio of annual demand to average daily demand in the peak month of the year (referred to as the daily ration or D); and the ratio of average daily demand to average peak-hour demand for the peak month of the year (referred to as the hourly ratio or H). **Table 4-3** shows the calculation of ASV under each forecast scenario and operating mode.

TABLE 4-3 ANNUAL SERVICE VOLUME

	2035 BASELINE FORECAST					2035 HIGH FORECAST				
	MIX INDEX	PERCENT OF YEAR (P)	HOURLY CAPACITY (C)	PERCENT MAXIMUM CAPACITY	WEIGHTING FACTOR (W)	MIX INDEX	PERCENT OF YEAR (P)	HOURLY CAPACITY (C)	PERCENT MAXIMUM CAPACITY	WEIGHTING FACTOR (W)
Mixed Mode										
VMC East Flow (Arr: Rwys 10L/10R, Dep: Rwys 10L/10R)	70%	96.0%	135	100%	1	72%	96.0%	135	100%	1
IMC East Flow (Arr: Rwy 10R, Dep: Rwys 10L/10R)	97%	4.0%	61	45%	25	98%	4.0%	62	46%	25
Weighted Hourly Capacity (Cw)	97					98				
Annual Operations	173,028					182,303				
Average Daily Operations (Peak Month)	516					540				
Average Peak-Hour Operations (Peak Month)	44					46				
D =	335.33					337.60				
H =	11.73					11.74				
ASV = Cw x D x H	**383,000**					**388,000**				
Segregated Mode										
VMC East Flow (Arr: Rwy 10R, Dep: Rwy 10L (with crossings)	70%	96.0%	75	100%	1	72%	96.0%	76	100%	1
IMC East Flow (Arr: Rwy 10R, Dep: Rwy 10R (with crossings)	97%	4.0%	58	77%	15	98%	4.0%	56	46%	15
Weighted Hourly Capacity (Cw)	68					98				
Annual Operations	173,028					182,303				
Average Daily Operations (Peak Month)	516					540				
Average Peak-Hour Operations (Peak Month)	44					46				
D =	335.33					337.60				
H =	11.73					11.74				
ASV = Cw x D x H	**270,000**					**271,000**				

NOTES:
VMC – Visual Meteorological Conditions; IMC – Instrument Meteorological Conditions; ASV – Annual Service Volume
Cw = Weighted Hourly Capacity = (P1 x C1 x W1) + … + (Pn x Cn x Wn) / (P1 x W1) + (Pn x Wn) | **C** = from *runway*Simulator) | **D** = Annual Operations / Peak Month Average Daily Operations | **H** = Peak Month Average Daily Operations / Average Peak-Hour Operations during Peak Month | **W** = Weighting factor: allows for additional lower capacity conditions to have a greater impact on the overall average (more conservative ASV).
SOURCE: Ricondo & Associates, Inc., May 2017 (using *runway*Simulator and FAA AC 150/5060-5, *Airport Capacity and Delay*).

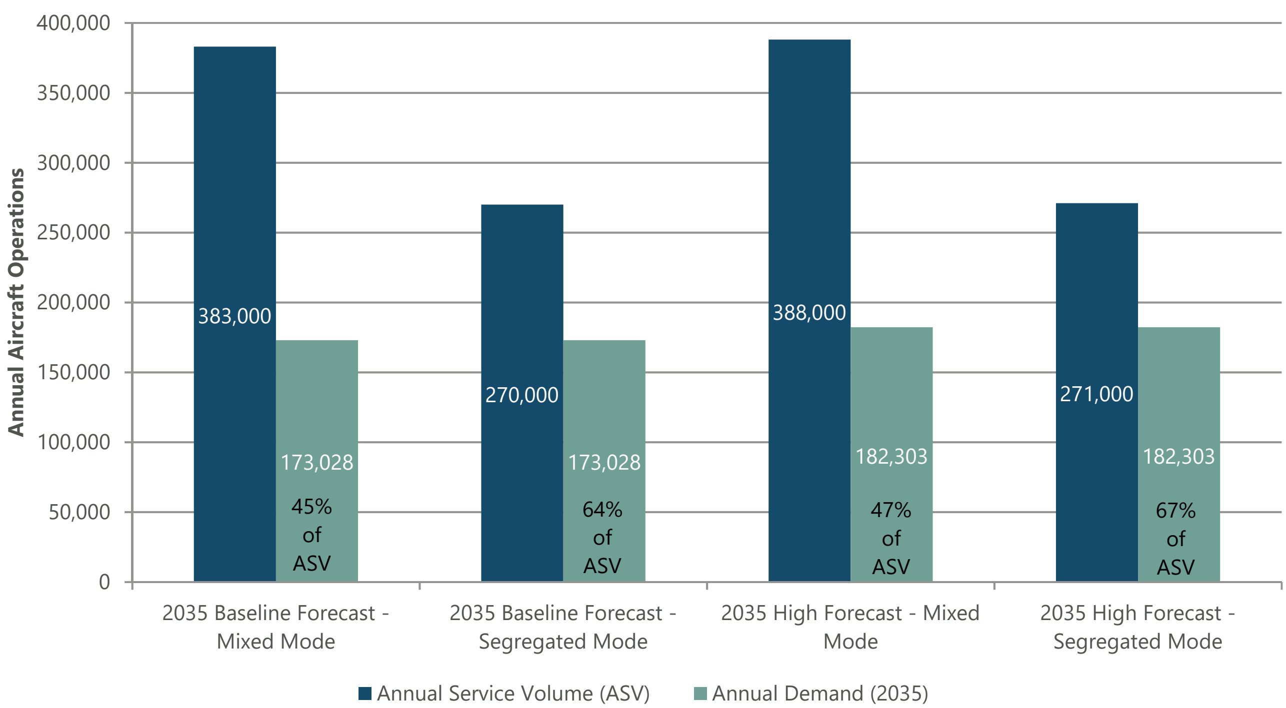
4.1.2.4 DEMAND/CAPACITY SUMMARY

Exhibit 4-1 depicts the relationship between estimated ASV and forecast annual demand for the airfield. Typically, when an airport's annual operations total exceeds 60 percent of its airfield capacity (ASV), some aircraft delay occurs. Therefore, when the airfield is operating at 60 percent of capacity (approximately 230,000 operations), planning for new airfield facilities should be initiated (for purposes of demand/capacity). When an airport's activity reaches 80 percent of capacity (approximately 300,000 operations), new airfield facilities should be constructed, or demand management strategies should be implemented.

As shown on Exhibit 4-1, annual aircraft operations at BOI is estimated to reach more than 60 percent of ASV by 2035 under the segregated operating mode. This mode assumes one runway is used for arrivals, while the other runway is used for departures. This mode does not achieve the highest efficiency rate for the airfield. Conversely, under the mixed mode, arrivals and departures can be performed from either runway, at least during IMC. Maximizing efficiency of the runway system in this way increases estimated ASV, with the ratio of demand to ASV reaching only about 45 percent.

The results of the demand/capacity analysis indicate the Airport has adequate capacity to efficiently accommodate forecast demand throughout the planning period. As a result, no additional runway facilities will be required for purposes of increasing capacity through 2035. However, if the number of annual operations or the fleet mix serving the Airport should change dramatically from the forecasts, then capacity may need to be reassessed.

EXHIBIT 4-1 AIRFIELD CAPACITY ANALYSIS



SOURCE: Ricondo & Associates, Inc., May 2017.

4.1.3 RUNWAY SYSTEM REQUIREMENTS

In addition to the airfield capacity analysis, the Airport's existing runway system was analyzed for conformance with FA design criteria and runway orientation, length, and pavement strength.

4.1.3.1 RUNWAY DESIGN CRITERIA

Table 4-4 presents the FAA-recommended runway design criteria for ARC D-IV, along with existing runway specifications at the Airport. The existing runways currently meet recommended design criteria, and no modifications to the runways are required in order to meet design standards.

TABLE 4-4 FEDERAL AVIATION ADMINISTRATION RUNWAY DESIGN CRITERIA

RUNWAY DESIGN ELEMENT	ARC D-IV DESIGN CRITERIA (FEET)	EXISTING RUNWAY 10L-28R (FEET)	EXISTING RUNWAY 10R-28L (FEET)
Runway width	150	150	150
Shoulder width	25	25	25
Blast pad width	200	200	200
Blast pad length	200	200	200
Runway centerline to:			
Parallel runway centerline[1]	700	700	
Holding position	279	279	279
Parallel taxiway centerline	400	400 (to Taxiway A)	437 (to Taxiway B)
Aircraft parking area	500	>500	>500

NOTES:
ARC – Airport Reference Code
1 A parallel runway separation of 700 feet allows for simultaneous landings and takeoffs under visual flight rules.
SOURCE: Federal Aviation Administration, Advisory Circular 150/5300-13A (Change 1), *Airport Design*, February 26, 2014.

4.1.3.2 RUNWAY ORIENTATION

The existing runway system at the Airport consists of two parallel runways oriented in a northwest–southeast direction. FAA design standards recommend additional runway configurations when the primary runway configuration provides less than 95 percent wind coverage at specific crosswind components. The 95 percent wind coverage is computed on the basis of crosswinds not exceeding 10.5 knots for small aircraft weighing less than 12,500 pounds and crosswinds from 13.0 to 20.0 knots for aircraft weighing over 12,500 pounds. **Table 4-5** summarizes the wind coverage of the existing runway system. The existing runways provide more than 95 percent wind coverage in all crosswind conditions, so the existing runway configuration is adequate.

TABLE 4-5 EXISTING RUNWAY SYSTEM WIND COVERAGE

WEATHER CONDITIONS	10.5 KNOTS	13.0 KNOTS	16.0 KNOTS	20.0 KNOTS
All weather wind coverage	98.98%	99.77%	99.92%	99.99%
VFR weather wind coverage	98.94%	99.76%	99.92%	99.99%
IFR weather wind coverage	99.74%	99.86%	99.94%	99.97%

NOTES: VFR – Visual Flight Rules; IFR – Instrument Flight Rules
SOURCE: Boise Airport automated surface observing system with 87,104 hourly recorded observations from January 1, 2007, to December 31, 2016.

4.1.3.3 RUNWAY LENGTH

The longest runway at the Airport is Runway 10L-28R at 10,000 feet. The primary runway (Runway 10R-28L) is 9,762 feet long. A runway length analysis was conducted to determine if additional runway length is required to meet the needs of aircraft that are projected to operate at the Airport through the planning period.

To estimate the runway length needed to accommodate aircraft at the Airport, AC 150/5325-4A, *Runway Length Requirements for Airport Design*, was used. The runway length analysis set forth in this AC relates to both arrivals and departures; however, departures normally require more runway length. Based on FAA criteria, the recommended runway length is determined by first considering either the family of aircraft or the specific aircraft needing the longest runway. In either case, the choice should be based on aircraft that are projected to use the runway on a regular basis (i.e., 500 or more operations per year).

To estimate the runway length needed to accommodate aircraft operating at the Airport, aircraft manufacturers' data for several aircraft expected to operate at the Airport were obtained. Runway length under the AC 150/5325-4A methodology is a function of the Airport's operating temperature, elevation, aircraft loads, and the length of haul (stage length) performed by the aircraft.

For purposes of this analysis, three aircraft were selected to represent the types of aircraft that would require the longest runway length on a regular basis at the Airport. The Boeing 737-900ER was assumed to be representative of passenger airline aircraft regularly using the Airport. The Airbus A300F4-600 and Boeing 767-300F, which are identified as the critical aircraft for the Airport, were assumed to be representative of cargo aircraft that do and are projected to use the Airport on a regular basis.

For each aircraft type, required departure runway length was calculated based on a temperature of International Standard Atmosphere (ISA; 59 degrees Fahrenheit) and ISA + 36°F (i.e., 95 degrees Fahrenheit). Other assumptions include an Airport elevation of 2,871 feet and zero wind.

Table 4-6 presents the results of the analysis. The runway lengths shown correspond to the maximum takeoff weight (MTOW) possible for each aircraft. Due to pressure altitude restrictions, which account for altitude and temperature effects on aircraft performance, the MTOW may not be achievable, as noted in the table.

TABLE 4-6 RUNWAY LENGTH REQUIREMENTS

AIRCRAFT	TAKEOFF WEIGHT (POUNDS)	TEMPERATURE	RUNWAY LENGTH REQUIRED (FEET)	% OF AVAILABLE RUNWAY (10L-28R : 10R-28L)[2]
Boeing 767-300F	400,000[1]	ISA	11,200	89% : 87%
Boeing 767-300F	390,000[1]	ISA + 36°F	11,200	89% : 87%
Boeing 737-900ER	174,000[1]	ISA	10,000	100% : 98%
Boeing 737-900ER	154,000[1]	ISA + 36°F	10,000	100% : 98%
A300F4-600	380,000	ISA	11.500	87% : 85%
A300F4-600	378,000[1]	ISA + 36°F	11,500	87% : 85%

NOTES:
ISA – International Standard Atmosphere = 59 degrees Fahrenheit (°F)
1 Runway length was assessed at maximum takeoff weight (MTOW) to represent a conservative runway length for planning purposes. It is understood that aircraft are not often departing at MTOW. Areas where temperature-pressure is a consideration, the MTOW may not be achievable, and the maximum weight is listed in lieu of MTOW.
2 Runway 10L-28R is 10,000 feet long; Runway 10R-28L is 9,762 feet long.
SOURCE: Ricondo & Associates, Inc., May 2017 (Boeing and Airbus aircraft planning manuals for selected aircraft).

As shown, cargo aircraft operating on hot days at the maximum weight possible given pressure altitude restrictions, would require over 11,000 feet of runway for departure. However, it is understood that aircraft often do not depart at maximum weight. Passenger aircraft, represented by the Boeing 737-900ER, can take off at maximum weight on the existing runway length of 10,000 feet. Adding runway length would allow cargo aircraft to depart at maximum weight. However, based on this analysis, it is recommended that runway lengths of at least 10,000 feet be maintained in the future.

4.1.3.4 PAVEMENT STRENGTH

Runway pavement strength can be expressed in terms of load-bearing capacity under different aircraft gear types and configurations, which dictate how the aircraft weight is distributed on the pavement and determine pavement response to loading. Examination of gear configuration, tire contact areas, and tire pressure indicates pavement strength is related to aircraft MTOW.

Using guidelines set forth in AC 150/5320-6D, *Airport Pavement Design and Evaluation*, the runway pavement needs to accommodate the frequent operations of aircraft that currently operate at the Airport, as well as the aircraft projected to operate in the future.

Table 4-7 compares the MTOW of the same representative aircraft assumed in the runway length analysis to the weight bearing capacity of the two runways at the Airport. As shown, the existing runways can accommodate the pavement loading imposed by the heaviest aircraft anticipated to use the Airport on a regular basis. Pavement design typically allows for aircraft weighing more than the design pavement strength to operate occasionally on the runways.

TABLE 4-7 RUNWAY PAVEMENT STRENGTH REQUIREMENTS

AIRCRAFT	MAXIMUM TAKEOFF WEIGHT (POUNDS)	WHEEL CONFIGURATION	RUNWAY 10L-28R LOAD BEARING (POUNDS)	RUNWAY 10R-28L LOAD BEARING (POUNDS)
Boeing 737-900ER	187,679	Dual Wheel	210,000	210,000
Boeing 767-300F	408,000	Dual Tandem Wheel	446,000	430,000
Airbus A300F4-600	380,000	Dual Tandem Wheel	446,000	430,000

SOURCES: Boeing and Airbus aircraft planning manuals for selected aircraft.

4.1.3.5 RUNWAY PROTECTION AREAS

Various runway-related safety and protection areas at the Airport were evaluated to determine whether the areas comply with FAA standards. These areas are depicted on the ALP set.

Runway Safety Area

Runway safety areas (RSAs) are rectangular areas centered on runway centerlines. Under normal (dry) conditions, these areas are capable of supporting aircraft without causing structural damage to the aircraft or injury to its occupants, should an aircraft inadvertently leave the paved runway surface. To serve this function, the FAA requires RSAs to be: (1) cleared and graded, (2) drained by grading or storm sewers to prevent water accumulation, and (3) free of objects, except those that must be located in the RSA because of their function (e.g., approach lighting, other NAVAIDS).

The existing RSA (length and width) for each runway meets the FAA design standards for ARC D-IV runways, and no improvements are required.

Runway Object-Free Area

Runway object-free areas (ROFAs) are rectangular areas centered on runway centerlines that are required to be clear of objects protruding above the RSA edge elevation, with the exception of those objects that are essential to air navigation or to aircraft ground maneuvering. Objects that are nonessential for either air navigation or aircraft ground maneuvering are not permitted within the ROFA. The existing ROFA (length and width) for each runway meets the FAA design standards for ARC D-IV runways, and no improvements are required.

Runway Protection Zone

The runway protection zone (RPZ) is a trapezoidal area centered on the extended runway centerline. The length and width of the RPZ are contingent on the size of the aircraft operating on the runway, as well as the type of approach (e.g., visual, instrument) and approach minimums available. As a result, the criteria for the RPZ may vary for each runway end. RPZs are designed to enhance the protection of people and property on the ground. To achieve this goal, the FAA recommends the airport operator own the property inside the RPZ. This area should be free of land uses that create glare and smoke. Also, the FAA recommends airport operators keep the RPZs clear of incompatible land uses, specifically residences, fuel storage facilities, and places of public assembly (e.g., churches, schools, office buildings, and shopping centers). All property within the RPZs at the Airport fall within the Airport property boundary (except for roadway right-of-way and a small portion of the Runway 10R RPZ that contains part of a gravel pit owned by the State of Idaho) and are therefore controlled by the Airport. Land use within these RPZs is compatible.

Obstacle-Free Zone

Obstacle-free zones (OFZs) are three-dimensional volumes of airspace that support the transition of ground to airborne aircraft (and vice-versa). The OFZ clearance standards established by the FAA prohibit taxiing and parking aircraft or locating other objects where they would penetrate this airspace, except frangible NAVAIDS or fixed-function objects. The OFZ consists of the airspace up to 150 feet above the established airport elevation and along the runway and extended runway centerline. The OFZ can be further categorized as inner-approach OFZs and inner-transitional OFZs.

The required runway OFZ for runways serving aircraft in excess of 12,500 pounds is typically 400 feet wide and extends 200 feet beyond each end of the runway. The OFZs for the existing runways meet current FAA standards. Currently, the only objects within the runway OFZs are NAVAIDS required to be located there because of their function.

Navigational Aid Critical Areas

Electronic NAVAIDS that send signals to aircraft are prone to signal interference from buildings, aircraft, or other objects. Airport design standards provide for clear or critical areas around these sensitive NAVAIDS. The following NAVAID critical/clear areas at the Airport are identified on the ALP:

- **Localizer and glideslope critical areas:** A critical area is established for the localizer and glideslope equipment to keep moving and stopped aircraft and vehicles from interfering with the navigation signals emitted from the equipment. The critical areas are required to be clear of objects and smoothly graded. All such critical areas at the Airport meet the required dimensions specified in FAA Order 5750.16D, *Siting Criteria for Instrument Landing Systems*. The location and function of these critical areas should be considered when planning for future Airport development.

- **VOR clear area:** VOR/VORTAC signals are susceptible to distortion caused by reflections. AC 150/5300-13A specifies that structures should be at least 1,000 feet from the VOR antenna. Beyond 1,000 feet, metal structures should not penetrate a 1.2-degree angle measured from the antenna base, while nonmetal structures should not penetrate a 2.5-degree angle measured from the antenna base. Metal fences should be at least 500 feet from the antenna, and power/telephone lines should be at least 1,200 feet from the antenna. The clear area surrounding the VORTAC at the Airport is currently free from structures that may cause signal interference. Future planning should ensure no structures penetrate the VOR clear area.
- **Airport Surveillance Radar (ASR) clear area:** The ASR for the Airport, located south of Gowen Road, uses a rotating antenna mounted on a 30-foot-tall platform to transmit electromagnetic waves to detect aircraft and to measure the distance and direction of the aircraft from the antenna. A clear area extends 1,500 feet from the ASR to ensure no interference from structures. Currently, no structures penetrate the ASR clear area.
- **Imaginary surfaces:** 14 CFR Part 77, *Objects Affecting Navigable Airspace* (Part 77), establishes standards for determining obstructions to air navigation and defines five standard surfaces for each of the runway ends at the Airport, based on the AAC for each runway. Section 8 includes additional information regarding the Part 77 surfaces. The ALP set contains sheets illustrating plans and profiles of Part 77 surfaces and approaches. The sheets list objects that penetrate any of these surfaces and describe how the penetration may be resolved.

4.1.4 TAXIWAY SYSTEM REQUIREMENTS

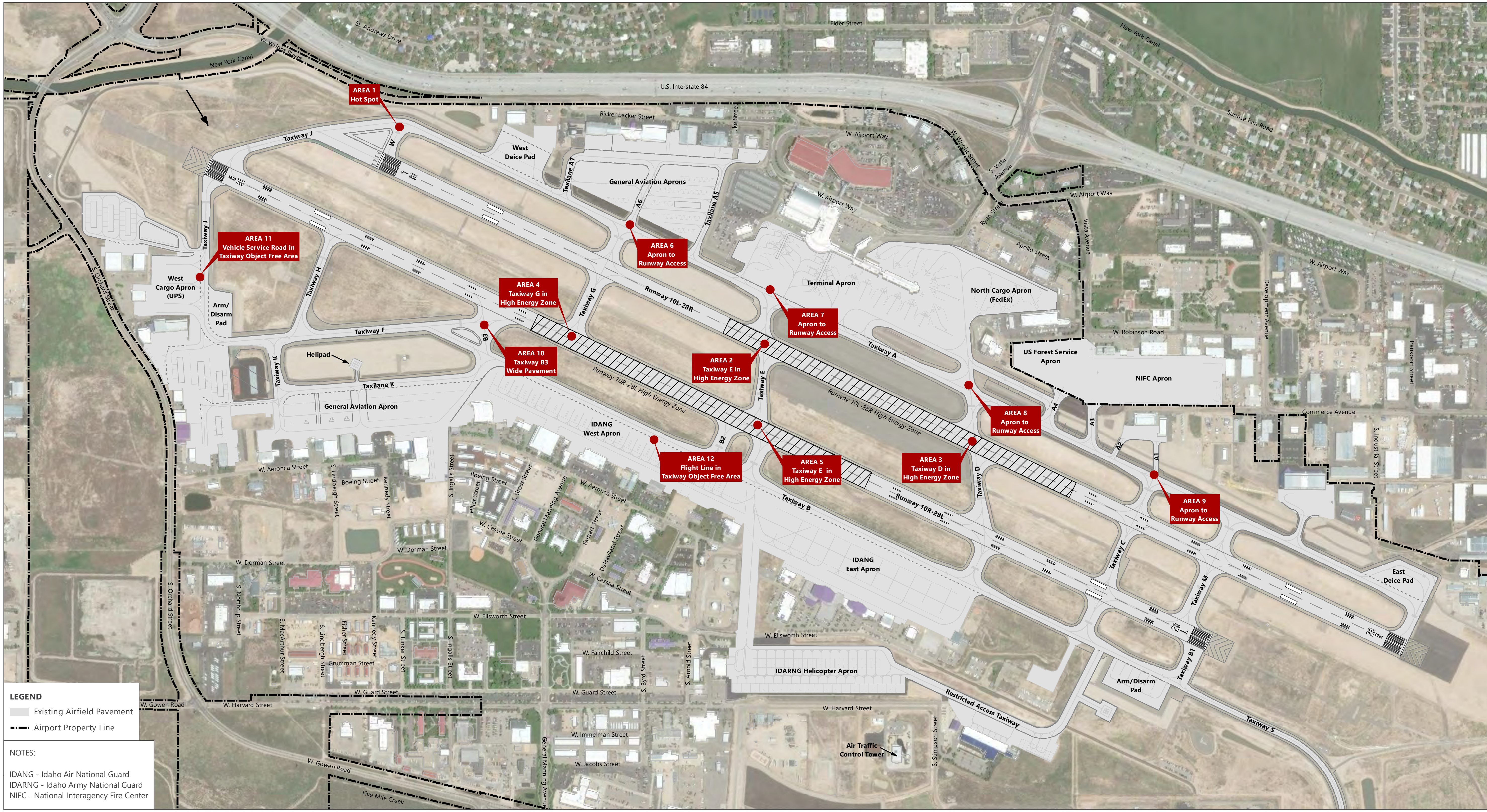
The existing taxiway system at the Airport, as described in Section 2, was evaluated based on specific FAA taxiway dimensional design criteria, as well as in accordance with general taxiway design principles, pursuant to the guidelines detailed in AC 150/5300-13A.

Taxiway dimensional design criteria are based on the TDG of the aircraft using the taxiway. TDG is a classification of airplanes based on outer-to-outer main gear width and cockpit-to-main-gear distance. As noted previously, the critical aircraft for the Airport (Boeing 767-300F and Airbus A300-600) are classified as TDG 5. In accordance with FAA taxiway design criteria, TDG 5 corresponds to a taxiway width requirement of 75 feet, with 30-foot-wide shoulders.

Section 2 presents an inventory of taxiway dimensions at the Airport. All taxiways that facilitate movement of TDG 5 aircraft are at least 75 feet wide, although most are identified to have shoulder widths of only 25 feet, rather than 30 feet. Additional pavement has been added to these shoulders over time, and most key taxiways now have adequate shoulder pavement. Some taxiways with shoulders less than 30 feet wide have a taxiway width that exceeds TDG 5 standards, which provides adequate overall pavement coverage. Paved shoulders are required for taxiways, taxilanes, and aprons accommodating ADG-IV and higher aircraft and are recommended for taxiways, taxilanes, and aprons accommodating ADG-III aircraft.

Taxiway S, constructed in 2016 to provide access to the SkyWest Maintenance facility, is 50 feet wide with 20-foot-wide shoulders (although additional pavement has been added to stabilize the shoulders out to an additional 20 feet), thereby meeting design standards for TDG 4. These dimensions are suitable for the current fleet of aircraft utilizing Taxiway S. However, potential cargo development in this area of the Airport will require Taxiway S to be upgraded to TDG 5 standards, with a full width of 75 feet of full-strength taxiway pavement and 30-foot-wide paved shoulders.

In addition to specific dimensional design criteria, an assessment of taxiway geometry principles and safety standards was conducted, based on guidance sent forth in AC 150/5300-13A. A total of 12 areas of noncompliance, or problem areas, were identified; **Exhibit 4-2** depicts these areas.



SOURCES: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community (aerial basemap); Power Engineers (Airport property line); Quantum Spatial aerial data collection and planimetric base mapping, September 2016 (airfield pavement); Ricondo & Associates, Inc., March 2017 (noncompliant areas).

EXHIBIT 4-2

TAXIWAY AREAS OF NONCOMPLIANCE

C:\Ricondo Projects\Active Projects\Boise\Master Plan Update\GIS\GIS Exhibits\04_Facility Requirements\Ex_4-2_Taxiway Issues.mxd

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4.1.4.1 HOT SPOT (AREA 1)

The FAA identifies hot spots as locations on an airfield with a history of potential risk of collisions or runway incursions and where heightened attention by pilots is necessary. The FAA has designated one hot spot (HS-1) at the Airport, located on the hold-short bar on Taxiway J, north of the Runway 10R threshold. Aircraft taxiing along Taxiway A to Runway 10L have proceeded onto Taxiway J when given instructions to hold short of Runway 10L.

To address the issue of runway incursions, the FAA has initiated a comprehensive multiyear Runway Incursion Management (RIM) program to identify, prioritize, and develop strategies to help airport sponsors mitigate incursion risk. The RIM program includes airports where three or more peak annual runway incursions have occurred in a given calendar year or averaged at least one runway incursion per year from 2008 to 2017.

As of 2018, BOI is officially listed as a RIM location. The hot spot identified at BOI has resulted in three peak annual runway incursions in a calendar year and a total of eight cumulative runway incursions for the 10-year period ending 2017.[2] As a RIM location, elimination of the designated hot spot at the Airport will be a priority for the FAA, and it is a priority in assessing airfield development concepts in this MPU.

4.1.4.2 HIGH ENERGY INTERSECTIONS (AREAS 2–5)

Taxiway design principles include the avoidance of taxiway intersections in the middle third (or "high energy" zone) of a runway. By limiting runway crossings to the outer thirds of the runway, the portion of the runway where a pilot can least maneuver to avoid a collision is kept clear.

Exhibit 4-2 depicts the high energy zone for each runway. Areas 2 through 5 indicate locations where taxiways intersect with runways within the high energy zones. Taxiways E and D are within the high energy zone for Runway 10L-28R. Taxiways G and E are within the high energy zone for Runway 10R-28L. Elimination of these intersections should be considered.

In addition to being located in high energy zones, Taxiways E and D intersect the runways at an acute angle. Instead, right-angle intersections are preferred to provide the best visibility to the left and right for a pilot.

4.1.4.3 APRON TO RUNWAY ACCESS (AREAS 6–9)

FAA taxiway design guidance specifies taxiways should not lead directly from an apron to a runway without requiring a turn. Such configurations can lead to confusion when a pilot typically expects to encounter a parallel taxiway, but instead accidently enters a runway. Areas 6 through 9 identify areas with direct apron to runway access:

- Taxiway G from the north GA apron (via Taxilane A6) to Runway 10L-28R
- Taxiway E from the west portion of the terminal apron to Runway 10L-28R
- Taxiway D from the east portion of the terminal apron to Runway 10L-28R
- Taxiway C from the Idaho Helicopters FBO apron (via Taxilane A1) to Runway 10L-28R

[2] Federal Aviation Administration, *Runway Incursion Mitigation Fiscal Year 2018 Annual Summary Report*, February 2019.

While not all of these areas have markings connecting an apron area to a taxiway that leads to the runway, the ability for an aircraft to proceed from an apron to the runway unrestricted is possible, especially during periods of poor weather or low visibility.

4.1.4.4 WIDE EXPANSES OF PAVEMENT (AREA 10)

The FAA states taxiway-to-runway interface encompassing wide expanses of pavement is not recommended. Wide pavement areas require placement of signs far from a pilot's eye, and they reduce the conspicuity of other visual cues. Under low visibility conditions or due to pilot focus on the centerline, signs can be missed. This is especially critical at runway entrance points. The intersection of Taxiways F and B3 with Runway 10R-28L is an example of a wide expanse of pavement that should be removed or simplified into a standard runway intersection.

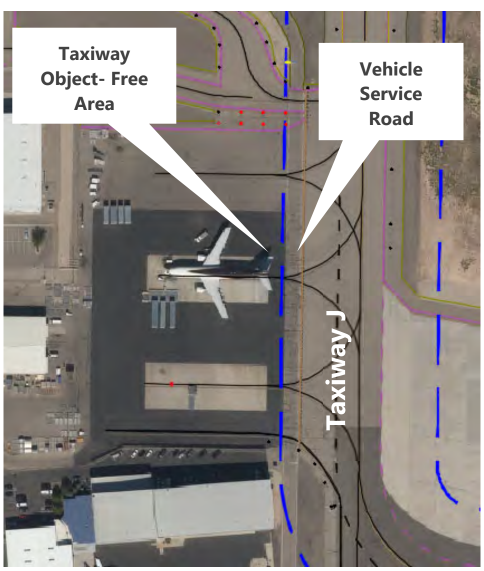
4.1.4.5 TAXIWAY OBJECT-FREE AREA ENCROACHMENT (AREAS 11–12)

The taxiway object-free area (TOFA) clearing standards prohibit vehicle service roads (VSRs), parked aircraft, and other objects, except for objects that need to be located in the TOFA for air navigation or aircraft ground maneuvering purposes. In accordance with ADG-IV standards, the TOFA is 129.5 feet from the taxiway centerline to a fixed or movable object. There are two areas on the airfield where encroachment on a TOFA has been identified as a modification of standard, as depicted on **Exhibit 4-3**.

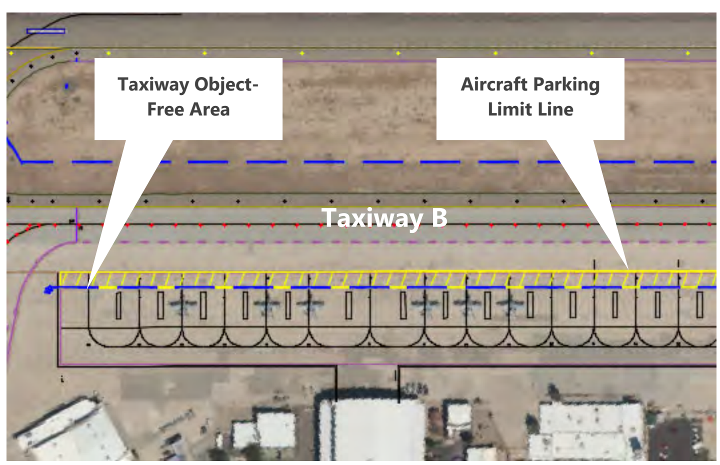
- Area 11 represents the west cargo apron area, currently occupied by UPS, where a VSR and the apron/aircraft parking positions reside within the Taxiway J TOFA by approximately 30 feet.
- At Area 12, the Taxiway B TOFA overlaps the IDANG apron parking limit line by 33 feet. Due to this encroachment, aircraft with wingspans greater than 141 feet, 1 inch require a vehicle ("follow me") escort along Taxiway B.

EXHIBIT 4-3 TAXIWAY OBJECT-FREE AREA ENCROACHMENT

Area 11: West Cargo Apron



Area 12: Idaho Air National Guard Apron and Taxiway B



SOURCES: GeoTerra, Inc., September 2016 (aerial photography – for visual reference only, may not be to scale); Ricondo & Associates, Inc., April 2017 (taxiway object-free area encroachment areas).

4.1.5 APRON REQUIREMENTS

Airport-controlled apron areas at BOI include the terminal apron, hold/deice, and GA parking aprons.

- The terminal apron provides adequate area for aircraft parking at existing terminal gates. Aircraft maneuverability on the north side of Concourse B can occasionally become restricted due to an access roadway and the adjacent air cargo (FedEx) area. An apron taxilane provides the only access point to the cargo area and the north side of Concourse B, which requires coordination between pilots and ATC controllers. If new gates are added in the future, then the terminal apron may need to expand, depending on the location and configuration of the new gate areas.
- The east and west hold/deice aprons provide areas for aircraft to deice or to hold for airfield operational flexibility. These aprons are also used on occasion for remote parking of aircraft that are towed to/from the terminal gates. Both aprons can accommodate large aircraft up to a Boeing 767. Boeing 757 or 767 aircraft cannot park on the currently designated painted lines without impacting Taxiway A or CBP processing. Accommodation of these aircraft on the west apron requires permission from Firehawk Helicopters so as to not block access to its facility. Expansion of both aprons should be considered to provide additional operational capability for more and/or large aircraft.
- Future GA apron requirements are described in Section 4.4.

4.1.6 NAVIAGIONAL AID REQUIREMENTS

As described in Section 2, visual NAVAIDS at the Airport include wind cones and visual slope indicators, neither of which requires the use of onboard receiving equipment. In accordance with 14 CFR Part 139.323, a lighted wind cone is located at each end of the runways, since the runways are available for day/night air carrier use. To provide visual slope guidance for aircraft approach to Runway 10R-28L, a VASI is installed on each approach end. The FAA considers PAPI installations easier to maintain and more precise. Therefore, it is anticipated that the existing VASIs on Runway 10R-28L will be eventually replaced with PAPIs. VASI units on each end of Runway 10L-28R were replaced with PAPIs in 2018.

The electronic NAVAID equipment installed at the Airport plays a critical role in providing nonprecision and precision instrument approach capability to both runways, as well as in providing important enroute navigation capability within the regional airspace system. Satellite-based navigation systems augment the physical equipment installed at the Airport, providing additional instrument approach and enroute navigation capabilities. The existing instrument approach procedures published for the Airport are adequate given the type and number of operations forecast for the Airport. Therefore, no additional electronic NAVAIDS should be required at the Airport through the planning period. Any future instrument approach procedures developed for the Airport will likely be based on satellite technology, which is unlikely to require the installation of any physical equipment at the Airport.

Weather equipment installed on the airfield consists of an ASOS, which allows for the recording and dissemination of weather conditions at the Airport. This equipment meets industry standards, and no additional weather reporting equipment is likely to be required through the planning period, except as required to upgrade or replace existing systems.

4.1.7 LIGHTING AND MARKING REQUIREMENTS

Both runways at the Airport are equipped with HIRL, which is sufficient and should be maintained through the planning period. Existing approach lighting is appropriate for the types of approaches available at the Airport. However, Runway 28R is equipped with an ILS, but it is not equipped with an approach light system. Installation of a MALSR approach lighting system would allow visibility minimums to be reduced, potentially resulting in greater reliability and capacity for the airfield during West Flow IFR conditions.

Requirements for airfield markings are described in AC 150/5340-1K, *Standards for Airport Markings*. Runway markings are specified according to the type of instrument approach available on the runway (precision or nonprecision). All runway markings are reported to be in good condition. To ensure aircraft remain on designated pavement areas, yellow centerline stripes are currently painted on all taxiway and apron surfaces at the Airport. Aircraft parking positions are also marked on appropriate apron areas. With routine maintenance, these markings are anticipated to be adequate through the planning period.

A compass calibration pad is painted on the east hold/deice pad. AC 150/5300-13A specifies the center of the pad should be at least 600 feet from magnetic objects, such as large parking lots, busy roads, railroad tracks, high voltage electrical transmission lines, or cables carrying direct current. Additionally, the center of the pad should be at least 300 feet from buildings, aircraft arresting gear, fuel lines, electrical or communication cable conduits when they contain magnetic materials, and other aircraft. The current location of the pad is not adequate given proximity to various interfering objects and plans for future development in that area of the airfield.

4.2 PASSENGER TERMINAL FACILITY REQUIREMENTS

As described in Section 2, the passenger terminal complex consists of a main terminal building, one connected concourse (Concourse B), and one integrated ground load concourse (Concourse A) located on the airside portion of the first floor of the main terminal building. The current configuration of the terminal building has remained substantially unchanged since completion of the last terminal development program in 2005. This section describes future requirements for aircraft gates, as well as for internal elements/spaces of the terminal building.

4.2.1 AIRCRAFT GATE REQUIREMENTS

A gating analysis was conducted to determine the number of gates needed to accommodate future passenger aircraft operations at the terminal through the planning period. The analysis was conducted using the Airport Operational Database (AODB) software developed by AirIT. The AODB allows for input of various schedule and gating parameters and outputs a gated schedule. The following process was used to conduct the gating analysis.

Define Available Gates

A total of 24 gate positions are currently available for aircraft parking. Concourse B has 13 gate positions with 11 loading bridges. Concourse C has 11 ground-loading parking positions accessible via ground-level covered walkways. Two of the loading bridges are swing gates, allowing access to two aircraft parking positions. Four remote RON parking positions were also included in the analysis as available positions for towing aircraft to and from the concourse gates.

Define Gate Rules

Airport operations staff provided information detailing the airline assignment, aircraft capability, and restrictions of each gate for use in the gating analysis. **Table 4-8** summarizes these assumptions. Aircraft dimensions, such as height, length, and wingspan, generally dictate the ability of a gate to accommodate a specific aircraft. Airline assignments are made generally on a preferential basis, with some gates available for any airline to use (common use). Several gates also have dependencies or restrictions imposed on the accommodation of certain aircraft, such as requiring adjacent gates to not be occupied or aircraft on one gate may block access to other gates.

TABLE 4-8 AIRCRAFT GATE CHARACTERISTICS

GATE	AIRLINE[1]	REPRESENTATIVE AIRCRAFT TYPES[2]	DEPENDENCIES / RESTRICTIONS
Concourse B			
B10	United	Regional jets/turboprops, narrowbody jets	
B11	United	Regional jets/turboprops, narrowbody jets	
B14	United/Delta	Regional jets/turboprops	No larger than Embraer E175
B15	Southwest	Narrowbody jets	
B16	Common	Regional jets, narrowbody jets	
B17	Southwest	Narrowbody jets	
B18	Delta	Regional jets, narrowbody jets	
B19	Common	Regional jets, narrowbody jets, Boeing 757	
B20	Delta	Regional jets, narrowbody jets, Boeing 757	
B21A	United	Regional jets, narrowbody jets	
B21B	United	Regional jets, narrowbody jets	
B22A	Delta	Regional jets, narrowbody jets, Boeing 757/767	Boeing 757/767 requires gates on both sides to be clear
B22B	Delta	Regional jets, narrowbody jets, Boeing 757/767	Boeing 757/767 requires gates on both sides to be clear
Concourse C			
C1	Common	Narrowbody jets (Boeing 737, MD80)	Can take these aircraft if C3 and C5 are not in use
C2	Alaska	Regional jets/turboprops up to Embraer 175	
C3	Alaska	Regional jets/turboprops up to Embraer 175	
C4	Alaska	Regional jets/turboprops up to Embraer 175	
C5	Alaska	Regional jets/turboprops up to Embraer 175	
C6	Alaska	Regional jets/turboprops up to Embraer 175	
C7	Alaska	Regional jets/turboprops up to Embraer 175	
C8	Alaska	Regional jets/turboprops up to Embraer 175	
C9	Alaska	Regional jets/turboprops up to Embraer 175	Can take Embraer E175 and Q400, but blocks C7
C10	Alaska	Regional jets/turboprops up to Embraer 175	
C12	Alaska	Regional jets/turboprops, narrowbody jets	Narrowbody jets block C7 and C9
Remote			
R1	Common	Regional jets, narrowbody jets	Use only when 21B is not occupied
R2	Common	Regional jets, narrowbody jets	Emergency use only; blocks service road and taxilane
R3	Common	Regional jets, narrowbody jets, Boeing 757	Boeing 757 requires tow-in only
R4	Common	Regional jets, narrowbody jets, Boeing 757	Boeing 757 requires tow-in only
R5	Common	Regional jets, narrowbody jets, Boeing 757	Boeing 757 requires tow-in only
East Deice	Common	Regional jets, narrowbody jets, Boeing 757/767	Boeing 757/767 impacts Taxiway A and customs
West Deice	Common	Regional jets, narrowbody jets, Boeing 757/767	Boeing 757/767 requires permission from Firehawk tenant

NOTES:
1 Common gates/positions are available for any airline.
2 Examples of regional aircraft include Canadair CRJ, Embraer E175, and Q400 turboprop. Examples of narrowbody jets include Boeing 737 and Airbus A319.
SOURCES: Ricondo & Associates, Inc., May 2017; City of Boise, Department of Aviation.

Gate occupancy assumptions were also developed, as follows:

- **Buffer time:** The buffer time refers to the time a gate is unoccupied, allowing for variability between scheduled and actual times that normally occur in day-to-day operations. The buffer time is applied both after departure and before arrival. For this analysis, it was assumed that a gate is unoccupied for 30 minutes between aircraft.
- **Minimum time at gate:** A minimum time at the gate between matched arrivals and departures was assumed. For regional jets and turboprops, a gate occupancy time of 30 minutes was assumed. For narrowbody aircraft, such as the Boeing 737 or Airbus A319/A320, 60 minutes was assumed. For widebody aircraft, such as the Boeing 767, 90 minutes was assumed.
- **Minimum time upon arrival:** The minimum time at the gate after arrival refers to the minimum time an aircraft is assumed to remain at the gate prior to being towed off (if needed) to allow for passenger deboarding and airline activities, such as cleaning the cabin. This parameter only applies if the aircraft is towed off the gate; it does not apply to a turn that remains on the gate between its arrival and departure. The minimum gate time upon arrival (before towing) was assumed to be 40 minutes for regional and narrowbody aircraft and 60 minutes for widebody aircraft.
- **Minimum time prior to departure:** The minimum time at the gate before departure refers to the minimum time an aircraft is assumed to need to be towed on (if needed) to allow for passenger boarding and airline activities, such as fueling and loading baggage. This parameter only applies if the aircraft is towed onto the gate; it does not apply to a turn that remains on the gate between its arrival and departure. The minimum gate time prior to departure was assumed to be 30 minutes for regional aircraft, 40 minutes for narrowbody aircraft, and 90 minutes for widebody aircraft.

Input Flight Schedule

Design day flight schedules (DDFSs) of passenger airline activity (and all other aircraft operations) at the Airport were developed for the base year (2015), as well as for forecast years (2020, 2025, and 2035) under both the baseline forecast and the high forecast scenarios. Development of the DDFSs is described in Section 3.

Analysis Results

Once the gating assumptions and flight schedules were input into the model, future gate requirements were determined by noting how many flights could not be gated. **Table 4-9** presents the resulting requirements as a range reflecting the baseline and high forecast scenarios. As shown, by 2035, an additional five to nine gates are estimated to be needed at the Airport.

TABLE 4-9 AIRCRAFT GATE REQUIREMENTS

	TOTAL GATES				ADDITIONAL GATES FROM EXISTING		
GATE TYPE	EXISTING	2020	2025	2035	2020	2025	2035
Regional Gates[1]	11	11–12	11–13	13–15	0–1	0–2	2–4
Mainline Gates[2]	13	14–15	14–16	16–18	1–2	1–3	3–5
Total	**24**	**25–27**	**25–29**	**29–33**	**1–3**	**1–5**	**5–9**

NOTES:
1 Regional gates accommodate regional jet and turboprop aircraft, such as the Canadair Regional Jet, Embraer EMB 145 and E175, and the Bombardier Q400.
2 Mainline gates accommodate narrowbody aircraft, such as the Boeing 737 and 757 and the Airbus A319/A320, and widebody aircraft, such as the Boeing 767. Not all mainline gates can accommodate the Boeing 757 and 767.
SOURCES: Ricondo & Associates, Inc., May 2017; City of Boise, Department of Aviation; Airport Operational Database software program developed by AirIT.

Preliminary results using the baseline 2015 DDFS indicated not all gates were being utilized, which is contrary to what Airport operations staff have witnessed; additionally, all gates (particularly on Concourse B) are typically occupied at night. To validate the 2015 DDFS, a busy day in 2017 was analyzed. The chosen day was August 6, 2017, which ranked in the 97.2 percentile in 2017 in terms of scheduled flights. There were 139 scheduled passenger flights on this day, compared to 120 scheduled passenger flights in the 2015 DDFS. Results of the 2017 analysis indicate all gates on Concourse B are being used on busy days at the Airport. Based on this analysis, it was determined that the gate requirement is tracking more closely to the high forecast requirement instead of the baseline requirement.

4.2.2 TERMINAL BUILDING REQUIREMENTS

This section describes the development of terminal building requirements for the Airport through the planning period. Requirements were developed for the baseline and high forecast scenarios for 2020, 2025, and 2035. Terminal requirements were broadly estimated for major functional areas of the terminal, including airline-related areas and security-related areas. **Appendix B** provides additional detail regarding the methodologies and assumptions used to estimate terminal requirements. Sources of data and guidance used in developing future terminal building requirements included the following: Airport records, files, and observations; the MPU activity forecast presented in Section 3; FAA and TSA publications; guidance prepared through the Airport Cooperative Research Program (ACRP); methodologies and assumptions from the International Air Transport Association (IATA); professional judgment; and industry benchmarking.

4.2.2.1 FACILITY DEMAND

Passenger demand provides area and unit requirements for various terminal building elements, including airline check-in, security checkpoints, and baggage claim. Area requirements for other airline- and nonairline-related facilities were derived using a ration of area per gate, as established from existing facilities or published guidelines, as applicable. **Table 4-10** presents the various BOI demand parameters used for terminal space planning.

TABLE 4-10 DEMAND PARAMETERS FOR TERMINAL PLANNING

		2020		2025		2035	
DEMAND ELEMENT	UNITS	BASELINE SCENARIO	HIGH SCENARIO	BASELINE SCENARIO	HIGH SCENARIO	BASELINE SCENARIO	HIGH SCENARIO
Million Annual Enplaned Passengers	Passengers	1,796,348	1,978,546	1,986,940	2,227,794	2,376,682	2,635,579
Large Regional Gates (ADG-IIIa)[1]	Gates	11	12	11	13	13	15
Narrowbody Gates (ADG-IIIb)[2]	Gates	14	15	14	16	16	18
Narrowbody Equivalent Gates[3]	Gates	22.8	24.4	26.3	20.7	26.4	29.9
Peak-Hour Departing Operations	Flights	9	10	9	10	10	11
Peak-Hour Enplaning Passengers	Passengers	890	1,010	925	1,055	955	1,085
Peak-Hour Deplaning Passengers	Passengers	660	770	695	855	795	1,015
Peak-Hour Originating Passengers	Passengers	890	1,010	925	1,055	955	1,085
Peak 20-Minute Destination Passengers	Passengers	360	360	435	435	510	510
Peak 20-Minute Arriving Operations	Flights	4	4	4	4	4	4

NOTES: ADG – Airplane Design Group

1 ADG-IIIa – large regional gates (e.g., Bombardier Q400, Embraer E175)

2 ADG-IIIb – narrowbody gates (e.g., Boeing 737, Airbus A320)

3 Narrowbody Equivalent Gates – normalized metric equating large regional gates as 80 percent of a narrowbody gate

SOURCE: Ricondo & Associates, Inc., May 2017 (Master Plan Update aviation activity forecast and gating analysis).

Table 4-10 references the term narrowbody equivalent gate (NBEG). NBEG is a normalized metric for defining certain terminal facility needs based on gate apron capacity, notwithstanding forecast demand. The NBEG index provides a ratio of passenger and baggage volumes based on relative aircraft size and seat capacity in relation to the physical apron required to accommodate the aircraft. While not an appropriate metric for dynamic processing components, such as check-in or security screening, gate equivalencies allow for the planning-level calculation of static areas, such as airline operations, Airport support, building services, and circulation.

4.2.2.2 AIRLINE-RELATED TERMINAL REQUIREMENTS

Airline facilities include those areas of the terminal related to airline activity, such as the check-in lobby, holdrooms, baggage handling system (BHS), baggage claim, and airline support. **Tables 4-11** and **4-12** present airline-related terminal facility requirements for the baseline and high forecast scenarios, respectively.

Check-in Lobby

Check-in is defined as the process by which passengers obtain their boarding pass and/or baggage tags and drop off checked baggage prior to being screened at the security screening checkpoint (SSCP). Existing check-in types at the Airport include bag-drop counters and kiosk positions, as well as agent-counter positions used for full-service transactions. Kiosk positions can be located in-line with agent positions or they may be standalone units in other locations at the Airport. A factor of 55 peak-hour originating passengers per in-line check-in position was used, based on the ratio of passengers in the 2015 DDFS and existing counter positions.

Charter Flight Area

Charter operators operate ticketing areas within the baggage claim lobby. These facilities were assumed to be adequate, with no growth assumed through the planning period.

Holdrooms

Holdrooms provide space for passenger preboarding activities, including seating and standing areas, airline agent gate podiums, boarding/deplaning queuing spaces, and access/egress aisleways. Holdroom areas are typically balanced to the seating capacity of the largest aircraft using the gate. An active, or loading/unloading gate, requires a passenger preboarding area for passengers to sequence themselves by boarding position, disparate from an unobstructed egress for unloading passengers debarking from the aircraft.

Holdroom requirements were initially developed from ACRP recommendations for Level of Service (LOS) C, based on assumptions for the ratio of standing, seated, and preboarding passengers.[3] These assumptions resulted in a space requirement of 1,760 square feet per large commuter gate and 2,820 square feet per narrowbody gate. Based on actual Airport holdroom space, the average space for a regional gate is approximately 850 square feet, and the average space for a mainline gate is approximately 1,400 square feet. In consideration of providing an enhanced LOS while better reflecting existing Airport space usage, the ACRP and Airport average space factors were averaged, resulting in approximately 1,300 square feet per large commuter gate and approximately 2,100 square feet per narrowbody gate. The reduced space factors are reasonable regarding the recommendation that holdrooms be situated so they are paired or grouped. Locating holdrooms in close proximity to one another allows the total amount of seating and standing space to be shared, thereby reducing the total space required for the composite area.

[3] Transportation Research Board, Airport Cooperative Research Program, *Report 25: Airport Passenger Terminal Planning and Design*, *Volume 1: Guidebook*, 2010.

TABLE 4-11 AIRLINE-RELATED TERMINAL REQUIREMENTS—BASELINE SCENARIO

ELEMENT	UNITS	PLANNING FACTOR	EXISTING	REQUIREMENTS			TOTAL ADDITIONAL NEEDED		
				2020	2025	2035	2020	2025	2035
Check-in Lobby									
Check-in Lobby	sq ft	260 sq ft/position	7,920	4,420	4,420	4,680	-	-	-
In-Line Ticket Positions	each	55 peak-hour originating passengers/position	46	17	17	18	-	-	-
Charter Flight Area									
Charter Flight Area	sq ft	no growth from existing	1,870	1,870	1,870	1,870	-	-	-
Holdroom									
Holdroom Area	sq ft	1,305 sq ft/large regional gate 2,110 sq ft/narrowbody gate	24,320	43,895	43,895	50,725	19,575	19,575	26,405
Baggage Handling System									
Outbound Makeup Devices	each	4 carts/peak-hour destination passenger	4	4	4	4	-	-	-
Outbound Baggage Area	sq ft	4,480 sq ft/device	70,230[1]	17,920	17,920	17,920	-	-	-
Inbound Offload Devices	each	baggage claim devices	4	2	2	2	-	-	-
Inbound Baggage Area	sq ft	1,300 sq ft/device		2,600	2,600	2,600	-	-	-
Baggage Claim									
Baggage Claim Area	sq ft	4,570 sq ft/device	18,280	9,140	9,140	9,140	-	-	-
Baggage Claim Devices	each	126 peak 20-minute destination passengers/device	4	2	2	2	-	-	-
Airline Support									
Ticketing Office	sq ft	125 sq ft/ticket position	8,620	2,310	2,310	2,250	-	-	-
Baggage Service Office	sq ft	150 sq ft/bag claim device	2,090	300	300	300	-	-	-
Operations and Support	sq ft	962 sq ft/Narrowbody Equivalent Gate	13,750	21,920	21,920	25,380	8,170	8,170	11,630
Total Airline-Related Facilities	**sq ft**			**104,195**	**104,195**	**114,865**	**27,745**	**27,745**	**38,035**

NOTE:
1 Includes all outbound and inbound space.
SOURCES: Ricondo & Associates, Inc., May 2017 (requirements); City of Boise Department of Aviation (existing).

TABLE 4-12 AIRLINE-RELATED TERMINAL REQUIREMENTS—HIGH SCENARIO

ELEMENT	UNITS	PLANNING FACTOR	EXISTING	REQUIREMENTS 2020	REQUIREMENTS 2025	REQUIREMENTS 2035	TOTAL ADDITIONAL NEEDED 2020	TOTAL ADDITIONAL NEEDED 2025	TOTAL ADDITIONAL NEEDED 2035
Check-in Lobby									
Check-in Lobby	sq ft	260 sq ft/position	7,920	4,940	5,200	5,200	-	-	-
In-Line Ticket Positions	each	55 peak-hour originating passengers/position	46	19	20	20	-	-	-
Charter Flight Area									
Charter Flight Area	sq ft	no growth from existing	1,870	1,870	1,870	1,870	-	-	-
Holdroom									
Holdroom Area	sq ft	1,305 sq ft/large regional gate 2,110 sq ft/narrowbody gate	24,320	44,700	49,420	56,250	20,380	25,100	31,930
Baggage Handling System									
Outbound Makeup Devices	each	4 carts/peak-hour destination passenger	4	4	4	4	-	-	-
Outbound Baggage Area	sq ft	4,480 sq ft/device	70,230[1]	17,920	17,920	17,920	-	-	-
Inbound Offload Devices	each	baggage claim devices	4	2	2	2	-	-	-
Inbound Baggage Area	sq ft	1,300 sq ft/device		2,600	2,600	2,600	-	-	-
Baggage Claim									
Baggage Claim Area	sq ft	4,570 sq ft/device	18,280	9,140	9,140	9,140	-	-	-
Baggage Claim Devices	each	126 peak 20-minute destination passengers/device	4	2	2	2	-	-	-
Airline Support									
Ticketing Office	sq ft	125 sq ft/ticket position	8,620	2,380	2,500	2,500	-	-	-
Baggage Service Office	sq ft	150 sq ft/bag claim device	2,090	300	300	300	-	-	-
Operations and Support	sq ft	962 sq ft/Narrowbody Equivalent Gate	13,750	23,460	25,290	28,750	9,710	11,540	15,000
Total Airline-Related Facilities	**sq ft**			**107,310**	**114,240**	**124,530**	**30,090**	**36,640**	**46,930**

NOTE:
1 Includes all outbound and inbound space.
SOURCES: Ricondo & Associates, Inc., May 2017 (requirements); City of Boise, Department of Aviation (existing).

Baggage Handling System

The BHS consists of outbound and inbound baggage sortation and delivery systems. Requirements for BHS include the necessary inbound and outbound units and the estimated area needed to sort and handle baggage at each unit. System type and conveyor/track layout will determine space requirements for connecting and sorting elements.

Outbound baggage makeup facilities consist of baggage makeup equipment, areas for staging and loading baggage carts, and baggage cart drive (circulation) aisles. Access to and from the apron and gate positions are also considered. Outbound baggage makeup devices can be configured to use piers or chutes with limited storage capacity that extend directly from the baggage conveyance and sortation system, or carousel units that allow baggage to continuously circulate, thereby providing higher storage capacity and greater staging area for carts. Carousels can be flat-plate units or slope-plate units. Slope-plate units provide greater capacity; however, flat-plate units are preferred by some airlines because they provide better ergonomics for workers. Carts can be staged either parallel to makeup devices or perpendicular, if the aisles between devices have sufficient width. Inbound facilities include offload devices and a handling area.

Baggage Claim

Baggage claim requirements define the number of claim units, the linear presentation frontage of claim conveyors, and the active retrieval areas. Facility requirements are defined to accommodate all passengers with baggage at the claim device during the peak 20 minutes. Passenger accumulation at claim facilities represents only the passengers checking bags and terminating their journeys at the Airport.

Airline Support

Airline support areas generally include back-of-house areas that are critical to the operation of the terminal and concourse but not directly related to passenger activity. These spaces include ticketing offices, baggage service offices, and ramp operations and support facilities.

4.2.2.3 SECURITY-RELATED TERMINAL REQUIREMENTS

As a result of the November 2001 Aviation and Transportation Security Act, the US Department of Homeland Security (DHS) maintains in-terminal facilities to conduct airline security screening principally related to the passenger SSCPs, baggage screening areas, and border and point-of-entry (POE) security. DHS terminal facility requirements are based on three DHS publications:

- Transportation Security Administration, *Recommended Security Guidelines for Airport Planning, Design and Construction*, June 15, 2006.
- Transportation Security Administration, *Checkpoint Design Guide (CDG), Revision 5.1*, May 7, 2014.
- US Customs and Border Protection, *Airport Technical Design Standards*, June 2012.

Tables 4-13 presents security-related terminal facility requirements for the baseline and high forecast scenarios.

Transportation Security Administration

The TSA is responsible for enforcing and regulating passenger and baggage screening at the Airport. DHS-published facility templates and guidelines developed the space requirements needed to accommodate equipment and passenger queuing and support areas.

TABLE 4-13 SECURITY-RELATED TERMINAL REQUIREMENTS

ELEMENT	UNITS	PLANNING FACTOR	EXISTING	REQUIREMENTS 2020	REQUIREMENTS 2025	REQUIREMENTS 2035	TOTAL ADDITIONAL NEEDED 2020	TOTAL ADDITIONAL NEEDED 2025	TOTAL ADDITIONAL NEEDED 2035
Baseline Scenario									
SSCP Lanes	each	258 peak-hour originating passengers/lane	4	4	4	4	-	-	-
SSCP Queue Area	sq ft	720 sq feet/lane	1,600	2,880	2,880	2,880	1,280	1,280	1,280
SSCP Processing Area	sq ft	750 sq feet/lane	3,600	3,000	3,000	3,000	-	-	-
Adjacent Support Area	sq ft	150 sq feet/lane	750	600	600	600	-	-	-
Total SSCP Area	**sq ft**			**6,480**	**6,480**	**6,480**	**1,280**	**1,280**	**1,280**
Other Support Facilities and Offices	sq ft	924 sq ft/Narrowbody Equivalent Gate	13,210	21,060	21,060	24,390	7,850	7,850	11,180
Baggage Screening Area	sq ft	1.5 sq feet/peak-hour originating passenger	1,130	1,300	1,350	1,390	170	220	260
Customs and Border Protection Area[1]	sq ft	Single narrowbody operating during peak period	5,040	8,590	8,590	8,590	3,550	3,550	3,550
Total Security-Related Facilities	**sq ft**			**37,430**	**37,480**	**40,850**	**12,850**	**12,900**	**16,270**
High Scenario									
SSCP Lanes	each	258 peak-hour originating passengers/lane	4	4	5	5	-	1	1
SSCP Queue Area	sq ft	720 sq feet/lane	1,600	2,880	3,600	3,600	1,280	2,000	2,000
SSCP Processing Area	sq ft	750 sq feet/lane	3,600	3,000	3,750	3,750	-	150	150
Adjacent Support Area	sq ft	150 sq feet/lane	750	600	750	750	-	-	-
Total SSCP Area	**sq ft**			**6,480**	**8,100**	**8,100**	**1,280**	**2,150**	**2,150**
Other Support Facilities and Offices	sq ft	924 sq ft/Narrowbody Equivalent Gate	13,210	22,540	24,300	27,620	9,330	11,090	14,410
Baggage Screening Area	sq ft	1.5 sq feet/peak-hour originating passenger	1,130	1,470	1,540	1,580	340	410	450
Customs and Border Protection Area[1]	sq ft	Single narrowbody operating during peak period	5,040	8,590	8,590	8,590	3,550	3,550	3,550
Total Security-Related Facilities	**sq ft**			**39,080**	**42,530**	**45,890**	**14,500**	**17,200**	**20,560**

NOTES: SSCP – Security Screening Checkpoint

1 The existing CBP facility is a remote facility not located in the terminal building. The space requirements identified are to accommodate a single narrowbody aircraft during the peak period.

SOURCES: Ricondo & Associates, Inc., May 2017 (requirements); City of Boise, Department of Aviation (existing).

Although the TSA has direct responsibility for determining the size and configuration of the passenger SSCPs and the baggage screening facilities at the Airport, it typically collaborates with airport sponsors to plan locations and programs.

Unit requirements for SSCPs are derived based on TSA goals for expected passenger-processing rates. Currently, the Airport operates standard and Trusted Traveler program (Pre✓) screening lanes, and processing rates can range from 200 to 280 passengers per hour.[4] DHS offers Trusted Traveler programs designed to enhance security and to increase system efficiency, while providing an improved passenger experience. Screening technology and passenger eligibility will continue to evolve. Future processing rates and utilization percentages are unknown variables. For purposes of the requirements analysis, an average processing rate of 200 passengers per hour was assumed.

Security screening lanes are most efficient when passengers and bags are continuously flowing. To achieve this, carry-on bag screening should be remotely located with an average of five officers for every pair of lanes. Officers view a bag image captured from the screening lanes and clear any bags that can be visually resolved. This process, referred to as on-screen resolution, allows bag screening to flow continuously, while bags that require further screening can be separated and inspected manually.

The Aviation and Transportation Security Act requires all checked baggage be screened for explosives. The TSA recommends baggage screening rooms to be located away from critical services, utilities, and distribution systems.

Customs and Border Protection

All international passengers must be processed at a POE prior to entering the United States, whether or not they are terminating their journey at the Airport or connecting to a domestic flight. Each POE is a fully independent facility within the Airport, with CBP administrative offices and facilities capable of processing terminating and connecting passengers. A POE typically includes the following facilities:

- **Sterile Corridor:** This is a secure corridor for international passengers deplaning and entering the primary processing area.
- **Primary Processing:** The initial passenger screening to process passports consists primarily of Automated Passport Control and Global Entry kiosks. Global Entry is part of CBP's Trusted Traveler program; it allows the expedited clearance of pre-approved, low-risk travelers into the United States.
- **International Baggage Claim:** This baggage claim hall is for international passengers; all passengers must reclaim their bags prior to exiting the POE.
- **Exit Control/Inspection Area:** This represents the final stages of the POE process. Typically, passengers with reclaimed baggage are inspected by officers at podiums before proceeding to exit the POE into the US territory. However, if an officer recommends further search of a passenger or baggage, then the targeted party must be processed through secondary screening.
- **Secondary Processing:** Secondary screening areas accommodate the screening of passengers and baggage for goods, narcotics, or perishables not permissible into the United States. Secondary screening areas may consist of holdrooms for each gender, interview rooms, canine rooms, and other screening support spaces.

[4] Specific processing rates were not disclosed by the TSA for purposes of the MPU, but they were indicated to be sufficient through the planning period.

The CBP facility at the Airport is not located within or adjacent to the terminal building. Currently, no international air carrier flights are scheduled at the Airport. BOI's CBP facility primarily serves international travelers on inbound private jets arriving from Canada or Mexico. The CBP space requirements listed in Table 4-13 would accommodate a single narrowbody aircraft during the peak period. These requirements are identified in order to guide potential expansion of the existing remote CBP facility, or to identify the estimated space required if the facility were to be integrated into the terminal building or in an adjacent/separate facility.

4.2.2.4 OTHER TERMINAL REQUIREMENTS

Other terminal requirements include concessions, Airport administration and amenities, building services, and circulation. **Tables 4-14** and **4-15** present other terminal facility requirements for the baseline and high forecast scenarios, respectively.

Concessions

Concession spaces include food and beverage, retail, specialty, and duty-free shopping, along with the corresponding support and storage spaces. ACRP Report 54 provides concession area and support requirements for an airport with 1 to 3 million annual enplaned passengers, based on a factor of 12.4 square feet per million annual enplaned passengers for concession area and support/storage consisting of 20 percent of such total concession space.[5]

Airport Amenities

The Airport amenities located in the terminal include Airport management and staff offices, meeting rooms, storage and maintenance, and specialty passenger services. Spaces are defined as follows:

- **Administration and support:** Airport administration facilities located in the terminal include Airport management and staff offices, meeting rooms, and facilities supporting the operation and maintenance of the Airport. Area requirements based on existing NBEG planning factors equate to 3,435 square feet per NBEG. Use of this factor results in a significant increase in future required space. The function of existing space as it relates to the provision of administrative and support services for any future expanded terminal facilities should be evaluated by Airport management. For purposes of this requirements analysis, it was assumed that existing administrative and support space is adequate through the planning period.
- **Service Animal Relief Areas (SARAs):** As of August 4, 2016, all airports with greater than 10,000 annual enplanements are required to provide SARAs. These areas are to be wheelchair accessible for service animals accompanying passengers. Facilities should be located in the terminal and each sterile area, preferably collocated with passenger restrooms. Area requirements were based on a 225-square-foot room. At BOI, a SARA is located pre-security outside the west exit from baggage claim on the first floor.
- **Rental car facilities:** In-terminal rental car facilities include service counters, seating, and queuing areas. Future rental car facility requirements are described in Section 4.3. Facilities currently located inside the terminal may be relocated to a separate facility in the future. For terminal space planning purposes, no growth was assumed in the current in-terminal rental car space.

[5] Transportation Research Board, Airport Cooperative Research Program, *Report 54, Resource Manuel for Airport In-Terminal Concessions*, 2011.

TABLE 4-14 OTHER TERMINAL REQUIREMENTS—BASELINE SCENARIO

ELEMENT	UNITS	PLANNING FACTOR	EXISTING	REQUIREMENTS		
				2020	2025	2035
Concessions (Retail, Food, and Beverage)						
Concessions Area	sq ft	12.4 sq ft/million annual enplaned passengers	19,240	22,270	24,640	29,470
Concessions Support and Storage	sq ft	20 percent of total concessions area	6,170	4,450	4,930	5,890
Airport and Amenities						
Administration and Support	sq ft	3,435 sq ft/Narrowbody Equivalent Gate	49,120	49,120	49,120	49,120
Service Animal Relief Area (SARA)	sq ft	230 sq ft/SARA	300	230	230	230
Rental Car Facilities[1]	sq ft	no growth	8,780	8,780	8,780	8,780
Building Services						
Public Restrooms	sq ft	pre-security: 2 sq ft/peak-hour passenger post-security: 4 sq ft/peak-hour passenger	9,790	9,300	9,720	10,500
Mechanical, Electrical, Plumbing	sq ft	15 percent of finished space	35,430	35,700	36,320	39,980
Circulation						
General Public Circulation	sq ft	30 percent of public space	87,160	32,640	33,480	37,330
Total Other Facilities	**sq ft**			**162,490**	**167,220**	**181,300**

NOTE:
1 Facilities currently located inside the terminal may be relocated to a separate facility in the future. For terminal space planning purposes, no growth was assumed in the current in
SOURCES: Ricondo & Associates, Inc., May 2017 (requirements); City of Boise, Department of Aviation (existing).

TABLE 4-15 OTHER TERMINAL REQUIREMENTS—HIGH SCENARIO

ELEMENT	UNITS	PLANNING FACTOR	EXISTING	REQUIREMENTS			TOTAL ADDITIONAL NEEDED		
				2020	2025	2035	2020	2025	2035
Concessions (Retail, Food, and Beverage)									
Concessions Area	sq ft	12.4 sq ft/million annual enplaned passengers	19,240	24,530	27,620	32,680	5,290	8,380	13,440
Concessions Support and Storage	sq ft	20 percent of total concessions area	6,170	4,910	5,520	6,540	-	-	370
Airport and Amenities									
Administration and Support	sq ft	3,435 sq ft/Narrowbody Equivalent Gate	49,120	49,120	49,120	49,120	-	-	-
Service Animal Relief Area (SARA)	sq ft	230 sq ft/SARA	300	230	230	230	-	-	-
Rental Car Facilities[1]	sq ft	no growth	8,780	8,780	8,780	8,780	-	-	-
Building Services									
Public Restrooms	sq ft	pre-security: 2 sq ft/peak-hour passenger post-security: 4 sq ft/peak-hour passenger	9,790	10,680	11,460	12,600	890	1,670	2,810
Mechanical, Electrical, Plumbing	sq ft	15 percent of finished space	35,430	37,240	39,940	43,650	1,810	4,510	8,220
Circulation									
General Public Circulation	sq ft	30 percent of public space	87,160	34,210	37,390	41,300	-	-	-
Total Other Facilities	**sq ft**			**162,490**	**167,220**	**181,300**	**7,990**	**14,560**	**24,840**

NOTE:
1 Facilities currently located inside the terminal may be relocated to a separate facility in the future. For terminal space planning purposes, no growth was assumed in the current in-terminal rental car space.
SOURCES: Ricondo & Associates, Inc., May 2017 (requirements); City of Boise, Department of Aviation (existing).

Building Services

Facilities supporting the operation and maintenance of the Airport comprise the building services space. This includes public restrooms and utilities.

- Public restrooms should be conveniently distributed throughout the public areas of the terminal and should be located near concession spaces. The restrooms should be spaced no further than 400 feet apart, and they should provide for a maximum walking distance of 200 feet to a restroom. Each location should include men's and women's restrooms, as well as a separate family or companion care restroom.
- Mechanical, electrical, and plumbing areas are utility spaces throughout the facility, which were based on 10 percent of finished spaces within the terminal.

Circulation

Some building areas are highly dependent on the terminal configuration and gross size; these areas are difficult to define during the programming phase. Therefore, a percentage of the total building is specified as 30 percent of public space.

Secure circulation space consists of public areas within the boundaries of the TSA passenger security checkpoint and aircraft gates, typically including the main corridor of the concourse and the circulation between functional elements. The main concourse corridor can have gates on either one side (single-loaded) or both sides (double-loaded). Minimum corridor widths for single-loaded and double-loaded concourses are 20 feet and 30 feet, respectively.[6] Public circulation located between the TSA passenger security checkpoint and the landside access is considered nonsecure.

4.2.2.5 SUMMARY OF TERMINAL REQUIREMENTS

Tables 4-16 and **4-17** summarize the terminal facility space requirements for the baseline and high forecast scenarios, respectively. These tables present requirements by each of the key subcategories that comprise the three main functional areas (airline facilities, security facilities, and other facilities). Detailed requirements for the individual elements that comprise each subcategory are shown in Tables 4-11 through 4-15.

Differences between estimated requirements and existing facilities are presented two ways. "Net additional requirements" reflect the difference between required and existing space for each subcategory. "Total additional requirements" assume individual elements within each subcategory with adequate space retain their existing space (see Tables 4-11 through 4-15). Reconfiguration of excess space in some elements may reduce the need for new/expanded facilities. For example, under the baseline scenario, approximately 70,000 square feet of "total additional space" is estimated to be needed by 2035 if elements within each subcategory with adequate space are assumed to retain their current space. However, if excess space for some elements can be reconfigured to accommodate additional space needed for other elements, then the "net" need for additional space by 2035 is approximately 60,000 square feet.

[6] Transportation Research Board, Airport Cooperative Research Program, *Report 54, Resource Manuel for Airport In-Terminal Concessions*, 2011.

TABLE 4-16 SUMMARY OF TERMINAL BUILDING REQUIREMENTS—BASELINE SCENARIO

SUBCATEGORIES BY FUNCTIONAL AREA (ALL AREAS IN SQ FT)	EXISTING	ESTIMATED REQUIREMENTS			NET ADDITIONAL REQUIREMENTS			TOTAL ADDITIONAL REQUIREMENTS		
		2020	2025	2035	2020	2025	2035	2020	2025	2035
Airline-Related Facilities										
Check-in Lobby	7,920	4,420	4,420	4,680						
Charter Flight Area	1,870	1,870	1,870	1,870						
Holdroom	24,320	43,895	43,895	50,725	19,575	19,575	26,405	19,575	19,575	26,405
Baggage Handling System	70,230	20,520	20,520	20,520						
Domestic Baggage Claim	18,280	9,140	9,140	9,140						
Airline Support	24,460	24,350	24,350	27,930			3,470	8,170	8,170	11,630
Total	**147,080**	**104,195**	**104,195**	**114,865**	**19,575**	**19,575**	**29,875**	**27,745**	**27,745**	**38,035**
Security-Related Facilities										
Passenger Security Screening Checkpoint	5,950	6,480	6,480	6,480	530	530	530	1,280	1,280	1,280
Other Support Facilities and Offices	13,210	21,060	21,060	24,390	7,850	7,850	11,180	7,850	7,850	11,180
Baggage Screening	1,130	1,300	1,350	1,390	170	220	260	170	220	260
Total TSA Facilities	**20,290**	**28,840**	**28,890**	**32,260**	**8,550**	**8,600**	**11,970**	**9,300**	**9,350**	**12,720**
Customs and Border Protection	5,040	8,590	8,590	8,590	3,550	3,550	3,550	3,550	3,550	3,550
Total	**25,330**	**37,430**	**37,480**	**40,850**	**12,100**	**12,150**	**15,520**	**12,850**	**12,900**	**16,270**
Other Facilities										
Commercial Program	25,410	26,720	29,570	35,360	1,310	4,160	9,950	3,030	5,400	10,230
Airport and Amenities	58,200	58,130	58,130	58,130						
Building Services	45,220	45,000	46,040	50,480		820	5,260	270	890	5,260
Circulation	87,160	32,640	33,480	37,330						
Total	**215,990**	**162,490**	**167,220**	**181,300**	**1,310**	**4,980**	**15,210**	**3,300**	**6,290**	**15,490**
Total Terminal	**388,400**	**304,115**	**308,895**	**337,015**	**32,985**	**36,705**	**60,605**	**43,895**	**46,935**	**69,795**

SOURCES: Ricondo & Associates, Inc., May 2017 (requirements); City of Boise, Department of Aviation (existing).

TABLE 4-17 SUMMARY OF TERMINAL BUILDING REQUIREMENTS—HIGH SCENARIO

SUBCATEGORIES BY FUNCTIONAL AREA (ALL AREAS IN SQ FT)	EXISTING	ESTIMATED REQUIREMENTS			NET ADDITIONAL REQUIREMENTS			TOTAL ADDITIONAL REQUIREMENTS		
		2020	2025	2035	2020	2025	2035	2020	2025	2035
Airline-Related Facilities										
Check-in Lobby	7,920	4,940	5,200	5,200						
Charter Flight Area	1,870	1,870	1,870	1,870						
Holdroom	24,320	44,700	49,420	56,250	20,380	25,100	31,930	20,380	25,100	31,930
Baggage Handling System	70,230	20,520	20,520	20,520						
Domestic Baggage Claim	18,280	9,140	9,140	9,140						
Airline Support	24,460	26,140	28,090	31,550	1,680	3,630	7,090	9,710	11,540	15,000
Total	**147,080**	**107,310**	**114,240**	**124,530**	**22,060**	**28,730**	**39,020**	**30,090**	**36,640**	**46,930**
Security-Related Facilities										
Passenger Security Screening Checkpoint	5,950	6,480	8,100	8,100	530	2,150	2,150	1,280	2,150	2,150
Other Support Facilities and Offices	13,210	22,540	24,300	27,620	9,330	11,090	14,410	9,330	11,090	14,410
Baggage Screening	1,130	1,470	1,540	1,580	340	410	450	340	410	450
Total TSA Facilities	**20,290**	**30,490**	**33,940**	**37,300**	**10,200**	**13,650**	**17,010**	**10,950**	**13,650**	**17,010**
Customs and Border Protection	5,040	8,590	8,590	8,590	3,550	3,550	3,550	3,550	3,550	3,550
Total	**25,330**	**39,080**	**42,530**	**45,890**	**13,750**	**17,200**	**20,560**	**14,500**	**17,200**	**20,560**
Other Facilities										
Commercial Program	25,410	29,440	33,140	39,220	4,030	7,730	13,810	5,290	8,380	13,810
Airport and Amenities	58,200	58,130	58,130	58,130						
Building Services	45,220	47,920	51,400	56,250	2,700	6,180	11,030	2,700	6,180	11,030
Circulation	87,160	34,210	37,390	41,300						
Total	**215,990**	**169,700**	**180,060**	**194,900**	**6,730**	**13,910**	**24,840**	**7,990**	**14,560**	**24,840**
Total Terminal	**388,400**	**316,090**	**336,830**	**365,320**	**42,540**	**59,840**	**84,420**	**52,580**	**68,400**	**92,330**

SOURCES: Ricondo & Associates, Inc., May 2017 (requirements); City of Boise, Department of Aviation (existing).

4.3 GROUND ACCESS REQUIREMENTS

This section identifies the following ground transportation and vehicle parking requirements:

- terminal roadways and curb requirements
- public parking requirements
- employee parking requirements
- rental car requirements

4.3.1 TERMINAL ROADWAYS AND CURB REQUIREMENTS

The existing terminal roadway circulation system and curb (described in Section 2) was opened in 2003 as part of Phase I of the new passenger terminal development project. The planning, design, and assessment of the terminal circulation system and curb are documented in a ground transportation master plan completed in 1998.[7] The circulation system was designed to accommodate forecast traffic up to an activity level of 6.0 million annual passengers. According to the MPU baseline forecast, approximately 2.4 million enplaned passengers are forecast by 2035, with approximately 2.6 million enplaned passengers forecast under the high forecast. Assuming deplaned passengers approximately equal enplaned passengers, total passengers are forecast to reach approximately 4.8 million and 5.2 million by 2035 under the baseline and high forecasts, respectively. Therefore, no required modification of the terminal circulation roadway or curb should be needed through the planning period. However, Airport management has noted the cell phone lane integrated into the inbound portion of the roadway is undersized.

4.3.2 PUBLIC PARKING REQUIREMENTS

Public parking requirements were determined by comparing parking demand to capacity for each parking facility. **Table 4-18** presents the current inventory of public parking spaces available at the Airport, both in terms of absolute capacity and effective capacity. Absolute capacity represents the total marked spaces available in a lot/facility. Effective capacity accounts for potential parkers unable to find a parking spot. Based on industry experience, the effective capacity for surface parking lots is assumed to be 95 percent of absolute capacity. Effective capacity for the parking garage is assumed to be 90 percent of absolute capacity.

TABLE 4-18 PUBLIC PARKING FACILITIES AND CAPACITY

PARKING FACILITY	ABSOLUTE CAPACITY[1]	EFFECTIVE CAPACITY (% OF ABSOLUTE)	EFFECTIVE CAPACITY[2]
Short-Term Surface	274	95%	260
Garage (Long-Term)	2,077	90%	1,868
Long-Term Surface	584	95%	555
Economy/Shuttle Lot (offsite)	1,313	95%	1,247
Total	**4,248**		**3,930**
Total without Economy Lot	2,935		2,684

NOTES:
1 Absolute capacity means the total number of marked parking spaces.
2 Effective capacity accounts for potential parkers unable to find a parking spot.

[7] CSHQA and HNTB Corporation, *Draft Report: Boise Air Terminal Ground Transportation Master Planning*, September 1998.

SOURCES: City of Boise, Department of Aviation, April 2017 (peak parking capacity reports for 2016); Ricondo & Associates, Inc., April 2017 (effective capacity).

A full year (365 days) of parking data were obtained for each parking facility at the Airport for calendar year 2016. The data were ranked according to the total number of vehicles parking in the facilities (combined). **Table 4-19** presents the number of days during this period that absolute and effective capacity of each parking facility was exceeded. As noted in Table 4-19, the short-term parking lot experiences high turnover throughout the day, which results in the lot reaching absolute capacity at various times throughout a given day. It is notable that the parking garage was at or above effective capacity approximately 20 percent of the days in 2016, while the long-term surface lot was at or above effective capacity approximately 47 percent of the days in 2016.

TABLE 4-19 PUBLIC PARKING FACILITIES AND CAPACITY

PARKING FACILITY	ABSOLUTE CAPACITY[1]	DAYS AT ABSOLUTE CAPACITY (1/1/16–12/31/16)	EFFECTIVE CAPACITY[2]	DAYS AT OR ABOVE EFFECTIVE CAPACITY (1/1/16–12/31/16)
Short-Term Surface[3]	274	-	260	-
Garage (Long-Term)	2,077	5	1,868	73
Long-Term Surface	584	90	555	170
Economy/Shuttle Lot (offsite)	1,313	-	1,247	-
Total	**4,248**	**-**	**3,930**	**-**
Total without Economy Lot	2,935	1	2,684	35

NOTES:
1 Absolute capacity means the total number of marked parking spaces.
2 Effective capacity accounts for potential parkers unable to find a parking spot.
3 Short-term parking experiences a high turnover cycle, which can and does result in the lot reaching capacity at various times throughout a given day.
SOURCES: City of Boise, Department of Aviation, April 2017 (peak parking capacity reports for 2016); Ricondo & Associates, Inc., April 2017 (effective capacity).

The overall peak day over this period was November 16, 2016, with a total of 3,027 vehicles accessing the parking facilities. Consistent with industry planning standards, a design day was selected for each individual parking facility based on the 18th highest peak occupancy day (95th percentile). This means demand for each parking facility meets or exceeds the daily peak parking demand of 95 percent of all days in the study year, corresponding to the demand on the 18th busiest day. **Table 4-20** presents the peak day and selected design day of 2016 and the corresponding demand for each Airport parking facility.

TABLE 4-20 PEAK DAY AND DESIGN DAY PARKING DEMAND

PARKING FACILITY	PEAK DAY (2016)	PEAK DAY DEMAND (SPACES)	DESIGN DAY (2016)	DESIGN DAY DEMAND (SPACES)
Short-Term Surface	Nov. 16	252	Dec. 24	183
Garage (Long-Term)	Nov. 16	2,126	Nov. 25	2,029
Long-Term Surface	Nov. 16	649	Jun. 8	593
Economy/Shuttle Lot (offsite)	Mar. 24	15	Dec. 7	-
Total		**3,042**		**2,805**

SOURCES: City of Boise, Department of Aviation, April 2017 (peak parking capacity reports for 2016); Ricondo & Associates, Inc., April 2017 (effective capacity).

The design day sets the baseline level of demand for the parking facilities. For each parking facility, design day demand was grown in proportion to forecast originating passenger growth.

A factor was applied to adjust for passengers' propensity to park. The assumption is that over time, there is lower automobile mode share accessing the Airport, consistent with data showing increased use of transportation network companies (TNCs), such as Uber and Lyft, as well as transit. Beginning with a factor of 100 percent in 2016 (baseline year), the percentage of annual originating passengers assumed to want to park in an Airport parking facility was reduced by 1.0 percent per year through 2018, held constant at 98.0 percent through 2020, reduced by 0.5 percent per year through 2025, then held constant at 95.0 percent through the end of the planning period (2035). The parking demand was also adjusted by a service factor to account for the number of spaces required to meet LOS standards (5.0 percent for surface lots and 10.0 percent for the garage).

Table 4-21 shows the calculation of demand for each parking facility compared with existing capacity. The table indicates the level of surplus or deficient parking spaces for each facility. When the Economy Lot is open, the total number of available parking spaces at the Airport exceeds projected demand by 18 spaces in 2035. However, when analyzing demand for each parking facility individually, the analysis shows that approximately 1,000 garage spaces and nearly 300 long-term surface spaces should be added by 2035 to accommodate demand in those facilities.

TABLE 4-21 PUBLIC PARKING REQUIREMENTS

	CAPACITY (SPACES)	DESIGN DAY DEMAND (SPACES)	SERVICE FACTOR[1]	2016 (BASELINE)	2020	2025	2035
Annual Originating Passengers[2]				1,581,940	1,754,331	1,940,465	2,321,091
Propensity to Park[3]				100.0%	98.0%	95.5%	95.0%
Passengers with Propensity to Park				1,581,940	1,719,244	1,853,144	2,205,036
Growth Relative to 2016				0.0%	8.7%	17.1%	39.4%
Public Parking Demand by Facility[4]							
Short-Term Surface	274	183	5%	190	210	220	260
Garage (Long-Term)	2,077	2,029	10%	2,230	2,420	2,610	3,110
Long-Term Surface	584	593	5%	620	670	730	860
Economy/Shuttle Lot (offsite)	1,313	-	5%	-	-	-	-
Total	**4,248**	**2,805**		**3,040**	**3,300**	**3,560**	**4,230**
Parking Surplus (Deficiency)							
Short-Term Surface					64	54	14
Garage (Long-Term)					(343)	(533)	(1,033)
Long-Term Surface					(86)	(146)	(276)
Economy/Shuttle Lot (offsite)					1,313	1,313	1,313
Total					**948**	**688**	**18**

NOTES:
1 Factor applied to estimate the number of spaces to meet level of service standards; this depends on whether the facility is a garage or surface lot.
2 Obtained from the Master Plan Update aviation activity forecast (see Section 3).
3 Assumed lower automobile mode share to access the Airport, consistent with data showing increased use of TNCs and transit.
4 2016 demand for each parking facility calculated by adding the design day demand for each facility to the product of the service factor and the design day demand. Demand for subsequent years is calculated by applying the growth relative to 2016 in the given year to the 2016 demand level.
SOURCES: City of Boise, Department of Aviation, April 2017 (peak parking capacity reports for 2016); Ricondo & Associates, Inc., April 2017.

4.3.3 EMPLOYEE PARKING REQUIREMENTS

Determination of employee parking requirements began with analyzing data provided by Airport staff; the data detail the beginning occupancy, entries, and exits for each employee parking lot for a representative peak day in March 2017. The peak day for each individual lot was provided by Airport staff. Design day requirements were grown in proportion to (average of) forecast originating passenger and total aircraft operations growth.

Table 4-22 presents the employee parking requirements. Total parking demand was estimated by lot. However, Airport management has discretion over which and how many employees to issue permits to for each lot. Future employee parking development may include centralized facilities, so overall demand and required additional parking spaces are of most importance. As shown in Table 4-22, a total of 1,095 employee parking spaces are estimated to be required by 2035, representing a need for 414 additional spaces compared to current capacity.

TABLE 4-22 EMPLOYEE PARKING REQUIREMENTS

	CAPACITY (SPACES)	DESIGN DAY DEMAND (SPACES)	2017 (ROUNDED DESIGN DAY)	2018 (BASELINE)	2020	2025	2035
Annual Originating Passengers[1]				1,581,940	1,754,331	1,940,465	2,321,091
Change from 2017				2.1%	6.5%	17.8%	40.9%
Total Aircraft Operations				138,677	141,832	150,742	173,028
Change from 2017				0.5%	2.8%	9.2%	25.4%
Average Change from 2017 in Passengers and Operations				25.0%[1]	4.6%	13.5%	32.2%
Employee Parking Demand by Lot[4]							
Lot 30	200	187	185	230	240	260	305
Lot 20	197	192	190	240	250	270	320
BCC Lot	132	138	140	175	185	200	235
Lot E-1	81	70	70	90	95	100	120
Lot W1	30	28	30	40	40	45	55
Lot R-2	23	21	20	25	25	30	35
Lot 45	18	16	15	20	20	25	25
Total	**681**	**652**	**650**	**820**	**855**	**930**	**1,095**
Parking Surplus (Deficiency)					**(174)**	**(249)**	**(414)**

NOTES:
1 Obtained from the Master Plan Update aviation activity forecast (see Section 3).
2 For 2018, a growth factor of 25 percent was assumed based on information provided by Airport management that increased demand from based flight crews would occur beginning in 2018.
3 Assumed lower automobile mode share to access the Airport, which is consistent with data showing increased use of TNCs and transit.
4 2018 demand for each parking lot is calculated by growing 2017 demand 25 percent. Subsequent forecast year demand is calculated by baseline demand adding the design day demand for each facility to the product of the service factor and design day demand. Demand for subsequent years is calculated growing 2018 demand at the corresponding percentage change from 2017 in passengers and operations.
SOURCES: City of Boise, Department of Aviation, April 2017 (employee entry/exit reports for March 2017); Ricondo & Associates, Inc., April 2017.

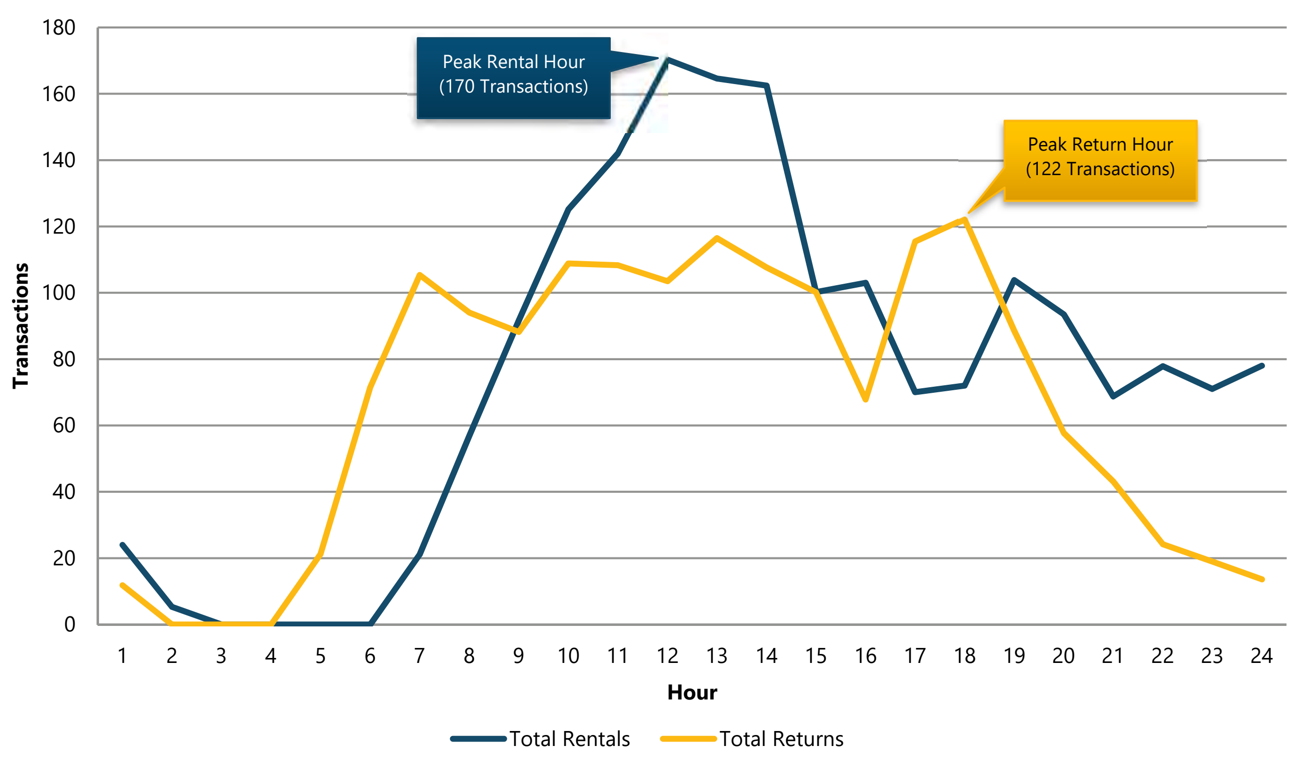
4.3.4 RENTAL CAR FACILITY REQUIREMENTS

To initiate the process for estimating rental car facility requirements, a questionnaire requesting hourly transaction information, as well as the size, configuration, and use of existing facilities, was sent to eight Airport rental car brands in April 2017. All rental car brands returned completed questionnaires. Specific requirements were requested for the following components:

- customer services area
- ready/return spaces
- on-site vehicle storage area
- QTA, including fueling positions, wash bays, vehicle stacking/staging spaces, vehicle light maintenance bays, administrative area, and employee parking spaces

Requirements for rental car facilities were developed using Airport-specific hourly rental car transactions during a peak rental day. A peak rental day was selected as the design day because ready vehicles occupy more space than the same number of return vehicles and, therefore, represent the maximum space required during a peak period. Planning hour activity was defined as the peak hour for rentals and returns. Based on information provided by the rental car companies, 170 peak-hour rentals and 122 peak-hour returns occurred during the peak day, which included a total of 1,802 rentals and 1,589 returns. **Exhibit 4-4** depicts the peak-day rental and return transactions.

EXHIBIT 4-4 PEAK-DAY RENTALS AND RETURNS BY HOUR



SOURCE: Ricondo & Associates, Inc., Boise Airport Rental Car Industry Questionnaire, April 2017.

Table 4-23 summarizes the responses from the rental car industry questionnaire with respect to existing facilities and needs for 2016.

TABLE 4-23 BOI RENTAL CAR COMPANY QUESTIONNAIRE RESPONSES

COMPONENT	HAVE (2016)[1]	NEED (2016)[2]	COMPONENT	HAVE (2016)[1]	NEED (2016)[2]
Customer Service Area			Service Area		
Regular Customer Service Positions	32	28	Vehicle Fueling Positions (nozzles)	11	15
			Car Wash Bays	6	14
Ready/Return Area			Vehicle Light Maintenance Bays	19	16
Regular Ready Spaces	308	320	Administrative Area – Service Facility (sq ft)	7,384	6,962
Premium Ready Spaces	117	138	Overflow Vehicle Storage Spaces	1,275	1,501
Total Ready Spaces	425	458	Stacking/Staging Spaces	574	613
Return Spaces	76	134			
Total Ready/Return Spaces	501	592	Employee Parking Spaces	211	211

NOTES:
1 Some responses were incomplete.
2 "Need" represents the total facility need as stated on each rental car company's questionnaire response.
SOURCE: Ricondo & Associates, Inc., Boise Airport Rental Car Industry Questionnaire, April 2017.

Rental car facility requirements were projected from a 2016 base year to two future years: 2025 and 2035. Where peak-hour rentals and returns are the basis for determining requirements, these transactions were projected based on growth in enplaned passengers from the MPU aviation activity forecast presented in Section 3. Standard industry planning factors were used to define facility requirements for the functional areas described in this section.

4.3.4.1 CUSTOMER SERVICE AREA

The customer service area is used to process arriving rental car customers. The number of counter positions required is the primary factor that determines the size of the customer service area. The utilization factor used to determine customer service counter requirements was 6 minutes per transaction or 10 transactions per hour, per position. Counter positions were calculated assuming all transactions are processed at a counter. The number of rental transactions was divided by 6 minutes per transaction plus a 30 percent surge factor.

4.3.4.2 READY/RETURN SAPCES

Customers pick up and return rental cars in the ready/return areas. Ready vehicles are parked similar to the configuration of a conventional public parking lot. Return vehicles are parked in a nose-to-tail configuration. As previously mentioned, ready vehicles occupy more space than the same number of return vehicles and would represent the maximum space required in the facility during a peak period.

The key utilization rate used to determine ready and return stall requirements was the highest 5-hour average number of rentals and returns and the number of hours of peak-period activity the stalls can accommodate during the peak rental day. Rental car companies prefer to maintain a sufficient supply of ready stalls and cars to accommodate the planned number of vehicles to be rented during the next hour's expected transactions. In addition, rental car companies prefer to have additional ready stalls available in case unplanned operational challenges, such as delayed flights, occur. When flights are delayed, delayed customers are added to the next hour's planned rentals, potentially creating a shortfall of available vehicles. To alleviate this potential shortfall and to avoid customer delays, the rental car companies prefer to have a buffer of ready vehicles available that provides more than 1 hour of capacity. For purposes of this analysis, averages of 2.0 hours of ready car capacity and 1.5 hours of return capacity were used to develop the facility requirements.

Ready spaces were calculated by multiplying the number of rentals by the assumed utilization rate of 2.0 hours of capacity. Return spaces were calculated by multiplying the number of returns by 1.5 hours of capacity.

4.3.4.3 QUICK TURNAROUND AREA

The QTA is designed to accommodate vehicle support functions, such as fueling, vacuuming, washing, and maintenance. After being processed through the QTA, the vehicle is parked in either a stacking space located in the QTA or in a rental stall for the next customer. Most rental car companies at the Airport occupy QTA facilities north of the terminal parking area along West Wright Street. Parking (stacking/staging) lanes are provided for queuing vehicles. Vehicles may be staged in lanes waiting for fuel or staged in lanes after fueling while waiting for washing, or staged after washing, waiting for an available rental stall.

Fueling Positions

The number of fueling nozzles required to accommodate future demand was based on the number of vehicles that can be fueled within the peak hour. The utilization rate, or number of vehicles that can be processed per hour, was assumed to be 10 minutes per vehicle or 6 vehicles per hour, per position, based on industry experience and an understanding of similar airport rental car facilities. For purposes of this analysis, "fueling" is defined as vehicle fueling, vehicle inspections, and accompanying documentation (e.g., request for mirror fix, windshield wiper replacement, minor scratch touchup). Fueling positions were calculated by dividing the number of returns by 6 vehicles processed per hour, per position.

Wash Bays

The number of wash bays required to accommodate future demand was based on the number of vehicles that can be washed within the peak hour. The utilization rate, or number of vehicles that can be processed per hour per wash bay, was assumed to be 3 minutes per vehicle or 20 vehicles per hour, per bay. Resulting bay requirements were calculated by dividing the number of returns by the utilization rate.

Vehicle Stacking/Staging Space

Overflow parking areas are provided for the staging of clean vehicles for peak rental periods and for the return of rented vehicles. The utilization rate used to size the stacking area was based on the number of required fueling positions. Returned vehicles are positioned in the stacking areas prior to the fueling positions before being serviced. In some cases, clean vehicles can be stored in this area prior to being placed back in a rental stall. It was assumed that each fueling position would accommodate eight vehicle stacking spaces.

Other Requirements

Several additional rental car facility areas were included in the requirements analysis. Each area was projected from existing facilities based on enplaned passenger forecast growth from 2016.

- **Vehicle light maintenance bays:** These facilities and functions, including vehicle lifts, parts storage, tool lockers, vehicle records storage, administrative support, and employee break areas and locker areas, are typically located adjacent to the wash bays. The light maintenance bays are used to change oil, align wheels, or make a minor parts replacement, such as interior, head, or tail lights. Because of the frequently unscheduled nature of vehicle maintenance, no utilization rate was developed.

- **Administrative areas:** Administrative areas are located in the QTA/service facility areas to accommodate various administrative functions, as well as break/restroom facilities.
- **Employee parking spaces:** Employee parking spaces are provided in the rental car service areas.
- **Vehicle storage spaces:** Vehicle storage requirements represent the number of spaces the rental car companies need to store vehicles that are not being rented or parked in a rental or return space.

4.3.4.4 FACILITY REQUIREMENTS

Table 4-24 presents the requirements for each rental car facility component for 2025 and 2035, including projected surpluses/deficiencies.

TABLE 4-24 RENTAL CAR FACILITY REQUIREMENTS

		REQUIREMENTS		SURPLUS (DEFICIENCY)	
COMPONENT	EXISTING	2025	2035	2025	2035
Customer Service Area					
Customer Service Counters	32	27	32	5	0
Ready/Return Area					
Ready Spaces	425	418	500	7	(75)
Return Spaces	76	225	269	(149)	(193)
Total Ready/Return Spaces	501	643	769	(142)	(268)
Quick Turnaround/Other Areas					
Fueling Positions	11	25	30	(14)	(19)
Wash Bays	6	8	9	(2)	(3)
Stacking/Staging Spaces	574	200	239	374	335
Vehicle Light Maintenance Bays	19	23	28	(4)	(9)
Administrative Area (sq ft)	7,384	9,057	10,834	(1,673)	(3,450)
Employee Parking Spaces	211	259	310	(48)	(99)
Vehicle Storage Spaces	1,275	1.841	2.202	(566)	(927)

SOURCES: Ricondo & Associates, Inc., Boise Airport Rental Car Industry Questionnaire, April 2017 (existing facilities); Ricondo & Associates, Inc., April 2017 (requirements).

The facility requirements were applied to various industry-accepted space factors to determine a gross area requirement for the facilities. It is understood that the components/functions are not currently all contained in a consolidated location; they are located in multiple areas of the Airport, including some in off-site facilities (i.e., some Economy Lot spaces are used for rental car vehicle storage). The space requirements presented in **Table 4-25** are intended to be a guide for space planning of individual components or for future consolidated facilities.

TABLE 4-25 RENTAL CAR SPACE REQUIREMENTS

COMPONENT / AREA	SPACE FACTOR (SQ FT)	2025 REQUIREMENT		2035 REQUIREMENT	
		QUANTITY	TOTAL AREA (SQ FT)	QUANTITY	TOTAL AREA (SQ FT)
Customer Service Area					
Counter Positions	290	27	7,900	32	9,400
Circulation	30%		2,400	30%	2,800
Total			**10,300**		**16,200**
Ready/Return/Storage Areas					
Ready Spaces	444	418	185,500	500	221,900
Return Spaces	211	225	47,500	269	56,800
Ready/Return Area Storage	10%		23,300		27,900
Total		**643**	**256,300**	**769**	**306,600**
Storage Spaces	189	1,841	348,000	2,202	416,200
Circulation	25%		87,000		104,100
Total			**435,000**		**520,300**
Exit Booths	500	7	3,500	8	4,200
Circulation	25%		875		1,050
Total			**4,375**		**5,250**
Quick Turnaround/Service Site					
Fueling Positions	360	25	9,000	30	10,800
Wash Bays	1,650	8	12,400	9	14,800
Stacking and Staging Spaces	200	200	40,000	239	47,900
Maintenance Bays	720	23	16,800	28	20,100
Administrative Area		9,057	9,100	10,834	10,800
Employee Parking	250	259	64,700	310	77,400
Circulation	25%		38,000		45,500
Total			**190,000**		**227,300**
Small Market Entrant (5% of total area)			44,800		53,800
Total Requirement			**940,800**		**1,129,500**

NOTE: Due to rounding, numbers may not add up precisely to the totals provided, and percentages may not precisely reflect the absolute figures.
SOURCES: Ricondo & Associates, Inc., Boise Airport Rental Car Industry Questionnaire, April 2017 (existing facilities); Ricondo & Associates, Inc., April 2017 (requirements).

4.4 TENANT AND SUPPORT FACILITY REQUIREMENTS

This section identifies facility requirements for tenants that own, lease, and/or operate facilities at the Airport. The determination of future requirements is primarily focused on aviation-related tenants that engage in flying or maintenance and have access to the airfield. These tenants include air cargo, GA, and government/military. Requirements were also considered for various support facilities, including ARFF and SRE.

4.4.1 AIR CARGO FACILITY REQUIREMENTS

Air cargo facilities at the Airport are used by both integrated cargo carriers and passenger airlines. Five cargo buildings are located in the north cargo area, which are used by FedEx, passenger airlines, and the US Postal Service. The south cargo area contains one cargo building currently used by UPS. Western Air Express leases building space west of the passenger terminal.

FedEx and UPS are the two primary air cargo operators at the Airport. Utilization factors provide an indication of how efficiently a given facility element is operating; they are calculated by dividing the number of tons of cargo processed (volume) by the square-foot area of individual facility elements. Based on existing facilities and cargo volumes (for 2015), utilization factors were developed for FedEx and UPS. These utilization factors were compared to industry-standard factors. For purposes of estimating future facility requirements, existing and industry-standard utilization factors were averaged for each carrier, as shown in **Table 4-26**.

TABLE 4-26 AIR CARGO UTILIZATION FACTORS

FACILITY ELEMENT	FEDEX UTILIZATION FACTORS[1]			UPS UTILIZATION FACTORS[1]		
	EXISTING CONDITION	INDUSTRY STANDARD	AVERAGE UTILIZATION	EXISTING CONDITION	INDUSTRY STANDARD	AVERAGE UTILIZATION
Buildings	0.92	0.85	0.89	0.82	0.85	0.83
Aircraft Apron	0.28	0.19	0.24	0.05	0.19	0.12
GSE Apron	0.49	0.57	0.53	0.33	0.57	0.45
Auto Parking[2]	1.48	N/A	2.35	5.82	N/A	2.35

NOTES: GSE – Ground Support Equipment

1 Utilization factors are in units of area (square feet) per ton of cargo volume.

2 No industry standard utilization factor for auto parking was available. An average auto parking utilization factor was calculated based on combined auto parking areas and cargo volumes for FedEx, UPS, and Western Air Express.

SOURCE: Mead & Hunt, Inc., October 2017.

Cargo facility requirements were developed for one future year: 2035. Based on current development plans for the Airport, it is unlikely that incremental facility expansions for the existing cargo operators will occur throughout the planning period. Rather, future planning for a consolidated air cargo facility should consider long-term facility requirements. Facility requirements for FedEx and UPS were projected using the calculated average utilization factors, as applied to forecast air cargo volume (see Section 3). Facility requirements for Western Air Express were estimated based on providing future facilities that equal or slightly exceed current space.[8] Estimated future requirements for each cargo operator were totaled to show Airport-wide cargo facility requirements for 2035. **Table 4-27** presents the total air cargo facility requirements, along with a comparison to existing facilities.

[8] Mead & Hunt, Inc., estimated the future facility requirements for Western Air Express.

TABLE 4-27 AIR CARGO FACILITY REQUIREMENTS

	EXISTING (2015)	FUTURE (2035)	SURPLUS (DEFICIENCY)
Total Cargo Volumes (Tons)[1]	42,507	65,060	
Aircraft Type (Typical)	Airbus A300	Boeing 767 Airbus A300	
Apron - Aircraft Parking Positions - Jet	5	6	(1)
Apron - Aircraft Parking Positions - Turboprop	1	1	-
Facility Areas (square feet)			
Apron Area - Aircraft Parking	290,350	327,448	(37,098)
Apron Area - GSE Support	95,200	127,395	(32,195)
Sort Building[2]	47,450	57,316	(9,866)
Building - Administrative/Other	925	976	(51)
Vehicle Parking Area	100,100	115,701	(15,601)
Total Occupied Space (Sq Ft)	**534,025**	**628,836**	**(94,811)**

NOTES:
GSE – Ground Support Equipment
1 Existing and forecast cargo volumes are from the MPU aviation activity forecast (Section 3).
2 Sort building requirements are based on aviation-related sort facilities only. There is cargo carrier interest in combining aviation and ground sortation activities at the Airport, which may effectively double the sort building requirement area to a total of approximately 120,000 square feet.
SOURCE: Mead & Hunt, Inc., October 2017.

4.4.2 GENERAL AVIATION FACILITY REQUIREMENTS

This assessment includes facilities that serve GA aircraft based at the Airport, as well as transient aircraft that require apron parking and/or flight support services. These facilities include aircraft parking aprons and aircraft storage and maintenance hangars. Existing GA facilities are described in Section 2 and consist of the following:

- approximately 1 million square feet of apron area with a total of approximately 200 marked aircraft parking positions
- 32 hangars totaling approximately 550,000 square feet, including private/corporate hangars, FBO storage/maintenance hangars, T-hangars, and shade hangars

4.4.2.1 GENERAL AVIATION APRON REQUIREMENTS

The requirements for GA apron space are driven by the need to accommodate based aircraft parked on the apron and by demand for parking area to accommodate transient or itinerant aircraft. Planning standards recommend the use of different area requirements for based aircraft versus transient aircraft. Therefore, the needs of each were analyzed separately and were combined to provide the overall apron space requirement throughout the planning period.

Aircraft parking aprons should be located to provide easy access to GA facilities/FBOs, fueling, and ground transportation facilities, and they should be configured to allow for safe and efficient taxiing movements between parking positions and the airfield. FAA guidelines, in conjunction with specific local factors, help in determining the number and area of aircraft parking positions needed to accommodate aircraft, based on future demand.

Based aircraft parking requirements assume 25 percent of based single-engine aircraft and 15 percent of twin-engine piston/turboprop aircraft will park at a marked position (e.g., tie-down), with the remaining based aircraft stored in hangars. **Tables 4-28** presents the parking requirements for based aircraft.

TABLE 4-28 BASED AIRCRAFT APRON REQUIREMENTS

	SINGLE-ENGINE PISTON	TWIN-ENGINE PISTON / TURBOPROP	BUSINESS JET	HELICOPTER	TOTAL
Percent Apron Parking	25%	15%	0%	0%	
Parking Area per Based Aircraft (sq ft)	3,600	7,600	12,800	6,200	
2020 - Total Based Aircraft	143	30	40	19	231
2020 - Parking Positions	36	4	0	0	
2020 - Tie-Down Area (sq ft)	128,287	33,844	0	0	162,132
2025 - Total Based Aircraft	147	30	44	22	244
2025 - Parking Positions	37	5	0	0	
2025 - Tie-Down Area (sq ft)	132,589	34,749	0	0	167,337
2030 - Total Based Aircraft	154	32	51	25	262
2030 - Parking Positions	39	5	0	0	
2030 - Tie-Down Area (sq ft)	138,884	36,453	0	0	175,337
2035 - Total Based Aircraft	164	34	59	30	286
2035 - Parking Positions	41	5	0	0	
2035 - Tie-Down Area (sq ft)	147,420	38,623	0	0	186,043

NOTE: Totals may not sum due to rounding.
SOURCES: Ricondo & Associates, Inc., April 2017 (based aircraft forecast); Mead & Hunt, Inc., October 2017 (space factors and requirements).

All transient aircraft are assumed to park on an apron. For transient apron requirements, provisions were made for the aircraft parking area, as well as for the taxilanes leading to the parking positions, and the area for movement of aircraft and space between aircraft. The number of required transient aircraft positions was based on the forecast peak-hour aircraft operations by aircraft, as presented in Section 3. **Table 4-29** presents the transient aircraft apron requirements for the Airport.

Table 4-30 presents the total GA apron requirements; the table combines based and transient aircraft parking position requirements and associated apron space. As shown, the number of existing marked parking positions and the overall GA apron area at the Airport appear sufficient through the planning period. A surplus in GA apron parking area of approximately 250,000 square feet is estimated by 2035. However, it is noted that in addition to GA aircraft, these apron areas also accommodate other aircraft throughout the year, including firefighting aircraft during fire season that cannot be accommodated at the existing US Forecast Service/NIFC base, as well as occasional itinerant military aircraft. Based on this assessment, no additional GA apron area is needed at the Airport through the planning period, except as may be necessary to compensate for a potential loss of apron area resulting from development of other Airport facilities.

TABLE 4-29 TRANSIENT AIRCRAFT APRON REQUIREMENTS

	SINGLE-ENGINE PISTON	TWIN-ENGINE PISTON / TURBOPROP	BUSINESS JET	HELICOPTER	TOTAL
Parking Area per Based Aircraft (sq ft)	3,600	7,600	12,800	6,200	
Transient Parking Area Space Factor	1.2	1.6	1.8	1.6	
Parking Area per Transient Aircraft (sq ft)	4,320	12,160	23,040	9,920	
Hourly Parking Factor	2.5	3.5	6.0	4.0	
2020 - Aircraft	5.2	1.5	2.2	0.8	10
2020 – Area (sq ft)	56,623	65,648	304,306	31,856	458,433
2025 - Aircraft	5.6	1.6	2.3	0.9	10
2025 – Area (sq ft)	60,435	70,067	324,794	34,001	489,297
2030 - Aircraft	6.1	1.8	2.6	0.9	11
2030 – Area (sq ft)	65,866	76,364	353,980	37,056	533,265
2035 - Aircraft	6.7	2.0	2.8	1.0	13
2035 – Area (sq ft)	72,656	84,236	390,473	40,876	588,242

NOTE: Totals may not sum due to rounding.
SOURCES: Ricondo & Associates, Inc., April 2017 (based aircraft; peak-hour aircraft); Mead & Hunt, Inc., October 2017 (space factors and requirements).

TABLE 4-30 GENERAL AVIATION APRON REQUIREMENTS

YEAR	SINGLE-ENGINE PISTON	TWIN-ENGINE PISTON / TURBOPROP	BUSINESS JET	HELICOPTER	TOTAL FORECAST DEMAND	EXISTING QUANTITY	SURPLUS (DEFICIENCY)
Aircraft Apron Parking Positions							
2020	41	6	2	1	50	197	147
2025	42	6	2	1	52	197	145
2030	45	7	3	1	55	197	142
2035	48	7	3	1	59	197	138
Aircraft Apron Parking Area							
2020	184,910	99,492	304,306	31,856	620,564	1,020,000	399,436
2025	193,024	104,816	324,794	34,001	656,634	1,020,000	363,366
2030	204,749	112,817	353,980	37,056	708,602	1,020,000	311,398
2035	220,076	122,859	390,473	40,876	774,285	1,020,000	245,715

SOURCE: Mead & Hunt, Inc., October 2017.

4.4.2.2 GENERAL AVIATION HANGAR REQUIREMENTS

GA aircraft are typically stored in T-hangars / shade hangars or conventional hangars. Storage requirements for GA aircraft reflect local weather conditions and the size and technology of the Airport's based aircraft fleet. Typically, larger and more expensive aircraft require the protection offered by either a conventional or T-hangar, instead of apron parking. In hot climates, such as Boise, even owners of small, less sophisticated aircraft prefer to store their aircraft in hangars. Specific assumptions used to determine future GA hangar requirements include the following:

- No transient aircraft are stored in hangars.
- Based aircraft to be stored in hangars include 75 percent of single-engine piston aircraft, 85 percent of multiengine aircraft, and 100 percent of all helicopters and jet aircraft.
- Of the aircraft to be stored in hangars, 65 percent of single-engine piston and 40 percent of multiengine aircraft were assumed to be stored in T-hangars. All other aircraft were assumed to be stored in conventional hangars.
- T-hangar space requirements assume 1,173 square feet for single-engine piston aircraft (based on existing BOI averages) and 1,400 square feet for multiengine aircraft.
- Required T-hangar units are based on dividing required T-hangar space by average area per existing unit.
- Conventional hangar usage assumes single-engine piston (10 percent), multiengine (45 percent), business jets (100 percent), and helicopters (100 percent).
- FBO and corporate hangars typically have lounge or waiting areas, administrative function space, or parts storage, so an allowance has been included in the conventional hangar requirements for these areas. In addition to the hangar building itself, the sites for conventional hangars will require areas for access and parking and other requirements specific to the individual tenant. Conventional hangar space requirements assume 2,400 square feet for single-engine piston aircraft, 3,600 square feet for multiengine aircraft, 8,000 square feet for business jets, and 6,000 square feet for helicopters.
- Required conventional hangars are based on dividing required conventional hangar space by average area per existing hangar.

Table 4-31 summarizes future requirements for hangars at the Airport through the planning period. The analysis estimates a total of 16 additional hangars may be needed at the Airport through 2035, comprising approximately 370,000 square feet of additional hangar space.

It should be noted that the City currently owns all T-hangar facilities at the Airport, while conventional hangars are owned by tenants who lease land on the Airport. Although this analysis shows requirements for more T-hangars and conventional hangars, the future provision of such hangars is subject to the availability of space, as well as business decisions by those entities constructing/operating the hangars. Rates charged for various hangar storage options may encourage or discourage the use of hangars. The future number and mix of hangars on the Airport may differ from the requirements estimated in this analysis.

The identified conventional hangar requirements are for facilities related to the storing of aircraft. FBOs and other GA tenants may require future hangars/buildings to accommodate other functions, such as administration, maintenance, and painting. Future requirements for such facilities are determined by tenants and were not available for purposes of this analysis.

TABLE 4-31 GENERAL AVIATION HANGAR REQUIREMENTS

		REQUIREMENTS				
	EXISTING	2020	2025	2030	2035	NEEDED THROUGH 2035
Aircraft in T-hangars						
T-hangar units	8	8	9	9	10	2
T-hangar space (sq ft)	89,150	92,584	95,614	100,171	106,306	17,156
Aircraft in conventional hangars						
Conventional hangar units	24	31	32	35	38	14
Conventional hangar space (sq ft)	467,384	586,228	643,722	722,961	820,179	352,795
Total aircraft in hangars						
Total hangar units	32	39	41	44	48	16
Total hangar spaces (sq ft)	556,534	678,812	739,336	823,133	926,485	369,951

SOURCE: Mead & Hunt, Inc., October 2017.

4.4.3 OTHER TENANT FACILITY REQUIREMENTS

4.4.3.1 AIRLINE MAINTENANCE

The SkyWest Airlines maintenance facility is located on the southeast side of the Airport; it includes a 135,000-square-foot maintenance hangar, approximately 200,000 square feet of aircraft apron, and surface parking accessible from Gowen Road. A site adjacent to the existing hangar is undergoing preparation for a future similar sized facility. The aircraft apron has already been expanded to serve the additional facility.

4.4.3.2 BACKCOUNTRY

Backcountry operators currently have ticketing space within the passenger terminal building and operate from an apron area adjacent to the old Airport fire station and the terminal apron. No additional facilities are anticipated to be needed through the planning period. However, a site should be selected to accommodate backcountry operations if existing facilities are to be displaced by future Airport development.

4.4.3.3 MILITARY

The IDANG and IDARNG currently operate from Gowen Field, the ING base located on the south side of the airfield. The US Department of Defense determines future requirements for the base. If the current mission of either detachment changes, then additional or different facilities may be needed to accommodate mission requirements. It is anticipated that any future requirements for the IDNG base will be accommodated within the currently leased area.

4.4.3.4 NATIONAL INTERAGENCY FIRE CENTER / US FOREST SERVICE

The US Forest Service currently operates on an apron area of approximately 258,000 square feet within the NIFC apron. This area, which includes three pits for fire retardant loading, aircraft parking, a tank farm, and vehicle parking, is not sufficient considering the number and type of aircraft operating from the facility during wildfire events. The US Forest Service provided facility needs for the next 5 and 10 years, as follows:[9]

- 5-year needs (710,000 square feet of apron, 35,000 square feet of parking, 17,500 square feet of buildings):
  - Construction of a tanker/air attack base, including 5,000 square feet of building, 20,000 square feet for vehicle parking and a retardant tank farm, and 650,000 square feet of aircraft apron, for a total area of approximately 675,000 square feet.
  - Construction of a BLM helitack base, including 8,500 square feet of building, 15,000 square feet of parking, and 60,000 square feet of aircraft apron, for a total area of approximately 83,500 square feet.
  - Construction of a fitness training room totaling approximately 4,000 square feet.
- 10-year needs (165,000 square feet of parking, 37,000 square feet of buildings):
  - Construction of the Boise Interagency Dispatch / Training Center, including 17,000 square feet of building, 30,000 square feet of secured vehicle parking, and 135,000 square feet of employee/visitor parking, for a total area of approximately 182,000 square feet.
  - Construction of the Interagency Fire Warehouse / BLM Engine Complex, including 10,000 square feet of building and 10,000 square feet of covered parking, for a total area of approximately 20,000 square feet.

4.4.3.5 US CUSTOMS AND BORDER PROTECTION

The current CBP facility is located adjacent to the east deice pad near the Runway 28R threshold; it primarily serves international travelers on inbound private jets. Additional space would be needed to accommodate a larger aircraft, including scheduled international air carrier operations. **Table 4-32** presents estimated space requirements for a CBP facility capable of processing a single narrowbody aircraft operation.

TABLE 4-32 CUSTOMS AND BORDER PROTECTION FACILITY SIZING

FACILITY ELEMENT	AREA (SQ FT)
Primary Processing Area	2,640
Primary Support Spaces	720
Secondary Processing Area	2,590
Secondary Operations and Support	1,100
Exit Control	250
Administration	1,290
Total	**8,590**

SOURCE: US Customs and Border Protection, Airport Technical Design Standards, June 2012 (design standards).

4.4.3.6 IDAHO TRANSPORTATION DEPARTMENT DIVISION OF AERONAUTICS

The current ITD building/hangar is 10,800 square feet and is located along Rickenbacker Street, adjacent to the Western Air Express cargo apron. Additional facilities are not currently needed; however, facility sizing and

9 Doug Marolf, Forest Aviation Officer of the US Forest Service, "Square Footage Figures for Boise Airport," email to Jason Apt and Joe Birge, Ricondo & Associates, Inc., May 26, 2017 (information regarding US Forest Service requirements).

configuration should be considered if relocation of the facility is necessary to facilitate additional Airport development.

4.4.4 SUPPORT FACILITY REQUIREMENTS

4.4.4.1 AIRCRAFT RESCUE AND FIREFIGHTING

Expansion of the Airport ARFF facility was completed in 2019 to meet current and future needs of the facility. The facility and associated equipment meet FAA requirements for Index C, in accordance with 14 CFR Part 139. The ARFF station is adequately located to meet required response times.

4.4.4.2 EQUIPMENT AND SNOW REMOVAL FACILITIES

Airport staff operate a variety of equipment for maintaining the airfield and grounds, including snow plows, runway deicing trucks, sweepers, mowers, and tractors. Several equipment and SRE storage facilities are located at the Airport. Information on airport maintenance buildings provided in AC 150/5220-15, *Buildings for Storage and Maintenance of Airport Snow Removal and Ice Equipment: A Guide*, indicates maintenance building needs are related to paved areas, activity levels, and climate. Existing equipment and SRE facilities are considered adequate. However, increases in runway taxiway and apron pavement, in addition to increased activity levels, would likely result in the need to provide additional maintenance building space. For planning purposes, additional locations for SRE facilities should be identified.

4.4.4.3 FLIGHT KITCHEN

The flight kitchen facility at the Airport is co-located in the building with Delta Air Lines cargo on the north cargo area. The facility comprises 3,802 square feet and serves all Delta Air Lines flights and FedEx crew. There are no capacity constraints with the current facility.

4.4.4.4 FUELING

FBOs provide fuel to aviation tenants at the Airport, including the airlines. Western Aircraft, the largest FBO, operates a fuel farm adjacent to the north cargo area where underground tanks provide a 1-day supply of fuel for all commercial aircraft at the Airport. Average jet fuel demand at the Airport is approximately 50,000 to 70,000 gallons per day. Maintaining a 5-day fuel supply is considered reasonable for facility planning purposes. According to a fuel supply report completed for the Airport, there is a potential jet fuel storage capacity of approximately 1.4 million gallons, which would provide up to 23 days of jet fuel storage. The study concluded BOI has sufficient jet fuel storage capacity to meet future demand, but existing commercial contracts limit the accessibility of additional potential capacity.[10]

4.4.4.5 FEDERAL AVIATION ADMINISTRATION FACILITIES

A new ATCT was commissioned at the Airport in 2013. The facility also houses a TRACON to control regional air traffic. The height and location of the ATCT eliminates many of the line-of-site issues that existed with the previous facility. The FAA has plans to construct a mobile asset staging facility and storage pad adjacent to the ATCT site.

[10] Armbrust Aviation Group, *Boise Airport Aviation Fuel Supply Report*, August 3, 2017.

4.4.4.6 UTILITIES AND STORMWATER

The need for additional utility and stormwater facilities is largely based on the location and nature of future Airport development. Information on the existing condition and issues regarding Airport utilities is provided in Section 2 and summarized as follows:

- Water: Improvements are needed in specific areas to satisfy fire protection needs.
- Wastewater: There are no current capacity issues, and the Airport property is well served.
- Power: No upgrades in the Airport area are planned by Idaho Power for the next 20 years.
- Natural gas: Existing facilities are sized correctly to accommodate current capacity and expected growth in the area for the next 5 years. Any expansion would depend on demands from new development by the Airport or IDNG.
- Stormwater drainage: A 200-year event in 2017 did not exceed capacity. Water from western expansion would require self-containment. Decommissioned ponds at Gowen Road and Orchard Street could be used for future expansion.
- Fiber optic: The fiber loop was closed around the Airport after 2012. Network expansion requirements at the Airport would depend on the location and nature of planned development.

4.5 SUMMARY OF FACILITY REQUIREMENTS

Based on the facility requirements described throughout this section, the following improvements/actions are recommended for the Airport over the planning period through 2035:

Airfield Facilities

- Reconfigure portions of the airfield as necessary to eliminate the existing hot spot and TOFA incursions and to correct nonstandard taxiway geometry.
- Construct additional pavement on Taxiway S to meet TDG 5/6 standards for future air cargo operations.
- Install a MALSR on Runway 28R to reduce visibility minimums associated with the published ILS approach.
- Replace VASI units on Runway 19R-28L with PAPIs.
- Expand east and west deice aprons to accommodate more/larger aircraft without restrictions.
- Maintain current runway pavement strength ratings.
- Preserve land area and land use compatibility for future development of the assault strip into a formal Airport runway (Runway 9-7).

Terminal Facilities

- Incrementally expand the terminal building to ultimately accommodate up to nine additional aircraft gates, as well as needed space enhancements, to meet forecast demand through the planning period.

Ground Access Facilities

- Provide additional public parking facilities to include up to 1,000 additional garage parking spaces and up to 300 additional long-term surface parking spaces.

- Provide up to 400 additional employee parking spaces.
- Expand rental car facilities to provide additional ready/return spaces and service area.

Tenant and Support Facilities

- Provide up to 95,000 square feet of additional air cargo facility area, including aircraft aprons and cargo sorting/processing building space.
- Identify locations for additional GA hangars.
- Expand CBP facility to enhance processing for current private/GA aircraft operations or for future narrowbody aircraft operations.
- Identify a long-term location for BLM/US Forest Service facilities.

5. DEVELOPMENT CONCEPTS

The primary focus of this section is to identify and evaluate Airport development concepts that address existing facility deficiencies, satisfy future aviation-related demand, and are responsive to the needs of the communities served by the Airport. This section is organized as follows:

- Airfield Development Concepts
- Passenger Terminal Development Concepts
- Landside Development Concepts
- General Aviation / Support Development Concepts

Concepts were based on information presented in previous sections of the MPU, as well as based on previously identified planning studies summarized in Section 1. This information was supplemented by the judgment and recommendations of Airport staff, as well as Airport stakeholder input from the TAC and the general public.

5.1 AIRFIELD DEVELOPMENT CONCEPTS

Airfield development concepts were identified to enhance airfield safety, fix airfield geometry, and ensure the airfield conforms to applicable design standards. The identification and evaluation of airfield development concepts considered eliminating cross-field taxiways in high-energy zones, fixing modifications to standards, mitigating the published hot spot, eliminating the direct ramp to runway access, cleaning up confusing intersections, and enhancing efficiency.

The concepts identified to resolve these airfield issues were not meant to be exclusive. The goal was to identify a range of potential solutions from which a preferred concept would be developed, potentially consisting of elements from several of the individual concepts. In some cases, a single concept was identified to resolve an issue.

5.1.1 WEST AIRFIELD CONCEPTS

Elimination of the hot spot located at the intersection of Taxiways A, J, and W was the primary focus of the development concepts for the west portion of the airfield.

5.1.1.1 INITIAL WEST AIRFIELD CONCEPTS

West Airfield Concept 1

In West Airfield Concept 1, depicted on **Exhibit 5-1**, Taxiway W is extended south across Runway 10R to Taxiway F. In this configuration, aircraft originating from the north airfield (including the terminal area) would cross Runways 10L and 10R on Taxiway W, then use Taxiways F and J to access Runway 10R for departure. This concept would mitigate the hot spot by providing an alternative (and preferred) route for aircraft to access Runway 10R without using Taxiway J between the Runway 10R threshold and Taxiway A. Taxiway H between Runway 10R and Taxiway F would be removed. This concept also includes the relocation of Taxiway G to the west to remain outside the Runway 10R-28L high-energy zone. Taxiway G would provide full cross-field accessibility by using a portion of existing Taxiway B3. Excess pavement on Taxiway B3 would be removed to standardize the exit taxiway geometry.

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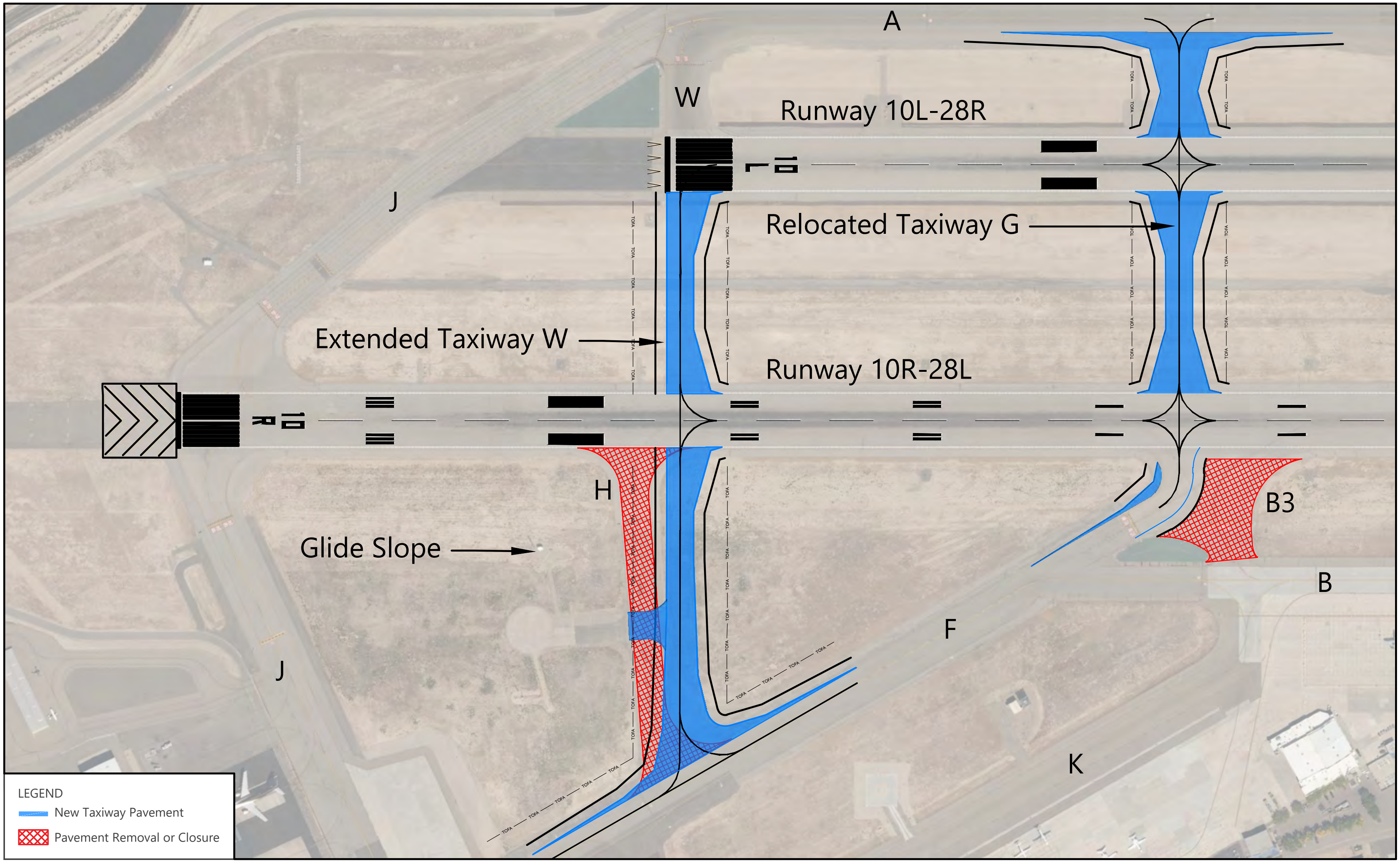

SOURCES: Quantum Spatial, September 2016 (aerial photography - for visual reference only, may not be to scale); Federal Aviation Administration, Advisory Circular 150/5300-13A, Change 1, Airport Design, February 26, 2014.

NORTH 0 400 ft.

EXHIBIT 5-1

WEST AIRFIELD CONCEPT 1

Drawing: P:\Project-Chicago\BOI\2016 BOI Master Plan\06 - Alternatives Development and Evaluation\BOI Airfield Alternatives - 20190802_Exhibits.dwgLayout: EX_WEST2 Plotted: Dec 20, 2019, 10:15AM

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West Airfield Concept 2

West Airfield Concept 2, depicted on **Exhibit 5-2**, features an extension of Taxiway B to Taxiway J. In this concept, the Taxiway B extension is shown turning south as it approaches Taxiway J so as not to penetrate the glide slope critical area. This concept also includes the relocation of Taxiway G to the west to remain outside the Runway 10R-28L high-energy zone, and it includes the modification of Taxiway B3 to provide a standard right-angle intersection between extended Taxiway G and Taxiway B. Taxiway H would be removed. This concept includes an optional extension of Taxiway W to Taxiway B, similar to West Airfield Concept 1. Other optional development included in this concept is a reconfiguration of the intersection of extended Taxiway B with Taxiway J to form a more standard right-angle entry taxiway for Runway 10R.

West Airfield Concept 3

West Airfield Concept 3, depicted on **Exhibit 5-3**, is identical to West Airfield Concept 2, with the exception of the alignment of the Taxiway B extension, which is shown to parallel Runway 10R-28L without curving to avoid the glide slope critical area. This parallel taxiway configuration is more standard, but it would require aircraft to hold clear of the glide slope critical area on Taxiway B when the ILS is in use.

West Airfield Concept 4

Exhibit 5-4 depicts West Airfield Concept 4. In this concept, the Runway 10R threshold would be displaced to align with the Runway 10L threshold. Under this concept, Taxiway J between the existing Runway 10R threshold and Taxiway A would be removed, which would eliminate the hot spot. Taxiway W would be extended to provide access from Taxiway A to Runway 10R from the north. Taxiway B would be extended to provide access to the relocated Runway 10R threshold from the south. Taxiway H and excess pavement on Taxiway B3 would be removed. With a displaced threshold, aircraft would land on the displaced threshold, but they can take off from either the displaced threshold or the existing threshold. Aircraft originating from the north side of the airfield desiring to take off on Runway 10R using the full runway length would have to cross Runways 10L and 10R on Taxiway W, take Taxiway B to Taxiway F, and then follow Taxiway F to Taxiway J for access to the existing Runway 10R threshold. Because the Runway 10R landing threshold would be moved, the glide slope would need to be relocated. This concept would also require the relocation of approach lights runway markings.

West Airfield Concept 5

As depicted on **Exhibit 5-5**, West Airfield Concept 5 is identical to West Airfield Concept 4, except that Taxiway W would be extended to Taxiway F, and Taxiway B would not be extended. For aircraft originating from the north side of the airfield, this configuration would simplify routing to the existing Runway 10R threshold for takeoff, but it would still require the crossing of both runways.

West Airfield Concept 6

Exhibit 5-6 depicts West Airfield Concept 6. This concept is similar to West Airfield Concept 4, except that instead of displacing the Runway 10R threshold, the threshold would be relocated to align with the Runway 10L threshold. With this concept, aircraft would take off and land from the relocated threshold, and runway pavement west of the relocated threshold would be removed. With the removal of existing runway pavement, this concept assumes Runway 10R would be extended to the east (see east airfield concepts).

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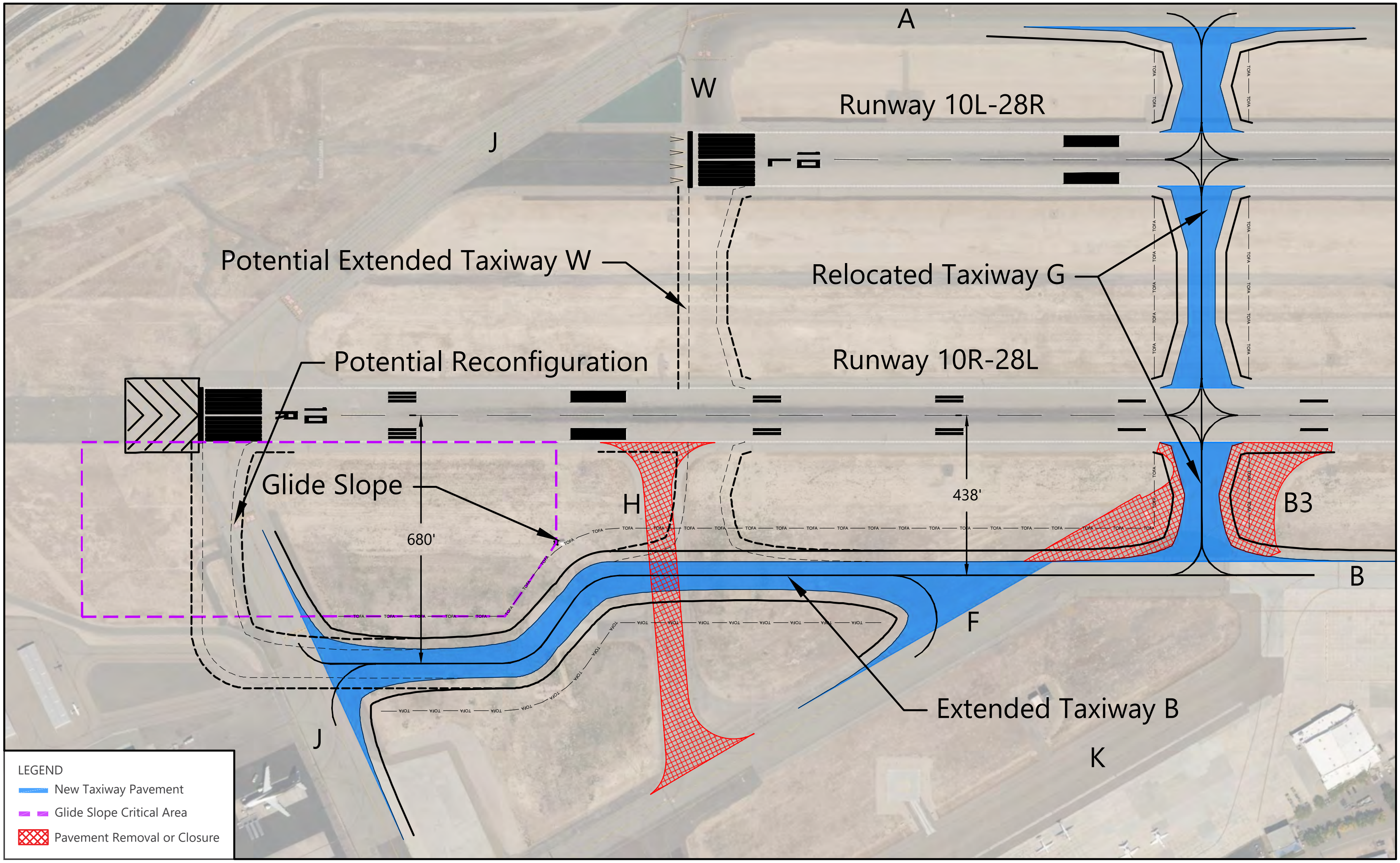

SOURCES: Quantum Spatial, September 2016 (aerial photography - for visual reference only, may not be to scale); Federal Aviation Administration, Advisory Circular 150/5300-13A, Change 1, Airport Design, February 26, 2014.

EXHIBIT 5-2

WEST AIRFIELD CONCEPT 2

NORTH 0 400 ft.

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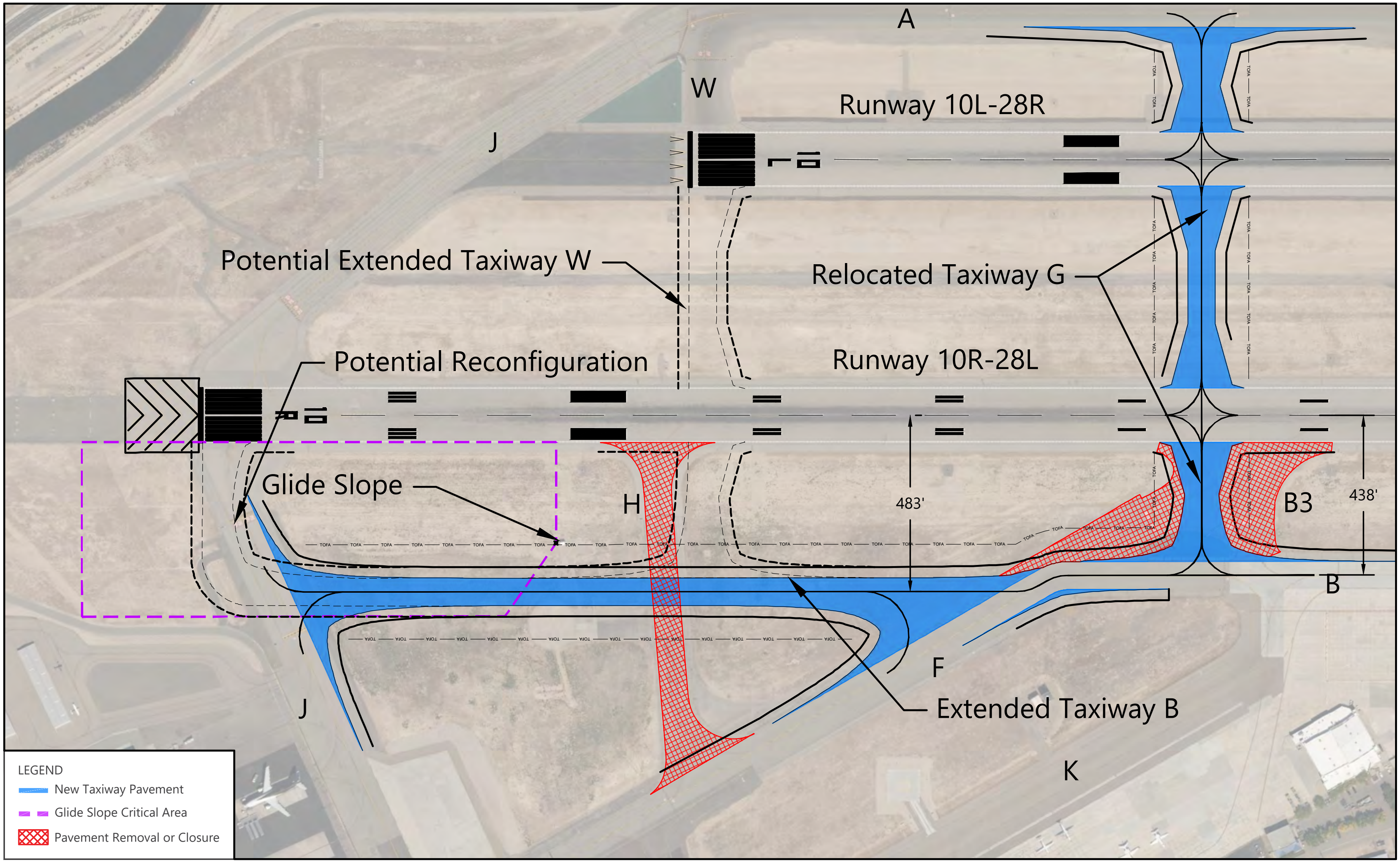

SOURCES: Quantum Spatial, September 2016 (aerial photography - for visual reference only, may not be to scale); Federal Aviation Administration, Advisory Circular 150/5300-13A, Change 1, Airport Design, February 26, 2014.

EXHIBIT 5-3

WEST AIRFIELD CONCEPT 3

NORTH 0 400 ft.

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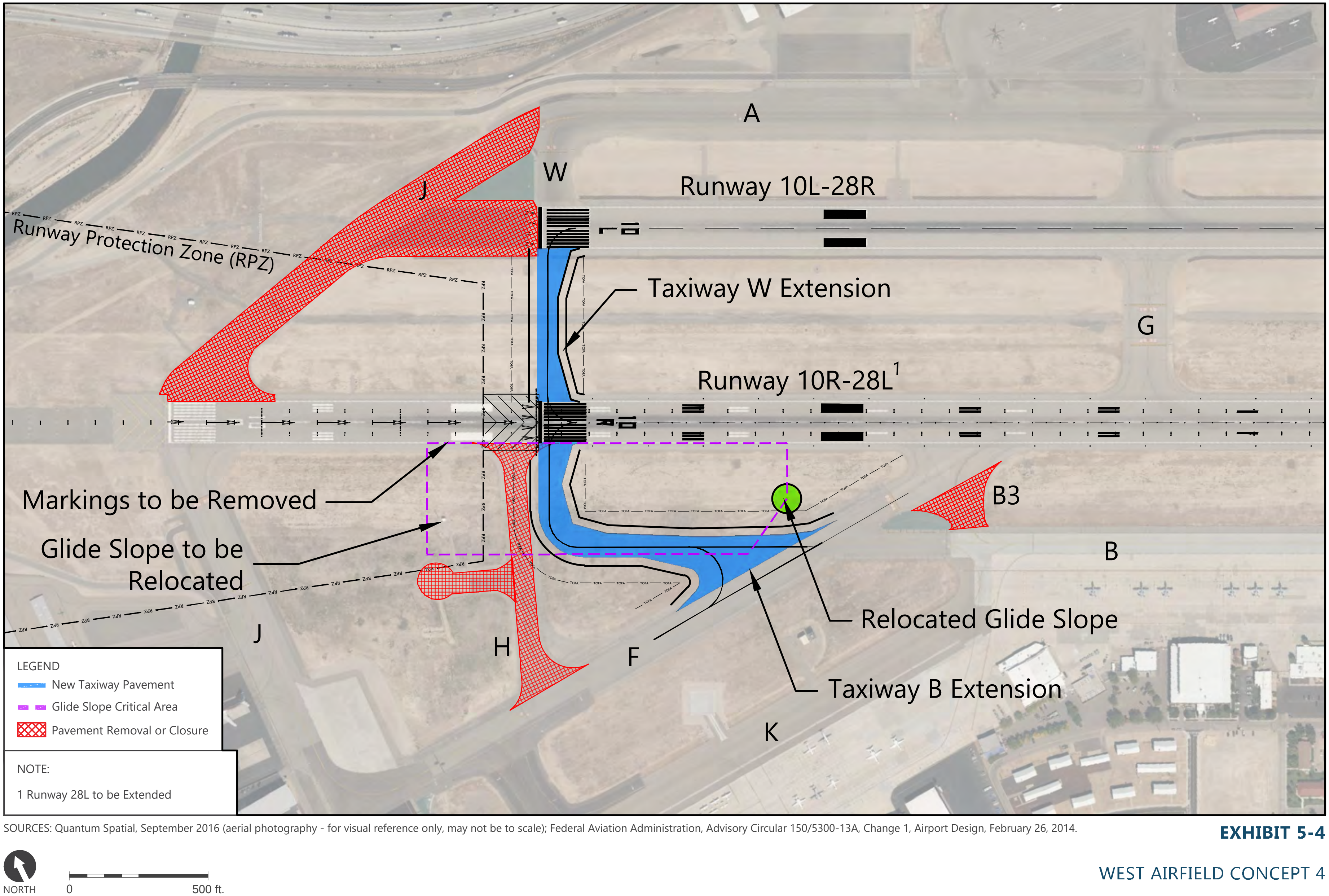

SOURCES: Quantum Spatial, September 2016 (aerial photography - for visual reference only, may not be to scale); Federal Aviation Administration, Advisory Circular 150/5300-13A, Change 1, Airport Design, February 26, 2014.

EXHIBIT 5-4

WEST AIRFIELD CONCEPT 4

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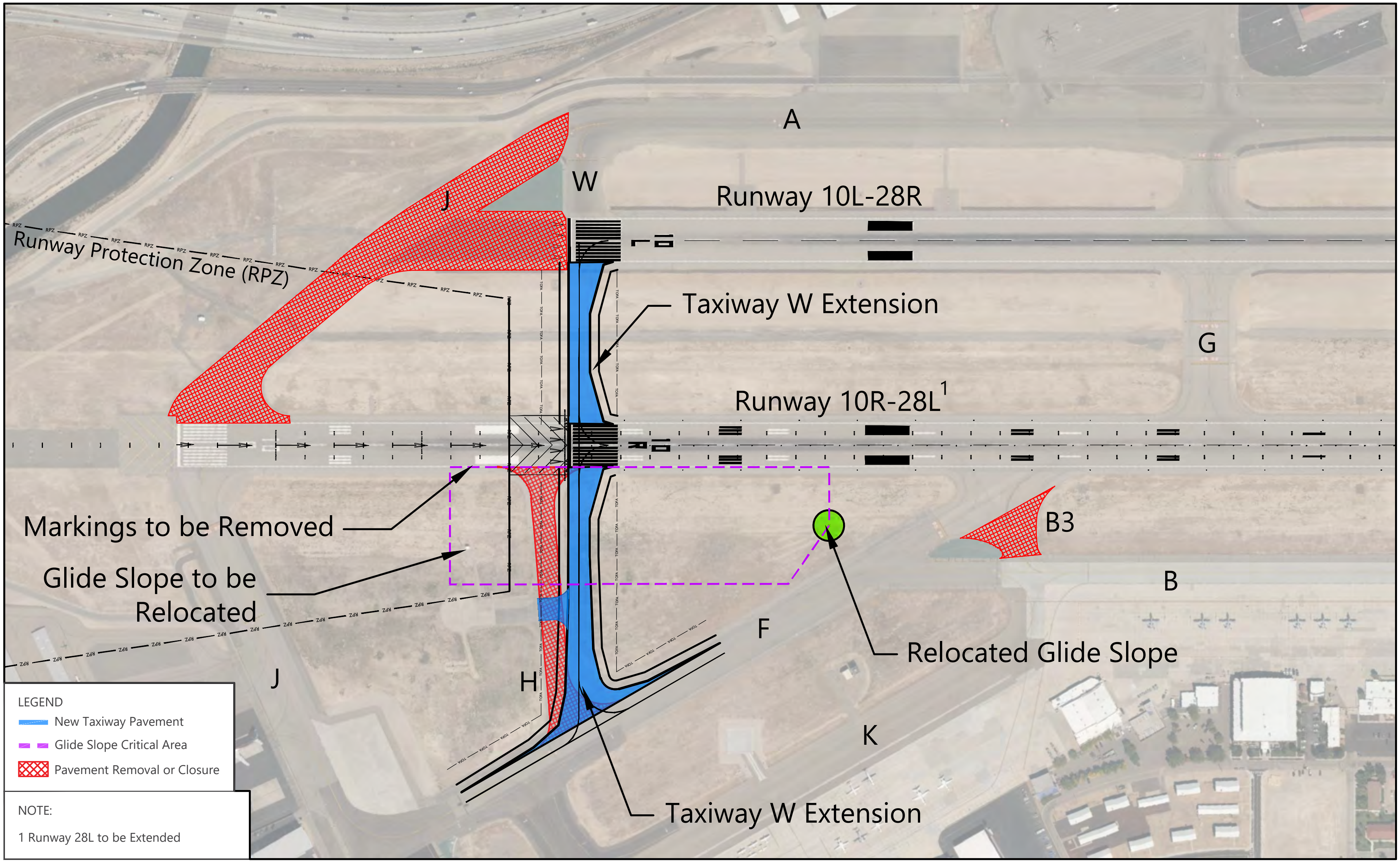

SOURCES: Quantum Spatial, September 2016 (aerial photography - for visual reference only, may not be to scale); Federal Aviation Administration, Advisory Circular 150/5300-13A, Change 1, Airport Design, February 26, 2014.

NORTH 0 500 ft.

EXHIBIT 5-5

WEST AIRFIELD CONCEPT 5

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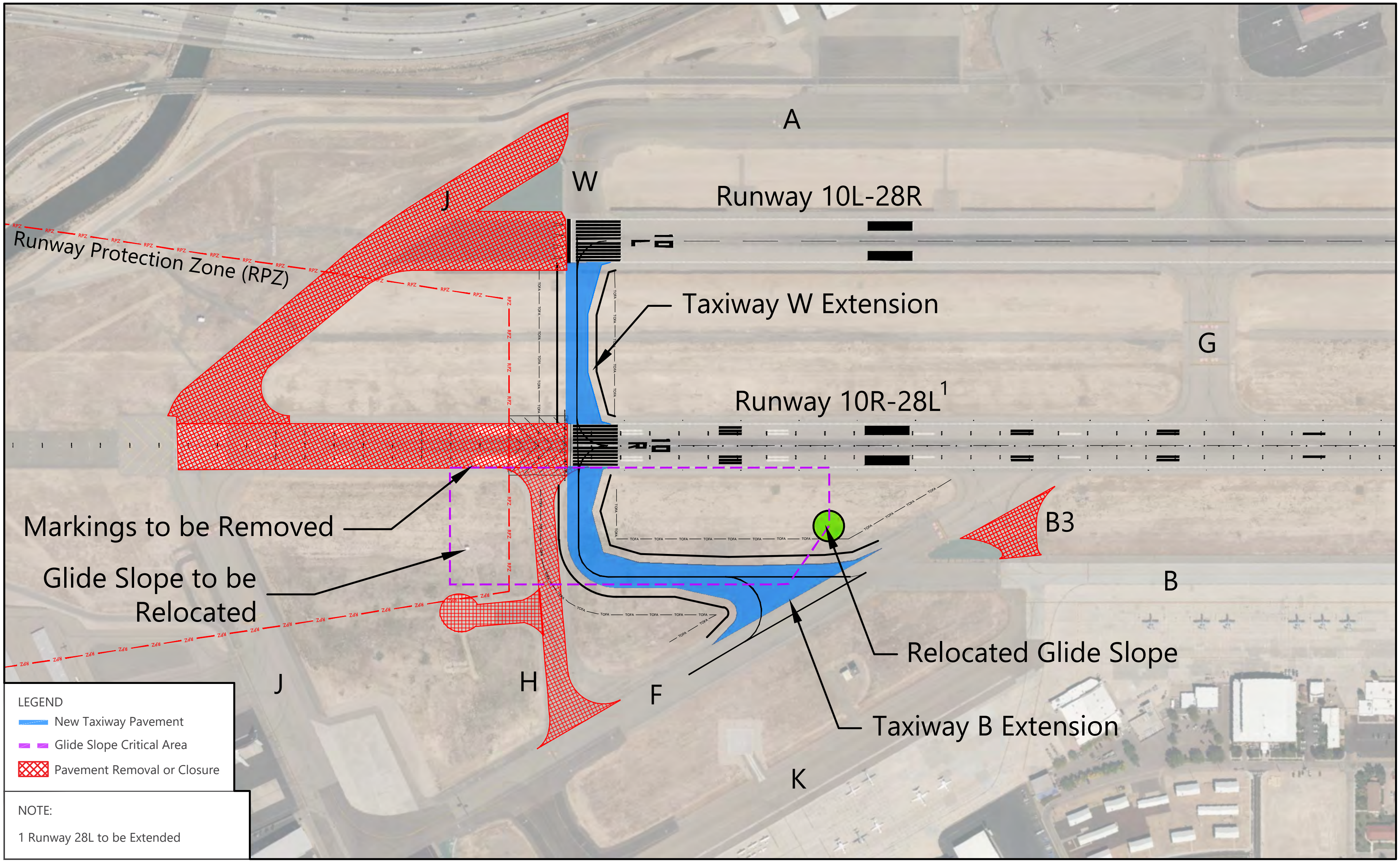

SOURCES: Quantum Spatial, September 2016 (aerial photography - for visual reference only, may not be to scale); Federal Aviation Administration, Advisory Circular 150/5300-13A, Change 1, Airport Design, February 26, 2014.

NORTH 0 500 ft.

EXHIBIT 5-6

WEST AIRFIELD CONCEPT 6

Drawing: P:\Project-Chicago\BOI\2016 BOI Master Plan\06 - Alternatives Development and Evaluation\BOI Airfield Alternatives - 20190802_Exhibits.dwgLayout: RELOCATED_WEST1 Plotted: Dec 20, 2019, 09:55AM

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West Airfield Concept 7

West Airfield Concept 7, depicted on **Exhibit 5-7**, is similar to West Airfield Concept 5, but it includes a relocated Runway 10R threshold instead of a displaced threshold. In this concept, Runway 10R would be extended to the east.

5.1.1.2 REFINED WEST AIRFIELD CONCEPTS

Based on discussions with and input from Airport staff, the FAA, and Airport stakeholders, it was determined that relocation of the Runway 10R threshold and removal of Taxiway J between the existing Runway 10R threshold and Taxiway A was the best alternative for mitigating the hot spot. Leaving the Runway 10R threshold in its current location without removing the portion of Taxiway J (Concepts 1, 2, and 3) would physically leave the hot spot in place, even though extension of Taxiway W provides an alternative for accessing the Runway 10R threshold from the north. In Concepts 4 and 5, where the Runway 10R threshold is displaced and the northern portion of Taxiway J is removed, the hot spot is mitigated, but aircraft originating from the north side of the airfield and taking off from the existing Runway 10R threshold (to utilize the full length of the runway) would have to cross two runways, thereby increasing the opportunity for runway incursions.

With this determination, various options were developed to refine the selected west airfield concept. **Exhibit 5-8** through **Exhibit 5-13** depict these options. Each west airfield development option included the following common elements:

- Existing Taxiway G would be relocated to the west, outside the existing Runway 10R-28L high-energy zone, with the TOFA of the relocated Taxiway G aligned on the western edge of the high-energy zone. This alignment allows tie-in with existing striping on Taxiways B and K on the south side of the airfield and with Taxiway A and the north GA apron on the north side.
- Taxiway B3 and Taxiway F north of Taxiway B would be demolished to eliminate the wide/excess pavement area on Taxiway B3, with relocated Taxiway G serving as a full crossfield taxiway and exit taxiway for Runway 10R-28L.
- Taxiway J would be demolished between the existing Runway 10R threshold and Taxiway A, as well as between the existing Runway 10R threshold and the adjacent T-hangar taxilanes.
- Approximately 1,340 feet of existing Runway 10R would be demolished, including the existing blast pad.
- Taxiway H would be demolished, with an extended Taxiway W providing access between Taxiway F and the relocated Runway 10R threshold.
- A 4-box PAPI would replace existing VASI lights on Runways 10L and 10R. Subsequent to development of these concepts, a 4-box PAPI was installed on each end of Runway 10L-28R to replace VASI lights.
- The Runway 10R threshold would be relocated to align with the Runway 10L threshold.
- Taxiway W would be extended south to Taxiway F.
- The Runway 10R glide slope would be relocated.

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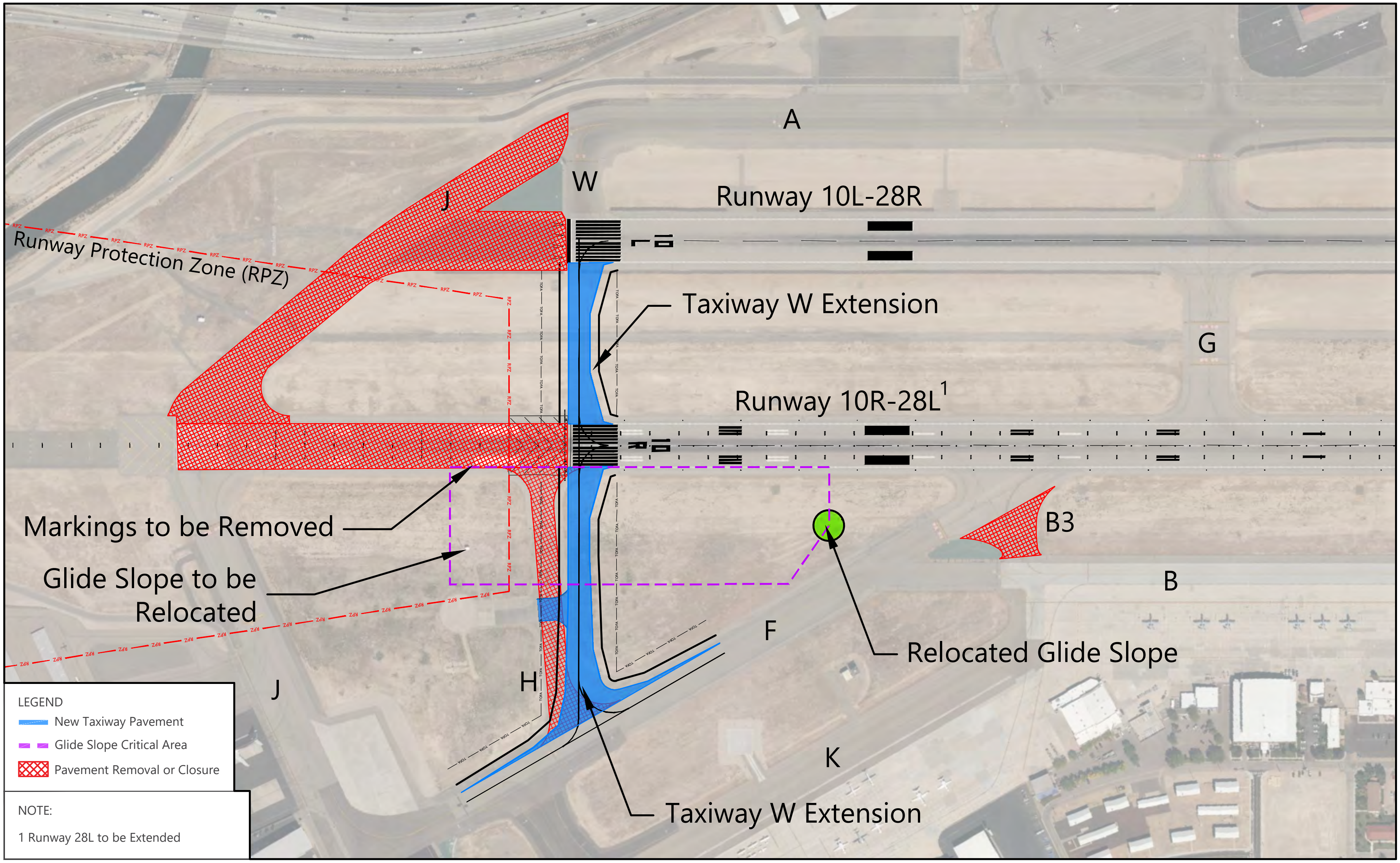

SOURCES: Quantum Spatial, September 2016 (aerial photography - for visual reference only, may not be to scale); Federal Aviation Administration, Advisory Circular 150/5300-13A, Change 1, Airport Design, February 26, 2014.

EXHIBIT 5-7

WEST AIRFIELD CONCEPT 7

NORTH 0 500 ft.

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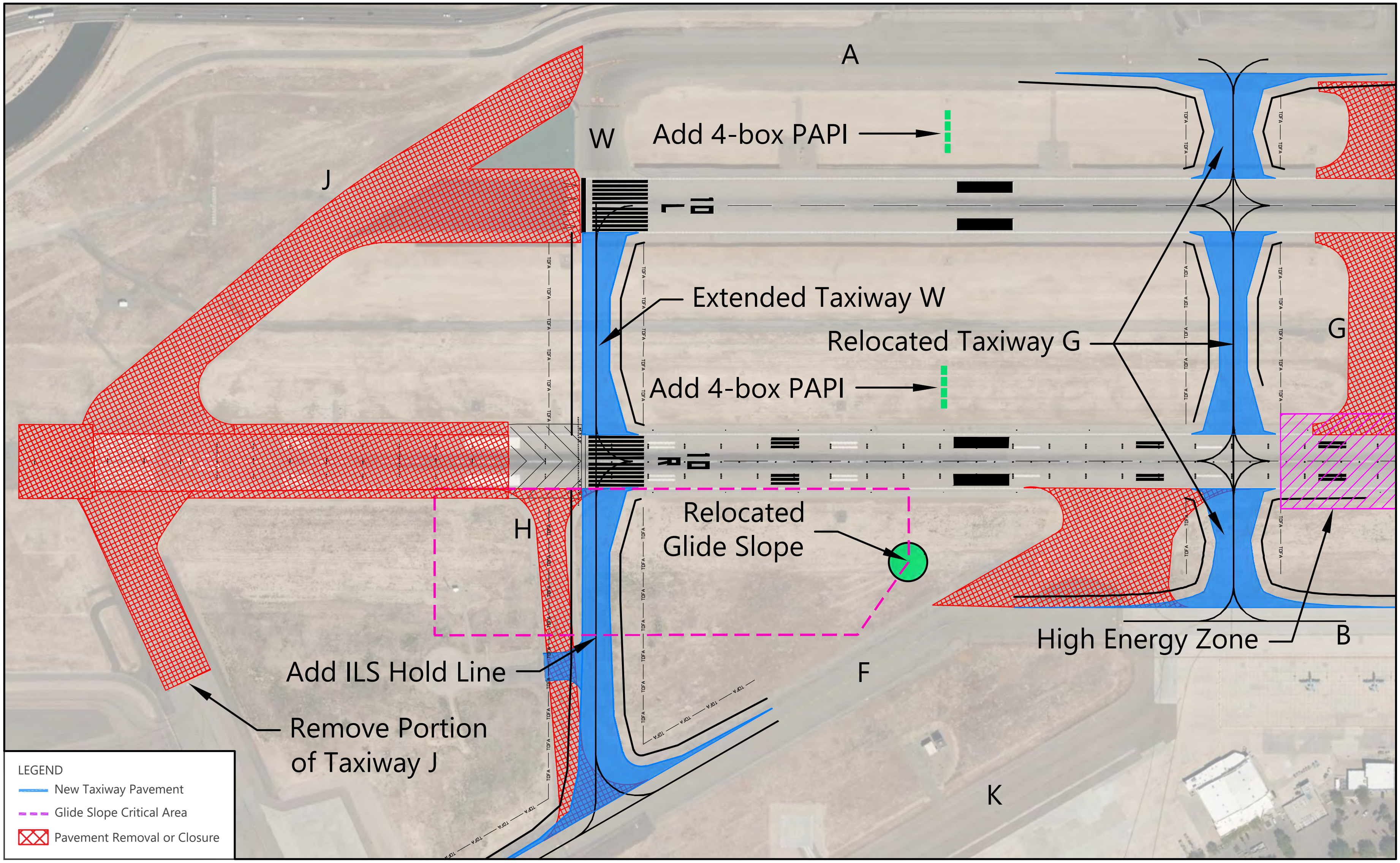

SOURCES: Quantum Spatial, September 2016 (aerial photography - for visual reference only, may not be to scale); Federal Aviation Administration, Advisory Circular 150/5300-13A, Change 1, Airport Design, February 26, 2014.

EXHIBIT 5-8

WEST AIRFIELD DEVELOPMENT OPTION 1

Drawing: P:\Project-Chicago\BOI\2016 BOI Master Plan\06 - Alternatives Development and Evaluation\TWY W and G Alternatives_Exhibits 20190802.dwgLayout: TWY W (2) Plotted: Dec 20, 2019, 09:38AM

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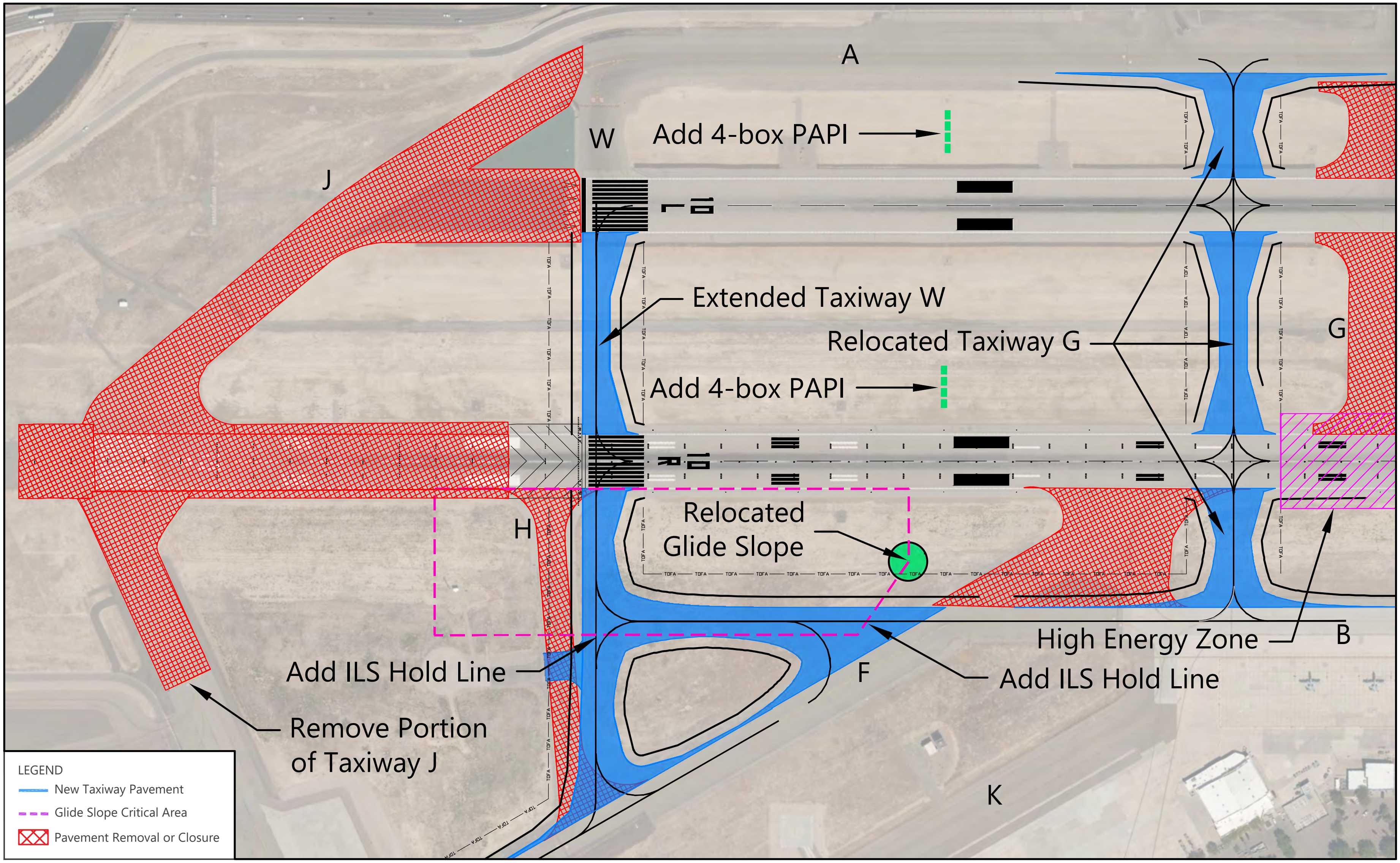

SOURCES: Quantum Spatial, September 2016 (aerial photography - for visual reference only, may not be to scale); Federal Aviation Administration, Advisory Circular 150/5300-13A, Change 1, Airport Design, February 26, 2014.

EXHIBIT 5-9

NORTH 0 400 ft.

WEST AIRFIELD DEVELOPMENT OPTION 2

Drawing: P:\Project-Chicago\BOI\2016 BOI Master Plan\06 - Alternatives Development and Evaluation\TWY W and G Alternatives_Exhibits 20190802.dwgLayout: TWY W & B (2) Plotted: Dec 20, 2019, 09:38AM

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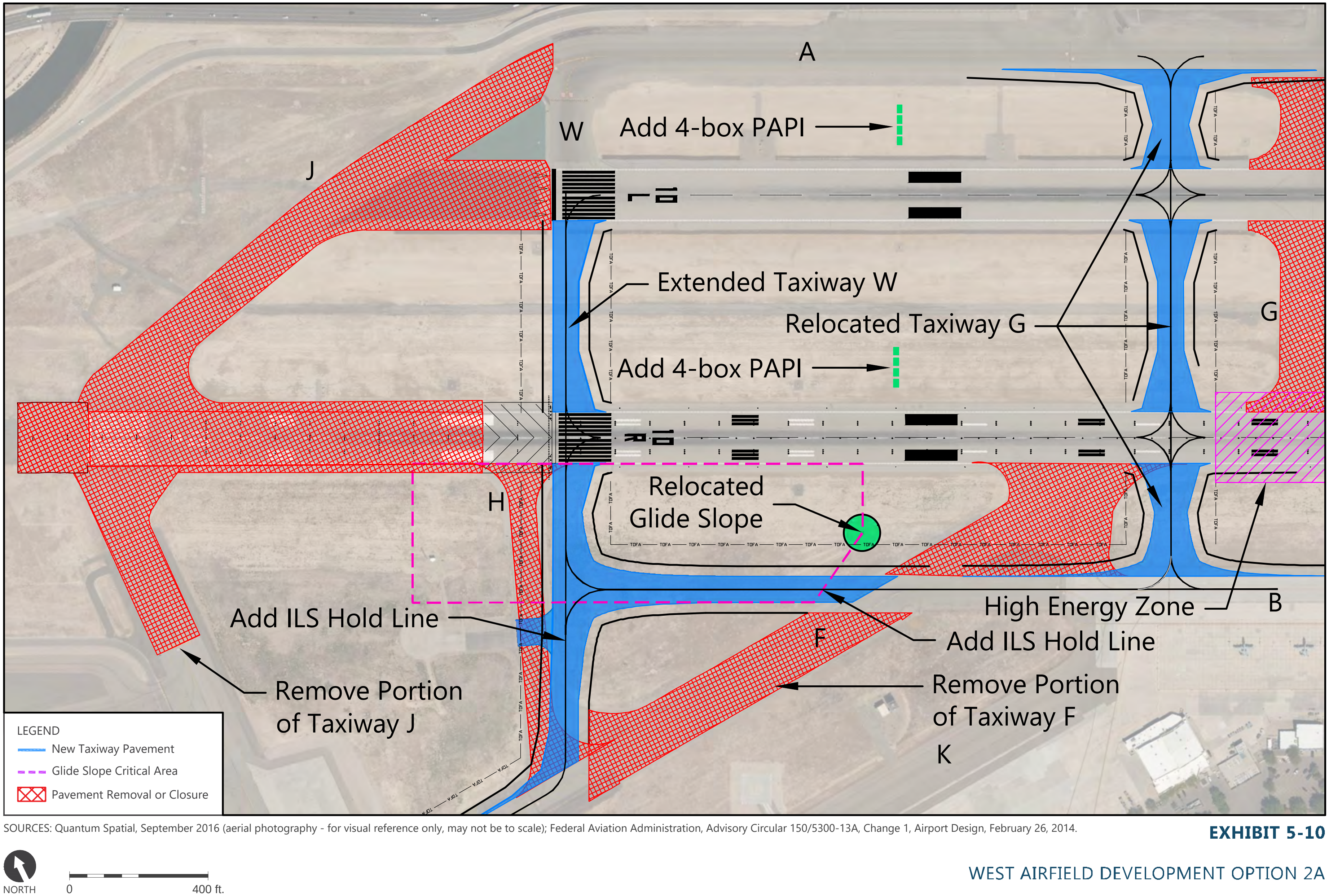

SOURCES: Quantum Spatial, September 2016 (aerial photography - for visual reference only, may not be to scale); Federal Aviation Administration, Advisory Circular 150/5300-13A, Change 1, Airport Design, February 26, 2014.

EXHIBIT 5-10

WEST AIRFIELD DEVELOPMENT OPTION 2A

Drawing: P:\Project-Chicago\BOI\2016 BOI Master Plan\06 - Alternatives Development and Evaluation\TWY W and G Alternatives_Exhibits 20190802.dwgLayout: TWY W & B Stright (2) Plotted: Dec 20, 2019, 09:39AM

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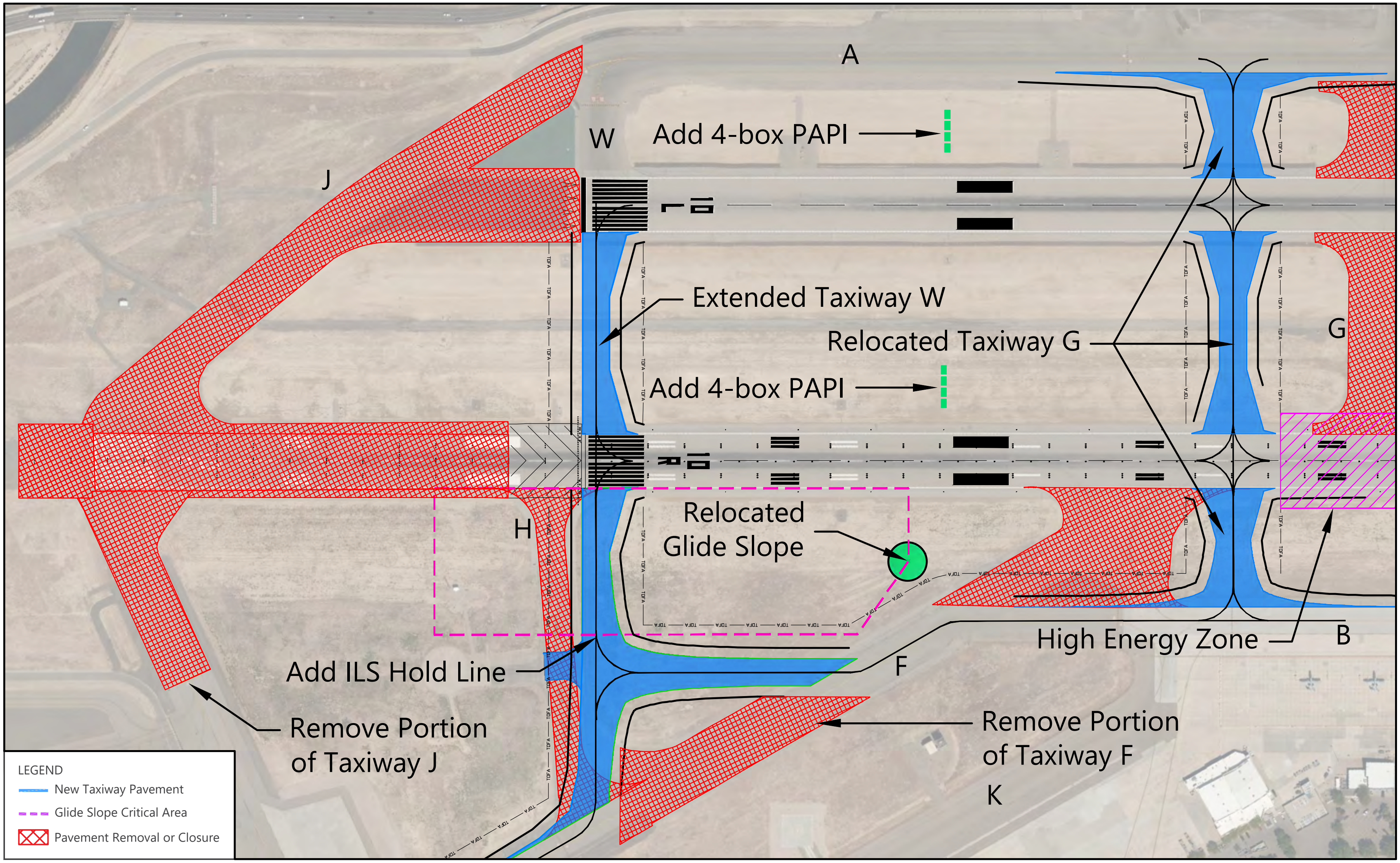

SOURCES: Quantum Spatial, September 2016 (aerial photography - for visual reference only, may not be to scale); Federal Aviation Administration, Advisory Circular 150/5300-13A, Change 1, Airport Design, February 26, 2014.

EXHIBIT 5-11

WEST AIRFIELD DEVELOPMENT OPTION 3

NORTH

0 400 ft.

Drawing: P:\Project-Chicago\BOI\2016 BOI Master Plan\06 - Alternatives Development and Evaluation\TWY W and G Alternatives_Exhibits 20190802.dwgLayout: TWY W & B Relocated (2) Plotted: Dec 20, 2019, 09:39AM

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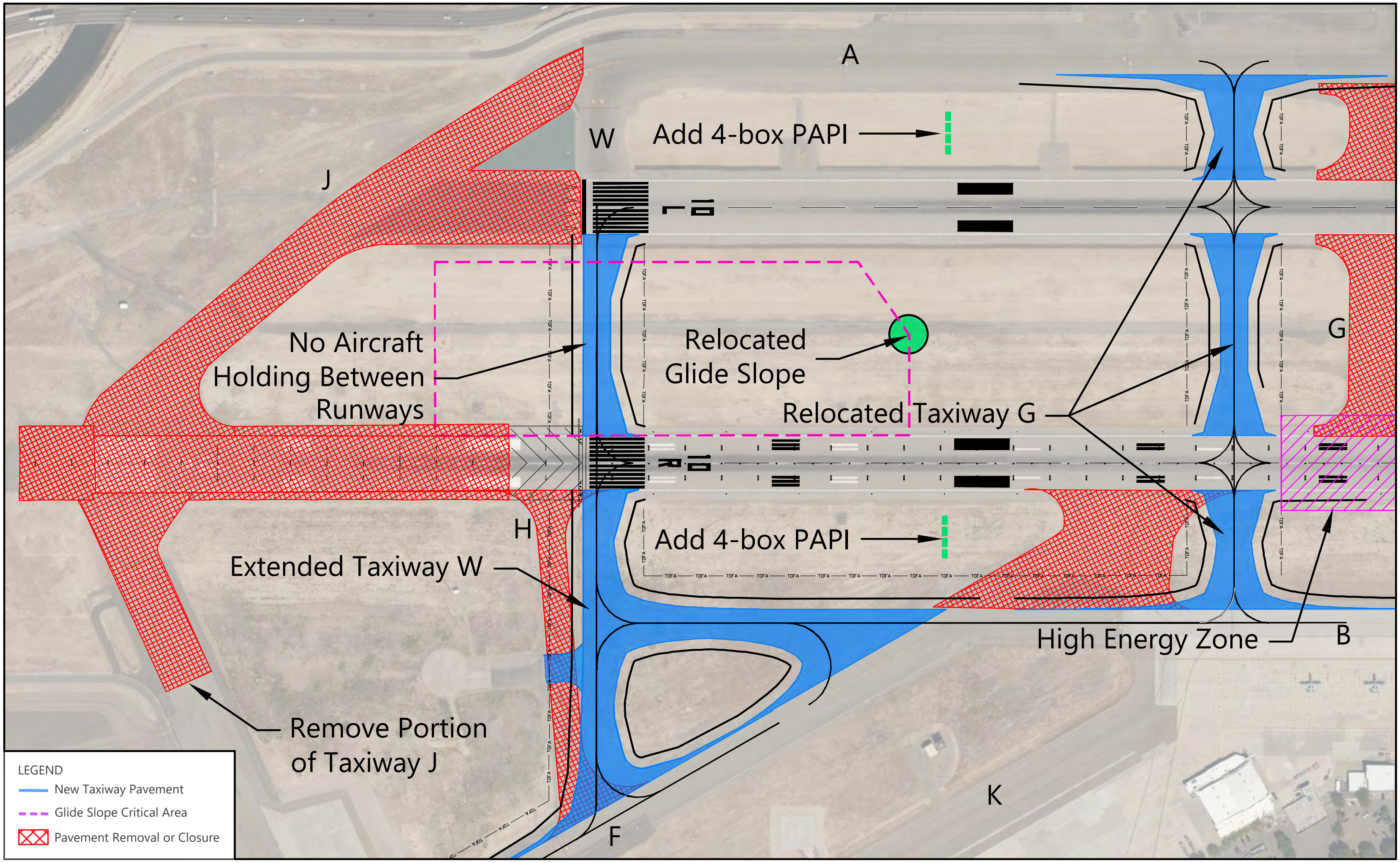

SOURCES: Quantum Spatial, September 2016 (aerial photography - for visual reference only, may not be to scale); Federal Aviation Administration, Advisory Circular 150/5300-13A, Change 1, Airport Design, February 26, 2014.

EXHIBIT 5-12

WEST AIRFIELD DEVELOPMENT OPTION 4

Drawing: P:\Project-Chicago\BOI\2016 BOI Master Plan\06 - Alternatives Development and Evaluation\TWY W and G Alternatives_Exhibits 20190802.dwgLayout: TWY W & B Straight Flipped GS (3) Plotted: Dec 20, 2019, 09:39AM

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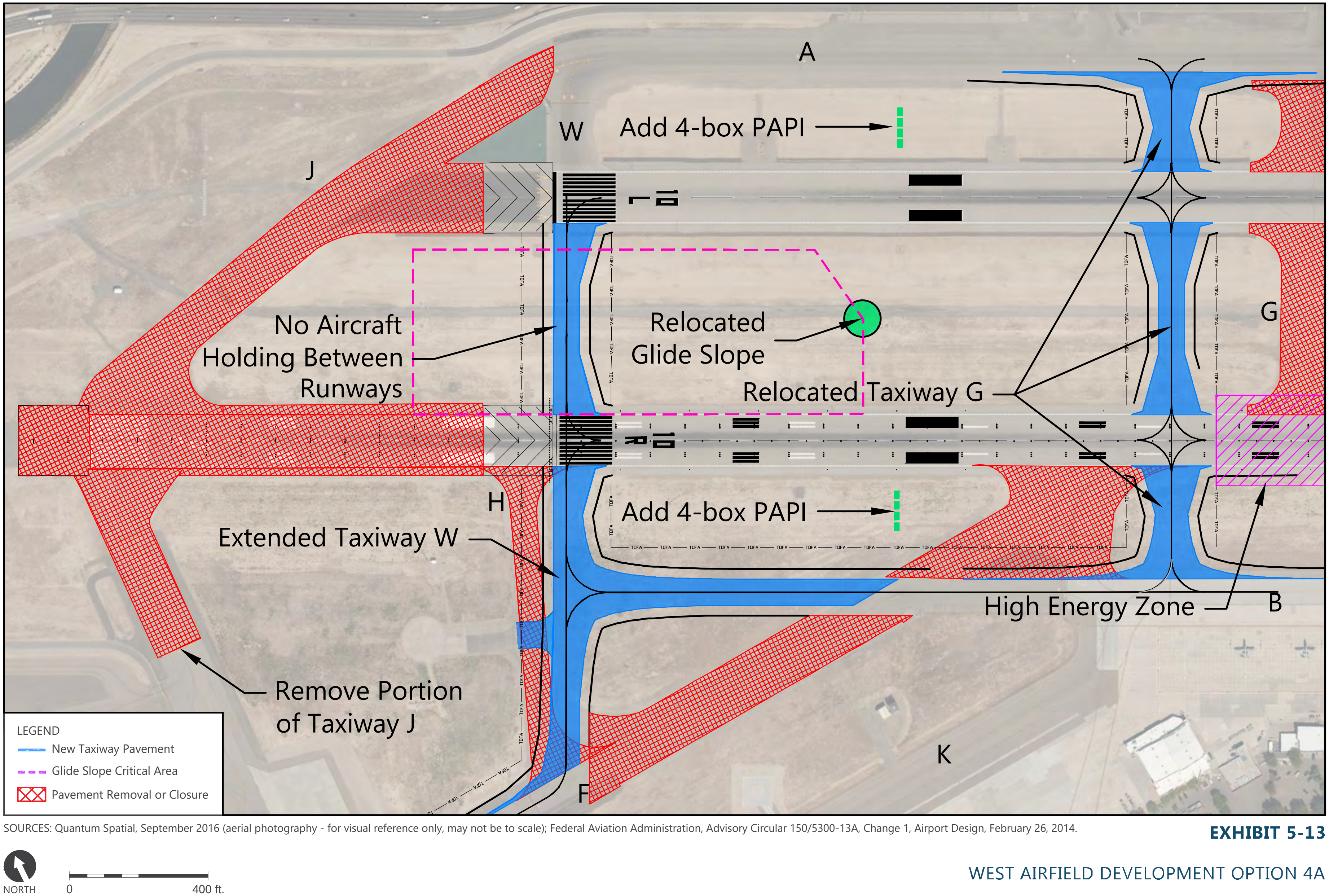

SOURCES: Quantum Spatial, September 2016 (aerial photography - for visual reference only, may not be to scale); Federal Aviation Administration, Advisory Circular 150/5300-13A, Change 1, Airport Design, February 26, 2014.

EXHIBIT 5-13

WEST AIRFIELD DEVELOPMENT OPTION 4A

Drawing: P:\Project-Chicago\BOI\2016 BOI Master Plan\06 - Alternatives Development and Evaluation\TWY W and G Alternatives_Exhibits 20190802.dwgLayout: TWY W & B Straight Flipped GS (4) Plotted: Dec 20, 2019, 09:40AM

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With these common elements established, the specific west airfield options comprise the following:

- **Option 1:** The glide slope would be relocated on the right side of the Runway 10R approach end. A precision approach path indicator (PAPI) would be located on the left side of Runway 10R. An ILS hold line would be located on extended Taxiway W north of Taxiway F. Under this option, Taxiway B would not be extended. Rather, access to Runway 10R from the south would be via Taxiway F to Taxiway W.
- **Option 2:** The glide slope would be relocated on the right side of the Runway 10R approach end, with a PAPI located on the left side of Runway 10R. Taxiway B would be extended to Taxiway W, and ILS hold lines would be located on extended Taxiway W north of Taxiway F and along the intersection of Taxiways B and F.
- **Option 2A:** This option is identical to Option 2, except that Taxiway F would be removed between Taxiway B and extended Taxiway W.
- **Option 3:** The glide slope would be relocated on the right side of the Runway 10R approach end, and a PAPI would be located on the left side of Runway 10R. Taxiway B would be extended to Taxiway W with a jog around the glide slope critical area. As depicted, the displacement of Taxiway B around the glide slope critical area is sighted for a Boeing 767-400 wingspan plus some buffer.
- **Option 4:** The glide slope would be relocated on the left side of the Runway 10R approach end, and a PAPI would be located on the right side of Runway 10R. Taxiway B would be extended to Taxiway W, and no ILS hold lines would be needed south of Runway 10R.
- **Option 4A:** This option is identical to Option 4, except that Taxiway F would be removed between Taxiway B and extended Taxiway W.

In Option 1, the extension of Taxiway W provides the only point of accessibility to the Runway 10R threshold, necessitating all traffic to use Taxiway F. This operational constraint led to the elimination of Option 1 from further consideration. Option 2 addresses the deficiency of Option 1 by extending Taxiway B to extended Taxiway W, thereby providing direct accessibility of Runway 10R from Taxiway B. Option 3 allows for extension of Taxiway B without an ILS hold line on Taxiway B by routing the taxiway south of the ILS critical area. The portion of Taxiway F between extended Taxiways B and W would be removed, allowing for the potential of aviation-related development in the area north of Taxilane K.

Option 4 includes relocation of the Runway 10R glide slope between Runways 10R and 10L, which is consistent with the configuration of the glide slope serving Runway 28R. In this configuration, the glide slope could be located further east along Runway 10R to allow for a more standard location of approximately 900 feet to 1,000 feet from the threshold, depending on runway grade. In addition, the glide slope would be accessible via an existing service road running between the two parallel runways. This option would allow Taxiway B to be extended to Taxiway W without the need for an ILS hold line. Option 4A is identical to Option 4, except that the portion of Taxiway F between extended Taxiways B and W would be removed.

Based on the beforementioned considerations, Option 4A was initially selected as the preferred west airfield development option. By relocating the glide slope north of Runway 10R, aircraft could avoid holding for ILS operations south of Runway 10R, and removing the portion of Taxiway F between extended Taxiways B and W would maximize the potential area for aviation-related development in the area north of Taxilane K. However, based on further discussion with the FAA, it was determined that relocating the glide slope north of Runway 10R would be problematic in terms of potentially not meeting tolerance standards for a CAT-III ILS approach. Therefore, Option 3 was selected as the preferred west airfield development concept.

5.1.2 CENTRAL AIRFIELD CONCEPTS

Development concepts for the central airfield area were identified to explore alternatives for mitigating direct runway access from apron areas and to eliminate taxiways in runway high-energy zones. Central Airfield Concept 1, depicted on **Exhibit 5-14**, shows the removal of Taxiway G and portions of Taxiways E and D. All three of these taxiways are located within high-energy zones, and the northern portion of each taxiway (between Runway 10L-28R and Taxiway A) allows direct runway access from apron areas. Previously depicted west airfield concepts show the potential relocation of Taxiway G outside the high-energy zone, which would also mitigate direct access to Runway 10L-28R from the adjacent GA apron area. Portions of Taxiways E and G between Runway 10L-28R and Taxiway A would be relocated to mitigate direct apron/runway access issues.

If the Runway 10R threshold is displaced or relocated and the runway is extended to the east, then the location of the Runway 10R-28L high-energy zone would shift, as depicted in Central Airfield Concept 2 on **Exhibit 5-15**. In this concept, Taxiway G is located outside the Runway 10R-28L high-energy zone, and an extension of Taxiway G to Taxiway B is depicted. Taxiways E and D would remain within the high-energy zones, and the central portions of these taxiways would be removed. Relocation of the northern portion of Taxiway D is depicted to mitigate direct runway access from the terminal apron.

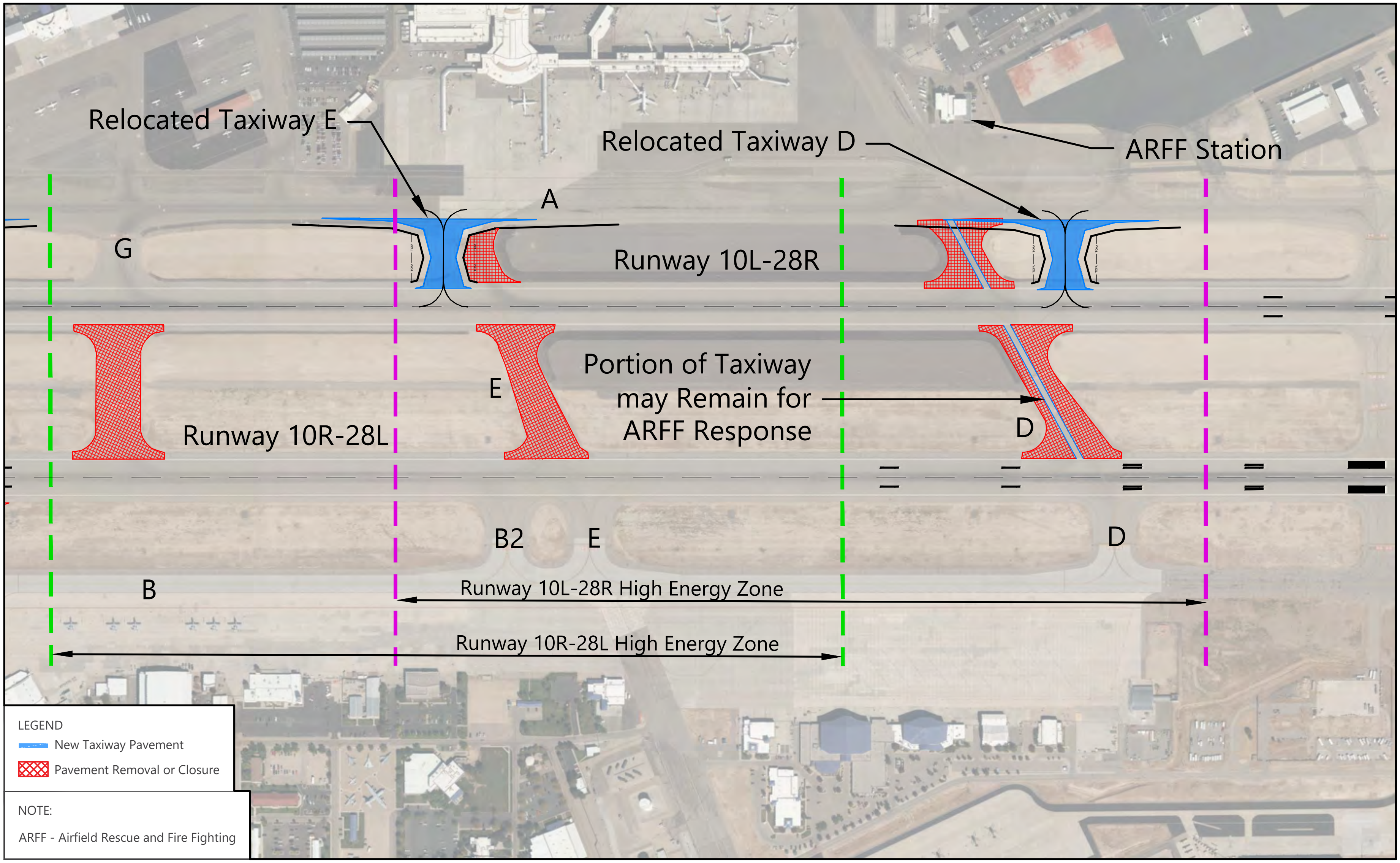
Preferred development elements from the two central airfield concepts include the following:

- Taxiway G would be relocated. Taxiway G would remain within the Runway 10L-28R high-energy zone until or unless the Runway 10R threshold is displaced/relocated and/or Runway 10L-28R is extended to the east. A nonstandard condition would therefore exist until such development occurs. Based on discussions with the FAA, and consistent with the preferred west airfield concept, preferred central airfield development includes relocation of Taxiway G outside the high-energy zone and would also mitigate direct access from the north GA apron to Runway 10L-28R.
- The central portions of Taxiways E and D would be removed. These taxiways are located within the high-energy zone of both runways, which would continue to be the case regardless of future modifications to Runway 10R-28L.
- The northern portions of Taxiways E and D would be relocated to mitigate direct access from the terminal apron to Runway 10L-28R.
- Crossfield access for ARFF vehicles would be maintained, either through preserving portions of Taxiway D for ARFF access or constructing a dedicated ARFF access road.

5.1.3 EAST AIRFIELD CONCEPTS

East Airfield Concept 1, depicted on **Exhibit 5-16**, assumes the Runway 10R threshold is not displaced or relocated. Under such a scenario, Runway 10R-28L would not be extended. Improvements to the east airfield would include a taxiway extension north of Taxiway A to facilitate future GA development, relocation of the existing compass pad, widening of Taxiway S to meet TDG 5 design standards, and relocation of the existing DME outside the Taxiway S TOFA.

East Airfield Concept 2, depicted on **Exhibit 5-17**, presents potential development centered around the extension of Runway 10R-28L. Common elements with East Airfield Concept 1 include the taxiway extension north of Taxiway A, the widening of Taxiway S, and the relocation of the compass pad and DME. Elements exclusive to East Airfield Concept 2 include construction of Taxiway P to connect the Runway 28R and Runway 28L thresholds and relocation of Taxiway B1 as an extension of Taxiway M.



SOURCES: Quantum Spatial, September 2016 (aerial photography - for visual reference only, may not be to scale); Federal Aviation Administration, Advisory Circular 150/5300-13A, Change 1, Airport Design, February 26, 2014.

NORTH 0 600 ft.

EXHIBIT 5-14

CENTRAL AIRFIELD CONCEPT 1

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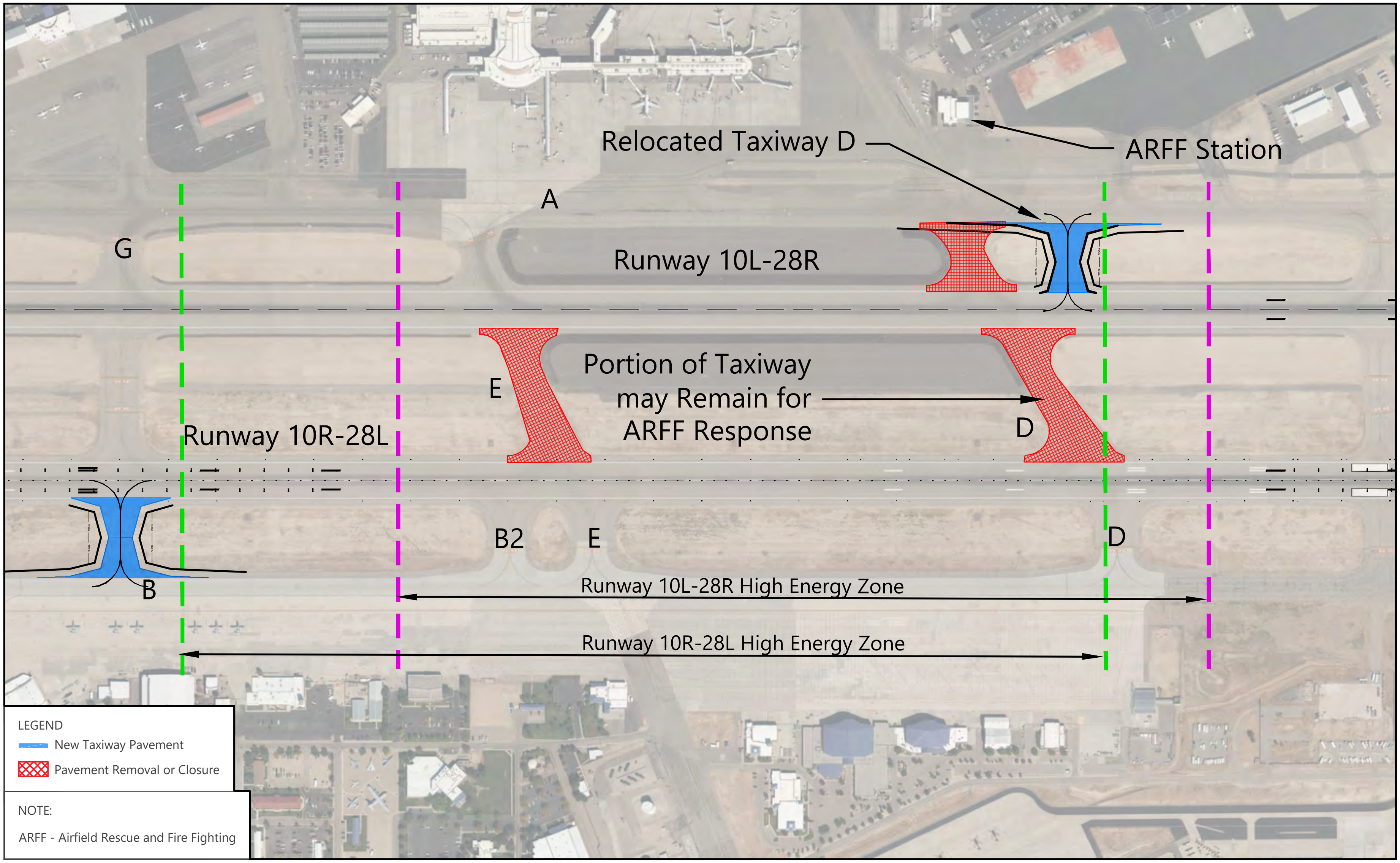

SOURCES: Quantum Spatial, September 2016 (aerial photography - for visual reference only, may not be to scale); Federal Aviation Administration, Advisory Circular 150/5300-13A, Change 1, Airport Design, February 26, 2014.

EXHIBIT 5-15

CENTRAL AIRFIELD CONCEPT 2

NORTH 0 600 ft.

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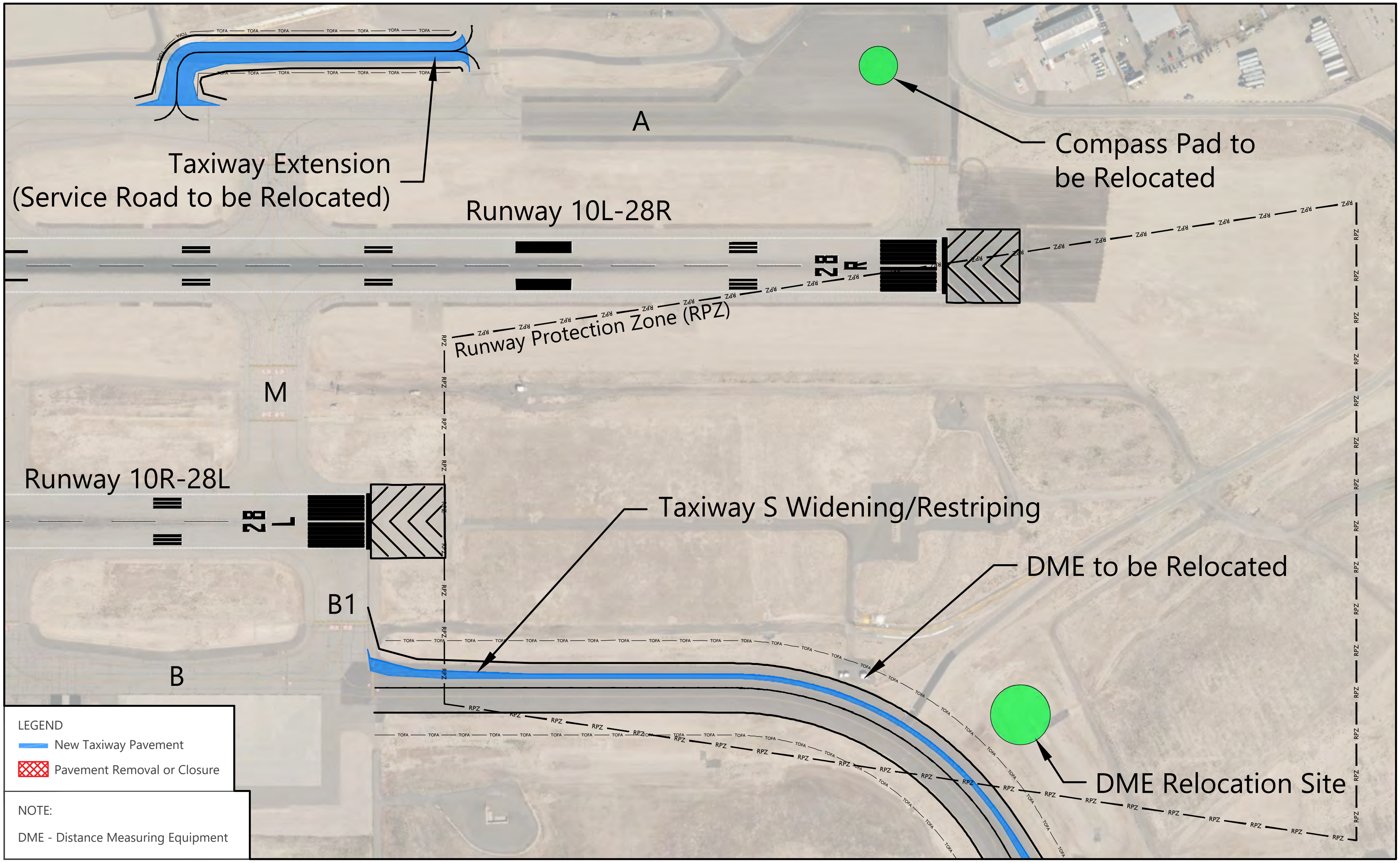

SOURCES: Quantum Spatial, September 2016 (aerial photography - for visual reference only, may not be to scale); Federal Aviation Administration, Advisory Circular 150/5300-13A, Change 1, Airport Design, February 26, 2014.

NORTH 0 400 ft.

EXHIBIT 5-16

EAST AIRFIELD CONCEPT 1

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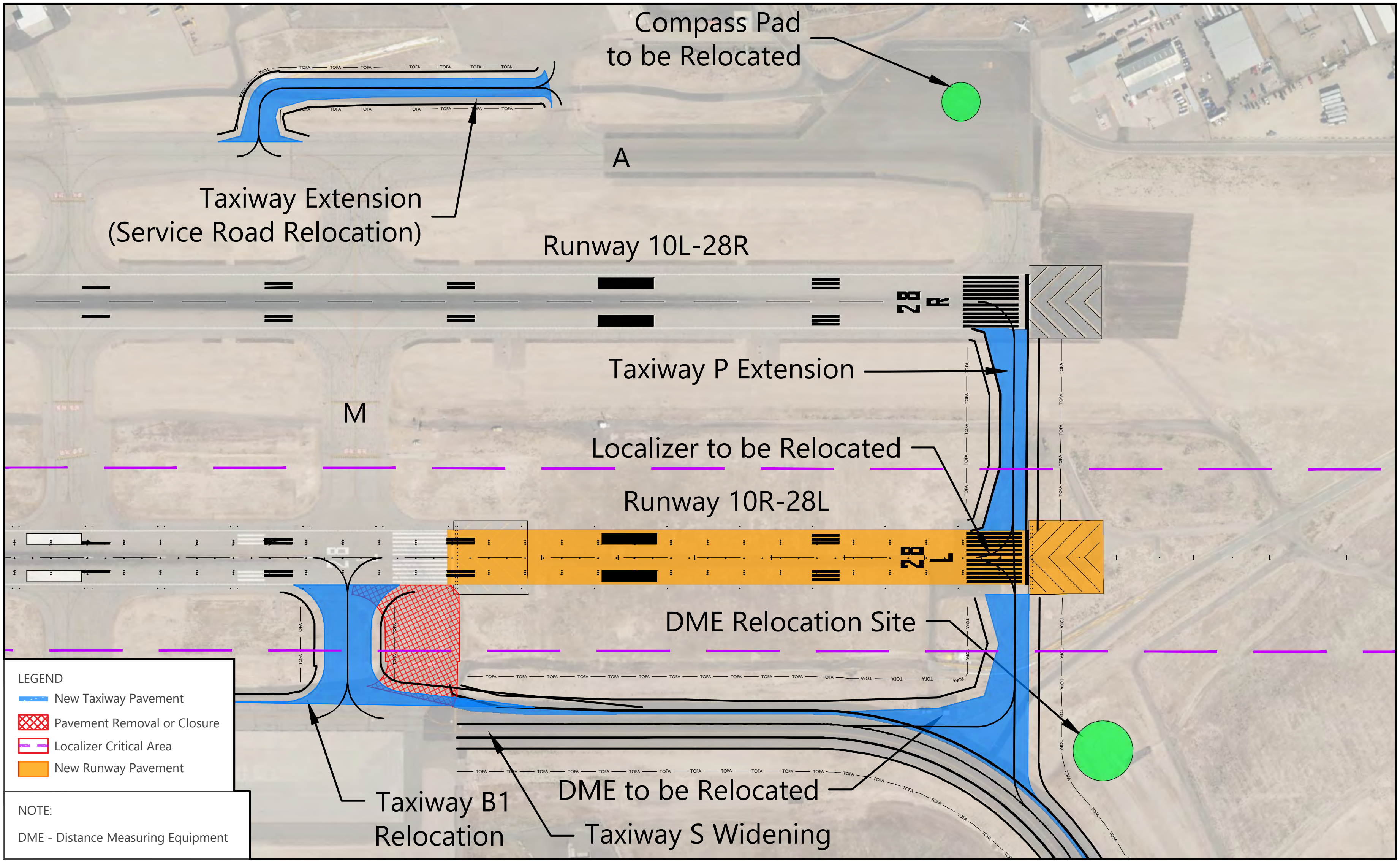

SOURCES: Quantum Spatial, September 2016 (aerial photography - for visual reference only, may not be to scale); Federal Aviation Administration, Advisory Circular 150/5300-13A, Change 1, Airport Design, February 26, 2014.

NORTH 0 400 ft.

EXHIBIT 5-17

EAST AIRFIELD CONCEPT 2

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5.1.4 OTHER AIRFIELD DEVELOPMENT CONCEPTS

5.1.4.1 RESOLUTION OF TAXIWAY OBJECT-FREE AREA ENCROACHMENT

The facility requirements analysis identified two areas of TOFA encroachment on the airfield. In the west cargo apron area, a VSR and the apron/aircraft parking positions reside within the Taxiway J TOFA by approximately 30 feet. **Exhibit 5-18** depicts a shift in the VSR by 30 feet to the west, along with a corresponding shift in the affected aircraft parking positions. To tie into the existing VSR, realignment of T-hangar taxilane north of the cargo area would be required. An alternative alignment for the relocated VSR would be to route the VSR south of the T-hangars.

Along Taxiway B, the TOFA overlaps the IDANG west apron parking limit line by 33 feet, requiring aircraft with wingspans greater than 141 feet, 1 inch to be escorted along Taxiway B. Three options were considered for resolving the TOFA encroachment:

- Option 1: relocate the IDANG parking limit line 33 feet to the south
- Option 2: relocate the Taxiway B centerline 33 feet to the north
- Option 3: relocate the IDANG flight line to an adjacent apron

Due to restrictions governing the setback distance from the military aircraft to hangars/buildings, Option 1 would not be allowable. Option 2 would require new taxiway pavement to be installed at a width of 33 feet for the length of Taxiway B in front of the IDANG west apron. The current centerline distance from Taxiway B to Runway 10R-28L is 438 feet, with 400 feet separation required for ADG IV aircraft operations. Therefore, relocating Taxiway B 33 feet to the north would continue to allow adequate taxiway/runway separation. Airport and IDANG staff have discussed the relocation of the IDANG flight line to the adjacent east apron, with indications that such a move is feasible. This relocation is the preferred option, and no relocation of the Taxiway B centerline is planned as part of the MPU.

5.1.4.2 TAXIWAY S WIDENING

At a width of 50 feet, Taxiway S currently meets TDG 4 standards. Potential future cargo development in the area will require Taxiway S to be upgraded to TDG 5 standards. The concept depicted on **Exhibit 5-19** includes widening Taxiway S by 25 feet. This project would also necessitate the relocation of DME equipment outside the Taxiway S TOFA. Exhibit 5-19 shows the proposed location for the relocation of this equipment. The concept also shows the addition of Taxiway P, which would connect Taxiway S to future Runway 9-27 (current assault strip).

5.1.4.3 COMPASS PAD RELOCATION

The facility requirements analysis identified the need to relocate the compass calibration pad currently located at the east deice apron. **Exhibit 5-20** depicts three potential locations for the relocated compass pad, along with facilities located within 300 feet of each location. AC 150/5300-13A, *Airport Design*, specifies the center of the pad should be at least 300 feet from buildings, aircraft arresting gear, fuel line, electrical or communication cable conduits, and other aircraft. Analysis of these locations identified Location 1 as the preferred relocation site in consideration of existing site features, as well as plans for potential future development in these areas.

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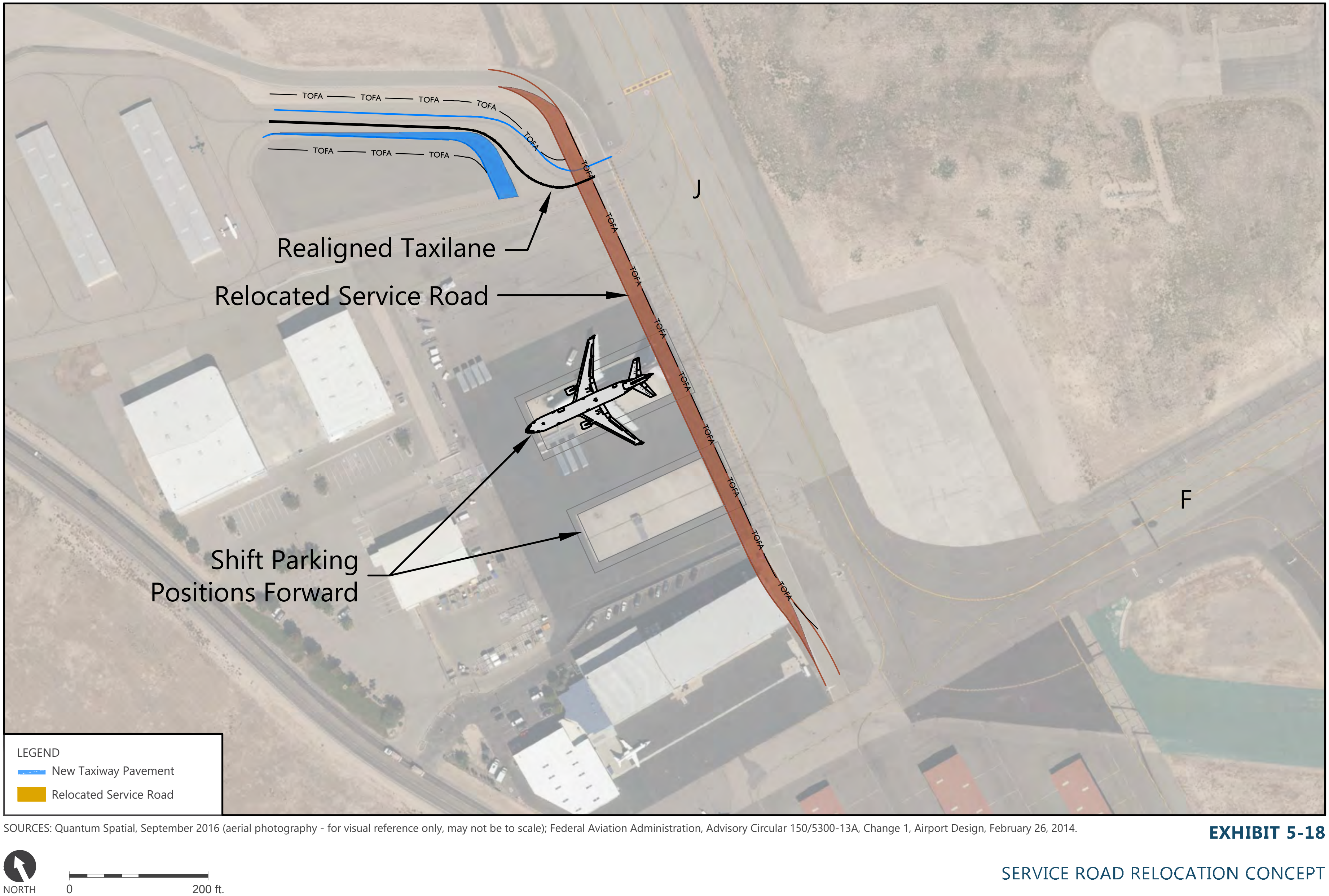

SOURCES: Quantum Spatial, September 2016 (aerial photography - for visual reference only, may not be to scale); Federal Aviation Administration, Advisory Circular 150/5300-13A, Change 1, Airport Design, February 26, 2014.

EXHIBIT 5-18

SERVICE ROAD RELOCATION CONCEPT

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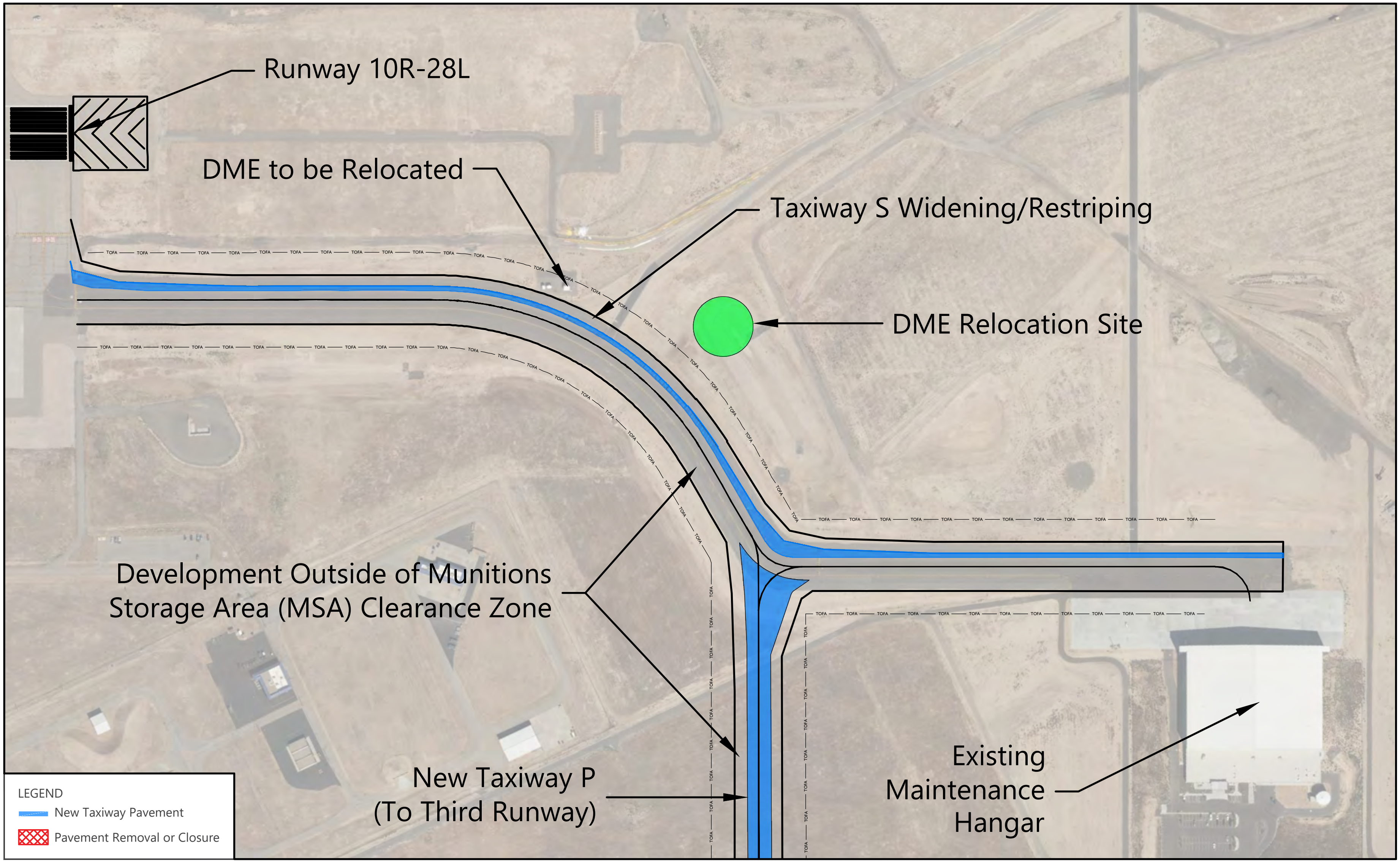

SOURCES: Quantum Spatial, September 2016 (aerial photography - for visual reference only, may not be to scale); Federal Aviation Administration, Advisory Circular 150/5300-13A, Change 1, Airport Design, February 26, 2014.

NORTH 0 400 ft.

EXHIBIT 5-19

TAXIWAY S WIDENING AND NEW TAXIWAY P CONCEPT

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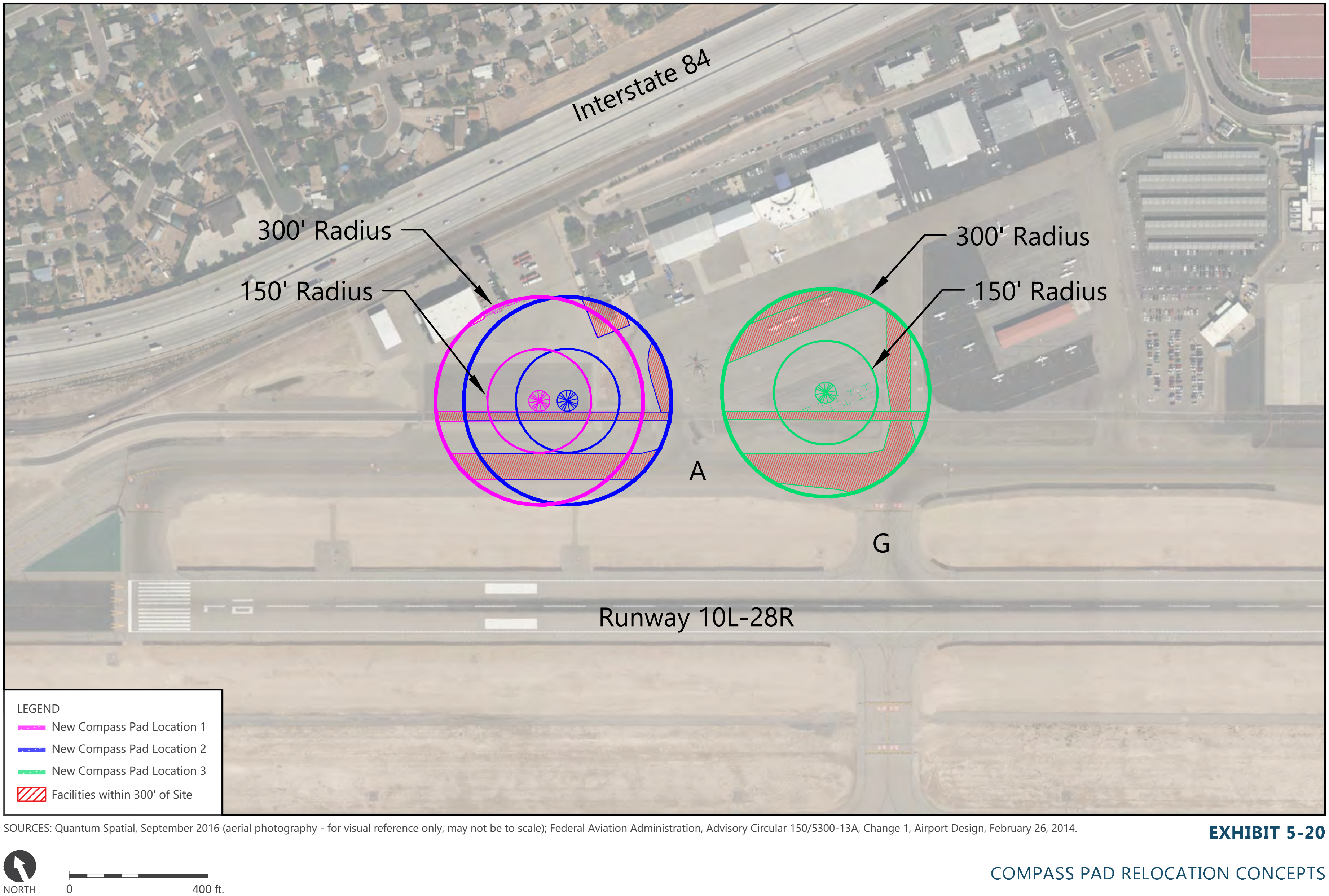

SOURCES: Quantum Spatial, September 2016 (aerial photography - for visual reference only, may not be to scale); Federal Aviation Administration, Advisory Circular 150/5300-13A, Change 1, Airport Design, February 26, 2014.

EXHIBIT 5-20

COMPASS PAD RELOCATION CONCEPTS

Drawing: P:\Project-Chicago\BOI\2016 BOI Master Plan\06 - Alternatives Development and Evaluation\BOI Airfield Alternatives - 20190802_Exhibits.dwgLayout: COMPASS ROSE Plotted: Dec 20, 2019, 10:00AM

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5.1.4.4 PRESERVATION OF LAND FOR FUTURE AIRFIELD DEVELOPMENT

Future and ultimate development south of the existing airfield is important for the future aviation and economic growth of the Airport. The airfield development concept depicted on **Exhibit 5-21** incorporates ultimate buildout of the assault strip as Runway 9-27, as well as includes opportunities for future aviation-related development. Development of Runway 9-27 is not currently required for capacity reasons; however, initial phased development of the runway and supporting facilities may be appropriate through the MPU planning period as opportunities for aviation development in the area may materialize at any time.

Specific elements of the full-build concept include a runway measuring 150 feet wide and approximately 10,800 feet long, capable of supporting any air carrier, military, cargo, or GA aircraft forecast to use the Airport. Taxiway connections to the main airfield would span Gowen Road, allowing for full integration with the existing airfield. Preservation of land for the future and ultimate development should remain a priority, with specific actions to maintain future land use compatibility within and adjacent to the potential development area.

5.2 PASSENGER TERMINAL DEVELOPMENT CONCEPTS

The primary goal for the development of passenger terminal concepts was to identify a range of concepts that provide additional mainline and regional aircraft gates to meet the facility requirements described in Section 4. According to the aircraft gate requirements analysis, two to four additional regional gates and three to five additional mainline gates are required by 2035, for a total of five to nine additional gates.

5.2.1 INITIAL DEVELOPMENT CONCEPTS

Several general parameters were established to guide the development of the terminal concepts. For example, mainline and regional gates should be grouped together to maximize efficiency of airside operations and passenger flow within the terminal. In addition, applicable clearances should be maintained from the Taxiway A TOFA and 14 CFR Part 77 surfaces. Finally, if a concept involves the relocation of the existing backcountry operations area (apron), then the concept should provide a suitable relocation site.

A total of six terminal concepts were initially developed:

- **Terminal Concept 1 (Exhibit 5-22):** This concept features development of mainline gates along the front side of the terminal, including buildout/extension of Concourse A, with regional gates accessed via ground-loading walkways on the west side of the terminal. Aircraft access to the front-side gates would be via Taxiway A, while a new taxilane would provide access to the new regional gates and backcountry apron.
- **Terminal Concept 2 (Exhibit 5-23):** This concept features development of mainline gates along the front and back sides of Concourse A. Development and expansion of Concourse A would be similar in configuration to the buildout of Concourse B. A single new regional gate is shown on the back side of Concourse A; although, any of the mainline gates could practically accommodate regional aircraft. In this concept, the regional gates currently located at Concourse C would not be relocated. Aircraft access to the front side Concourse A gates would be via Taxiway A, while a new taxilane would provide access to the gates located along the back side of Concourse A.

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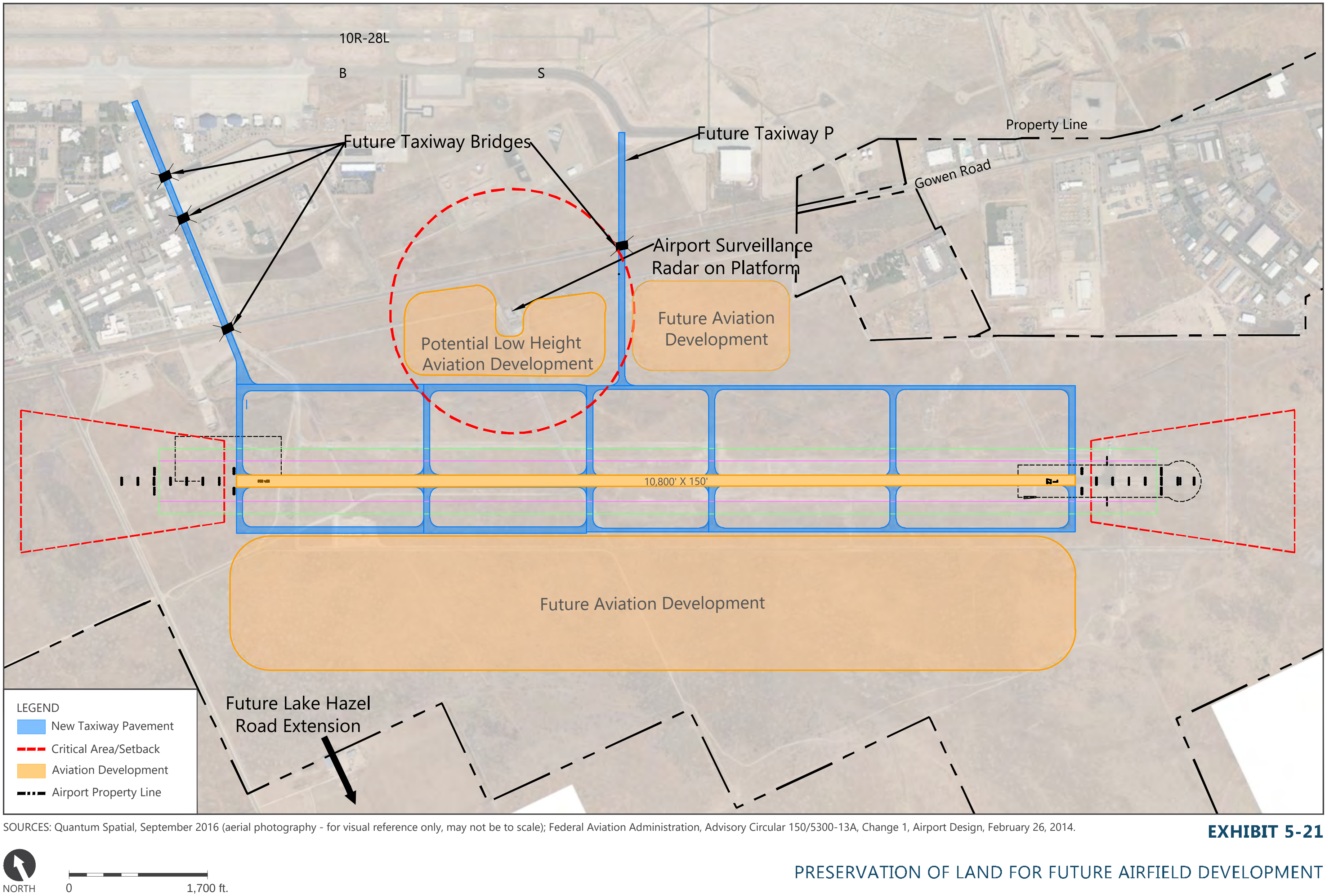

SOURCES: Quantum Spatial, September 2016 (aerial photography - for visual reference only, may not be to scale); Federal Aviation Administration, Advisory Circular 150/5300-13A, Change 1, Airport Design, February 26, 2014.

EXHIBIT 5-21

PRESERVATION OF LAND FOR FUTURE AIRFIELD DEVELOPMENT

Drawing: P:\Project-Chicago\BOI\2016 BOI Master Plan\06 - Alternatives Development and Evaluation\Third Runway_Exhibits 20190802.dwgLayout: North West Layout Plotted: Dec 20, 2019, 09:41AM

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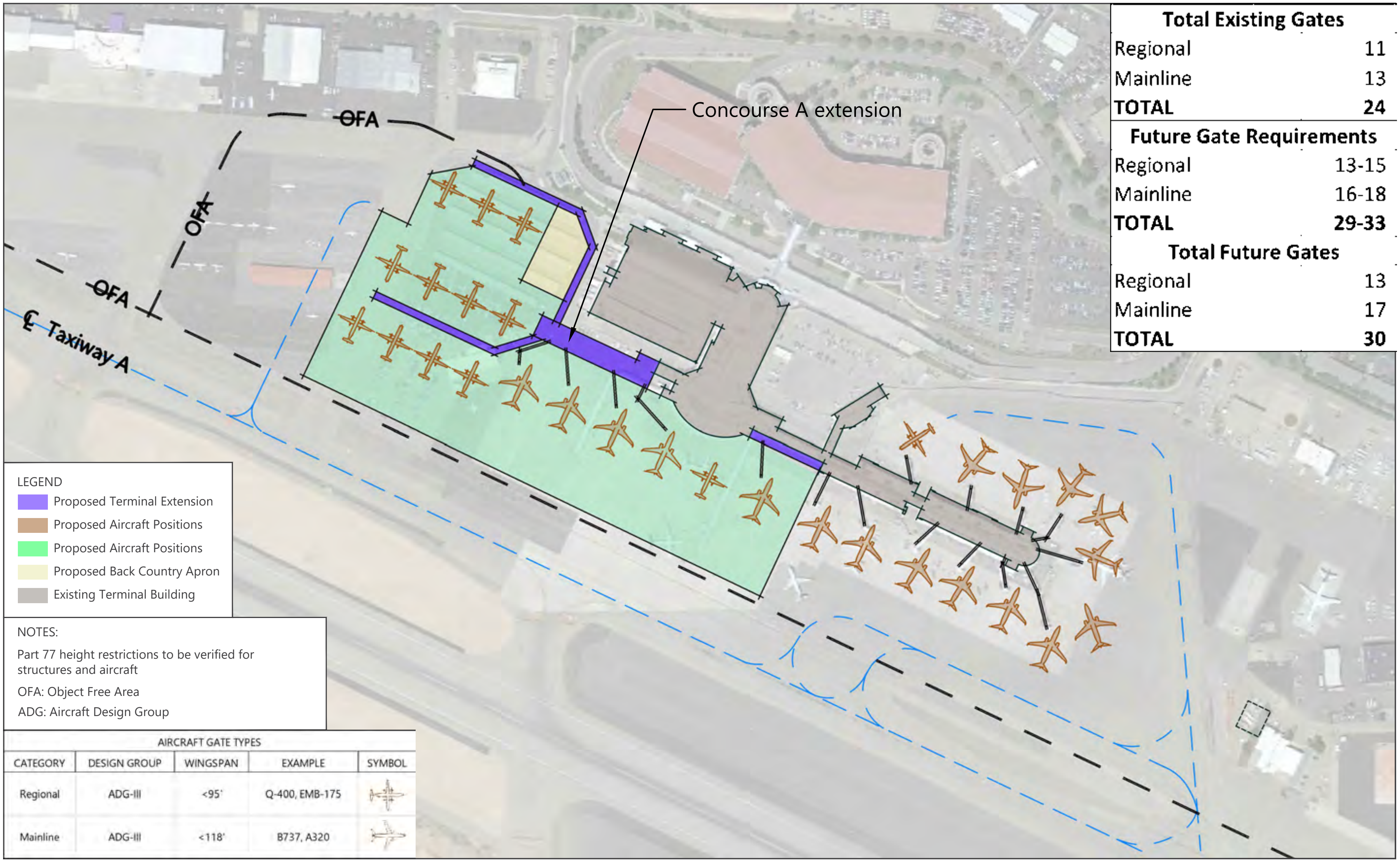

Total Existing Gates	
Regional	11
Mainline	13
TOTAL	**24**
Future Gate Requirements	
Regional	13-15
Mainline	16-18
TOTAL	**29-33**
Total Future Gates	
Regional	13
Mainline	17
TOTAL	**30**

LEGEND
- Proposed Terminal Extension
- Proposed Aircraft Positions
- Proposed Aircraft Positions
- Proposed Back Country Apron
- Existing Terminal Building

NOTES:

Part 77 height restrictions to be verified for structures and aircraft

OFA: Object Free Area

ADG: Aircraft Design Group

AIRCRAFT GATE TYPES

CATEGORY	DESIGN GROUP	WINGSPAN	EXAMPLE	SYMBOL
Regional	ADG-III	<95'	Q-400, EMB-175	
Mainline	ADG-III	<118'	B737, A320	

SOURCES: Quantum Spatial AGIS Data Collection Overflight, 2016; Ricondo & Associates, Inc., September 2017.

NORTH 0 400 ft.

EXHIBIT 5-22

TERMINAL CONCEPT 1

Drawing: P:\Project-Alexandria\BOI\03-Working\03-Drawings&Models\01-Terminal Alternatives\BOI Terminal Options-Segoe-20190918.dwgLayout: X-1 LTR Plotted: Nov 25, 2019, 10:48AM

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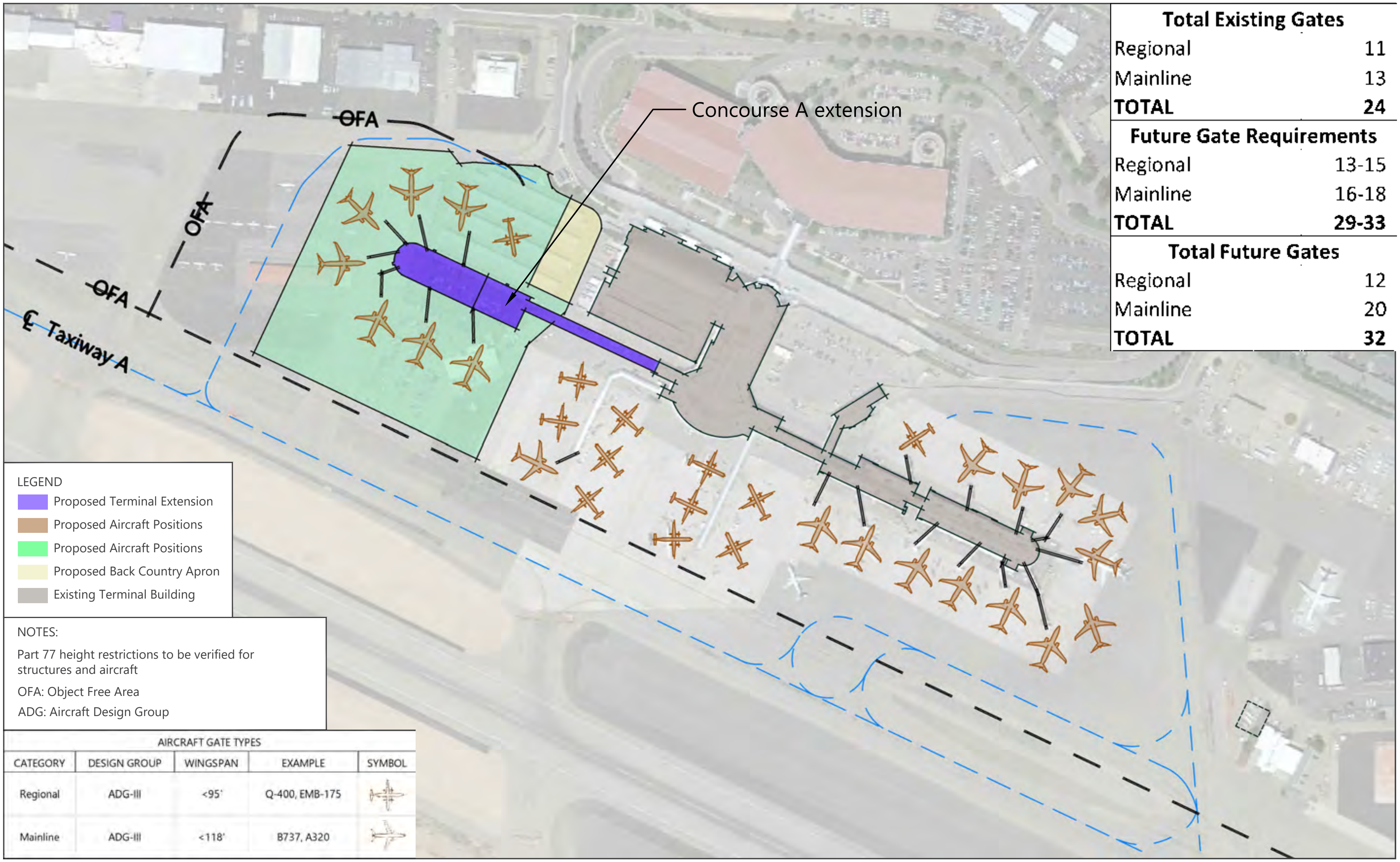

Total Existing Gates	
Regional	11
Mainline	13
TOTAL	**24**

Future Gate Requirements	
Regional	13-15
Mainline	16-18
TOTAL	**29-33**

Total Future Gates	
Regional	12
Mainline	20
TOTAL	**32**

LEGEND
- Proposed Terminal Extension
- Proposed Aircraft Positions
- Proposed Aircraft Positions
- Proposed Back Country Apron
- Existing Terminal Building

NOTES:

Part 77 height restrictions to be verified for structures and aircraft

OFA: Object Free Area

ADG: Aircraft Design Group

AIRCRAFT GATE TYPES

CATEGORY	DESIGN GROUP	WINGSPAN	EXAMPLE	SYMBOL
Regional	ADG-III	<95'	Q-400, EMB-175	
Mainline	ADG-III	<118'	B737, A320	

SOURCES: Quantum Spatial AGIS Data Collection Overflight, 2016; Ricondo & Associates, Inc., September 2017.

NORTH 0 400 ft.

EXHIBIT 5-23

TERMINAL CONCEPT 2

Drawing: P:\Project-Alexandria\BOI\03-Working\03-Drawings&Models\01-Terminal Alternatives\BOI Terminal Options-Segoe-20190918.dwgLayout: X-2 LTR Plotted: Nov 25, 2019, 10:48AM

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- **Terminal Concept 3 (Exhibit 5-24):** This concept features development of mainline gates along the front side of the terminal, including buildout/extension of Concourse A, with regional gates relocated from Concourse C to ground-load walkways on the west side of the terminal. New mainline gates are positioned on piers extending from Concourse A. Southward expansion of the piers is limited due to the Taxiway A TOFA, as well as Part 77 height restrictions. Aircraft access to the gates would be via taxilanes off Taxiway A.
- **Terminal Concept 4A (Exhibit 5-25):** This concept explores the potential for extending Concourse B to achieve additional gate capacity, so as to not impact facilities west of the existing terminal. Gates are positioned along Concourse B, as well as on piers extending the west end of Concourse C, the midpoint of Concourse B, and from an extension of Concourse B. Aircraft access to the gates would be via taxilanes off Taxiway A. In this concept, the backcountry operations area is not relocated from its existing location.
- **Terminal Concept 4B (Exhibit 5-26):** This concept is identical to Concept 4B, but it includes three additional regional gates via a ground-load walkway from the west end of Concourse C.
- **Terminal Concept 5 (Exhibit 5-27):** The purpose of this concept was to determine whether sufficient gate capacity can be achieved with minimal impact to facilities west of the terminal building. In this concept, Concourse A is developed to the west, with three additional mainline gates positioned on a pier extending from the west end of Concourse C. Regional gates are positioned at the west end of Concourse A and accessed via ground-load walkways.

In general, each concept features either an extension of the existing Concourse B or development/extension of Concourse A, which would involve concourse development to the west of the terminal building. In each concept, mainline aircraft gates were assumed to accommodate aircraft such as the Boeing 737 or Airbus A320, while regional aircraft gates were assumed to accommodate aircraft such as the Bombardier Q-400 or Embraer 175. Mainline gates were assumed to be accessed via loading bridges from the terminal/concourse, while regional aircraft were assumed to be accessed via ground loading with covered walkways connected to the main terminal or concourse. Those concepts involving relocation of the backcountry operations area depict the relocated backcountry area adjacent to the baggage claim area of the main terminal, which is where the backcountry ticket counters are located.

5.2.2 TERMINAL CONCEPTS EVALUATION

Discussions with and comments received from Airport staff, the TAC, FAA, TSA, and the public were key in the evaluation of each concept, the selection of a preferred concept, and the eventual refinement of the preferred concept. The following subsections describe the evaluation criteria and results used to compare the six terminal concepts. For all rankings, a lower rank is better.

5.2.2.1 MEETS FUTURE GATE REQUIREMENTS

Each terminal concept was evaluated on the basis of whether the concept provides the required number of mainline, regional, and total gates pursuant to the gate requirements analysis.

Table 5-1 summarizes the number of gates provided by each concept compared to the requirements established for 2035. Each concept was ranked based on the number of available mainline and regional gates. As shown, Concepts 1 and 4b are the only concepts that at least minimally meet both mainline and regional gate requirements. Concepts 2 and 3 provide the most mainline and total gates, while Concepts 4a and 5 do not meet the total gate requirement. For Concepts 2 and 3, which do not provide the minimum required regional gates, but do provide more than the recommended number of mainline gates, some mainline gates could theoretically be used to accommodate regional aircraft, if necessary.

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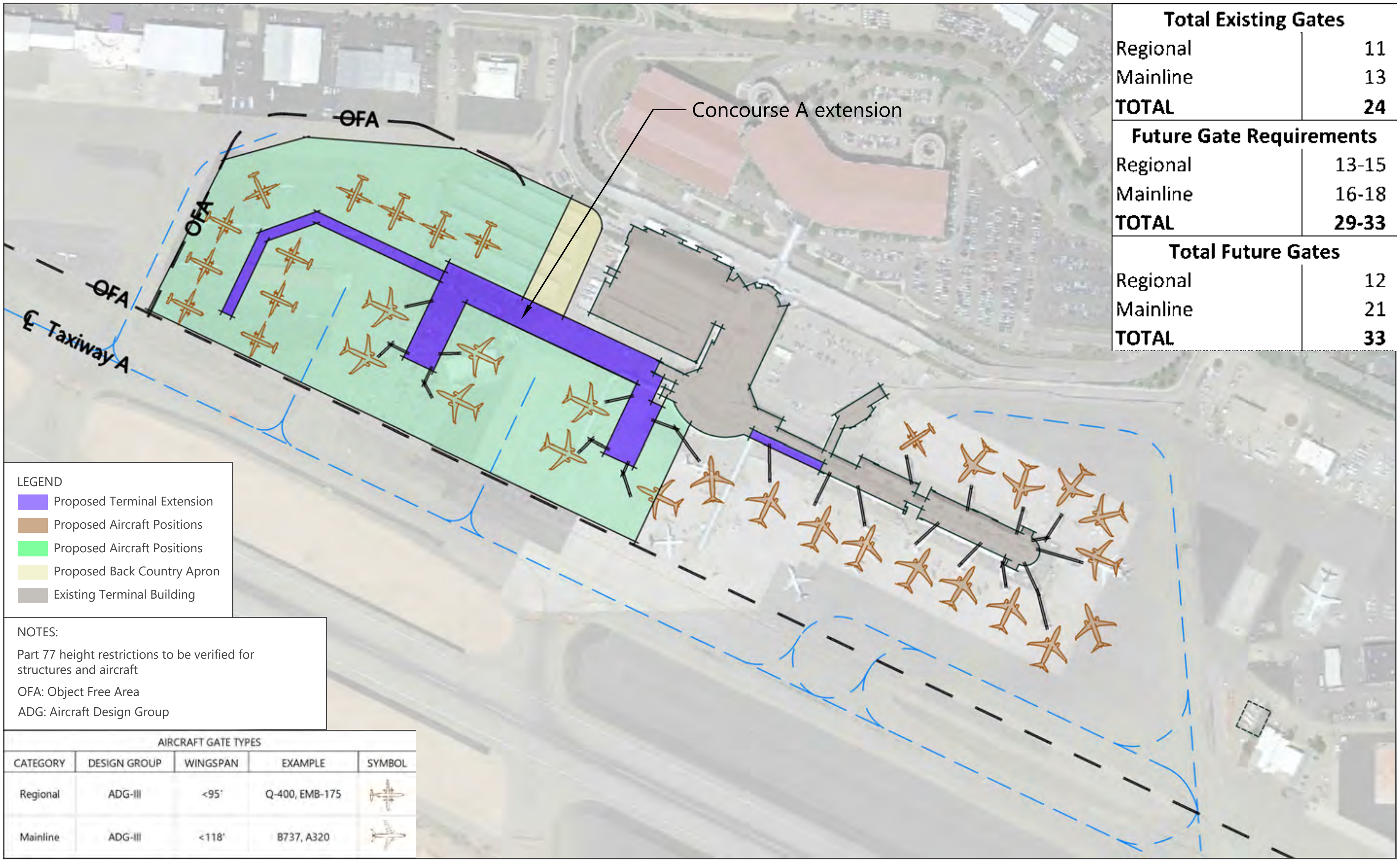

Total Existing Gates	
Regional	11
Mainline	13
TOTAL	**24**
Future Gate Requirements	
Regional	13-15
Mainline	16-18
TOTAL	**29-33**
Total Future Gates	
Regional	12
Mainline	21
TOTAL	**33**

LEGEND
- Proposed Terminal Extension
- Proposed Aircraft Positions
- Proposed Aircraft Positions
- Proposed Back Country Apron
- Existing Terminal Building

NOTES:

Part 77 height restrictions to be verified for structures and aircraft

OFA: Object Free Area

ADG: Aircraft Design Group

AIRCRAFT GATE TYPES

CATEGORY	DESIGN GROUP	WINGSPAN	EXAMPLE	SYMBOL
Regional	ADG-III	<95'	Q-400, EMB-175	
Mainline	ADG-III	<118'	B737, A320	

SOURCES: Quantum Spatial AGIS Data Collection Overflight, 2016; Ricondo & Associates, Inc., September 2017.

NORTH 0 400 ft.

EXHIBIT 5-24

TERMINAL CONCEPT 3

Drawing: P:\Project-Alexandria\BOI\03-Working\03-Drawings&Models\01-Terminal Alternatives\BOI Terminal Options-Segoe-20190918.dwgLayout: X-3 LTR Plotted: Nov 25, 2019, 10:49AM

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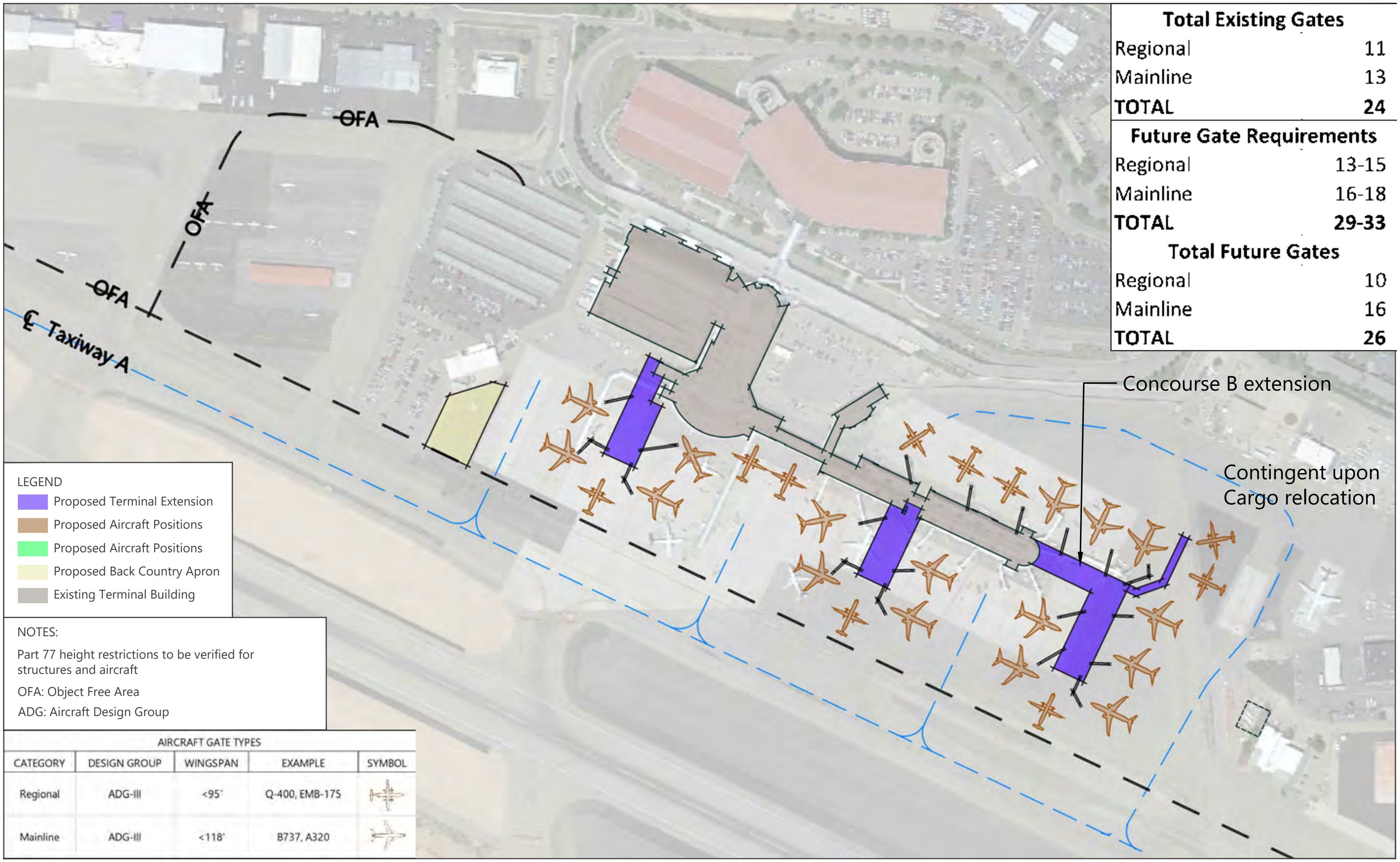

Total Existing Gates	
Regional	11
Mainline	13
TOTAL	**24**
Future Gate Requirements	
Regional	13-15
Mainline	16-18
TOTAL	**29-33**
Total Future Gates	
Regional	10
Mainline	16
TOTAL	**26**

NOTES:

Part 77 height restrictions to be verified for structures and aircraft

OFA: Object Free Area

ADG: Aircraft Design Group

AIRCRAFT GATE TYPES

CATEGORY	DESIGN GROUP	WINGSPAN	EXAMPLE	SYMBOL
Regional	ADG-III	<95'	Q-400, EMB-175	
Mainline	ADG-III	<118'	B737, A320	

SOURCES: Quantum Spatial AGIS Data Collection Overflight, 2016; Ricondo & Associates, Inc., September 2017.

NORTH 0 400 ft.

EXHIBIT 5-25

TERMINAL CONCEPT 4A

Drawing: P:\Project-Alexandria\BOI\03-Working\03-Drawings&Models\01-Terminal Alternatives\BOI Terminal Options-Segoe-20190918.dwgLayout: X-4A LTR Plotted: Nov 25, 2019, 10:49AM

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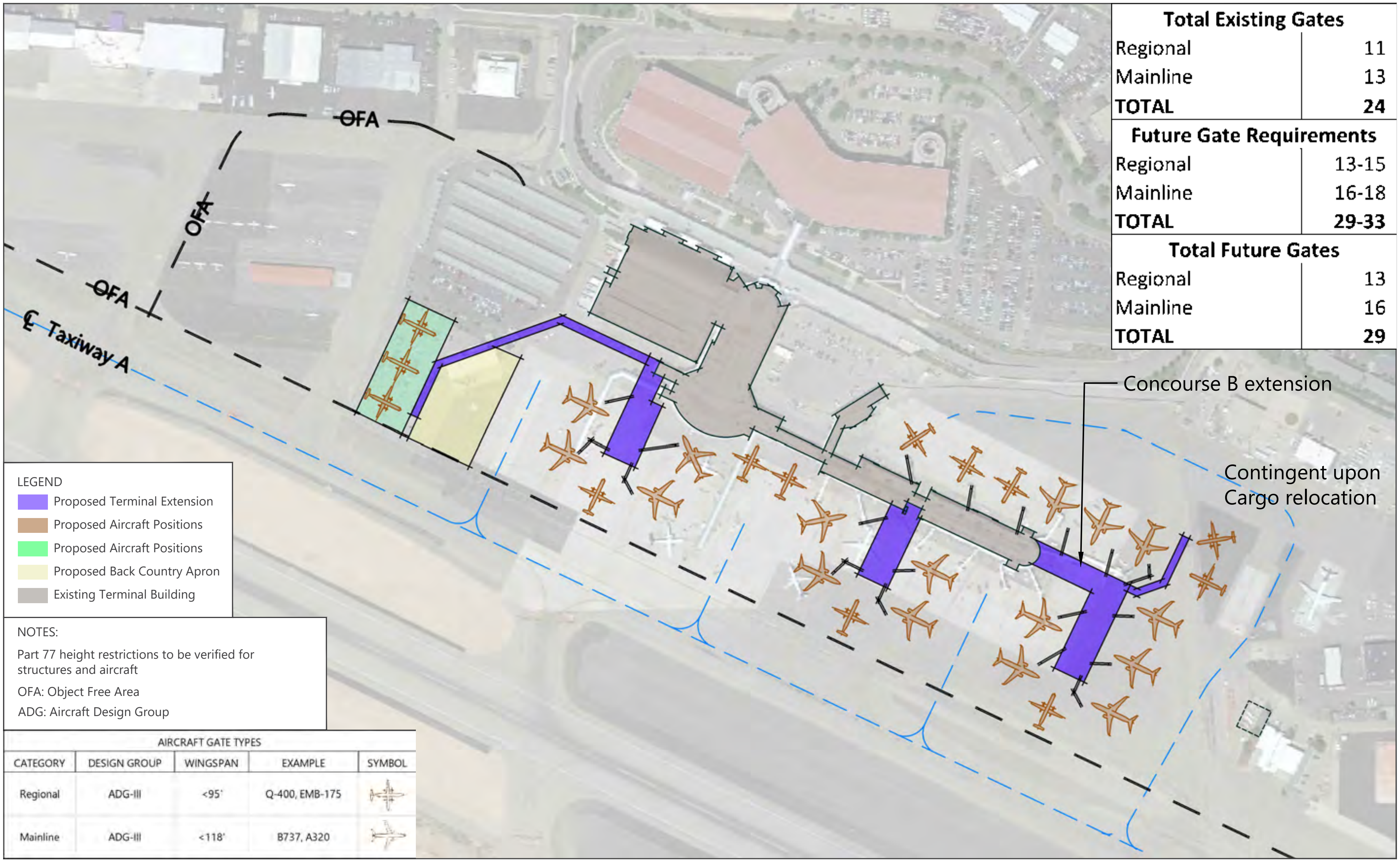

Total Existing Gates	
Regional	11
Mainline	13
TOTAL	**24**
Future Gate Requirements	
Regional	13-15
Mainline	16-18
TOTAL	**29-33**
Total Future Gates	
Regional	13
Mainline	16
TOTAL	**29**

LEGEND
- Proposed Terminal Extension
- Proposed Aircraft Positions
- Proposed Aircraft Positions
- Proposed Back Country Apron
- Existing Terminal Building

NOTES:

Part 77 height restrictions to be verified for structures and aircraft

OFA: Object Free Area

ADG: Aircraft Design Group

AIRCRAFT GATE TYPES

CATEGORY	DESIGN GROUP	WINGSPAN	EXAMPLE	SYMBOL
Regional	ADG-III	<95'	Q-400, EMB-175	
Mainline	ADG-III	<118'	B737, A320	

SOURCES: Quantum Spatial AGIS Data Collection Overflight, 2016; Ricondo & Associates, Inc., September 2017.

NORTH 0 400 ft.

EXHIBIT 5-26

TERMINAL CONCEPT 4B

Drawing: P:\Project-Alexandria\BOI\03-Working\03-Drawings&Models\01-Terminal Alternatives\BOI Terminal Options-Segoe-20190918.dwgLayout: X-4B LTR Plotted: Nov 25, 2019, 10:49AM

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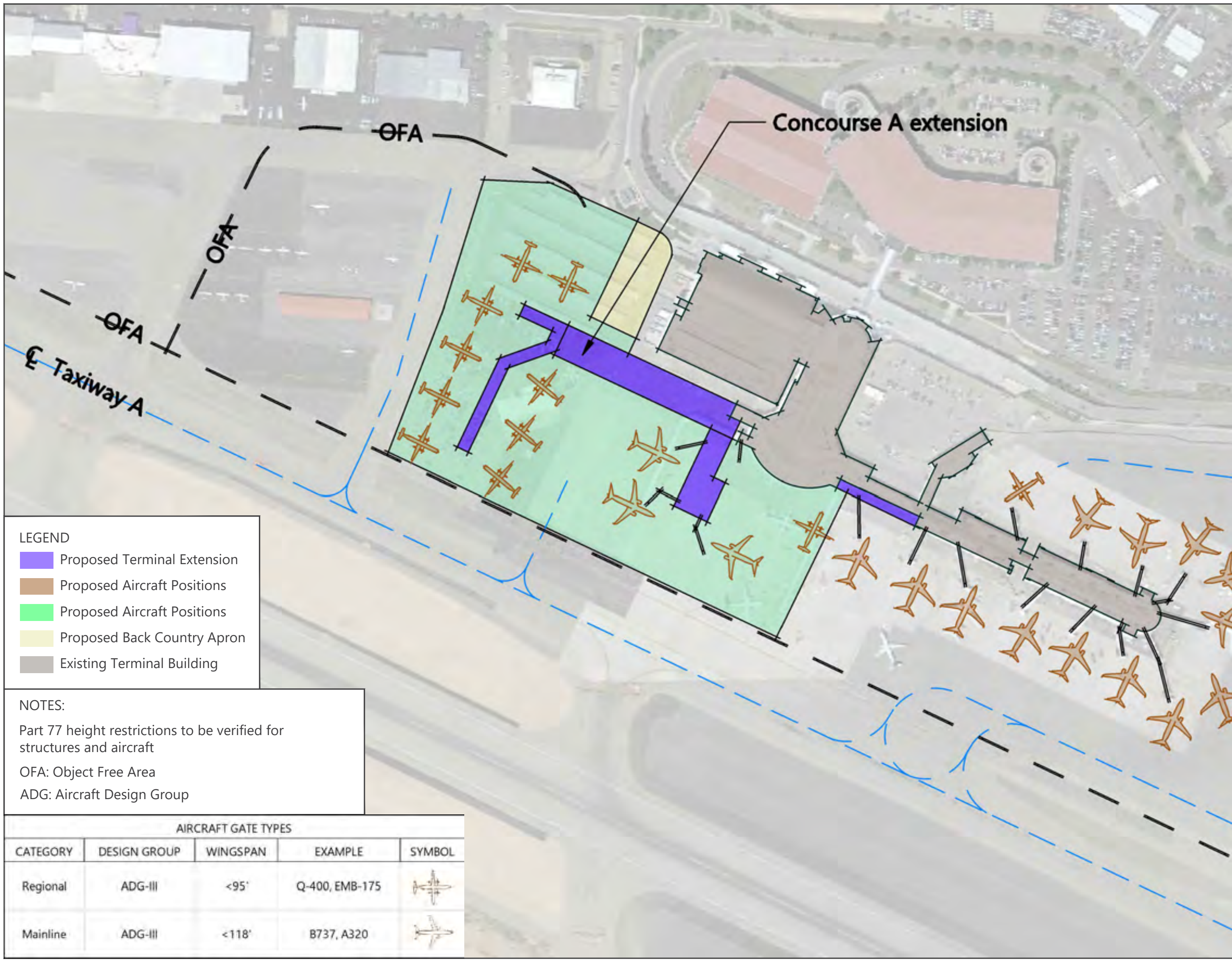

Total Existing Gates	
Regional	11
Mainline	13
TOTAL	**24**
Future Gate Requirements	
Regional	13-15
Mainline	16-18
TOTAL	**29-33**
Total Future Gates	
Regional	11
Mainline	16
TOTAL	**27**

LEGEND
- Proposed Terminal Extension
- Proposed Aircraft Positions
- Proposed Aircraft Positions
- Proposed Back Country Apron
- Existing Terminal Building

NOTES:

Part 77 height restrictions to be verified for structures and aircraft

OFA: Object Free Area

ADG: Aircraft Design Group

AIRCRAFT GATE TYPES

CATEGORY	DESIGN GROUP	WINGSPAN	EXAMPLE	SYMBOL
Regional	ADG-III	<95'	Q-400, EMB-175	
Mainline	ADG-III	<118'	B737, A320	

SOURCES: Quantum Spatial AGIS Data Collection Overflight, 2016; Ricondo & Associates, Inc., September 2017.

NORTH 0 400 ft.

EXHIBIT 5-27

TERMINAL CONCEPT 5

Drawing: P:\Project-Alexandria\BOI\03-Working\03-Drawings&Models\01-Terminal Alternatives\BOI Terminal Options-Segoe-20190918.dwgLayout: X-5 LTR Plotted: Nov 25, 2019, 10:49AM

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TABLE 5-1 TERMINAL CONCEPT GATE COUNTS

CONCEPT	NUMBER OF GATES			RANK (LOWER IS BETTER)
	MAINLINE	REGIONAL	TOTAL	
1	**17**	**13**	**30**	**1**
2	20	12	32	4
3	21	12	33	3
4A	16	10	26	6
4B	16	13	29	2
5	16	11	27	5
Requirement (2035)	16–18	13–15	29–33	

NOTE: Red font indicates the number of gates does not meet the requirement.
SOURCE: Ricondo & Associates, Inc., April 2018.

5.2.2.2 RELATIVE CONSTRUCTION COST

The relative construction cost of each concept was estimated for comparison to each concept. Approximate square footage of additional space associated with each concept was used as a proxy for construction cost. Square footage was estimated separately for concourse space versus ground-load walkway space, since enclosed concourse space would be more expensive to construct per square foot. **Table 5-2** summarizes the relative construction cost evaluation. Using this methodology, Concept 1 would be estimated to cost less to construct than the other concepts, followed by Concepts 2 and 5.

TABLE 5-2 RELATIVE CONSTRUCTION COST (ADDITIONAL SPACE)

CONCEPT	ADDITIONAL SPACE (SQUARE FEET)			RANK (LOWER IS BETTER
	CONCOURSE	WALKWAY	TOTAL	
1	**27,200**	**22,600**	**49,800**	**1**
2	48,100	0	48,100	2
3	95,700	23,100	118,800	6
4A	80,600	4,900	85,500	5
4B	80,600	0	80,600	4
5	59,200	15,400	74,600	3

SOURCE: Ricondo & Associates, Inc., April 2018.

5.2.2.3 COST-EFFICIENT GATE DEVELOPMENT

A measure of cost effectiveness was quantified through a calculation of new constructed space per total number of gates associated with each concept. **Table 5-3** presents the results of the analysis. This evaluation rewards concepts that provide the most gates with the least amount of construction needed to construct the gates. Concept 2 was ranked best in this regard, primarily because all new construction is directly associated with new gate capacity. Other concepts include construction/modification of existing gate areas to reconfigure the terminal for alternative gate layouts, which is less cost-efficient. From a relative standpoint, Concept 2 is even more cost-efficient because almost all the new gate capacity is from mainline gates.

TABLE 5-3 SPACE PER GATE

CONCEPT	ADDITIONAL SPACE (SQUARE FEET)	GATES	SPACE/GATE (SQUARE FEET)	RANK (LOWER IS BETTER)
1	49,800	30	1,660	2
2	**48,100**	**32**	**1,500**	**1**
3	118,800	33	3,600	6
4A	85,500	26	3,290	5
4B	80,600	29	2,780	4
5	74,600	27	2,760	3

SOURCE: Ricondo & Associates, Inc., April 2018.

5.2.2.4 CUSTOMER EXPERIENCE (WALKING DISTANCE)

Numerous factors influence the customer experience or LOS within a terminal building. For purposes of evaluating the terminal concepts, average walking distance to a gate was identified as a reasonable proxy of customer experience. In the case of BOI, the food court is located immediately adjacent to the secure side of the TSA checkpoint. Shorter walking distances between this central concession area and the aircraft gates could result in increased time spent at concessions by passengers before they go to their gate. Shorter walking distances also increase the likelihood that a passenger may return to the concession area after first locating the departure gate.

For each concept, an approximate distance was measured from a point just beyond the TSA security checkpoint on the post-security side of the terminal to each existing and conceptual gate location. Individual distance measurements to each gate were then averaged, with each concept ranked based on the shortest average walking distance being the most desirable.

Table 5-4 presents the results of the walking distance evaluation. Concept 2 has the shortest average walking distance to a gate. In this concept, the Concourse C regional gates located directly below the security checkpoint are not relocated, resulting in Concept 2 having the shortest average walking distance to a regional gate. Concept 1, ranked third overall, has the shortest average walking distance to a mainline gate, which exhibits an enhanced LOS for mainline carriers that operate larger aircraft. Similarly, Concept 3 has a relatively modest average walking distance to a mainline gate; however, at over 1,000 feet, the average walking distance to a regional gate is greater than what is typically considered acceptable/appropriate, particularly without the aid of a moving sidewalk. In all concepts that involve development/extension of Concourse A, it is assumed that a moving sidewalk could be installed somewhere within Concourse A to mitigate longer walking distances.

TABLE 5-4 WALKING DISTANCES TO GATES

CONCEPT	AVERAGE WALKING DISTANCE (FEET) MAINLINE	REGIONAL	ALL GATES	RANK (LOWER IS BETTER
1	664	836	736	3
2	**800**	**428**	**660**	**1**
3	710	1,200	890	4
4A	960	830	910	6
4B	960	840	905	5
5	680	770	720	2

NOTES:
For Concepts 1, 2, 3, and 5, a moving sidewalk could be installed in Concourse A.
Walking distances were estimated from conceptual drawings and measured from a point just beyond the security screening checkpoint, adjacent to the food court above Concourse C, to each existing and conceptual gate location, then they were averaged.
SOURCE: Ricondo & Associates, Inc., April 2018.

5.2.2.5 OPERATIONAL DISRUPTION DURING CONSTRUCTION

A qualitative evaluation was made of each concept to assess the level of disruption expected to operations during construction/implementation of the concept. Concepts that involve significant reconfiguration of existing gate areas or expansion immediately adjacent to existing gate areas would have resulted in a higher level of disruption to aircraft operations and in-terminal operations during construction.

Implementation of Concept 2 would have the least impact on aircraft operations and passenger flow during construction. This concept does not require reconfiguration of Concourses B and C, so operations at these existing concourses could be maintained during construction of Concourse A. The passenger experience would remain unchanged during construction.

Concepts 1, 3, and 5 would have some impact to operations during construction. In particular, these concepts involve relocating most of the regional gates currently at Concourse C to a new centralized regional gate area on the west side of the terminal. The level of operational impact to these operations and the resulting passenger inconvenience would depend on the ability to construct and operate the new regional gates prior to relocating operations from Concourse C. In each of these concepts, operations at Concourse B would not be significantly impacted.

Concepts 4A and 4B would most significantly impact operations during construction. Construction of the piers off Concourses B and C would remove several existing gate positions from operation during construction. Use of airfield buses to transport passengers between the terminal and remote aircraft parking positions would likely be necessary during construction.

5.2.2.6 IMPACT TO ADJACENT FACILITIES

The existing terminal and concourses are surrounded by various facilities, including employee parking, rental car parking, and GA hangars and apron areas to the west, as well as cargo facilities to the east. Implementation of any of the terminal concepts would result in various impacts to these facilities. **Table 5-5** ranks each concept in terms of impact to adjacent facilities.

TABLE 5-5 IMPACT TO ADJACENT FACILITIES

CONCEPT	IMPACT RANK (LOWER IS BETTER)					OVERALL RANK (LOWER IS BETTER
	EMPLOYEE PARKING	RENTAL CAR PARKING	CARGO	GENERAL AVIATION	TOTAL IMPACT	
1	2	2	1	2	7	3
2	2	2	1	3	8	4
3	2	2	1	4	9	5
4A	**1**	**1**	**2**	**1**	**5**	**1**
4B	2	1	2	1	6	2
5	2	2	1	1	6	2

NOTE:
An impact rank of 1 indicates little or no impact to an adjacent facility. An impact rank of 2 indicates an operational impact or required facility removal/relocation. Higher impact ranks for general aviation facilities indicate the level of impact to adjacent apron areas and an adjacent shade hangar.
SOURCE: Ricondo & Associates, Inc., April 2018.

Concept 4A achieves the best rank in this analysis by virtue of no westward facility expansion, meaning existing GA facilities, employee parking, and rental car parking facilities do not need to be removed/relocated. This concept does involve expansion of Concourse B to the east, which would require removal of one aircraft position on the adjacent north cargo area. Increased aircraft operations due to the concentration of gates along extended Concourse B and the associated pier would likely result in increased congestion on the taxilane between the air carrier gates and the north cargo area. Concept 4B achieves a similarly high overall rank; although, the addition of three regional gates to the west of the terminal would require relocation of adjacent employee parking.

All other concepts that involve the development/expansion of Concourse A would require removal/relocation of the adjacent rental car ready/return lot and employee parking lot. In addition, each of these concepts would require removal of the old fire station/maintenance building adjacent to the Concourse C apron. The Concept 5 impacts would be limited to these areas.

Concepts 1, 2, and 3 would result in additional impacts to adjacent GA facilities, including an existing shade hangar and/or the tie-down apron. Of these concepts, Concept 1 would result in the least impact to GA facilities, with minimal encroachment on the GA apron, and it would result in the potential for the shade hangar to remain in place, depending on the configuration of taxilane access to the west regional gates. Concept 2 would require removal of the shade hangar and a significant portion of the GA apron. Concept 3 would also require removal of the shade hangar, along with removal of the entire eastern portion of the north GA apron.

5.2.2.7 EASE OF CONSTRUCTION/PHASING

A qualitative assessment was made to evaluate the ability of each concept to be constructed in phases. Phased construction of future terminal development at the Airport is important for several reasons. Phasing allows for new gates/space to be constructed as they are needed, which prevents overbuilding and may delay impacts to certain adjacent areas. Phasing is also important and likely necessary for several concepts to maintain the operational capability of the terminal during construction.

Concept 2 was determined to be the easiest concept to construct from the standpoint of phasing. Since this concept only involves development/extension of Concourse A, which is independent of existing operations, the concourse could be built over time as additional gates are needed, without significantly impacting existing operations.

Concepts 1, 3, and 5 were ranked equally after Concept 2. Each of these concepts involves the extension of Concourse A, with regional gates relocated to the west end of the development. For these concepts, it could be possible to build out a portion of Concourse A to add some mainline gate capacity without impacting Concourse C/regional aircraft operations. However, as more mainline gates are needed, regional gates would need to be relocated. The regional gate positions would need to be constructed on the west end of the development prior to relocating operations from Concourse C. Overall, the construction/phasing of these concepts would be possible, but it would be more complicated than Concept 2.

Concepts 4A and 4B were determined to be the most difficult to construct/phase. The extension of Concourse B and the construction of the piers would significantly constrain existing gate capacity during construction by removing gates from service while replacement/new gates are constructed. Since the concepts involve disruption of the existing terminal operations area and do not involve expansion to the west, there are limited opportunities to relocate gates to other areas of the terminal during construction.

5.2.2.8 MAINTAINS GROUPING OF SIMILAR AIRCRAFT

Grouping of similar size/type of aircraft is beneficial from an aircraft operational standpoint, as well as beneficial for efficient passenger flow and holdroom sizing within the terminal. At the existing terminal, most regional aircraft are concentrated at Concourse C, while mainline aircraft generally operate at gates on Concourse B.

Concepts 1 and 5 rank best for the grouping of similar aircraft. In Concept 1, new mainline gates are constructed along the front of Concourses A and C, while a pier configuration is used for new mainline gates in Concept 5. In both concepts, regional gates are generally concentrated on ground-load walkways at the west end of the terminal. Concepts 2 and 3 also mostly maintain separation of aircraft types; however, some mixing of regional aircraft with mainline aircraft could occur on the back side of Concourse A.

Concepts 4A and 4B feature a significant amount of mixing of aircraft types. In these concepts, the only way to maintain the existing gate count or add new gates is to position mainline gates along the new piers and Concourse B extension, while positioning regional gates wherever they can fit.

5.2.2.9 OPERATIONAL FLOW

The flow of aircraft within and around the terminal area is an important consideration for terminal development. Concepts that increase opportunities for bottlenecks and aircraft collisions are less desirable.

Concept 1 was determined to achieve the most satisfactory operational flow among the alternative concepts. Access to north-facing mainline and regional gates along the front of the terminal would be straightforward via access from Taxiway A. Access to regional gates along the west end of the terminal would require a taxilane between two rows of aircraft, which is not ideal, but this does reflect existing operations at Concourse C and is efficient from the standpoint of regional aircraft.

In Concept 2, aircraft gates along the front of Concourse A would be accessed by Taxiway A, while a taxilane would provide access to gates along the end and back side of the concourse, similar to the flow of aircraft around the existing terminal/concourse configuration. Aircraft flow would be straightforward; however, aircraft operations along the back side of Concourse A could create a bottleneck, and they would be in close proximity to existing facilities. These issues are similar to those faced by aircraft currently operating along the back side of Concourse B.

The pier configuration in Concepts 3 and 5 are less ideal from an aircraft operational standpoint, particularly when aircraft must taxi between two rows of aircraft. In both of these concepts, mainline and regional aircraft would have to share a taxiway to access gates at the pier locations. However, the general separation of regional gates from mainline gates in these concepts is desirable, although regional aircraft operations along the back side of Concourse A could face similar issues to those described for Concept 2.

Concepts 4A and 4B would present the most challenging aircraft flow among the alternative concepts. These concepts involve the taxiing and pushback of aircraft between piers, similar to Concepts 3 and 5. In addition, the high concentration of aircraft on the east side of the Concourse B extension, combined with aircraft along the back side of Concourse B, could result in significant bottlenecks, as this area is constrained by the north cargo area with only one taxilane providing access.

5.2.2.10 AIRCRAFT SIZE FLEXIBILITY

As described previously, mainline gates in each concept were assumed to accommodate aircraft such as the Boeing 737 or Airbus A320, while regional aircraft gates were assumed to accommodate aircraft such as the Bombardier Q-400 or Embraer 175. While these aircraft are representative of the types of air carrier aircraft projected to operate at the Airport through the planning period, it was considered prudent for future terminal development to accommodate occasional larger aircraft.

Gate 22A at the end of Concourse B can accommodate up to a Boeing 767-300 (ADG IV) if adjacent gates are clear. Concept 2 would provide similar capability on the west end of Concourse A. Concepts 3 and 5 could potentially accommodate an ADG IV aircraft at one of the piers, although Part 77 height restrictions, along with separation from aircraft parking positions behind and to the side of the ADG IV position, could limit this potential. The accommodation of ADG IV aircraft at piers in Concepts 4A and 4B would meet the same challenges as those described previously for Concepts 3 and 5. However, due to the extension of Concourse B in Concepts 4A and 4B, the existing ADG IV position at Gate 22A would be removed. Concept 1 positions all new mainline gates in a linear configuration along the front of the terminal. Due to Part 77 height restrictions, this configuration would not be able to accommodate an ADG IV aircraft gate position, making this concept the least able to meet the aircraft size flexibility criteria.

5.2.2.11 INTERIOR TERMINAL SPACE CONSIDERATIONS

The facility requirements analysis identified the need for additional space for various elements within the terminal building. From a practical standpoint, it was assumed that between the existing terminal building and the new space associated with each concept, adequate space allowances would be incorporated into the design of each concept. Specific considerations with regard to meeting space requirements include the following:

- Modification to the existing baggage makeup piers and the addition of one baggage makeup pier has already been planned.
- There is capacity to add one or more lanes to the TSA security screening checkpoint by narrowing the corridor through which passengers pass from the post-security side to the pre-security side of the terminal.
- Each concept implicitly maintains the ability to expand the main terminal facility to the east on land currently occupied by a loading dock and employee Lot E-1. This area was previously identified for future terminal expansion in the 2010 Master Plan Update.
- Concept 2 maintains Concourse C as the primary facility for regional aircraft operations. Concourse C currently features a large holdroom that is well-suited and sized for the regional aircraft utilizing the ground-load walkways/gates. All other concepts involve relocation of regional gates, requiring adequate regional gate

holdroom space to be integrated into other terminal areas, such as Concourse A. This consideration enhances Concept 2 from the standpoint of ease of construction and passenger flow within the terminal.

- In concepts where Concourse C is no longer used for regional aircraft operations, this space may be utilized for other functions. One potential use for this space could be the integration of CBP activities within the terminal if international air carrier service were to materialize in the future.

5.2.3 PREFERRED TERMINAL CONCEPT

Through evaluation of each terminal concept, in conjunction with discussions with Airport staff, stakeholders, and the public, Concept 2 was identified as the preferred terminal concept. **Table 5-6** summarizes the terminal concept evaluation, showing Concept 2 as the highest ranked concept.

TABLE 5-6 TERMINAL CONCEPT EVALUATION AND RANKING

	TERMINAL CONCEPT RANKING (LOWER IS BETTER)					
EVALUATION CRITERIA	1	2	3	4A	4B	5
Meets future gate requirements	1	4	3	6	2	5
Relative construction cost	1	2	6	5	4	3
Cost-efficient gate development	2	1	6	5	4	3
Custom experience (walking distance)	3	1	4	6	5	2
Operational disruption during construction	3	1	2	4	4	2
Impact to other facilities	3	4	5	1	2	2
Ease of construction/phasing	2	1	2	3	3	2
Maintain aircraft groupings	1	2	2	3	3	1
Operational flow	1	2	3	4	4	3
Aircraft size flexibility	5	1	3	4	4	2
Total Rank (lower is better)	**22**	**19**	**36**	**41**	**35**	**25**

SOURCE: Ricondo & Associates, Inc., April 2018.

5.3 LANDSIDE DEVELOPMENT CONCEPTS

Landside development concepts were identified to meet requirements for public parking, employee parking, and rental car facilities. **Table 5-7** summarizes the landside facility requirements.

TABLE 5-7 LANDSIDE FACILITY REQUIREMENTS

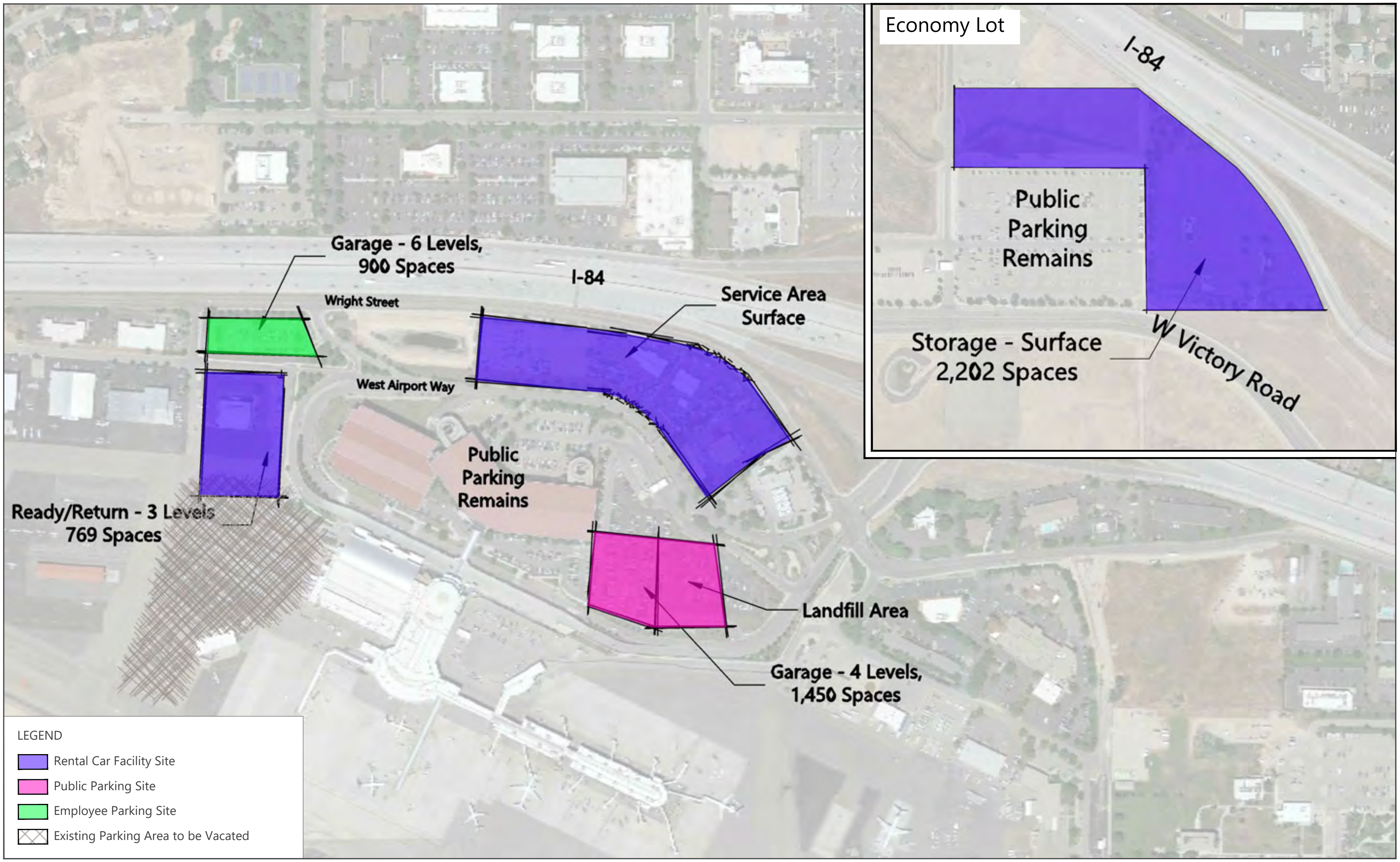
LANDSIDE ELEMENT	EXISTING	2025 REQUIREMENT	2035 REQUIREMENT
Rental Car Requirements			
Customer Service (square feet)	12,000	10,300	16,200
Ready/Return (spaces)	501	643	769
Storage (spaces)	1,275	1,841	2,202
Quick Turnaround (square feet)	189,159	190,000	227,300
Total (square feet)	735,959	940,800	1,129,500
Public Parking Requirements (spaces)			
Short-Term Surface	274	220	260
Garage	2,077	2,610	3,110
Long-Term Surface	584	730	860
Economy	1,313	N/A	N/A
Total Public Parking Spaces	4,248	3,560	4,230
Employee Parking Requirements (spaces)			
Employee Parking	681	930	1,095

NOTE: Additional spaces are available at the Economy Lot.
SOURCE: Ricondo & Associates, Inc., April 2017.

5.3.1 INITIAL DEVELOPMENT CONCEPTS

An underlying consideration when identifying landside concepts was the selection of Terminal Concept 2 as the preferred terminal development concept. Terminal Concept 2 involves the development and extension of Concourse A to the west, requiring the relocation of employee parking Lot 20 and the existing rental car ready/return lot. As such, each landside concept assumes removing/vacating employee Lot 20 and the rental car ready/return lot. Impact to these facilities requires the landside concepts to consider replacement of these removed parking areas, as well as additional areas/spaces needed to accommodate future growth. Each concept identifies locations for public parking, employee parking, and rental car facilities. Location considerations for parking and rental car facilities included on-site locations close to the terminal and off-site locations further away from the terminal. Other considerations included the need for a shuttle, as well as separate versus consolidated parking/rental car facilities. These initial concepts were not intended to be exclusive; rather, they evaluate the feasibility of placing various elements in various locations. Eight landside concepts were initially developed:

- **Landside Concept 1 (Exhibit 5-28):** Public parking requirements would be accommodated in a multilevel garage adjacent to the existing central parking garage. In this case, the garage would accommodate requirements for both future garage spaces and long-term surface lot spaces. Employee parking requirements would be accommodated in a multilevel garage at the site of the existing Boise Cascade Lot along Wright Street and Owyhee Street. The existing rental car ready/return lot would be replaced with a multilevel garage adjacent to the existing ready/return lot on the site currently occupied by the ITD Division of Aeronautics hangar. The existing rental car QTA area located along Wright Street would remain and be expanded, as necessary. Rental car storage would be located off-site at the Economy Lot.



SOURCES: Google Earth, 2017 (aerial basemap); Ricondo & Associates, Inc., October 2017 (facility locations).

EXHIBIT 5-28

Landside Concept 1

Drawing: P:\Project-Alexandria\BOI\03-Working\03-Drawings&Models\Rental Car & Parking\BOI Rental Car & Parking(Sid off)v21.dwgLayout: LC1 Plotted: Nov 25, 2019, 07:55AM

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- **Landside Concept 2 (Exhibit 5-29):** A multilevel public parking garage would be constructed adjacent to the existing central parking garage. Employee Lot 30 would be converted to long-term public surface parking. Employee parking would be accommodated in a multilevel garage at the site of the existing Boise Cascade Lot. The existing rental car QTA and storage area along Wright Street would be converted to a multilevel garage. A portion of the garage would be dedicated to ready/return spaces, while another portion of the garage would be used for QTA and storage. A shuttle or bridge over West Airport Way would be required to facilitate passenger access to the ready/return garage.
- **Landside Concept 3 (Exhibit 5-30):** The existing rental car QTA and storage area along Wright Street would be converted to long-term public surface parking. A shuttle or bridge over West Airport Way would be required to facilitate passenger access between the parking lot and the terminal building. Employee Lot 30 would be converted to long-term public surface parking. Employee parking would be accommodated in a multilevel garage at the site of the existing Boise Cascade Lot. Rental car ready/return and QTA facilities would be located in garage structures constructed at an off-site parcel located east of the terminal area. This parcel is not currently owned by the City. The ready/return garage would be a consolidated garage that would also accommodate public garage parking. A shuttle would be required to transport passengers between the ready/return and public parking garage and the terminal building. Rental car storage would be located off-site at the Economy Lot.
- **Landside Concept 4 (Exhibit 5-31):** This concept is similar to Concept 3, except that the off-site garage would be dedicated to rental car ready/return, QTA, and storage. In this configuration, the facility would be considered a consolidated rental car (ConRAC) facility. Additional public garage parking requirements would be accommodated in a multilevel garage adjacent to the existing central garage, similar to Concept 2.
- **Landside Concept 5 (Exhibit 5-32):** This concept is similar to Concept 4, except that the off-site ConRAC facility would be located on land adjacent to the off-site Economy Lot along West Victory Road. A shuttle would be required to transport passengers between the ConRAC and the terminal building.
- **Landside Concept 6 (Exhibit 5-33):** This concept is similar to Concept 1, except that the rental car ready/return garage would be constructed at the location currently used as employee Lot E-1. Construction of a garage on this site would require the demolition of a portion of Concourse B used for Airport storage and the relocation of a loading dock delivery area. An area on the west side of the terminal building could be suitable for relocation of this facility.
- **Landside Concept 7 (Exhibit 5-34):** In this concept, a portion of the existing rental car QTA and storage area along Wright Street would be used for long-term public surface parking, while another portion would be developed into a multilevel garage to accommodate rental car QTA and storage. A shuttle or bridge over West Airport Way would be required to facilitate passenger access to the surface lot. Additional public parking would be accommodated in a multilevel garage expansion adjacent to the central garage, while an adjacent garage would be constructed for rental car ready/return. Employee parking would be accommodated in a multilevel garage at the site of the existing Boise Cascade Lot.
- **Landside Concept 8 (Exhibit 5-35):** This concept is similar to Concept 7, except that a single consolidated ready/return and public parking garage would be constructed in place of separate facilities. This configuration allows flexibility in meeting demand for both rental cars and public parking.

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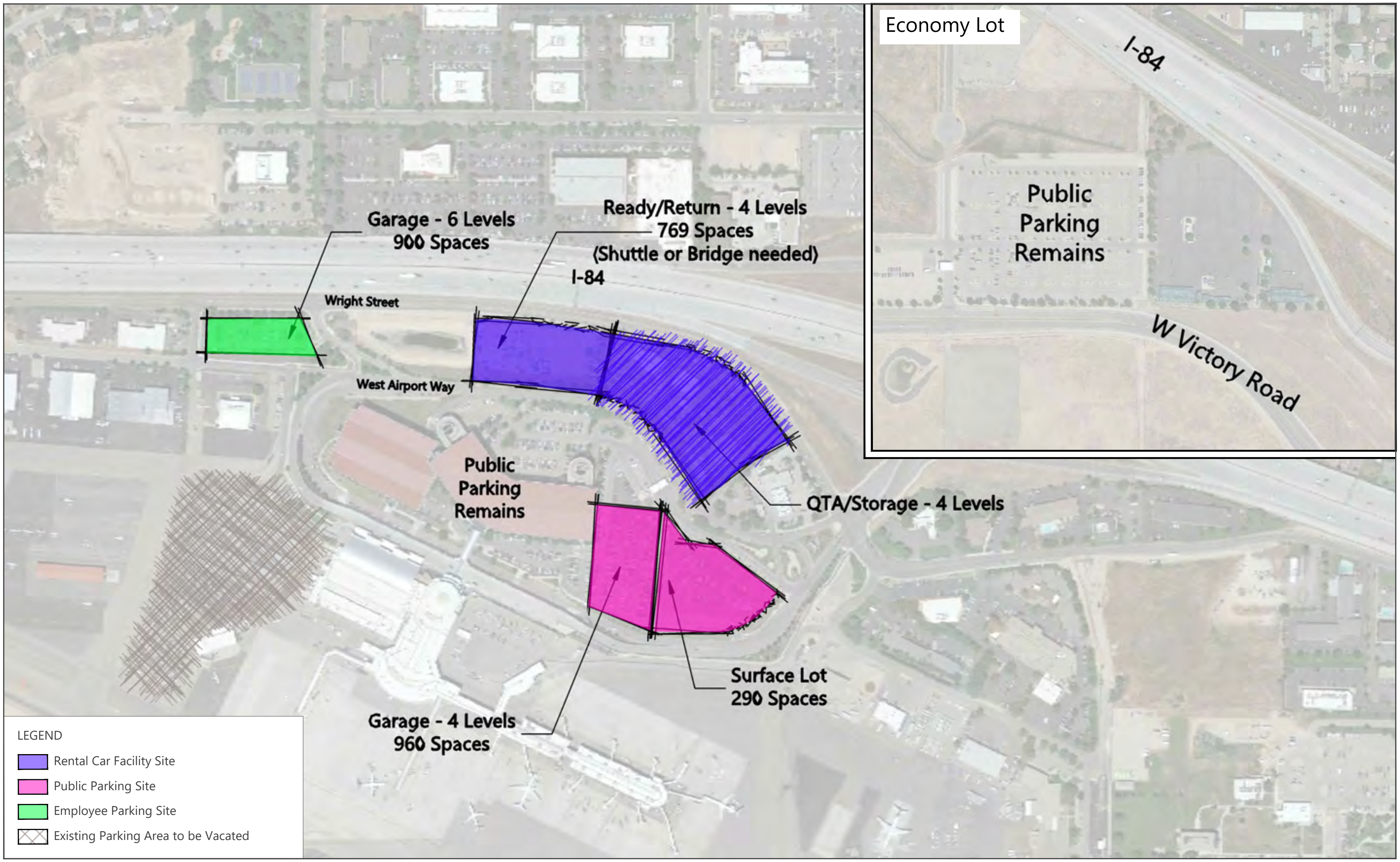

SOURCES: Google Earth, 2017 (aerial basemap); Ricondo & Associates, Inc., October 2017 (facility locations).

EXHIBIT 5-29

Landside Concept 2

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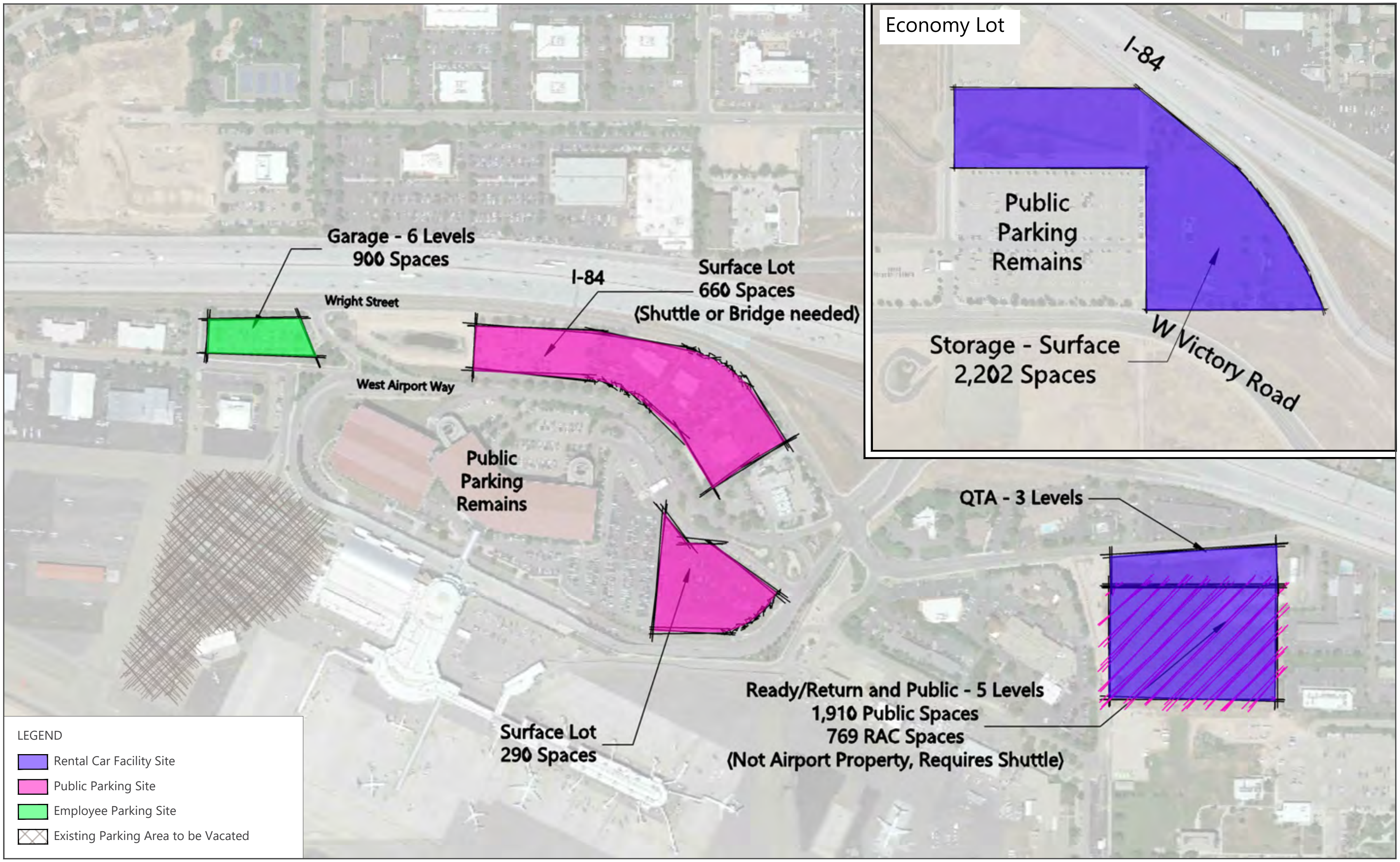

SOURCES: Google Earth, 2017 (aerial basemap); Ricondo & Associates, Inc., October 2017 (facility locations).

EXHIBIT 5-30

Landside Concept 3

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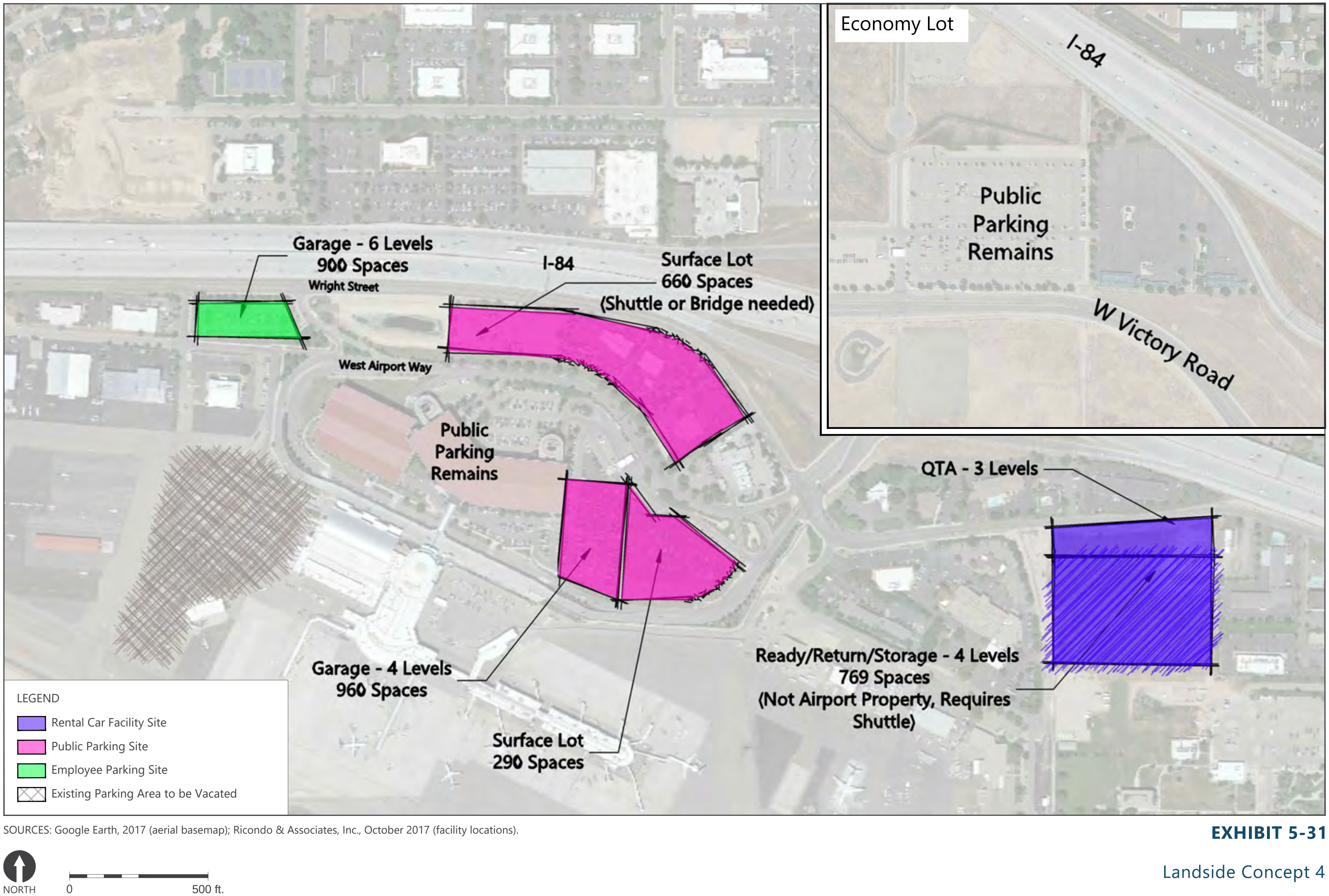

SOURCES: Google Earth, 2017 (aerial basemap); Ricondo & Associates, Inc., October 2017 (facility locations).

EXHIBIT 5-31

Landside Concept 4

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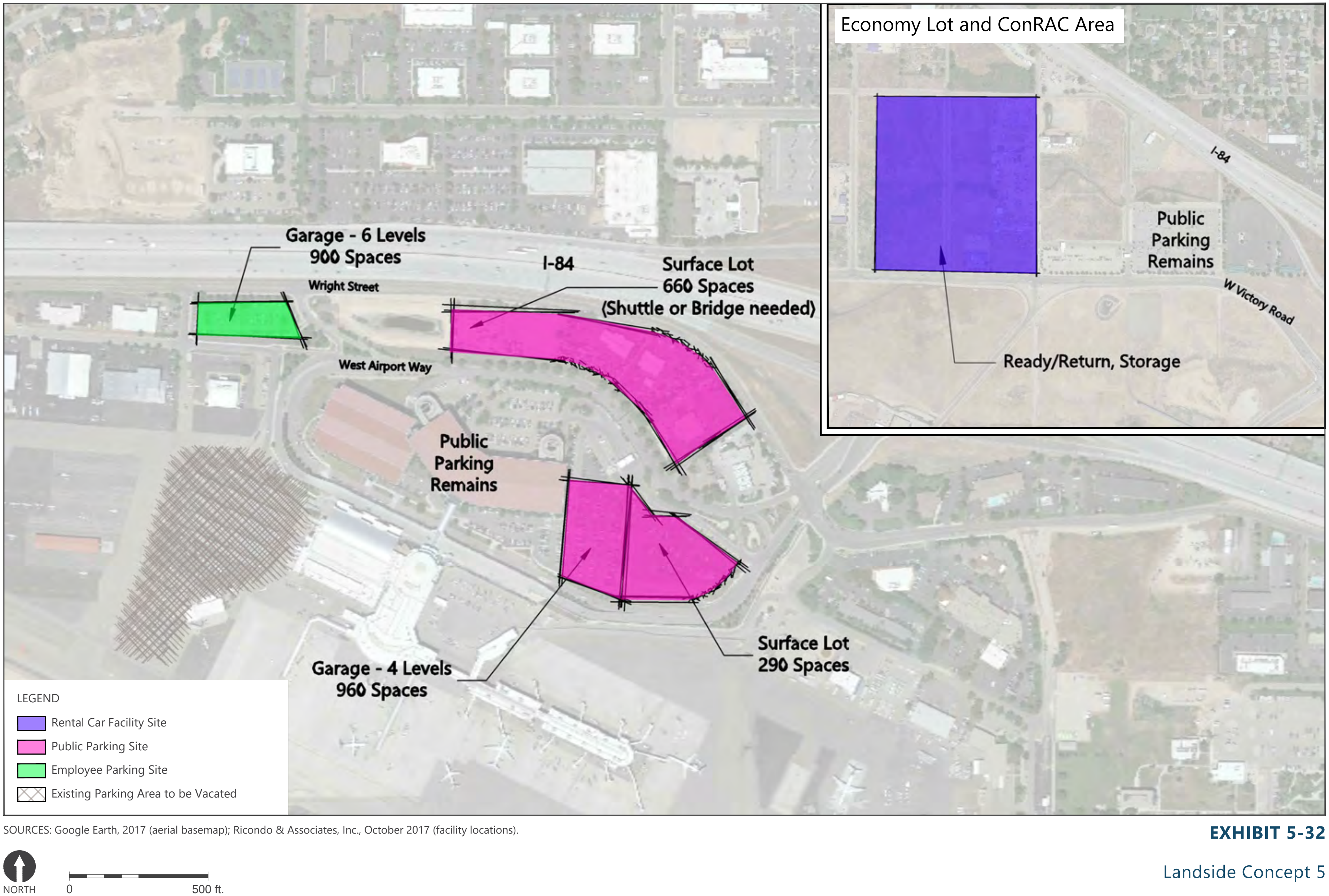

SOURCES: Google Earth, 2017 (aerial basemap); Ricondo & Associates, Inc., October 2017 (facility locations).

EXHIBIT 5-32

Landside Concept 5

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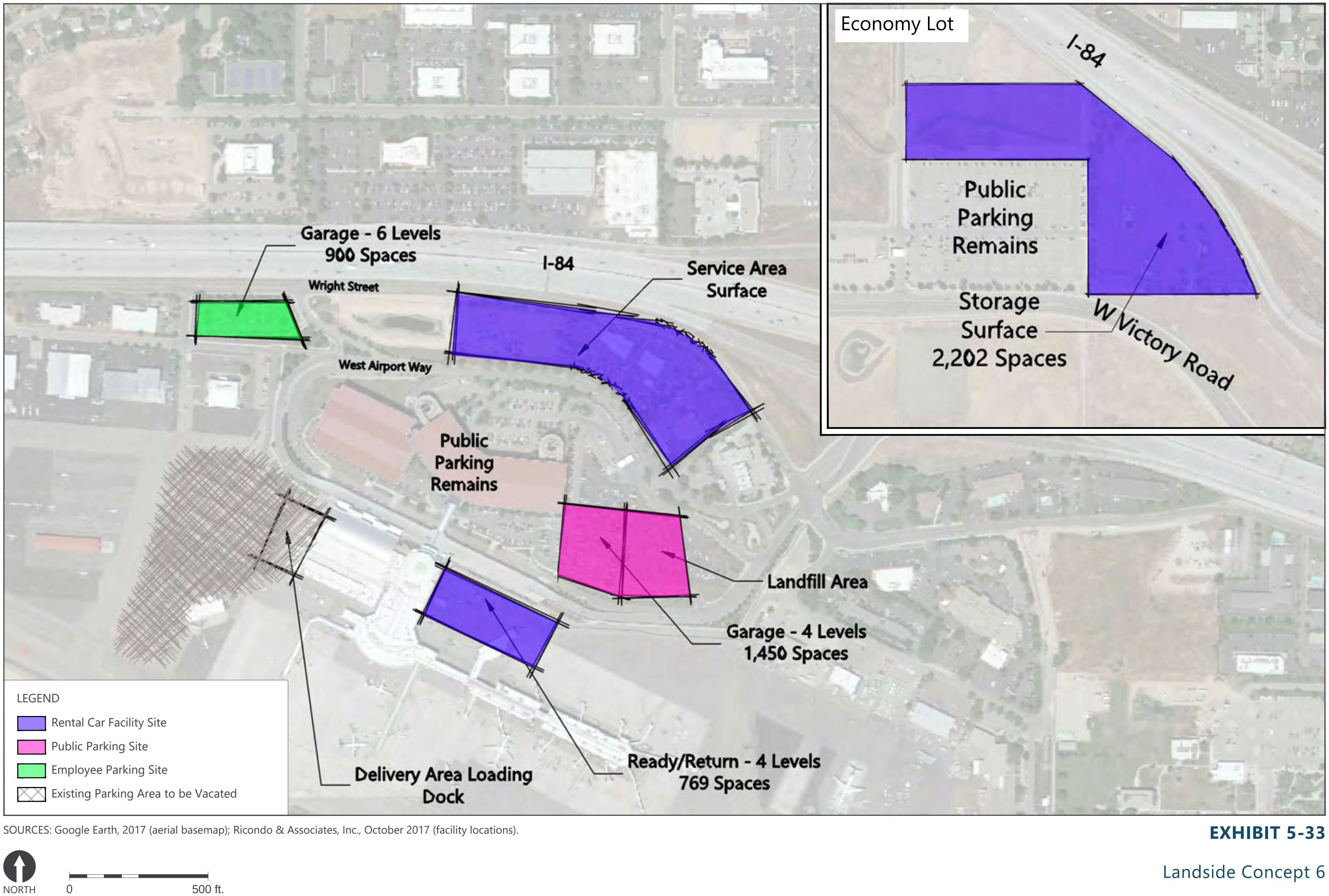

SOURCES: Google Earth, 2017 (aerial basemap); Ricondo & Associates, Inc., October 2017 (facility locations).

EXHIBIT 5-33

Landside Concept 6

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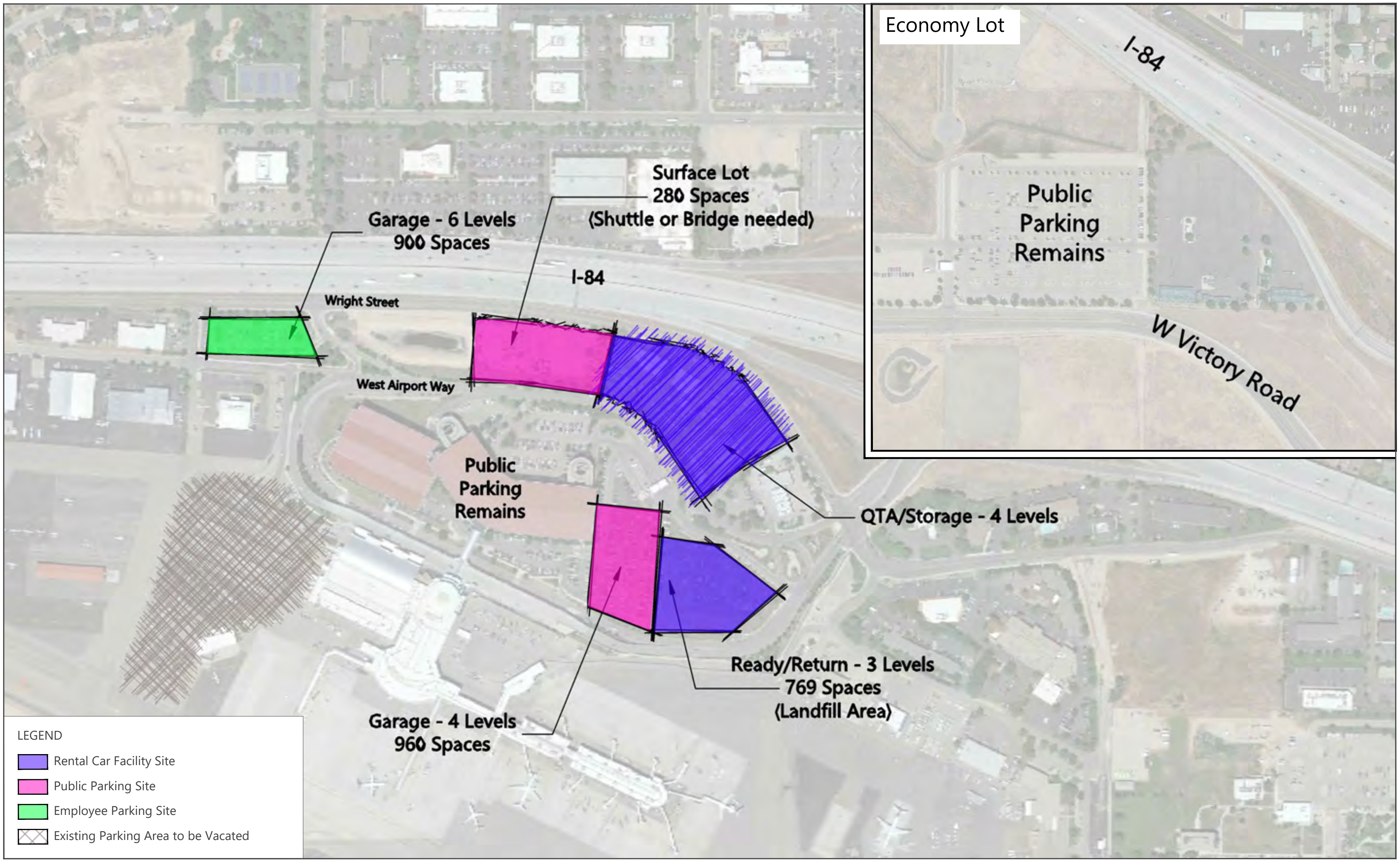

SOURCES: Google Earth, 2017 (aerial basemap); Ricondo & Associates, Inc., October 2017 (facility locations).

NORTH 0 500 ft.

EXHIBIT 5-34

Landside Concept 7

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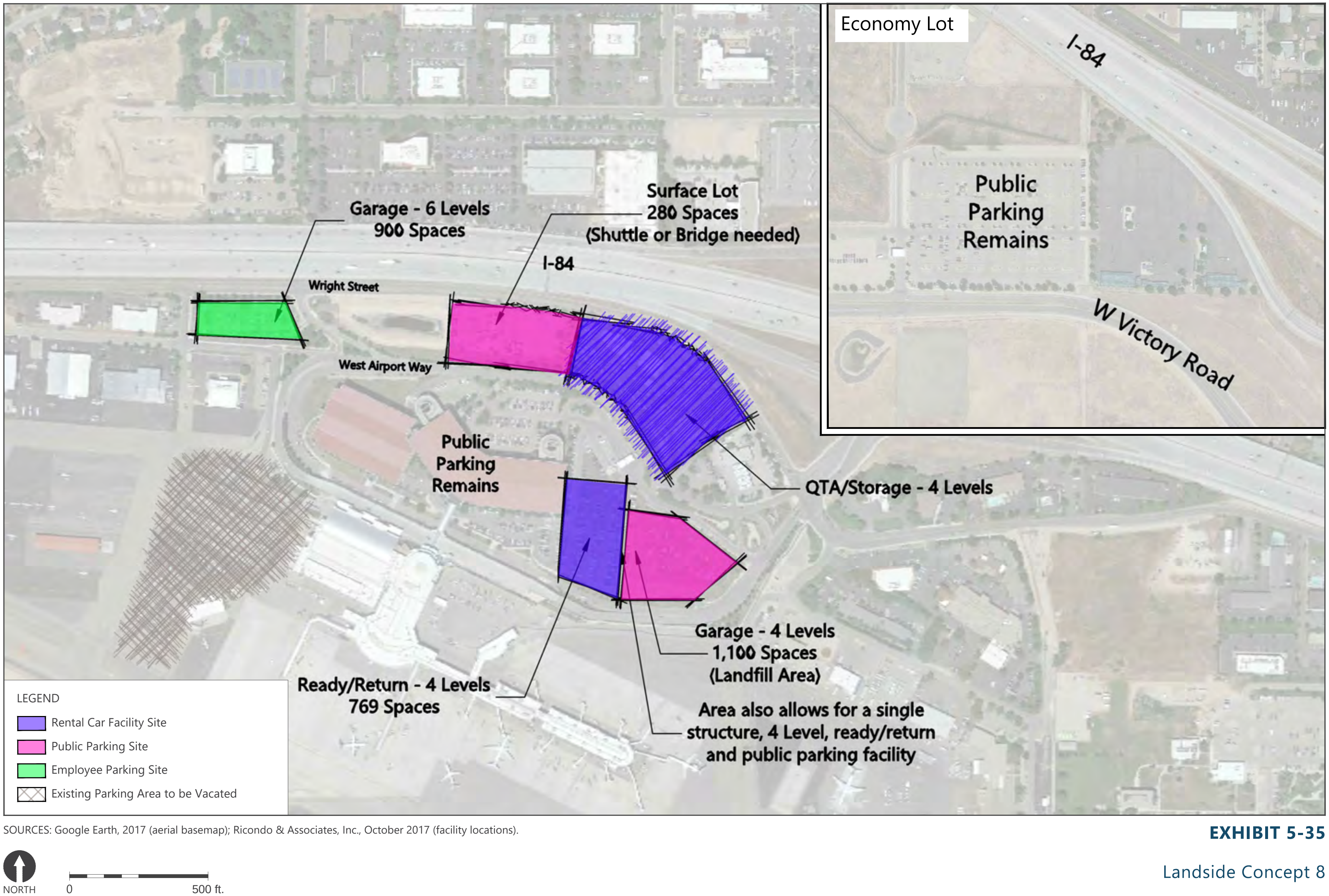

SOURCES: Google Earth, 2017 (aerial basemap); Ricondo & Associates, Inc., October 2017 (facility locations).

EXHIBIT 5-35

Landside Concept 8

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5.3.2 LANDSIDE CONCEPTS EVALUATION

The evaluation of landside concepts was based on considerations and feedback received from the TAC and other Airport stakeholders. Public parking, employee parking, and rental car facility elements of the concepts were evaluated separately.

5.3.2.1 PUBLIC PARKING

For public parking, an important consideration is balancing the priority of public demand with other parking needs. Passengers who drive to BOI generally prefer to park close-in, either in a garage or on surface lots adjacent to the garages. Garage parking is in high demand at BOI due to the convenient location of the garages to the terminal and the protection that garages offer from weather conditions. Garage parking fees are also an important source of revenue for the Airport.

The off-site Economy Lot provides additional capacity, but there are cost and customer service concerns with using the Economy Lot. Costs for operating the shuttle buses that provide service between the Economy Lot and the terminal are borne by the City. From a passenger perspective, the shuttle service is free, but it costs passengers in terms of time and convenience.

Walking distance between long-term parking areas and the terminal building was an important consideration in evaluating the concepts. Concepts 3, 4, 5, 7, and 8 include a long-term public surface parking lot at the location of the current rental car QTA and storage area along Wright Street. Pedestrian access to this parking lot would require a bridge to be installed over West Airport Way. Walking distance between this location and the terminal rotunda was estimated at approximately 1,000 feet, which is undesirable without the availability of systems such as moving walkways or the availability of shuttles.

Environmental considerations also weigh on the determination of preferred public parking development. In particular, the location currently designated as employee Lot 30 is an old landfill site. Construction of surface parking at the location is feasible, but structured parking on this site (i.e., a garage) would face constructability issues and higher development costs. Landfill and resulting constructability issues are also present at the location depicted in Concept 3, which shows a consolidated rental car ready/return and public parking garage.

5.3.2.2 EMPLOYEE PARKING

Existing employee parking at the Airport is inadequate relative to demand through the planning period. A compounding issue is that preferred terminal development will require the removal/relocation of employee Lot 20, which accounts for almost 30 percent of available employee parking spaces at the Airport. Additionally, several landside concepts involve the conversion of employee Lot 30 to public parking, representing a potential loss of another 30 percent of available employee parking spaces.

There are limited available properties close to the terminal for employee parking, and the priorities for such parking must be balanced with other needs, including public parking and rental car facilities. Each of the concepts except Concept 6 assume employee Lot E-1, comprising 81 spaces, will remain available, at least in the short and medium term, until or unless the area is needed for terminal or other high-priority development. Employee Lot W-1 (30 spaces) and Lot R-2 (23 spaces) are also assumed to remain available.

Given the limited space available for additional employee parking, one option for accommodating future demand is to designate a portion of the Economy Lot for employee parking, requiring employees to take a shuttle between the parking lot and the Airport. Another option is to construct an employee parking garage in the terminal area, which would offer an enhanced level of convenience over what is currently available to employees. Multilevel garages are a viable option for employee parking, although there are financial considerations, such as the relatively high cost of structured parking, the limited funding options, and the generally reduced revenue potential to offset capital costs. For planning purposes, construction of an employee parking garage at the location of the existing Boise Cascade Lot was assumed in all landside concepts.

5.3.2.3 RENTAL CAR FACILITIES

Alternative rental car facility locations were evaluated in part through a meeting of rental car agency representatives that was held at the Airport, as well as evaluated with input from the TAC and general public.

With regard to the siting of a future rental car ready/return area, walking distance between the facility and the terminal was a key consideration. The existing ready/return area is located west of the terminal building immediately adjacent to the baggage claim area. Walking distance from the terminal rotunda (the approximate location of the existing rental car counters) and the existing ready/return area is approximately 500 feet. Walking distance from the rotunda to a ready/return facility at other locations depicted in the landside concepts is as follows:

- garage at employee Lot E-1: 100 to 300 feet, depending on internal/external access point (Concept 6)
- garage on ITD parcel: 600 to 900 feet (Concept 1)
- surface lot/garage at existing QTA/storage location: 1,000 feet (Concept 2)
- expansion of existing public parking garage: 700 feet (Concept 8)

From a distance perspective, a ready/return garage located on employee Lot E-1, as depicted in Concept 6, would be most convenient. However, such development would require displacement of the employee lot, the delivery/loading dock, terminal storage space, and an aircraft gate on Concourse B. Also, a ready/return facility at this location could significantly increase traffic on the terminal curbs as vehicles enter/exit the ready/return facility.

Concept 2 shows a ready/return garage located at the current QTA and storage area along Wright Street, which would require a bridge to be installed over West Airport Way for pedestrian access. With a walking distance between this area and the rotunda of approximately 1,000 feet, this location is less favorable, and it could require the operation of a shuttle.

Rental car agency representatives voiced strong concern about having to operate shuttle buses between the terminal and an off-site ready/return facility. Therefore, ready/return locations that would require busing are not preferred, which include Concepts 3, 4, and 5.

Additionally, environmental concerns and associated constructability issues are present at ready/return locations depicted in Concepts 3, 4, 7, and 8.

With regard to the siting of rental car QTA and storage areas, operational efficiencies are realized when both QTA and storage are located adjacent to/consolidated with ready/return facilities, such as in Concepts 2, 4, and 5. However, each of these locations would likely require shuttle service for the ready/return portion of the facility, and the Concept 4 location faces potentially significant environmental and constructability issues for structured development.

In general, an on-site QTA facility is more convenient for faster delivery to/from the ready/return area, while off-site/remote storage is more common with close-in facilities where space is constrained. This concept is depicted in Concepts 1 and 6, in which the QTA area remains in its current location and rental car storage is relocated off-site at the Economy Lot. Another consideration favoring these two concepts with regard to QTA and storage locations is that the existing QTA facilities could be reconfigured as a common service facility for efficiently serving all agencies, with minimal additional land requirements.

5.3.3 PREFERRED LANDSIDE CONCEPTS

Based on the considerations discussed in Section 5.3.2, elements of various concepts were identified for eventual refinement into a preferred landside development plan. For public parking, concepts that include construction of additional close-in garage parking, along with surface parking, are more favorable. Public garage development as shown in Concepts 2, 4, 5, and 7 is preferred. Public surface parking converted from existing employee parking (Lot 30) as shown in Concepts 2, 3, 4, and 5 is preferred. To accommodate employee vehicles, construction of a multilevel employee garage at the location of the existing Boise Cascade Lot is preferred.

Construction of a ready/return garage on the existing ITD property adjacent to the existing ready/return area as shown in Concept 1 is preferred, given the constraints and disadvantages associated with alternative locations. Development of a ready/return garage at this location would need to account for any constraints resulting from the extension of Concourse A. In addition, the facility would need to be sized to include a customer service area, since rental car representatives stated their customer service counters would likely relocate to the ready/return facility at any of the alternative locations, except for those depicted in Concepts 6 and 8.

The preferred location for rental car QTA facilities is the surface level configuration at the existing QTA and storage area along Wright Street. To accommodate future expansion of these facilities over time, the preferred location for rental car storage is at the off-site Economy Lot.

5.4 GENERAL AVIATION / SUPPORT DEVELOPMENT CONCEPTS

The following is a summary of facility requirements for GA and other tenant/support facilities:

- Existing GA apron area is sufficient through the planning period. However, preferred terminal development will reduce available aircraft parking area on the north GA apron. Identification of areas for future GA apron development is prudent.
- Additional GA hangar requirements through the planning period include 2 T-hangar units and 14 conventional hangar units.
- Cargo requirements include up to 95,000 square feet of additional air cargo facility area, including aircraft aprons and cargo sorting/processing building space.
- A second aircraft maintenance facility and associated apron are planned adjacent to the existing SkyWest Airlines maintenance facility located on the southeast side of the Airport.
- A long-term location for BLM/US Forest Service facilities should be identified.
- The CBP facility should be expanded to enhance processing for current private/GA aircraft operations or for future narrowbody aircraft operations.
- The preferred landside development will require relocation of the ITD Division of Aeronautics hangar.
- Locations for additional SRE/storage buildings should be identified.
- The FAA has plans to construct a mobile asset staging facility and storage pad adjacent to the ATCT site.

The development of GA and support facility concepts was based primarily on identifying suitable areas on the Airport for such development, rather than on depicting specific physical building configuration options. Concepts depicting potential development opportunities were identified on the west, east, and south portions of the Airport/airfield.

5.4.1 WEST GENERAL AVIATION / SUPPORT DEVELOPMENT CONCEPTS

Exhibit 5-36 depicts opportunities for GA and support development on the west side of the Airport. The anticipated relocation of Orchard Road by the Ada County Highway District would open a significant portion of land for future aviation development. This area could be suitable for GA hangars and apron area, as well as suitable for BLM/US Forest Service operations. Airfield access from this area is shown through extension of existing taxilanes. Access by larger (ADG IV) aircraft may require removal of portions of existing buildings that would lie within the resulting taxilane object-free area (OFA).

The UPS air cargo facility is located along Taxiway J south of Runway 10R-28L. The facility is currently under lease. However, when that lease expires, cargo operations in this area could be relocated to a consolidated cargo facility planned on the southeast side of the Airport. Such a move could allow for additional GA hangar development in this area, which would be compatible with surrounding GA facilities and operations. Other potential locations for future GA hangar development include the area between the southern T-hangar complex and Taxiway K, the GA apron south of Taxiway K, and an area currently under lease north of Taxiway A and the adjacent west deice apron.

5.4.2 EAST GENERAL AVIATION / SUPPORT DEVELOPMENT CONCEPTS

Exhibit 5-37 depicts opportunities for GA and support development on the east side of the Airport. If FedEx is relocated to the planned consolidated cargo facility on the southeast side of the Airport, then the north cargo area would be suitable for future aviation development.

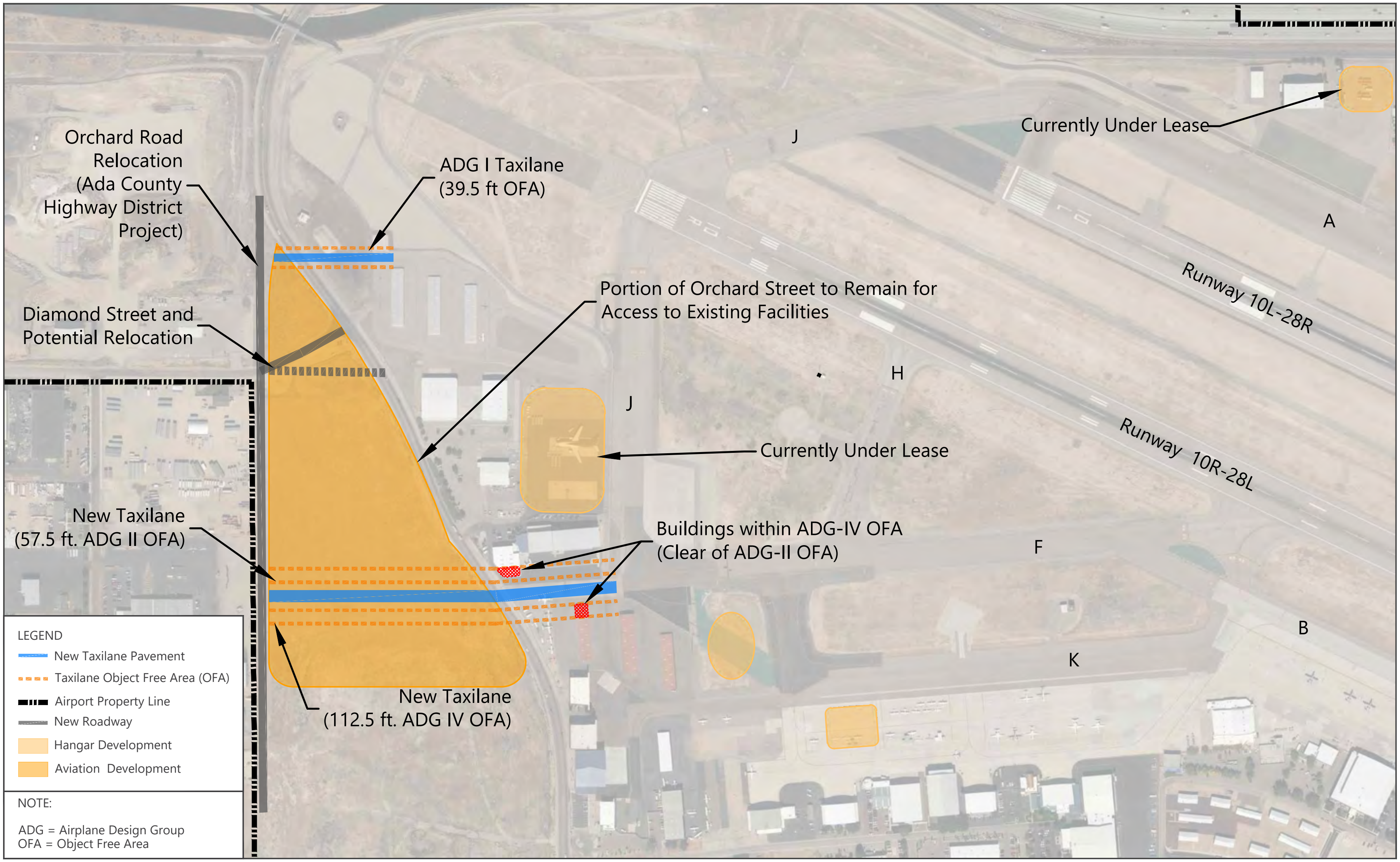
Two areas north of Taxiway A have been identified as suitable locations for future GA hangar development. One of the areas is currently under lease. Taxilane development would provide airfield access to these areas. Two options have been identified to provide airfield access. Option 1 involves a new taxilane running parallel to Taxiway A, which would provide access to both potential development areas. Option 2 involves separate access taxiways to each area from Taxiway A. Option 1 is preferred based on input from various Airport stakeholders, including ATCT personnel, who see the taxilane as an opportunity to increase airfield efficiency in this area.

A location east of the east deice apron has also been identified as an area suitable for future hangar development.

5.4.3 SOUTH GENERAL AVIATION / SUPPORT DEVELOPMENT CONCEPTS

Exhibit 5-38 depicts opportunities for GA and support development on the south side of the Airport. Construction of Taxiway S in 2016 to provide access to the SkyWest Airlines maintenance facility has created significant opportunities for future aviation development in this area.

The most prominent development in this area is a consolidated cargo facility. The 2010 Master Plan Update identified this area as suitable for future cargo development. Plans for such a facility have evolved in the years since that study was completed. A refined cargo facility concept is depicted on Exhibit 5-38 showing five aircraft parking positions, cargo building areas, vehicle parking, and roadway access from Gowen Road, which would need to be slightly relocated. Taxiway S would provide airfield access via construction of Taxiway P, which could ultimately be extended to provide connectivity to a future Runway 9-27 (third runway). Initial development of Taxiway P would stop short of Gowen Road, with the extension over and south of Gowen Road unlikely within the planning period for this MPU.



SOURCES: Quantum Spatial, September 2016 (aerial photography - for visual reference only, may not be to scale); Federal Aviation Administration, Advisory Circular 150/5300-13A, Change 1, Airport Design, February 26, 2014.

EXHIBIT 5-36

WEST GENERAL AVIATION/SUPPORT DEVELOPMENT CONCEPTS

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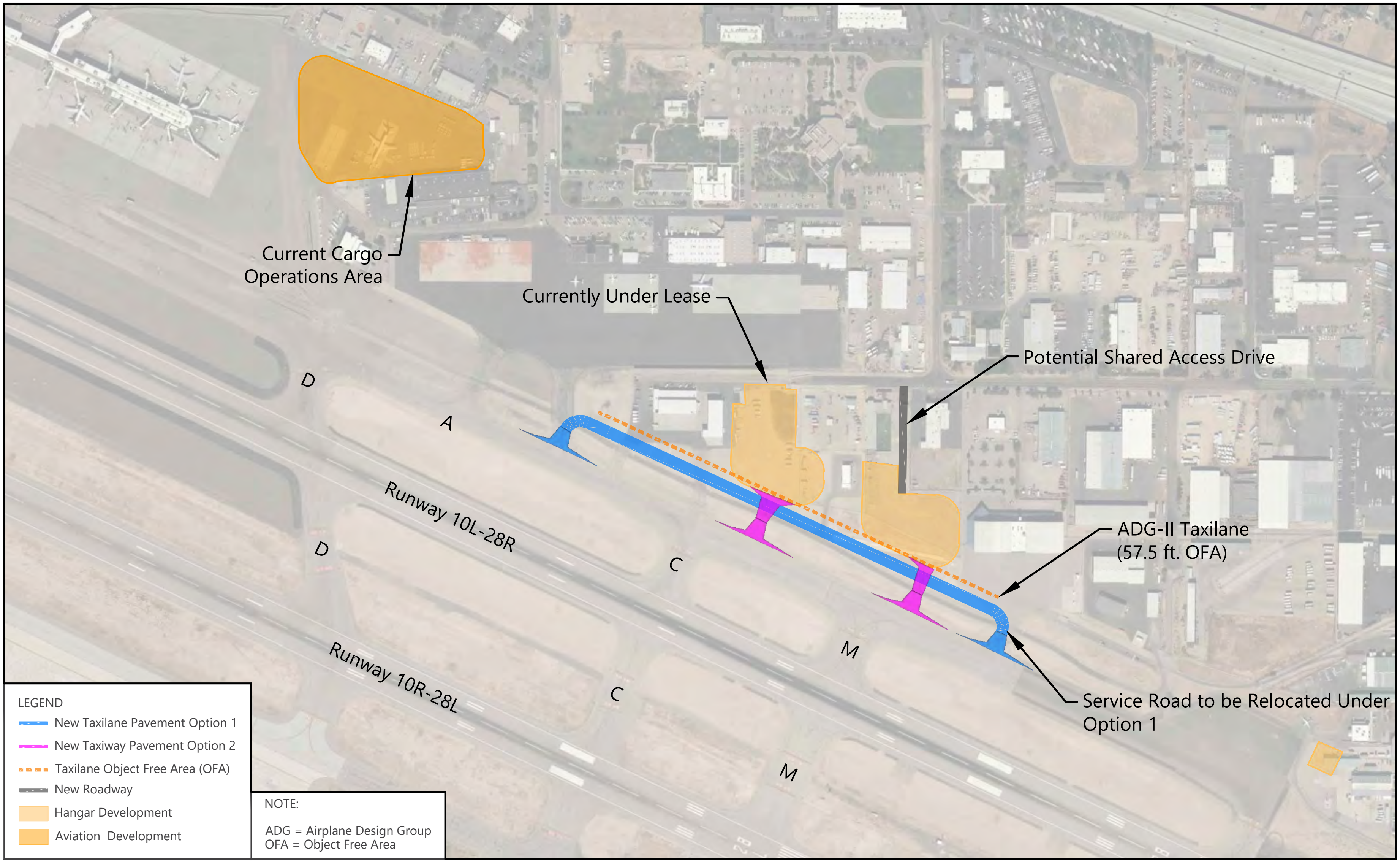

SOURCES: Quantum Spatial, September 2016 (aerial photography - for visual reference only, may not be to scale); Federal Aviation Administration, Advisory Circular 150/5300-13A, Change 1, Airport Design, February 26, 2014.

EXHIBIT 5-37

NORTH 0 600 ft.

EAST GENERAL AVIATION/SUPPORT DEVELOPMENT CONCEPTS

Drawing: P:\Project-Chicago\BOI\2016 BOI Master Plan\06 - Alternatives Development and Evaluation\BOI GA Development Alternatives_v3_Exhibits - Aerial_20190802.dwgLayout: East Layout - TAC 36x48 Plotted: Dec 20, 2019, 10:26AM

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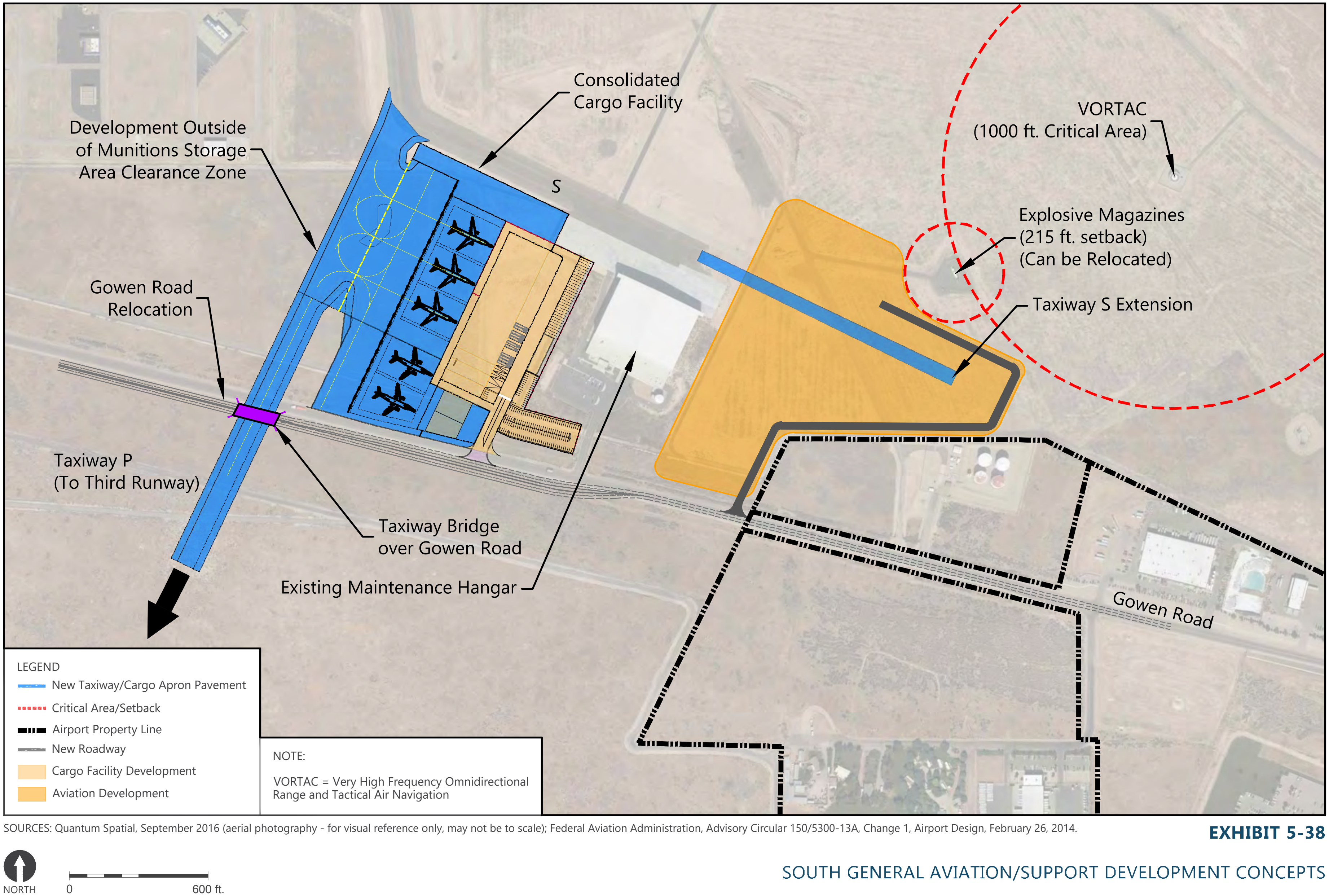

SOURCES: Quantum Spatial, September 2016 (aerial photography - for visual reference only, may not be to scale); Federal Aviation Administration, Advisory Circular 150/5300-13A, Change 1, Airport Design, February 26, 2014.

EXHIBIT 5-38

SOUTH GENERAL AVIATION/SUPPORT DEVELOPMENT CONCEPTS

Drawing: P:\Project-Chicago\BOI\2016 BOI Master Plan\06 - Alternatives Development and Evaluation\BOI GA Development Alternatives_v3_Exhibits - Aerial_20190802.dwgLayout: South East Layout TAC 36x48 Plotted: Dec 20, 2019, 10:07AM

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Extension of Taxiway S to the east would facilitate additional aviation development in this area. A second airline maintenance facility is currently planned for construction adjacent to the existing SkyWest Airlines maintenance hangar. However, the remaining available area allows for additional opportunities for the development of GA hangars and other support functions, such as BLM/US Forest Service operations. This area has also been identified as a preferred site for relocation of the ITD Division of Aeronautics facility that would be displaced by preferred landside development.

5.5 FINAL REFINED PREFERRED DEVELOPMENT

Subsequent to the selection of preferred development concepts, input from Airport and FAA staff, along with the TAC and general public led to refinement of the concepts into a final preferred development plan. This section describes the preferred development for the terminal area, landside, and airfield and GA/support facilities.

5.5.1 PREFERRED TERMINAL DEVELOPMENT

Preferred terminal development includes the phased construction and expansion of Concourse A, along with other terminal improvements.

5.5.1.1 PHASE 1 TERMINAL DEVELOPMENT

Exhibit 5-39 depicts preferred Phase 1 terminal development, featuring construction of a portion of Concourse A, including three mainline gates, three regional gates, and associated apron areas. Three mainline gates would be located along the front side of the concourse, accommodating ADG III narrowbody aircraft, such as the B737-900. Three gates along the back (north side) of the concourse would accommodate large regional aircraft, such as the Q400, EMB-175, or Airbus A220. Loading bridges are depicted at every new gate, although provision for ground loading of certain regional aircraft could be made, if necessary. It is also anticipated that Gate B16 would be converted from a mainline gate to a regional gate due to maneuverability issues along the back side of Concourse B. At the completion of Phase 1 development, the Airport would have a total of 15 regional gates and 15 mainline gates, which is projected to accommodate gate demand through at least 2025.

Phase 1 development of Concourse A would require removal of an employee parking lot, the rental car ready/return area, and an Airport storage building. Taxiway access to Concourse A would be via Taxiway A, including initial construction of a new taxilane providing access to the gate positions in front of Concourse A. Existing Taxilane A6 would provide access to the back side of Concourse A, thereby minimizing impact to the adjacent GA aircraft apron. Phase 1 development may also include various interior upgrades to Concourse B.

5.5.1.2 PHASE 2/3 TERMINAL DEVELOPMENT

Subsequent phases of preferred terminal development would include extension of Concourse A to accommodate an additional three mainline gates and one additional regional gate. One gate on the end of Concourse A would be capable of accommodating an ADG IV widebody aircraft. Expansion of the Concourse A and Concourse B connectors would provide additional space and could facilitate the development of contact gates along the front side of the terminal. The timing and order of development of these projects will depend on the need for future gates and the evolution of the air carrier fleet at the Airport, among other considerations. Since it is unknown in which order this development may occur, Phases 2 and 3 are combined for purposes of representing future development, which is depicted on **Exhibit 5-40**. Upon completion of the Concourse A extension, the Airport would have a total of 16 regional gates and 18 mainline gates, which is projected to accommodate gate demand through the MPU planning period (2035).

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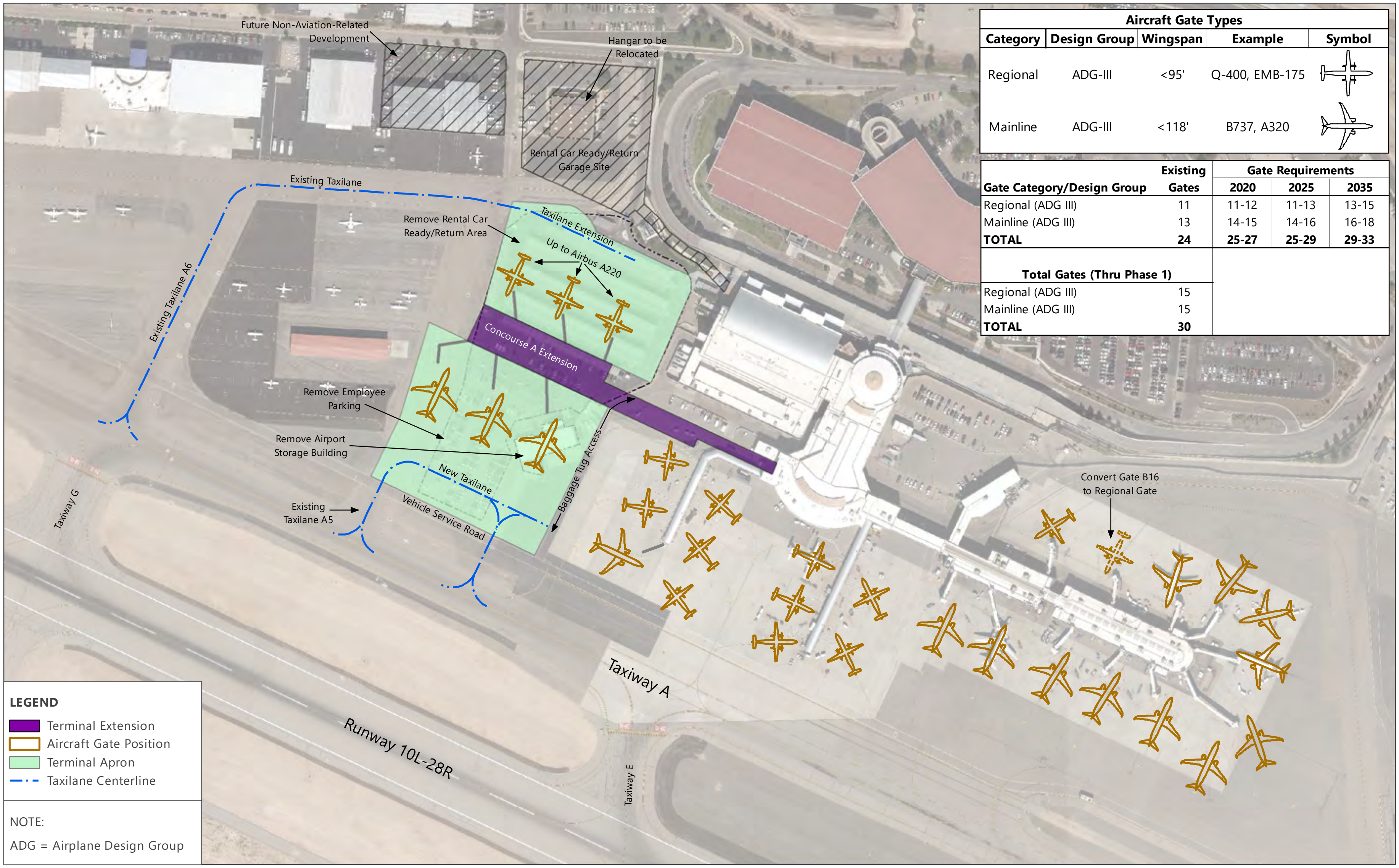

Aircraft Gate Types

Category	Design Group	Wingspan	Example	Symbol
Regional	ADG-III	<95'	Q-400, EMB-175	
Mainline	ADG-III	<118'	B737, A320	

Gate Category/Design Group	Existing Gates	Gate Requirements 2020	2025	2035
Regional (ADG III)	11	11-12	11-13	13-15
Mainline (ADG III)	13	14-15	14-16	16-18
TOTAL	**24**	**25-27**	**25-29**	**29-33**

Total Gates (Thru Phase 1)	
Regional (ADG III)	15
Mainline (ADG III)	15
TOTAL	**30**

SOURCES: GeoTerra, Inc., September 2016 (aerial basemap); Ricondo & Associates, Inc., March 2019, based on input from the City of Boise Department of Aviation (Phase 1 development).

NORTH 0 350ft

EXHIBIT 5-39

PREFERRED TERMINAL DEVELOPMENT
PHASE 1

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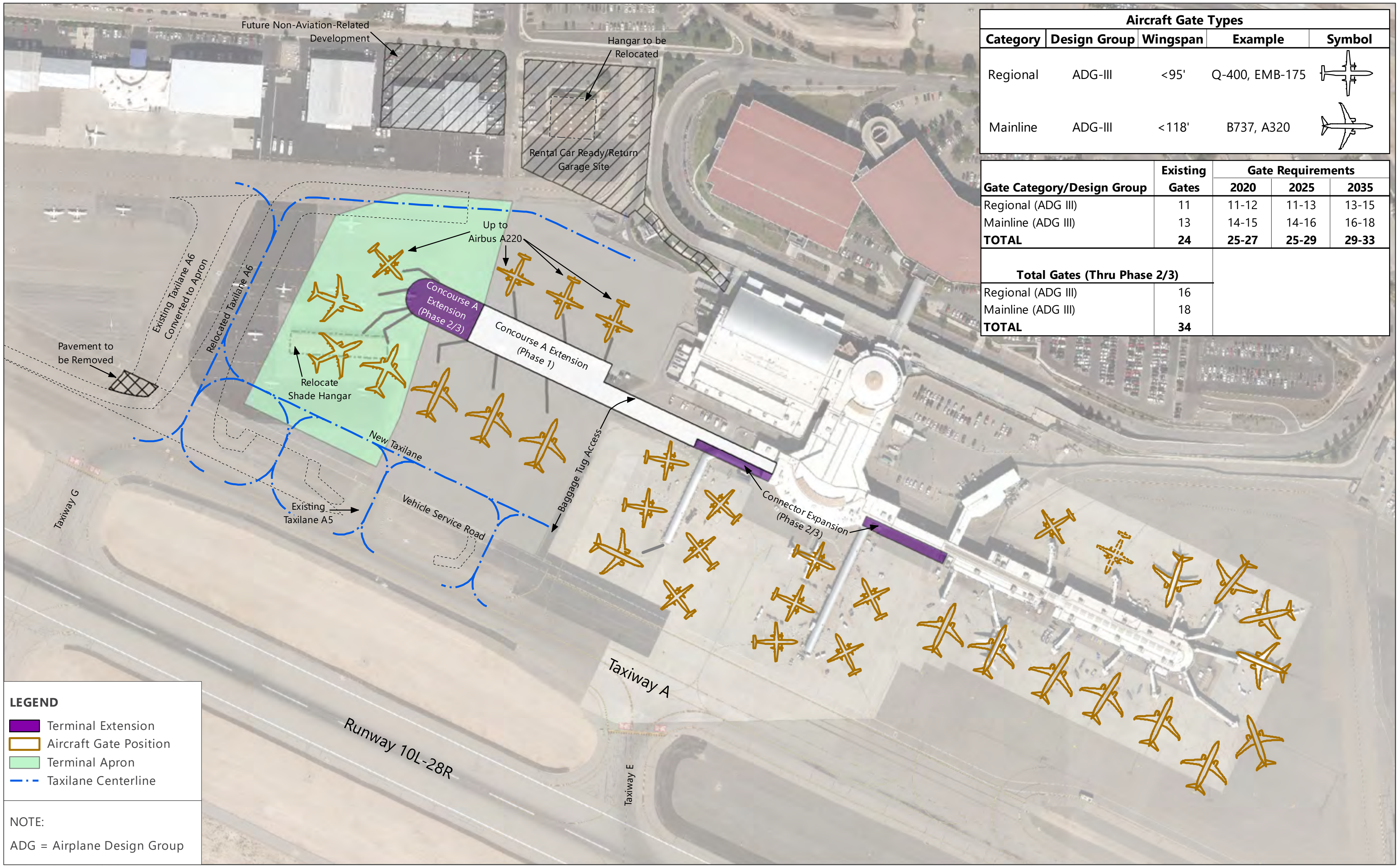

Aircraft Gate Types				
Category	Design Group	Wingspan	Example	Symbol
Regional	ADG-III	<95'	Q-400, EMB-175	
Mainline	ADG-III	<118'	B737, A320	

Gate Category/Design Group	Existing Gates	Gate Requirements 2020	2025	2035
Regional (ADG III)	11	11-12	11-13	13-15
Mainline (ADG III)	13	14-15	14-16	16-18
TOTAL	**24**	**25-27**	**25-29**	**29-33**

Total Gates (Thru Phase 2/3)	
Regional (ADG III)	16
Mainline (ADG III)	18
TOTAL	**34**

SOURCES: GeoTerra, Inc., September 2016 (aerial basemap); Ricondo & Associates, Inc., March 2019, based on input from the City of Boise Department of Aviation (Phase 2/3 development).

NORTH 0 350ft

EXHIBIT 5-40

PREFERRED TERMINAL DEVELOPMENT
PHASE 2/3

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Extension of Concourse A subsequent to Phase 1 would require removal of an Airport-owned shade hangar. Taxilane A6 would be relocated approximately 130 feet east, with existing Taxilane A6 converted to aircraft apron. Relocated Taxilane A6 would be a dual-use taxilane, serving both air carrier aircraft and GA aircraft. Relocated Taxilane A6 would be anticipated to accommodate up to ADG IV aircraft along the west end of Concourse A, transitioning into an ADG III taxilane along the back side of the concourse.

The new taxilane in front of Concourse A would be expanded to tie into relocated Taxilane A6. Relocated Taxilane A6 and the new southside parallel taxilane would be set back such that aircraft can push back 60 feet from the gate for deicing while remaining clear of the taxilane OFA. The configurations of the new taxilanes and relocated Taxilane A6 were planned in conjunction with Airport and FAA staff, as well as through comments received from the Safety Risk Management Panel (SRMP). When fully extended, Concourse A would displace approximately 250,000 square feet of existing GA tie-down apron.

5.5.1.3 FULL BUILD TERMINAL DEVELOPMENT

Exhibit 5-41 depicts the full build of the preferred terminal development. When fully extended, the length of Concourse A would be approximately 950 feet. At this distance, installation of moving walkways in Concourse A is anticipated. As described previously, preferred terminal development includes the option for construction of concourse connector expansions where Concourses A and B connect to the main terminal. This creates more interior terminal space and allows for up to six additional mainline gates to be constructed along the front of the Concourse A and Concourse B connectors. Construction of mainline gates along the front of the connectors would be at the cost of existing regional gates operating from Concourse C. The purpose of this development is to allow for future fleet flexibility in a case (for example) where the air carrier fleet at the Airport becomes more heavily weighted towards mainline aircraft.

An area east of the existing terminal processing core would be reserved for potential ultimate terminal development or transportation-related facilities. Development in this area may displace employee parking, an Airport storage building, and a loading dock. The extent of development in this area may also eliminate regional Gate B14.

5.5.2 PREFERRED LANDSIDE DEVELOPMENT

Landside development includes rental car, public parking, and employee parking facilities in the terminal area, as well as in the Economy Lot area located approximately 1.5 miles from the terminal. **Exhibit 5-42** depicts preferred landside development in the terminal area. **Exhibit 5-43** depicts preferred landside development in the Economy Lot area.

Future construction/expansion of Concourse A would necessitate the relocation of employee parking and the rental car ready/return area. Rental car ready/return space would be accommodated in a multilevel garage north of the existing ready/return area, requiring relocation of the ITD hangar. An enclosed corridor would connect the ready/return garage to the west end of the terminal building. The existing rental car service area located along West Airport Way could be expanded, with longer-term storage requirements accommodated in the Economy Lot. An area adjacent to the Economy Lot is depicted on Exhibit 5-43 for ultimate ConRAC development. Preferred rental car facility development described in this section accommodates ready/return and QTA functions in close proximity to the terminal through the MPU planning period, which is preferred based on consultation with rental car agency representatives. However, identification of a suitable location for a future ConRAC is prudent, given the constraints in the terminal area to accommodate ultimate rental car demand beyond the planning period. Not all of the property located within the area designated for ultimate ConRAC development is currently owned by the Airport, but is identified for land use planning considerations.

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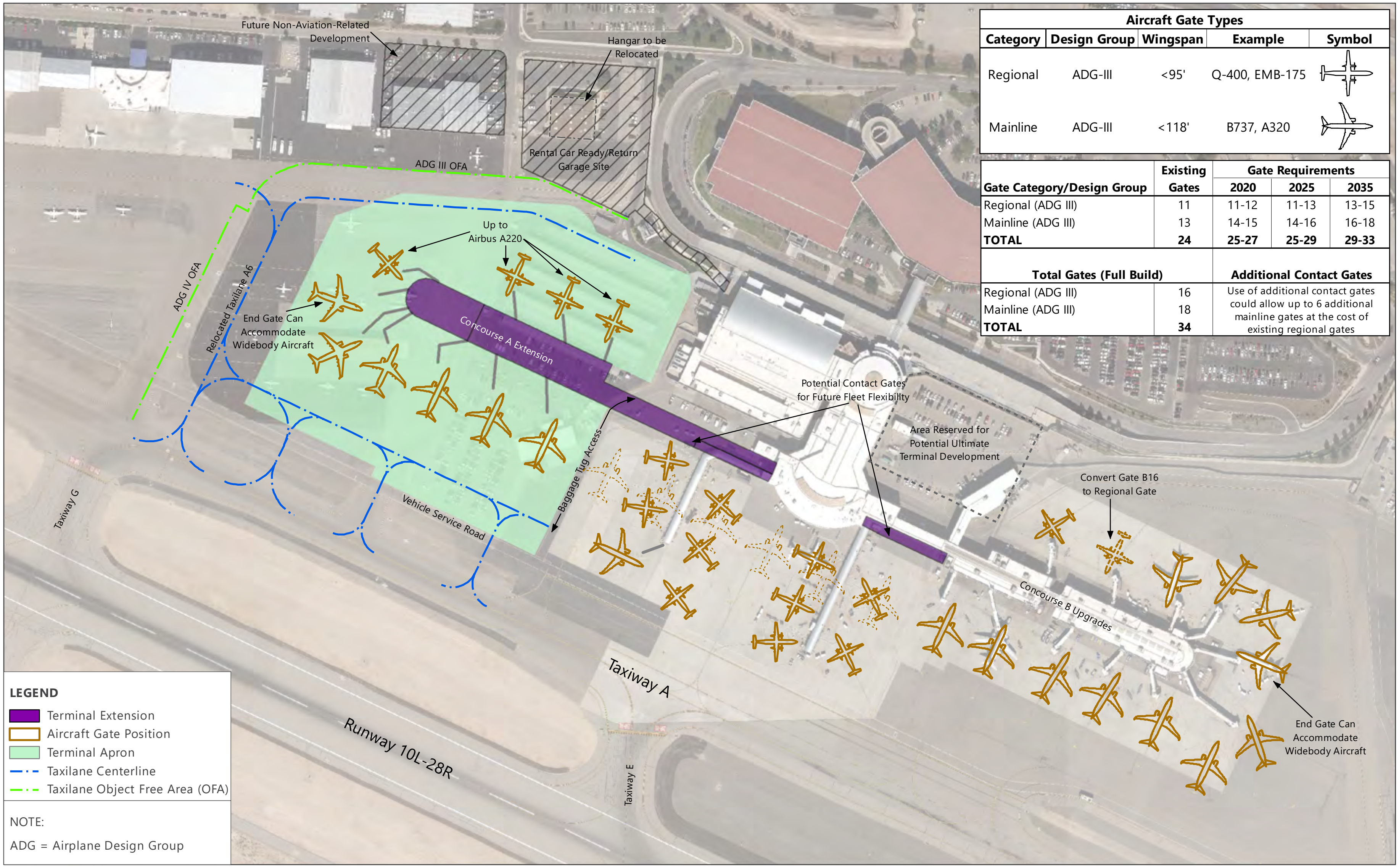

Aircraft Gate Types

Category	Design Group	Wingspan	Example	Symbol
Regional	ADG-III	<95'	Q-400, EMB-175	
Mainline	ADG-III	<118'	B737, A320	

Gate Category/Design Group	Existing Gates	Gate Requirements 2020	2025	2035
Regional (ADG III)	11	11-12	11-13	13-15
Mainline (ADG III)	13	14-15	14-16	16-18
TOTAL	**24**	**25-27**	**25-29**	**29-33**

Total Gates (Full Build)		Additional Contact Gates
Regional (ADG III)	16	Use of additional contact gates could allow up to 6 additional mainline gates at the cost of existing regional gates
Mainline (ADG III)	18	
TOTAL	**34**	

SOURCES: GeoTerra, Inc., September 2016 (aerial basemap); Ricondo & Associates, Inc., March 2019, based on input from the City of Boise Department of Aviation (full build development).

NORTH 0 350ft

EXHIBIT 5-41

PREFERRED TERMINAL DEVELOPMENT
FULL BUILD

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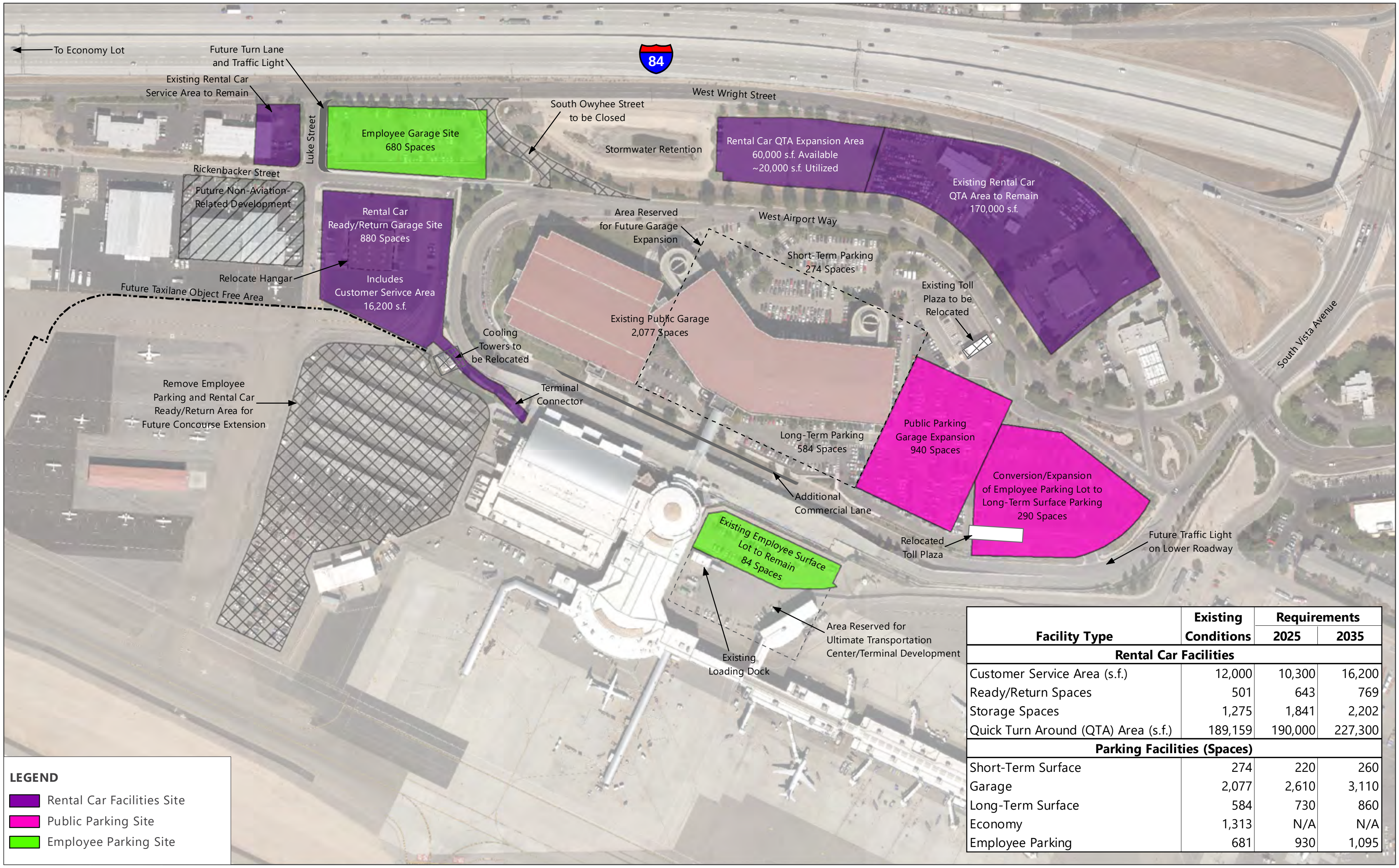

Facility Type	Existing Conditions	Requirements 2025	Requirements 2035
Rental Car Facilities			
Customer Service Area (s.f.)	12,000	10,300	16,200
Ready/Return Spaces	501	643	769
Storage Spaces	1,275	1,841	2,202
Quick Turn Around (QTA) Area (s.f.)	189,159	190,000	227,300
Parking Facilities (Spaces)			
Short-Term Surface	274	220	260
Garage	2,077	2,610	3,110
Long-Term Surface	584	730	860
Economy	1,313	N/A	N/A
Employee Parking	681	930	1,095

SOURCES: GeoTerra, Inc., September 2016 (aerial basemap); Ricondo & Associates, Inc., March 2019, based on input from the City of Boise Department of Aviation (landside development).

NORTH 0 350ft

EXHIBIT 5-42

PREFERRED LANDSIDE DEVELOPMENT
TERMINAL AREA

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SOURCES: GeoTerra, Inc., September 2016 (aerial basemap); Ricondo & Associates, Inc., March 2019, based on input from the City of Boise Department of Aviation (landside development).

EXHIBIT 5-43

PREFERRED LANDSIDE DEVELOPMENT
ECONOMY LOT AREA

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Displaced and future employee parking demand would be accommodated through the construction of a multilevel parking garage along Rickenbacker Street, the existing employee lot east of the terminal building (Lot E-1), and the available space in the Economy Lot, as required. South Owyhee Street would be closed to accommodate the new employee parking garage. Other existing employee lots in the terminal area, along with potential off-site areas suitable for employee parking would also accommodate employee parking demand through the planning period.

Future public parking requirements would be accommodated with expansion of the existing public parking garage and conversion/expansion of an existing employee parking lot to public surface parking. Development in this area would require the parking toll plaza to be relocated. An area encompassing the existing central garage and adjacent areas is identified for potential future garage expansions beyond the MPU planning period. The Economy Lot would continue to accommodate overflow public parking demand during peak periods, with ample space for future expansion. In addition, a cell phone lot would be constructed in the Economy Lot, replacing or supplementing the existing cell phone “lane” along the terminal loop roadway.

Preferred landside development also includes some terminal area roadway improvements. A turn lane and traffic light would be added to Luke Street to facilitate efficient traffic flow around the employee parking garage. An additional commercial lane would be added to the lower level terminal curb to increase capacity for taxis, shuttles, and other commercial vehicles. A traffic light would also be added on the lower level terminal roadway where commercial and private vehicles picking up arriving passengers merge with vehicles dropping off departing passengers from the upper terminal roadway.

5.5.3 PREFERRED AIRFIELD AND GENERAL AVIATION / SUPPORT FACILITY DEVELOPMENT

For presentation purposes, airfield, GA, and support facility development was combined since this development all occurs on the airfield with interrelated elements. Using the various development concepts as a basis for evaluation and discussion, preferred airfield development resulted from coordination with Airport and FAA staff and other stakeholders, as well as from comments received from the SRMP. Preferred development is depicted for the west airfield area, the east airfield area, and the south airfield area.

5.5.3.1 PREFERRED WEST AIRFIELD AREA DEVELOPMENT

Exhibit 5-44 depicts the preferred west airfield area development. Runway 10R would be relocated southeast 1,341 feet such that the threshold aligns with Runway 10L, including provision for a blast pad. Pavement demolition associated with runway relocation would include Taxiway H, the relocated portion of Runway 10R, Taxiway J between the existing Runway 10R threshold and Taxiway A, and a portion of Taxiway J south of Runway 10R.

Taxiway W would be extended south, providing access between the relocated Runway 10R threshold and Taxiway A to the north and Taxiway F to the south. Extension of Taxiway B to the west and clear of glide slope critical area would allow for removal of a portion of Taxiway F between Taxiways B and K, and it would open space for future aviation development. Vehicle access to this development would be facilitated through construction of a roadway accessed via a future airfield access gate from West Aeronca Street. Future hangar development on the GA apron adjacent to the roadway may be feasible.

CAT II/III ILS capability would be maintained through relocation of the glide slope on the right side of Runway 10R, and a PAPI would be also installed on the right side of Runway 10R. Additional airfield support equipment may include an arresting barrier on Runway 10R and relocation of approach lights on Runway 10R, including removal of the existing approach lights bridge structure.

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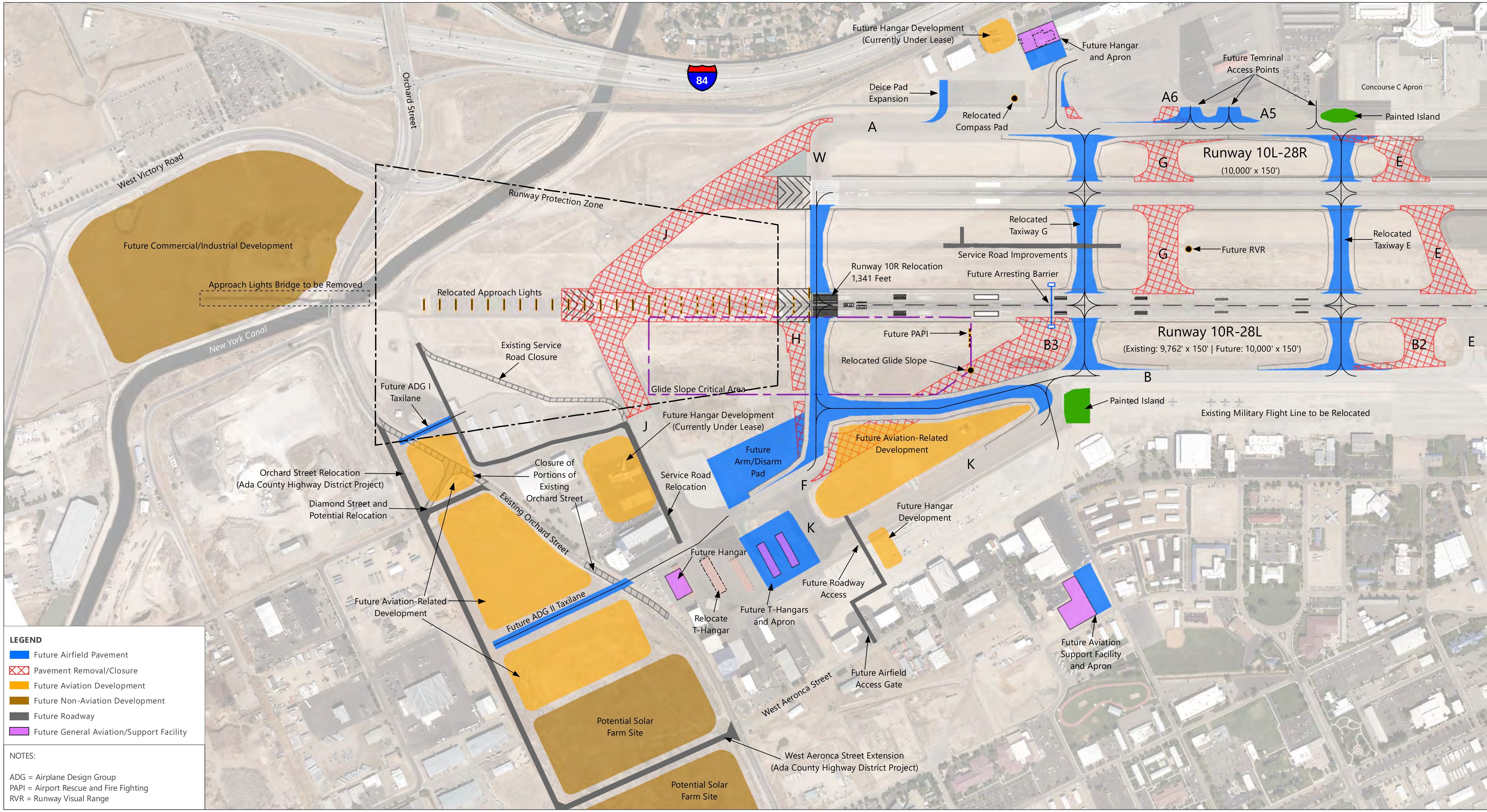

SOURCES: Quantum Spatial, September (aerial photography, aerial data collection, and planimetric base mapping); Ricondo & Associates, Inc., March 2019, in coordination with the City of Boise Department of Aviation and Federal Aviation Administration (preferred airfield development).

EXHIBIT 2-44

PREFERRED WEST AIRFIELD DEVELOPMENT

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Development north of Taxiway A would include expansion of a deice pad, installation of a new compass pad (relocated from the east end of Taxiway A), future hangar development, and taxiway pavement associated with preferred terminal development.

The planned relocation of Orchard Street by the Ada County Highway District would open space for future aviation and non-aviation development. New taxilanes would enable aircraft access to the area, while portions of existing Orchard Street would remain open to provide vehicle access to existing and future facilities. Additional future hangar facilities and sites have been identified in this area, along with relocation of a service road adjacent to the existing UPS and northwest T-hangar facilities.

Additionally, Taxiway G would be relocated approximately 400 feet west and extended to Taxiway B, allowing for the removal of Taxiway B3. A Painted island would mitigate direct access from the IDANG apron to Runway 10R-28L. The northern section of Taxiway E would be relocated perpendicular to Runway 10L-28R, and a painted island would visually eliminate direct access from the Concourse C terminal apron to Runway 10L-28R. The portion of Taxiway E between the two runways would be removed, along with exit Taxiway B2.

5.5.3.2 PREFERRED EAST AIRFIELD AREA DEVELOPMENT

Exhibit 5-45 depicts the preferred east airfield area development. Taxiway D would be relocated perpendicular to Runway 10L-28R. Required ARFF response would be maintained through construction of an ARFF access road spanning from the ARFF station to Taxiway B. Taxiways C and B1 would be removed, with Taxiway M extended from Runway 10R-28L to Taxiway B.

Shade ports could be constructed by the military along the east military apron to accommodate the relocation of the IDANG flight line from the west apron to the east apron. An FAA storage building and staging pad would be constructed next to the ATCT facility, with adjacent areas designated for future commercial/industrial development.

North of Taxiway A, aviation-related development would be maintained within the existing cargo area, presuming the eventual relocation of FedEx to the consolidated cargo facility. Taxilane A3 providing access to the NIFC apron would be relocated to eliminate direct apron-to-runway access on relocated Taxiway D. A new taxilane would be constructed to facilitate access to future hangar development areas, with connecting access to Taxiway A, along with removal of two existing taxilane connectors (A1 and A2). The east deice pad would be expanded, and a painted island would visually eliminate direct access from the deice/CBP apron to Runway 10L-28R. The CBP facility would be expanded, and support facilities would be constructed/relocated.

Runway 28L would be extended 1,580 feet to the southeast such that the threshold aligns with the Runway 28R threshold, providing two equal-length (10,000 feet) parallel runways. Taxiway P would be constructed between Runway 28R and Taxiway S. The DME facility and associated equipment would be relocated outside the TOFA to enable connection of Taxiway P with Taxiway S. Existing approach lights on Runway 28L would be relocated, and approach lights would be installed on Runway 28R.

Taxiway S would be widened to TDG 5 standards to accommodate ADG IV cargo aircraft operating at the future consolidated cargo facility. The cargo facility would include apron, buildings, and vehicle access/parking, and it would be sized to accommodate multiple cargo operators, enabled by the relocation/shift of a portion of Gowen Road to the south. Taxiway P south of Taxiway S would tie into the cargo apron and would provide future bypass capability. A future aircraft maintenance facility and associated apron would be constructed, with adjacent space identified for future aviation-related development, including provision for vehicle access from Gowen Road. Taxiway S would be extended at TDG 3 standards to provide aircraft access east of the existing aircraft maintenance facility.

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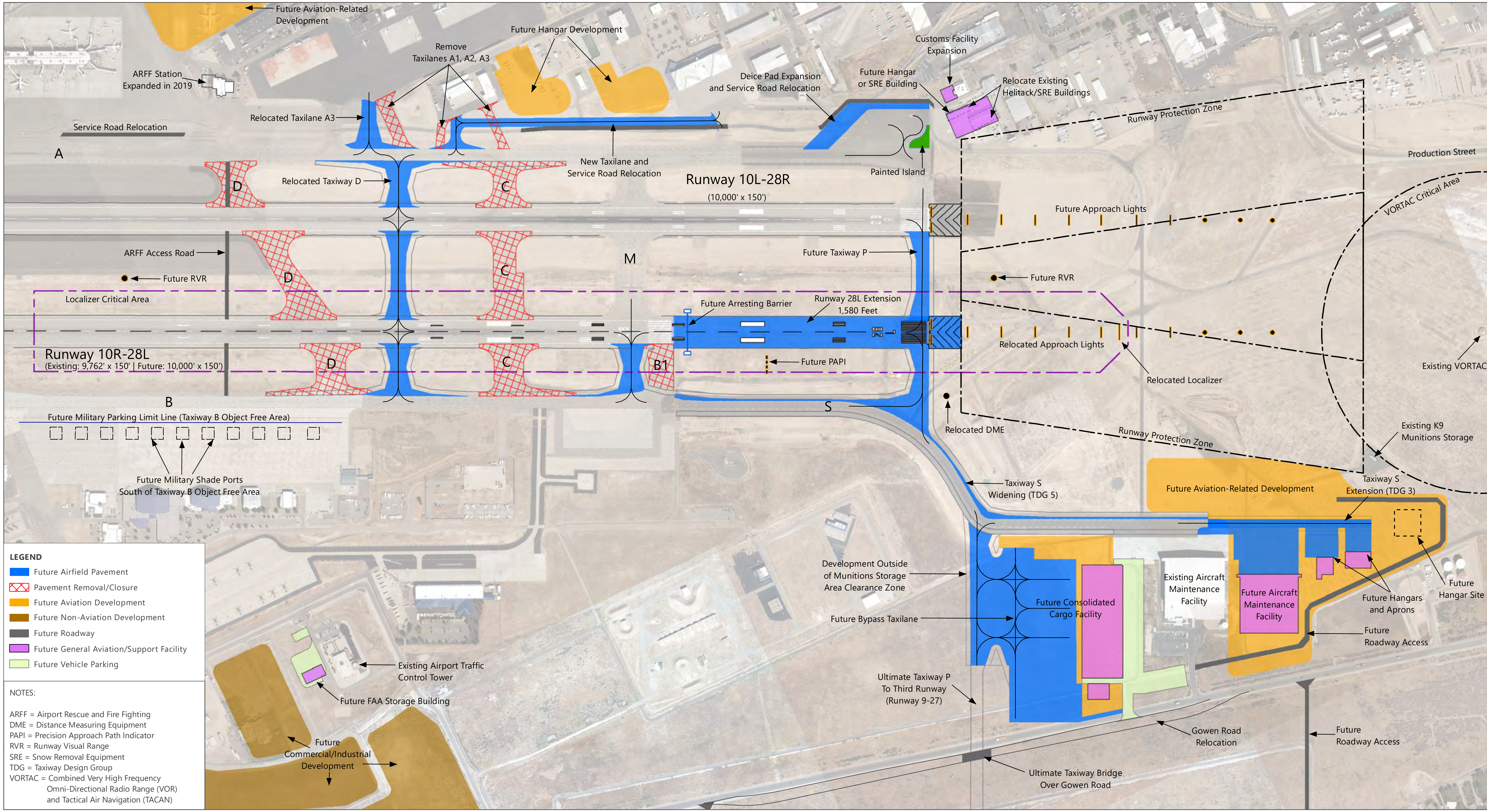

SOURCES: Quantum Spatial, September (aerial photography, aerial data collection, and planimetric base mapping); Ricondo & Associates, Inc., March 2019, in coordination with the City of Boise Department of Aviation and Federal Aviation Administration (preferred airfield development).

EXHIBIT 2-45

PREFERRED EAST AIRFIELD DEVELOPMENT

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5.5.3.3 PREFERRED SOUTH AIRFIELD AREA DEVELOPMENT

Exhibit 5-46 depicts the preferred south airfield area development. Specifically, as it relates to development of the south airfield or “third runway” area, “Future” development is distinguished from “Ultimate” development. Areas depicted as “Future” are developments that may occur within the MPU planning period (by 2035). Areas depicted as “Ultimate” are developments that may occur beyond the MPU planning period (after 2035). However, various factors may necessitate or facilitate implementation of “Ultimate” development sooner. Ultimate development is depicted for purposes of preserving land for future airfield and related development.

Regarding “Future” development in this area, the existing assault strip measuring 5,000 feet in length would be repaved and widened to 100 feet, with a future designation of Runway 9-27. Future taxiway development would occur on the north side of the runway, with initial facility development potentially consisting of a heliport sized to accommodate CH-47 helicopter operations. Initial phased development of this area would include extension of utilities and access roads.

A future ARFF training area has been identified for construction east of and adjacent to the existing ARFF burn pit north of Gowen Road. A site for a potential future fuel farm has been identified east of the ARFF training area, along with an area for future commercial/industrial development.

Ultimate development of the south airfield may include extension and widening of Runway 9-27, construction of a full taxiway system to include connectivity to the existing airfield via a bridge over Gowen Road, and a variety of aviation-related development, such as GA facilities and BLM/US Forest Service tanker base facilities. An area underneath the existing ASR critical area could accommodate low-height aviation-related development, up to 30 feet.

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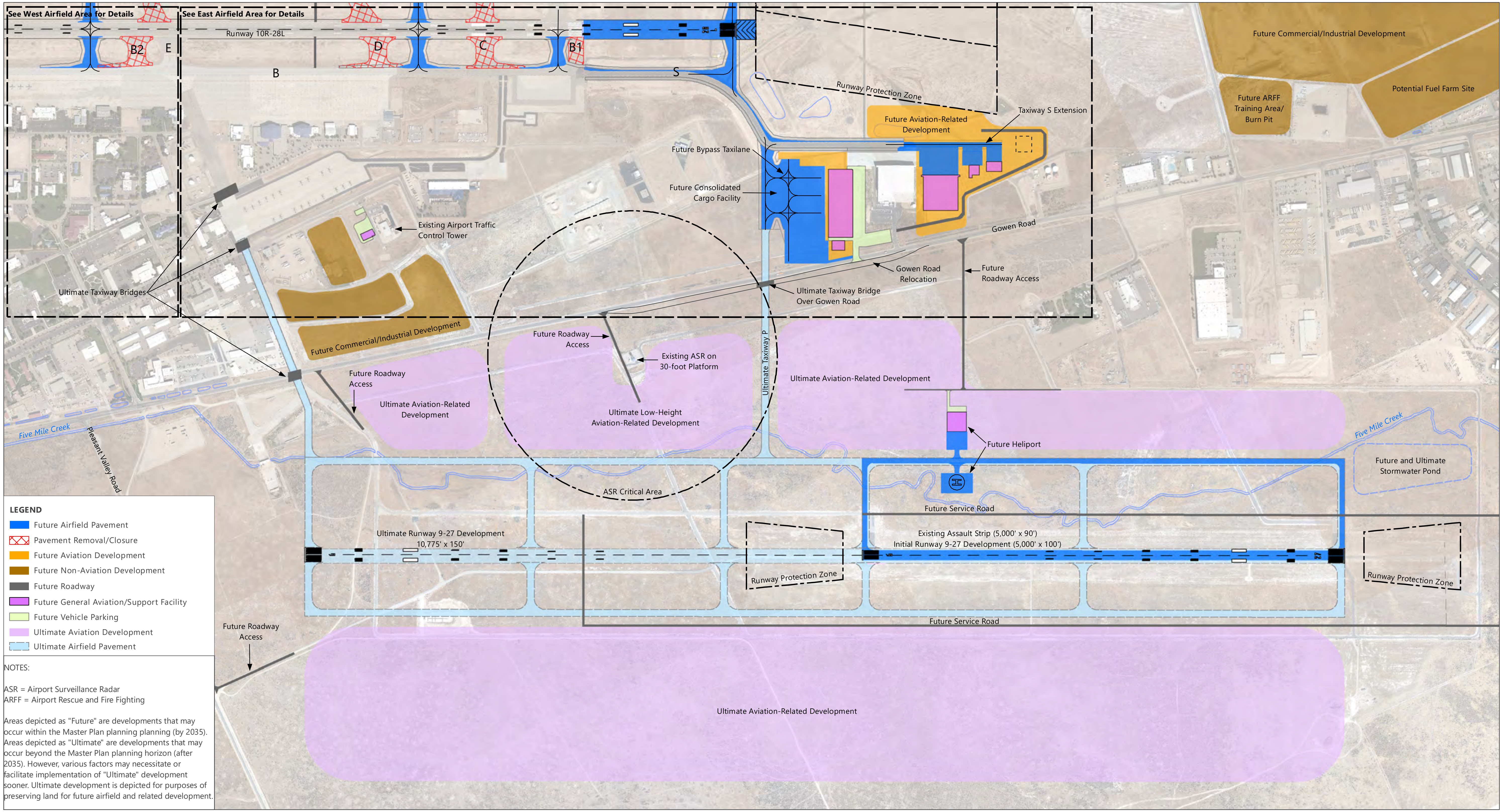

LEGEND

- Future Airfield Pavement
- Pavement Removal/Closure
- Future Aviation Development
- Future Non-Aviation Development
- Future Roadway
- Future General Aviation/Support Facility
- Future Vehicle Parking
- Ultimate Aviation Development
- Ultimate Airfield Pavement

NOTES:

ASR = Airport Surveillance Radar
ARFF = Airport Rescue and Fire Fighting

Areas depicted as "Future" are developments that may occur within the Master Plan planning planning (by 2035). Areas depicted as "Ultimate" are developments that may occur beyond the Master Plan planning horizon (after 2035). However, various factors may necessitate or facilitate implementation of "Ultimate" development sooner. Ultimate development is depicted for purposes of preserving land for future airfield and related development.

SOURCES: Quantum Spatial, September (aerial photography, aerial data collection, and planimetric base mapping); Ricondo & Associates, Inc., March 2019, in coordination with the City of Boise Department of Aviation and Federal Aviation Administration (preferred airfield development).

NORTH 0 1,000 ft

EXHIBIT 2-46

PREFERRED SOUTH AIRFIELD DEVELOPMENT

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6. IMPLEMENTATION PLAN

The implementation plan presented in this section outlines a feasible development sequence and schedule for the recommended Master Plan Projects through the planning period (2035). The Master Plan Projects include all projects and associated elements that comprise the preferred development concepts described in Section 5.[1] The development sequence of projects in the implementation plan is subsequently assessed in the financial plan described in Section 7. Cost estimates developed in support of the implementation plan and the financial plan are also included in this section, along with an overview of environmental considerations for the Master Plan Projects.

6.1 FACTORS AFFECTING IMPLEMENTATION AND PHASING

The overall goal of the implementation plan is to ensure critical projects are in place when they are needed. The ability to stage implementation correctly requires an understanding of the factors that prompt development, as well as ongoing data monitoring and analysis to identify when action should be taken. The following subsections describe the factors affecting the implementation and phasing of the Master Plan Projects.

6.1.1 DEMAND

In many cases, the need for future development correlates with specific levels of demand. Preferably, projects should be implemented in sufficient time to serve the needs of growing demand, but not so early that facilities are underutilized. The implementation plan was developed based on the forecasts presented in Section 3 and the demand/capacity analyses conducted as part of the assessment of future facility requirements, as presented in Section 4. The volume and character of activity at the Airport determine when certain development should occur through the planning period. Recognizing that growth may not occur as forecast, it is important to continuously monitor overall activity and assess the individual characteristics of that activity.

The type of demand on individual Airport components may indicate more about utilization patterns and facility needs than overall activity statistics. For example, changes in the Airport's air carrier fleet mix can impact the timing of new terminal facilities. An increase in the number of regional jet or turboprop aircraft operations may not require the same improvements necessary to accommodate the same increase in the number of mainline aircraft operations, although the increase in the total number of aircraft operations may be the same. For this reason, preferred future terminal development includes the flexibility to accommodate changes in the types of aircraft that airlines may operate at the Airport.

The demand for or timing of future ground transportation facilities may be impacted by trends in vehicle use and mode share. Growth in the activity of TNCs, such as Uber and Lyft, may impact the demand for public parking and rental car facilities. In addition, rises in gasoline prices could result in the reduced use of private vehicles and increases in the use of public transportation, carpooling, shuttle services, etc. These changes could impact the long-term demand for public and employee parking lots, as well as change the demand for public transportation facilities. Ongoing monitoring of the utilization of these facilities should be conducted, with adjustments made to facility requirements, as necessary.

[1] Projects included in the ADP account only for future capital development projects recommended in the MPU; they do not reflect the needs of the Airport sponsor to undertake additional projects through the planning period related to maintaining existing Airport facilities or conditions. The financial impacts of these additional projects, in conjunction with the projects included in the ADP, are analyzed in Section 7.

6.1.2 FUNDING

The availability of funds often affects the implementation schedule for airport development projects. Funds available for capital development projects at the Airport in any given year are limited. In some cases, funds may need to be saved over the course of multiple years in order to construct a large project. In other cases, the implementation schedule for certain projects may need to shift due to a lack of funding that was previously anticipated, or to take advantage of unexpected funding opportunities.

6.1.3 PRIORITIES

In some cases, the implementation of projects may not necessarily be based on or triggered by future demand. For example, projects involving the development of land for new commercial or tenant leasing opportunities could be undertaken at any point within the planning period, at the discretion of the Airport sponsor, in consideration of factors such as available funding and the need to implement projects that are more sensitive to increasing demand or that may be required for operational or safety reasons.

6.1.4 ENABLING PROJECTS

In some cases, particularly for larger capital development projects, one or more projects or actions may need to be completed in order to fully implement the project. Therefore, the implementation plan must account for the time necessary to complete these enabling projects prior to construction. For example, prior to expanding terminal facilities to increase the number of aircraft gates, various facilities would need to be relocated, which requires construction of additional facilities to accommodate the displaced demand. In addition, environmental processes and design would be required prior to construction of the terminal improvements, as well as the enabling projects. When factoring in a phased construction schedule, full implementation of a project, such as the terminal concourse expansion, may take several years from project initiation.

6.2 ADDITIONAL STUDIES

Implementation of various elements of the ADP would likely require further study prior to design and construction to better define the project scope and to understand the actual demand and/or impacts of the development.

- **Environmental Studies**: NEPA requires environmental processing for all airport development projects that require federal (i.e., FAA) action for implementation. The level of environmental processing required for various projects may range from a qualitative examination of potential impacts to a detailed quantitative analysis, with processing timelines ranging from a few months to a year or more.
- **Terminal Programming**: Section 4 of the MPU quantifies general future space and aircraft gate requirements for the terminal building, while Section 5 describes recommended terminal development to meet these requirements. However, refinement of the preferred terminal development concept did not include detailed space layout planning within future terminal facilities/expansion. The layout, configuration, and placement of various functional elements within the expanded terminal should be examined prior to or in conjunction with project definition and design.
- **Airfield Development Programming**: The most significant airfield project recommended in the MPU is the relocation of the Runway 10R threshold to line up with the Runway 10L threshold and the extension of Runway 28L to the southeast to line up with the Runway 28R threshold. Associated projects include the demolition of portions of Taxiway J, the realignment of various access taxiways, and the relocation of NAVAIDS, lighting, and other supporting equipment and infrastructure. A subsequent study should refine the planning, cost estimates, and schedule for the projects that comprise this airfield development program.

- **Future Land Development Studies**: Preferred Airport development described in the MPU includes the identification of areas for future aviation and non-aviation development. Additional studies may be required to determine the type and layout of facilities to be developed in these areas. For example, areas identified for future aviation development may be suitable for GA hangars. The size, number, and configuration of hangars would need to be determined as an initial step to implement such development. As another example, areas for potential future solar development have been identified. Any solar-array development proposal would require FAA coordination prior to project approval, which may include studies to quantify potential impacts of solar glare. Future fuel farm development would also require additional study to determine the size, number, and configuration of fuel tanks and associated distribution infrastructure.
- **Master Plan Updates**: The planning period for the MPU extends through 2035. Since the FAA recommends that airport sponsors update their master plan every 5 to 10 years, certain medium-term or long-term projects identified for implementation in this MPU may be re-evaluated in subsequent master plan updates to further assess project requirements and timing.

6.3 PHASED IMPLEMENTATION PLAN

In consideration of the factors identified previously, this section describes a potential phasing plan for project development. It identifies the individual Master Plan Projects and illustrates the progression of development to transition the Airport from existing conditions through full development of the Master Plan Projects. **Exhibit 6-1** depicts key Master Plan Projects and illustrates the potential implementation schedule for each project.

The implementation plan is divided into three phases. The first phase covers short-term development (2019 through 2021). The second phase covers medium-term development (2022 through 2028), and the third phase covers long-term development (2029 through 2035). The following subsections describe the Master Plan Projects identified for implementation within each of the three phases. All years are based on the City's fiscal year (FY), which runs from October 1 through September 30. Various factors, including those previously described, may impact the actual sequence or timing of implementation of the Master Plan Projects.

6.3.1 SHORT-TERM PROJECTS (2019–2021)

Table 6-1 lists the short-term Master Plan Projects that may be implemented by 2021. The timing for short-term projects is generally more certain than for medium- or long-term projects, so the estimated year of development for each project is also identified, as included in the Airport's 5-year Capital Improvement Program (CIP).

Short-term development is highlighted by significant landside projects, including construction of an employee parking garage, public parking garage, and rental car ready/return garage. These projects are necessary to accommodate existing and future demand, as well as necessary to accommodate parking facilities that would be displaced by construction of Concourse A. Other landside projects include improvements to the off-site Economy Lot, as well as relocation of existing cooling towers and the ITD hangar, both of which must be removed to allow construction of the rental car ready/return garage and associated connector building between the garage and the terminal building. Once the existing employee parking and rental car facilities are removed/relocated, terminal projects include construction of Phase 1 of the Concourse A apron, along with design for Concourse A Phase 1 development.

Airfield construction projects include extension of deice aprons, extension of Taxilane S near the SkyWest Airlines maintenance facility, and construction of Taxiway N north of Taxiway A to provide access to future aviation-related development. Extension of Taxiway W from Runway 10L-28R to Taxiway F and relocation of Taxiway G outside the Runway 10R-28L high-energy zone are also anticipated by 2021.

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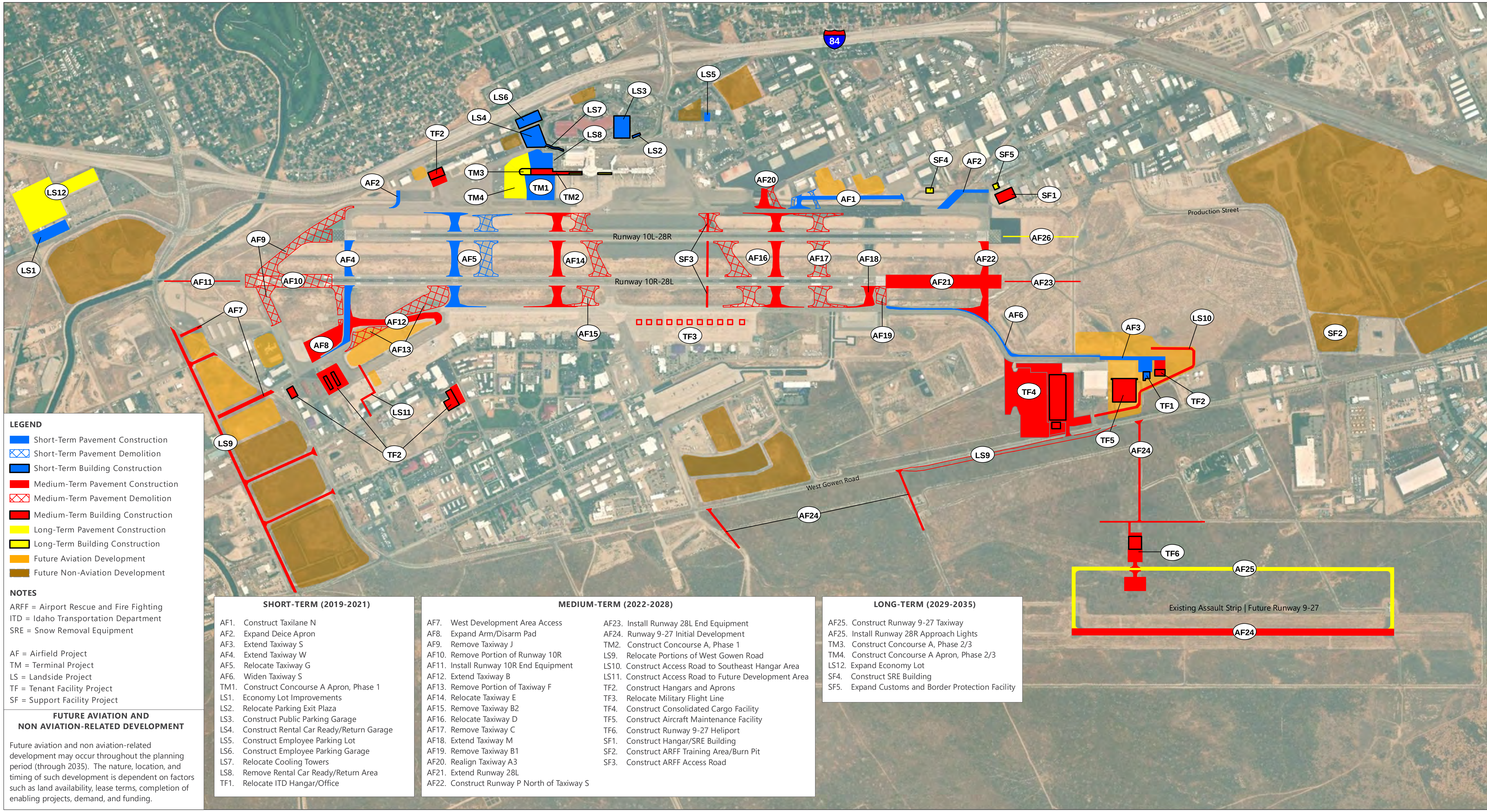

LEGEND

- Short-Term Pavement Construction
- Short-Term Pavement Demolition
- Short-Term Building Construction
- Medium-Term Pavement Construction
- Medium-Term Pavement Demolition
- Medium-Term Building Construction
- Long-Term Pavement Construction
- Long-Term Building Construction
- Future Aviation Development
- Future Non-Aviation Development

NOTES

ARFF = Airport Rescue and Fire Fighting
ITD = Idaho Transportation Department
SRE = Snow Removal Equipment

AF = Airfield Project
TM = Terminal Project
LS = Landside Project
TF = Tenant Facility Project
SF = Support Facility Project

FUTURE AVIATION AND NON AVIATION-RELATED DEVELOPMENT

Future aviation and non aviation-related development may occur throughout the planning period (through 2035). The nature, location, and timing of such development is dependent on factors such as land availability, lease terms, completion of enabling projects, demand, and funding.

SHORT-TERM (2019-2021)

AF1. Construct Taxilane N
AF2. Expand Deice Apron
AF3. Extend Taxiway S
AF4. Extend Taxiway W
AF5. Relocate Taxiway G
AF6. Widen Taxiway S
TM1. Construct Concourse A Apron, Phase 1
LS1. Economy Lot Improvements
LS2. Relocate Parking Exit Plaza
LS3. Construct Public Parking Garage
LS4. Construct Rental Car Ready/Return Garage
LS5. Construct Employee Parking Lot
LS6. Construct Employee Parking Garage
LS7. Relocate Cooling Towers
LS8. Remove Rental Car Ready/Return Area
TF1. Relocate ITD Hangar/Office

MEDIUM-TERM (2022-2028)

AF7. West Development Area Access
AF8. Expand Arm/Disarm Pad
AF9. Remove Taxiway J
AF10. Remove Portion of Runway 10R
AF11. Install Runway 10R End Equipment
AF12. Extend Taxiway B
AF13. Remove Portion of Taxiway F
AF14. Relocate Taxiway E
AF15. Remove Taxiway B2
AF16. Relocate Taxiway D
AF17. Remove Taxiway C
AF18. Extend Taxiway M
AF19. Remove Taxiway B1
AF20. Realign Taxiway A3
AF21. Extend Runway 28L
AF22. Construct Runway P North of Taxiway S
AF23. Install Runway 28L End Equipment
AF24. Runway 9-27 Initial Development
TM2. Construct Concourse A, Phase 1
LS9. Relocate Portions of West Gowen Road
LS10. Construct Access Road to Southeast Hangar Area
LS11. Construct Access Road to Future Development Area
TF2. Construct Hangars and Aprons
TF3. Relocate Military Flight Line
TF4. Construct Consolidated Cargo Facility
TF5. Construct Aircraft Maintenance Facility
TF6. Construct Runway 9-27 Heliport
SF1. Construct Hangar/SRE Building
SF2. Construct ARFF Training Area/Burn Pit
SF3. Construct ARFF Access Road

LONG-TERM (2029-2035)

AF25. Construct Runway 9-27 Taxiway
AF25. Install Runway 28R Approach Lights
TM3. Construct Concourse A, Phase 2/3
TM4. Construct Concourse A Apron, Phase 2/3
LS12. Expand Economy Lot
SF4. Construct SRE Building
SF5. Expand Customs and Border Protection Facility

SOURCES: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community (aerial photo); Ricondo & Associates, Inc., April 2019, in coordination with the City of Boise Department of Aviation and Federal Aviation Administration (Master Plan Projects implementation plan).

NORTH 0 1,500 ft

EXHIBIT 6-1

IMPLEMENTATION PLAN FOR MASTER PLAN PROJECTS

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TABLE 6-1 SHORT-TERM DEVELOPMENT PROJECTS (2019–2021)

PROJECT ID[1]	PROJECT NAME	PROJECT DESCRIPTION/ELEMENTS	ESTIMATED IMPLEMENTATION YEAR
Airfield Projects			
AF1	Design Taxilane N	▪ Design of Taxilane N north of Taxiway A	2019
AF2	Rehabilitate and Expand Deice Aprons	▪ Rehabilitation/expansion of east deicing apron, including painted island and service road relocation ▪ Rehabilitation/expansion of west deicing apron	2019
AF3	Extend Taxiway S	▪ Extension of Taxiway S to the east for access by future aviation development	2019
AF4	Extend Taxiway W	▪ Demolition of Taxiway H ▪ Extension of Taxiway W from Runway 10L to Taxiway F	2020
	Airfield Development Program, Planning	▪ Planning, cost estimating, and schedule development for future airfield development	2020
AF5	Relocate Taxiway G	▪ Demolition of Taxiway G ▪ Construction of Taxiway G and extension to Taxiway B, including bid preparation, construction administration, and construction	2021
AF1	Construct Taxilane N	▪ Construction of Taxilane N north of Taxiway A ▪ Demolition of Taxilanes A1 and A2	2021
AF6	Widen Taxiway S	▪ Widening of Taxiway S to meet Taxiway Design Group 5 standards	2021
	Airfield Development Program, Environmental Assessment	▪ Environmental assessment for future airfield development	2021
	Airfield Development Program, Preliminary Design	▪ Preliminary design and geotechnical surveys for future airfield development	2021
	Airfield Development Program, Develop New Procedures	▪ Reimbursable agreement with the FAA for development of new procedures for future airfield development	2021
Terminal Projects			
TM1	Design Concourse A Apron, Phase 1	▪ Design of the Concourse A apron associated with Phase 1 of terminal development	2020
TM2	Design Concourse A, Phase 1	▪ Design of Concourse A and associated utilities	2020
TM1	Construct Concourse A Apron, Phase 1	▪ Phase 1 construction of the Concourse A apron, providing six aircraft parking positions and associated taxilane development/improvements	2021
Landside Projects			
LS1	Economy Lot Improvements	▪ Paving, striping, and lighting of unimproved areas of the Economy Lot	2019
LS2	Relocate Parking Exit Plaza	▪ Relocation of the parking toll plaza and associated roadway realignment	2019
LS3	Design Public Parking Garage Expansion	▪ Preliminary design and design/build documentation for the new public parking garage	2019
LS4	Rental Car Ready/Return Garage, Planning and Design	▪ Planning and design for the new rental car ready/return garage	2019
LS5	Construct Employee Parking Lot	▪ Construction of a new employee parking lot along Apollo Street in the vicinity of the north cargo area	2019
LS6	Construct Employee Parking Garage	▪ Construction of an employee parking garage providing up to 680 parking spaces with sloped plate/ramps	2020
LS4	Design Rental Car Ready/ Return Garage and Lobby	▪ Design for the new rental car ready/return garage	2020
LS3	Construct Public Parking Garage	▪ Construction of the new public parking garage providing up to 940 parking spaces with sloped plate/ramps	2020
LS7	Relocate Cooling Towers	▪ Relocation of cooling towers for future rental car ready/return garage connector	2020
LS1	Economy Lot Improvements	▪ Paving, striping, and lighting of unimproved areas of the Economy Lot	2020
LS4	Construct Rental Car Ready/ Return Garage	▪ Construction of a new rental car ready/return garage, providing up to 880 parking spaces with sloped plate/ramps ▪ Integrated customer service lobby ▪ Ground level connector between the garage and main terminal building	2021
LS8	Remove Existing Rental Car Ready/Return Area	▪ Removal of existing rental car ready/return area canopies and kiosks	2021
Tenant Facility Projects			
TF1	Relocate Idaho Transportation Department (ITD) Hangar and Office	▪ Demolition of the ITD hangar and construction of new hangar and apron	2019

NOTES: Years represent fiscal years from October 1 to September 30.

1 Projects that are not tied to a physical construction project are not assigned a Project ID. Planning/design of a project and subsequent construction of the same project are assigned the same Project ID. Project IDs relate to Exhibit 6-1.

AF – Airfield
FAA – Federal Aviation Administration
LS – Landside
TF – Tenant Facility
TM – Terminal

SOURCE: Ricondo & Associates, Inc., April 2019 (based on information provided by the City of Boise Department of Aviation).

6.3.2 MEDIUM-TERM PROJECTS (2022–2028)

Table 6-2 lists the Master Plan Projects anticipated to be implemented in the medium term (2022 through 2028).

TABLE 6-2 (1 OF 2) MEDIUM-TERM DEVELOPMENT PROJECTS (2022–2028)

PROJECT ID[1]	PROJECT NAME	PROJECT DESCRIPTION/ELEMENTS
Airfield Projects		
AF7	West Development Area Access	▪ Extend taxilane from T-hangars ▪ Extend taxilane from Taxiway F
AF8	Expand Arm/Disarm Pad	▪ Expansion of Idaho Air National Guard arm/disarm pad
AF9	Remove Taxiway J	▪ Demolition of Taxiway J north of Runway 10R threshold ▪ Demolition of portion of Taxiway J south of Runway 10R threshold
AF10	Remove Portion of Runway 10R	▪ Demolition of Runway 10R from existing west end to Runway 10L threshold alignment
AF11	Runway 10R End Equipment	▪ Install Runway 10R PAPI ▪ Relocate glide slope ▪ Relocate approach lights and bridge ▪ Install arresting barrier
AF12	Extend Taxiway B	▪ Extension of Taxiway B around glide slope critical area to connect with extended Taxiway W
AF13	Remove Portion of Taxiway F	▪ Demolition of portion of Taxiways F and B ▪ Demolition of Taxiway B3
AF14	Relocate Taxiway E	▪ Demolition of Taxiway E (center and north sections) ▪ Construction of new Taxiway E ▪ Installation of Painted Island north of Taxiway A
AF15	Remove Taxiway B2	▪ Demolition of Taxiway B2
AF16	Relocate Taxiway D	▪ Demolition of Taxiway D ▪ Construction of New Taxiway D
AF17	Remove Taxiway C	▪ Demolition of Taxiway C
AF18	Extend Taxiway M	▪ Extension of Taxiway M from Runway 10R-28L to Taxiway B
AF19	Remove Taxiway B1	▪ Demolition of Taxiway B1
AF20	Realign Taxilane A3	▪ Demolition of Taxilane A3 ▪ Construction of realigned Taxiway A3
AF21	Extend Runway 28L	▪ Extension of Runway 28L east to align with Runway 28R threshold
AF22	Construct Taxiway P North of Taxiway S	▪ Construction of Taxiway P from Runway 28R threshold to Taxiway S
AF23	Runway 28L End Equipment	▪ Install Runway 28L PAPI ▪ Install runway lights ▪ Relocate runway visual range equipment (entire runway) ▪ Relocate localizer ▪ Relocate approach lights ▪ Relocate distance-measuring equipment and support buildings
AF24	Runway 9-27 Initial Development	▪ Repave, widen, and commission the assault strip as Runway 9-27 ▪ Extend utilities to the Runway 9-27 area ▪ Construction of access roads

TABLE 6-2 (2 OF 2) MEDIUM-TERM DEVELOPMENT PROJECTS (2022–2028)

PROJECT ID[1]	PROJECT NAME	PROJECT DESCRIPTION/ELEMENTS
Terminal Projects		
TM2	Construct Concourse A, Phase 1	▪ Phase 1 construction of Concourse A ▪ Acquisition and installation of up to six passenger loading bridges
Landside Projects		
LS9	Relocate Portions of West Gowen Road	▪ Relocation/realignment of a segment of West Gowen Road to facilitate air cargo facility construction
LS10	Construct Access Road to Southeast Hangar Area	▪ Construction of access road from existing aircraft maintenance hangar to serve future aviation-related development
LS11	Construct Access Road to Future Development Area	▪ Construction of access road from West Aeronca Street to aviation-related infill development area ▪ Installation of airfield access gate on West Aeronca Street
Tenant Facility Projects		
TF2	Construct Hangars and Aprons	▪ Relocation of two T-hangar buildings ▪ Construction of conventional hangar in place of removed T-hangars ▪ Construction of airside building and apron south of west general aviation apron ▪ Construction of hangar and apron at location of FAA Duvall Building ▪ Construction of hangar and apron along extended Taxiway S
TF3	Relocate Military Flight Line	▪ Relocation of Idaho Air National Guard flight line from west military apron to east military apron ▪ Potential construction of aircraft shade hangars along flight line
TF4	Construct Consolidated Cargo Facility	▪ Construction of cargo buildings ▪ Construction of cargo apron, including portion of Taxiway P south from Taxiway S ▪ Construction of vehicle parking and access from West Gowen Road
TF5	Construct Aircraft Maintenance Facility	▪ Construction of aircraft maintenance facility adjacent to existing aircraft maintenance facility ▪ Vehicle access via new access road (Project LS11)
TF6	Construct Runway 9-27 Heliport	▪ Construction of a heliport sized to accommodate a CH-47 aircraft, including hangar, apron, helipad, and parking/vehicle access
Support Facility Projects		
SF1	Construct Hangar/Snow Removal Equipment (SRE) Building	▪ Demolition of existing helitack/SRE storage buildings ▪ Construction of new hangar/SRE storage building
SF2	Construct Aircraft Rescue and Firefighting (ARFF) Burn Pit	▪ Construction of ARFF training area/burn pit adjacent to existing burn pit
SF3	Construct ARFF Access Road	▪ Construction of ARFF access road from existing ARFF station to Taxiway B

NOTES: Years represent fiscal years from October 1 to September 30. All projects include design and construction, as applicable.
1 Project IDs relate to Exhibit 6-1.
AF – Airfield
TM – Terminal
LS – Landside
TF – Tenant Facility
SF – Support Facility
PAPI – Precision Approach Path Indicator
FAA – Federal Aviation Administration
SOURCE: Ricondo & Associates, Inc., April 2019 (based on information provided by the City of Boise Department of Aviation).

Phase 1 of Concourse A is anticipated to be constructed in 2022, including up to three mainline and three regional aircraft loading bridges.

Pending planning, design, environmental approvals, and funding availability, a significant number of airfield projects are anticipated to be implemented in the medium term. Following airfield work expected to be completed in the short term, many of these medium-term airfield projects are associated with efforts to improve the safety and efficiency of the airfield, including eliminating the published hot spot, removing taxiways from runway high-energy zones, and eliminating direct apron-to-runway access. Significant projects include relocation of Taxiways E and D, removal of Taxiway C, relocation of the Runway 10R threshold, removal of portions of Taxiway J, extension of Taxiway B, and extension of Runway 28L.

Relocation of the Runway 10R threshold and extension of Runway 28L would require the significant relocation of NAVAIDS and other equipment that support the runway, including a glide slope, localizer, and approach lights. A PAPI and arresting barriers for military aircraft could be installed on each end of the runway. The runway would also require restriping.

Initial development/conversion of the existing assault strip to a third Airport runway (Runway 9-27) is also possible in the medium term. This initial development would consist of rehabilitating and widening the existing assault strip from 90 feet to 100 feet at the current length of 5,000 feet. Initially, Runway 9-27 would be a daytime VFR-only runway (no lights or instrument approach procedures/capability) that would support operations such as helicopters or touch-and-go operations of small GA aircraft. Initial development may also include the extension of utilities and roadway access to the runway area. Preferred south airfield development includes access roads stemming from Gowen Road and Pleasant Valley Road. Full buildout of all these roads may not be warranted until ultimate development of Runway 9-27 is realized, which is not projected within the planning period of the MPU. However, limited roadway development, such as a single access point from Gowen Road, may be feasible. For planning purposes, development of a heliport in the Runway 9-27 area is depicted in the medium term. Basing of fixed-wing aircraft in the area would require taxiway access.

Relocation of Orchard Street on the west side of the Airport is anticipated around 2023. This is an Ada County Highway District project that, upon completion, would potentially open up additional land for future aviation development. The implementation plan includes construction of taxilanes to provide aircraft access. Aviation development in this area may not materialize within the medium term, which may impact the need for or timing of taxilane construction.

Provided that short-term landside development is implemented as expected, landside development in the medium term is expected to be relatively minimal. Airfield development related to the relocation of the Runway 10R threshold and the extension of Taxiway B may provide an opportunity for infill aviation-related development in this area. Provision of an access road from West Aeronca Street to this area, including an airside access gate, is included in the implementation plan. Aviation development in this area may not materialize within the medium term, which may impact the need for or timing of roadway construction.

Roadway projects are also anticipated in the area around the SkyWest Airlines maintenance hangar. Construction of the consolidated cargo facility is anticipated to require relocation/realignment of a portion of West Gowen Road. In addition, an access road stemming from the existing maintenance hangar would provide access to future aviation-related development in this area.

The implementation plan includes the construction or relocation of various tenant facilities in the medium term. Exhibit 6-1 depicts specific GA hangar and apron areas that may be developed through 2028, although the timing of such development would be dependent on tenant needs and financing. Relocation of the IDANG flight line from the west military apron to the east military apron may occur in the medium term, and it could include construction of aircraft shade ports. The most significant tenant-related development anticipated in the medium term includes construction of a consolidated cargo facility and a new aircraft maintenance facility.

Support facilities and infrastructure anticipated to be implemented in the medium term include construction of a new storage/SRE building, which would require demolition of two existing structures currently occupied by the BLM helitack and SRE equipment. Construction of an ARFF training area and burn pit is planned in the area adjacent to the existing ARFF burn pit. In association with airfield development, an ARFF access road would be constructed between the ARFF station and Taxiway B to maintain adequate ARFF response time upon removal of Taxiway D.

6.3.3 LONG-TERM PROJECTS (2029–2035)

Table 6-3 presents Master Plan Projects anticipated to be implemented in the long term (2029 through 2035). The timing of some medium-term projects and all long-term projects is likely to be re-evaluated in a subsequent master plan update. It is possible that some long-term projects could be implemented prior to the long-term period (prior to 2029) or after the planning period of the MPU (after 2035).

TABLE 6-3 LONG-TERM DEVELOPMENT PROJECTS (2029–2035)

PROJECT ID[1]	PROJECT NAME	PROJECT DESCRIPTION/ELEMENTS
Airfield Projects		
AF25	Construct Runway 9-27 Taxiway	▪ Construction of a parallel taxiway system for Runway 9-27
AF26	Install Runway 28R Approach Lights	▪ Installation of approach lights on Runway 28R to reduce landing minimums
Terminal Projects		
TM3	Construct Concourse A, Phase 2/3	▪ Expansion of Concourse A ▪ Acquisition and installation of up to four passenger loading bridges ▪ Expansion of connectors to Concourses A and B
TM4	Construct Concourse A Apron, Phase 2/3	▪ Expansion of the Concourse A apron to accommodate up to three additional mainline aircraft parking positions and one additional regional aircraft parking position and associated taxilane development/improvements
Landside Projects		
LS12	Expand Economy Lot	▪ Expansion of the Economy Lot to provide additional capacity for public and employee parking, as well as rental car storage
Support Facility Projects		
SF4	Construct Snow Removal Equipment (SRE) Building	▪ Construction of a new SRE storage building ▪ Requires removal of existing railroad tracks
SF5	Expand Customs and Border Protection (CBP) Facility	▪ Expansion of the CBP facility to accommodate larger aircraft and/or additional processing capacity

NOTES: Years represent fiscal years from October 1 to September 30. All projects include design and construction, as applicable.
1 Project IDs relate to Exhibit 6-1.
AF – Airfield
TM – Terminal
LS – Landside
SF – Support Facility
SOURCE: Ricondo & Associates, Inc., April 2019 (based on information provided by the City of Boise Department of Aviation).

Completion of Phase 1 of Concourse A would include up to six additional aircraft gates, bringing total terminal gates to 30, which is projected to meet gate requirements through 2025 or possibly 2035. The implementation plan assumes a subsequent phase of terminal development would occur in the long term, adding up to four more gates on Concourse A (three mainline gates and one regional gate). Expansion of the connectors from the main terminal to Concourses A and B is also assumed, which would add interior terminal space and would facilitate the implementation of additional mainline gates to the front of the terminal, if needed. Additional terminal apron and taxilane access would also be constructed.

Long-term development of Runway 9-27 may include construction of a parallel taxiway. Such development is likely to be spurred by interest in facility development from an anchor tenant, such as an FBO or the US Forest Service.

Additional long-term projects include the installation of a MALSR approach light system to reduce landing minimums on Runway 28R; expansion of the Economy Lot to provide additional space for public and employee parking, along with rental car storage; construction of a new SRE facility; and expansion of the CBP facility.

6.3.4 AREAS FOR FUTURE DEVELOPMENT

As noted earlier in this section, preferred Airport development described in the MPU includes the identification of areas for future aviation and non-aviation development. These areas are depicted on preferred development exhibits in Section 5, as well as on Exhibit 6-1, and on the FAA-approved ALP.

Future aviation and non-aviation-related development may occur throughout the planning period (through 2035). The nature, location, and timing of such development is dependent on factors such as land availability, lease terms, completion of enabling projects, demand, and funding.

Colliers International assessed several potential development areas around the Airport to help determine the type of development most appropriate for each site, with specific emphasis on non-aviation or commercial or industrial development opportunities. This study is included as **Appendix C**. Development of the land available around the Airport for non-aviation purposes presents an opportunity to increase non-aeronautical revenue.

6.4 ENVIRONMENTAL CONSIDERATIONS

NEPA requires environmental processing for all airport development projects that require a federal (i.e., FAA) action for completion. The three levels of environmental processing are the following:

- **Categorical Exclusion (CATEX)**—for projects that have no potential for significant environmental impact
  - Examples: installation of equipment/instrumentation; facility siting; maintenance; minor construction; vehicle acquisition; facility/building construction (depends on scope/location of project)
  - Typical duration: 1 to 2 months
  - Level of analysis: completion of CATEX form; possible technical analysis of some impact categories
  - Determination: action/project categorically excluded
- **Environmental Assessment (EA)**—for projects that may have significant environmental impacts
  - Examples: terminal construction/expansion; runway extension; site development; land acquisition
  - Typical duration: 1 to 2 years

- Level of analysis: identification of reasonable alternatives and quantitative assessment of potential environmental impacts
- Determination: Finding of No Significant Impact (FONSI)

- **Environmental Impact Statement (EIS)**—for projects that have significant environmental impacts
  - Examples: new commercial service airport; new air carrier runway
  - Typical duration: 2 to 3 (or more) years
  - Level of analysis: detailed technical analysis; significant agency coordination and public outreach
  - Determination: Record of Decision (ROD)

The effects of development on environmental resources have been considered throughout the MPU process, from defining environmental resources in the Airport environs (see Section 2) to incorporating environmental considerations into the evaluation of development concepts (see Section 5). These considerations provide a general understanding of the environmental issues related to implementation of the Master Plan Projects.

An overview of environmental conditions related to the Master Plan Projects was conducted in relation to the environmental impact categories outlined in FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*,[2] as well as those typically considered under NEPA. Based on known environmental conditions at the Airport (defined in Section 2) and the nature of the development associated with the recommended Master Plan Projects, the following potential environmental impacts have been preliminarily identified[3,4]:

Air Quality

All construction projects at the Airport may generate temporary air pollutant emissions resulting from engine exhaust, earthmoving activities, and other sources. The nature and amount of such construction activity would dictate whether resulting emissions would be considered significant. In particular, grading/earthmoving activities related to construction occurring on undeveloped land could be a major source of fugitive dust. Changes to the airfield, particularly the relocation of taxiways, may alter aircraft taxi time, which could result in increased (or decreased) aircraft emissions.

Noise and Compatible Land Use

Noise exposure contours were developed for the Airport as part of the 2015 Part 150 Study Update, as described in Section 2. The noise study found areas where noise levels are too loud to be compatible with underlying residential land use. These areas are located north/northwest of the Airport. Relocation of the Runway 10R threshold and extension of Runway 28L will have some impact on the shape of noise contours on and surrounding the Airport. However, aircraft departing from extended Runway 28L would be at a higher altitude above potentially sensitive land uses northwest of the Airport compared to existing conditions. Similarly, aircraft arriving on relocated Runway

[2] US Department of Transportation, Federal Aviation Administration, Order 1050.1F, *Environmental Impacts: Policies and Procedures*, July 16, 2015.

[3] Environmental impact categories listed in FAA Order 1050.1F that are not applicable to BOI or would not be expected to be significantly impacted as a result of implementation of the Master Plan Projects are not listed/described in this section.

[4] More specific environmental analyses will be required when individual projects near the development stage and are submitted for environmental review.

10R would be higher on approach over these same areas compared to existing conditions. Therefore, the recommended runway project may not have an adverse impact on incompatible land uses.

Significant noise impacts would also not be expected from aircraft operations on the assault strip/future Runway 9-27. Initial development of the runway would likely exclusively accommodate helicopters and GA piston or turboprop aircraft, which do not generate the same magnitude of noise as jet aircraft. Land use planning would minimize any potential impact to sensitive land uses.

Aquatic Features

The southern perimeter of the Airport is located within the 100-year floodplain of Five Mile Creek, which may be a consideration with regard to future development of Runway 9-27 and the surrounding area.

Regarding water quality, pollution prevention practices would be implemented during construction to prevent significant impacts to surface water quality. An increase in impervious surfaces (i.e., pavement) at the Airport would result in increased stormwater runoff. Additional stormwater retention ponds have been planned in consideration of future development.

Terrestrial Features

Development of the area west of the Airport within the proposed Orchard Street relocation project should be done in consideration of potential landfill sites identified in that area. Best management practices would reduce the potential for releases of hazardous materials. Solid waste would be generated during construction activities. There are no known capacity issues with existing landfills with regard to accommodating the increased solid waste.

Slickspot peppergrass is the only federal-listed threatened species known to occur on the Airport, and it has been sighted on undeveloped land south of Gowen Road. Impacts to this species from development of Runway 9-27 and surrounding areas south of Gowen Road should be avoided or mitigated, as appropriate.

The Five Mile Creek Drain is the only previously recorded "eligible" resource at the Airport listed under the NRHP. A cultural resources report for the Airport prepared in March 2019 identified various aboveground resources (e.g., buildings) that may be potentially eligible for listing on the NRHP. The FAA and the Idaho SHPO are responsible for the final determination of eligibility and should be consulted as part of environmental processing requirements for future Airport development projects, as applicable.

Environmental Justice and Socioeconomic Impacts

It is anticipated that recommended development would avoid incompatible land use and noise issues. Temporary traffic restrictions could affect access to businesses and industrial facilities around the Airport during construction. However, these temporary impacts would not likely be significant. No non-Airport business relocation is anticipated in connection with implementation of the recommended Master Plan Projects.

Natural Resources and Energy Supply

Implementation of the Master Plan Projects would increase the footprint of Airport facilities and would likewise increase energy consumption at the Airport. The most notable increases would result from passenger terminal expansion (water, electricity, and natural gas) and airfield expansion (electricity for runway/taxiway lighting). However, compared to the energy consumption of the City as a whole, the increases in energy consumption and the effect on natural resources and energy supply would likely be insignificant.

Visual Impacts

Runway and taxiway projects may result in the addition or relocation of airfield lighting, primarily in areas that are buffered from residential and commercial properties. Where necessary, it is anticipated that lights would contain baffles to ensure light emissions would not adversely impact off-Airport properties.

6.5 ESTIMATED MASTER PLAN PROJECT COSTS

Table 6-4 presents rough order of magnitude cost estimates for implementation of the recommended Master Plan Projects. The cost estimates are provided in current (2019) dollars. Estimated costs for short-term development projects were obtained from the Airport's 5-year CIP. Medium-term and long-term development project costs were provided by Connico, Incorporated, in April 2019. The cost estimates presented herein were prepared for MPU implementation and financial planning purposes only. Actual project costs will be defined through subsequent design and bidding.

For short-term projects, costs associated with design are generally broken out as separate projects, as applicable. For medium-term and long-term projects, "soft" costs are estimated at 15.0 percent of direct construction costs and include architectural/engineering design (10.0 percent), program management (3.0 percent), and construction administration (2.0 percent). The costs presented in Table 6-4 do not include any general contractor markups. No cost escalation was assumed for short-term projects (through FY 2021). Medium-term project costs were escalated at 3.0 percent per year from FY 2019 to FY 2024, the approximate midpoint of the medium-term implementation period. Long-term project costs were escalated at 3.0 percent per year from FY 2019 to FY 2031, the approximate midpoint of the long-term implementation period.

Estimated costs for implementation of the recommended Master Plan Projects are summarized as follows:

- Airfield Project Costs: $107,825,000
- Terminal Project Costs: $114,598,000
- Landside Project Costs: $91,176,000
- Tenant Facility Project Costs: $130,487,000
- Support Facility Project Costs: $17,678,000
- **Total Project Costs: $461,764,000**

TABLE 6-4 (1 OF 2) COST ESTIMATES FOR MASTER PLAN PROJECTS

PROJECT NAME	PROJECT CATEGORY	IMPLEMENTATION YEAR/TIMEFRAME	ESTIMATED PROJECT COST[1]
Short-Term Development Projects			
Design Taxilane N	Airfield	2019	$287,281
Rehabilitate and Expand Deice Aprons	Airfield	2019	$5,104,000
Extend Taxiway S	Airfield	2019	$800,000
Economy Lot Improvements	Landside	2019	$600,000
Relocate Parking Exit Plaza	Landside	2019	$1,200,000
Design Public Parking Garage Expansion	Landside	2019	$420,000
Rental Car Ready/Return Garage, Planning and Design	Landside	2019	$400,000
Construct Employee Parking Lot R4	Landside	2019	$461,000
Relocate Idaho Transportation Department Hangar and Office	Tenant Facility	2019	$2,994,000
Extend Taxiway W	Airfield	2020	$5,182,000
Airfield Development Program, Planning	Airfield	2020	$150,000
Design Concourse A Apron, Phase 1	Terminal	2020	$1,400,000
Design Concourse A, Phase 1	Terminal	2020	$5,000,000
Construct Employee Parking Garage	Landside	2020	$15,000,000
Design Rental Car Ready/Return Garage and Lobby	Landside	2020	$1,400,000
Construct Public Parking Garage	Landside	2020	$17,500,000
Relocate Cooling Towers	Landside	2020	$3,500,000
Economy Lot Improvements	Landside	2020	$800,000
Relocate Taxiway G	Airfield	2021	$6,200,000
Construct Taxilane N	Airfield	2021	$970,000
Widen Taxiway S	Airfield	2021	$600,000
Airfield Development Program, Environmental Assessment	Airfield	2021	$200,000
Airfield Development Program, Preliminary Design	Airfield	2021	$200,000
Airfield Development Program, Develop New Procedures	Airfield	2021	$1,000,000
Construct Concourse A Apron, Phase 1	Terminal	2021	$15,000,000
Construct Rental Car Ready/Return Garage	Landside	2021	$35,700,000
Remove Existing Rental Car Ready/Return Area	Landside	2021	$2,000,000
Total Short-Term Development Costs			**$124,068,000**
Medium-Term Development Projects			
West Development Area Access	Airfield	2022–2028	$2,798,000
Expand Arm/Disarm Pad	Airfield	2022–2028	$5,715,000
Remove Taxiway J	Airfield	2022–2028	$2,503,000
Remove Portion of Runway 10R	Airfield	2022–2028	$2,535,000
Runway 10R End Equipment	Airfield	2022–2028	$4,448,000
Extend Taxiway B	Airfield	2022–2028	$6,340,000
Remove Portion of Taxiway F	Airfield	2022–2028	$2,292,000
Relocate Taxiway E	Airfield	2022–2028	$7,129,000
Remove Taxiway B2	Airfield	2022–2028	$823,000
Relocate Taxiway D	Airfield	2022–2028	$8,991,000
Remove Taxiway C	Airfield	2022–2028	$2,202,000
Extend Taxiway M	Airfield	2022–2028	$1,461,000

TABLE 6-4 (2 OF 2) COST ESTIMATES FOR MASTER PLAN PROJECTS

PROJECT NAME	PROJECT CATEGORY	IMPLEMENTATION YEAR/TIMEFRAME	ESTIMATED PROJECT COST[1]
Remove Taxiway B1	Airfield	2022–2028	$1,722,000
Realign Taxilane A3	Airfield	2022–2028	$1,522,000
Extend Runway 28L	Airfield	2022–2028	$8,571,000
Construct Taxiway P North of Taxiway S	Airfield	2022–2028	$4,361,000
Runway 28L End Equipment	Airfield	2022–2028	$4,160,000
Runway 9-27 Initial Development	Airfield	2022–2028	$9,988,000
Construct Concourse A, Phase 1	Terminal	2022–2028	$48,902,000
Relocate Portions of West Gowen Road	Landside	2022–2028	$2,447,000
Construct Access Road to Southeast Hangar Area	Landside	2022–2028	$1,366,000
Construct Access Road to Future Development Area	Landside	2022–2028	$78,000
Construct Hangars and Aprons	Tenant Facility	2022–2028	$51,647,000
Relocate Military Flight Line	Tenant Facility	2022–2028	$2,464,000
Construct Consolidated Cargo Facility	Tenant Facility	2022–2028	$42,116,000
Construct Aircraft Maintenance Facility	Tenant Facility	2022–2028	$21,947,000
Construct Runway 9-27 Heliport	Tenant Facility	2022–2028	$9,319,000
Construct Hangar/Snow Removal Equipment Building	Support Facility	2022–2028	$10,022,000
Construct Aircraft Rescue and Firefighting Burn Pit	Support Facility	2022–2028	$707,000
Construct Aircraft Rescue and Firefighting Access Road	Support Facility	2022–2028	$458,000
Total Medium-Term Development Costs			**$269,034,000**
Long-Term Development Projects			
Construct Runway 9-27 Taxiway	Airfield	2029–2035	$7,931,000
Install Runway 28R Approach Lights	Airfield	2029–2035	$1,640,000
Construct Concourse A, Phase 2/3	Terminal	2029–2035	$38,322,000
Construct Concourse A Apron, Phase 2/3	Terminal	2029–2035	$5,974,000
Expand Economy Lot	Landside	2029–2035	$8,304,000
Construct Snow Removal Equipment (SRE) Building	Support Facility	2029–2035	$2,270,000
Expand Customs and Border Protection (CBP) Facility	Support Facility	2029–2035	$4,221,000
Total Long-Term Development Costs			**$68,662,000**

NOTES: Years represent fiscal years from October 1 to September 30.

1 Baseline cost estimates are in 2019 dollars. Short-term project costs are in 2019 dollars. Medium-term project costs are escalated at 3.0 percent per year from 2019 to 2024. Long-term project costs are escalated at 3.0 percent per year from 2019 to 2031. Costs do not include general contractor markups. Medium-term and long-term costs include soft costs of 15.0 percent of direct construction costs.

SOURCES: City of Boise Department of Aviation, April 2019 (short-term project costs); Connico, Incorporated, April 2019 (medium-term and long-term project costs).

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7. FINANCIAL PLAN

This section presents a potential funding plan for implementing the projects recommended in the MPU. It also assesses the ability of the Airport sponsor to fund the recommended projects associated with the preferred alternatives. These projects are designed to maintain the Airport and provide the required improvements and facilities through FY 2035.

The actual implementation schedule for the various construction projects recommended in the MPU will be influenced, in part, by demand, funding availability, the City's priorities, and other relevant factors, and it may not correspond precisely to the schedule described in this section. For purposes of the illustrative financial analysis, a specific implementation schedule was assumed. However, it should be noted that this schedule and the resulting financial analysis are intended only to demonstrate financial feasibility. Actual funding strategies for each project will be determined nearer to the time of project implementation.

In general, the financial analysis for the MPU was conducted as follows:

- The Airport's existing financial structure was examined and applicable financial information was obtained.
- A list of proposed capital development projects was compiled, including estimated project construction costs and implementation years (see Section 6).
- Potential funding sources were identified and the potential availability of funding from those sources was analyzed, as applicable.
- Debt service was estimated for projects requiring the use of future bond proceeds.
- Depreciation was estimated for Airport cash expenditures.
- Projections of operation and maintenance (O&M) expenses and nonairline revenues were developed.
- Airline revenues and rates and charges were projected to enable an assessment of the effect of the potential funding plan on key financial metrics, such as airline rates and charges, cost per enplaned passenger (CPE), and debt service coverage.

7.1 AIRPORT FINANCIAL STRUCTURE

The City of Boise owns and operates the Airport through its Department of Aviation. The City also manages numerous tenant facilities at BOI, provides a safe and efficient Airport for the operation of aircraft, promotes the development of Airport property for aviation and related commercial services, obtains and administers FAA grants, and ensures the compatibility of proposed developments within and around the Airport with federal, state, and local standards. The City/Airport operates on a fiscal year basis, with years ending September 30. City/Airport staff are responsible for finance, budget, and human resources functions, including the development and administration of budgets and the collection of revenues. The City maintains the financial records for the Airport in accordance with generally accepted accounting principles as they apply to enterprise funds.

The Department of Aviation manages and operates the Airport Fund, an enterprise fund of the City. The Airport Fund is used to account for services provided to the general public using the Airport, and its costs are recovered primarily through user rentals, fees, and charges (e.g., landing fees, building and ground rentals, parking fees, concession fees). All operations, debt service, and capital additions are accounted for in the Airport Fund.

7.1.1 AIRLINE AGREEMENT

The Airport Use and Lease Agreement (the Airline Agreement) dictates the business and operational relationship between the City and the airlines that execute the Airline Agreement (the Signatory Airlines), and it defines the terms under which those airlines operate at and use the Airport. The term of the existing Airline Agreement began October 2015 and runs through September 30, 2020. For purposes of the financial analysis described in this section, it is assumed that future airline agreements will have provisions similar to those in the existing Airline Agreement. The current Airline Agreement includes the following key provisions:

- With certain exceptions, approval by a Majority-in-Interest (MII)[1] of the Signatory Airlines is required for capital expenditures for improvements and developments that are to be included in space rentals and landing fees charged for the use and/or occupancy of terminal and airfield facilities. If an MII disapproves a capital expenditure, then the City may proceed with the expenditure as long as the project is deferred for 21 months after the disapproval.
- The Airline Agreement establishes the following cost centers: (1) Airfield, (2), Terminal, (3) Parking and Airport Roads, and (4) Other. A separate Jetbridge cost center is included in the Terminal cost center. Indirect cost centers include Administration, Security, and Fire Station.
- Terminal rates are set based on a cost center residual methodology for the Terminal cost center. Landing fees are set on a cost center residual methodology for the Airfield and Parking and Airport Roads cost centers.[2]
- The Airline Agreement establishes the Capital Improvement Fund and the Discretionary Fund. Monies in the Capital Improvement Fund are to be used on a priority basis for terminal and airfield capital and equipment projects, but they can also be used for parking and environmental projects. Monies in the Discretionary Fund may be used for any lawful purpose and are not subject to Signatory Airline approval.

7.1.2 TRUST INDENTURES

Trust indentures have been established to highlight the rules and responsibilities that the City and a bond issuer must adhere to with regard to the issuance of bonds. The indentures specify requirements for the financial operations of the Airport, including the covenant to maintain rates and charges. Specifically, rates and charges for services rendered or space used at the Airport are to be reasonable and just. Under the Senior Trust Indenture the rates and charges shall be sufficient to produce net revenues at least equal to 125 percent of the debt service requirement on senior bonds for the applicable fiscal year. Under the Subordinate Trust Indenture, the rates and charges shall be sufficient to produce net revenues at least equal to 115 percent of the aggregate senior debt service requirements and subordinate debt service requirements for the applicable fiscal year.[3]

The trust indentures also establish certain funds and accounts, as well as the priority for the flow of revenues to these accounts. Revenues in the Airport Fund are used to pay O&M expenses. Remaining revenues then flow to

[1] A Majority-in-Interest means at least 66.66 percent of the Signatory Airlines representing at least 66.66 percent of Signatory Airline total landed weight for the most recent 12-month period for which landed weight data are available. A project is considered to be disapproved if 33.33 percent of Signatory Airlines submit disapprovals.

[2] Several nonscheduled airlines serve the Airport and pay higher landing fees than those paid by Signatory Airlines. All-cargo airlines that lease or sublease space at the Airport and that request signatory status are granted such status, provided they maintain proper insurance coverage and name the Airport as an additional insured. The landing fee for on-Airport cargo airlines is higher than that for signatory passenger airlines, but it is lower than the landing fee rate for nonsignatory airlines.

[3] The Airport currently has three outstanding series of bonds. The Series 2011 and Series 2012 bonds are senior bonds, while the Series 2015 bonds are subordinate bonds. Additional information regarding existing bonds is provided in Section 7.2.2.4.

senior bond funds, a senior reserve fund, subordinate bond funds, and then to a subordinate reserve fund. Allowable uses for all remaining revenues include credits to airline rates and charges and deposits to the Capital Improvement Fund and Discretionary Fund, as established in the Airline Agreement.

7.1.3 COST CENTERS

For purposes of calculating airline rates and charges, Airport-related revenues and costs are allocated to various cost centers, defined in the Airline Agreement, as follows:

- **Airfield:** The Airfield cost center includes all costs for the operation, repair, and maintenance of the airfield area, the aircraft parking apron, the landing area, and the ramp area. Other charges to this cost center include applicable depreciation and amortization, revenue bond debt service, and bond coverage, as well as a pro-rata share of administrative costs. Revenues credited to this cost center include revenues received from GA fuel sales, tiedown fees, landing and aircraft parking fees, and military airfield charges.
- **Terminal:** The Terminal cost center includes the costs of normal operation, repair, and maintenance of the terminal building, applicable depreciation and amortization, revenue bond debt service, bond coverage, and a pro-rata share of administrative costs and minor building modifications. The amount of concession revenue needed to fund the Capital Improvement Fund is dedicated from concession revenues. All other concession revenues offset expenses in the Terminal cost center.
- **Parking and Airport Roads:** The Parking and Airport Roads cost center includes the costs of maintenance and repair of the Airport parking areas (both public and employee) and Airport roads area (not a part of the Ada County Highway District system), depreciation, revenue bond debt service, bond coverage, and a pro-rata share of administrative costs. Revenues from the parking lots and the limo/courtesy van fees are credited to this cost center. The first $1 million in net income in this cost center is credited to the Airfield cost center. Net income in excess of $1 million is split between the Capital Improvement Fund and the Airfield cost center.
- **Other:** All Airport costs and depreciation not charged to another cost center, and a pro-rata share of administrative costs, are charged to this cost center. All Airport revenues not credited to another cost center are credited to this cost center.
- **Indirect Cost Centers:** The City uses certain indirect cost centers for accounting purposes to allocate revenues and expenses to the direct cost centers. Indirect cost centers include Administration, Security, and Fire Station. Revenues and expenses associated with these indirect cost centers are allocated to the cost centers as specified in the Airline Agreement.

7.1.4 HISTORICAL REVENUES AND EXPENSES

Table 7-1 presents historical revenues and expenses for the Airport from FY 2015 to FY 2018, including budget data for FY 2019. Operating revenues are revenues that are directly associated with the running and operation of the Airport. These revenues are classified as airline and nonairline. Airline revenues include landing fees and terminal rentals paid by passenger airlines. In FY 2018, airline revenues accounted for approximately 14 percent of total operating revenue. Nonairline revenues include landing and parking fees from other aircraft, as well as nonaeronautical revenue, such as parking and concessions. In FY 2018, public parking accounted for the highest portion of nonairline revenue, with an approximate share of 40 percent.

Operating expenses are categorized as personnel services, such as employee salaries and benefits, and O&M expenses. Overall, operating revenues and expenses realized similar growth from FY 2015 to FY 2018.

TABLE 7-1 HISTORICAL REVENUES AND EXPENSES

REVENUE AND EXPENSE TYPE	ACTUAL 2015	ACTUAL 2016	ACTUAL 2017	ACTUAL 2018	BUDGET 2019	CAGR 2015–2018
Airline Revenues						
Airline Landing Fees	$2,701,871	$3,098,444	$3,085,632	$3,174,999	$2,739,025	
Airline Terminal Rentals	1,606,653	1,709,814	1,602,968	1,516,028	1,447,528	
	$4,308,524	$4,808,258	$4,688,600	$4,691,027	$4,186,553	2.9%
Nonairline Revenues						
Freight/Charter/Other Landing Fees	$917,369	$968,791	$869,489	$831,412	$789,841	
Aircraft Parking Fees	93,204	100,345	108,299	113,987	113,900	
Fuel Flowage Fees	202,974	203,465	180,161	192,121	190,000	
National Guard Joint-Use Fees	194,283	175,203	175,203	175,203	175,203	
Car Rental	4,411,704	4,911,198	5,188,664	5,524,834	5,778,246	
Concessions	1,605,541	1,892,758	2,106,014	2,355,805	2,463,704	
Nonairline Terminal Rentals	491,072	497,569	489,680	582,187	580,000	
Advertising and Other Concessions	429,302	493,512	543,823	548,143	516,700	
Jetway Fees	97,210	115,254	126,855	145,590	152,870	
Public Parking	8,910,816	9,683,427	10,447,459	11,197,766	11,757,654	
Employee Parking	277,900	304,045	332,110	452,224	500,000	
Taxi/Hotel Shuttles	141,404	134,645	132,494	104,603	75,000	
Industrial Land Rent	1,903,531	3,343,787	3,484,647	3,642,534	3,788,235	
Inflight Kitchen Sales	356,371	320,949	360,366	230,751	226,000	
Hangar Rent	194,375	194,200	196,690	200,102	200,000	
Airport Gas Station	191,188	174,151	182,264	190,776	200,315	
Hotel Rent	88,889	95,895	113,666	159,704	167,460	
Administration Revenues	278,655	253,886	193,090	321,816	200,000	
Security Revenues	620,620	558,406	583,461	583,115	583,000	
Fire Station Revenues	4,701	2,735	340	1,909	1,000	
Interest Income	303,382	365,149	224,609	115,064	80,000	
Miscellaneous	106,979	141,975	115,068	121,824	80,000	
	$21,821,470	$24,931,345	$26,154,452	$27,791,470	$28,619,128	8.4%
Total Operating Revenue	**$26,129,994**	**$29,739,603**	**$30,843,052**	**$32,482,497**	**$32,805,682**	**7.5%**
Operating Expenses						
Personnel Services	$6,397,515	$6,697,500	$6,987,260	$7,182,895	$7,890,526	3.9%
Operation and Maintenance Expenses	12,891,888	13,459,487	15,703,088	16,849,610	17,413,366	9.3%
Total Operating Expenses	**$19,289,403**	**$20,156,987**	**$22,690,348**	**$24,032,505**	**$25,303,892**	**7.6%**

NOTES: Years are fiscal years ending September 30.
CAGR – Compound Annual Growth Rate
SOURCE: City of Boise Department of Aviation, April 2019.

7.2 CAPITAL IMPROVEMENT PROGRAM – PROJECTS AND FUNDING

Section 6 discusses the Master Plan Projects, as well as a phasing schedule for those projects. Separate from the Master Plan Projects, the City plans to undertake several additional Airport projects, as defined in its CIP. For purposes of this financial analysis, Master Plan Projects were combined with other projects included in the Airport's CIP (Other CIP Projects) to develop a total combined CIP from which to assess the financial feasibility of the overall development program, which spans through FY 2035.

7.2.1 PROJECTS

The total estimated cost of the combined CIP is approximately $589.0 million. For summary purposes, the Master Plan Projects and Other CIP Projects were organized into the cost centers defined in the Airline Agreement. **Table 7-2** summarizes the costs of the CIP by development period and project cost center. The table also shows how the costs of the Master Plan Projects combine with the costs of the Other CIP Projects to equal the total combined CIP. In total, Master Plan Projects account for over 75 percent of total combined CIP project costs through the planning period, reflecting the significant capital development recommended in the MPU.

Airfield-related Other CIP Projects include GA apron rehabilitation, miscellaneous paving, airfield erosion and dust control, and acquisition of new SRE. Terminal-related Other CIP Projects include building upgrades and improvements, security checkpoint reconfiguration, baggage system upgrades, and all associated design and program management services. Parking and roadway-related Other CIP Projects include access road improvements, employee parking improvements, and curbside improvements. Other projects include stormwater system improvements, public art projects, sustainability projects, and various VALE projects. Administration projects include infrastructure and utility development, information technology and infrastructure upgrades, computer and network systems, and property acquisition. Security-related Other CIP Projects include security doors, fence, gates, and rollup door upgrades. No fire station–related Other CIP Projects were identified in the Airport's CIP through 2024.

The implementation plan for the Master Plan Projects calls for specific projects to be implemented each year from FY 2019 through FY 2035, while the Airport's CIP includes non–Master Plan Projects and costs through FY 2024. For purposes of including a comprehensive CIP through FY 2035 in the financial analysis, cost "allowances" of future Other CIP Projects from FY 2025 to FY 2035 were assumed based on average project costs from FY 2019 to FY 2024. For example, $2 million of airfield-related Other CIP Projects was assumed each year from FY 2025 to FY 2035. Similar annual cost assumptions were made for terminal projects ($3 million per year), parking and roadway projects ($250,000 per year), other projects ($400,000 per year), administration projects ($1 million per year), security projects ($150,000 per year), and fire station/ARFF-related projects ($100,000 per year).

Due to the conceptual nature of a master plan, implementation of many of the significant capital projects would occur only after further refinement through engineering and architectural analyses. As a result, the estimated CIP costs developed for the Airport must be viewed as preliminary, reflecting a master plan level of detail subject to refinement in subsequent implementation steps.

7.2.2 CAPITAL IMPROVEMENT PROGRAM FUNDING SOURCES

Airport development is often funded by a combination of public and private sources. The funding plan presented herein does not represent a final plan of finance. Additional actions would need to be undertaken prior to the use of some of these funding sources for specific projects. It is assumed that costs of the combined CIP will ultimately be financed from sources including federal Airport Improvement Program (AIP) grants, passenger facility charges (PFCs), customer facility charges (CFCs), Airport funds (cash), bond proceeds, and other funds. **Table 7-3** presents the estimated funding sources for the projects in the combined CIP.

TABLE 7-2 CAPITAL IMPROVEMENT PROGRAM SUMMARY

IMPLEMENTATION PERIOD	AIRFIELD	TERMINAL	PARKING AND AIRPORT ROADS	OTHER	ADMINISTRA-TION	SECURITY	FIRE STATION[1]	TOTAL
Master Plan Projects								
Short Term (2019–2021)	$20,693,000	$21,400,000	$78,981,000	$2,994,000	$0	$0	$0	$124,068,000
Medium Term (2022–2028)	77,561,000	48,902,000	3,891,000	137,515,000	0	0	1,165,000	269,034,000
Long Term (2029–2035)	11,841,000	44,296,000	8,304,000	4,221,000	0	0	0	68,662,000
Total	**$110,095,000**	**$114,598,000**	**$91,176,000**	**$144,730,000**	**$0**	**$0**	**$1,165,000**	**$461,764,000**
Other CIP Projects								
Short Term (2019–2021)	$5,354,000	$12,845,000	$830,000	$1,442,000	$4,170,000	$380,000	$0	$25,021,000
Medium Term (2022–2028)	10,810,000	26,550,000	1,750,000	5,200,000	7,450,000	1,020,000	400,000	53,180,000
Long Term (2029–2035)	14,000,000	21,000,000	1,750,000	3,500,000	7,000,000	1,050,000	700,000	49,000,000
Total	**$30,164,000**	**$60,395,000**	**$4,330,000**	**$10,142,000**	**$18,620,000**	**$2,450,000**	**$1,100,000**	**$127,201,000**
Combined CIP								
Short Term (2019–2021)	$26,047,000	$34,245,000	$79,811,000	$4,436,000	$4,170,000	$380,000	$0	$149,089,000
Medium Term (2022–2028)	88,371,000	75,452,000	5,641,000	142,715,000	7,450,000	1,020,000	1,565,000	322,214,000
Long Term (2029–2035)	25,841,000	65,296,000	10,054,000	7,721,000	7,000,000	1,050,000	700,000	117,662,000
Total	**$140,259,000**	**$174,993,000**	**$95,506,000**	**$154,872,000**	**$18,620,000**	**$2,450,000**	**$2,265,000**	**$588,965,000**

NOTES:
CIP – Capital Improvement Program
1 Projects included in the Fire Station cost center include any project or equipment associated with aircraft rescue and firefighting (ARFF) activities, including the ARFF access road and future burn pit/training area included in the Master Plan Projects and the allowances for similar projects or ARFF equipment acquisition included the Other CIP Projects.
SOURCES: City of Boise Department of Aviation, April 2019 (Other CIP Projects costs and certain Master Plan Projects costs); Connico, Inc., April 2019 (certain Master Plan Projects costs).

TABLE 7-3 CAPITAL IMPROVEMENT PROGRAM FUNDING SOURCES (1 OF 3)

PROJECT	COST CENTER[1]	IMPLEMENTATION PERIOD[2]	ESTIMATED COST	AIP ENTITLEMENT GRANTS	AIP DISCRETIONARY GRANTS	TOTAL AIP GRANTS	PASSENGER FACILITY CHARGES	CUSTOMER FACILITY CHARGES	AIRPORT FUNDS (CASH)	BOND PROCEEDS[3]	OTHER FUNDS[4]	TOTAL FUNDING
Master Plan Projects												
Design Taxilane N	Airfield	2019–2021	$287,000	$269,000		$269,000			$18,000			$287,000
Rehabilitate and Expand Deice Aprons	Airfield	2019–2021	5,104,000	4,785,000		4,785,000			304,000		15,000	5,104,000
Extend Taxiway S	Airfield	2019–2021	800,000						800,000			800,000
Economy Lot Improvements	Parking and Airport Roads	2019–2021	600,000						600,000			600,000
Relocate Parking Exit Plaza	Parking and Airport Roads	2019–2021	1,200,000						1,200,000			1,200,000
Design Public Parking Garage Expansion	Parking and Airport Roads	2019–2021	420,000						420,000			420,000
Rental Car Ready/Return Garage, Planning and Design	Parking and Airport Roads	2019–2021	400,000					400,000				400,000
Construct Employee Parking Lot R4	Parking and Airport Roads	2019–2021	461,000						461,000			461,000
Relocate Idaho Transportation Department Hangar and Office	Other	2019–2021	2,994,000						2,994,000			2,994,000
Extend Taxiway W	Airfield	2019–2021	5,182,000	4,858,000		4,858,000			309,000		15,000	5,182,000
Airfield Development Program, Planning	Airfield	2019–2021	150,000						150,000			150,000
Design Concourse A Apron, Phase 1	Terminal	2019–2021	1,400,000				700,000		700,000			1,400,000
Design Concourse A, Phase 1	Terminal	2019–2021	5,000,000				5,000,000					5,000,000
Construct Employee Parking Garage	Parking and Airport Roads	2019–2021	15,000,000						15,000,000			15,000,000
Design Rental Car Ready/ Return Garage and Lobby	Parking and Airport Roads	2019–2021	1,400,000					1,400,000				1,400,000
Construct Public Parking Garage	Parking and Airport Roads	2019–2021	17,500,000							17,500,000		17,500,000
Relocate Cooling Towers	Parking and Airport Roads	2019–2021	3,500,000							3,500,000		3,500,000
Economy Lot Improvements	Parking and Airport Roads	2019–2021	800,000						800,000			800,000
Relocate Taxiway G	Airfield	2019–2021	6,200,000	4,109,000	1,600,000	5,709,000			476,000		15,000	6,200,000
Construct Taxilane N	Airfield	2019–2021	970,000	909,000		909,000			61,000			970,000
Widen Taxiway S	Airfield	2019–2021	600,000		563,000	563,000			37,000			600,000
Airfield Development Program, Environmental Assessment	Airfield	2019–2021	200,000		188,000	188,000			12,000			200,000
Airfield Development Program, Preliminary Design	Airfield	2019–2021	200,000		188,000	188,000			12,000			200,000
Airfield Development Program, Develop New Procedures	Airfield	2019–2021	1,000,000		938,000	938,000			62,000			1,000,000
Construct Concourse A Apron, Phase 1	Terminal	2019–2021	15,000,000						15,000,000			15,000,000
Construct Rental Car Ready/ Return Garage	Parking and Airport Roads	2019–2021	35,700,000							35,700,000		35,700,000
Remove Existing Rental Car Ready/Return Area	Parking and Airport Roads	2019–2021	2,000,000					2,000,000				2,000,000
West Development Area Access	Airfield	2022–2028	2,798,000						2,798,000			2,798,000
Expand Arm/Disarm Pad	Airfield	2022–2028	5,715,000								5,715,000	5,715,000
Remove Taxiway J	Airfield	2022–2028	2,503,000	2,347,000		2,347,000			156,000			2,503,000
Remove Portion of Runway 10R	Airfield	2022–2028	2,535,000	917,000	1,460,000	2,377,000			158,000			2,535,000
Runway 10R End Equipment	Airfield	2022–2028	4,448,000		4,170,000	4,170,000			278,000			4,448,000
Extend Taxiway B	Airfield	2022–2028	6,340,000	1,605,000		1,605,000			4,735,000			6,340,000
Remove Portion of Taxiway F	Airfield	2022–2028	2,292,000		2,149,000	2,149,000			143,000			2,292,000

TABLE 7-3 CAPITAL IMPROVEMENT PROGRAM FUNDING SOURCES (2 OF 3)

PROJECT	COST CENTER[1]	IMPLEMENTATION PERIOD[2]	ESTIMATED COST	AIP ENTITLEMENT GRANTS	AIP DISCRETIONARY GRANTS	TOTAL AIP GRANTS	PASSENGER FACILITY CHARGES	CUSTOMER FACILITY CHARGES	AIRPORT FUNDS (CASH)	BOND PROCEEDS[3]	OTHER FUNDS[4]	TOTAL FUNDING
Relocate Taxiway E	Airfield	2022–2028	7,129,000	5,102,000	787,000	5,889,000			1,225,000		15,000	7,129,000
Remove Taxiway B2	Airfield	2022–2028	823,000		772,000	772,000			51,000			823,000
Relocate Taxiway D	Airfield	2022–2028	8,991,000	5,060,000	940,000	6,000,000			2,976,000		15,000	8,991,000
Remove Taxiway C	Airfield	2022–2028	2,202,000		2,064,000	2,064,000			138,000			2,202,000
Extend Taxiway M	Airfield	2022–2028	1,461,000		1,370,000	1,370,000			91,000			1,461,000
Remove Taxiway B1	Airfield	2022–2028	1,722,000	1,614,000		1,614,000			93,000		15,000	1,722,000
Realign Taxilane A3	Airfield	2022–2028	1,522,000		1,427,000	1,427,000			95,000			1,522,000
Extend Runway 28L	Airfield	2022–2028	8,571,000		8,035,000	8,035,000			521,000		15,000	8,571,000
Construct Taxiway P North of Taxiway S	Airfield	2022–2028	4,361,000						4,361,000			4,361,000
Runway 28L End Equipment	Airfield	2022–2028	4,160,000		3,900,000	3,900,000			260,000			4,160,000
Runway 9-27 Initial Development	Airfield	2022–2028	9,988,000	3,306,000	3,000,000	6,306,000			3,667,000		15,000	9,988,000
Construct Concourse A, Phase 1	Terminal	2022–2028	48,902,000							48,902,000		48,902,000
Relocate Portions of West Gowen Road	Parking and Airport Roads	2022–2028	2,447,000						2,447,000			2,447,000
Construct Access Road to Southeast Hangar Area	Parking and Airport Roads	2022–2028	1,366,000						1,366,000			1,366,000
Construct Access Road to Future Development Area	Parking and Airport Roads	2022–2028	78,000						78,000			78,000
Construct Hangars and Aprons	Other	2022–2028	51,647,000						1,647,000		50,000,000	51,647,000
Relocate Military Flight Line	Other	2022–2028	2,464,000								2,464,000	2,464,000
Construct Consolidated Cargo Facility	Other	2022–2028	42,116,000	5,145,000		5,145,000			6,956,000	30,000,000	15,000	42,116,000
Construct Aircraft Maintenance Facility	Other	2022–2028	21,947,000						8,947,000	13,000,000		21,947,000
Construct Runway 9-27 Heliport	Other	2022–2028	9,319,000						4,319,000		5,000,000	9,319,000
Construct Hangar/Snow Removal Equipment Building	Other	2022–2028	10,022,000	3,351,000		3,351,000			6,671,000			10,022,000
Construct Aircraft Rescue and Firefighting Burn Pit	Fire Station	2022–2028	707,000						692,000		15,000	707,000
Construct Aircraft Rescue and Firefighting Access Road	Fire Station	2022–2028	458,000						458,000			458,000
Construct Runway 9-27 Taxiway	Airfield	2029–2035	7,931,000	7,435,000		7,435,000			496,000			7,931,000
Install Runway 28R Approach Lights	Airfield	2029–2035	1,640,000	1,538,000		1,538,000			102,000			1,640,000
Construct Concourse A, Phase 2/3	Terminal	2029–2035	38,322,000						10,000,000	28,322,000		38,322,000
Construct Concourse A Apron, Phase 2/3	Terminal	2029–2035	5,974,000						5,974,000			5,974,000
Expand Economy Lot	Parking and Airport Roads	2029–2035	8,304,000						8,304,000			8,304,000
Construct Snow Removal Equipment (SRE) Building	Airfield	2029–2035	2,270,000	2,128,000		2,128,000			142,000			2,270,000
Expand Customs and Border Protection (CBP) Facility	Other	2029–2035	4,221,000						4,221,000			4,221,000
Total Master Plan Projects			**$461,764,000**	**$54,478,000**	**$33,551,000**	**$88,029,000**	**$5,700,000**	**$3,800,000**	**$123,982,000**	**$176,924,000**	**$63,329,000**	**$461,764,000**
Other CIP Projects												
Short-Term Airfield Projects	Airfield	2019–2021	$5,354,000	$1,567,000	$1,212,000	$2,779,000	$600,000		$1,975,000			$5,354,000
Medium-Term Airfield Projects	Airfield	2022–2028	10,810,000	7,500,000	1,294,000	8,794,000	1,250,000		706,000		60,000	10,810,000

TABLE 7-3 CAPITAL IMPROVEMENT PROGRAM FUNDING SOURCES (3 OF 3)

PROJECT	COST CENTER[1]	IMPLEMENTATION PERIOD[2]	ESTIMATED COST	AIP ENTITLEMENT GRANTS	AIP DISCRETIONARY GRANTS	TOTAL AIP GRANTS	PASSENGER FACILITY CHARGES	CUSTOMER FACILITY CHARGES	AIRPORT FUNDS (CASH)	BOND PROCEEDS[3]	OTHER FUNDS[4]	TOTAL FUNDING
Long-Term Airfield Projects	Airfield	2029–2035	14,000,000	13,125,000		13,125,000			770,000		105,000	14,000,000
Short-Term Terminal Projects	Terminal	2019–2021	12,845,000		190,000	190,000	4,975,000		7,680,000			12,845,000
Medium-Term Terminal Projects	Terminal	2022–2028	26,550,000				21,650,000		4,900,000			26,550,000
Long-Term Terminal Projects	Terminal	2029–2035	21,000,000				13,000,000		8,000,000			21,000,000
Short-Term Parking and Roadway Projects	Parking and Airport Roads	2019–2021	830,000						830,000			830,000
Medium-Term Parking and Roadway Projects	Parking and Airport Roads	2022–2028	1,750,000				750,000		1,000,000			1,750,000
Long-Term Parking and Roadway Projects	Parking and Airport Roads	2029–2035	1,750,000						1,750,000			1,750,000
Short-Term Other Projects	Other	2019–2021	1,442,000		478,000	478,000			964,000			1,442,000
Medium-Term Other Projects	Other	2022–2028	5,200,000		372,000	372,000	1,000,000		3,828,000			5,200,000
Long-Term Other Projects	Other	2029–2035	3,500,000						3,500,000			3,500,000
Short-Term Administrative Projects	Administrative	2019–2021	4,170,000		938,000	938,000			3,232,000			4,170,000
Medium-Term Administrative Projects	Administrative	2022–2028	7,450,000						7,450,000			7,450,000
Long-Term Administrative Projects	Administrative	2029–2035	7,000,000						7,000,000			7,000,000
Short-Term Security Projects	Security	2019–2021	380,000						380,000			380,000
Medium-Term Security Projects	Security	2022–2028	1,020,000						1,020,000			1,020,000
Long-Term Security Projects	Security	2029–2035	1,050,000						1,050,000			1,050,000
Medium-Term Fire Station Projects	Fire Station	2022–2028	400,000	375,000		375,000			25,000			400,000
Long-Term Fire Station Projects	Fire Station	2029–2035	700,000	656,000		656,000			44,000			700,000
Total Other CIP Projects			**$127,201,000**	**$23,223,000**	**$4,484,000**	**$27,707,000**	**$43,225,000**		**$56,104,000**		**$165,000**	**$127,201,000**
Total Combined CIP			**$588,965,000**	**$77,701,000**	**$38,035,000**	**$115,736,000**	**$48,925,000**	**$3,800,000**	**$180,086,000**	**$176,924,000**	**$63,494,000**	**$588,965,000**
Percentage of Total Funding				13.2%	6.5%	19.7%	8.3%	0.6%	30.6%	30.0%	10.8%	

NOTES:
AIP – Airport Improvement Program
CIP – Capital Improvement Program
1 Cost centers as defined in the Boise Airport Airline Use and Lease Agreement, October 2015.
2 Fiscal years ending September 30.
3 Bond proceeds may be from bonds supported by general airport revenues, passenger facility charge revenue, and/or customer facility charge revenue.
4 Other funds include third-party (i.e., tenant) funding and Idaho state grants.
SOURCES: Ricondo & Associates, Inc., August 2019; City of Boise Department of Aviation, April 2019.

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Table 7-4 summarizes the funding sources for select years, as well as in total through the short-term, medium-term, and long-term project implementation periods.

TABLE 7-4 CAPITAL IMPROVEMENT PROGRAM FUNDING SUMMARY

FUNDING SOURCE	2020	2025	2030	2035	SHORT TERM 2019–2021	MEDIUM TERM 2022–2028	LONG TERM 2029–2035	TOTAL
AIP Entitlement Grants	$6,008,000	$5,188,000	$1,969,000	$9,404,000	$16,497,000	$36,322,000	$24,882,000	$77,701,000
AIP Discretionary Grants	736,000	2,198,000			6,293,000	31,742,000		38,035,000
PFC Funds	7,000,000	2,000,000	3,000,000	1,000,000	11,275,000	24,650,000	13,000,000	48,925,000
CFC Funds	1,400,000				3,800,000			3,800,000
Airport Funds (Cash)	21,815,000	9,638,000	7,990,000	4,512,000	54,480,000	74,254,000	51,352,000	180,086,000
Bond Proceeds	21,000,000				56,700,000	91,902,000	28,322,000	176,924,000
Other Funds	15,000	52,494,000	15,000	15,000	45,000	63,344,000	105,000	63,494,000
Total Funding Sources	**$57,974,000**	**$71,518,000**	**$12,974,000**	**$14,931,000**	**$149,090,000**	**$322,214,000**	**$117,661,000**	**$588,965,000**

NOTES: Fiscal years ending September 30.
AIP – Airport Improvement Program
PFC – Passenger Facility Charge
CFC – Customer Facility Charge
SOURCES: Ricondo & Associates, Inc., August 2019; City of Boise Department of Aviation, April 2019.

7.2.2.1 FEDERAL GRANTS

The Airport and Airway Improvement Act of 1982 authorizes federal funding for the AIP from the Airport and Airway Trust Fund for airport development, airport planning, and noise compatibility planning and programs. The Airport and Airway Trust Fund is funded through user taxes on airfares, air freight, and aviation fuel.

The FAA Reauthorization Act of 2018 was signed into law on October 5, 2018, which reauthorized FAA AIP funding for airport projects. Under this reauthorization, the AIP was extended for 5 federal fiscal years, through September 2023. This 5-year authorization of the FAA represents the first significant multiyear reauthorization since the FAA Modernization and Reform Act of 2012, and the first 5-year reauthorization since 1982.

The FAA distributes AIP funds in the form of grants to airport sponsors to finance eligible costs of certain airport improvements. AIP grants include entitlement grants (passenger and cargo grants) and discretionary grants. AIP grants may be used to fund eligible land acquisition, noise mitigation, airfield improvements, airport roadways, planning studies, and safety and security systems and equipment. All AIP grants are subject to a prescribed local match requirement. For most small-hub airports (such as BOI), the FAA share of eligible costs is up to 90.0 percent, with local matching funds contributing at least 10.0 percent. However, Idaho is one of the states with certain nontaxable and public land areas whereby an upward adjustment in the percentage of federal shares of eligible project costs has been listed in FAA Order 5100.38D, *Airport Improvement Program Handbook* (AIP Handbook). According to Appendix Y of the AIP Handbook, the federal share for AIP grants at small-hub and nonhub airports in Idaho (including BOI) is 93.75 percent, with a 6.25 percent sponsor match requirement.

The City has historically applied for FAA AIP grants to fund important Airport capital development and maintenance needs. **Table 7-5** summarizes past AIP grants received by the Airport, which total more than $47.5 million since 2010. As summarized in Table 7-3 and Table 7-4, the use of approximately $115.7 million in AIP grant funding, equating to approximately 20 percent of total funding sources, was assumed in the CIP funding plan through the planning period.

TABLE 7-5 BOI AIRPORT IMPROVEMENT PROGRAM GRANT HISTORY

FISCAL YEAR[1]	ENTITLEMENT GRANTS	DISCRETIONARY GRANTS	TOTAL GRANTS	DESCRIPTION
2010	$5,100,000	$0	$5,100,000	Modify Service Road, Rehabilitate Apron, Rehabilitate Taxiway
2010	1,650,000		1,650,000	Acquire Aircraft Rescue and Firefighting Vehicle, Acquire Snow Removal Equipment
2010		768,630	768,630	VALE Infrastructure
2010	571,567		571,567	Modify Terminal Building
2011	4,812,750		4,812,750	Acquire Snow Removal Equipment, Rehabilitate Access Road, Rehabilitate Apron, Rehabilitate Taxiway
2012	5,722,152	1,125,838	6,847,990	Apply Runway Friction Course – Runway 10R-28L
2013	4,694,378		4,694,378	Improve Runway Safety Area – Runway 10L-28R, Improve Service Road, Rehabilitate Taxiway, Security Enhancements
2014	3,900,000		3,900,000	Construct Taxiway, Install Guidance Signs, Rehabilitate Taxiway
2014	322,562	115,738	438,300	Conduct Noise Compatibility Plan Study
2015	3,744,598		3,744,598	Acquire Snow Removal Equipment, Security Enhancements
2015		660,246	660,246	VALE Infrastructure
2016	1,280,379		1,280,379	Update Airport Master Plan Study
2016	715,745		715,745	Improve Runway Safety Area – Runway 10L-28R, Rehabilitate Aircraft Rescue and Firefighting Building, Rehabilitate Taxiway
2016		186,656	186,656	VALE Program Infrastructure
2017		281,250	281,250	Install Noise Monitoring System
2017	3,560,586		3,560,586	Rehabilitate Aircraft Rescue and Firefighting Building
2017	3,922,633		3,922,633	Improve Runway Safety Area – Runway 10L-28R, Rehabilitate Taxiway
2018	15,000		15,000	Install Taxiway Lighting
2018	20,000		20,000	Install Runway Lighting
2018	100,000		100,000	Improve Terminal Building
2018	400,000		400,000	Reconstruct Taxiway
2018	630,000		630,000	Modify Service Road
2018	650,000		650,000	Acquire Snow Removal Equipment
2018	2,619,375		2,619,375	Reconstruct Taxiway
Total	**$44,431,725**	**$3,138,358**	**$47,570,083**	

NOTES:
VALE – Voluntary Airport Low Emissions
1 Federal fiscal years ending September 30.
SOURCE: Federal Aviation Administration, Airport Improvement Program (AIP) Grant Histories, http://www.faa.gov/airports/aip/grant_histories/ (accessed August 15, 2019).

Airport Improvement Program Entitlement Grants

AIP entitlement grants, which include passenger entitlement grants and cargo entitlement grants, are allocated to airports using a formula based on airport activity. Passenger entitlement grants are distributed based on the number of enplaned passengers served at an airport on an annual basis. Passenger entitlement grants available in any given year are established by a formula set forth in the FAA AIP Handbook.[4] Entitlement grants for the Airport were projected based on the following formula using the enplaned passenger data provided in Section 3 of the MPU:

- $15.60 for each of the first 50,000 enplaned passengers
- $10.40 for each of the next 50,000 enplaned passengers
- $5.20 for each of the next 400,000 enplaned passengers
- $1.30 for each of the next 500,000 enplaned passengers
- $1.00 for each enplaned passenger beyond 1.0 million enplaned passengers

For a given year, the entitlement formula is based on the numbers of enplaned passengers from 2 years prior. For example, when calculating passenger entitlement grants for FY 2019, the formula applies to the number of enplaned passengers in FY 2017. Total AIP passenger entitlement grants available to fund CIP projects at the Airport through the planning period are estimated to be approximately $85.4 million.

AIP cargo entitlement grants are allocated among airports by a formula based on cargo aircraft landed weight. According to the FAA AIP Handbook, when at least $3.2 billion in AIP funding is available in a given fiscal year, cargo entitlement grants equal 3.5 percent of total AIP funds available for grants, divided on a pro-rata basis according to an airport's share of total US cargo landed weight. For FY 2019, the Airport received entitlement grants of approximately $229,000 based on its 0.21 percent share of total US landed cargo weight. For purposes of this analysis, it was assumed that cargo entitlement grants for the Airport would increase 2.0 percent per year throughout the planning period, consistent with the forecast growth in all-cargo aircraft operations presented in Section 3. Total AIP cargo entitlement grants available to fund CIP projects at the Airport through the planning period are estimated to be approximately $4.6 million.

As shown in **Table 7-6**, approximately $90.0 million in AIP entitlement grants is projected to be available for funding the CIP through the planning period, ranging from approximately $5.0 million to $5.6 million per year. In allocating AIP entitlement grant funds to various projects, the projected annual availability of such funds was considered.

TABLE 7-6 PROJECTED AIRPORT IMPROVEMENT PROGRAM ENTITLEMENT GRANTS

AIRPORT IMPROVEMENT PROGRAM ENTITLEMENT GRANT TYPE	SHORT TERM 2019–2021	MEDIUM TERM 2022–2028	LONG TERM 2029–2035	TOTAL
Passenger Entitlement Grants	$14,463,000	$34,515,000	$36,410,000	$85,388,000
Cargo Entitlement Grants	701,000	1,807,000	2,075,000	4,583,000
Total Entitlement Grants	**$15,164,000**	**$36,322,000**	**$38,485,000**	**$89,971,000**

NOTE: Fiscal years ending September 30.
SOURCES: Ricondo & Associates, Inc., June 2019; Federal Aviation Administration, Order 5100.38D, *Airport Improvement Program Handbook*, February 26, 2019.

[4] Federal Aviation Administration, Order 5100.38D, *Airport Improvement Program Handbook*, February 26, 2019.

Airport Improvement Program Discretionary Grants

Unlike entitlement grants that are allocated on a prescribed formula, AIP discretionary grants are distributed for individual projects based on funding availability and the priority of projects at airports nationwide. The funding plan presented in Table 7-3 includes approximately $38 million in discretionary funding through the planning period. Discretionary grants are primarily assumed to fund either all or remaining AIP eligible costs of significant airfield projects. These funding estimates assume the Airport will continue to receive discretionary funding through the planning period for higher priority eligible projects. However, the future availability of AIP discretionary grants is not certain until an actual grant is awarded. Therefore, CIP projects for which discretionary funding is anticipated to be needed may have to be delayed or postponed until such funds become available.

7.2.2.2 PASSENGER FACILITY CHARGES

Since 1991, the collection of a PFC has been authorized under 14 CFR Part 158, and the PFC Program has been administered by the FAA. PFCs are collected from qualified passengers to fund eligible airport projects. Since April 1, 2001, airport sponsors can impose a PFC of up to $4.50 per qualified enplaned passenger. The Airport does not currently collect a PFC. However, approval to begin collecting a PFC is anticipated beginning in FY 2020, since such revenues represent an important funding source for the CIP. For purposes of this financial analysis, it is assumed that the City will continue to apply for, collect, and use PFC revenues at a level of $4.50 per eligible enplaned passenger at the Airport throughout the planning period.

PFC revenues may be used on a "pay-as-you-go" (paygo) basis or leveraged to pay debt service on bonds or other debt issued for PFC-eligible projects. Because airport sponsors may use PFC revenues for the local matching share of AIP grants, PFCs can help airport sponsors implement AIP-financed projects sooner than they would be able to otherwise. Although the FAA approves the collection of a PFC and the use of PFC revenues, the PFC Program permits local collection of PFC revenues through the airlines operating at the airport and provides more flexibility to airport sponsors than AIP funding. PFC revenues may be used for any AIP-eligible project, although PFC eligibility is generally broader than AIP eligibility.

The MPU funding plan assumes approximately $49.0 million of PFC revenues will be used on a paygo basis to fund PFC-eligible projects. In addition, PFC revenues are assumed to pay PFC-eligible debt service on bonds issued to fund the construction and expansion of Concourse A. **Table 7-7** presents projected PFC revenues based on the enplaned passenger forecast described in Section 3.

7.2.2.3 CUSTOMER FACILITY CHARGES

A CFC is a user fee imposed by an airport operator on each rental car user, collected by rental car companies. CFC revenues are generally used for capital and financing costs on rental car–related projects. CFC revenues can also be used for the operating expenses of a rental car facility, including a common bussing system. The authorization, collection, and project eligibility of CFCs are regulated at the state level; however, the CFC rate is determined at the airport/sponsor level instead of at the state level.

The Airport currently collects a CFC of $1.20 per rental car transaction day. Similar to PFCs, CFC revenues can be used on a paygo basis or leveraged to pay debt service on bonds issued for rental car–related projects. The funding plan assumes approximately $3.8 million of CFC revenue to be used on a paygo basis, with additional CFC revenue used to pay debt service on bonds issued to finance the construction of the proposed rental car ready/return facility.

TABLE 7-7 PASSENGER FACILITY CHARGE REVENUE PROJECTION AND APPLICATION

	2020	2025	2030	2035	SHORT TERM 2019–2021	MEDIUM TERM 2022–2028	LONG TERM 2029–2035
PFC Collections							
Enplaned Passengers[1]	1,787,067	1,977,231	2,171,701	2,366,604	5,361,555	13,842,948	15,743,992
PFC Level	$4.50	$4.50	$4.50	$4.50	$4.50	$4.50	$4.50
Less: Airline Collection Fee	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)
Net PFC Level	$4.39	$4.39	$4.39	$4.39	$4.39	$4.39	$4.39
Percent Passengers Paying a PFC[2]	90%	90%	90%	90%	90%	90%	90%
Passengers Paying a PFC	1,608,000	1,780,000	1,955,000	2,130,000	4,825,000	12,458,000	14,170,000
PFC Collections	**$7,059,000**	**$7,814,000**	**$8,582,000**	**$9,351,000**	**$14,267,000**	**$54,691,000**	**$62,206,000**
Application of PFC Revenues							
Beginning Balance	$0	$1,382,000	$8,567,000	$15,664,000	$0	$3,024,000	$7,369,000
PFC Collections	7,059,000	7,814,000	8,582,000	9,351,000	14,267,000	54,691,000	62,206,000
PFC Interest Income[3]	1,000	42,000	185,000	331,000	32,000	614,000	1,698,000
PFC Revenues	$7,060,000	$7,856,000	$8,767,000	$9,682,000	$14,299,000	$55,305,000	$63,904,000
Use of PFC Revenues							
Future Pay-as-You-Go Projects	7,000,000	2,000,000	3,000,000	1,000,000	11,275,000	24,650,000	13,000,000
Future Debt Service	0	4,385,000	4,385,000	6,924,000	0	26,310,000	40,851,000
Ending Balance	$60,000	$2,853,000	$9,949,000	$17,422,000	$3,024,000	$7,369,000	$17,422,000

NOTES: Fiscal years ending September 30.
PFC – Passenger Facility Charge
1 Enplaned passengers are based on the forecasts presented in Section 3, but they were recalculated from calendar years to fiscal years.
2 Only those passengers paying for an airline ticket are charged a PFC for that ticket. Therefore, in any given year, the percentage of passengers paying a PFC may not equal 100 percent. The assumption that 90 percent of passengers enplaned at the Airport pay a PFC is believed to be reasonable based on historical Airport PFC collections data, as well as generally accepted industry PFC revenue projection practices for airports of similar size.
3 Interest income based on a rate of 2.0 percent.
SOURCE: Ricondo & Associates, Inc., June 2019.

For purposes of this analysis, it was assumed that the CFC level would be increased beginning in FY 2020 to cover applicable estimated debt service payments. Increased O&M expenses are expected to be incurred through operation of the new rental car garage. Such increases were not assumed for purposes of this analysis; however, it is assumed that the CFC level would be increased as necessary to cover any additional O&M expenses. Separate from this MPU-level financial analysis, more detailed analyses are being conducted on behalf of Airport management to determine an appropriate CFC level to cover debt service, O&M expenses, and any anticipated future rental car–related paygo projects. **Table 7-8** lists the projected collections and uses of CFC revenues.

TABLE 7-8 CUSTOMER FACILITY CHARGE REVENUE PROJECTION AND APPLICATION

	2020	2025	2030	2035	SHORT TERM 2019–2021	MEDIUM TERM 2022–2028	LONG TERM 2029–2035
CFC Collections							
Enplaned Passengers[1]	1,787,067	1,977,231	2,171,701	2,366,604	5,361,555	13,842,948	15,743,992
Transaction Days[2]	900,591	996,423	1,094,426	1,192,648	2,701,950	6,976,139	7,934,168
CFC Level[3]	$2.55	$2.55	$2.55	$2.55	$2.55	$2.55	$2.55
CFC Collections	**$2,297,000**	**$2,541,000**	**$2,791,000**	**$3,041,000**	**$5,699,000**	**$17,790,000**	**$20,232,000**
Application of CFC Revenues							
Beginning Balance	$10,219,000	$8,938,000	$4,614,000	$1,145,000	$9,365,000	$11,908,000	$5,413,000
CFC Collections	2,297,000	2,541,000	2,791,000	3,041,000	5,699,000	17,790,000	20,232,000
CFC Interest Income[4]	216,000	169,000	85,000	17,000	644,000	1,195,000	398,000
CFC Revenues	$2,513,000	$2,710,000	$2,876,000	$3,058,000	$6,343,000	$18,985,000	$20,630,000
Use of CFC Revenues							
Future Pay-as-You-Go Projects	1,400,000	0	0	0	3,800,000	0	0
Future Debt Service	0	3,640,000	3,640,000	3,640,000	0	25,480,000	25,480,000
Ending Balance	$11,332,000	$8,008,000	$3,850,000	$563,000	$11,908,000	$5,413,000	$563,000

NOTES: Fiscal years ending September 30.
CFC – Customer Facility Charge
1 Enplaned passengers are based on the forecasts presented in Section 3, but they were recalculated from calendar years to fiscal years.
2 Projections of transaction days are based on a factor of approximately 0.50 transaction days per enplaned passenger, derived from actual data from fiscal year 2018, as provided by the City of Boise Department of Aviation.
3 A CFC level of $1.20 per transaction day is currently charged at the Airport. The increase shown in this projection is illustrative for purposes of showing CFC revenues would be anticipated to cover applicable future rental car–related debt service and other costs, as applicable. The City of Boise will determine an appropriate future CFC level that is likely to differ from the level identified in this projection.
4 Interest income based on a rate of 2.0 percent.
SOURCE: Ricondo & Associates, Inc., August 2019 (based on information provided by the City of Boise Department of Aviation).

7.2.2.4 BOND PROCEEDS

Proceeds from the issuance of revenue bonds represent a significant portion (approximately 30 percent) of assumed funding for the combined CIP. In total, approximately $176.9 million of CIP project costs are assumed to be funded with bond proceeds.[5] The types of bonds that may be issued by the City to finance Airport projects include General Airport Revenue Bonds (GARBs), PFC bonds, and/or CFC bonds. GARBs are secured by general Airport revenues. PFC bonds are secured by PFC revenues, while CFC bonds are secured by CFC revenues. It is anticipated that all three revenue types will be leveraged to finance various CIP projects.

Table 7-9 summarizes existing and future debt service used for purposes of this financial analysis.

5 DISCLAIMER: This analysis is not and shall not be considered to be a recommendation or advice to the City of Boise with respect to the issuance of municipal securities. Ricondo & Associates, Inc. is not registered as a municipal advisor under Section 15B of the Securities Exchange Act of 1934. Ricondo & Associates, Inc. owes no fiduciary duty to the City of Boise. The City of Boise should discuss the information in this section with internal and external advisors and experts that the City of Boise deems appropriate before taking any action. Any opinions, assumptions, views, or information contained herein are not intended to be, and do not constitute, "advice" within the meaning of Section 15B of the Securities and Exchange Act of 1934.

TABLE 7-9 EXISTING AND FUTURE DEBT SERVICE PROJECTIONS

	2020	2025	2030	2035	SHORT TERM 2019–2021	MEDIUM TERM 2022–2028	LONG TERM 2029–2035
Existing Debt Service							
Series 2011 Bonds	$4,426,000	$0	$0	$0	$8,854,000	$0	$0
LESS: Applied PFC Revenues	(3,482,000)				(6,966,000)		
Series 2012 Bonds	826,000	829,000	827,000		2,482,000	5,788,000	3,306,000
Series 2015 Bonds	791,000	790,000	794,000	791,000	2,378,000	5,541,000	5,542,000
Net Existing Debt Service	**$2,561,000**	**$1,619,000**	**$1,621,000**	**$791,000**	**$6,748,000**	**$11,329,000**	**$8,848,000**
Future Debt Service							
Public Parking Garage	$0	$1,782,000	$1,782,000	$1,782,000	$1,784,000	$12,477,000	$12,474,000
Rental Car Ready/Return Garage		3,640,000	3,640,000	3,640,000		25,480,000	25,480,000
LESS: Applied CFC Revenues		(3,640,000)	(3,640,000)	(3,640,000)		(25,480,000)	(25,480,000)
Concourse A, Phase 1		4,385,000	4,385,000	4,385,000		26,310,000	30,695,000
LESS: Applied PFC Revenues		(4,385,000)	(4,385,000)	(4,385,000)		(26,310,000)	(30,695,000)
Consolidated Cargo Facility		2,690,000	2,690,000	2,690,000		10,760,000	18,830,000
Aircraft Maintenance Facility		1,166,000	1,166,000	1,166,000		5,830,000	8,162,000
Concourse A, Phase 2/3				2,539,000			10,156,000
LESS: Applied PFC Revenues				(2,539,000)			(10,156,000)
Net Future Debt Service	**$0**	**$5,638,000**	**$5,638,000**	**$5,638,000**	**$1,784,000**	**$29,067,000**	**$39,466,000**
Net Debt Service by Cost Center							
Terminal	$944,000	$0	$0	$0	$1,888,000	$0	$0
Parking and Airport Roads	826,000	2,611,000	2,609,000	1,782,000	4,266,000	18,265,000	15,780,000
Other	791,000	4,646,000	4,650,000	4,647,000	2,378,000	22,131,000	32,534,000
Total Net Debt Service	**$2,561,000**	**$7,257,000**	**$7,259,000**	**$6,429,000**	**$8,532,000**	**$40,396,000**	**$48,314,000**

NOTES: Fiscal years ending September 30.
CFC – Customer Facility Charge
PFC – Passenger Facility Charge
SOURCES: City of Boise Department of Aviation, April 2019 (existing debt service); Ricondo & Associates, Inc., August 2019 (future debt service).

Existing Bonds

The City currently pays debt service on three debt issues:

- **Series 2011 Bonds:** On February 28, 2011, the City issued Airport revenue refunding bonds in the amount of $32,480,000 to refund $42,725,000 of its Series 2000 Certificates of Participation, which were originally issued in November 2000 to fund terminal renovation projects. Debt service on the Series 2011 bonds is payable at 75.6 percent from pledged PFC revenues and 24.4 percent from general Airport revenues, which is allocated to the Terminal cost center. The Series 2011 bonds will mature on December 31, 2020.
- **Series 2012 Bonds:** In December 2012, the City issued GARBs in the amount of $11,760,000 to fund an expansion of the existing parking garage at the Airport. Debt service on the Series 2012 bonds is payable from general Airport revenues, which is allocated to the Parking and Airport Roads cost center. The Series 2012 bonds will mature on September 1, 2032.

- **Series 2015 Bonds:** In July 2015, the City issued Airport revenue bonds in the amount of $12,665,000 to acquire aircraft maintenance facilities that are currently occupied and operated by SkyWest Airlines. Debt service on the Series 2015 bonds is paid through Airport revenues generated through lease payments made by SkyWest Airlines to the Airport. Under a lease agreement between SkyWest Airlines and the Airport, SkyWest Airlines pays a ground lease rate, along with a facility rate that includes the annual debt service payments on the Series 2015 bonds, which is allocated to the Other cost center. The Series 2015 bonds mature on September 1, 2040.

Future Debt Service

For purposes of this financial analysis, future debt service was estimated for various projects that were assumed to be funded wholly or in part with bond proceeds. General parameters of the bond issues include an interest rate of 6.00 percent, a capitalized interest period of 1 year, and issuance expenses totaling 1.50 percent of bond principal. The terms of the bonds vary by type of project, and they assume 20 years for the public and rental car ready/return garages and 25 years for each of the other projects listed in Table 7-9.

Debt service associated with the public parking garage expansion would be payable from general Airport revenues, although practically supported by parking revenues. It is anticipated that CFC revenues would be applied to pay debt service associated with the rental car ready/return garage. Similarly, it is anticipated that PFC revenues would be applied to pay debt service associated with Concourse A construction and expansion. Debt service associated with the consolidated cargo facility would be payable from Airport revenues; however, future lease agreements with cargo carriers operating at the facility could be structured to at least partially offset the debt service requirement. For this analysis, it was assumed that debt service associated with the new aircraft maintenance facility would be payable from Airport revenues generated through tenant lease payments, whereby debt service requirements are included in the facility lease rate.

Table 7-9 presents net debt service by cost center. These net debt service requirements are applied to applicable rates and charges, except for debt service associated with the consolidated cargo facility and aircraft maintenance facility, which is allocated to the Other cost center.

7.2.2.5 AIRPORT FUNDS

Revenues remaining after the payment of O&M expenses and outstanding debt service are made available for other allowable uses, including funding of capital improvement projects. Airport funds (cash) are assumed to be used to fund projects that are not funded through the other funding sources described in this section. Airport funds are assumed to provide the largest source of funding for CIP projects, totaling approximately $180.1 million.

In accordance with the Airline Agreement, the use of Airport funds on capital projects is depreciated and included in applicable airline rates and charges. Airport staff use straight-line depreciation, whereby the amount funded with Airport funds is divided by the estimated useful life of the asset/project, with the resulting depreciation applied each year through the useful life. **Table 7-10** presents existing, future, and total depreciation by cost center. Future depreciation is associated with those projects implemented from FY 2019 to FY 2035.

TABLE 7-10 EXISTING AND FUTURE DEPRECIATION PROJECTIONS

	2020	2025	2030	2035	SHORT TERM 2019–2021	MEDIUM TERM 2022–2028	LONG TERM 2029–2035
Existing Depreciation							
Airfield	$1,274,000	$1,152,000	$1,041,000	$941,000	$3,823,000	$8,071,000	$7,004,000
Terminal Building	1,225,000	1,107,000	1,001,000	905,000	3,676,000	7,757,000	6,734,000
Parking and Airport Roads	441,000	399,000	361,000	326,000	1,323,000	2,793,000	2,429,000
Other	951,000	859,000	777,000	702,000	2,853,000	6,020,000	5,226,000
Administration	88,000	78,000	71,000	66,000	264,000	547,000	483,000
Security	196,000	176,000	160,000	145,000	588,000	1,235,000	1,078,000
Fire Station	54,000	49,000	44,000	39,000	162,000	343,000	294,000
Total	$4,229,000	$3,820,000	$3,455,000	$3,124,000	$12,689,000	$26,766,000	$23,248,000
Future Depreciation							
Airfield	$167,000	$694,000	$1,345,000	$1,284,000	$407,000	$5,695,000	$9,192,000
Terminal Building	571,000	1,632,000	1,321,000	2,380,000	1,339,000	11,447,000	13,593,000
Parking and Airport Roads	208,000	2,260,000	2,237,000	1,140,000	2,079,000	14,948,000	9,800,000
Other	173,000	1,139,000	1,914,000	2,292,000	361,000	6,422,000	14,099,000
Administration	49,000	389,000	639,000	802,000	193,000	2,649,000	4,934,000
Security	9,000	53,000	103,000	144,000	25,000	376,000	852,000
Fire Station	0	0	82,000	85,000	0	94,000	583,000
Total	$1,177,000	$6,167,000	$7,641,000	$8,127,000	$4,404,000	$41,631,000	$53,053,000
Total Depreciation by Cost Center							
Airfield	$1,441,000	$1,846,000	$2,386,000	$2,225,000	$4,230,000	$13,766,000	$16,196,000
Terminal Building	1,796,000	2,739,000	2,322,000	3,285,000	5,015,000	19,204,000	20,327,000
Parking and Airport Roads	649,000	2,659,000	2,598,000	1,466,000	3,402,000	17,741,000	12,229,000
Other	1,124,000	1,998,000	2,691,000	2,994,000	3,214,000	12,442,000	19,325,000
Administration	137,000	467,000	710,000	868,000	457,000	3,196,000	5,417,000
Security	205,000	229,000	263,000	289,000	613,000	1,611,000	1,930,000
Fire Station	54,000	49,000	126,000	124,000	162,000	437,000	877,000
Total	$5,406,000	$9,987,000	$11,096,000	$11,251,000	$17,093,000	$68,397,000	$76,301,000

NOTE: Fiscal years ending September 30.
SOURCES: City of Boise Department of Aviation, May 2019 (existing depreciation); Ricondo & Associates, Inc., August 2019 (future depreciation).

7.2.2.6 OTHER FUNDS

For purposes of this funding plan, other funding sources include Idaho state grants and tenant funding. A total of approximately $63.5 million of CIP project costs is assumed to be funded with other funds.

State Funds

The ITD Division of Aeronautics provides discretionary grant funding for public airports in Idaho through the Idaho Airport Aid Program (IAAP). The IAAP provides matching funds to municipal governments for public airport improvements. The grant funds are derived from Idaho's aviation fuel tax.

The Airport has historically received some funds from the IAAP. However, the funding allocated to the Airport has been relatively small (approximately $15,000 per year), and the availability of such funds in any given year is not guaranteed. The funding plan assumes continued receipt and use of $15,000 of state funds per year.

Tenant Funds

The most significant amount of tenant funds assumed in the funding plan is associated with the construction of private GA hangars and associated apron/pavement areas. Common practice at BOI and at similar airports is for a tenant to lease Airport land and then construct its own facility. Such a funding structure was also assumed for the potential heliport facility located near future Runway 9-27.

Some projects in the CIP are associated with military (IDANG) facilities or operations at the Airport. In particular, costs associated with moving the IDANG flight line from the west military apron to the east military apron, as well as expansion of the west arm/disarm pad, are assumed to be funded by the military.

7.3 FEASIBILITY ANALYSIS

Following initial development of the CIP funding plan for the MPU, an analysis was conducted to determine whether the funding plan is feasible. The following elements were evaluated to assess the feasibility of the funding plan:

- reasonable airline rates and charges and resulting CPE
- positive cash flow when incorporating the use of Airport cash to fund CIP projects
- meeting debt service coverage requirements as specified in the trust indentures

7.3.1 PROJECTED OPERATING EXPENSES

Operating expenses at the Airport include personnel expenses and O&M expenses. **Table 7-11** presents projected operating expenses based on the Airport's FY 2020 budget. For all cost centers, personnel expenses were assumed to increase 3.0 percent per year, and O&M expenses were assumed to increase 2.5 percent per year, resulting in an annual baseline increase of 2.7 percent for total operating expenses. Additional O&M expenses were considered for certain Master Plan Projects:

- **Parking garages:** The expanded public parking garage and the new employee garage are anticipated to become operational in FY 2021. In that year, a one-time additional increase of 10 percent per garage was assumed to reflect additional O&M expenses with the new facilities.
- **Concourse A:** Based on the FY 2020 budget's O&M expenses in the terminal cost center, the estimated cost per square foot of terminal space was calculated at $9.47. This factor was grown at an annual rate of 2.5 percent per year. In FY 2023, Phase 1 of Concourse A was assumed to become operational with an estimated additional area of approximately 45,000 square feet. The increased space was applied to the cost-per-square-foot factor to project future terminal-related O&M. A similar increase was assumed for Phase 2 of the concourse in FY 2032, with an addition of approximately 10,000 square feet of terminal area.

TABLE 7-11 BUDGET AND PROJECTED OPERATING EXPENSES

	BUDGET 2020	PROJECTED 2025	PROJECTED 2030	PROJECTED 2035	SHORT TERM 2019–2021	MEDIUM TERM 2022–2028	LONG TERM 2029–2035
Personnel Services							
Airfield	$1,037,491	$1,203,000	$1,394,000	$1,616,000	$3,122,000	$8,435,000	$10,370,000
Terminal Building	3,915,510	4,539,000	5,261,000	6,099,000	11,429,000	31,828,000	39,139,000
Parking and Airport Roads							
Other	125,000	145,000	168,000	194,000	379,000	1,016,000	1,247,000
Administration	2,062,704	2,393,000	2,774,000	3,216,000	5,755,000	16,779,000	20,636,000
Security	1,966,219	2,279,000	2,642,000	3,063,000	5,693,000	15,981,000	19,655,000
Fire Station							
Total	**$9,106,924**	**$10,559,000**	**$12,239,000**	**$14,188,000**	**$26,378,000**	**$74,039,000**	**$91,047,000**
				CAGR during time period:	*9.0%*	*3.0%*	*3.0%*
Operation and Maintenance Expenses							
Airfield	$2,598,426	$2,940,000	$3,326,000	$3,763,000	$7,784,000	$20,605,000	$24,489,000
Terminal Building	3,865,075	4,843,000	5,480,000	6,334,000	11,580,000	33,508,000	40,865,000
Parking and Airport Roads	2,381,789	3,221,000	3,644,000	4,123,000	7,612,000	22,572,000	26,831,000
Other	1,332,184	1,507,000	1,707,000	1,932,000	3,991,000	10,563,000	12,572,000
Administration	1,162,385	1,315,000	1,488,000	1,683,000	3,482,000	9,218,000	10,955,000
Security	3,445,105	3,897,000	4,409,000	4,989,000	10,321,000	27,311,000	32,465,000
Fire Station	3,211,983	3,633,000	4,110,000	4,650,000	9,563,000	25,462,000	30,264,000
Total	**$17,996,947**	**$21,356,000**	**$24,164,000**	**$27,474,000**	**$54,333,000**	**$149,239,000**	**$178,441,000**
				CAGR during time period:	*4.2%*	*2.9%*	*2.6%*
Total Operating Expenses	**$27,103,872**	**$31,915,000**	**$36,403,000**	**$41,662,000**	**$80,711,000**	**$223,278,000**	**$269,488,000**
				CAGR during time period:	*5.8%*	*2.9%*	*2.7%*
Total Operating Expenses by Cost Center							
Airfield	$3,635,917	$4,143,000	$4,720,000	$5,379,000	$10,906,000	$29,040,000	$34,859,000
Terminal Building	7,780,585	9,382,000	10,741,000	12,433,000	23,008,000	65,336,000	80,004,000
Parking and Airport Roads	2,381,789	3,221,000	3,644,000	4,123,000	7,612,000	22,572,000	26,831,000
Other	1,457,182	1,652,000	1,875,000	2,126,000	4,370,000	11,579,000	13,819,000
Administration	3,225,088	3,708,000	4,262,000	4,899,000	9,237,000	25,997,000	31,591,000
Security	5,411,324	6,176,000	7,051,000	8,052,000	16,014,000	43,292,000	52,120,000
Fire Station	3,211,983	3,633,000	4,110,000	4,650,000	9,563,000	25,462,000	30,264,000
Total	**$27,103,872**	**$31,915,000**	**$36,403,000**	**$41,662,000**	**$80,710,000**	**$223,278,000**	**$269,488,000**

NOTES: Fiscal years ending September 30.
CAGR – Compound Annual Growth Rate
SOURCES: City of Boise Department of Aviation, May 2019 (Budget 2020); Ricondo & Associates, Inc., August 2019 (projections).

- **Rental car garage:** Additional expenses are anticipated to be incurred with the opening of the new rental car ready/return garage. However, it is assumed the City will increase the CFC to a level adequate to cover any associated debt service, as well as operating expenses. Therefore, there is no anticipated cash flow or rate impact from incremental cost increases with the new facility.
- **Airfield:** Significant additions to pavement area could increase O&M expenses, particularly for activities such as snow removal or debris sweeping. However, although pavement is proposed to be added, large areas of pavement would also be removed or closed as part of implementing the recommended airfield modifications. Therefore, for purposes of this analysis, no additional O&M expenses were assumed.
- **Tenant facilities:** New large facilities, such as the consolidated cargo facility and the aircraft maintenance hangar, would likely incur additional O&M expenses. However, it was assumed such costs would be solely the responsibility of the respective tenants. This would also be the case for smaller private hangar development.

7.3.2 PROJECTED NONAIRLINE REVENUES

Nonairline revenues include terminal concessions, car rentals, parking, space rentals, GA activity, cargo facilities, and other revenues, including interest income. **Table 7-12** presents projected nonairline revenues based on the Airport's FY 2020 budget. The following describes the basis by which nonairline revenues were projected through FY 2035.

- **Airfield revenues**
  - Freight, charter, and other landing fee revenues were grown at 1.6 percent per year, reflecting the average GA, cargo, and air taxi operations growth forecast from 2019 to 2035.
  - Aircraft parking fees and fuel flowage fees were grown at 1.5 percent per year, reflecting the average GA and air taxi operations growth forecast from 2019 to 2035.
  - National Guard fees and interest income were assumed to be constant at $176,000 and $20,000 per year, respectively.
  - Miscellaneous revenues were grown at an assumed annual inflation rate of 2.5 percent.
- **Terminal revenues**
  - Rental car revenues are budgeted and projected to represent the largest share of terminal-related nonairline revenues. Rental car revenue is received through privilege fees of 10 percent of gross revenues subject to a minimum annual guarantee, in addition to terminal rent and ground rentals. These revenues are a function of passenger traffic, contract terms, and changes in the prices charged by the rental car companies. For purposes of this analysis, rental car revenues were grown at 3.4 percent per year, reflecting half the annual forecast growth in enplaned passengers from 2019 to 2035, plus an assumed annual inflation rate of 2.5 percent.
  - Concessions revenues include revenues received from food and beverage and gifts and news establishments within the terminal. In June 2014, the City approved new Master Concessionaire agreements to provide these concessions. These agreements currently extend to FY 2024. Under these agreements, the City receives approximately 14.0 percent of gross food and beverage revenues and approximately 16.5 percent of gross news and gifts revenues, all subject to minimum annual guarantees. For purposes of this analysis, terminal concessions revenues were grown at 3.4 percent per year, reflecting half the annual forecast growth in enplaned passengers from 2019 to 2035, plus an assumed annual inflation rate of 2.5 percent.

— Nonairline terminal rentals, advertising and other concessions, and miscellaneous revenues were grown at an assumed annual inflation rate of 2.5 percent.

— Interest income was assumed to be constant at $20,000 per year.

TABLE 7-12 BUDGET AND PROJECTED NONAIRLINE REVENUES (1 OF 2)

	BUDGET 2020	PROJECTED 2025	PROJECTED 2030	PROJECTED 2035	SHORT TERM 2019–2021	MEDIUM TERM 2022–2028	LONG TERM 2029–2035
Airfield							
Freight/Charter/Other Landing Fees	$750,349	$815,000	$884,000	$960,000	$2,303,000	$5,708,000	$6,400,000
Aircraft Parking Fees	113,900	124,000	134,000	144,000	344,000	868,000	966,000
Fuel Flowage Fees	190,000	205,000	220,000	235,000	573,000	1,435,000	1,582,000
National Guard Fees	175,203	176,000	176,000	176,000	526,000	1,232,000	1,232,000
Interest Income	20,000	20,000	20,000	20,000	60,000	140,000	140,000
Miscellaneous	48,000	53,000	58,000	66,000	145,000	371,000	426,000
	$1,297,452	**$1,393,000**	**$1,492,000**	**$1,601,000**	**$3,951,000**	**$9,754,000**	**$10,746,000**
				CAGR during time period:	-0.7%	1.4%	1.4%
Terminal Building							
Car Rental	6,046,008	6,841,000	7,740,000	8,757,000	18,021,000	47,944,000	56,992,000
Concessions	2,585,389	3,370,000	3,992,000	4,729,000	7,724,000	23,366,000	29,972,000
Nonairline Terminal Rentals	580,000	657,000	743,000	842,000	1,755,000	4,603,000	5,475,000
Advertising and Other Concessions	516,700	530,000	557,000	585,000	1,550,000	3,736,000	3,969,000
Jetway Fees	160,513	178,000	207,000	242,000	475,000	1,265,000	1,538,000
Interest Income	20,000	20,000	20,000	20,000	60,000	140,000	140,000
Miscellaneous	15,000	15,000	15,000	15,000	45,000	105,000	105,000
	$9,923,610	**$11,611,000**	**$13,274,000**	**$15,190,000**	**$29,630,000**	**$81,159,000**	**$98,191,000**
				CAGR during time period:	3.4%	3.1%	2.7%
Parking and Airport Roads							
Public Parking	$13,580,091	$15,665,000	$18,972,000	$22,979,000	$39,176,000	$111,466,000	$143,140,000
Employee Parking	500,000	566,000	641,000	725,000	1,513,000	3,968,000	4,718,000
Taxi/Hotel Shuttles	60,000	65,000	70,000	75,000	196,000	455,000	504,000
Interest Income	20,000	20,000	20,000	20,000	60,000	140,000	140,000
Miscellaneous	12,000	12,000	12,000	12,000	36,000	84,000	84,000
	$14,172,091	**$16,328,000**	**$19,715,000**	**$23,811,000**	**$40,981,000**	**$116,113,000**	**$148,586,000**
				CAGR during time period:	8.1%	3.5%	3.5%

TABLE 7-12 BUDGET AND PROJECTED NONAIRLINE REVENUES (2 OF 2)

	BUDGET 2020	PROJECTED 2025	PROJECTED 2030	PROJECTED 2035	SHORT TERM 2019–2021	MEDIUM TERM 2022–2028	LONG TERM 2029–2035
Other							
Industrial Land Rent	$3,939,765	$6,310,000	$6,895,000	$7,557,000	$11,766,000	$40,500,000	$50,095,000
Inflight Kitchen Sales	226,000	241,000	256,000	271,000	681,000	1,687,000	1,834,000
Hangar Rent	200,000	217,000	237,000	257,000	603,000	1,520,000	1,715,000
Airport Gas Station	210,331	239,000	270,000	305,000	627,000	1,673,000	1,988,000
Hotel Rent	175,611	208,000	246,000	291,000	525,000	1,458,000	1,845,000
Interest Income	20,000	20,000	20,000	20,000	60,000	140,000	140,000
Miscellaneous	5,000	5,000	5,000	5,000	15,000	35,000	35,000
	$4,776,706	**$7,240,000**	**$7,929,000**	**$,706,000**	**$14,277,000**	**$47,013,000**	**$57,652,000**
				CAGR during time period:	3.1%	7.3%	1.9%
Administration	200,000	226,000	256,000	290,000	605,000	1,585,000	1,886,000
Security	583,000	660,000	747,000	846,000	1,764,000	4,627,000	5,503,000
Fire Station	1,000	1,000	1,000	1,000	3,000	7,000	7,000
Total Nonairline Revenue	**$30,953,859**	**$37,459,000**	**$43,414,000**	**$50,445,000**	**$91,211,000**	**$260,258,000**	**$322,571,000**
				CAGR during time period:	5.1%	3.9%	2.9%

NOTES: Fiscal years ending September 30.
CAGR – Compound Annual Growth Rate
SOURCES: City of Boise Department of Aviation, May 2019 (Budget 2020); Ricondo & Associates, Inc., August 2019 (projections).

- **Parking and Airport Roads revenues**
  - Public parking revenues represent the largest share of nonairline revenues at the Airport (approximately 44.0 percent in the FY 2020 budget). These revenues are generated through use of the Airport's surface and garage parking facilities. Parking revenues are projected to increase in accordance with forecast growth in enplaned passengers (1.9 percent annually from 2019 to 2035), plus an additional 5.0 percent increase every three years to account for new parking products and/or parking rate increases.
  - Airport employees pay for parking privileges in designated employee parking lots. Employee parking revenues and miscellaneous revenues were projected to increase at an assumed annual inflation rate of 2.5 percent.
  - Revenues from taxis and hotel/courtesy shuttles were assumed to grow at 1.9 percent annually, reflecting the forecast enplaned passenger growth from 2019 to 2035.
  - Interest income was assumed to be constant at $20,000 per year.
  - Miscellaneous revenues were grown at an assumed annual inflation rate of 2.5 percent.
- **Other revenues**
  - Industrial land rent includes revenues from businesses located off-Airport. These revenues were projected to increase at an assumed annual inflation rate of 2.5 percent. For purposes of this analysis, revenues projected to be received from a future tenant of the proposed aircraft maintenance facility are included in

this category. Based on the current structure of the SkyWest Airlines maintenance hangar lease, future revenues associated with this facility assume the tenant pays fees that include annual debt service from bonds issued to finance the facility, along with amortization at 4.5 percent annually on any Airport funds/cash used to fund the facility.

- Inflight kitchen sales were assumed to grow in accordance with the forecast growth in passenger airline operations (1.1 percent per year).
- Hangar rent was assumed to grow at 1.7 percent per year, reflecting the forecast growth in GA operations.
- Revenues received from the on-Airport gas station were assumed to grow at an annual inflation rate of 2.5 percent.
- Hotel rent was assumed to grow at 3.4 percent per year, reflecting half the annual forecast growth in enplaned passengers from 2019 to 2035, plus an assumed annual inflation rate of 2.5 percent.
- Interest income was assumed to be constant at $20,000 per year.
- Miscellaneous revenues were grown at an assumed annual inflation rate of 2.5 percent.

- **Indirect revenues**
  - Administration, Security, and Fire Station revenues were grown at an annual inflation rate of 2.5 percent.

7.3.3 AIRLINE REVENUES

Airline revenues include landing fees and terminal rentals payable by the passenger airlines operating at the Airport, in accordance with the Airline Agreement. **Table 7-13** presents projected airline rates and charges and associated airline revenues (requirements) through the MPU planning period.

The Signatory Airline landing fee rate per 1,000 pounds of landed weight is calculated by dividing: (1) the sum of (a) direct and allocated indirect operating expenses and applicable depreciation to the Airfield cost center, minus (b) nonairline Airfield revenues, the first $1 million of net revenues from the Parking and Airport Roads cost center, and 50 percent of net revenues from the Parking and Airport Roads cost center over $1 million; by (2) estimated Signatory Airline landed weight. From the FY 2020 budget, airline landed weight was projected to increase 2.0 percent per year.

The terminal building rental rate per square foot per year is calculated by dividing: (1) the sum of direct and allocated indirect operating expenses to the Terminal cost center, any applicable depreciation and debt service allocable to the Terminal cost center minus the first $900,000 of nonairline Terminal revenues, and 50 percent of nonairline Terminal revenues over $900,000; by (2) the estimated airline rented square footage. According to Airport records, the airlines currently rent 109,071 square feet of terminal space. The amount of space rented by airlines would be expected to increase with construction and extension of Concourse A. Future terminal programming and design activities will ultimately determine the amount of additional rentable space associated with new terminal facilities. For purposes of this analysis, Concourse A Phase 1 was assumed to add approximately 22,500 square feet of airline-rented space in the medium term, while Phase 2/3 was assumed to add approximately 5,000 square feet of airline-rented space in the long term.

TABLE 7-13 PROJECTED AIRLINE REVENUES AND RATES AND CHARGES

	PROJECTED 2020	PROJECTED 2025	PROJECTED 2030	PROJECTED 2035	SHORT TERM 2019–2021	MEDIUM TERM 2022–2028	LONG TERM 2029–2035
Signatory Airline Landing Fee							
Airfield Operating Expenses	$3,636,000	$4,143,000	$4,720,000	$5,379,000	$10,906,226	$29,040,000	$34,859,000
Airfield Depreciation	1,441,000	1,846,000	2,386,000	2,225,000	4,230,000	13,766,000	16,196,000
Expense Allocations from Other Cost Centers	5,645,000	6,531,000	7,612,000	8,683,000	16,739,953	45,995,000	56,306,000
Adjustments	(1,500,000)				(3,000,000)		
Airfield Nonairline Revenues	(1,297,000)	(1,393,000)	(1,492,000)	(1,601,000)	(3,950,944)	(9,754,000)	(10,746,000)
Credit of Parking and Airport Road Area Net Revenue	(4,899,000)	(3,370,000)	(4,740,000)	(7,466,000)	(11,975,049)	(24,948,000)	(41,994,000)
Total Airfield Requirement [A]	**$3,026,000**	**$7,757,000**	**$8,486,000**	**$7,220,000**	**$12,950,186**	**$54,099,000**	**$54,621,000**
Passenger Airline Landed Weight (1,000-lb Units) [B]	2,351,980	2,596,776	2,867,050	3,165,455	6,990,980	18,191,690	20,896,533
Average Airline Landing Fee (Per Unit) [A/B]	**$1.29**	**$2.99**	**$2.96**	**$2.28**	**$1.85**	**$2.97**	**$2.61**
Terminal Rentals							
Terminal Operating Expenses	$7,781,000	$9,382,000	$10,741,000	$12,433,000	$23,008,629	$65,336,000	$80,004,000
Terminal Depreciation	1,796,000	2,739,000	2,322,000	3,285,000	5,015,000	19,204,000	20,327,000
Expense Allocations from Other Cost Centers	3,982,000	4,355,000	5,015,000	5,961,000	11,316,289	30,533,000	37,967,000
Net Terminal Debt Service	944,000				1,888,047		
Adjustments	1,000,000				2,500,000		
Terminal Nonairline Revenues	(9,924,000)	(11,611,000)	(13,274,000)	(15,190,000)	(29,631,519)	(81,159,000)	(98,191,000)
Revenue Allocation To (From) Capital Improvement Fund	(2,088,000)	(400,000)	(1,596,000)	(4,134,000)	(3,541,456)	(4,149,000)	(19,466,000)
Total Terminal Requirement [A]	**$3,491,000**	**$4,465,000**	**$3,208,000**	**$2,355,000**	**$10,554,990**	**$29,765,000**	**$20,641,000**
Total Airline Rented Space (Square Feet) [B]	109,701	132,201	132,201	137,201	329,103	902,907	945,407
Average Airline Terminal Rental Rate (Per Square Foot) [A/B]	**$31.82**	**$33.77**	**$24.27**	**$17.16**	**$32.07**	**$32.97**	**$21.83**
Passenger Airline Cost Per Enplaned Passenger							
Total Airline Revenue Requirement	$6,517,000	$12,222,000	$11,694,000	$9,575,000	$23,505,175	$83,864,000	$75,262,000
Enplaned Passengers	1,787,000	1,977,000	2,172,000	2,367,000	5,361,000	13,843,000	15,745,000
Average Passenger Airline Cost Per Enplaned Passenger	**$3.65**	**$6.18**	**$5.38**	**$4.05**	**$4.38**	**$6.06**	**$4.78**

NOTE: Fiscal years ending September 30.
SOURCE: Ricondo & Associates, Inc., August 2019 (based on information provided by the City of Boise Department of Aviation).

Throughout the planning period, the landing fee and terminal rental rates fluctuate due to new and expiring debt service and depreciation, increases in aircraft landed weight and terminal rented space, net revenue credits from the Parking and Airport Roads cost center, and revenue allocations from the Capital Improvement Fund. Total airline revenue is estimated to increase from approximately $6.5 million in FY 2020 to approximately $9.6 million in FY 2035.

It should be noted that the projected landing fee and terminal rental rates presented in Table 7-13 are not intended to indicate a formal schedule of future rates and charges to be assessed to the airlines. Airport management calculates appropriate airline rates and charges annually in consultation with the airlines. Projected rates and charges in this MPU are estimated for purposes of determining if the order of magnitude of the rates and charges seems reasonable given the described assumptions, including the future CIP. In this context, the estimated order of magnitude of the rates and charges presented in Table 7-13 seems reasonable.

Table 7-13 also presents estimated average passenger airline CPE. The City's 2018 *Comprehensive Annual Financial Report* includes the CPE for the Airport from FY 2009 to FY 2018. Over this 10-year period, the maximum CPE was $4.81 (FY 2010 and FY 2011); the lowest was $3.62 (FY 2018) and the average was $4.36.[6] In this context, the CPE values presented in Table 7-13, including short-term, medium-term, and long-term averages, seem reasonable.

7.3.4 APPLICATION OF REVENUES

7.3.4.1 CASH FLOW ANALYSIS

Table 7-14 presents the funds remaining after operating expenses and debt service are deducted from Airport revenues. The resulting analysis shows cash available for capital projects remains positive throughout the MPU planning period, indicating the assumed use of Airport funds (cash) to fund various projects in the CIP is reasonable and feasible in the context of projected revenues, expenses, and debt service.

7.3.4.2 DEBT SERVICE COVERAGE

The final test of the CIP funding plan's feasibility is whether the net revenues available to pay existing plus estimated future debt service meet the debt service coverage requirements, as specified in the trust indentures. **Table 7-15** presents the calculation of estimated debt service coverage. As depicted, net revenues available for coverage exceed 125 percent of the net existing and future debt service requirement through the planning period, as required under the Senior Trust Indenture. This analysis assumes future bonds will be issued by the City as senior bonds, since the 125 percent coverage requirement on senior bonds represents the most conservative test. Recommendations as to the structure of future bonds would be made by a registered municipal advisor.

[6] City of Boise, *Fiscal Year 2018 Comprehensive Annual Financial Report*, March 8, 2019.

TABLE 7-14 PROJECTED CASH FLOW

	PROJECTED 2020	PROJECTED 2025	PROJECTED 2030	PROJECTED 2035	SHORT TERM 2019–2021	MEDIUM TERM 2022–2028	LONG TERM 2029–2035
Revenues							
Airline Revenues	$6,517,000	$12,222,000	$11,694,000	$9,575,000	$23,505,175	$83,864,000	$75,262,000
Nonairline Revenues	30,954,000	37,459,000	43,414,000	50,445,000	91,212,128	260,258,000	322,571,000
Total Revenues [A]	$37,471,000	$49,681,000	$55,108,000	$60,020,000	$114,717,303	$344,122,000	$397,833,000
Operating Expenses							
Personnel Expenses	$9,107,000	$10,559,000	$12,239,000	$14,188,000	$26,378,526	$74,039,000	$91,047,000
Operation and Maintenance Expenses	17,997,000	21,356,000	24,164,000	27,474,000	54,332,366	149,239,000	178,441,000
Total Cash Expenses [B]	$27,104,000	$31,915,000	$36,403,000	$41,662,000	$80,710,892	$223,278,000	$269,488,000
Net Debt Service Requirement							
Existing Debt Service	$6,043,000	$1,619,000	$1,621,000	$791,000	$13,714,000	$11,329,000	$8,848,000
Future Debt Service		14,022,000	14,022,000	16,561,000	2,141,000	83,367,000	108,310,000
PFC Revenues Applied to Debt Service	(3,482,000)	(4,385,000)	(4,385,000)	(6,924,000)	(6,966,000)	(26,310,000)	(40,851,000)
CFC Revenues Applied to Debt Service		(3,640,000)	(3,640,000)	(3,640,000)		(25,480,000)	(25,480,000)
Total [C]	$2,561,000	$7,616,000	$7,618,000	$6,788,000	$8,889,000	$42,906,000	$50,827,000
Net Cash Flow from Operations [D=A-B-C]	$7,806,000	$10,150,000	$11,087,000	$11,570,000	$25,117,412	$77,938,000	$77,518,000
Capital Improvement Fund Deposits							
From (To) Terminal Nonairline Revenues	($2,088,000)	($400,000)	($1,596,000)	($4,134,000)	($3,541,456)	($4,149,000)	($19,466,000)
From Parking and Airport Roads	3,899,000	2,370,000	3,740,000	6,466,000	8,975,049	17,948,000	34,994,000
Total [E]	$1,811,000	$1,970,000	$2,144,000	$2,332,000	$5,433,593	$13,799,000	$15,528,000
Deposit to Discretionary Fund [F=D-E]	$5,995,000	$8,180,000	$8,943,000	$9,238,000	$19,683,819	$64,139,000	$61,990,000
Cash Available for Capital Projects							
Beginning Balance	$22,203,000	$173,000	$13,774,000	$23,290,000	$29,861,000	$499,000	$4,183,000
Capital Improvement Fund [E]	1,811,000	1,970,000	2,144,000	2,332,000	5,434,000	13,799,000	15,528,000
Deposit to Discretionary Fund [F]	5,995,000	8,180,000	8,943,000	9,238,000	19,684,000	64,139,000	61,990,000
Use of Cash for Capital Projects	(21,815,000)	(9,638,000)	(7,990,000)	(4,512,000)	(54,480,000)	(74,254,000)	(51,352,000)
Ending Balance	**$8,194,000**	**$685,000**	**$16,871,000**	**$30,348,000**	**$499,000**	**$4,183,000**	**$30,349,000**

NOTES: Fiscal years ending September 30.
CFC – Customer Facility Charge
PFC – Passenger Facility Charge
SOURCE: Ricondo & Associates, Inc., August 2019 (based on information provided by the City of Boise Department of Aviation).

TABLE 7-15 PROJECTED DEBT SERVICE COVERAGE

	PROJECTED 2020	PROJECTED 2025	PROJECTED 2030	PROJECTED 2035	SHORT TERM 2019–2021	MEDIUM TERM 2022–2028	LONG TERM 2029–2035
Airline Revenues	$6,517,000	$12,222,000	$11,694,000	$9,575,000	$23,505,175	$83,864,000	$75,262,000
Nonairline Revenues	30,954,000	37,459,000	43,414,000	50,445,000	91,212,128	260,258,000	322,571,000
Total Revenues	$37,471,000	$49,681,000	$55,108,000	$60,020,000	$114,717,303	$344,122,000	$397,833,000
LESS: Total Cash Expenses	$27,104,000	$31,915,000	$36,403,000	$41,662,000	$80,710,892	$223,278,000	$269,488,000
Net Revenues Available for Coverage	**$10,367,000**	**$17,766,000**	**$18,705,000**	**$18,358,000**	**$34,006,411**	**$120,844,000**	**$128,345,000**
Net Debt Service Requirement	$2,561,000	$7,616,000	$7,618,000	$6,788,000	$8,889,000	$42,906,000	$50,827,000
Debt Service Coverage	**4.05**	**2.33**	**2.46**	**2.70**	**3.83**	**2.82**	**2.53**
Required Coverage	*1.25*	*1.25*	*1.25*	*1.25*	*1.25*	*1.25*	*1.25*

NOTE: Fiscal years ending September 30.
SOURCE: Ricondo & Associates, Inc., August 2019 (based on information provided by the City of Boise Department of Aviation).

7.4 CONCLUSIONS AND RECOMMENDATIONS

Based on the analyses documented in this section, implementation of the recommended Master Plan Projects, as incorporated into the Airport's overall long-term CIP, appears to be financially feasible given the funding sources anticipated to be available to the Airport through the planning period. The projected airline rates and the average passenger airline CPE remain reasonable over the planning period, and the projected available Airport funds appear to be adequate to fund applicable portions of the CIP. Finally, revenues available for debt service coverage are projected to be significantly above the minimum 125 percent of net debt service throughout the planning period.

As implementation of the CIP progresses, Airport management, in conjunction with the Airport sponsor, should continually assess the financial feasibility of each project included in the CIP. Future considerations regarding the funding of the CIP include the following:

- Enplaned passenger/traffic growth: As applicable, the financial plan was developed and analyzed in consideration of the FAA-approved aviation activity forecast developed for the Airport (see Section 3). Actual year-to-year enplaned passengers and aircraft operations will likely deviate from the forecast. Significant changes in enplaned passengers and aircraft operations levels may impact revenues and expenses, as well as PFC and CFC revenues, and AIP grant availability.
- Availability of AIP funds: The potential funding plan for the CIP assumes the FAA will continue to authorize and appropriate AIP funds for eligible projects. Because the level of authorized and appropriated AIP funds may vary from year to year, alternative funding sources may need to be identified if grants cannot be obtained for certain eligible projects.
- Potential increase in maximum PFC level: Airport industry groups have requested that federal PFC regulations be changed to increase the PFC program's maximum PFC level from its current level of $4.50 per eligible enplaned passenger. While the FAA Reauthorization Act of 2018 did not address the issue, it is likely that future reauthorization legislation will have to address it, with increasing pressure to raise the maximum PFC level. The financial projections and the funding plan reflected in this section assume the current $4.50 maximum PFC level remains in place for the entire planning period. If federal PFC regulations are changed and the maximum PFC level is increased, then the City may choose to apply to the FAA for authorization to collect the higher PFC level.

The Airport sponsor should consider the following recommendations for enhancing the financial position of the Airport:

- Conduct periodic assessments of operating and maintenance activities to determine if specific activities are being conducted as efficiently as possible and continue to take advantage of opportunities to implement sustainable practices, development, and technologies (e.g., alternative fuel vehicles, solar/wind power, green roofs).
- Actively seek opportunities to encourage nonaeronautical development at the Airport. Section 6, along with the ALP, identifies suitable areas for nonaeronautical development at the Airport. Consideration should be given to the creation of a marketing/development plan to help identify and guide appropriate development within Airport property.
- Take advantage of funding opportunities that may supplement or replace "typical" airport capital development funding sources. Examples may include public-private partnerships for third-party financing, TSA grants for security-related improvements within the terminal, economic development grants, and tax incentives for private facility development.
- As current leases expire, review terms/rates of current leases to determine the most appropriate lease terms and rates given market conditions, specific land/facility uses, and opportunity costs. In addition, periodic reviews of rates and charges imposed on Airport users should be undertaken.

8. AIRPORT LAYOUT PLAN NARRATIVE

The ALP is intended to graphically portray existing conditions at the Airport, detail design standards outlined in FAA AC 150/5300-13A, Airport Design, future development, and areas in which future development may occur. The ALP set is a set of drawings used by the FAA when budgeting for future projects, assessing impacts to the Airport, and to determine zoning and other land uses in the Airport environment. The ALP also stands as a planning tool for the FAA to use when reviewing planned development and AIP grants and for the surrounding communities to use when determining zoning and land use planning.

The Final ALP associated with the MPU was approved by the FAA in May 2019. A reduced-size copy of the FAA approved ALP set is attached at the end of this section. A full-size print of the complete ALP set is on file with the City/Airport and may be made available electronically by the City.

Recommended development projects depicted on the ALP are future described in Sections 5 and 6 of this MPU report. Section 5 describes the development and evaluation of the concepts that form the foundation of the recommended development plan. Section 6 describes the individual projects that comprise the recommended development plan, including implementation of the plan. The projects described in these sections are depicted on the Future Airport Layout Plan (Sheet 3) and are supported by the remaining sheets in the ALP set, and within various sections of the MPU report.

The ALP set consists of the following drawing sheets:

- Sheet 1: Airport Data Sheet
- Sheet 2: Existing Airport Layout Plan
- Sheet 3: Future Airport Layout Plan
- Sheet 4: Terminal Area Plan
- Sheets 5 and 6: General Aviation Areas
- Sheet 7: Runway Centerline Profiles
- Sheets 8, 9, and 10: Airport Airspace Plan
- Sheet 11: Inner Portion of Runway 10L-28R
- Sheet 12: Inner Portion of Runway 10R-28L
- Sheet 13: Inner Portion of Runway 9-27
- Sheet 14: On-Airport Land Use Plan
- The ALP set includes, under separate cover, a set of drawings comprising the Exhibit A property map for the Airport.

The remainder of this section describes the key elements depicted on the ALP set.

Cover Sheet and Index of Drawings

The cover sheet shows a sheet index of the ALP set and provides both vicinity and location maps that show the Airport in relation to its surrounding geography.

Airport Data Sheet (Sheet 1)

The Airport Data Sheet is designed to be a compiled source of all pertinent Airport data. This sheet is intended to be used in conjunction with the Future Airport Layout Plan sheet as a reference document for existing and planned Airport development. Various tables and graphics depicted on this sheet are as follows:

- **Runway Data Table:** This table is a compiled tabulation of information relating specifically to runways at the Airport. Various specifications are listed for each existing and future runway, including runway location, dimensions, design group, available lighting and navigational aids, as well as safety areas as defined in AC 150/5300-13A.
- **Runway Surfaces Tables:** These tables and an associated graphic depict the approach visibility minimums for each runway, as well as dimensions for various safety areas.
- **Airport Data Table:** This table lists existing and future information specific to the Airport, such as Airport elevation, service level, role, reference code, design aircraft, owner Airport Reference Point, temperature information, and available navigational aids.
- **Taxiway Data Table:** This table lists the existing and future width and safety area dimensions for each major taxiway at the Airport.
- **Declared Distances Table:** This table identifies the existing and future takeoff and landing distance available on each existing and future runway.
- **Wind Rose and Wind Coverage Table:** These components detail the percentage of time a runway end or combination of ends or runways are available for arrivals. When combined, the coverage is intended to be as near as possible to 100 percent. The Wind Rose depicts the runway orientation and percentages over which winds from a given direction occur. The box width varies based on the crosswind component desired and is intended to graphically portray the information displayed in the Wind Coverage Table.

Airport Layout Plan (Sheets 2 and 3)

For purposes of this MPU, the Airport Layout Plan comprises two separate sheets. The Existing Airport Layout Plan sheet depicts the existing layout of Airport facilities and safety areas. The Future Airport Layout Plan sheet depicts planned airfield and related Airport development. Together with the Airport Data Sheet, this sheet serves as an overview for the FAA and Airport sponsor as grant and other federal funding for future improvements are assigned. The Future Airport Layout Plan sheet also graphically depicts compliance with standards set forth in AC 150/5300-13A or necessary modifications to those standards.

Facility Detail Sheets (Sheets 4, 5, and 6)

The ALP set includes a Future Terminal Area Plan sheet which, provides a detailed depiction of the terminal area, including the location of future aircraft gates. Similarly, two sheets were developed to depict the five areas of the Airport where general aviation facilities are concentrated.

Runway Centerline Profiles (Sheet 7)

This sheet depicts the profile of each existing and future runway at the Airport, including the runway slope and line of sight.

Airport Airspace Plan (Sheets 8, 9, and 10)

The Airport Airspace Plan is a set of three sheets depicting the 14 CFR Part 77 *Objects Affecting Navigable Airspace* (Part 77) imaginary airspace surfaces for the Airport. Part 77 details requirements for the safe and efficient use of navigable airspace. These surfaces are intended to provide airports and sponsors with a mechanism to evaluate existing and proposed objects as part of the 7460 process for determining hazards to air navigation. Part 77 surfaces correspond to available navigational aids and types of approaches available to a runway end. The following surfaces are depicted on the Airport Airspace Plan:

- Horizontal Surface: This surface corresponds to the type of approach available to each runway and is defined as swinging arcs of a specified radius. The surface is 150 feet above Airport elevation.
- Primary Surface: This surface is dependent on the most precise type of approach available to a runway. The surface is rectangular in shape, is the same elevation as the runway centerline, and extends 200 feet beyond the runway end.
- Conical Surface: The conical surface extends upwards and outwards from the periphery of the horizontal surface for a distance of 4,000 feet at a slope of 20:1.
- Approach Surface: The approach surface extends upwards and outwards from the end of the primary surface along the runway centerline. The inner dimension is the same as the primary surface and the length and outer dimension are dependent on the most precise approach available to the specified runway end. Slopes may vary from 50:1 to 20:1.
- Transitional Surface: The transitional surface extends upwards and outwards from the edge of the approach surface for a distance of 5,000 feet at a slope of 7:1.

The Part 77 surfaces are the basis for protecting airspace around an airport; therefore, it is ideal to keep these surfaces clear of obstructions whenever possible. The obstruction data tables on Sheet 3 of the Airport Airspace Plan identify each obstruction and its location, along with disposition to address the described obstruction.

Inner Portion of Ruway Approach (Sheets 11, 12, and 13)

The Inner Portion of the Runway Approach drawings depict the objects that occur within the first 5,750 feet of the Part 77 approach surface. These sheets provide specific data regarding potential obstruction and ground topography. The obstruction tables identify which surfaces are penetrated by obstructions, the amount of penetration, and the proposed disposition of the obstruction.

On-Airport Land Use Plan (Sheet 14)

The On-Airport Land Use Plan is a composite drawing that depicts the land uses for areas within the Airport boundary. All existing and planning improvements at the Airport are depicted and organized by general use categories.

Airport Property Map (Separate Cover)

The Airport Property Map is available under separate cover and reflects current Airport property interests and future property acquisitions, including easements.

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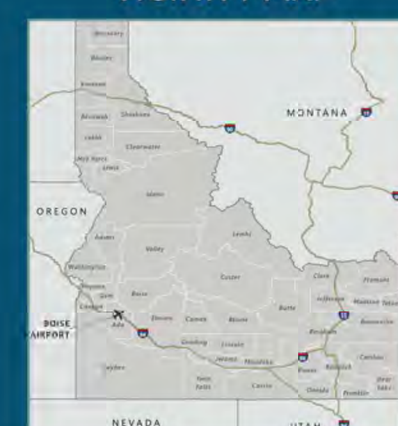
AIRPORT LAYOUT PLAN

BOISE AIR TERMINAL | GOWEN FIELD

DRAWING INDEX

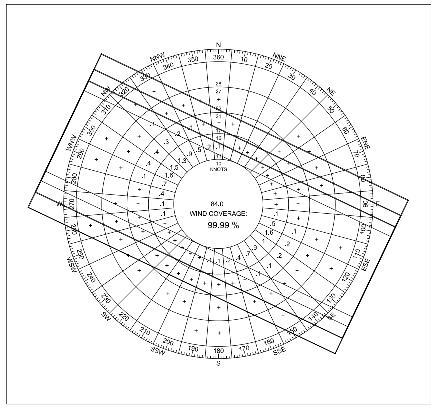
LOCATION MAP

VICINITY MAP



APRIL 2019

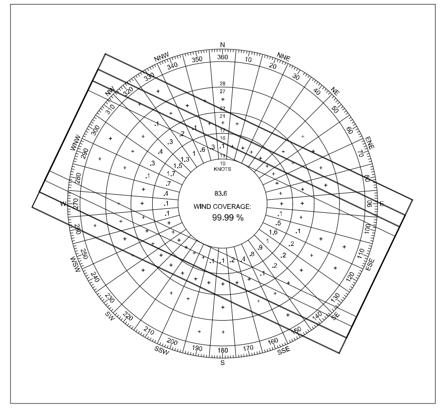
ALL WEATHER WIND ROSE



CROSSWIND COMPONENT	RUNWAY COVERAGE (PERCENT)	
	Runway 10L/R	Runway 28L/R
10.5 knots (12 mph)	73.59%	75.61%
	98.98%	
13 knots (15 mph)	73.91%	76.09%
	99.77%	
16 knots (18.4 mph)	73.96%	76.20%
	99.92%	
20 knots (23 mph)	73.99%	76.23%
	99.99%	

WIND COVERAGE TABLE

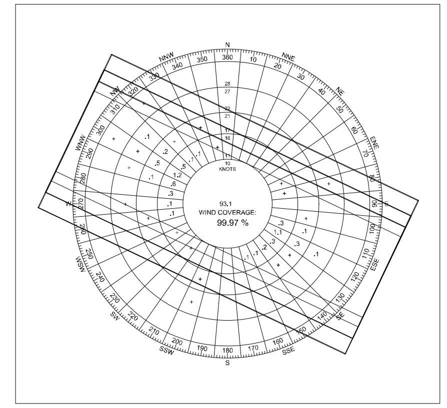
VFR WIND ROSE



WIND COVERAGE TABLE

CROSSWIND COMPONENT	RUNWAY COVERAGE (PERCENT)	
	Runway 10L/R	Runway 28L/R
10.5 knots (12 mph)	73.12%	75.02%
	98.94%	
13 knots (15 mph)	73.45%	75.51%
	99.76%	
16 knots (18.4 mph)	73.50%	75.62%
	99.92%	
20 knots (23 mph)	73.53%	75.65%
	99.99%	

IFR WIND ROSE



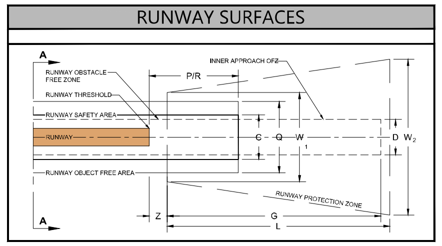
WIND COVERAGE TABLE

CROSSWIND COMPONENT	RUNWAY COVERAGE (PERCENT)	
	Runway 10L/R	Runway 28L/R
10.5 knots (12 mph)	84.83%	89.76%
	99.74%	
13 knots (15 mph)	84.83%	89.87%
	99.86%	
16 knots (18.4 mph)	84.86%	89.93%
	99.94%	
20 knots (23 mph)	84.89%	89.93%
	99.97%	

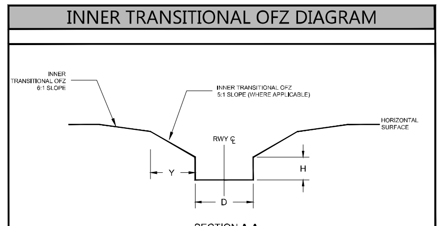
RUNWAY DATA TABLE

DESCRIPTION		Runway 10L-28R				Runway 10R-28L				Runway 9-27			
		Existing		Future		Existing		Future		Existing		Future	
		Runway 10L	Runway 28R	Runway 10L	Runway 28R	Runway 10R	Runway 28L	Runway 10R	Runway 28L	Runway 9	Runway 27	Runway 9	Runway 27
Runway Length		10,000'		Same		9,762'		10,000'				5,000'	
Runway Width		150'		Same		150'		Same				100'	
Runway Design Code		D/IV/4000'	D/IV/4000'	Same	D/IV/2400'	D/IV/1600'	D/IV/2400'	Same	Same			B/II/VIS	B/II/VIS
Approach Reference Code		D/IV/4000'	D/IV/4000'	Same	D/IV/2400'	D/IV/1600'	D/IV/2400'	Same	Same			D/VI/VIS	D/VI/VIS
Departure Reference Code		D/IV	D/IV	Same	Same	D/IV	D/IV	Same	Same			D/VI	D/VI
Approach Visibility Minimums (SM)		7/8	3/4	Same	1/2	1/2	5/8	Same	Same			N/A	N/A
Part 77 Approach Type		Non-Precision	Precision	Same	Same	Precision	Non-Precision	Same	Same			Visual	Visual
Part 77 Approach Slope		34:1	50:1	Same	Same	50:1	34:1	Same	Same			20:1	20:1
Aeronautical Survey Required for Approach		VGS	VGS	Same	Same	VGS	VGS	Same	Same			NVGS	NVGS
TERPS Departure Surface/OCS		40:1	40:1	Same	Same	40:1	40:1	Same	Same			N/A	N/A
Threshold Siting Surface		20:1	20:1	Same	34:1	34:1	20:1	Same	Same			20:1	20:1
Runway End Elevation (MSL)		2,830.6'	2,871.7'	Same	Same	2,824.3'	2,858.2'	2,829.8'	2,858.2'			2,887.3'	2,922.6'
Runway Touchdown Zone Elevation (MSL)		2,844.3'	2,871.7'	Same	Same	2,835.8'	2858.2'	2,851.6'	2,858.2'			2,908.6'	2,922.6'
Highest Point on Runway Centerline (MSL)		2,871.7'	2,871.7'	Same	Same	2,858.2'	2,858.2'	2,858.2'	2,858.2'			2,922.6'	2,922.6'
Lowest Point on Runway Centerline (MSL)		2,830.6'	2,830.6'	Same	Same	2,824.3'	2,824.3'	2,829.8'	2,829.8'			2,887.3'	2,887.3'
Runway End Coordinates	Latitude (N)	43° 34' 12.76" N	43° 33' 30.80" N	Same	Same	43° 34' 12.12" N	43° 33' 31.16" N	43° 34' 06.50" N	43° 33' 24.54" N			43° 32' 30.33" N	43° 32' 09.34" N
	Longitude (W)	116° 14' 12.88" W	116° 12' 09.95" W	Same	Same	116° 14' 33.42" W	116° 12' 33.39" W	116° 14' 16.92" W	116° 12' 13.99" W			116° 12' 29.38" W	116° 11' 27.92" W
True Bearing		115°	295°	Same	Same	115°	295°	Same	Same			115°	295°
Maximum Gradient		0.75%	0.75%	Same	Same	0.62%	0.62%	Same	Same			0.71%	0.71%
Effective Gradient		0.41%	0.41%	Same	Same	0.35%	0.35%	0.28%	0.28%			0.71%	0.71%
Runway Lighting		None	None	Same	MALSR	ALSF-2	MALSR	Same	Same			None	None
Runway Marking		Precision	Precision	Same	Same	Precision	Precision	Same	Same			Visual	Visual
Runway Edge Lighting		HIRL	HIRL	Same	Same	HIRL	HIRL	Same	Same			MIRL	MIRL
Surface Composition		Asphalt	Asphalt	Same	Same	Asphalt	Asphalt	Same	Same			Asphalt	Asphalt
Surface Treatment		Grooved	Grooved	Same	Same	Grooved	Grooved	Same	Same			Grooved	Grooved
Surface Condition		Good	Good	Same	Same	Good	Good	Same	Same			N/A	N/A
Pavement Strength by:	PCN	105/F/C/W/T	105/F/C/W/T	N/A	N/A	76/F/B/W/T	76/F/B/W/T	N/A	N/A			N/A	N/A
	Wheel Loading (x 1,000 lbs.)	DW - 200 DTW - 400 DDTW - 400	DW - 200 DTW - 400 DDTW - 400	Same Same Same	Same Same Same	DW - 200 DTW - 400 DDTW - 400	DW - 200 DTW - 400 DDTW - 400	Same Same Same	Same Same Same			TBD	TBD
Navigational Aids		GPS, VOR, DME	ILS, LOC, GPS	Same	Same	ILS, LOC, GPS, VOR, DME, NDB, RVR	GPS, VOR, DME, RVR	Same	Same			GPS, VOR, DME	GPS, VOR, DME
Visual Aids		VASI - 4	VASI - 4	PAPI - 4	PAPI - 4	VASI - 4	VASI - 4	PAPI - 4	PAPI - 4			TBD	TBD

RUNWAY SURFACES



INNER TRANSITIONAL OFZ DIAGRAM



NOTES:

1. Distance is measured prior to the physical end of pavement in the direction of travel.
2. Distance is measured 200 feet prior to the runway threshold and extends 200 feet beyond the last light unit in the ALS.
3. All elevations are Mean Sea Level (MSL).
4. The horizontal surface elevation is 3,021.7' feet (MSL), 150 feet above established airport elevation.
5. Vertical distance measured from the edges of the ROFZ and Inner Approach OFZ (refer to Inner Transitional OFZ diagram).
6. All coordinates reference the North American Datum 1983(NAD83).
7. All elevations reference the North American Vertical Datum 1988 (NAVD88).

ABBREVIATIONS:

SW: Single Wheel
DW: Dual Wheel
DTW: Dual Wheel Tandem
DDTW: Double Dual Tandem Wheel
DME: Distance Measuring Equipment
GPS: Global Positioning System
ILS: Instrument Landing System
LOC: Localizer
NBD: Non-Directional Beacon
VOR: Very-High Frequency Omnidirectional Range Station
TACAN: Tactical Area Navigation
MIRL: Medium Intensity Runway Lighting
HIRL: High Intensity Runway Lighting
REIL: Runway End Identifier Lights
MITL: Medium Intensity Taxiway Lighting
PAPI-4: Precision Approach Path Indicator (four lights)
MALSR: Medium-intensity Approach Lighting System with Runway Alignment Indicator Lights
VASI-4: Visual Approach Slope Indicator (four lights)
RSA: Runway Safety Area
OFA: Object Free Area
RPZ: Runway Protection Zone
ROFZ: Runway Obstacle Free Zone
POFZ: Precision Obstacle Free Zone

AIRPORT DATA TABLE

ITEM		EXISTING	FUTURE
NPIAS Category		Commercial Service	Same
IDOT Category		Developed	Same
Operational Role		Medium Haul	Same
Airport Reference Code		D - IV	Same
Critical Design Aircraft		A-300	Same
Airport Reference Point (NAD 83)	Latitude (N)	43° 33' 51.71" N	43° 33' 30.88" N
	Longitude (W)	116° 13' 22.28" W	116° 12' 58.47" W
Airport Magnetic Declination (WMM 2015)	Declination	13° 20' E ± 0° 22'	Same
	Annual Rate of Change	0° 7' W	Same
	Date	February 20, 2018	Same
	Source	National Centers for Environmental Information, NOAA; Boulder, CO	Same
Airport Elevation (MSL)		2,871.7'	2,922.6'
Airport Rescue & Firefighting Index		C	Same
Airport Property in Acres (Airport Parcel in Acres)		5,101 (4,279)	5,381 (4,851)
Mean Max Temperature (Hottest Month)		90.5°	Same
Distance & Direction from Boise		3 miles South	Same
Owner		City of Boise	Same
Terminal Navigation Aids		VORTAC, VOR/DME, ATCT, GPS, LOC, NDB	Same
Visual Aids		Rotating Beacon, LTD Wind Cone, PAPI, VASI, ALSF-2, MALSR	Same
Weather Aids		ASOS	Same
Taxiway Lighting		MITL	Same
Datum		NAD 83, NAVD 88	Same

TAXIWAY DATA TABLE

ITEM	WIDTH		SHOULDER		SAFETY AREA		OBJECT FREE AREA	
	EXISTING	FUTURE	EXISTING	FUTURE	EXISTING	FUTURE	EXISTING	FUTURE
TAXIWAY A	75'	SAME	25'	SAME	171'	SAME	259'	SAME
TAXILANE A1	45'	REMOVE	N/A	REMOVE	49'	REMOVE	79'	REMOVE
TAXILANE A2	45'	REMOVE	N/A	REMOVE	49'	REMOVE	79'	REMOVE
TAXILANE A3	75'	SAME	10'	SAME	171'	SAME	225'	SAME
TAXILANE A4	75'	SAME	7.5'	SAME	171'	SAME	225'	SAME
TAXILANE A5	50'	SAME	N/A	SAME	79'	SAME	115'	SAME
TAXILANE A6	60'	75'	N/A	30'	79'	118'	115'	162'
TAXILANE A7	60'	SAME	N/A	SAME	79'	SAME	115'	SAME
TAXIWAY B	75'	SAME	25'	SAME	171'	SAME	259'	SAME
TAXIWAY B1	130'	REMOVE	25'	REMOVE	171'	REMOVE	259'	REMOVE
TAXIWAY B2	75'	REMOVE	25'	REMOVE	171'	REMOVE	259'	REMOVE
TAXIWAY B3	75'	REMOVE	25'	REMOVE	171'	REMOVE	259'	REMOVE
TAXIWAY C	80'	REMOVE	25'	REMOVE	171'	REMOVE	259'	REMOVE
TAXIWAY D	75'	88'	25'	30'	171'	SAME	259'	SAME
TAXIWAY E	130'	88'	25'	30'	171'	SAME	259'	SAME
TAXIWAY F	75'	SAME	33'	SAME	171'	SAME	259'	SAME
TAXIWAY G	130'	88'	25'	30'	171'	SAME	259'	SAME
TAXIWAY H	75'	REMOVE	10'	REMOVE	171'	REMOVE	259'	REMOVE
TAXIWAY J	75'	REMOVE	20'	REMOVE	171'	REMOVE	259'	REMOVE
TAXIWAY K	75'	SAME	30'	SAME	171'	SAME	259'	SAME
TAXIWAY M	130'	97'	25'	SAME	171'	SAME	259'	SAME
TAXILANE N	50'	SAME	10'	N/A	79'	SAME	115'	SAME
TAXILANE N2	N/A	50'	N/A	N/A	N/A	79'	N/A	115'
TAXIWAY P	N/A	79'	N/A	30'	N/A	171'	N/A	259'
TAXIWAY S	50'	75'	20'	30'	118'	SAME	162'	SAME
TAXIWAY W	N/A	75'	N/A	30'	N/A	171'	N/A	259'

DECLARED DISTANCES TABLE

DESCRIPTION	Runway 10L-28R				Runway 10R-28L				Runway 9-27			
	Existing		Future		Existing		Future		Existing		Future	
	Runway 10L	Runway 28R	Runway 10L	Runway 28R	Runway 10R	Runway 28L	Runway 10R	Runway 28L	Runway 9	Runway 27	Runway 9	Runway 27
Take Off Run Available	10,000'	10,000'	Same	Same	9,762'	9,762'	10,000'	10,000'	N/A	N/A	5,000'	5,000'
Take Off Distance Available	10,000'	10,000'	Same	Same	9,762'	9,762'	10,000'	10,000'	N/A	N/A	5,000'	5,000'
Accelerate Distance Available	10,000'	10,000'	Same	Same	9,762'	9,762'	10,000'	10,000'	N/A	N/A	5,000'	5,000'
Landing Distance Available	10,000'	10,000'	Same	Same	9,762'	9,762'	10,000'	10,000'	N/A	N/A	5,000'	5,000'

EXISTING RUNWAY SURFACES TABLE

RUNWAY	RSA/OFA			RPZ				ROFZ		POFZ		INNER TRANSITIONAL OFZ[4]		
	C	(P/R)[1]	Q	W_1	W_2	L	Z	D	G	Width	Length	D	(H)[5]	Y
10L	500'	1000'	800'	1,000'	1,510'	1,700'	200'	400'	N/A	N/A	N/A	N/A	N/A	N/A
28R	500'	1000'	800'	1,000'	1,510'	1,700'	200'	400'	N/A	N/A	N/A	N/A	N/A	N/A
10R	500'	1000'	800'	1,000'	1,750'	2,500'	200'	400'	2,400'	800'	200'	400'	24.6'	556.9'
28L	500'	1000'	800'	1,000'	1,750'	2,500'	200'	400'	2,514'	N/A	N/A	N/A	N/A	N/A

FUTURE RUNWAY SURFACES TABLE

RUNWAY	RSA/OFA			RPZ				ROFZ		POFZ		INNER TRANSITIONAL OFZ[4]		
	C	(P/R)[1]	Q	W_1	W_2	L	Z	D	G	Width	Length	D	(H)[5]	Y
10L	500'	1000'	800'	1,000'	1,510'	1,700'	200'	400'	N/A	N/A	N/A	N/A	N/A	N/A
28R	500'	1000'	800'	1,000'	1,750'	2,500'	200'	400'	2,135'	800'	200'	400'	36.3'	N/A
10R	500'	1000'	800'	1,000'	1,750'	2,500'	200'	400'	2,400'	800'	200'	400'	24.5'	556.8'
28L	500'	1000'	800'	1,000'	1,750'	2,500'	200'	400'	2,135'	N/A	N/A	N/A	N/A	N/A
9	150'	300'	500'	500'	700'	1,000'	200'	400'	N/A	N/A	N/A	N/A	N/A	N/A
27	150'	300'	500'	500'	700'	1,000'	200'	400'	N/A	N/A	N/A	N/A	N/A	N/A

RICONDO

In Association With: POWER ENGINEERS

Boise Airport
BOISE AIR TERMINAL
GOWEN FIELD
BOISE, IDAHO

AIRPORT DATA SHEET

FAA DISCLAIMER:

The contents do not necessarily reflect the official views or policy of the FAA. Acceptance of this plan 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 in accordance with appropriate public laws.

APPROVED BY:

Federal Aviation Administration Date

APPROVED BY AIRPORT SPONSOR:

Signature

Title

Date

REVISION HISTORY

NO.	DATE	BY	DESCRIPTION	APPD

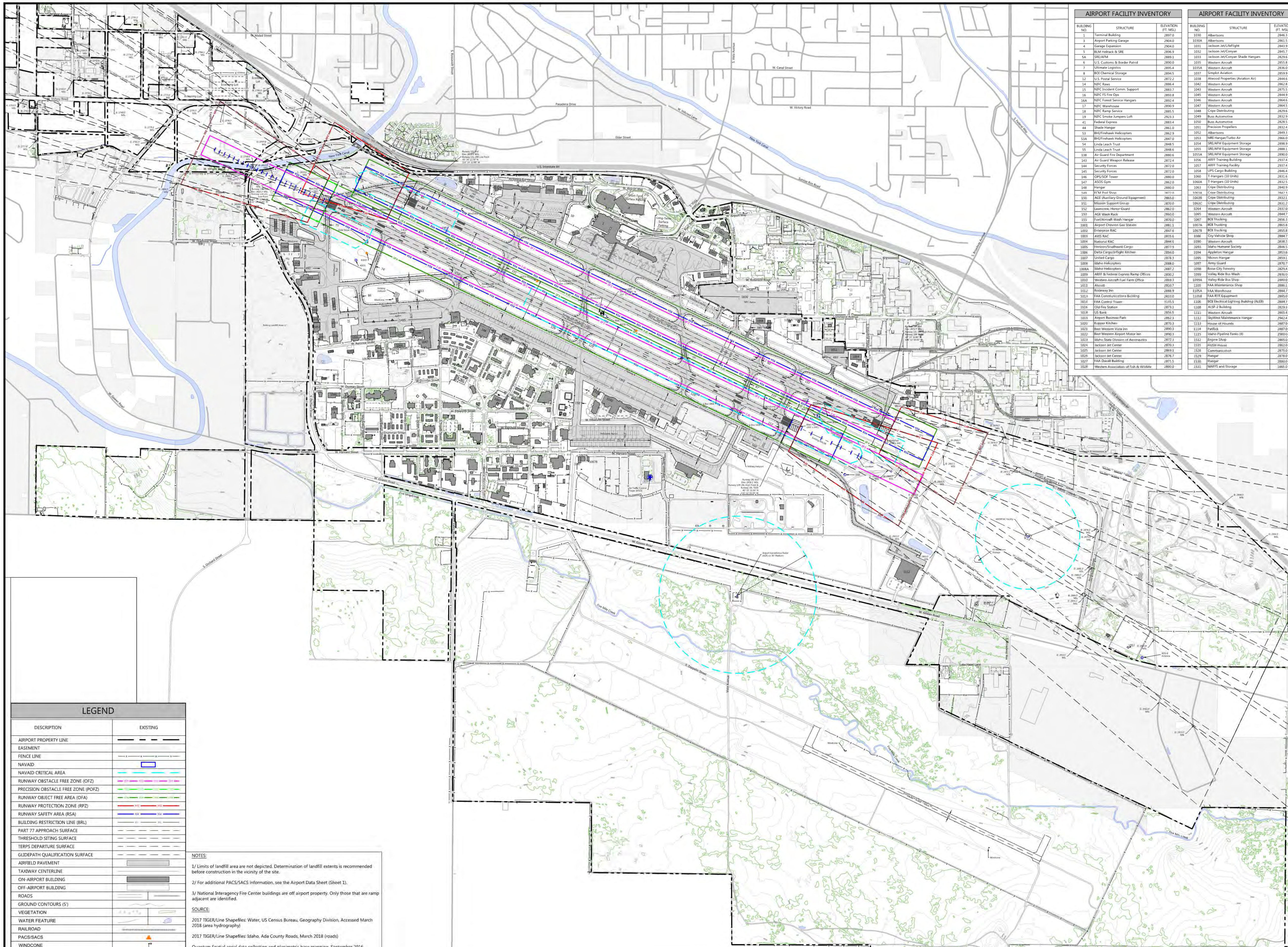
0 X
GRAPHICAL SCALE IN FEET

DRAWN BY: CJB

CHECKED BY: MDT

PREPARED BY: Ricondo & Associates, Inc.

DATE: APRIL 2019



AIRPORT FACILITY INVENTORY		
BUILDING NO.	STRUCTURE	ELEVATION (FT. MSL)
1	Terminal Building	2897.0
3	Airport Parking Garage	2904.0
4	Garage Expansion	2904.0
5	BLM Helitack & SRE	2896.9
5A	SRE/AFM	2889.1
6	U.S. Customs & Border Patrol	2890.0
7	Ultimate Logistics	2895.4
8	BOI Chemical Storage	2894.5
12	U.S. Postal Service	2872.2
14	NIFC Raws	2886.4
15	NIFC Incident Comm. Support	2883.7
16	NIFC FS Fire Ops	2893.8
16A	NIFC Forest Service Hangars	2892.4
17	NIFC Warehouse	2890.9
18	NIFC Ramp Service	2885.5
19	NIFC Smoke Jumpers Loft	2923.3
41	Federal Express	2883.4
44	Shade Hangar	2861.0
53	BHI/Firehawk Helicopters	2862.9
53A	BHI/Firehawk Helicopters	2847.0
54	Linda Leach Trust	2848.5
55	Linda Leach Trust	2848.6
138	Air Guard Fire Department	2880.6
143	Air Guard Weapon Release	2872.4
144	Security Forces	2872.0
145	Security Forces	2872.0
146	OPS/SOF Tower	2880.0
147	ASOS Gym	2862.0
148	Hangar	2880.0
149	ECM Pod Shop	2872.0
150	AGE (Auxiliary Ground Equipment)	2865.0
151	Mission Support Group	2870.0
152	Lawncrew, Honor Guard	2862.0
153	AGE Wash Rack	2860.0
155	Fuel/Aircraft Wash Hangar	2870.0
1001	Airport Chevron Gas Station	2881.1
1002	Enterprise RAC	2847.6
1003	AVIS RAC	2835.6
1004	National RAC	2844.6
1005	Horizon/Southwest Cargo	2877.9
1006	Delta Cargo/Inflight Kitchen	2894.0
1007	United Cargo	2878.3
1008	Idaho Helicopters	2888.0
1008A	Idaho Helicopters	2887.2
1009	ARFF & Federal Express Ramp Offices	2890.2
1010	Western Aircraft Fuel Farm Office	2869.3
1011	Alscott	2910.7
1012	Rodeway Inn	2888.9
1013	FAA Communications Building	2833.0
1014	FAA Control Tower	3135.5
1016	Old Fire Station	2873.1
1018	US Bank	2856.5
1019	Airport Business Park	2862.3
1020	Kopper Kitchen	2870.3
1021	Best Western Vista Inn	2890.3
1022	Best Western Airport Motor Inn	2890.3
1023	Idaho State Division of Aeronautics	2872.3
1024	Jackson Jet Center	2870.3
1025	Jackson Jet Center	2869.1
1026	Jackson Jet Center	2876.7
1027	FAA-Duvall Building	2871.5
1028	Western Association of Fish & Wildlife	2890.0

AIRPORT FACILITY INVENTORY		
BUILDING NO.	STRUCTURE	ELEVATION (FT. MSL)
1030	Albertsons	2846.3
1030A	Albertsons	2861.5
1031	Jackson Jet/LifeFlight	2843.9
1032	Jackson Jet/Conyan	2845.7
1033	Jackson Jet/Conyan Shade Hangars	2829.6
1035	Western Aircraft	2855.8
1035A	Western Aircraft	2836.0
1037	Simplot Aviation	2859.9
1038	Atwood Properties (Aviation Air)	2844.6
1042	Western Aircraft	2862.8
1043	Western Aircraft	2875.5
1045	Western Aircraft	2844.9
1046	Western Aircraft	2864.6
1047	Western Aircraft	2864.5
1048	Cripe Distributing	2829.6
1049	Buss Automotive	2832.9
1050	Buss Automotive	2828.5
1051	Precision Propellers	2832.4
1052	Albertsons	2849.3
1053	MRI Hangar/Turbo Air	2866.0
1054	SRE/AFM Equipment Storage	2898.9
1055	SRE/AFM Equipment Storage	2888.1
1055A	SRE/AFM Equipment Storage	2890.0
1056	ARFF Training Building	2937.4
1057	ARFF Training Facility	2937.4
1058	UPS Cargo Building	2846.4
1060	T-Hangars (10 Units)	2831.6
1060A	T-Hangars (10 Units)	2832.5
1063	Cripe Distributing	2840.9
1063A	Cripe Distributing	2842.3
1063B	Cripe Distributing	2832.1
1063C	Cripe Distributing	2831.2
1064	Western Aircraft	2837.0
1065	Western Aircraft	2844.7
1067	BOI Trucking	2856.3
1067A	BOI Trucking	2865.8
1067B	BOI Trucking	2855.8
1086	City Vehicle Shop	2884.7
1090	Western Aircraft	2838.3
1093	Idaho Humane Society	2846.5
1094	Appleton Hangar	2853.6
1095	Micron Hangar	2859.1
1097	Army Guard	2870.7
1098	Boise City Forestry	2829.4
1099	Valley Ride Bus Wash	2836.0
1099A	Valley Ride Bus Shop	2840.0
1105	FAA Maintenance Shop	2886.1
1105A	FAA Warehouse	2884.7
1105B	FAA RTR Equipment	2885.0
1106	BOI Electrical Lighting Building (ALEB)	2884.7
1108	ALSF-2 Building	2829.3
1111	Western Aircraft	2865.4
1112	SkyWest Maintenance Hangar	2942.4
1113	House of Hounds	2887.0
1114	PatRick	2887.0
1115	Idaho Pipeline Tanks (4)	2900.0
1512	Engine Shop	2865.0
1515	HUSH House	2862.0
1528	Communication	2875.0
1529	Hangar	2878.0
1530	Hangar	2880.0
1531	MAFFS and Storage	1865.0

LEGEND

DESCRIPTION	EXISTING
AIRPORT PROPERTY LINE	
EASEMENT	
FENCE LINE	
NAVAID	
NAVAID CRITICAL AREA	
RUNWAY OBSTACLE FREE ZONE (OFZ)	
PRECISION OBSTACLE FREE ZONE (POFZ)	
RUNWAY OBJECT FREE AREA (OFA)	
RUNWAY PROTECTION ZONE (RPZ)	
RUNWAY SAFETY AREA (RSA)	
BUILDING RESTRICTION LINE (BRL)	
PART 77 APPROACH SURFACE	
THRESHOLD SITING SURFACE	
TERPS DEPARTURE SURFACE	
GLIDEPATH QUALIFICATION SURFACE	
AIRFIELD PAVEMENT	
TAXIWAY CENTERLINE	
ON-AIRPORT BUILDING	
OFF-AIRPORT BUILDING	
ROADS	
GROUND CONTOURS (5')	
VEGETATION	
WATER FEATURE	
RAILROAD	
PACS/SACS	
WINDCONE	

NOTES:

1/ Limits of landfill area are not depicted. Determination of landfill extents is recommended before construction in the vicinity of the site.

2/ For additional PACS/SACS information, see the Airport Data Sheet (Sheet 1).

3/ National Interagency Fire Center buildings are off airport property. Only those that are ramp adjacent are identified.

SOURCE:

2017 TIGER/Line Shapefiles: Water, US Census Bureau, Geography Division, Accessed March 2018 (area hydrography)

2017 TIGER/Line Shapefiles: Idaho, Ada County Roads, March 2018 (roads)

Quantum Spatial aerial data collection and planimetric base mapping, September 2016

RICONDO

In Association With: POWER ENGINEERS

Boise Airport

BOISE AIR TERMINAL
GOWEN FIELD
BOISE, IDAHO

EXISTING AIRPORT LAYOUT PLAN

FAA DISCLAIMER:

The contents do not necessarily reflect the official views or policy of the FAA. Acceptance of this plan 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 in accordance with appropriate public laws.

APPROVED BY:

Federal Aviation Administration — Date

APPROVED BY AIRPORT SPONSOR:

Signature

Title

Date

REVISION HISTORY				
NO.	DATE	BY	DESCRIPTION	APPD
X	X	X	XXXXXX	

Magnetic Declination 13° 20' E
0° 7' W/Year
February 2018

True N / Mag. N

0 — 600
GRAPHICAL SCALE IN FEET

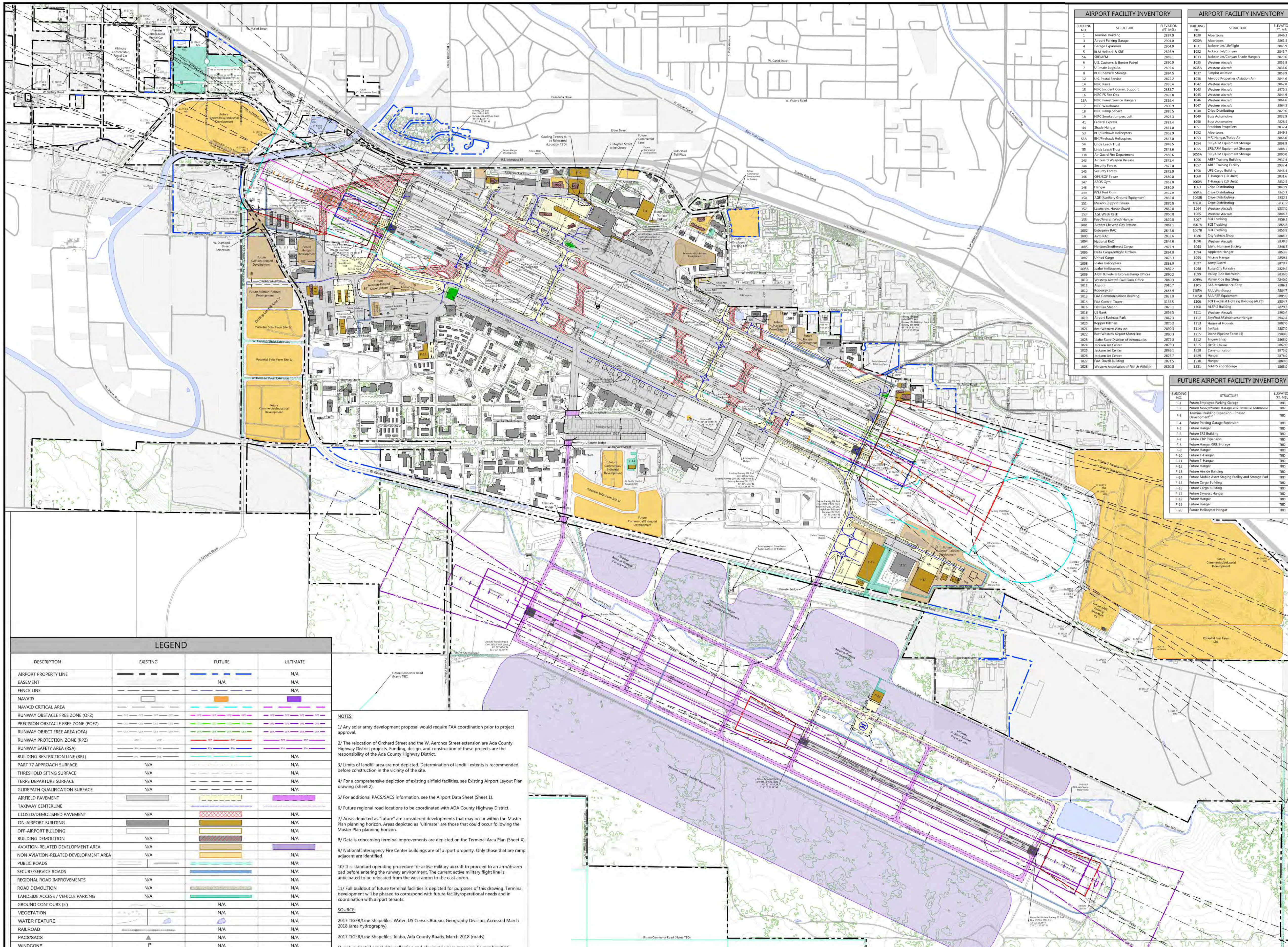
DRAWN BY: CJB

CHECKED BY: MDT

PREPARED BY:
Ricondo & Associates, Inc.

DATE: APRIL 2019

SHEET 2 OF 14



AIRPORT FACILITY INVENTORY

BUILDING NO.	STRUCTURE	ELEVATION (FT. MSL)
1	Terminal Building	2897.0
3	Airport Parking Garage	2904.0
4	Garage Expansion	2904.0
5	BLM Helitack & SRE	2896.9
5A	SRE/AFM	2889.1
6	U.S. Customs & Border Patrol	2890.0
7	Ultimate Logistics	2895.4
8	BOI Chemical Storage	2894.5
12	U.S. Postal Service	2872.2
14	NIFC Raws	2886.4
15	NIFC Incident Comm. Support	2883.7
16	NIFC FS Fire Ops	2893.8
16A	NIFC Forest Service Hangars	2892.4
17	NIFC Warehouse	2890.9
18	NIFC Ramp Service	2885.5
19	NIFC Smoke Jumpers Loft	2923.3
41	Federal Express	2883.4
44	Shade Hangar	2861.0
53	BHI/Firehawk Helicopters	2862.9
53A	BHI/Firehawk Helicopters	2847.0
54	Linda Leach Trust	2848.5
55	Linda Leach Trust	2848.6
138	Air Guard Fire Department	2880.6
143	Air Guard Weapon Release	2872.4
144	Security Forces	2872.0
145	Security Forces	2872.0
146	OPS/SOF Tower	2880.0
147	ASOS Gym	2862.0
148	Hangar	2880.0
149	ECM Pod Shop	2872.0
150	AGE (Auxiliary Ground Equipment)	2865.0
151	Mission Support Group	2870.0
152	Lawncrew, Honor Guard	2862.0
153	AGE Wash Rack	2860.0
155	Fuel/Aircraft Wash Hangar	2870.0
1001	Airport Chevron Gas Station	2881.1
1002	Enterprise RAC	2847.6
1003	AVIS RAC	2835.6
1004	National RAC	2844.6
1005	Horizon/Southwest Cargo	2877.9
1006	Delta Cargo/Inflight Kitchen	2894.0
1007	United Cargo	2878.3
1008	Idaho Helicopters	2888.0
1008A	Idaho Helicopters	2887.2
1009	ARFF & Federal Express Ramp Offices	2890.2
1010	Western Aircraft Fuel Farm Office	2869.3
1011	Alscott	2910.7
1012	Rodeway Inn	2888.9
1013	FAA Communications Building	2833.0
1014	FAA Control Tower	3135.5
1016	Old Fire Station	2873.1
1018	US Bank	2856.5
1019	Airport Business Park	2862.3
1020	Kopper Kitchen	2870.3
1021	Best Western Vista Inn	2890.3
1022	Best Western Airport Motor Inn	2890.3
1023	Idaho State Division of Aeronautics	2872.3
1024	Jackson Jet Center	2870.3
1025	Jackson Jet Center	2869.1
1026	Jackson Jet Center	2876.7
1027	FAA-Duvall Building	2871.5
1028	Western Association of Fish & Wildlife	2890.0

AIRPORT FACILITY INVENTORY

BUILDING NO.	STRUCTURE	ELEVATION (FT. MSL)
1030	Albertsons	2846.3
1030A	Albertsons	2861.5
1031	Jackson Jet/LifeFlight	2843.9
1032	Jackson Jet/Conyan	2845.7
1033	Jackson Jet/Conyan Shade Hangars	2829.6
1035	Western Aircraft	2855.8
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1037	Simplot Aviation	2859.9
1038	Atwood Properties (Aviation Air)	2844.6
1042	Western Aircraft	2862.8
1043	Western Aircraft	2875.5
1045	Western Aircraft	2844.9
1046	Western Aircraft	2864.6
1047	Western Aircraft	2864.5
1048	Cripe Distributing	2829.6
1049	Buss Automotive	2832.9
1050	Buss Automotive	2828.5
1051	Precision Propellers	2832.4
1052	Albertsons	2849.3
1053	MRI Hangar/Turbo Air	2866.0
1054	SRE/AFM Equipment Storage	2898.9
1055	SRE/AFM Equipment Storage	2888.1
1055A	SRE/AFM Equipment Storage	2890.0
1056	ARFF Training Building	2937.4
1057	ARFF Training Facility	2937.4
1058	UPS Cargo Building	2846.4
1060	T-Hangars (10 Units)	2831.6
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1063	Cripe Distributing	2840.9
1063A	Cripe Distributing	2842.3
1063B	Cripe Distributing	2832.1
1063C	Cripe Distributing	2831.2
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1065	Western Aircraft	2844.7
1067	BOI Trucking	2856.3
1067A	BOI Trucking	2865.8
1067B	BOI Trucking	2855.8
1086	City Vehicle Shop	2884.7
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1093	Idaho Humane Society	2846.5
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1095	Micron Hangar	2859.1
1097	Army Guard	2870.7
1098	Boise City Forestry	2829.4
1099	Valley Ride Bus Wash	2836.0
1099A	Valley Ride Bus Shop	2840.0
1105	FAA Maintenance Shop	2886.1
1105A	FAA Warehouse	2884.7
1105B	FAA RTR Equipment	2885.0
1106	BOI Electrical Lighting Building (ALEB)	2884.7
1108	ALSF-2 Building	2829.3
1111	Western Aircraft	2865.4
1112	SkyWest Maintenance Hangar	2942.4
1113	House of Hounds	2887.0
1114	PatRick	2887.0
1115	Idaho Pipeline Tanks (4)	2900.0
1512	Engine Shop	2865.0
1515	HUSH House	2862.0
1528	Communication	2875.0
1529	Hangar	2878.0
1530	Hangar	2880.0
1531	MAFFS and Storage	1865.0

FUTURE AIRPORT FACILITY INVENTORY

BUILDING NO.	STRUCTURE	ELEVATION (FT. MSL)
F-1	Future Employee Parking Garage	TBD
F-2	Future Ready/Return Garage and Terminal Connector	TBD
F-3	Terminal Building Expansion - Phased Development 11/	TBD
F-4	Future Parking Garage Expansion	TBD
F-5	Future Hangar	TBD
F-6	Future SRE Building	TBD
F-7	Future CBP Expansion	TBD
F-8	Future Hangar/SRE Storage	TBD
F-9	Future Hangar	TBD
F-10	Future T-Hangar	TBD
F-11	Future T-Hangar	TBD
F-12	Future Hangar	TBD
F-13	Future Airside Building	TBD
F-14	Future Mobile Asset Staging Facility and Storage Pad	TBD
F-15	Future Cargo Building	TBD
F-16	Future Cargo Building	TBD
F-17	Future Skywest Hangar	TBD
F-18	Future Hangar	TBD
F-19	Future Hangar	TBD
F-20	Future Helicopter Hangar	TBD

LEGEND

DESCRIPTION	EXISTING	FUTURE	ULTIMATE
AIRPORT PROPERTY LINE			N/A
EASEMENT		N/A	N/A
FENCE LINE			N/A
NAVAID			
NAVAID CRITICAL AREA			
RUNWAY OBSTACLE FREE ZONE (OFZ)			
PRECISION OBSTACLE FREE ZONE (POFZ)			
RUNWAY OBJECT FREE AREA (OFA)			
RUNWAY PROTECTION ZONE (RPZ)			
RUNWAY SAFETY AREA (RSA)			
BUILDING RESTRICTION LINE (BRL)			N/A
PART 77 APPROACH SURFACE	N/A		N/A
THRESHOLD SITING SURFACE	N/A		N/A
TERPS DEPARTURE SURFACE	N/A		N/A
GLIDEPATH QUALIFICATION SURFACE	N/A		N/A
AIRFIELD PAVEMENT			
TAXIWAY CENTERLINE			
CLOSED/DEMOLISHED PAVEMENT	N/A		N/A
ON-AIRPORT BUILDING			N/A
OFF-AIRPORT BUILDING			N/A
BUILDING DEMOLITION	N/A		N/A
AVIATION-RELATED DEVELOPMENT AREA	N/A		
NON AVIATION-RELATED DEVELOPMENT AREA	N/A		N/A
PUBLIC ROADS			N/A
SECURE/SERVICE ROADS			N/A
REGIONAL ROAD IMPROVEMENTS	N/A		N/A
ROAD DEMOLITION	N/A		N/A
LANDSIDE ACCESS / VEHICLE PARKING	N/A		N/A
GROUND CONTOURS (5')		N/A	N/A
VEGETATION		N/A	N/A
WATER FEATURE			N/A
RAILROAD		N/A	N/A
PACS/SACS		N/A	N/A
WINDCONE		N/A	N/A

NOTES:

1/ Any solar array development proposal would require FAA coordination prior to project approval.

2/ The relocation of Orchard Street and the W. Aeronca Street extension are Ada County Highway District projects. Funding, design, and construction of these projects are the responsibility of the Ada County Highway District.

3/ Limits of landfill area are not depicted. Determination of landfill extents is recommended before construction in the vicinity of the site.

4/ For a comprehensive depiction of existing airfield facilities, see Existing Airport Layout Plan drawing (Sheet 2).

5/ For additional PACS/SACS information, see the Airport Data Sheet (Sheet 1).

6/ Future regional road locations to be coordinated with ADA County Highway District.

7/ Areas depicted as "future" are considered developments that may occur within the Master Plan planning horizon. Areas depicted as "ultimate" are those that could occur following the Master Plan planning horizon.

8/ Details concerning terminal improvements are depicted on the Terminal Area Plan (Sheet X).

9/ National Interagency Fire Center buildings are off airport property. Only those that are ramp adjacent are identified.

10/ It is standard operating procedure for active military aircraft to proceed to an arm/disarm pad before entering the runway environment. The current active military flight line is anticipated to be relocated from the west apron to the east apron.

11/ Full buildout of future terminal facilities is depicted for purposes of this drawing. Terminal development will be phased to correspond with future facility/operational needs and in coordination with airport tenants.

SOURCE:

2017 TIGER/Line Shapefiles: Water, US Census Bureau, Geography Division, Accessed March 2018 (area hydrography)

2017 TIGER/Line Shapefiles: Idaho, Ada County Roads, March 2018 (roads)

Quantum Spatial aerial data collection and planimetric base mapping, September 2016

RICONDO

In Association With: POWER ENGINEERS

Boise Airport
BOISE AIR TERMINAL
GOWEN FIELD
BOISE, IDAHO

FUTURE AIRPORT LAYOUT PLAN

APPROVED BY:

Federal Aviation Administration Date

APPROVED BY AIRPORT SPONSOR:

Signature

Title

Date

REVISION HISTORY

NO.	DATE	BY	DESCRIPTION	APPD
X	X	X	XXXXXX	

Magnetic Declination 13° 20' E 0° 7' W/Year February 2018

True N / Mag. N

0 600

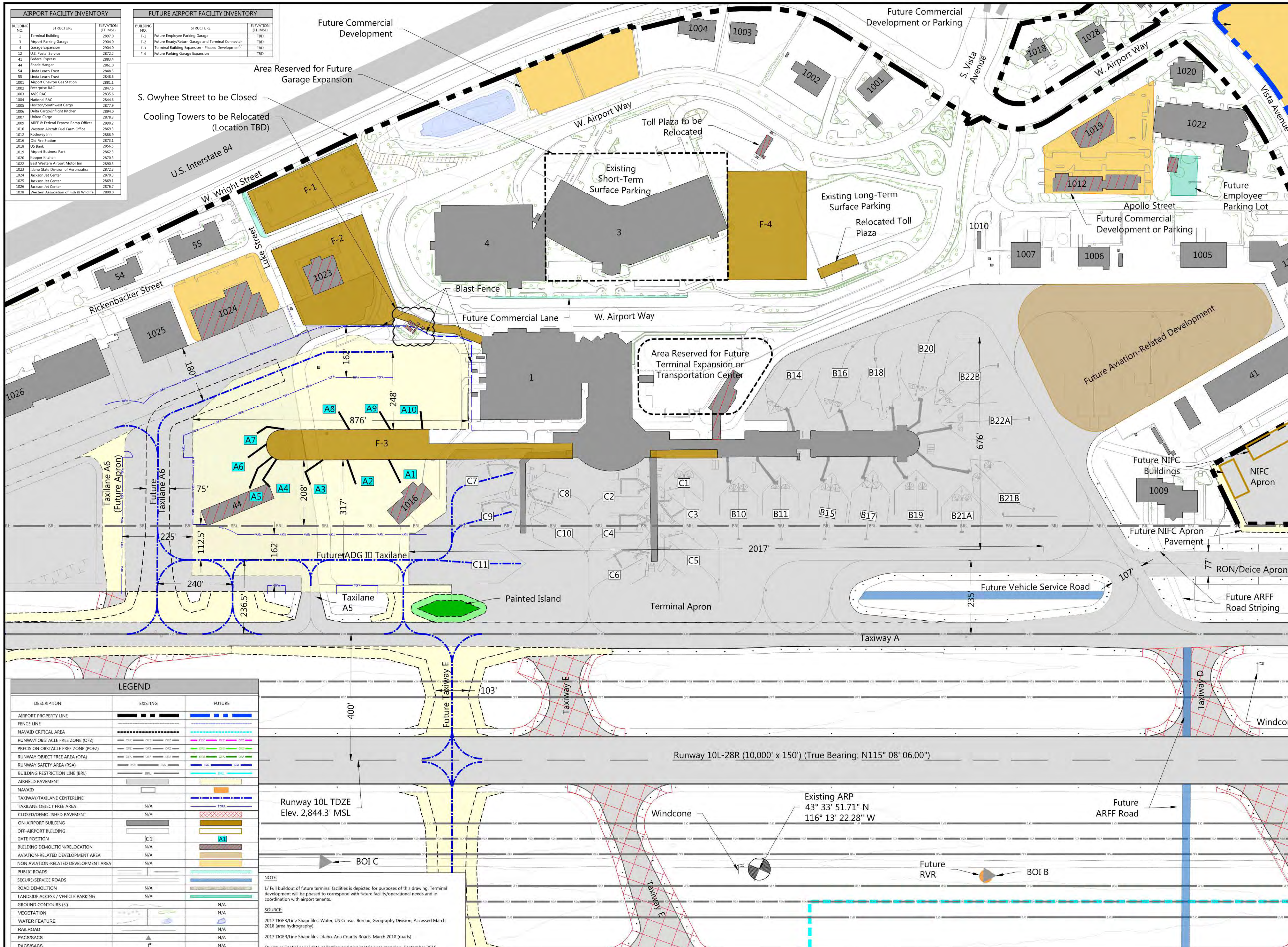
GRAPHICAL SCALE IN FEET

DRAWN BY: CJB

CHECKED BY: MDT

PREPARED BY: Ricondo & Associates, Inc.

DATE: APRIL 2019



AIRPORT FACILITY INVENTORY		
BUILDING NO.	STRUCTURE	ELEVATION (FT. MSL)
1	Terminal Building	2897.0
3	Airport Parking Garage	2904.0
4	Garage Expansion	2904.0
12	U.S. Postal Service	2872.2
41	Federal Express	2883.4
44	Shade Hangar	2861.0
54	Linda Leach Trust	2848.5
55	Linda Leach Trust	2848.6
1001	Airport Chevron Gas Station	2881.1
1002	Enterprise RAC	2847.6
1003	AVIS RAC	2835.6
1004	National RAC	2844.6
1005	Horizon/Southwest Cargo	2877.9
1006	Delta Cargo/Inflight Kitchen	2894.0
1007	United Cargo	2878.3
1009	ARFF & Federal Express Ramp Offices	2890.2
1010	Western Aircraft Fuel Farm Office	2869.3
1012	Rodeway Inn	2888.9
1016	Old Fire Station	2873.1
1018	US Bank	2856.5
1019	Airport Business Park	2862.3
1020	Kopper Kitchen	2870.3
1022	Best Western Airport Motor Inn	2890.3
1023	Idaho State Division of Aeronautics	2872.3
1024	Jackson Jet Center	2870.3
1025	Jackson Jet Center	2869.1
1026	Jackson Jet Center	2876.7
1028	Western Association of Fish & Wildlife	2890.0

FUTURE AIRPORT FACILITY INVENTORY		
BUILDING NO.	STRUCTURE	ELEVATION (FT. MSL)
F-1	Future Employee Parking Garage	TBD
F-2	Future Ready/Return Garage and Terminal Connector	TBD
F-3	Terminal Building Expansion - Phased Development[1/]	TBD
F-4	Future Parking Garage Expansion	TBD

LEGEND		
DESCRIPTION	EXISTING	FUTURE
AIRPORT PROPERTY LINE		
FENCE LINE		
NAVAID CRITICAL AREA		
RUNWAY OBSTACLE FREE ZONE (OFZ)	OFZ	OFZ
PRECISION OBSTACLE FREE ZONE (POFZ)	OFZ	OFZ
RUNWAY OBJECT FREE AREA (OFA)	OFA	OFA
RUNWAY SAFETY AREA (RSA)	RSA	RSA
BUILDING RESTRICTION LINE (BRL)	BRL	BRL
AIRFIELD PAVEMENT		
NAVAID		
TAXIWAY/TAXILANE CENTERLINE		
TAXILANE OBJECT FREE AREA	N/A	TOFA
CLOSED/DEMOLISHED PAVEMENT	N/A	
ON-AIRPORT BUILDING		
OFF-AIRPORT BUILDING		
GATE POSITION	C1	A1
BUILDING DEMOLITION/RELOCATION	N/A	
AVIATION-RELATED DEVELOPMENT AREA	N/A	
NON AVIATION-RELATED DEVELOPMENT AREA	N/A	
PUBLIC ROADS		
SECURE/SERVICE ROADS		
ROAD DEMOLITION	N/A	
LANDSIDE ACCESS / VEHICLE PARKING	N/A	
GROUND CONTOURS (5')		N/A
VEGETATION		N/A
WATER FEATURE		
RAILROAD		N/A
PACS/SACS		N/A
PACS/SACS		N/A

NOTE:

1/ Full buildout of future terminal facilities is depicted for purposes of this drawing. Terminal development will be phased to correspond with future facility/operational needs and in coordination with airport tenants.

SOURCE:

2017 TIGER/Line Shapefiles: Water, US Census Bureau, Geography Division, Accessed March 2018 (area hydrography)

2017 TIGER/Line Shapefiles: Idaho, Ada County Roads, March 2018 (roads)

Quantum Spatial aerial data collection and planimetric base mapping, September 2016

RICONDO

In Association With: POWER ENGINEERS

Boise Airport
BOISE AIR TERMINAL
GOWEN FIELD
BOISE, IDAHO

FUTURE TERMINAL AREA PLAN

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APPROVED BY:

Federal Aviation Administration — Date

APPROVED BY AIRPORT SPONSOR:

Signature

Title

Date

REVISION HISTORY				
NO	DATE	BY	DESCRIPTION	APPD
X	X	X	XXXXXX	

Magnetic Declination 13° 20' E 0° 7' W/Year February 2018

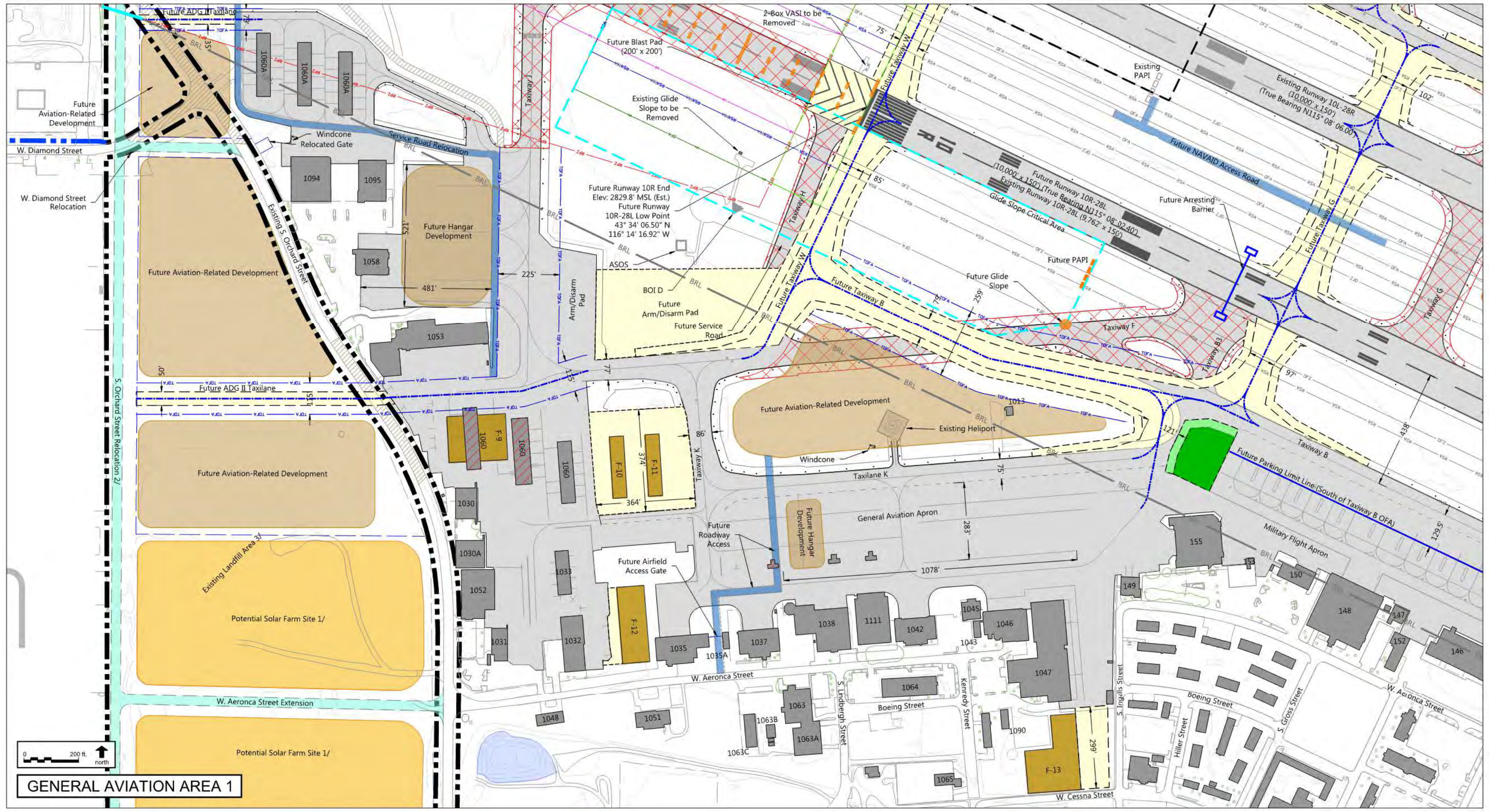
0 100 GRAPHICAL SCALE IN FEET

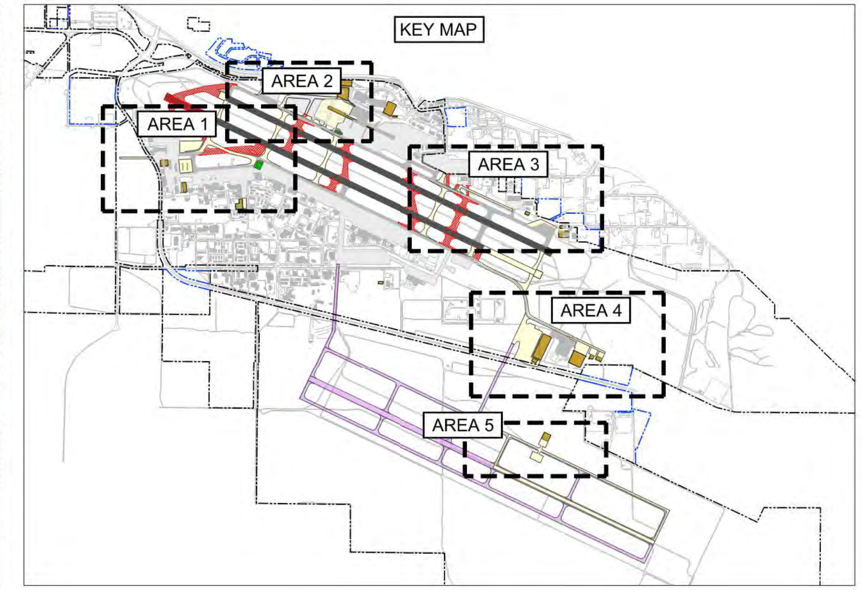
DRAWN BY: CJB

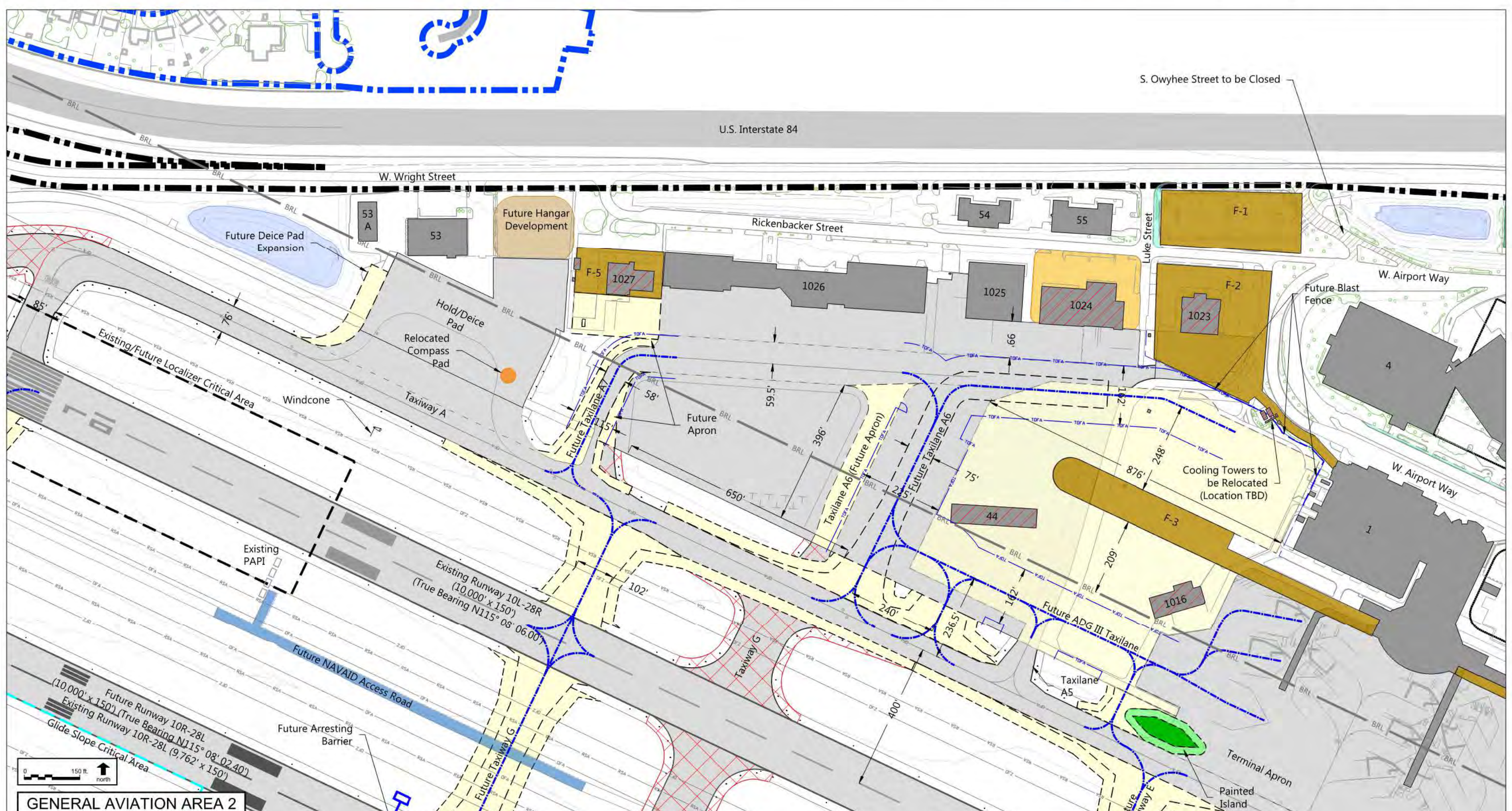
CHECKED BY: MDT

PREPARED BY: Ricondo & Associates, Inc.

DATE: APRIL 2019







AIRPORT FACILITY INVENTORY		
BUILDING NO.	STRUCTURE	ELEVATION (FT. MSL)
1	Terminal Building	2897.0
4	Garage Expansion	2904.0
44	Shade Hangar	2861.0
53	BHI/Firehawk Helicopters	2862.9
53A	BHI/Firehawk Helicopters	2847.0
54	Linda Leach Trust	2848.5
55	Linda Leach Trust	2848.6
146	OPS/SOF Tower	2880.0
148	Hangar	2880.0
149	ECM Pod Shop	2872.0
150	AGE (Auxiliary Ground Equipment)	2865.0
152	Lawncrew, Honor Guard	2862.0
153	AGE Wash Rack	2860.0
155	Fuel/Aircraft Wash Hangar	2870.0
1013	FAA Communications Building	2833.0
1016	Old Fire Station	2873.1
1023	Idaho State Division of Aeronautics	2872.3
1024	Jackson Jet Center	2870.3
1025	Jackson Jet Center	2869.1
1026	Jackson Jet Center	2876.7
1027	FAA-Duvall Building	2871.5
1030	Albertsons	2846.3
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1031	Jackson Jet/LifeFlight	2843.9
1032	Jackson Jet/Conyan	2845.7
1033	Jackson Jet/Conyan Shade Hangars	2829.6
1035	Western Aircraft	2855.8
1035A	Western Aircraft	2836.0
1037	Simplot Aviation	2859.9
1038	Atwood Properties (Aviation Air)	2844.6
1042	Western Aircraft	2862.8
1043	Western Aircraft	2875.5
1045	Western Aircraft	2844.9
1046	Western Aircraft	2864.6

AIRPORT FACILITY INVENTORY		
BUILDING NO.	STRUCTURE	ELEVATION (FT. MSL)
1047	Western Aircraft	2864.5
1048	Cripe Distributing	2829.6
1051	Precision Propellers	2832.4
1052	Albertsons	2849.3
1053	MRI Hangar/Turbo Air	2866.0
1058	UPS Cargo Building	2846.4
1060	T-Hangars (10 Units)	2831.6
1060A	T-Hangars (10 Units)	2832.5
1063	Cripe Distributing	2840.9
1063A	Cripe Distributing	2842.3
1063B	Cripe Distributing	2832.1
1063C	Cripe Distributing	2831.2
1064	Western Aircraft	2837.0
1094	Appleton Hangar	2853.6
1095	Micron Hangar	2859.1
1111	Western Aircraft	2865.4

FUTURE AIRPORT FACILITY INVENTORY		
BUILDING NO.	STRUCTURE	ELEVATION (FT. MSL)
F-1	Future Employee Parking Garage	TBD
F-2	Future Ready/Return Garage and Terminal Connector	TBD
F-3	Terminal Building Expansion - Phased Development	TBD
F-5	Future Hangar	TBD
F-9	Future Hangar	TBD
F-10	Future T-Hangar	TBD
F-11	Future T-Hangar	TBD
F-12	Future Hangar	TBD
F-13	Future Airside Building	TBD

LEGEND		
DESCRIPTION	EXISTING	FUTURE
AIRPORT PROPERTY LINE		
FENCE LINE		
NAVAID		
NAVAID CRITICAL AREA		
RUNWAY OBSTACLE FREE ZONE (OFZ)		
PRECISION OBSTACLE FREE ZONE (POFZ)		
RUNWAY OBJECT FREE AREA (OFA)		
RUNWAY PROTECTION ZONE (RPZ)		
RUNWAY SAFETY AREA (RSA)		
BUILDING RESTRICTION LINE (BRL)	BRL	BRL
AIRFIELD PAVEMENT		
TAXIWAY/TAXILANE CENTERLINE		
TAXIWAY/TAXILANE OBJECT FREE AREA	N/A	
CLOSED/DEMOLISHED PAVEMENT	N/A	
ON-AIRPORT BUILDING		
OFF-AIRPORT BUILDING		
BUILDING DEMOLITION/RELOCATION	N/A	
AVIATION-RELATED DEVELOPMENT AREA	N/A	
NON AVIATION-RELATED DEVELOPMENT AREA	N/A	
PUBLIC ROADS		
SECURE/SERVICE ROADS		
ROAD DEMOLITION	N/A	
LANDSIDE ACCESS / VEHICLE PARKING	N/A	
GROUND CONTOURS (5')		N/A
VEGETATION		N/A
WATER FEATURE		
RAILROAD		N/A
PACS/SACS		N/A
WINDCONE		N/A

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Boise Airport
BOISE AIR TERMINAL
GOWEN FIELD
BOISE, IDAHO

GENERAL AVIATION AREAS 1 & 2

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APPROVED BY:

Federal Aviation Administration Date

APPROVED BY AIRPORT SPONSOR:

Signature

Title

Date

REVISION HISTORY				
NO.	DATE	BY	DESCRIPTION	APPD
X	X	X	XXXXXX	

Magnetic Declination 13° 20' E 0° 7' W/Year February 2018

GRAPHICAL SCALE IN FEET

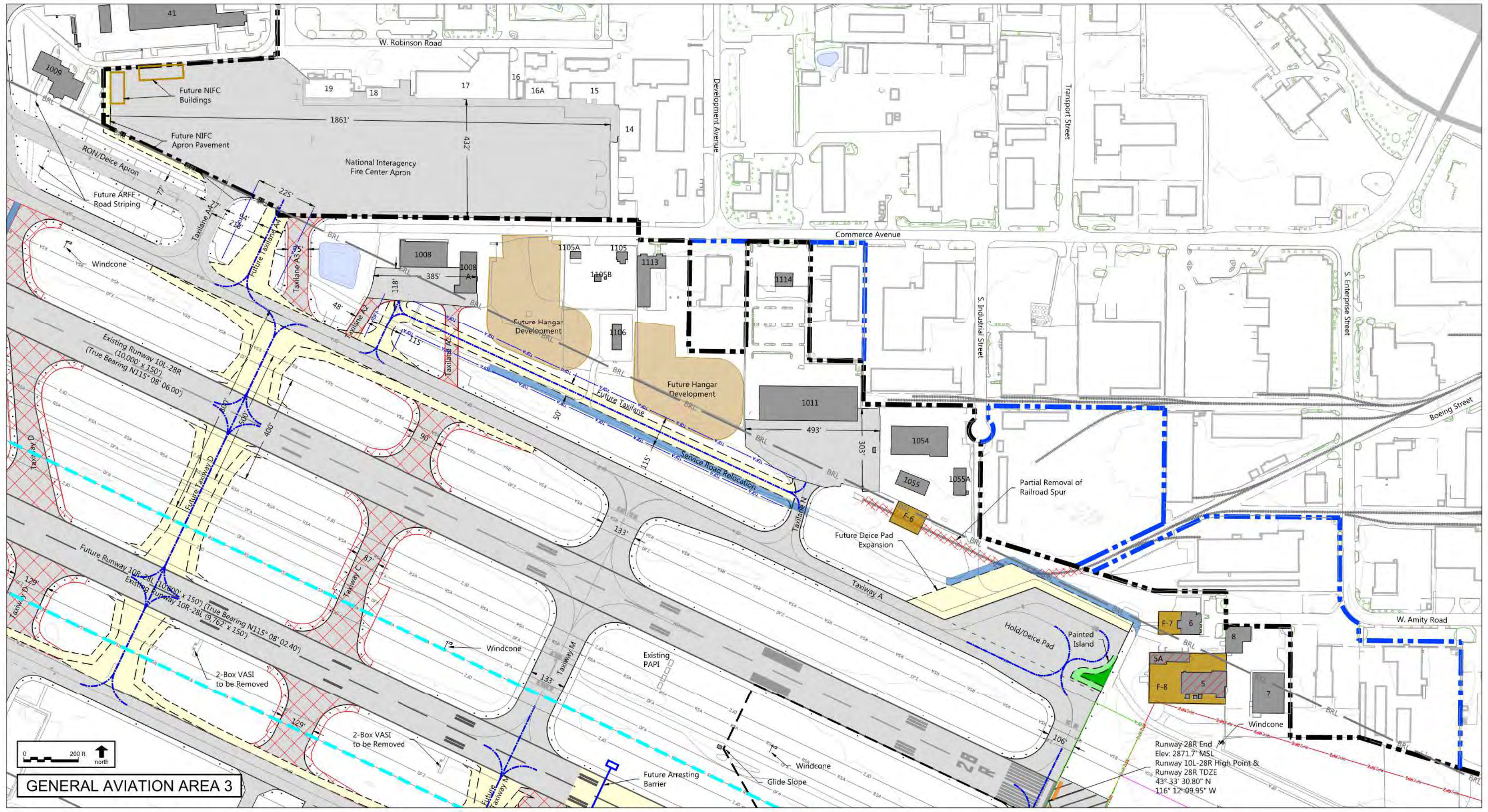
DRAWN BY: CJB

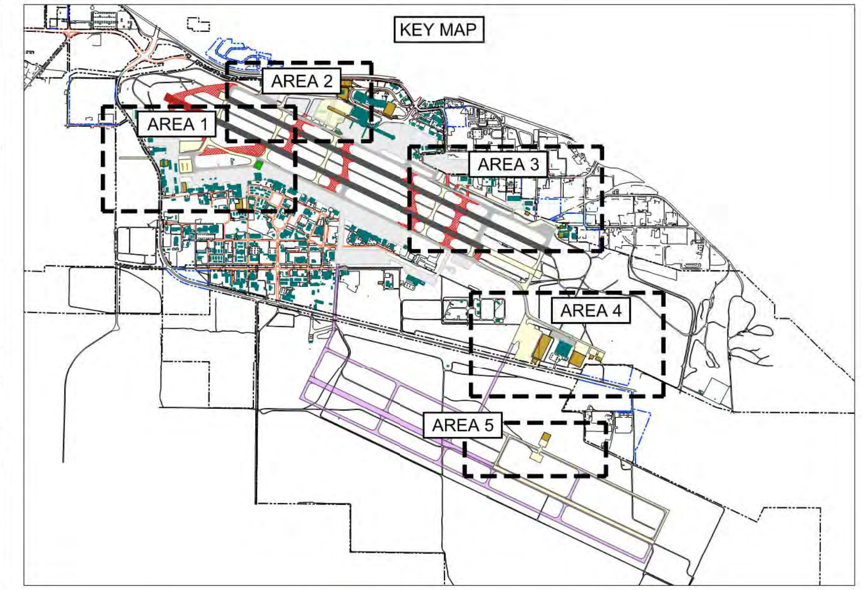
CHECKED BY: MDT

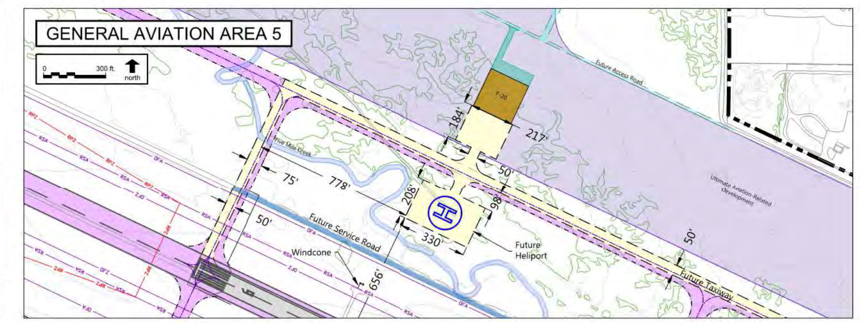
PREPARED BY: Ricondo & Associates, Inc.

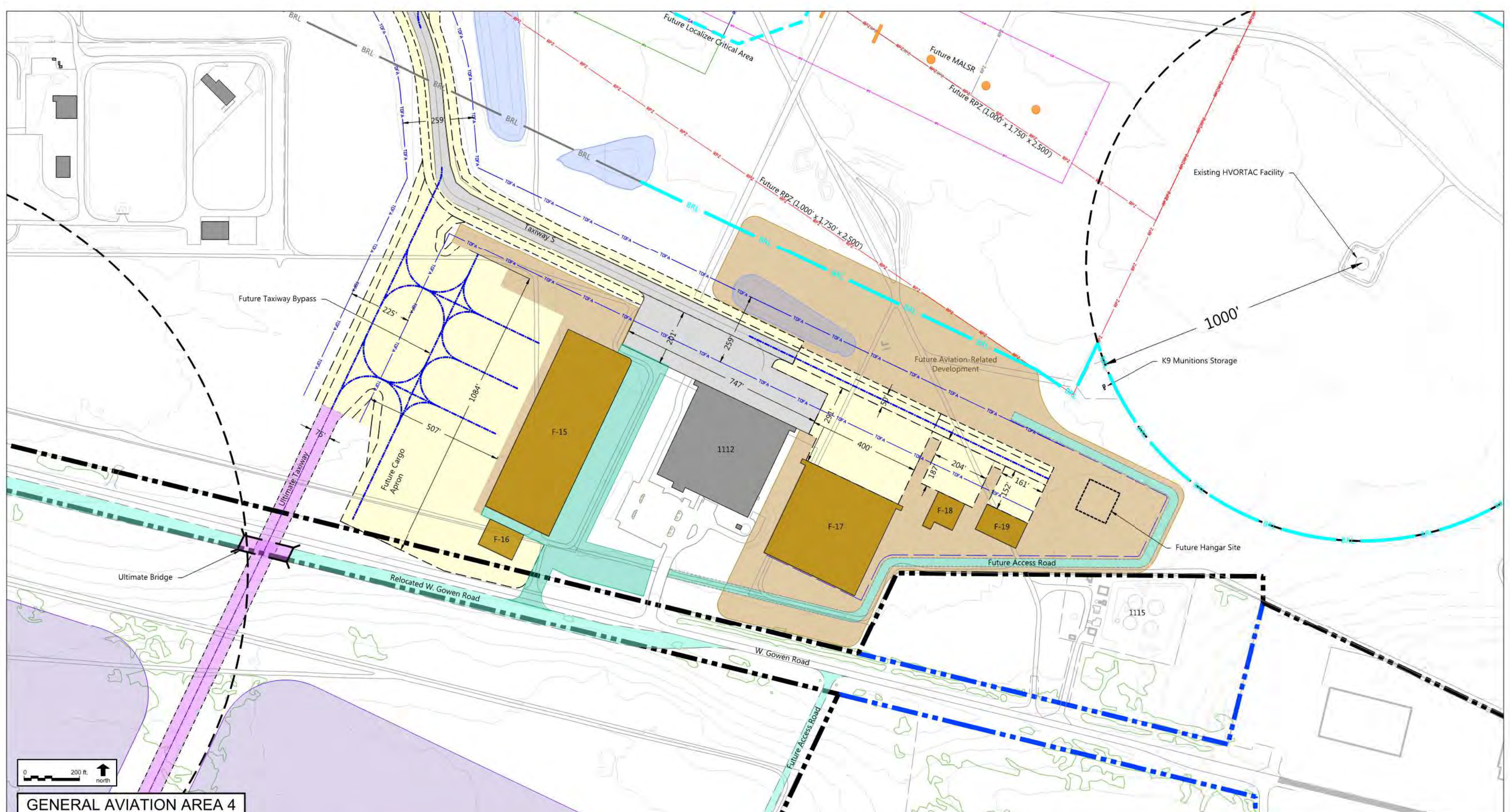
DATE: APRIL 2019

SHEET 5 OF 14









AIRPORT FACILITY INVENTORY

BUILDING NO.	STRUCTURE	ELEVATION (FT. MSL)
5	BLM Helitack & SRE	2896.9
5A	SRE/AFM	2889.1
6	U.S. Customs & Border Patrol	2890.0
7	Ultimate Logistics	2895.4
8	BOI Chemical Storage	2894.5
14	NIFC Raws	2886.4
15	NIFC Incident Comm. Support	2883.7
16	NIFC FS Fire Ops	2893.8
16A	NIFC Forest Service Hangars	2892.4
17	NIFC Warehouse	2890.9
18	NIFC Ramp Service	2885.5
19	NIFC Smoke Jumpers Loft	2923.3
41	Federal Express	2883.4
1008	Idaho Helicopters	2888.0
1008A	Idaho Helicopters	2887.2
1009	ARFF & Federal Express Ramp Offices	2890.2
1011	Alscott	2910.7
1054	SRE/AFM Equipment Storage	2898.9
1055	SRE/AFM Equipment Storage	2888.1
1055A	SRE/AFM Equipment Storage	2890.0
1086	City Vehicle Shop	2884.7
1105	FAA Maintenance Shop	2886.1

AIRPORT FACILITY INVENTORY

BUILDING NO.	STRUCTURE	ELEVATION (FT. MSL)
1105A	FAA Warehouse	2884.7
1105B	FAA RTR Equipment	2885.0
1106	BOI Electrical Lighting Building (ALEB)	2884.7
1112	SkyWest Maintenance Hangar	2942.4
1113	House of Hounds	2887.0
1114	PatRick	2887.0
1115	Idaho Pipeline Tanks (4)	2900.0

FUTURE AIRPORT FACILITY INVENTORY

BUILDING NO.	STRUCTURE	ELEVATION (FT. MSL)
F-6	Future SRE Building	TBD
F-7	Future CBP Expansion	TBD
F-8	Future Hangar/SRE Storage	TBD
F-15	Future Cargo Building	TBD
F-16	Future Cargo Building	TBD
F-17	Future Skywest Hangar	TBD
F-18	Future Hangar	TBD
F-19	Future Hangar	TBD
F-20	Future Helicopter Hangar	TBD

LEGEND

DESCRIPTION	EXISTING	FUTURE	ULTIMATE
AIRPORT PROPERTY LINE			N/A
FENCE LINE			N/A
NAVAID			
NAVAID CRITICAL AREA			
RUNWAY OBSTACLE FREE ZONE (OFZ)			
PRECISION OBSTACLE FREE ZONE (POFZ)			
RUNWAY OBJECT FREE AREA (OFA)			
RUNWAY PROTECTION ZONE (RPZ)			
RUNWAY SAFETY AREA (RSA)			
BUILDING RESTRICTION LINE (BRL)	BRL	BRL	N/A
AIRFIELD PAVEMENT			
TAXIWAY/TAXILANE CENTERLINE			
CLOSED/DEMOLISHED PAVEMENT	N/A		N/A
ON-AIRPORT BUILDING			N/A
OFF-AIRPORT BUILDING			N/A
BUILDING DEMOLITION/RELOCATION	N/A		N/A
AVIATION-RELATED DEVELOPMENT AREA	N/A		
NON AVIATION-RELATED DEVELOPMENT AREA	N/A		N/A
PUBLIC ROADS			N/A
SECURE/SERVICE ROADS			N/A
LANDSIDE ACCESS / VEHICLE PARKING	N/A		N/A
GROUND CONTOURS (5')		N/A	N/A
VEGETATION		N/A	N/A
WATER FEATURE			N/A
RAILROAD		N/A	N/A
PACS/SACS		N/A	N/A
WINDCONE		N/A	N/A

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GENERAL AVIATION AREAS 3, 4, & 5

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APPROVED BY:

Federal Aviation Administration — Date

APPROVED BY AIRPORT SPONSOR:

Signature

Title

Date

REVISION HISTORY

NO.	DATE	BY	DESCRIPTION	APPD
X	X	X	XXXXXX	

Magnetic Declination 13° 20' E 0° 7' W/Year February 2018

GRAPHICAL SCALE IN FEET

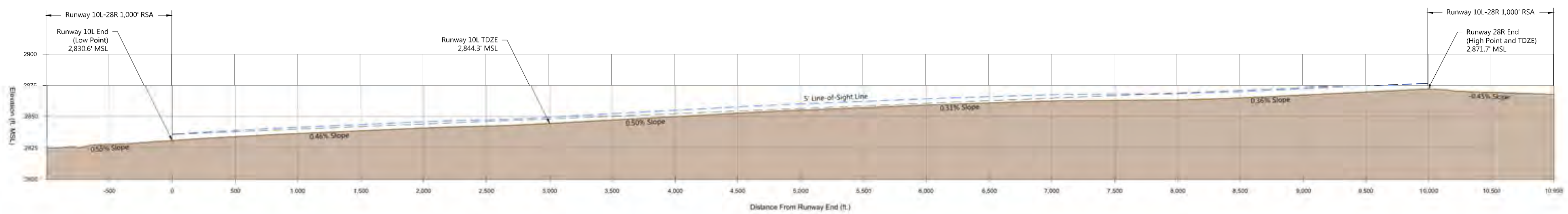
DRAWN BY: CJB

CHECKED BY: MDT

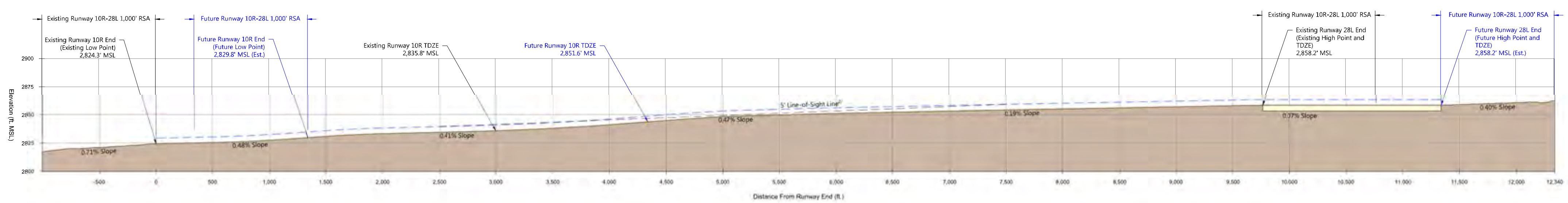
PREPARED BY: Ricondo & Associates, Inc.

DATE: APRIL 2019

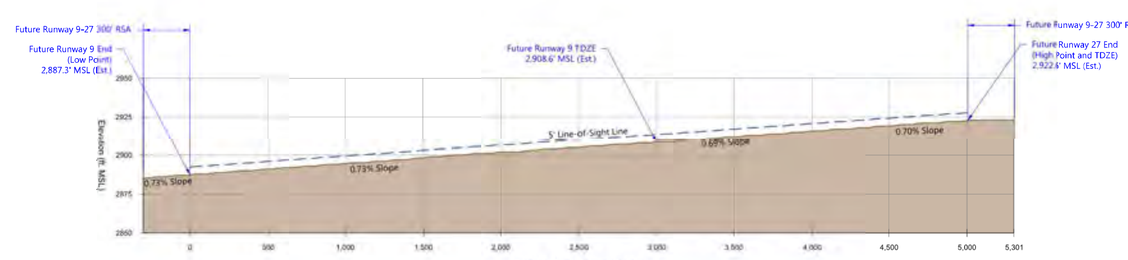
Runway 10L-28R



Runway 10R-28L



Existing Assault Strip (Future Runway 9-27)



NOTES:

1/ Vertical scale exaggerated 10 times.
2/ According to Advisory Circular 150/5300-13A *Airport Design*, any point 5' above the runway centerline must be mutually visible with any other point 5' above the runway centerline that is located at a distance that is less than one half the length of the runway for runways with a full parallel taxiway

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Boise Airport
BOISE AIR TERMINAL
GOWEN FIELD
BOISE, IDAHO

RUNWAY CENTERLINE PROFILES

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APPROVED BY AIRPORT SPONSOR:

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Title

Date

REVISION HISTORY

NO.	DATE	BY	DESCRIPTION	APPD
X	X	X	XXXXXX	

0 400
GRAPHICAL SCALE IN FEET

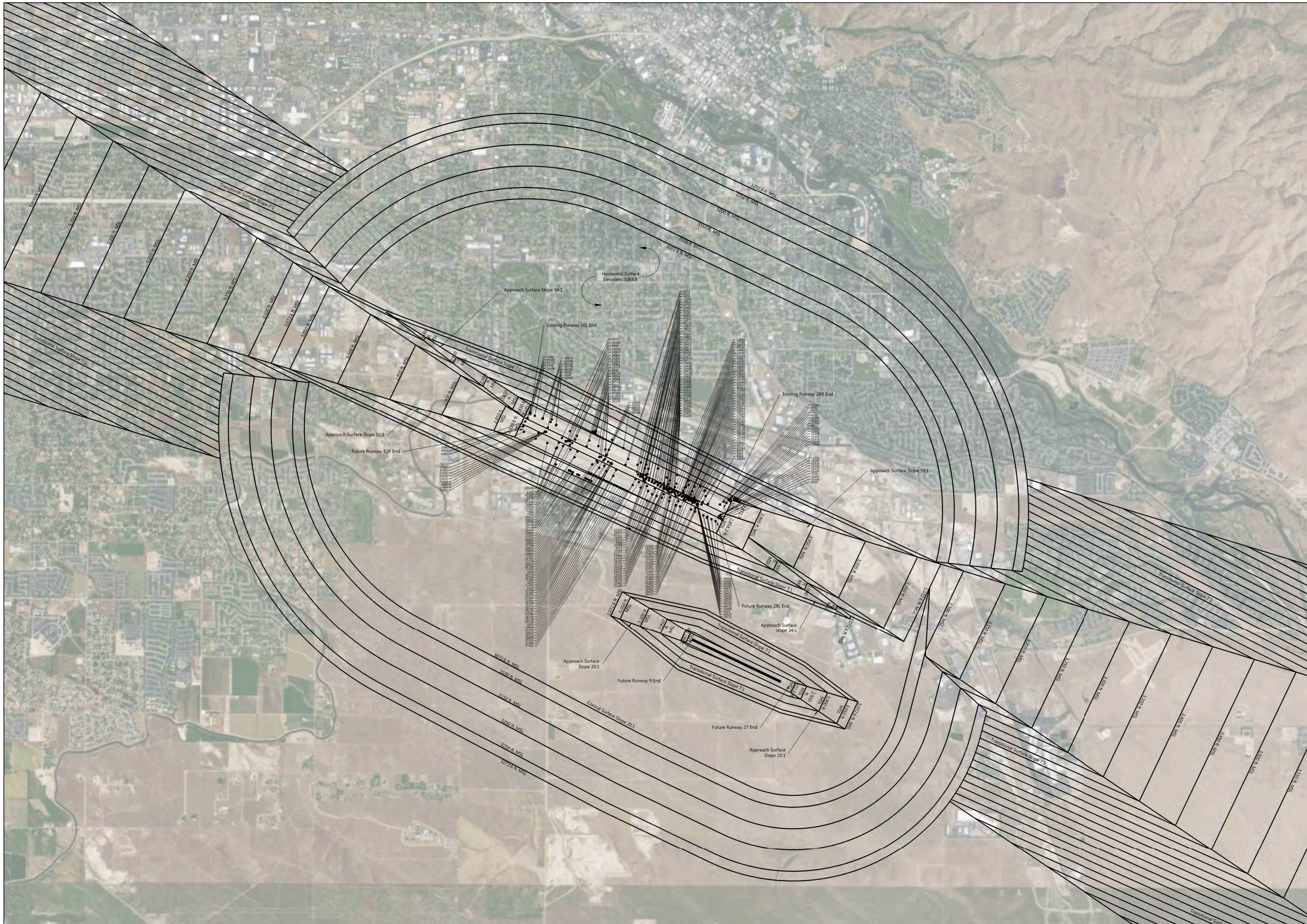
DRAWN BY: CJB

CHECKED BY: MDT

PREPARED BY:
Ricondo & Associates, Inc.

DATE: APRIL 2019

SHEET 7 OF 14



NOTES:

1/ Obstacle data source: Quantum Spatial, Obstacle data Collection and Planimetric Base Mapping, April 2017.
2/ Aerial Image data source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User
3/ See Sheet 10 for Obstruction Tables

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Boise Airport
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AIRPORT AIRSPACE PLAN
1 OF 3

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Federal Aviation Administration Date

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Title

Date

REVISION HISTORY

NO.	DATE	BY	DESCRIPTION	APPD
X	X	X	XXXXXX	

Magnetic Declination 13° 20' E 0° 7' W/Year February 2018

0 1,500
GRAPHICAL SCALE IN FEET

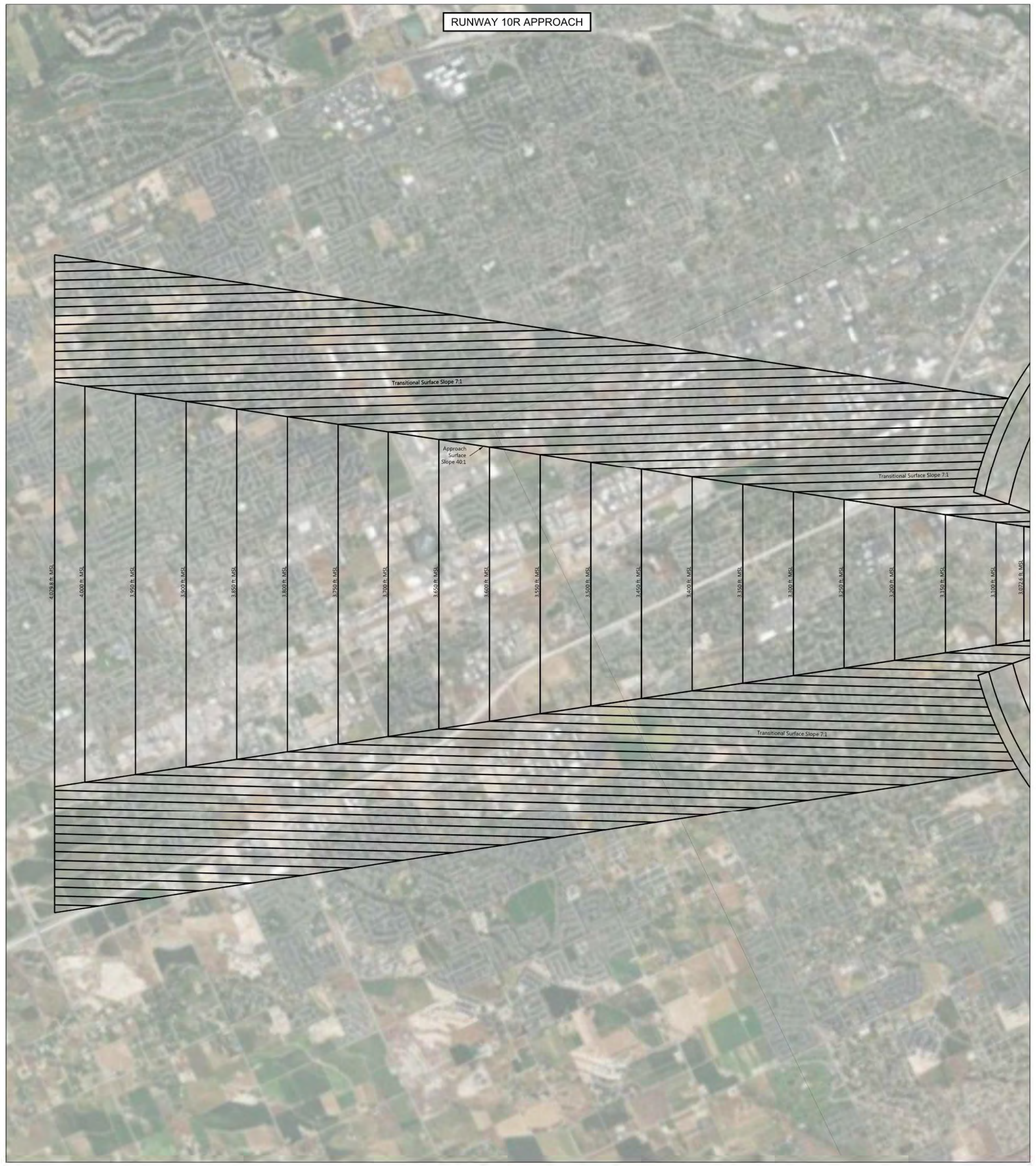
DRAWN BY: CJB

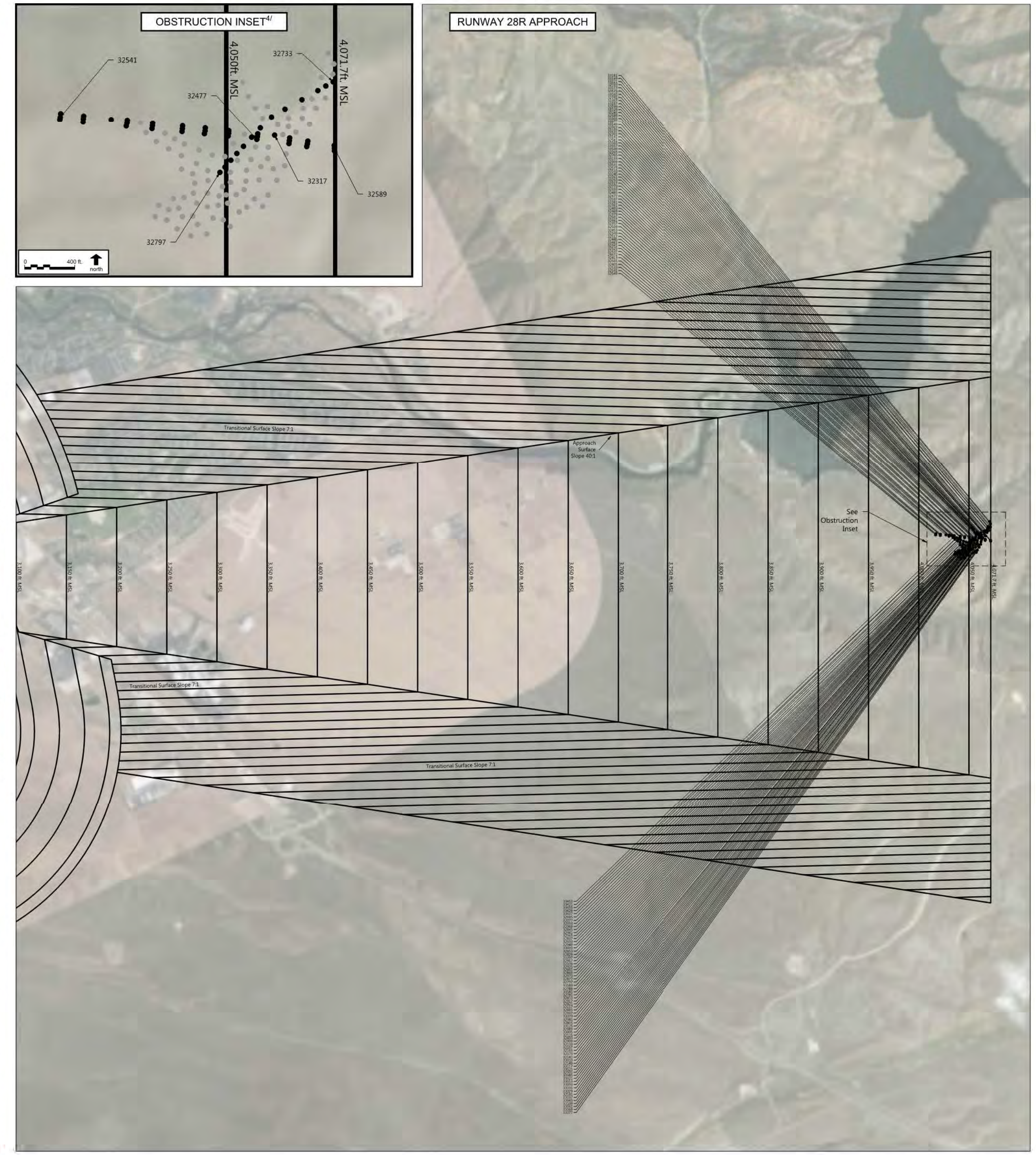
CHECKED BY: MDT

PREPARED BY:
Ricondo & Associates, Inc.

DATE: APRIL 2019

SHEET 8 OF 14





NOTES:

1/ Obstacle data source: Quantum Spatial, Data Collection and Planimetric Base Mapping, April 2017.
2/ Aerial Image data source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User.
3/ See Sheet 10 for Obstruction Tables.
4/ Obstructions marked with black dots are above ground objects. Obstructions marked with grey dots are ground points. Not all obstructions labeled on this inset, see Sheet 10 for additional obstruction information.

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Boise Airport
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AIRPORT AIRSPACE PLAN
2 OF 3

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APPROVED BY:

Federal Aviation Administration Date

APPROVED BY AIRPORT SPONSOR:

Signature

Title

Date

REVISION HISTORY

NO.	DATE	BY	DESCRIPTION	APPD
X	X	X	XXXXXX	

Magnetic Declination 13° 20' E 0° 7' W/Year February 2018

0 2,000
GRAPHICAL SCALE IN FEET

DRAWN BY: CJB

CHECKED BY: MDT

PREPARED BY: Ricondo & Associates, Inc.

DATE: APRIL 2019

SHEET 9 OF 14

Obstructions Table

Point ID	Description	Easting	Northing	Object Elevation (MSL)	Surface Elevation (ft. MSL)	Surface Penetrated	Penetration (ft.)	Disposition of Obstruction
4503	GROUND	2499778.15	690761.78	2849.6	2845.9	Transitional	3.6	Trim/Remove
4511	GROUND	2501084.88	690137.44	2851.4	2850.2	Transitional	1.2	Trim/Remove
4576	ANTENNA	2503465.54	689977.51	2907.5	2854.5	Primary	53.0	Trim/Remove
4584	AWOS	2503420.14	689972.07	2893.1	2854.4	Primary	38.7	Trim/Remove
4616	SIGN	2500203.75	692067.23	2856.8	2851.2	Primary	5.6	Trim/Remove
4640	PAPI	2496851.25	693636.95	2838.6	2836.6	Primary	2.0	Trim/Remove
4648	WINDSOCK	2496649.63	693905.36	2841.0	2835.4	Primary	5.6	Trim/Remove
4672	GROUND	2497123.58	693043.51	2836.5	2835.2	Primary	1.3	Trim/Remove
4680	AWOS	2496387.63	693333.52	2850.4	2833.0	Primary	17.4	Trim/Remove
4688	WINDSOCK	2499273.08	691944.94	2860.4	2841.8	Primary	18.5	Trim/Remove
4696	POLE	2499394.48	691877.77	2866.4	2842.2	Primary	24.2	Trim/Remove
4736	SIGN	2502629.88	689868.03	2859.4	2852.5	Primary	6.8	Trim/Remove
5151	SIGN	2499179.50	691509.58	2851.4	2842.1	Primary	9.3	Trim/Remove
5159	SIGN	2496890.88	692599.82	2837.5	2835.2	Primary	2.3	Trim/Remove
5167	SIGN	2496848.25	692559.29	2838.8	2835.1	Primary	3.7	Trim/Remove
6212	CONTROL TOWER	2500270.33	688836.56	3133.7	3067.5	Transitional	66.2	Trim/Remove
7430	RUNWAY LIGHT	2495654.09	694163.67	2831.4	2831.4	Primary	0.1	Trim/Remove
7446	FENCE	2495521.09	693971.09	2832.3	2831.3	Primary	1.0	Trim/Remove
7454	NAVAID	2495328.37	693607.56	2830.3	2830.1	Primary	0.2	Trim/Remove
7462	SIGN	2497706.01	692150.84	2844.3	2837.7	Primary	6.6	Trim/Remove
7486	SIGN	2497834.82	692421.34	2844.1	2837.7	Primary	6.4	Trim/Remove
7494	SIGN	2501072.25	690815.41	2856.0	2847.6	Primary	8.4	Trim/Remove
7526	GROUND	2504431.52	689327.81	2862.7	2857.6	Primary	5.1	Trim/Remove
8398	GROUND	2504599.49	689231.57	2864.9	2858.2	Primary	6.8	Trim/Remove
8422	SIGN	2504785.49	690029.38	2872.0	2871.0	Primary	1.0	Trim/Remove
8430	SIGN	2504889.32	690186.12	2872.6	2871.1	Primary	1.5	Trim/Remove
8880	SIGN	2497495.88	693357.44	2842.4	2839.3	Primary	3.0	Trim/Remove
8896	SIGN	2498398.73	692927.49	2846.6	2843.3	Primary	3.4	Trim/Remove
8952	SIGN	2504660.74	690089.10	2871.9	2870.4	Primary	1.5	Trim/Remove
8968	NAVAID	2503927.83	689989.49	2868.8	2866.5	Primary	2.3	Trim/Remove
8976	SIGN	2503685.50	690078.67	2869.0	2862.5	Primary	6.5	Trim/Remove
8984	WINDSOCK	2503629.28	689960.47	2873.5	2854.9	Primary	18.6	Trim/Remove
9416	BUILDING	2505142.89	690232.17	2894.4	2887.7	Transitional	6.7	Trim/Remove
13695	GROUND	2495418.97	693812.00	2830.2	2830.1	Primary	0.1	Trim/Remove
13881	SIGN	2497818.74	693143.61	2842.8	2840.8	Primary	1.9	Trim/Remove
13913	GROUND	2497487.17	692885.80	2838.2	2836.3	Primary	1.9	Trim/Remove
13921	SIGN	2497737.13	692971.81	2842.8	2840.9	Primary	1.9	Trim/Remove
14052	SIGN	2503191.28	690574.33	2865.2	2864.4	Primary	0.8	Trim/Remove
14060	SIGN	2502911.63	690777.72	2863.4	2863.0	Primary	0.4	Trim/Remove
14076	SIGN	2503028.90	690867.23	2863.4	2863.3	Primary	0.1	Trim/Remove
14084	SIGN	2502466.04	690927.69	2863.3	2861.2	Primary	2.1	Trim/Remove
14108	SIGN	2502159.12	691075.65	2862.8	2859.8	Primary	3.0	Trim/Remove
14116	SIGN	2502009.21	691207.70	2863.6	2859.1	Primary	4.5	Trim/Remove
14124	SIGN	2501151.75	691615.93	2860.9	2855.3	Primary	5.5	Trim/Remove
14132	SIGN	2500975.30	691640.08	2859.1	2854.7	Primary	4.5	Trim/Remove
14140	WINDSOCK	2501040.61	691814.68	2863.9	2854.6	Primary	9.3	Trim/Remove
14156	NAVAID	2503296.13	690290.55	2865.5	2864.5	Primary	1.0	Trim/Remove
14180	SIGN	2503117.92	690418.82	2865.2	2864.4	Primary	0.8	Trim/Remove
14196	SIGN	2502774.70	690583.54	2863.9	2862.9	Primary	1.0	Trim/Remove
14204	SIGN	2502384.68	690757.91	2863.4	2861.2	Primary	2.2	Trim/Remove
14212	SIGN	2502078.03	690904.46	2862.9	2859.8	Primary	3.0	Trim/Remove
14220	SIGN	2501880.70	690937.85	2864.1	2856.9	Primary	7.2	Trim/Remove
14236	SIGN	2501023.06	691346.93	2860.7	2854.4	Primary	6.3	Trim/Remove
14252	SIGN	2500075.63	691797.87	2856.7	2851.1	Primary	5.5	Trim/Remove
14282	SIGN	2500845.69	691258.37	2856.8	2846.5	Primary	10.3	Trim/Remove
14290	GROUND	2503132.07	690275.95	2860.4	2853.3	Primary	7.1	Trim/Remove
14298	GROUND	2502892.49	690389.06	2861.2	2852.6	Primary	8.6	Trim/Remove
14314	VERTICAL POINT	2501409.65	690940.98	2862.2	2848.3	Primary	13.9	Trim/Remove
14322	SIGN	2500981.29	691103.43	2856.5	2847.0	Primary	9.5	Trim/Remove
14330	SIGN	2502100.42	690688.98	2860.6	2850.3	Primary	10.3	Trim/Remove
14338	SIGN	2502160.56	690513.61	2859.3	2850.6	Primary	8.7	Trim/Remove
14346	AWOS	2501888.13	690670.53	2874.7	2849.8	Primary	25.0	Trim/Remove
14354	POLE	2502253.30	690526.53	2864.6	2850.8	Primary	13.8	Trim/Remove
14386	GROUND	2503257.89	690107.44	2860.6	2853.8	Primary	6.8	Trim/Remove
14394	GROUND	2502803.01	690200.40	2858.9	2852.6	Primary	6.3	Trim/Remove
14402	STREET SIGN	2502714.29	690321.52	2863.7	2852.2	Primary	11.5	Trim/Remove
14410	STREET SIGN	2502970.35	690237.35	2863.3	2852.9	Primary	10.4	Trim/Remove
14418	GROUND	2502534.81	690503.07	2858.5	2851.6	Primary	6.9	Trim/Remove
14434	GROUND	2502407.19	690434.11	2857.6	2851.3	Primary	6.3	Trim/Remove
14442	GROUND	2502339.08	690637.27	2858.8	2850.9	Primary	7.8	Trim/Remove
14450	GROUND	2501698.97	690953.89	2857.6	2849.0	Primary	8.7	Trim/Remove
14458	GROUND	2501698.28	690777.96	2855.6	2849.2	Primary	6.4	Trim/Remove
14466	GROUND	2501886.46	690782.87	2856.9	2849.6	Primary	7.2	Trim/Remove
14482	GROUND	2502697.45	690459.57	2859.1	2852.0	Primary	7.1	Trim/Remove
14618	SIGN	2500792.96	691905.18	2857.6	2853.6	Primary	4.1	Trim/Remove
14626	SIGN	2500636.22	691801.47	2857.2	2853.2	Primary	4.1	Trim/Remove
14706	GROUND	2500661.80	691351.36	2853.3	2845.9	Primary	7.4	Trim/Remove
14714	GROUND	2501183.67	691168.32	2855.6	2847.4	Primary	8.2	Trim/Remove
14722	GROUND	2501539.77	690995.39	2856.5	2848.5	Primary	8.0	Trim/Remove
14778	GROUND	2503315.61	690189.53	2861.5	2853.9	Primary	7.6	Trim/Remove
14794	SIGN	2499511.12	691290.92	2853.8	2843.2	Primary	10.7	Trim/Remove
14950	BUILDING	2503442.39	689990.10	2872.0	2854.4	Primary	17.6	Trim/Remove
19222	BUILDING	2505018.90	690289.48	2889.6	2887.2	Transitional	2.4	Trim/Remove
19663	STREET SIGN	2504992.35	690082.77	2874.2	2871.6	Primary	2.6	Trim/Remove
19712	VERTICAL POINT	2495654.82	694235.22	2832.3	2831.3	Primary	1.0	Trim/Remove
24844	GROUND	2497507.96	692932.13	2839.0	2836.3	Primary	2.7	Trim/Remove
24852	GROUND	2500894.05	691272.89	2854.9	2846.6	Primary	8.3	Trim/Remove
24860	GROUND	2500894.48	691347.63	2855.6	2846.6	Primary	9.0	Trim/Remove
24868	GROUND	2500904.92	691186.94	2854.5	2846.7	Primary	7.8	Trim/Remove
24876	GROUND	2500924.20	691092.34	2854.4	2846.9	Primary	7.5	Trim/Remove
24884	GROUND	2500986.23	690993.51	2854.4	2847.2	Primary	7.2	Trim/Remove
24892	GROUND	2500775.96	691341.93	2853.8	2846.2	Primary	7.5	Trim/Remove
24900	GROUND	2500607.47	691477.77	2853.8	2845.7	Primary	8.1	Trim/Remove
24908	GROUND	2501055.98	691199.84	2854.6	2847.1	Primary	7.5	Trim/Remove
24916	GROUND	2501170.13	691076.31	2854.6	2847.5	Primary	7.1	Trim/Remove
24924	GROUND	2501331.91	691077.67	2855.8	2847.9	Primary	7.8	Trim/Remove
24932	GROUND	2501301.55	691005.64	2855.0	2847.9	Primary	7.1	Trim/Remove
24940	GROUND	2501577.70	690857.31	2855.5	2848.8	Primary	6.7	Trim/Remove
24948	GROUND	2501619.24	690916.32	2856.1	2848.8	Primary	7.3	Trim/Remove
24956	GROUND	2501460.51	690981.19	2855.6	2848.3	Primary	7.3	Trim/Remove
24964	GROUND	2501752.93	690838.81	2856.4	2849.2	Primary	7.2	Trim/Remove
24972	GROUND	2501862.42	690883.43	2857.9	2849.5	Primary	8.4	Trim/Remove
24980	GROUND	2502027.01	690797.11	2858.3	2850.0	Primary	8.3	Trim/Remove
24988	GROUND	2501987.01	690729.21	2857.5	2849.9	Primary	7.6	Trim/Remove
24996	GROUND	2502152.75	690665.09	2858.6	2850.4	Primary	8.2	Trim/Remove
25004	GROUND	2502103.69	690543.37	2857.0	2850.4	Primary	6.6	Trim/Remove
25012	GROUND	2502370.37	690528.48	2858.3	2851.1	Primary	7.1	Trim/Remove

Obstructions Table

Point ID	Description	Easting	Northing	Object Elevation (MSL)	Surface Elevation (ft. MSL)	Surface Penetrated	Penetration (ft.)	Disposition of Obstruction
25020	GROUND	2502547.71	690374.83	2857.8	2851.7	Primary	6.0	Trim/Remove
25036	GROUND	2502847.44	690294.37	2860.0	2852.6	Primary	7.4	Trim/Remove
25044	GROUND	2502975.55	690352.00	2859.9	2852.9	Primary	7.0	Trim/Remove
25052	GROUND	2503047.99	690316.47	2860.0	2853.0	Primary	7.0	Trim/Remove
25060	GROUND	2503226.92	690226.57	2860.9	2853.6	Primary	7.3	Trim/Remove
25068	DIRT PILE	2503020.29	690220.49	2862.1	2853.1	Primary	9.0	Trim/Remove
25076	DIRT PILE	2503122.21	690184.61	2861.4	2853.4	Primary	8.0	Trim/Remove
25084	GROUND	2503126.75	690128.31	2859.8	2853.5	Primary	6.3	Trim/Remove
25092	GROUND	2503205.69	690037.63	2858.8	2853.8	Primary	5.0	Trim/Remove
25100	DIRT PILE	2503024.81	690158.29	2861.4	2853.2	Primary	8.2	Trim/Remove
25116	SIGN	2502791.30	690359.37	2862.3	2852.4	Primary	9.9	Trim/Remove
25124	GROUND	2503201.87	690155.06	2860.3	2853.6	Primary	6.6	Trim/Remove
25132	GROUND	2503045.35	690260.63	2859.8	2853.1	Primary	6.7	Trim/Remove
25140	GROUND	2502924.14	690300.25	2860.0	2852.8	Primary	7.3	Trim/Remove
25148	GROUND	2502617.06	690402.59	2858.8	2851.9	Primary	6.9	Trim/Remove
25156	GROUND	2502449.71	690575.56	2858.8	2851.3	Primary	7.5	Trim/Remove
25164	GROUND	2502216.56	690697.54	2859.5	2850.5	Primary	9.0	Trim/Remove
25172	GROUND	2502138.74	690738.64	2859.5	2850.3	Primary	9.2	Trim/Remove
25180	GROUND	2502051.52	690617.43	2856.8	2850.2	Primary	6.5	Trim/Remove
25188	STREET SIGN	2502006.66	690665.48	2862.0	2850.1	Primary	11.9	Trim/Remove
25196	VERTICAL POINT	2501907.48	690698.88	2861.4	2849.8	Primary	11.6	Trim/Remove
25204	POST	2501854.16	690702.19	2861.3	2849.6	Primary	11.6	Trim/Remove
25212	POST	2501860.76	690698.85	2861.3	2849.7	Primary	11.6	Trim/Remove
25220	POST	2501864.05	690706.08	2861.1	2849.7	Primary	11.5	Trim/Remove
25228	POST	2501857.63	690709.50	2861.1	2849.6	Primary	11.5	Trim/Remove
25236	ELECTRIC BOX	2501857.76	690703.95	2858.3	2849.6	Primary	8.6	Trim/Remove
25252	STREET SIGN	2500760.84	691252.15	2858.4	2846.3	Primary	12.1	Trim/Remove
25260	STREET SIGN	2501036.91	691158.97	2858.6	2847.1	Primary	11.5	Trim/Remove
25268	STREET SIGN	2502257.32	690579.47	2863.0	2850.8	Primary	12.2	Trim/Remove
25276	STREET SIGN	2499127.58	692068.00	2852.9	2841.3	Primary	11.6	Trim/Remove
25284	STREET SIGN	2498863.92	692156.90	2850.4	2840.5	Primary	9.8	Trim/Remove
25292	STREET SIGN	2497595.35	692810.56	2841.8	2836.6	Primary	5.2	Trim/Remove
25300	STREET SIGN	2497340.65	692887.98	2841.2	2835.9	Primary	5.2	Trim/Remove
25332	ELECTRIC BOX	2496332.33	693334.26	2835.9	2832.9	Primary	3.0	Trim/Remove
25340	VERTICAL POINT	2497294.93	692899.15	2844.7	2835.8	Primary	8.9	Trim/Remove
25348	ELECTRIC BOX	2499438.59	691855.61	2851.5	2842.3	Primary	9.2	Trim/Remove
25356	POST	2499435.14	691854.00	2853.5	2842.3	Primary	11.2	Trim/Remove
25364	POST	2499441.32	691851.14	2853.4	2842.3	Primary	11.1	Trim/Remove
25372	POST	2499444.63	691857.80	2853.5	2842.3	Primary	11.2	Trim/Remove
25380	POST	2499438.51	691860.83	2853.5	2842.3	Primary	11.2	Trim/Remove
25388	VERTICAL POINT	2499385.43	691881.95	2853.8	2842.2	Primary	11.6	Trim/Remove
25396	VERTICAL POINT	2499400.00	691881.10	2855.8	2842.2	Primary	13.6	Trim/Remove
25404	VERTICAL POINT	2496386.11	693329.56	2840.9	2833.1	Primary	7.9	Trim/Remove
25412	POST	2496331.67	693339.92	2837.8	2832.9	Primary	4.9	Trim/Remove
25420	POST	2496338.88	693336.55	2837.8	2832.9	Primary	4.9	Trim/Remove
25428	POST	2496336.39	693329.43	2837.8	2832.9	Primary	4.9	Trim/Remove
25436	POST	2496328.95	693332.74	2837.8	2832.9	Primary	4.9	Trim/Remove
26985	NAVAID	2495320.05	693589.72	2830.4	2830.1	Primary	0.3	Trim/Remove
27033	SIGN	2496029.22	693281.27	2835.9	2832.2	Primary	3.7	Trim/Remove
27041	SIGN	2495900.37	693010.64	2835.5	2832.2	Primary	3.3	Trim/Remove
27049	SIGN	2496440.80	692813.86	2835.8	2833.8	Primary	2.0	Trim/Remove
27129	SIGN	2496977.13	692830.53	2838.5	2835.1	Primary	3.4	Trim/Remove
27137	SIGN	2497174.82	692675.03	2837.5	2835.8	Primary	1.8	Trim/Remove
27145	SIGN	2497415.76	692919.68	2839.5	2836.1	Primary	3.5	Trim/Remove
27153	SIGN	2497495.28	692725.05	2839.4	2836.5	Primary	2.9	Trim/Remove
27161	SIGN	2497517.91	692511.62	2840.4	2836.8	Primary	3.6	Trim/Remove
27177	SIGN	2498270.20	692657.79	2846.2	2843.3	Primary	2.9	Trim/Remove
27185	SIGN	2498530.87	691818.42	2848.9	2840.1	Primary	8.8	Trim/Remove
27233	SIGN	2498854.06	691661.71	2850.4	2841.1	Primary	9.3	Trim/Remove
27241	SIGN	2498736.85	691991.78	2851.2	2840.4	Primary	10.7	Trim/Remove
27249	SIGN	2498780.44	691910.45	2849.9	2840.6	Primary	9.3	Trim/Remove
27273	SIGN	2498943.30	692171.58	2849.0	2840.7	Primary	8.3	Trim/Remove
27281	SIGN	2499057.06	692009.92	2849.9	2841.2	Primary	8.7	Trim/Remove
27289	SIGN	2499095.60	691759.66	2851.2	2841.6	Primary	9.6	Trim/Remove
27297	SIGN	2499639.96	691561.62	2853.8	2843.2	Primary	10.6	Trim/Remove
27305	SIGN	2500413.81	690860.85	2855.5	2845.9	Primary	9.6	Trim/Remove
27313	SIGN	2500542.82	691131.60	2855.9	2845.9	Primary	10.0	Trim/Remove
27321	SIGN	2500701.06	690997.66	2854.3	2846.4	Primary	7.8	Trim/Remove
27361	SIGN	2500784.99	690744.74	2854.5	2847.0	Primary	7.6	Trim/Remove
27369	SIGN	2501127.98	690581.49	2856.0	2848.0	Primary	8.1	Trim/Remove
27377	SIGN	2501445.60	690701.63	2857.4	2848.6	Primary	8.8	Trim/Remove
27385	SIGN	2501316.71	690430.90	2857.3	2848.6	Primary	8.7	Trim/Remove
27417	SIGN	2502127.77	690108.32	2858.3	2851.0	Primary	7.3	Trim/Remove
27433	SIGN	2502171.63	690292.00	2857.9	2850.9	Primary	7.0	Trim/Remove
27441	SIGN	2501867.64	690438.62	2856.5	2850.0	Primary	6.6	Trim/Remove
27473	NAVAID	2502430.67	689930.32	2858.3	2852.0	Primary	6.3	Trim/Remove
27481	NAVAID	2502423.67	689916.02	2858.3	2852.0	Primary	6.3	Trim/Remove
27489	SIGN	2502552.18	690113.96	2858.3	2852.1	Primary	6.2	Trim/Remove
27497	SIGN	2502881.34	690163.45	2860.7	2852.8	Primary	7.9	Trim/Remove
28232	SIGN	2501784.15	690269.04	2856.4	2850.0	Primary	6.4	Trim/Remove
28240	SIGN	2502783.51	690508.63	2865.2	2859.8	Primary	5.4	Trim/Remove
28256	NAVAID	2501528.02	690360.45	2856.3	2849.2	Primary	7.1	Trim/Remove
28264	NAVAID	2501521.07	690346.00	2856.2	2849.2	Primary	6.9	Trim/Remove
28424	NAVAID	2503144.36	689726.43	2860.5	2854.0	Primary	6.5	Trim/Remove
28432	NAVAID	2503333.72	689636.28	2861.6	2854.5	Primary	7.0	Trim/Remove
28440	POST	2503319.07	689643.16	2861.4	2854.5	Primary	6.9	Trim/Remove
28448	NAVAID	2503523.00	689546.01	2865.1	2855.1	Primary	9.9	Trim/Remove
28456	NAVAID	2503712.64	689455.43	2868.2	2855.7	Primary	12.5	Trim/Remove
28464	VERTICAL POINT	2503707.54	689458.09	2863.3	2855.7	Primary	7.7	Trim/Remove
28472	NAVAID	2503881.34	689344.15	2870.4	2856.2	Primary	14.1	Trim/Remove
28480	NAVAID	2503893.37	689369.44	2870.7	2856.2	Primary	14.5	Trim/Remove
28488	NAVAID	2503905.21	689394.89	2870.4	2856.2	Primary	14.1	Trim/Remove
28496	NAVAID	2504091.87	689274.76	2873.7	2856.8	Primary	16.9	Trim/Remove
28504	NAVAID	2504280.98	689184.76	2876.1	2857.4	Primary	18.6	Trim/Remove
28520	GROUND	2503295.88	690052.84	2860.2	2854.0	Primary	6.3	Trim/Remove
28528	GROUND	2503347.58	690091.88	2861.0	2854.0	Primary	6.9	Trim/Remove
28536	GROUND	2503382.95	690150.24	2861.6	2854.1	Primary	7.5	Trim/Remove
28544	GROUND	2503453.07	690121.48	2862.4	2854.3	Primary	8.1	Trim/Remove
28552	VERTICAL POINT	2503401.89	689979.57	2863.5	2854.3	Primary	9.2	Trim/Remove
28560	ELECTRIC BOX	2503447.28	689945.42	2862.5	2854.5	Primary	8.1	Trim/Remove
28592	POST	2503447.01	689951.65	2864.0	2854.5	Primary	9.6	Trim/Remove
28600	POST	2503454.44	689947.81	2864.0	2854.5	Primary	9.6	Trim/Remove
28608	POST	2503450.94	689941.06	2864.0	2854.5	Primary	9.6	Trim/Remove
28616	POST	2503443.74	689944.89	2864.0	2854.5	Primary	9.6	Trim/Remove
28624	STREET SIGN	2503427.78	689920.80	2862.4	2854.4	Primary	8.0	Trim/Remove
28632	POST	2503335.23	689775.63	2862.3	2854.4	Primary	7.9	Trim/Remove
28640	NAVAID	2503921.19	689974.80	2868.9	2864.2	Primary	4.7	Trim/Remove

Obstructions Table

Point ID	Description	Easting	Northing	Object Elevation (MSL)	Surface Elevation (ft. MSL)	Surface Penetrated	Penetration (ft.)	Disposition of Obstruction
28704	GROUND	2499956.67	690676.97	2849.9	2846.5	Transitional	3.5	Trim/Remove
28712	GROUND	2500089.71	690613.49	2850.0	2846.9	Transitional	3.2	Trim/Remove
28720	GROUND	2499669.80	690813.56	2849.2	2845.6	Transitional	3.6	Trim/Remove
28728	GROUND	2499561.51	690864.72	2849.3	2845.3	Transitional	4.0	Trim/Remove
28736	GROUND	2499428.65	690934.85	2848.7	2844.0	Transitional	4.6	Trim/Remove
28744	GROUND	2499292.38	690997.65	2847.8	2843.9	Transitional	3.9	Trim/Remove
28752	GROUND	2499188.56	691047.24	2847.0	2843.6	Transitional	3.5	Trim/Remove
28760	GROUND	2499064.94	691107.17	2846.4	2843.0	Transitional	3.4	Trim/Remove
28768	GROUND	2498932.84	691174.73	2845.7	2842.2	Transitional	3.5	Trim/Remove
28776	GROUND	2498835.64	691222.78	2845.3	2841.9	Transitional	3.4	Trim/Remove
28784	GROUND	2498705.80	691283.78	2844.7	2841.5	Transitional	3.2	Trim/Remove
28792	GROUND	2498597.34	691335.55	2843.9	2841.1	Transitional	2.8	Trim/Remove
28800	GROUND	2498489.31	691386.96	2843.2	2840.6	Transitional	2.6	Trim/Remove
28808	GROUND	2498371.62	691442.46	2842.3	2840.5	Transitional	1.7	Trim/Remove
28824	GROUND	2499868.19	690719.40	2849.7	2846.2	Transitional	3.5	Trim/Remove
28832	GROUND	2500029.63	690642.38	2849.9	2846.7	Transitional	3.2	Trim/Remove
28840	GROUND	2500159.23	690580.55	2850.2	2847.1	Transitional	3.1	Trim/Remove
28848	LIGHT POLE	2498209.77	691177.72	2894.5	2884.3	Transitional	10.2	Trim/Remove
28856	LIGHT POLE	2498275.93	691144.60	2894.5	2884.7	Transitional	9.8	Trim/Remove
28864	LIGHT POLE	2498380.90	691095.00	2895.6	2885.0	Transitional	10.7	Trim/Remove
28872	LIGHT POLE	2498485.01	691045.30	2896.4	2885.3	Transitional	11.1	Trim/Remove
28880	LIGHT POLE	2497917.50	691316.92	2892.7	2883.4	Transitional	9.3	Trim/Remove
28888	LIGHT POLE	2497838.94	691354.11	2892.6	2883.2	Transitional	9.4	Trim/Remove
28896	LIGHT POLE	2497633.45	691453.72	2892.1	2882.3	Transitional	9.7	Trim/Remove
28904	LIGHT POLE	2497532.08	691500.83	2891.3	2882.2	Transitional	9.2	Trim/Remove
28912	LIGHT POLE	2497446.04	691541.42	2891.1	2882.0	Transitional	9.1	Trim/Remove
28920	BUILDING	2497579.38	691372.35	2897.7	2896.1	Transitional	1.6	Trim/Remove
28928	CONTROL TOWER	2497476.06	691544.60	2882.7	2879.8	Transitional	2.9	Trim/Remove
28944	LIGHT POLE	2496839.09	691817.45	2886.7	2881.8	Transitional	4.8	Trim/Remove
30154	VERTICAL POINT	2495527.19	693965.91	2831.9	2831.3	Primary	0.6	Trim/Remove
30290	SIGN	2495861.02	694075.07	2833.3	2832.3	Primary	1.0	Trim/Remove
30322	VERTICAL POINT	2496235.88	693962.66	2836.4	2833.8	Primary	2.6	Trim/Remove
30346	NAVAID	2496226.35	693952.77	2834.8	2833.8	Primary	1.0	Trim/Remove
30354	NAVAID	2496219.53	693938.22	2834.9	2833.8	Primary	1.1	Trim/Remove
30378	SIGN	2496464.65	693518.00	2837.8	2835.4	Primary	2.4	Trim/Remove
30386	SIGN	2496593.35	693787.52	2837.8	2835.4	Primary	2.4	Trim/Remove
30394	NAVAID	2496858.21	693651.66	2838.6	2836.6	Primary	2.0	Trim/Remove
30538	FENCE	2498684.70	693245.70	2852.1	2851.7	Transitional	0.3	Trim/Remove
30554	FENCE	2498599.75	693287.09	2851.7	2851.5	Transitional	0.2	Trim/Remove
30578	LIGHT POLE	2498555.67	693345.14	2861.9	2856.0	Transitional	5.9	Trim/Remove
30586	LIGHT POLE	2498610.77	693319.99	2862.3	2856.4	Transitional	5.9	Trim/Remove
30594	LIGHT POLE	2498668.08	693293.87	2863.1	2856.8	Transitional	6.3	Trim/Remove
30610	SIGN	2498815.49	692668.69	2847.2	2845.2	Primary	2.0	Trim/Remove
30642	SIGN	2499145.53	692510.54	2849.9	2846.7	Primary	3.3	Trim/Remove
30650	SIGN	2499301.40	692497.95	2851.7	2847.2	Primary	4.5	Trim/Remove
30658	SIGN	2499207.62	692271.31	2850.6	2847.3	Primary	3.3	Trim/Remove
30666	SIGN	2499172.77	692227.97	2851.7	2847.2	Primary	4.5	Trim/Remove
30740	SIGN	2499979.78	692575.14	2851.4	2850.6	Transitional	0.9	Trim/Remove
31108	SIGN	2501102.28	691368.93	2860.3	2855.6	Primary	4.7	Trim/Remove
31116	SIGN	2495354.63	693331.31	2831.8	2830.5	Primary	1.3	Trim/Remove
31140	SIGN	2501586.22	691627.81	2860.9	2856.9	Primary	4.1	Trim/Remove
31204	SIGN	2502500.07	691328.04	2862.8	2860.6	Primary	2.2	Trim/Remove
31228	WINDSOCK	2502437.67	690344.85	2865.5	2851.5	Primary	14.0	Trim/Remove
31236	SIGN	2503009.95	691063.30	2863.9	2862.9	Primary	1.0	Trim/Remove
31244	SIGN	2502848.48	690737.91	2863.4	2862.9	Primary	0.6	Trim/Remove
31252	SIGN	2503300.56	690790.13	2865.2	2864.4	Primary	0.8	Trim/Remove
31260	NAVAID	2503289.29	690275.95	2865.2	2862.4	Primary	2.8	Trim/Remove
31268	SIGN	2503574.97	690794.57	2865.5	2865.4	Primary	0.2	Trim/Remove
31276	SIGN	2503761.51	690596.40	2867.0	2866.4	Primary	0.7	Trim/Remove
31284	SIGN	2503814.28	690347.92	2868.5	2867.0	Primary	1.6	Trim/Remove
31292	STREET SIGN	2504434.26	689410.97	2867.4	2857.5	Primary	9.9	Trim/Remove
31300	STREET SIGN	2504509.24	689348.58	2867.3	2857.8	Primary	9.5	Trim/Remove
31308	STREET SIGN	2504532.25	689297.57	2866.7	2857.9	Primary	8.8	Trim/Remove
31316	STREET SIGN	2504496.46	689451.48	2870.0	2857.6	Primary	12.4	Trim/Remove
31324	ELECTRIC BOX	2504501.84	689449.55	2867.2	2857.7	Primary	9.5	Trim/Remove
31332	ELECTRIC BOX	2504505.38	689447.71	2867.4	2857.7	Primary	9.8	Trim/Remove
31340	STREET SIGN	2504529.22	689482.10	2868.5	2857.7	Primary	10.9	Trim/Remove
31348	STREET SIGN	2504934.23	690151.69	2874.2	2871.3	Primary	2.9	Trim/Remove
31356	STREET SIGN	2504960.91	690115.26	2874.2	2871.5	Primary	2.7	Trim/Remove
31364	POST	2504976.26	690222.41	2877.8	2875.9	Transitional	1.9	Trim/Remove
31380	SIGN	2504484.48	689958.46	2870.9	2870.0	Primary	0.9	Trim/Remove
31468	BUILDING	2505263.34	690240.92	2899.4	2896.1	Transitional	3.4	Trim/Remove
31660	POLE	2505302.22	690130.87	2886.0	2884.2	Transitional	1.8	Trim/Remove
31668	ANTENNA	2505292.31	690161.20	2893.5	2887.5	Transitional	6.0	Trim/Remove
31676	BUILDING	2505212.21	690157.26	2882.6	2882.2	Transitional	0.4	Trim/Remove
31684	BUILDING	2505193.95	690156.89	2883.0	2881.0	Transitional	2.0	Trim/Remove
31692	BUILDING	2505165.87	690157.88	2882.7	2879.5	Transitional	3.3	Trim/Remove
31756	BUILDING	2505405.53	690105.12	2889.5	2887.0	Transitional	2.4	Trim/Remove
33637	LIGHT POLE	2498703.44	693369.66	2869.0	2868.7	Transitional	0.3	Trim/Remove
33645	LIGHT POLE	2499447.37	692963.09	2873.3	2865.3	Transitional	8.0	Trim/Remove
28672	POWER LINE	2549083.42	670476.46	4125.7	4027.1	Runway 28R Approach	98.6	Trim/Remove
32069	GROUND	2549417.94	669875.54	4044.7	4041.1	Runway 28R Approach	3.6	Trim/Remove
32077	GROUND	2549462.36	669972.17	4054.8	4041.1	Runway 28R Approach	13.7	Trim/Remove
32085	GROUND	2549525.39	670045.64	4062.2	4041.7	Runway 28R Approach	20.5	Trim/Remove
32093	GROUND	2549608.92	669951.65	4069.1	4044.6	Runway 28R Approach	24.4	Trim/Remove
32109	GROUND	2549772.16	669817.02	4081.6	4049.8	Runway 28R Approach	31.8	Trim/Remove
32117	GROUND	2549849.63	669746.43	4083.8	4052.3	Runway 28R Approach	31.6	Trim/Remove
32125	GROUND	2549950.87	669706.60	4087.1	4055.0	Runway 28R Approach	32.1	Trim/Remove
32133	GROUND	2549882.42	669644.11	4086.1	4054.1	Runway 28R Approach	32.0	Trim/Remove
32141	GROUND	2549840.09	669567.61	4080.8	4054.0	Runway 28R Approach	26.8	Trim/Remove
32149	GROUND	2549724.30	669504.18	4075.6	4052.0	Runway 28R Approach	23.5	Trim/Remove
32157	GROUND	2549650.73	669537.43	4074.6	4050.0	Runway 28R Approach	24.5	Trim/Remove
32165	GROUND	2549558.63	669489.12	4069.7	4048.5	Runway 28R Approach	21.2	Trim/Remove
32173	GROUND	2549477.50	669414.53	4061.4	4047.4	Runway 28R Approach	14.0	Trim/Remove
32181	GROUND	2549572.60	669295.85	4053.3	4050.9	Runway 28R Approach	2.4	Trim/Remove
32261	POWER LINE	2550278.61	669690.57	4122.1	4062.5	Runway 28R Approach	59.6	Trim/Remove
32269	POWER LINE	2550396.10	669608.26	4109.5	4066.1	Runway 28R Approach	43.4	Trim/Remove
32277	POWER LINE	2550580.85	669482.13	4079.6	4071.6	Runway 28R Approach	8.0	Trim/Remove
32285	POWER LINE	2550597.85	669521.81	4079.6	4071.6	Runway 28R Approach	8.0	Trim/Remove
32301	POWER LINE	2550422.55	669643.87	4107.7	4066.3	Runway 28R Approach	41.4	Trim/Remove
32309	POWER LINE	2550302.90	669728.75	4120.5	4062.7	Runway 28R Approach	57.8	Trim/Remove
32317	POWER LINE	2550204.17	669800.49	4136.5	4059.7	Runway 28R Approach	76.8	Trim/Remove
32333	POWER LINE	2550087.25	669868.07	4126.8	4056.3	Runway 28R Approach	70.5	Trim/Remove
32341	POWER LINE	2549197.21	670416.92	4091.9	4030.3	Runway 28R Approach	61.6	Trim/Remove
32349	POWER LINE	2549369.92	670309.58	4084.2	4035.4	Runway 28R Approach	48.8	Trim/Remove
32357	POWER LINE	2549574.49	670183.91	4077.9	4041.3	Runway 28R Approach	36.6	Trim/Remove
32373	POWER LINE	2549730.38	670090.68	4070.8	4045.9	Runway 28R Approach	24.9	Trim/Remove

Obstructions Table

Point ID	Description	Easting	Northing	Object Elevation (MSL)	Surface Elevation (ft. MSL)	Surface Penetrated	Penetration (ft.)	Disposition of Obstruction
32381	POWER LINE	2549889.90	669990.24	4087.2	4050.5	Runway 28R Approach	36.6	Trim/Remove
32405	POWER LINE	2548871.79	670553.13	4062.9	4021.5	Runway 28R Approach	41.4	Trim/Remove
32413	POWER LINE	2548897.74	670595.82	4060.4	4021.6	Runway 28R Approach	38.8	Trim/Remove
32437	POWER LINE	2549168.60	670376.12	4093.7	4030.1	Runway 28R Approach	63.6	Trim/Remove
32445	POWER LINE	2549344.68	670268.77	4084.2	4035.2	Runway 28R Approach	48.9	Trim/Remove
32453	POWER LINE	2549550.34	670144.28	4077.9	4041.2	Runway 28R Approach	36.7	Trim/Remove
32461	POWER LINE	2549704.03	670051.77	4070.8	4045.7	Runway 28R Approach	25.1	Trim/Remove
32469	POWER LINE	2549867.01	669953.57	4087.2	4050.4	Runway 28R Approach	36.8	Trim/Remove
32477	POWER LINE	2550061.63	669830.68	4126.8	4056.1	Runway 28R Approach	70.7	Trim/Remove
32485	POWER LINE	2550075.26	669848.97	4126.8	4056.2	Runway 28R Approach	70.6	Trim/Remove
32493	POWER LINE	2549879.85	669971.57	4087.2	4050.5	Runway 28R Approach	36.7	Trim/Remove
32501	POWER LINE	2549718.95	670070.63	4070.8	4045.8	Runway 28R Approach	25.0	Trim/Remove
32509	POWER LINE	2549562.93	670163.58	4077.9	4041.3	Runway 28R Approach	36.6	Trim/Remove
32517	POWER LINE	2549358.49	670289.53	4084.2	4035.3	Runway 28R Approach	48.9	Trim/Remove
32525	POWER LINE	2549185.53	670396.32	4091.9	4030.3	Runway 28R Approach	61.7	Trim/Remove
32533	POWER LINE	2548740.53	670692.77	4022.4	4017.1	Runway 28R Approach	5.4	Trim/Remove
32541	POWER LINE	2548724.52	670667.80	4022.4	4017.0	Runway 28R Approach	5.5	Trim/Remove
32549	POWER LINE	2548713.74	670651.88	4022.4	4016.9	Runway 28R Approach	5.5	Trim/Remove
32565	POWER LINE	2548885.43	670576.71	4061.7	4021.6	Runway 28R Approach	40.1	Trim/Remove
32573	POWER LINE	2550291.31	669710.14	4120.5	4062.6	Runway 28R Approach	57.9	Trim/Remove
32581	POWER LINE	2550410.28	669625.59	4108.6	4066.2	Runway 28R Approach	42.4	Trim/Remove
32589	POWER LINE	2550589.70	669501.88	4079.6	4071.6	Runway 28R Approach	8.0	Trim/Remove
32733	FENCE	2550811.10	669988.95	4085.3	4071.4	Runway 28R Approach	14.0	Trim/Remove
32741	FENCE	2550670.69	669978.87	4079.8	4068.3	Runway 28R Approach	11.5	Trim/Remove
32749	FENCE	2550525.08	669967.56	4077.3	4065.1	Runway 28R Approach	12.2	Trim/Remove
32757	FENCE	2550370.47	669957.03	4083.1	4061.8	Runway 28R Approach	21.3	Trim/Remove
32765	FENCE	2550246.05	669946.37	4090.8	4059.1	Runway 28R Approach	31.7	Trim/Remove
32773	FENCE	2550126.57	669902.26	4085.8	4056.8	Runway 28R Approach	28.9	Trim/Remove
32781	FENCE	2549941.70	669826.43	4081.7	4053.5	Runway 28R Approach	28.2	Trim/Remove
32789	FENCE	2549803.32	669769.85	4084.7	4051.0	Runway 28R Approach	33.7	Trim/Remove
32797	FENCE	2549683.03	669720.36	4082.3	4048.8	Runway 28R Approach	33.5	Trim/Remove
32805	GROUND	2549474.87	669516.19	4067.0	4046.3	Runway 28R Approach	20.8	Trim/Remove
32813	GROUND	2549410.40	669578.44	4066.9	4044.2	Runway 28R Approach	22.8	Trim/Remove
32821	GROUND	2549523.81	669613.02	4069.7	4046.3	Runway 28R Approach	23.3	Trim/Remove
32829	GROUND	2549600.81	669775.53	4073.0	4046.3	Runway 28R Approach	26.7	Trim/Remove
32837	GROUND	2549686.19	669872.61	4076.2	4047.2	Runway 28R Approach	28.9	Trim/Remove
32845	GROUND	2549545.47	669864.72	4065.5	4044.1	Runway 28R Approach	21.3	Trim/Remove
32853	GROUND	2549464.85	669728.17	4060.7	4043.8	Runway 28R Approach	17.0	Trim/Remove
32861	GROUND	2549421.36	669661.61	4061.6	4043.5	Runway 28R Approach	18.1	Trim/Remove
32869	GROUND	2549264.04	669604.66	4056.1	4040.6	Runway 28R Approach	15.5	Trim/Remove
32877	GROUND	2549261.83	669530.04	4057.7	4041.3	Runway 28R Approach	16.4	Trim/Remove
32885	GROUND	2549338.37	669500.47	4061.6	4043.4	Runway 28R Approach	18.2	Trim/Remove
32893	GROUND	2549343.88	669423.13	4057.1	4044.3	Runway 28R Approach	12.8	Trim/Remove
32901	GROUND	2549377.19	669323.29	4050.8	4046.1	Runway 28R Approach	4.7	Trim/Remove
32909	GROUND	2549256.17	669364.52	4046.2	4043.0	Runway 28R Approach	3.3	Trim/Remove
32917	GROUND	2549182.63	669460.48	4046.1	4040.3	Runway 28R Approach	5.8	Trim/Remove
32925	GROUND	2549136.62	669560.50	4044.1	4038.2	Runway 28R Approach	5.9	Trim/Remove
32933	GROUND	2549065.41	669624.31	4039.1	4035.9	Runway 28R Approach	3.2	Trim/Remove
32941	GROUND	2549131.46	669692.05	4040.5	4036.6	Runway 28R Approach	3.8	Trim/Remove
32949	GROUND	2549257.87	669691.18	4048.3	4039.5	Runway 28R Approach	8.8	Trim/Remove
32957	GROUND	2549338.39	669662.07	4055.8	4041.6	Runway 28R Approach	14.2	Trim/Remove
32965	GROUND	2549482.35	669804.09	4057.0	4043.3	Runway 28R Approach	13.6	Trim/Remove
32973	GROUND	2549569.62	669702.32	4069.3	4046.4	Runway 28R Approach	22.9	Trim/Remove
32981	GROUND	2549652.26	669608.60	4076.3	4049.3	Runway 28R Approach	27.1	Trim/Remove
32989	GROUND	2549725.28	669613.30	4079.1	4050.9	Runway 28R Approach	28.2	Trim/Remove
32997	GROUND	2549758.27	669685.29	4082.0	4050.9	Runway 28R Approach	31.1	Trim/Remove
33005	GROUND	2549597.01	669554.72	4074.1	4048.6	Runway 28R Approach	25.5	Trim/Remove
33013	GROUND	2549633.12	669472.62	4069.5	4050.3	Runway 28R Approach	19.2	Trim/Remove
33021	GROUND	2549544.69	669367.47	4059.1	4049.5	Runway 28R Approach	9.6	Trim/Remove
33029	GROUND	2549686.22	669370.02	4061.5	4052.6	Runway 28R Approach	8.9	Trim/Remove
33037	GROUND	2549757.27	669379.08	4064.3	4054.1	Runway 28R Approach	10.2	Trim/Remove
33045	GROUND	2549842.24	669410.21	4069.1	4055.7	Runway 28R Approach	13.4	Trim/Remove
33053	GROUND	2549939.65	669532.15	4080.6	4056.6	Runway 28R Approach	24.0	Trim/Remove
33061	GROUND	2550065.89	669468.96	4072.6	4060.1	Runway 28R Approach	12.5	Trim/Remove
33069	GROUND	2549951.99	669392.52	4068.5	4058.4	Runway 28R Approach	10.1	Trim/Remove
33077	GROUND	2549874.91	669328.76	4058.1	4057.3	Runway 28R Approach	0.8	Trim/Remove
33085	GROUND	2549797.92	669512.65	4077.6	4053.6	Runway 28R Approach	24.0	Trim/Remove
33093	GROUND	2550078.37	669562.65	4081.1	4059.4	Runway 28R Approach	21.7	Trim/Remove
33101	GROUND	2550222.08	669626.37	4074.1	4062.0	Runway 28R Approach	12.1	Trim/Remove
33109	GROUND	2550172.26	669544.63	4070.2	4061.7	Runway 28R Approach	8.5	Trim/Remove
33117	GROUND	2550074.71	669656.48	4083.3	4058.3	Runway 28R Approach	25.0	Trim/Remove
33125	GROUND	2550116.46	669735.65	4084.7	4058.4	Runway 28R Approach	26.3	Trim/Remove
33133	GROUND	2550263.58	669866.93	4084.1	4060.3	Runway 28R Approach	23.8	Trim/Remove
33141	GROUND	2550367.59	669748.71	4078.6	4063.9	Runway 28R Approach	14.7	Trim/Remove
33149	GROUND	2550463.85	669831.99	4076.0	4065.2	Runway 28R Approach	10.8	Trim/Remove
33157	GROUND	2550597.60	669858.25	4071.5	4067.9	Runway 28R Approach	3.5	Trim/Remove
33165	GROUND	2550700.21	669900.45	4075.6	4069.8	Runway 28R Approach	5.8	Trim/Remove
33173	GROUND	2550740.04	670061.18	4076.5	4069.0	Runway 28R Approach	7.5	Trim/Remove
33181	GROUND	2550875.22	670213.59	4075.7	4070.4	Runway 28R Approach	5.3	Trim/Remove
33189	GROUND	2550877.01	670115.20	4083.3	4071.5	Runway 28R Approach	11.9	Trim/Remove
33221	GROUND	2550834.23	670046.93	4081.7	4071.3	Runway 28R Approach	10.5	Trim/Remove
33229	GROUND	2550502.49	669901.93	4075.6	4065.3	Runway 28R Approach	10.3	Trim/Remove
33237	GROUND	2550364.99	669878.85	4081.5	4062.5	Runway 28R Approach	19.0	Trim/Remove
33245	GROUND	2550265.47	669776.51	4082.1	4061.3	Runway 28R Approach	20.8	Trim/Remove
33253	GROUND	2550176.32	669967.67	4084.6	4057.3	Runway 28R Approach	27.3	Trim/Remove
33357	GROUND	2550598.91	669939.79	4074.4	4067.1	Runway 28R Approach	7.3	Trim/Remove
33365	GROUND	2550493.78	669760.39	4069.0	4066.6	Runway 28R Approach	2.4	Trim/Remove
33373	GROUND	2550025.92	669781.72	4081.5	4055.9	Runway 28R Approach	25.7	Trim/Remove
33381	GROUND	2549991.57	669909.68	4054.4	4053.7	Runway 28R Approach	0.7	Trim/Remove
33397	GROUND	2549877.81	669881.07	4060.5	4051.4	Runway 28R Approach	9.0	Trim/Remove
33421	GROUND	2549421.81	670190.90	4051.7	4037.8	Runway 28R Approach	13.8	Trim/Remove
33429	GROUND	2549472.23	670116.53	4055.5	4039.8	Runway 28R Approach	15.8	Trim/Remove
33437	GROUND	2549394.58	670065.32	4048.5	4038.6	Runway 28R Approach	10.0	Trim/Remove
33445	GROUND	2549331.27	670160.25	4042.5	4036.1	Runway 28R Approach	6.4	Trim/Remove
33453	GROUND	2549288.85	670259.56	4041.5	4034.1	Runway 28R Approach	7.4	Trim/Remove
33461	GROUND	2549283.97	670352.27	4042.4	4033.0	Runway 28R Approach	9.4	Trim/Remove
33493	GROUND	2549186.75	669628.11	4048.9	4038.6	Runway 28R Approach	10.4	Trim/Remove
33525	GROUND	2549997.27	669620.85	4081.7	4056.9	Runway 28R Approach	24.8	Trim/Remove
33533	GROUND	2550161.36	670065.61	4077.1	4055.9	Runway 28R Approach	21.2	Trim/Remove
33541	GROUND	2550150.44	670174.72	4070.7	4054.4	Runway 28R Approach	16.3	Trim/Remove
33549	GROUND	2550159.56	670295.26	4062.0	4053.4	Runway 28R Approach	8.6	Trim/Remove
33557	GROUND	2550252.29	670037.93	4077.3	4058.2	Runway 28R Approach	19.1	Trim/Remove
33565	GROUND	2550333.18	669816.34	4081.8	4062.4	Runway 28R Approach	19.4	Trim/Remove
33573	FENCE	2550743.77	669984.80	4081.4	4069.9	Runway 28R Approach	11.5	Trim/Remove
33581	FENCE	2549869.38	669798.01	4082.7	4052.2	Runway 28R Approach	30.5	Trim/Remove
33589	FENCE	2549737.25	669740.62	4082.3	4049.8	Runway 28R Approach	32.5	Trim/Remove
33597	FENCE	2550031.93	669864.36	4080.9	4055.1	Runway 28R Approach	25.8	Trim/Remove

NOTES:

1/ All coordinates reference the North American Datum 1983 (NAD83).
2/ All elevations reference the North American Vertical Datum 1988 (NAVD88).
3/ Obstacle data source: Quantum Spatial, Obstacle Data Collection and Planimetric Base Mapping, April 2017.

RICONDO

In Association With: POWER ENGINEERS

Boise Airport
BOISE AIR TERMINAL
GOWEN FIELD
BOISE, IDAHO

AIRPORT AIRSPACE PLAN
3 OF 3

FAA DISCLAIMER:

The contents do not necessarily reflect the official views or policy of the FAA. Acceptance of this plan 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 in accordance with appropriate public laws.

APPROVED BY:

Federal Aviation Administration Date

APPROVED BY AIRPORT SPONSOR:

Signature

Title

Date

REVISION HISTORY				
NO.	DATE	BY	DESCRIPTION	APPD
X	X	X	XXXXXX	

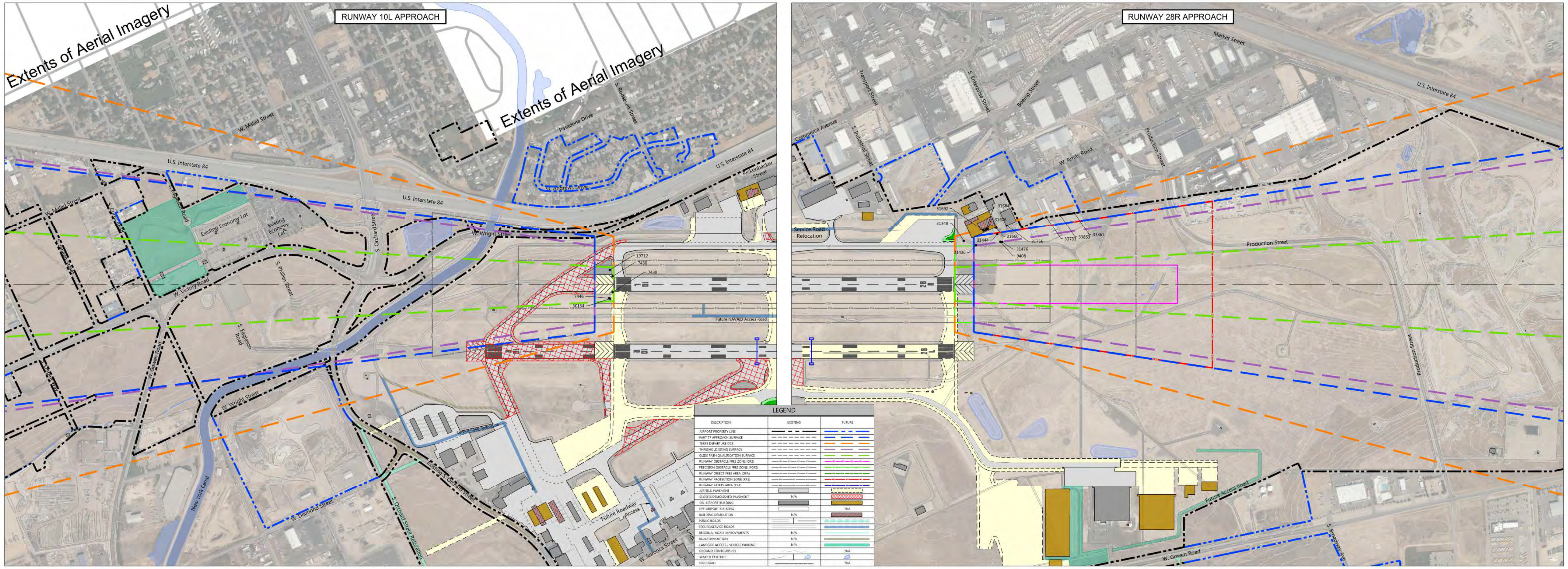
0 X
GRAPHICAL SCALE IN FEET

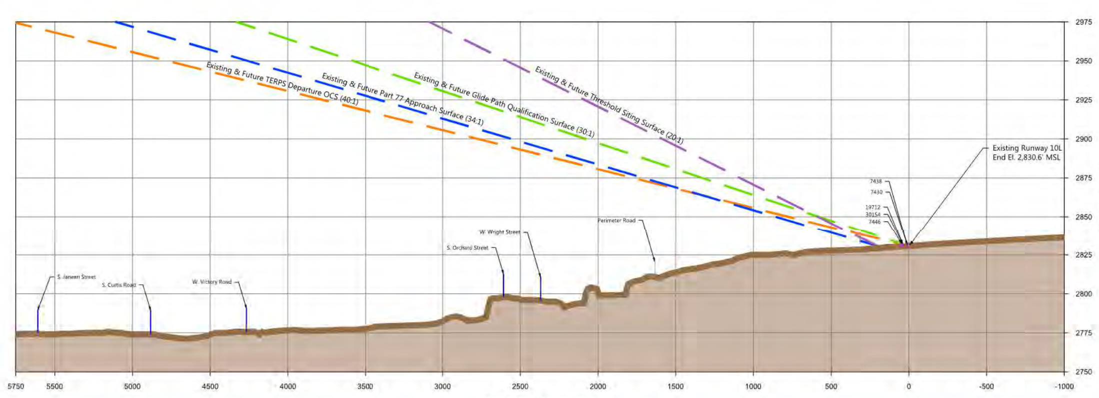
DRAWN BY: CJB

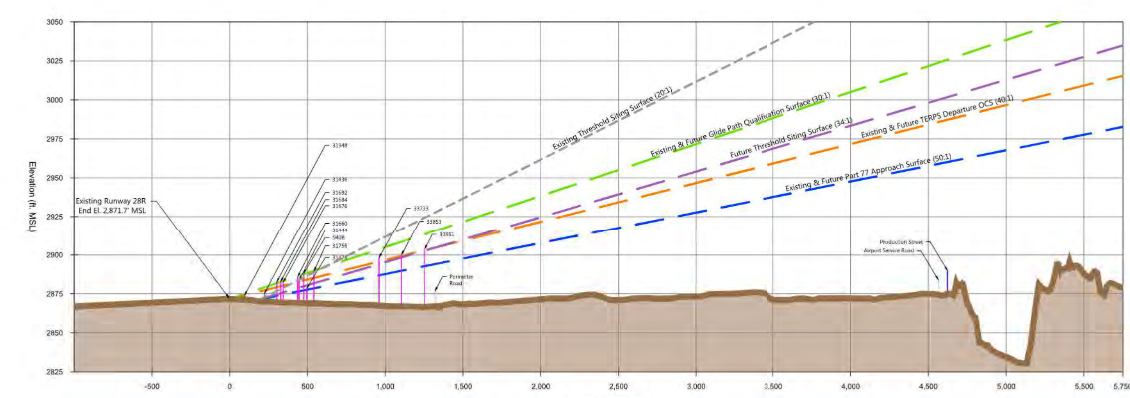
CHECKED BY: MDT

PREPARED BY:
Ricondo & Associates, Inc.

DATE: APRIL 2019







Obstructions Table

Point ID	Description	Easting	Northing	Object Elevation (MSL)	Surface Elevation (ft. MSL)	Surface Penetrated	Penetration (ft.)	Disposition of Obstruction
7446	FENCE	2495521.09	693971.09	2832.3	2831.8	Future Departure, GQS	0.5	Trim/Remove
30154	VERTICAL POINT	2495527.19	693965.91	2831.9	2831.6	Future Departure	0.3	Trim/Remove
19712	VERTICAL POINT	2495654.82	694235.22	2832.3	2831.6	Future Departure, GQS	0.6	Trim/Remove
7430	RUNWAY LIGHT	2495654.09	694163.67	2831.4	2830.9	Future Departure, GQS	0.5	Trim/Remove
7438	RUNWAY LIGHT	2495581.03	694010.28	2831.3	2830.9	Future Departure, GQS	0.4	Trim/Remove

Obstructions Table

Point ID	Description	Easting	Northing	Object Elevation (MSL)	Surface Elevation (ft. MSL)	Surface Penetrated	Penetration (ft.)	Disposition of Obstruction
31348	STREET SIGN	2504934.23	690151.69	2874.2	2874.1	Future Departure	0.1	Trim/Remove
31692	BUILDING	2505165.87	690157.88	2882.7	2879.3	Future Departure	3.5	Trim/Remove
31684	BUILDING	2505193.95	690156.89	2883.0	2879.9	Future Departure	3.1	Trim/Remove
31676	BUILDING	2505212.21	690157.26	2882.6	2880.3	Future Departure	2.3	Trim/Remove
31660	POLE	2505302.22	690130.87	2886.0	2882.6	Future Departure	3.3	Trim/Remove
31756	BUILDING	2505405.53	690105.12	2889.5	2885.2	Future Departure	4.2	Trim/Remove
33733	LIGHT POLE	2505822.85	690007.98	2898.2	2895.7	Future Departure	2.5	Trim/Remove
33853	LIGHT POLE	2505963.02	689964.16	2900.2	2899.3	Future Departure	0.8	Trim/Remove
33861	LIGHT POLE	2506107.71	689922.19	2903.9	2903.0	Future Departure	0.8	Trim/Remove
31436	STREET SIGN	2505028.08	690055.15	2875.1	2872.1	Future Part 77, TERPS	2.9	Trim/Remove
31444	BUILDING	2505280.63	690063.53	2883.9	2876.6	Future Part 77, Departure	7.3	Trim/Remove
9408	WINDSOCK	2505272.53	689977.72	2888.2	2877.2	Future Part 77, Departure, TERPS	11.0	Trim/Remove
31476	FENCE	2505289.76	689968.81	2878.5	2877.6	Future Part 77	0.9	Trim/Remove

NOTES:

1/ Source: Quantum Spatial, Obstacle data Collection and Planimetric Base Mapping, April 2017.

RICONDO

In Association With: POWER ENGINEERS

Boise Airport
BOISE AIR TERMINAL
GOWEN FIELD
BOISE, IDAHO

INNER PORTION OF RUNWAY 10L-28R APPROACH/DEPARTURE SURFACES

FAA DISCLAIMER:

The contents do not necessarily reflect the official views or policy of the FAA. Acceptance of this plan 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 in accordance with appropriate public laws.

APPROVED BY:

Federal Aviation Administration   Date

APPROVED BY AIRPORT SPONSOR:

Signature

Title

Date

REVISION HISTORY

NO.	DATE	BY	DESCRIPTION	APPD
X	X	X	XXXXXX	

Magnetic Declination 13° 20' E 0° 7' W/Year February 2018

0 400 GRAPHICAL SCALE IN FEET

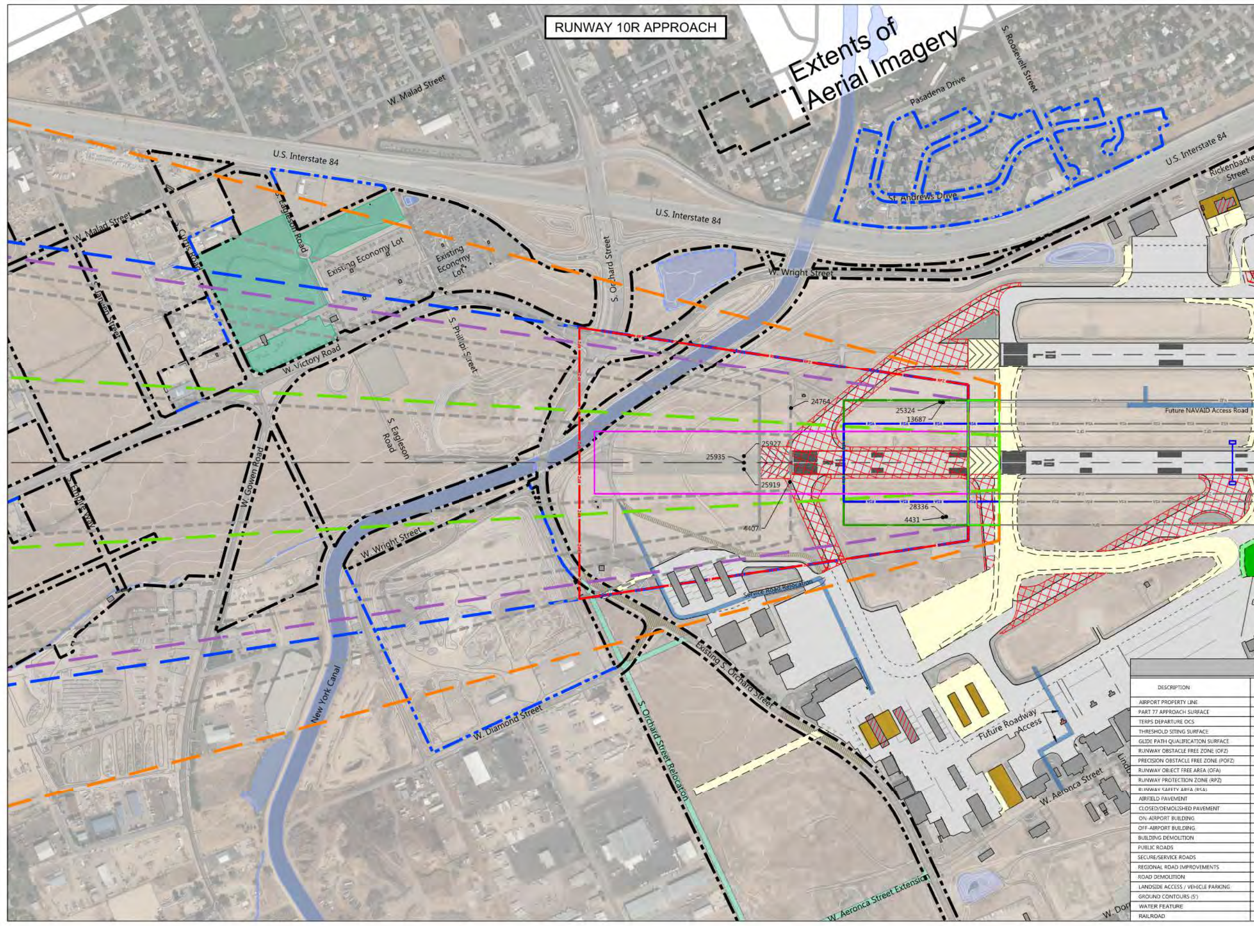
DRAWN BY: CJB

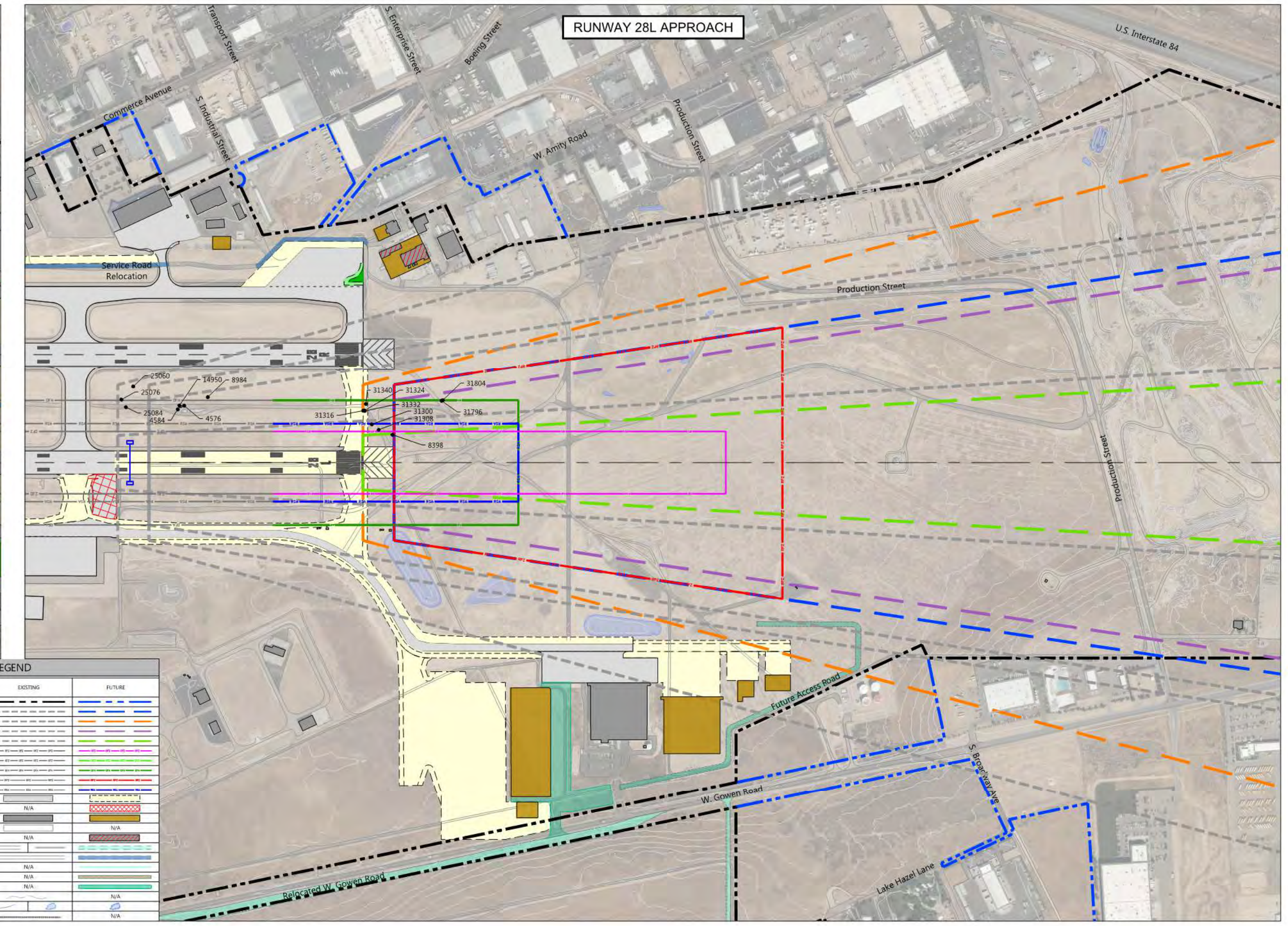
CHECKED BY: MDT

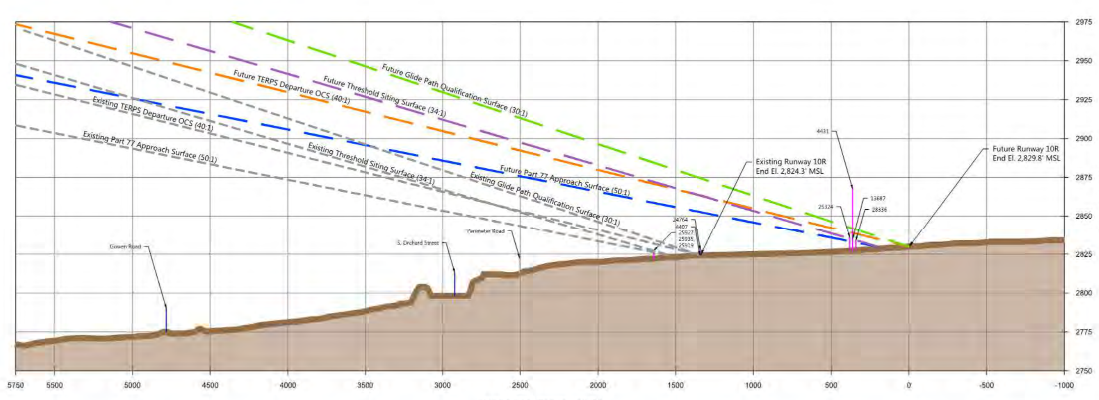
PREPARED BY: Ricondo & Associates, Inc.

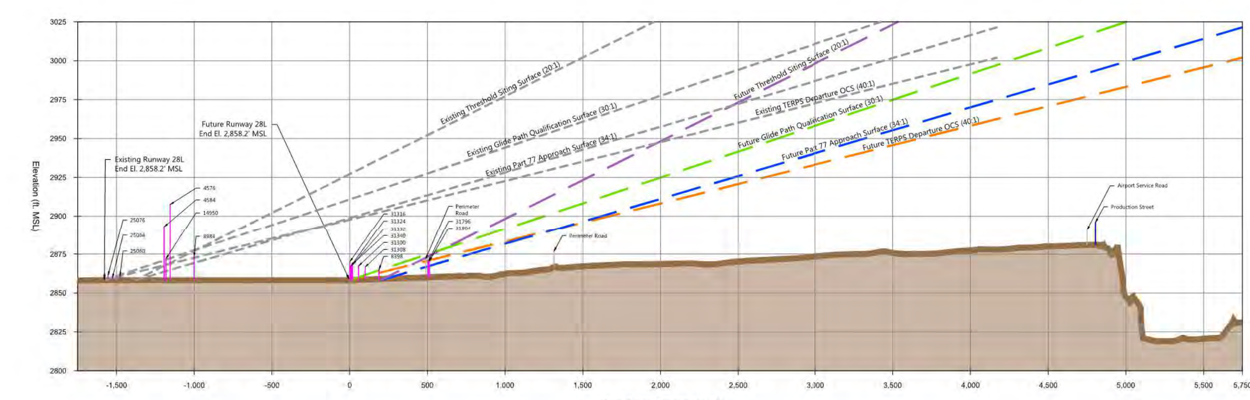
DATE: APRIL 2019

SHEET 11 OF 14









Obstructions Table

Point ID	Description	Easting	Northing	Object Elevation (MSL)	Surface Elevation (ft. MSL)	Surface Penetrated	Penetration (ft.)	Disposition of Obstruction
4407	RUNWAY LIGHT	2494055.95	693916.29	2824.4	2824.4	Existing Part 77	0.1	Trim/Remove
25927	NAVAID	2493860.97	694193.58	2827.3	2827.2	Existing TERPS Approach	0.1	Trim/Remove
25935	NAVAID	2493843.31	694156.33	2827.5	2827.2	Existing TERPS Approach	0.3	Trim/Remove
25919	NAVAID	2493825.78	694119.32	2827.3	2827.2	Existing TERPS Approach	0.1	Trim/Remove
24764	POST	2494263.10	694343.54	2827.8	2824.4	Existing Departure, Part 77, TSS	3.4	Trim/Remove
25324	VERTICAL POINT	2495146.64	693962.13	2835.9	2833.4	Future Part 77, TERPS, TSS	2.5	Trim/Remove
4431	ANTENNA	2494846.87	693290.05	2867.6	2833.0	Future Part 77, TERPS, TSS, Departure	34.6	Trim/Remove
13687	VERTICAL POINT	2495166.23	693958.06	2834.9	2833.0	Future Part 77, TERPS, TSS	1.9	Trim/Remove
28336	BUILDING	2494868.58	693284.81	2833.8	2832.6	Future Part 77	1.2	Trim/Remove

Obstructions Table

Point ID	Description	Easting	Northing	Object Elevation (MSL)	Surface Elevation (ft. MSL)	Surface Penetrated	Penetration (ft.)	Disposition of Obstruction
25076	DIRT PILE	2503122.21	690184.61	2861.4	2858.8	Existing Departure, Part 77	2.6	Trim/Remove
25084	GROUND	2503126.75	690128.31	2859.8	2859.5	Existing Departure, Part 77	0.3	Trim/Remove
25060	GROUND	2503226.92	690226.57	2860.9	2860.7	Existing Departure	0.2	Trim/Remove
4584	AWOS	2503420.14	689972.07	2893.1	2867.8	Existing Departure, Part 77, TSS	25.3	Trim/Remove
14950	BUILDING	2503442.39	689990.10	2872.0	2868.1	Existing Departure, Part 77	3.9	Trim/Remove
4576	ANTENNA	2503465.54	689977.51	2907.5	2868.8	Existing Departure, Part 77, TSS	38.8	Trim/Remove
8984	WINDSOCK	2503629.28	689960.47	2873.5	2872.6	Existing Departure	0.9	Trim/Remove
31316	STREET SIGN	2504496.46	689451.48	2870.0	2844.1	Future Departure	25.9	Trim/Remove
31324	ELECTRIC BOX	2504501.84	689449.55	2867.2	2844.2	Future Departure	23.0	Trim/Remove
31332	ELECTRIC BOX	2504505.38	689447.71	2867.4	2844.3	Future Departure	23.2	Trim/Remove
31340	STREET SIGN	2504529.22	689482.10	2868.5	2844.4	Future Departure	24.1	Trim/Remove
31300	STREET SIGN	2504509.24	689348.58	2867.3	2845.5	Future Departure	21.8	Trim/Remove
31308	STREET SIGN	2504532.25	689297.57	2866.7	2846.6	Future Departure	20.1	Trim/Remove
8398	GROUND	2504599.49	689231.57	2864.9	2849.0	Future Departure, GQS	16.0	Trim/Remove
31796	STREET SIGN	2504980.59	689291.83	2870.5	2857.4	Future Departure, Part 77	13.1	Trim/Remove
31804	STREET SIGN	2504985.39	689290.63	2870.5	2857.5	Future Departure, Part 77	13.0	Trim/Remove

NOTES:

1/ Source: Quantum Spatial, Obstacle data Collection and Planimetric Base Mapping, April 2017.

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Boise Airport
BOISE AIR TERMINAL
GOWEN FIELD
BOISE, IDAHO

INNER PORTION OF RUNWAY 10R-28L APPROACH/DEPARTURE SURFACES

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APPROVED BY:

Federal Aviation Administration Date

APPROVED BY AIRPORT SPONSOR:

Signature

Title

Date

REVISION HISTORY

NO.	DATE	BY	DESCRIPTION	APPD
X	X	X	XXXXXX	

Magnetic Declination 13° 20' E 0° 7' W/Year February 2018

0 400 GRAPHICAL SCALE IN FEET

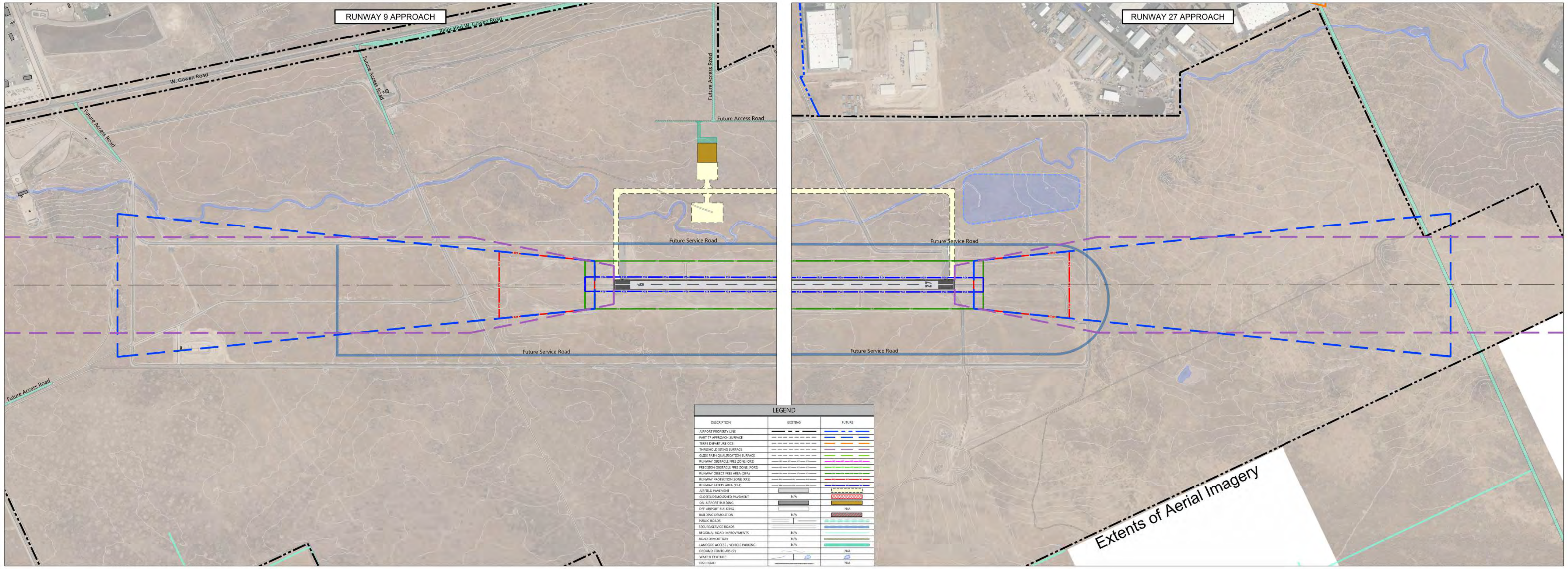
DRAWN BY: CJB

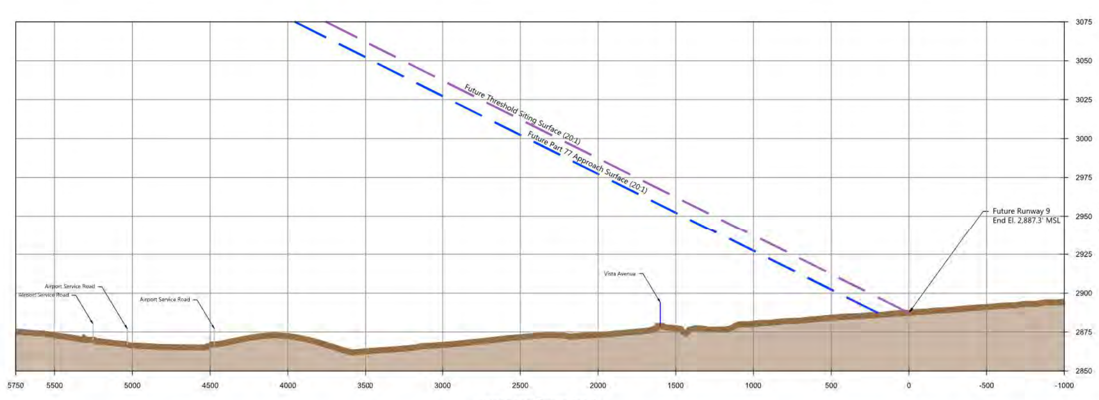
CHECKED BY: MDT

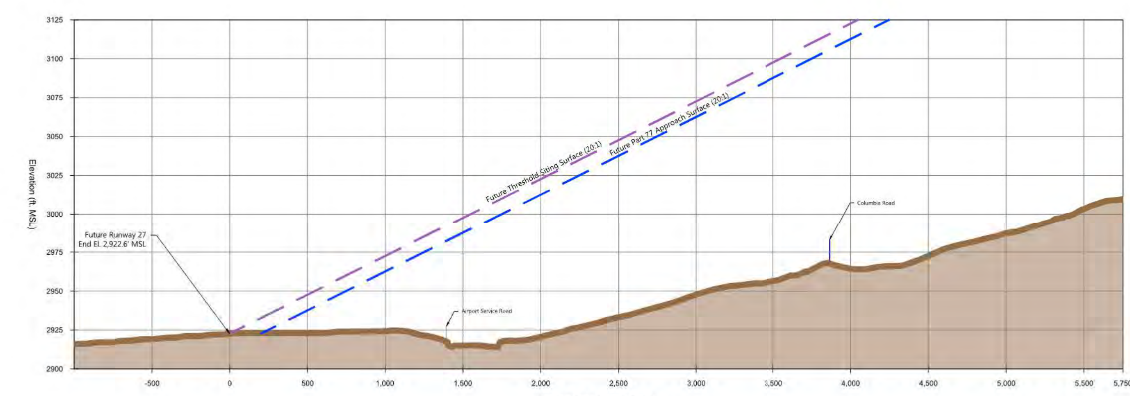
PREPARED BY: Ricondo & Associates, Inc.

DATE: APRIL 2019

SHEET 12 OF 14







Obstructions Table

Point ID	Description	Easting	Northing	Object Elevation (MSL)	Surface Elevation (ft. MSL)	Surface Penetrated	Penetration (ft.)	Disposition of Obstruction
No Anticipated Penetrations to Airspace Surfaces								

Obstructions Table

Point ID	Description	Easting	Northing	Object Elevation (MSL)	Surface Elevation (ft. MSL)	Surface Penetrated	Penetration (ft.)	Disposition of Obstruction
No Anticipated Penetrations to Airspace Surfaces								

NOTES:

1/ Source: Quantum Spatial, Obstacle data Collection and Planimetric Base Mapping, April 2017.

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GOWEN FIELD
BOISE, IDAHO

INNER PORTION OF RUNWAY 9-27 APPROACH/DEPARTURE SURFACES

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Date

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NO.	DATE	BY	DESCRIPTION	APPD
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Magnetic Declination 13° 20' E 0° 7' W/Year February 2018

True N. Mag. N.

0 400 GRAPHICAL SCALE IN FEET

DRAWN BY: CJB

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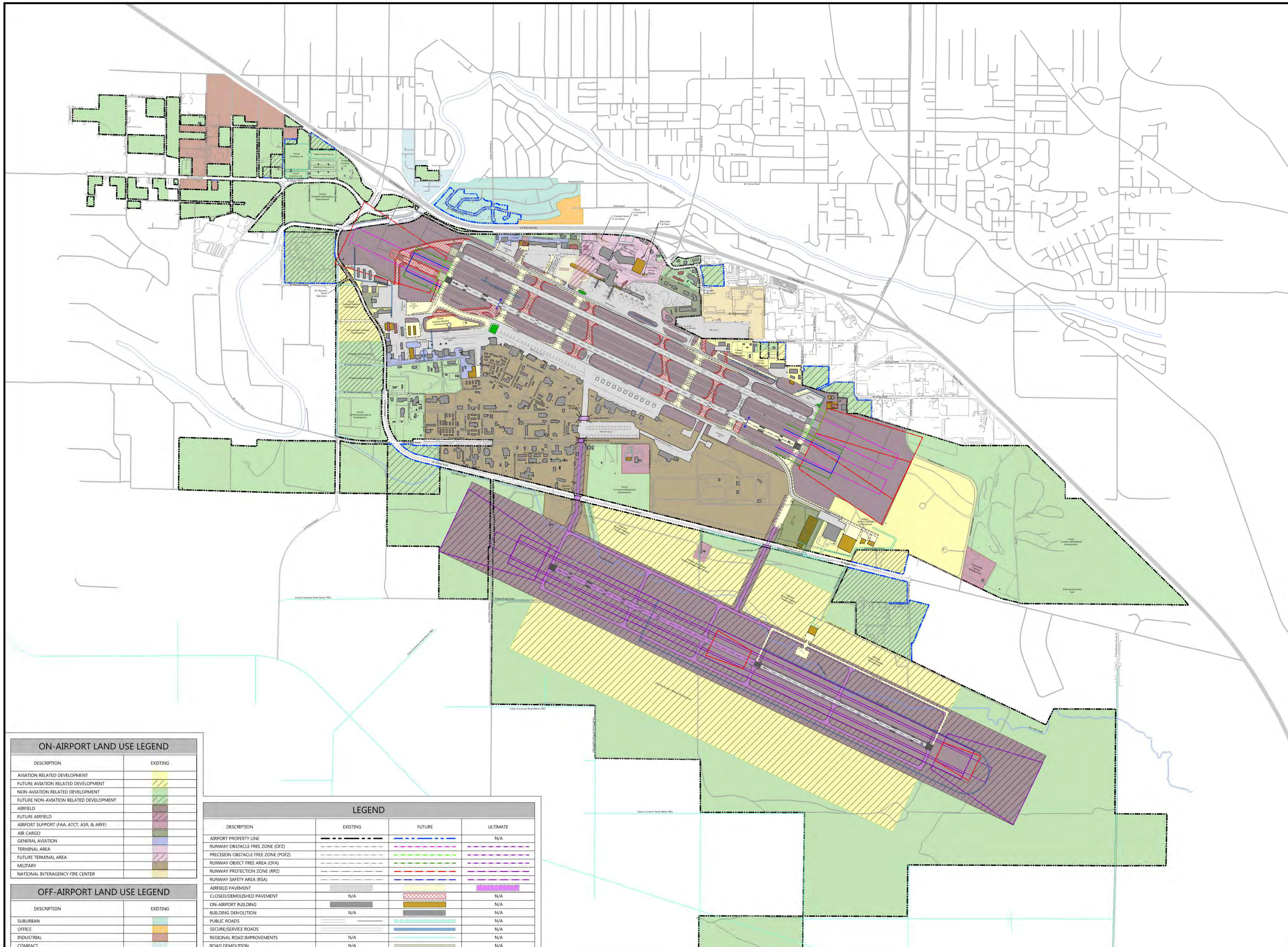
PREPARED BY: Ricondo & Associates, Inc.

DATE: APRIL 2019

SHEET 13 OF 14



ON-AIRPORT LAND USE LEGEND

DESCRIPTION	EXISTING
AVIATION RELATED DEVELOPMENT	
FUTURE AVIATION RELATED DEVELOPMENT	
NON-AVIATION RELATED DEVELOPMENT	
FUTURE NON-AVIATION RELATED DEVELOPMENT	
AIRFIELD	
FUTURE AIRFIELD	
AIRPORT SUPPORT (FAA, ATCT, ASR, & ARFF)	
AIR CARGO	
GENERAL AVIATION	
TERMINAL AREA	
FUTURE TERMINAL AREA	
MILITARY	
NATIONAL INTERAGENCY FIRE CENTER	

OFF-AIRPORT LAND USE LEGEND

DESCRIPTION	EXISTING
SUBURBAN	
OFFICE	
INDUSTRIAL	
COMPACT	

LEGEND

DESCRIPTION	EXISTING	FUTURE	ULTIMATE
AIRPORT PROPERTY LINE			N/A
RUNWAY OBSTACLE FREE ZONE (OFZ)			
PRECISION OBSTACLE FREE ZONE (POFZ)			
RUNWAY OBJECT FREE AREA (OFA)			
RUNWAY PROTECTION ZONE (RPZ)			
RUNWAY SAFETY AREA (RSA)			
AIRFIELD PAVEMENT			
CLOSED/DEMOLISHED PAVEMENT	N/A		N/A
ON-AIRPORT BUILDING			N/A
BUILDING DEMOLITION	N/A		N/A
PUBLIC ROADS			N/A
SECURE/SERVICE ROADS			N/A
REGIONAL ROAD IMPROVEMENTS	N/A		N/A
ROAD DEMOLITION	N/A		N/A

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BOISE AIR TERMINAL
GOWEN FIELD
BOISE, IDAHO

ON-AIRPORT LAND USE PLAN

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APPROVED BY:

Federal Aviation Administration Date

APPROVED BY AIRPORT SPONSOR:

Signature

Title

Date

REVISION HISTORY

NO.	DATE	BY	DESCRIPTION	APPD
X	X	X	XXXXXX	

Magnetic Declination 13° 20' E 0° 7' W/Year February 2018

0 800
GRAPHICAL SCALE IN FEET

DRAWN BY: CJB

CHECKED BY: MDT

PREPARED BY:
Ricondo & Associates, Inc.

DATE: APRIL 2019

SHEET 14 OF 14

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APPENDIX A

Stakeholder and Public Engagement Program

APPENDIX A STAKEHOLDER/PUBLIC ENGAGEMENT

As a strategic vision process, the MPU is structured to be responsive to Airport needs while being inclusive of broader community considerations. Airport staff understands the importance of stakeholder and public involvement in the MPU process and sought to develop a comprehensive stakeholder and public engagement program as one of the first tasks of the MPU. The stakeholder and public engagement program (the Program) was targeted to engage key Airport stakeholders (elected officials, community leaders, users, constituents, tenants, agencies, and related parties), to address comments, and actively encourage public participation. Development of the Program was a collaborative effort between the consultant team and Airport staff and was implemented and refined at appropriate points in the planning process to address specific MPU action and expectations.

Airport staff strives to continue to foster a positive relationship with the community. The Program was designed to generate productive conversations and strengthen the foundation for future Airport development and community engagement.

A.1 STAKEHOLDER AND PUBLIC ENGAGEMENT PROGRAM GOALS

Information sharing was at the heart of the public process. In accordance with FAA guidance, the project team strived to be sensitive to the interests and values of stakeholders, and to maintaining a positive and receptive attitude when meeting with the public and interested parties. For effective communication, the same planners who worked with stakeholders and engaged with the public were involved in the master planning activities.

The primary goal of the Program was to inform and build support for the MPU recommendations and facilitate input from stakeholders. A second goal was to reinforce and incorporate the City's LIV initiative and culture into MPU messaging and outreach efforts. Additional goals of the Program included the following:

- **Conduct a thorough and well-documented process:** The Airport is committed to providing members of the public opportunities for input on actions that could affect their lives through the MPU process. The project team used the public involvement process to recognize and communicate the needs and interests of participants, including decision-makers, to make sustainable decisions. The PIP was structured to solicit the participation of potentially affected stakeholders using a variety of tools to reach a wide audience.

  The focus was to engage stakeholders and the public during phases where their input is most relevant. This period covered the inventory and facility requirements phases, during which the MPU's goals and objectives were identified and needs described; and the alternatives development phases during which alternative concepts were developed and evaluated, and preferred concepts selected.
- **Close the feedback loop:** The team was committed to an open and active stakeholder/public involvement program. Public comments were considered, and whenever possible, responded to in a timely fashion. Comments received from the public/stakeholders were used to help inform the planning process.
- **Applicable guidelines:** The FAA regulates public use airports and their activity in the United States. Hence, in addition to promoting long-term fiscal sustainability for the Airport, the MPU was prepared to meet FAA master plan guidance.
- **Master Plan's influence on military activity:** The team understood and appreciated that adjacent neighbors have strong opinions about military aviation activity and impacts. Early and ongoing effort and information was communicated to concerned citizens to understand that those decisions are made by the U.S. military and not

the Airport. Communication was transparent about the benefits to the area as a result of mission, and the importance of these benefits to the Boise area and the Airport.

A.2 STAKEHOLDER AND PUBLIC ENGAGEMENT PROGRAM ELEMENTS

The Program consisted primarily of three elements to engage Airport stakeholders and the public including formation and engagement of a Technical Advisory Committee (TAC), creation of a Public Involvement Program (PIP), and a project website. These elements are described in the following sections.

A.2.1 TECHNICAL ADVISORY COMMITTEE

The TAC was created to consist of primarily on-Airport constituents offering technical and operational perspectives to the MPU and provide input on the MPU's approach to facility development. The TAC served in an advisory capacity to review MPU recommendations and guide MPU development. Airport staff assembled the TAC, with consultant input on composition, role, and responsibility of the TAC.

Final composition of the TAC included representatives from each FBOs a local GA user/tenant, the City, Ada County, the ATCT, FAA Helena Airports District Office, US Customs, two airlines, TSA, IDNG, cargo carriers (UPS and FedEx), two concessions operators, two rental car agencies, Idaho State Aeronautics, and a City Council representative. Participating guidelines/expectations for TAC members included the following:

- Be present and participate
- Attend four meetings (two hours on weekdays)
- Review materials and be prepared to discuss
- Represent interests beyond your own, such as including peers, partners, and industry
- Be respectful and open to differing opinions from fellow TAC members

Four TAC meetings were held throughout the MPU process at the Airport conference center located on Level 3 of the passenger terminal building. The content of each TAC meeting is summarized below:

- **TAC #1:** The first TAC meeting was held December 14, 2016. The meeting began with introductions of Airport and consultant staff, as well as the TAC members. TAC participation guidelines were discussed, along with an overview of the MPU purpose, process, and schedule. Technical elements of the meeting included a review of the purpose and approach for identifying existing conditions, as well as a discussion of the methodologies and results of the aviation activity forecast.
- **TAC #2:** The second TAC meeting was held June 1, 2017, with the purpose of reviewing the revised aviation activity forecast and discussing facility requirements.
  - In response to comments received during the first TAC meeting, COMPASS data was reviewed and considered for purposes of refining the enplaned passenger forecast. Discussions centered around additions made to the forecast since the first TAC meeting, including the development of high and low forecast scenarios, along with design day flight schedules. TAC members were informed that the forecast had been submitted to FAA for approval.
  - The facility requirements analysis was reviewed and discussed with the TAC. Requirements had been developed for major function areas including airfield, terminal, ground access, GA, cargo, and other/support. Potential development areas for the subsequent concepts development task were discussed.

- **TAC #3:** The third TAC meeting was held October 24, 2017. The primary purpose of this meeting was to discuss the alternative development concepts that had been prepared subsequent to the previous TAC meeting. The TAC meeting included four distinct sessions conducted in a workshop format to review and discuss terminal, landside, GA/support, and airfield development concepts. In each session, TAC members were invited to mark up hardcopy layout drawings of prepared concepts, or to contribute additional concept ideas.
- **TAC #4:** The final TAC meeting was held May 1, 2018. The purpose of this meeting was to present and discuss preferred development concepts for terminal, landside, airfield, and GA/support functional areas. Discussion of each functional area included a review of development considerations, as well as criteria that were used to evaluate each of the development concepts. Implementation considerations discussed at the meeting included aviation activity forecasts, financial considerations, and environmental considerations. A conceptual implementation plan was discussed which grouped preferred development concepts into short-, medium-, and long-term timeframes.

A.2.2 PUBLIC INVOLVEMENT PROGRAM

The public involvement process was used to inform, educate, and solicit feedback from the public regarding the MPU process, findings, and conclusions. The consultant team and Airport staff coordinated to develop the PIP and strategy for the MPU's public involvement methods and outreach events. The PIP defined roles and responsibilities, developed key messages, addressed media and social media outreach, explained how input was to be gathered and how information was to be disseminated, and developed a schedule for meetings and events.

A key element of the PIP was to incorporate public open house meetings to provide information to the public on the MPU process and progress, and to solicit and capture public comment and perspective to guide and support MPU decisions. Public meetings were held in an open house format with stations and display boards representing MPU elements. All information presented at the public open houses was made available online through the project website (see Section A.2.3).

A total of four open houses were conducted during the MPU process. All public open houses were held at the Airport in the conference center located on Level 3 of the passenger terminal building. At each open house, key Airport staff and members of the MPU consultant team were available to present materials and answer questions. The content of each open house is summarized below:

- **Open House #1:** The first open house was held on November 16, 2016. This event featured a presentation given by the Airport Director to effectively kick off the MPU public engagement process. Topics covered included the purpose of the MPU, an overview of the Airport, a summary of the Airport's economic impact on the surrounding area, key elements of the MPU, the public outreach plan, a preliminary schedule for the MPU, and an introduction to the project website. A handout was also available to provide an overview of the MPU process.
- **Open House #2:** The second open house was held on December 12, 2016, the same day as the first TAC meeting. Key topics covered at this event included the purpose and process of the MPU, the Airport's economic impact, formation of the TAC, presentation of the overall layout and major facilities at the Airport, the collection and use of information for developing an inventory of existing conditions at the Airport, and the development and results of the initial aviation activity forecasts for the MPU.
- **Open House #3:** The third open house was held October 24, 2017 and was focused on the presentation of alternative development concepts. Concepts were organized into categories including terminal concepts, landside concepts, GA/support concepts, and airfield concepts. Each concepts category was presented at its own station. An update on the MPU schedule was also presented.

- **Open House #4:** The final open house was held on May 1, 2018 with the primary purpose of presenting the preferred Airport development concepts for public comment. Preferred concepts were shown for terminal development, landside development, airfield development, and GA/support development. A draft implementation plan was also presented, indicating the approximate timeframe for project implementation.

A.2.3 PROJECT WEBSITE

As an important part of the Program, a project website was created and hosted by the City. The purpose of the website was to provide summary information regarding the MPU process, present information displayed during public open houses, and to advertise upcoming open houses and other opportunities for public participation. The website also included the ability for the public to submit MPU-related comments to Airport staff, which were collected and distributed among the MPU team, as appropriate.

A.2.4 OTHER STAKEHOLDER ENAGEMENT OPPORTUNITIES

Additional opportunities to engage stakeholders in the MPU process evolved during the process and included the following:

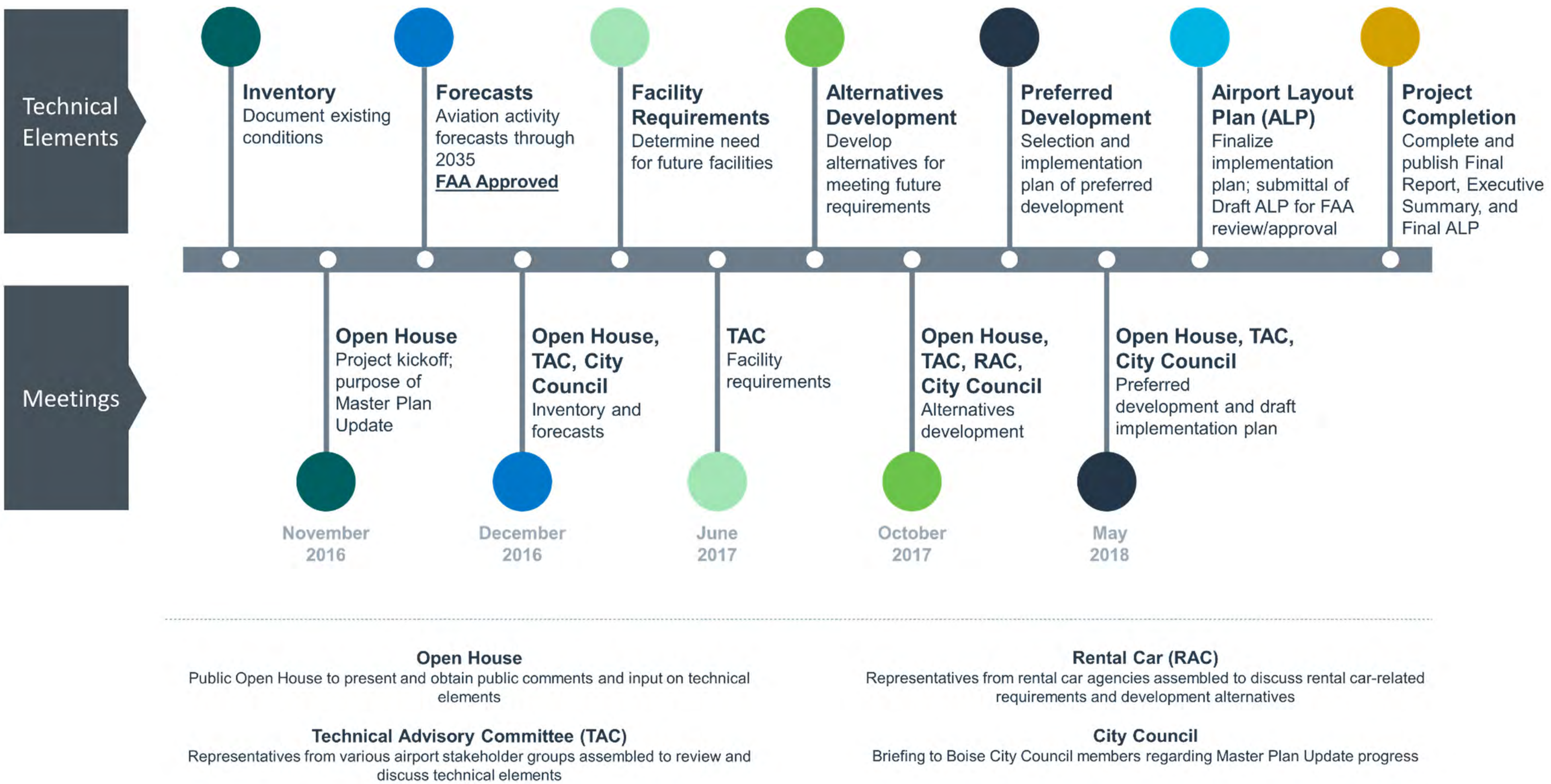
- **City Council briefings:** Two City Council briefings were conducted during the MPU process. Each briefing took place during a regular meeting the City Council and was attended by the Airport Director and a member of the MPU consultant team.
  - The first City Council briefing took place on December 14, 2016 as an introduction to the MPU process, a description of the process undertaken for identifying existing conditions, and a presentation of the draft aviation activity forecast.
  - The second City Council briefing took place on October 24, 2017 and included a review of the aviation activity forecast, facility requirements, and presentation of terminal, landside, airfield, and GA/support development concepts.
- **Airport Commission briefing:** On June 1, 2017, a member of the MPU consultant team briefed a regular meeting of the Airport Commission on the status of the MPU. Topics included a review of the MPU schedule, a description of the stakeholder engagement program, a review of the aviation activity forecast, and a summary of facility requirements for major functional areas of the Airport.
- **Rental car stakeholder meeting:** On October 24, 2017, a rental car stakeholder meeting was held to discuss rental car facility requirements and draft development concepts related to rental car and related landside facilities. The meeting was attended by representatives from rental car companies that operate at the Airport and included discussion of the specific methodologies used to determine rental car requirements, including a review of responses from an industry questionnaire previously sent to each company. The resulting discussion led to a refinement of the requirements analysis and the addition of a new rental car development concept.
- **Safety Risk Management Panel (SRMP):** On June 25, 2018, the Airport hosted a SRMP in accordance with the processes outlined by the FAA's Airports division and in compliance with FAA Order 5200.11. Panelists included representatives from FAA local and regional offices, the Airline Pilots Association, Idaho Transportation Department, and Airport staff. This meeting included a discussion of the preferred development concepts for each functional area with a focus on potential risks involved in implementing or operating the concept. The SRMP was conducted by an independent facilitator and followed the FAA's 5-step process, including defining the system, identifying the hazards, analyzing the risk (including associated consequences and existing controls), assessing the risk, and mitigating the risk.

Eight potential hazards were identified during the SRMP. Panelists determined that five hazards resulted in a risk level assessed as "Low." Based on the panel's discussion, a revised airfield configuration was developed subsequent to the SRMP. The SRMP process was documented in a report published in July 2018.[1]

Exhibit A-1 depicts a summary timeline of the stakeholder and public engagement program in relation to technical elements of the MPU.

[1] RS&H, *Boise Airport Master Plan Update Airport Layout Plan Safety Assessment Documentation,* July 2018.

EXHIBIT A-1 STAKEHOLDER AND PUBLIC ENGAGEMENT PROGRAM TIMELINE



SOURCE: Ricondo & Associates, Inc., May 2018.

APPENDIX B

Terminal Planning Assumptions

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Terminal Planning Assumptions

April 2017

Planning Assumptions

Planning parameters are the assumed passenger and facility characteristics used to analyze functional areas.

The following outlines methodologies, passenger attributes, and operating parameters used to develop functional area and overall facility requirements.

Methodologies

NBEG Count

Passenger Attributes

Process

Airline

Department of Homeland Security

Commercial Program

Airport & Other Facilities

Methodologies – Level of Service

ADRM 10TH EDITION	ARDM 9TH EDITION	FLOWS	DELAYS	COMFORT
Over Design	A - Excellent	Free	None	Excellent
Over Design	B - High	Stable	Very Few	High
Optimum	C - Good	Stable	Acceptable	Good
Suboptimum	D - Adequate	Unstable	Passable	Adequate
Suboptimum	E - Inadequate	Unstable	Unacceptable	Inadequate
Under-Provided	F - Failure	System Breakdown	System Breakdown	Unacceptable

Optimum: Acceptable level of service; conditions of adequate to above-average space and reasonable to very few delays; good level of comfort.

Suboptimum/Under-Provided: Unsatisfactory level of service; conditions that provide crowded and uncomfortable spaces and present unacceptable processing and wait times; inadequate level of comfort.

Overdesign: Poor level of service; conditions of either excessive or empty space and over provision of resources; immoderate or unacceptable level of comfort.

Source: International Air Transport Association, *Airport Development Reference Manual, 10th Edition*, Effective March 2014; International Air Transport Association, *Airport Development Reference Manual, 9th edition*. Effective January 2004.; : John J. Fruin, *Pedestrian Planning and Design*, 1971 (Images).

Methodologies

NBEG Count

Passenger Attributes

Process

Airline

Department of Homeland Security

Commercial Program

Airport & Other Facilities

Narrow Body Equivalent Gate Count

A normalized metric for anticipating certain terminal facility needs based on gate apron utilization.

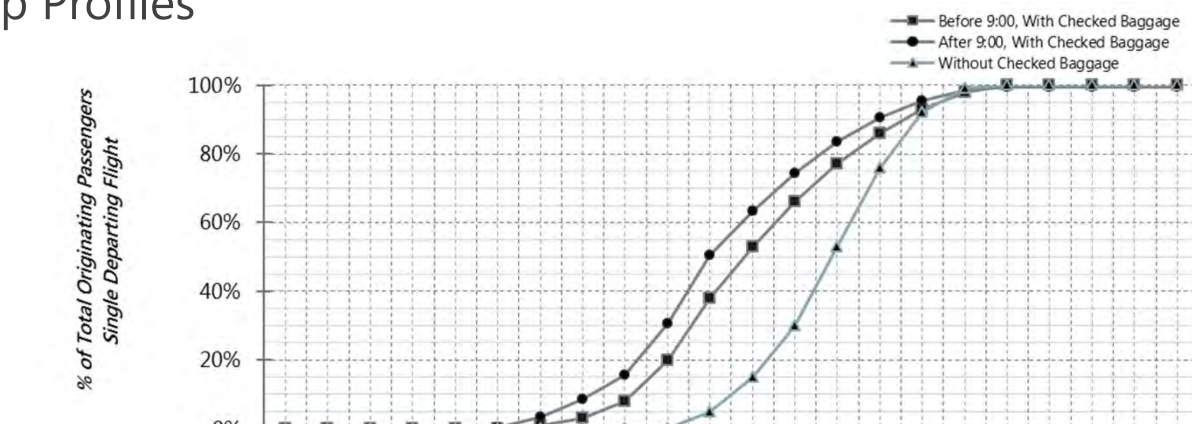
BASELINE 2015

Design Group	Class and Aircraft	Index	Concourse C	Concourse B	
II	Medium Regional	0.7	-	1.0	
IIIa	Large Regional	0.8	5.0	2.0	
IIIb	Narrowbody	1.0	-	8.0	
	Total Gates		**5.0**	**11.0**	
	Total NBEGs		**4.0**	**10.3**	**14.3**

SOURCE: BOI Airport, *Aircraft Parking By Gate and Aircraft Type*, received March 28, 2017 (NBEG Count); Airport Cooperative Research Program, *Report 25: Air Passenger Terminal Planning and Design*, Volume 1: Guidebook, 2010 (NBEG Index).

Passenger Attributes

Show-up Profiles



	210	200	190	180	170	160	150	140	130	120	110	100	90	80	70	60	50	40	30	20	10	0
Before 9:00, With Checked Baggage	0%	0%	0%	0%	0%	0%	1%	3%	8%	20%	38%	53%	66%	77%	86%	93%	98%	100%	100%	100%	100%	100%
After 9:00, With Checked Baggage	0%	0%	0%	0%	0%	1%	4%	9%	16%	31%	51%	64%	75%	84%	91%	96%	99%	100%	100%	100%	100%	100%
Without Checked Baggage	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	5%	15%	30%	53%	76%	92%	99%	100%	100%	100%	100%	100%

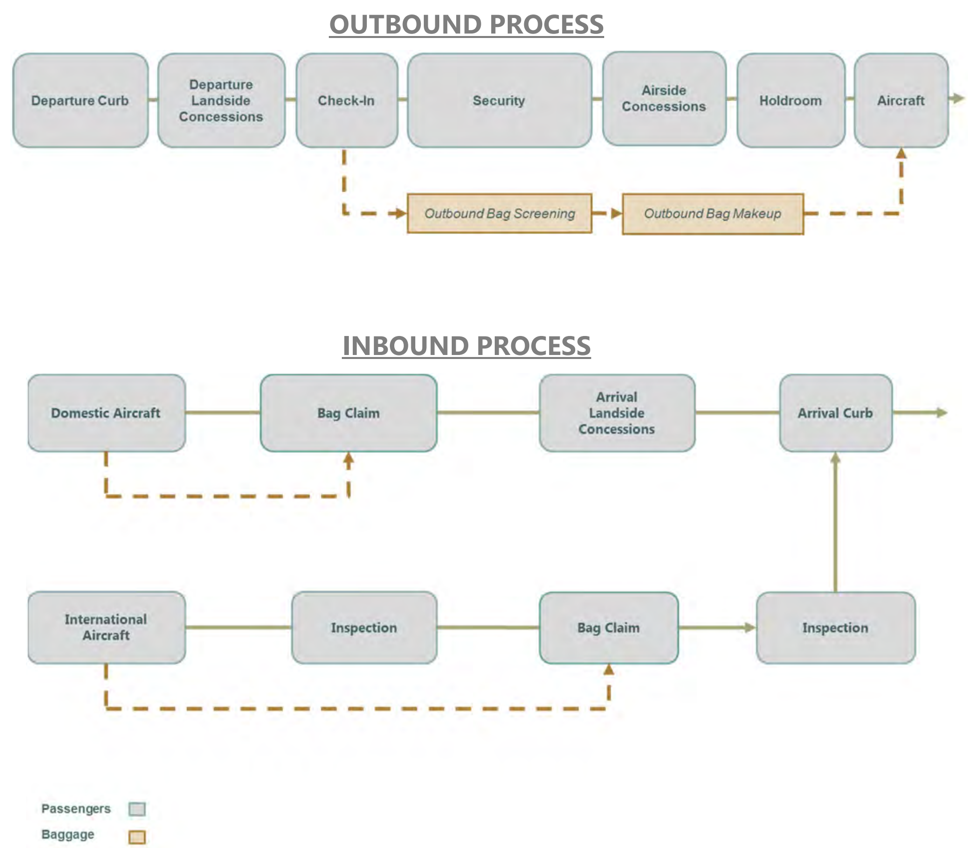
Checked Baggage

	UNITS	
Percentage of Passengers Not Checking Bags	percent	60
Percentage of Passengers Checking Bags	percent	40
Overall Average Bags per Passenger	ratio	0.51
Average Bags per Passenger Checking a Bag	ratio	1.28

SOURCE: Benchmarked from comparable airports, Ricondo & Associates, Inc., April 2017.

Methodologies
NBEG Count
Passenger Attributes
Process
Airline
Department of Homeland Security
Commercial Program
Airport & Other Facilities

Operating Parameters – Process

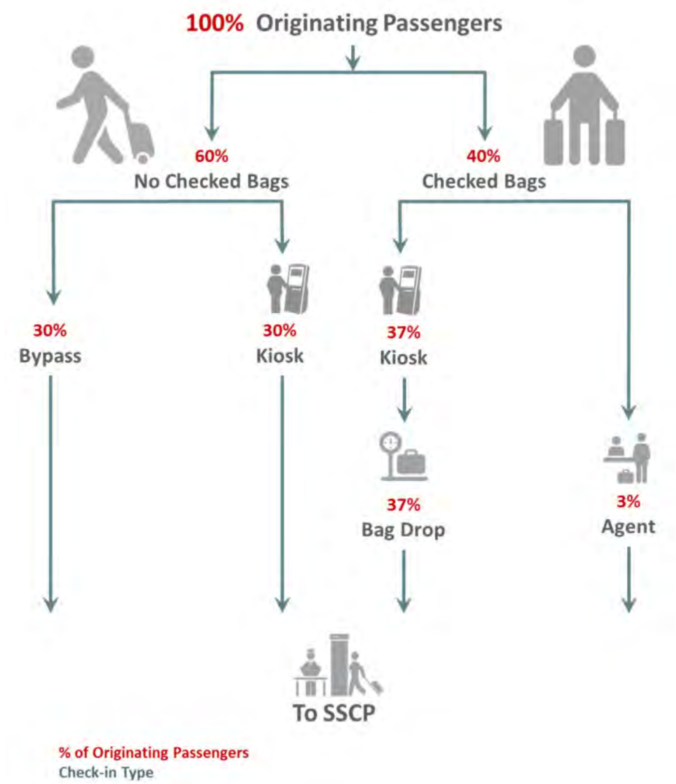


SOURCE: Ricondo & Associates, Inc., April 2017.

CONFIDENTIAL – DRAFT FOR DISCUSSION, SUBJECT TO CHANGE

Operating Parameters – Airline

Check-in Channels



SOURCE: Benchmarked from comparable airports, Ricondo & Associates, Inc., April 2017.

Check-in Type	Percentage	Wait time	Average Transaction Time
No Checked Bags			
Bypass	30%	n/a	n/a
Kiosk	30%	4 minutes	1.5 minutes
Checked Bags			
Kiosk	37%	4 minutes	2 minutes
Bag Drop	37%	4 minutes	1 minutes
Agent	3%	10 minutes	3.5 minutes

Bypass (Internet/Mobile Device) Check-in: Passengers who do not check bags may check in remotely, prior to showing up at the terminal, and consequently do not need to use terminal check-in facilities.

Kiosks: passengers acquiring boarding passes and/or printing baggage tags use stand-alone kiosks located in front of in-line positions or located remotely from the check-in counter.

Bag Drop Positions: Airline staff tag and accept bags from passengers who checked in at a remote kiosk for two-step check-in process or at an inline kiosk position.

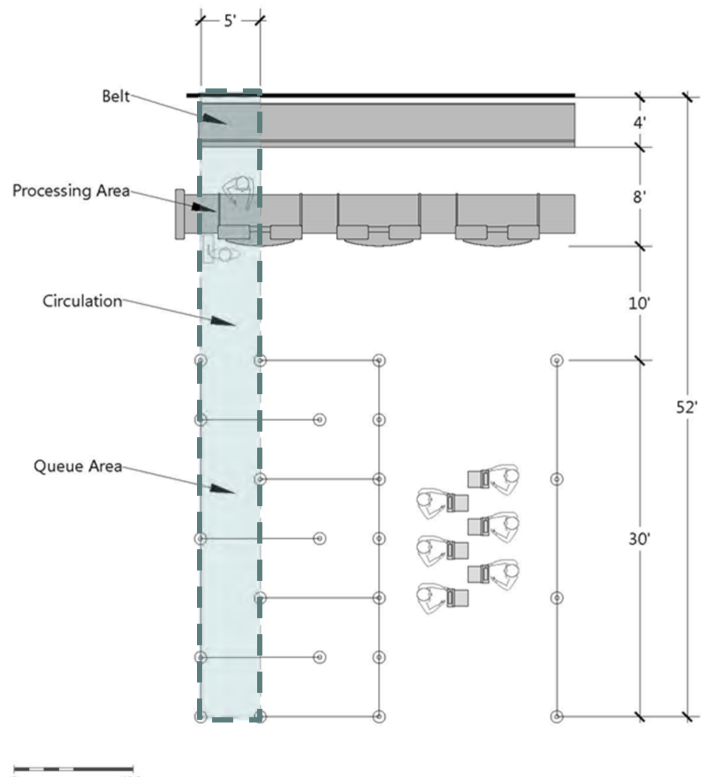
Full Service (Agent) Counter Positions: Airline staff assist passengers with purchasing tickets, obtaining boarding passes, checking in bags, and rebooking flights.

Device Utilization: Assumes exclusive-use.

Assumptions: reflect overall airport average.

Operating Parameters – Airline

Check-in Space Template



	UNITS	
Area per Passenger in Queue	sq ft	18.3
Inline Position Width	feet	5.0
Processing Area/Circulation per Position	sq ft	110.0
Queue Area per Inline Position	sq ft	150.0
Area per Inline Position	**sq ft**	**260.0**

Inline Positions: Represents counter positions adjacent to bag induction belts.

Utilization: Counter utilization assumes exclusive –use.

Does not reflect airline lease agreements

SOURCE: Airport Cooperative Research Program. *Report 25, Airport Passenger Terminal Planning and Design*, Volume 1: Guidebook. 2010 (Critical Dimensions); International Air Transportation Association, *Airport Development Reference Manual*, 10th Edition, Effective March 2014 (LOS); Boise Airport, *As-Built Drawings*, March 2005 (Layout).

Operating Parameters – Airline

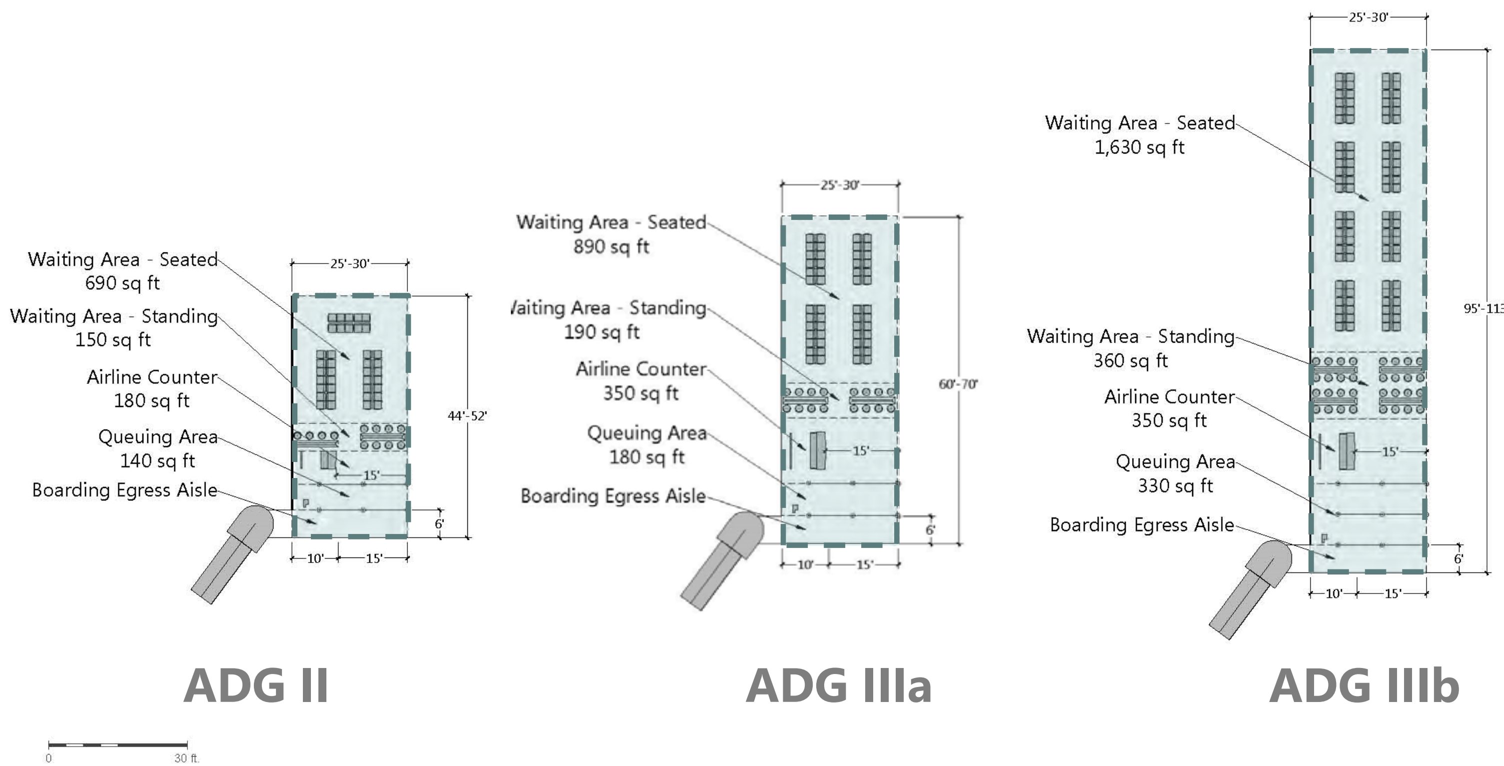
Holdrooms

	UNITS	ADG-II	ADG-IIIa	ADG-IIIb
Aircraft Seats	seats	70.0	90.0	165.0
Load Factor	percent	90.0	90.0	90.0
Seated Passenger Population	percent	60.0	60.0	60.0
Area per Seated Passenger	sq ft	18.3	18.3	18.3
Standing Passenger Population	percent	20.0	20.0	20.0
Area per Standing Passenger	sq ft	12.0	12.0	12.0
Standing Passenger in Queue Population	percent	20.0	20.0	20.0
Area per Standing Passenger in Queue	sq ft	11.0	11.0	11.0
Airline Podium	each	0.5	1.0	1.0
Boarding/Egress Aisle Width	feet	6.0	6.0	6.0
Area per ADG Holdroom	**sq ft**	**1,310.0**	**1,760.0**	**2,820.0**

SOURCE: Airport Cooperative Research Program. *Report 25, Airport Passenger Terminal Planning and Design*, Volume 1: Guidebook. 2010 (Critical Dimensions); International Air Transportation Association, *Airport Development Reference Manual*, 10th Edition, Effective March 2014 (LOS); Ricondo & Associates, Inc., April 2017 (Layout).

Operating Parameters – Airline

Holdroom Space Template

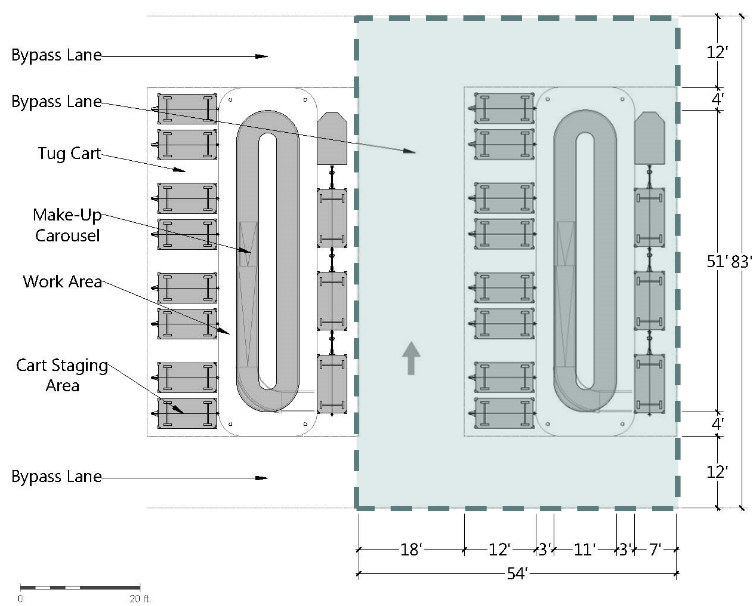


ADG II **ADG IIIa** **ADG IIIb**

SOURCE: Airport Cooperative Research Program. *Report 25, Airport Passenger Terminal Planning and Design*, Volume 1: Guidebook. 2010 (Critical Dimensions); International Air Transportation Association, *Airport Development Reference Manual*, 10th Edition, Effective March 2014 (LOS); Ricondo & Associates, Inc., April 2017 (Layout).

Operating Parameters – Airline

Outbound Baggage Make-up



	UNITS	
Staged Carts per Carousel	carts	11
Staging Period (before STD)	minutes	30-120
Device Length	feet	113
Work Area Depth	feet	3
Area per Carousel	**sq ft**	**4,480**

Staging: All carts staged and total number of simultaneously staged carts for individual flights will not exceed the manufacturer's recommendation.

AIRCRAFT TYPE	STAGED CARTS PER CONTAINER
CRJ	1
CR7, CR9, DH4, E7W	2
319, 73C, 73W	3
320, 739, M90	4

Transfer Bags: Assumed to be aircraft tail-to-tail.

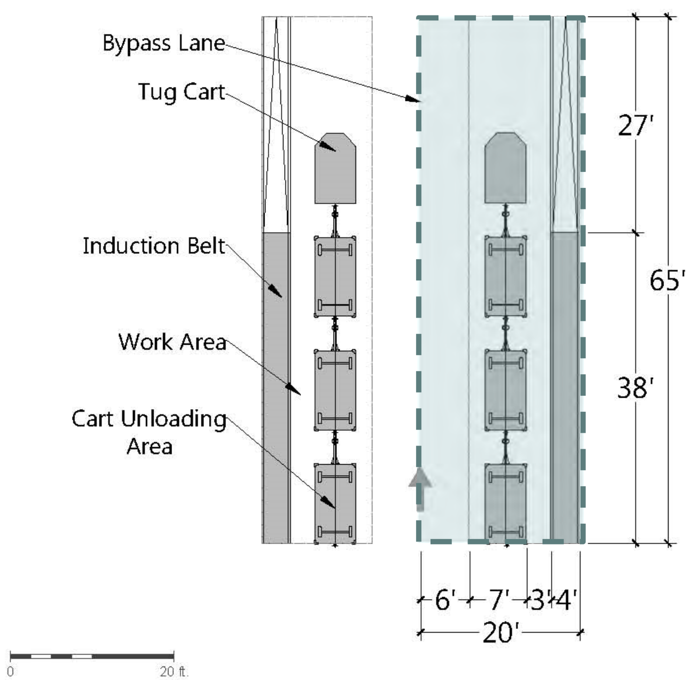
Sortation: No up-line sortation of bags would occur.

Utilization: Common-use of baggage makeup devices is assumed.

SOURCE: Airport Cooperative Research Program. *Report 25, Airport Passenger Terminal Planning and Design*, Volume 1: Guidebook. 2010 (Critical Dimensions); International Air Transportation Association, *Airport Development Reference Manual*, 10th Edition, Effective March 2014 (LOS); Boise Airport, As-Built Drawings, March 2005 (Layout).

Operating Parameters – Airline

Inbound Baggage Offload



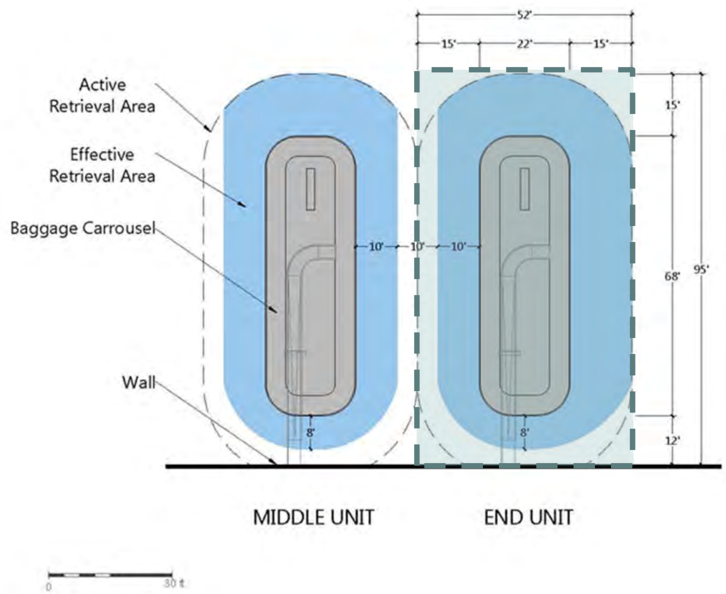
	UNITS	
Number of Inbound Feeds per Device	each	1
Device Length	feet	38
Work Area Depth	feet	3
Area per Pier	**sq ft**	**1,300**

Utilization: Common-use of unloading devices is assumed.

SOURCE: Airport Cooperative Research Program. *Report 25, Airport Passenger Terminal Planning and Design*, Volume 1: Guidebook. 2010 (Critical Dimensions); International Air Transportation Association, *Airport Development Reference Manual*, 10th Edition, Effective March 2014 (LOS); Boise Airport, As-Built Drawings, March 2005 (Layout).

Operating Parameters – Airline

Baggage Claim



	UNITS	
Area per Passenger	sq ft	18.3
Passenger Accumulation	percent	100.0
Peak Period	minutes	20.0
Linear Presentation Frontage	feet	166.0
Claim Device Area	sq ft	1,440.0
Active Retrieval Area	sq ft	3,130.0
End Unit Efficiency Factor	percent	80.0
Middle Unit Efficiency Factor	percent	68.0
Area per Device	**sq ft**	**4,570.0**
Average Passengers in Effective Retrieval Area	**passengers**	**126.0**

Peak Period: Facility requirements are based on all passengers with baggage at the claim device during the peak 20 minute operation.

Passenger Accumulation: Represents only the number of passengers checking bags and terminating their journeys at the Airport.

Efficiency Factor: Accounts for proper circulation and accessibility.

Utilization: Device utilization assumes common-use.

SOURCE: Airport Cooperative Research Program. *Report 25, Airport Passenger Terminal Planning and Design*, Volume 1: Guidebook. 2010 (Critical Dimensions); International Air Transportation Association, *Airport Development Reference Manual*, 10th Edition, Effective March 2014 (LOS); Boise Airport, As-Built Drawings, March 2005 (Layout).

Methodologies

NBEG Count

Passenger Attributes

Process

Airline

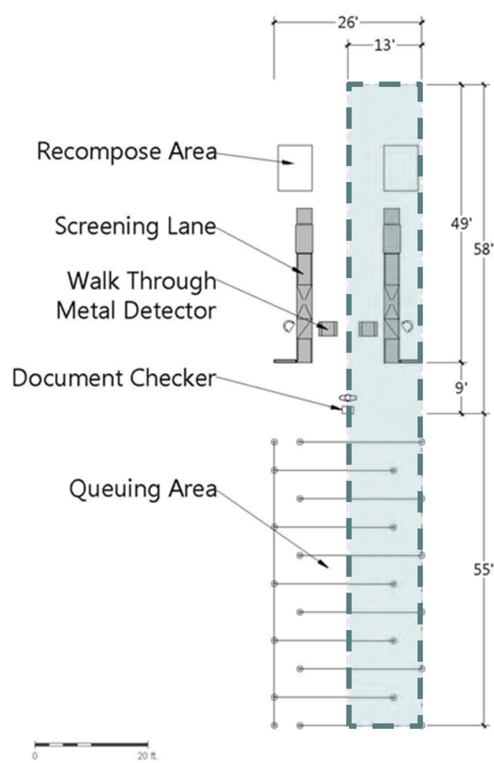
Department of Homeland Security

Commercial Program

Airport & Other Facilities

Operating Parameters – DHS

Transportation Security Administration (TSA)



	UNITS	
Average Throughput Rate per Hour, per Lane	passengers	200.0
Wait Time Goal	minutes	10.0
Queue Capacity	minutes	20.0
Area per Passenger in Queue	sq ft	10.8
Adjacent Support Area per Lane	sq ft	150.0
Other Support Facilities and Offices per NBEG	sq ft	539.0
Queue Area per Lane	sq ft	720.0
Processing Area per Lane	sq ft	750.0
Area per Lane (excluding IT and support)	**sq ft**	**1,470.0**
Baggage Screening per Peak Hour OD	**sq ft**	**1.5**

Queue Area: Based on average throughput rate and 20-minute wait time capacity.

SOURCES: International Air Transport Association, *Airport Development Reference Manual*, 10th Edition, Effective March 2014 (LOS); Airport Cooperative Research Program, *Report 25: Air Passenger Terminal Planning and Design*, Volume 1: Guidebook, 2010 (Critical Dimensions); Transportation Security Administration, *Checkpoint Design Guide (CDG),* Revision 5.1, May 07, 2014 (Critical dimensions); Boise Airport, *As-Built Drawings*, March 2005 (Layout); Benchmarked from comparable airports, Ricondo & Associates, Inc., March 2017 (Throughput).

Methodologies

NBEG Count

Passenger Attributes

Process

Airline

Department of Homeland Security

Commercial Program

Airport & Other Facilities

Operating Parameters – DHS

Customs and Border Protection (CBP)

	Design Standards
Peak Hour Deplaning Passengers (PHDP)	200.0
Facility	**Area (sq ft)**
Primary Processing Area	2,640
Primary Support Spaces	720
Secondary Processing Area	2,590
Secondary Operations and Support	1,100
Exit Control	250
CBP Administration	1,290
Total CBP Facility Area	**8,590**

Design guidelines for a small airport throughput and represents a single narrowbody operation during the peak period.

No future growth projected.

SOURCES: Design Standards based on US Customs and Border Protection, *Airport Technical Design Standards,* June 2012.

Operating Parameters – Commercial

Concessions and Storage/Support

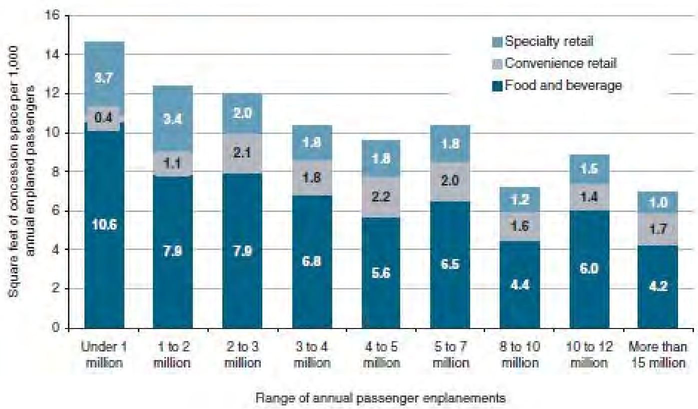


Table 11-2. Storage space requirements by concession category.

Category	Storage (percent of leasable concession space)
Duty free	30%
Food and beverage	15%
Convenience retail	20%
Specialty retail	15%
Services	10%

	UNITS	
Concession Area per 1,000 MAEP	sq ft	12.4
Storage and Support Percentage of Program	percent	20.0

Million Annual Enplaned Passengers (MAEP): Current airport range 1-2 MAEP.

Factors: Subject to change based on MAEP forecast range.

SOURCES: City of Boise Aviation Department, *Traffic Reports*, November 2016, *U.S. Department of Transportation DB1B Survey*, November 2016 (Current MAEP). Airport Cooperative Research Program. *Report 54, Resource Manual for Airport In-Terminal Concessions*, 2011 (Factors).

Methodologies

NBEG Count

Passenger Attributes

Process

Airline

Department of Homeland Security

Commercial Program

Airport & Other Facilities

Operating Parameters – Other Facilities

AIRLINE SUPPORT	UNITS	
Charter Flight Check-in Area per NBEG	sq ft	Maintains Current Facilities
Ticketing Office per Inline Position	sq ft	125
Baggage Service Office per Claim Device	sq ft	150
Operations and Support per NBEG	sq ft	962

AIRPORT FACILITIES		
Administration and Support per NBEG	sq ft	3,435
Service Animal Relief Area (SARA)	sq ft	230
Rental Car Facilities per NBEG	sq ft	Maintains Current Facilities
Public Non-secure Restrooms per Peak Hour Passengers	sq ft	2
Public Secure Restrooms per Peak Hour Passengers	sq ft	4
Mechanical, Electrical, and Plumbing	percent	15
General Public Circulation	percent	30

SARA: As of August 4, 2016, all airports with greater than 10,000 annual enplanements are required SARAs.

Restrooms: Includes peak hour enplanements and deplanements.

MEP: Percentage of total finished spaces.

General Public Circulation: Percentage of total public spaces.

SOURCES: Airport Cooperative Research Program, *Report 25: Air Passenger Terminal Planning and Design*, Volume 1: Guidebook, 2010 (ATO); Ricondo & Associates, Inc., April 2017 (ATO and BSO); BOI Airport, *BOI Airline SF*, received March 24, 2017 (Airline Space); BOI Airport, *Aircraft Parking By Gate and Aircraft Type*, received March 28, 2017 (NBEG Count); U.S. Government Publishing Office. 2017. Code of Federal Regulations. Title 49. Subtitle A, Part 27.71. (SARA); Ricondo & Associates, Inc., April 2017.

APPENDIX C

Assessment of Development Areas

REAL ESTATE **CONSULTING**

Supplement

SEPTEMBER 2018

Prepared by:

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Brokerage Services
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Accelerating success.

SUB-AREA OVERVIEW

SUB-AREAS

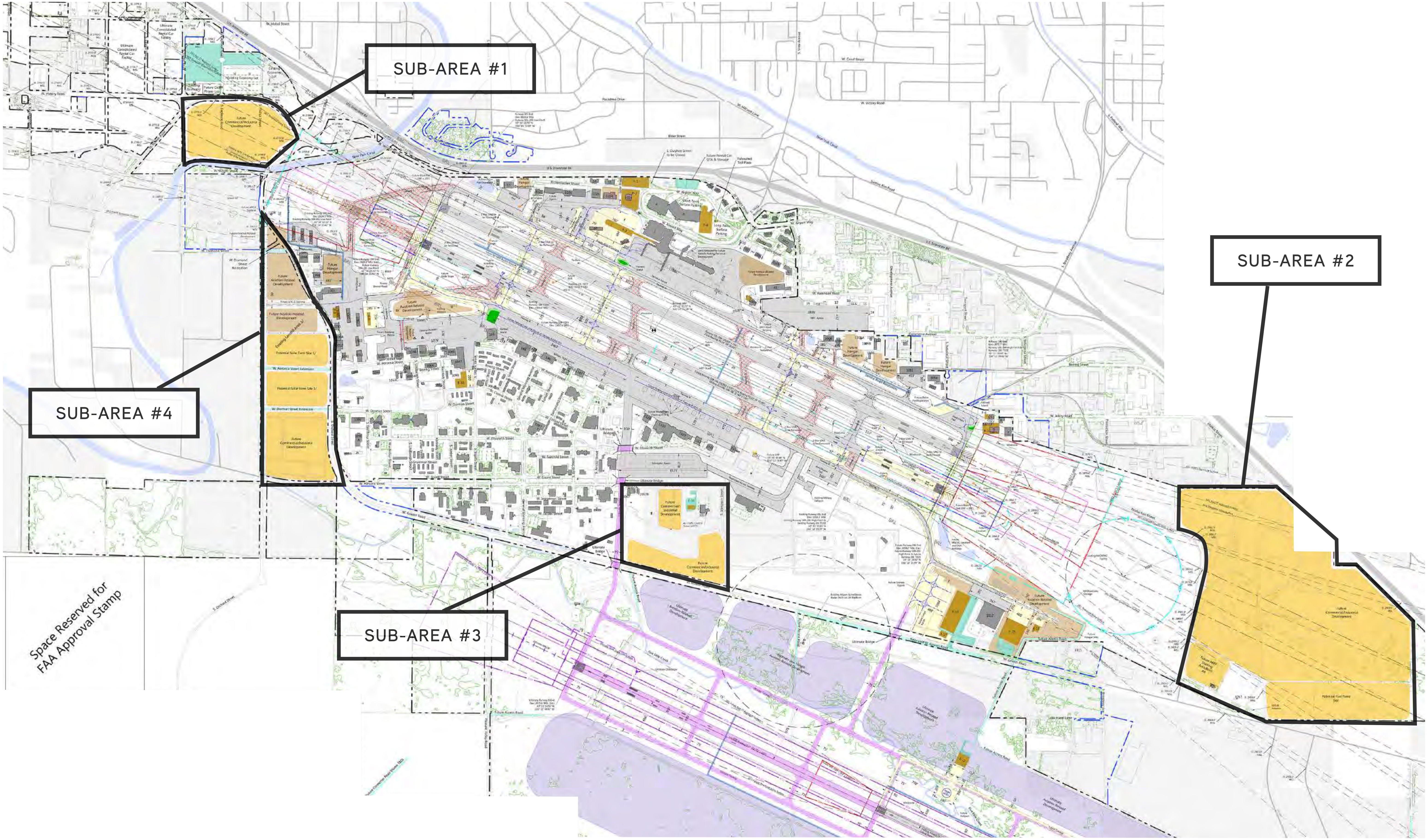
Colliers has taken into consideration the Future Airport Layout Plan which identifies the non-aviation related development areas which coincide with a few of the sub-area's Colliers identified in their 2013 report. Those areas are sub-area 4 (1), 7 (2), 10 (3), and 13 (4). Below we will compare and rate the overall development opportunity of the aforementioned sub-areas.

SUB-AREA RATINGS

The sub-area ratings are a high level rating combining the assessments for the market analysis with the opportunities and constraints analysis. As this is a high level rating, four ratings categories were established as shown on the chart below. The ratings could be further refined and detailed if desired. With thousands of acres to manage and an airport facility to operate, Colliers felt that this rating approach would be most relevant for the Airport to identify the priority areas where resources could be focused.

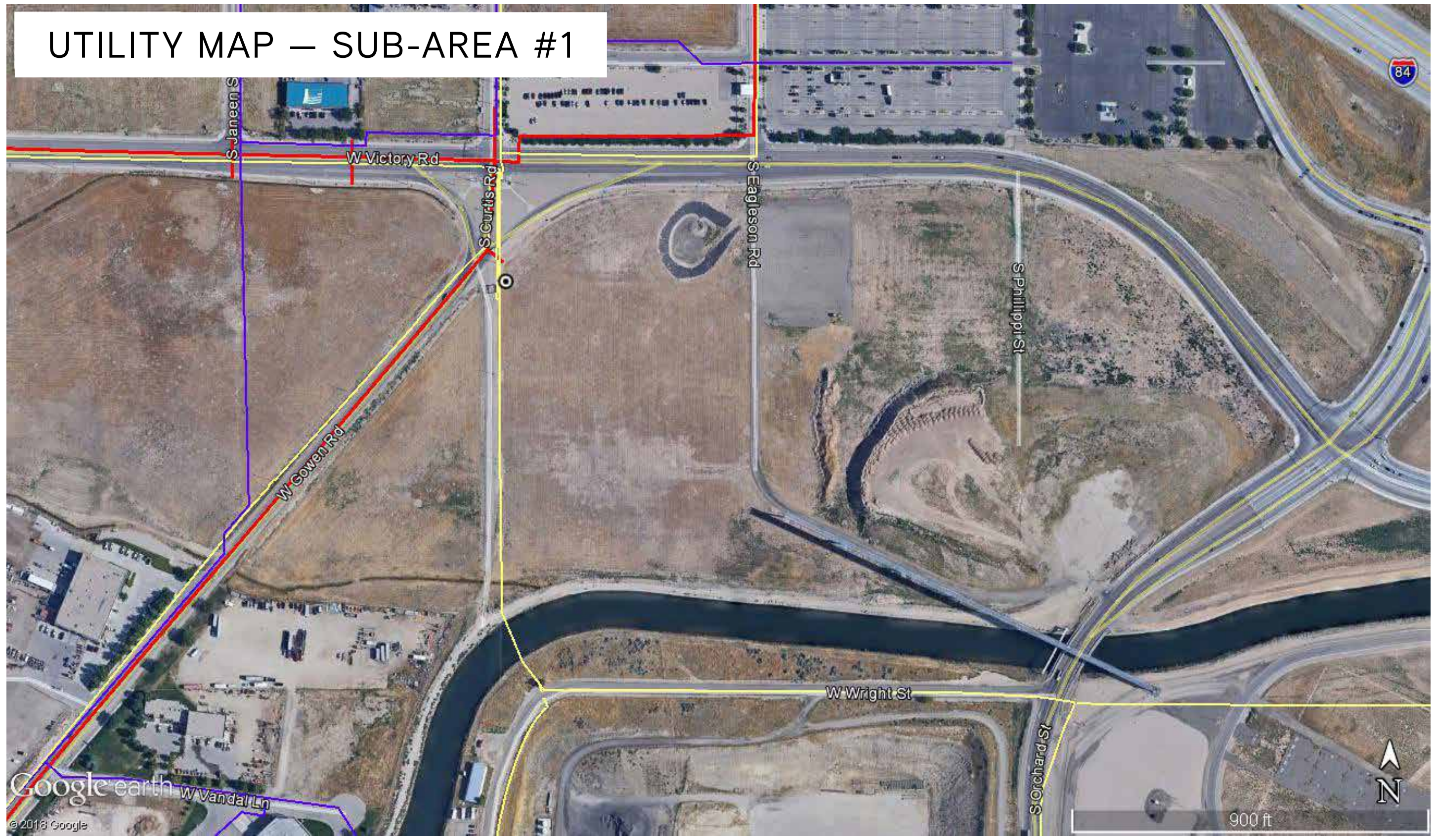
SUB-AREA RATING CHART

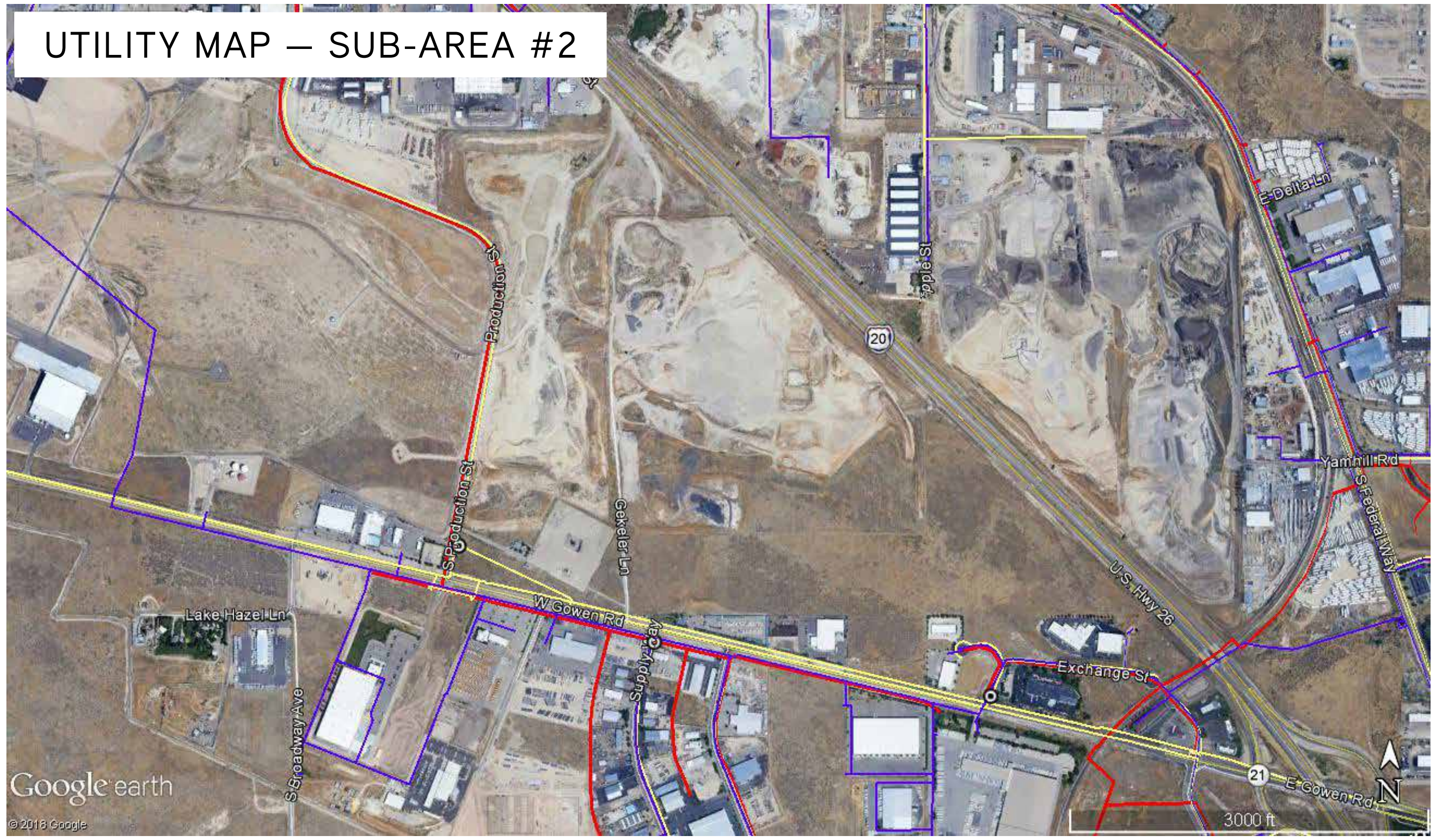
BOISE AIRPORT SUB-AREA RATING		
(Market Analysis & Opportunities/Constraints Analysis)		
Sub-Area	**Rank**	**Comments**
1	A-B	This is a great parcel for future development with easy access to I-84 via Orchard Road Exit, Victory Road, and West Gowen. Topography, the Runway Protection Zone (RPZ), and the Airport light bridge will impact the development of this site.
2	C-D	Formally known as the "gravel pit," a remediation plan for the gravel pit, and future development plan are needed for this sub-area. Infrastructure is near-by, but improvements to the infrastructure would be needed to develop. Great I-84 visibility.
3	A-B	Formally known as the "paintball site," this sub-area's development score has increased due site conditions having limited development constraints, and most of the utilities are in the public right-a-ways which surround the property.
4	C-D	Structural fill is still needed in most locations, environmental and geotechnical concerns still exist. The extension of Gowen Road and Orchard servicing south Boise will increase traffic flows and have resulted which once environmental and geotechnical concerns are resolved, will increase the score rating up to A-B.

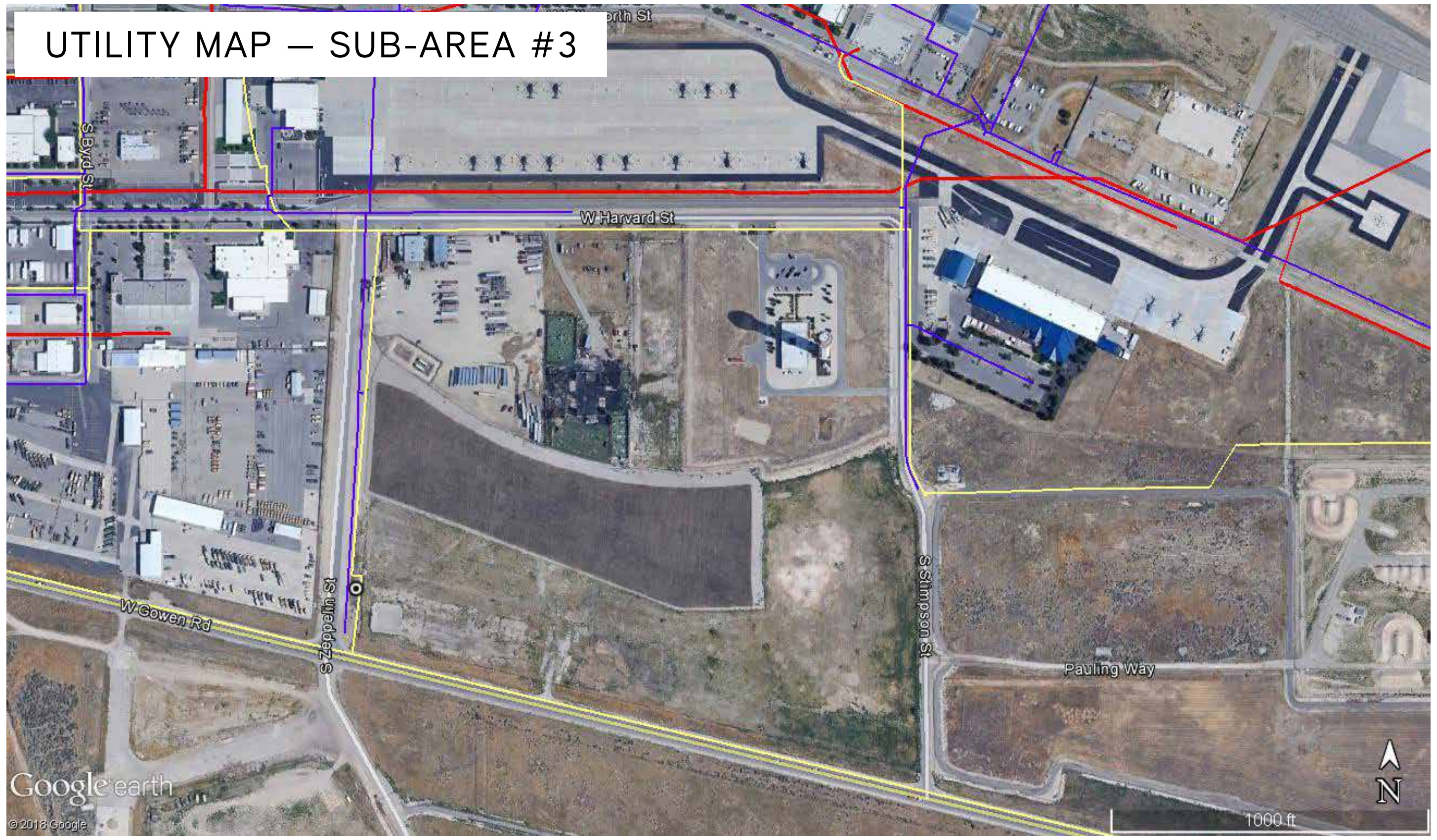

SUB-AREA #1
SUB-AREA #2
SUB-AREA #3
SUB-AREA #4
Space Reserved for
FAA Approval Stamp

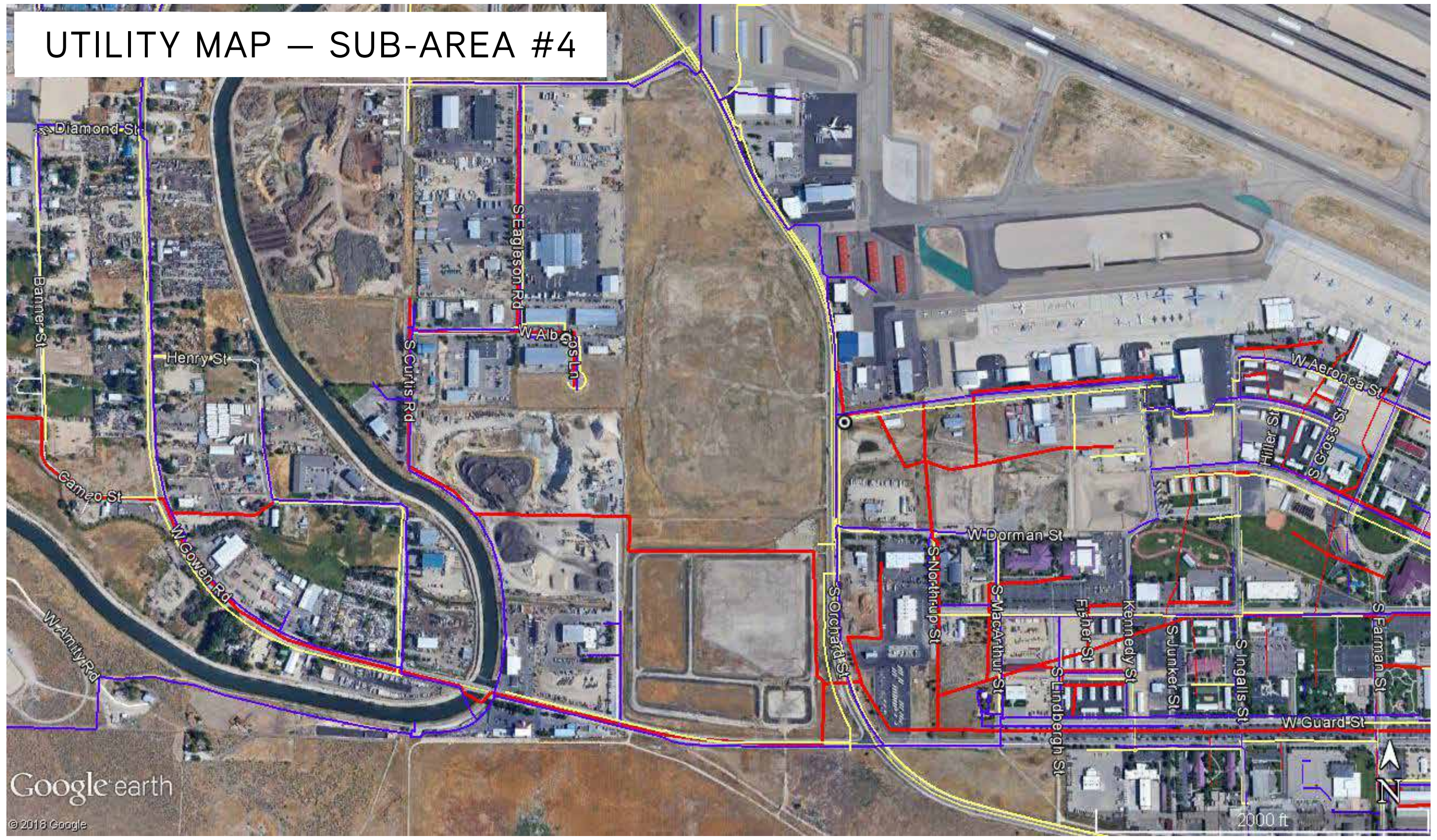
KEY

- WATER
- SEWER
- GAS









KEY STRATEGIES

After reviewing each of the Airport parcels and potential utilization, Colliers is recommending the following key strategies for each sub-area to increase ROI and to stimulate economic development:

Extending Infrastructure:

- Improves marketability of properties by creating "user ready" status
- Implement an infrastructure and transportation plan for each sub-market
- Possible phasing of sub-market improvements to have equilibrium between supply and demand
- Improves marketability of the properties

Development Planning:

- Identifies future value
- Clarifies future uses
- Solves access and infrastructure issues

Gravel Pit Remediation:

- Remediation plan for gravel pit to be implemented
- Final elevation of the gravel pit remediation should take into consideration height restrictions to maximize the value of the property

Fuel Tank Farm:

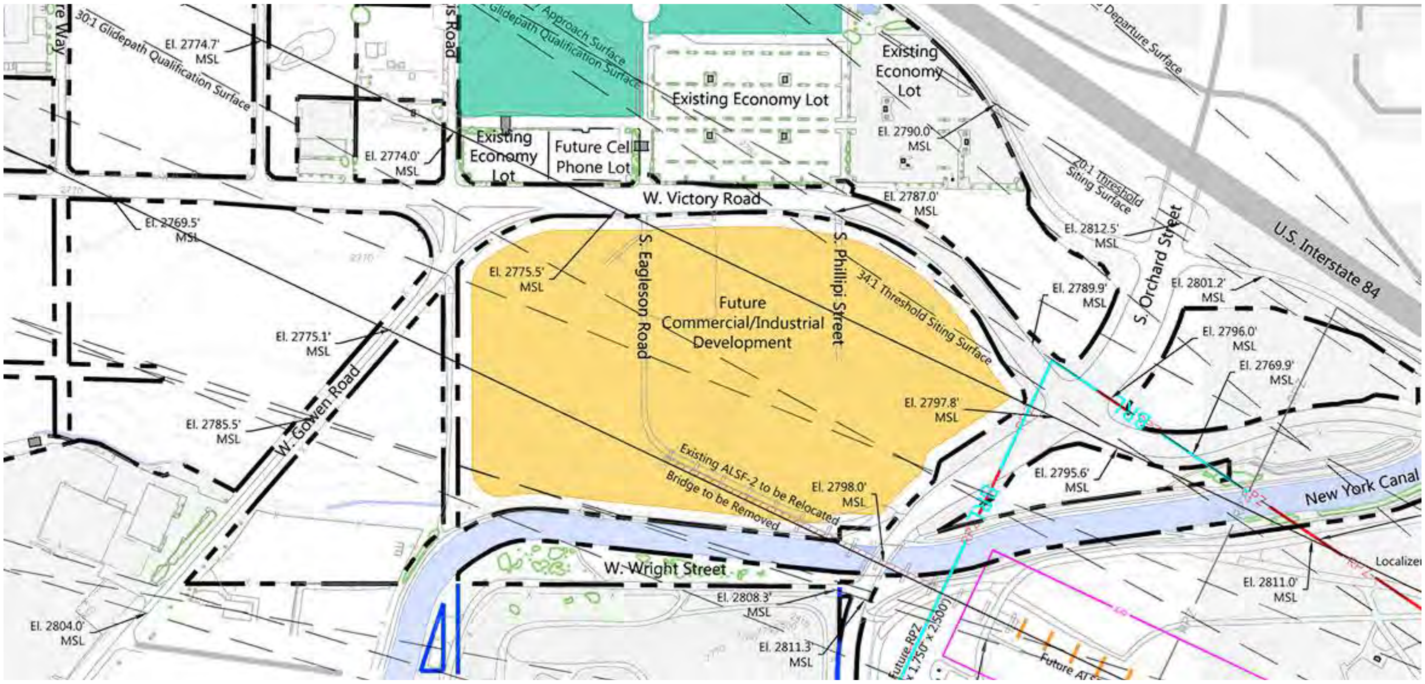
- Design Fuel Tank Farm to accommodate complementary uses for both the private and public enterprise
- Determine access roads between Fuel Tank Farm and Gravel Pit Area

Development Planning:

- Identifies pad sizes and locations
- Transportation plan for ingress/egress for each sub-market
- Clarifies future uses and identifies potential conflicts
- Solves potential access and infrastructure issues

Airport Sub-Area #1

Sub-Area Rating: **A-B**



Sub-area #4 is located south of Victory Road, between West Gowen Road and the New York Canal. There are multiple other dedicated, but undeveloped roadways in the sub-area. The Runway Protection Zone (RPZ) and the Airport light bridge, impact the southeast portion of the sub-area. Current zoning is a mix of M-1D and A-1. There are significant grade elevation differences to the east as you approach Orchard Street, and near the Airport light bridge, limiting future development, and possible compaction issues could exist.

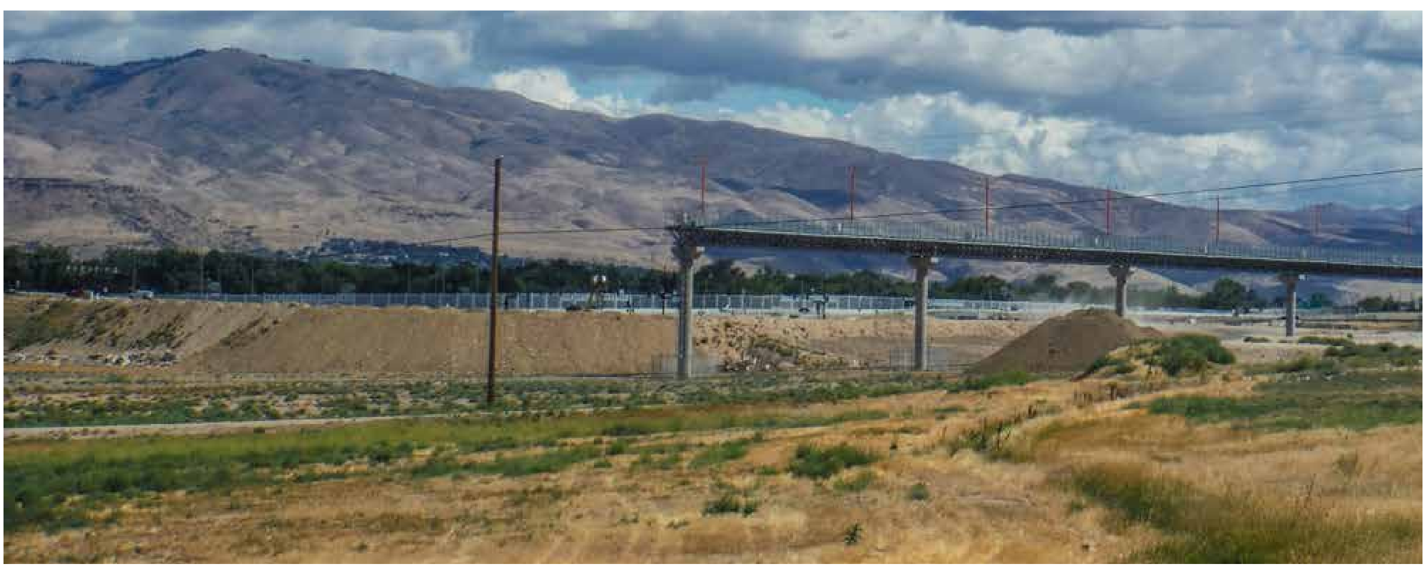
This sub-area has great potential for future development. The area that's not affected by elevation and grade constraints have commercial and industrial potential, with great access to I-84, and conforming to current uses around the sub-area. The hard corners of Orchard and Victory Road, or West Gowen Road and Victory Road are great locations for convenience store (C-store) applications which would also service the rental car plans for the area. The future consolidated car rental facility has been slotted for the north side of Victory Road.

It's recommended that the Airport discontinue the placement of unengineered fill at the light bridge due to the impact on the parcel, future possibility of removal, and marketing negative. If the material is suitable, stock pile the material in a dedicated location to be used as needed for future development.

Parcel #	Acreage	Zoning	Comments
S1030110500	9.58	M-1D (Industrial)	Access easement off of W. Vandal Lane
S1030110300	0.29	M-1D (Industrial)	Small interior parcel
R1580291111	34.23	A-1 (Airport)	Large parcel fronting Victory, includes light bridge
R1580300205	12.88	A-1 (Airport)	Hard corner of Victory Road & Orchard

Airport Sub-Area #1

Sub-Area Rating: **A-B**



Airport Sub-Area #2

Sub-Area Rating: C-D*

Sub-area #2 is located east of the current airfield and includes two gravel pit operations. One pit is operated by Nelson Construction under a lease agreement, and the second pit is operated by the State of Idaho. The airport acquired the property from the State of Idaho but the State retained the mineral rights.

The parcels identified as future commercial/industrial development on the attached map is 235± acres with approximately 2,600' of linear frontage along I-84. Approximately 8.6± acres is being dedicated as a future ARFF Burn Pit, and another 40± acres which is being dedicated as a future Fuel Tank Farm location. Development of the parcels could be limited by the gravel extraction uses, parcel configuration, access, and utilities. A long-term remediation plan for the gravel pits should be taken into consideration along with future development plans to be implemented during the remediation. The proposed fuel farm could also create concerns of hazardous materials contamination, and could limit some industrial users who deal with food or consumable products. Heavier industrial users tend not to have the same concerns and would be would be a good complementary use to the Fuel Tank Farm.

The City of Boise Public Works department has indicated that due to the elevation of the I-84 frontage parcel relative to the existing sewer trunk-lines, a lift station would be required to service the prime frontage area. Colliers recommends that the Airport consult with the City of Boise's Public Works department to determine a long-term sewer solution for the parcels.

There are limited opportunities for future development unless access, remediation, and utility constraints are resolved.

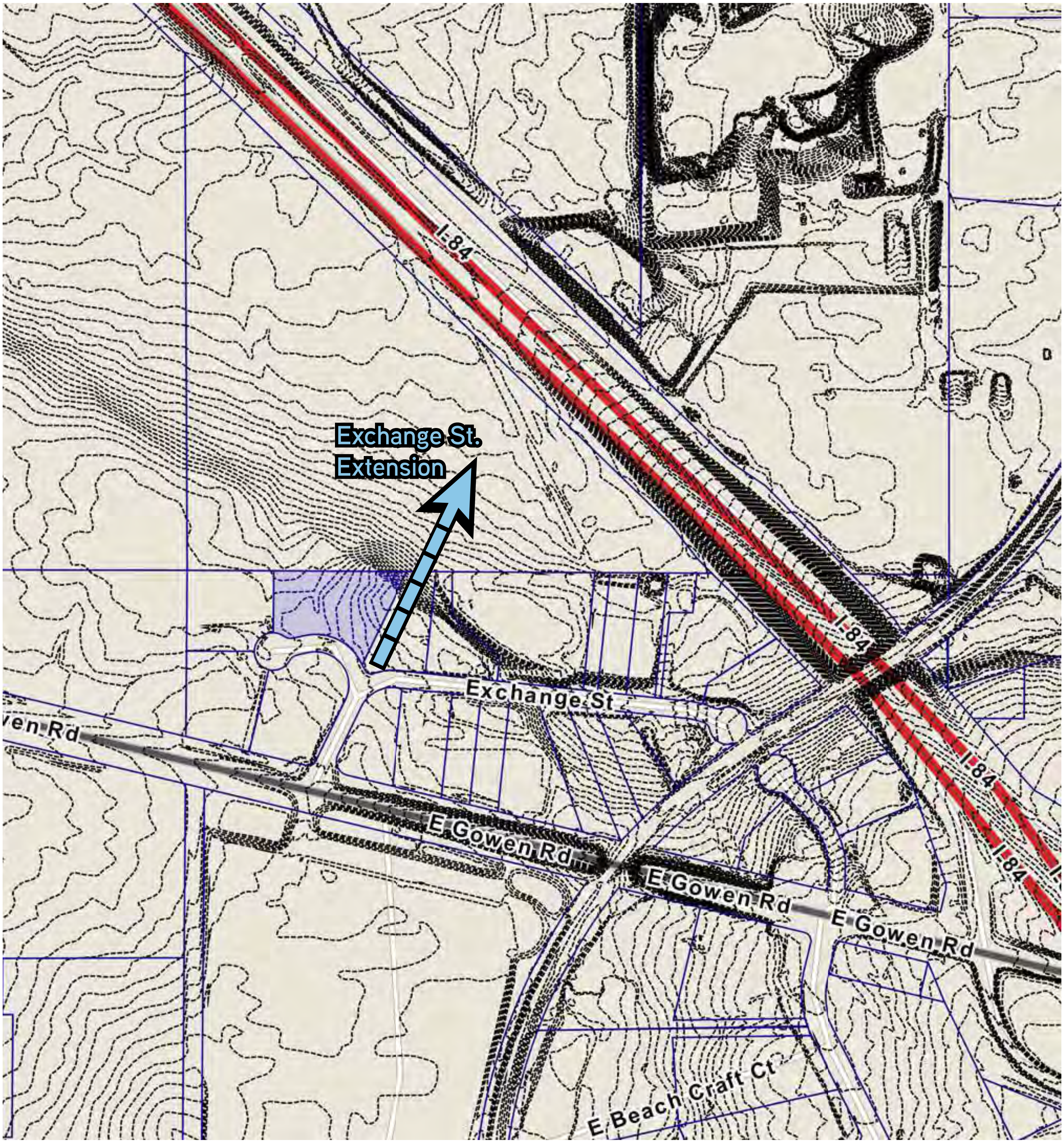
Parcel #	Acreage	Zoning	Comments
S1035233600	80.00	M-1D (Industrial)	A portion of, northern parcel adjoining Idaho Timber
S1035131500	30.04	M-1D (Industrial)	1355' of linear frontage along I-84
S1035411500	145.00	A-1 (Airport)	1280' of linear frontage along I-84, 40 AC dedicated for future Fuel Tank Farm
S1036336000	37.60	A-1 (Airport)	Not identified by the Airport on their "short-list", but the acquired by the City of Boise at 924 Citation Court purpose is to allow for connectivity and to allow for redundant utility supply to the parcels in the sub-area.
S1035314800	125.00	A-1 (Airport)	A part of. Includes Future ARFF Burn Pit

* Rating is due to no remediation plan for gravel pit or development plan

Airport Sub-Area #2

Sub-Area Rating: **C-D***

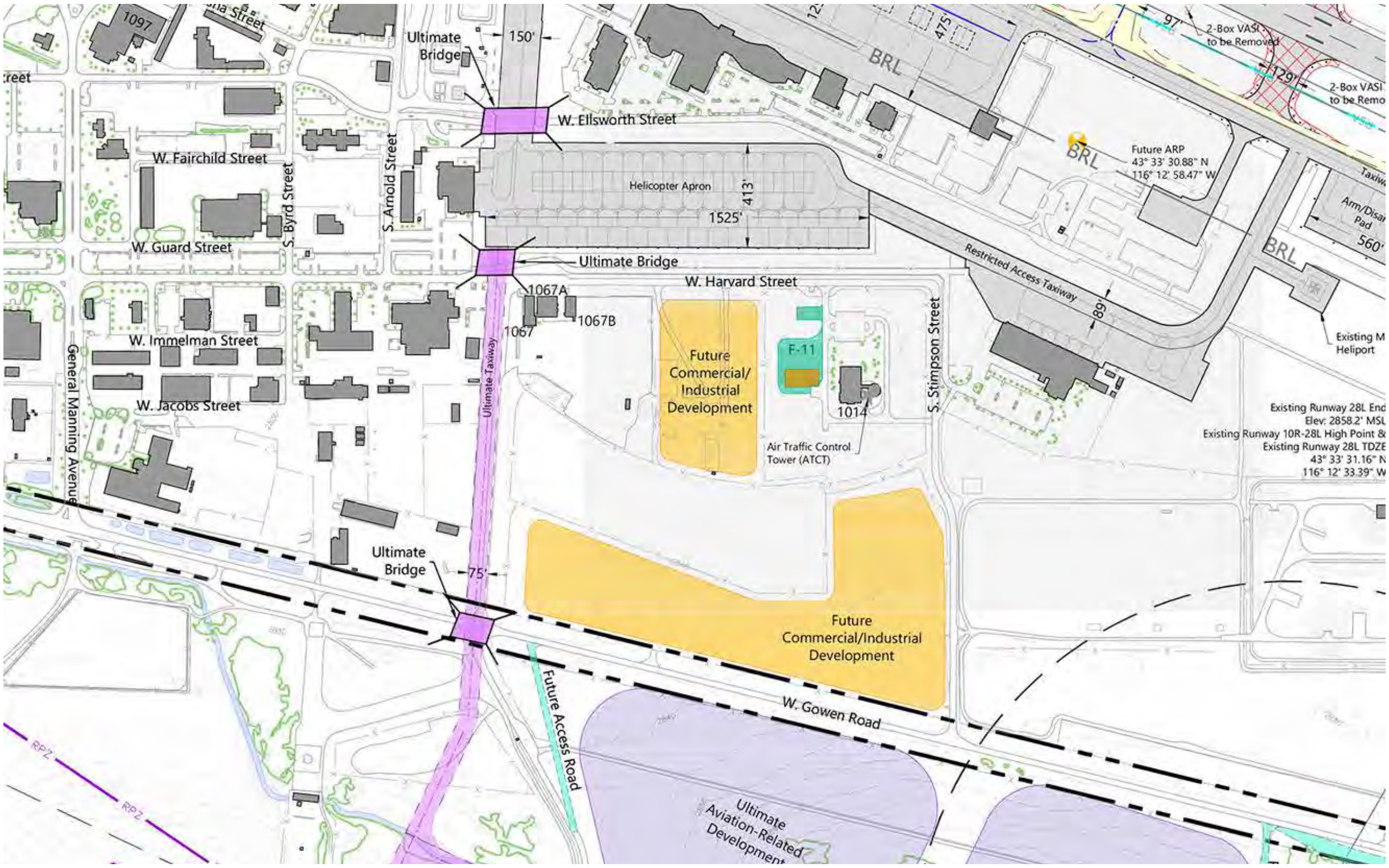
* Rating is due to no remediation plan for gravel pit or development plan


I-84
Exchange St.
Extension
Exchange St
E Gowen Rd
E Gowen Rd
E Gowen Rd
I-84
I-84
I-84
E Beach Craft Ct


Future AARF
Burn Pit
Production Street
Gekeler Lane
Relocation
Future Fuel Tank
Farm Location
Gowen Road

Airport Sub-Area #3

Sub-Area Rating: **A-B**



Sub-area #3 is located between Zeppelin Street and Simpson Street, and includes the former "paintball" location, which is approximately 7.60 acres, and another 22.70 acres fronting Gowen Road. The 22.70 acres has 1850' of linear frontage along Gowen Road. The 22.70 acre site along Gowen Road is a great candidate for future industrial development. Given the flat topography of the 22.70 acres, Boise City Public Works expects a non-gravity sewer solution will be required to access the sewer line in Harvard Street, to the north from the 22.70 acre site.

The 7.60 acre site is directly next door to the new Airport control tower. The control tower will have to be taken into consideration when considering development and use restrictions. The site is relatively flat, and is fully fenced with security fencing. The parcel could be put to immediate use and leased as yard space. This parcel is also a good candidate for future industrial development with possible restrictions being so close to the Airport control tower.

Parcel #	Acreage	Zoning	Comments
S1033200000	520.00	M-1 (Industrial)	Approximately 30.30 acres, apart of the 520.00 total acres

Airport Sub-Area #3

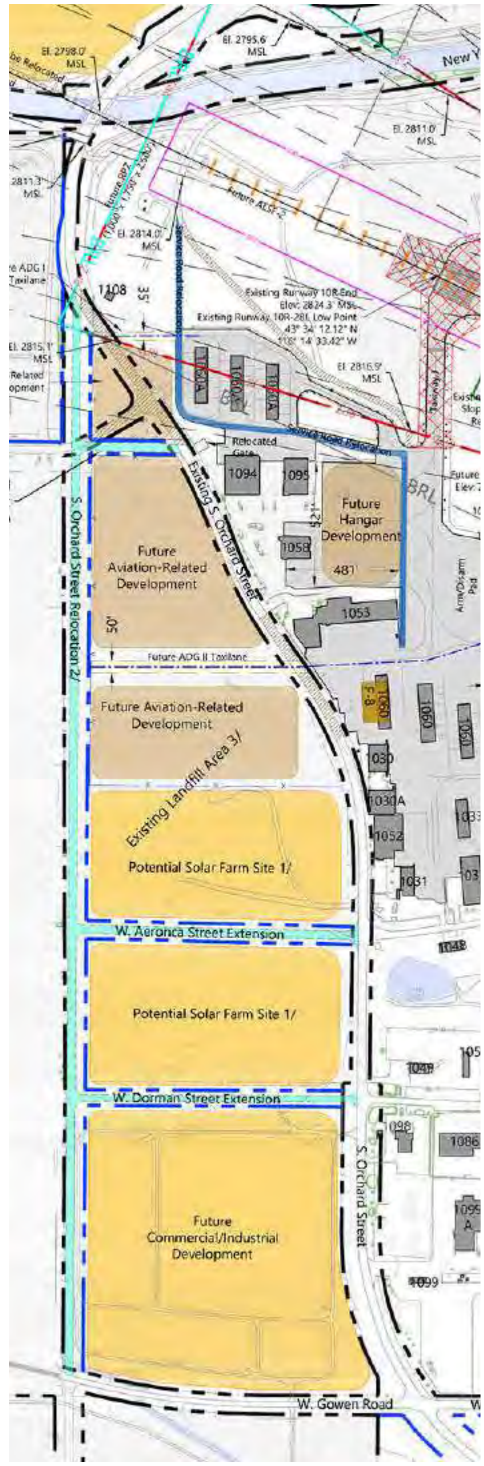
Sub-Area Rating: **A-B**



Airport Sub-Area #4

Sub-Area Rating: **C-D**

Sub-area #4 is located on the west side of Orchard Street from the southwest side of the airfield to south of Gowen Road. The parcels were formally a municipal golf course, a landfill, and former wastewater lagoon.



Total acre of this sub-area is 96.83 acres (61.32 acres and 35.51 acres). The west boundary of the parcels located north of Gowen Road is the future alignment for the relocation of Orchard Street and will connect to the infrastructure completed in Q2 2018. The planned 5 lane roadway will become the gateway for future development in southwest Boise.

The 36.6 acre landfill site, apart of the 61.32 acres, was used for municipal solid waste and later as an Airport construction landfill. The landfill was covered with layers of fill of varying depths. The landfill is closed, groundwater is contaminated, and cleanup of the property by the City is ongoing complying with the Idaho DEQ consent order. Remediation efforts include both passive and active measures to vent gases from the landfill and prevent gases from further contaminating the groundwater.

In 2006 STRATA conducted a geotechnical evaluation of the landfill site to identify issues related to the realignment of Orchard Street and the extension of Aeronca Street across the landfill parcel. The STRATA draft report advised a significant settlement would occur on the site under the Aeronca extension and offered three approaches for mitigation. One method, called Deep Dynamic Compaction, involves dropping heavy weights (10-15 tons from heights of 50-75 feet) to minimize, but not eliminate settlement concerns. The second method, limited subgrade improvement and soil reinforcement, involves over-excavation of 4 feet of material, and filling with 8 inch layers of compacted fill with 3 layers of geogrids placed at 12", 24", and 36" depths, but will not eliminate settlement. The third option involved the complete removal of landfill material to expose native soil and replace with structural fill.

The potential uncertainty of structural support and the cost to mitigate represent significant constraint to any development of this site.

The 35.51 acre lagoon site south of the landfill site was initially used as a municipal landfill site, converted to a lagoon for wastewater retention following removal of the landfill debris, and eventually was an application site for solid waste from wastewater treatment. The lagoon has been closed and the sludge removed. However, Boise City Public Works staff believes that some landfill material may still be present on site. Groundwater is also contaminated below the parcel (believed to be from the landfill to the north) and contamination is being cleaned up under an Idaho DEQ consent order.

Colliers recommends that the Airport investigate the possibility of landfill material on both parcels and develop a plan to remove any non-structural material from the site. In addition, the lagoon parcel should be brought up to grade with engineered fill from the berms around the lagoon boarders and from other material sources.

Continued on next page...

Airport Sub-Area #4

Sub-Area Rating: **C-D**

The City operates a series of monitoring wells in the area to test water quality and in some cases vent any remaining landfill gases. Any future development will need to protect these well locations.

Colliers recommends that as part of the final design for the re-alignment of Orchard Street a landscape plan be developed to mitigate the impact of the heavy industrial users that operate to the west. Colliers also recommends that given the significant constrains affecting this sub-area, Colliers recommends preparing a development concept plan to determine appropriate uses and mitigation required for development.

Once mitigation efforts area completed this sub-area's ranking will increase significantly from C-D to A-B, due to location, demand, and accessibility to I-84.

Parcel #	Acreage	Zoning	Comments
S1029315300	61.32	M-1 (Industrial)	Includes former landfill site
S1032212403	35.51	M-1 (Industrial)	Former lagoon location

Airport Sub-Area #4

Sub-Area Rating: **C-D**

Boise Airport