SLC INTERNATIONAL

MASTER PLAN | 2022

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INVENTORY OF EXISTING CONDITIONS

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1.1 INTRODUCTION

The purpose of crafting the Salt Lake City International Airport Master Plan is to assess the ability of airport facilities to accommodate user needs at existing and forecast demand levels. In addition, the Master Plan provides recommendations regarding additional facilities that are needed to meet the forecasted demand. In the broadest sense, this involved collecting relevant data of existing conditions, forecasting aviation user demand levels, determining the capacities of existing facilities, analyzing facility requirements based on the demand and capacity relationships, generating alternative development options which meet that demand, and developing a financially feasible implementation plan to achieve those facility improvements. The study is comprehensive in nature, with the objective of creating a thorough list of airport projects, known as the Capital Improvement Program (CIP), that are recommended for future development. Finally, the Master Plan proposes an Implementation Plan that suggests the sequence of execution to achieve it. The Implementation Plan takes into account available funding, stakeholder needs, FAA safety and design standards, operational efficiencies, and overall impact to user level of service experience.

Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5070-6B Change 2, *Airport Master Plans*, outlines FAA required and recommended steps in the development of an airport master plan. The initial recommended step in documenting the master planning process is the identification of existing conditions at an airport. This involves the collection of data germane to an airport and the area it serves. The objective of the existing condition inventory task for Salt Lake City International Airport (SLCIA) is to provide background information used during subsequent phases of the study. In addition to gathering baseline quantitative inventory data, empirical and qualitative data was gathered by way of observation, tenant surveys, and stakeholder input collected during on-site interviews.

At the time of this writing, SLCIA was in the process of redeveloping its terminal, concourse, and landside environment, a plan 20 years in the making, resulting from the preferred development path identified in the 1998 Salt Lake City Airport Master Plan. This program is known as the Airport Redevelopment Program (ARP) (previously known as the Terminal Redevelopment Program). As economic development and demand for aviation services matured over time, the Salt Lake City Department of Airports (SLCDA) began taking the steps required to meet passenger demand and maintain optimal customer service levels. The construction of these new facilities is a massive undertaking, costing upwards of $4 billion and requiring a complex coordination effort between the SLCDA and the contracted construction firms which are helping make the plans happen.

Much like the 1998 Master Plan did before, the current master planning process ensures that the proper steps are being taken to maintain, improve, and build upon the foundation created through the implementation of the ARP, in a strategic and coordinated fashion. The unique aspect of this master planning effort is that it must establish a baseline of existing conditions as if passenger facilities under construction in 2018 are completed, and then identify the facility requirements necessary to meet user demand for the 20 years following their completion. This Master Plan will develop a baseline inventory under the future “as-built” conditions, according to design and construction documents being used to create the new terminal and landside facilities.

1.2 HISTORIC CONTEXT AND BACKGROUND

The SLCIA is operated and managed by the SLCDA, a department of Salt Lake City (SLC) Corporation. In addition to SLCIA, the SLCDA operates and manages South Valley Regional Airport (U42) and Tooele Valley Airport (TVY). These three airports serve unique roles in the national airspace system, the State of Utah, and the greater Salt Lake Valley region.

SLCIA is located approximately five miles west of Salt Lake City's downtown business district in Salt Lake County, Utah. SLCIA provides service for most of the commercial passenger activity in the intermountain region. The primary counties served by SLCIA include Davis, Salt Lake, Tooele, Utah, and Weber. Beyond those five counties, SLCIA is also an important link to the nation's air transportation network for the rest of Utah and even draws users from as far as Idaho, Wyoming, Nevada, and western Colorado. SLCIA serves an estimated 23 million passengers per year and ranks as the 25th busiest airport in North America.[1] SLCIA is currently served by ten airlines and their affiliates, and is a major hub for Delta Air Lines. Additionally, SLCIA is an important center of economic activity for the State of Utah, contributing approximately $1.9 billion annually to Utah's gross domestic product (GDP).[2]

The SLCIA originated in 1911 as a cinder-covered landing strip in a marshy pasture called "Basque Flats". This area was originally used for training and acrobatic flights and was the host of the 1911 "Great International Aviation Carnival". Following the success of the carnival and a nationwide increase in aviation activity, Salt Lake City purchased an additional 100 acres of land surrounding the existing landing strip. This allowed for the expansion of airport infrastructure by adding hangars and other buildings to support the United States Postal Service, which began air mail service to Salt Lake City in 1920. That same year, the airfield was named "Woodward Field" in honor of local aviator, John P. Woodward. Six years after the purchase and development of additional land at Woodward Field, Western Air Express initiated the first commercial passenger flight out of Woodward Field. This company eventually grew into Western Airlines, which later established its primary hub operation in Salt Lake City.

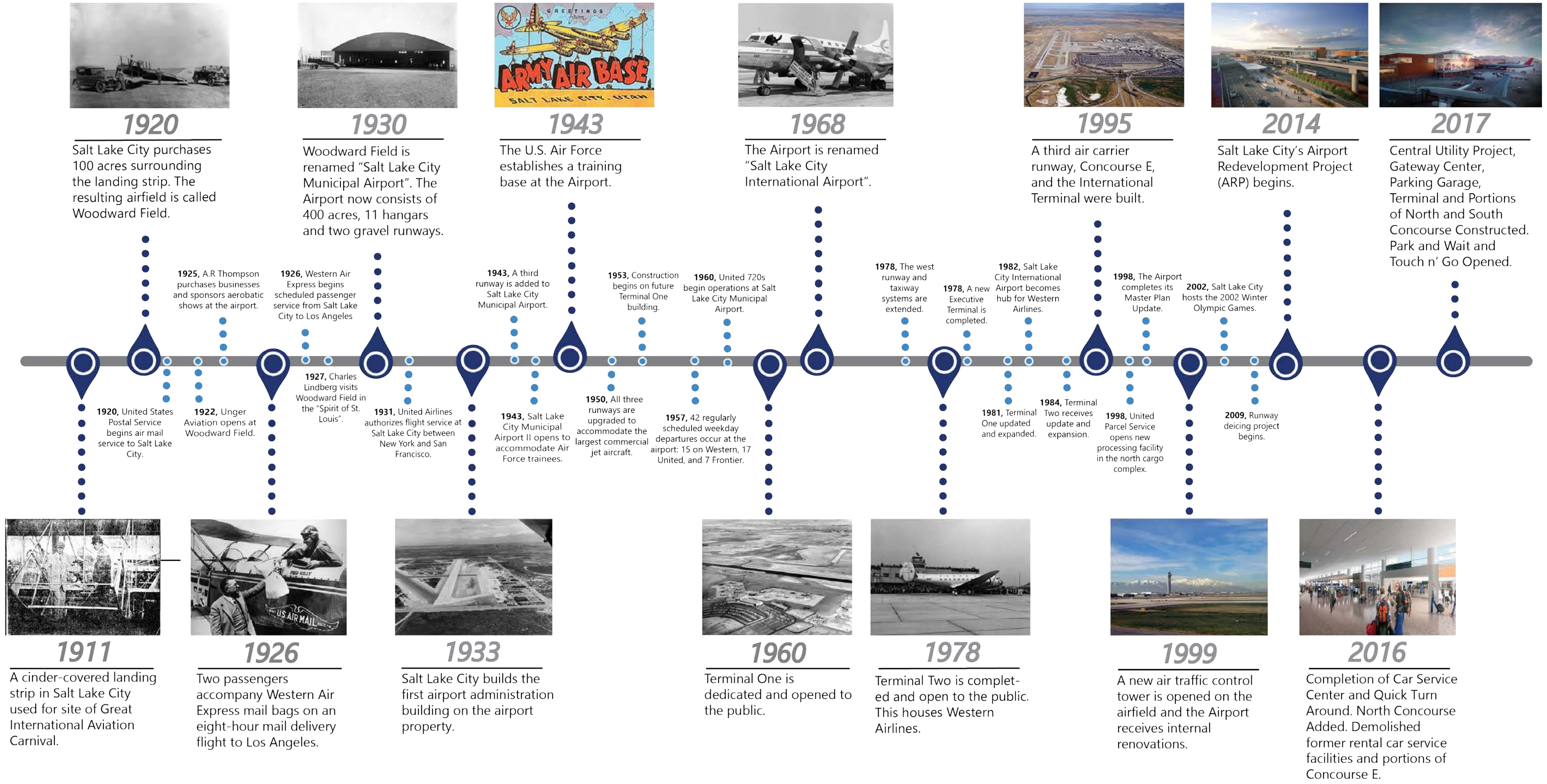
In 1930, Woodward Field changed it's name to "Salt Lake City Municipal Airport" and acquired an additional 300 acres of land to add a second runway. Shortly after, the Airport built the first terminal and airport administration building on Airport property to support increases in airport operations. The expansion of airport facilities allowed Salt Lake City Municipal Airport to become a training base and replacement depot for the U.S. Air Force.

Due to the continued growth of the aviation industry, an additional terminal building was constructed in 1960 and Salt Lake Municipal Airport was renamed "Salt Lake City International Airport" eight years later. As SLCIA continued to experience increased activity, additional concourses and airport facilities were constructed to support the growth. In 1978, Terminal Two was constructed to host Western Airlines. The west runway and taxiway systems were extended that same year. SLCIA became a Western Airlines operational hub in 1982 and Terminal Two was expanded two years later to accommodate an additional concourse.

Over the course of the next decade, growth in user demand continued to necessitate further improvements to the airfield and support facilities. Ground access improvements, parking facilities, support facilities, and a golf course were all developed on SLCIA property from the late 1980s into the early 1990s. An additional air carrier runway, Concourse E, and an International Terminal were added to SLCIA by 1995. These, coupled with other passenger and support facility improvements, enabled SLCIA to accommodate the passenger activity levels experienced during the 2002 Olympic Winter Games hosted by Salt Lake City.

Since the 2002 Olympic Winter Games, SLCIA has made various improvements required to accommodate steadily increasing demand levels and prepare SLCDA for implementation of the preferred development path identified in the 1998 Salt Lake City International Airport Master Plan. Advanced planning for the terminal and landside elements of the 1998 Master Plan have evolved over time through a number of Airport Redevelopment Program iterations, which ultimately honed the preferred development plan into a comprehensive and implementable project. FIGURE 1-1 details SLCIA's history from its inception through the anticipated completion of the terminal area investments by 2024. The ARP will ultimately extend beyond 2024 as projects are developed to support the overall initiative.

Figure 1-1: SLCIA Historical Timeline



Source: SLCDA; Delta Flight Museum; SLC Chamber; Prepared by RS&H, 2018

[1] SLC Airport Fast Facts, Retrieved from https://www.slcairport.com/about-the-airport/airport-overview/fast-facts, 2018
[2] Salt Lake City International Airport Economic Impact Analysis, 2013

1.2.1 Airport Redevelopment Program

The previous Master Plan, completed in 1998, identified the need for additional terminal space to accommodate increased passenger activity over a 20-year period. In 2009, the SLCDA approved plans to redevelop the existing terminal facilities to accommodate forecasted growth and to replace aging terminal facilities. This plan, referred to as the Airport Redevelopment Program (ARP), includes over $4 billion worth of improvements through 2024 as detailed in FIGURE 1-2.

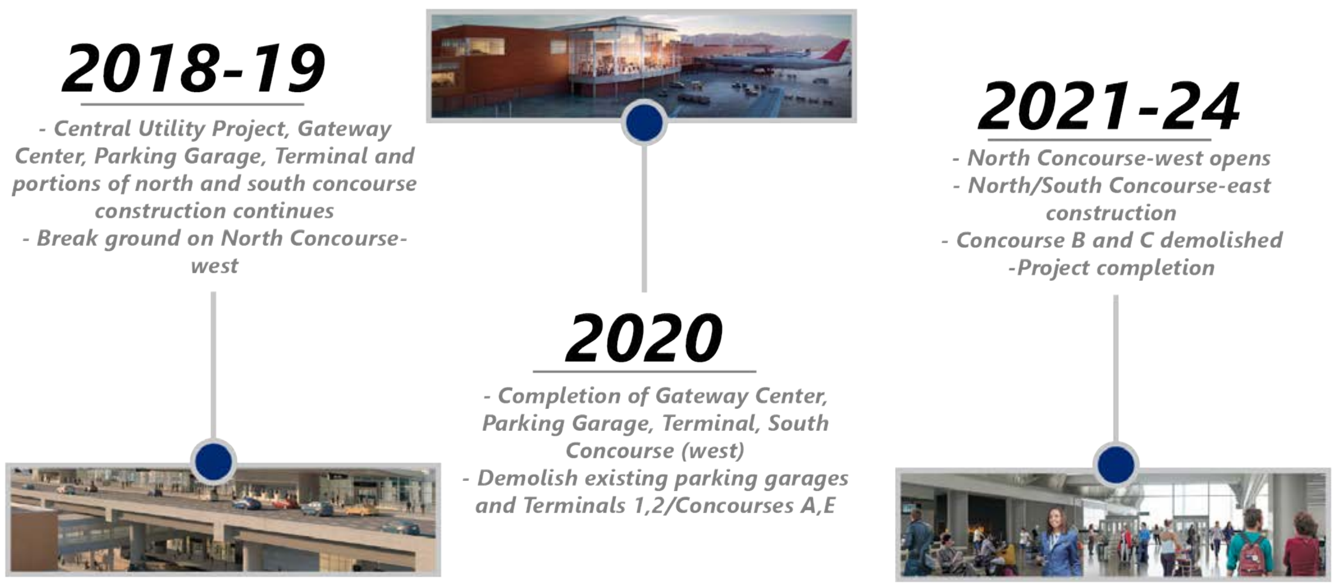
Originally constructed in the 1960s, the existing terminal facility is aging and has become costly to maintain. The aging terminal building suffered from energy inefficiencies and levels of service became unsatisfactory based on current industry standards. From an airside perspective, the concourse layout contributed to airfield congestion, ultimately increasing aircraft fuel consumption and emissions output. In order to accommodate increasing passenger activity and combat the negative impacts of an aging terminal facility, the ARP proposed removing the three existing terminal buildings and replacing them with one centrally located terminal building which serves a system of attached and satellite concourses. The new terminal complex consists of two concourses, one of which is a satellite concourse connected by passenger tunnels. FIGURE 1-3 shows the construction images taken during the Airport Redevelopment Program.

In addition to the new terminal, concourses, and airfield improvements, the ARP also includes implementation of a variety of facilities which improve the airport user experience. Additional projects proposed in the ARP include a passenger service gateway with sky bridges connecting to the terminal, expanded parking facilities, new dual-level curb facilities, and consolidated rental car services.

The following is an abbreviated list of major ARP improvements:

- Multistory central terminal building serving three new concourses with a total of 78 concourse level (second story) gates served by passenger boarding bridges.
  - Concourse A - East with 22 gates (formerly known as South Concourse East).
  - Concourse A - West with 25 gates (formerly known as South Concourse West).
  - Concourse B with 31 gates (formerly known as North Concourse).
- Simplified airfield taxiway and taxilane system with dual taxilanes between concourses.
- Gateway building accessing passenger sky bridges over the terminal curb roads serving the terminal, ground transportation, and parking facilities.
- Five-story, approximately 1.7 million square foot parking garage facility serving public parking and rental car ready-return. This space accommodates roughly 3,600 parked vehicles.
- Consolidated rental car service facility comprised of three buildings and a two-story quick turn-around facility with capacity for roughly 1,650 stacked cars, 72 fuel nozzles, and 16 wash bays.
- Economy parking lots with 10,463 parking space capacity
- Two-level curb road with separated arrivals, departures, and commercial vehicle traffic lanes.
- Central Utility Plant

Figure 1-2: Airport Redevelopment Program Timeline (2018 - 2024)



Source: SLCDA; Prepared by RS&H, 2018

Figure 1-3: ARP Construction Photographs (Summer 2018)

North Tunnel Opening - June 2018

Terminal Area Looking West - June 2018

Terminal Area Looking North - July 2018

Terminal Plaza - July 2018

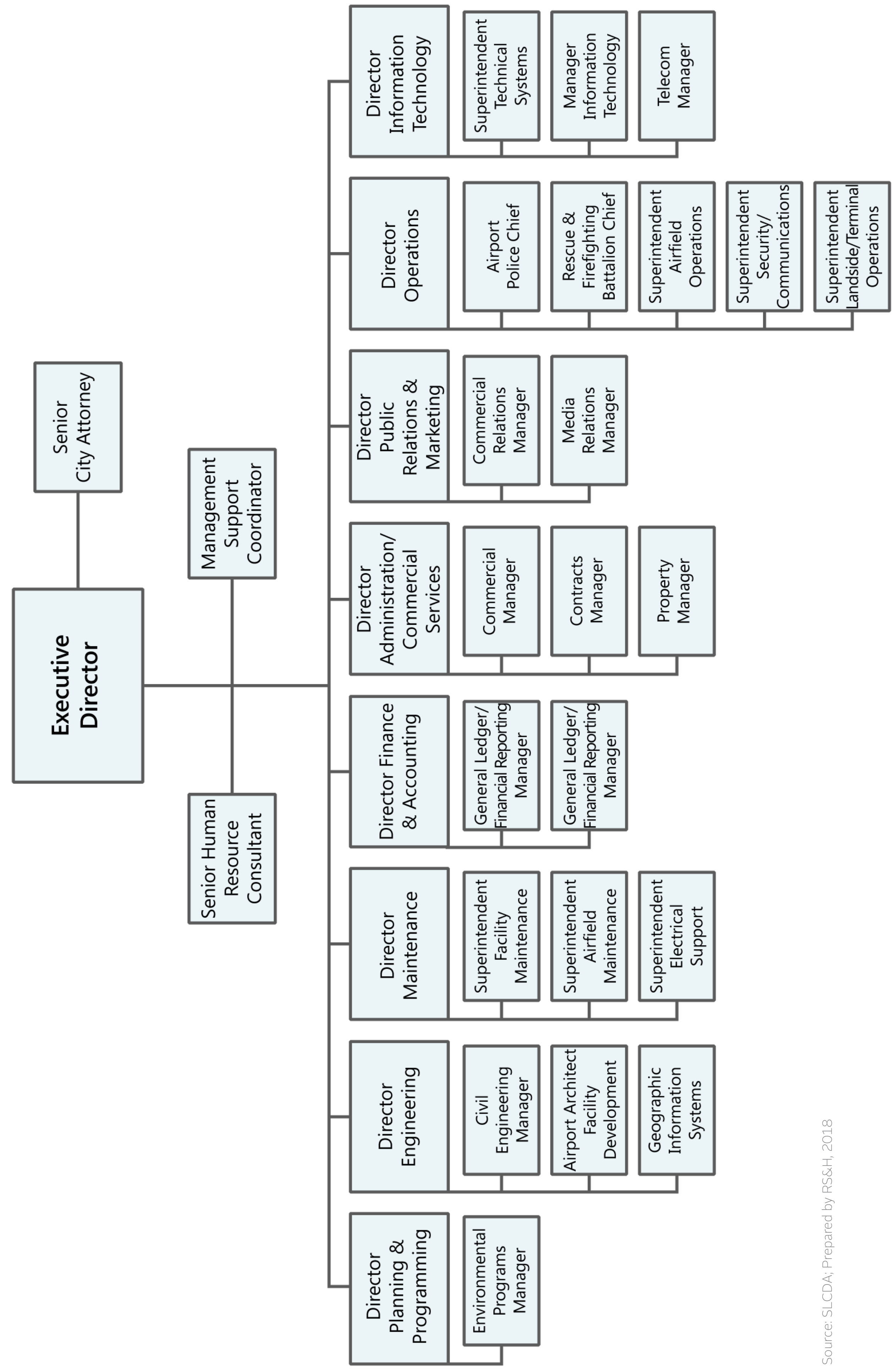
Source: SLCDA, 2018

1.2.2 Ownership, Management, and Oversight

The SLCIA is owned by Salt Lake City Corporation. As an enterprise department of Salt Lake City Corporation, the Department of Airports requires no funding from property taxes, local government funds, or special district taxes. Rather, all capital requirements are met from a variety of sources, including: earned airport operational revenues, revenue bonds, FAA approved passenger facility charges (PFCs), rental car customer facility charges (CFCs), and FAA Airport Improvement Program grants.

Salt Lake City's mayor, the City Council, and a nine-member advisory board of citizen volunteers oversee SLCIA's affairs. The Advisory Board provides a citizen and business perspective for SLCDA staff and makes recommendations to the Mayor regarding airport rules and regulations, airport staff, construction and expansion, airport policy, and airport financial matters. Airport board members are appointed by the Mayor to serve a four-year term. In addition to SLCIA, the SLCDA operates and manages South Valley Regional Airport (U42) and Tooele Valley Airports (TVY). The organizational structure of SLCDA's administrative leadership is shown in FIGURE 1-4.

Figure 1-4: SLCDA Organizational Chart



Source: SLCDA, Prepared by RS&H, 2018

1.3 AIRPORT SETTING AND ROLE

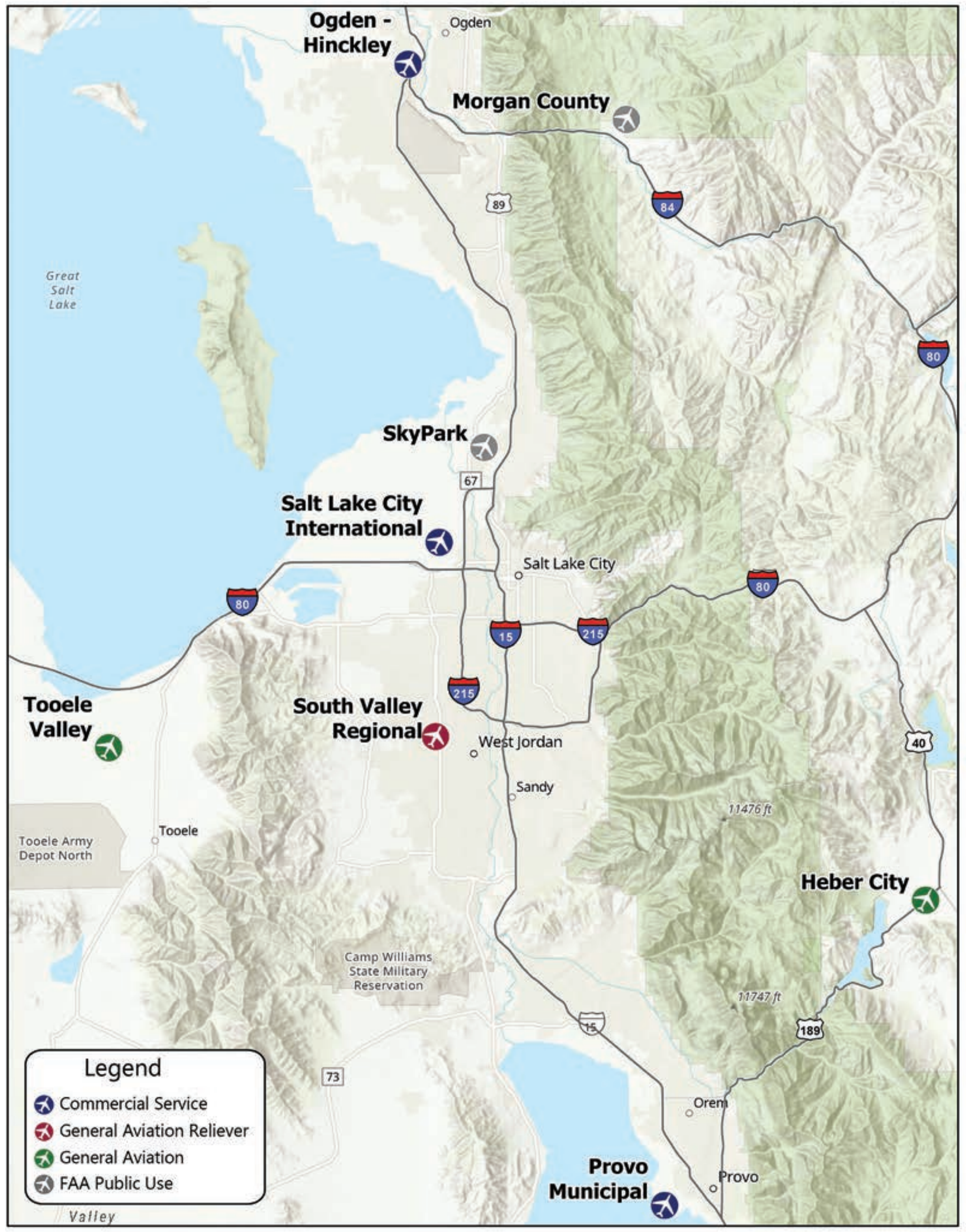
The following section describes the setting in which SLCIA operates and its role within the local, regional, and national aviation system.

1.3.1 Airport Setting

SLCIA is located in north-central Utah, five miles west of the Salt Lake City business district, near the junction of Interstate 80 and Interstate 215. SLCIA is an integral element of the overall Salt Lake Valley transportation network, which also includes robust road and rail systems. FIGURE 1-5 shows the regional location of Salt Lake City International Airport relative to the Salt Lake City urban areas.

SLCIA is located within Salt Lake County, part of the Salt Lake City metropolitan area and the Wasatch Front. The SLCIA service area, however, covers most of the State of Utah as well as extending into portions of neighboring states, including Colorado, Idaho, Nevada, and Wyoming. SLCIA is one of five airports in Utah that provide commercial air transportation services. FIGURE 1-6 illustrates SLCIA's location and the relative location of other commercial service airports in the State of Utah.

Figure 1-5: Salt Lake Valley Intermountain Region



Source: SLCDA; Prepared by RS&H, 2018

1.3.2 Airport Role

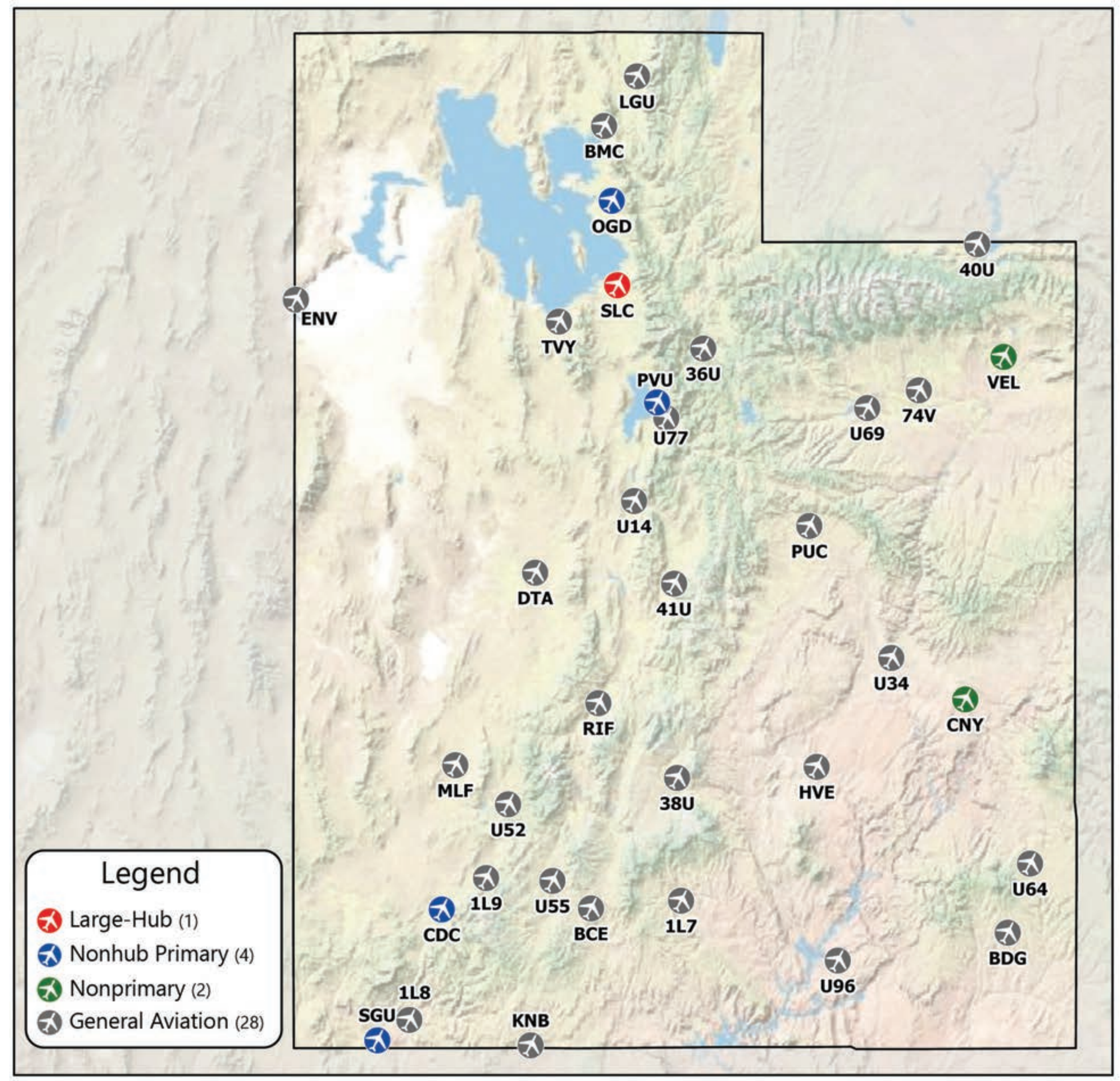
SLCIA plays an important role within the local and national aviation system. It serves more than one percent of the total commercial passengers in the nation and serves a full range of operation types. The Utah Continuous Airport System Plan defines SLCIA as an international airport, which provides essential national and international commercial airline access. SLCIA is the only airport defined with this role in the state.

1.3.2.1 Commercial Passenger Service

The FAA has identified in the National Plan of Integrated Airports Systems (NPIAS) approximately 3,400 airports in the United States that are significant to national air transportation and are eligible to receive federal grants under the Airport Improvement Program (AIP). Salt Lake City International Airport is a Large-Hub Primary Commercial Service airport within the NPIAS. Large-hub airports are defined as airports that enplane one percent or more of total U.S. passenger enplanements. With 11,143,738 enplanements, SLCIA ranked 24th in the nation, enplaning approximately 1.34% of all U.S. passengers for calendar year 2016 (the most recent year for which data is available). SLCIA is one of nine airports in the U.S. that serve as a hub for Delta Air Lines.

SLCIA holds an FAA issued 14 CFR 139 - Airport Certification, which is required for airports serving scheduled air carrier operations. There are four different classes of airports under Part 139 which differ in the type of commercial aircraft they

Figure 1-6: Utah NPIAS Airports



Source: SLCDA, 2018

can serve. SLCIA is certificated as a Class I airport, which allows it to serve scheduled operations of large (30+ seats) and small (10-30 seats) air carrier aircraft, and unscheduled passenger operations of large air carrier aircraft.

Currently, the following airlines provide service at SLCIA:

- AeroMexico
- Alaska Airlines
- American Airlines
- Delta Air Lines
- Frontier Airlines
- JetBlue Airways
- KLM Royal Dutch Airlines
- SkyWest Airlines
- Southwest Airlines
- United Airlines

Service by these airlines was provided to a total of 94 domestic and international non-stop locations. As of March 2018, the most frequent departure destinations from SLCIA include Denver International Airport (DEN), Los Angeles International Airport (LAX), and Phoenix – Sky Harbor International Airport (PHX). Airlines at SLCIA use a variety of regional jets and passenger jets; among the largest used include the Airbus 330-300 and Boeing 787-900.

1.3.2.2 General Aviation

SLCIA, and the two Fixed-Base Operators (FBOs) providing service, serve a wide variety of general aviation aircraft users including both aviation hobbyists and private businesses. These include corporate flying, law enforcement, fire suppression, aircraft rescue, medical air evacuation, flight training, air charters, transport of mail, government aviation, and the Utah Air National Guard operations. General aviation services are located along the eastern side of Airport property. The total number of based general aviation aircraft at SLCIA is 290, of which most are single-engine aircraft. However, SLCIA is experiencing strong corporate aviation growth and demand.
As part of the SLCDA, SLCIA operates within an airport system, including South Valley Regional Airport, Tooele Valley Airport, and several non-SLCDA airports, that provide aviation services to the metropolitan area. The SLCDA General Aviation Strategic Plan, updated as part of the master planning process, identifies the role of SLCIA as a primary commercial service airport with supporting general aviation facilities and services. General aviation operations are accommodated as a secondary activity to SLCIA's primary purpose of serving commercial air carrier operations. Future general aviation activities at SLCIA will focus on those most compatible with commercial services.

One important element when detailing the issues and existing conditions at an airport is the examination of neighboring airports and the services they offer. Understanding the services offered at surrounding airports aids in understanding how SLCIA fits into the local and regional aviation systems.
There are six NPIAS airports within an approximate one hour drive time from SLCIA. There is also one privately owned public-use airport. TABLE 1-1 lists those airports along with their role within the FAA NPIAS, based aircraft numbers, and estimated drive time from Salt Lake City International Airport.

Table 1-1: Airports Within One Hour Drive Time of SLCIA

ICAO	Airport	Town	Primary Runway Length	Pavement	Instrument Approaches	NPIAS Role	Based Aircraft	Approximate Drive Time from SLC
BTF	Skypark Airport	Bountiful, UT	4,700'	Asphalt	None	N/A[1]	217	19 Minutes
U42[2]	South Valley	Salt Lake City, UT	5,862'	Asphalt	RNAV	Regional	272	26 Minutes
TVY[2]	Tooele Valley	Tooele, UT	6,100'	Asphalt	ILS, RNAV	Local	16	33 Minutes
OGD	Ogden-Hinckley	Ogden, UT	8,103	Asphalt	ILS, RNAV, VOR	Non-hub Primary	241	43 Minutes
HCR	Heber City	Heber City, UT	6,898'	Asphalt	RNAV	Regional	78	55 Minutes
PVU	Provo Airport	Provo, UT	8,599'	Asphalt	ILS, RNAV, VOR	Non-hub Primary	111	61 minutes
BMC	Brigham City	Brigham City, UT	8,900'	Asphalt	RNAV	Regional	68	62 Minutes

Source: FAA 5010, Airnav.com, Google Maps
Note: (1) BTF is a privately owned public-use airport. (2)U42 and TVY are part of SLCDA system of airports.

The majority of these airports have sizable amounts of based aircraft, which is an indicator of an active general aviation community along the Wasatch Front.

Two airports, Ogden-Hinckley Airport and Provo Airport, also provide commercial service. However, as non-hub primary service airports, they perform substantially different roles than SLCIA as a large-hub airport. The closest hub airport to SLCIA is Boise Airport (BOI), which is a small-hub airport located an estimated five-hour drive time from Salt Lake City.

1.3.3 Meteorological Conditions

A review of the prevailing meteorological conditions is necessary to assist in the evaluation of aircraft performance characteristics. Temperature, precipitation, winds, visibility, and cloud ceiling heights are elements used to analyze an area's climate for airport planning purposes. National Weather Service (NWS), a division of the National Oceanic and Atmospheric Administration (NOAA), provides historic climate, weather, and precipitation information. The following information was derived from the NWS.

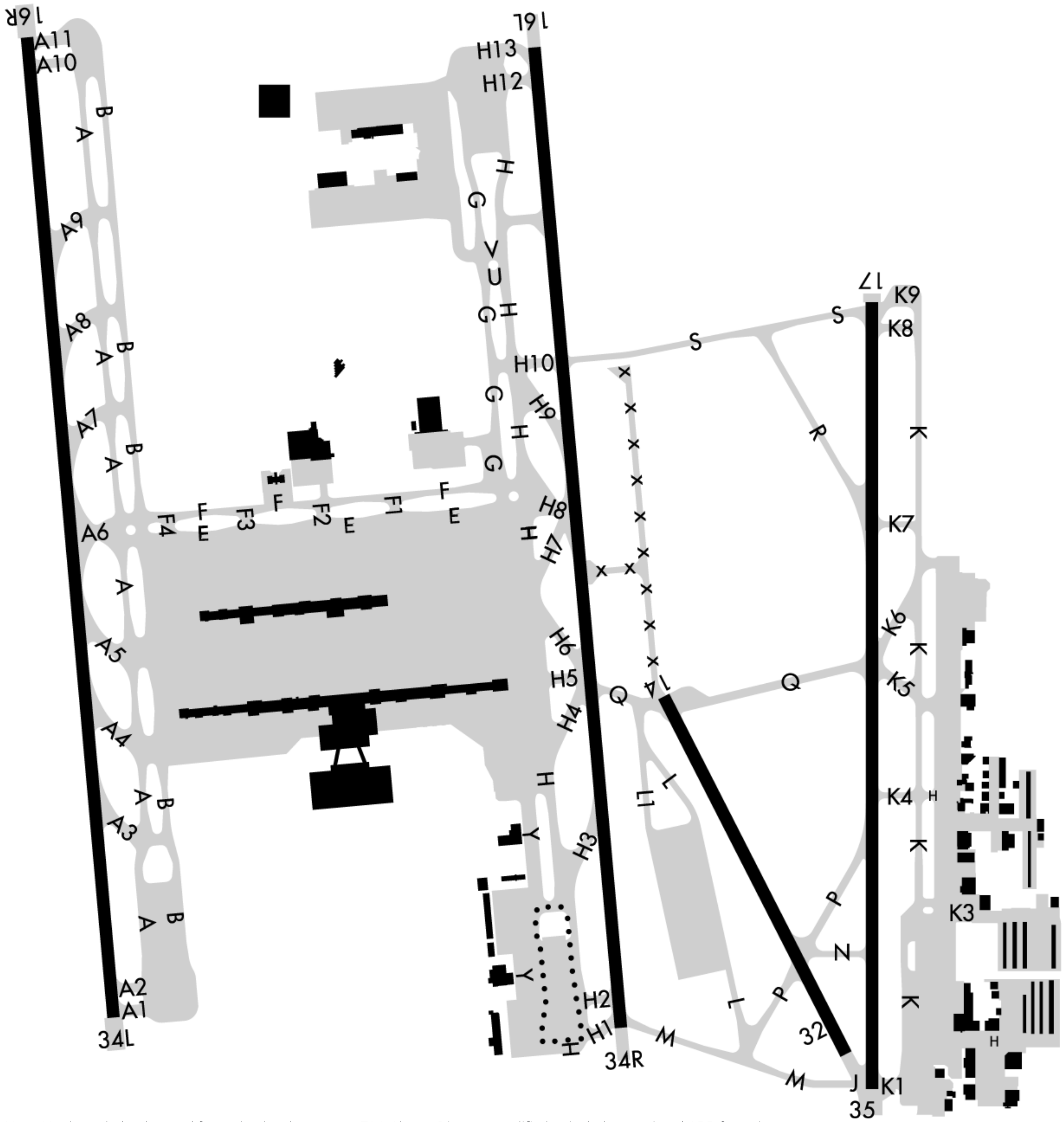
Salt Lake City is situated between the Wasatch Mountains to the east, the Oquirrh Mountains to the west, and Great Salt Lake to the northwest. The configuration of these ranges creates a typically moderate climate with moderate rainfall for the region. With the exception of the summer months, precipitation falls evenly throughout the year. Salt Lake City typically receives approximately 16.1 inches of annual precipitation. On average, there is measurable snowfall in Salt Lake City 35 days per year.

Temperatures during cooler months have average highs of 30 and 40 degrees Fahrenheit with average lows of 20 to 30 degrees Fahrenheit. Summer time highs usually average from 80 degrees to low 90 degrees. According to NOAA records, between 2000 and 2018 the Salt Lake City area averaged eight days above 100 degrees during the summer months, with most occurring in July. On average, the hottest month of the year is July with an average maximum temperature of 92.6 degrees, and the coldest month is January with average minimum temperature of 29.5 degrees.

1.4 AIRFIELD FACILITIES

This section provides an inventory of airside facilities at SLCIA, which includes the runway and taxiway systems as well as aprons and helipads. Additionally, this section will discuss airfield hot spots, existing pavement condition, navigational aids, and lighting. FIGURE 1-7 provides a graphical depiction of the airfield facilities.

Figure 1-7: SLC Airfield Diagram



Note: Not intended to be used for navigational purposes. FAA Airport Diagram modified to include completed ARP footprint.
Source: FAA Airport Diagram retrieved July 2018, Prepared by RS&H, 2018

1.4.1 Runway System

The runway system at SLCIA consists of two parallel runways oriented in the north-south direction (16R-34L and 16L-34R), a third nearly-parallel runway oriented north-south (17-35), and a northeast-southwest runway (14-32).

Runway 16L-34R is a 12,002-foot-long, 150-foot-wide grooved asphalt runway with precision markings and a High Intensity Runway Lighting (HIRL) system. Runway 16R-34L is a 12,000 foot-long, 150 foot-wide Portland Cement Concrete runway with precision markings and HIRL lighting. The two runway centerlines are separated by a distance of 6,155 feet. This separation distance allows air traffic control (ATC) to conduct independent operations on both runways simultaneously without intersecting the flight patterns. These two runways accommodate the majority of commercial airline activity at SLCIA.

Runway 17-35 is a 9,597-foot-long and 150-foot-wide grooved asphalt runway. This runway is equipped with precision runway markings and a HIRL system. Runway 14-32 is a 4,892 foot-long and 150 foot-wide grooved asphalt runway with visual markings and HIRL lighting system. Due to their proximity to the existing general aviation facilities along the east side of SLCIA, these two runways accommodate a majority of SLCIA's general aviation and military traffic, with Runway 14-32 used primarily for cargo aircraft operations. The runway characteristics for SLCIA are summarized in TABLE 1-2.

Table 1-2: Runway System

Runway	16L-34R	16R-34L	17-35	14-32
Orientation	NNW-SSE	NNW-SSE	N-S	NW-SE
Length (feet)	12,002'	12,000'	9,597'	4,892'
Width (feet)	150'	150'	150'	150'
AAC	D	D	D	B
Design Group	V	V	V	III
Surface Type	Grooved Asphalt	Grooved Concrete	Grooved Asphalt	Grooved Asphalt
Markings	Precision	Precision	Precision	Visual
Lighting	HIRL	HIRL	HIRL	HIRL
Distance Remaining Signs	Yes	Yes	Yes	No

Source: FAA 5010 Master Record Effective 3/1/2018, Airport Facilities Directory Effective 2/1/2018 to 3/29/2018

Declared distances are established for the runways and are summarized in TABLE 1-3. Declared distances, established in AC 150/5300-13A, *Airport Design,* represent the maximum distances available and suitable for meeting takeoff, rejected takeoff, and land distance requirements for aircraft.

For Runway 35, the Takeoff Run Available (TORA), Takeoff Distance Available (TODA), and the Accelerate Stop Distance Available (ASDA) is the full length of the runway (9,597 feet). However, the Landing Distance Available (LDA) is reduced to 9,273 feet due to the displaced landing threshold caused by the intersection between the Runway 14-32 Runway Obstacle Free Area (ROFA) and the approach end of Runway 35. The remaining runways have full runway length for TORA, TODA, ASDA, and LDA.
Runways are designed based on a Runway Design Code (RDC), which is determined using a combination of the aircraft approach speed category (AAC), airplane design group (ADG), and the approach visibility minimums, all of which are based on the critical aircraft using the runway. The AAC and ADG definitions are shown in TABLE 1-4 and TABLE 1-5. The visibility minimums, shown in TABLE 1-6 are expressed by Runway Visual Range (RVR) values.

The RDC provides the information needed to determine certain design standards that apply to the runway system to allow unrestricted operations of the design aircraft. The RDC for Runway 16L-34R, Runway 16R-34L, and Runway 17-35 is D-V-1200, meaning the runways can accommodate aircraft with approach speeds up to 166 knots, wingspans up to 214 feet, tail heights up to 66 feet tall, and visibility minimums below 1/4 mile. The RDC for Runway 14-32 is B-III-VIS, meaning the runway can accommodate aircraft with approach speeds up to 121 knots, wingspans up to 118 feet, and tail heights up to 45 feet.

The Runway Safety Area (RSA) is a defined surface surrounding the runway specifically prepared to reduce the risk of damage to aircraft in the event of an undershoot, overshoot, or excursion from the runway. The RSA is based on the RDC. The RSA for Runways 16L-34R, 16R-34L, and 17-35 extend 1,000 feet beyond the runway end (or 600 feet prior to the threshold where the runway end is equipped with vertical guidance) and is 500 feet wide centered on the runway centerline. The RSA for Runway 14-32 extends 600 feet beyond the runway end (or 600 feet prior to the threshold where the runway end is equipped with vertical guidance) and is 300 feet wide centered on the runway centerline.

Table 1-3: Declared Distances

Runway	Existing Runway Length	TORA	TODA	ASDA	LDA
Runway 16L-34R	12,002'				
16L		12,002'	12,002'	12,002'	12,002'
34R		12,002'	12,002'	12,002'	12,002'
Runway 16R-34L	12,000'				
16R		12,000'	12,000'	12,000'	12,000'
34L		12,000'	12,000'	12,000'	12,000'
Runway 17-35	9,597'				
17		9,597'	9,597'	9,597'	9,597'
35		9,597'	9,597'	9,597'	9,273'
Runway 14-32	4,892'				
14		4,892'	4,892'	4,892'	4,892'
32		4,892'	4,892'	4,892'	4,892'

Source: FAA 5010 Master Record Effective 3/1/2018, Airport Facilities Directory Effective 2/1/2018 to 3/29/2018

The Runway Object Free Area (ROFA) is an area centered on the ground on a runway centerline provided to enhance the safety of aircraft operations by remaining clear of objects, except for objects which are "fixed by function" and need to be located within the object free area for air navigation or aircraft ground maneuvering purposes. The ROFA for Runways 16L-34R, 16R-34L, and 17-35 extends 1,000 feet beyond the runway end and is 800 feet wide centered on the runway centerline. The ROFA for Runway 14-32 extends 600 feet beyond the runway end and is 800 feet wide centered on the runway centerline.

The Runway Protection Zones (RPZ) are areas at ground level prior to the threshold and beyond the runway end to enhance the safety and protection of people and property on the ground. The RPZ dimensions for each runway are based on the visibility minimums, AAC, and ADG of the runway. For the 16L, 16R, 34R, 34L, 17, and 35 runway ends, the approach RPZ dimensions are 1,000 feet (inner width) by 1,750 feet (outer width) by 2,500 feet (length). For the 14 and 32 runway ends, the approach RPZ dimensions are 500 feet (inner width) by 700 feet (outer width) by 1,000 feet (length). The departure RPZ dimensions for Runway 17 are 500 feet (inner width) by 1,010 feet (outer width) by 1,700 feet (length). The departure RPZ dimensions for all other runway ends, excluding Runway 17, are 500 feet (inner width) by 1,010 feet (outer width) by 1,700 feet (length).

Runway pavement bearing strengths are defined in SECTION 1.4.4, Airfield Pavement.

1.4.2 Helipads

SLCIA has two helipad facilities located on the general aviation apron. Helipad "B" (HB) is located in the south portion of the general aviation apron within the TAC Air leasehold area. Helipad "F" (HF) is located on the general aviation apron in front of Aircraft Rescue and Fire Fighting (ARFF) Station #11, just outside the movement area adjacent Taxiway K4. Information about the two helipads are detailed in TABLE 1-7.

Table 1-4: Aircraft Approach Categories

Aircraft Approach Category	Approach Speed
A	Approach speed less than 91 knots
B	Approach speed 91 knots or more but less than 121 knots
C	Approach speed 121 knots or more but less than 141 knots
D	Approach speed 141 knots or more but less than 166 knots
E	Approach speed 166 knots or more

Source: FAA AC 150/5300-13A, *Airport Design*

Table 1-5: Airplane Design Groups

Group	Tail Height	Wingspan
I	< 20'	< 49'
II	20' ≤ 30'	49' ≤ 79'
III	30' ≤ 45'	79' ≤ 118'
IV	45' ≤ 60'	118' ≤ 171'
V	60' ≤ 66'	171' ≤ 214'
VI	66' ≤ 80'	214' ≤ 262'

Source: FAA AC 150/5300-13A, *Airport Design*

Table 1-6: Visibility Minimums

RVR	Instrument Flight Visibility Category (statute mile)
5000'	Not lower than 1 mile
4000'	Lower than 1 mile but not lower than 3/4 mile
2400'	Lower than 3/4 mile but not lower than 1/2 mile
1600'	Lower than 1/2 mile but not lower than 1/4 mile
1200'	Lower than 1/4 mile

Source: FAA AC 150/5300-13A, *Airport Design*

Table 1-7: Helipad System

Helipads	HB	HF
Length (ft)	60'	60'
Width (ft)	60'	60'
Surface Type	Grooved Asphalt	Grooved Asphalt
Lighting	None	None
Markings	General Aviation	General Aviation

Source: Airport Data Collection, Prepared by RS&H, 2018

1.4.3 Taxiway System

SLCIA has an extensive taxiway system that provides access to four runways from numerous aprons, as previously shown in FIGURE 1-7. A list of the key taxiways at SLCIA is shown in TABLE 1-8. Runway 16L-34R is serviced by Taxiway H, which is a full-length parallel taxiway located west of the runway with a centerline separation of 600 feet. The position of this taxiway allows aircraft access to the terminal area, as well as the north and south cargo aprons. The runway is also serviced by a partial-length parallel taxiway, Taxiway G, which provides access to the terminal and north cargo apron from the Runway 16L end. Taxiway G and Taxiway H are separated 267 feet from taxiway centerline to taxiway centerline.

Runway 16R-34L is serviced by two full-length parallel taxiways, Taxiway A and Taxiway B located east of the runway. These taxiways are separated from the runway centerline by a distance of 600 feet and 867 feet respectively. The two taxiways provide access to Runway 16R-34L from the terminal and apron areas, and vice versa. Dual parallel Taxiway E and Taxiway F connect the east and west sides of the airfield. Located north of the terminal area, these taxiways are separated 267 feet from taxiway centerline to taxiway centerline.

Runway 17-35 is serviced by a full-length parallel taxiway, Taxiway K, with a centerline separation of 570 feet, with the exception of the first 1,800 feet at the approach end of Runway 35. The centerline separation in this area is reduced to 400 feet. This taxiway provides access to the general aviation facilities located along the east side of airfield. Access between the departure end of Runway 17 and the terminal area is provided primarily by Taxiway S.

Taxiway M is the main taxiway connector between the south end of Runway 34R and the departure ends of Runway 35 and Runway 32. This taxiway provides an east and west connection to both sides of the airfield.

Table 1-8: Taxiway System

Taxiway Designator	Width	Type
A	75'	Parallel (Rwy 16R-34L)
B	75'	Parallel (Rwy 16R-34L)
E	75'	Crossfield Taxiway (Rwy 16L-34R and Rwy 16R-34L)
F	75'	Crossfield Taxiway (Rwy 16L-34R and Rwy 16R-34L)
G	75'	Parallel (Rwy 16L-34R)
H	100'	Parallel (Rwy 16L-34R)
J	100'	Connector (Rwy 14-32)
K	75'	Parallel (Rwy 17-35)
L	75'	Deicing Pad Taxiway
M	90'	Connector (Rwy 14-32 and Rwy 16L-34R)
P	90'	Mid-Field Angled Taxiway (Rwy 17-35 and Rwy 14-32)
Q	100'	Rwy 17-35 and Rwy 14-32 Connector / Rwy 16L-34R Mid-Field Angled Taxiway
R	75'	Mid-Field Angled Taxiway (Rwy 17-35)
S	75'	Rwy 17-35 Connector / Rwy 16L-34R Mid-Field Connector
Y	75'	Parallel (Rwy 16L-34R)

Source: Airport Data Collection, Prepared by RS&H, 2018

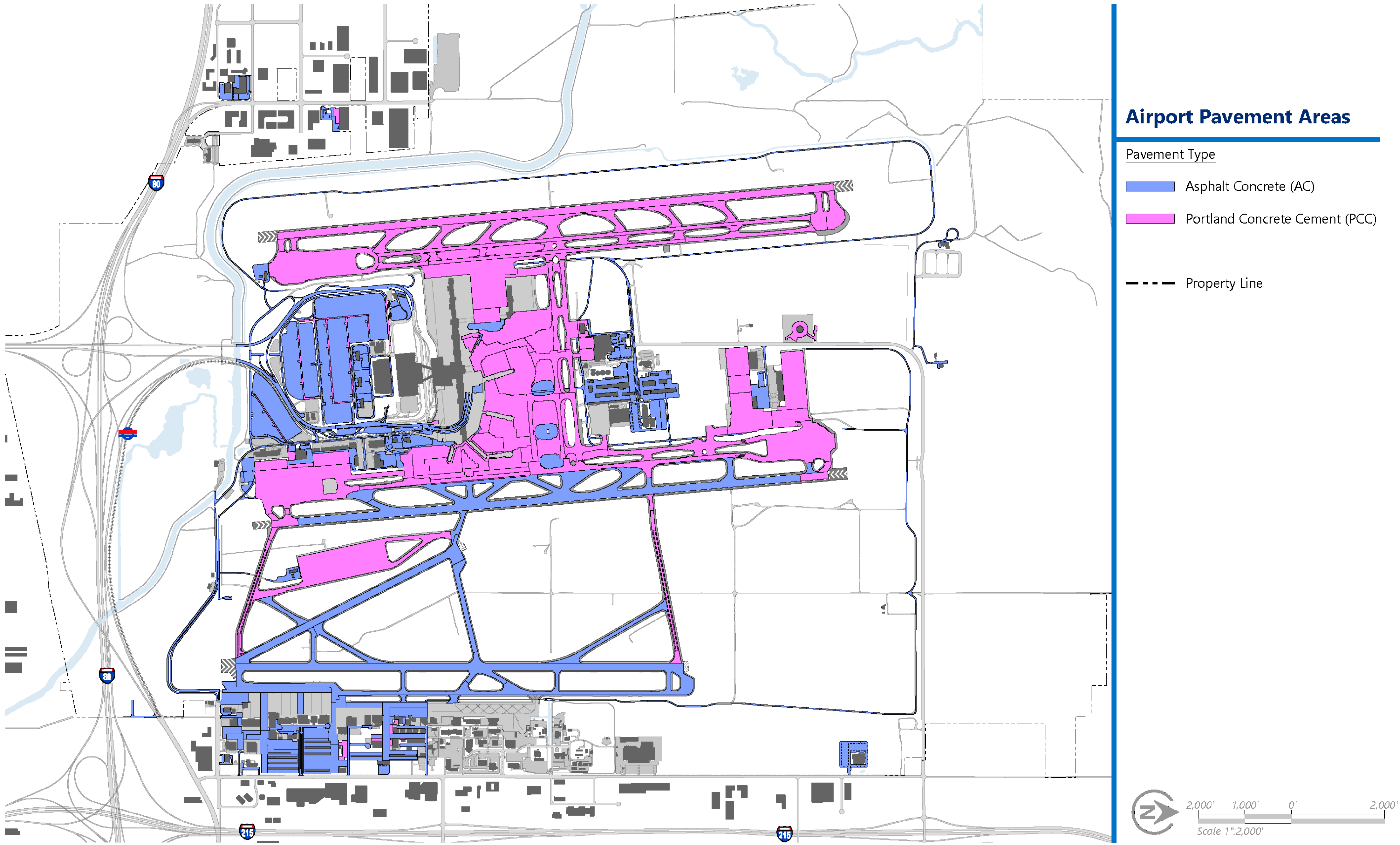
1.4.4 Airfield Pavement

SLCIA has approximately 4,075,000 square yards of paved airfield surfaces which are made up of either Asphalt Concrete (AC) or Portland Cement Concrete (PCC). These paved surfaces consist of runways, taxiways, and aprons as shown in FIGURE 1-9. It is important to note that a portion of the airfield pavements are installed, managed, and maintained by various SLCIA tenants.

To determine the condition of the SLCDA-owned and maintained paved airfield surfaces, the SLCDA conducts a Pavement Condition Index (PCI) survey every year as part of an ongoing Pavement Management Program (PMP) using the criteria contained in ASTM D5340 *Standard Test Method for Airport Pavement Condition Index Surveys.*[3]

[3] The 2017 update was the most recent survey at this time and data contained in this section is from that survey.

Figure 1-8: Airfield Pavement



Source: SLCIA pavement date, 2017 Prepared by RS&H, 2018

The purpose of the PCI survey is to determine a PCI value for each contiguous pavement section having uniform construction, maintenance, usage history (traffic volume/load intensity), and condition. The PCI value provides a measure of the present condition of the pavement based on the distresses observed on the surface of the pavement. This indicates the structural integrity and surface operational condition. The PCI values correspond with a pavement condition rating, shown in FIGURE 1-8, which provides more detailed description of pavement condition as a function.

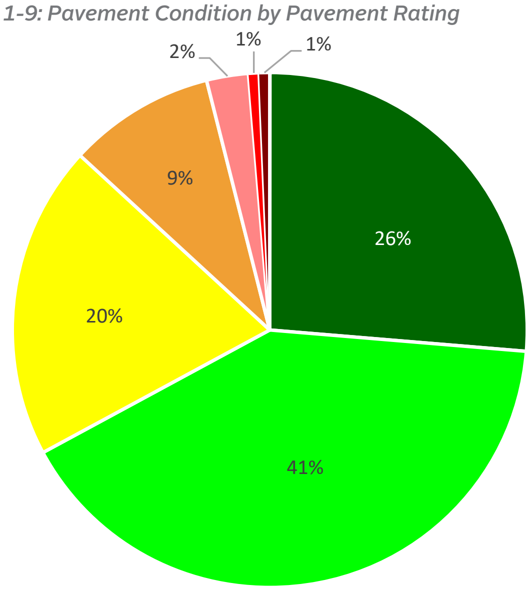
The following is a summary of each pavement condition rating:

- Pavement rated as "Good" condition, between 100 to 86 PCI, has minor or no distresses and will require only routine maintenance.
- Pavement rated as "Satisfactory" condition, between 85 to 71 PCI, has scattered low-severity distresses and very few, if any, medium-severity distresses that should need only routine maintenance.
- Pavement rated as "Fair" condition, between 70 to 56 PCI, has a combination of generally low- and medium-severity distresses. Maintenance and repair needs should be routine to major in the near term.
- Pavement rated as "Poor" condition, between 55 and 41 PCI, has low-, medium-, and high-severity distresses that probably cause some operational problems. Maintenance and repair needs should range from routine to reconstruction in the near term.
- Pavement rated as "Very Poor" condition, between 40 and 26 PCI, has predominantly medium- and high-severity distresses causing considerable maintenance and operational problems. Near-term maintenance and repair needs will be intensive. Pavement rated as "Serious" condition, between 25 and 11 PCI, has mainly high-severity distresses that cause operational restrictions. Repair needs are immediate. Pavement rated as "Failed" condition, between 10 and 0 PCI, is pavement that deteriorated and progressed to the point that safe aircraft operations are no longer possible. Complete reconstruction is required.

The airfield pavement condition rating at SLCIA from the 2017 PCI survey ranges from Good to Failed with most of the airfield pavements in either good or satisfactory condition as illustrated in FIGURE 1-8 and FIGURE 1-10. The airfield pavement condition ratings serve as the baseline to determine airfield pavement CIP projects over the course of the next five years.

In addition to the Pavement Condition Index, the runways also have an associated pavement bearing strength that define the weight limit at or below which an aircraft may operate on the runways. The weight bearing capacity for a runway is determined by the configuration of the aircraft landing gear system and is shown in TABLE 1-9.

Figure 1-9: Pavement Condition by Pavement Rating



Pavement Condition	Condition Color Code	Rating
Good		100-86
Satisfactory		85-71
Fair		70-56
Poor		55-41
Very Poor		40-26
Serious		11-25
Failed		10-0

Source: SLCDA 2017 PMP; Prepared by RS&H, 2018

Table 1-9: Runway Pavement Bearing Strength

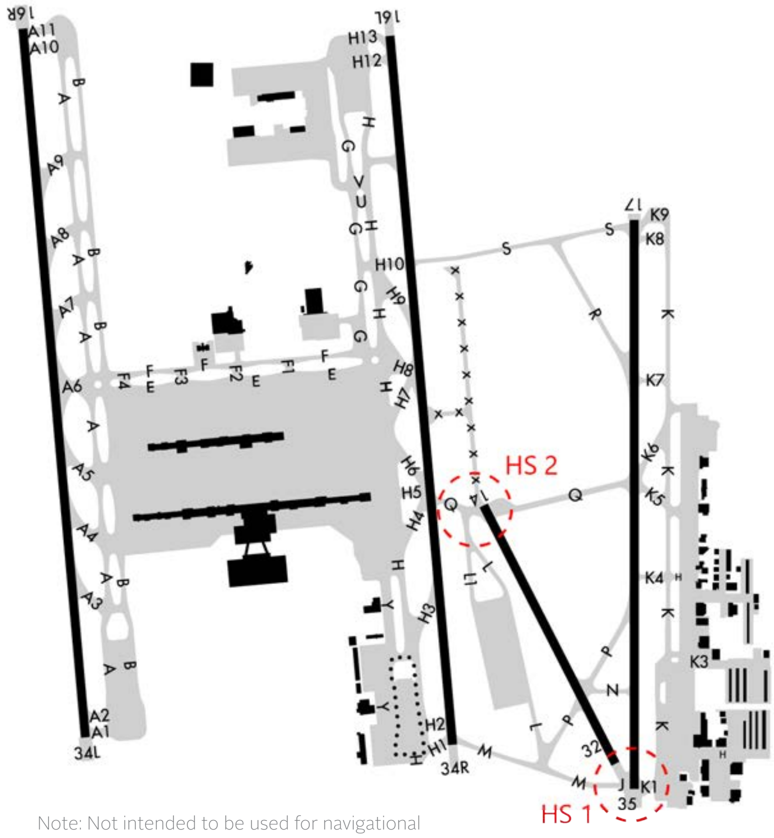
Landing Gear	Runway 16L-34R	Runway 16R-34L	Runway 17-35	Runway 14-32
Single (S)	60,000 lbs	60,000 lbs	60,000 lbs	60,000 lbs
Dual (D)	200,000 lbs	200,000 lbs	200,000 lbs	200,000 lbs
Two-Dual (2D)	350,000 lbs	350,000 lbs	350,000 lbs	350,000 lbs
Two-Dual/Double-Dual Tandem (2D/2D2)	850,000 lbs	850,000 lbs	850,000 lbs	850,000 lbs

Source: Airport Facilities Directory Effective 9/13/2018 to 11/7/2018

Figure 1-10: Airfield Pavement Condition (2017)

Source: SLCIA pavement date, 2017 Prepared by RS&H, 2018

Figure 1-10: Airfield Pavement Condition (2017)



Note: Not intended to be used for navigational purposes. FAA Airport Diagram modified to include completed ARP footprint.
Source: FAA Airport Diagram retrieved July 2018, Prepared by RS&H, 2018

1.4.5 Airfield Hot Spots

The FAA has defined specific locations at airports as hot spots to help alert airport users to locations on the airfield that are confusing and have a history of runway incursions or potential risk of collision. SLCIA has two designated hot spots. The first is located near the thresholds of Runway 32 and Runway 35. This location is designated by the FAA as "HS1". The second hot spot is located at the intersection of Taxiway Q and Taxiway L, near the approach end of Runway 14. This location is designated by the FAA as "HS2". FAA Airport Diagram publications provide a description of why these locations are listed as hot spots, as shown in FIGURE 1-11.

The following is a list of hot spots at SLCIA with a brief description:

- **HS1** – Wrong runway departure risk. Hold lines for Runway 32 and Runway 35 are at the same location at Taxiway K1 and Taxiway M with short taxi distance to either runway.
- **HS2** – High risk of runway incursions at Runway 14-32 on Taxiway Q due to short taxi distance between runways.

In 2015, the FAA initiated a pilot program to improve runway safety at airports. The Runway Incursion Mitigation (RIM) program, allows the FAA to focus on reducing the risk of runway incursions at specific airfield intersections at an airport. The following subsections provide an overview of the RIM program along with the historic runway incursions that have occurred at SLCIA.

1.4.5.1 Runway Incursion Mitigation Program

In an effort to improve the safety of the NPIAS, the FAA evaluated runway incursion data at airports across the United States. At the time of this writing, the national RIM program has compiled a list of incursions occurring between 2008 and 2016, and has identified airports where geometry risk factors may have contributed to these incursions. The FAA initiated the multi-year RIM program to identify, prioritize, and develop strategies to mitigate risk at these locations. SLCIA locations where three or more incursions occurred in a given year, or more than nine cumulative incursions occurred over the evaluation period, were identified for further study. FAA continually collects and updates the RIM inventory list on an annual basis.

Both HS1 and HS2 are listed on the Preliminary Inventory List of Airport Locations in the RIM program. Intersections on the RIM inventory list need to be studied and evaluated to determine an effective solution to reduce runway incursions. The configuration of the taxiways in these particular areas will be further assessed in the Facility Requirements and Alternatives chapters of this master plan.

1.4.5.2 Historic Runway Incursions

A Runway Incursion (RI), as defined by the FAA is "any occurrence at an Aerodrome involving the incorrect presence of an aircraft, vehicle, or pedestrian on the protected area of a surface designated for the landing and takeoff of aircraft." There are three different classifications of runway incursions. These include operational incidents, pilot deviations, and vehicle/pedestrian deviations. Runway incursions may be the result of multiple factors such as a breakdown in communications, pilot error, Air Traffic Control Tower (ATCT) error, vehicle driver error, and/or airfield design factors.

The three classifications of runway incursion are defined below:

- Operational Incident (OI) – A surface event attributed to ATC action or inaction.
- Pilot Deviation (PD) – An action of a pilot that violates any Federal Aviation Regulation.
- Vehicle / Pedestrian Deviation (VPD) – Any entry or movement in the movement area or safety area of a vehicle or pedestrian that has not been authorized by ATC.

Between the periods of June 1st, 2013 and June 30th, 2018, 62 runway incursions[4] were documented at various locations at SLCIA. Of the 62 recorded runway incursions, 18 took place at HS1 and 9 took place at HS2. A large majority of runway incursions took place east of the Terminal building. A complete summary of the 62 runway incursions can be found in the Appendix folder of the report.

1.4.6 Navigational Aids

Navigational Aids, known as NAVAIDS, are visual, electronic, and meteorological air navigation equipment that facilitate flight operations and enhance flight safety at an airport during instances of inclement weather and/or darkness. Visual aids include pavement markings, signage, and airfield lighting systems. Electronic aids are devices used for aircraft instrument approaches. Meteorological aids provide the SLCIA with real-time weather updates for air traffic control personnel and pilots. FIGURE 1-12 displays the locations of the various NAVAIDs found at SLCIA.

1.4.6.1 Visual Aids

Visual aids and airfield lighting are necessary to facilitate flight operations and enhance safety during periods of inclement weather and/or darkness by providing guidance to pilots in the air and on the ground. Visual aids at SLCIA are listed in TABLE 1-10.

The Approach Lighting Systems (ALS) provide a means of transition from instrument flight to visual flight for pilots on final approach. The approach lighting systems installed at SLCIA are the Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR) and Approach Light System with Sequenced Flashing Lights (ALSF-2). The MALSR consists of a combination of threshold lights providing runway alignment information, height perception, and horizontal references for Category I instrument precision approaches. The ALSF-2 is a high intensity approach light system for operations under Category II or Category III conditions. (Instrument approaches are discussed in more detail in SECTION 1.5, Airspace). Runways 17 and 35 are equipped with MALSR systems. Runways 16L, 16R, 34L, and 34R are equipped with ALSF-2 systems.

The Precision Approach Path Indicators (PAPI) assist in providing visual glide slope guidance to pilots on approach. The PAPIs are designed to visually inform the pilots during the approach when the descent is too high or low from the runway threshold or on proper angle of approach. Each runway at SLCIA is equipped with four-box PAPIs located on the approach end.

Table 1-10: Navigational Aids

	Runway		Runway		Runway		Runway	
	16L	34R	16R	34L	17	35	14	32
Visual Aids								
Lighting System	HIRL	HIRL	HIRL	HIRL	HIRL	HIRL	HIRL	HIRL
Approach Lighting	ALSF-2	ALSF-2	ALSF-2	ALSF-2	MALSR	MALSR	-	-
Touchdown Zone Lighting	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Visual Slope Indicator	PAPI (P4L)	PAPI (P4L)	PAPI (P4L)	PAPI (P4L)	PAPI (P4R)	PAPI (P4L)	PAPI (P4L)	PAPI (P4L)
Runway Markings	Precision	Precision	Precision	Precision	Precision	Precision	Visual	Visual
RWY Centerline Lights	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Electronic Aids (Approaches)								
ILS or LOC DME	Yes	Yes	Yes	Yes	Yes	Yes	No	No
ILS CAT II-III	Yes	Yes	Yes	Yes	Yes	No	No	No
RNAV RNP	No	No	No	No	No	No	No	No
RNAV GPS	Yes	Yes	Yes	Yes	Yes	Yes	No	No
VOR/DME	No	No	No	No	No	No	No	No

Source: FAA Chart Supplements, FAA.gov, Prepared by RS&H, 2018

Notes: ALSF-2 = High intensity approach light system with sequenced flashers, MALSR = Medium intensity approach light system with runway alignment indicator lights, PAPI = Precision approach path indicator.

[4] FAA Aviation Safety Information Analysis and Sharing (ASIAS) – Runway Incursion (RWS), 2018

Figure 1-12: SLC Navigational Aid Locations

Note: Only on-airport navigational aids are shown in graphic.

Source: Prepared by RS&H, 2018

Runways 17-35, 16L-34R, and 16R-34L have precision instrument markings which provide pilots with landing and takeoff guidance during periods of inclement weather or poor visibility. These markings consist of threshold markings at the end of the runway, five sets of touchdown zone markings, and one set of aiming points. The markings are in accordance with 14 CFR 139.311(a) and AC 150/5340-1, *Standards for Airport Markings*. Runway 14-32 contains visual markings including threshold and touchdown markings.

Various types of airfield signs are present at SLCIA to assist pilots with identifying their location on the airfield and directing them to their intended destination. Such signs include taxiway and runway location signs, directional signs, and assorted informational signs. All runways, except for Runway 14-32, are equipped with runway distance remaining signs.

1.4.6.2 Electronic Aids

Electronic Aids include devices and equipment used for aircraft instrument approaches, which are listed in TABLE 1-10. Some approaches rely on Very High Frequency Omni-Directional Range (VOR) aids, which is a ground-based facility that transmits high frequency radio signals 360 degrees in azimuth from the station. These signals help the pilot turn at a given point above the ground or fly along a radial to/from the station. VORTAC is a combination VOR and tactical air navigation system (TACAN), which also provides omni-directional azimuth bearing information for military aircraft. Four VORTACs currently operate near SLCIA: Wasatch (TCH), Ogden (OGD), Fairfield (FFU), and Provo (PVU) VORTACs.

SLCIA is also equipped with Distance Measuring Equipment (DME) which allows pilots to determine their distance from a land-based transponder. TACANs are generally more accurate than a combined VOR/DME, but they can also be used with VOR and DME facilities.

Runways 16L, 34R, 16R, 34L, 17, and 35 feature Instrument Landing Systems (ILS), which is an approach path that provides horizontal and vertical alignment for an aircraft under Instrument Flight Rules (IFR) or poor weather and visibility conditions that typically contains three components: approach lights, a localizer, and a glide slope. Guidance information is provided through the combination of a localizer and a glide slope. Localizers provide horizontal runway centerline guidance whereas glide slopes provide vertical guidance.

SLCIA's Area Navigation (RNAV) and Global Positioning System (GPS) approaches rely on the space-based GPS satellite system to provide position and time information. GPS satellites are owned by the United States Government and controlled by the Department of Defense.

SLCIA also features Runway Visual Range (RVR) equipment on Runway 16L-34R and Runway 16R-34L. This system consists of three sensors, one on each end of the runway and one in the center, which work to determine real-time visibility conditions. Additionally, Runway 17-35 is equipped with an RVR consisting of two sensors, one on each end of the runway.

The SLCIA ATCT hosts the terminal radar approach control (TRACON) facility for SLCIA. The TRACON facility provides radar air traffic control service throughout the terminal area. Additionally, to support the TRACON, an Airport Surveillance Radar (ASR) is stationed southeast of the Runway 34R end. The ASR is used by the FAA air traffic controllers to track aircraft moving through the airspace they are controlling.

1.4.6.3 Meteorological Aids

SLCIA has two Automatic Surface Observing Systems (ASOS) operating on the airport. The ASOS provides real time weather updates to air traffic control personnel and pilots, as well as recording data used by the National Weather Service. Additionally, SLCIA has a Runway Weather Information System (RWIS) which provides real time data used by SLCDA operations personnel. The ASOS system is located near the end of Runway 32.

SLCIA also has a Low Level Wind Shear Alert System (LLWAS) with ground-based detection facilities located around airport. A LLWAS system generates warnings associated with the detection of wind shear and microburst events which are especially dangerous to aircraft operating in the arrival and departure phases of flight.

1.5 AIRSPACE

The airspace system for Salt Lake City International Airport, and the rest of the United States, is regulated by the FAA. In establishing and regulating the National Airspace System (NAS), the FAA's goal is the safe and efficient use of navigable airspace. The NAS is comprised of air navigation facilities, ATC facilities, airports, and the governing rules and regulations under which the system operates.

The following sections describe the SLCIA airspace system, the responsibilities of various air traffic control facilities, as well as flight path limitations imposed by the regional geography, local communities, and the structure of the airspace system itself. In addition, this section will describe preferred runway uses, aircraft approaches and departures, special air traffic rules, and noise mitigation strategies.

1.5.1 National Airspace Structure

Airspace can be categorized as either controlled or uncontrolled. The area over and surrounding SLCIA is in controlled airspace. Controlled airspace is defined as positive navigational control, meaning the pilot is communicating with a controller on the ground, providing either directions to takeoff, land or transition through the airspace.

The different classes of controlled airspace are defined as follows:

- **Class A Airspace** – Generally includes all airspace between 18,000 feet mean sea level (MSL) and Flight Level (FL) 600. In order to fly in this class of airspace both the pilot and the aircraft must be instrument rated and obey instrument flight rules (IFR).
- **Class B Airspace** – Generally consists of airspace from the surface to 10,000 feet MSL, although SLCIA Class B airspace extends to 12,000 feet MSL. The dimensions of this type of airspace are tailored to specific airport conditions based on operational needs and topographic constraints. Class B airspace is associated with airports that experience large numbers of IFR operations and/ or passenger enplanements. Class B airspace is supported by a 30 nautical mile (NM) radius which is defined as the terminal area. ATC clearance is required to enter Class B airspace and all aircraft within it receive separation services, therefore a Mode C transponder is required.
- **Class C Airspace** – Class C airspace typically surrounds medium sized airports. Dimensions of Class C airspace typically exist from the surface to 4,000 feet above the airport's elevation, usually extending in a 5 NM to 10 NM radius. Two-way radio communication with ATC is required prior to entering Class C airspace and must be continually maintained. Mode C transponders are also required in Class C airspace.
- **Class D Airspace** – Class D airspace typically extends from the surface to 2,500 feet above the airport's elevation at airports with an operational ATCT. Each configuration is tailored to the specific airport but usually Class D airspace spans a 5 NM radius. Unless otherwise authorized and published, aircraft must establish two-way radio communication with ATC prior to entering Class D and maintain communication while in the airspace.
- **Class E Airspace** – Generally, all controlled airspace that is not defined as A, B, C, or D is Class E. Class E airspace is often provided to transition aircraft from the terminal to the en route environment. Class E also typically surrounds many non-towered airports. In most cases, Class E airspace either begins at the surface, 700 feet above ground level (AGL), or 1,200 feet AGL. Class E extends up to, but not including, 18,000 MSL and all airspace above FL600 is categorized as Class E.

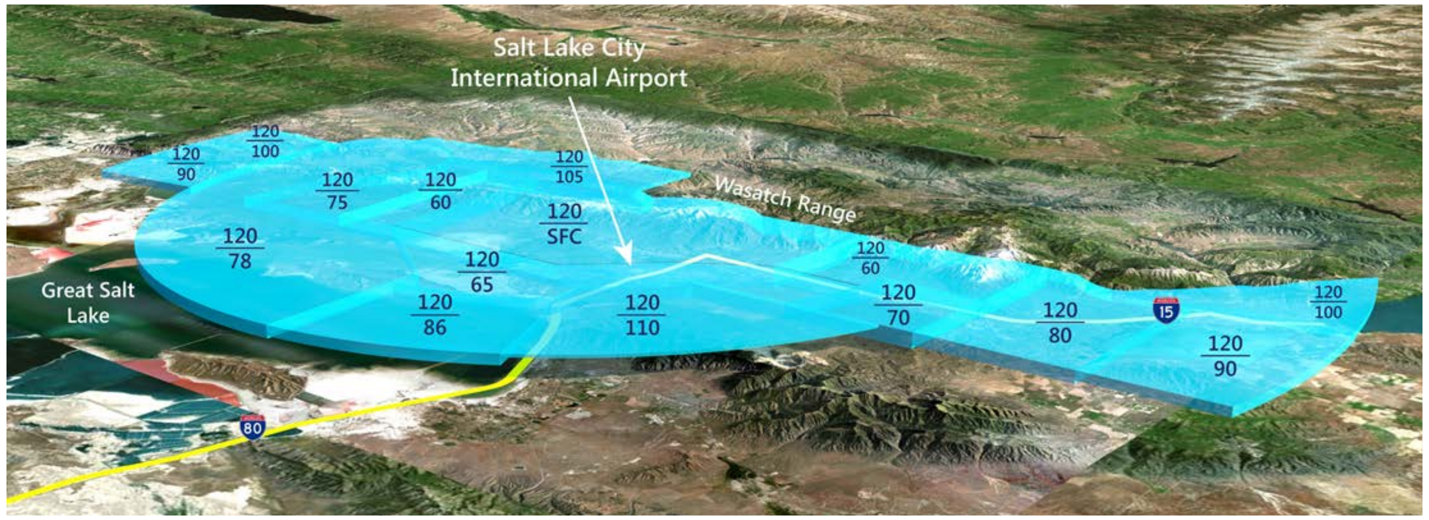
1.5.2 Salt Lake City Airspace Structure

The airspace over SLCIA is Class B, which is the most restrictive class of controlled airspace. All aircraft entering the SLCIA Class B Mode C Veil (Terminal Area) are required to obtain ATC clearance prior to entering, establish and maintain two-way radio communication with ATC, and have operational, all navigational equipment required of Class B and the authorized published flight procedures to be flown. Class B airspace is designed to enhance safe operations in and around the airport by restricting uncontrolled traffic. In general, Class B airspace restrictions enable larger and faster flying aircraft, such as the commercial airline jets operating at SLCIA, to operate unimpeded by what are typically smaller and slower general aviation aircraft. At the very minimum, pilots are required to have a private pilot's license or meet the student pilot requirements outlined in 14 CFR 61 to fly in Class B airspace. Helicopters are not required to have special equipment or a transponder, if they operate at or below 1,000 feet above the elevation of an airport.

In recent years, as part of the FAA NextGen program, the FAA has rolled out an initiative which mandates aircraft operating in most controlled airspace classes, including those at SLCIA, to be equipped with, at a minimum, Automatic Dependent Surveillance – Broadcast (ADS-B) Out by January 1, 2020. ADS-B equipment is designed with two functions, the ability to broadcast data to (ADS-B Out) and receive data from (ADS-B In) other ADS-B equipment. ADS-B Out equipment broadcasts information such as position, identification, and velocity as well as other details specific to the individual aircraft, which are capable of being received by ADS-B In equipment. At the time of this writing, installation of ADS-B In equipment has not yet been mandated by FAA. Ultimately, the new ADS-B equipment is designed to increase pilot situational awareness by displaying the locational data about nearby aircraft. Though pilots flying in the Salt Lake City terminal area are required to have a Mode C transponder today, all aircraft that continue to fly in the area once the ADS-B mandate goes into effect, will need to be fitted with this new technology.

Three public airports lie under the SLCIA Class B airspace. Although the SLCIA Class B airspace exists above these airports and restricts certain operations above them, other less restrictive airspace lies between the airfield surface and the beginning of the Class B floors which provides corridors for controlled and uncontrolled aircraft operations, including general aviation. The first is a non-towered public airport, Skypark Airport (BTF), located within the immediate vicinity of SLCIA, approximately five miles to the northeast. The Class B airspace floor begins at 7,500 MSL above BTF. The second airport under the SLCIA Class B airspace is South Valley Regional Airport (U42) which is located about 10 statute miles (SM) directly south of SLCIA. SLCIA Class B airspace floor begins at 6,000 MSL above U42. The third airport located under SLCIA Class B airspace is Ogden-Hinckley Airport, which is a towered airport roughly 26 SM north of SLCIA. Additionally, there is one military airport, Hill Air Force Base (HIF), located under SLCIA Class B airspace approximately 20 SM north of SLCIA. SLCIA Class B airspace floor begins at 7,800 MSL above HIF. A three dimensional graphic showing vertical limits of SLCIA Class B airspace in the Salt Lake Valley is shown in FIGURE 1-13 and FIGURE 1-14.

Figure 1-13: SLC Class B Airspace



Source: Google Earth; FAA Sectional Chart; Prepared by RS&H, 2018

Figure 1-14: U42 Under SLC Class B Airspace Cross Section

Source: Google Earth; FAA Sectional Chart; Prepared by RS&H, 2018

There are other airports located within the 30 NM SLCIA Terminal Area. Tooele Valley Airport (TVY) is a non-towered public airport located approximately 22 SM southwest of SLCIA. Morgan County Airport (42U) is a non-towered public airport positioned roughly 26 SM miles northeast of SLCIA. There are also a couple of private airstrips falling within the SLCIA 30 NM radius, including Cedar Valley 30 SM to the south, and Hoytsville, in the mountains about 30 SM to the east.

In terms of special use airspace, the terminal area for SLCIA contains five restricted areas to the south and southwest. Restricted areas are zones where operations are hazardous to nonparticipating aircraft and contain airspace within which the flight of aircraft, while not wholly prohibited, is subject to restrictions. Unusual, often invisible hazards to aircraft (such as artillery firing, aerial gunnery, or guided missiles) can exist in restricted areas. The first restricted area is R-6403. It is a relatively small area approximately 29 miles southwest of SLCIA. Restrictions on aircraft flight exist up to 9,000 feet MSL from 8:00am to 8:00pm Monday through Thursday. There are no air to ground communication radio frequencies to monitor for R-6403. The last four restricted areas (R-6412 A, B, C, and D) exist roughly 24 miles south of SLCIA over the Camp Williams State Military Reservation, which is a Utah National Guard training site. For R-6412 A and C, restrictions exist up to 9,000 feet MSL. For R-6412 B and D, restrictions exist from 9,000 feet MSL to 10,000 feet MSL. Times of restrictions are posted by Notice to Airmen (NOTAM) for all four areas and Salt Lake TRACON is the controlling agency.

A Military Operations Area (MOA) contains airspace designated and used for military operations. The closest MOA is located approximately 52 miles east of SLCIA, over the Great Salt Lake Desert. Restricted airspaces are also located over the desert. Shape and sizes of both the MOAs and restricted airspaces vary. FIGURE 1-15 shows the SLCIA Terminal Area.

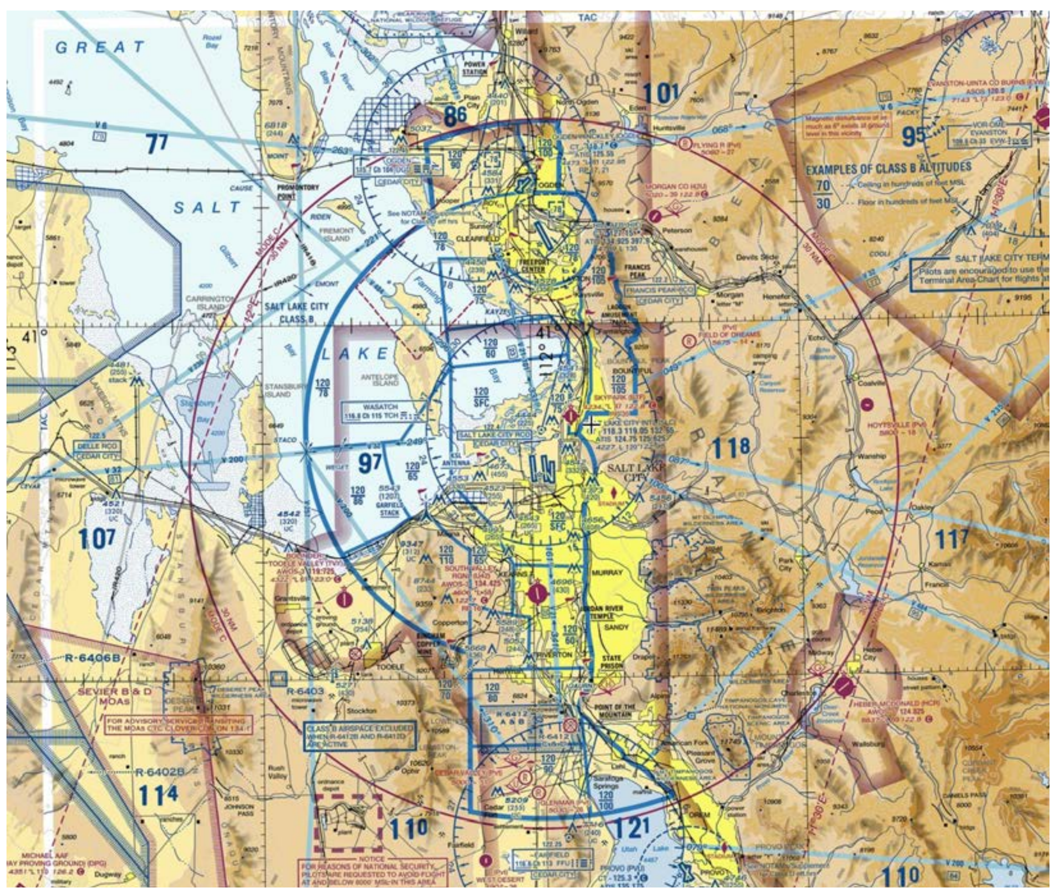
1.5.3 Airport Traffic Control Procedures

The FAA controls airspace through several layers of air traffic control facilities. In broad terms, the National Airspace System is broken out into two categories: Air Route Traffic Control Centers (ARTCC) and Air Traffic Control (ATC) facilities. The following sections describe these facilities as they relate to SLCIA airspace management.

1.5.3.1 Air Route Traffic Control Center

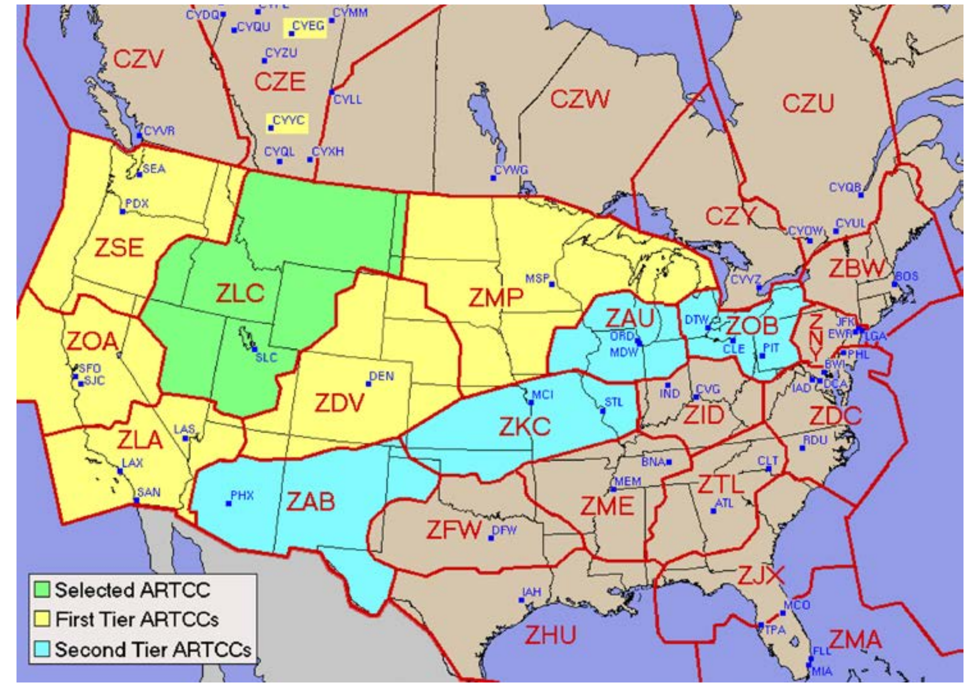
The Salt Lake City Air Traffic Control Center (ZLC) (referred to as "Salt Lake Center") serves as one of 22 FAA ARTCCs for the NAS. Salt Lake Center services are provided from a secure facility located on the east side of SLCIA, adjacent the Utah Air National Guard Base. Salt Lake Center provides separation and sequencing of arriving and departing aircraft as well as control over en route traffic flying over the SLCIA airspace under IFR. ZLC controls aircraft within one of the largest service areas, covering 350,000 square miles. The ZLC service area covers the majority of Utah and Montana, the western half of Wyoming, the southern portion of Idaho, the far eastern section of Oregon, the northeast area of Nevada, and small regions of the western Dakotas. The ZLC service area is shown in FIGURE 1-16.

Figure 1-15: SLC Sectional Chart



Source: www.faa.gov/air_traffic/flight_info/aeronav/digital_products/vfr, Retrieved July 31, 2018

Figure 1-16: FAA ARTCC Zones Within the Continental United States



Source: www.faa.gov/air_traffic/flight_info/aeronav/digital_products/vfr, Retrieved July 31, 2018

1.5.3.2 Air Traffic Control

The Salt Lake City ATCT is responsible for controlling the movement of aircraft within the 30 NM SLCIA Terminal Area. The SLCIA ATC service area extends from Plain City in the north to the city of Provo in the south, covering a range of approximately 70 miles. Due to topographic constraints, primarily the Wasatch Mountain Range, the service area only extends approximately 30 miles from east to west. SLCIA Class B airspace is centered on the airport. SLCIA ATCT provides two services, housed in a single facility including, local Salt Lake City Air Traffic Control (referred to as Salt Lake Tower) and Salt Lake City Terminal Radar Approach Control (referred to as Salt Lake TRACON).

These two divisions are defined below:

- **Salt Lake Tower** – Provides clearances and instructions to aircraft and ground vehicles.
- **Salt Lake TRACON** – Controls airspace within the terminal area.

Salt Lake Tower is operated continuously, meaning air traffic controllers are on duty actively managing traffic all day, every day. The tower is staffed with at least one controller at all times and operations are managed by an operations supervisor. Staff counts can vary throughout the day, depending upon demand levels. Pilots contact the applicable ATC service through assigned radio frequencies which can be found in the most current published FAA Airport/Facility Directory.[5] Salt Lake Tower divides control services into Approach Control, Departure Control, Tower, Ground control, Pre-taxi Clearance, Pre-departure Clearance, and Clearance Delivery. For the most part, ATC services are intuitive since each serves the flight action associated with its title, i.e., aircraft approaching to land at the airport contact "Approach Control", aircraft seeking ground movement taxi clearances contact "Ground Control", etc. The "Tower" frequency manages clearing aircraft traffic on and off the active runways. Based on the large amount of operations experienced annually by SLCIA, each runway has a separate ATC frequency, with the exception of Runway 14-32. These separate frequencies help controllers better manage workload by dividing work into designated sectors. Ground communications are also divided into two separate ground frequencies based on whether the activity is on the east portion and or west portion of the airfield. Pilots or vehicle operators on the airport are required contact the appropriate controller to obtain clearance and/or instructions based on their location.

The second division of air traffic control is the Salt Lake TRACON facility, designated with the code "S56". The TRACON is overseen by an operations manager. The TRACON Operations Manager directs a team of supervisors, each of whom manage a staff of air traffic controllers. The primary role of the TRACON facility is to provide safe separation of aircraft operating within the SLCIA Terminal Area. Salt Lake TRACON controllers provide air surveillance radar service for instrument approaches to SLCIA and for U42. In addition to this, TRACON

[5] The FAA Airport/Facility Directory is updated and published in 56 day cycles.

controllers handle and direct IFR arrivals to other local airports extending as far south as Provo Airport. This facility, like the SLCIA ATCT, is actively operated continuously.

1.5.4 VFR and IFR Procedures

Air traffic operations generally fall within two categories: aircraft flying under Visual Flight Rules (VFR) and those flying under IFR. Under VFR, aircraft operate during good visibility conditions at the required distance from clouds using "see and avoid" practices. Specific VFR visibility and clearance requirements are described under 14 CFR 91.155 – Basic VFR Weather Minimums.

All transport category aircraft[6] as well as many charter aircraft and high performance general aviation aircraft with proper equipment and crew ratings, operate under IFR. IFR weather conditions are those with cloud ceilings less than 1,000 AGL and or/visibility less than three statue miles. IFR conditions occur when aircraft are required to fly through clouds or inclement weather conditions which restrict or eliminate visibility outside the aircraft. Aircraft flying under IFR are required to file an IFR flight plan. These flight plans can be approved as requested or altered by ATC dependent upon air traffic circumstances. Pilots are required to read back and comply with all assigned IFR routes and altitudes given by air traffic controllers during all phases of flight. Air traffic controllers then monitor aircraft flying filed flight plans to ensure adequate separation from other aircraft.

1.5.4.1 VFR Flight Procedures

Aircraft operating under VFR flight procedures are controlled either by Salt Lake Tower or Salt Lake TRACON. Aircraft departing under VFR flight procedures are assigned a departing runway based on their current location on the airfield, destination, current wind direction, and the volume of traffic at the time of their request. Aircraft depart from the runway on an ATC assigned heading. Aircraft transitioning in and out of the SLCIA Class B airspace must comply with local airspace restrictions.

VFR aircraft requesting to land at SLCIA must contact and receive authorization from Salt Lake TRACON prior to entering SLCIA Class B airspace. Arrival procedures will vary depending upon the location of the aircraft in relation to SLCIA, current wind direction, and volume of traffic at the time of the request. Pilots must obtain current weather information from the Automatic Terminal Information Service (ATIS) before a landing request can be made.

1.5.4.2 IFR Arrival Procedures

Salt Lake TRACON controllers will typically clear aircraft to land using a Standard Terminal Arrival Route (STAR). A STAR is a standardized set of instructions used to shorten clearance deliveries between an air traffic controller and the pilot. A STAR defines a specific flight route, altitudes, speed restrictions, and fixes used to arrive into the Terminal Area. STARs use a combination of published VHF omni-directional range (VOR[7]) radials and intersections, along with assigned vectors, altitudes, and speeds to standardized aircraft arrival flows, terminating at the initial approach fix of the Instrument Approach Procedure (IAP) to be flown. Aircraft are typically assigned a STAR based on the location they are coming from. SLCIA has five published STARs that use VOR technology.[8]
These procedures are as follows:

- BEARR – Aircraft arriving from the northwest
- BONNEVILLE – Aircraft arriving from the west
- BRIGHAM CITY – Aircraft arriving from the northeast
- JAMMN – Aircraft arriving from the south/southwest
- SPANE – Aircraft arriving from the south/southeast

Since the completion of the 1998 SLCIA Master Plan, the FAA has implemented a new technology into developing STARs. Area navigation, also referred to as RNAV, allows aircraft to choose a course within a network of navigational beacons rather than flying on a radial to and from a VOR. Navigational beacons serves as a GPS waypoint for pilots to ensure they are on the correct course. This change in technology allows aircraft to take more direct and precise routes as opposed to the old method of "bouncing" from one VOR to another. The RNAV improvement creates arrival flow efficiencies which save valuable time and fuel, and reduce the environmental impacts of each flight. With this change in technology and arrival procedures, a trend has been set into motion. NDB and VOR facilities across the nation are being decommissioned and replaced with RNAV (GPS) technology to serve aircraft during all phases of flight.

In addition to the five VOR based STARs, SLCIA has six RNAV STARs. These procedures are listed below:

- DELTA – Aircraft arriving from the northeast
- LEEHY – Aircraft arriving from the southeast
- NORDK – Aircraft arriving from the north
- QWENN – Aircraft arriving from the south/ southwest
- SKEES – Aircraft arriving from the north / northwest
- WAATS – Aircraft arriving from the west

[6] All airline operations use transport category aircraft and are conducted under IFR, therefore, IFR flight plans are required for all commercial airline flights.
[7] Very High Frequency (VHF) Omni-Directional Range (VOR) is a type of fixed ground-based navigational equipment that allows properly equipped aircraft to use short range radio signals to determine position based on relative direction to/from that facility.
[8] All airline operations use transport category aircraft and are conducted under IFR, therefore, IFR flight plans are required for all commercial airline flights.

1.5.4.3 IFR Approach Procedures

Aircraft approaching SLCIA during IFR conditions fly through the airspace to land on runways using predetermined routes called Standardized IAPs. The ability of a pilot to land without actually seeing the runway landing zone is determined by a number of factors, including pilot qualifications, aircraft equipment, available navigational aids, and airport approach lighting systems. A critical point of emphasis for pilots flying IAPs is the requirement to adhere to procedural restrictions regarding the decision altitude/decision height (DA/DH) or minimum decent altitudes (MDA). Generally speaking, pilots are prohibited from continuing the approach procedure below these altitudes unless they meet airfield environment visual reference requirements. Specific regulations regarding takeoff and landing under IFR are available in 14 CFR 91.175. TABLE 1-11 summarizes the instrument approaches available at SLCIA and the minimum visibility and DA/DH associated with each approach.

Table 1-11: Instrument Approaches

Instrument Approaches	Minimum Visibility	Decision Altitude (AGL)(ft)
Runway 16L-34R		
Runway 16L		
ILS or LOC	1/2 SM	200'
CAT II / III	1,000 ft RVR / 0-700 ft RVR	100' / N/A
RNAV (GPS)	1/2 SM	600'
Runway 34R		
ILS or LOC	1/2 SM	200'
SA CAT I	1,400 ft RVR	150'
CAT II / III	1,200 ft RVR / 300 ft RVR	100' / N/A
RNAV (GPS)	1/2 SM	200'
Runway 16R-34L		
Runway 16R		
ILS or LOC	1/2 SM	200'
SA CAT I	1,400 ft RVR	150'
CAT II / III	1,200 ft RVR / 0-700 ft RVR	100' / N/A
RNAV (GPS)	1/2 SM	600'
Runway 34L		
ILS or LOC	1/2 SM	200'
SA CAT I	1,400 ft RVR	150'
CAT II / III	1,200 ft RVR / 0-700 ft RVR	100' / N/A
RNAV (GPS)	1/2 SM	200'
Runway 17-35		
Runway 17		
ILS or LOC	1/2 SM	200'
SA CAT I / II	1,400 ft RVR / 1,200 ft RVR	150' / 100'
RNAV (GPS)	1/2 SM	200'
Runway 35		
RNAV (GPS)	1/2 SM	400'
LDA	1/2 SM	300'

Source: FAA Facility Directory, FAA.gov, 2018
Notes: All approaches listed are best approach available.
Definitions: AGL - Above Ground Level, GPS - Global Positioning System, ILS - Instrument Landing System, LDA - Localizer-type Directional Aid, LOC - Localizer, RNAV - Area Navigation, SM - Statute Mile, SA - Special Aircrew and Aircraft Certification Required

1.5.4.4 IFR Departure Procedures

There are two forms of IFR departure procedures (DP) available at SLCIA: Obstacle Departure Procedures (ODP) and Standard Instrument Departures (SID).[9] The key difference between the two is that ODPs are not required of pilots flying under 14 CFR 91 but exist to assist pilots in obstruction avoidance; whereas, SIDs, while also providing protection from obstacles, assist in meeting environmental, capacity, and air traffic control requirements. Overall, DPs help to alleviate the controller's workload and improve communication between the pilot and the controller while providing aircraft a safe route to exit the terminal environment. This helps the controller to sequence aircraft with standardized heading and altitude assignments for aircraft taking off. DPs ensure that aircraft receive proper separation from obstacles and other aircraft that may be in the area.

ODPs are developed to provide takeoff minimums when obstructions penetrate the 40:1 departure obstacle clearance surface (OCS).[10] The primary goal of an ODP is to provide standard takeoff minimums with a standard climb gradient to a determined altitude at a designated fix. Each available ODP is specific to a particular runway.

SIDs are assigned by ATC and provide pilots with specific routing, altitude requirements, speed restrictions, and other relevant flight instructions following takeoff as aircraft climb out of the terminal environment. SIDS may require certain aircraft equipment in order to be flown. SLCIA has eight SIDs, five of which require RNAV capabilities.
These are listed as follows:

- ARCHZ (RNAV) – Destination to the south / southwest of SLCIA.
- CGULL (RNAV) – Destination to the northwest of SLCIA.
- DEZERT (RNAV) – Destination to the west of SLCIA.
- FAIRFIELD – Destination to the south / southeast of SLCIA.
- RUGGED (RNAV) – Destination to the north / northeast of SLCIA.
- SALT LAKE – Destination to the north / south of SLCIA.
- SEVYR – Destination to the southwest of SLCIA.
- ZIONZ (RNAV) – Destination to the south of SLCIA.

1.5.5 Local Airspace

The airfield geometry plays a crucial role in determining the traffic patterns for an airport. SLCIA is served by two parallel runways, Runway 16L-34R and Runway 16R-34L and two non-parallel runways, Runway 17-35 and Runway 14-32. The parallel runways are predominately used by commercial service and large/heavy aircraft. This is primarily based on takeoff and landing runway length requirements and the location of nearby commercial terminal and air cargo facilities.

In 2014, the FAA released a capacity study conducted at SLCIA which concluded that roughly one in every ten aircraft operating at SLCIA is categorized as a general aviation aircraft. Runway 17-35 is the primary runway serving general aviation traffic but it is also used for commercial operations. Training operations, such as touch-and-go's, are isolated to this runway. The alignment for Runway 17-35 is not parallel to the middle runway (Runway 16L-34R) which results in impacts to the configuration of the airspace system, specifically for traffic arriving from the south on Runways 34L, 34R, and 35. These impacts affect aircraft sequencing and separation requirements, ultimately limiting airfield capacity.

Based on this type of airfield configuration, traffic patterns should never cross over another runway. Runway 17 has a right hand traffic pattern to avoid the runways to the west. Runway 16L also has a right hand traffic pattern to avoid the runways to the east. Runways 35 and 16R have standard left hand traffic patterns. Aircraft take off and land into the wind to maximize performance and, due to predominant wind patterns in the area, the Airport often experiences a north traffic flow. Under these conditions, Runways 34L, 34R and 35 are used for departing and arriving aircraft.

At the regional level, South Valley Regional Airport Runway 16-34 lies south of SLCIA within less than a mile of being in direct alignment with Runway 16R-34L at SLCIA. The alignment and relative proximity of these runways has significant impacts and constraints on ATC procedures and the sequencing of aircraft at both airports.

1.5.6 14 CFR 77 - Objects Affecting Navigable Airspace

The airspace surrounding SLCIA should be kept clear of obstructions to the furthest extent possible. 14 CFR 77, Objects Affecting Navigable Airspace (often referred to as "Part 77") is the framework by which the FAA attempts to keep essential airspace free and clear of obstructions that could prove hazardous to aircraft flying an approach or departure from an airport. For an object to be deemed an obstruction, it must penetrate one of the five imaginary airspace surfaces defined under Part 77. These surfaces are as follows: Primary Surface, Approach Surface, Transitional Surface, Horizontal Surface, and Conical Surface.
A description of each surface along with their dimensions are listed below:

- **Primary Surfac**e – This surface is centered on the runway, extending 200 feet beyond the edge of the runway. The width of the surface is dependent upon the approach to the runway. With the exception of Runway 14-32, the width of the primary surface is 1,000 feet. Runway 14-32 has a primary surface width of 250 feet.

[9] FAA Order 8260.46F describes the specific distinctions between ODPs and SIDs.
[10] OCS is described in FAA Order 8260.3 – U.S. Standard for Terminal Instrument Procedures (TERPS).

- **Approach Surface** - This surface is a sloped plane that begins at the edge of the Primary Surface and extends horizontal in the shape of a trapezoid. The slope, horizontal length, and the width of the surface are dependent upon the approach to the runway. All runway ends at SLCIA, with the exception of Runway 14-32, are precision instrument runways with an approach surface length of 50,000 feet and a width at the end of the surface of 16,000 feet. The first 10,000 feet of the approach surface have a slope of 50:1, the remaining 40,000 feet have a slope of 40:1. Runway 14-32 is a visual approach runway with an approach surface length of 5,000 feet and a width at the end of a surface of 1,250 feet and an approach slope of 20:1.
- **Transitional Surface** – This surface is a plane sloped at 7:1 from the primary surface and approach surfaces. The surface terminates when it intersects with the horizontal surface. Transitional surfaces for those portions of the precision approach surface which project through and beyond the limits of the conical surface, extend a distance of 5,000 feet from the edge of the approach surface and at right angles to the runway centerline.
- **Horizontal Surface** – This surface is a horizontal plane 150 feet above the airport elevation. The geometry of the surface is created by arcs centered on the edge of the primary surface with defined radii and then connected by tangents. The radius of the horizontal surface, based on the approaches at SLCIA, is 10,000 feet.
- **Conical Surface** – This surface is a plane sloped at 20:1 extending upward from the periphery of the horizontal surface to 4,000 feet.

A graphical sectional view of 14 CFR 77 imaginary surfaces is shown in FIGURE 1-17. A detailed illustration of the Part 77 surfaces which includes a three dimensional graphic, is shown in **Chapter 7, Airport Layout Plan**.

1.5.7 Obstructions

Understanding the location of ground objects relative to moving aircraft is critical to ensuring safe flight operations. In order for the FAA to preserve navigable airspace and promote safe flight operations, any object with potential to penetrate a Part 77 surface requires notice be provided to the FAA through the Notice or Proposed Construction or Alternation (Form 7460-1) process in order to allow for evaluation of potential impacts to flight safety. An obstruction analysis[11] performed in May 2017 identified over 100 objects as obstructions to air navigation under SLCIA Part 77 surfaces. Most of the objects penetrating a Part 77 surface were defined as fixed by function. Fixed by function objects are intentionally sited with the sole purpose of aiding safe flight navigation and providing situational awareness for landings, takeoffs and ground maneuvers. These fixed by function objects range from airfield edge lights, to signs and in some instances, navigational aids. Other obstructions documented in the 2017 obstruction analysis occur naturally, such as trees, while others are man-made. TABLE 1-12 shows the objects determined to be an obstruction. The table lists object descriptions, identifies heights in feet (MSL), and the impacted surface. It should be noted that the obstructions listed below do not include objects that could be categorized as fixed by function.

1.5.8 Noise Abatement

The SLCDA has adopted a Noise Compatibility Program (NCP) as a result of having a completed Federal Aviation Regulations (FAR) Part 150 study. One of the main objectives of the program is to mitigate the impact of noise in non-compatible land uses, such as residential areas. The program outlines several FAA approved policies and procedures introduced by SLCDA to reduce noise in these sensitive areas.
These procedures are listed along with a brief description as follows:

- **Nighttime Operations** – Between the hours of 11:00pm and 7:00am SLCIA will utilize a north flow for departures and a south flow for arrivals.
- **Runways 16R, 16L and 17 Departures** – All jet aircraft and large piston-powered aircraft are to turn west as soon as practical.
- **Runways 34R, 34L, and 35 Departures** – Restricts all traffic heading eastbound until they are one-half mile from SLCIA.
- **Runways 34R, 34L, and 35 Arrivals** – Aircraft flying in visual meteorological conditions (VMC) to fly as short a downwind leg as.
- **Runway 17-35 Traffic Pattern** – Traffic pattern east of SLCIA is restricted to aircraft weighting 19,000 pounds or less.

Aircraft are classified, for noise purposed, into four different stage groups and assigned a stage number based on the noise levels they produce. In 2013, the FAA adopted a provision in the FAA Modernization and Reform Act of 2012 which required jets, regardless of weight, to be Stage 3 noise compliant. This provision prohibits all non-compliant Stage 3 aircraft from flying in the United States. All non-compliant Stage 3 aircraft were required to be modified into compliance or sold by the year 2016.

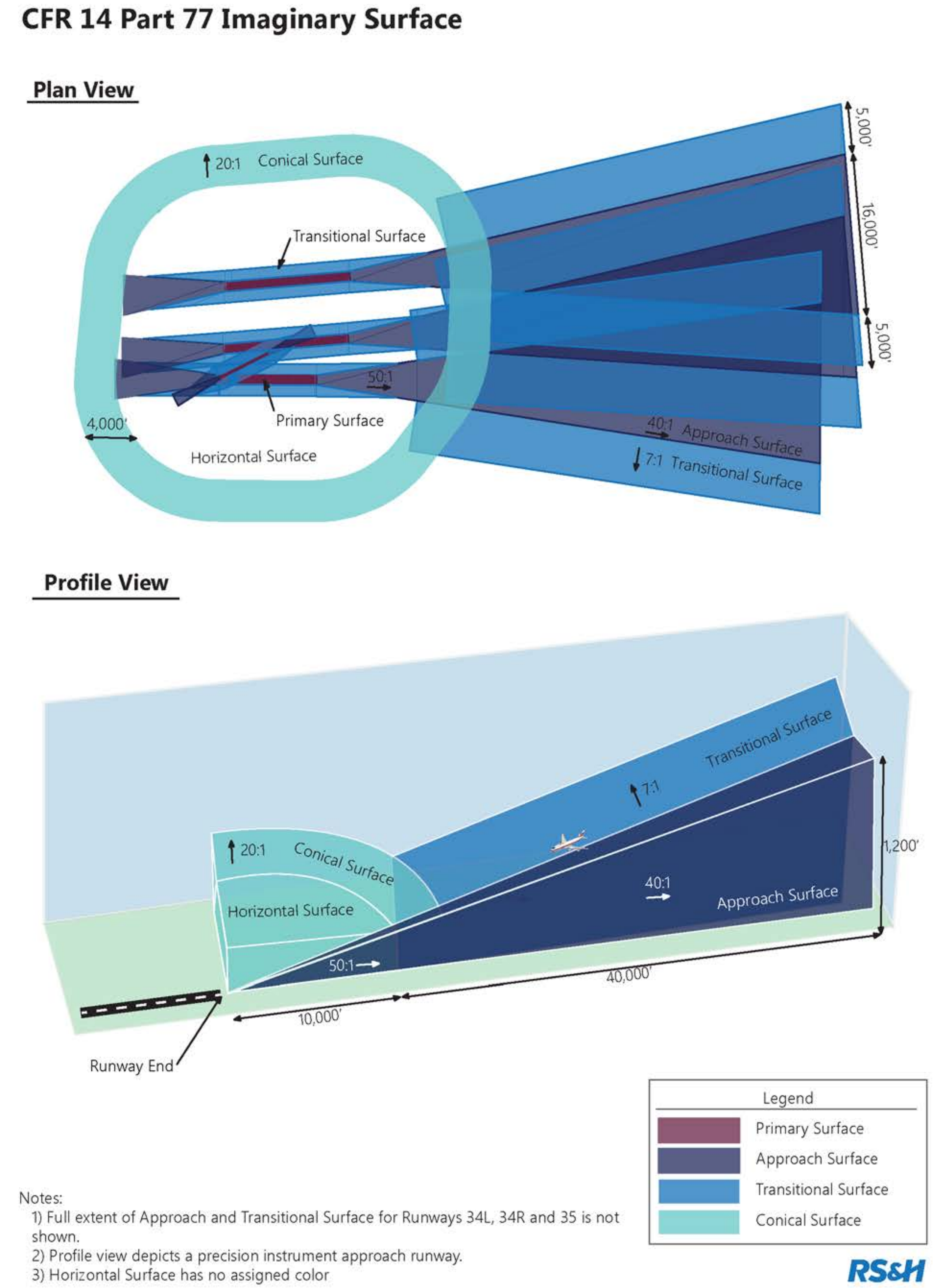
[11] Obstruction analysis performed by Woolpert, Inc., 2017

Table 1-12: Airspace Obstructions

Object	Height (MSL')	Impacted Surface
Runway 16L-34R		
Light Pole	4,293'	Transitional Surface
Tree	4,254'	Transitional Surface
Pole	4,268'	Transitional Surface
Airfield Drive	4,231'	Primary Surface
Runway 16R-34L		
Tree	4,227'	Primary Surface
Utility Pole	4,267'	Transitional Surface
Runway 17-35		
Bush	4,222'	Primary Surface
Utility Pole	4,227'	Primary Surface
Road	4,240'	Transitional Surface
Interstate	4,270'	Runway 35 Approach
Runway 14-32		
N/A		
Horizontal/Conical Surfaces		
Transmission Lines	4,387'	Horizontal Surface

Source: Analysis performed by Woolpert, Inc.; Prepared by RS&H, 2018
Notes: All roadway elevations include traverseway adjustment (23' Railroads, 17' Highways, 15' Public Roads, and 10' Prviate Roads.)

Figure 1-17: 14 CFR 77 Imaginary Surfaces



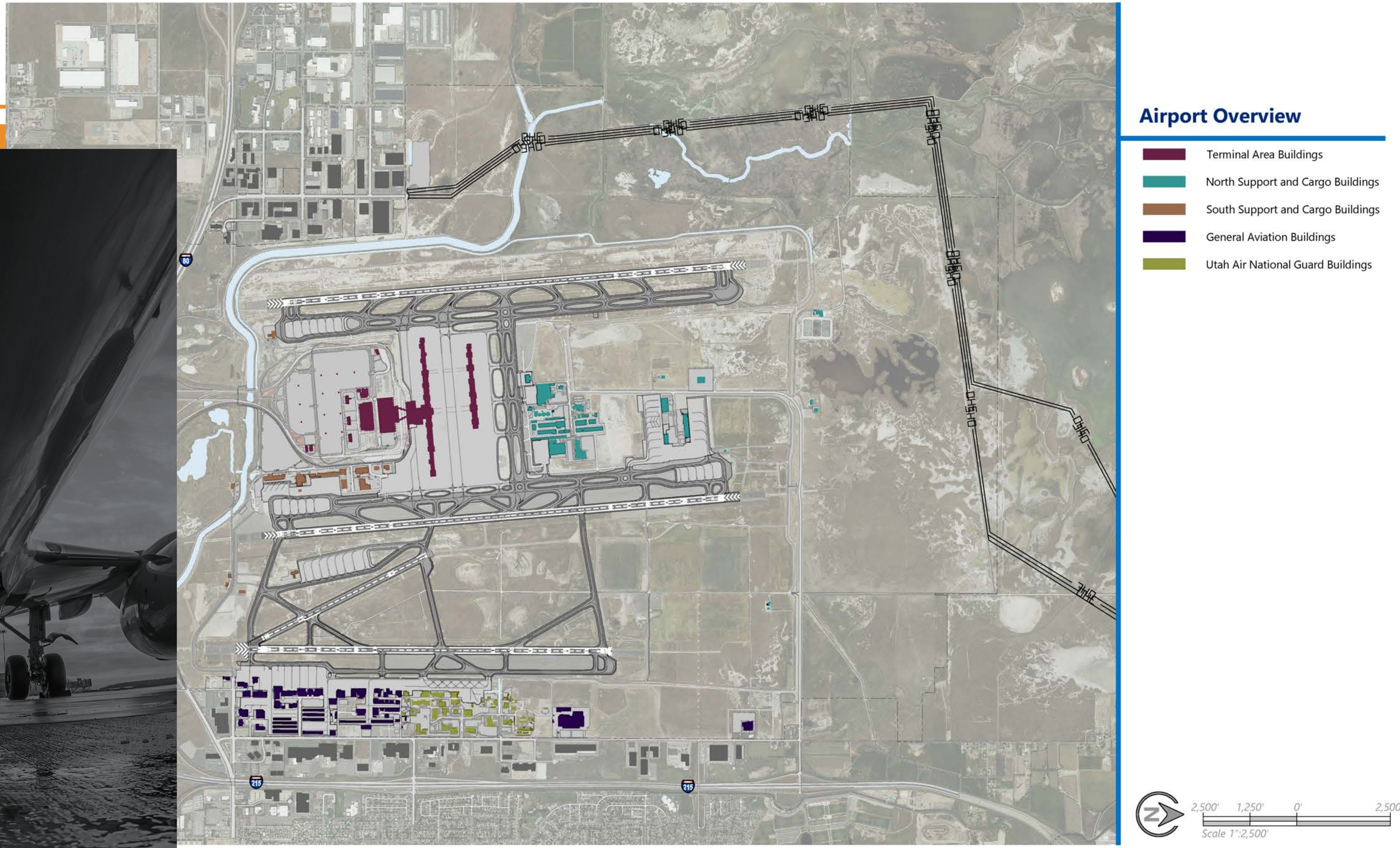
1.6 AIRPORT FACILITIES OVERVIEW

Salt Lake City International Airport facilities can best be organized into five functional areas as follows:

1. Terminal Area
2. North Support and Cargo Area
3. South Support and Cargo Area
4. General Aviation Area
5. Utah Air National Guard Area

Buildings for these areas are identified and color coded in FIGURE 1-18. The following inventory sections are structured within this facility organizational framework.

Figure 1-18: Airport Facilities Overview



1.7 AIRLINE TERMINAL AND GATES

The previous SLCIA Master Plan, completed in 1998, provided a plan for developing a new terminal, concourses, airfield taxiway system, and landside roads and parking facilities. FIGURE 1-19 shows a diagram of the ARP terminal area. In 2008, SLCDA began the process of implementing that plan through the development of a Terminal Area Program (subsequently referred to as the Airport Redevelopment Program or ARP) which laid out the framework for an ultimate two concourse terminal complex and the supporting apron and taxiway system. At the time, various economic factors put project development and construction on hold.

In 2012, SLCDA validated the 2008 ARP documents with the Program Validation and Preliminary Planning Update study, further refining previous development scenarios based on the most current available information, and combining them with new information from SLCDA and airline stakeholders. Shortly thereafter, SLCDA initiated the first phase of program implementation by advancing construction of the Terminal and South Concourse (subsequently known as Concourse A). In 2016, the North Concourse Program (subsequently known as Concourse B) produced an updated version of the 2012 Program Validation and Preliminary Planning Update. The final version of this report was published in February 2017, at which time, SLCDA approved the North Concourse Program for final design and construction. Throughout the remainder of this Master Plan, the South Concourse will be referred to as Concourse A and the North Concourse will be referred to as Concourse B.

This inventory of terminal and aircraft gate facilities was finalized prior to the completion of ARP construction, however, it is written from the perspective that all ARP projects including terminal, concourse, airfield, and landside facilities have been completed. Since these projects were already well underway at the time of beginning the Master Plan, ARP completion is considered the existing condition for all terminal and concourse facilities within this inventory chapter.

1.7.1 Terminal Overview

The footprint of the new ARP facilities is roughly 300 acres, with the following elements (approximated):

- Terminal - 908,000 square feet
- South Concourse – 3,700 linear feet (including 400 feet of the terminal building) with 455,000 square feet in the west area and 375,000 square feet in the east area
- North Concourse – 2,250 linear feet with 385,000 square feet included in Phase 1 development and 200,000 square feet in Phase 2 development
- Roadways – 11.9 miles of at grade road and 2.1 miles of elevated road
- West Tunnel – Tunnel length of 1,000 feet with an area of 62,500 square feet
- Center Tunnel – Tunnel length of 1,000 feet with an area of 147,000 square feet

SLCDA's goal for the new buildings is LEED Gold Certification with a focus on energy efficiency through use of natural light. Construction of facilities within the ARP began in 2014 with large scale enabling projects such as the addition of a new economy parking lot, and later in 2016, the construction of the new Rental Car Service Center and Quick Turn Around facility. Terminal tunnel excavation also began at this time.

Ground was broken for construction of the new terminal on July 18, 2014 . The new terminal is located west of the former terminal facility site and is scheduled for completion in 2020. This was the first of three major terminal development phases that transformed SLCIA's terminal area into a safer and more efficient model. The new format meets high customer level of service expectations, contains approximately 908,000 square feet of space and includes functional areas programmed for the following uses:

- Airline space
  - Airline ticketing and service counters
  - Preferred customer check-in
  - Airline ticket office space
  - Self-serve check-in
  - Inbound baggage delivery
  - Airline operations areas
  - Departure lounges
  - Preferred customer lounges
- Domestic passenger security screening
  - Transportation Security Administration (TSA) passenger security screening checkpoints
  - Bomb detection screening
  - TSA offices
  - Baggage make-up and return
- Federal Inspection Services (FIS)
  - Customs and Border Protection (CBP) primary space and secondary space
  - CBP support and administrative space
  - Immigration and passport control
  - Sterile corridor
  - International baggage claim
  - International arrivals support space
- Concessions
  - News, food, and retail
  - Kitchens and food storage
  - Beverage lounges
- Ground Transportation
  - Rental car counters
  - Rental car offices
  - Additional ground transportation counters and offices

- Administrative Space
  - SLCDA administrative offices
  - FAA administrative offices
- Other space
  - Public spaces and circulation area
  - Restrooms
  - Janitorial
  - Secure delivery locations
  - Mechanical and utility
  -

1.7.2 Terminal Level 1

Level 1 of the new terminal building houses many of SLCIA's support functions. Sized at approximately 260,000 square feet of programmed space, a significant portion of Level 1 is used for Federal Inspection Services and is occupied by Customs and Border Protection. This includes areas for international arrival document control (passport control), two international baggage carousels, and customs inspection services. The FIS facility is designed to simultaneously handle passenger loads of 400 passengers per hour from two international arrivals, one jumbo and one wide-body aircraft.

The security checkpoint on this level is reserved for employees but also used for connecting international passengers. This security checkpoint has five lanes. Terminal Level 1 also contains mechanical/electrical rooms, offices, and general circulation space. The northern area of Level 1 is occupied by baggage processing equipment and conveyors. Secure and non-secure loading docks are also located on Level 1.

1.7.3 Terminal Level 2

Terminal Level 2 contains approximately 255,000 square feet of programmed space. Terminal Level 2 holds the primary TSA security screening checkpoint, which accommodates 14 security screening lanes, and includes a large passenger queuing area. TSA administrative offices are conveniently located adjacent to the security checkpoint. The south end of Terminal Level 2 contains eight sloped bed baggage claim units and an additional two baggage claim units for oversized items. Airline baggage services offices are located in this area near the baggage claim devices. Delta leases the four westernmost bag claim units and the remaining devices are shared-use by all other airlines. The bag claim area on Terminal Level 2 provides direct access to the pedestrian sky bridge that serves the Gateway Building and the parking garage.

Terminal Level 2 also contains a variety of other amenities including an arrivals hall for greeters awaiting arriving passengers, and two restrooms, one on each side of the terminal. Concessions programmed for food and retail offerings are located adjacent to this area for airport user convenience. Public seating is also available in this area.

1.7.4 Terminal Level 3

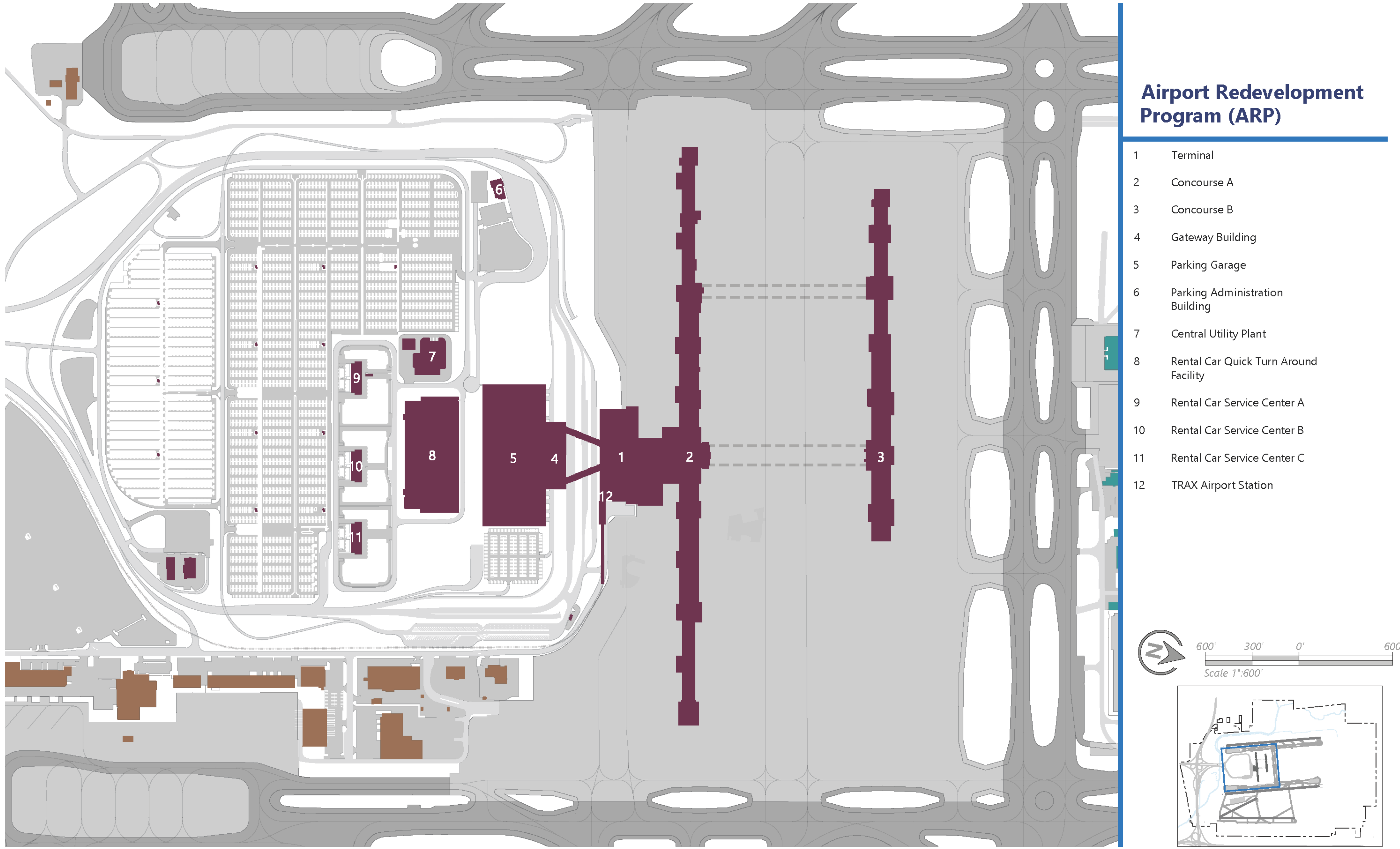
Terminal Level 3 has a total of approximately 167,000 square feet of programmed space. This level primarily supports departing passenger services including passenger ticketing and check-in facilities. Airline support offices are located behind ticket counters and baggage handling services.

Level 3 of the terminal contains airline support offices and passenger check-in facilities. The check-in counters are divided into two sections, one is located on the east half of the terminal and one is located on the west half. Each section has 38 counters for a combined total of 76 check-in counters. Oversized bag drops are available on the east and west ends of this level. Self-check-in kiosks are also available. Terminal Level 3 features large open areas for circulation and open space which overlooks the central core of Terminal Level 2. Building support areas for mechanical and electric systems are also housed on this level. Two curbside check-in locations are also available along the terminal curb road at this level. These positions are currently programmed for shared-use and do not have a single airline lessee.

SLCDA administrative offices are also located on Terminal Level 3 in space north of the airline ticketing offices. SLCDA activities housed in this area include planning, administration, finance, and engineering. In the northeast quadrant of Terminal Level 3 is the Delta Sky Club which occupies 18,000 square feet and offers lounge areas with views and an outdoor SkyDeck.

Terminal Level 3 also contains a 20-foot wide sterile corridor that connects all international gates to the US Customs and Border Protection passenger screening area. No flights other than international arrivals access this area.

Figure 1-19: Airport Redevelopment Program



Source: Prepared by RS&H, 2018

1.7.5 Terminal Rail Station

The TRAX/Light Rail Service station at SLCIA is located to the east of the new terminal building. This facility is located on the ground level and has storage space for 9 bicycles.

1.7.6 Terminal Gateway Building

The Gateway Building is a two-story accessory structure attached to the parking garage and connected to the terminal building via two 35 foot wide pedestrian sky bridges. The sky bridges allow movement between the Terminal and Gateway buildings and completely remove the need for passengers to cross any curb roads. Level 1 of the Gateway Building houses rental car customer services and includes rental car counters and queuing space, rental car offices, public circulation, and restrooms. Level 2 of the Gateway Building offers departing passengers the opportunity to perform self-check-in (ticketing) and remote bag drop (baggage processing) functions prior to entering the terminal building. 16 shared use check-in kiosks are available at Gateway Building Level 2. At the time of this writing, it is unknown whether any airline has leased this space exclusively or these facilities will be operated by a third-party service provider. Level 2 of the Gateway Building also provides public restrooms. Infrastructure is in place to install Pay on Foot (POF) parking kiosks if desired by airport management, but they have not yet been installed. Both levels of the facility provide parking garage access, although rental car ready return is programmed on the ground level (Level 1).

1.7.7 Terminal Concourses and Aircraft Gates

There are two concourses at SLCIA; Concourse A and Concourse B (formally known as the South Concourse and the North Concourse respectively). Concourse A is generally 90 feet wide and 3,700 feet long, containing "bump out nodes" located at roughly 350 foot intervals (on center) to provide additional space for vertical circulation, terminal support functions, and public restrooms, depending on the building level. Concourse A is oriented linearly in an east-west configuration and directly connected to the terminal at its mid-point where it is divided into east and west halves. The western half of Concourse A has 25 gates, all occupied by Delta Air Lines. Four of the gates on the north side of the concourse closest to the terminal building are also designated for international flights. Three of the four international gates can accommodate wide-body aircraft. The eastern half of Concourse A has 22 gates, bringing the total Concourse A gates to 47. The central area of Concourse A, immediately beyond the TSA security screening re-composure area, is dedicated to food service and retail concessions. Concourse A and Concourse B are connected by a system of tunnels. The primary connecting access between the terminal building, Concourse A, and Concourse B is called the "Center Tunnel" and is located at the north end of the terminal building at the midpoint of Concourse A. Adjacent tunnels running parallel to the Central Tunnel provide dedicated access routes for baggage processing and terminal support functions. In total, the Center tunnel covers 147,000 square feet. Located 1,000 feet west of the Center Tunnel, a 62,500 square foot secondary access tunnel labeled the "West Tunnel" connects Concourse A and Concourse B. The tunnel is located between Gates 13 and 15 on Concourse A and between Gates 10 and 12 on Concourse B. This secondary tunnel serves both passenger circulation and terminal support functions within segregated spaces dedicated to each use. The following sections describe approximate square footage of programmed functional uses within each concourse.

1.7.7.1 Concourse A

Concourse A is divided into east and west halves because it is bisected by the north end of the terminal building. Concourse A East exclusively serves Delta Air Lines and international arrivals traffic. Concourse A East Level 1 includes 55,000 square feet of space located immediately adjacent to the terminal building for outbound baggage processing. 71,000 square feet of Level 1 space is programmed for terminal support functions, 39,000 square feet serves airline support functions, and 5,600 square feet is devoted to concession needs such as food storage. All functional areas of Level 1 are served by a generally centralized corridor. Ground Service Equipment (GSE) access to the outbound baggage area and through Concourse A East is provided by Vehicle Service Roads (VSRs) at Level 1. Concourse A East Level 1 has a total space of 172,000 square feet.

Concourse A East Level 2 serves passenger needs with 67,000 square feet is dedicated to departure lounges for airline gates and with 86,000 square feet dedicated to public circulation or other public functions. Fifty foot wide circulation corridors run through the center of the concourse with multiple 160 foot long, 4 foot wide, moving walkways traveling each direction through the center in series. Concession lease space accounts for 26,000 square feet and approximately 3,000 square feet is split between airline support and terminal support use. Concourse A East Level 2 has a total space of 182,000 square feet.

Concourse A East Level 3 is dedicated to terminal support functions including 25,000 square feet for building mechanical systems and vertical circulation corridors. 25,000 square feet is the total space for Concourse A East Level 3. Combined with Levels 1 and 2, total area is approximately 375,000 square feet.

Generally speaking, Concourse A West Level 1 is a mirror of the eastern half of the concourse. Like Concourse A East Level 1, Concourse A West Level 1 includes a central area for outbound baggage processing (69,000 square feet) and hosts a variety of terminal and airline support functions in addition to providing other mechanical and utility space. The floor plan allocates 13,000 square feet for airline support, whereas 8,000 square feet are programmed for concessions (storage), and 49,000 square feet are programmed for terminal support functions. A small amount of airport support space is also provided and there is a centrally located Canine Relief Area. Concourse A West Level 1 provides 141,000 square feet of space.

Passenger services are located on Concourse A West Level 2. Functional space on this level primarily consists of departure lounges, concessions space, and circulation corridors. Public restrooms are also located at 350 foot intervals in the building bump out nodes. A series of moving walkways assist passengers traversing the concourse. Concourse A West Level 2 has a total of 202,000 square feet, with 99,000 square feet dedicated to public circulation and other public functions, 29,000 square feet programmed for concessions, 60,000 square feet used as departure lounges, and 6,000 square feet devoted to terminal support facilities. A small amount of airline support space is also provided on Concourse A West Level 2.

The sterile corridor that serves international arrival gates on Concourse A West (Gates 19, 21, 23, and 25) begins on the northern exterior of Level 2. Arriving international passengers use this corridor to ascend to Level 3 (Mezzanine) and continue following the sterile corridor leading to the terminal building prior to descending to the FIS located on Level 1 of the terminal building. The sterile corridor for international arrivals accounts for 8,000 square feet on Concourse A East Level 2 and another 9,000 square feet on Concourse A West Level 3. Concourse A West Level 3 also contains 17,000 square feet worth of terminal support function space within the concourse bump out nodes. Total programmed space on Concourse A West Level 3 is 26,000 square feet. Total programmed space for Concourse A West is 475,000 square feet.

1.7.7.2 Concourse B

The Concourse B Phase 1 is a satellite concourse located approximately 1,100 feet north of the terminal building, in an east-west orientation parallel to Concourse A. The first phase of Concourse B development is 1,550 feet long, 90 feet wide, and features four bump out nodes at 350 foot intervals (on center). Similar to Concourse A, the bump outs provides additional space for vertical circulation, terminal support functions, and public restrooms, depending on the building level. Concourse B Phase 2 extends the concourse eastward by an additional 700 feet with two additional bump out nodes.

Generally speaking, the Concourse B is a mirror image of Concourse A, with the exception of direct integration into the terminal and the lack of swing gates with a sterile corridor to support international arrivals facilities. Instead, Concourse B is connected to Concourse A through the Center Tunnel and the West Tunnel. Concourse B Phase 1 includes a total of 23 gates.

Concourse B Phase 1 Level 1 serves terminal support functions (67,000 square feet), outbound baggage processing (51,000 square feet), and to a much lesser extent, airport support (1,000 square feet) and concessions functions (6,500 square feet). A central corridor runs through the center of Concourse B Phase 1 Level 1 providing access to a variety of rooms allocated to airline operations, break-rooms, and ground crew restrooms. There is also an airline club. This space is currently unused and was constructed as a shell. The total space provided on Concourse B Phase 1 Level 1 is 168,000 square feet.

Concourse B Phase 1 Level 2 houses passenger facilities such as departure lounges (56,000 square feet), concessions (20,000 square feet), and general public circulation space (86,000 square feet). Terminal support functions occupy 13,000 square feet and roughly 3,000 square feet is not programmed. Moving walkways are provided through the center of the circulation corridor and restrooms are located within the bump out nodes. Total space provided in Concourse B Phase 1 Level 2 is 178,000 square feet.

Concourse B Phase 1 Level 3 is mezzanine space serving terminal support functions such as vertical circulation and mechanical space. This accounts for 38,000 square feet within the total Concourse B Phase 1 space. Total space for Concourse B Phase 1 is 384,000 square feet.

Concourse B Phase 2 is the final completed stage of the ARP, accommodating an additional eight gates. This Concourse B addition features a central station connecting Concourse A and Concourse B via the Center Tunnel and creating a confluence zone for passenger amenities including food service and retail concessions. This section of Concourse B is designed to allow future expansion of Concourse B Phase 2 east beyond the 2024 completion of the ARP.

Level 1 of Concourse B Phase 2 supports an additional 10,000 square feet of airport operations space, 23,000 square feet of terminal support space, and 54,000 square feet of outbound baggage processing space. The central movement corridor is continued from Concourse B Phase 1 and is used to access rooms including airline offices, ground crew restrooms, and six additional outbound baggage carousels. Total space provided in Concourse B Phase 2 Level 1 is 90,000 square feet.

Concourse B Phase 2 Level 2 again supports passenger services including departure lounges (32,000 square feet), concessions (16,000 square feet), terminal support functions (5,000 square feet), and public space such as circulation (45,000 square feet). Total space provided on Concourse B Phase 2 Level 2 is 99,000 square feet.

Concourse B Phase 2 Level 3 consists of mezzanine space for vertical circulation and mechanical uses and accounts for 14,000 square feet. Total program space provided in Concourse B Phase 2 is 203,000 square feet.

Total combined square footage of the North Concourse (Phase 1 and Phase 2) is:

- Concourse B Level 1 – 258,000 square feet
- Concourse B Level 2 – 277,000 square feet
- Concourse B Level 3 – 52,000 square feet
- Total Concourse B All Levels – 587,000 square feet

1.7.7.3 Potential Future Expansions

Future expansions beyond 2024 are programmed for Concourse B to extend facilities in the same linear pattern to the east. At the time of this writing, future expansions anticipated for Concourse B extend the concourse east an additional 1,200 feet.

Other plans created prior to the completion of the ARP and this Master Plan also anticipated constructing a third parallel satellite concourse north of Concourse B. This new east-west oriented concourse would again mirror Concourse A and Concourse B, be connected via tunnel extensions, and would be located 1,800 feet north of Concourse B. This concourse has yet to be fully programmed or designed. Further analysis in this Master Plan will address the need and preferred location of any potential third concourse.

1.8 LANDSIDE FACILITIES

SLCIA's landside facilities provide commercial passengers access to the terminal building and, ultimately, commercial aircraft, through a variety of available ground transportation connections. Additionally, the landside system provides ground access to all airport facilities for airport employees, tenants, and other airport users. The landside system at SLCIA begins at numerous regional access points stemming from roads, rail, and pedestrian/bicycle paths. These regional access points connect to on-airport circulation roadways, the terminal building, an SLCIA TRAX station, parking facilities, and rental car services. The location of these facilities are shown in FIGURE 1-20.

Like the terminal building and concourse inventory, the airport landside facilities inventory was finalized prior to the completion of ARP construction and is written from the perspective that all ARP projects including terminal, concourse, airfield, and landside facilities have been completed. Since these projects were already well underway at the time of beginning the Master Plan, ARP completion is considered the existing condition for all landside facilities within this inventory chapter.

The following are the landside elements which will be documented in the inventory:

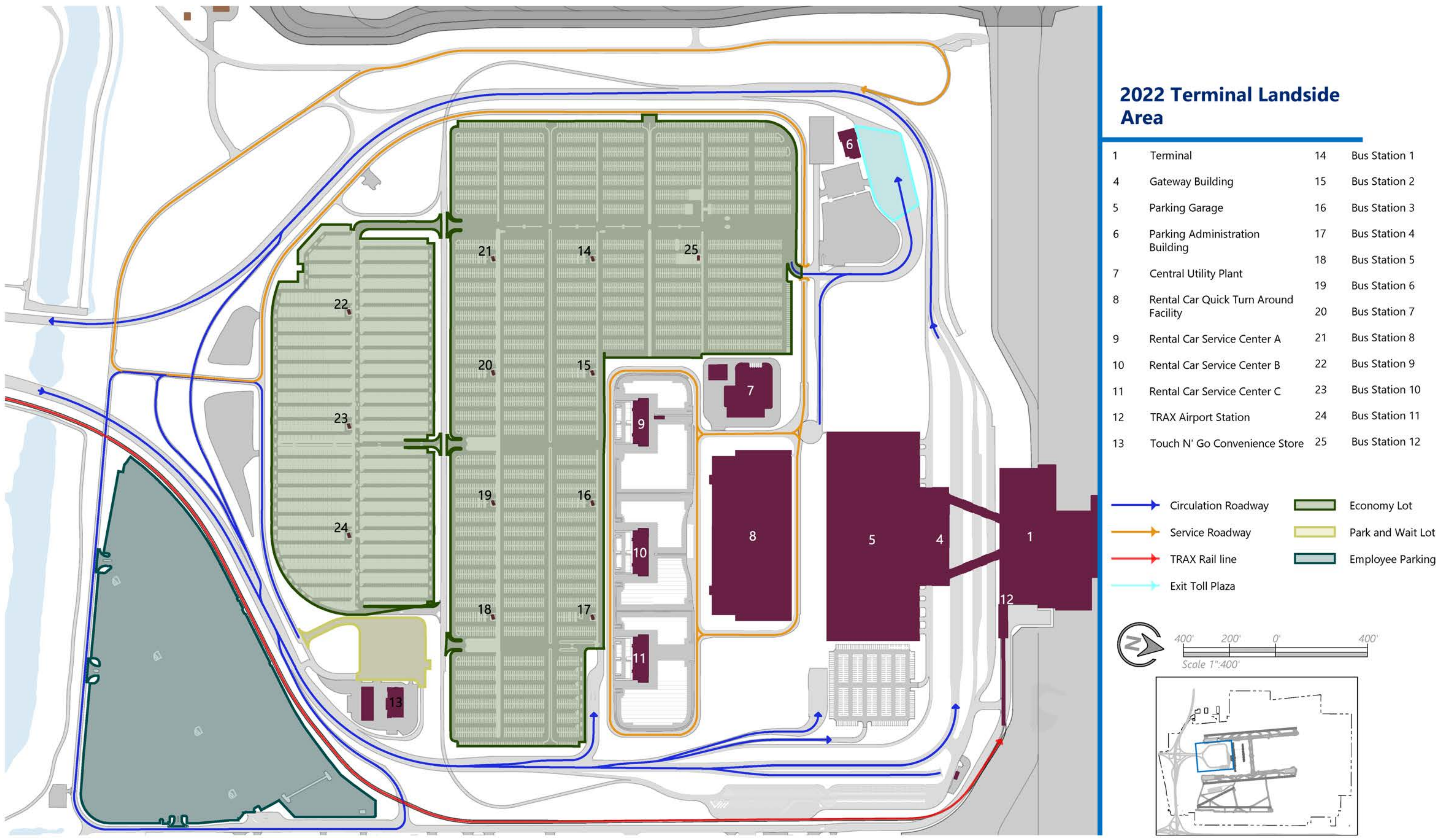
- SLCIA connections to the regional transportation network.
- On-airport access and circulation roadways, including sections south of the Economy Lot entrance (on the inbound) and south of the Parking Exit Plaza (on the outbound), and all service roadways.
- Access and circulation roads serving the new terminal, parking garage, and rental car facilities.
- Surface parking lots including public, employee, and the park 'n' wait lot.
- Rental car service and Quick Turn Around (QTA) areas.
- Off-airport commercial vehicle staging area.
- Access/egress roadways to non-terminal portions of the airport, including the air cargo area, general aviation areas, the Utah Air National Guard complex, and the Boeing facility.
- Utah Transit Authority (UTA) TRAX service to SLCIA.

In order to align landside demand forecasting with passenger demand forecasting, data were collected on-site during existing conditions at busy times in 2018. Vehicle counts were taken using pneumatic tube counters and video capturing equipment, over a one week period from June 4th, 2018 through June 10th, 2018, on main access and circulation roadways serving the terminal campus. Using Peak Hour Average Day Peak Month (PHADPM) analysis, these data will be adjusted/factored in the Facility Requirements Chapter of this Master Plan using passenger activity data to forecast traffic volumes during the common planning hour.

1.8.1 Airport Access

Landside access modes for SLCIA include roadways, the TRAX light rail transit system, and a shared use pedestrian/bicycle path. Roadways access a variety of parking facilities including garage parking, economy parking, employee parking, and a park 'n' wait cell phone lot. The access and circulation roadways also connect to the terminal curb roadways where passengers can be picked up or dropped off by private vehicles or commercial vehicles. A TRAX light rail station is located on the east side of the terminal building. The pedestrian/bicycle path leads to the TRAX light rail station where bicycle parking facilities are also offered.

Figure 1-20: Terminal Area Landside Facilities



Source: Prepared by RS&H, 2018

1.8.1.1 Regional Access

The primary form of access for most airport users is the roadway system. The commercial terminal area of SLCIA is served by a highway interchange where Interstate 80 (I-80) meets Bangerter Highway (Utah Route 154). This interchange also provides connections between I-80, SLCIA, and North Temple Street. The primary access/egress point for the commercial terminal and associated landside facilities is Terminal Drive, which begins at the northern end of this interchange as the northern extension of the Bangerter Highway. SLCDA owned right-of-way begins on Terminal Drive where the Terminal Drive/Bangerter Highway bridges cross the canal.

General aviation facilities, the Utah Air National Guard complex, Boeing, and other facilities located on the east side of SLCIA are primarily served by access from Interstate 215 (I-215) and 2200 W Street. Access is also provided via North Temple from the south and 2100 N Street to the north. 2100 N is also the only access road for facilities at the north end of SLCIA property. At its westernmost point at SLCIA, this road bends 90 degrees to turn south, changing into 4000 W Street, and is a critical access route for major air cargo facilities, the ATCT, SLCDA maintenance facilities, and ARFF Station #12. This road also provides access to the SkyWest hangar and the Delta hangar and reservation facilities.

The Utah Department of Transportation (UDOT) is the state agency responsible for Utah's multi-modal transportation system. UDOT's focus is on the roadways and has varying roles for all modes which use their public right-of-way, including autos, trucks, pedestrians, bicyclists, and public transit systems. UDOT has a regional structure with SLCIA located in UDOT Region 2 which covers Salt Lake, Summit, and Tooele Counties. Policy, project priorities, and funding decisions are governed by the Utah Transportation Commission (UTC), an independent advisory committee consisting of seven members appointed by the governor, four of whom represent a UDOT region.

The Utah Transit Authority (UTA) operates the TRAX light rail transit (LRT) system and bus service to SLCIA. The TRAX and bus services to/from SLCIA connect with UTA's other services, including commuter rail, to enable communities as far south as Provo, Utah to access SLCIA via public transportation.

The TRAX rail system is one component of a larger network of public transportation provided by the UTA. The TRAX Green Line provides rail transit access to the SLCIA Train Station located at the eastern side of the terminal building. TRAX trains arrive and depart from the SLCIA Train Station daily at 15 minute intervals roughly between 5am and midnight. The SLCIA Train Station is the westernmost stop in the city for the train on the Green Line, which runs east-west parallel to I-80 until reaching Temple Square when it turns south through downtown Salt Lake City and then branches southwest at Central Point Station. Through the SLC downtown area, the TRAX Green line stops at a variety of stations which provide transfer opportunities to the larger transit network, including the TRAX Red Line, TRAX Blue Line, S-Line Streetcar, and the FrontRunner. The TRAX Green Line also provides rider options to connect to local and regional bus routes including inter-county, express, and flex routes. FIGURE 1-21 shows the UTA network map.

1.8.1.2 On-Airport Circulation

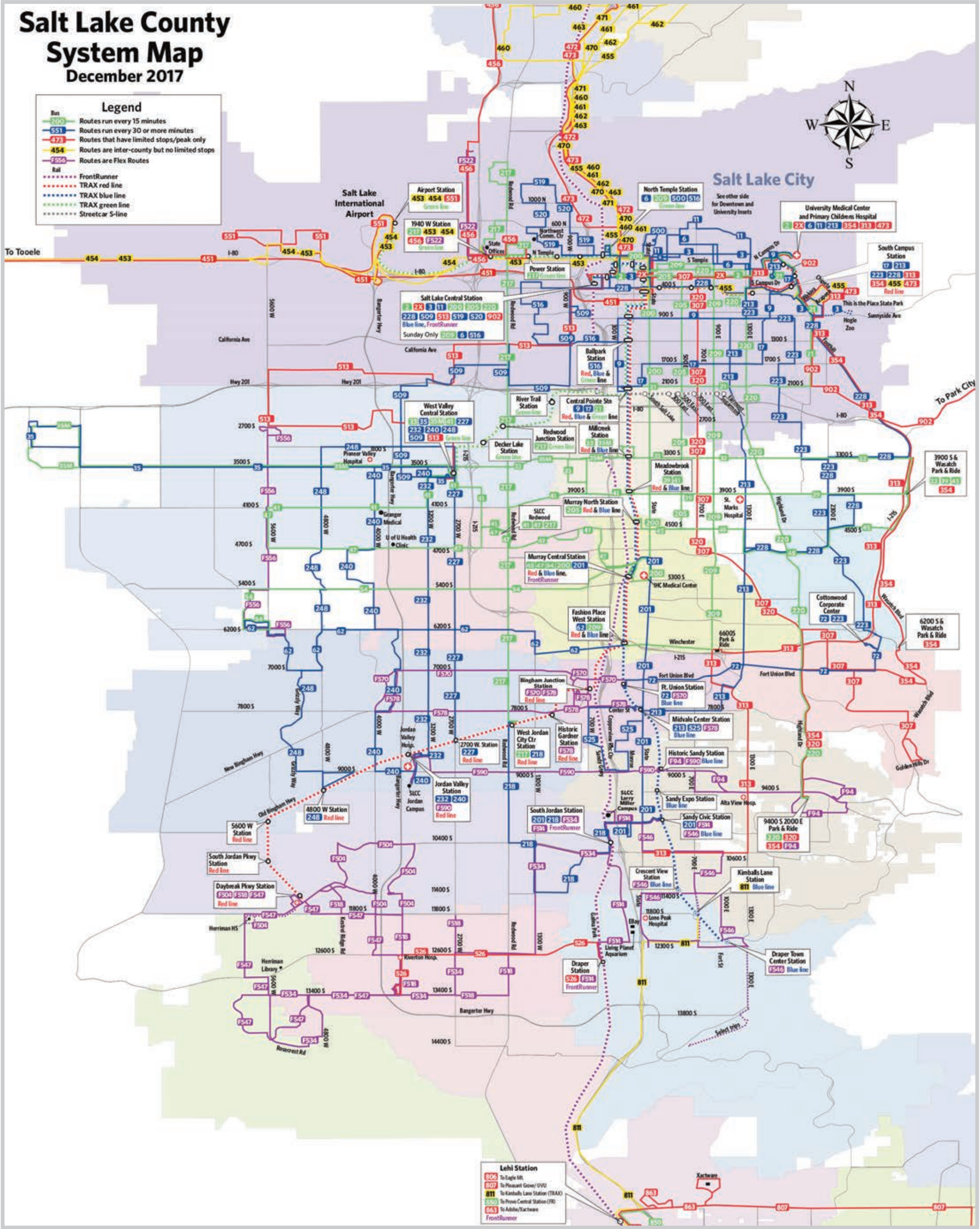
Terminal Drive (terminal loop road) is the primary loop roadway serving the commercial terminal area. Terminal Drive is a one-way street which creates a loop beginning at the northbound lanes from the interchange of I-80 and Bangerter Highway, continuing and splitting into two levels serving arrivals and departures at the terminal curb, and reconnecting beyond the terminal curb to exit SLCIA property where it becomes the southbound lanes of Bangerter Highway just north of its interchange with I-80. Terminal Drive is designed for high traffic volumes. The loop road has four dedicated lanes as you enter the terminal area, splits to two levels at the terminal curb, reconnects at ground level as you exit the curb area, and becomes three dedicated lanes as you approach the economy parking exit plaza and exit the terminal area. Speeds slow as you enter the loop road environment and begin gradually increasing again once you pass the terminal curb roads. Terminal Drive also provides access other areas of SLCIA including 3700 W Street which serves cargo, support, and parking facilities at the south end of SLCIA. There is no traffic signalization on the main Terminal Drive loop road, however, there is a TRAX light rail crossing with gates and signalization on the Terminal Drive exit to 3700 W.

Access to the following facilities is provided from Terminal Drive:

- 3700 W Street
- Park 'n' Wait cell phone lot
- Economy parking lots
- Parking garage
- Rental car ready/return
- Crossbar Road
- 4000 W Street

Crossbar Road provides a route for users of facilities at the south end of SLCIA to pass over Terminal Drive and exit the terminal area without requiring them to drive past the terminal curb. Crossbar Road is a two-way, two lane road with relatively low traffic volumes. There is a traffic signal at the intersection of Crossbar Road and Terminal Drive. Additionally, 3700 W connects with North Temple and provides access along the south end of the airfield from the terminal area to the east side of SLCIA. This road is a two-way, two-lane road with very low traffic volumes.

Figure 1-21: UTA System Map (Effective December 2017)



Source: Utah Transit Authority, www.rideuta.com/Rider-Tools/Schedules-and-Maps, Retrieved August 13,2018.

Various service roads limited to airport service vehicles and rental car companies are located strategically within the Terminal Drive loop road footprint to separate and limit conflicts between public traffic and airport operations. These roads are two-way, two-lane, low volume roads.

On the east side of SLCIA in the general aviation campus, 2200 W Street is the primary arterial road providing north-south travel to access points. Additionally, I-215 parallels 2200 W one block east with on/off ramp locations at 700 N Street, 1700 N Street, and 2100 N Street. Extending west of 2200 W, 2100 N provides entry to the northern half of SLCIA. This is a 50 mile per hour, two-way, four lane road with shoulders designated as bicycle lanes.

1.8.1.3 Terminal Curb Roadway

The terminal curb roadway is split into two levels, three at-grade roads and one elevated road, each providing approximately 1,000 feet of curb length. The elevated road is programmed for drop-off of departing passengers. The associated terminal curb is immediately adjacent to airline ticketing and check-in facilities which are located inside the terminal building. The departures curb road is five lanes wide. The two innermost lanes closest to the curb are for vehicles maneuvering and unloading passengers and baggage. The middle lane (Lane 3) is a transitional lane where vehicles pull in and out of the two drop-off lanes. The two outermost lanes (Lanes 4 and 5) are intended for use by through traffic.

There are three lower-level, at grade roads along the terminal curb. The outermost road is five lanes wide and dedicated to arriving passenger pick ups. Similar to the elevated departures curb road, the two innermost lanes closest to the curb are for vehicles pulling over and load passengers and baggage, the middle lane (Lane 3) is a transitional lane for privately owned vehicles (POVs) to pull in and out of the two drop-off lanes, and the two outermost lanes (Lanes 4 and 5) are intended for use by through traffic. There is no access from the terminal building to the arrivals curb at grade level. Instead, access to the arrivals curb is made possible by way of the pedestrian sky-bridge which allows passengers to pass from the terminal building to the arrivals curb without ever crossing at road grade. Vertical circulation is then provided from the sky bridge to the arrivals curb via elevators, escalators, and stairs to descend to the curb.

Two at-grade roads between the arrivals road and the terminal building are dedicated to commercial vehicle use. Both roads are three lanes wide. These roads are dedicated to commercial vehicles picking up arriving passengers at the terminal. At the time of this writing, it is not known what space will be dedicated to specific commercial vehicle activities. Pedestrians using the outermost commercial vehicles curb cross the innermost commercial vehicle road at marked and lighted crosswalk locations. In order to access the commercial vehicle roads, vehicles must pass through a gates with Automated Vehicle Identification (AVI) equipment, meaning the necessary Radio-frequency Identification (RFID) tags must be present in the vehicle. TNC's operate through the ground transportation lot and then proceed through Booth 10, a guard shack located just east of the Terminal. The TNC operators do not have AVI readers but instead are verified at Booth 10 and both pick up and drop off on the outermost commercial vehicle lane. FIGURE 1-22 shows a conceptual rendering of the completed SLCIA terminal curb roads.

Figure 1-22: Conceptual Rendering of SLC Terminal Curb Roads

Source: SLCDA, 2018

1.8.2 Ground Transportation Services and Facilities

Salt Lake City International Airport is served by a number of commercial ground transportation providers which make use of road and rail facilities. Additionally, facilities are provided for pedestrian and bicycle use. Observations and stakeholder interviews noted that employees are the primary users of pedestrian/bicycle trails and bicycle storage facilities.

One unique element of Utah is that, in 2017, the state deregulated the taxi industry, meaning that a person was no longer required to have a taxi endorsement on their driver's license in order to legally drive a taxi within Utah. Any ground transportation provider registered with the state can now perform taxi services. However, in order to perform those services, specifically related to operations at SLCIA, all commercial vehicles must register with Salt Lake City, undergo vehicle inspections, and meet a minimum standards code. Additionally, at SLCIA, drivers must be vetted through the same badging process as SLCDA and tenant employees. TNC drivers are regulated by the State. TNC drivers are managed through a permitting process which allows SLCDA to ensure security and collect fees. Functionally, there is very little distinction between taxis, TNCs, and any other form of commercial ground transportation providing for-hire services in the State of Utah.

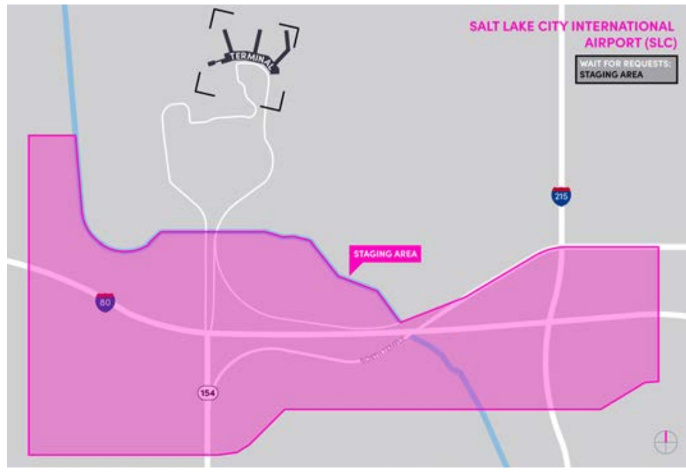
Modes of commercial vehicles performing ground transportation at SLCIA include:

- Taxi cab companies
- TNCs
- UTA buses
- Charter buses
- TRAX light rail
- Limousines
- Courtesy shuttles
- Resort shuttles

Commercial vehicle staging takes place at an SLCDA-owned and operated staging lot off of the main SLCIA campus. The lot is located at 2400 W Street immediately south of North Temple. This lot covers slightly more than one acre with 79 parking spaces, three of which are oversized for buses.

TNC operations at SLCIA are regulated by SLCDA and drivers are required to enter the First In-First Out (FIFO) TNC queuing area shown in FIGURE 1-23. The queuing area is defined by a geo-fence boundary that triggers the TNC driver application to allow ride requests from the SLCIA terminal. When TNC drivers are dropping off passengers at the terminal curb, they are allowed a five minute period to accept new ride requirements from the terminal area through a process known as "rematching

Figure 1-23: SLC TNC Geo-fence Area



Source: https://help.lyft.com/hc/en-us/articles/115012928467-Utah-airport-information-for-drivers, Retrieved August 30, 2018.

1.8.3 Vehicle Parking

Parking is provided at SLCIA for the traveling public, SLCDA and tenant employees, and various other users including air cargo, military, general aviation, and airport support services. Public parking for commercial terminal users is provided in two facilities, each with an associated pricing structure. The program capacity and rate structure is shown below.

Economy Lot: 10,463 spaces

- 0-60 minutes = $2.00
- Additional hour = $1.00
- 24 hour max = $9.00
- Parking garage: 3,600 spaces
- 0-30 minutes = $2.00
- Additional 20 minutes = $1.00
- 24 hour max = $32.00

The closest available parking to the terminal building is in the parking garage. The garage is a five story, cast-in-place, post-tensioned concrete structure providing a total of 3,600 spaces and direct access to the Gateway Building on the second level via the pedestrian sky-bridge. The structure covers approximately 11 acres including the helical ramps. All vehicle parking levels are covered. The garage first level is dedicated to rental car ready/return vehicle parking. The second story is programmed for short-term parking spaces with posted "No Overnight Parking" signs and wayfinding signage directs long-term parkers to levels three, four, and five. The parking operator enforces the "No Overnight Parking" policy according to SLCDA direction. Two helical ramps allow vertical vehicle access and egress from the different garage levels. This avoids the requirement for vehicles to circulate past parked vehicles. The helical ramp exterior diameters are 90 feet. The entry ramp is dedicated to one-way upward movement and the egress ramp is dedicated to one-way downward movement.

Economy surface parking lots are available on the interior of the Terminal Drive loop road. Combined with vehicle circulation routes, approximately 10,500 spaces are provided over 86 acres of land. Two lanes which exit from Terminal Drive provide public access to the lots. These feed three access lanes with gated ticketing systems which control entry into the lots.

Payment systems for public parking can be performed through the "Hub Parking Technology" parking system. This system allows payment by cash, credit, credit in/credit out, validation, badges, and AVI. Pay-on-foot kiosks are also available in the parking garage. Final egress from the parking garage and economy parking lots takes place through the parking exit plaza where payment can be taken, confirmed, or waived.

Terminal tenant employee parking takes place on a gated 22 acre lot with 3,355 spaces located outside the southeast portion of the Terminal Drive loop road. The gates are activated by a current airport employee badge. Badged employees are shuttled to and from the airport, or can walk or bike to the terminal using a path along 3700 W. SLCDA employee parking is provided near the terminal building and employee parking for other individual businesses/facilities is provided on-site adjacent to the building.

1.8.4 Rental Car Facilities

Rental car facilities are structured and located to prioritize customer convenience and efficient operational flows. Customer service and administrative functions take place in the Gateway Building on Level 1. This space includes customer service counters with agents, queuing, circulation, and administrative offices. The proximate locations of all rental car customer services eliminates any need for customer shuttling.

Rental car ready/return is located immediately adjacent on Level 1 of the parking garage. This is where rental car customers pick up and drop off rented vehicles. Spaces hold vehicles ready for rental and returned vehicles are parked nose-to-tail in return lanes for employee handling.

Rental car servicing and light maintenance is performed in the QTA service center structure immediately south of the parking garage. This facility serves fueling, washing, and storage purposes. Fencing and barriers separate access between leased spaces for different rental car agencies.

Three rental car service centers are located immediately south of the QTA service center structure. These buildings are where light maintenance such as oil changes, tire rotations, and small repairs are performed. Space around these buildings supplies additional nose-to-tail parking storage.

Several off-airport rental car agencies serving SLCIA also exist. Inventory of these company assets is not included in this Master Plan since SLCDA leases no land to them and holds no control over managing their future facility needs. Off-site rental car companies pickup on the far west side of the parking garage.

1.8.5 Stakeholder Interviews and 2018 Terminal Curb Road Observations

In order to better understand the SLCIA landside system, existing terminal curb road demand, and how the curb roads are operated, quantitative and qualitative data were collected during two two-hour peak demand times in June 2018, a relatively busy month. Note that this data was collected prior to the completion of the ARP, which made major improvements to the airports landside operating environment. On Wednesday June 27, 2018, data were collected during an evening arrival peak from 8:00pm to 10:00pm. Data collected on June 28, 2018 were gathered during the afternoon mixed peak from 12:15pm to 2:15pm. These data are used to quantify landside demand in the Facility Requirements Chapter.
Empirical study during these two events revealed the following challenges with the terminal curb.

- Demand on terminal curbs caused recurrent congestion for a variety of reasons, with concurrent queuing traffic along Terminal Drive as a result.
- While active unloading predominated on the departures curb, "active loading only" rules by the public were not well observed on the arrivals curb. Curb management staff takes a variety of approaches to encourage users to obey the regulation, stepping up their encouragement and enforcement as needed when the curb gets most severely congested.
- Airport user confusion existed and appeared to be caused by a mix of ongoing construction, curb design (June 2018 curb), and inconsistent and/or confusing wayfinding signing.
- When the parking garage (June 2018 garage) is full and parkers are manually redirected to economy parking, this traffic is required to drive past the terminal curb in order to reach other parking/waiting locations.

It is important to reiterate that the data collected at this time was related to operations on the terminal curb as it existed in June 2018. This was prior to the completion of the ARP which creates an entirely new curb road environment. The intent of performing this study and providing this data is to inform SLCDA of operational challenges in order to assist in avoiding them under the new curb road configuration.

In addition to recording observations during peak events, interviews were conducted with key landside stakeholders including SLCDA staff, the parking operations company, and on-airport rental car agencies. The following areas requiring attention during the planning process were noted:

- On-airport parking
  - Capacity constraints for all locations (garage, economy, employee)
  - Economy parking shuttle routes, fleet size, and shelter configurations
  - Enforcement of parking and curb policies
  - Parking exit plaza, specifically oversize lanes, bypass lanes, and shelter design
  - Growing presence of off-airport parking companies
  - Parking program effectiveness and pricing rate structure
- Terminal curb roads
  - Arrivals and Departures curb programming
  - TNC pick up/drop-off locations and "pre-match and re-match" policies
  - Curb management and active loading/unloading policy enforcement
- Rental car
  - Capacity of new facilities
- TNCs
  - Impacts of TNC increased use on rental car and parking are uncertain
- TRAX
  - Hours of operation limit usefulness for some airport/tenant employees
- Park 'n' Wait lot
  - User confusion created by location and access/egress paths
- Airport roadway safety
  - Adequacy of shoulders for Airport Police use
  - Diversion paths for traffic during Code Red emergency operations

Figure 1-24: Arrivals Curb Road Queueing Traffic (June 2018)

Source: RS&H, 2018

Figure 1-25: Departures Curb Road (June 2018)

Source: RS&H, 2018

One important consideration when planning landside and terminal facilities at SLCIA is the need to accommodate short-term parking for greeting and well-wisher crowds during missionary arrivals or departures. These occur in short, concentrated time-frames, when missionaries from local church groups depart for, or arrive home from trips. Family and friends of the missionaries arrive in large groups to show support for and welcome home the missionaries, creating significant peaks of demand for hourly or short-term parking spaces. Additionally, these events trigger the need for designated meeting space within the terminal arrivals hall just outside of the exit location from the sterile area.

Ensuring high levels of customer service are provided and sustained during the ARP and beyond is an important element of the landside portion of the Master Plan study. This can be done by providing safe, efficient, and adequately sized facilities; determining how, when, and where landside facilities can expand to meet demand growth, and programming the facilities to meet the unique needs of airport users at SLCIA. Therefore, consideration will be given to these areas during facility requirements and alternatives analyses in later chapters.

Figure 1-26: Greeters Awaiting Missionary Arrivals (June 2018)

Source: RS&H, 2018

1.9 GENERAL AVIATION FACILITIES

Salt Lake City International Airport serves a wide variety of general aviation aircraft users including corporate flying, law enforcement, fire rescue, medical air evacuation, recreational flying, flight training, air charters, government aviation, military aviation, and the transport of mail. General aviation facilities at SLCIA are located along the east side of the airfield, extending north from North Temple Road, between 2200 W Street and Taxiway K. 2200 W Street provides landside access to the east side general aviation area. General aviation facilities have developed parallel to Runway 17-35 and Taxiway K, and are the primary users of this portion of the airfield. The location of general aviation facilities are identified in FIGURE 1-27.

SLCDA also manages two additional general aviation airports, South Valley Regional Airport (U42) and Tooele Valley Airport (TVY). A General Aviation Strategy Plan (GASP), which is being prepared at the time of this writing, provides analysis and a recommended action plan for the entire general aviation system managed by SLCDA, which includes U42 and TVY.

19.1 Leasehold Zones

In 2015, SLCDA began a transition within the general aviation area to program zones of control between SLCDA and the FBOs serving SLCIA. This transition split control of facilities into three zones managed by TAC Air, Atlantic Aviation, and SLCDA. Zone 1, at the south end of the general aviation area, is managed by TAC Air. Atlantic Aviation manages Zone 2 and SLCDA controls Zone 3, which is located north of the taxilane nearest to Taxiway K4. This system of control ultimately reduces the involvement of SLCDA in the overall management and future development of general aviation hangars at SLCIA. At an undetermined future date, all leases will be conveyed to the managing organization. At the time of this writing, approximately 74 percent of based aircraft are in a location that is managed by SLCDA, 24 percent are based with TAC Air, and two percent are managed by Atlantic Aviation. The area managed by SLCDA primarily consists of corporate hangars but also includes an ARFF facility and a T-hangar row. The future programmed areas of control are graphically depicted in FIGURE 1-28.

1.9.2 SLCDA T-Hangar Facilities

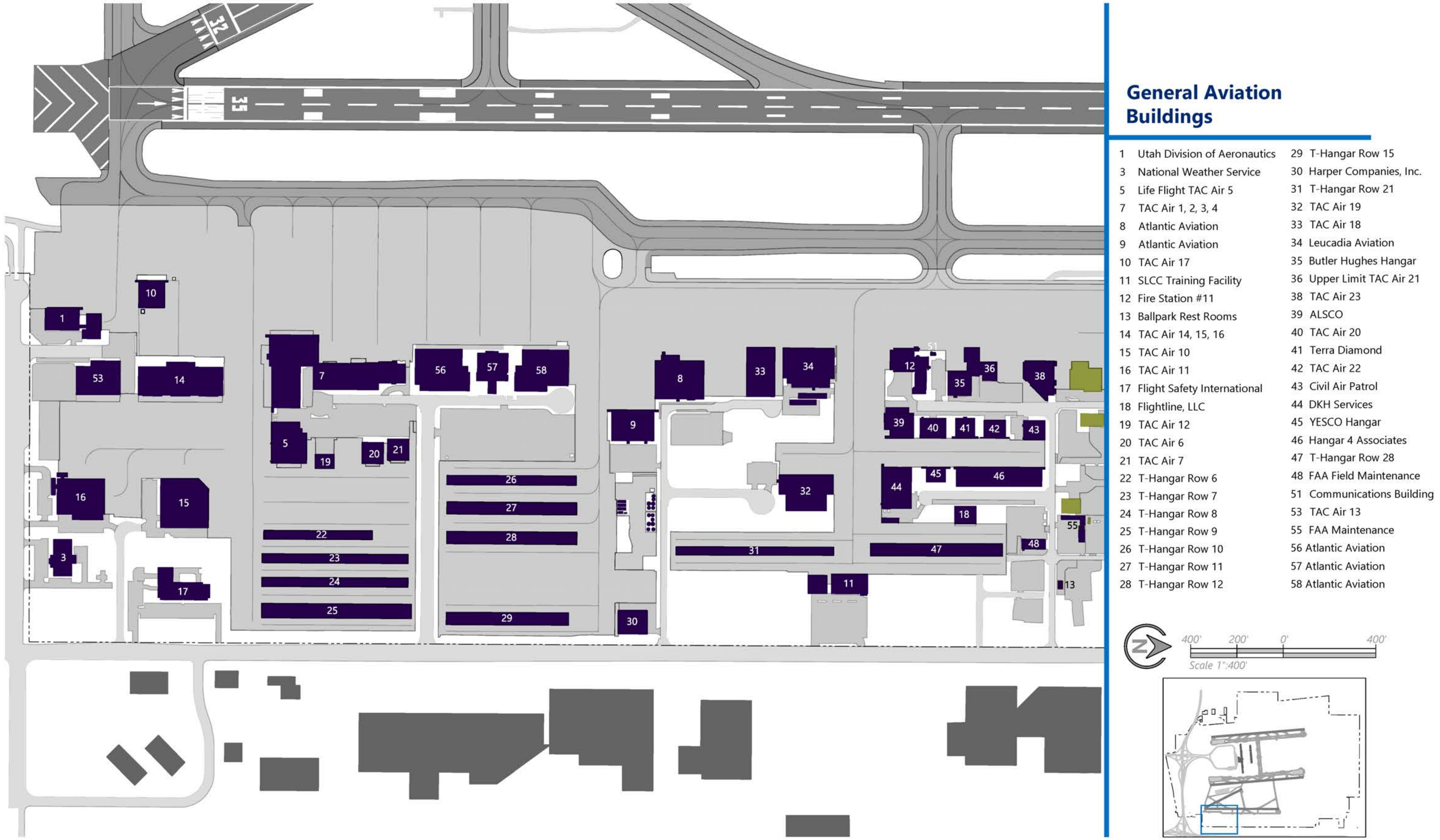
SLCDA owns and maintains 226 total T-hangars at SLCIA, mostly located in the southeast sector of the general aviation area. These hangars include 145 single-engine T-hangar bays, 27 twin-engine T-hangar bays, and 54 shade hangars, located in eight T-hangar rows and two shade hangar rows. However, 19 of the single-engine T-hangar bays are un-rentable due to structural deficiencies. The hangars were built between 1970 and 1984, making them between 34 and 48 years old. It is expected that most, if not all, T-hangars will need to be replaced within the planning horizon of this Master Plan. The T-hangar facilities available at SLCIA are included in TABLE 1-13. As of March 2018, 75 interested parties are on the waiting list for single-engine aircraft hangars, and 20 are waiting for twin-engine aircraft hangar availability. The historically estimated waiting time on the hangar waiting list is over 500 days.

Tab;e 1-13: SLCDA T-Hangar Facilities

Building	T-Hangar	Type	Year Built	Units	Area	Ultimate Zone of Control
GA-22	Row 6	Single	1970	15	944 sf	1 - TAC Air
GA-23	Row 7	Single	1970	20	944 sf	1 - TAC Air
GA-24	Row 8	Single	1970	20	944 sf	1 - TAC Air
GA-25	Row 9	Twin	1978	27	1,228 sf	1 - TAC Air
GA-26	Row 10	Single	1978	18	944 sf	2 - Atlantic Aviation
GA-27	Row 11	Shade	1981	27	995 sf	2 - Atlantic Aviation
GA-28	Row 12	Shade	1980	27	995 sf	2 - Atlantic Aviation
GA-29	Row 15	Single	1978	24	944 sf	2 - Atlantic Aviation
GA-31	Row 21	Single	1978	22	944 sf	2 - Atlantic Aviation
GA-37	Row 28	Single	1984	26	944 sf	3 - SLCDA

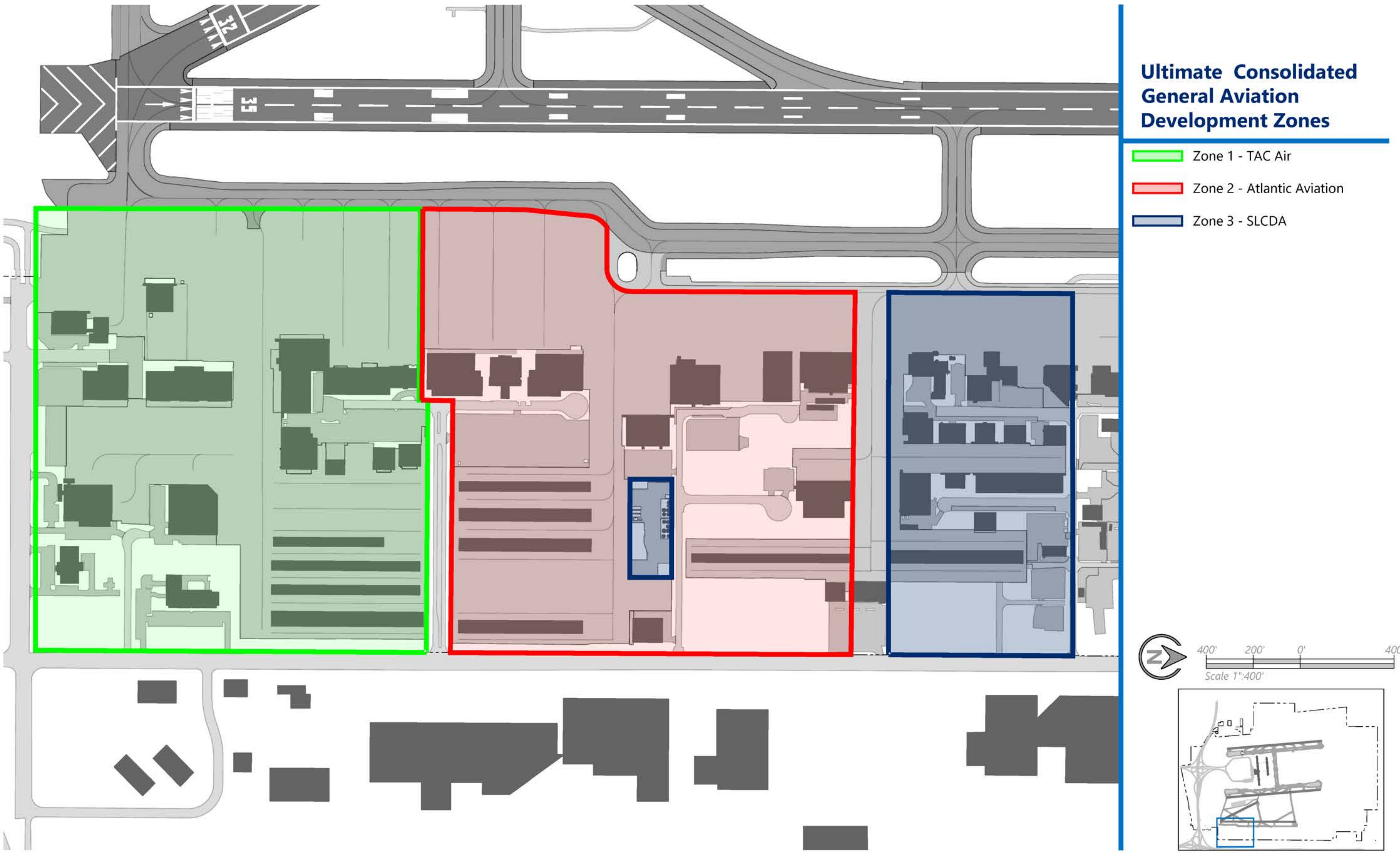
Source: SLCDA; Prepared by RS&H, 2018

Figure 1-27: East Side General Aviation Buildings



Source: Prepared by RS&H, 2018

Figure 1-28: Ultimate General Aviation Development Zones



Source: Prepared by RS&H, 2018

1.9.3 SLCDA Corporate Tenants

SLCDA leases corporate hangars in the general aviation area to 12 organizations. Through the implementation of transitioning into zones, some of these leases will ultimately be transferred to Atlantic Aviation or TAC Air control. TABLE 1-14 provides a breakdown of the corporate hangars leased by SLCDA.

1.9.3.1 Utah Division of Aeronautics

The Utah Division of Aeronautics, a division of the UDOT, leases 86,444 square feet, including ramp access, hangar facilities, and office space for operations. The Utah Division of Aeronautics operates a Beechcraft King Air B200, Beechcraft King Air C90, and a Cessna 206 from SLCIA.

1.9.3.2 Flightline, LLC

Flightline, LLC bases a Mitsubishi MU-2B-25 at SLCIA in a 6,768 square feet hangar. Their total lease area is 11,040 square feet.

1.9.3.3 Harper Companies, Inc.

Harper Companies, Inc., dealing in custom precast products, bases a Cessna 550 aircraft and a Beechcraft King Air B300 in a 12,500 square feet hangar at SLCIA. The total lease area for Harper Companies, Inc. is 25,562 square feet.

1.9.3.4 Leucadia Hangar

This hangar lease has been assigned to American Investment from Leucadia Aviation. Aircraft based at SLCIA for use by this company includes a Gulfstream G450, a Gulfstream G-IV, a Cessna Citation 525B, a Pilatus PC12, and a Cessna Sovereign 680.

1.9.3.5 Hughes & Hughes Investment Corporation

Hughes & Hughes Investment Corporation develops and manages commercial real estate projects. The company leases 32,160 total square feet from SLCDA, including a 17,694 square foot hangar. Based aircraft at SLCIA include a Cessna LC41-550FG Corvallis, Cessna 510 Citation Mustang, and a Cessna 525C Citation.

1.9.3.6 ALSCO

ALSCO provides linen rentals, employee uniform and work-wear services. A Gulfstream G450 aircraft is based at SLCIA in a 13,961 square foot hangar, part of a 35,970 square foot total lease area.

1.9.3.7 Terra Diamond

Terra Diamond is an independent company specializing in manufacturing tools and accessories. They lease a total of 12,675 square feet including a 6,933 square foot hangar where a Cessna 441 is based.

Table 1-14: SLCDA Corporate Hangar Tenants

Building	Tenant	Approx. Apron Area	Hangar/Office Area	Total Lease Area
GA-01	Utah Division of Aeronautics	38,869 sf	21,865 sf	86,889 sf
GA-11	Salt Lake City Community College	- sf	24,507 sf	85,550 sf
GA-18	Flightline, LLC	900 sf	6,768 sf	11,040 sf
GA-30	Harper Companies, Inc.	2,538 sf	12,500 sf	25,562 sf
GA-34	Leucadia Aviation	39,939 sf	35,877 sf	91,028 sf
GA-35	Hughes & Hughes Investment Corp.	11,033 sf	17,694 sf	32,160 sf
GA-39	ALSCO	10,107 sf	13,961 sf	35,970 sf
GA-41	Terra Diamond	698 sf	6,933 sf	12,675 sf
GA-43	Civil Air Patrol	- sf	7,110 sf	16,172 sf
GA-44	DKH Services	5,948 sf	24,188 sf	52,830 sf
GA-45	Young Electric Sign Company	1,414 sf	5,163 sf	17,368 sf
GA-46	Hangar 4 Associates	5,837 sf	29,176 sf	47,804 sf

Source: SLCDA; Prepared by RS&H, 2018

1.9.3.8 Civil Air Patrol

The Civil Air Patrol – Salt Lake City Senior Squadron (CAP), is a volunteer program, funded as a United States Air Force Auxiliary, with missions for emergency services, cadet training, and aerospace education. The CAP leases a total of 16,172 square feet including hangar space. Ten Cessna 182s, a Cessna 206, and a Gippsland GA8 are based at SLCIA.

1.9.3.9 DKH Services

DKH Services operates a Bombardier Global 5000. Bombardier BD-700-1A11, Dassault Mystère-Falcon 50, Quest Kodiak 100, and an Aviat A-1B. DKH Services leases a total of 52,830 square feet of space.

1.9.3.10 Young Electric Sign Company

Young Electric Sign Company, or YESCO, is a private manufacturer of signs, lighting, and display systems. The company bases a Beechcraft Baron 58 and Beech Bonanza V35B aircraft from SLCIA, stored in a 5,163 square foot hangar. Total area included in the YESCO lease is 17,368 square feet.

1.9.3.11 Hangar 4 Associates

This building includes a total of four hangars, some of which are leased to private individuals. Aircraft in this 29,176 square foot facility include an Embraer EMB-500, Pilatus PC 12/45, Cessna 320, Cirrus SR22, Cessna 210T, and Beech B200 King Air.

1.9.4 Fixed Base Operators

Two FBOs serve the general aviation community at SLCIA. Services provided include aircraft sales and leasing, air charter service, aircraft parts and maintenance, fuel sales, and aircraft storage.

Atlantic Aviation began operations at SLCIA in April 2016. After assuming possession of the company's leased area, improvements were made including apron renovations and new hangar construction. In April 2018, Atlantic Aviation opened a new executive terminal. The FBO has more than 100,000 square feet of aircraft storage split between four hangars. A total of five aircraft are based with Atlantic Aviation including four multi-engine aircraft and one single-engine aircraft. Atlantic Aviation has capacity for growth in based aircraft, with substantial additional room available in their newly constructed hangars. The Atlantic Aviation total leasehold area is 866,208 square feet. Atlantic Aviation buildings are shown in TABLE 1-15.

Atlantic Aviation offers full fueling service with Jet A and 100LL fuel available for purchase. Between July 2017 and April 2018, Atlantic Aviation fuel flowage data shows approximately 209,355 gallons per month on average. Additional fuel capacity details are included in SECTION 1.11.5, Aviation Fuel Storage.

Non-aeronautical services provided by Atlantic Aviation include office space rental, "snooze rooms", and rental car services provided through partnership with Go Rentals, a rental car company based in the Atlantic Aviation executive terminal.

TAC Air also provides FBO service at SLCIA. This FBO includes subsidiary company Keystone Aviation, as well as Million Air, a former FBO at SLCIA which was acquired by TAC Air in May 2012. TAC Air manages 18 total buildings, ranging in size from 7,500 square feet to over 45,000 square feet. A total of 75 aircraft are based at TAC Air including 19 single-engine, 15 multi-engine aircraft, 35 jet-engine aircraft, and six helicopters. The demand for aircraft storage fluctuates seasonally, spiking during the winter months. In 2016, TAC Air completed construction of an additional 39,200 square feet box hangar and, according to TAC Air, is receiving inquires for additional growth. The total TAC Air leasehold area is 1,319,297 square feet. An overview of facilities managed by TAC Air is shown in TABLE 1-16.

TAC Air offers full fueling service with Jet A and 100LL fuel available for purchase. In addition to sales, fuel is provided for transient military operations as well as fuel pumping for commercial airlines. Between July 2017 and April 2018 the TAC Air fuel flowage data shows approximately 297,413 gallons per month on average. Additional fuel capacity details are included in SECTION 1.11.5, Aviation Fuel Storage.

TAC Air provides a wide range of services at SLCIA. Aircraft sales and leasing are available through a partnership with SOCATA TBM and Honda Jet aircraft. Air charter operations are available through a fleet of 20 aircraft including a variety of team charters. Additionally, aircraft maintenance is available for five of the airlines that utilize SLCIA and private aircraft.

Table 1-15: Atlantic Aviation Buildings

Building	Tenant	Building Area	Total Lease Area
GA-03	National Weather Service	13,148 sf	31,983 sf
GA-17	Flight Safety International	31,140 sf	173,889 sf
GA-49	Boeing Company	24,156 sf	800,000 sf
GA-52	Boeing Company	32,139 sf	800,000 sf

Source: SLCDA, Prepared by RS&H, 2018

Table 1-16: TAC Air Buildings

Building	Type	Approx. Apron Area	Hangar/Office Area	Total Lease Area
TAC Air 1, 2	Office	330,796 sf	40,004 sf	463,782 sf
TAC Air 5	Hangar	6,728 sf	24,156 sf	35,250 sf
TAC Air 6	Hangar	- sf	8,217 sf	8,217 sf
TAC Air 7	Hangar	20,822 sf	8,217 sf	31,983 sf
TAC Air 10	Hangar	40,014 sf	39,200 sf	112,989 sf
TAC Air 11	Office	21,502 sf	30,804 sf	140,267 sf
TAC Air 12	Hangar	3,198 sf	4,614 sf	13,709 sf
TAC Air 13	Hangar	- sf	39,200 sf	N/A[1] sf
TAC Air 14, 15, 16	Office	181,186 sf	45,908 sf	246,891 sf
TAC Air 17	Hangar	2,273 sf	13,132 sf	26,342 sf
TAC Air 18	Hangar	39,972 sf	25,200 sf	95,760 sf
TAC Air 19	Hangar	12,173 sf	30,640 sf	83,060 sf
TAC Air 20	Hangar	352 sf	8,360 sf	15,000 sf
TAC Air 22	Hangar	447 sf	7,520 sf	13,032 sf
TAC Air 23	Office	8,203 sf	18,152 sf	33,015 sf

Note: (1) Information not available.

Source: SLCDA; Prepared by RS&H, 2018

1.9.5 Military Facilities

The Utah Air National Guard (UANG) leases approximately 135 acres for the Roland R. Wright Air National Guard Base. In 2018, this lease agreement was extended for an additional term through 2068. The 151st Air Refueling Wing is the host unit at this base charged with the mission of aerial refueling operations utilizing Boeing KC-135R Stratotankers. As of 2016, nearly 1,500 personnel are involved in the operation of the base. FIGURE 1-29 illustrates the UANG facilities on SLCIA.

1.9.6 Non-Airside Facilities

SLCDA also leases non-airside facilities within the general aviation footprint on the east side of SLCIA. These vary in function, as described in the following sections, and are shown in FIGURE 1-30.

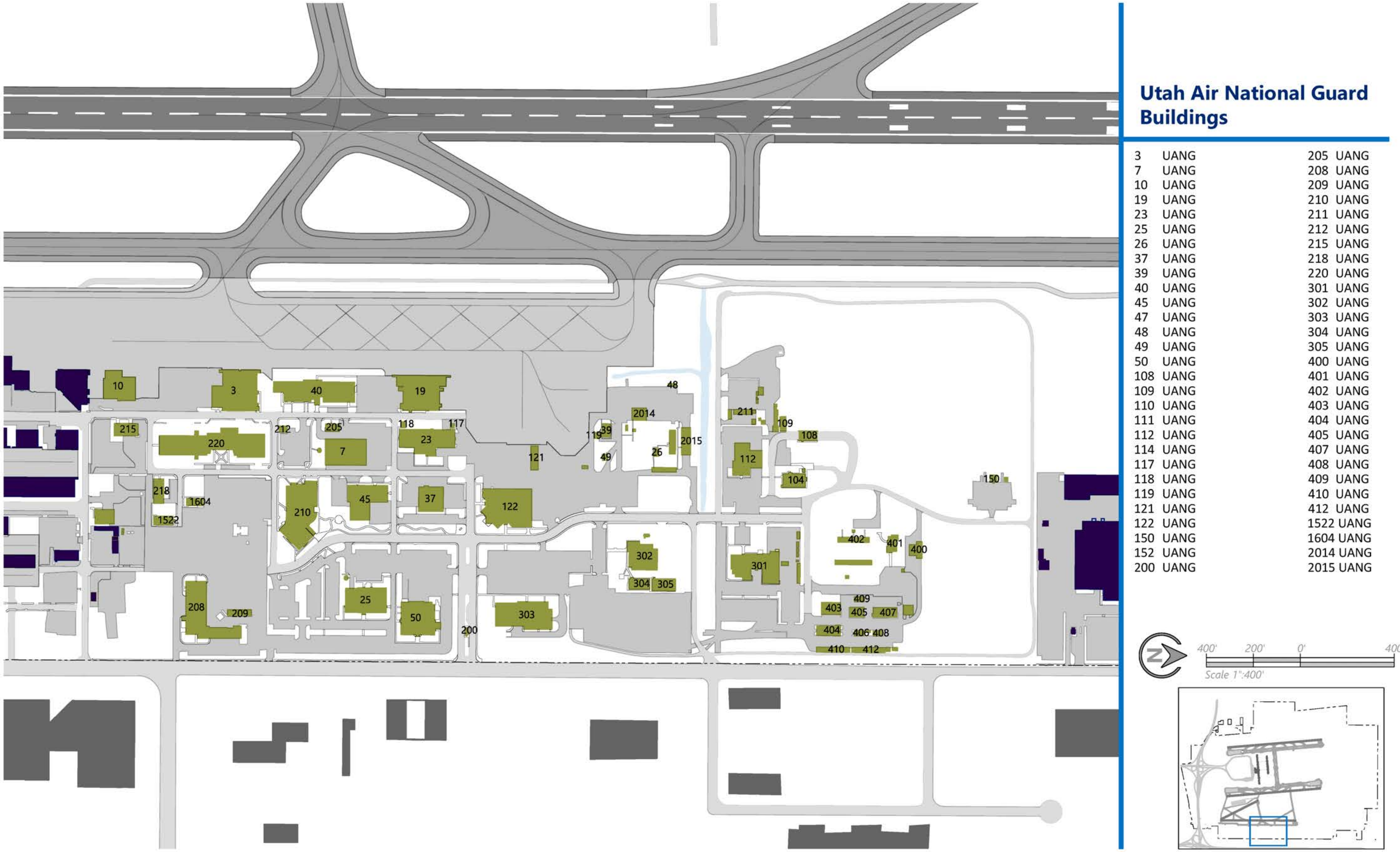
1.9.6.1 National Weather Service

The NWS leases a 55,617 square foot office facility for the Salt Lake City NWS Forecast Office on W North Temple.

1.9.6.2 Flight Safety International

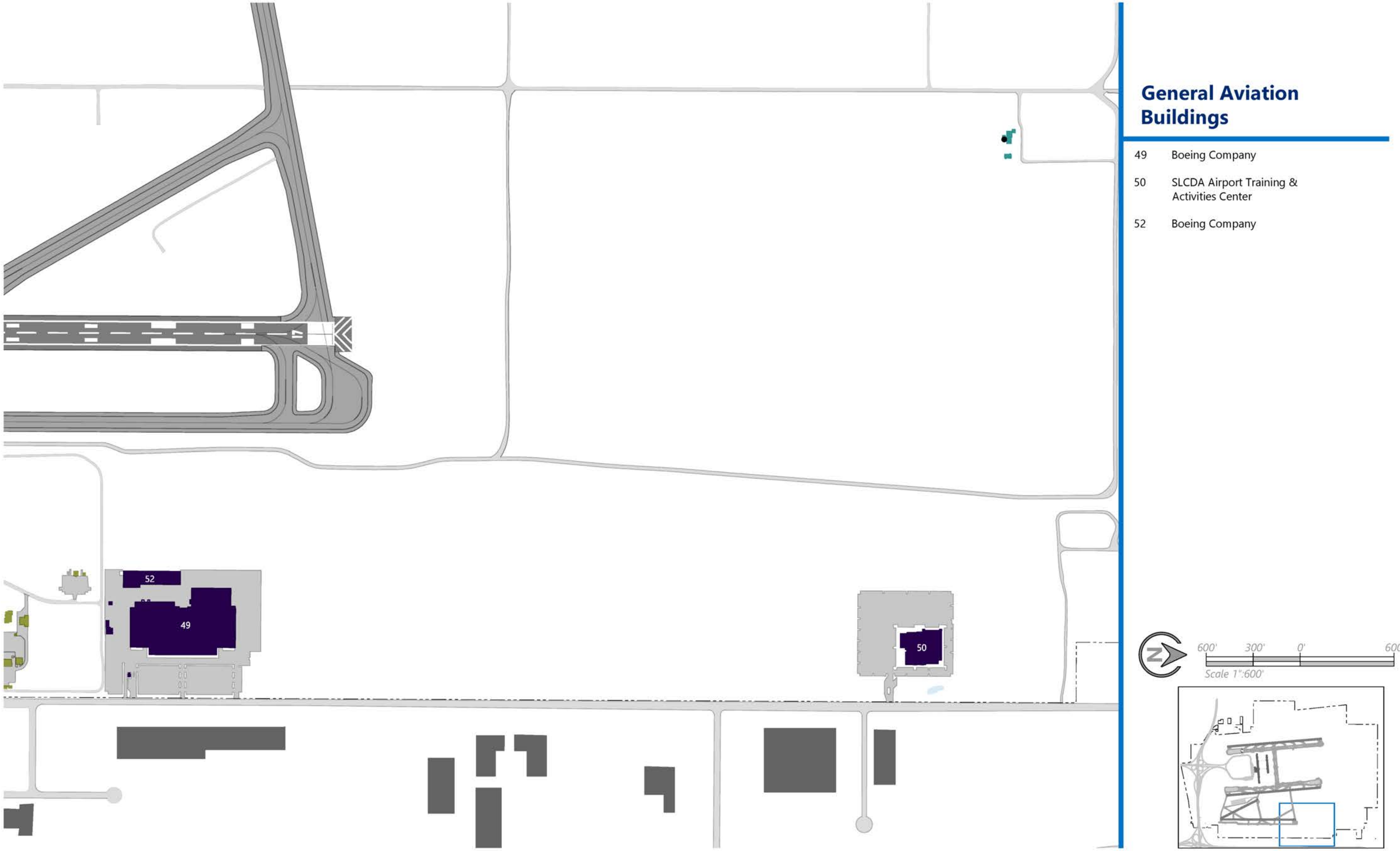
Flight Safety International offers flight training for the Bombardier CRJ200 and Bombardier CRJ700. The company leases a 173,889 of square foot facility along 2200 W.

Figure 1-29: Utah Air National Guard Buildings



Source: Prepared by RS&H, 2018

Figure 1-30: Other General Aviation Buildings Without Airfield Access



Source: Prepared by RS&H, 2018

1.10 AIR CARGO FACILITIES

Air cargo at SLCIA includes the movement of freight and mail. In 2017, 382.2 million pounds of total cargo was handled by the tenants of SLCIA. Cargo facilities at SLCIA are located in two areas, the South Cargo Area, located near the approach end of Runway 34R, and the North Cargo Area, located near the approach end of Runway 16L. The South Cargo Area is accessed via N 3700 W. Landside access for the North Cargo Area facilities is provided via 1580 N. FIGURE 1-31 and FIGURE 1-32 visually depict cargo facilities.

1.10.1 South Cargo Area

1.10.1.1 United States Postal Service

The United States Postal Service (USPS) occupies a 45,000 square foot building situated between Joint Cargo Building #2 and the Airport Operations Center. This facility offers typical Post Office services with 23 vehicle parking spaces available for public use and another 64 parking spaces inside a fenced area for employee parking and USPS vehicles. This facility has a total of eight truck docks. The 84,000 square feet apron is used for GSE only. Mail and packages are shipped/received via United Parcel Service (UPS) or Delta Air Lines.

1.10.1.2 Joint Cargo Building #1

Located between Joint Cargo Building #2 and #3, Joint Cargo Building #1 previously served as the main location for cargo operations but currently serves mostly belly cargo handling for airlines. Companies that lease sections of this building include G-2 Secure, which is a contractor that handles American Airlines cargo operations, SkyWest Cargo, and Southwest Airlines. The building includes 34,095 square feet of space with 22 truck dock spaces and a total of 35 vehicle parking spaces.

1.10.1.3 Joint Cargo Building #2

Joint Cargo Building #2, the southernmost building of the Joint Cargo buildings, is a 10,424 square foot facility with three truck dock spaces and 23 vehicle parking spaces. SkyWest Airlines leases space in this building for cargo opertions. Five aircraft parking positions are located to the east of Joint Cargo Building #1 and #2. These are designated for remain-overnight (RON) parking. There are four aircraft parking positions to the east of SLCIA Operations Center which are also designated for RON parking. SkyWest does park Embraer 175 aircraft in this location using the taxi-in and taxi-out method.

1.10.1.4 Consolidated Cargo Facility

The Consolidated Cargo Facility has a total of 37,168 square feet and accommodates 10 truck dock spaces and an additional 21 vehicle parking spaces. Perimeter Gate 11, staffed by an airport security officer, is located southeast of Joint Cargo Building #2 to allow for secured side access.

Air General provides cargo handling operations out of the Consolidated Cargo building. Several airlines, including Alaska Air, United Cargo, and American Cargo contract with Air General to handle their cargo services. Combined, these airlines handled 1.3 million pounds of cargo in 2017.

1.10.1.5 Delta Air Cargo

Delta Air Cargo leases a 202,413 square foot facility to handle their cargo operations. This includes a 22,646 square foot building with nine truck dock spaces and a total of 64 vehicles parking spaces. In 2017 Delta Air Cargo handled 31.2 million pounds of cargo.

1.10.2 North Cargo Area

1.10.2.1 United Parcel Service

The UPS cargo operations in the North Cargo Area began after construction of a 26,211 square foot facility constructed after the completion of the previous Airport Master Plan. The facility has the capacity to accommodate a total of 25 trucks through five truck dock locations. There are 130 vehicle parking spaces available northwest of the facility. The UPS apron in the North Cargo Area is approximately 787,000 square feet. The existing apron layout is marked to accommodate a maximum of four large jets and nine smaller aircraft.

In 2017, UPS handled 117.4 million pounds of cargo at SLCIA. Aircraft in the UPS fleet at SLCIA include the Airbus A300-600, the Boeing 757-200, the Boeing 767-300, and the McDonnell Douglas MD-11. Cargo flights for UPS typically occur daily approximately in the range of 4:00 am and 5:30 am as well as 5:00 pm and 8:00 pm. Daily flights from Louisville, KY to SLCIA occur, with most days seeing several flights between these destinations. Multiple cargo flights occur weekly to SLCIA from Ontario, CA and Boise, ID as well.

1.10.2.2 Federal Express

Federal Express (FedEx) relocated its cargo operations to the North Cargo Area in 2015 after completing the construction of a new 70,908 square foot building. The new building has the ability to accommodate a total of 25 trucks. There are 109 vehicle parking spaces available southeast of the facility. The FedEx apron in the North Cargo Area is approximately 608,000 square feet. The existing apron layout is marked to accommodate a maximum of four large jets and 14 aircraft that are ADG II or smaller.

In 2017, FedEx handled 192.2 million pounds of cargo at SLCIA. Aircraft utilized in the FedEx fleet at SLCIA include the Cessna 208 Caravan, Airbus A300-600, Boeing 757-200, McDonnell Douglas DC-10, and McDonnell Douglas MD-11. FedEx 76 77 cargo operations time slots at SLCIA are clustered around 5:00 am and 6:00 pm, every day except Monday. Several daily flights typically occur from Memphis International Airport (MEM) to SLCIA. Flights originating from Indianapolis, IN and Oakland, CA occur approximately four days a week. Other FedEx flight locations include Grand Junction, CO and Boise, ID.

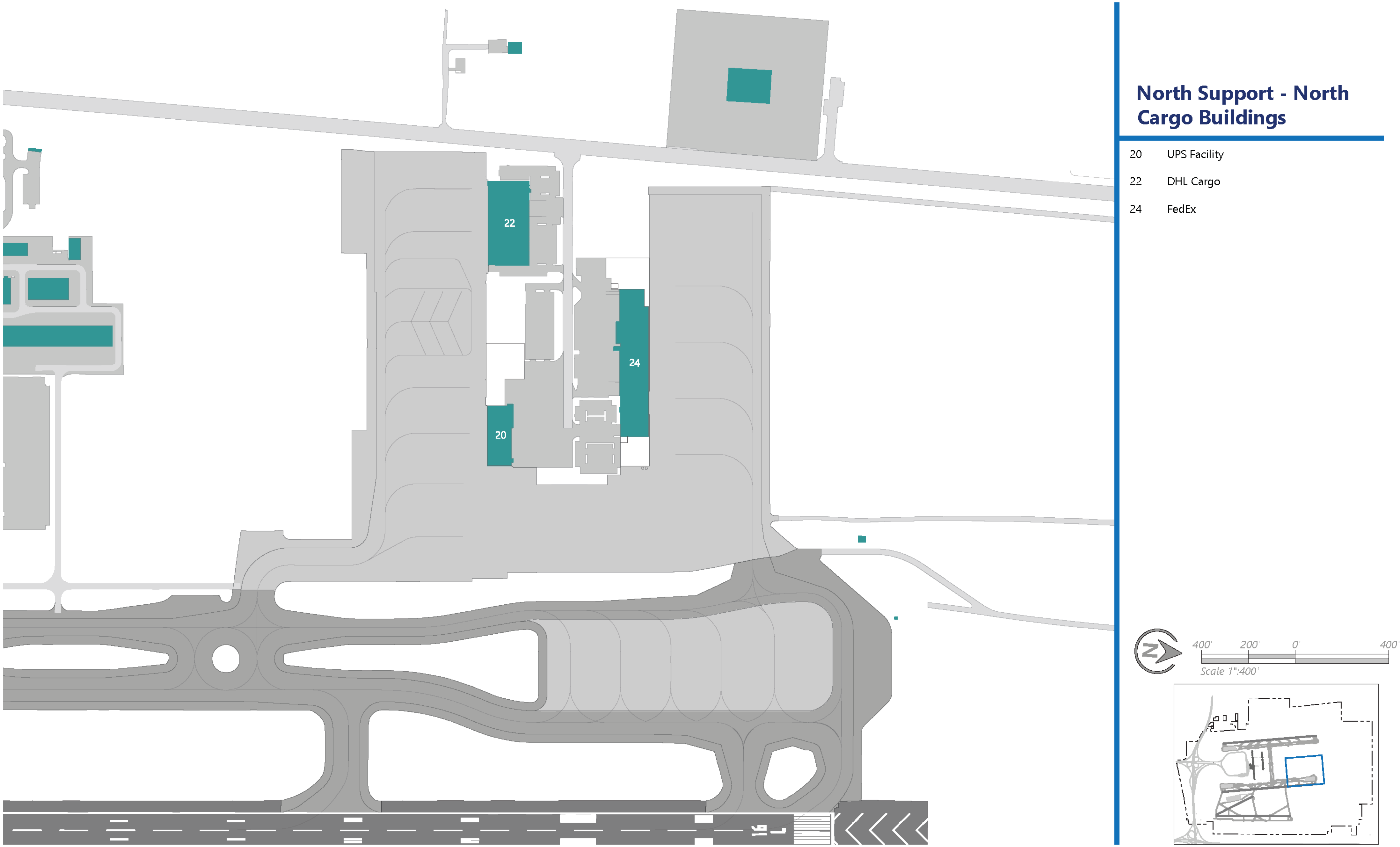
DHL Express located cargo facilities in the North Cargo Area in 2006 after constructing a new 62,000 square foot facility. Before construction for the new facility was completed, DHL managed cargo coming into SLCIA through ramp operations. The new DHL cargo building has a total of five truck docks and an overall capacity for 15 trucks. A total of 132 vehicle parking spaces are available. The DHL apron in the North Cargo Area is approximately 278,000 square feet and the existing apron layout is marked to accommodate a maximum of two large jets and four smaller aircraft.

In 2017, DHL handled 4.5 million pounds of cargo at SLCIA. Air service for DHL is provided by Southern Air, who operate Boeing 737-400 aircraft for cargo operations at SLCIA. Flights occur near the 8:00 am hour from Cincinnati Monday through Friday, and near the 5:00 am hours on Sunday. Flights from Sacramento arrive near the 8:00 pm hour every day except for Saturdays.

Figure 1-31: South Cargo and Support Buildings

Source: Prepared by RS&H, 2018

Figure 1-32: North Cargo and Support Buildings



Source: Prepared by RS&H, 2018

1.11 AVIATION SUPPORT FACILITIES

The aviation support facilities area is located south of the Air Cargo facilities. This describes the location and condition of various support facilities important to the overall operation of SLCIA. These facilities include FAA facilities, aircraft rescue and firefighting facilities, fuel facilities, de-icing, airport maintenance facilities, snow removal equipment facilities, and security related facilities. A graphical representation of all the support facilities are shown in FIGURE 1-31, FIGURE 1-32, FIGURE 1-33, and FIGURE 1-34.

1.11.1 FAA Facilities

The ATCT, as shown in FIGURE 1-33, is located off of 1200 N on SLCIA property. The ATCT facility was built in the late 1990s and handles over 300,000 operations per year. An operation is defined as either a takeoff or a landing. Therefore, if an aircraft lands, drops off, and picks up passengers, and then departs to a new destination, two operations have occurred. The tower operates continuously under the control of FAA personnel. When the ATCT is in operation, air traffic controllers provide clearance to pilots and vehicle operators on the movement area. They also provide takeoff clearance and instructions, along with providing pertinent weather information.

Although not located on SLCIA property, an ARTCC is located adjacent to SLCIA. This ARTCC, known as ZLC, is one of 22 FAA Area Control Centers in the United States. It covers one of the largest areas of any other control center. The ARTCC facility also contains the Salt Lake TRACON.

1.11.2 Aircraft Rescue and Fire Fighting

Aircraft Rescue and Fire Fighting (ARFF) involves hazard mitigation, as well as fire prevention, firefighting, rescue, and medical response in the event of an aircraft incident or accident. All Part 139 airports serving scheduled and unscheduled air carriers are required to provide ARFF services at an FAA-established appropriate level. This level, known as an index, is defined in 14 CFR 139.315 and characterizes the level of service for the ARFF facility.
Using the index set forth in 14 CFR 139.315, SLCIA's ARFF index to serve commercial aircraft is Index E. Index E is based on the potential for an average of five or more daily departures of B767-400 air carrier aircraft. Although the average daily departures may lower on a seasonal basis, SLCIA will continue to staff and equip for the higher index value. TABLE 1-18 details the ARFF equipment at SLCIA.

There are two ARFF stations supporting SLCIA. The first is located east of Runway 17-35 (Fire Station #11), shown in FIGURE 1-28. The second is located in the North Support Area between Runway 16L-34R and Runway 16R-34L (Fire Station #12), shown in FIGURE 1-33. Fire Station #12 is the site of the original facility that supported the airfield prior to the construction of Runway 16R-34L in 1995. These facilities are staffed 24 hours a day, 7 days a week with appropriately trained fire personnel as required to maintain SLCIA's Index E. Since 1997, SLCIA had been the site of the first FAA approved ARFF Training Center in the Western United States, located on the west side of SLCIA property. Due to the high cost of maintenance and operation of an aging facility, the training center closed on June 30th, 2018.

1.11.3 Aircraft Deicing Facilities

SLCIA has five de-icing pads on the airfield; one near Runway 34L, one near the end of Runway 34R, one between Runways 16L-34R and 14-32, one at Taxiway K3, and one near the end of Runway 16L. There are two additional deice locations on the North Cargo Ramp for UPS, FedEx, and DHL. The locations of the aircraft deicing pads are shown in FIGURE 1-35 and detailed in TABLE 1-19.

The deicing pads at the ends of Runway 34L, Runway 34R, and Taxiway L-Runway 34R are the primary facilities for commercial service aircraft deicing. The deicing pad located at K3 taxiway is used for general and business aviation aircraft. Additionally, the deicing pads located at the North Cargo Ramp include one near the UPS/DHL Ramp and one near the FedEx ramp. These facilities provide deicing services for any cargo aircraft that parks on these ramps. The newest deicing pad, located at the end of Runway 16L was completed in 2017.

The Airport exclusively uses propylene glycol-based fluids for deicing and anti-icing. All deicing fluids must be approved by the Airport Executive Director who is notified of the type and manufacturer of each fluid prior to the winter season. The deicing pads have been designed to capture residual deicing

Table 1-18: Aircraft Rescue and Firefighting Equipment

Vehicle	Capacity (gallons)	
	Water	Foam
GMC 1-Ton 4x4	300 g	40 g
GMC 1-Ton 4x4	300 g	40 g
Oshkosh Striker 3000	3000 g	420 g
Rosenbauer Panther 300	3000 g	400 g
Oshkosh Striker 3000	3000 g	420 g
Oshkosh TB3000	3000 g	420 g
Oshkosh Striker 3000[1]	3000 g	420 g
Oshkosh Striker 3000[1]	3000 g	420 g

Source: SLC Airport Certification Manual, 2018
Note: (1) Indicates vehicle assigned to ARFF training facility.

fluid as it is being used on the aircraft for recycling purposes. Aircraft deicing fluid captured from the drainage system in the deicing pads is then transferred to a deicing fluid reclamation plant and processed back into glycol. The glycol collected in this process is able to be reused and resold, simultaneously conserving airport resources and generating additional airport revenue. Since 2016, SLCIA has processed over 3 million gallons of fluid and recovered more than 100,000 gallons of glycol.[12]

1.11.4 Airport Snow and Ice Control Plan

Frequently, SLCIA experiences heavy periods of snow and ice which can impact airport operations. The SLCIA pavement de-icing and snow removal plans allow for safe and efficient removal of snow and ice from pavement surfaces.

1.11.4.1 Snow Removal

The SLCDA removes ice and snow from almost all areas of the airport including runways, taxiways, aprons, cargo areas, roads, and sidewalks that access the terminal area. The Snow Removal Team at SLCIA is composed of two individual groups referred to as "elements". Each element on the airfield includes the necessary snow removal equipment required to maintain an operational airfield during periods of snow and ice. Each element is under the control of an Airfield Maintenance Supervisor, with the exception of the ramp snow removal element. One runway and taxiway element is referred to as "Snow Command One" and the other element is "Snow Command Two". Ramp clearing elements are referred to as "Snow Command Ramp".

SLCDA maintains appropriate equipment levels and staffing to comply with the recommended snow clearance times for commercial service airports, described in TABLE 1-20. A list of SLCIA Snow Removal Equipment (SRE) is shown in TABLE 1-21.

1.11.4.2 Pavement Deicing

When forecasted to experience winter weather conditions, SLCDA will pre-treat the airfield with an EPA and FAA approved solution composed of biodegradable potassium acetate. This deicing solution can be used concurrently with sand and solid runway deicer to improve runway and taxiway conditions.

1.11.5 Aviation Fuel Storage

Aviation fuel storage can be found in two locations on SLCIA, as shown in FIGURE 1-36. The first area is in the North Support Area and the second is in the General Aviation Area in the southeast portion of the airport. The UANG also has its own fuel storage area. The UANG uses JP-8 fuel that is delivered by truck. Aircraft are fueled using a hydrant fueling system.

1.11.5.1 North Fuel Storage Area

The North Fuel Storage Area is located between the SkyWest Hangar (NS-23) and airport maintenance buildings along the east side of 3950 W Street. Jet A fuel is stored in six above ground tanks (two 40,000 barrel tanks, two 30,000 barrel tanks, and two 5,000 barrel tanks) with a total capacity of 150,000 barrels (or 6.45 million gallons). This fuel is supplied to the tanks via a dedicated pipeline from the tanks where it is then supplied to the terminal hydrant system. Menzies Aviation provides fuel to the aircraft at the passenger terminal for Delta Air Lines and American Airlines. TAC Air provides fuel to Southwest Airlines from the tanks in this area via truck. In addition to the Jet A fuel tanks, there is one 18,000 gallon tank storing gasoline. The gasoline is supplied by truck. It is offloaded to underground pipes at a location just northwest of the fuel storage tanks where the gasoline is then transferred to the storage tank.

Table 1-19 Deicing Pads

Location	Aircraft Service Positions
34L Runway End	8
34R Runway End	6
Taxiway L-Runway 34R End	8
Taxiway K3	1
Runway 16L	5

Note: 2 additional decing locations on cargo ramps for cargo aircraft.
Source: SLC ACM (FAA Approved 2014), Prepared by RS&H, 2018

Table 1-20: Snow Clearance Times

Annual Operations (including cargo)	Clearance Time (Hours)
40,000 or greater	1/2
10,000 to less than 40,000	1
6,000 to less than 10,000	1 1/2
Less than 6,000	2

Source: SLC ACM (FAA approved 2014), Prepared by RS&H, 2018

[12] SLCIA, November 17, 2017, https://slcairport.com/blog/2017/11/airport-works-to-preserve-resources-by-recycling-deicing-fluid, Retrieved August 28, 2018

Figure 1-21: Snow Removal Equipment

Type	Year	Make	Quantity
ATV			**2**
	2010	Club Car	2
Deicer Truck			**2**
	1984	Mack	1
	1995	Mack	1
Dump Truck			**27**
	1987	Mack	2
	1992	Mack	1
	1995	Mack	2
	1998	Mack	1
	2003	International	2
	2004	Mack	4
	2005	Mack	1
	2006	International	1
	2008	International	2
	2009	International	9
	2012	International	2
Field Tractor			**4**
	2001	John Deere	2
	2002	John Deere	2
Grader			**1**
	1995	Dresser	1
Loader			**8**
	1995	Kawasaki	1
	1998	Kawasaki	2
	1999	Kawasaki	1
	2003	Kawasaki	2
	2005	Kawasaki	2
Mower			**2**
	1999	Kubota	2
Plow Blade			**2**
	1997	Wausau	2
Push Plow			**2**
	2006	Volvo	2
Roadway Plow			**3**
	1996	Wausau	2
	1999	Western	1
Runway Broom			**20**
	1995	Stewart Stevenson	2
	1998	Stewart Stevenson	2
	2003	MB	1
	2008	MB	3
	2009	MB	7
	2010	MB	5
Runway Friction Tester			**2**
	2004	Saab	2
Runway Plow			**7**
	1995	Wausau	7
Runway Sander			**2**
	1998	Mack	2
Runway Truck			**7**
	1995	Mack	7

Type	Year	Make	Quantity
Sander			**23**
	1991	Henderson Chief	1
	1995	Henderson Chief	2
	1997	Henderson Chief	4
	1998	Henderson Chief	2
	1999	Warren	1
	2000	Warren	1
	2003	Swenson	2
	2004	Monroe	1
	2006	Swenson	1
	2009	Swenson	2
	2010	Meyer	1
	2010	Swenson	5
Snow Blower			**12**
	1994	Schmidt	1
	1995	Kodiak	3
	1998	Stewart Stevenson	1
	2004	Kodiak	1
	2008	Oshkosh	1
	2009	Oshkosh	3
	2010	Oshkosh	1
	2012	Oshkosh	1
Snow Cat			**1**
	1998	Tucker	1
Snow Plow			**49**
	1970	Frink	2
	1970	Meyer	2
	1970	Unknown Make	1
	1995	Champion	2
	1995	Kodiak	1
	1995	Root	1
	1995	Wausau	1
	1996	Jensen	1
	1998	Wausau	3
	2000	Western	1
	2002	Western	1
	2003	Henke	2
	2004	Wausau	1
	2005	Wausau	2
	2006	Boss	8
	2006	Henke	2
	2009	Wausau	11
	2010	Arctic	2
	2010	Boss	1
	2010	Wausau	2
	2011	Wausau	2
Utility Truck			**1**
	1995	International	1
Wrecker			**1**
	1992	Mack	1

Source: SLCDA, Prepared by RS&H, 2018

1.11.5.2 General Aviation Fuel Storage Area

The General Aviation Fuel Storage Area is located between the Atlantic Aviation Hangar (GA-09) and the Harper Construction Hangar (GA-30) along the south side of 470 N Street. Fuel storage for Atlantic Aviation is provided by three 30,000 gallon tanks of Jet A, one 10,000 gallon tank of 100LL, and one 2,000 gallon diesel fuel tank.

For TAC Air, fuel is stored in two 30,000 gallon tanks, two 28,800 gallon tanks, and two 28,200 gallon tanks, resulting in a total Jet A storage capacity of 174,000 gallons. Additional fuel storage is provided by two 16,800 gallon tanks storing 100LL and one 16,800 gallon diesel tank. Four 16,800 gallon fuel tanks are currently not in service. TAC Air provides fuel to Frontier Airlines, FedEx and DHL from the tanks in the general aviation area via fuel trucks.

A summary of the aviation fuel stored on SLCIA can be found in TABLE 1-22.

1.11.5.3 North Fuel Storage Area

The North Fuel Storage Area is located between the SkyWest Hangar (NS-23) and airport maintenance buildings along the east side of 3950 W Street. Jet A fuel is stored in six above ground tanks (two 40,000 barrel tanks, two 30,000 barrel tanks, and two 5,000 barrel tanks) with a total capacity of 150,000 barrels (or 6.45 million gallons). This fuel is supplied to the tanks via a dedicated pipeline from the tanks where it is then supplied to the terminal hydrant system. Menzies Aviation provides fuel to the aircraft at the passenger terminal for Delta Air Lines and American Airlines. TAC Air provides fuel to Southwest Airlines from the tanks in this area via truck. In addition to the Jet A fuel tanks, there is one 18,000 gallon tank storing gasoline. The gasoline is supplied by truck. It is offloaded to underground pipes at a location just northwest of the fuel storage tanks where the gasoline is then transferred to the storage tank.

1.11.5.4 General Aviation Fuel Storage Area

The General Aviation Fuel Storage Area is located between the Atlantic Aviation Hangar (GA-09) and the Harper Construction Hangar (GA-30) along the south side of 470 N Street. Fuel storage for Atlantic Aviation is provided by three 30,000 gallon tanks of Jet A, one 10,000 gallon tank of 100LL, and one 2,000 gallon diesel fuel tank.

For TAC Air, fuel is stored in two 30,000 gallon tanks, two 28,800 gallon tanks, and two 28,200 gallon tanks, resulting in a total Jet A storage capacity of 174,000 gallons. Additional fuel storage is provided by two 16,800 gallon tanks storing 100LL and one 16,800 gallon diesel tank. Four 16,800 gallon fuel tanks are currently not in service. TAC Air provides fuel to Frontier Airlines, FedEx and DHL from the tanks in the general aviation area via fuel trucks.

A summary of the aviation fuel stored on SLCIA can be found in TABLE 1-22.

1.11.6 Airport Police and Security Facilities

Police protection at SLCIA is provided by the Salt Lake City Police Department, with full police authority granted by the State of Utah. Airport Police have multiple divisions including patrol (and bicycle patrol), detectives, K-9 explosive detection teams, SWAT, Explosive Ordnance Disposal (EOD), and training. Management of the department is performed by the airport police chief, a captain, and two lieutenant officers.

Police operations are conducted out of the Airport Operations Center. A police training facility and police dog training facility are located on the northern portion of SLCIA property in a 4,225 square foot facility. The facility also includes an exterior police dog training course and a firing range.

SLCIA has security facilities typical of large commercial airports. The airfield is secured through a perimeter fence and a hierarchy of controlled access areas requiring specific levels of badging. SLCIA access to secure areas of the airport including the Secure Identification Display Area (SIDA), is vetted through the Airport Security badging program which includes an FBI fingerprinting criminal history background check and a TSA security threat assessment.

Table 1-22: Aviation Fuel Storage

Aviation Fuel Storage	Size (Gallons)	Fuel Type
Airport Group International	6,450,000 g	Jet A
Atlantic Aviation	90,000 g	Jet A
TAC Air	174,000 g	Jet A
TAC Air	33,600 g	100LL AvGas
Atlantic Aviation	10,000 g	100LL AvGas
Fuel Trucks	N/A	Jet A /100LL AvGas

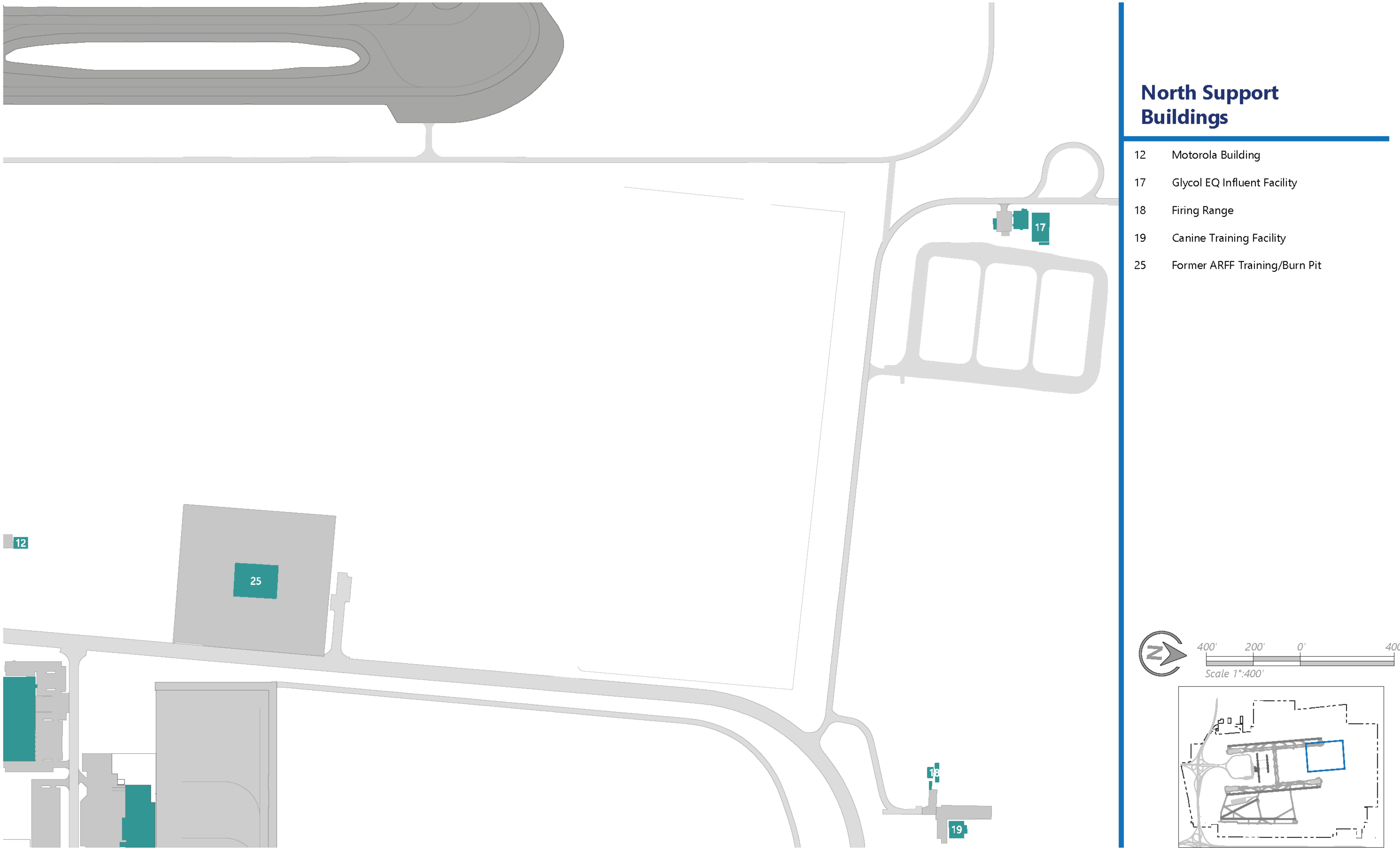
Note: AIG storage data provided in crude oil barrels (bbl) of 150,000 bbl. 43 gallons estimated per barrel.

Source: SLCIA Master Plan, 1998; Atlantic Aviation & TAC Air records, 2018; Prepared by RS&H, 2018

Figure 1-33: North Support Buildings

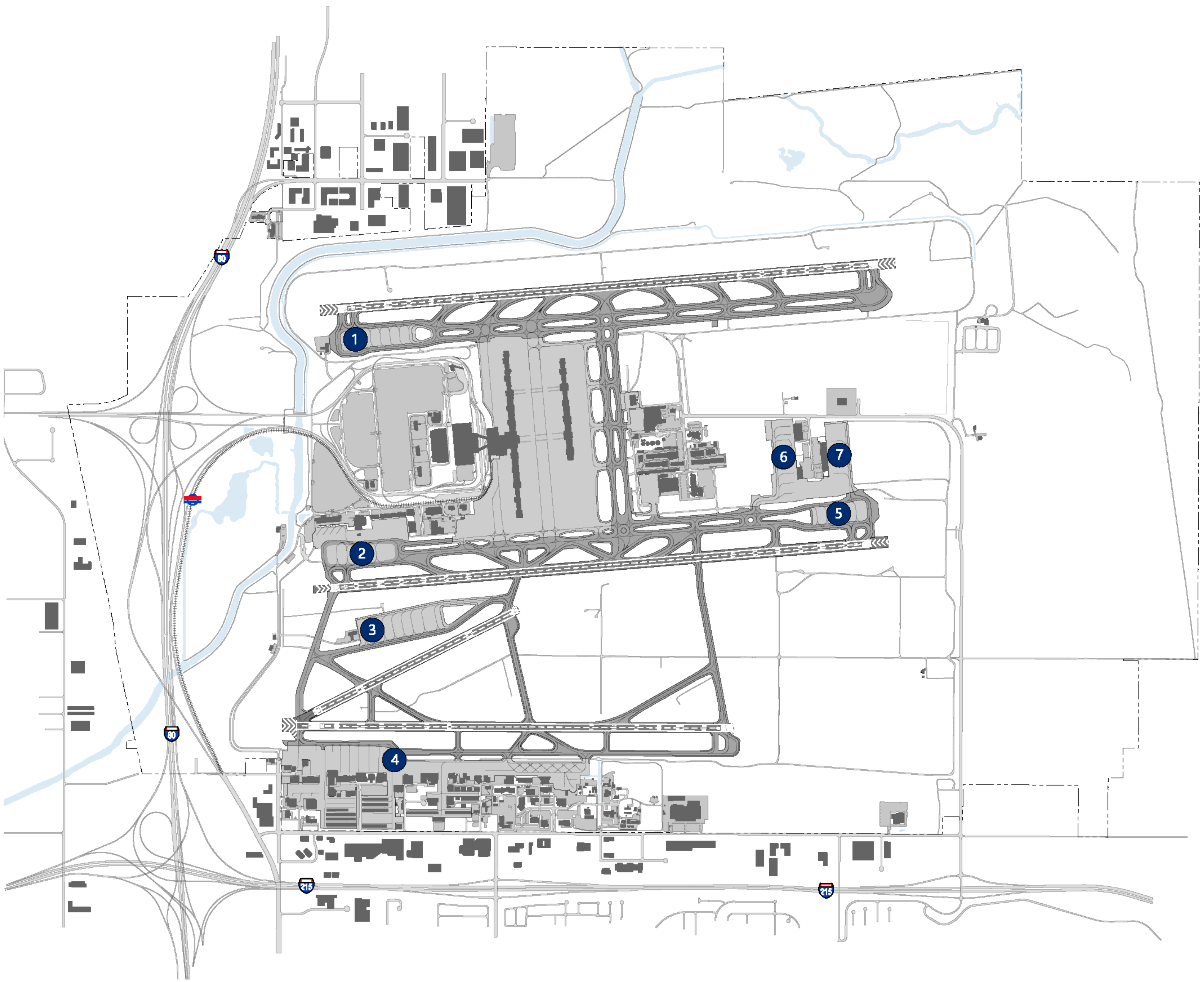
Source: Prepared by RS&H, 2018

Figure 1-34: Additional North Support Buildings



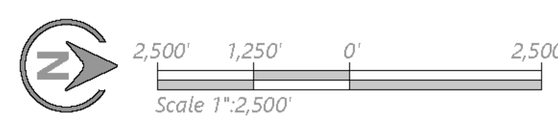
Source: Prepared by RS&H, 2018

Figure 1-35: SLC Deicing Locations



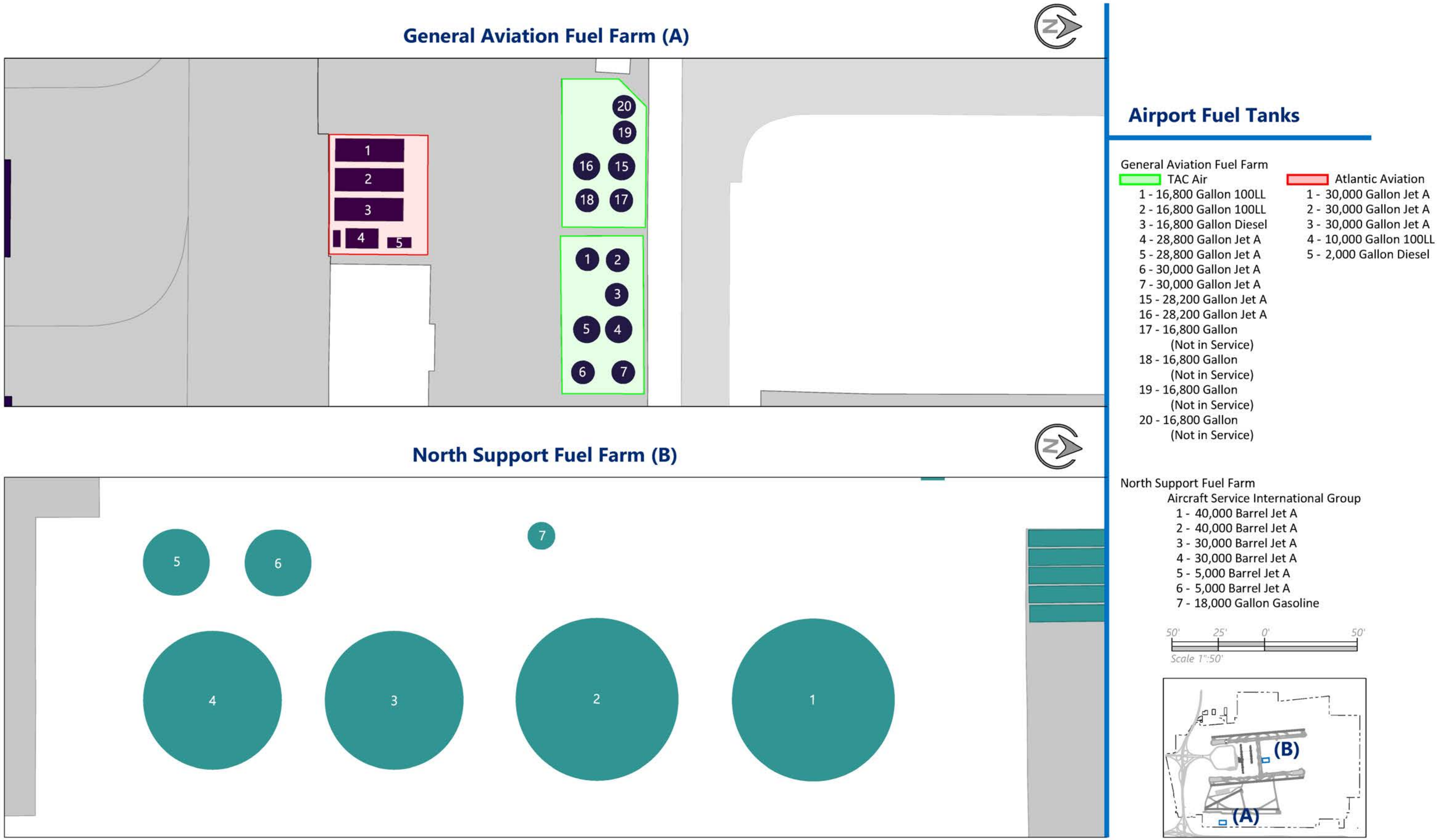
Primary Deicing Locations

Location 1	34L Runway End Deice Facility
Location 2	34R Runway End Deice Pad
Location 3	L Taxiway Runway End Deice Facility
Location 4	K3 Taxiway Deice Location
Location 5	16L Runway End Deice Pad
Location 6	North Cargo Ramp Deice Location
Location 7	North Cargo Ramp Deice Location



Source: Prepared by RS&H, 2018

Figure 1-36: Fuel Farms



Source: Prepared by RS&H, 2018

1.12 UTILITIES

Utilities provide an essential service that tenants, passengers and users need in order to operate on a day-to-day basis. Utilities can enhance user experience at a facility, for example, through offering complimentary WiFi connectivity via a fiber network connection or supplying water to an aircraft wash rack. SLCIA serves its tenants and users by providing a multitude of utilities at various locations on the airport. Available utilities include electrical power, stormwater and sanitary sewer, water, natural gas, communication, and glycol and fuel lines. The following sections describe each of the utilities found at SLCIA along with a brief description of the provider, location of trunk lines, and details about the utility.

1.12.1 Electrical Power Lines

The primary source of electrical power at SLCIA is Rocky Mountain Power. Several trunk lines feed power to the airport. About one and a half miles north of the Runway 16L approach end are overhead electrical power lines. These power lines generally run in an east-west direction on the northwest side of SLCIA. These electrical lines supply power to a large portion of the airfield systems and feed electrical energy into an underground duct bank system that enters the airfield at the middle portion of Runway 16L-34R.

On the east side of SLCIA the primary electrical trunk line is located along the right-of-way for 2200 W. This trunk line is buried underground and supplies power to support facilities in the east portion of the airfield.

FIGURE 1-37 shows the electrical utility lines found at SLCIA.

1.12.2 Water, Sewer, and Stormwater Lines

SLCIA has several storm drain lines of various sizes which all feed into detention basins. The existing storm water system has the ability to retain all stormwater on site as necessary, but can also release water into the Surplus Canal and city stormwater drainage system, also known as the "City Drain", as required. Both the Surplus Canal and stormwater drainage system are owned and operated by Salt Lake County. All stormwater that is discharged into the county's infrastructure is done so mechanically through lift stations.[13] SLCIA has one outfall[14] that discharges to the city's stormwater system and four outfalls that discharge into the Surplus Canal. A majority of the storm drain pipes are reinforced with concrete or with high-density polyethylene (HDPE) and polyvinyl chloride (PVC) materials.

The southeast side of SLCIA has 18-inch and 24-inch sanitary sewer lines that flow into a lift station. This lift station is owned and operated by the Salt Lake City Department of Public Utilities (SLCDPU). On the north side of SLCIA, a 12-inch sanitary sewer line runs along the west side of the air cargo apron, towards 2100 N. These lines feed two additional lift stations located just south of the terminal parking garage and the west end of the terminal building. The majority of the sewer pipe is made of PVC material, with some reinforced concrete, vitrified clay, cast iron, ductile iron, asbestos cement, and HDPE pipe.

The water demand at SLCIA is supplied by SLCDPU and used for culinary/drinking water, fire suppression sprinklers, and fire hydrants. Two main trunk lines supply SLCIA with water. Two 12-inch water lines enter the airport from the southeast and supply the terminal and surrounding facilities through a loop system. One 12-inch line supplies water to the northern portion of SLCIA which terminates in a loop system as well. Most of the water lines are PVC, but there are also some segments made of steel, cast iron, ductile iron, and asbestos cement.

FIGURE 1-38 shows the stormwater, sewer, and water lines found at SLCIA.

1.12.3 Other Airport Utilities

Dominion Energy supplies SLCIA with natural gas through a 6-inch high pressure line on the south end of the airport and a 6-inch intermediate high pressure line on the north end. Two intermediate high pressure gas loops are installed around the terminal building. In addition to the major supply lines, there are also gas lines that supply each of the buildings at SLCIA.

Century Link and MCI/Verizon own various communications lines that serve all major facilities at SLCIA. A major communications trunk line is located on the north side of Interstate 80. This line supplies communication service to the terminal building and surrounding facilities. In addition, the FAA owns and operates several fiber-optic communication lines buried underneath the airfield. The FAA-owned lines support various navigational aids maintained by the FAA.

On the north side of SLCIA there are two 16-inch glycol lines that direct glycol contaminated stormwater to glycol

[13] Wastewater lift stations are facilities designed to move wastewater from lower to higher elevation through pipes. – Collection Systems Technology Fact Sheet Sewers, Lift Station https://www3.epa.gov/npdes/pubs/sewers-lift_station.pdf

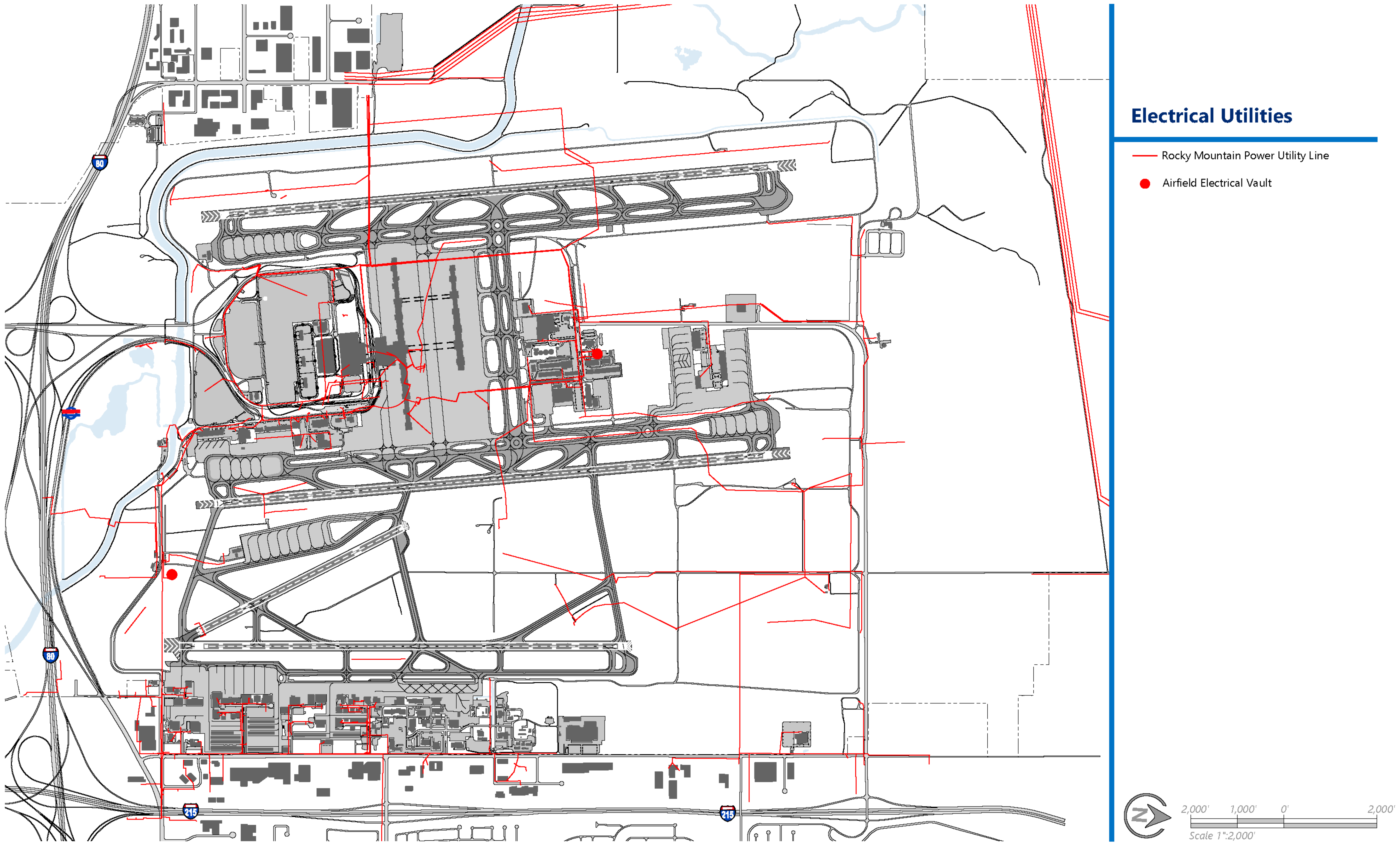
[14] A point source as defined by 40 CFR 122.2 at the point where a municipal separate storm sewer system discharges to waters of the united States and does not include open conveyances connecting two municipal separate storm sewers or pipes, tunnels or, other conveyances which connect segments of the same stream or other waters of the United States and are used to convey waters of the United States – EPA https://www3.epa.gov/region10/pdf/npdes/stormwater/msgp_faq_aug2015.pdf

retention ponds where it is held until being treated/recycled at the treatment plant. There are several glycol pump stations strategically located around SLCIA. These lines are either gravity-feed or supplemented with a pump to aid the flow of glycol. The main glycol lines are made of an HDPE material and reinforced concrete, while the channel drain pipes are made of concrete. The glycol pipelines were installed in 1998, and are in good condition.

Approximately four miles northeast of SLCIA is the Big West Oil Refinery. This oil refinery supplies the airport with fuel through two underground pipelines that supply the tanks on the north end of SLCIA. From those storage tanks, fuel is distributed via ground piping to the terminal apron. The pipes are made of steel and coated with a caprolactam (CPL) material. Transfer of fuel through the buried lines is aided by two pump stations. The first pump station is located west of the Air National Guard Base and the second is located further west, near 2200 N.

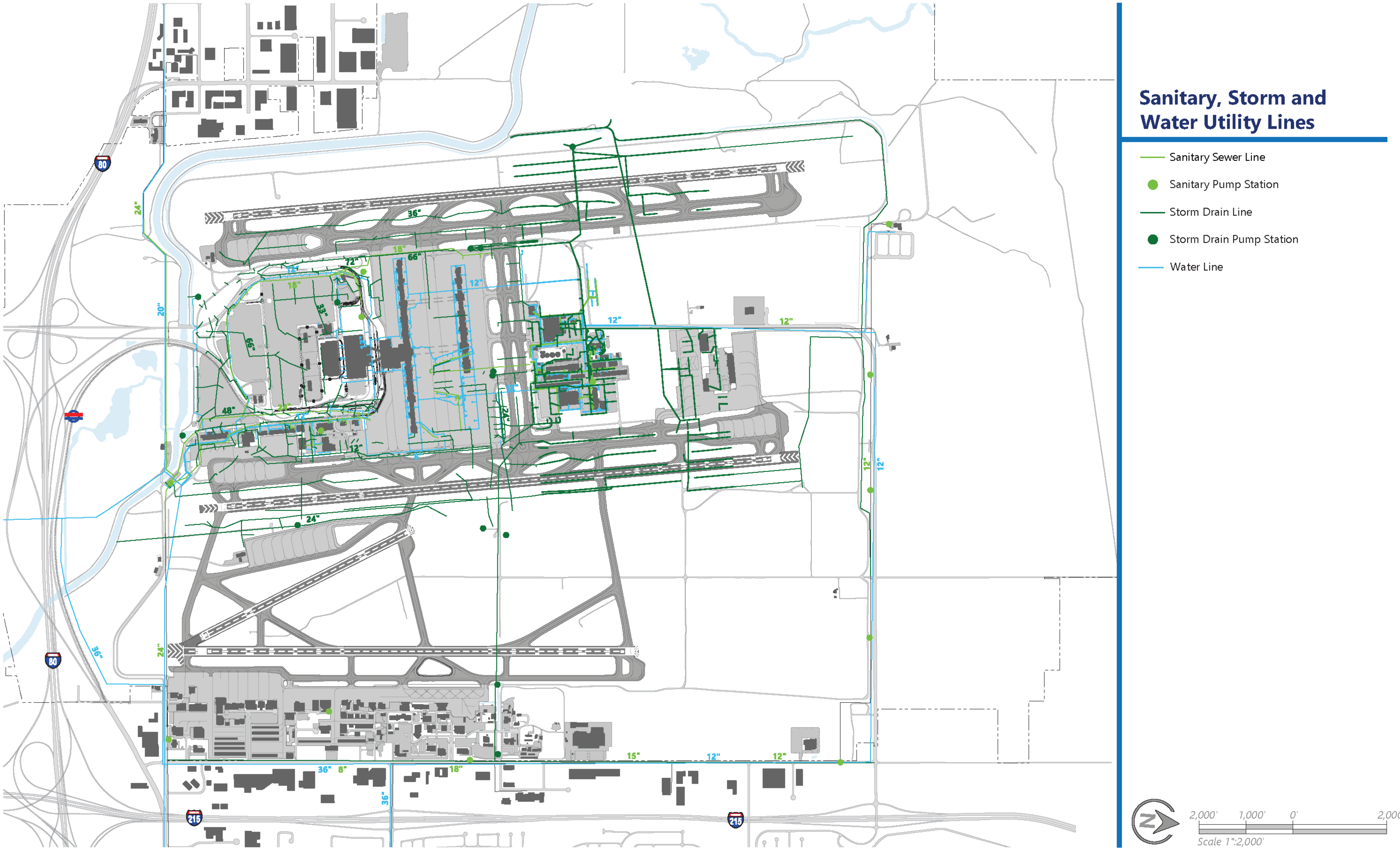
FIGURE 1-39 shows the natural gas, communication, glycol, and fuel lines at SLCIA.

Figure 1-37: SLC Electrical Utilities



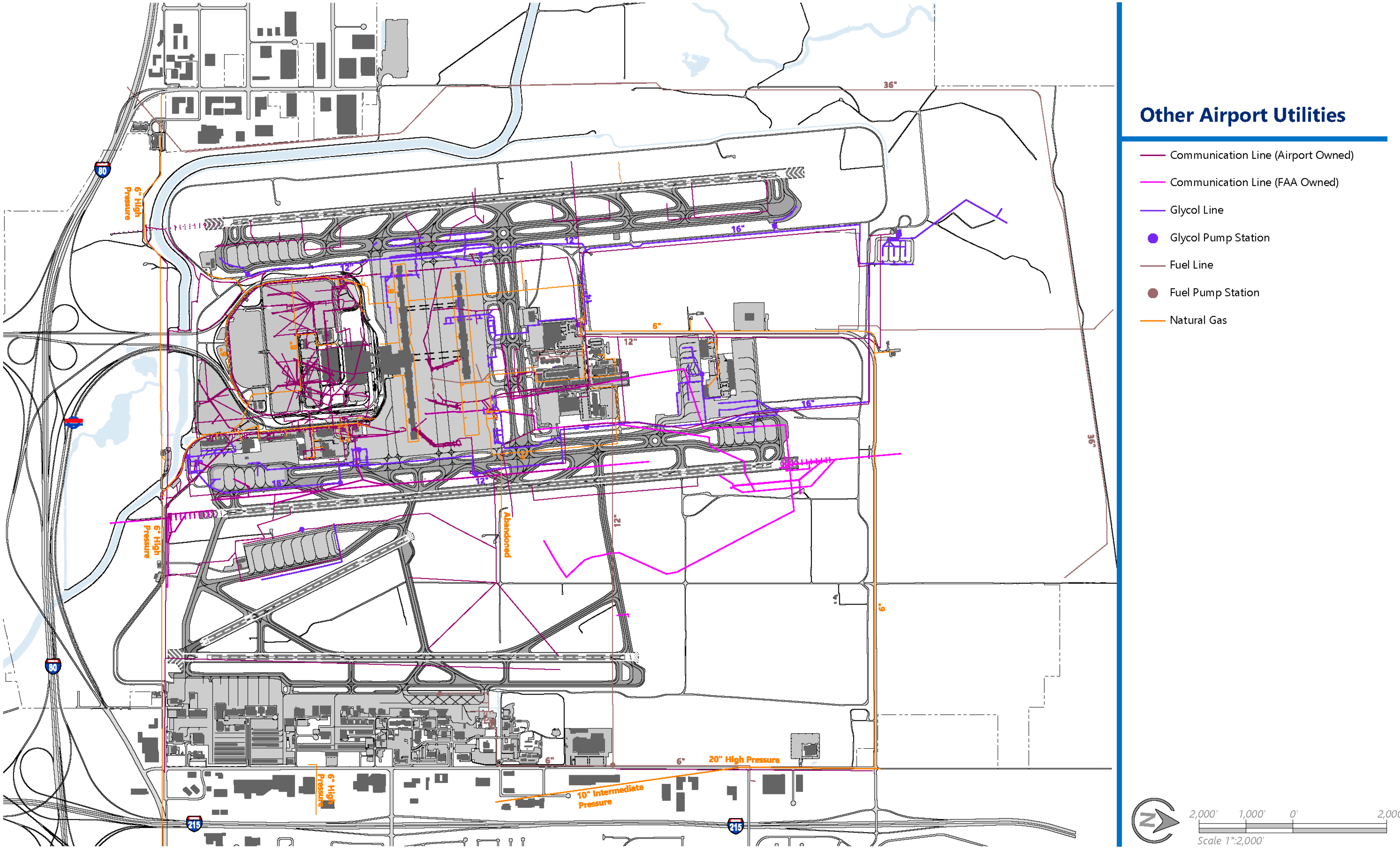
Source: Prepared by Bowen Collins & Associates and RS&H, 2018

Figure 1-38: SLC Water and Stormwater Lines



Source: Prepared by Bowen Collins & Associates and RS&H, 2018

Figure 1-39: Other SLC Utilities



Source: Prepared by Bowen Collins & Associates and RS&H, 2018

1.13 FINANCIAL OVERVIEW

Salt Lake City Department of Airports comprises a single enterprise fund and operates as a self-sustaining department within Salt Lake City Corporation. This means that SLCDA is not supported by any general tax revenues from Salt Lake City. The other airports within the SLCDA system, U42 and TVY, are also included in the enterprise fund but constitute only a small amount of the financial total.

This section provides a high-level overview of the SLCDA revenues, expenses, capital expenditures, and FAA grants received to date at SLCIA. The Financial Feasibility chapter of this Master Plan provides a deeper analysis of the overall financial standing and capacity to undertake future capital projects.

1.13.1 Revenues

TABLE 1-23 shows the revenues generated by SLCDA from Fiscal Years (FY) 2013 to 2017. Revenues are generated from a variety of sources and are grouped into the following categories: airline aeronautical revenues, non-airline aeronautical revenues, non-aeronautical revenues, and non-operating revenues. Historically, non-aeronautical revenues have been the largest source of revenue, averaging 39.2 percent of total revenue. Non-operating revenues have provided the second largest source of revenue at 35.3 percent of total revenue.

The single largest revenue producing item is the Passenger Facility Charge (PFC). This FAA program allows airports to collect PFC fees of up to $4.50 for every enplaned passenger at commercial airports. The program caps PFC fees at $4.50 per flight segment with a maximum of two PFCs charged on a one-way trip or four PFCs on a round trip, for a maximum of $18 total. FAA allows airports to use the proceeds from this fee to fund FAA-approved projects that enhance safety, security, or capacity; reduce noise; or increase air carrier competition.

Two other charges are determined by Salt Lake City Ordinance. Customer facility charge (CFC) is a user fee that is imposed on each rental car transaction. CFCs are charged each rental transaction day, up to a maximum of 12 days. As of 2018, SLCDA charges $5 per day, however the ordinance allows for a maximum charge of up to $10 per day. Landing fees are also determined by Salt Lake City Ordinance. SLCDA charges landing fees for air carriers at a rate of $2.22 per 1,000 pounds of landing weight for aircraft landing on SLCIA runways.

1.13.2 Expenses

Operating expenses for SLCDA are shown in TABLE 1-24. Expenses have been broken into three categories: salaries and benefits, services and supplies, and depreciation of assets. Depreciation has historically been the largest operating expense for SLCDA.

1.13.3 Capital Investments

As discussed previously, the ARP is the most prominent capital investment project occurring at SLCIA, with costs totaling over $3 billion. Other capital projects, such as pavement management programs, include capital investment projects that are also underway at SLCIA.

At the time of this writing, to fund ARP construction costs, SLCDA has borrowed $2 billion through issuance of General Airport Revenue Bonds (GARB). Additional borrowing is expected to as necessary to completely fund the ARP. Bonds were issued on February 23, 2017 through two different series of bonds with interest rates of 5 percent and a final maturity date of July 1, 2047. General obligations for repayment of the GARBs lie entirely with SLCDA and do not extend to Salt Lake City and the taxing power of the City.

The total capital expenditures in progress for SLCDA has grown substantially due to ARP construction. The cost of projects in progress in 2017 was seven times the level it was in 2013 due to the project phase and level of construction activity. A yearly financial breakdown of capital expenditures in progress is included in TABLE 1-25.

1.13.4 Airport Grants

SLCDA receives grant money from the FAA in the form of AIP entitlement funding, which equate to yearly allocated federal funds based on the role of the airport. Additionally, SLCIA can receive AIP discretionary grants, which are special awards for priority projects as determined by FAA processes. TABLE 1-26 lists the total AIP grant receipts from 2000 to 2017. As shown in the table, some projects are funded in multiple consecutive years, while other projects may require one large investment. Often, the cost of these projects requires discretionary funding from the FAA. In those instances, funding levels are typically reduced the following year so that the FAA can balance funding allocation to all airports in the region. Between 2007 and 2017, SLCIA averaged $6,117,684 annually in federal AIP funding.

Table 1-23: SLC Operating Revenues

Revenue Source	Fiscal Year				
	2013	2014	2015	2016	2017
Airline Aeronautical Revenues	**$41,453,348**	**$41,611,480**	**$42,432,331**	**$45,486,027**	**$48,975,280**
Landing Fees	21,678,296	23,134,600	21,249,240	24,937,798	27,918,254
Terminal Fees	19,775,052	18,476,880	18,297,944	17,237,510	17,025,166
Other	0	0	2,885,147	3,310,719	4,031,860
% of Total Revenues	*21.08%*	*20.64%*	*20.65%*	*21.06%*	*21.41%*
Non-Airline Aeronautical Revenues	**$9,033,742**	**$9,273,277**	**$9,469,644**	**$9,387,469**	**$9,966,291**
Landing Fees	1,772,877	1,865,607	1,949,362	2,085,132	2,102,056
Cargo and Hangar Rental	3,477,585	3,676,266	3,557,959	2,947,769	2,762,696
Fuel Sales/Tax	2,577,391	2,590,460	2,820,921	3,238,061	4,149,614
Other	1,205,889	1,140,944	1,141,402	1,116,507	951,925
% of Total Revenues	*4.59%*	*4.60%*	*4.61%*	*4.35%*	*4.36%*
Non-Aeronautical Revenues	**$73,368,360**	**$76,111,470**	**$80,368,137**	**$86,159,092**	**$95,864,566**
Parking	30,772,861	31,135,131	33,132,598	35,770,084	37,173,006
Car rentals	17,481,940	18,063,577	19,340,855	22,142,192	27,186,247
Terminal Fees	14,404,168	15,519,388	16,015,649	16,636,679	18,119,889
Land Leases	7,707,867	8,127,502	8,100,139	7,561,390	7,745,774
Other	3,001,524	3,265,872	3,778,896	4,048,747	5,639,650
% of Total Revenues	*37.30%*	*37.75%*	*39.11%*	*39.89%*	*41.92%*
Non-Operating Revenues	**$72,822,299**	**$74,607,698**	**$73,244,381**	**$74,942,710**	**$73,894,648**
PFC	37,534,715	38,437,248	40,976,537	42,805,519	45,750,397
CFC	14,308,670	14,848,663	15,606,695	15,613,155	16,157,076
Interest	366,516	3,530,345	2,067,467	2,782,668	8,006,030
Grants	22,558,966	17,916,389	15,148,122	14,230,033	17,793,909
Non-Operating Expenses	-1,946,568	-124,947	-554,440	-488,665	-13,812,764
% of Total Revenues	*37.03%*	*37.01%*	*35.64%*	*34.70%*	*32.31%*
Total Revenues	**$196,677,749**	**$201,603,925**	**$205,514,493**	**$215,975,298**	**$228,700,785**

Source: Salt Lake City Comprehensive Annual Financial Reports; Prepared by RS&H, 2018

Table 1-24: SLC Operating Expenses

Source	Fiscal Year				
	2013	2014	2015	2016	2017
Operating Expenses	**$144,598,329**	**$146,642,549**	**$136,203,788**	**$151,721,992**	**$163,124,845**
Salaries and Benefits	42,347,684	44,916,215	33,880,463	45,096,185	49,350,124
Services and Supplies	45,123,042	42,698,885	42,328,220	44,968,911	50,109,735
Depreciaton	57,127,603	59,027,449	59,995,105	61,656,896	63,664,986

Source: Salt Lake City Comprehensive Annual Financial Reports; Prepared by RS&H, 2018

Table 1-25: SLC Capital Expenditures

Source	Fiscal Year				
	2013	2014	2015	2016	2017
Capital Expenditures in Progress	**$44,334,139**	**$73,841,130**	**$126,461,001**	**$138,812,583**	**$310,347,987**

Source: FAA Airport Financial Reporting System; Prepared by RS&H, 2018

Table 1-26: AIP Grant History

Year	Grant Sequence	AIP Federal	Entitlement	Discretionary	ARRA	Description
2000	57	$ 4,435,443	$ -	$ -	$ -	Extend Runway; Install Fencing
2000	58	$ 9,000,000	$ -	$ -	$ -	Construct Apron (Phase II)
2001	59	$ 7,247,706	$ -	$ -	$ -	Rehabilitate A Portion of Runway 16L/34R, Portion of Taxiway H and H13; Expand North Cargo Apron (Phase I); Construct Taxiway F4; Install Runway Guard Lighting (Phase II); Improve Deicing Apron Drainage
2001	60	$ 2,000,000	$ -	$ -	$ -	Acquire Security Equipment
2001	61	$ 4,989,700	$ -	$ -	$ -	Expand North Cargo Apron (Phase II)
2001	62	$ 9,000,000	$ -	$ -	$ -	Pursuant to Letter of Intent ANM-98-01: Construct a Portion of Terminal Apron
2001	63	$ 1,268,820	$ -	$ -	$ -	Acquire Security Equipment
2002	64	$ 919,810	$ -	$ -	$ -	Rehabilitate Taxiway
2002	65	$ 1,688,543	$ -	$ -	$ -	Expand Apron
2002	66	$ 2,270,720	$ -	$ -	$ -	Improve Runway Safety Area
2002	67	$ 1,706,063	$ -	$ -	$ -	Security Enhancements
2002	68	$ 7,000,000	$ -	$ -	$ -	Construct Apron
2002	69	$ 900,000	$ -	$ -	$ -	Rehabilitate Apron
2002	69	$ 901,632	$ -	$ -	$ -	Security Enhancements
2002	70	$ 2,200,000	$ -	$ -	$ -	Extend Taxiway
2002	70	$ 2,000,000	$ -	$ -	$ -	Rehabilitate Apron
2003	71	$ -	$ 3,977,366	$ -	$ -	Rehabilitate Taxiway; Construct Service Road
2003	72	$ -	$ -	$ 10,875,000	$ -	Security Enhancements
2003	73	$ -	$ -	$ 7,000,000	$ -	Construct Apron
2003	74	$ -	$ -	$ 2,720,000	$ -	Rehabilitate Apron
2003	75	$ -	$ -	$ 1,075,000	$ -	Rehabilitate Apron
2003	U42-010	$ 950,000	$ -	$ -	$ -	Rehabilitate Runway 16-34
2004	76	$ 5,680,024	$ -	$ -	$ -	Rehabilitate Taxiway
2004	77	$ 4,587,360	$ -	$ -	$ -	Construct Apron
2004	78	$ 3,945,443	$ -	$ -	$ -	Rehabilitate Runway 16-34
2005	79	$ 3,710,427	$ -	$ -	$ -	Rehabilitate Taxiway (Taxiway M)
2005	80	$ 8,000,000	$ -	$ -	$ -	Rehabilitate Taxiway (Taxiway H H2-H4)
2005	81	$ 939,752	$ -	$ -	$ -	Acquire Land for Noise Compatibility within 65 - 69 DNL
2006	82	$ 3,193,192	$ -	$ -	$ -	Rehabilitate Taxiway
2006	83	$ 787,097	$ -	$ -	$ -	Rehabilitate Taxiway
2007	84	$ 2,200,000	$ -	$ -	$ -	Improve Airport Drainage
2007	85	$ 6,800,000	$ -	$ -	$ -	Rehabilitate Runway - 17/35, Rehabilitate Taxiway
2007	86	$ 2,530,287	$ -	$ -	$ -	Rehabilitate Apron
2008	87	$ 3,132,868	$ -	$ -	$ -	Rehabilitate Taxiway
2008	88	$ 5,900,000	$ -	$ -	$ -	Rehabilitate Apron
2008	89	$ 399,650	$ -	$ -	$ -	Conduct Environmental Study
2008	90	$ 1,051,186	$ -	$ -	$ -	Rehabilitate Taxiway
2009	91	$ 1,403,851	$ -	$ -	$ -	Rehabilitate Taxiway
2009	92	$ 8,930,651	$ -	$ -	$ -	Construct Taxiway
2009	93	$ 1,914,296	$ -	$ -	$ -	Rehabilitate Taxiway
2009	94	$ 7,809,035	$ -	$ -	$ -	Construct Taxiway
2010	95	$ 11,066,676	$ 3,566,676	$ 7,500,000	$ -	Construct Apron
2011	96	$ 8,697,207	$ 3,378,889	$ 5,318,318	$ -	Construct Apron
2011	97	$ 6,161,619	$ 661,619	$ 5,500,000	$ -	Construct Apron
2011	98	$ 9,005,892	$ 33,549	$ 8,972,343	$ -	Construct Apron
2012	99	$ 9,938,163	$ 3,938,163	$ 6,000,000	$ -	Construct Apron
2012	100	$ 9,000,000	$ -	$ 9,000,000	$ -	Construct Apron
2012	101	$ 10,000,000	$ -	$ 10,000,000	$ -	Rehabilitate Runway - 16L/34R
2012	102	$ 500,000	$ -	$ 500,000	$ -	Sustainable Management Plan
2013	103	$ 11,894,887	$ 3,894,887	$ 8,000,000	$ -	Construct Apron
2014	104	$ 2,175,000	$ -	$ 2,175,000	$ -	Rehabilitate Apron
2014	105	$ 12,290,476	$ 3,890,476	$ 8,400,000	$ -	Construct Apron
2015	106	$ 13,938,351	$ 3,938,351	$ 10,000,000	$ -	Construct Apron
2015	107	$ 1,000,000	$ -	$ 1,000,000	$ -	Conduct Airport Master Plan Study
2015	108	$ 3,100,000	$ -	$ 3,100,000	$ -	Rehabilitate Taxiway
2016	109	$ 6,910,000	$ 2,982,308	$ 3,927,692	$ -	Rehabilitate Runway - 17/35, Rehabilitate Runway Lighting - 17/35
2016	110	$ 10,000,000	$ 1,073,976	$ 8,926,024	$ -	Rehabilitate Apron
2017	111	$ 2,900,000	$ 1,305,110	$ 1,594,890	$ -	Rehabilitate Runway - 14/32, Rehabilitate Runway Lighting - 14/32
2017	112	$ 2,880,428	$ 2,880,428	$ -	$ -	Conduct Airport Master Plan Study
2017	113	$ 10,000,000	$ -	$ 10,000,000	$ -	Rehabilitate Apron

Source: Federal Aviation Administration, 2018

1.14 AIRPORT ENVIRONS

The following section discusses existing land use and zoning policies for Salt Lake City International Airport and the surrounding region. The specific sections include a discussion of area land uses surrounding the Airport as well as an inventory of land use controls and future land use actions in the vicinity of SLCIA. Additionally, to ensure SLCIA Master Plan alignment with regional planning efforts, a review of local and regional vision plans, land use plans, and transportation plans has been performed.

1.14.1 Land Use and Zoning

Airport land development policies can influence the characteristics of the Salt Lake Valley region. That is why it's important to ensure development land surrounding SLCIA, especially that underlying primary navigational corridors, is compatible with existing and future airport development plans. Effective December 2000, Utah has established a set of standards for compatible land use development at the State's 54 airports enrolled in the Statewide Airport System. These standards provide methods and tools for airport administrators and local planning and zoning officials to ensure safe and efficient access to the state, region, and national air transportation systems. The responsible development of land and the preservation of open space are very important to the people of Utah and Salt Lake City. As such, Chapter 21A of the Salt Lake City Code (SLC Code) describes land use policies with the purpose of promoting the "health, safety, morals, convenience, order, prosperity and welfare of the present and future inhabitants of Salt Lake City." In order to guide development in a way which promotes these goals, Salt Lake City has established a series of zoning districts as follows: Residential, Commercial, Form Based, Manufacturing, Downtown, Gateway, Special Purpose, and Overlay.

Salt Lake City International Airport land use regulations are also governed under SLC Code Title 21A – Zoning. SLCIA land is categorized under Special Purpose District rules, and specifically sub-categorized as an "Airport District". SLC Code 21A.32.060 defines the purpose of the Airport District code as to "provide a suitable environment for the Salt Lake City International Airport and private uses that function in support of the airport facility. This district is appropriate in areas of the city where the applicable master plans support this type of land use." Permitted and conditional uses within the Airport District area is defined under SLC Code 21A.33.070. Airport District zoning ultimately preserves the land for airport uses and provides a buffer to minimize conflicts with surrounding uses.

City codes also delineate an Airport Flight Path Protection (AFPP) Overlay District under SLC Code 21A.34.040 to protect land uses below aircraft navigation routes and the airborne aircraft flying them. The AFPP Airport Flight Path Protection Overlay District provides "supplemental regulations or standards pertaining to specific geographic features or land uses, wherever these are located, in addition to 'base' or underlying zoning district regulations applicable within a designated area." SLC Code recognizes that "hazard[s] to the operation of the airport endangers the lives and property of users of the Salt Lake City International Airport, and the health, safety and welfare of property or occupants of land in its vicinity. If the hazard is an obstruction or incompatible use, such hazard effectively reduces the size of the area available for landing, takeoff and maneuvering of aircraft, thus tending to destroy or impair the utility of the Salt Lake City International Airport and the public investment. Accordingly, it is declared:

- That the creation or establishment of an airport hazard is a public nuisance and an injury to the region served by the Salt Lake City International Airport;
- That it is necessary in the interest of the public health, public safety, and general welfare that the creation or establishment of airport hazards be prevented; and
- That the prevention of these hazards should be accomplished, to the extent legally possible, by the exercise of the police power without compensation.

This Overlay District serves to protect development occurring under regular navigation routes to and from SLCIA from "impacts [that] may interfere with the use and enjoyment of adjacent property and use" by "minimiz[ing] them where possible." This distinction establishes four "Airport Influence Zones" that restrict or establish requirements on the type of development in each area. These influence zones include:

- Airport Influence Zone A: Area is exposed to very high levels of aircraft noise and has specific height restrictions. The following uses are incompatible in this zone and are prohibited
- Residential uses;
  - Commercial uses, except those constructed with air circulation systems and at least twenty five (25) dBs of sound attenuation;
  - Institutional uses such as schools, hospitals, churches and rest homes;
  - Hotels and motels, except those constructed with air circulation systems and at least thirty (30) dBs of sound attenuation in sleeping areas and at least twenty five (25) dBs of sound attenuation elsewhere.
- Airport Influence Zone B: Area is exposed to high levels of aircraft noises and has specific height restrictions. The following uses are incompatible in this zone and are prohibited:
  - Residential uses, except residences in agricultural zones with air circulation systems and at least twenty five (25) dBs of sound attenuation;
  - Institutional uses such as schools, hospitals, churches and rest homes, except those constructed with air circulation systems and at least twenty five (25) dBs of sound attenuation;
  - Hotels and motels except those constructed with air circulation systems, and at least twenty five (25) dBs of sound attenuation, in sleeping areas.
- Airport Influence Zone C: Area is exposed to moderate levels of aircraft noises and has specific height restrictions. The following uses are incompatible uses in this zone and are prohibited:
  - Residential uses, except those constructed with air circulation systems;
  - Mobile homes, except those constructed with air circulation systems and at least twenty (20) dBs of sound attenuation;
  - Institutional uses such as schools, hospitals, churches and rest homes, except those constructed with air circulation systems.
- Airport Influence Zone H: Uses shall be the same as the underlying city zone.

FIGURE 1-40 shows the Salt Lake City zoning districts. Further applications of the SLC Code related to the Airport Flight Path Protection (AFPP) Overlay District, such as avigation easement requirements and use restrictions, can be found in SLC Code 21A.34.040. A table of land uses falling within the Airport Influence Zone are shown in TABLE 1-27. Detailed and updated information specific to individual parcels is made available through the Salt Lake City Planning Department website.

Table 1-27: Zoned Land Uses Within SLC Airport Influence Area

Zoning District	Description
AG	Agricultural
AG-2	Agricultural 2 Acre Minimum
BP	Business Park
CB	Community Business
CC	Commercial Corridor
CN	Neighborhood Commercial
CS	Community Shopping
M-1	Light Manufacturing
M-2	Heavy Manufacturing
OS	Open Space
PL	Public Lands
R1	Single Family Residential
RMF-30	Low Density Multifamily Residential
RMF-45	Moderate/High Density Multifamily Residential
TSA-MUEC	Mixed Use Employment Center Transit Station

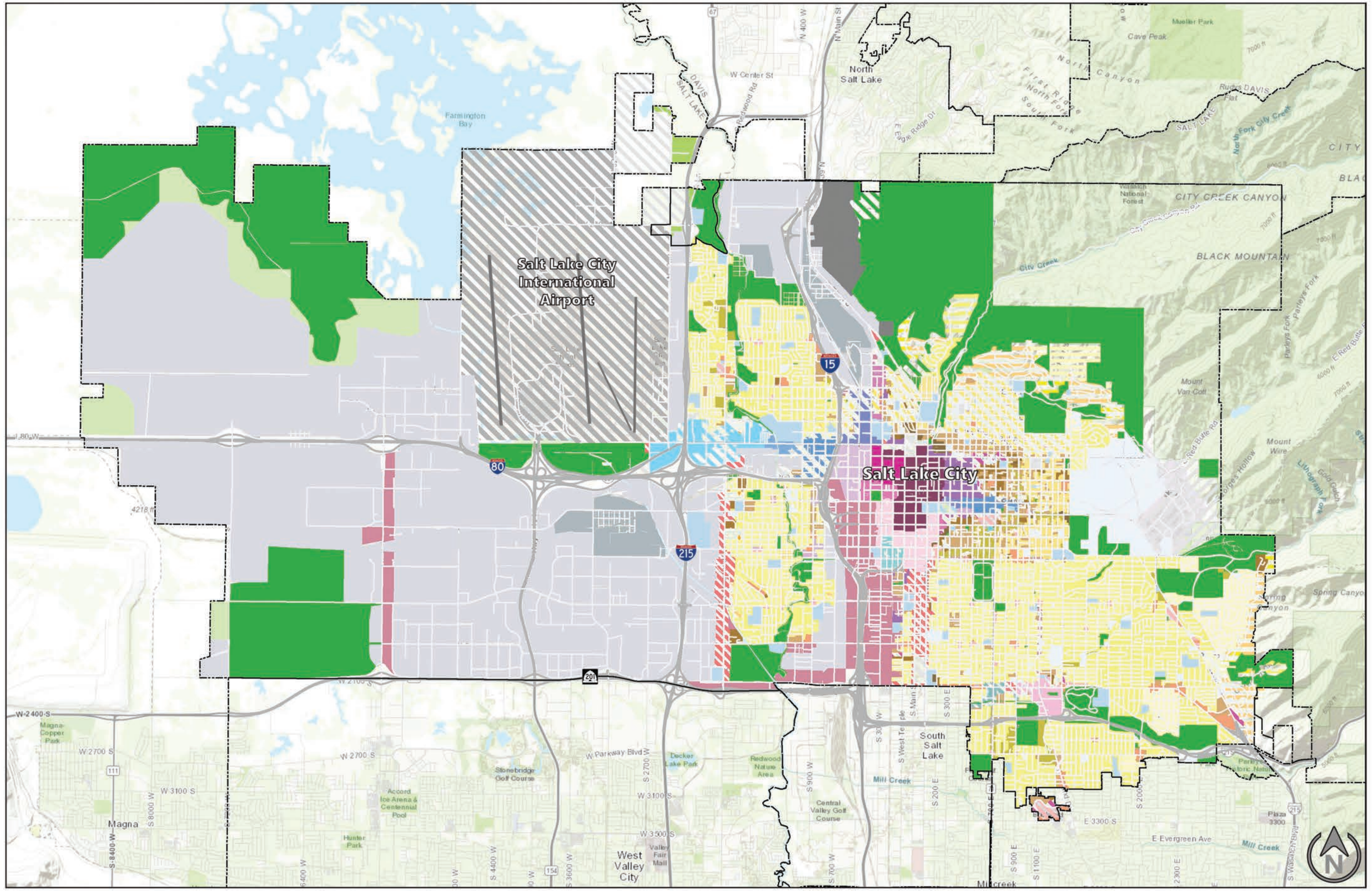
Source: Salt Lake City Zoning Ordinance, 2018

Title 16 of the SLC Code governs airport operations and restrictions. This section contains operational requirements for aircraft, ground transportation, tenants, and all supporting activities. Airport property leasing requirements are also codified within SLC Code 16.56. Airport use restrictions limit landing and taking off aircraft to Stage 2 or 3 to control noise disturbances, according to the federal requirements found within the Airport Noise and Capacity Act of 1990 (ANCA). More information regarding aircraft noise can be found in SECTION 1.15, Environmental Conditions.

ZONING MAP LEGEND

- AG: Agriculture
- AG-2: Agriculture 2 Acre Minimum
- AG-5: Agriculture 5 Acre Minimum
- Airport
- BP: Business Park
- CB: Community Business
- CC: Commercial Corridor
- CG: General Commercial
- CN: Neighborhood Commercial
- CS: Community Shopping
- CSHBD1: Sugar House Business District 1
- CSHBD2: Sugar House Business District 2
- D-1: Central Business District
- D-2: Downtown Support District
- D-3: Downtown Warehouse/Residential District
- D-4: Secondary Central Business District
- EI: Extractive Industry
- FB-SC: Form Based Special Purpose Corridor Core
- FB-SE: Form Based Special Purpose Corridor Edge
- FB-UN1: Form Based Urban Neighborhood 1
- FB-UN2: Form Based Urban Neighborhood 2
- FP: Foothills Protection
- FR-1: 43560 Foothills Estates Residential
- FR-2: 21780 Foothills Estates Residential
- FR-3: 20000 Foothills Estates Residential
- GMU: Gateway Mixed Use
- I: Institutional
- M-1: Light Manufacturing
- M-2: Heavy Manufacturing
- MH: Mobile Home Park
- MU: Mixed Use
- NOS: Natural Open Space
- OS: Open Space
- PL: Public Lands
- PL2: Public Lands Library
- R-1-12000: Single Family Residential
- R-1-5000: Single Family Residential
- R-1-7000: Single Family Residential
- R-2: Single and Two Family Residential
- R-MU: Residential Mixed Use
- R-MU-35: Residential Mixed Use
- R-MU-45: Residential Mixed Use
- RB: Residential Business
- RMF-30: Multifamily Residential
- RMF-35: Multifamily Residential
- RMF-45: Multifamily Residential
- RMF-75: Multifamily Residential
- RO: Residential Office
- RP: Research Park
- SNB: Small Neighborhood Business
- SR-1: Special Development Pattern Residential
- SR-1A: Special Development Pattern Residential
- SR-3 Special Development Pattern Residential
- TSA-MUEC-C: Mixed Use Transit Station
- TSA-MUEC-T: Mixed Use Transit Station
- TSA-SP-C: Special Purpose Transit Station
- TSA-SP-T: Special Purpose Transit Station
- TSA-UC-C: Urban Center Transit Station
- TSA-UC-T: Urban Center Transit Station
- TSA-UN-C: Urban Neighborhood Transit Station
- TSA-UN-T: Urban Neighborhood Transit Station
- UI: Urban Institutional

Figure 1-40: Salt Lake City Zoning Map



Source: http://gis-slcgov.opendata.arcgis.com/datasets, Retrieved March 29, 2018; Prepared by RS&H, 2018

1.14.2 Coordination with Existing Local and Regional Plans

Salt Lake City and the surrounding metropolitan area have many land use and transportation plans in place to guide community development and the regional transportation system. Utah State Code Title 10, Chapter 9a – Municipal Land Use, Development, and Management Act, outlines regulations granting local entities authority to "enact all ordinances, resolutions, and rules... appropriate for the use and development of land within the municipality." In order to ensure coordinated development in the region, a review of existing plans has been performed. The following list outlines important local and regional plans along with an analysis of how they relate to the Salt Lake City Master Plan.

1.14.2.1 Salt Lake City Comprehensive Plan – Plan Salt Lake (Adopted 2015)

Plan Salt Lake, the comprehensive plan for the Salt Lake City metropolitan area, was created to establish "a shared Vision for the future of Salt Lake City for the next 25 years." "The Plan outlines the overarching 'umbrella' policies related to managing growth and change that are best identified on a citywide level." This plan provides direction to policy makers by identifying commonly held community values, establishing a framework for future community plans, and setting targets and metrics to measure success over time. Planning efforts included the coordination of dozens of community organizations.

Promoting the goals of efficient and sustainable land use across the rural and urban spectrum, the SLCIA Master Plan works in harmony with Plan Salt Lake. The planning goals promoted within Plan Salt Lake serve to emphasize zoning policies which are compatible with SLCIA and protect the surrounding environs from sprawling and incompatible development.

One specific goal of Plan Salt Lake is to provide "a transportation and mobility network that is safe, accessible, reliable, affordable, and sustainable, providing real choices and connecting people with places." The City's transportation network has become increasingly multi-modal, with SLCIA being the primary regional link to the nation's air transportation network. Mobility and economic initiatives within the plan "support and enhance the Salt Lake City International Airport as a regional and international amenity" for passenger and freight activity.

Beyond progressing proper social policies surrounding airport development and its associated impacts, Plan Salt Lake explicitly promotes economic development surrounding airport activities through economic initiatives that "support for the redevelopment of Salt Lake City International Airport." This may be achieved through the support of the ongoing Airport Redevelopment Program, which is expected to bring additional revenue in for the city.

1.14.2.2 Northwest Community Master Plan (Adopted 1992, amended 2000 and 2004)

The Salt Lake City metropolitan area is divided into distinct community boundaries and the Northwest Community Master Plan includes SLCIA. Adjacent communities include the "Northwest Quadrant", "West Salt Lake", and "Capitol Hill". FIGURE 1-41 shows SLCIA in relation to the Northwest Quadrant and other surrounding communities.

The Northwest Community Master Plan guides land use planning to meet future growth needs within the community boundary. The policy direction in the plan is based on the community's vision coupled with the City's land use code, and is intended to address the needs and desires of the Northwest Community residents. The plan integrates with SLCIA by creating a study area called the "Jordan River/Airport Area" that encompasses the east side of the airport and the associated residential areas. This plan examines the existing mix of land uses surrounding SLCIA and concludes a future development strategy that would benefit the community while preserving the aeronautical necessity of SLCIA.

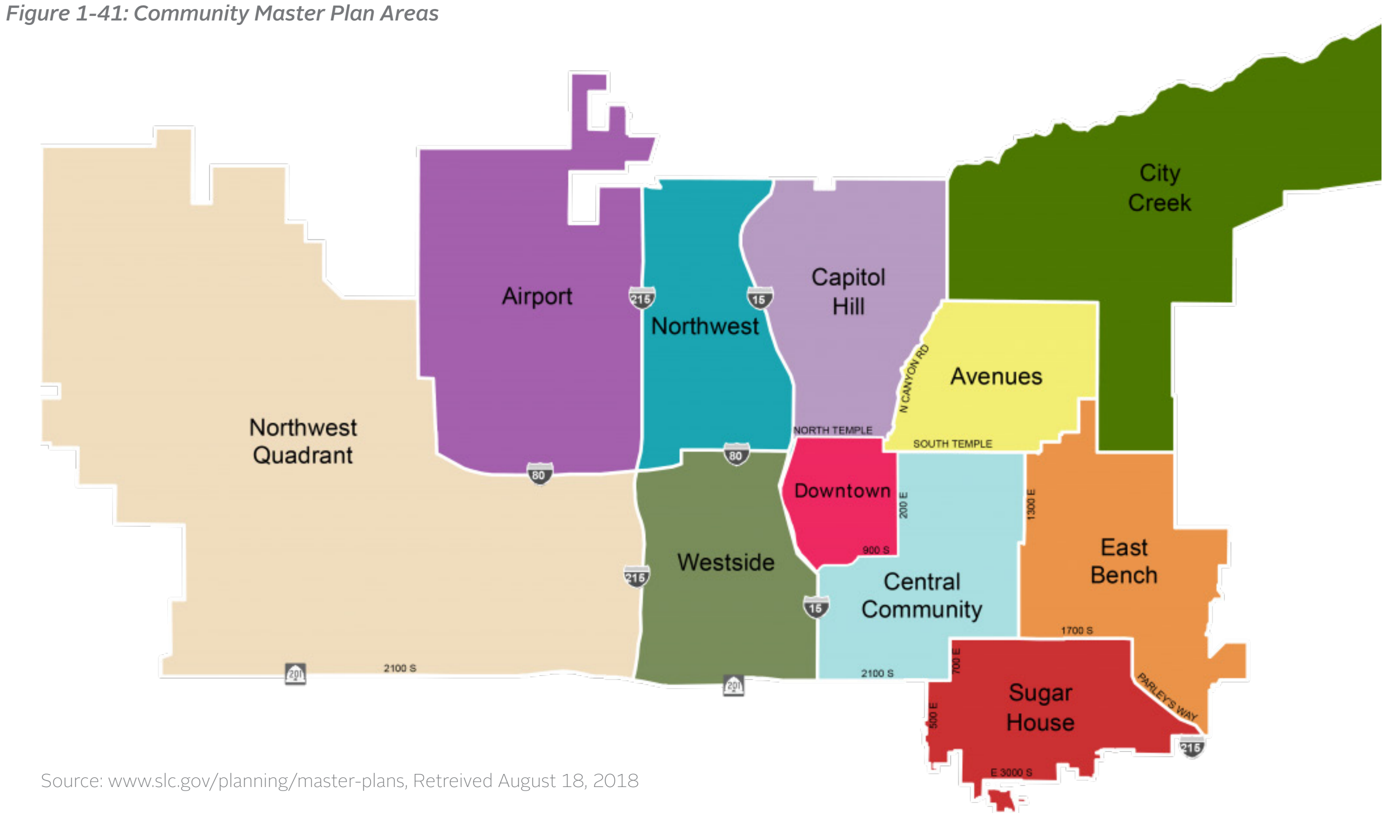
The Northwest Community Master Plan specifically recognizes the economic and transportation benefits that SLCIA provides to its community. The airport is identified as an economic asset and the plan encourages development that supports airport expansion while keeping in mind the surrounding community desires. To that effect, the plan suggests changes in zoning policies for Airport Influence Zone B (see Section 1.14.1, Land Use and Zoning) to allow for the expansion of residential uses in the area. Residential uses are allowed within Airport Influence Zone B only if they have air circulation systems and a specified degree of soundproofing.

1.14.2.3 Northwest Quadrant Master Plan (Adopted 2016)

Additionally, the Northwest Quadrant is another Salt Lake City community master plan identified in the County's Master Plan Boundaries (see FIGURE 1-41). Although this community does not encompass SLCIA directly, the community is affected by long-term aviation development at the airport. Representing a large portion of the County's undeveloped land, the goal of the Northwest Quadrant Master Plan is to support sustainable growth experienced in the region by providing a long-term community approach. The plan is coordinated at a community level in order to preserve the needs and desires of the community.

The Northwest Quadrant Master Plan also acknowledges the impacts airport development has upon surrounding land uses and the regional transportation network. Specifically, the plan suggests new, practical ways to connect the relatively undeveloped land encompassed by the community boundaries to the future development at SLCIA by tapping in to the existing light rail lines and bus routes.

Figure 1-41: Community Master Plan Areas



Source: www.slc.gov/planning/master-plans, Retreived August 18, 2018

The plan addresses the 2006 Airport Layout Plan Update that identified the future need for an additional runway that would enter the Northwest Quadrant Boundary. The plan takes into consideration that SLCIA development may expand into this territory and establishes a goal of preservation of existing Northwest Quadrant lands for future airport business and accommodation of that expansion.

The Northwest Quadrant Master Plan encourages the vision articulated by Plan Salt Lake in its support and enhancement of SLCIA's future development as regional and international amenity. This Master Plan presents various policies to achieve that goal that include:

- Policy DA-2.1: Coordinate with SLCIA on future expansion plans.
- Policy DA-2.2: Continue to support land uses that benefit from being adjacent to SLCIA.
- Policy DA-2.3: Encourage the continuation of the Salt Lake City International Airport and airport related industry by maintaining the high level of compatible land uses that exist around the airport today.
- Policy T-1.4: Connect the Northwest Quadrant with a public transit network to provide transportation choices. Preserve a corridor for future transit to connect to the airport TRAX line. Extend airport light rail incrementally west as a critical mass of jobs are located along I-80.
- Policy T-4.1: Support the expansion of the short line railroad west of the International Center to boost the economic advantage of that area.

Recent changes to land use within the Northwest Quadrant include the development of an inland port on approximately 20,000 acres west and southwest of SLCIA. Under 2018 Utah Senate Bill 234, the Utah Inland Port Authority was established with responsibility for governing development of the land as a logistics hub. The location leverages proximity to highways, railroad, and SLCIA for development of facilities supporting freight handling logistics.

1.14.2.4 Regional Transportation Plan

The Regional Transportation Plan (RTP) is a plan created in partnership with UDOT, UTA, and the local communities to address long-term transportation needs in the region. According to the Wasatch Front Regional Council, which is the local Metropolitan Planning Organization (MPO) accountable for programming federal transportation funding dollars in the region, the RTP is "a fiscally constrained plan for roadway, transit, and other transportation facility improvements over the next 20-30 years." Designed with the intent of meeting the travel demands of a growing population, the RTP meets federal guidelines. This "includes roadway, transit, and active transportation facilities paired with the appropriate land use that is identified, modeled, selected, and phased, with the help of region-wide transportation partners; local communities including planners, engineers, and elected officials; stakeholders; and the general public through an extensive planning process." This process helps determine the best transportation investments under funding constraints. The RTP incorporates high degrees of consideration to SLCIA air transportation including coordination of freight networks, roadway networks, and transit services.

1.14.2.5 UDOT Long Range Transportation Plan

The 2015-2040 Long Range Transportation Plan is developed by UDOT and updated every four years to identify anticipated transportation system needs for the next 25 to 30 years in Utah's rural areas. This plan recognizes the importance of providing safe mobility connections to regional airports through proactive preservation of transportation infrastructure. The plan is a collaborative planning effort between Salt Lake City staff, residents, and a technical committee comprised of members of Utah transit authorities. Projects within this plan improve access to SLCIA at a regional level and have minimal or no direct impact on facilities within the SLCIA boundary. UDOT maintained roadways do connect to roadways on SLCIA property and any future airport expansion decisions impacting roads beyond the airport boundary need to be coordinated with UDOT.

1.14.2.6 Utah's Unified Transportation Plan

Utah's Unified Transportation Plan is unique in that it is a "collaborative effort between transportation agencies across the state of Utah including UDOT, Wasatch Front Regional Council, Mountainland Association of Governments, Dixie Metropolitan Planning Organization, Cache Metropolitan Planning Organization and UTA." The goal of establishing this statewide coordination is to share information and enhance returns on infrastructure investments for the public good. Through statewide coordination, common goals are developed, financial plans can be made, and performance can be measured. Capital projects within this plan ultimately impact the connectivity to SLCIA from the statewide transportation network, but only those improvement found within the Wasatch Front Regional Council project lists have noticeable impacts to development of SLCIA. The most impactful project on record requiring coordination between the SLCDA, UDOT, and UTA, is the planned extension of the TRAX line to the west and south of the Airport. This transit project is long-term, slated for 2035-2040.

1.15 ENVIRONMENTAL CONDITIONS

Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5070-6B Change 2, Airport Master Plans, provides guidance for the preparation of master plans for airports. The purpose of considering environmental factors in airport master planning is to help the Airport Sponsor thoroughly evaluate airport development alternatives and to provide information that will help expedite subsequent environmental processing. For a comprehensive description of the existing environmental conditions at SLCIA, environmental resource categories outlined in FAA Order 1050.1F, Environmental Impacts: Policies and Procedures, were used as a guide that help identify potential environmental effects during the planning process.

FAA Order 1050.1F and FAA Order 5050.4B, National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions, require the evaluation of airport development projects as they relate to specific environmental resource categories by outlining impacts and thresholds at which the impacts are considered significant. For some environmental resource categories, this determination can be made through calculations, measurements, or observations. However, other environmental resource categories require that the determination be established through correspondence with appropriate federal, state, and/or local agencies. A complete evaluation of the environmental resource categories identified in FAA Orders 1050.1F and 5050.4B is required during a categorical exclusion, environmental assessment, or environmental impact statement.

Future development plans at SLCIA take into consideration environmental resources that are known to exist in the vicinity of the airport. Early identification of these environmental resources help avoid impeding development plans in the future. This section provides an overview of resource categories defined in FAA Order 1050.1F, Chapter 4, as it applies to the environs at, and surrounding, SLCIA. TABLE 1-28 provides a summary of the environmental resource categories studied for the Master Plan.

1.15.1 Air Quality

The U.S. Environmental Protection Agency (USEPA) sets National Ambient Air Quality Standards (NAAQS) for certain air pollutants to protect public health and welfare through Section 109 of the Clean Air Act (CAA). The USEPA has identified the following six criteria air pollutants and has set NAAQS for them: Carbon Monoxide (CO), Lead (Pb), Nitrogen Dioxide (NO_2), 8-Hour Ozone (O_3), Particulate Matter (PM_{10} and $PM_{2.5}$), and Sulfur Dioxide (SO_2).

Areas found to be in violation of one or more NAAQS of these pollutants are classified as "non-attainment areas." States with non-attainment areas must develop a State Implementation Plan (SIP) demonstrating how the areas will be brought back into attainment of the NAAQS within designated time-frames. Areas where concentrations of the criteria pollutants are below (i.e., within) these threshold levels are classified as "attainment areas." Areas with prior non-attainment status that have since transitioned to attainment are known as "maintenance areas."

According to the USEPA, SLCIA, located in Salt Lake County, is in a maintenance area for CO and PM_{10}, and in a nonattainment area for $PM_{2.5}$, O_3, and SO_2.[15]

[15]U.S. Environmental Protection Agency, Air Quality Green Book, Utah. Accessed: https://www3.epa.gov/airquality/greenbook/anayo_ut.html, May 2021

Figure 1-28: Environmental Resource Categories Summary

Environmental Resource	Description
Air Quality	The Airport is in a maintenance area for Carbon Monoxide (CO) and Particulate Matter-10 (PM_{10}), and in a nonattainment area for Particulate Matter-2.5 ($PM_{2.5}$), 8-Hour Ozone (O_3), and Sulfur Dioxide (SO_2). See **Section 1.15.1** for details.
Biological Resources	There are federal- and state-threatened and –endangered species, and migratory birds in the Airport area. There is no critical habitat at the Airport. See **Section 1.15.2** for details
Climate	There are greenhouse gas (GHG) emissions produced at the Airport. See Section 1.15.3 for details.
Coastal Resources	The Airport is not within a coastal zone and there are no Coastal Barrier Resource System (CBRS) segments within Airport property. See **Section 1.15.4** for details.
Department of Transportation Act, Section 4(f)	There is one Section 4(f) property on Airport property. See **Section 1.15.5** for details.
Farmlands	The Airport contains farmland of statewide importance and prime farmland soil types. See **Section 1.15.6** for details.
Hazardous Materials, Solid Waste and Pollution Prevention	The Airport is considered a hazardous waste site. The Airport is required under the Airport's Utah Pollutant Discharge Elimination System (UPDES) stormwater discharge permit (UPDES Permit #UT0024988, approved on March 14, 2014) to have a Stormwater Pollution Prevention Plan (SWPPP). The Airport additionally has a Spill Prevention, Control, and Countermeasure Plan (SPCC). See **Section 1.15.7** for details. Salt Lake County Landfill is the only municipal solid waste landfill in Salt Lake County.
Historical, Architectural, Archaeological and Cultural Resources	There are no known historic resources located at the Airport. See **Section 1.15.8** for details.

Environmental Resource	Description
Land Use	Future development plans would [or would not] occur entirely on Airport property; therefore, would be compatible with surrounding land uses. See **Section 1.15.9** for details.
Natural Resources and Energy Supply	Electricity is supplied to the Airport by Rocky Mountain Power, natural gas is supplied by Dominion Energy, and water and sewer is supplied by the Salt Lake City Department of Public Utilities. None of the natural resources or energy supplies used at the Airport are in rare or short supply. See **Section 1.15.10** for details.
Noise and Noise-Compatible Land Use	There are no noise-sensitive land uses within the updated DNL 65 dBA noise contour. See **Section 1.15.11** for details.
Socioeconomics, Environmental Justice, Children's Environmental Health and Safety Risks	The Airport is located within the Salt Lake City, Utah Metropolitan Area, as defined by the U.S. Census Bureau. See **Section 1.15.12** for details.
Department of Transportation Act, Section 4(f)	There is one Section 4(f) property on Airport property. See Section **1.15.5** for details.
Visual Effects	Light emissions at the Airport currently result from airfield, building, access roadway, parking, and apron area lighting fixtures required for the safe and secure movement of people, vehicles, and aircraft. The visual resources and visual character of the Airport currently includes the terminal building, fixed base operators, hangars, and maintenance buildings. See **Section 1.15.13** for all Visual Effects details.
Water Resources	The Airport property does contain wetlands. There are 100-year floodplains located on Airport property. Three canals exist on Airport property: the Surplus Canal, the North Point Canal, and a city drain. In addition, two unnamed ponds are in the southern portion of Airport property. The Airport property is within the Crystal Creek and Jordan River watersheds. The Airport property does not contain any wild and scenic rivers. See **Section 1.15.14** for all Water Resources details.

1.15.2 Biological Resources

Biological resources include terrestrial and aquatic plant and animal species; game and non-game species; special status species; and environmentally sensitive or critical habitats. The following are relevant federal laws, regulations, Executive Orders (EOs), and guidance[16] that protect biotic communities:

- Endangered Species Act (ESA) (16 U.S.C. §§ 1531-1544);
- Bald and Golden Eagle Protection Act (16 U.S.C. §§ 668 et seq.);
- Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. § 1801 et seq.);
- Fish and Wildlife Coordination Act (16 U.S.C. § 661-667d);
- Executive Order (EO) 13112, Invasive Species (64 FR 6183);
- Marine Mammal Protection Act (16 U.S.C. § 1361 et seq.);
- Migratory Bird Treaty Act (MBTA) (16 U.S.C. §§ 703 et seq.);
- EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds (66 FR 3853);
- Council on Environmental Quality (CEQ) Guidance on Incorporating Biodiversity Considerations into Environmental Impact Analysis under NEPA; and
- Memorandum of Understanding to Foster the Ecosystem Approach.

Although the Endangered Species Act does not protect state-protected species or habitats, NEPA documentation ensures that environmental analysis prepared for airport actions addresses the potential effects to state-protected resources. TABLE 1-29 lists the 28 federally- and state-threatened and endangered species that have the potential to be found in Salt Lake County.[17] According to the U.S. Fish and Wildlife Service (USFWS), there is no designated critical habitat at SLCIA.[18]

The Migratory Bird Treaty Act (MBTA) prohibits the taking of any migratory birds, their parts, nests, or eggs except as permitted by regulations, and does not require intent to be proven. TABLE 1-30 lists the 22 migratory bird species that have the potential to be found at SLCIA.[19]
Essential Fish Habitat (EFH) are those waters and substrate necessary for fish spawning, breeding, feeding, and growth to maturity as defined under the Magnuson-Stevens Fishery Conservation and Management Act (MSA). The MSA also requires federal agencies to consult with NOAA Fisheries about actions that could damage EFH. There are no fish species currently protected under the MSA in Salt Lake County.[20]

An SLCIA Wildlife Hazard Assessment (WHA) was completed by SLCDA in 2004 and revised in 2018. SLCDA continues to consult with the United States Department of Agriculture (USDA) Wildlife Services on a regular basis in order to reduce wildlife hazards. During the 2004 WHA, 60 bird species and seven mammal species were observed in and around SLCIA. As a result of the WHA, a Wildlife Hazard Management Plan (WHMP) was prepared. The WHMP prescribes wildlife management techniques for preventing and reducing wildlife hazards at SLCIA.[21]

1.15.3 Climate

Relevant federal laws, regulations, and EOs that relate to climate include:

- CAA (42 U.S.C. §§ 7408, 7521, 7571, 7661 et seq.);
- EO 13514, Federal Leadership in Environment Energy and Economic Performance (74 FR 52117);
- EO 13653, Preparing the United States for the Impacts of Climate Change (78 FR 66817); and
- EO 13693, Planning for Federal Sustainability (80 FR 15869).

Greenhouse gases (GHG) are gases that trap heat in the earth's atmosphere. Both naturally occurring and man-made GHGs primarily include water vapor, carbon dioxide, methane, nitrous oxide, hydro-fluorocarbons, perfluorocarbons, and sulfur hexafluoride. Activities that require fuel or power are the primary stationary sources of GHGs at airports. Aircraft and ground access vehicles that are not under the control of an airport, typically generate more GHG emissions than airport controlled sources.

Research has shown there is a direct correlation between fuel combustion and GHG emissions. In terms of U.S. contributions, the Government Accountability Office (GAO) reports that "domestic aviation contributes about three percent of total carbon dioxide emissions, according to EPA data, "compared with other industrial sources, including the remainder of the transportation sector (20%) and power generation (41%).[22]
The International Civil Aviation Organization (ICAO) estimates that GHG emissions from aircraft account for roughly three percent of all anthropogenic GHG emissions globally.[23]

[16] Due to the number of federal laws and EOs applicable to the future development plans, this section presents only the legal citations or references for those requirements in lieu of summarizing their requirements. See FAA Order 1050.1F Desk Reference for more information.
[17] State of Utah Natural Resources, Division of Wildlife Resources, Utah Sensitive Species List.
[18] U.S. Fish and Wildlife Service, Information for Planning and Conservation (IPaC), Salt Lake County. Accessed: https://ecos.fws.gov/ipac/location/HPRQ53L6KFCCPNQX6PQUGXVLDA/resources, August 2018
[19] U.S. Fish and Wildlife Service, Information for Planning and Conservation (IPaC), Salt Lake County. Accessed: https://ecos.fws.gov/ipac/location/HPRQ53L6KFCCPNQX6PQUGXVLDA/resources#migratory-birds, August 2018
[20] National Marine Fisheries Service, Essential Fish Habitat Mapper. Accessed: http://www.habitat.noaa.gov/protection/efh/efhmapper/index.html, August 2018
[21] Salt Lake City International Airport, Wildlife Hazard Management Plan. Accessed: https://www.slcairport.com/assets/pdfDocuments/Wildlife_Plan.pdf, August 2018
[22] U.S. Government Accountability Office, Report to Congressional Committees, Aviation and Climate Change, June 2009. Accessed: http://www.gao.gov/new.items/d09554.pdf, May 2016
[23] Melrose, Alan, European ATM and Climate Adaptation: A Scoping Study, ICAO Environmental Report, 2010. Accessed: http://www.icao.int/environmental-protection/Documents/EnvironmentReport-2010/ICAO_EnvReport10-Ch6_en.pdf, May 2016.

1.15.4 Coastal Resources

The primary statutes, regulations, and EOs that protect coastal resources include:

- Coastal Barrier Resources Act (16 U.S.C. § 3501 et seq.);
- Coastal Zone Management Act (CZMA) (16 U.S.C. § 1451-1466);
- National Marine Sanctuaries Act (16 U.S.C. §1431 et seq.);
- EO 13089, Coral Reef Protection (63 FR 32701); and
- EO 13547, Stewardship of the Ocean, Our Coasts, and the Great Lakes (75 FR 43021-43027).

Utah is not a coastal state. As such, SLCIA is not within a coastal zone. Additionally, there are no Coastal Barrier Resource System (CBRS) segments within SLCIA property.[24] The closest CBRS segment is over 1,200 miles southeast of the airport.

Table 1-29: Federally and State Listed Species

Species Common Name	Species Scientific Name	Listing Status[1]
Birds		
American Three-toed Woodpecker	*Picoides dorsalis*	SPC
American White Pelican	*Pelecanus erythrorhynchos*	SPC
Bald Eagle	*Haliaeetus leucocephalus*	SPC
Black Swift	*Cypseloides niger*	SPC
Bobolink	*Dolichonyx oryzivorus*	SPC
Burrowing Owl	*Athene cunicularia*	SPC
Ferruginous Hawk	*Buteo regalis*	SPC
Grasshopper Sparrow	*Ammodramus savannarum*	SPC
Greater Sage-grouse	*Centrocercus urophasianus*	SPC
Lewis's Woodpecker	*Melanerpes lewis*	SPC
Long-billed Curlew	*Numenius americanus*	SPC
Northern Goshawk	*Accipiter gentilis*	CS
Short-eared Owl	*Asio flammeus*	SPC
Yellow-billed Cuckoo[2]	*Coccyzus americanus*	FT
Fish		
Bonneville Cutthroat Trout	*Oncorhynchus clarkii*	CS
June Sucker	*Chasmistes liorus*	FE
Least Chub	*Iotichthys phlegethontis*	CS
Mollusk		
California Floater	*Anodonta californiensis*	SPC
Lyrate Mountainsnail	*Oreohelix haydeni*	SPC
Western Pearlshell	*Margaritifera falcata*	SPC
Amphibian		
Columbia Spotted Frog	*Rana luteiventris*	CS
Western Toad	*Bufo anaxyrus*	SPC
Mammal		
Canada Lynx	*Lynx canadensis*	FT
Kit Fox	*Vulpes macrotis*	SPC
Spotted Bat	*Euderma maculatum*	SPC
Townsend's Big-eared Bat	*Corynorhinus townsendii*	SPC
Reptile		
Smooth Green Snake	*Opheodrys vernalis*	SPC
Flowering Plants		
Ute Ladies'-tresses	*Spiranthes diluvialis*	FT

Notes: (1) FE – Federally Endangered, FT – Federally Threatened, SPC – State Species of Concern, CS – Species receiving special state management to preclude Federal Listing. (2) Includes the Western Yellow-Billed Cuckoo Subspecies.
Source: USFWS, 2018; Utah DNR, 2018; Prepared by RS&H, 2018

[24] Accessed: https://www.fws.gov/cbra/Maps/Mapper.html, August 2018.

Table 1-30: Potential Migratory Birds in Airport Area

Species Common Name	Species Scientific Name
Bald Eagle	*Haliaeetus leucocephalus*
Black Rosy-finch	*Leucosticte atrata*
Black Swift	*Cypseloides niger*
Brewer's Sparrow	*Spizella breweri*
Brown-capped Rosy-finch	*Leucosticte austrailis*
Burrowing Owl	*Athene cunicularia*
Clark's Grebe	*Aechmophorus clarkia*
Golden Eagle	*Aquila chrysaetos*
Green-tailed Towhee	*Piplio chlorurus*
Lesser Yellowlegs	*Tringa flavipes*
Lewis's Woodpecker	*Melanerpes lewis*
Long-Billed Curlew	*Numenius americanus*
Long-eared Owl	*Asio otus*
Marbled Godwit	*Limosa fedoa*
Olive-sided Flycatcher	*Contopus cooperi*
Pinyon Jay	*Gymnorhinus cyanocephalus*
Rufous Hummingbird	*Selasphorus rufus*
Sage Thrasher	*Oreoscoptes montanus*
Virginia's Warbler	*Vermivora virginiae*
Willet	*Tringa sempipalmata*
Williamson's Sapsucker	*Sphyrapicus thyroideus*
Willow Flycatcher	*Empidonax traillii*

Source: USFWS, 2018; Prepared by RS&H, 2018

1.15.5 Department of Transportation, Section 4(f)

Relevant federal laws, regulations, and EOs that protect Section 4(f) resources include:

- U.S. Department of Transportation (USDOT) Act, Section 4(f) (49 U.S.C. § 303.);
- Land and Water Conservation Fund Act of 1965 (16 U.S.C. §§ 4601-4604 et seq.);
- Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) – Section 6009 (49 U.S.C. § 303.); and
- U.S. Department of Defense Reauthorization (Public Law (P.L.) 105-185, Division A, Title X, Section 1079, November 18, 1997, 111 Stat. 1916).

The USDOT Act, Section 4(f) provides that no project that requires the use of any land from a public park or recreational area, wildlife and waterfowl refuge, or historic site be approved by the Secretary of Transportation unless there is no viable alternative and provisions to minimize any possible harm are included in the planning. Similarly, the Land and Water Conservation Fund (LWCF) Act prevents the conversion of lands purchased or developed with Land and Water Conservation funds to non-recreation uses, unless the Secretary of the Interior, through the National Park Service, approves the conversion. Conversion may only be approved if it is consistent with the comprehensive statewide outdoor recreation plan when the approval occurs. Additionally, the converted property must be replaced with other recreation property of reasonably equivalent usefulness and location, and at least equal fair market value.

The closest Section 4(f) property to SLCIA is the Airport Trail bike path, a 2.8-mile bike path that runs through the southern portion of SLCIA property (see Figure 1-47).[25] The closest LWCF site to SLCIA is the Red Butte Canyon Research Area, located about six miles east of the airport.[26]

[25] Salt Lake City Government, Transportation, Urban Trails. Accessed: https://www.slcairport.com/assets/pdfDocuments/bike_map.pdf, September 2018.
[26] Land Water Conservation Fund, Utah.
Accessed: https://static1.squarespace.com/static/58a60299ff7c508c3c05f2e1/t/5b29566eaa4a99e30737b026/1529435758782/Utah+fact+sheet+6.13.18.pdf, August 2018.

1.15.6 Farmlands

The following statutes, regulations, and guidance pertain to farmlands:

- Farmland Protection Policy Act (FPPA) (7 U.S.C. §§ 4201-4209); and
- CEQ Memorandum on the Analysis of Impacts on Prime or Unique Agricultural Lands in Implementing the National Environmental Policy Act (45 FR 59189).

The FPPA of 1981 regulates federal actions that have the potential to convert farmland to non-agricultural uses. The FAA requires consideration of "important farmlands," which it defines to include "all pasturelands, croplands, and forests considered to be prime, unique, or statewide or local important lands."[27]

According to the Natural Resource Conservation Service (NRCS), portions of SLCIA property contain farmland of statewide importance and prime farmland, as defined above.[28] However, according to Section 523.10(B) of the FPPA, lands identified as urbanized areas by the U.S. Census Bureau are not subject to the provision of the FPPA. Further, Section 658.29(a) of the FPPA states that, "farmland does not include land already in or committed to urban development." According to the U.S. Census Bureau, SLCIA property is identified as an urban area.[29] Additionally, airports can be considered urban land uses. Therefore, the soils on SLCIA property are not protected by the FPPA.

1.15.7 Hazardous Materials, Solid Waste, and Pollution Prevention

Federal laws, regulations, and EOs that relate to hazardous materials, solid waste, and pollution prevention include:

- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 U.S.C. §§ 9601-9765);
- Emergency Planning and Community Right to Know Act (42 U.S.C. §§ 11001-11050);
- Federal Facilities Compliance Act (42 U.S.C. § 6961);
- Hazardous Materials Transportation Act (49 U.S.C. §§ 5101-5128);
- Oil Pollution Prevention Act of 1990 (33 U.S.C. §§ 2701-2762);
- Pollution Prevention Act (42 U.S.C. §§ 13101-13109);
- Toxic Substances Control Act (TSCA) (15 U.S.C. §§ 2601-2697);
- Resource Conservation and Recovery Act (RCRA) (42 U.S.C. §§ 6901-6992k);
- EO 12088, Federal Compliance with Pollution Control Standards (43 FR 47707);
- EO 12580, Superfund Implementation (52 FR 2923), (63 CFR 45871), and (68 CFR 37691);
- EO 13423, Strengthening Federal Environmental, Energy, and Transportation Management (72 FR 3919); and
- EO 13514, Federal Leadership in Environmental, Energy, and Economic Performance (74 FR 52117).

1.15.7.1 Hazardous Materials

In a regulatory context, the terms "hazardous wastes," "hazardous substances," and "hazardous materials" have very precise and technical meanings:

Hazardous Wastes. Subpart C of the RCRA defines hazardous wastes (sometimes called characteristic wastes) as solid wastes that are ignitable, corrosive, reactive, or toxic. Examples include waste oil, mercury, lead or battery acid. In addition, Subpart D of the RCRA contains a list of specific types of solid wastes that the USEPA has deemed hazardous (sometimes called listed wastes). Examples include degreasing solvents, petroleum refining waste, or pharmaceutical waste.

Hazardous Substances. Section 101(14) of the CERCLA defines hazardous substances broadly and includes hazardous wastes, hazardous air pollutants, or hazardous substances designated as such under the Clean Water Act and TSCA and elements, compounds, mixtures, solutions, or substances listed in 40 CFR Part 302 that pose substantial harm to human health or environmental resources. Pursuant to the CERCLA, hazardous substances do not include any petroleum or natural gas substances and materials. Examples include ammonia, bromine, chlorine, or sodium cyanide.

Hazardous Materials. According to 49 CFR Part 172, hazardous materials are any substances commercially transported that pose unreasonable risk to public health, safety, and property. These substances include hazardous wastes and hazardous substances, as well as petroleum and natural gas substances and materials. As a result, hazardous materials represent hazardous wastes and substances. Examples include household batteries, gasoline, or fertilizers.

[27] Federal Aviation Administration, Order 1050.1F Desk Reference, July 2015. Accessed: https://www.faa.gov/about/office_org/headquarters_offices/apl/environ_policy_guidance/policy/faa_nepa_order/desk_ref/media/desk-ref.pdf, August 2018.
[28] Natural Resources Conservation Service, Web Soil Survey. Accessed: https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx, August 2018.
[29] U.S. Census Bureau, Urbanized Areas and Urban Clusters: 2010.
Accessed: https://www2.census.gov/geo/maps/dc10map/UAUC_RefMap/ua/ua78499_salt_lake_city--west_valley_city_ut/DC0UA78499.pdf, September, 2018.

Aircraft fuel constitutes the largest quantity of hazardous substances stored and consumed at SLCIA. Fuel is stored on Airport property within a 261,491 square foot fuel farm. SECTION 1.11.5, Aviation Fuel Storage describes the fuel type and quantity within the fuel farm.

The USEPA identifies SLCIA (Handler ID: UTD982595662) as a hazardous waste site under the RCRA.[30] The USEPA also identified two additional hazardous waste sites on SLCIA property:

- SLC Department of Airports, Deicing Fluid Reclamation Plant (Handler ID: UTR000005397); and
- SLCC Public Utilities Lab (Handler ID: UTD982586703).

There are no CERCLA superfund sites on SLCIA property, however there are two superfund sites within three miles of the airport.[31] Portland Cement Kiln Dust 2 & 3 (Site EPA ID: UTD980718670) is located 1.75 miles southeast of SLCIA, and Utah Power & Light/American Barrel Co. (Site EPA ID: UTD980667240) is located 2.3 miles east of the airport.

1.15.7.2 Solid Waste

The Salt Lake County Landfill is the only municipal solid waste landfill located in Salt Lake County.[32] This landfill is located two miles southwest of SLCIA. This landfill is not expected to reach capacity until 2077, and recently received permission to increase its slope and height, prolonging the lifespan of the landfill.[33]

1.15.7.3 Pollution Prevention

SLCIA is required under the airport's Utah Pollutant Discharge Elimination System (UPDES) stormwater discharge permit (UPDES Permit #UT0024988, approved on March 14, 2014) to have a Stormwater Pollution Prevention Plan (SWPPP). The Airport's Spill Prevention and Countermeasure Plan (SPCC) was prepared in June, 2015. The SPCC is required to satisfy the federal requirements for facilities that have above ground oil storage tanks with a capacity greater than 1,320 gallons.

1.15.8 Historical, Architectural, Archaeological, and Cultural Resources

The National Historic Preservation Act (NHPA) (54 U.S.C. §§300101 et seq.) establishes the Advisory Council on Historic Preservation (ACHP). The ACHP oversees federal agency compliance with the NHPA. The NHPA also established the National Register of Historic Places (NRHP) that the National Park Service (NPS) oversees. Other applicable statues and EOs include:

- American Indian Religious Freedom Act (42 U.S.C. § 1996);
- Antiquities Act of 1906 (54 U.S.C. §§320301-320303);
- Archaeological and Historic Preservation Act (54 U.S.C. §§ 312501-312508);
- Archaeological Resources Act (16 U.S.C. §§ 470aa-470mm);
- USDOT Act, Section 4(f) (49 U.S.C. § 303);
- Historic Sites Act of 1935 (16 U.S.C. §§ 461-467);
- Native American Graves Protection and Repatriation Act (25 U.S.C. §§ 3001-3013);
- Public Building Cooperative Use Act (40 U.S.C. §§ 601a, 601a1, 606, 611c, and 612a4);
- EO 11593, Protection and Enhancement of the Cultural Environment (36 FR 8921);
- EO 13006, Locating Federal Facilities on Historic Properties in Our Nation's Central Cities (61 FR 26071);
- EO 13007, Indian Sacred Sites (61 FR 26771);
- EO 13175, Consultation and Coordination with Indian Tribal Governments (65 FR 67249);
- Executive Memorandum, Government-to-Government Relations with Native American Tribal Governments (April 29, 1994);
- Executive Memorandum on Tribal Consultation (Nov. 5, 2009) (65 FR 67249); and
- USDOT Order 5650.1, Protection and Enhancement of the Cultural Environment.

The closest National Register of Historic Places (NRHP)-listed historic site is the Fisher, Albert, Mansion and Carriage House located approximately 1.75 miles southeast of the SLCIA.[34] Additionally, the Fisher, Albert, Mansion and Carriage House is the closest Salt Lake City Historic Site.[35]

[30] U.S. Environmental Protection Agency, Envirofact, Hazardous Waste (RCRA info). Accessed: https://www3.epa.gov/enviro/facts/rcrainfo/search.html, September 2018.
[31] U.S. Environmental Protection Agency, Superfund, National Priorities List, Utah. Accessed: https://www.epa.gov/superfund/search-superfund-sites-where-you-live#map, September 2018.
[32] Salt Lake County, Utah, Public Works & Municipal Services Department, Landfill. Accessed: https://slco.org/landfill/, September 2018.
[33] Office of the Salt Lake County Auditor, A Performance Audit of The Salt Lake Valley Solid Waste Management Facility. Accessed: https://slco.org/uploadedFiles/depot/fAuditor/2015_audit_reports/15_07_solid_waste_management.pdf, September, 2018.
[34] U.S. Environmental Protection Agency, NEPAssist. Accessed: https://nepassisttool.epa.gov/nepassist/nepamap.aspx?wherestr=salt+lake+city+airport, August 2018.
[35] Salt Lake City, Historic Districts and Buildings, Landmark Sites. Accessed: https://www.slc.gov/historic-preservation/historic-districts-and-buildings, September 2018.

1.15.9 Land Use

Various statutes, regulations, and EOs relevant to land use include:

- The Airport and Airway Improvement Act of 1982, and subsequent amendments (49 U.S.C. 47107(a)(10));
- The Airport Improvement Program (49 U.S.C. 47106(a)(1);
- The Airport Safety, Protection of Environment, Criteria for Municipal Solid Waste Landfills (40 CFR § 258.10); and
- State and local regulations

SLCIA is within Salt Lake County, zoned as a Special Purpose District (specifically an "Airport District") under the Salt Lake Municipal Code Title 21A – Zoning. SLC Code 21A.32.060 defines the purpose of the Airport District code is to "provide a suitable environment for the Salt Lake City International Airport and private uses that function in support of the Airport facility. This district is appropriate in areas of the City where the applicable master plans support this type of land use." The City also delineates an Airport Flight Path Protection (AFPP) Overlay District under SLC Code 21A.34.040[36] (see FIGURE 1-42) to protect land uses below aircraft navigation routes. The AFPP Overlay District rules declare:

- That the creation or establishment of an airport hazard is a public nuisance and an injury to the region served by the Salt Lake City International Airport;
- That it is necessary in the interest of the public health, public safety, and general welfare that the creation or establishment of airport hazards be prevented; and
- That the prevention of these hazards should be accomplished, to the extent legally possible, by the exercise of the police power without compensation.

Land uses within the immediate vicinity of SLCIA include open space, commercial, mixed use transit station, single family and multifamily residential, and agricultural.[37] Less than a mile east of SLCIA is mainly residential, along with various commercial developments. Immediately south of SLCIA is open space, and west of the airport is open space as well as agricultural land. North of the airport is Farmington Bay, a section of the Great Salt Lake, including wetlands and open salt water.

1.15.10 Natural Resources and Energy Supply

Statutes and EOs that are relevant to natural resources and energy supply include:

- Energy Independence and Security Act (42 U.S.C. § 17001 et seq.);
- Energy Policy Act (42 U.S.C. § 15801 et seq.);
- EO 13423, Strengthening Federal Environmental, Energy, and Transportation Management (72 FR 3919); and
- EO 13514, Federal Leadership in Environmental, Energy, and Economic Performance (74 FR 52117).

Natural resources (e.g., water, asphalt, aggregate, etc.) and energy use (e.g., fuel, electricity, etc.) at an airport is a function of the needs of aircraft, support vehicles, airport facilities, support structures, and terminal facilities.

Water is the primary natural resource used at the Airport on a daily basis (see the SECTION 1.15.14, Water Resources for further details). Asphalt, aggregate, and other natural resources have also been used in various construction projects at SLCIA. None of the natural resources that the airport uses, or has used, are in rare or short supply. Energy use at SLCIA is primarily in the form of electricity required for the operation of airport-related facilities (e.g., terminal building, hangars, airfield lighting) and fuel for aircraft, aircraft support vehicles/equipment, and Airport maintenance vehicles/equipment. Rocky Mountain Power supplies electricity to SLCIA, Dominion Energy provides natural gas services, and the Salt Lake City Department of Public Utilities provides water and sewer services.

1.15.11 Noise and Noise-Compatible Land Use

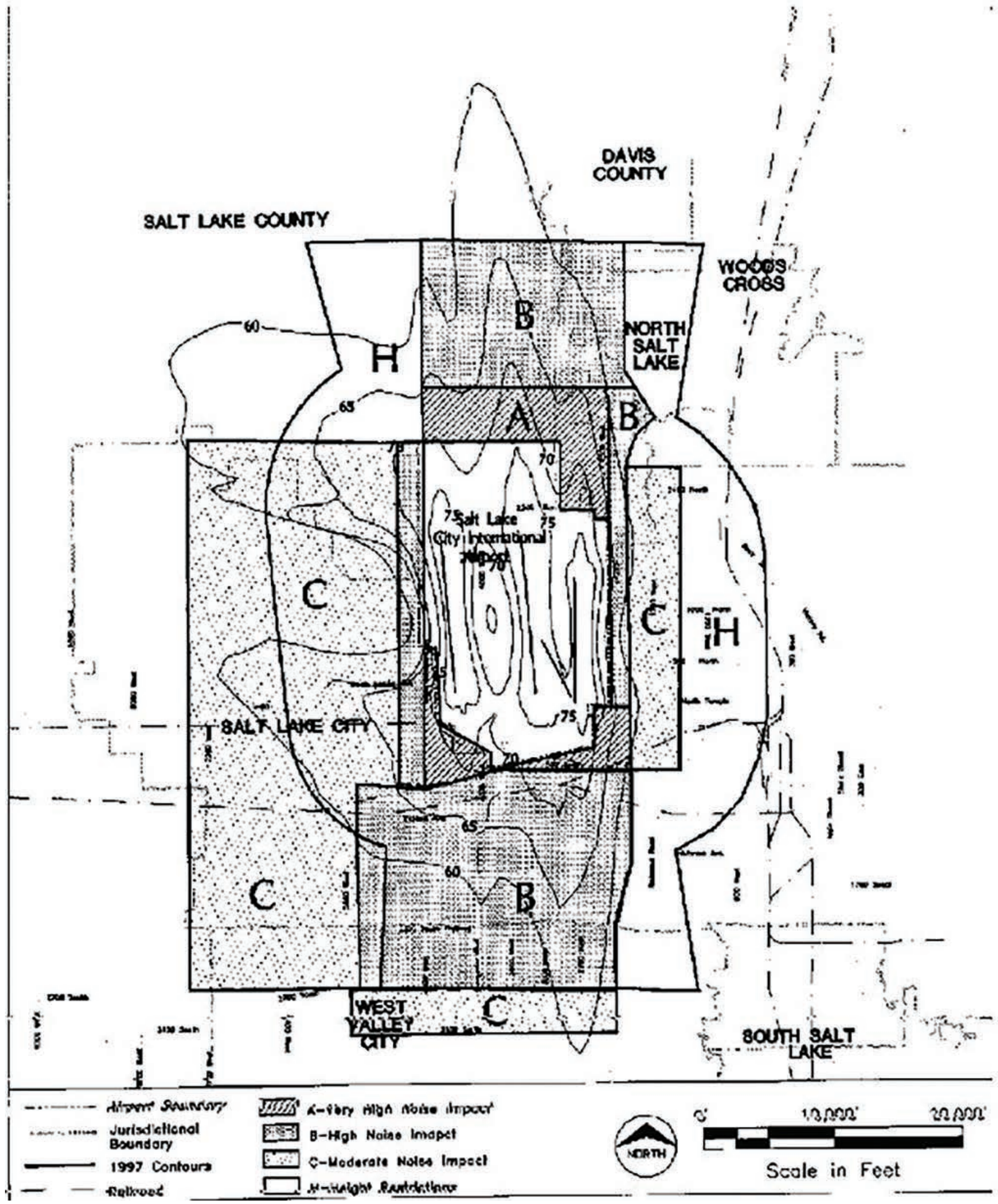
Statutes and EOs relevant to noise and noise-compatible land use include:

- The Control and Abatement of Aircraft Noise and Sonic Boom Act of 1968 (49 U.S.C. § 44715);
- The Noise Control Act of 1972 (42 U.S.C. §§ 4901-4918);
- Aviation Safety and Noise Abatement Act of 1979 (49 U.S.C. § 47501 et seq.);
- Airport and Airway Improvement Act of 1982 (49 U.S.C. § 47101 et seq.);
- Airport Noise and Capacity Act of 1990 (49 U.S.C. §§ 47521-47534, §§ 106(g);
- Section 506 of the FAA Modernization and Reform Act of 2012, Prohibition on Operating Certain Aircraft Weighting 75,000 Pounds of Less Not Complying with Stage 3 Noise Levels (49 U.S.C. §§ 47534); and
- State and local noise laws and ordinances.

The measurement of aircraft noise impacts on land uses is prescribed by the FAA as a Day-Night Sound Level (DNL). The DNL is based on sound levels measures in relative intensity of sound, (decibels or dB) on the "A-weighted scale" or dBA over a time-weighted average normalized to a 24-hour period.[38] DNL has been widely accepted as the best available method to describe aircraft noise exposure. The USEPA identifies the DNL as the principal metric for airport noise analysis. The FAA requires DNL as the noise descriptor for use in aircraft noise exposure analysis and noise compatibility planning. DNL levels are commonly shown as lines of equal noise exposure, similar to terrain contour maps, referred to noise contours. All residential areas are considered compatible with cumulative noise level below DNL 65 dBA. As SECTION 1.15.9, Land Use describes,

[36] Salt Lake City, Salt Lake City Code, Chapter 21A.34, Overlay Districts. Accessed: www.sterlingcodifiers.com/codebook/index.php?book_id=672, September 2018.
[37] Salt Lake City, Salt Lake City Maps, Zoning. Accessed: http://maps.slcgov.com/mws/zoning.htm, September 2018.
[38] Federal Aviation Administration, Technical Support for Day/Night Average Sound Level (DNL) Replacement Metric Research, Final Report, June 14, 2011.

Figure 1-42: SLC Airport Flight Path Protection Overlay District



Source: Salt Lake City, 1995

there are residential land uses near SLCIA. These areas may be sensitive to aircraft noise associated with the Airport. The Airport's aviation noise contours have been updated as part of this Master Plan (see FIGURE 1-43). There are no noise-sensitive land uses within the updated DNL 65 dBA noise contour.

As mentioned in SECTION 1.5.8, Noise Abatement, SLCDA adopted a Noise Compatibility Program (NCP) for SLCIA in January 1999 as a result of their completed Part 150 Study. The Part 150 Study outlines procedures to mitigate the impact of aircraft noise on non-compatible land uses, such as residential areas. Additionally, SLCDA actively implements mitigation measures at SLCIA from the FAA-approved NCP, such as reducing night-time activity, utilizing departure tracks which avoid residential areas, etc.

1.15.12 Socioeconomic, Environmental Justice, and Children's Environmental Health and Safety Risks

The primary considerations of socioeconomics analysis are the economic activity, employment, income, population, housing, public services, and social conditions of the area. The Uniform Relocation Assistance and Real Property Acquisitions Policy Act of 1970 (42 U.S.C. § 61 et seq.), implemented by 49 CFR Part 24, is the primary statute related to socioeconomic impacts. Statutes, EOs, memorandums, and guidance that are relevant to environmental justice and children's environmental health and safety risks include:

- Title VI of the Civil Rights Act, as amended (42 U.S.C. §§ 2000d-2000d-7);
- EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (59 FR 7629);
- Memorandum of Understanding on Environmental Justice and EO 12898;
- USDOT Order 5610.2(a), Environmental Justice in Minority and Low-Income Populations (77 FR 27534);
- CEQ Guidance: Environmental Justice: Guidance Under the National Environmental Policy Act;
- Revised USDOT Environmental Justice Strategy (77 FR 18879); and
- EO 13045, Protection of Children from Environmental Health Risks and Safety Risks (62 FR 19885).

SLCIA is entirely within Census Tract 9800, Block Group 1, which has a population of zero. Therefore, the Salt Lake City, Utah Metropolitan Area, as defined by the U.S. Census Bureau, was used to describe the socioeconomic and environmental justice characteristics in the airport area compared to Utah (see TABLE 1-31). Census data for the Salt Lake City, Utah Metropolitan Area is from the U.S. Census Bureau 2012-2016 American Community Survey, and census data for Utah is from 2017 American Community Survey.

With regard to children's environmental health and safety risks, the closest school to SLCIA is Meadowlark Elementary, approximately 1,500 feet east of the airport.[39] The school serves students in kindergarten through sixth grade. The closest child care center to SLCIA is the Sunshine House, located approximately 1,200 feet east of the airport.[40] The closest child friendly recreational area is Westpointe Park, a city park with tennis courts, basketball courts and playground area located 1,700 feet east of the Airport.[41] The closest children's health clinic is the Children's Center, a children's mental health clinic located approximately 3.9 miles east of SLCIA.[42]

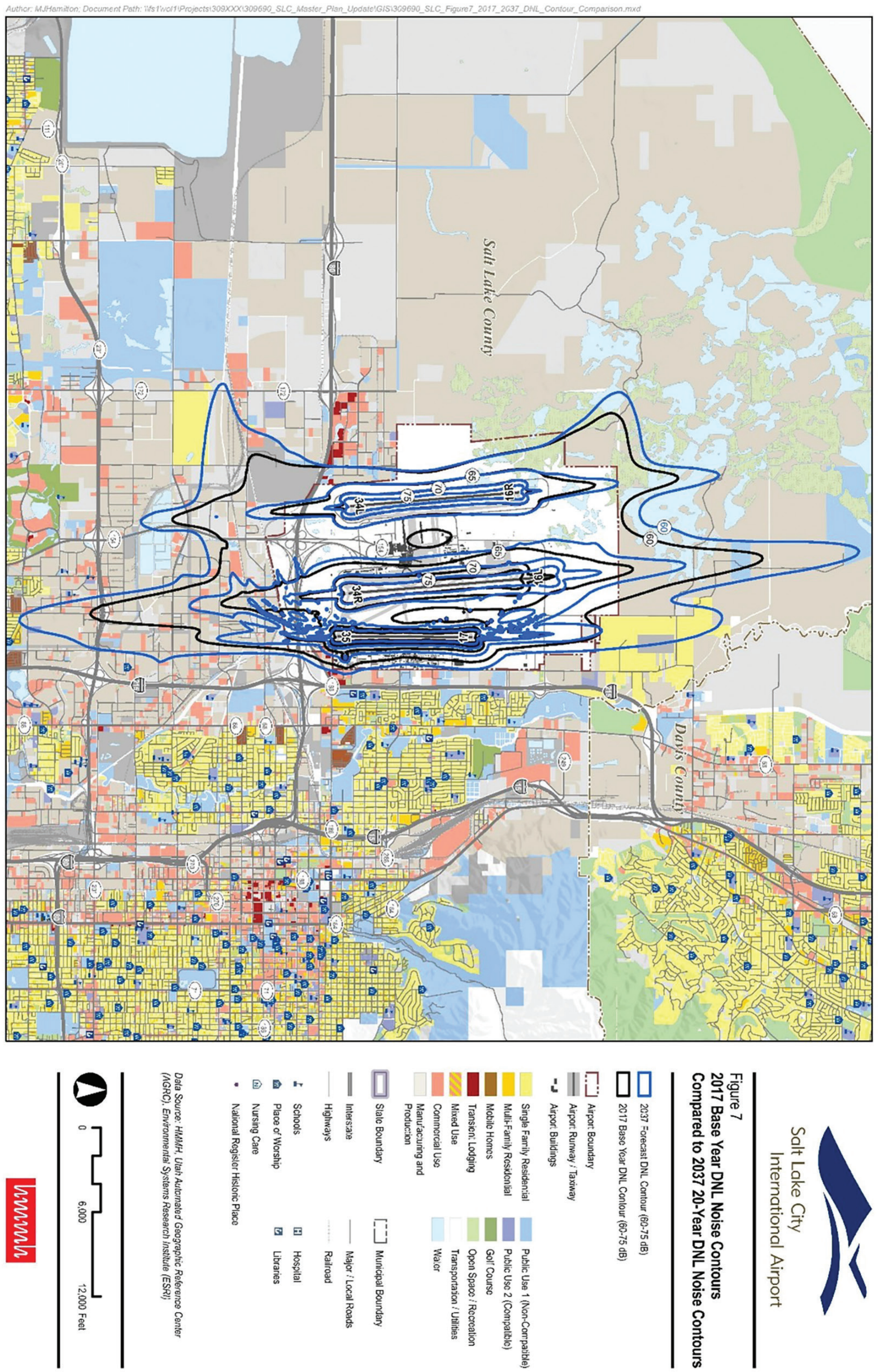
Figure 1-31: Socioeconomic and Environmental Justice Characteristics

Characteristic	Salt Lake City, Utah Metro Area	Utah
Total Population	1,154,504	3,101,833
Percent Minority	18.34%	14.34%
Percent Living Below the Poverty Level	11.14%	9.70%
Percent of the population below 18 Years of Age	28.65%	29.82%
Percent Unemployed (above 16 years of Age)	5.15%	3.60%
Total Housing Units	397,381	1,084,685
Vacant Housing Units	22,254	109,237

Source: U.S. Census Bureau, 2012-2016; Prepared by RS&H, 2018

[39] U.S. Environmental Protection Agency, NEPAssist, Places, Schools. Accessed: https://nepassisttool.epa.gov/nepassist/nepamap.aspx?wherestr=salt+lake+city+airport, September 2018.
[40] Sunshine House Early Learning Academy, Salt Lake City. Accessed: https://sunshinehouse.com/center/salt-lake, September 2018.
[41] Salt Lake City Government, Parks and Public Lands. Accessed: http://slcgov.maps.arcgis.com/apps/webappviewer/index.html?id=85ef343352c8495ba0cdf-d0504610a92, September 2018.
[42] The Children's Center, Salt Lake City. Accessed: https://childrenscenterutah.org, September 2018

Figure 1-43: 2017 Noise Contour Map



1.15.13 Visual Effects

There is no federal statutory or regulatory requirement for adverse effects resulting from light emissions or visual impacts. FAA Order 1050.1F describes factors to consider within light emissions and visual resources/visual character. Potential impacts from light emissions include the annoyance or interference with normal activities, as well as effects to the visual character of the area due to light emissions, including the importance, uniqueness, and aesthetic value of the affected visual resources.

1.15.13.1 Light Emissions

Various lighting features currently illuminate SLCIA facilities, such as the airfield (e.g., runways and taxiways), buildings, access roadways, automobile parking areas, and apron areas for the safe and secure movement of people and vehicles (e.g., aircraft, passenger cars, etc.).

1.15.13.2 Visual Resources and Visual Character

Structures at SLCIA include, but are not limited to, the terminal building, the FAA Air Traffic Control Tower, fixed base operators, hangars, and maintenance buildings. As previously mentioned, SLCIA is zoned as an Airport District and is developed in a manner that is consistent with this zoning.

Residential land uses to the east have a direct line of sight to SLCIA. Vegetation (e.g., trees and shrubs) help to reduce both the light emissions and visual effects to SLCIA for residential areas.

1.15.14 Water Resources

Water resources are considered wetlands, floodplains, surface waters, groundwater, and wild and scenic rivers. These resources typically function as a single, integrated natural system that are important in providing drinking water in supporting recreation, transportation and commerce, industry, agriculture, and aquatic ecosystems.

1.15.14.1 Wetlands

Statutes and EOs that are relevant to wetlands include:

- EO 11990, Protection of Wetlands (42 FR 26961);
- Clean Water Act (33 U.S.C. §§ 1251-1387);
- Fish and Wildlife Coordination Act (16 U.S.C. § 661-667d) ; and
- USDOT Order 6660.1A, Preservation of the Nation's Wetlands.

The Clean Water Act defines wetlands as "...those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions."[43]

Wetlands have three necessary characteristics:

- Water: Presence of water at or near the ground surface for a part of the year;
- Hydrophytic Plants: A preponderance of plants adapted to wet conditions; and
- Hydric Soils: Soil developed under wet conditions.

An SLCIA airport-wide wetlands inventory was conducted in 2004 (see FIGURE 1-43). Wetlands were identified during the site survey and mapped for future development considerations, and all wetlands shown in FIGURE 1-43 have been determined as jurisdictional by the U.S. Army Corps of Engineers (USACE); however, jurisdictional determinations are only valid for a five-year period.

1.15.14.2 Floodplains

Statues and EOs that are relevant to floodplains include:

- EO 11988, Floodplain Management (42 FR 26951);
- National Flood Insurance Act (42 U.S.C. § 4001 et seq.); and
- U.S. Department of Transportation (USDOT) Order 5650.2, Floodplain Management and Protection.

Floodplains are "...lowland areas adjoining inland and coastal water which are periodically inundated by flood waters, including flood-prone area of offshore islands." Floodplains are often referred to in terms of the 100-year floodplain, rather, the one percent chance of a flood occurring in any given year. The USDOT Order 5650.2 outlines the policies and procedures for ensuring that proper consideration is given to the avoidance and mitigation of adverse floodplain impacts in agency actions, planning programs, and budget requests. Therefore, the objective is to avoid, to the extent practicable, any impacts within the 100-year floodplain.

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) for the SLCIA area, there are floodplains within the airport property.[44] The floodplains are located in the northwestern, western, and southern portions of SLCIA property (see FIGURE 1-44).

[43] U.S. Environmental Protection Agency, Section 404 of the Clean Water Act.
[44] Federal Emergency Management Agency, Flood Map Service Center, Flood Insurance Rate Maps 49035C0140E (effective 9/21/2001), 49035C0137E (effective 9/21/2001), 49035C0139E (effective 9/21/2001), 49035C0120E (effective 9/21/2001), 49035C0150G (effective 9/25/2009), 49035C0125G (effective 9/25/2009), and 49035C0129G (effective 9/25/2009). Accessed: https://msc.fema.gov/portal/search#searchresultsanchor, September 2018.

1.15.14.3 Surface Waters

Statues that are relevant to surface water include:

- Clean Water Act (33 U.S.C. §§ 1251-1387);
- Fish and Wildlife Coordination Act (16 U.S.C. § 661-667d); and
- Rivers and Harbors Act (33 U.S.C. § 401 and 403).

Surface waters include areas where water collects on the surface of the ground, such as streams, rivers, lakes, ponds, estuaries, and oceans. There is one unnamed stream running through SLCIA property (see FIGURE 1-45).[45] This stream runs through the southern and western portions of SLCIA property. Additionally, there are two unnamed ponds in the southern portion the property (see FIGURE 1-45).

1.15.14.4 Groundwater

Statues relevant to groundwater include:

- Safe Drinking Water Act (42 U.S.C. §§ 300(f)-300j-26).

Groundwater is described as the "subsurface water that occupies the space between sand, clay, and rock formations."[46] SLCIA property intersects two hydrologic units.[47] The western portion of airport property is within the Crystal Creek watershed (HUC 12 ID: 160202040404) and the eastern portion of airport property is within the Jordan River watershed (HUC 12 ID: 160202040405).

1.15.14.5 Wild and Scenic Rivers

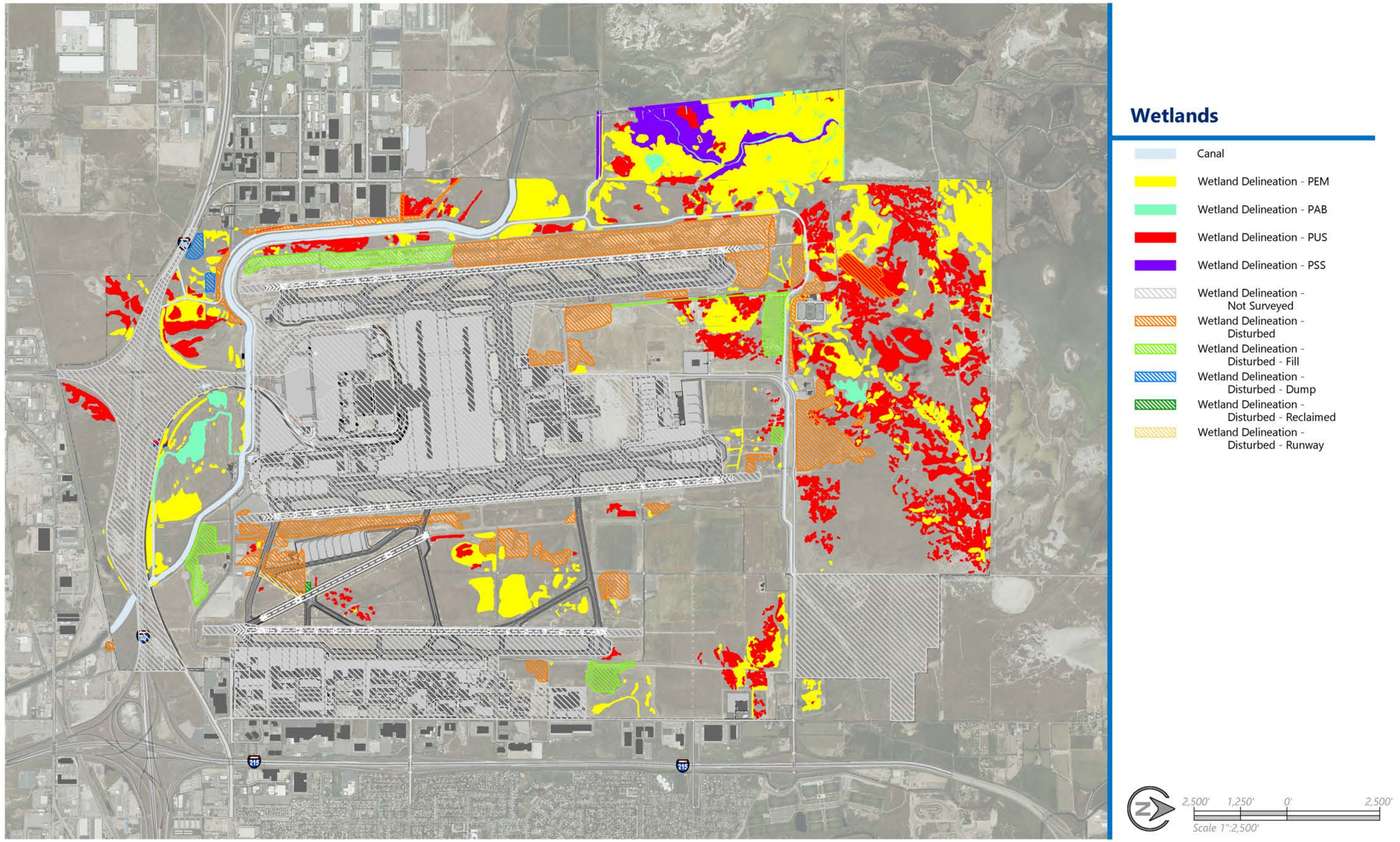
Statues relevant to wild and scenic rivers include:

- Wild and Scenic Rivers Act (16 U.S.C. §§ 1271-1278).

Wild and scenic rivers are defined as "outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations."[48] There are no wild and scenic rivers or river segments within the SLCIA area.[49] The closest wild and scenic river, the Snake River, is over 170 miles northeast of SLCIA.[50]

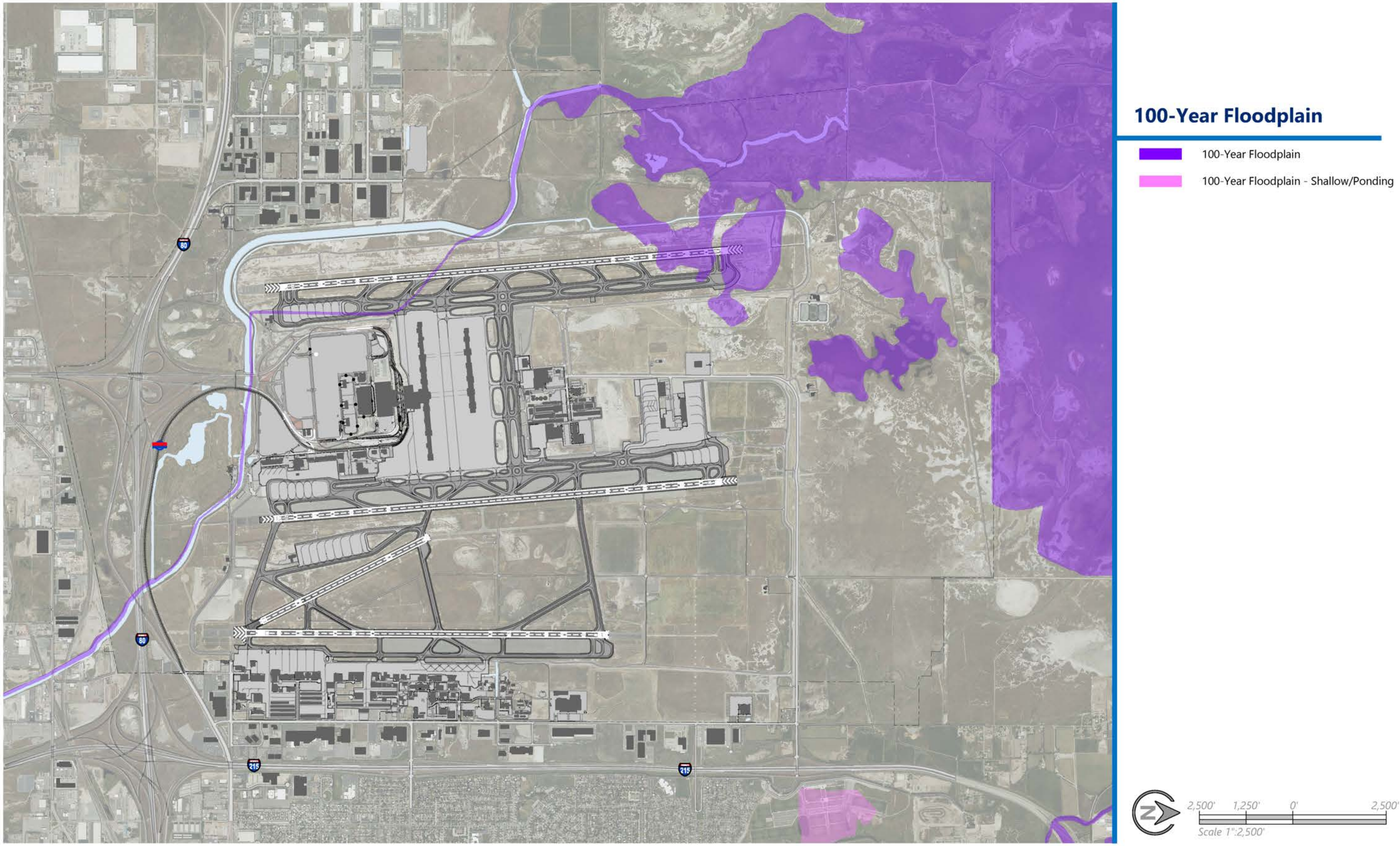
[45] U.S. Environmental Protection Agency, NEPAssist, Water Features, Streams. Accessed: https://nepassisttool.epa.gov/nepassist/nepamap.aspx?wherestr=salt+lake+city+airport, September 2018.
[46] Federal Aviation Administration, 1050.1F Desk Reference, Section 14.4 Groundwater. July 2015.
[47] U.S. Environmental Protection Agency, NEPAssist, Water Features, Watersheds (HUC 12). Accessed: https://nepassisttool.epa.gov/nepassist/nepamap.aspx?wherestr=salt+lake+city+airport, September 2018.
[48] National Wild and Scenic Rivers System, About the WSR Act. Accessed: https://www.rivers.gov/wsr-act.php, September 2018.
[49] U.S. Environmental Protection Agency, NEPAssist, Water Features, Wild and Scenic Rivers.
[50] U.S. National Park Service, Wild and Scenic Rivers Program, Interactive Map of NPS Wild and Scenic Rivers.

Figure 1-44: Wetlands



Source: SLCDA wetlands data, 2004; Prepared by RS&H, 2018

Figure 1-45: Floodplains



Source: FEMA; Prepared by RS&H, 2018

Figure 1-46: Surface Waters

Source: Esri; Prepared by RS&H, 2018

Figure 1-47: Department of Transportation Act, Section 4(f)

Source: Esri; Prepared by RS&H, 2018

AVIATION ACTIVITY FORECAST

AVIATION ACTIVITY FORECAST

2.1 INTRODUCTION

Chapter 2 presents a forecast of aviation activity for Salt Lake City International Airport (SLC or Airport). The forecast uses 2017 as the baseline year, and makes projections beginning in 2018, extending over the 20-year planning horizon to 2037.

The aviation activity forecast chapter:

- Reviews and compares relevant forecasts for projected growth at SLC
- Identifies the service area for SLC that represents the primary geographic area from which customers are drawn and socioeconomic data is evaluated. Valid and relevant data from a variety of sources was evaluated, including but are not limited to:
  - Bureau of Transportation Statistics
  - T-100 market segment data
  - Official Airline Guide schedules (OAG)
  - Federal Aviation Administration (FAA)
    - › Terminal Area Forecast (TAF) 2017, published in January 2018
    - › FAA Aerospace Forecasts
    - › The Operations Network (OPSNET)
  - Historical Airport Data from the Salt Lake City Department of Airports
  - General Aviation Strategy Plan, 2019
  - Key stakeholder input identified in the Forecast Expert Panel Session (See Section 1.2.6)
  - The University of Utah Kem C. Gardner Policy Institute
  - 2007 Utah Continuous Airport Systems Plan (UCASP)
  - Woods & Poole, Inc., 2018 socioeconomic data for United States (U.S.) metropolitan statistical areas (MSAs), and Micropolitan Statistical Areas (MICROs)
- Uses a variety of methods for generating forecasts with included; trendline analysis, econometric regression modeling, and monte carlo simulation.
- Forecasts projections for the Airport in the areas of:
  - Passenger Activity
    - › Enplanements (total, origin & destination (O&D), and connecting)
    - › Operations (itinerant, local, annual instrument approaches, instrument flight rules (IFR), visual flight rules (VFR), and fleet mix)
    - › Design Day Schedule
    - › Peak Hour
  - Air Cargo (total, freight, and belly cargo)
  - General Aviation (GA) Based Aircraft and Operations
  - Military Operations
  - Critical aircraft identified by runway

Three forecasts were generated for passenger, cargo, and GA activity – they are identified as the Base Case, Low Case, and High Case Scenario Forecasts. The prevailing practice relative to military activity is to maintain the base year data (in this case 2017) constant over the forecast period, therefore the military activity for the Base Case, Low Case Scenario, and High Case Scenario Forecasts are all the same.

The preferred forecast is referred to as the Base Case Forecast, and it has the highest probability for achievement. In addition, several specialized forecasts, or derivatives, were developed by considering different assumptions regarding passenger enplanements which identify both a lower and higher level of enplanements than the Base Case Forecast.

The Base Case Forecast of passenger enplanements can be used as a barometer to measure growth and the need for facilities in future years. If activity grows faster than anticipated by this Base Case Forecast, i.e., toward the level of enplanements identified by the High Case Scenario Forecast, then the Salt Lake City Department of Airports should reassess their implementation schedule and accelerate plans as necessary. Similarly, slower than projected growth (Low Case Scenario Forecast) may warrant SLCDA deferring planned improvements until higher activity is reached. Actual activity growth should be frequently compared to anticipated design and construction schedules so that modifications can be identified, as necessary.

This document provides an aviation demand forecast and develops support forecasts, or derivative forecasts such as peak period passenger or aircraft operations forecasts by type, for use in preparing Facility Requirements within the next chapter.

Given the recent period of fast enplanement growth and the uncertainty about the ability to sustain this level of growth much longer, the Base Case and two scenario forecasts provide flexibility to predict future facility requirements that might be needed within a range of reasonableness. These forecasts serve as benchmarks for understanding the pace of growth at SLC should the Base Case Forecast be exceeded, or conversely, not achieved.

Reflecting positive trends in the United States and the region for future growth in air travel, the Base Case Forecast assumes;

- Continuation of strong growth between SLC and its city pairs at least in the short term
- Continuation of seasonal flights
- Continuation of flights to small cities in the western mountain region and the use of aircraft with 60 seats and less
- Limited increases in non-stop destinations as SLC already serves 98 cities non-stop (August 2018)
- Continued increases in international enplanements with a growth in new international city pairs
- Continued upgauging of aircraft on routes from SLC, particularly to the West Coast
- Additional overnight flights to the east coast to connect with international flights
- Accommodation of expanding growth in tourism and business.

The High Case Scenario Forecast is based upon a slightly higher long-term growth rate in population and employment as indicated in forecasts by the University of Utah's Kem C. Gardener Policy Institute as opposed to using Woods & Poole. In addition, the FAA's slightly higher long-term Gross Domestic Product (GDP) for the U.S. is used as opposed to the Woods & Poole Gross Regional Product (GRP) for the counties in the SLC Service Area (defined in Section 2.1.2). All these variables for this region are approximately equal to or greater than those of the United States. This is in addition to the possible effect from sustained competitive airfares and airline profitability. The Low Case Scenario assumes a slight decline in long-term GDP growth relative to Woods & Poole's estimate of regional GRP as well as higher airfares and airline yields that suppresses air passenger growth.

It should be noted that the aviation activity forecasts were completed before the onset of the global pandemic caused by COVID-19. Having a forecast range that covers possible activity levels between the Low Case and High Case ensures that master plan analysis and recommendations remain valid given future social and economic uncertainties.

2.1.1 Executive Summary of Forecast for FAA Approval

This section provides a quick summation of forecasts for the reader and for the FAA. Detailed explanation about the forecast methodology and results may be found in subsequent portions of the forecast chapter.

A key consideration in the development of aviation forecasts is how they compare with the Federal Aviation Administration (FAA) Terminal Area Forecasts (TAF).[1] The TAF is an important planning tool used by the FAA to review and compare forecasts prepared by Airport Sponsors. In accordance with FAA Order 5050.4B, National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions, paragraph 706.b(3), "The sponsor's forecast must be consistent with the Terminal Area Forecast (TAF). To be consistent with the TAF, the sponsor's 5-year forecast should be within 10% of the TAF and a 10-year forecast should be within 15% of the TAF."[2] The FAA must approve sponsor forecasts before they can be used to prepare facility requirements in a master plan or before going forward with an environmental document that requires a forecast. If these stated thresholds are exceeded, the FAA Region office in which the airport is located will forward the forecasts to FAA headquarters for approval.

The basis for comparison of forecasts is the FAA TAF 2017 published in January 2018. The FAA TAF compares data on a fiscal year basis, i.e., October 1 of a year through September 30 of the next year. Wherever possible, the Master Plan Update forecasts use the same fiscal year methodology as the FAA TAF for purposes of direct comparison. Data cited identifies whether it is fiscal year data or calendar year.

It should be noted that the preferred Base Case Forecast for SLC tracks closely with the current FAA, TAF 2017 published January 2018.) TABLE 2-1 provides a comparison of the SLC Forecast with the FAA TAF 2017. Commercial operations refer to all scheduled and non-scheduled passenger and air cargo operations. As described in the paragraphs below, the long-term number of commercial operations indicated by TAF 2017 is slightly higher than forecast by the Base Case. This is due to assumptions regarding increasing gauge that results in fewer total operations having greater seating configurations and carrying more passengers. In addition, long-term GA operations are projected to slightly increase over TAF 2017 levels, as a result of anticipated increases in the number of turbojet operations, although, piston operations are forecast to decline.

[1] The Terminal Area Forecast is the official FAA forecast of aviation activity for United States airports.
[2] December 23, 2004, memorandum from the FAA Director, Airport Planning and Programming, entitled Revision to Guidance on Review and Approval of Aviation Forecasts.

Table 2-1: Base Case Forecast Comparison with FAA TAF 2017

	2017		2022		2027		2037	
Category	**Base Case**	**TAF 2017**	**Base Case**	**TAF 2017**	**Base Case**	**TAF 2017**	**Base Case**	**TAF 2017**
Enplanements	11,515,639	11,515,639	14,228,574	13,121,857	15,662,157	14,499,142	18,666,369	17,623,339
Passenger Operations	257,863	277,269	282,077	298,163	309,395	324,653	343,535	388,313
Cargo Operations	19,406		23,122		24,280		31,142	
GA Operations	40,476	40,476	42,825	39,599	45,624	39,899	52,807	40,503
Military Operations	7,348	7,348	7,348	7,348	7,348	7,348	7,348	7,348
Total Operations	325,093	325,093	355,372	345,110	386,647	371,900	434,832	436,164
GA Based Aircraft[1]	290	359	294	387	295	415	303	478
Comparison with FAA TAF 2017 (percent different)								
Enplanements		0.0%		7.8%		7.4%		5.6%
Commercial Operations[2]		0.0%		2.3%		2.7%		-3.6%
GA Operations		0.0%		7.5%		12.5%		23.3%
Military Operations		0.0%		0.0%		0.0%		0.0%
Total Operations		0.0%		2.9%		3.8%		-0.3%
GA Based Aircraft		-23.8%		-31.6%		-40.7%		-57.8%

[1] The discrepancy between the Base Case Forecast and FAA TAF 2017 in GA Based Aircraft is the result of a verified count completed in mid-2018
[2] Commercial Operations are defined as scheduled air carrier passenger and cargo
Source: RS&H, 2018; FAA TAF 2017

2.1.2 SLC Service Area

The SLC service area is defined as the maximum boundary from which Airport customers are anticipated to travel, giving consideration for drive time, cost, and the types of services that are unique to SLC over other airports. Defining the service area plays a major role in the forecast, because it determines the values of the socioeconomic variables that will be used in projecting the Airport's growth.

The drive-time analysis assumes people would drive a maximum distance of approximately 120 minutes to reach SLC, based on the size of SLC and the variety of airport services offered there. As a result, the main population center of Salt Lake City[3] is included in the Salt Lake Metropolitan Statistical Area[4] (MSA) along with three other MSAs that include: Provo-Orem, UT MSA; Ogden-Clearfield, UT MSA; and Logan, UT MSA. It also includes three Micropolitan Statistical Areas[5] (MICRO) s: Heber, UT MICRO; Summit Park, UT MICRO; and Evanston, WY MICRO. The counties that are within these statistical areas are identified as the SLC Service Area and used as some of the socioeconomic data for this forecast. FIGURE 2-1 shows the SLC Service Area.

A consensus regarding the composition of the SLC Service Area was gained during the Master Plan Update Forecast Expert Panel Session held on August 28, 2018. While additional counties in Utah, Idaho, and Wyoming were discussed as potentially being part of the service area, the decision to exclude them from the analysis centered on including only MSAs and MICROs for which there was more complete data and due to the small additional population those other counties would add, which would not significantly affect the forecast.

TABLE 2-2 shows a comparison of key socioeconomic variables for the SLC service area, state of Utah, and the U.S. as a whole.

2.1.2.1 Socioeconomic Analysis

Population, employment, personal income per capita (PIPC), and Gross Regional Product (GRP)[6] are all considered the four key socioeconomic variables, or potential economic drivers for forecasting aviation activity. Therefore they were all analyzed for historical and long term growth projections.

From 1993 to 2017, the SLC service area and the State of Utah aligned very closely in each of the four variables as well as their annual average growth rates (AAGR)s.[7] This was, and still is, due to the populations of the MSAs and MICROs surrounding the Airport representing a high proportion of the state as a whole. In 2017, 87.5% of the state of Utah's population was within the SLC service area.[8]

Over the past 25 years, the SLC service area and state of Utah each had greater AAGRs than the U.S. for all of the socioeconomic variables compared. The SLC service area (2.0% AAGR) and the state of Utah (2.1% AAGR) both had double the rate of population growth that the U.S. (1.0% AAGR) had. While the employment and PIPC also followed similar trends, the PIPC rates of growth were the closest among the four socioeconomic variables with the SLC service area (2.2% AAGR), state of Utah (2.1% AAGR), and U.S. (1.8% AAGR). The GRP was the most noticeably divergent statistic with the SLC service area and the state of Utah (4.4% AAGR) over 1.5% higher than the U.S. (2.7% AAGR). FIGURE 2-2 compares the historical AAGRs for the socioeconomic variables from 1993-2017.

The projected AAGRs of the SLC service area and state of Utah remained similar over the planning horizon indicating the region is an economic core to the state of Utah and surrounding areas. Like the historical growth rates, the SLC service area projections showed AAGR increases in all of the socioeconomic variables over the planning horizon, with GRP being the greatest. The only variable that shows a projected U.S. AAGR surpassing the SLC service area and the state of Utah is PIPC. FIGURE 2-3 compares the projected socioeconomic variables from 2018-2037.

[3] SLC is located approximately five miles due west and slightly north of downtown Salt Lake City, Utah.
[4] Metropolitan Statistical Areas, or MSAs, are defined by having at least one urbanized area of 50,000 or more population, plus adjacent territory that has a high degree of social and economic integration with the core as measured by commuting ties.
[5] Micropolitan Statistical Areas, or MICROs are defined by having at least one urban cluster of at least 10,000 but less than 50,000 population, plus adjacent territory that has a high degree of social and economic integration with the core as measured by commuting ties.
[6] GRP is referred to as Gross Domestic Product (GDP) at the national level.
[7] AAGRs are calculated by taking each percentage of growth for a particular timeframe and averaging them.
[8] Percentage based on Woods and Poole Inc. 2018 population totals for SLC service area counties and the U.S.

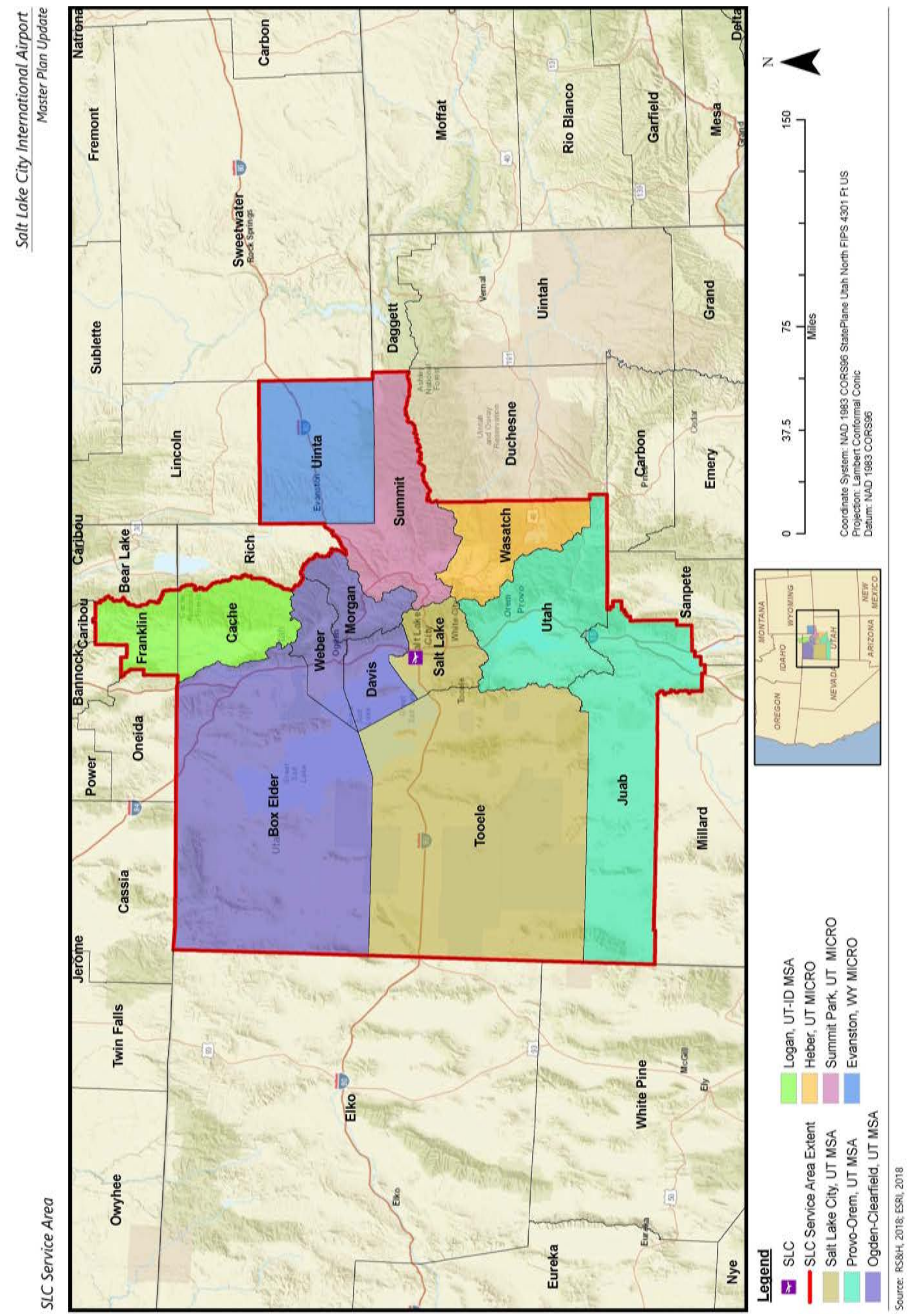


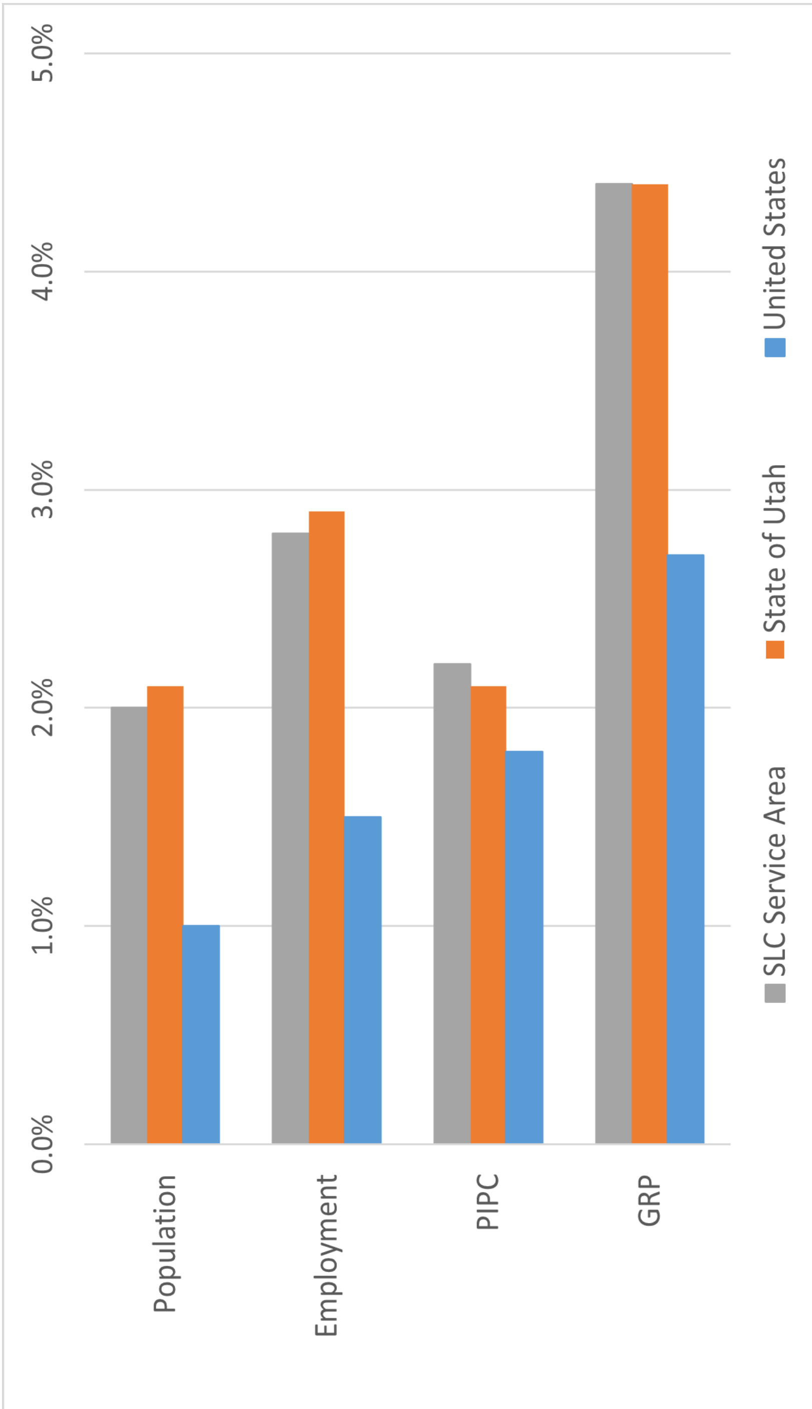
Figure 2-1: SLC Service Area

Table 2-2: Key Socioeconomic Variables Projected (2017-2037)

	2017	2022	2027	2037	2018-2037 AAGR	2029-2038 AAGR
SLC Service Area						
Total Population	2,707,367	2,903,182	3,110,811	3,539,175	1.3%	1.28%
Total Employment	1,773,518	1,944,582	2,103,410	2,406,825	1.5%	1.32%
Personal Income Per Capita	$46,209	$49,135	$51,532	$55,094	0.9%	0.63%
Gross Regional Product (millions)	$158,355	$177,503	$195,862	$233,343	2.0%	1.73%
State of Utah						
Total Population	3,093,435	3,325,603	3,573,578	4,092,861	1.4%	1.35%
Total Employment	1,984,346	2,179,169	2,361,331	2,714,541	1.6%	1.37%
Personal Income Per Capita	$44,506	$47,366	$49,735	$53,269	0.9%	0.65%
Gross Regional Product (millions)	$173,547	$194,551	$214,808	$256,479	2.0%	1.76%
United States						
Total Population	325,888,129	341,327,746	357,430,460	389,046,190	0.9%	0.84%
Total Employment	198,989,688	214,599,006	229,158,435	256,758,953	1.3%	1.12%
Personal Income Per Capita	$53,201	$56,915	$60,250	$65,558	1.0%	0.81%
Gross Regional Product (millions)	$20,189,355	$22,237,573	$24,257,497	$28,406,746	1.7%	1.57%

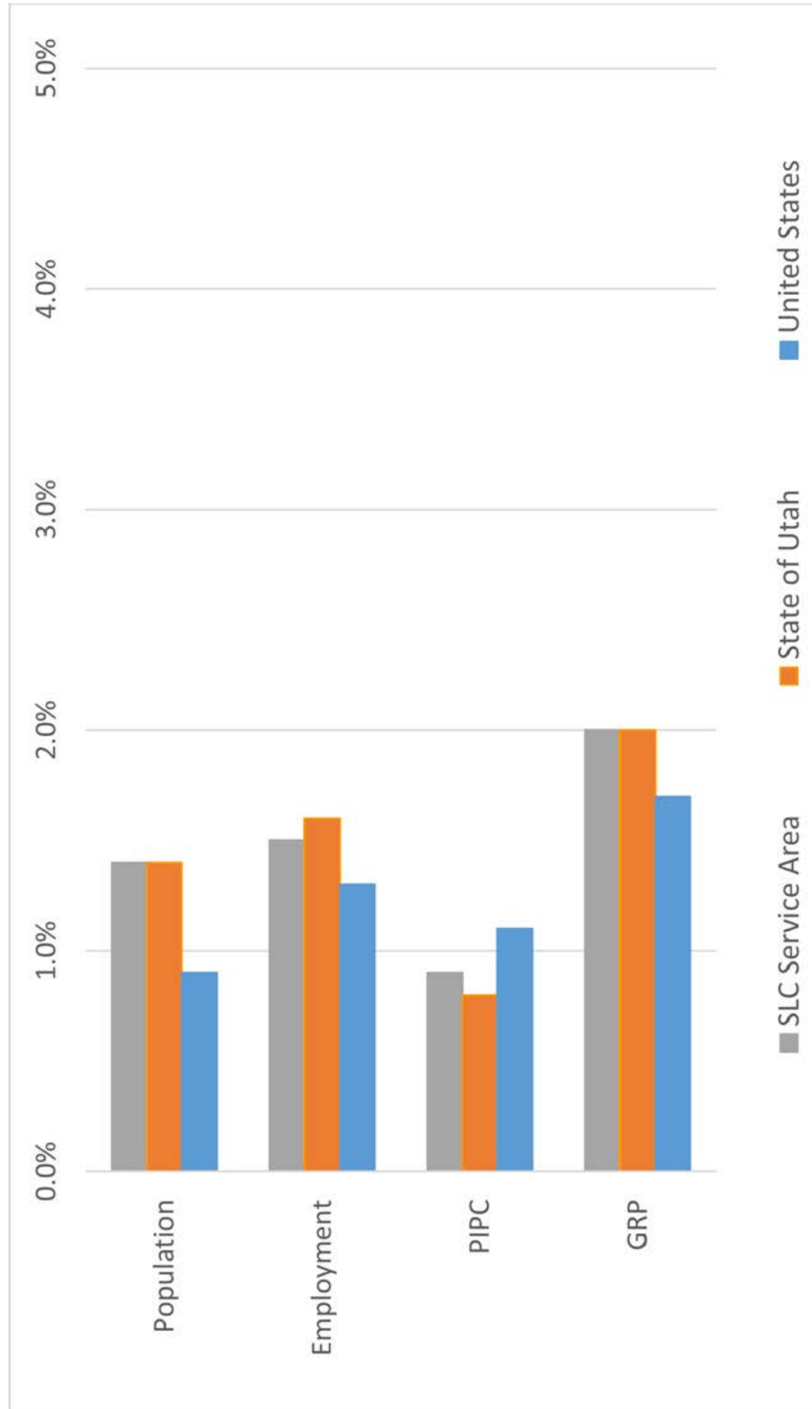
Note AAGRs are rounded to the nearest 0.1%
Source: RS&H, 2018; Woods and Poole Inc, 2018

Figure 2-2: Comparison of Historical Socioeconomic Variables (1993-2017)



Source: RS&H, 2018; Woods and Poole Inc., 2018

Figure 2-3: Comparison of Socioeconomic Variable Projections (2018-2037)



Source: RS&H, 2018; Woods and Poole Inc., 2018

2.1.3 Gross Domestic Product

U.S. GDP is one of the variables that correlates very well with long-term growth and is a factor that is often associated with passenger and cargo forecasts.

Additional research was preformed regarding other historical estimates and future projections of GDP. Data was available from 1980 with projections beyond 2037 from two sources -- Woods & Poole and Global Insight. Woods & Poole was used as the primary indicator of U.S. GDP and SLC GRP forecasts. Global Insight is used by the FAA in its annual Aerospace Forecasts. Another source consulted was GDP forecasts published by the Congressional Budget Office. Their data was available for the period 2013-2028. An international GDP projection of U.S. GDP published by the Organization for Economic Cooperation and Development (OECD) was also consulted. The OECD is a more than 50-year old organization originally established to plan the most efficient way to use U.S. money from the Marshall Plan to rebuild Europe after World War II. That organization publishes U.S. GDP forecasts from 2014 to beyond 2037.

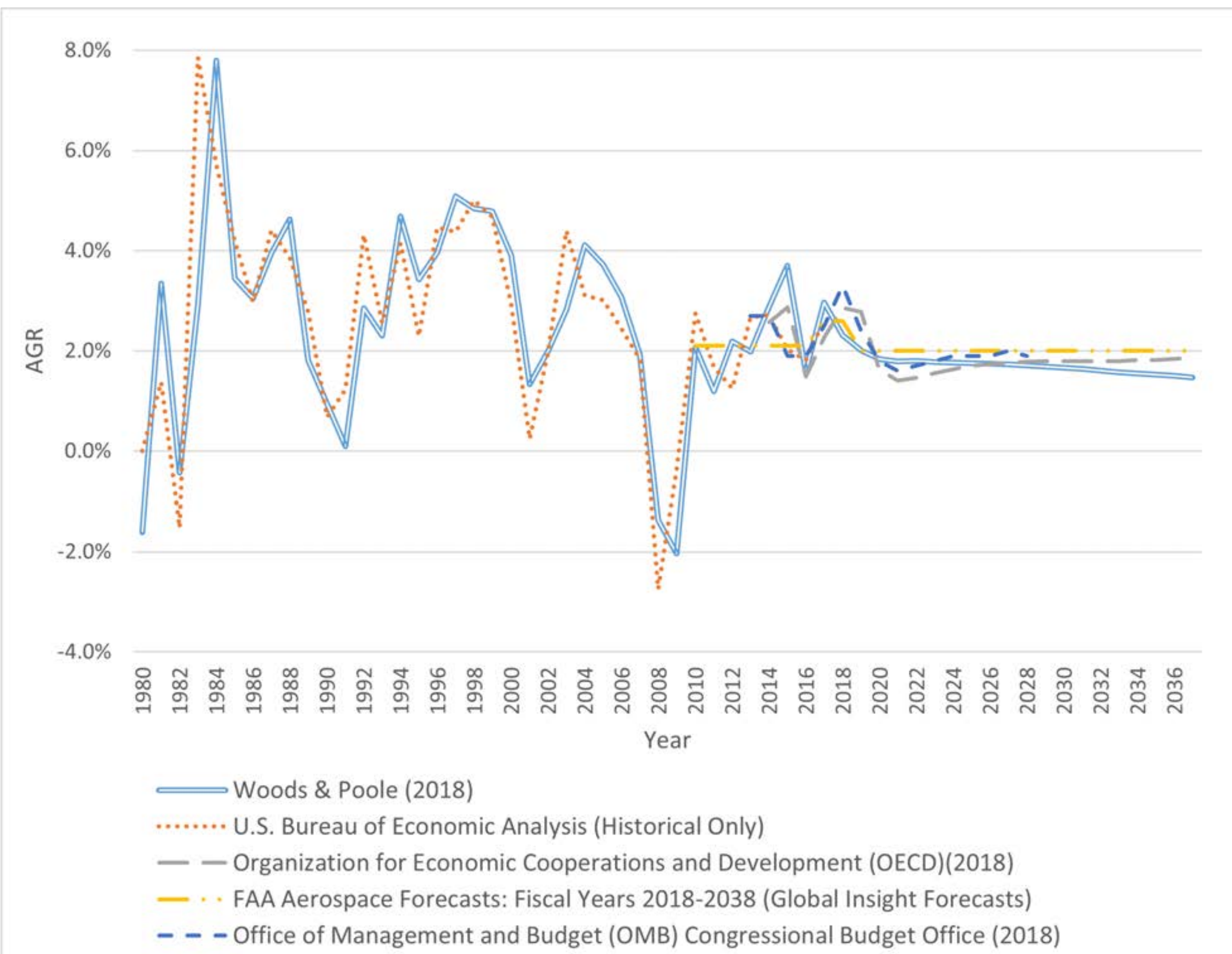
Finally, the U.S. Bureau of Economic Analysis was considered, which provides historical GDP data, going back to 1980.

Other sources, including Barclays and the International Monetary Fund, were also investigated but excluded as a result of limited available data.

FIGURE 2-4 provides a graph of these GDP forecasts. All annual projections show U.S. GDP growth is expected to peak in 2018 and decrease quickly over the next 5 years to 1.8%-1.4%. In particular, the next 5 years appear to be especially slow growth years with only modest increasing forecasts thereafter; nothing approaching the recent period.

- Woods & Poole's projections of GDP are highest in 2018 (2.97%) and decline to 1.8% in five years and continues to decline thereafter to less than 1.5% after 2038.
- Global Insight's peak forecast of GDP over the next 20 years is in 2018 at 2.6% and then declines to 2.0% where it remains constant over to beyond 2037. This forecast is highest over the long term.
- OECD's estimates of GDP growth indicate the next five years as a trough with a low projection of 1.4% in 2021 followed by a slow growth rebound through 2038 at 1.9%.
- The Congressional Budget Office predicts a 3.3% GDP growth rate for 2018 declining in the next five years to 1.6% and leveling off at approximately 1.9% after ten years.

Figure 2-4: Comparison of Gross Domestic Product Forecasts by Various Sources



Source: Woods & Poole, Inc., 2018; U.S. Bureau of Economic Analysis; Organization for Economic Cooperation and Development, 2018; FAA Aerospace Forecast: FY 2018-2038; U.S. Office of Management and Budget, Congressional Budget Office, 2018

2.2 REVIEW OF FORECASTS

This section provides an assessment of key reports and documentation used in preparing SLC aviation activity forecasts.

2.2.1 FAA Aerospace Forecast Fiscal Years 2018-2038

The *FAA Aerospace Forecast for Fiscal Years 2018-2038* projects steady long term growth for revenue passenger enplanements of U.S. commercial air carriers.[9] Revenue passenger enplanements are projected to increase rapidly from FY 2017-2018 for all passenger types with domestic enplanements increasing with an AAGR of 4.7%, international enplanements at an AAGR of 5.0%, and the combined system enplanements at an AAGR of 4.7%. Post-2018 through the end of the planning horizon growth is predicted to level out to an AAGR of 1.7% for domestic, 3.3% AAGR for international, and 1.9% for the system. FIGURE 2-5 shows the projected growth for U.S. domestic, international, and system revenue passenger enplanements over the next 20 years.

2.2.2 Terminal Area Forecast 2017 (Published January, 2018) and Forecast Report

The FAA TAF is the official forecast produced annually by the FAA for U.S. airports. TAF forecasts are prepared to assist in planning efforts and needs of the FAA. Because the TAF is updated annually, a specific forecast may differ from previous years. The TAF is based on the federal fiscal year (FY) which goes from October 1 through September 30, as opposed to calendar year (CY) which begins January 1 and ends December 31. FIGURE 2-6 shows the growth rates per actual year of a selection of TAF forecasts including: preliminary TAF 2018, as well as the current TAF 2017 (which was published in January, 2018), TAF 2016, TAF 2015, TAF 2014, TAF 2010, and TAF 2006.

2.2.3 2019-2023 National Plan of Integrated Airport Systems (NPIAS)

The FAA's National Plan of Integrated Airport Systems (NPIAS) for 2019-2023 identifies the roles for each of the 3,328 airports included within the national airport system, as well as the federal funding each airport is eligible to receive under the Airport Improvement Program (AIP). Each time the NPIAS is updated, all of the NPIAS airports are categorized as either primary or non-primary, based on their enplaned passenger totals. For the evaluation of each airport within the 2019-2023 NPIAS, passenger enplanement totals for CY 2017 were used. Of all NPIAS airports, there were a total of 380 primary airports receiving scheduled service with 10,000 or more enplaned passengers annually, while there were 2,941 non-primary airports that received less than 10,000 enplaned passengers. Salt Lake City International Airport is a primary airport, since it does enplane more than 10,000 passengers.

Each primary airport is then further classified as a large hub, medium hub, small hub, or non-hub airport based on the percentage of total U.S. enplanements it handles. In the 2019-2023 NPIAS, there were 30 large hub airports each accounting for 1 percent or more of the U.S. total, 31 medium hub airports each accounting for 0.25 to 1 percent of the U.S. total, 72 small hub airports each accounting for 0.05 to 0.25 percent of the U.S. total, and 249 non-hub airports each accounting for less than 0.05 percent of the U.S. total, but still receiving more than 10,000 enplanements annually. Based on SLC's passenger enplanement total of 11,143,738, it accounts for 1.3% of the U.S. total, ranking as the 24th busiest U.S. airport in terms of passenger enplanements in the 2019-2023 NPIAS Report. FIGURE 2-7 shows a comparison of large hub airports in the 2019-2023 NPIAS, with SLC identified in green.

2.2.4 2006 Salt Lake City International Airport Layout Plan Update

The 2006 Salt Lake City International Airport Layout Plan Update produced optimistic and conservative scenario forecasts for enplanement growth through 2025. FIGURE 2-8 shows the two scenarios and compares them to the actual enplanement growth of the Airport through 2017. The conservative scenario forecast aligned closely with the actual enplanement growth through 2010. It should be noted that decline in actual activity was significantly influenced by the 2008 national economic crisis which affected the entire aviation industry.

2.2.5 Utah Continuous Airport System Plan

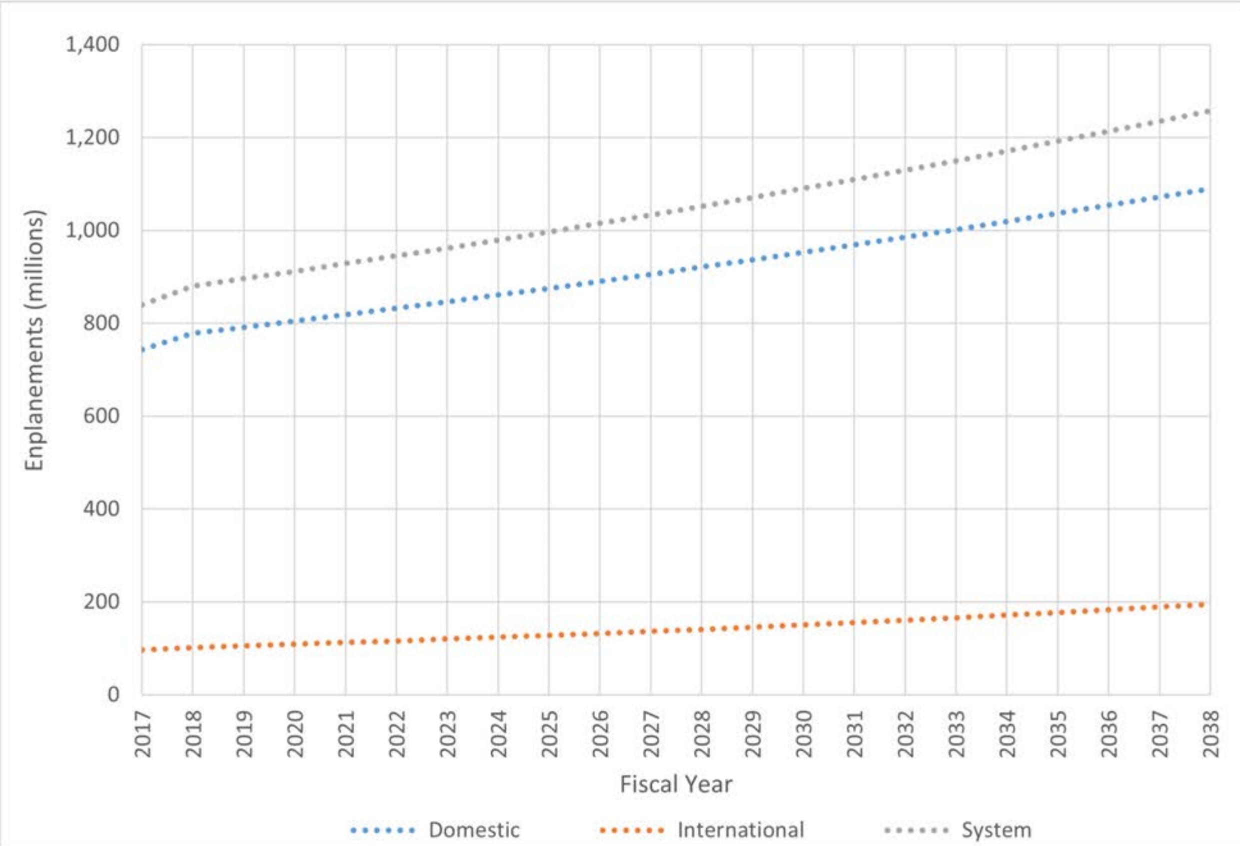
The 2007 Utah Continuous Airport System Plan (UCASP) identifies SLC as the sole international airport in the state of Utah, providing essential national and international commercial airline service. The last UCASP update in 2007 forecast an AAGR of 0.9% for commercial operations, and 1.2% for total passenger enplanements through 2026. FIGURE 2-9 shows the projected enplanements and commercial operations for SLC through 2026, as well as the actual totals during that timeframe. As with the forecast of enplanements, actual activity was negatively impacted by the 2008 national economic crisis.

The 2007 UCASP also recognized multiple factors that could influence aviation demand in Utah including:

- Transportation improvements
- Tourism
- Oil/Gas
- Retirements/Second homes
- Population growth
- Employment growth

[9] Includes both mainline and regional air carriers.

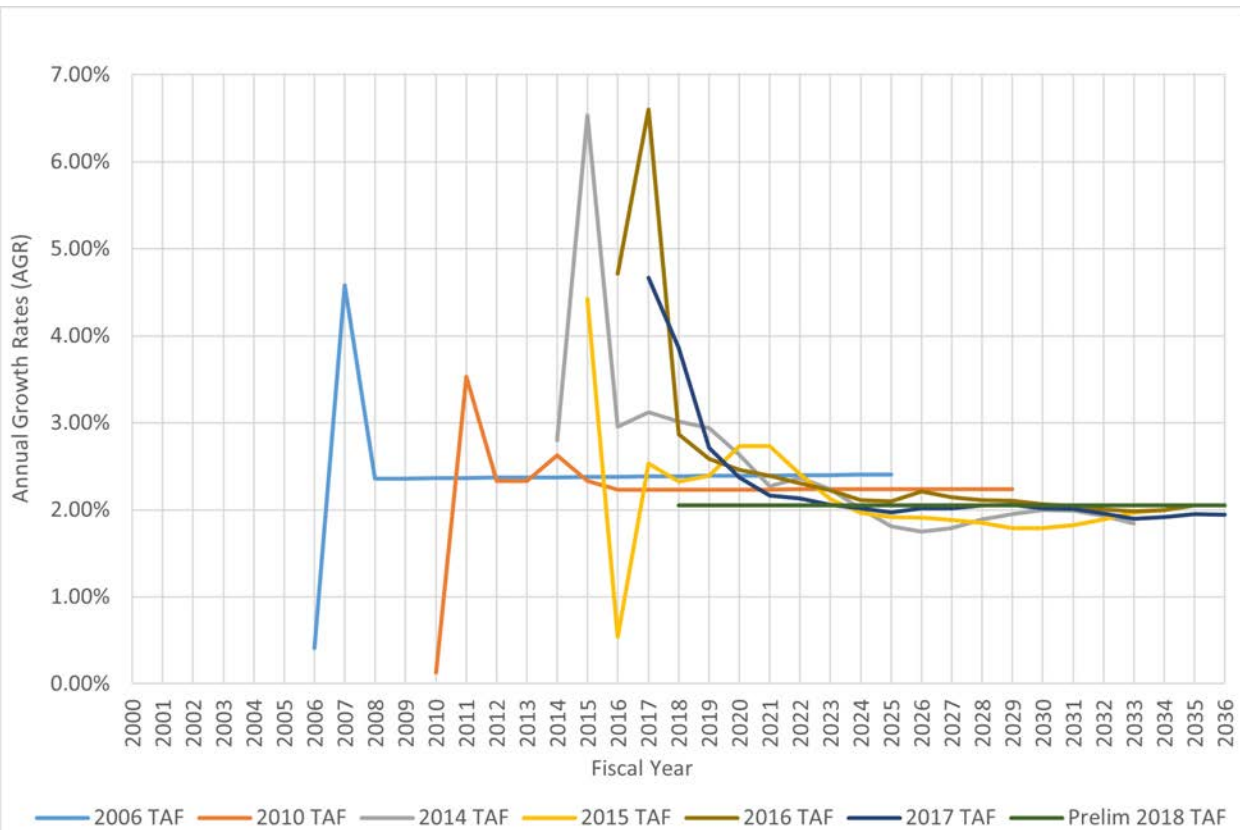
Figure 2-5: Projected Revenue Passenger Enplanements for U.S. Commercial Air Carriers (2017-2038)



Note: Totals represent the sum of U.S. Mainline and Regional Air Carriers; Totals are interpolated and rounded using the AAGRs from 2017-2018 and 2018-2038 U.S. Mainline Air Carriers Scheduled Passenger Traffic Table (Table 5)

Source: FAA Aerospace Forecasts Fiscal Years 2018-2038; RS&H, 2018

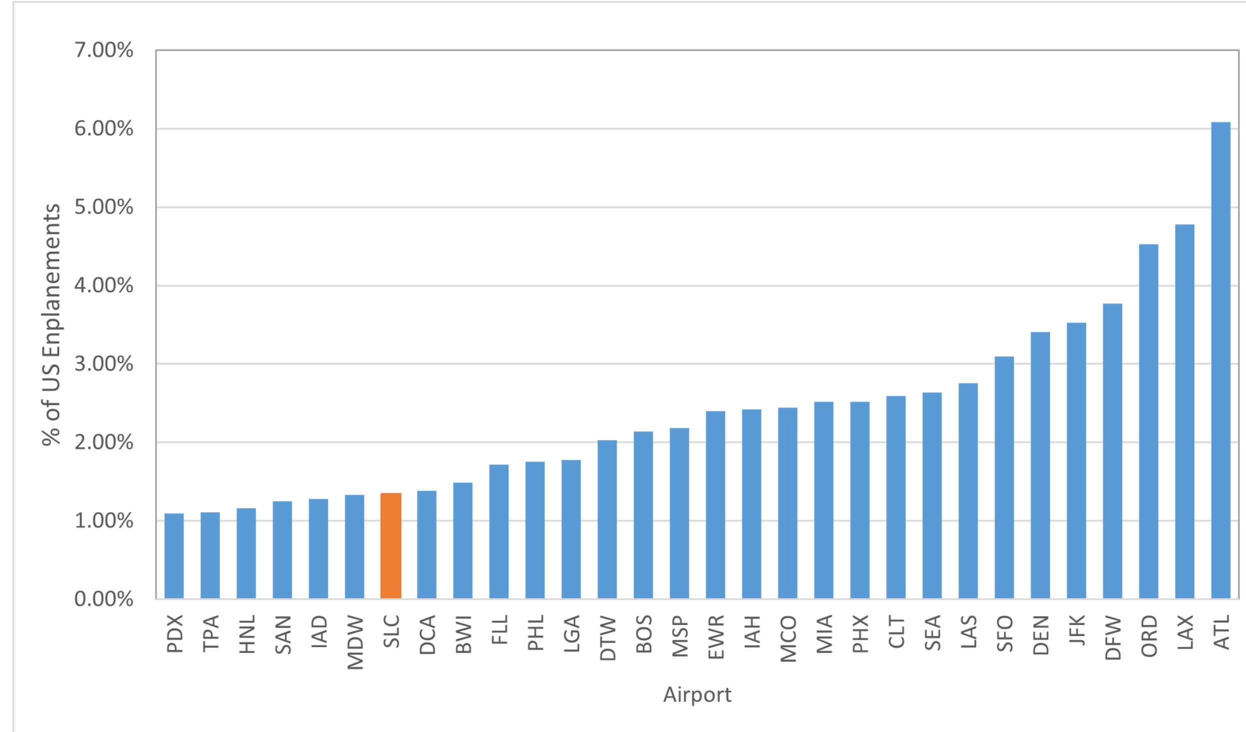
Figure 2-6: Recent TAF Forecast Growth Rates for SLC



Note: Growth rates are per actual year of forecast

Source: FAA TAF 2006; FAA TAF 2010: FAA TAF 2014; FAA TAF 2015; FAA TAF 2016; FAA TAF 2017; Preliminary FAA TAF 2018

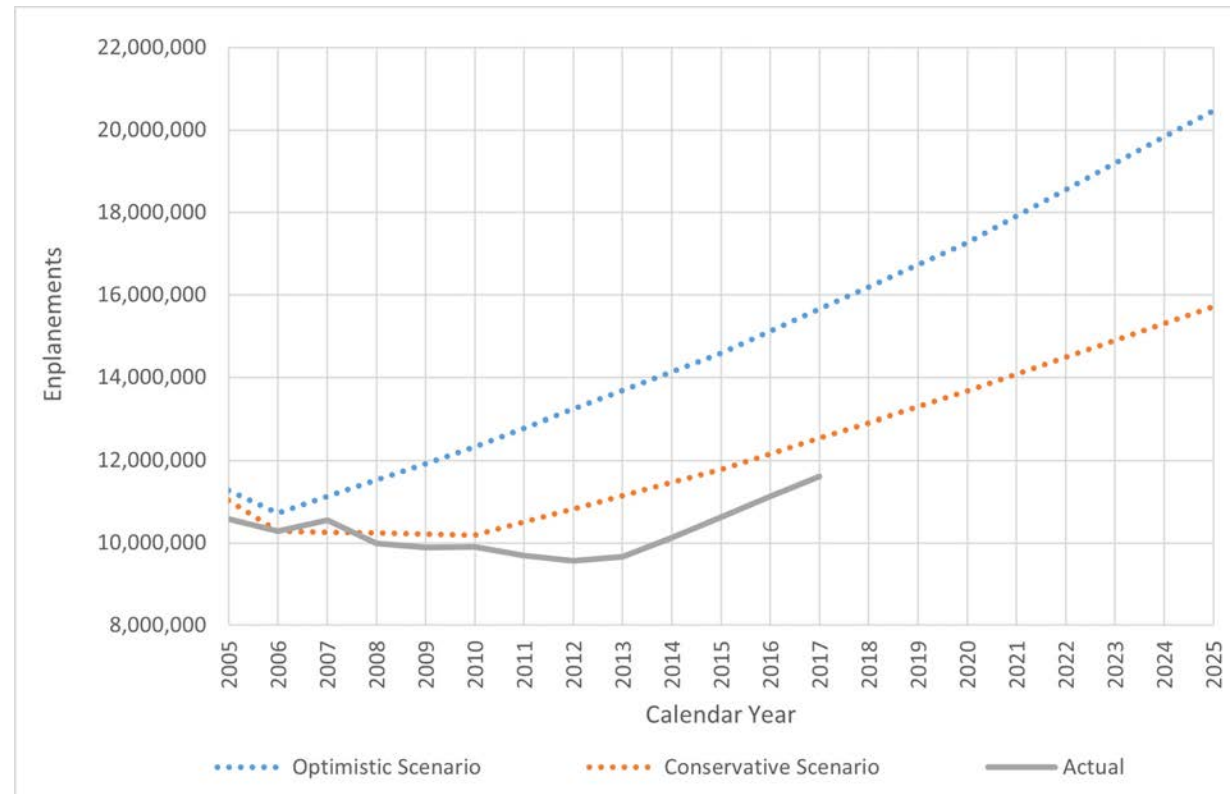
Figure 2-7: Comparison of NPIAS Large Hub Airports



Note: Based on Calendar Year 2017 enplanement totals

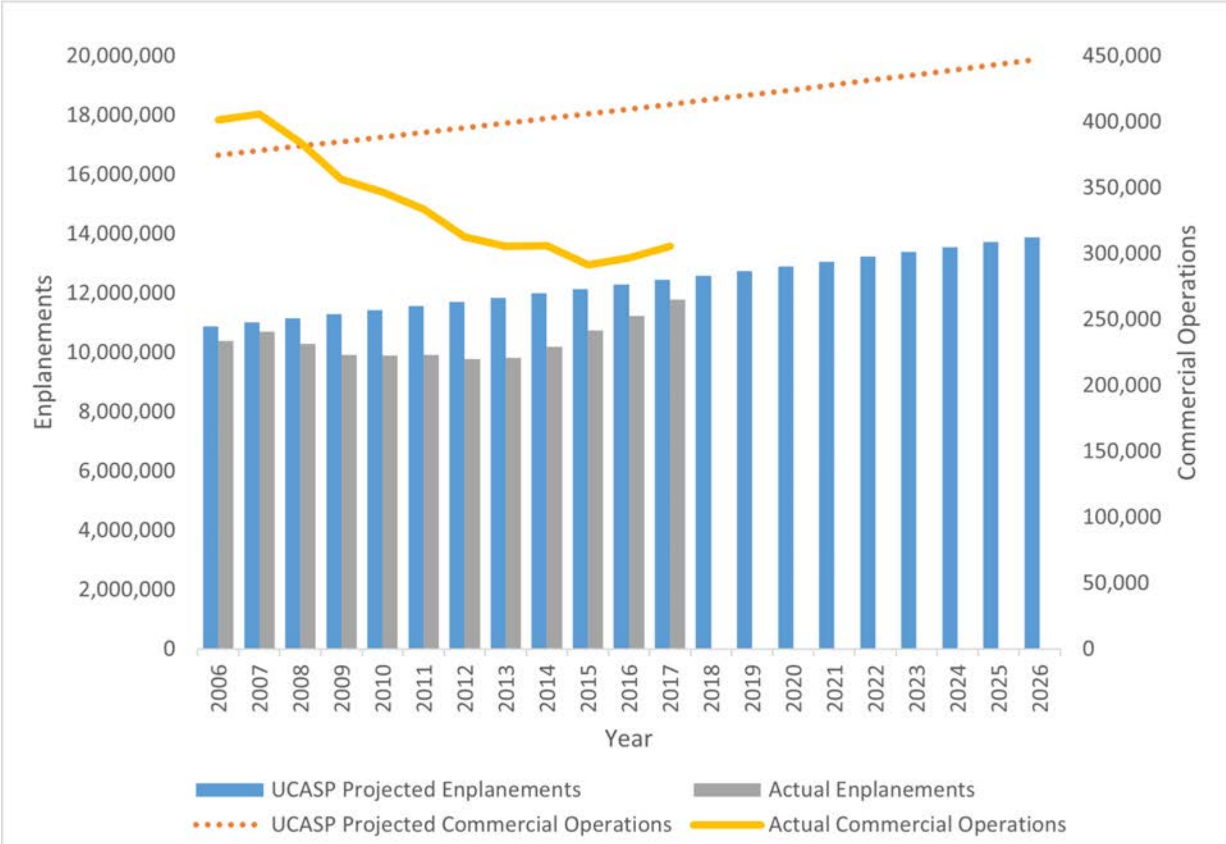
Source: RS&H, 2018; NPIAS, 2019-2023

Figure 2-8: Optimistic and Conservative Scenarios (2006 SLC Airport Layout Plan Update)



Source: SLC Master Plan Update, 2006

Figure 2-9: 2007 UCASP Forecast for Commerical Operations and Enplanements in Utah



Note: Values are interpolated and rounded using the UCASP AAGR for commercial operations (0.89%) and enplanements (1.23%)
Source: RS&H, 2018; UCASP Executive Summary, 2007; FAA TAF, 2017 (State of Utah Summary)

2.2.6 Expert Panel

The SLCDA established a committee composed of technical persons knowledgeable of aviation industry trends to critique the draft forecast prepared for the Airport. This committee, or Expert Panel, included individuals representing the FAA, Utah Division of Aeronautics, airlines interests including Delta, Economic Development Corporation of Utah, Utah Governor's Office of Economic Development, and executive SLCDA Staff. An Expert Panel meeting was held on August 28, 2018. The consultant provided a presentation of historical Airport, airline, passenger, cargo, general aviation, and military trends as well as the input that would be used in developing a base case passenger enplanement forecast and derivative forecasts of lower and higher scenarios.

Numerous comments were provided by the Expert Panel members to help guide forecast development. Comments received from the panel included:

- SkyWest enplanement shares should be broken down by affiliated mainline carriers (American, Alaska, Delta, and United) and separate from SkyWest only operations
- Discussion of future growth in domestic and international markets and the aircraft that would serve them was provided
- Consensus was reached that SLC anticipated growth of four percent would be achieved over the next four-to-five years
- The general forecast methodology is sound and the macro/micro areas considered to be representative of the SLC Market Service Area is appropriate
- Utah population growth is quite different than much of the US total population
- Commenting about the uniqueness of SLC traffic patterns showing upgauging to support west coast airports and the paradigm shifts effects on near term growth
- General trends that will likely result in only having 20 to 30 Regional Jet operations per day by 2030 having seats of 60 or fewer passengers
- Acknowledging the benefits of the new airport terminal, its favorable cost model, and the competitive advantage it gives SLC over competitive airports like Denver International Airport (DEN), Phoenix Sky Harbor International Airport (PHX), and Dallas-Fort Worth International Airport (DFW).

2.2.7 Passenger Aircraft Fleet Mix-Baseline 2017

The passenger aircraft[10] fleet mix baseline list identifies the most commonly used passenger aircraft[11] at SLC for 2017. Further details on the number of operations of each aircraft compared to the passenger aircraft operations as a whole can be found in Appendix C.

Airbus
- Airbus 319-100
- Airbus 320-200
- Airbus 321-200
- Airbus 300-600
- Airbus 330-200, -300

Boeing
- Boeing 717-200
- Boeing 737-700, -800, -900
- Boeing 757-200
- Boeing 767-300
- Boeing 787-900

Bombardier
- Bombardier CRJ 200
- Bombardier CRJ 700
- Bombardier CRJ 900
- Bombardier Dash 8 (Q400)

Embraer
- Embraer 170
- Embraer 175-L, -S

McDonnell-Douglas (Boeing)
- McDonnell Douglas MD-90
- McDonnell Douglas DC-10
- McDonnell Douglas MD-11

[10] For this forecast, the term "passenger aircraft" or "passenger operations" refers to the sum of total of air carrier and air taxi & commuter aircraft types operating out of SLC.
[11] "Most commonly used passenger aircraft" refers to those aircraft with at least 1,000 operations in FY 2017, however this list it is not meant to limit or omit any the other passenger aircraft fleet used out of SLC.

2.3 HISTORICAL OPERATIONS

2.3.1 Historical Total Operations

Over the past 15 years, the total operations from SLC have decreased by over 75,000. During that time the largest contributors to the decline were decreases in air taxi & commuter (-5.1% AAGR)[12]; this category includes commuter jets having fewer than 60 seats, e.g., CRJ-200. General Aviation (GA) operations (-4.1% AAGR) reflects declining piston engine operations. In contrast, air carrier[13] operations (2.4% AAGR) increased from 146,598 to 209,203 during those 15 years to offset some of the decline. FIGURE 2-10 shows the historical distribution of total airport operations from 2003-2017.

2.3.2 Historical Passenger Operations

In 2003, the distribution of passenger operations[14] by type as indicated in the FAA TAF was nearly an even split, with air taxi & commuter representing 52.5%, and air carrier representing 47.5% of the total. Since that time, air carrier activity increased from 146,598 to 209,203 flights, representing 75.5% of total passenger share; and air taxi & commuter decreased from 164,914 to 68,066, representing a 24.5% share of passenger operations. This shift in operations is largely due to evolving airline business strategies in which high frequency routes currently served by small aircraft are being served by larger aircraft flying less often. FIGURE 2-11 shows the historical distribution of passenger operations from 2003-2017.

2.3.3 Historical General Aviation Operations

Itinerant GA operations predominate over local operations at SLC. Historically from 2003-2017, the itinerant GA operations have averaged 93% of all GA operations annually. FIGURE 2-12 shows the historical distribution of operations from 2003-2017.

2.3.4 Historical Military Operations

Historical military operations provide a view of how active military aircraft operate out of SLC. Much like GA, the historical military operations are very much one sided with the majority of operations being itinerant. Over the past 15 years, itinerant military operations have never represented less than 98.2% of military operations. The total military operations have decreased from 9,020 in 2003, to 7,348 in 2017. FIGURE 2-13 shows the historical distribution of total military operations from 2003-2017.

2.3.5 Detail 2017 Fleet Mix

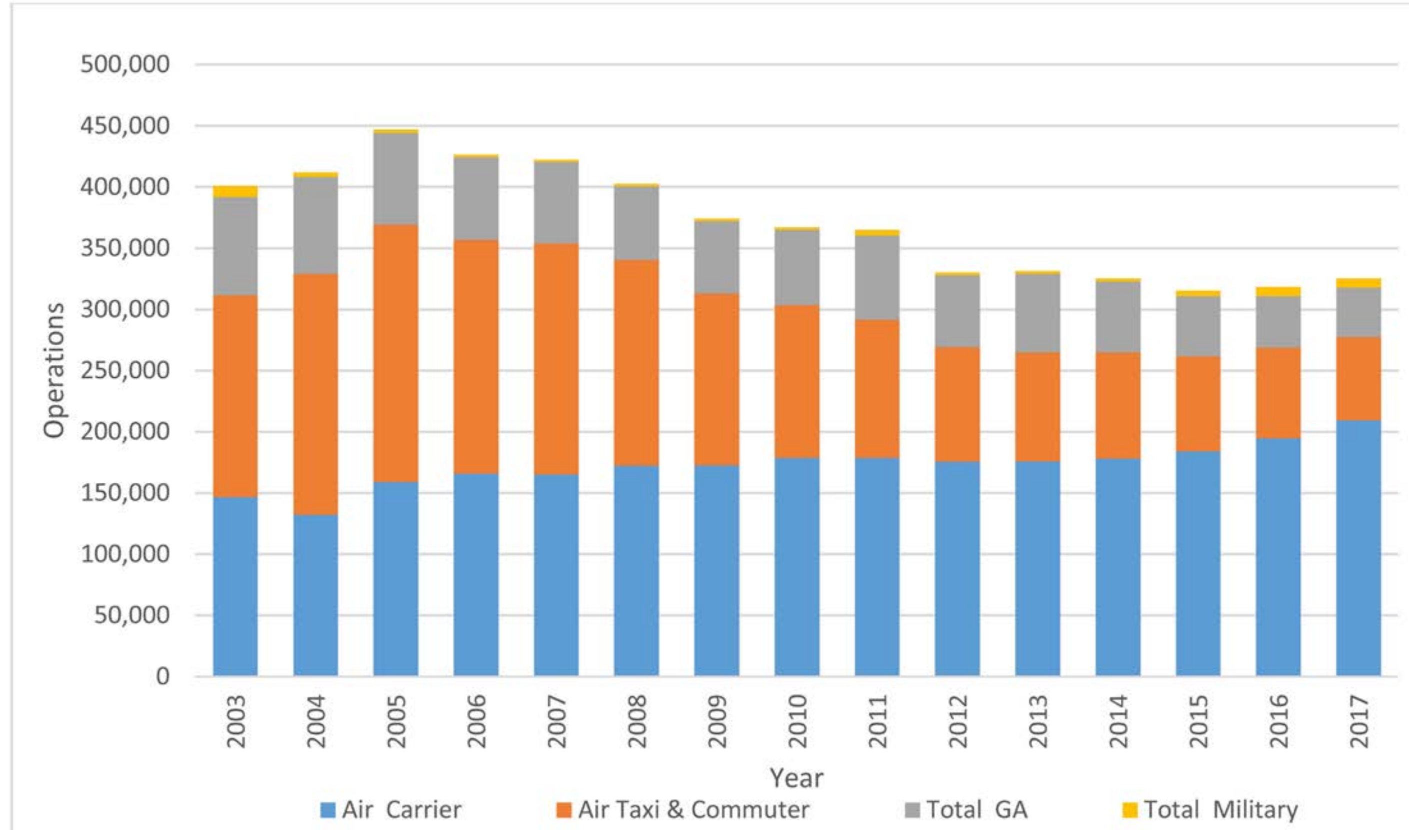
Appendix C provides a detail listing of the aircraft model types that operated at SLC in 2017. This data was derived from the FAA's National Offload Program (NOP) for aircraft activity and comprises 91% of all operations. It, however, does not include military or helicopter operations. Appendix C included military and helicopter operations as a result of coordinating with the FAA Airport Traffic Control Tower (ATCT) and Fixed Base Operators (FBOs). The 325,093 operations represented in this table is the same as the FAA TAF 2017 number of operations for SLC.

[12] Air taxi and commuter operations are those with less than 60 passenger seats or a cargo payload of less than 18,000 pounds. These can include aircraft such as the Embraer 120 or Cessna 208.
[13] Includes air cargo operations.
[14] For this forecast, passenger operations refer to the combined total of air carrier and air taxi & commuter operations.

Figure 2-10: Historical Total Operations (2003-2017)

FY	Total Operations	Air Carrier	Air Taxi & Commuter	Total GA	Total Military
2003	400,700	146,598	164,914	80,168	9,020
2004	411,785	132,072	197,093	79,122	3,498
2005	446,926	158,880	210,342	74,944	2,760
2006	426,350	165,632	191,068	67,611	2,039
2007	422,297	165,306	188,429	66,642	1,920
2008	402,424	172,208	168,106	60,029	2,081
2009	374,004	172,481	140,470	58,955	2,098
2010	366,785	178,513	125,074	61,085	2,113
2011	364,839	178,563	113,077	68,570	4,629
2012	330,023	175,449	93,681	58,649	2,244
2013	331,008	175,921	88,915	64,097	2,075
2014	325,115	178,093	86,586	58,243	2,193
2015	315,338	184,011	77,652	49,249	4,426
2016	318,284	194,767	73,990	42,118	7,410
2017	325,093	209,203	68,066	40,476	7,348
Average Annual Growth Rate (AAGR)					
2003 - 2017	-1.3%	2.4%	-5.1%	-4.1%	7.7%

Source: FAA TAF 2017, Published January, 2018

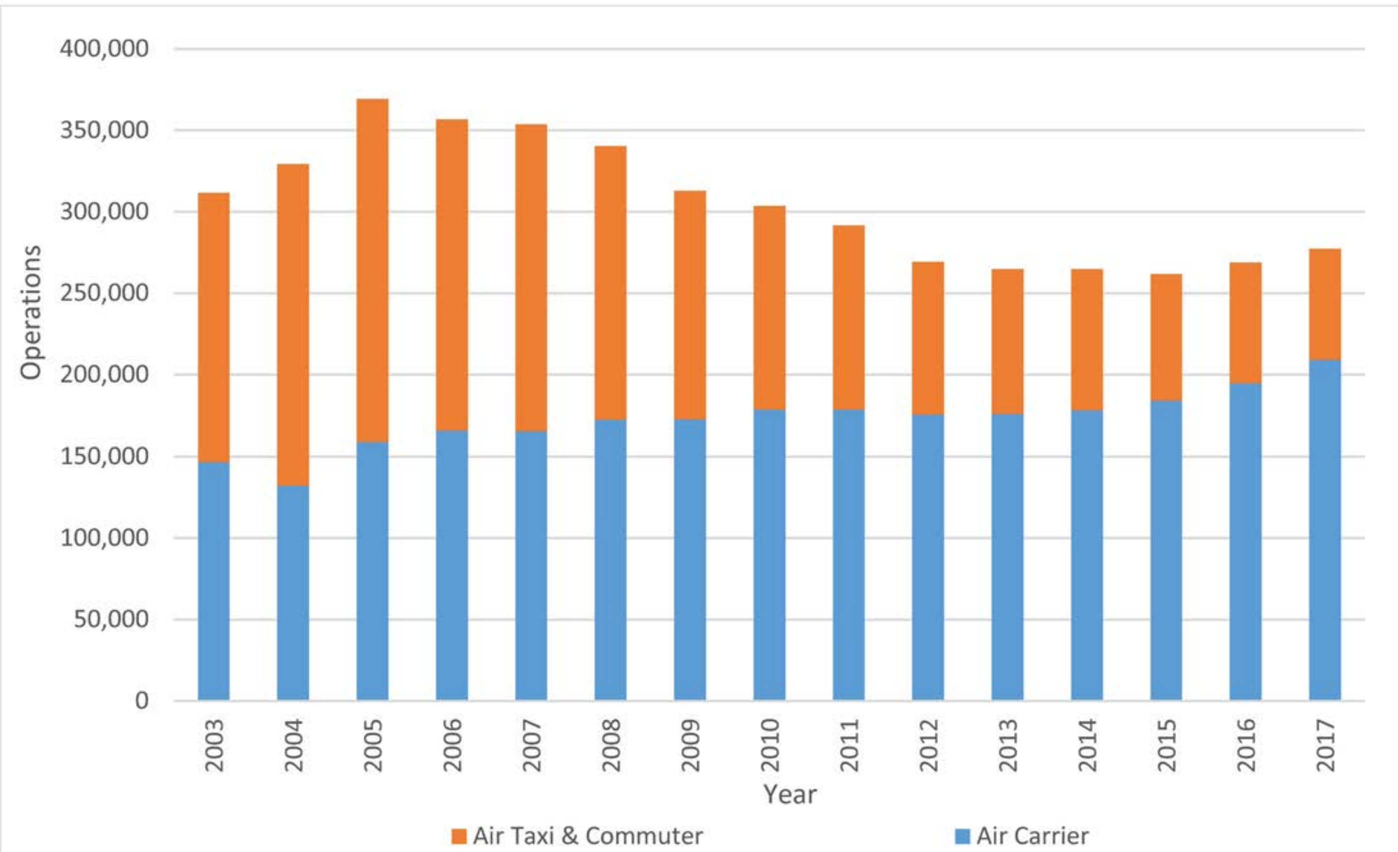


Source: FAA TAF 2017, Published January, 2018

Figure 2-11: Historical Passenger Operations (2003-2017)

FY	Total	Air Carrier	% Share	Air Taxi & Commuter	% Share
2003	311,512	146,598	47.1%	164,914	52.9%
2004	329,165	132,072	40.1%	197,093	59.9%
2005	369,222	158,880	43.0%	210,342	57.0%
2006	356,700	165,632	46.4%	191,068	53.6%
2007	353,735	165,306	46.7%	188,429	53.3%
2008	340,314	172,208	50.6%	168,106	49.4%
2009	312,951	172,481	55.1%	140,470	44.9%
2010	303,587	178,513	58.8%	125,074	41.2%
2011	291,640	178,563	61.2%	113,077	38.8%
2012	269,130	175,449	65.2%	93,681	34.8%
2013	264,836	175,921	66.4%	88,915	33.6%
2014	264,679	178,093	67.3%	86,586	32.7%
2015	261,663	184,011	70.3%	77,652	29.7%
2016	268,757	194,767	72.5%	73,990	27.5%
2017	277,269	209,203	75.5%	68,066	24.5%

Source: FAA TAF 2017, Published January, 2018

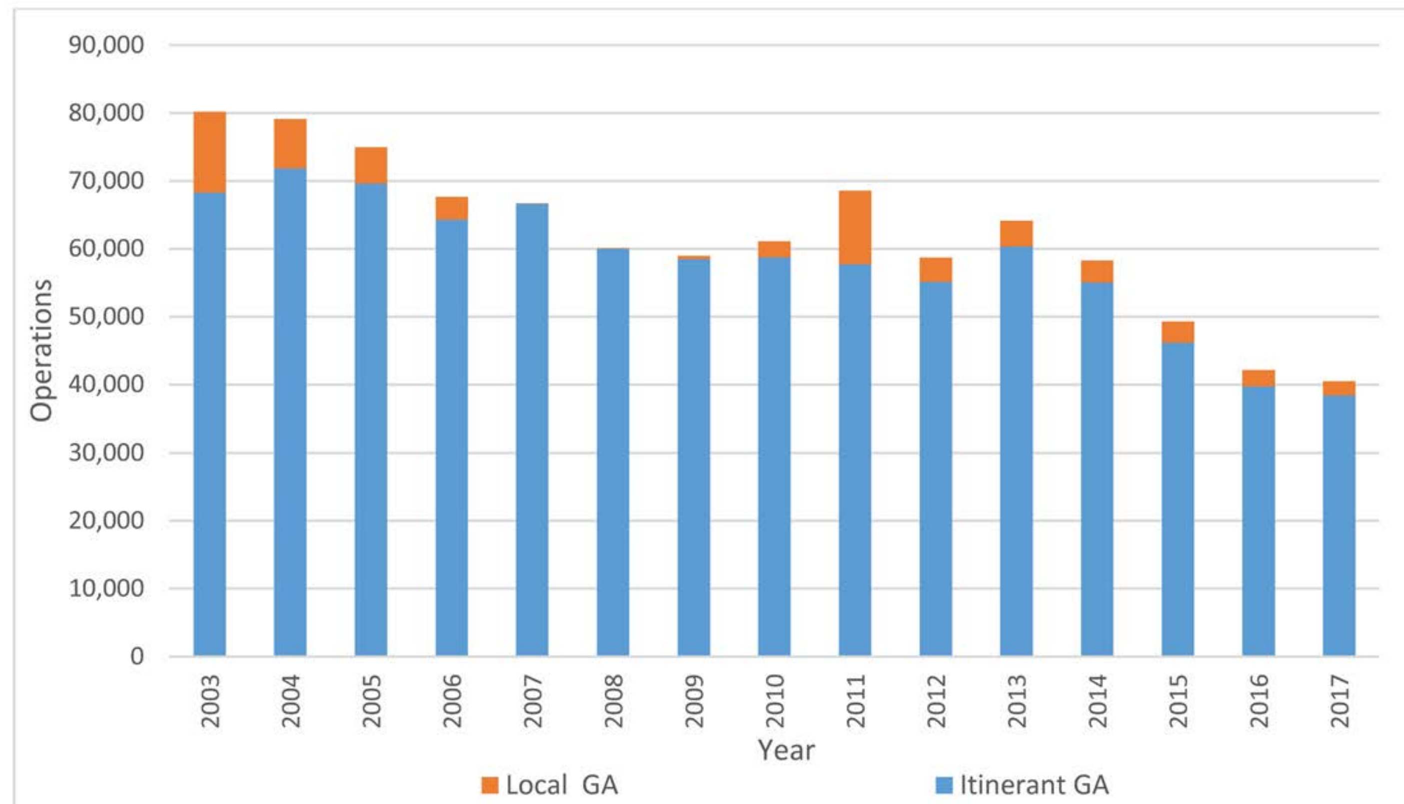


Source: FAA TAF 2017, Published January, 2018

Figure 2-12: Historical General Aviation Operations (2003-2017)

FY	Total GA	Itinerant GA	% Share	Local Civil*	% Share
2003	80,168	68,282	85.2%	11,866	14.8%
2004	79,122	71,879	90.8%	7,243	9.2%
2005	74,944	69,617	92.9%	5,327	7.1%
2006	67,611	64,267	95.1%	3,344	4.9%
2007	66,642	66,633	>99.9%	9	<0.1%
2008	60,029	60,027	>99.9%	2	<0.1%
2009	58,955	58,444	99.1%	511	0.9%
2010	61,085	58,700	96.1%	2,385	3.9%
2011	68,570	57,701	84.1%	10,869	15.9%
2012	58,649	55,118	94.0%	3,531	6.0%
2013	64,097	60,346	94.1%	3,751	5.9%
2014	58,243	55,022	94.5%	3,221	5.5%
2015	49,249	46,180	93.8%	3,069	6.2%
2016	42,118	39,710	94.3%	2,408	5.7%
2017	40,476	38,372	94.8%	2,104	5.2%

Note: *Local Civil Operations refers to Local GA operations in the FAA TAF
Source: FAA TAF 2017, Published January, 2018

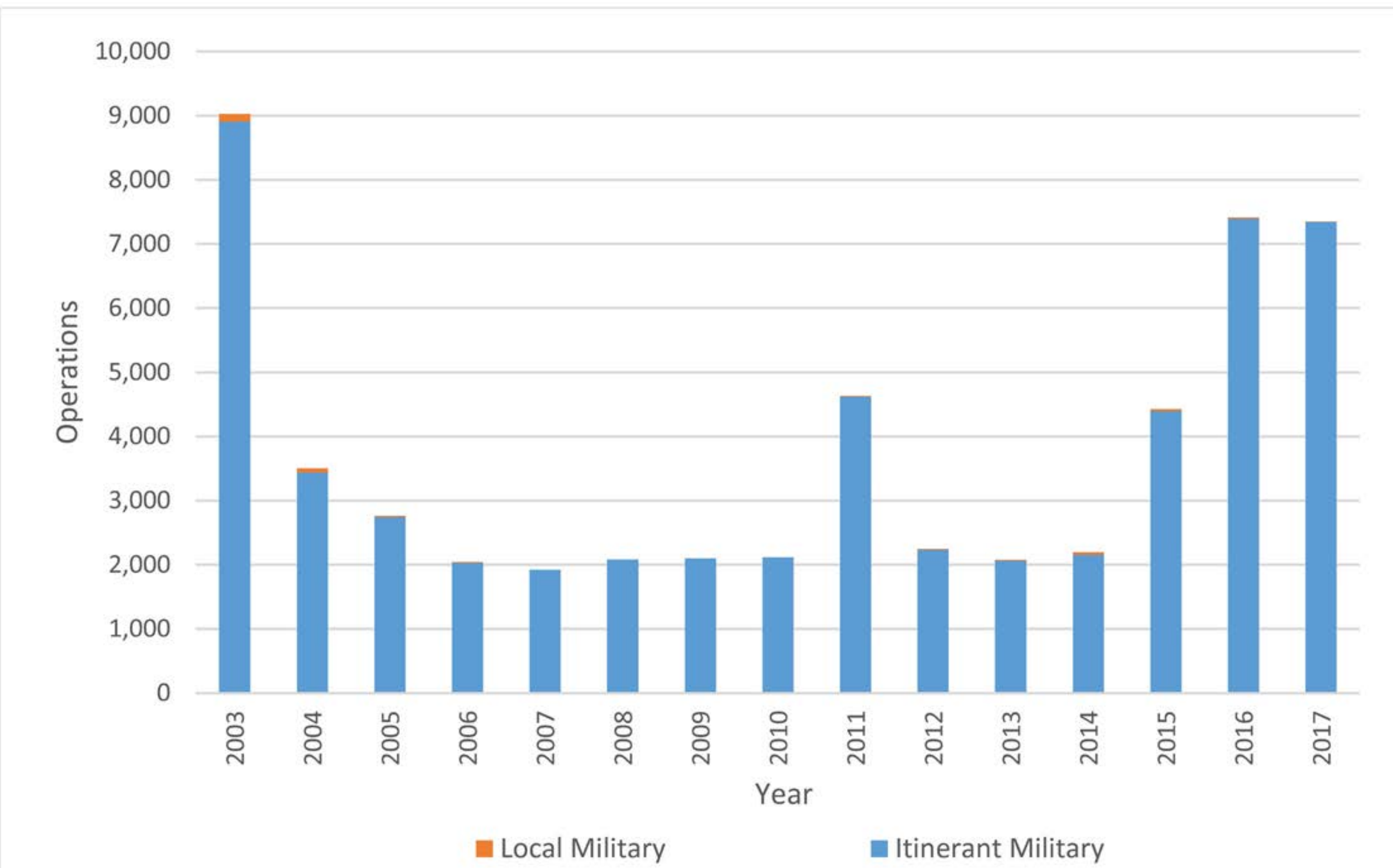


Source: FAA TAF 2017, Published January, 2018

Figure 2-13: Historical Military Operations (2003-2017)

FY	Total Military	Itinerant Military	% Share	Local Military	% Share
2003	9,020	8,910	98.8%	110	1.2%
2004	3,498	3,437	98.3%	61	1.7%
2005	2,760	2,744	99.4%	16	0.6%
2006	2,039	2,027	99.4%	12	0.0%
2007	1,920	1,920	100.0%	0	0.0%
2008	2,081	2,081	100.0%	0	0.0%
2009	2,098	2,098	100.0%	0	0.0%
2010	2,113	2,113	100.0%	0	0.0%
2011	4,629	4,620	99.8%	9	0.2%
2012	2,244	2,234	99.6%	10	0.4%
2013	2,075	2,061	99.3%	14	0.7%
2014	2,193	2,153	98.2%	40	1.8%
2015	4,426	4,396	99.3%	30	0.7%
2016	7,410	7,392	99.8%	18	0.2%
2017*	7,348	7,342	99.9%	6	0.1%

Source: FAA TAF 2017, Published January, 2018



Source: FAA TAF 2017, Published January, 2018

2.4 PASSENGER ENPLANEMENTS

2.4.1 Historical Enplanements

According to the historical data from the FAA TAF 2017, annual[15] enplanements[16] at SLC have increased by over 4 million from FY 1993-2017. During that time both air carrier and commuter[17] enplanements increased by over 2 million. The proportion of enplanements served by each airline type has also changed, as commuter airlines served only 3.8% of the Airport's total enplanements in 1993, and in 2017 they served 22.9%. TABLE 2-3 and FIGURE 2-14 show the historical enplanements by type from 1993-2017.

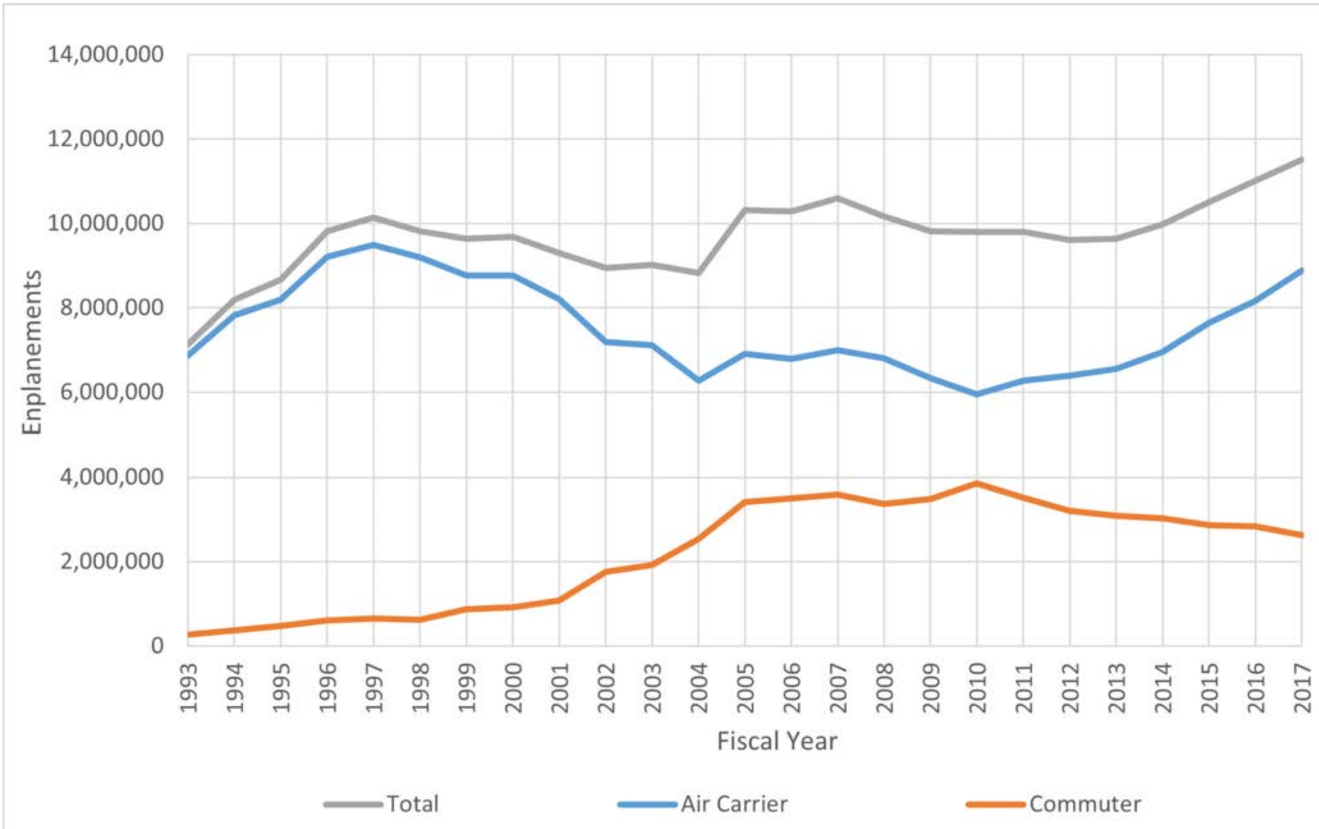
Table 2-3: Historical Enplanements by Type (1993-2017)

	Enplanements		
FY	Air Carrier	Commuter	Total
1993	6,855,872	269,203	7,125,075
1994	7,825,735	364,279	8,190,014
1995	8,192,501	469,625	8,662,126
1996	9,203,501	469,625	8,662,126
1997	9,495,786	649,333	10,145,119
1998	9,192,805	615,431	9,808,236
1999	8,770,603	866,780	9,637,383
2000	8,760,945	917,629	9,678,574
2001	8,206,164	1,084,526	9,290,690
2002	7,189,655	1,756,937	8,946,592
2003	7,107,602	1,913,721	9,021,323
2004	6,278,603	2,545,231	8,823,834
2005	6,899,968	3,414,855	10,314,823
2006	6,783,300	3,503,255	10,286,555
2007	7,001,699	3,590,981	10,592,680
2008	6,809,752	3,361,871	10,171,623
2009	6,324,440	3,489,027	9,813,467
2010	5,945,758	3,845,991	9,791,749
2011	6,276,982	3,519,577	9,796,559
2012	6,394,392	3,209,108	9,603,500
2013	6,549,622	3,088,372	9,637,994
2014	6,958,146	3,021,896	9,980,042
2015	7,647,018	2,862,209	10,509,227
2016	8,161,829	2,840,040	11,001,869
2017	8,880,620	2,635,019	11,515,639
Average Annual Growth Rate (AAGR)			
1993 - 2017	1.9%	11.3%	2.7%

Source: FAA TAF 2017, Published January, 2018

[15] Unless otherwise identified, all references to "annual" refers to the federal fiscal year, October 1-September 30.
[16] An enplanement is count of an individual who boards a passenger aircraft
[17] The definition of commuter refers to a passenger aircraft having fewer than 60 seats.

Figure 2-14: Historical Enplanement Breakdown (1993-2017)



Source: FAA TAF 2017, Published January, 2018

2.4.1.1 Origination & Destination and Connecting Enplanements.

Enplanements can be classified by passenger types, in reference to the Airport's role within their itinerary. These passenger types include origin & destination (O&D) and connecting enplanements.

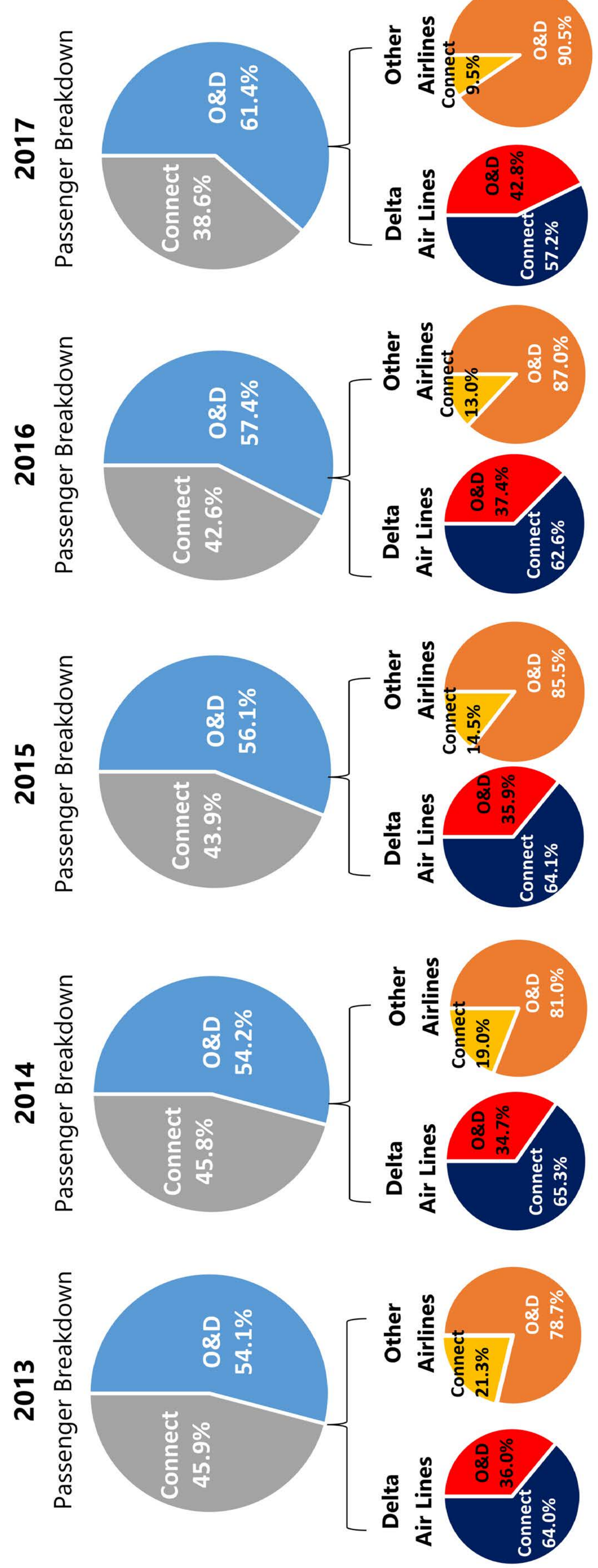
O&D enplanements represent the passengers that enplane/deplane a commercial aircraft beginning or ending their itinerary at SLC. These passengers may travel nonstop, or connect at other airports domestically and internationally before reaching their final destination. Meanwhile, connecting passengers begin their itinerary at a different airport, and connect in SLC and possibly other airports before reaching their final destination. As a connecting airport, SLC acts as a middle segment to a passenger's trip. Enplanement type distribution ratios are essential, because they provide valuable information to determine the facilities that will be necessary to accommodate the needs of each enplanement type. TABLE 2-4 shows a historical summary of the total enplanements, and ratios of O&D and connecting enplanements from 1993-2017.

Historically, the Airport has fluctuated around the 50% mark for both O&D and connecting enplanements. More recently, the trend has seen O&D enplanements increasing at a higher rate (AAGR of 3.6%) than connecting enplanements which increased at an AAGR of 0.8% from 1993-2017. From 2013-2017, the Airport proportion of O&D and connecting enplanements changed by 7.3% resulting in base year 2017 in which SLC had its highest percentage of O&D enplanements (61.4%), and lowest percentage of connecting enplanements (38.6%) over the past 25 years.

Delta Air Lines (DL) has been the largest operating commercial airline out of SLC for the past 25+ years. As the most prominent air carrier at SLC, its own O&D and connecting activities greatly affect the Airport's passenger type distribution. During the past five years, DL has decreased its connections and become more even in its distribution of O&D and connecting enplanements. At the same time, other airlines operating out of SLC have shown an increase in O&D enplanements resulting in lower connecting proportions. FIGURE 2-15 compares DL's contribution to the total enplanements at SLC with the rest of the commercial passenger airlines as a whole from 2013-2017.[18]

[18] Analysis of O&D and connecting passengers includes connecting passengers among interline carriers as a part of the mainline carrier statistic.

Figure 2-15: Historical O&D and Connecting Enplanements (2013-2017)



Source: Bureau of Transportation Statistics T-100 segment data, 2013-2017

Fiscal Year	Delta Air Lines			Other Airlines			All Airlines		
	O&D	Connecting	Total	O&D	Connecting	Total	O&D	Connecting	Total
2013	1,989,061	3,536,473	5,525,534	3,195,702	862,525	4,058,227	5,184,763	4,398,998	9,583,761
2014	2,005,015	3,768,784	5,773,799	3,391,844	796,810	4,188,654	5,396,859	4,565,594	9,962,453
2015	2,242,318	4,001,808	6,244,126	3,670,263	623,732	4,293,995	5,912,581	4,625,540	10,538,121
2016	2,449,728	4,103,010	6,552,738	3,850,978	576,397	4,427,375	6,300,706	4,679,407	10,980,113
2017	3,007,367	4,024,807	7,032,174	4,057,990	424,847	4,482,837	7,065,357	4,449,654	11,515,011

Source: Bureau of Transportation Statistics T-100 segment data, 2013-2017

Table 2-4: Historical Enplanement Distribution (1993-2017)

FY	Origin & Destination (O&D)		Connecting	
	%	Enplanements	%	Enplanements
1993	44.3%	3,156,408	55.7%	3,968,667
1998	48.5%	4,756,994	51.5%	5,051,242
2003	50.8%	4,582,832	49.2%	4,438,491
2008	55.3%	5,620,821	44.7%	4,550,802
2009	52.2%	5,119,439	47.8%	4,694,028
2010	51.3%	5,019,406	48.7%	4,772,343
2011	52.3%	5,121,099	47.7%	4,675,460
2012	53.6%	5,143,580	46.4%	4,459,920
2013	54.1%	5,214,155	45.9%	4,423,839
2014	54.2%	5,406,189	45.8%	4,573,853
2015	56.1%	5,896,727	43.9%	4,612,500
2016	57.4%	6,312,872	42.6%	4,688,997
2017	61.4%	7,065,996	38.6%	4,449,643
Enplanement Average Annual Growth Rate (AAGR)				
1993-1997	11.9%		7.4%	
1998-2002	-1.7%		-3.1%	
2003-2007	4.5%		3.1%	
2008-2017	2.5%		-1.1%	
1993-2017	3.60%		0.77%	

Note: O&D and Connecting Enplanements were interpolated using connecting percentages from the 2006 SLC Master Plan Update and T-100 Airline Market Data from 2005-2012 and the FAA TAF 2018
Source: Bureau of Transportation Statistics T-100 segment data, 2005-2017; 2005-2012; SLC Mast Plan Update, 2006 (data for years 1993-2004)

2.4.1.2 Domestic and International Enplanements

Domestic O&D passengers begin or end their itinerary at SLC, and travel to or from a domestic destination. These passengers fly nonstop or connect through various locations. The connecting domestic passengers are those that originate their travel at an airport other than SLC, connect at SLC, and continue to another domestic airport upon departing from SLC. In either case, SLC acts as a middle segment of a domestic itinerary. TABLE 2-5 ranks the top 25 domestic O&D destinations by total enplaned and deplaned O&D passengers for FY 2017.

Three types of international travelers were defined based on the Bureau of Transportation Statistics (BTS) T-100 segment market data.[19] The first group was identified as nonstop international O&D enplanements. The nonstop international O&D enplanements include those individuals that were on nonstop flights out of SLC, to any of the destinations at which the Airport provides nonstop international service. The second group is also identified as international O&D enplanements, but is different from the first because they included various connecting segments. These enplanements include passengers that began their trip in SLC, before connecting to other airports (both domestic and international), upon reaching their final international destination.

TABLE 2-6 ranks the top 25 international destinations by the total enplaned and deplaned O&D passenger counts for FY 2017. The last group is identified as connecting international passengers. These passengers all connect at SLC for one of their middle segments on their international trip.

TABLE 2-7 provides an alternative way to view the top 25 international O&D destinations as compared to the previous table, by adding in total connecting passengers to establish a final total of international passengers to each market. FIGURE 2-16 provides a map of these top international markets from 2017.

An analysis of these three types of international enplanements out of SLC for FY 2013-2017 found that the domestic percentage of O&D versus connecting enplanements were very similar. As a result, for planning purposes, it was determined to use the same O&D/connecting percentages for both domestic and international enplanements in this forecast. This does not have any impact upon the Facility Requirements that would be generated from these forecasts.

[19] T-100 segment market data, also known as the Air Carrier Statistics database, contains certificated monthly reports of domestic and international airline market and segment data.

Table 2-5: Top 25 Domestic Destinations by O&D Passengers (2013-2017)

2017 Top 25 Domestic Departures and Arrivals Locations	IATA Code	Total Enplaned and Deplaned Passengers				
		2013	2014	2015	2016	2017
1 Los Angeles, California	LAX	495,880	377,700	630,080	700,790	717,260
2 Denver, Colorado	DEN	538,180	407,420	503,110	499,290	605,370
3 Phoenix, Arizona	PHX	470,130	330,420	518,150	522,070	562,810
4 Seattle, Washington	SEA	370,930	304,130	398,770	427,310	441,150
5 Las Vegas, Nevada	LAS	350,380	262,920	391,550	424,780	423,070
6 Long Beach, California	LGB	295,460	223,530	299,670	339,990	419,570
7 San Diego, California	SAN	250,170	210,970	371,520	363,040	409,870
8 New York, New York (JFK International)	JFK	318,670	211,310	310,730	330,930	360,740
9 Dallas-Fort Worth, Texas	DFW	240,560	184,970	254,300	291,740	348,270
10 Chicago, Illinois (O'Hare International)	ORD	187,220	132,990	292,540	325,040	338,410
11 Orlando, Florida (Orlando International)	MCO	176,830	142,740	277,490	327,710	329,010
12 Portland, Oregon	PDX	251,900	215,160	280,660	310,990	324,410
13 Oakland, California	OAK	293,770	216,690	332,130	318,870	307,660
14 San Francisco, California	SFO	166,150	153,110	299,970	308,360	307,650
15 San Jose, California	SJC	92,770	93,530	150,610	180,660	287,100
16 Atlanta, Georgia	ATL	213,700	158,830	244,130	253,720	284,720
17 Boston, Massachusetts	BOS	153,700	124,420	176,980	224,500	275,480
18 Minneapolis, Minnesota	MSP	141,230	116,000	168,030	174,200	187,530
19 Houston, Texas (Bush Intercontinental)	IAH	153,900	126,600	197,140	187,150	186,520
20 Santa Ana, California	SNA	194,350	124,270	158,750	170,870	186,380
21 Baltimore, Maryland	BWI	146,610	124,600	195,270	194,120	182,500
22 Washington D.C. (Reagan National)	DCA	139,280	109,280	160,980	179,970	174,340
23 Sacramento, California	SMF	103,330	83,870	110,450	126,960	168,120
24 Newark, New Jersey	EWR	112,300	70,320	104,950	117,600	157,950
25 Philadelphia, Pennsylvania	PHL	112,370	86,290	124,190	134,870	149,210

1 2 3 4 5 6

Source: Bureau of Transportation Statistics T-100 segment data, 2013-2017

Table 2-6: Top 25 International Destinations by O&D Passengers (2013-2017)

2017 Top 25 International Destinations based on O&D Passengers	IATA Code	Total Enplaned and Deplaned Passengers				
		2013	2014	2015	2016	2017
1 London, England	LHR	36,478	49,211	34,328	46,006	60,490
2 Cancun, México	CUN	48,311	61,451	60,690	59,987	54,129
3 Cabo San Lucas, México	SJD	22,483	30,458	19,920	29,111	39,865
4 Toronto, Canada	YYZ	30,184	41,001	38,172	40,855	39,532
5 Vancouver, Canada	YVR	25,936	37,351	31,649	36,402	38,664
6 Puerto Vallarta, México	PVR	15,102	17,690	21,360	28,060	36,775
7 Mexico City, México	MEX	35,158	45,751	33,038	32,700	27,549
8 Paris, France	CDG	14,770	20,973	16,141	18,017	24,767
9 Guadalajara, México	GDL	18,002	28,493	22,583	22,271	21,750
10 Montreal, Canada	YUL	15,660	20,615	18,034	19,386	18,974
11 Amsterdam, Netherlands	AMS	10,471	13,851	10,375	12,214	18,811
12 Calgary, Canada	YYC	15,817	20,544	20,036	20,145	16,829
13 Tokyo, Japan	NRT	18,824	29,693	19,292	21,152	16,679
14 Seoul, South Korea	ICN	13,388	17,691	13,957	16,402	15,750
15 Shanghai, China	PVG	9,129	14,178	12,397	15,339	15,430
16 Frankfurt, Germany	FRA	13,787	17,659	13,977	13,470	14,356
17 Beijing, China	PEK	9,917	14,287	11,032	13,242	13,982
18 Lima, Peru	LIM	11,591	18,343	11,709	14,377	12,835
19 Rome, Italy	FCO	9,132	11,468	10,145	10,426	12,241
20 Hong Kong, China	HKG	7,744	11,363	10,466	11,558	12,044
21 Sydney, Australia	SYD	7,507	7,606	8,379	9,863	10,977
22 San José, Costa Rica	SJO	7,499	7,939	9,597	10,964	10,681
23 Dublin, Ireland	DUB	6,845	6,808	7,163	8,468	10,110
24 Manila, Philippines	MNL	6,367	6,789	7,441	7,494	9,787
25 Edmonton, Canada	YEG	8,438	11,382	13,423	13,217	9,753

Note: Ranking based on FY 2017 O&D Passengers only
Source: Bureau of Transportation Statistics T-100 segment data, 2013-2017

1	2	3	4	5	6

Service in 2017 — Service in 2017 but not served in 2013

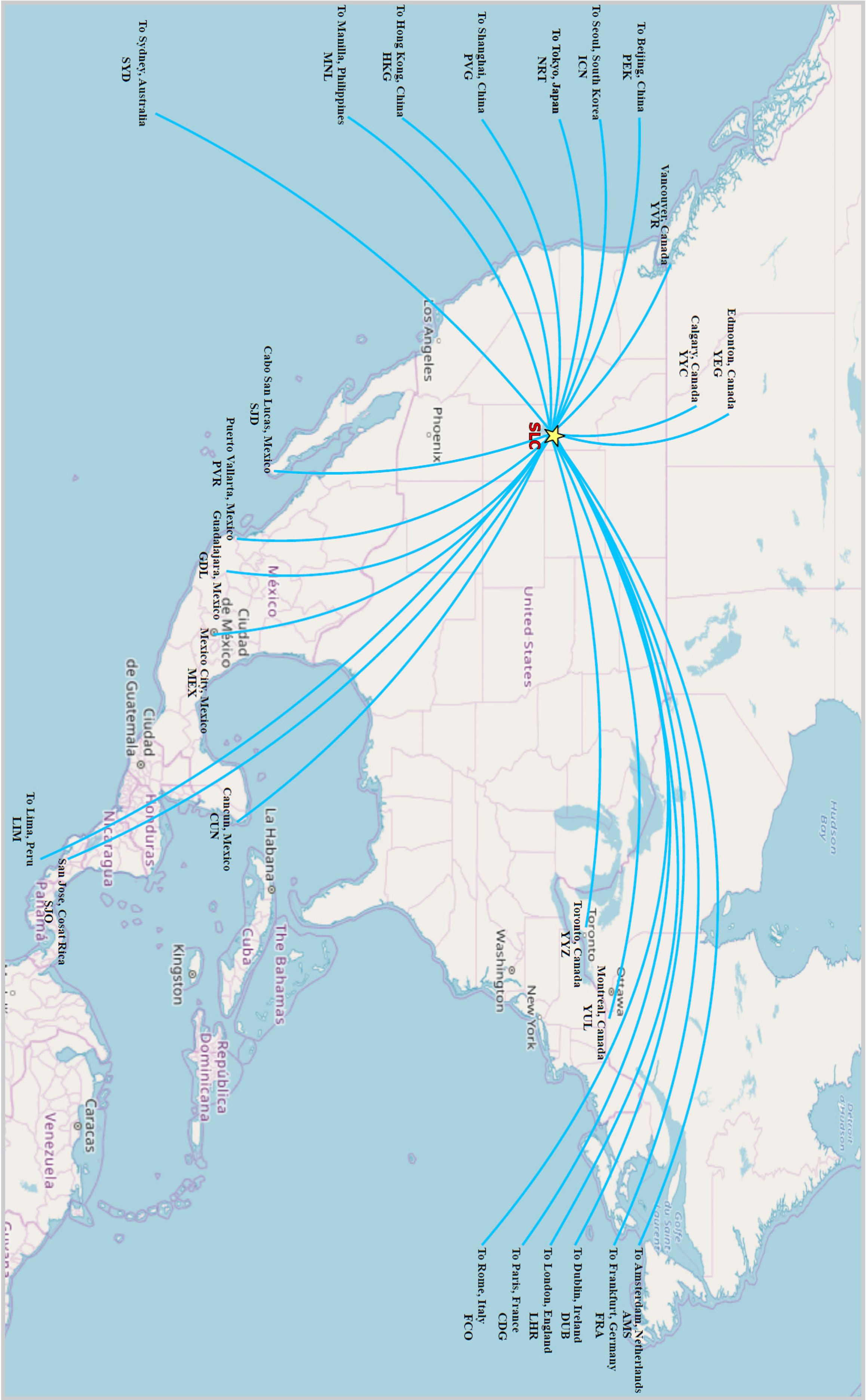
Table 2-7: Top 25 International Destinations by Total O&D Passengers with Connecting Passengers Included (2013-2017)

2017 Top 25 International Destinations by O&D Passengers with Connecting Passengers Included	IATA Code	Total Enplaned and Deplaned Passengers				
		2013	2014	2015	2016	2017
1 Cancun, México	CUN	52,023	56,373	82,918	89,203	85,978
2 London, England	LHR	36,757	39,535	36,764	57,263	83,859
3 Toronto, Canada	YYZ	31,580	42,401	39,622	52,256	64,357
4 Vancouver, Canada	YVR	56,506	65,288	59,313	59,586	61,390
5 Cabo San Lucas, México	SJD	31,296	43,937	32,025	39,165	49,012
6 Puerto Vallarta, México	PVR	18,421	23,439	31,616	39,090	45,018
7 Mexico City, México	MEX	35,945	46,703	48,127	48,056	41,366
8 Paris, France	CDG	27,846	36,586	29,687	31,481	37,150
9 Guadalajara, México	GDL	20,408	32,229	32,513	34,558	35,047
10 Calgary, Canada	YYC	43,915	50,628	42,381	41,503	33,583
11 Amsterdam, Netherlands	AMS	11,488	14,663	14,436	20,986	30,965
12 Shanghai, China	PVG	10,478	16,329	15,104	21,569	20,807
13 Montreal, Canada	YUL	16,509	21,304	18,779	20,195	19,940
14 Tokyo, Japan	NRT	23,567	36,857	25,182	27,724	19,380
15 Seoul, South Korea	ICN	18,716	20,253	15,662	17,659	16,617
16 Frankfurt, Germany	FRA	14,881	19,286	15,482	15,031	15,677
17 Beijing, China	PEK	12,738	16,128	15,249	15,092	15,270
18 Rome, Italy	FCO	10,627	13,675	13,068	12,326	14,520
19 Lima, Peru	LIM	12,521	19,283	12,614	15,397	13,817
20 Hong Kong	HKG	8,239	12,108	11,482	12,077	12,668
21 Sydney, Australia	SYD	9,274	9,242	9,809	11,322	12,321
22 San José, Costa Rica	SJO	8,220	9,126	10,644	12,410	12,237
23 Dublin, Ireland	DUB	8,115	8,224	8,193	10,132	11,551
24 Edmonton, Canada	YEG	8,849	11,684	13,670	14,207	10,635
25 Manila, Philippines	MNL	7,010	7,925	8,162	8,290	10,148

Note: Ranking based on addition of connecting passengers to O&D passengers
Source: Bureau of Transportation Statistics T-100 segment data, 2013-2017

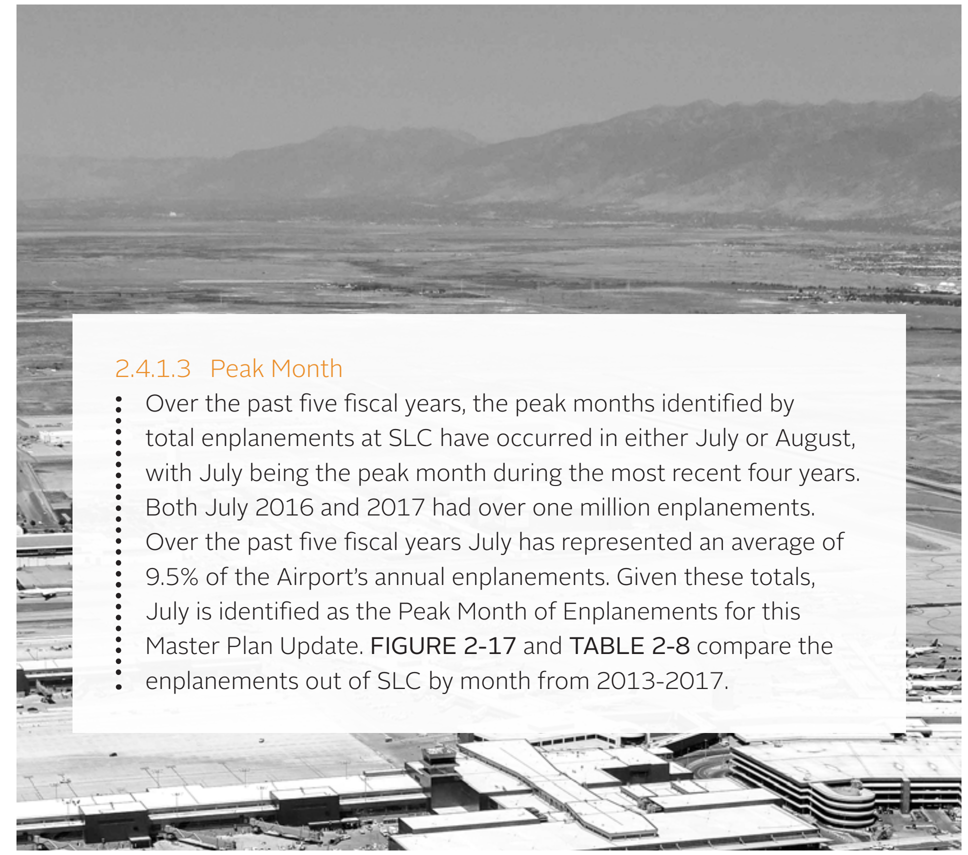
1	2	3	4	5	6

Service in 2017 — Service in 2017 but not served in 2013



Source: RS&H, 2018; Esri, 2018

Figure 2-16: Top 25 International Destinations by Region (2017)



2.4.1.3 Peak Month

Over the past five fiscal years, the peak months identified by total enplanements at SLC have occurred in either July or August, with July being the peak month during the most recent four years. Both July 2016 and 2017 had over one million enplanements. Over the past five fiscal years July has represented an average of 9.5% of the Airport's annual enplanements. Given these totals, July is identified as the Peak Month of Enplanements for this Master Plan Update. FIGURE 2-17 and TABLE 2-8 compare the enplanements out of SLC by month from 2013-2017.

Figure 2-17: Peak Month Enplanements (FY 2013-2017)

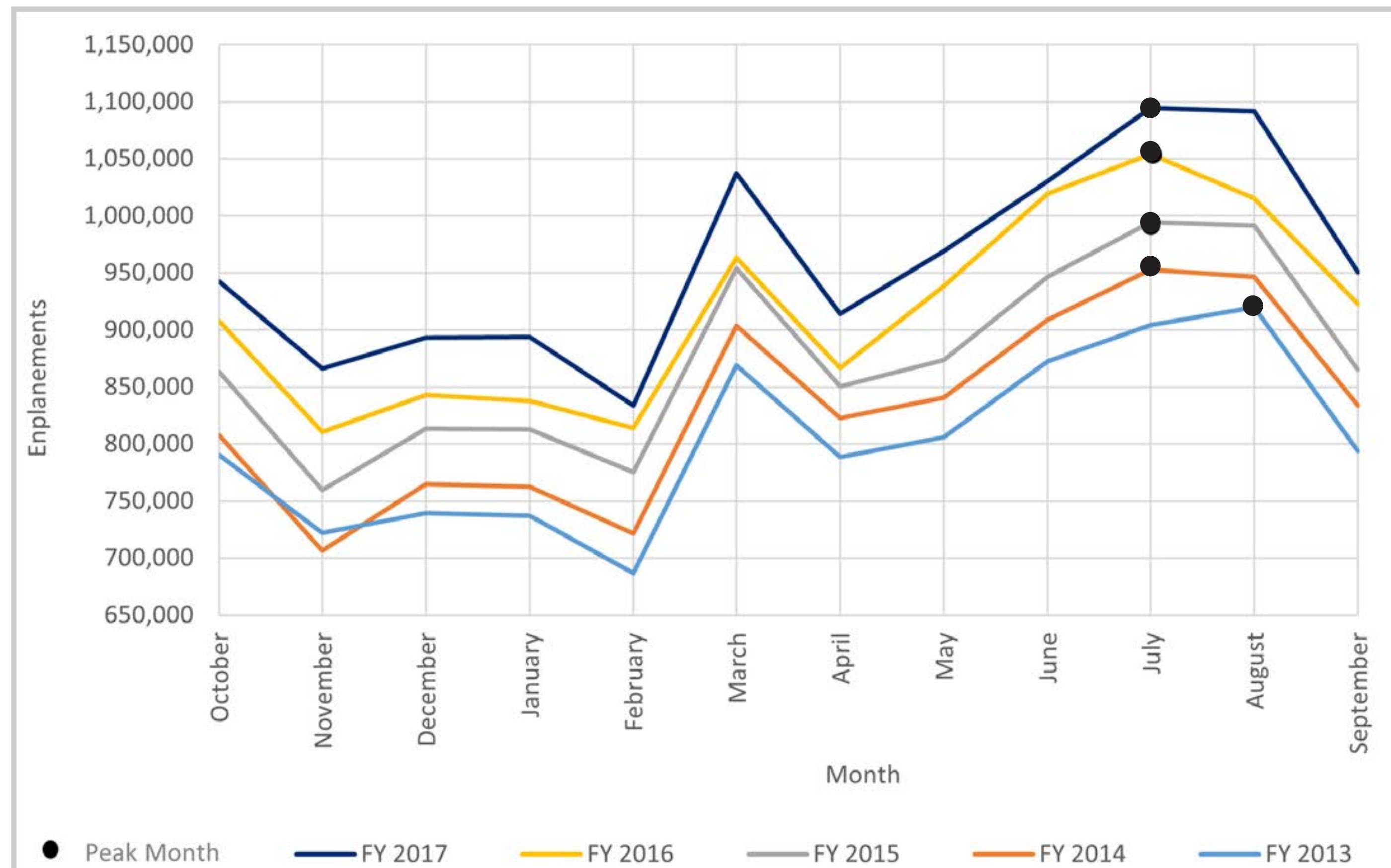


Table 2-8: Monthly Enplanements Share by Fiscal Year (2013-2017)

CY	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Total
2013	789,975	721,723	739,355	737,070	686,624	868,718	788,514	805,649	872,124	904,385	919,677	793,877	9,627,691
	8.2%	7.5%	7.7%	7.7%	7.1%	9.0%	8.2%	8.4%	9.1%	9.4%	9.6%	8.3%	100.00%
2014	807,637	706,650	764,706	762,258	721,642	903,538	822,656	840,416	908,652	953,006	946,713	833,644	9,971,518
	8.1%	7.1%	7.7%	7.7%	7.2%	9.1%	8.3%	8.4%	9.1%	9.6%	9.5%	8.4%	100.00%
2015	863,227	759,426	813,222	812,664	775,006	953,733	850,502	873,283	946,509	994,554	991,313	865,158	10,498,597
	8.2%	7.2%	7.8%	7.7%	7.4%	9.1%	8.1%	8.3%	9.0%	9.5%	9.4%	8.2%	100.00%
2016	907,714	810,778	842,708	837,854	814,052	963,447	866,482	938,148	1,019,460	1,054,169	1,015,294	922,929	10,993,035
	8.3%	7.4%	7.7%	7.6%	7.4%	8.8%	7.9%	8.5%	9.3%	9.6%	9.2%	8.4%	100.00%
2017	942,172	865,832	893,331	893,921	833,491	1,037,170	914,332	968,768	1,030,585	1,094,789	1,091,511	950,605	11,516,507
	8.2%	7.5%	7.8%	7.8%	7.2%	9.0%	8.0%	8.4%	9.0%	9.5%	9.5%	8.3%	100.00%

Note: For each year the first fow of values shows the total enplanements during that fiscal year, the second row of values for that year is equal to the percentage of the fiscal year that the enplanements represent for that month. Percentages are rounded to the nearest 0.1 percent.
Source: Bureau of Transportation Statistics T-100 segment data, 2013-2017

2.4.2 Market Trends and Activity

2.4.2.1 SLC Operating Air Carriers

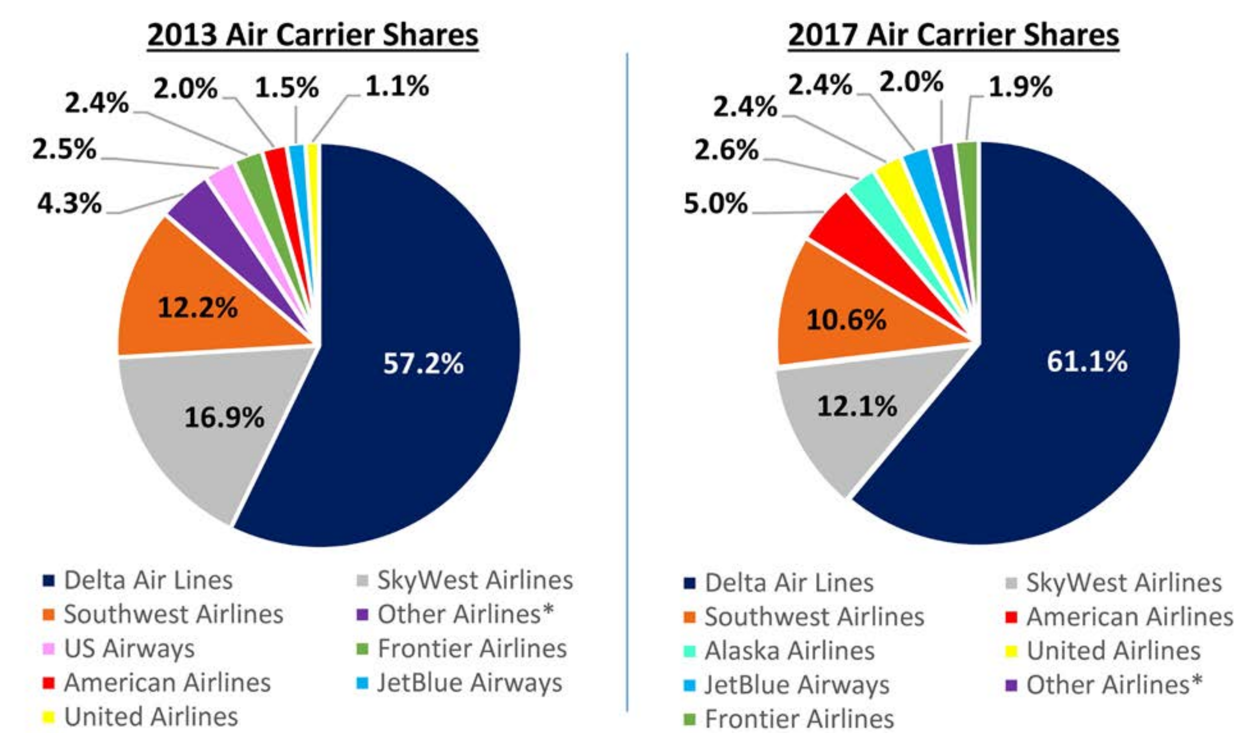
The air carriers which operate at SLC include;

- Aeroméxico (AM)
- Alaska Airlines (AS)
- American Airlines (AA)
- Delta Air Lines (DL)
- Frontier Airlines (F9)
- JetBlue Airways (B6)
- KLM Royal Dutch Airlines (KL)
- SkyWest Airlines (OO)
- Southwest Airlines (WN)
- United Airlines (UA)

2.4.2.2 Air Carrier Market Share

Of all mainline and regional carriers operating out of SLC, DL has consistently maintained the largest share of enplanements over the past 25+ years. More recently DL has increased its share with a 3.9% increase from 2013 to 2017. As a regional carrier, SkyWest Airlines[20] (OO) code shares with Alaska Airlines, American Airlines, Delta Air Lines, as well as United Airlines and operates as an individual airline. The air carrier shares indicated in FIGURE 2-18 includes the portion of SkyWest code shares, and are identified as part of the mainline carrier's market share of enplanements. As an individual airline, the airline with the second greatest share is SkyWest Airlines. Southwest Airlines is third in air carrier shares.

Figure 2-18: SLC Air Carrier Market Share of Enplanements (2013 & 2017)



Note: Other Airlines* indicates teh sum of all enplanements by those airlines with less than 100,000 eb=nplanements annually
Source: Bureau of Transportation Statistics T-100 segment data, 2018

2.4.2.3 Airline Markets Served

As of August, 2018 the Airport's route network had 373 daily departures to 98 nonstop destinations. The international destinations include three European, three Canadian, and five Mexican nonstop destinations. Domestically, SLC provides service across the country, with nonstop service from coast to coast, as well as the Hawaiian Islands, and Alaska. FIGURE 2-19 shows a map of the nonstop destinations in August, 2018.

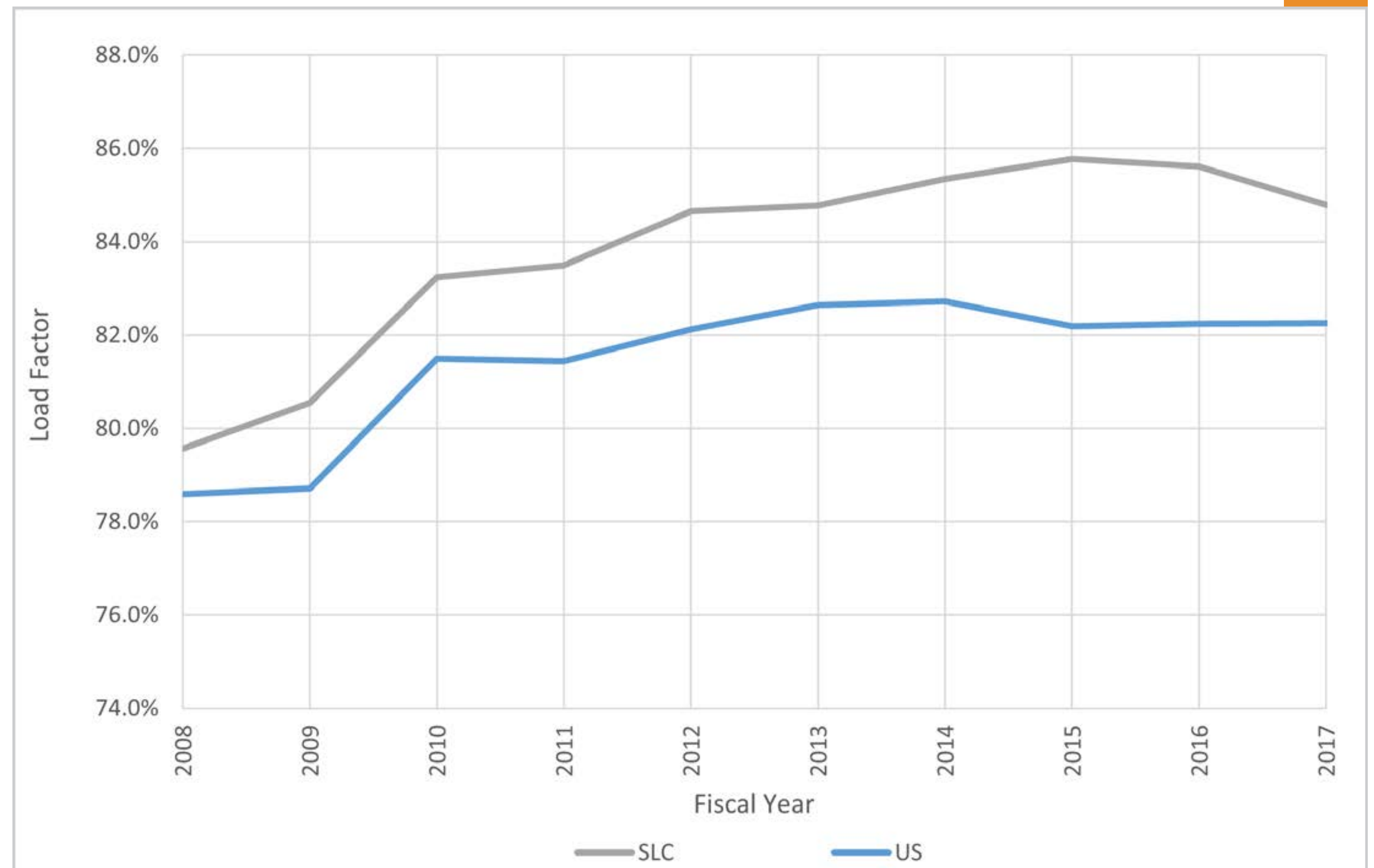
[20] SkyWest Airlines is not included in the list of air carriers because it is a regional carrier.

Figure 2-19: Nonstop Destinations (August, 2018)

Salt Lake City's Route Network Includes 373 Average Daily Departures to 98 Nonstop Destinations

Source: SLCDA, 2018

Figure 2-20: Historic Load Factors



Source: Bureau of Transportation Statistics T-100 segment data, 2018

2.4.2.4 Load Factors

Load factors represent the percentage number of paying passengers on a commercial flight, compared to total seats available. Over the past 10 fiscal years, air carriers at SLC have sustained a load factor of 80%[21] or greater annually, as well as continuing to be above the U.S. average each year. In FY 2015, SLC reached its highest average loads during that time with an annual load factor of 85.77%; the highest U.S. average was 82.72% in 2014. FIGURE 2-20 compares changes in the FY origin load factors[22] for all airlines out of SLC and the U.S. from 2008-2017.

Load factors are also unique to markets, airlines, and routes. An analysis of the T-100 load factors by air carriers at SLC showed that many of the top SLC markets for all passengers had outbound load factors near the Airport's average of 84.8%.

LAX = 83.3%
DEN = 83.2%
PHX = 75.3%
ATL = 92.2%
SEA = 79.9%
LAS = 77.9%

2.4.2.5 Comparative Airport Analysis

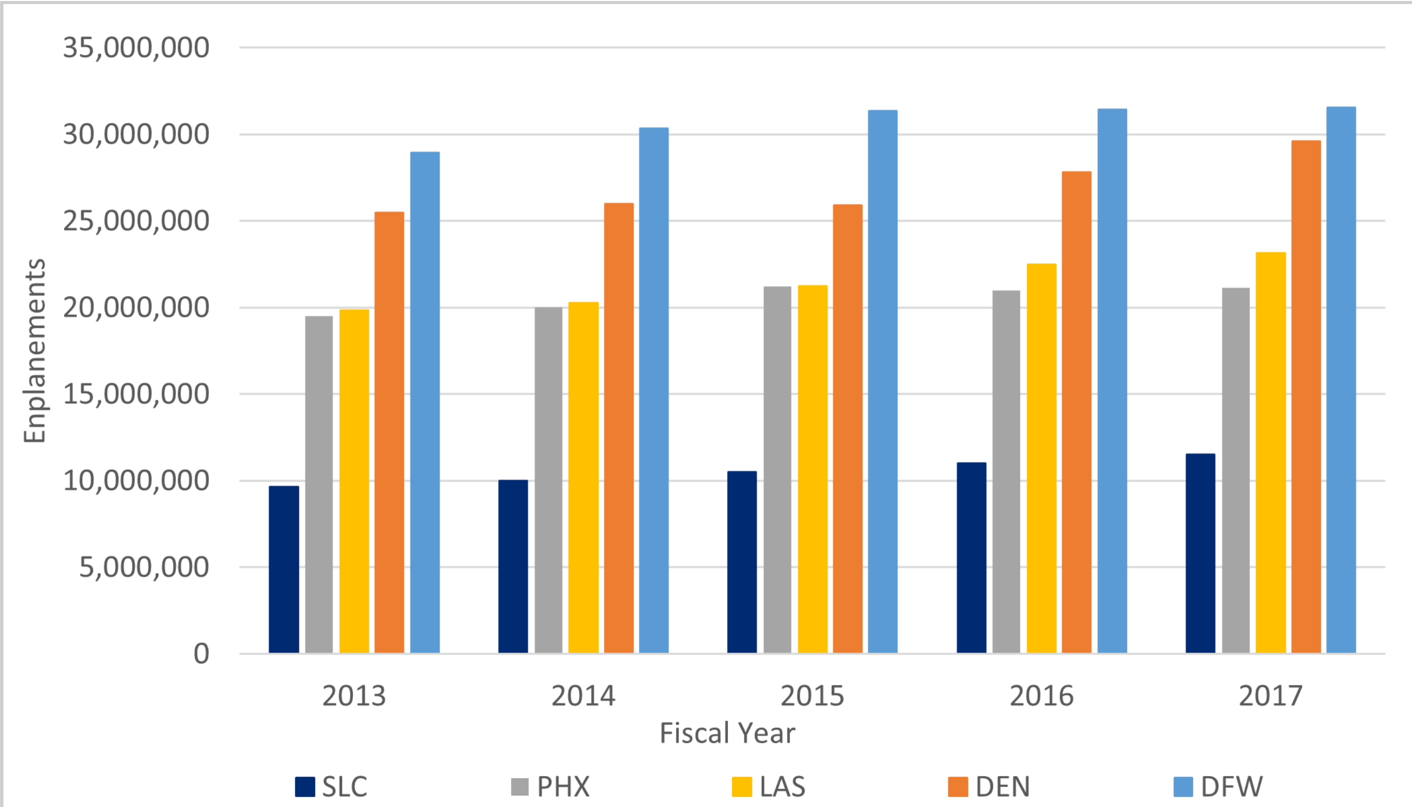
2.4.2.5.1 Regional Large Hub Market Share Comparison

FIGURE 2-21 compares the total enplanements for four of the other large hub airports in the general region over the past five fiscal years. These airports include Denver International Airport (Denver, Colorado-DEN), McCarran International Airport (Las Vegas, Nevada-LAS), Phoenix Sky Harbor International Airport (Phoenix, Arizona-PHX), and Dallas-Fort Worth International Airport (Dallas/Fort Worth, Texas-DFW).

The average air fares of these airports were also compared in FIGURE 2-22. From 2008-2017 SLC had a greater average airfare than three of the four large hub airports compared with the exception of DFW. It also had higher annual average airfares than the United States' average as a whole, except for the years of 2008 and 2009.

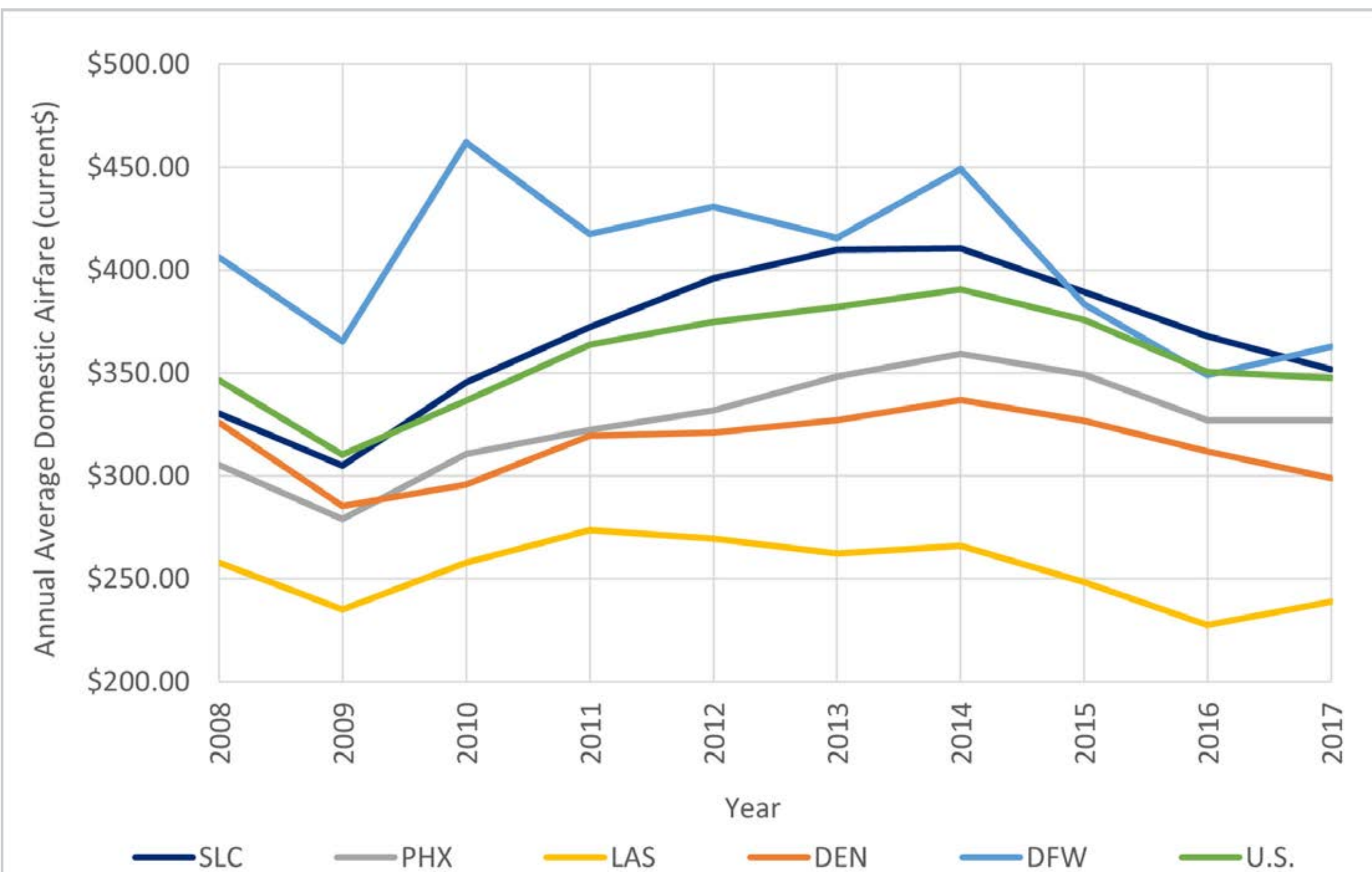
[21] Load factors were taken from BTS T-100 market segment data, and rounded in some cases for comparative purposes.
[22] Average FY load factors were calculated by taking the average load factor for the FY analyzed.

Figure 2-21: Comparison of Regional Large Hub Airport Enplanements (2013-2017)



Source: FAA TAF, 2017, Published January, 2018

Figure 2-22: Annual Average Domestic Airfare Comparison among similarly sized Regional Airports



Source: Bureau of Transportation Statistics T-100 segment data, 2018

2.4.2.6 SLC Market Analysis

2.4.2.6.1 Average Airfares

Average airfare data for each airport is provided by the Bureau of Transportation Statistics. The averages provided for each airport are based on a 10% sample of all airline tickets for U.S. carriers at that airport. The airfares[23] are "itinerary in type", meaning they include round trip costs, unless a one way ticket is purchased. Each average airfare is in current US dollars for the year that it is listed.

Since 1993, SLC has been below the U.S. average for airfare until 2007. However, airfares for the U.S. as a whole and SLC have both increased very similarly over the past 25 years. The historical AAGR for SLC's average airfare and the U.S. is 0.5%. FIGURE 2-23 shows the historical and projected airfares for SLC and the U.S. The projected growth rates of airlines for this Forecast were derived using the same historical AAGRs.

2.4.2.6.2 Airline Yield

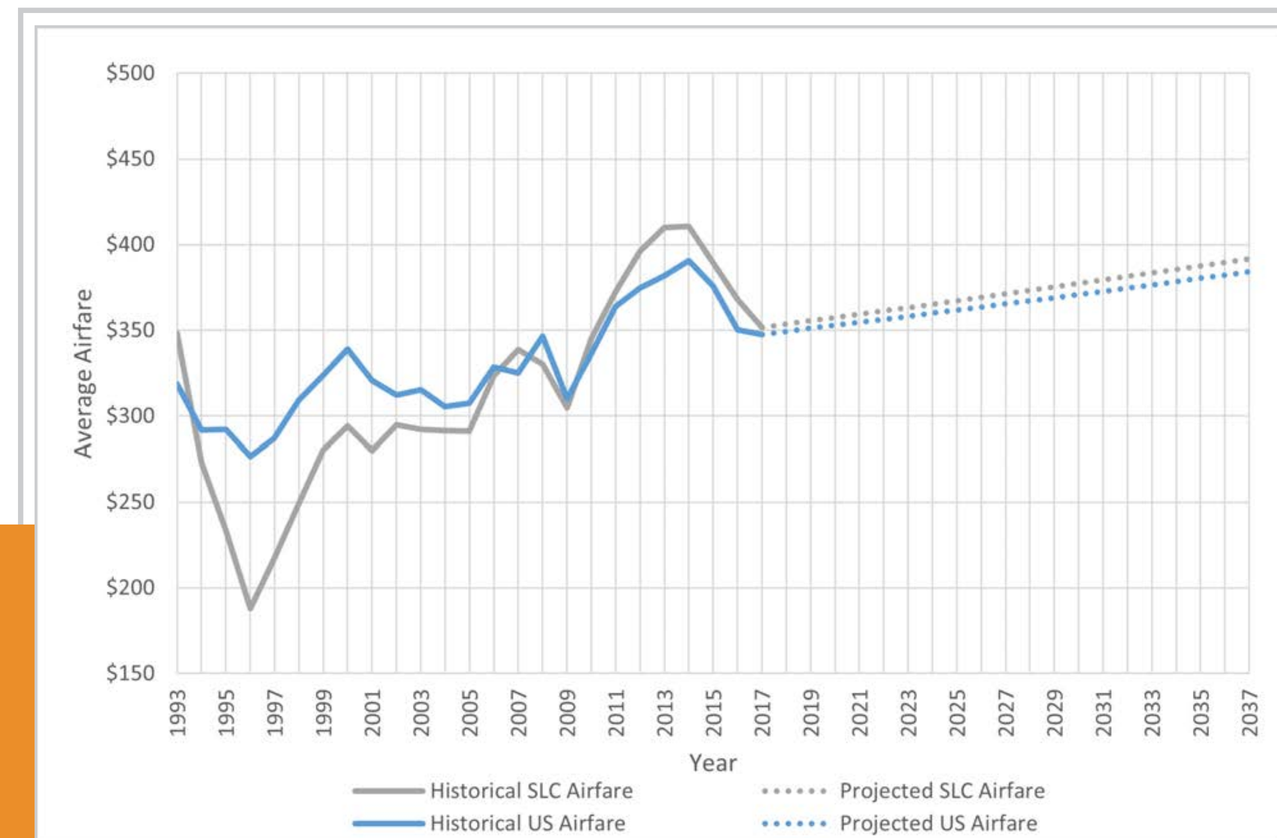
Airline yield like airfare, is also a good indicator for projecting airport enplanement growth. Airline yield is the average airfare per passenger per mile. Oftentimes, airline yield can be used as a surrogate for airfares, if the airfare variable is not usable or unavailable. Airline yield is determined by taking the revenue seat miles and dividing them by total revenue. Airline yield is reported in cents (¢) and the assumption can be made that when yield is higher the number of enplanements is usually lower.

For this Forecast, the historical (1.5%) AAGR for SLC airline yields from 1993-2017 was used, although the U.S. used the (1.9%) AAGR projected in the *FAA Aerospace Forecast for FY 2018-2038*. The U.S. airline yield is shown for comparison purposes only. FIGURE 2-24 shows the historical airline yields for SLC and the U.S. from 1993-2017, and the yields forecast over the planning horizon.

2.4.2.6.3 Jet Fuel Prices Analysis

Jet fuel prices are a highly important variable to consider when analyzing enplanements. Fuel prices may impact the cost of a passenger's ticket; higher fuel prices often result in higher airfares which translates into decreases in discretionary travel. This Forecast uses the U.S. Energy Information Administration for historical jet fuel prices and the projected 4.3% AAGR for Jet Fuel Prices over the planning horizon from the *FAA Aerospace Forecast FY 2018-2038*. FIGURE 2-25 shows the historical and projected jet fuel prices.

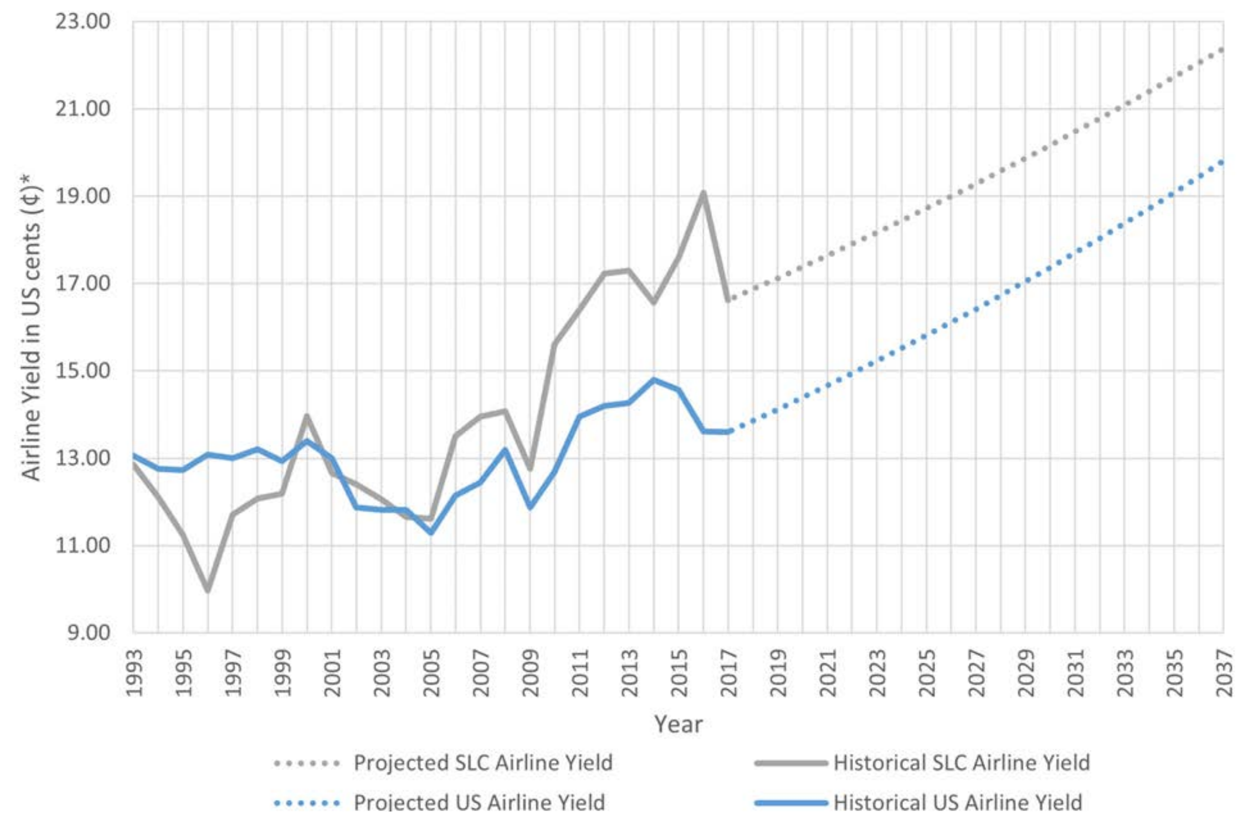
Figure 2-23: Historical and Projected Average Domestic Airfare (1993-2037)



Source: Bureau of Transportation Statistics T-100 segment data, 2018

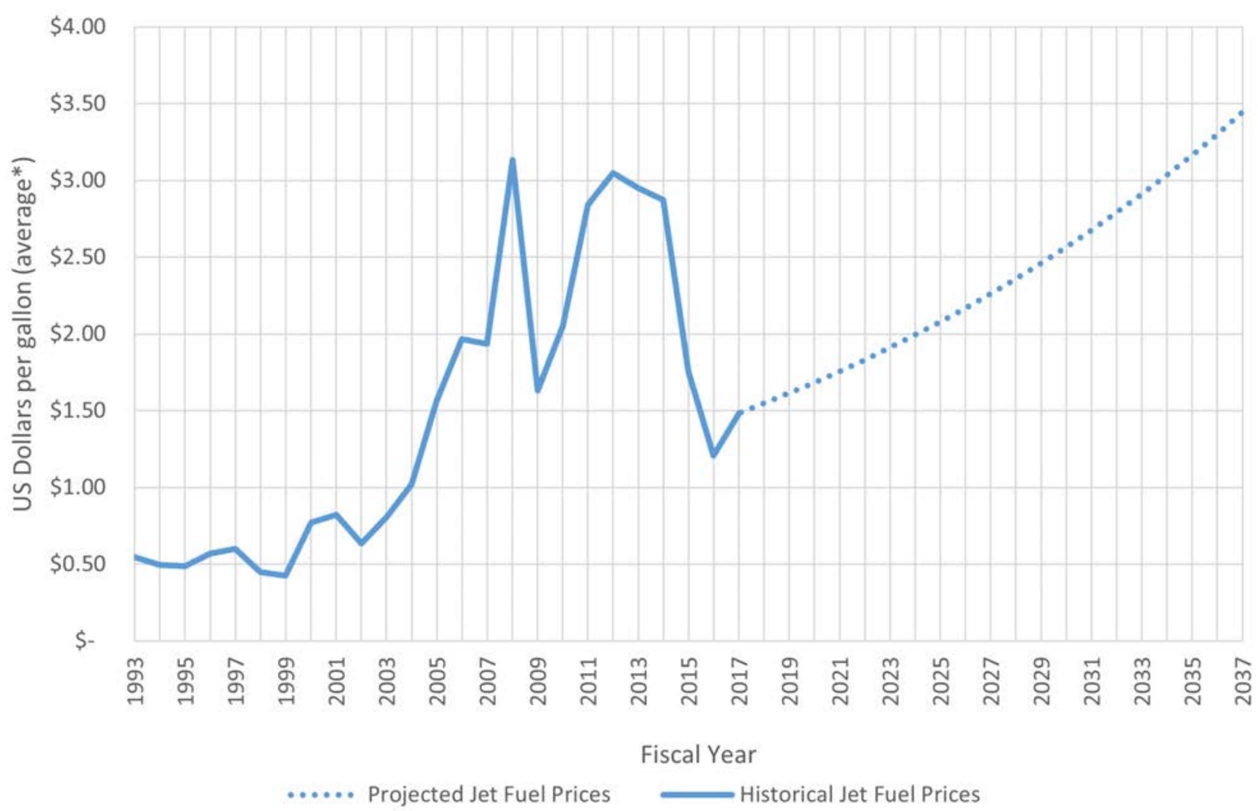
[23] Average air fares do not include charter air travel or baggage and optional services that an airline may provide at additional costs.

Figure 2-24: Historical and Projected Airline Yield (1993-2037)



*Airline yields are shown in US cents for the year that they are referenced | Note: Projected airline yields were interpolated using the historical AAGR (1.5%) from 1993-2017 for SLC, and the projected (1.9%) AAGR given in the FAA Aerospace Forecast FY 2018-2038 for the US. | Source: RS&H, 2018; Bureau of Transportation Statistics T-100 segment data, 2018, Salt Lake City Master Plan Update, 2006; FAA Aerospace Forecast FY 2018-2038

Figure 2-25: Historical and Projected Jet Fuel Prices (1993-2037)



*Jet fuel prices are shown in US dollars for the year that they are referenced | Note: Projected Jet Fuel Prices are interpolated using the FAA Aerospace Forecast FY 2018-2038 AAGR of 4.3% from 2018-2037 | Source: U.S. Energy Information Administration, 2018; FAA Aerospace Forecast FY 2018-2038; RS&H, 2018

2.4.2.6.4 Passenger Aircraft Fleet Mix Trend Analysis

Anticipated trends for the Airport's passenger aircraft fleet mix over the planning horizon are identified in this section. Some of these changes are anticipated due to the age of existing aircraft or potential requirements, while others are based on trends in upgauging, or increased performance and efficiency. The following changes are intended to only reflect each listed airline's SLC fleet mix, and is not necessarily intended to be representative for the airline as a whole.

Delta Air Lines

Airbus 220-100, -300
Airbus 320-Airbus 321 → Airbus320neo/Airbus321neo
Boeing 737-700, -800, -9001 → Boeing 737 MAX 7, MAX 8, MAX 9
Boeing 747-4001 → Airbus 350-900
Boeing 777-200

Frontier Airlines

Airbus 319-Airbus 321 → Airbus 321neo

JetBlue Airways

Airbus 320-Airbus 321 → Airbus 320neo/321neo

KLM Royal Dutch Airlines

Boeing 777-200/Boeing 787-900

United Airlines

Airbus 319-320 → Airbus 320neo/Airbus 321neo

2.4.2.6.5 Short, Medium, and Long Range Global Potential

It is anticipated that SLC will slowly add new nonstop domestic city pairs in the future. In terms of international routes, the largest number of non-stop markets unserved are those in Asia. There may be incremental new city pairs to North American markets such as to Canada or Mexico and potentially Latin America or the Caribbean. Another possibility is a South American city pair. At this time, there are no additional non-stop routes anticipated to Europe.

2.4.3 Passenger Enplanement Forecasts

2.4.3.1 Methodology

This section provides the methodology for developing passenger enplanement forecasts. This involves the formulation and use of three multiple regression models with different growth assumptions to develop the most likely forecast, referred to as the Base Case Forecast, and the alternate forecasts presenting High Case and Low Case Scenarios. Each model incorporates various combinations of independent variables with statistical significance based on the standard alpha P-value[24] of 0.05. The output of these models (or dependent variable) is a projected number of O&D enplanements for each of the 20 years over the planning horizon. The independent variables that were tested and selected ranged from:

- Socioeconomic characteristics unique to the SLC service area
- Economic indicators such as national jet fuel prices, average airfare, and airline yield
- Qualitative variables,[25] which are unique events that have a noticeable impact on aviation activity locally at SLC or nationally.

The general practice in forecasting enplanements is the use of a multiple variable regression analysis that ultimately provides the "best fit" model[26] for the data. The best fit regression model identified as the Base Case Forecast makes projections for enplanements based on the projected growth rates that have been derived from the data sources used, FAA projections, or historical AAGRs when applicable. Often times, the Base Case model's variables adjust their projected growth rates to generate derivative scenario forecasts to reflect Low and High ranges. For example, if the Base Case variables that produces the most statistically relevant equation with the highest correlations includes population, GRP, and airline yield, then the Low Case could decrease the rate of GRP growth and increase airline yield, whereas the rate of GRP growth could be increased and airline yield would be decreased to generate the High Case.

For SLC the same approach was applied but in greater detail. For the Base Case and derivative Low and High Cases, the same 11 predictor variables were analyzed for use. The Low and High Case Scenario variables selected for each model, include adjustments to some of the projections so that they could better reflect the nature of the scenario. For instance,

[24] A standard alpha P-value of 0.05 is the value commonly used in social sciences for accepting or rejecting null hypotheses regarding multivariate regression models. When a P-value is less than the alpha 0.05, the null hypothesis (that states the regression model is not impacted by the selected independent variables) can be rejected. This conclusion, enables the model with a P-value less than 0.05 to be accepted at the 95% confidence level.
[25] For this Forecast qualitative variables are also known as "binomial" or "dummy' variables.
[26] Designation of a "Best Fit" regression model is supported by the model or models that have the greatest R Square value, along with other supporting statistics that are statistically significant for the tests performed.
[27] In the High Case Scenario, the University of Utah Kem C. Gardner Policy Institute data were used in lieu of increasing Woods & Poole population and employment growth rates for regional area.

the Low Case Scenario included projections that were decreased by ten percent, and the High Case Scenario includes projections that were increased by ten percent. There was also one instance where a different source for projecting population and employment over the planning horizon was used.

To further validate the forecasts and take into consideration random error, Monte Carlo Simulation was used to test results (see discussion of Monte Carlo below). The simulation results prove with a 95% probability that the models all have the potential to predict future enplanements.

In summary, the results of this process identifies a unique set of variables for each scenario while using the same overall data set for each scenarios. The results is a best fit equation for each scenario derived from the variables that correlate best with that scenario's enplanement projections.

2.4.3.1.1 Regression Models and Statistics

The following three regression models were selected as the Base Case, Low Case Scenario, and High Case Scenario Forecasts. The equation and statistics of each forecast are provided below.

- Base Case Forecast
  - R Square[28]= 0.989
  - Adjusted R Square[29]= 0.972
  - Equation[30]= 3052880.55391373 + (-7358.77682732965*AIRFARE) + (141401.285712933*FUEL)+(41.8884116094778*GRP)+ (-228537.429647365*RECESS) + (-523832.531871583*9/11)
  - Degrees of Freedom[31]=5
  - Significance (F)[32]= <0.01
  - Durbin-Watson[33]=2.002
  - Variables[34]=
    - AIRFARE= Average airfare of SLC (P-value=< 0.01)
    - FUEL= National Jet Fuel Prices (P-value=0.037)
    - GRP= Gross Regional Product of SLC Service Area (P-Value= <0.01) value
    - RECESS= Recession qualitative variable ("1" given for those years affected by the 2009 Recession) (P-value= 0.020)
    - 9/11= Terrorists attacks of 9/11 qualitative variable ("1" given for the year of 9/11 and all years thereafter)

The forecast variables, or predictors[35] that generated the "best fit" equation to estimate the future level of O&D enplanements for the Base Case Forecast, are projections of average airfares, jet fuel prices, SLC Service Area GRP, and variables that account for unanticipated local, national, or world events.

- Low Case Scenario Forecast
  - R Square= 0.976
  - Adjusted R Square= 0.971
  - Equation=1964317.012+(-7240.154096*AIRFARE) +(6.90256294*EMPLOY)+(-2.404449617*POP)+ (90651.2393*YIELD)
  - Degrees of Freedom=4
  - Significance (F)= <0.01
  - Durbin-Watson=1.723
  - Variables=
    - AIRFARE= Average airfare of SLC (P-value=< 0.01)
    - EMPLOY= Employment of SLC Service Area (P-Value= <0.01)
    - POP= Population of SLC Service Area (P-Value= <0.01)
    - YIELD= SLC Airline Yield (P-value=<0.01)

The forecast variables that best represent a forecast of slower growth in O&D enplanements in the SLC market for the Low Case are an increase in airfares and airline yield and a slowing of growth in population and employment over the Base Case.

- High Case Scenario Forecast
  - R Square= 0.869
  - Adjusted R Square= 0.843
  - Equation= -4214297.74147306 + (-871241.946536854*MERGE) + (5.84509052639647*POP) + (-185318.820602199*YIELD) + (-1037476.00386821*9/11)
  - Degrees of Freedom=4
  - Significance (F)= <0.01
  - Durbin-Watson=1.495
  - Variables=
    - MERGE= Delta Air Lines-Northwest Airlines Merger of 2008 ("1" given for the year of the merge in 2008, and every year thereafter) (P-Value= <0.01)
    - POP= Population of SLC Service Area (with University of Utah Population Growth Rate) (P-Value= <0.01)
    - YIELD= SLC Airline Yield (decreased by 10%) (P-value=<0.01)
    - 9/11= Terrorists attacks of 9/11 qualitative variable ("1" given for the year of 9/11 and all years thereafter)

The forecast variables that best represent an increase in O&D enplanements for the High Case Scenario Forecast is assumed increases in the rate of population growth over the Base Case, a decline in airline yield, the ongoing effect of airline mergers, and variables that account for unanticipated local, national, or world events.

After the three regression models were selected, the O&D projections were given a proportion of all enplanements relevant to specific historical trends of O&D and connecting enplanement distributions out of SLC. Because SLC is a hub, the existing 61.4% of enplanements being O&D, is not anticipated to continue, instead each forecast anticipates a transition back to more even distribution between O&D and connecting enplanements. Therefore, the three scenario distributions reflect more of a hub-type distribution.[36]

2.4.3.1.2 Monte Carlo Simulations

Monte Carlo simulation was used to evaluate each of the three scenarios.

The software developer[37] of Monte Carlo simulation refers to the software as a probability simulation. It is a technique used to understand the impact of risk and uncertainty in forecasting models.
In developing a forecast, certain assumptions are made in order to identify that a future value, for example, enplanements, will occur in a particular year. Since this is a forecast, the best one can do is to estimate an expected value based upon historical data, future trends information, or experience. The greater the number of variables that are used to generate a forecast, the greater the number of potential ranges of outcomes. Typically, several variables produce the best overall statistical correlations. Using a range of possible values can generate a more realistic future.

Monte Carlo simulation provides an estimate of the probability of the likelihood of a resulting outcome based upon the range of variables. Because it is a simulation technique, each set of variables can be tested against each other to identify ranges of probability.

For this Forecast, the simulation compared the projections of the regression model within the Monte Carlo simulation's 95% probability range. Each Monte Carlo simulation run completed a total of 10,000 iterations of all input variables. The results which include random error, verify that each of the three forecast models are generated within a 95% confidence level.

FIGURE 2-26 shows the Base Case Forecast regression model and identifies the upper and lower limits with a 95% probability confidence level. After inserting the Monte Carlo simulation predicted O&D enplanements, and establishing the AAGRs over the planning horizon, some of the annual growth rates were adjusted to provide a smooth transition from the previous distribution to the new hub type distributions. Results for the Low and High Scenario regressions within a 95% probability confidence level look almost exactly like the one depicted in FIGURE 2-26.

2.4.3.2 O&D Enplanements Forecasts

The Base Case Forecast for O&D has an AAGR of 1.7% over the planning horizon. The model was built using the SLC service area's GRP, average airfare for the Airport, national jet fuel prices, and two qualitative variables that reflect the impacts of the Terrorist Attacks of 9/11 and the Recession of 2009. Using this model, the number of annual O&D enplanements will increase from approximately 7.1 million in 2017, to 9.9 million in 2037.

The Low Case Scenario Forecast model is built using the SLC service area's population and employment, as well as the airline yield and average airfare for the Airport; please see Section 2.4.3.1 Methodology. The Low Case Scenario model projects an AAGR of 1.4% over the planning horizon, increasing the annual O&D enplanements from approximately 7.1 million in 2017, to 9.2 million in 2037.

Lastly, the High Case Scenario Forecast model was based on population growth for the SLC service area, but instead of using the Woods & Poole projections, it used the slightly higher University of Utah's AAGR (1.5%). The other variables include the projected airline yield for SLC, but in this scenario it is decreased by 10%, and finally the two qualitative variables which include the Terrorist Attacks of 9/11 and the Northwest Airlines and Delta Air Lines Merge of 2008. The High Case Scenario model projects an AAGR of 2.4% over the planning horizon, increasing the annual O&D enplanements from approximately 7.1 million in 2017, to 11.3 million in 2037.

TABLE 2-10 shows the projected O&D enplanements for each forecast, and the distribution or share of O&D enplanements versus connecting enplanements as a percentage from 2018-2037.

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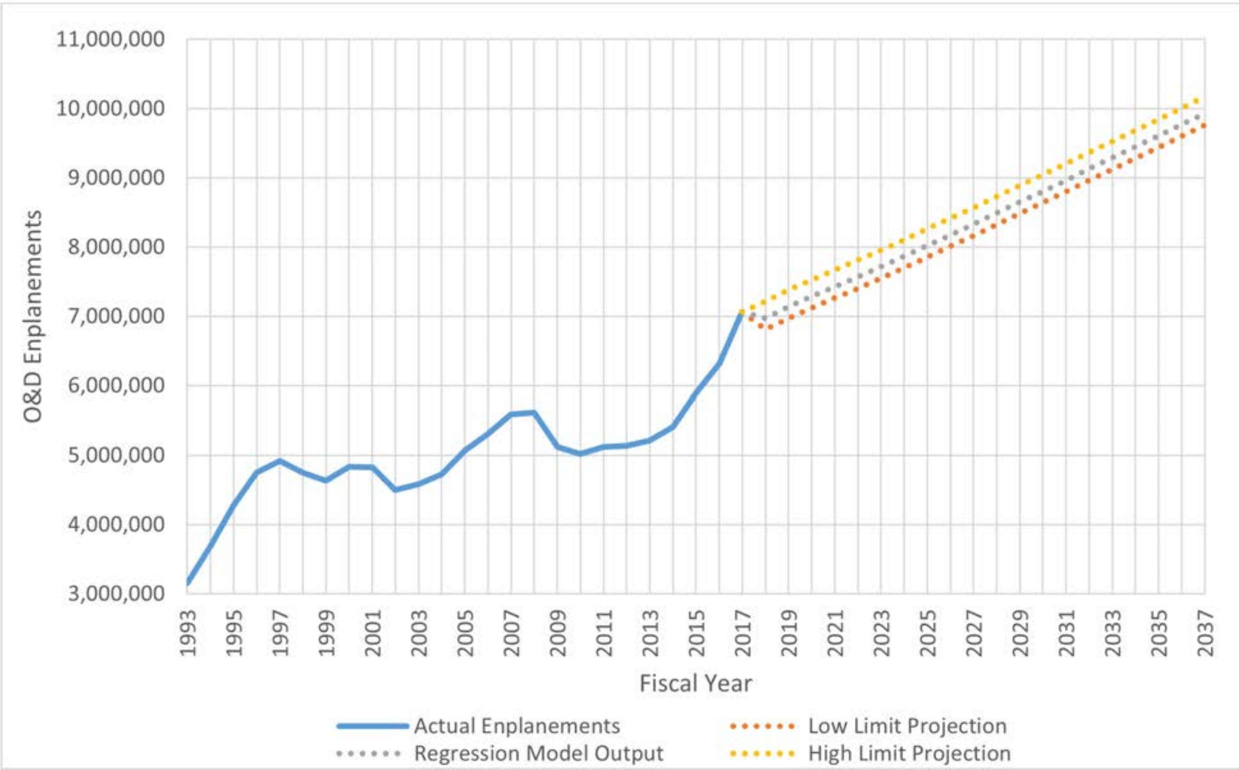
[28] The R Square value is a percentage that indicates how well the data points fit the regression model. If R Square values are closer to 1.0, then the regression model can be regarded as a good model for fitting the data.
[29] The Adjusted R Square value is also a percentage indicating goodness of fit in the regression model, but unlike the R Square value it is based on the importance of each of the independent variables that are used in the model, therefore if it differs greatly from the R Square value, there are a greater number of insignificant variables in the model.
[30] The multivariate regression model uses the equation Y=b0 + b1*X1 + b2*X2...
[31] Degrees of Freedom represent the number of coefficients which are free to vary, or (n-1) where n=the number of independent variables.
[32] The Significance F of the regression, tells what the probability of the regression output is by chance. If it is below the alpha P-value of 0.05, then there is a greater than 95% probability the model's output is not by chance.
[33] The Durbin-Watson statistic tests for autocorrelations in a data sample, or correlations between data over time. It produces a value between 0 and 4, and a value of 2 indicates that there is no autocorrelation in the sample.
[34] Variables listed in each of the models are the coefficients used in the regression model, each with significant P-values.
[35] Also known as independent variables.
[36] In this Forecast, a "hub-type" distribution refers to a more balanced breakdown of O&D and connecting enplanements.
[37] Internet, www.riskamp.com, November 13, 2018.

Figure 2-26: Base Case Forecast Regression Model and Monte Carlo Simulation Limits



Source: RS&H, 2018

2.4.3.3 Connecting Enplanements Forecasts

As of 2017, the connecting enplanements represented 38.6% of all passengers departing from SLC. During its time as a hub airport, the distribution of connecting versus O&D passengers has fluctuated over the past 25 years, but it has always been in the vicinity of a 50-50 split. A major factor influencing the annual connecting enplanements, and ultimately total annual enplanements, is the distribution percentages of O&D and connecting passengers. The SLC city pair for each airline will have its own connecting ratio based upon the number of O&D passengers available on that route and that airline's policy.

There are two typical ways that connecting passengers are estimated. One is to hold the number of enplanements constant over the course of the forecast period or, based on more in depth analysis, forecast the existing O&D/connecting mix per route. Essentially holding the current level constant is a weighted average for that point in time.

At this point in SLC's history, the connecting ratio is near its historical low point. It is unknown whether this is a long-term phenomenon, a trend that could be reversed with the additional capacity afforded by the new terminal along with the potential for upgauging that this building brings, or is reflective of this point in SLC's history.

The number of connecting passengers is generally dictated by the operational policies of the major hub carrier at an airport, in this case Delta. For 2017, the O&D to connecting ratio of approximately 61/39 percent is an outlier and the connecting share of 39% is much lower than historical trends. In conversations with Delta, it has been their general policy to maintain a higher overall level of connecting passengers at SLC than exists at the present time. In addition, Delta has been using SLC as a connect point to west coast markets and there are opportunities for this trend to expand in the future. At the same time, there is not expected to be much change in the way the other airlines operate at SLC which indicates those airlines' average O&D to connecting ratios will not change appreciably. It is also anticipated that once the new airline terminal opens in 2020, there will be more space available for upgauging aircraft and thereby providing more seating capacity to accommodate connecting passengers.

These factors all point to the potential for increasing numbers of connecting passengers, although there is no expectation that the O&D to connecting ratio will return to a 50/50 split. The three forecast scenarios for O&D to connecting passenger ratios are patterned after historical time frames at SLC and their O&D to connecting ratios. The Base Case reflects the dynamic period since 2000 that includes periods both of fast-paced and declining economic growth. The Low Case reflects a lower connecting ratio and fewer enplanements whereas the High Case reflects a slightly higher connecting ratio than the Base Case with greater enplanement levels:

- Base Case Forecast- 53.2% O&D and 46.8% Connecting Passengers reflect the average percentages of SLC Passengers from FY 2000-2017. This is a higher level of connections than currently but does reflect the ongoing effects of airline mergers (anticipated to be completed) as well as upheaval in events such as an unforeseen global event and a recession. As a mid-level of connections, it is used with the Base Case Scenario and generates an increase in the number of annual connecting enplanements from approximately 4.5 million in 2017 to 8.7 million in 2037.
- Low Case Scenario Forecast- 56.5% O&D and 43.5% Connecting Passengers reflect the average percentages of SLC Passengers from FY 2013-2017. This level of connections is similar to today's level and reflects a solid SLC Market Service Area economy and maintaining the ratio of seats for O&D versus connecting passengers at the higher O&D levels. As an overall lower level of connections, it is used with the Low Case Scenario and generates an increase in the number of annual connecting enplanements from approximately 4.5 million in 2017 to 7.1 million in 2037.
- High Case Scenario Forecast- 51.9% O&D and 48.1% Connecting Passengers reflect the average percentages of SLC Passengers from FY 1993-2017. This level of connections represents the long-term historical level. As an overall higher level of connections, it is used in the High Case Scenario and generates an increase in the number of annual connecting enplanements from approximately 4.5 million in 2017 to 10.5 million in 2037.

TABLE 2-11 shows the projected connecting enplanements for each forecast scenario, and the distribution or share of connecting enplanements versus O&D enplanements as a percentage from 2017-2037.

2.4.3.4 International and Domestic Forecast

SLC has increased its international share of annual enplanements from 1.0% in FY 2003 to 3.9% in 2017 with accelerated growth since 2013 by Delta. A historical analysis of international O&D and connecting enplanements from FY 2013-2017 showed that the distribution of O&D and connecting enplanements does not deviate greatly from the domestic enplanements. Therefore, the same distributions of O&D and connecting enplanements were used in each of the international enplanement forecasts as was used for domestic enplanements.

Over the past few years, Delta through its code share partners has continued to increase its international service from SLC by providing new nonstop service to some of the most popular destinations such as London, Amsterdam, and Mexico City. It is not anticipated that the accelerated rate of the past five years will continue as robustly into the future now that service is provided to all ten of the top ten international markets from SLC but the trend toward increasing the percentage of international enplanements compared to all enplanements is anticipated to continue slowly.

In terms of future service, it is common knowledge in the industry that Delta has increased its ownership share in Aeroméxico which will provide customers more opportunities of flying to destinations in Mexico, Central America, and the Caribbean. In addition, five of the Top 25 International Destinations (See TABLE 1-11) between #11 and #20 are Asian locations in Japan, Korea, and China. Currently, there is no non-stop service between SLC and Asia, although there has been some discussion it may be a possibility. As far as long-term new markets are concerned, it is not anticipated that there will be any more direct flights to European destinations but it is not out of the realm of feasibility to think that a destination such as Lima, Peru could materialize.

Given these trends, there are expectations for continued growth on existing international routes as well as the potential for SLC to serve new international markets.

The Base Case assumes continued growth on existing routes and the incremental addition of new routes. This would have the impact of increasing the percentage number of international enplanements to total enplanements. Over the past five years, the number of international enplanements to total enplanements has doubled, i.e., from 1.9% to approximately 3.8%. The Low Case assumes a lower rate of growth that would accompany a slowdown in domestic and international economic activity. In addition to growth in current markets, the High Case assume initiation of new international routes at a faster rate with more time for growth in those markets over the forecast period. As a result the percent of international enplanements to total enplanements would be greater than the Base Case.

TABLE 2-9 shows the distributions of international and domestic enplanements for each forecast scenario over the planning horizon. While each distribution differs slightly, each scenario forecast shows growth in the number of international enplanements over the planning horizon, although the percentage of international enplanements to total enplanements differ.

TABLE 2-12 shows the projected international and domestic enplanements out of SLC over the planning horizon. FIGURE 2-27 compares the international enplanement forecast scenarios, and FIGURE 2-28 compares the domestic enplanement forecast scenarios over the planning horizon.

2.4.3.5 Total Enplanements Forecast

The total enplanements projected in each forecast scenario are a combination of the output of the O&D enplanement forecasts and historical hub-type distributions. Therefore, not only does each model inform the rate of growth for O&D enplanements and total enplanements, but as the O&D and connecting distribution becomes more even, the greater the total enplanements will be also.

In the Base Case Forecast, it is assumed that the Airport would maintain a 53.2% O&D to 46.8% connecting hub-type distribution over the planning horizon. This yields a 2.77% AAGR over the planning horizon, increasing the total annual enplanements by over 5.5 million in 2037.

The Low Case Scenario Forecast assumes a 56.5% O&D to 43.5% connecting hub-type distribution over the planning horizon. This yields a 1.78% AAGR over the planning horizon, which would increase the total annual enplanements by over 4.8 million in 2037.

Lastly, the High Case Scenario Forecast assumes a 51.9% O&D to 48.1% connecting hub-type distribution over the planning horizon. This yields a 3.71% AAGR over the planning horizon, which would increase the total annual enplanements by over 10.2 million in 2037.

TABLE 2-13 shows the year-by-year total enplanements for each of the three forecast scenarios, as well as the FAA TAF 2017. FIGURE 2-29 compares each forecast with the FAA TAF 2017 from 2018-2037.

Table 2-9: International/Domestic Enplanement Forecast Distribution (2017-2037)

FY	Low Case Scenario Forcast		Base Case Forcast		High Case Scenario Forcast	
	% International	% Domestic	% International	% Domestic	% International	% Domestic
2017	3.9%	96.1%	3.9%	96.1%	3.9%	96.1%
2022	3.6%	96.4%	4.1%	95.9%	4.1%	95.9%
2027	3.5%	96.5%	4.3%	95.8%	4.5%	95.5%
2032	3.5%	96.5%	4.3%	95.8%	4.6%	95.4%
2037	3.5%	96.5%	4.3%	95.8%	4.6%	95.4%

Source: RS&H, 2018

Table 2-10: O&D Enplanement Forecasts (2017-2037)

FY	Low Case Scenario Forecast	% O&D	Base Case Forecast	% O&D	High Case Scenario Forecast	% O&D
2017	7,065,996	61.4%	7,065,996	61.4%	7,065,996	61.4%
2018	6,843,216	57.5%	6,976,958	53.9%	7,201,366	53.3%
2019	7,002,191	57.2%	7,142,807	53.7%	7,336,736	53.0%
2020	7,136,649	57.0%	7,292,447	53.6%	7,472,105	52.7%
2021	7,268,551	56.9%	7,430,107	53.5%	7,607,475	52.4%
2022	7,403,102	56.7%	7,571,925	53.3%	7,742,845	52.2%
2023	7,532,369	56.5%	7,721,692	53.2%	7,878,215	51.9%
2024	7,662,685	56.5%	7,872,937	53.2%	8,099,023	51.9%
2025	7,794,392	56.5%	8,025,538	53.2%	8,323,277	51.9%
2026	7,926,922	56.5%	8,179,033	53.2%	8,551,061	51.9%
2027	8,057,849	56.5%	8,334,593	53.2%	8,782,420	51.9%
2028	8,187,290	56.5%	8,492,480	53.2%	9,017,426	51.9%
2029	8,315,456	56.5%	8,651,201	53.2%	9,256,101	51.9%
2030	8,442,061	56.5%	8,810,727	53.2%	9,498,528	51.9%
2031	8,566,628	56.5%	8,970,546	53.2%	9,744,750	51.9%
2032	8,688,609	56.5%	9,130,470	53.2%	9,994,864	51.9%
2033	8,807,732	56.5%	9,290,414	53.2%	10,248,866	51.9%
2034	8,924,402	56.5%	9,450,469	53.2%	10,506,870	51.9%
2035	9,039,025	56.5%	9,610,840	53.2%	10,768,911	51.9%
2036	9,151,398	56.5%	9,771,610	53.2%	11,035,077	51.9%
2037	9,261,464	56.5%	9,932,837	53.2%	11,305,420	51.9%
Average Annual Growth Rates (AAGR)						
2018 - 2022	1.0%		1.4%		1.9%	
2023 - 2027	1.7%		1.9%		2.6%	
2028 - 2037	1.4%		1.8%		2.6%	
2018 - 2037	1.4%		1.7%		2.4%	

Source: RS&H, 2018; FAA TAF, 2017; BTS T-100 Segment Data, 2013-2017

Table 2-11: Connecting Enplanements Forecasts (2017-2037)

FY	Low Case Scenario Forecast	% Connecting	Base Case Forecast	% Connecting	High Case Scenario Forecast	% Connecting
2017	4,449,643	38.6%	4,449,643	38.6%	4,449,643	38.6%
2018	5,271,609	42.5%	6,133,258	46.1%	6,321,832	46.7%
2019	5,393,490	42.8%	6,279,149	46.3%	6,511,109	47.0%
2020	5,496,615	43.0%	6,410,789	46.4%	6,703,399	47.3%
2021	5,597,755	43.1%	6,531,893	46.5%	6,898,666	47.6%
2022	5,700,917	43.3%	6,656,648	46.7%	7,097,024	47.8%
2023	5,800,045	43.5%	6,788,398	46.8%	7,298,516	48.1%
2024	5,899,990	43.5%	6,921,451	46.8%	7,503,135	48.1%
2025	6,000,984	43.5%	7,055,681	46.8%	7,710,988	48.1%
2026	6,102,581	43.5%	7,190,726	46.8%	7,922,103	48.1%
2027	6,202,982	43.5%	7,327,564	46.8%	8,136,510	48.1%
2028	6,302,216	43.5%	7,466,458	46.8%	8,354,305	48.1%
2029	6,400,523	43.5%	7,606,086	46.8%	8,575,514	48.1%
2030	6,497,599	43.5%	7,746,413	46.8%	8,800,183	48.1%
2031	6,593,084	43.5%	7,887,008	46.8%	9,028,393	48.1%
2032	6,686,632	43.5%	8,027,699	46.8%	9,260,166	48.1%
2033	6,777,980	43.5%	8,168,397	46.8%	9,495,571	48.1%
2034	6,867,421	43.5%	8,309,201	46.8%	9,734,701	48.1%
2035	6,955,334	43.5%	8,450,279	46.8%	9,977,541	48.1%
2036	7,041,492	43.5%	8,591,703	46.8%	10,224,233	48.1%
2037	7,125,882	43.5%	8,733,537	46.8%	10,474,783	48.1%
Average Annual Growth Rates (AAGR)						
2018 - 2022	5.3%		9.2%		10.8%	
2023 - 2027	1.7%		1.9%		2.8%	
2028 - 2037	1.4%		1.8%		2.6%	
2018 - 2037	2.4%		3.7%		4.7%	

Source: RS&H, 2018

Table 2-12: International and Domestic Enplanements Forecasts (2017-2037)

Year	Low Case Scenario Forecast		Base Case Forecast		High Case Scenario Forecast	
	International Enplanements	Domestic Enplanements	International Enplanements	Domestic Enplanements	International Enplanements	Domestic Enplanements
2017	448,031	11,067,608	448,031	11,067,608	448,031	11,067,608
2018	484,198	11,931,138	519,033	12,789,504	527,405	12,995,793
2019	483,153	12,131,796	537,123	13,026,588	548,375	13,299,470
2020	482,402	12,313,403	554,946	13,249,688	569,855	13,605,649
2021	480,063	12,494,614	572,629	13,462,392	591,851	13,914,290
2022	477,547	12,678,023	589,312	13,679,748	612,887	14,226,982
2023	475,968	12,856,461	607,973	13,902,120	635,905	14,540,826
2024	474,694	13,088,000	628,762	14,165,629	663,092	14,939,069
2025	482,838	13,312,537	640,951	14,440,255	692,680	15,341,590
2026	491,032	13,538,466	653,215	14,716,543	723,172	15,749,990
2027	499,128	13,761,679	665,642	14,996,514	754,585	16,164,358
2028	507,133	13,982,386	678,255	15,280,681	786,939	16,584,781
2029	515,889	14,200,905	690,935	15,566,353	820,245	17,011,350
2030	522,889	14,416,784	703,678	15,853,463	841,740	17,456,965
2031	530,590	14,629,134	716,446	16,141,111	863,564	17,909,572
2032	538,132	14,837,082	729,222	16,428,945	885,731	18,369,281
2033	545,500	15,040,204	741,999	16,716,812	908,245	18,836,204
2034	552,714	15,239,105	754,786	17,004,877	931,112	19,310,453
2035	559,750	15,434,561	767,598	17,293,525	954,338	19,792,142
2036	566,750	15,626,109	780,441	17,582,878	977,929	20,281,388
2037	573,558	15,813,804	793,321	17,873,047	1,001,889	20,778,308
Average Annual Growth Rates (AAGR)						
2018 - 2022	1.3%	2.8%	5.8%	4.5%	6.6%	5.3%
2023 - 2027	0.9%	1.7%	2.5%	1.9%	4.3%	2.6%
2028 - 2037	1.4%	1.4%	1.8%	1.8%	2.9%	2.5%
2018 - 2037	1.3%	1.8%	2.9%	2.5%	4.2%	3.3%

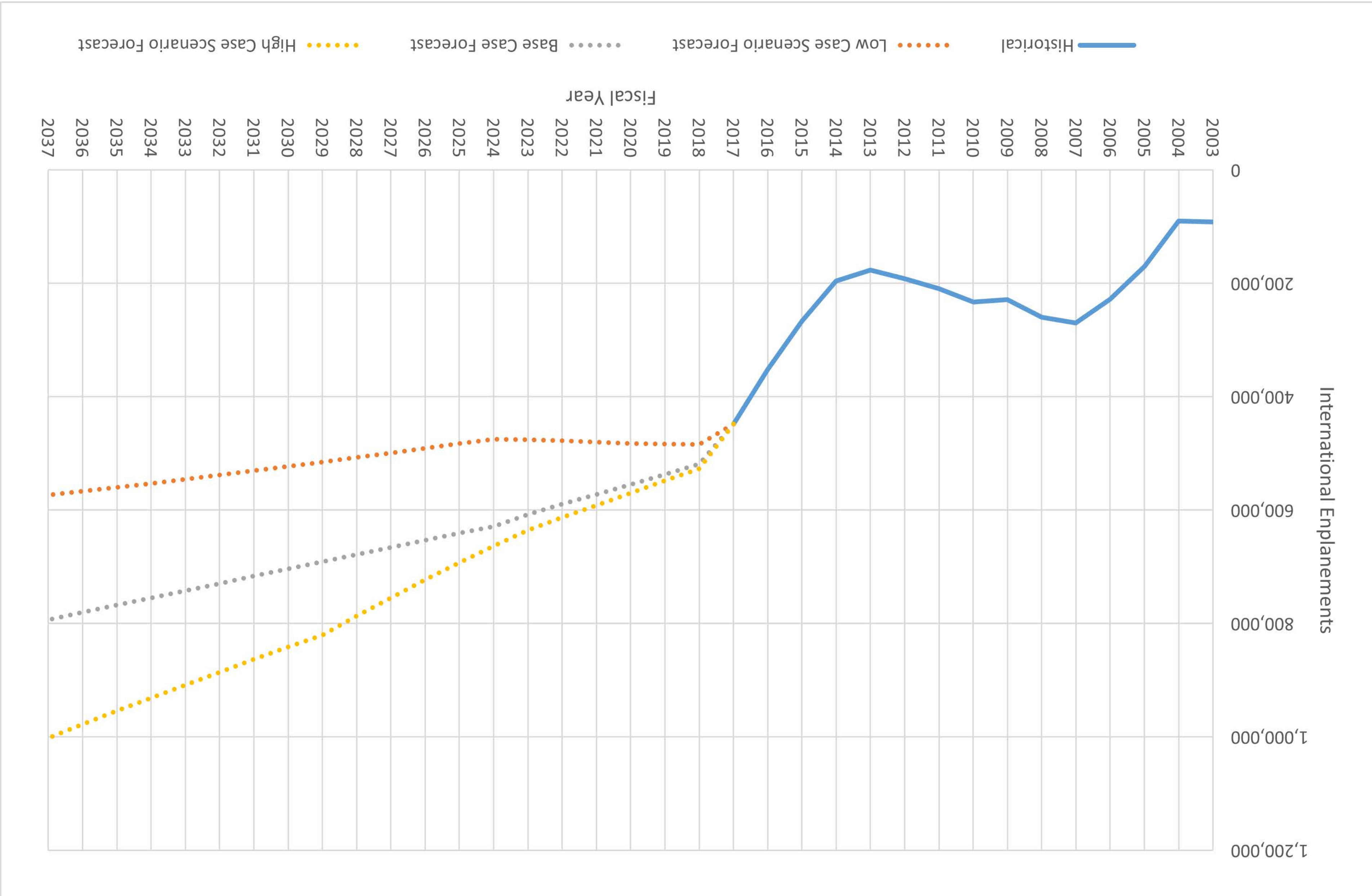
Source: RS&H, 2018

Table 2-13: Total Enplanements Forecasts (2017-2037)

FY	FAA TAF 2017	Low Case Scenario Forecast	Base Case Forecast	High Case Scenario Forecast
2017	11,515,639	11,515,639	11,515,639	11,515,639
2018	11,960,071	12,114,825	13,110,216	13,523,198
2019	12,284,399	12,395,681	13,421,956	13,847,845
2020	12,575,476	12,633,264	13,703,235	14,175,504
2021	12,847,704	12,866,306	13,962,000	14,506,141
2022	13,121,857	13,104,019	14,228,573	14,839,869
2023	13,391,866	13,332,415	14,510,090	15,176,732
2024	13,662,276	13,562,675	14,794,388	15,602,158
2025	13,931,873	13,795,376	15,081,219	16,034,266
2026	14,212,655	14,029,503	15,369,759	16,473,165
2027	14,499,142	14,489,506	15,662,157	16,918,931
2028	14,796,623	14,489,506	15,958,938	17,371,731
2029	15,100,690	14,715,979	16,257,287	17,831,614
2030	15,405,642	14,939,660	16,557,139	18,298,711
2031	15,715,354	15,159,712	16,857,553	18,773,142
2032	16,022,593	15,975,242	17,158,168	19,255,030
2033	16,326,068	15,585,712	17,458,811	19,744,437
2034	16,638,974	15,791,823	17,759,671	20,241,571
2035	16,963,658	15,994,359	18,061,119	20,746,451
2036	17,293,073	16,192,889	18,363,313	21,259,310
2037	17,623,339	16,387,346	18,666,374	21,780,203
Average Annual Growth Rates (AAGR)				
2018 - 2022	2.7%	2.6%	4.4%	5.4%
2023 - 2027	2.0%	1.7%	3.1%	4.4%
2028 - 2037	2.0%	1.4%	1.8%	2.6%
2018 - 2037	2.2%	1.8%	2.8%	3.7%

Source: RS&H, 2018

Figure 2-27: International Enplanements – Historical (2003-2017) and Forecast (2018-2037)



Source: RS&H, 2018

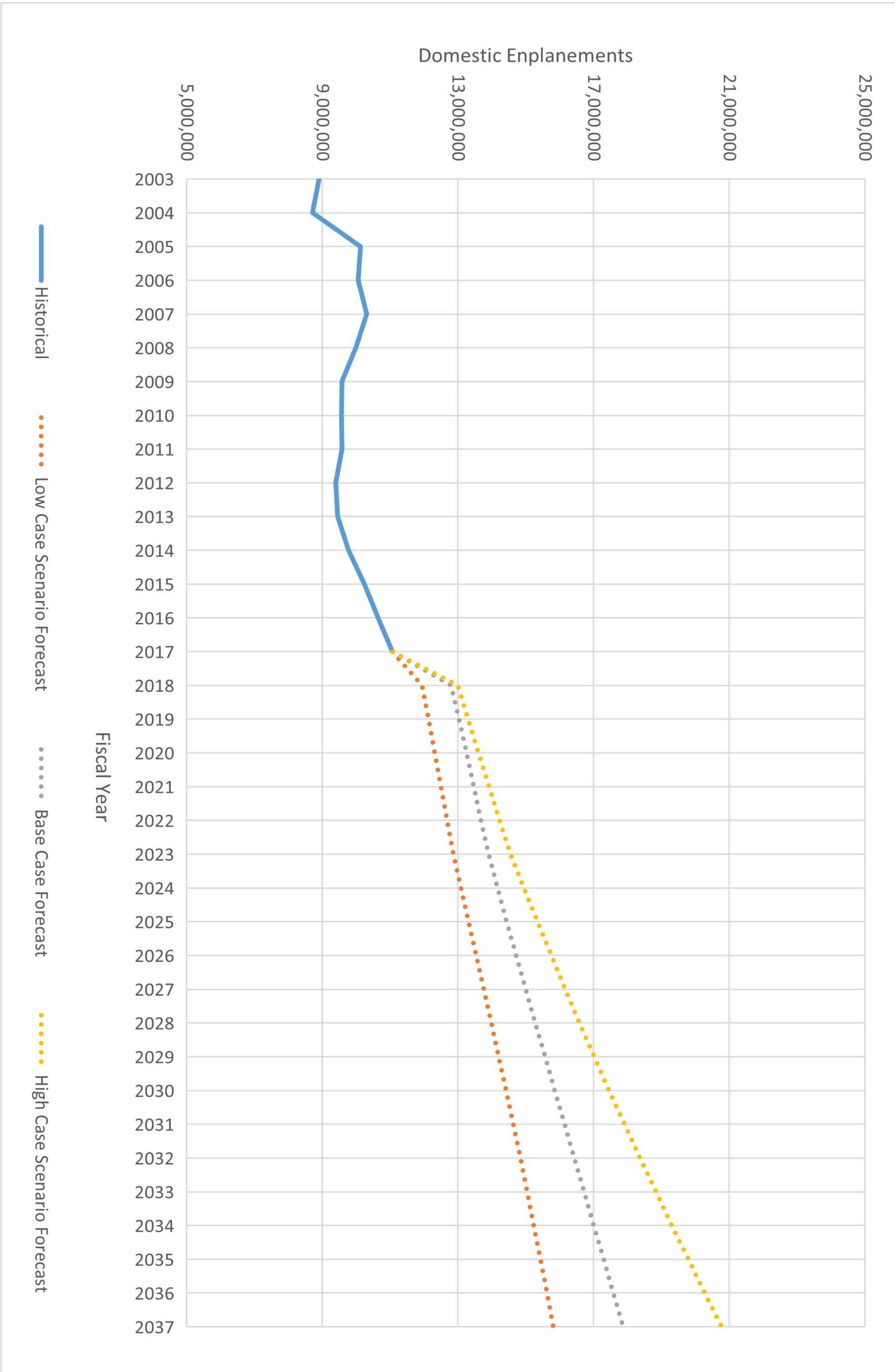


Figure 2-28: Domestic Enplanements – Historical (2003-2017) and Forecast (2018-2037)

Source: RS&H, 2018

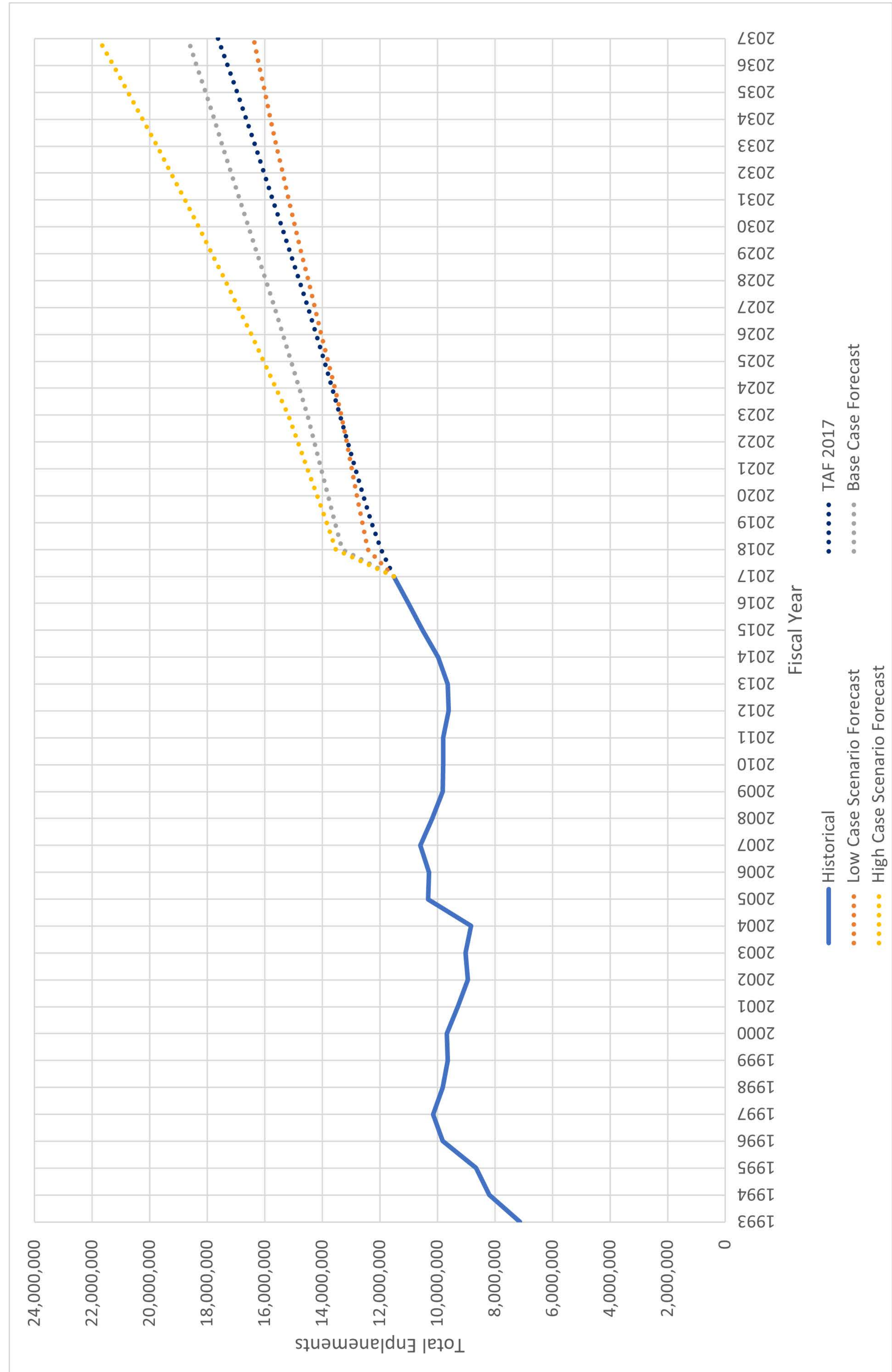


Figure 2-29: Total Enplanements- Historical (1993-2017) and Forecast (2018-2038)

Source: RS&H, 2018

2.5 PLANNING DAY MODEL

2.5.1 Planning Day Model Methodology

The demand for an airport is identified by incorporating all of the characteristics that express how a total number of enplanements can be achieved. In order to recognize each of them, a daily planning model is often created. Planning models, are very useful tools in establishing facility requirements, as they represent the frequency of arriving and departing aircraft for an Average Day of the Peak Month (ADPM). In addition, they also recognize the equipment used, and how full the planes are.

Four planning model schedules (2022, 2027, 2032, and 2037) were produced for each planning scenario, Base, Low, and High Cases. Each planning model schedule was based upon the assumed average day of the peak month for 2018 which was July 19, 2018[38] that had 377 arrivals and departures.

Each schedule scenario for the Base, Low, and High Cases used initial load factors that were provided by Delta for June 1-June 12, 2018 and applied to all Delta flights by market. Initial load factors for all other airlines were obtained from BTS T-100 Segment Data, 2013-2017.

Forecast assumptions included:

- Addition of new markets, as reflected from conversations with Airport staff, airline representatives, research about future industry trends, comments made during the Expert Panel session, and other related research conducted, in an effort to make each planning day model more robust.
- Addition of incremental frequencies were added to existing markets where the base schedule load factor exceeded 85%, and to new markets with an initial 80% load factor. All incremental frequencies were added at times of the day that complemented existing schedules.
- Flights were added at times respecting the current structure of Delta's banks of arrivals and departures.
- Equipment changes were upgauged based upon existing airline fleets, orders, and options with highest load factor flights by market being upgraded first. Load factors for equipment upgrades largely remained the same as on the prior equipment, assuming high load factors existing prior to the upgrade would fill the larger aircraft over the five-year interval between forecasts.

2.5.2 Baseline Flight Schedule 2018

The flight schedule for an ADPM in 2018, identified a total of 377 arriving and 377 departing commercial service operations, with 12 of the arrivals and 12 of the departures being international flights. The peak hour for arrivals was 7:00 pm with 49 operations, and the peak hour for departures was 11:00 am with 51 operations. For international operations, 12:00 pm, 1:00 pm, and 6:00 pm each had two arrivals; and 9:00 am and 11:00 am each had three departures. The peak hour for combined departures and arrivals was at 1:00 pm with 64 total operations.

FIGURE 2-30 shows the ADPM for the Baseline Flight Schedule of July 19, 2018. TABLE 2-14 shows a summary of the mainline carrier's operations for the planning day model with a list of each type of equipment used.

[38] An analysis of the enplanements by month over the past five fiscal years identified July as the Airport's peak month.

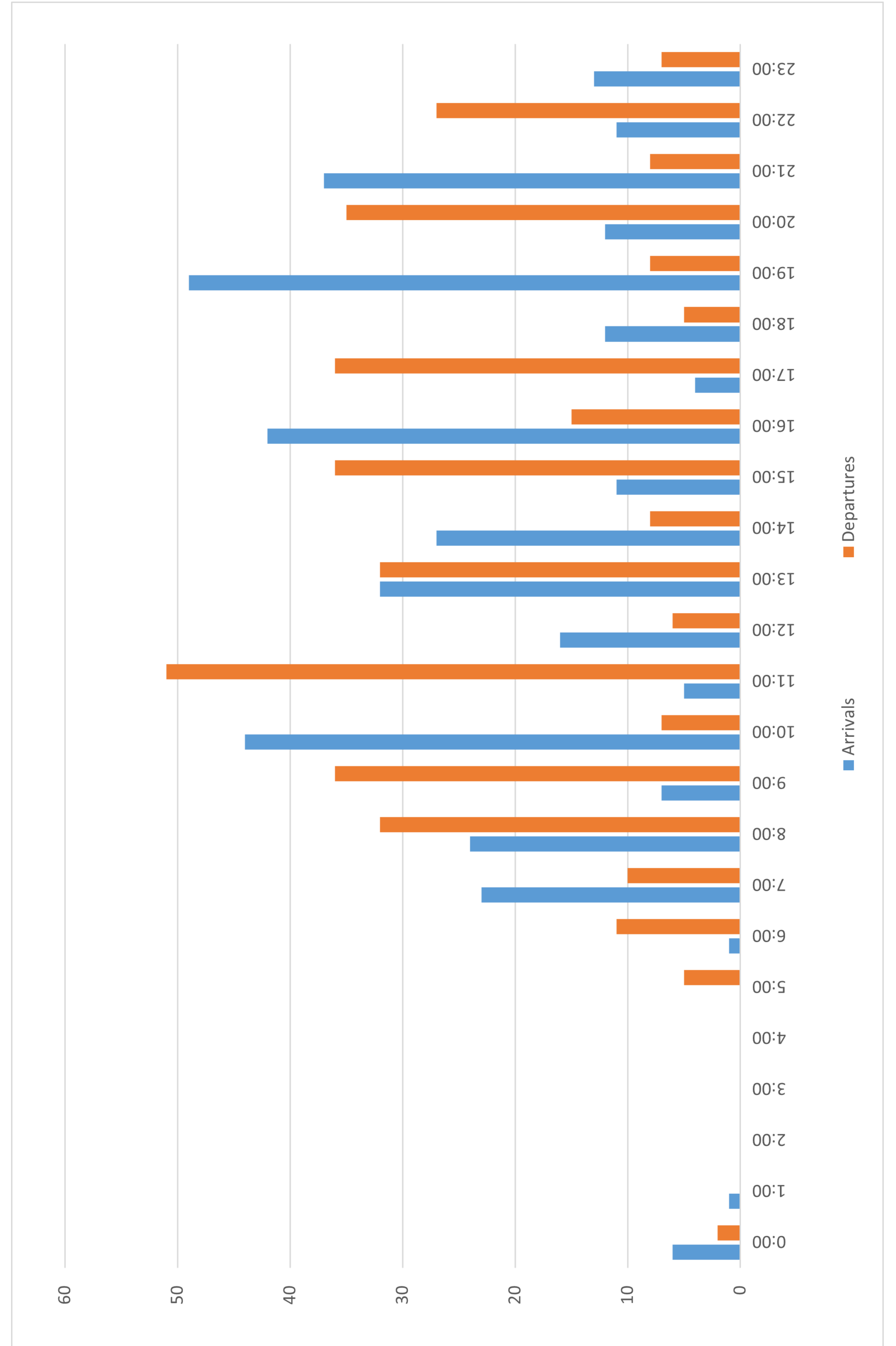


Figure 2-30: Total Operations ADPM Baseline Schedule (2017)

Table 2-14: Baseline Schedule 2018 Airline Summary

Airline	Arrivals	Departures	Equipment (IATA Code)
Aeroméxico	1	1	E90
Alaska Airlines	12	12	739, 73H, 73J, E75
American Airlines	20	20	319, 321, 738, CR7, E75
Delta Air Lines	277	277	319, 320, 321, 717, 738, 739, 757, 76W, CRJ, CR7, CR9, E75, E7W, M90
Frontier Airlines	4	4	320, 321
JetBlue Airways	7	7	320
Southwest Airlines	33	33	73H, 73W
United Airlines	23	23	319, 320, 739, 73G, CRJ, CR7, E70, E7W, 73H, 73W
Total	**377**	**377**	

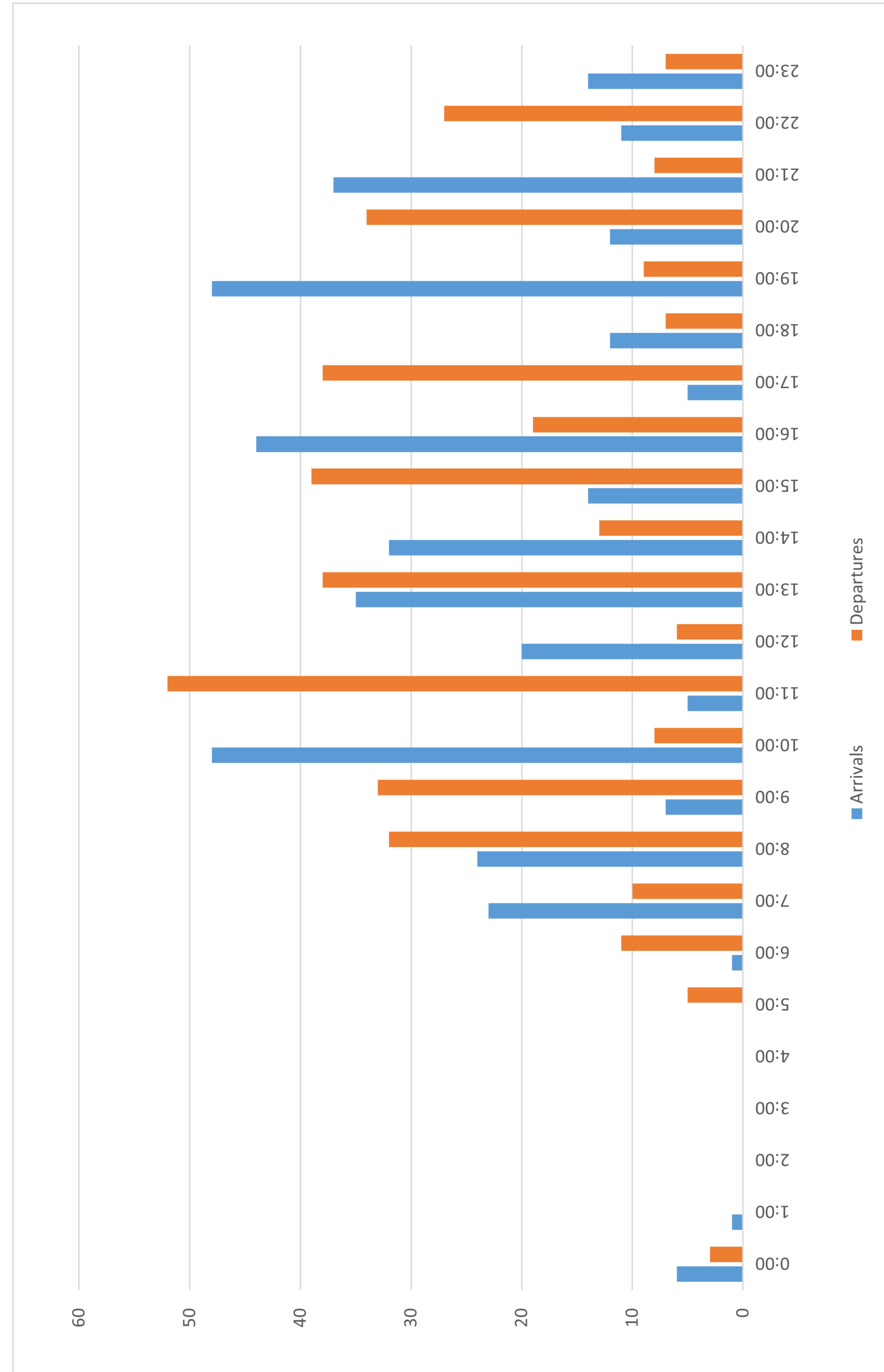
Source: Mary A. Lynch, 2018

2.5.3 Planning Day Model Base Case Forecast

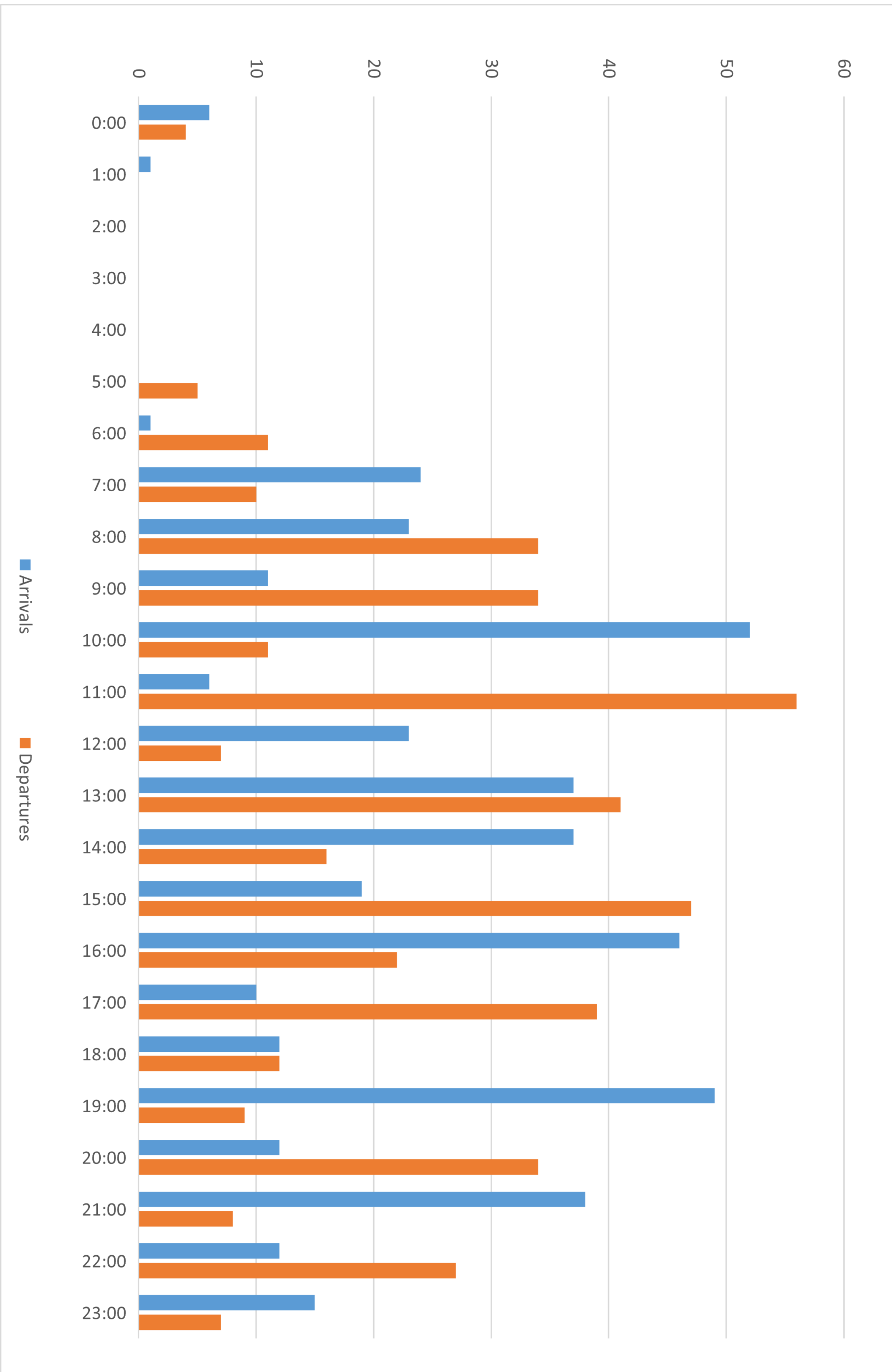
The Base Case Forecast Planning Day Model summarizes the operational counts and times for the four forecast years listed below:

- FY 2022 projects a total of 413 arriving and 413 departing commercial service operations, with 14 of the arrivals, and 14 of the departures being international flights. The peak hour for total arrivals is 10:00 am with 50 operations, and total departures is 11:00 am with 56 operations. For international operations, 10:00 am, 12:00 pm, 1:00 pm, 4:00 pm, and 6:00 pm each have two arrivals, and 11:00 am has four departures. The peak hour for combined departures and arrivals is at 1:00 pm with 76 total operations. Average day peak month FY 2022 domestic operations are shown in FIGURE 2-31, international operations are shown in FIGURE 2-35, and total operations are shown in FIGURE 2-39.
- FY 2027 projects a total of 453 arriving and 453 departing commercial service operations, with 19 of the arrivals, and 19 of the departures being international flights. The peak hour for total arrivals is 10:00 am with 55 operations, and total departures is 11:00 am with 60 operations. For international operations, 10:00 am, 12:00 pm, and 6:00 pm each have three arrivals, and 11:00 am has four departures. The peak hour for combined departures and arrivals is at 1:00 pm with 82 total operations. Average day peak month FY 2027 domestic operations are shown in FIGURE 2-32, international operations are shown in FIGURE 2-36, and total operations are shown in FIGURE 2-40.
- FY 2032 projects a total of 475 arriving and 475 departing commercial service operations, with 24 of the arrivals, and 24 of the departures being international flights. The peak hour for total arrivals is 10:00 am with 57 operations, and total departures is 11:00 am with 62 operations. For international operations, 6:00 pm has four arrivals, and 11:00 am and 8:00 pm each have four departures. The peak hour for combined departures and arrivals is at 1:00 pm with 84 total operations. Average day peak month FY 2032 domestic operations are shown in FIGURE 2-33, international operations are shown in FIGURE 2-37, and total operations are shown in FIGURE 2-41.
- FY 2037 projects a total of 503 arriving and 503 departing commercial service operations, with 27 of the arrivals, and 27 of the departures being international flights. The peak hour for total arrivals is 10:00 am with 58 operations, and total departures is 11:00 am with 63 operations. For international operations, 1:00 pm and 6:00 pm each have four arrivals, and 11:00 am and 8:00 pm each have four departures. The peak hour for combined departures and arrivals is at 1:00 pm with 94 total operations. Average day peak month FY 2037 domestic operations are shown in FIGURE 2-34, international operations are shown in FIGURE 2-38, and total operations are shown in FIGURE 2-42.

Figure 2-31: Domestic Operations ADPM Base Case Forecast (2022)



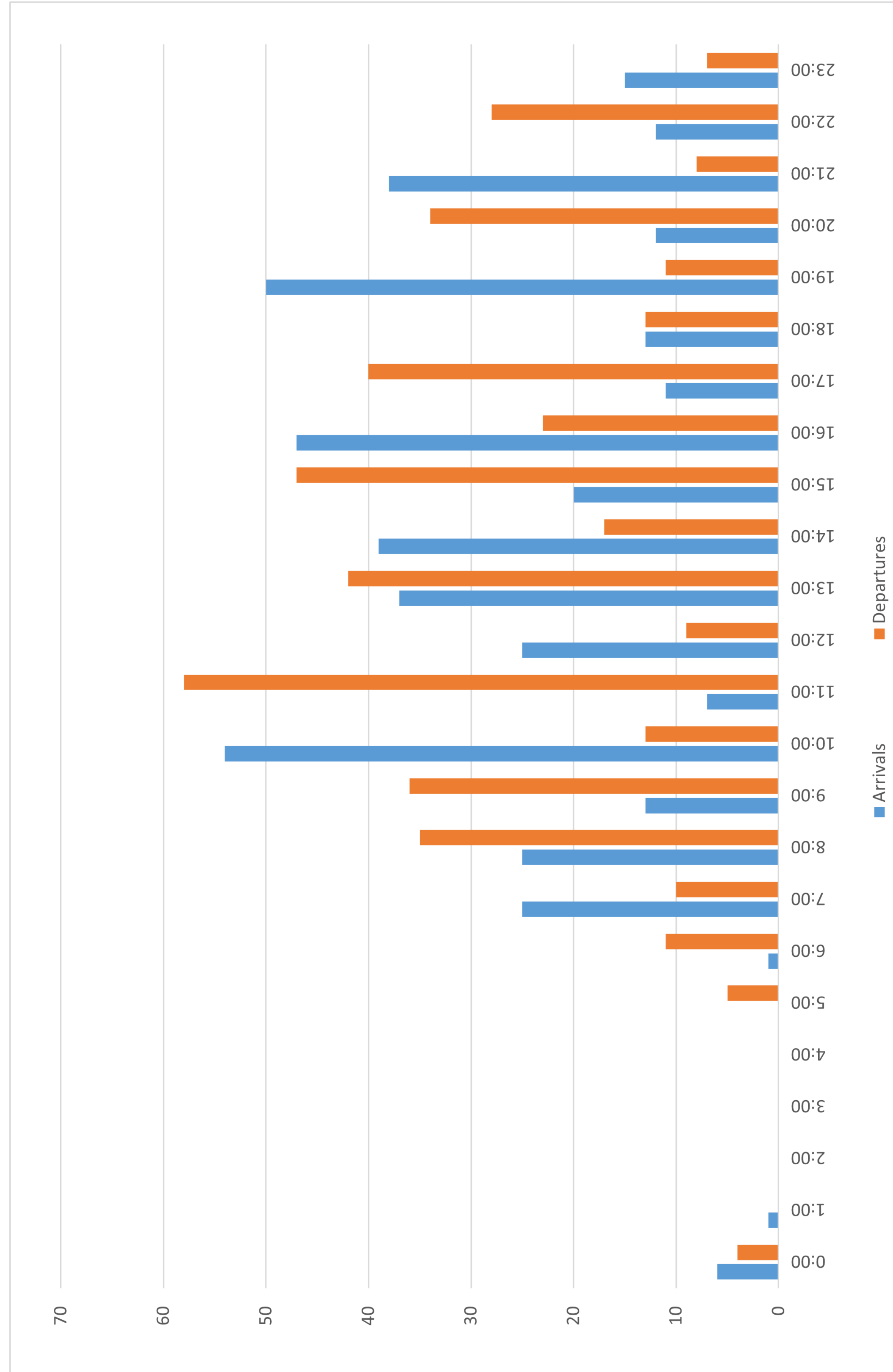
Source: Mary A. Lynch, 2018



Source: Mary A. Lynch, 2018

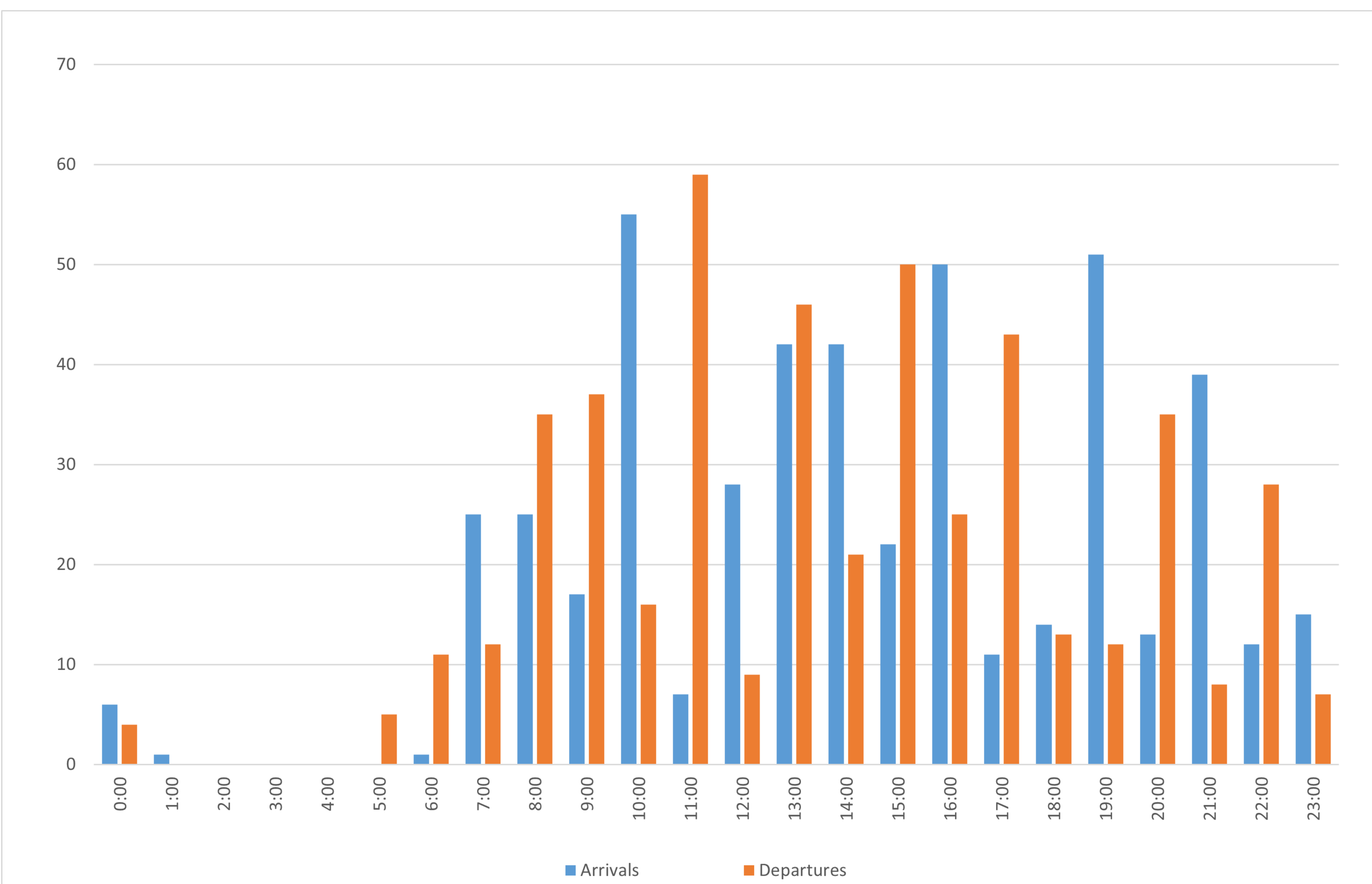
Figure 2-32: Domestic Operations ADPM Base Case Forecast (2027)

Figure 2-33: Domestic Operations ADPM Base Case Forecast (2032)



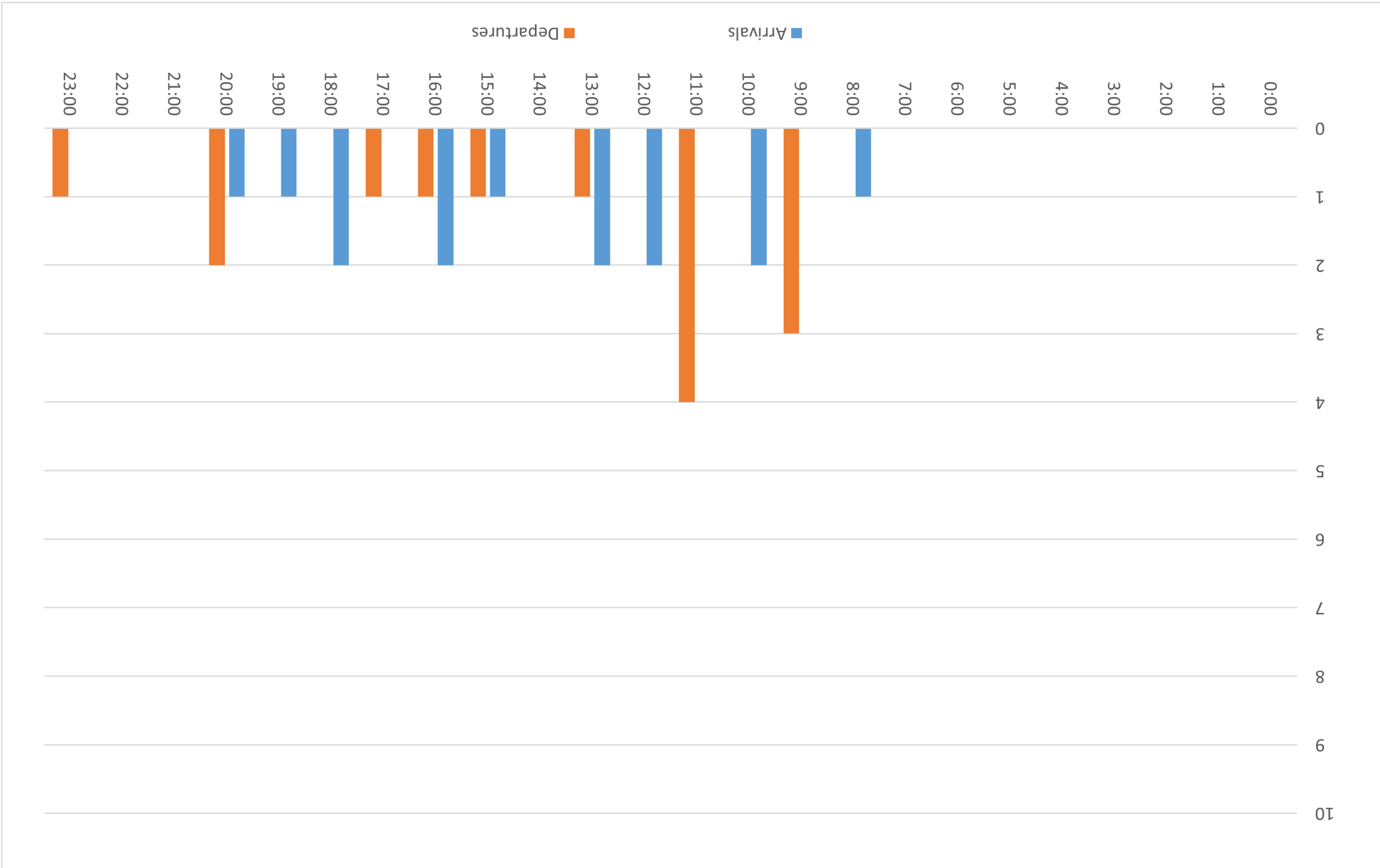
Source: Mary A. Lynch, 2018

Figure 2-34: Domestic Operations ADPM Base Case Forecast (2037)

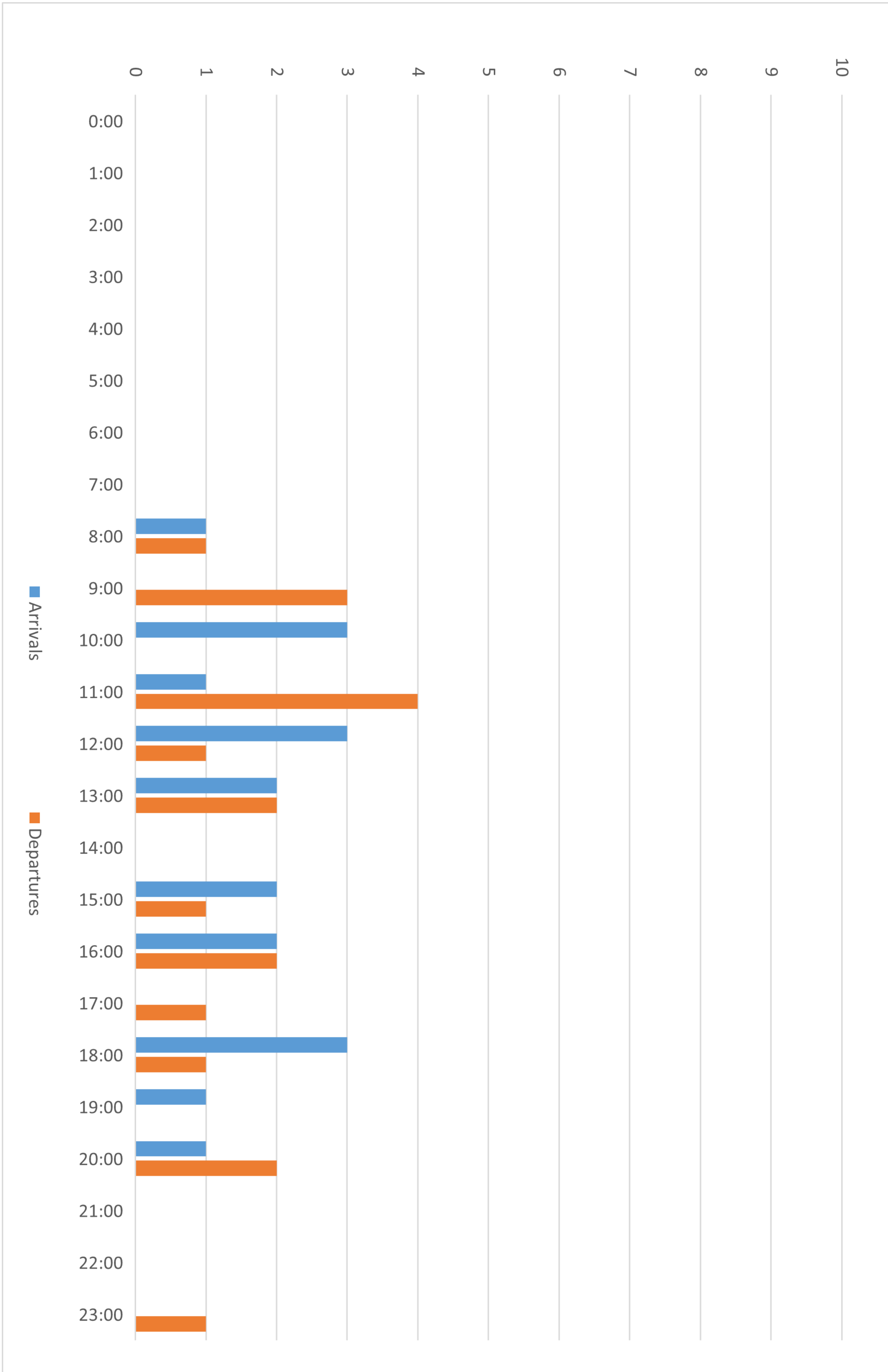


Source: Mary A. Lynch, 2018

Figure 2-35: International Operations ADPM Base Case Forecast (2022)



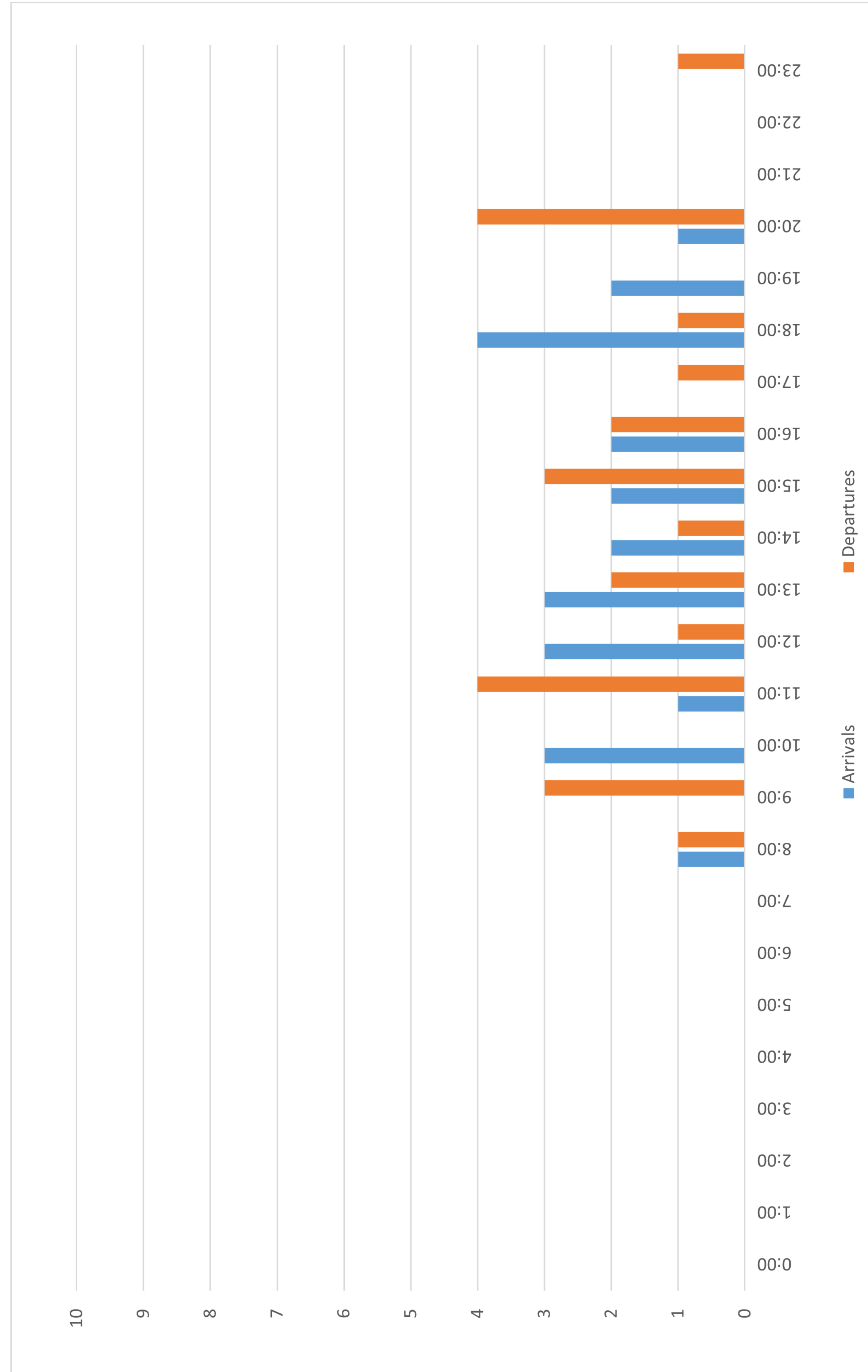
Source: Mary A. Lynch, 2018



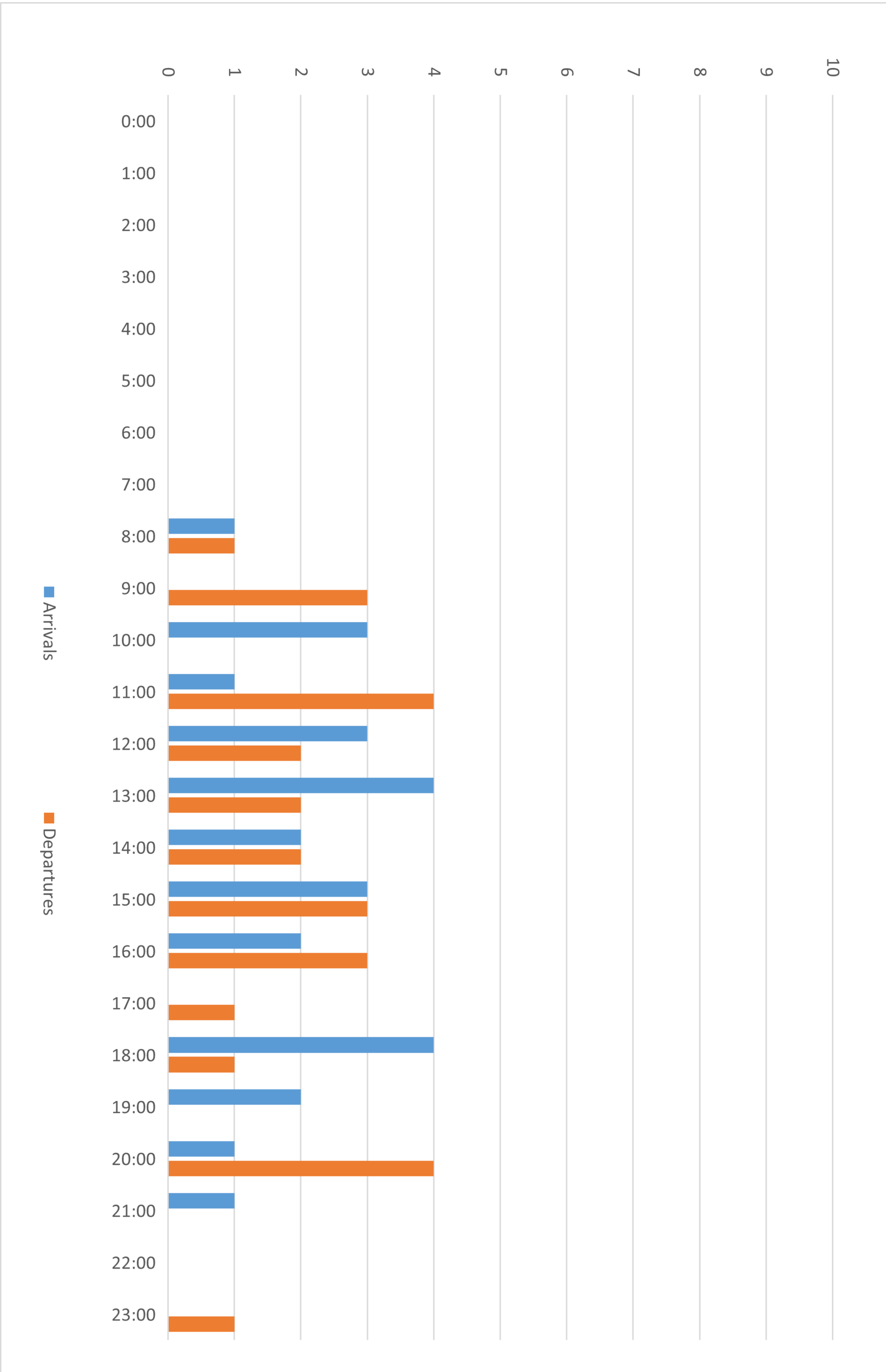
Source: Mary A. Lynch, 2018

Figure 2-36: International Operatoins ADPM Base Case Forecast (2027)

Figure 2-37: International Operations ADPM Base Case Forecast (2032)



Source: Mary A. Lynch, 2018



Source: Mary A. Lynch, 2018

Figure 2-38: International Operations ADPM Base Case Forecast (2037)

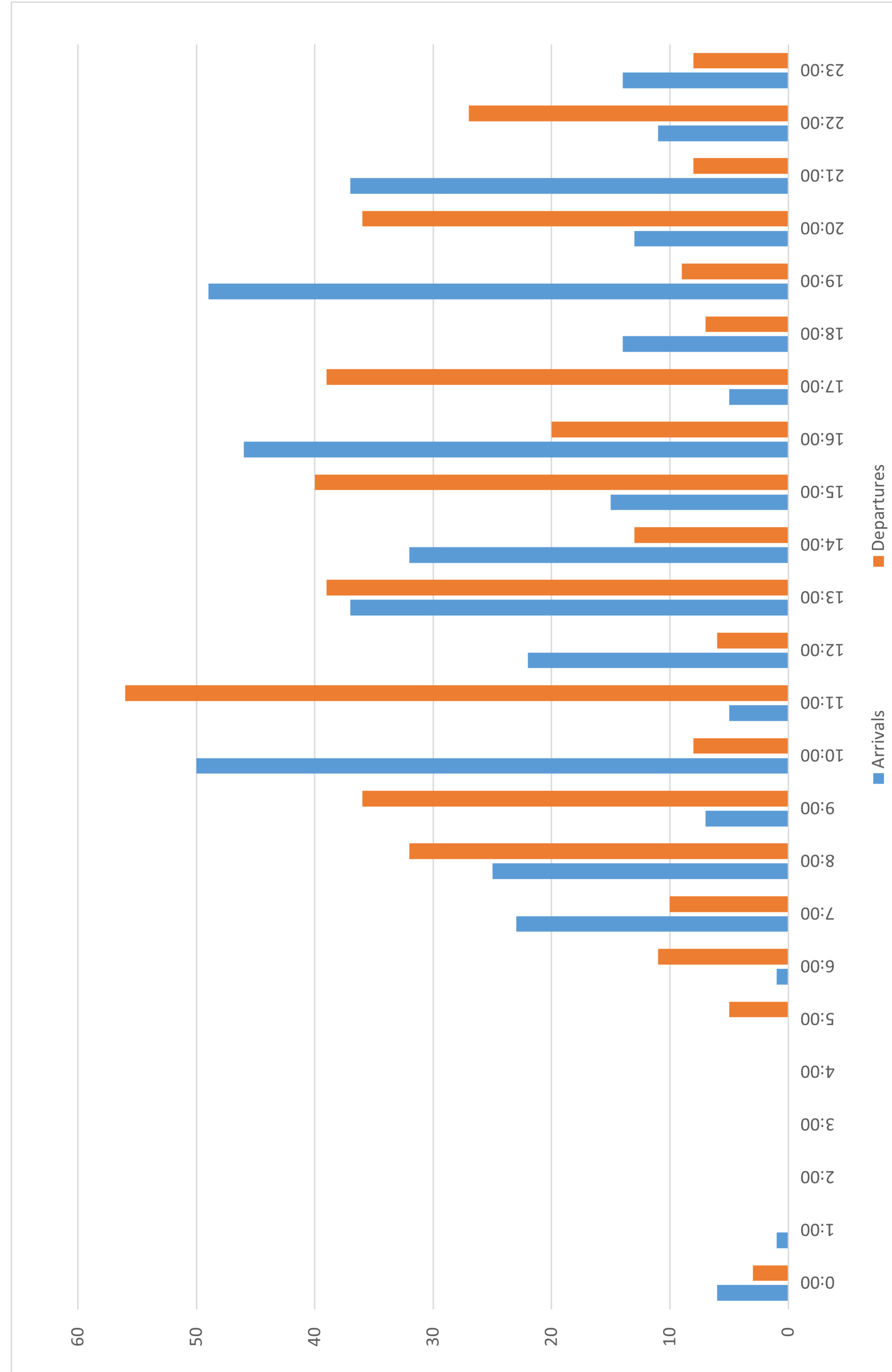


Figure 2-39: Total Operations ADPM Base Case Forecast (2022)

Source: Mary A. Lynch, 2018

Source: Mary A. Lynch, 2018

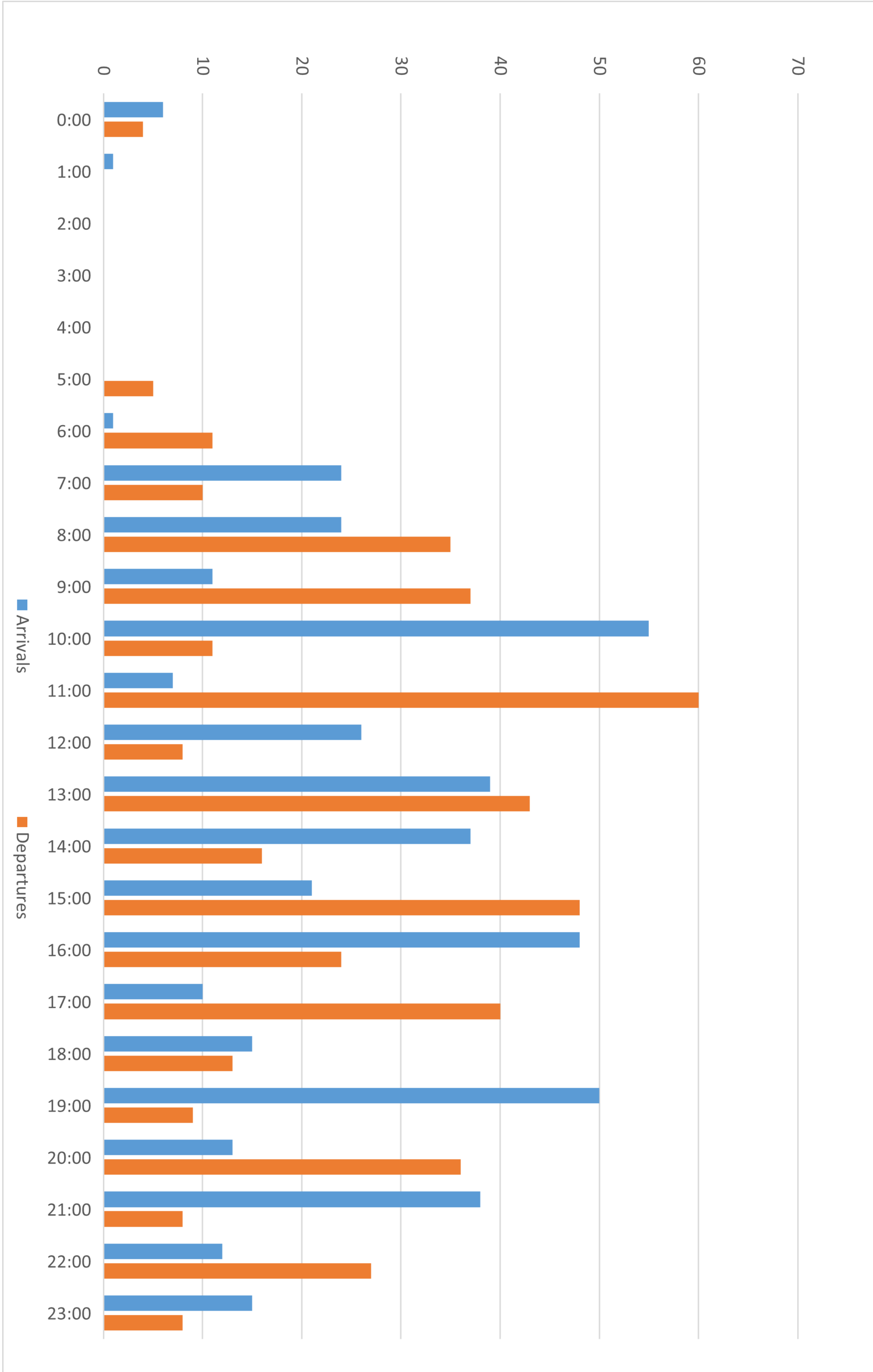
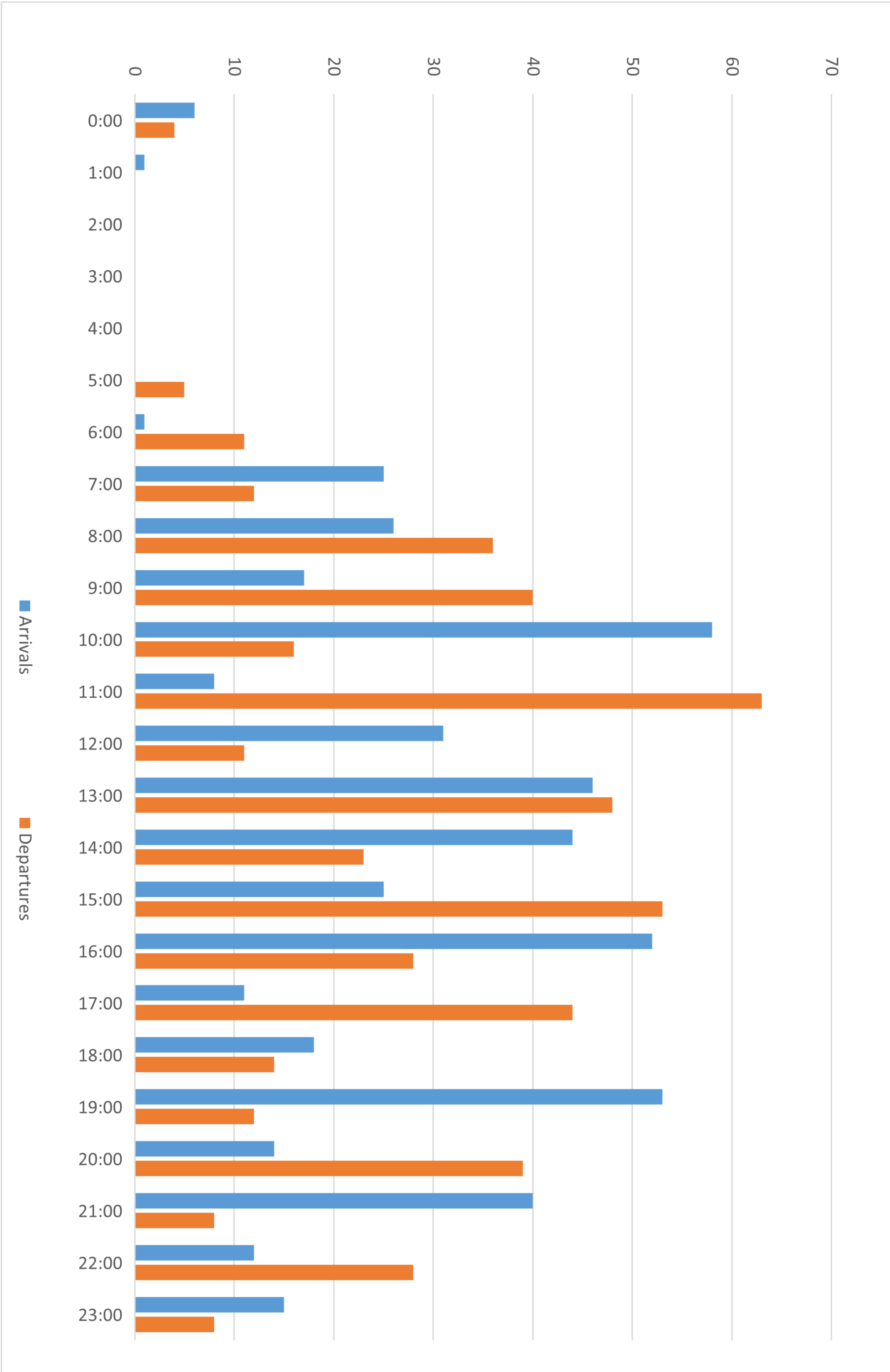


Figure 2-40: Total Operations ADPM Base Case Forecast (2027)

Figure 2-41: Total Operations ADPM Base Case Forecast (2032)

Source: Mary A. Lynch, 2018



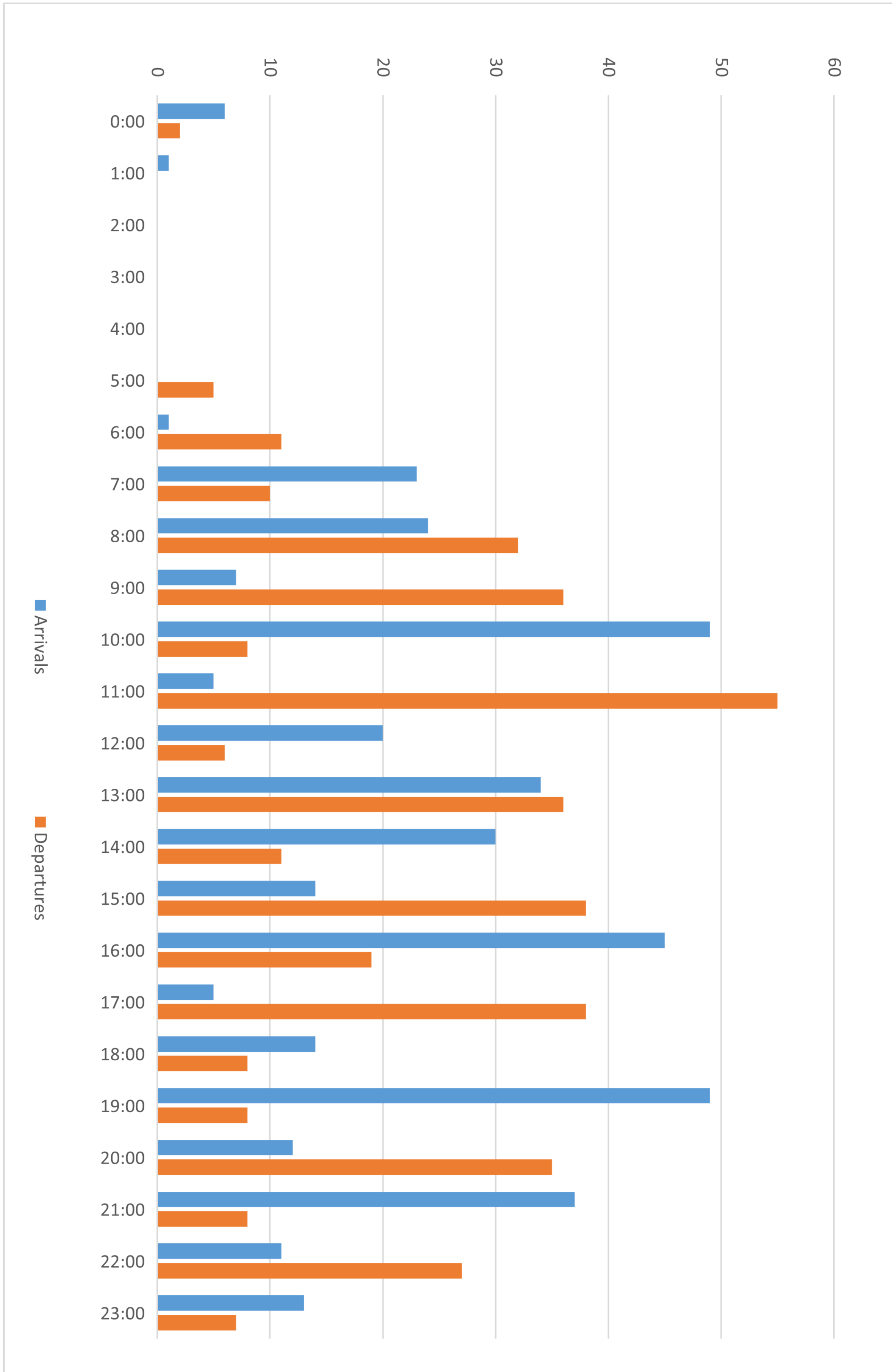
Source: Mary A. Lynch, 2018

Figure 2-42: Total Operations ADPM Base Case Forecast (2037)

2.5.4 Planning Day Model Low Case Scenario Forecast

The Low Case Scenario Forecast Planning Day Model projects the following operational counts and times for the forecast years listed below:

- FY 2022 projects a total of 400 arriving and 400 departing commercial service operations, with 13 of the arrivals, and 13 of the departures being international flights. The peak hour for total arrivals is 10:00 am and 7:00 pm, with each having 49 operations, and total departures is 11:00 am with 55 operations. For international operations, 10:00 am, 12:00 pm, 1:00 pm, 4:00 pm, and 6:00 pm each have two arrivals, and 11:00 am has four departures. The peak hour for combined departures and arrivals is at 1:00 pm with 70 total operations. Total operations for the average day of peak month in FY 2022 are shown in FIGURE 2-43.
- FY 2027 projects a total of 422 arriving and 422 departing commercial service operations, with 16 of the arrivals, and 16 of the departures being international flights. The peak hour for total arrivals is 10:00 am with 52 operations, and total departures is 11:00 am with 57 operations. For international operations, 10:00 am and 6:00 pm each have three arrivals, and 11:00 am has four departures. The peak hour for combined departures and arrivals is at 1:00 pm with 77 total operations. Total operations for the average day of peak month in FY 2027 are shown in FIGURE 2-44.
- FY 2032 projects a total of 438 arriving and 438 departing commercial service operations, with 18 of the arrivals, and 18 of the departures being international flights. The peak hour for total arrivals is 10:00 am with 54 operations, and total departures is 11:00 am with 60 operations. For international operations, 10:00 am and 6:00 pm each have three arrivals, and 11:00 am has four departures. The peak hour for combined departures and arrivals is at 1:00 pm with 79 total operations. Total operations for the average day of peak month in FY 2032 are shown in FIGURE 2-45.
- FY 2037 projects a total of 450 arriving and 450 departing commercial service operations, with 20 of the arrivals, and 20 of the departures being international flights. The peak hour for total arrivals is 10:00 am with 54 operations, and total departures is 11:00 am with 60 operations. For international operations, 10:00 am, 12:00 pm, and 6:00 pm each have three arrivals, and 11:00 am has four departures. The peak hour for combined departures and arrivals is at 1:00 pm with 83 total operations. Total operations for the average day of peak month in FY 2037 are shown in FIGURE 2-46.



Source: Mary A. Lynch, 2018

Figure 2-43: Total Operations ADPM Low Case Scenario Forecast (2022)

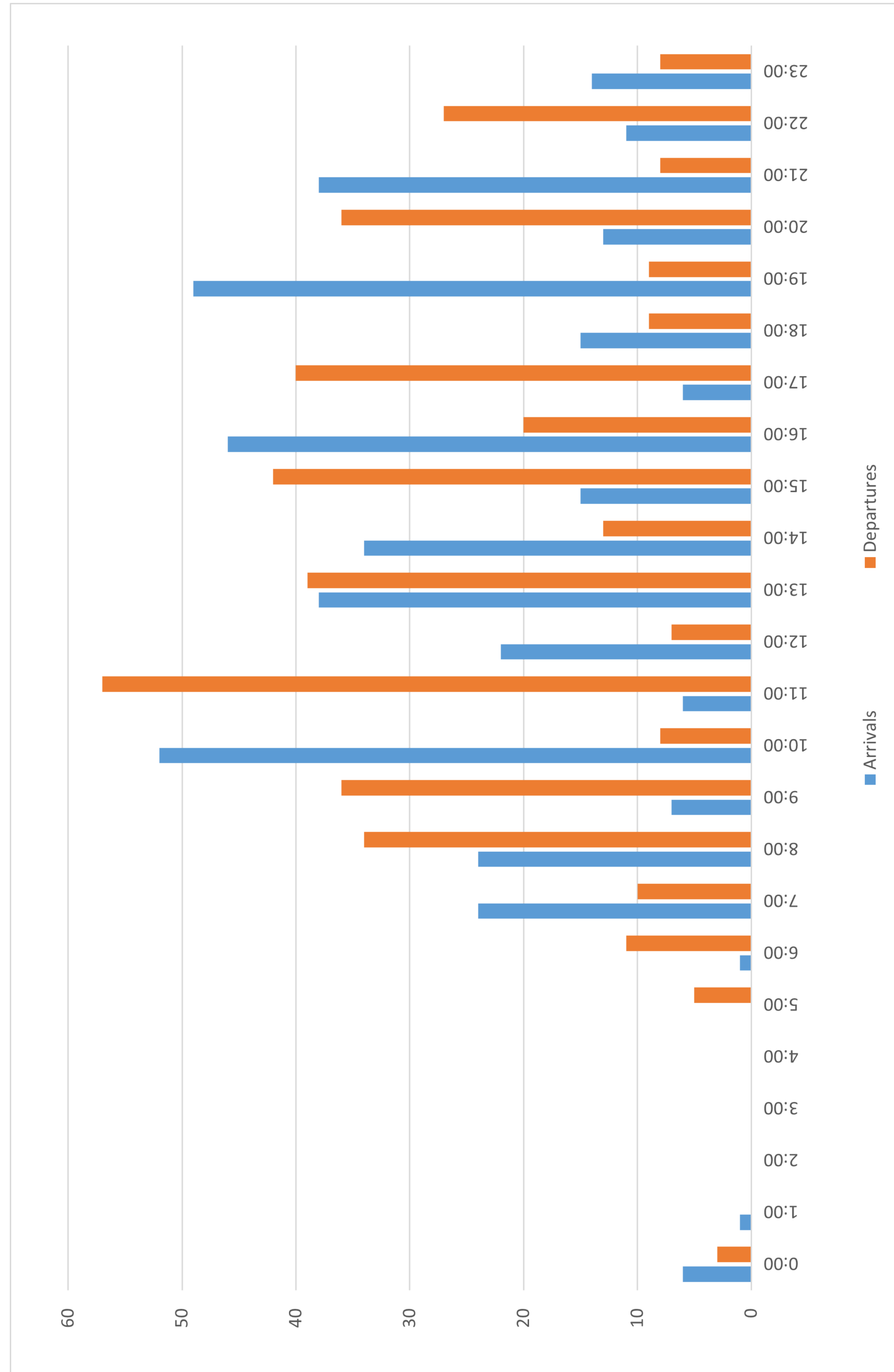
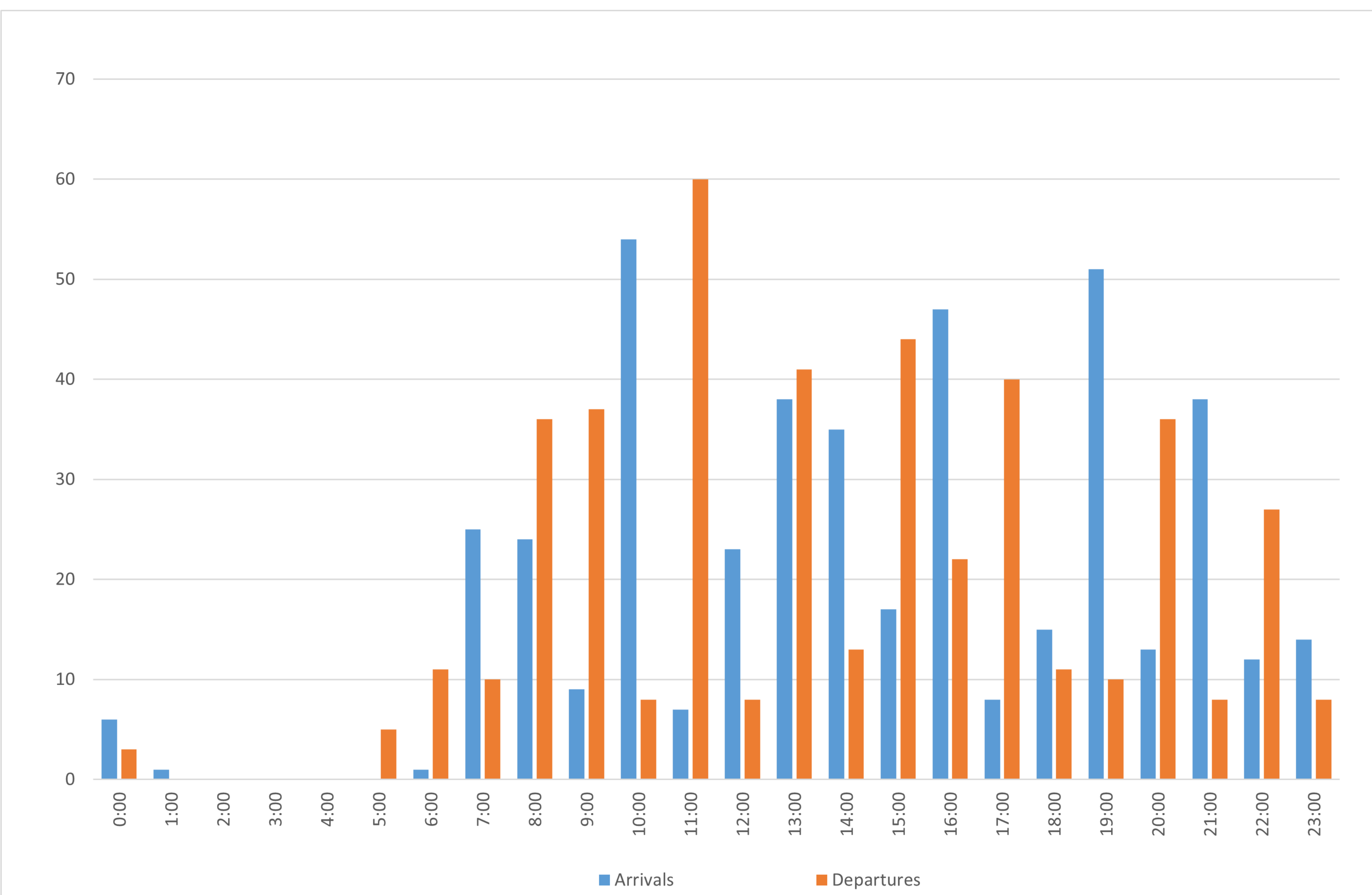


Figure 2-44: Total Operations ADPM Low Case Scenario Forecast (2027)

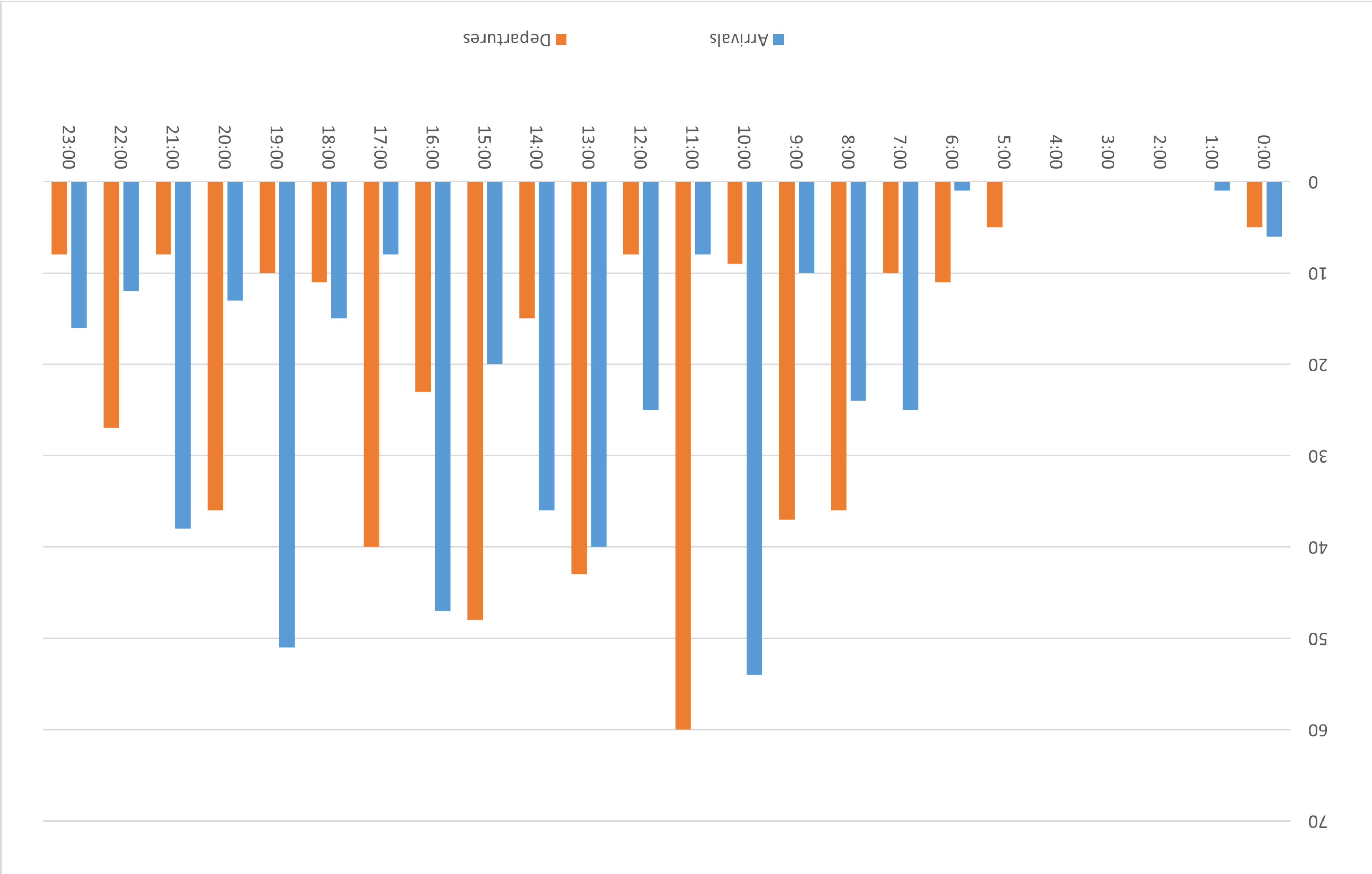
Source: Mary A. Lynch, 2018

Figure 2-45: Total Operations ADPM Low Case Scenario Forecast (2032)



Source: Mary A. Lynch, 2018

Figure 2-46: Total Operations ADPM Low Case Scenario Forecast (2037)



Source: Mary A. Lynch, 2018

2.5.5 Planning Day Model High Case Scenario Forecast

The High Case Scenario Forecast Planning Day Model projects the following operational counts and times for the forecast years listed below:

- FY 2022 projects a total of 413 arriving and departing commercial service operations, with 14 of the arrivals, and 14 of the departures being international flights. The peak hour for total arrivals is 10:00 am with 50 operations, and total departures is 11:00 am with 56 operations. For international operations, 10:00 am, 12:00 pm, 1:00 pm, 4:00 pm, and 6:00 pm each have two arrivals, and 11:00 am has four departures. The peak hour for combined departures and arrivals is at 1:00 pm with 76 total operations. FIGURE 2-47 shows the total operations of average day and peak month for FY 2022.
- FY 2027 projects a total of 480 arriving and departing commercial service operations, with 24 of the arrivals, and 24 of the departures being international flights. The peak hour for total arrivals is 10:00 am with 57 operations, and total departures is 11:00 am with 62 operations. For international operations, 1:00 pm and 6:00 pm each have four arrivals, and 11:00 am has four departures. The peak hour for combined departures and arrivals is at 1:00 pm with 91 total operations. FIGURE 2-48 shows the total operations of average day and peak month for FY 2027.
- FY 2032 projects a total of 517 arriving and departing commercial service operations, with 29 of the arrivals, and 29 of the departures being international flights. The peak hour for total arrivals is 10:00 am with 58 operations, and total departures is 11:00 am with 63 operations. For international operations, 1:00 pm has five arrivals, and 11:00 am and 4:00 pm each have four departures. The peak hour for combined departures and arrivals is at 1:00 pm with 103 total operations. FIGURE 2-49 shows the total operations of average day and peak month for FY 2032.
- FY 2037 projects a total of 561 arriving and departing commercial service operations, with 32 of the arrivals, and 32 of the departures being international flights. The peak hour for total arrivals is 10:00 am with 62 operations, and total departures is 11:00 am with 66 operations. For international operations, 1:00 pm has five arrivals, and 11:00 am, 1:00 pm, 3:00 pm, and 4:00 pm each have four departures. The peak hour for combined departures and arrivals is at 1:00 pm with 111 total operations. FIGURE 2-50 shows the total operations of average day and peak month for FY 2037.

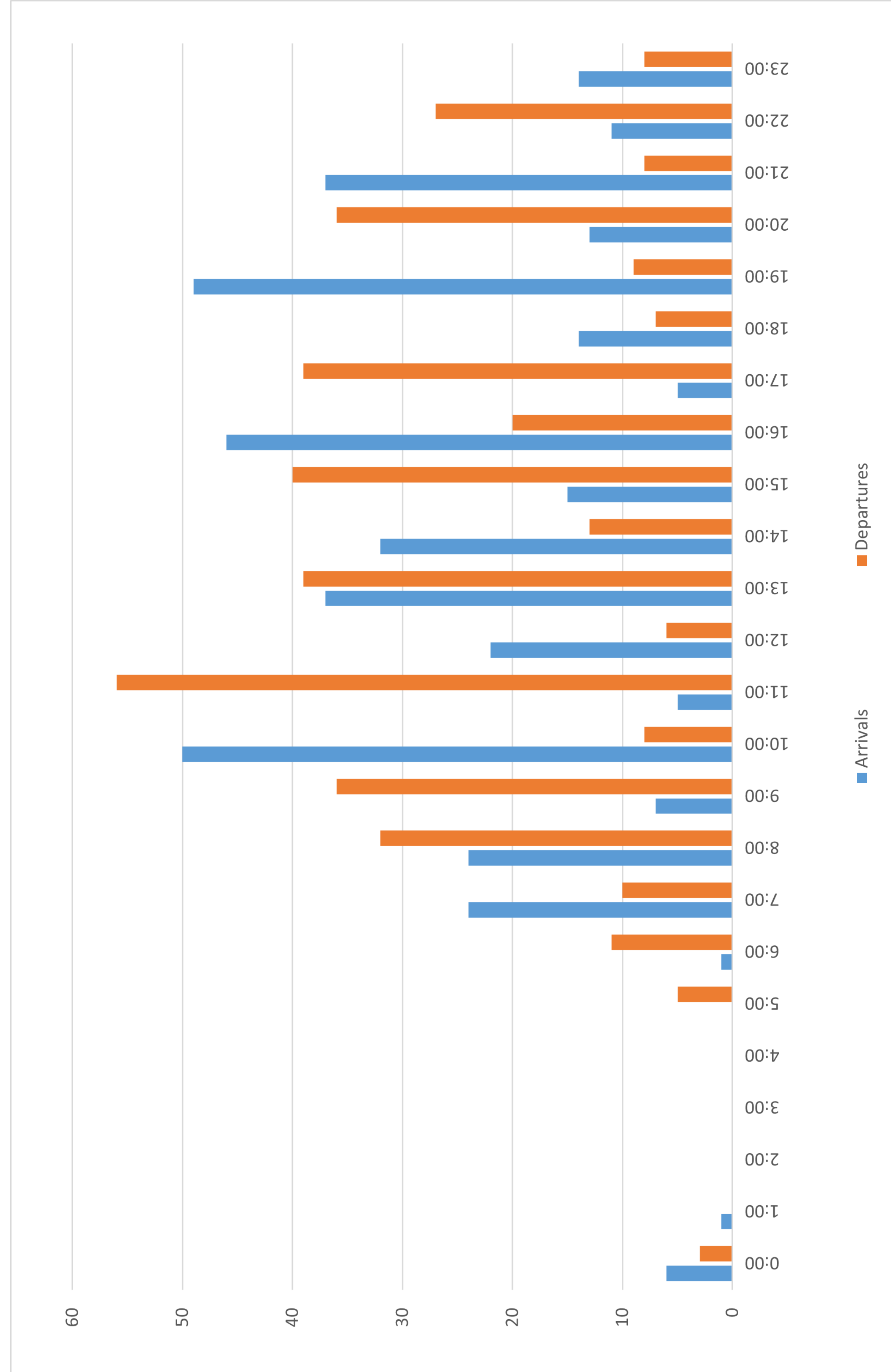
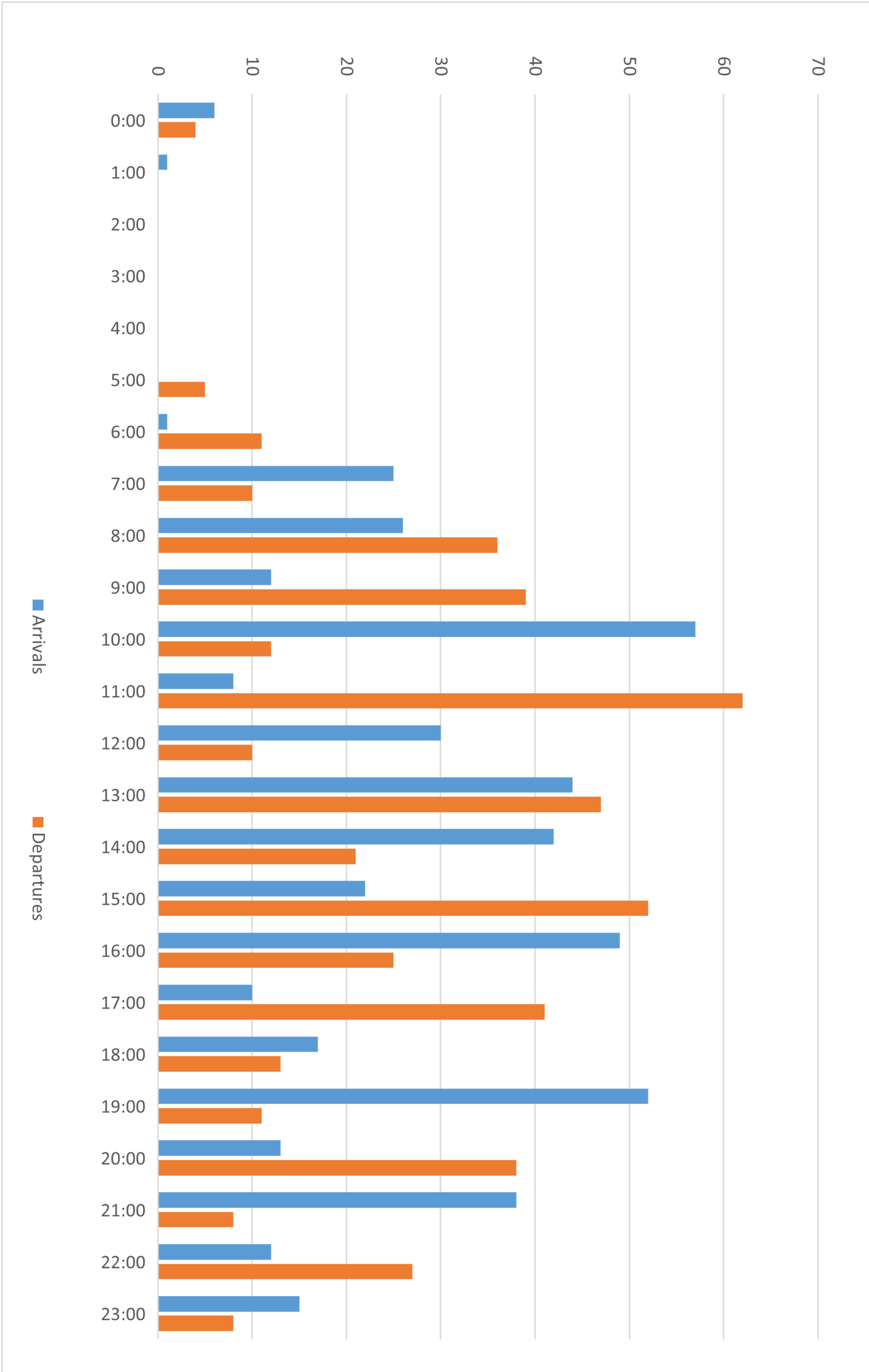


Figure 2-47: Total Operations ADPM High Case Scenario Forecast (2022)

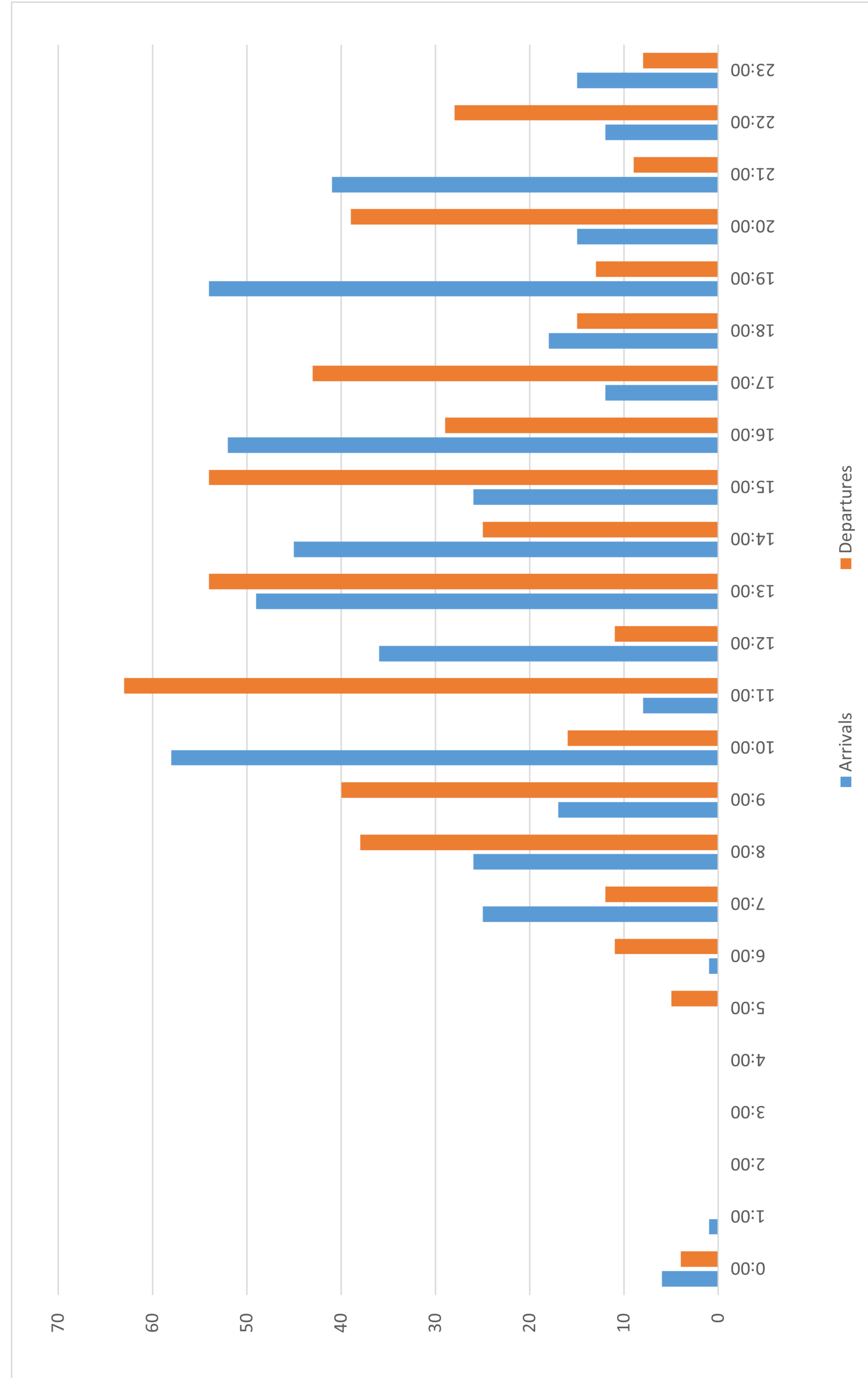
Source: Mary A. Lynch, 2018

Figure 2-48: Total Operations ADPM High Case Scenario Forecast (2027)

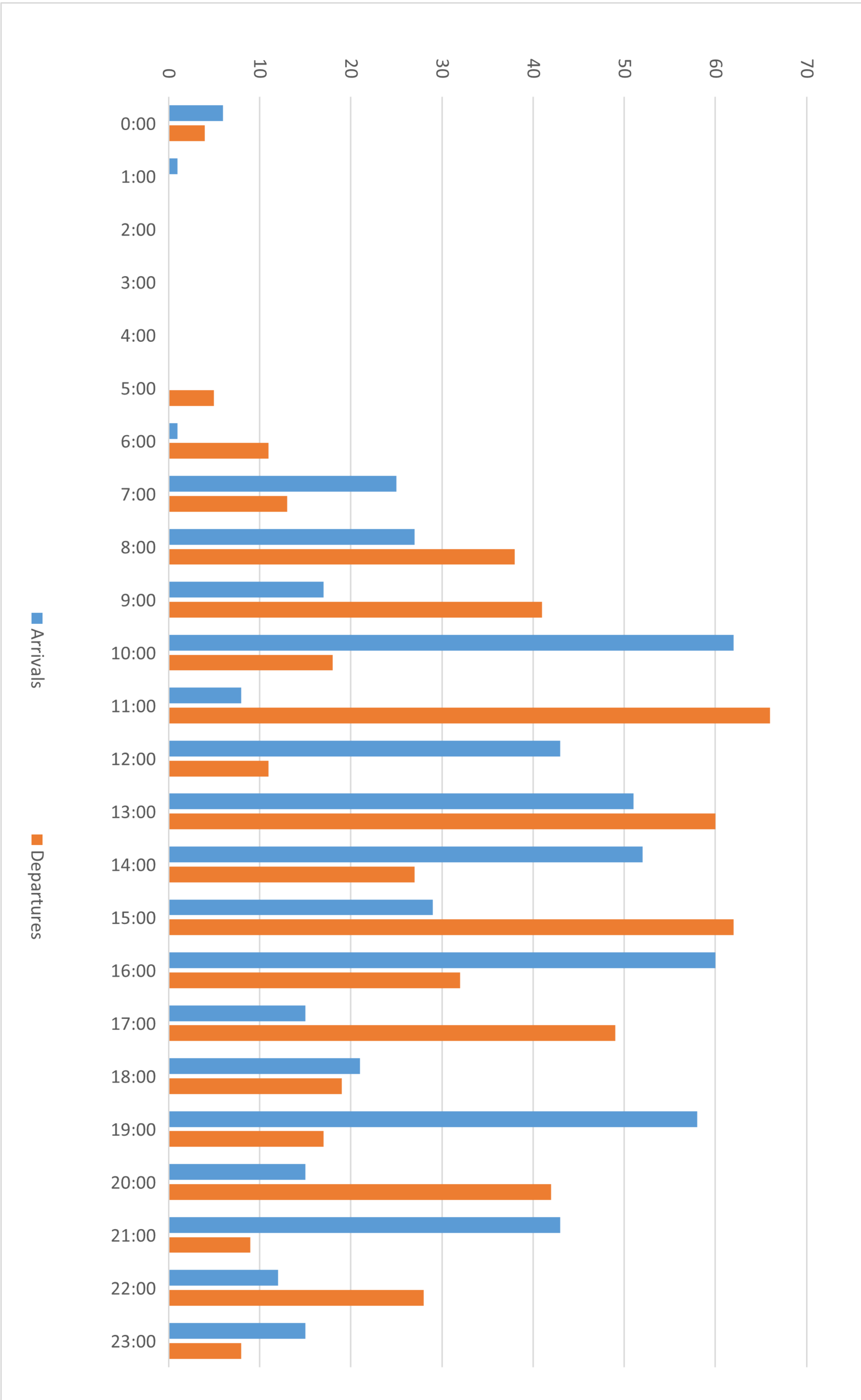


Source: Mary A. Lynch, 2018

Figure 2-49: Total Operations ADPM High Case Scenario Forecast (2032)



Source: Mary A. Lynch, 2018



Source: Mary A. Lynch, 2018

Figure 2-50: Total Operations ADPM High Case Scenario Forecast (2037)

2.5.6 Peak Day and Total Passenger Air Carrier Operations

Peak day passenger carrier operations forecasts were built off of the planning design day models of each forecast scenario. Total passenger air carrier operations were derived from the planning design day models by using the most recent five year average of peak month enplanements to annual enplanements or 9.5% peak month to annual.

There are two primary reasons for the dip in air carrier passenger operations between 2017 and 2018. The 2018 peak day operations were built off of actual schedules and there was a noticeable upgauge from one year to the next. In addition, 2017 operational figures were based upon the National Offload Program that included a number of on demand operations that were classified as air passenger that are not reflected in the schedule.

TABLE 2-15 shows a comparison of the ADPM passenger operations by forecast from 2018-2037. TABLE 2-16 shows a comparison of the operations by passenger aircraft type operations from 2022-2037, and FIGURE 2-51 compares the total passenger operations from 2018-2037.

Table 2-15: Summary of ADPM Passenger Carrier Operations Forecasts (2018-2037)

FY	Low Case Scenario Forcast		Base Case Forcast		High Case Scenario Forcast	
	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
2018	377	377	377	377	377	377
2022	400	400	413	413	413	413
2027	422	422	453	453	480	480
2032	438	438	475	475	517	517
2037	450	450	503	503	561	560

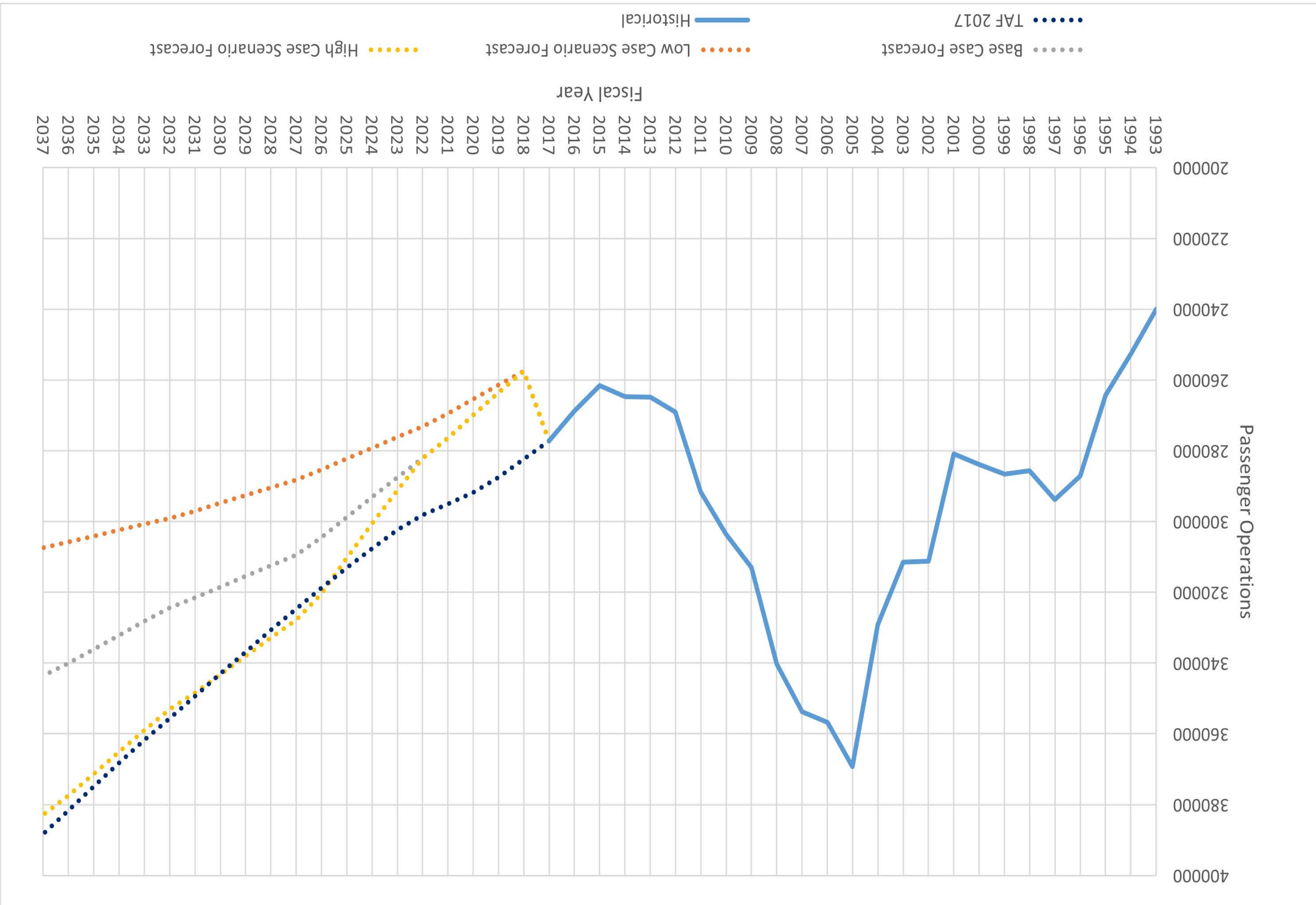
Source: Mary A. Lynch, 2018

Table 2-16: Summary of Air Carrier Operations forecasts by Aircraft Type (2022-2037)

	Low Case Scenario Forecast				Base Case Forecast				High Case Scenario Forecast			
Passenger Aircraft	2022	2027	2032	2037	2022	2027	2032	2037	2022	2027	2032	2037
A220	-	4,781	6,830	6,830	3,415	7,513	13,660	19,124	3,415	14,343	23,222	30,052
A319	10,928	10,928	10,245	683	11,611	11,611	683	683	11,611	11,611	683	683
A320	21,856	2,049	-	-	16,392	2,049	1,366	1,366	16,392	2,049	-	-
A320neo	-	21,856	33,467	46,443	6,147	30,052	43,711	51,907	6,147	32,101	49,858	51,907
A321	18,441	16,392	14,343	15,709	16,392	18,441	16,392	16,392	16,392	18,441	16,392	17,758
A321neo	4,098	4,781	8,196	8,196	4,781	8,196	12,977	14,343	4,781	10,928	17,075	24,588
A330	-	683	683	683	683	683	683	683	683	683	683	683
A339	-	3,415	4,098	4,781	3,415	4,098	4,781	4,781	3,415	4,781	4,781	5,464
A359	-	-	-	-	-	-	-	-	-	-	683	683
712	12,294	12,294	12,294	-	12,294	12,294	12,294	-	12,294	12,294	12,294	-
737	22,539	22,539	16,392	16,392	22,539	16,392	14,343	14,343	22,539	16,392	14,343	10,928
739	40,297	41,663	28,686	14,343	41,663	44,394	15,026	14,343	41,663	44,394	15,026	15,026
739	20,490	5,464	5,464	2,732	21,173	5,464	6,147	3,415	21,173	6,147	6,147	3,415
MAX7	-	-	-	12,294	-	-	-	12,977	-	-	-	12,977
MAX8	683	19,807	41,663	59,420	2,732	31,418	64,201	70,348	2,732	34,833	73,080	86,740
763	2,732	-	-	-	-	-	-	-	-	-	-	-
CRJ	3,415	3,073	3,073	3,073	2,732	2,732	2,732	2,732	2,732	2,732	2,732	3,415
CR7	45,760	46,102	33,808	33,808	46,443	47,809	47,809	47,809	46,443	10,586	10,245	10,928
CR9	17,075	17,075	32,101	32,784	17,075	19,124	19,124	19,124	17,075	56,347	56,688	56,688
E170	683	683	683	683	683	683	683	683	683	683	683	683
E175	43,029	45,760	45,760	47,126	43,029	45,077	45,077	45,760	43,029	45,760	45,760	47,809
E90	1,366	1,366	1,366	1,366	1,366	1,366	2,732	2,732	1,366	2,732	2,732	2,732
M90	7,513	7,513	-	-	7,513	-	-	-	7,513	-	-	-
	273,197	288,223	299,151	307,346	282,076	309,395	324,421	343,545	282,076	327,836	353,107	383,159

Source: Mary A. Lynch, 2018: RS&H, 2018

Figure 2-51: Passenger Operations Forecasts (1993-2037)



Source: Mary A. Lynch, 2018; RS&H, 2018

2.5.7 Electric Vertical Takeoff and Landing Operations

The concept of autonomous and on-demand ridesharing air taxis or, Electric Vertical Takeoff and Landing (eVTOL) aircraft, is continuing to progress as one potential solution to urban congestion and increased mobility. In Uber Elevate's white paper, titled *Fast-Forwarding to a Future of On-Demand Urban Air Transportation*[39], some of the details for how an eVTOL system could function and what resources might be needed are described. In the paper, the use of the terms "vertiports" and "vertistops" are used to provide the means for connecting passengers from one destination to another. The vertiports and vertistops[40], could potentially use the flat rooftops of existing buildings and facilities within already-built up urban and suburban areas or adjacent flat areas to these facilities. Overall, the concept aims to provide efficient service within urban and suburban environments using the eVTOL equipment. Uber Elevate assumes the maximum VTOL distance would be 120 miles, and the enroute speed would be approximately 170 mph.

2.5.7.1 eVTOL Operations Forecast

It is important that this Forecast recognize the eVTOL technology so that thought can be given to potential locations for facilities to serve these operations. However, it is felt the technology is so new that it is premature to provide an enplanements forecast.

In addition, the timing for the technology is also speculative. This Forecast assumes operations will not begin at airports like SLC until a few years after the technology becomes available. Given some of the Uber concepts and assumptions, this Forecast assumes that SLC would integrate regular eVTOL service to at least two or three destinations within 50 miles of the Airport and near the end of the planning horizon (2032-2037).

Even though certification and approval of eVTOL operations are anticipated to be sometime after 2022, the first active year with steady demand and ridership of eVTOL operations out of SLC is grossly estimated to be sometime after 2027 and will be part of the operations forecast by 2032. While the cost of the service is expected to be highest in its initial phases, increased ridership and success will likely lower fares over the long-term, adding to the overall number of passengers and operations.

TABLE 2-17 provides an initial estimate of potential activity based upon what would need to be a profitable venture. At this point, these forecasts are conjecture and are not included in the summary of total operations for SLC. Operations forecasts are based upon 10 percent of arrival air passenger operations generating commuter eVTOL operations with a fast-paced growth to 20 percent by 2037.

Table 2-17: eVTOL Operations Forecast (2022-2037)

FY	Low Scenario Forcast	Base Case Forcast	High Scenario Forcast
	eVTOL Operations	Total eVTOL Operations	Total eVTOL Operations
2022	0	0	0
2027	0	0	0
2032	15,998	17,349	18,883
2037	32,873	36,744	40,981

Source: RS&H, 2018

[38] An analysis of the enplanements by month over the past five fiscal years identified July as the Airport's peak month.
[39] Uber Elevate (October 27, 2016) Retrieved online November 11, 2018 at: https://www.uber.com/elevate.pdf/
[40] Uber Elevate identifies vertiports as sites for eVTOLs with multiple takeoff and landing pads, and vertistops as a single takeoff and landing pad.

2.6 AIR CARGO

2.6.1 Historical Air Cargo

Over the past decade, SLC has shown continual growth in its air cargo activity. The following historical[41] analysis and forecasts define the Airport's air cargo activity, which is made up of freight and belly cargo, with air mail being a subcategory of the total belly cargo poundage. TABLE 2-18 provides the annual totals of air cargo by type, with TABLE 2-19 showing the total air cargo processed by the largest air cargo carriers and all others combined. FIGURE 2-52 compares the shares of total air cargo by the largest air cargo carriers, and FIGURE 2-53 compares the total enplaned and deplaned cargo from 2008 to 2017.

2.6.1.1 Historical Freight

Since 2008, Federal Express (FedEx) and the United Parcel Service (UPS) have maintained their roles as the most active integrated cargo carrier operators out of SLC. FIGURE 2-54 compares the largest shares of air cargo freight at SLC in 2008 and 2017. During the past ten years UPS has increased its total freight share at the Airport by 12% going from 66,340,875 lbs to 117,415,471 lbs Meanwhile, FedEx the largest cargo operator at the Airport, has decreased its total freight share by over 5%, however, it still maintains the greatest quantity of total freight processed by any integrated cargo carrier. The annual enplaned and deplaned freight totals out of SLC has remained somewhat consistent in quantity over the past 10 years, with the totals never differing by more than 10.7%. TABLE 2-18 and FIGURE 2-55 provides the enplaned, deplaned, and total freight annually from 2008-2017. Finally, TABLE 2-19 shows the annual freight poundage processed by the largest cargo carriers at SLC from 2008-2017.

2.6.1.2 Historical Belly Cargo

The two mainline carriers (Delta Air Lines and Southwest Airlines) with the greatest number of enplanements at SLC, have also maintained the greatest amount of belly cargo poundage processed from 2008-2017. The belly cargo poundage deplaned has consistently been greater than the poundage enplaned, although both annual quantities are similar in size. In base year 2017, DL increased its share of belly cargo at SLC from 2008 by over 9%, and WN decreased its share by over 4% during the same time. FIGURE 2-56 compares the largest shares of belly cargo out of SLC. TABLE 2-18 and FIGURE 2-57 show the historical enplaned and deplaned belly cargo from 2008 to 2017.

2.6.1.3 Historical Air Mail

The air mail processed into/out of SLC is carried by both combination and integrated cargo carriers. While statistics track the number of pounds (lbs) of mail, there are no totals differentiating specific amount of mail carried by particular airlines, whether a combination of passenger and belly cargo by passengers airlines or freight by the all-cargo airlines. Therefore, these forecasts do not identify a separate forecast of airmail and assume forecasts of belly cargo and all-cargo include air mail. Air mail has changed in type over the past ten years. In 2008, the enplaned air mail was 22.5% greater than deplaned air mail. Today, the enplaned air mail is 72.3% greater than the deplaned air mail. TABLE 2-18 provides annual air mail and belly cargo totals, and FIGURE 2-58 shows the historical enplaned and deplaned air mail from 2008-2017.

2.6.1.4 Historical Air Cargo Peak Month

The total historical air cargo was compared on a monthly basis from 2013-2017. During those years, the Airport showed consistent balance as no month ever dropped below 7% of the yearly total. The highest month of any year during that period was 10.57% in December, 2015. The analysis confirmed that December, is the peak air cargo month at SLC, likely due to fulfillment orders for the holidays. It is interesting to note that in 2017, June had 37,077,806 lbs of total cargo, or 9.70%, and December had 37,097,455 lbs or 9.71% making it the closest alternative month to December over the past five years. TABLE 2-20 and FIGURE 2-59 show the total monthly air cargo by month out of SLC from 2013-2017.

[41] Historical air cargo data is in calendar year (CY).

Table 2-18: Historical Cargo Activity (2008-2017)

Calendar Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Freight										
Enplaned	151,358,775	125,888,128	130,459,300	146,249,045	153,946,751	154,977,560	152,917,822	153,099,983	151,307,031	160,318,645
Deplaned	149,477,489	121,447,154	130,955,226	140,983,568	145,182,640	140,001,183	140,295,248	150,331,450	167,428,531	179,459,334
Total	3000,836,264	247,335,282	261,414,526	287,232,613	299,129,391	294,978,743	293,213,070	303,431,433	318,735,562	339,777,979
Belly Cargo										
Enplaned	19,352,125	18,830,160	20,708,863	19,249,059	20,279,288	17,548,078	15,866,630	15,553,022	14,499,148	18,138,413
Deplaned	24,436,588	23,233,411	27,936,108	24,481,006	24,794,930	24,133,275	19,524,528	20,523,272	20,513,034	24,286,719
Total	43,788,713	42,063,571	48,644,971	43,730,065	45,074,218	41,681,353	35,411,158	36,076,294	35,012,182	42,425,132
Air Mail*										
Enplaned	5,184,840	5,030,709	7,101,860	11,822,427	16,220,471	20,302,479	18,786,949	24,111,040	20,338,710	23,476,276
Deplaned	4,230,725	4,522,865	3,481,273	5,849,551	8,509,006	9,693,709	9,444,067	12,739,257	10,079,570	13,618,441
Total	9,414,565	9,553,574	10,583,133	17,671,978	24,729,477	29,996,188	28,231,016	36,850,297	30,418,280	37,094,717
Totaly Air Cargo*										
Enplaned	170,710,900	144,718,288	151,168,163	165,498,104	174,226,039	172,525,638	168,804,452	168,653,005	165,806,179	178,457,058
Deplaned	173,914,077	144,680,565	158,891,334	165,464,574	169,977,570	164,134,458	159,819,776	170,854,722	187,941,565	203,746,053
Total	344,624,977	289,398,853	310,059,497	330,962,678	344,203,609	336,660,096	328,624,228	339,507,727	353,747,744	382,203,111

*Air Mail at SLC is included in both belly cargo freight poundage and excluded from forecast Total Air Cargo totals

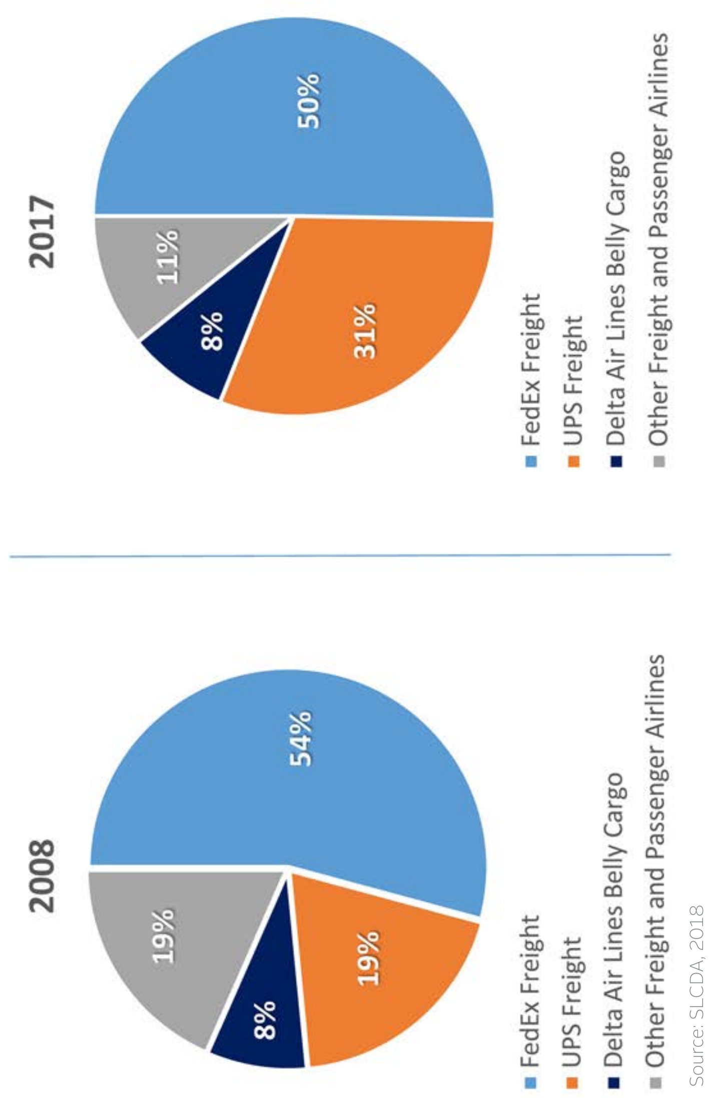
Source: SLCDA, 2018

Table 2-19: Historical Air Cargo by Carrier

Calendar Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Integrated Carrieers										
FedEx	186,846,219	164,621,549	176,198,518	182,587,926	182,793,312	170,870,817	165,032,042	171,737,401	186,862,728	192,239,391
UPS	66,340,875	63,716,259	63,671,501	81,101,715	94,029,660	101,287,129	104,334,465	105,648,851	107,749,530	117,415,471
Other Carriers	47,649,170	18,997,474	21,544,507	23,542,972	22,306,419	22,820,797	23,846,563	26,045,181	24,159,304	30,123,117
Combination Carriers										
Delta Air Lines	27,983,228	29,576,421	38,276,631	33,386,676	34,098,357	30,608,258	25,017,569	24,911,023	23,489,368	31,159,354
Southwest Airlines	10,577,817	8,575,911	8,125,865	8,395,082	9,656,258	9,772,120	9,134,636	9,561,364	8,969,857	8,378,975
Other Carriers	5,227,668	3,911,239	2,242,475	1,948,307	1,319,603	1,300,975	1,258,953	1,603,907	2,552,957	2,886,803

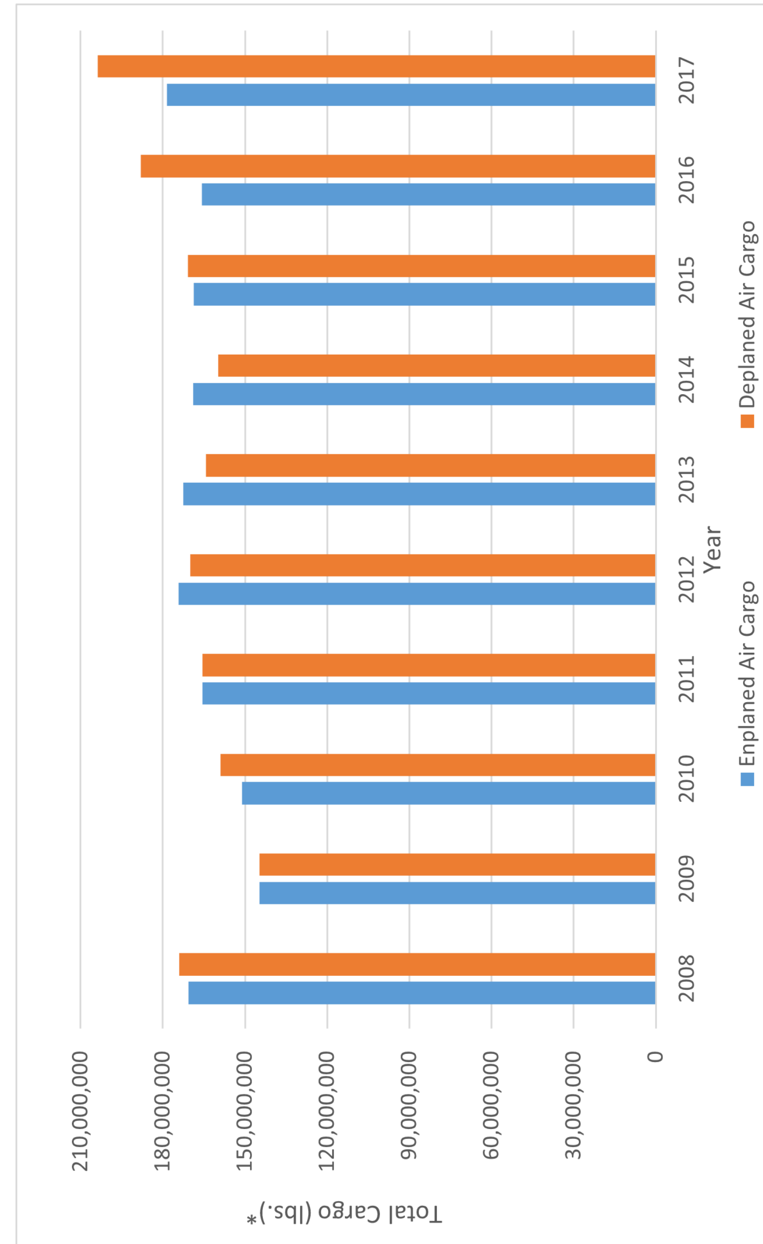
Source: SLCDA, 2018

Figure 2-52: Comparison of Total Air Cargo Shares by Carrier (2008 & 2017)



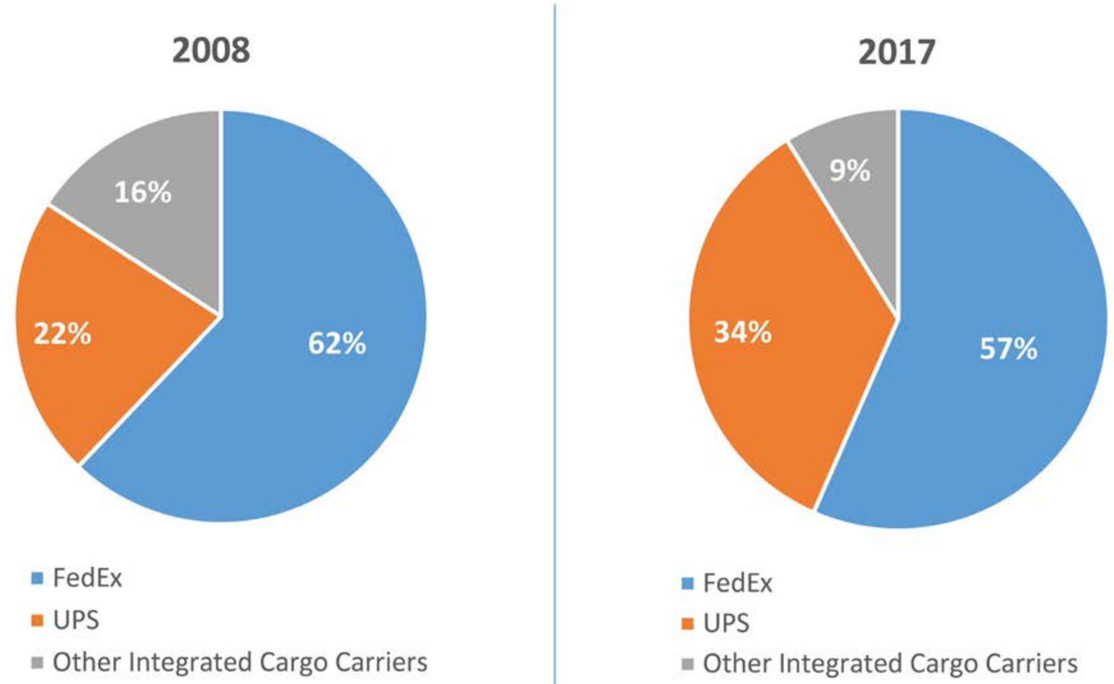
Source: SLCDA, 2018

Figure 2-53: Historical Total Air Cargo (2008-2017)



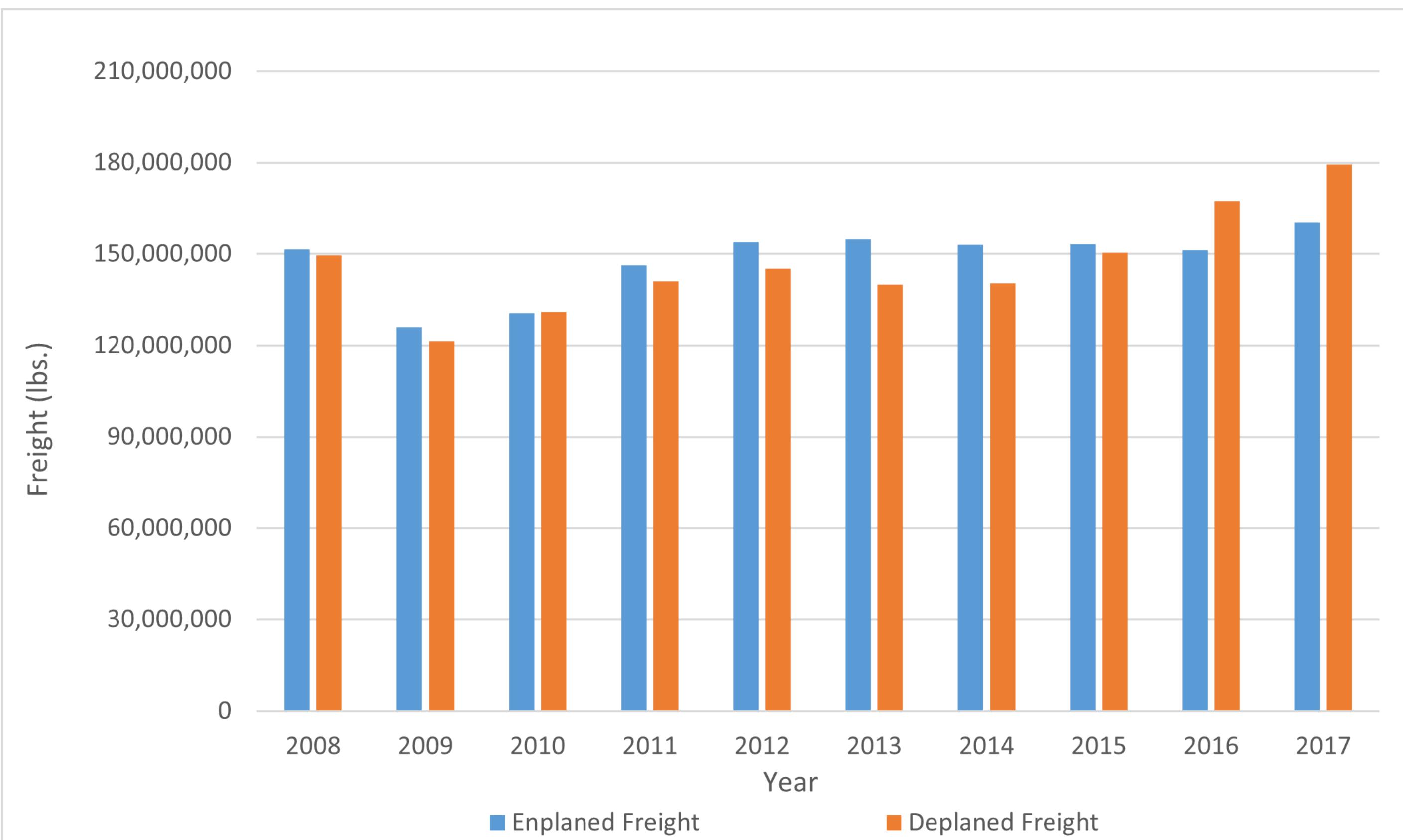
Source: RS&H, 2018

Figure 2-54: Comparison of Freight Cargo Shares by Carrier (2008 & 2017)



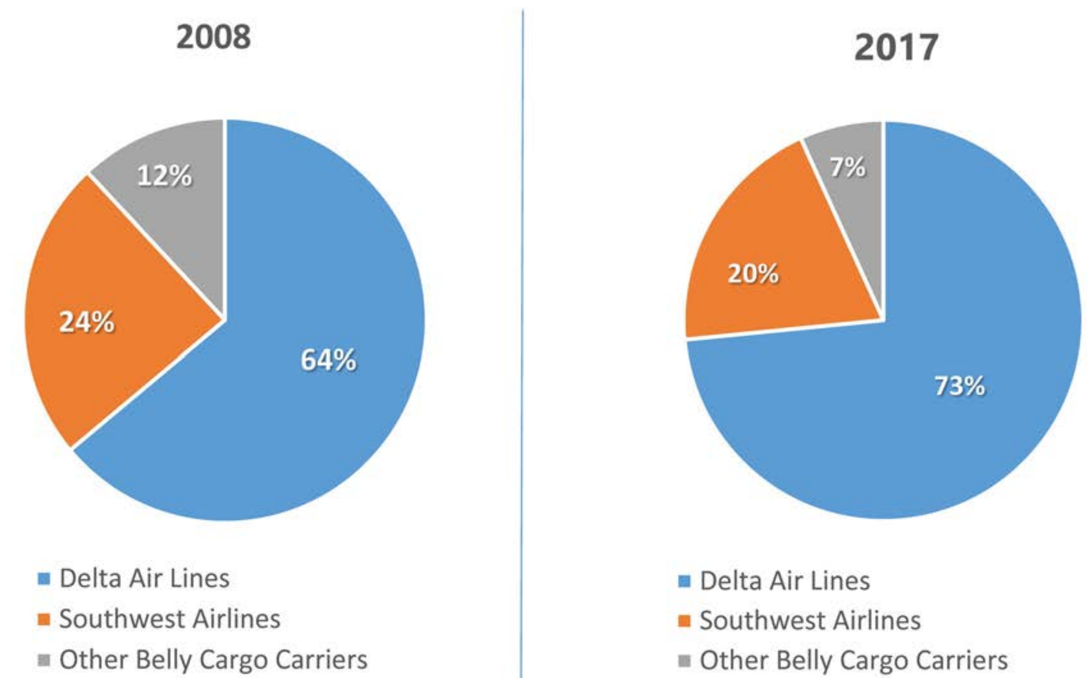
Source: SLCDA, 2018

Figure 2-55: Historical Freight (2008-2017)



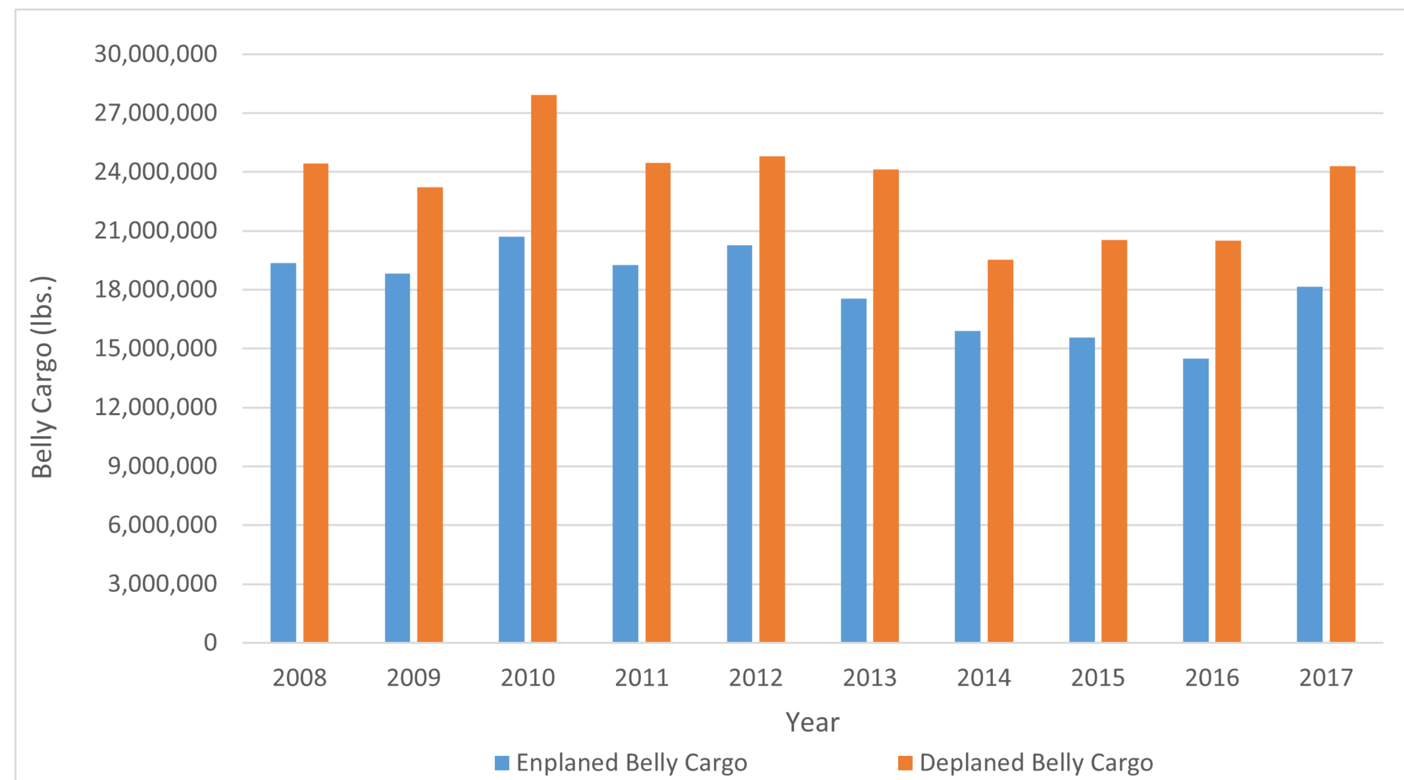
Source: SLCDA, 2018

Figure 2-56: Comparison of Belly Cargo Shares by Carrier (2008 & 2017)



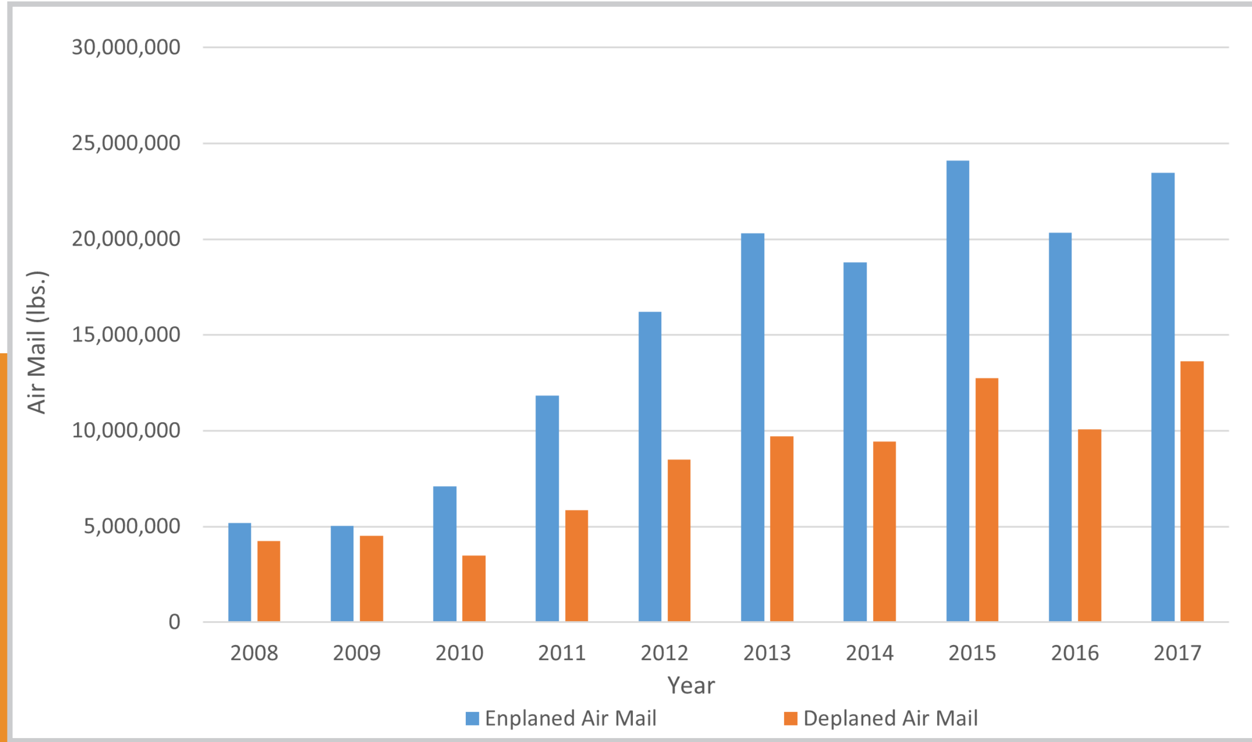
Source: SLCDA, 2018

Figure 2-57: Historical Belly Cargo (2008-2017)



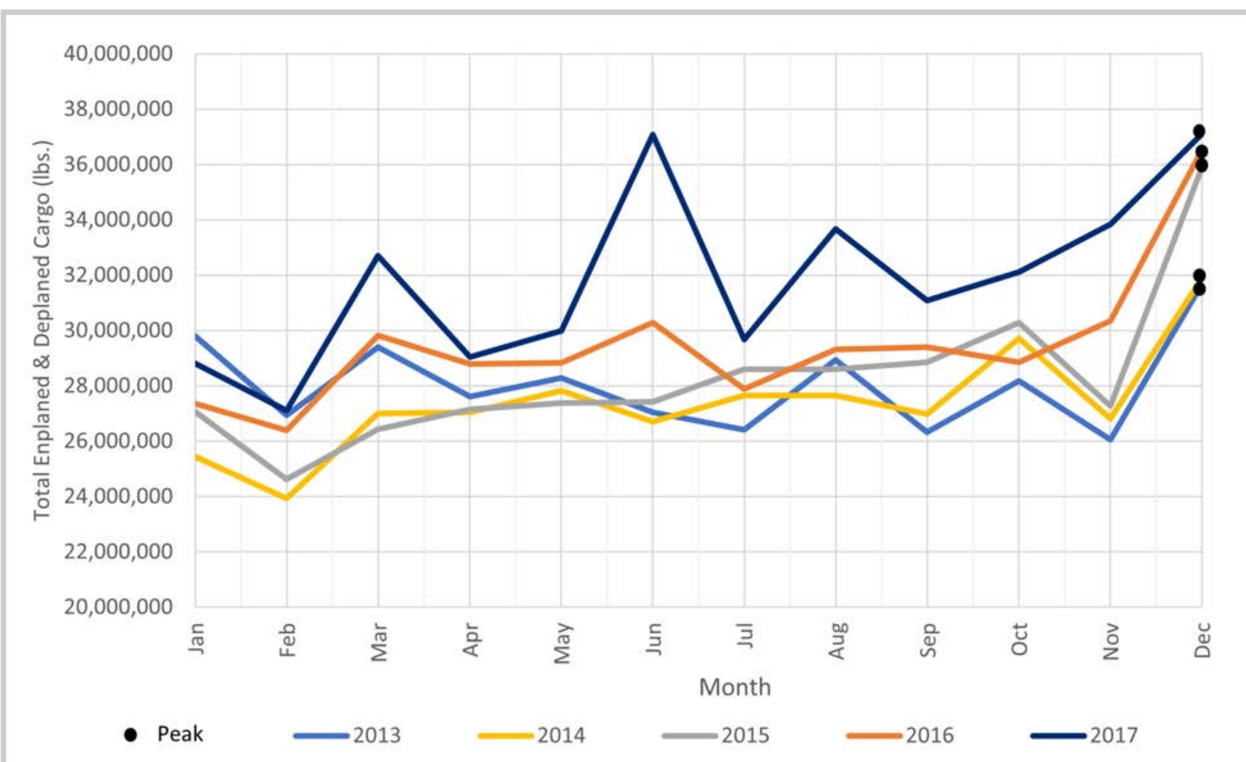
Source: SLCDA, 2018

Figure 2-58: Historical Air Mail (2008-2017)



Source: SLCDA, 2018

Figure 2-59: Peak Month Total Cargo (2013-2017)



Source: SLCDA, 2018

Table 2-20: Air Cargo Processed by Month (2013-2017)

CY	Jan	Feb	Mar	Apr	May	Jun
2013	29,800,841 8.9%	26,940,868 8.0%	29,391,583 8.7%	27,605,363 8.2%	28,288,634 8.4%	27,040,027 8.0%
2014	25,443,398 7.7%	23,924,434 7.3%	27,004,935 8.2%	27,040,438 8.2%	27,821,637 8.5%	26,707,931 8.1%
2015	27,061,527 8.0%	24,620,591 7.3%	26,431,303 7.8%	27,143,281 8.0%	27,369,468 8.0%	27,417,151 8.0
2016	27,354,310 7.7%	26,381,449 7.5%	29,815,741 8.4%	28,781,732 8.1%	28,822,798 8.2%	30,285,538 8.6%
2017	28,809,066 7.5%	27,112,995 7.1%	32,707,931 8.6%	29,044,665 7.6%	29,990,574 7.9%	37,077,806 9.7%

CY	Jul	Aug	Sep	Oct	Nov	Dec
2013	26,415,727 7.9%	28,933,808 8.6%	26,334,221 7.8%	28,186,057 8.4%	26,060,500 7.7%	31,662,467 9.4%
2014	27,660,644 8.4%	27,650,980 8.4%	26,974,235 8.2%	29,712,209 9.0%	26,800,812 8.2%	31,882,575 9.7%
2015	28,595,556 8.4%	28,594,636 8.4%	28,843,187 8.5%	30,287,128 8.9%	27,262,764 8.0%	35,881,135 10.6%
2016	27,884,788 7.9%	29,318,809 8.3%	29,400,339 8.3%	28,847,122 8.2%	30,347,128 8.6%	36,507,990 10.3%
2017	26,672,343 7.8%	33,664,372 8.8%	31,090,161 8.1%	32,106,170 8.4%	33,829,573 8.9%	37,097,455 9.7%

Note: Percentages are rounded to the nearest 0.1.
Source: SLCDA, 2018

2.6.2 Air Cargo Fleet Mix-Baseline 2017

The air cargo fleet mix baseline, identifies the most commonly used fleet of aircraft by the Airport's integrated carriers in 2017. These aircraft include:

Airbus
- Airbus 300-600

ATR
- ATR-43 Cargo
- ATR-72 Cargo

Beech
- Beech King Air 1900
- Beech 99 Airliner

Boeing
- Boeing 737-400F
- Boeing 757-200F
- Boeing 767-300F

Cessna
- Cessna 208 Caravan
- Cessna 402

Embraer
- Embraer 120

Fairchild Swearingen
- Fairchild Swearingen 4 Metro

McDonnell Douglas (Boeing)
- McDonnell Douglas DC-10
- McDonnell Douglas MD-11

2.6.3 Local Cargo Forecasts

The local belly cargo forecasts project the combined enplaned and deplaned belly cargo, whereas the local freight forecasts project the combined enplaned and deplaned freight.

2.6.3.1 Belly Cargo Forecast

There are no FAA forecasts for growth in air cargo pounds. Instead, the forecast will use revenue ton miles (RTM) as a surrogate. The AAGR for domestic airlines belly cargo forecast RTM ranges from 1.0 percent to 1.2 percent over the course of the 20-year planning period . Forecasts of belly cargo RTM carried on international routes is more robust and is anticipated to average about 3.4 percent over the same period . Due to the larger cargo capacities of international airlines' aircraft that use a greater percentage of wide body equipment, it is common that the average cargo capacity of international passenger aircraft is significantly greater than U.S. domestic aircraft. While percentages vary widely, studies have indicated that U.S. airport belly cargo represents from 10-15 percent of all cargo whereas the percentage at international airports is almost evenly split.

Over the past ten years, belly cargo growth at SLC has been approximately 1.25 percent AAGR which is very similar to the FAA forecast for domestic RTMs. Over the past five years, as the percent of international enplanements has doubled at SLC, belly cargo growth has been 3.5 percent AAGR which is very similar to the long-term forecast of international belly cargo RTMs for the U.S.

In conversations with both passenger and air cargo carriers, including Delta, Federal Express, and UPS, these airlines have equated general growth for the next few years to be in line with the growth in U.S. GDP.

For the belly cargo forecasts, the rate of GDP growth is used for the Base Case Forecast (1.7 percent). This rate of growth is a hybrid between the previous five and ten year growth rates in belly cargo at SLC and is in line with the potential for increased belly cargo capacity from upgauging.

The Low Case belly cargo forecast assumes a rate of GDP growth associated with belly cargo to be 20 percent lower than the Base Case which rate is slightly larger than the growth FAA forecast for long-term domestic belly cargo RTMs (approximately 1.4 percent).

The High Case belly cargo forecast assumes a rate of 40 percent higher GDP rate of growth than the Base Case. Two primary reasons are assumed for the High Case growth rate: (1) anticipation that new international flights on larger aircraft will provide more belly cargo capacity, as a result of carrying a growing number of passengers relative to all enplanements on larger aircraft, and (2) an outgrowth of the first, an anticipated initiation of international service from SLC to Asia, the fastest air cargo growth market in the world, that would provide more opportunity for belly air cargo growth.

TABLE 2-21 shows the belly cargo forecasts from 2017-2037.

[42] AFAA Aerospace Forecast: Fiscal Years 2018-2038, Federal Aviation Administration, Table 19 – U.S. Commercial Air Carriers Air Cargo Revenue Ton Miles, p. 84.
[43] FAA Aerospace Forecast: Fiscal Years 2018-2038, Federal Aviation Administration, Table 19 - U.S. Commercial Air Carriers Air Cargo Revenue Ton Miles, p. 84.
[44] Airport Cooperative Research Program, Air Cargo Facility Planning and Development Final Report, 2015.

Table 2-21: Belly Cargo Forecast-Total Pounds (2017-2037)

Year	Low Case Scenario Forecast	Base Case Forecast	High Case Scenario Forecast
2017	42,425,132	42,425,132	42,425,132
2018	43,006,356	43,154,844	43,439,093
2019	43,595,543	43,897,108	44,477,287
2020	44,192,802	44,652,138	45,540,294
2021	44,798,244	45,420,155	46,628,707
2022	45,411,980	46,201,381	47,743,133
2023	46,034,124	46,996,045	48,884,194
2024	46,664,731	47,804,377	50,052,526
2025	47,304,099	48,626,612	51,248,782
2026	47,952,165	49,462,990	52,473,628
2027	48,609,110	50,313,753	53,727,747
2028	49,275,055	51,179,150	55,011,841
2029	49,950,123	52,059,431	56,326,623
2030	50,634,439	52,954,854	57,672,830
2031	51,328,131	53,865,677	59,051,210
2032	52,031,327	54,792,167	60,462,534
2033	52,744,156	55,734,592	61,907,589
2034	53,466,751	56,693,227	63,387,180
2035	54,199,245	57,668,350	64,902,134
2036	54,941,775	58,660,246	66,453,295
2037	55,694,477	59,669,202	68,041,529
Average Annual Growth Rate (AAGR)			
2018-2037	1.37%	1.72%	2.39%

Source: RS&H, 2018

2.6.3.2 Freight Forecast

The annual local freight forecasts were based on historical and anticipated changes for FedEx and UPS individually as well as the remainder of the integrated cargo carriers combined into the "Others" group.

Rates of growth were mainly determined from interviews with the individual carriers for the short term. FedEx and UPS indicated that they expected to grow in line with U.S. GDP AAGRs over the short-term and into the future. In addition, the forecasts also include consideration for a potential expansion in the SLC market based upon serving Amazon whether through expansion of service with integrated carriers or initiation of individual service that primarily serves Amazon.

The Base Case air cargo forecast assumes continuation of growth for the next five years based upon rates over the past five years plus the potential growth that might be associated with Amazon. While, there are no specific indicators regarding the potential for Amazon growth, it is accounted through assumptions of experiencing growth rates greater than GDP. The Low Case scenario assumes growth that is based upon a decrease in the U.S. GDP by ten percent. The High Case Scenario Forecast builds on the Base Case Forecast by assuming a growth rate 20 percent over the Base Case. This assumes the potential for greatly expanded service that would be due to, in part a sustained economy, but also the possibility of a new airline operated for or by Amazon.

TABLE 2-22 shows the total freight forecasts from 2017-2037.

Table 2-22: Freight Forecast-Total Pounds (2017-2037)

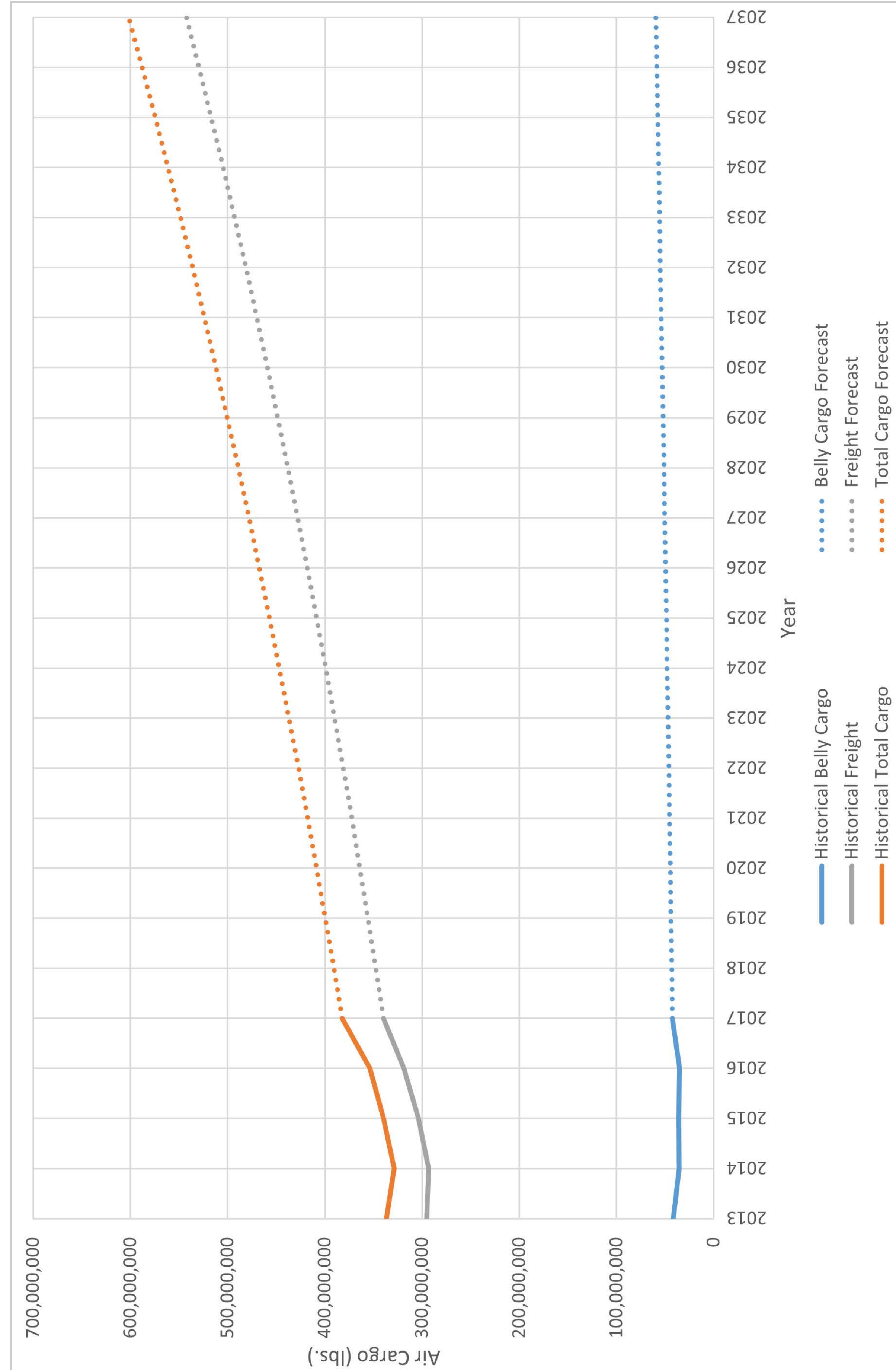
Year	Low Case Scenario Forecast	Base Case Forecast	High Case Scenario Forecast
2017	339,777,979	339,777,979	339,777,979
2018	345,005,312	347,593,221	350,008,670
2019	350,313,065	355,610,674	360,558,000
2020	355,702,475	363,836,141	371,436,252
2021	361,174,799	372,275,605	382,654,054
2022	366,731,312	380,935,231	394,222,390
2023	372,373,310	389,821,380	406,152,609
2024	378,102,107	398,940,605	418,456,447
2025	383,919,040	408,299,667	431,146,028
2026	389,825,463	417,905,536	444,233,888
2027	395,822,754	427,765,398	457,732,983
2028	401,912,310	437,886,666	471,656,708
2029	408,095,552	448,276,982	486,018,908
2030	414,373,920	458,944,230	500,833,897
2031	420,748,878	469,896,537	516,116,472
2032	427,221,912	481,142,290	531,881,932
2033	433,794,531	492,690,135	548,146,096
2034	440,468,266	504,548,992	564,925,317
2035	447,244,674	516,728,062	582,236,506
2036	454,125,334	529,236,836	600,097,148
2037	461,111,850	542,085,104	618,525,325
Average Annual Growth Rate (AAGR)			
2018-2037	1.54%	2.36%	3.04%

Source: RS&H, 2018

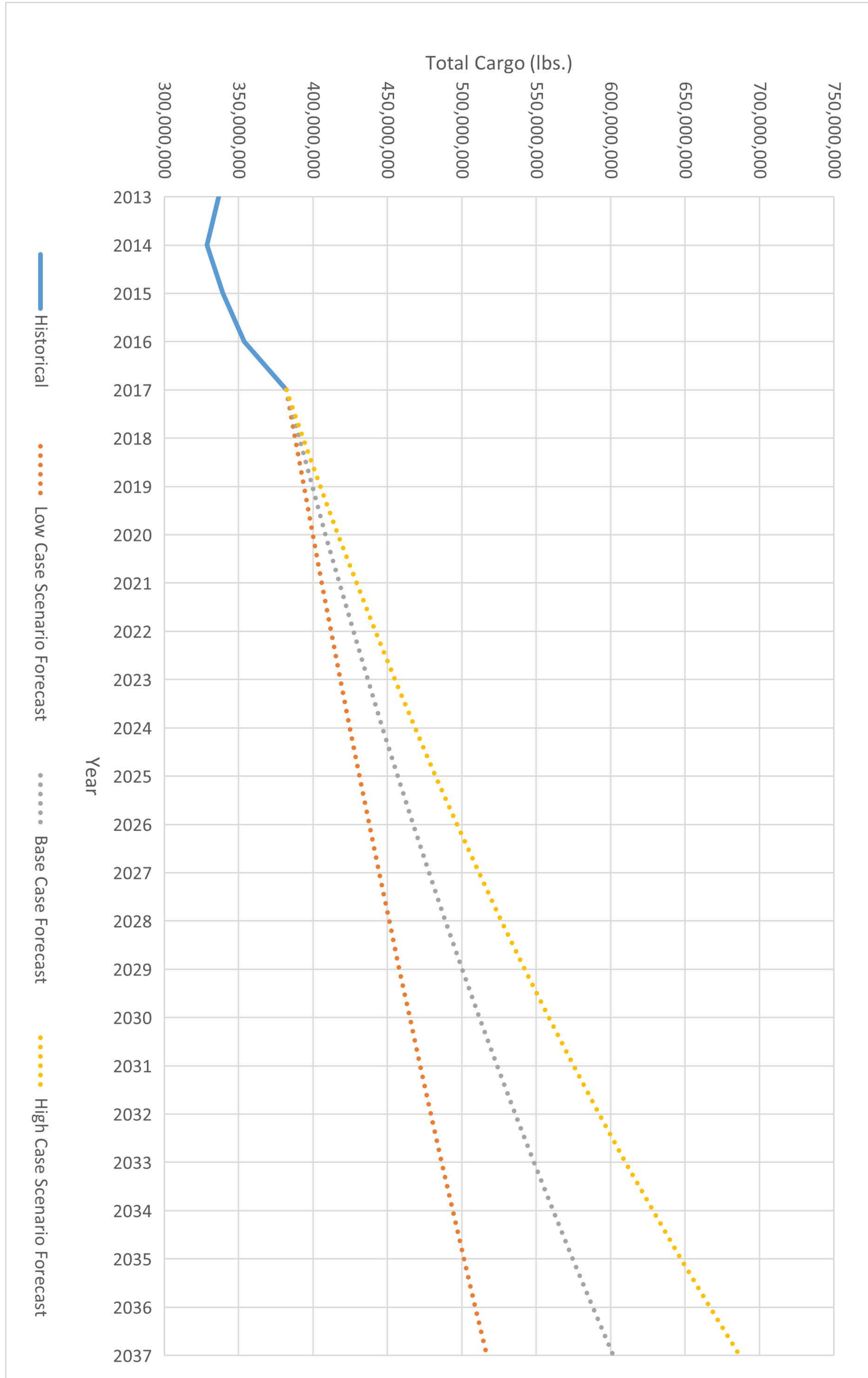
2.6.4 Total Air Cargo Forecast

The total air cargo forecasts take a bottom up approach, in which the total enplaned and deplaned air cargo in pounds (lb.) is projected based on the growth of both enplaned and deplaned belly cargo and enplaned and deplaned freight. FIGURE 2-60 provides a breakdown of belly cargo versus freight cargo forecasts for the Base Case Forecast. FIGURE 2-61 compares the projected total air cargo poundage of the three forecast scenarios through 2037.

Figure 2-60: Base Case Forecast of Air Cargo by Type (2013-2037)



Source: RS&H, 2018



Source: RS&H, 2018

Figure 2-61: Total Air Cargo (lbs.) Forecast Comparison (2013-2037)

2.6.5 Air Cargo Operations Forecast (Integrated Carriers)

To accurately reflect operations by aircraft type, interviews were conducted with the largest passenger and integrated cargo carriers.

Trends and market factors that may affect cargo operations out of SLC are:

- Surveyed responses from major cargo providers including FedEx, UPS, Delta Air Lines, Southwest Airlines, and American Airlines
- Examination of changes in fleet mix (e.g. anticipated retirements of passenger aircraft, usage of small vs. large aircraft)
- Belly cargo versus dedicated freighter cargo demand and anticipated changes in air cargo fleets by integrated carriers
- Economic political and demographic trends that will have potential impacts on the Airport's market share growth in the short, medium, and long-term

A detailed analysis was performed of cargo load factors by air cargo aircraft type by integrated carrier for September and December 2017 to calibrate load factors to be used in forecasting future operations forecasts for integrated carriers. Increased potential for belly cargo uplift is assumed by the air passenger forecasts.

Each integrated carrier indicated that it would be upgauging aircraft in the future, with plans for additional parking positions for both their air carrier fleet and feeder fleets and could be constrained if more space is not available. In general, there would be a move away from older aircraft such as the B-757, MD-11, and DC-10s to more frequencies by B767-300. In terms of feeder aircraft, wherever possible the use of existing aircraft in the fleet would grow over time with upgauging where possible to handle additional load. A separate sub-forecast of integrated carriers was developed for feeder aircraft and which derived operational forecasts for those aircraft. This is included within the identified forecasts. For example, instead of adding an additional ATR-43 to a route, the aircraft would be upgauged to an ATR-72 when the air cargo load factor increased to the 2017 level. Existing air cargo airline load factors were maintained over the forecast period based upon 2017 load factors.

In terms of the future fleet beyond upgauging to B-767s or increasing B-767 frequencies, the long-term forecasts consider larger aircraft that are not currently being anticipated to handle increasing volumes of air cargo. For that reason, aircraft such as the B-777 and A330 could be introduced to increase capacity per flight as opposed to increasing frequencies. There are no other apparent new generation aircraft that would increase capacity for feeder aircraft to a point that could offset the need for an increased frequencies of operations . Should this happen, the number of feeder aircraft frequencies would be less than forecast.

TABLE 2-23, TABLE 2-24, and TABLE 2-25 provide air cargo operations forecast for the Base, Low, and High Cases.

Table 2-23: Air Cargo Operations by Aircraft-Base Case Forecast (2017-2037)

Base Case Forecast - Air Cargo Operations by Aircraft						
Aircraft	2017	2018	2022	2027	2032	2037
Airbus 300-600	2,177	2,392	2,496	3,068	2,148	1,344
Airbus 330-300	0	0	0	0	440	1,360
Boeing 777F	0	0	254	384	522	1,018
Boeing 767-300F	489	538	1,720	3,532	6,374	7,836
Boeing 757-200SF	1,370	2,300	2,206	742	0	0
Boeing 737-400F	986	1,002	1,096	1,168	1,272	1,384
McDonnell Douglas MD-11	1,846	1,944	1,358	1,122	328	0
McDonnell Douglas DC-10	331	436	312	166	0	0
ATR-72 Cargo	28	276	356	652	1,182	1,460
ATR-43 Cargo	377	450	540	548	906	996
Embraer 120	620	452	338	220	214	0
Fairchild Swearingen 4 Metro	1,391	1,420	1,574	750	300	0
Beech 99 Airliner	3,392	3,458	3,796	4,310	4,894	5,556
Beech King Air 1900	3,168	3,236	3,544	4,024	4,570	5,188
Cessna 402	495	608	716	758	1,328	1,620
Cessna 208 Caravan	2,736	2,776	2,816	2,886	2,956	3,380
Total	**19,406**	**21,288**	**23,122**	**24,280**	**27,434**	**31,142**

Source: RS&H, 2018

[45] All-cargo versions of CRJ-200 exist but have approximately the same air cargo capacity as the ATR-72.

Table 2-24: Air Cargo Operations by Aircraft-Low Case Scenario Forecast (2017-2037)

Low Case Scenario Forecast - Air Cargo Operations by Aircraft						
Aircraft	2017	2018	2022	2027	2032	2037
Airbus 300-600	2,177	2,440	2,496	3,068	1,700	1,218
Airbus 330-300	0	0	0	0	104	408
Boeing 777F	0	0	268	422	528	942
Boeing 767-300F	489	1,228	2,094	3,612	6,424	7,170
Boeing 757-200SF	1,370	1,574	1,690	474	0	0
Boeing 737-400F	986	1,000	1,062	1,166	1,240	1,360
McDonnell Douglas MD-11	1,846	1,768	1,042	606	0	0
McDonnell Douglas DC-10	331	322	312	104	0	0
ATR-72 Cargo	28	320	338	448	1,034	1,154
ATR-43 Cargo	377	486	518	564	616	670
Embraer 120	620	504	350	202	104	0
Fairchild Swearingen 4 Metro	1,391	1,408	1,494	504	0	0
Beech 99 Airliner	3,392	3,432	3,794	3,808	4,308	4,694
Beech King Air 1900	3,168	3,222	3,498	3,510	4,026	4,384
Cessna 402	495	710	1,014	1,114	1,264	1,356
Cessna 208 Caravan	2,736	2,750	2,852	3,098	3,444	3,942
Total	**19,406**	**21,164**	**22,822**	**22,700**	**24,792**	**27,298**

Source: RS&H, 2018

Table 2-25: Air Cargo Operations by Aircraft-High Case Scenario Forecast (2017-2037)

High Case Scenario Forecast - Air Cargo Operations by Aircraft						
Aircraft	2017	2018	2022	2027	2032	2037
Airbus 300-600	2,177	2,236	3,512	3,150	2,498	0
Airbus 330-300	0	0	0	208	416	1,288
Boeing 777F	0	0	358	388	416	832
Boeing 767-300F	489	1,332	3,802	6,028	7,870	10,012
Boeing 757-200SF	1,370	1,186	240	0	0	0
Boeing 737-400F	986	1,026	1,104	1,128	1,270	1,476
McDonnell Douglas MD-11	1,846	1,660	194	0	0	0
McDonnell Douglas DC-10	331	312	312	0	0	0
ATR-72 Cargo	28	150	576	954	1,328	1,570
ATR-43 Cargo	377	390	566	670	792	938
Embraer 120	620	532	466	0	0	0
Fairchild Swearingen 4 Metro	1,391	1,174	898	598	0	0
Beech 99 Airliner	3,392	3,508	3,958	4,680	5,538	6,552
Beech King Air 1900	3,168	3,276	3,694	4,372	5,176	6,114
Cessna 402	495	512	746	1,746	2,144	2,688
Cessna 208 Caravan	2,736	2,830	3,218	3,658	4,226	4,788
Total	**19,406**	**20,124**	**23,644**	**27,580**	**31,674**	**36,258**

Source: RS&H, 2018

2.7 GENERAL AVIATION AND MILITARY

2.7.1 General Aviation Forecast

2.7.1.1 Based Aircraft

The Salt Lake City Department of Airports General Aviation Strategy Plan (SLCDA GASP) was prepared to examine the Salt Lake City Department of Airports General Aviation (SLCDA GA) System of Airports. The report determined a total of 290 based aircraft at SLC, including 178 single-engine, 42 multi-engine, 51 jets, and 19 helicopters. This reflects a decrease in total based aircraft by 109 since 2008, mainly in single engine aircraft (-92), jet (-18), and multi-engine (-7). Helicopter is the only category of aircraft that has increased during that time (+8). During this time nationally, jet, turboprop, and helicopters are increasing as a part of the fleet whereas single/multi-engine piston are decreasing.

The forecast prepared in the *General Aviation Strategy Plan* report for based aircraft at SLC was built off of the actual 2017 totals, and used the AAGRs derived from the FAA Aerospace Forecast for FY 2018-2038 as its means for change. Using the trends of the FAA Aerospace Forecast, the single-engine aircraft category is the only type of based aircraft anticipated to decrease with a -1.0% AAGR, while jets are projected to increase the fastest with a 2.2% AAGR from 2018-2037. TABLE 2-26 shows the historical based aircraft fleet at SLC by type from 2008-2017, as well as the forecast for the Base Case projections over the planning horizon.

2.7.1.2 General Aviation Operations

The SLCDA GA Forecast for GA operations over the planning horizon used a methodology of combining operations per based aircraft (OPBA) and the *FAA Aerospace Forecast for FY 2018-2038: Active General Aviation and Air Taxi Hours Flown* AAGRs. Each of the GA designated aircraft categories and their operations were classified by based aircraft type using the categories supplied by the FAA Aerospace Forecast which included: single-engine piston, multi-engine piston, single-engine turboprop, multi-engine turboprop, jet, and helicopter. Data from the FAA's National Offload Program was then gathered to identify the operations of the fleet mix for SLC in FY 2017. FAA Aerospace Forecast AAGRs were used to project the aircraft category's growth through 2037.

TABLE 2-28 shows the forecast of operations by GA aircraft type, in which some of the Airport's specific aircraft types were identified.

Local GA operations increased at the rate of single engine piston aircraft hours flown, while still maintaining the same number of OPBA for single engine pistons in 2017. This results in the local GA operations decreasing from 2,104 in 2017 to 1,686 in 2037 with a -1.1% AAGR. However, the itinerant GA operations are projected to increase from 38,372 annual operations in 2017 to 51,121 operations in 2037 with a 1.5% AAGR largely attributed to an increase in jet operations at the Airport.

TABLE 2-27 shows the itinerant and local GA operations forecast for 2018-2037.

Table 2-26: General Aviation Based Aircraft Historical and Forecast (2008-2037)

Salt Lake City International Airport					
Year	Single-Engine	Multi-Engine	Jet	Helicopter	Total
2008	270	49	69	11	399
2009	250	46	55	15	366
2010	250	46	55	15	366
2011	204	36	46	15	301
2012	204	36	46	15	301
2013	186	41	70	31	328
2014	186	41	70	31	328
2015	186	41	70	31	328
2016	203	46	62	31	342
2017	178	42	51	19	290
2022	171	47	56	20	294
2027	163	48	62	22	295
2032	155	50	69	24	298
2037	147	52	77	27	303
Average Annual Growth Rate (AAGR)					
	-4.3%	-0.9%	5.3%	5.3%	-3.2%
	-1.0%	0.8%	1.8%	1.8%	0.2%

Source: Salt Lake City Department of Airports, General Aviation Strategic Vision and Immediate Action Plan, 2019

Table 2-27: Itinerant and Local GA Operations Historical (2008-2017) and Forecast (2018-2037)

Year	Itinerant Operations	Local Operations	Total Operations
2008	60,027	2	60,029
2009	58,444	511	58,955
2010	58,700	2,385	61,085
2011	57,701	10,869	68,570
2012	55,118	3,531	58,649
2013	60,346	3,751	64,097
2014	55,022	3,221	58,243
2015	46,180	3,069	49,249
2016	39,710	2,408	42,118
2017	38,372	2,104	40,476
2018	38,832	2,081	40,913
2019	39,284	2,081	41,365
2020	39,799	2,035	41,834
2021	40,308	2,013	42,321
2022	40,834	1,991	42,825
2023	41,378	1,969	43,347
2024	41,940	1,947	43,888
2025	42,521	1,926	44,447
2026	43,121	1,905	45,026
2027	43,741	1,884	45,624
2028	44,380	1,863	46,243
2029	45,040	1,842	46,883
2030	45,721	1,822	47,544
2031	46,424	1,802	48,226
2032	47,148	1,782	48,931
2033	47,896	1,763	49,658
2034	48,666	1,743	50,409
2035	49,460	1,724	51,184
2036	50,278	1,705	51,983
2037	51,121	1,686	52,807
Average Annual Growth Rate (AAGR)			
2018 - 2037	1.5%	-1.1%	1.4%

Source: Salt Lake City Department of Airports, General Aviation Strategic Vision and Immediate Action Plan, 2019

Table 2-28: GA Operations by Aircraft Type Forecast Summary (2017-2037)

Aircraft	2017	2018	2022	2027	2032	2037
Pistons	**11,166**	**12,747**	**10,657**	**10,173**	**9,714**	**9,279**
Cessna 172	4,816	5,498	4,557	4,312	4,080	3,860
Cirrus SR22	989	1,129	936	885	838	793
Cessna 182	751	857	711	672	636	602
Cessna 206	343	392	325	307	291	275
Cessna 185	334	381	316	299	283	268
Piper 28A	330	377	312	295	280	265
Diamond DA-40	287	328	272	257	243	230
Cessna 340	333	380	328	323	318	314
Piper-44	287	328	283	278	274	270
Other Pistons	2,696	3,078	2,618	2,543	2,472	2,403
Turboprops	9,341	10,663	9,426	9,549	9,714	9,923
Pilatus PC-12	5,225	5,965	4,871	4,679	4,495	4,318
Piper 46T	273	312	320	307	295	283
Beechcraft Super King Air	2,996	3,420	3,266	3,571	3,904	4,268
Other Turboprops	847	967	969	992	1,020	1,053
Jet	17,324	19,778	19,794	22,614	25,836	29,518
Cessn Citation	6,990	7,980	7,464	8,528	9,743	11,131
Gulfstream IV	1,734	1,979	1,852	2,115	2,417	2,761
Hawker 800	966	1,103	1,032	1,179	1,346	1,538
Hawker 400	334	381	413	472	593	616
Challenger 300	1,354	1,547	1,676	1,915	2,188	2,500
Challenger 350	345	394	427	488	557	637
Challenger 650	760	868	940	1,074	1,227	1,402
Falcon 900	359	410	444	507	580	662
Falcon 2000	455	519	563	643	735	839
LearJet 35	475	542	588	671	767	876
LearJet 45	253	289	313	358	409	467
Learjet 60	416	475	515	588	672	768
Other Jets	2,883	3,291	3,567	4,075	4,656	5,319
Helicopter	2,645	2,949	2,949	3,288	3,666	4,087
Agusta A109SP	994	1,108	1,108	1,236	1,378	1,536
Bell 206	577	643	643	717	800	892
Robinson R22	440	491	491	547	610	680
Robinson R44	302	337	337	375	419	467
Other Helicopters	332	370	370	413	460	513
Total	**40,476**	**46,137**	**42,826**	**45,624**	**48,930**	**52,807**

Source: Salt Lake City Department of Airports, General Aviation Strategic Vision and Immediate Action Plan, 2019

2.7.2 Military Forecast

2.7.2.1 Military Operations

The itinerant and local military aircraft that operate out of SLC represented only 2.2% of all 325,093 operations as identified within TAF 2017. This Forecast does not make any changes to the number of local or itinerant military operations. Instead, as is a customary practice, it holds the existing count of 7,348 operations for local and itinerant military operations constant from 2017-2037. TABLE 2-29 shows the military operations and represents military operations forecasts for the Base, Low, and High Cases.

Table 2-29: Military Operations Forecast (2017-2037)

	Operations by Military Aircraft				
Aircraft	2017	2022	2027	2032	2037
A-7D Corsair 2	4	4	4	4	4
F-18S Super Hornet	2	2	2	2	2
T-38 Talon	4	4	4	4	4
C-23 Sherpa	2	2	2	2	2
F-18 Hornet	100	100	100	100	100
C-17 Globemaster III	10	10	10	10	10
C-130 Hercules	10	10	10	10	10
C-12 Huron	200	200	200	200	200
C-20 Gulfstream	200	200	200	200	200
Pilatus PC-12	200	200	200	200	200
KC-135 Stratotanker	6,580	6,580	6,580	6,580	6,580
V-22 Osprey	32	32	32	32	32
AH-64 Apache	4	4	4	4	4
Total	**7,348**	**7,348**	**7,348**	**7,348**	**7,348**

Source: FAA, TAF 2018; SLC ATC, 2018 and TAC Air, 2018

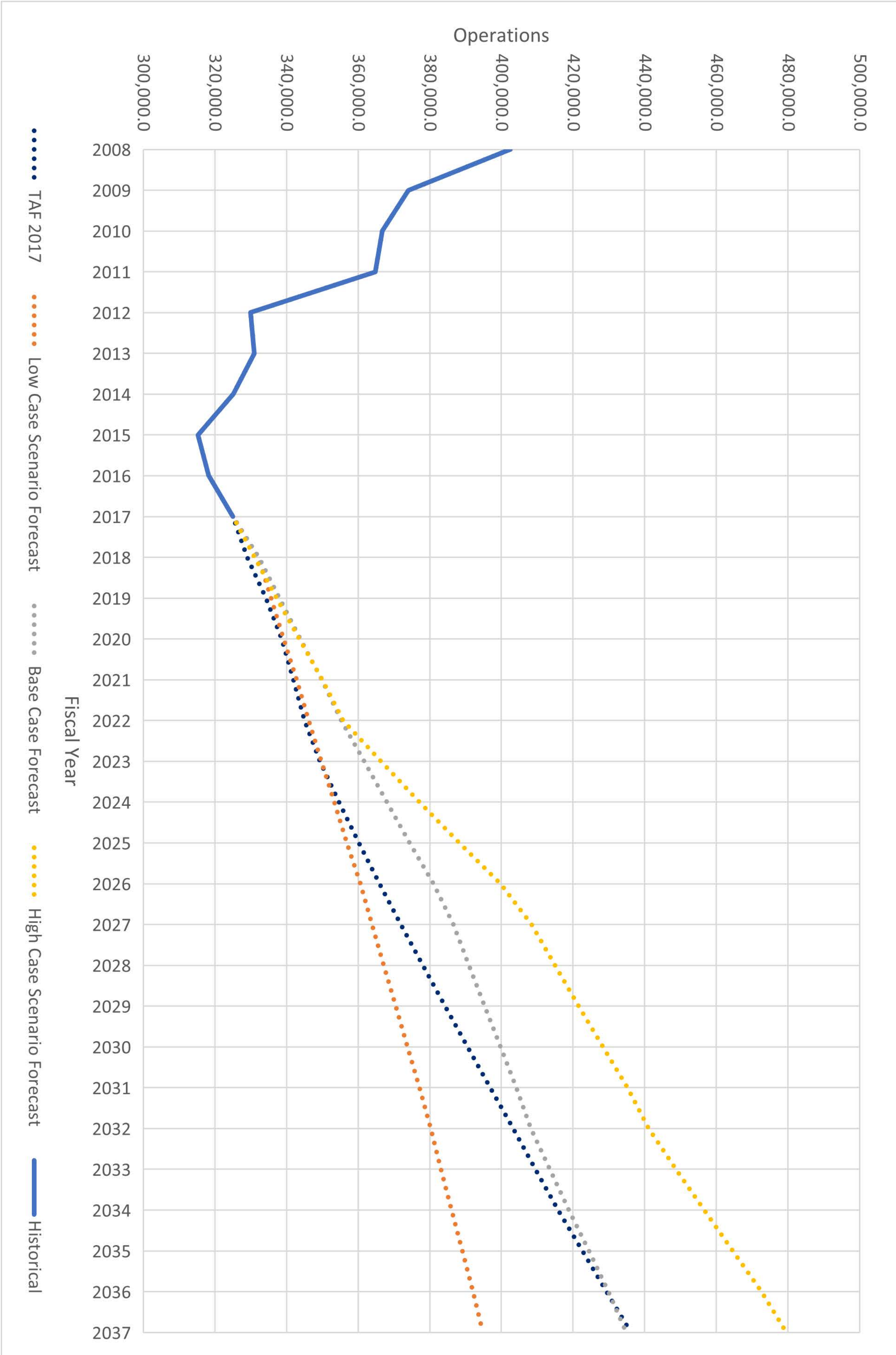
2.8 SUMMARY OF AIRCRAFT OPERATIONS

The forecast of total operations for the Airport are a summation of the passenger, air cargo, GA, and military operation forecasts presented in previous sections. Also mentioned above, the forecast of eVTOL operations is not included at this time. TABLE 2-30 and FIGURE 2-62 show the projected totals from 2017-2037 for each scenario.

Table 2-30: Comparison of Total Annual Operations Forecasts (2017-2037)

FY	TAF 2017	Base Case Forecast	Low Case Scenario Forecast	High Case Scenario Forecast
2017	325,093	325,093	325,093	325,093
2018	329,087	332,261	332,137	331,097
2019	334,320	338,039	335,651	337,296
2020	338,635	343,917	339,203	343,612
2021	341,941	349,897	342,792	350,045
2022	345,110	355,372	346,194	355,894
2023	349,378	361,627	349,734	366,393
2024	354,722	367,992	353,310	377,201
2025	360,257	374,469	356,923	388,329
2026	366,020	381,060	360,573	399,784
2027	371,900	386,647	363,894	408,388
2028	378,003	390,944	367,159	414,922
2029	384,244	395,289	370,454	421,561
2030	390,514	399,682	373,778	428,306
2031	396,873	404,124	377,132	435,159
2032	403,191	408,133	380,220	441,059
2033	409,446	413,473	383,136	448,761
2034	415,899	418,882	386,074	456,598
2035	422,591	424,363	389,035	464,572
2036	429,371	429,915	392,018	472,685
2037	436,164	434,832	394,799	479,571

Source: RS&H, 2018; SLCDA General Aviation Strategy Plan, 2018: Mary A Lynch,,2018



Source: RS&H, 2018

Figure 2-62: Total Operations Forecasts (2018-2037)

2.8.1 Base Case Forecast Summary of Total Operations by Category

TABLE 2-31 provides projections of the number of Air Carrier/ Air Taxi, Cargo, GA, and Military operations for each forecast year. Each category of operation forecast was developed in the sections above.

2.8.2 Base Case Forecast Summary of ADPM Operations by Category

TABLE 2-32 provides projections of the number of Air Carrier/ Air Taxi, Cargo, GA, and Military operations for an average day of the peak month (ADPM) for each forecast year. The total SLC fleet mix and operations were obtained from the 2017 FAA National Offload Program and annualized to reflect the FAA TAF 2018, published in January, 2017. Afterwards, the 2018 ADPM totals were developed using the SLC aviation activity forecast, while maintaining the 2017 ADPM proportion. The Cargo and GA operations maintained their proportionate share of 2017, and align with total operations for each forecast year. Military operations remained constant over the planning horizon.

However, the passenger[46] operations were obtained using the design day forecast flight schedule for commercial passenger air carriers. They were then adjusted to include the on-demand and miscellaneous commercial operations identified in 2017.

Table 2-31: Base Case Forecast Summary of Total Operations by Category (2018-2037)

Year	Air Carrier/ Air Taxi[1]	Cargo	GA[2]	Military	Total
2018	257,488	21,288	46,137	7,348	332,261
2022	282,076	23,122	42,827	7,348	355,372
2027	309,395	24,280	45,624	7,348	386,647
2032	324,421	27,434	48,930	7,348	408,133
2037	343,545	31,142	52,807	7,348	434,842

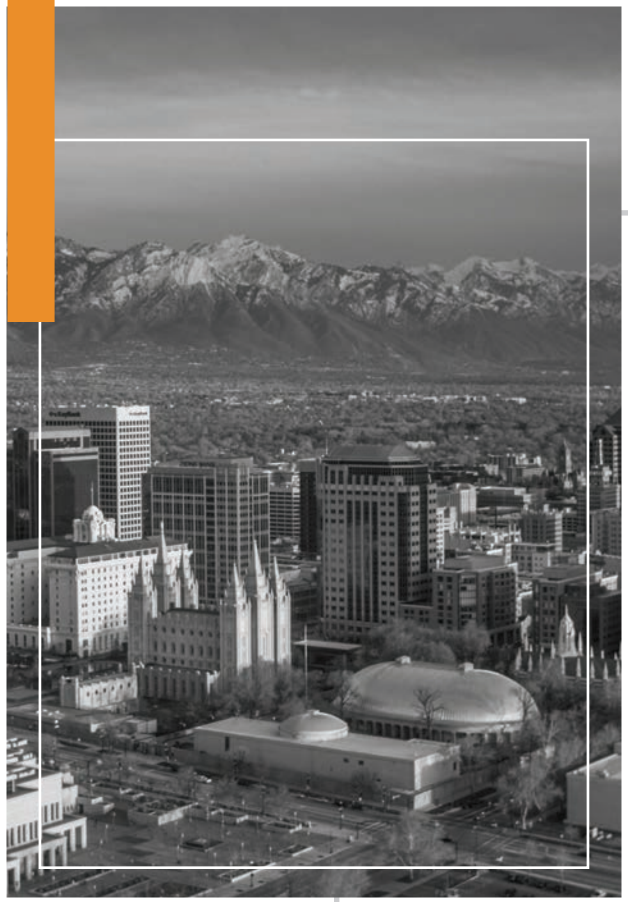
[1] Air carrier/Air taxi operations include on-demand and miscellaneous commercial operations in addition to air carrier passenger operations. See table 2-15 for the total number of passenger operations in the ADPM.
[2] GA includes helicopter operations.
Source: RS&H, 2018

Table 2-32: Base Case Forecast Summary of ADPM Operations by Category (2018-2037)

Year	Air Carrier/ Air Taxi[1]	Cargo	GA[2]	Military	Total
2018	822	68	147	23	1,060
2022	907	71	146	23	1,147
2027	988	77	145	23	1,233
2032	1,042	88	157	23	1,310
2037	1,097	99	168	23	1,387

[1] Air carrier/Air taxi operations include on-demand and miscellaneous commercial operations in addition to air carrier passenger operations. See table 2-15 for the total number of passenger operations in the ADPM.
[2] GA includes helicopter operations.
Source: RS&H, 2018

[46] Passenger operations were identified as "Air Carrier/Air Taxi" in this analysis.



2.8.3 IFR and VFR Operations

The SLC Terminal Radar Approach Control (TRACON) provided a distribution of the existing IFR and VFR itinerant operations for SLC. For Base Year 2017, the Airport had 78.5%, of its operations identified as instrument flight rules (IFR) itinerant, and 21.5% of operations identified as visual flight rules (VFR) itinerant. Holding the 2017 distribution constant, the IFR and VFR operations projected for each of the forecast years are compared in TABLE 2-33.

2.8.3.1 Annual Instrument Approaches

Annual instrument approaches represent the number of approaches that use IFR procedures annually. The number of annual instrument approaches can be identified as 50% of the IFR operations projected for the Airport in each forecast. TABLE 2-34 shows the forecasts for annual instrument approaches for the forecast years of 2022, 2027, 2032, and 2037.

Table 2-33: IFR and VFR Forecasts (2018-2037)

FY	Base Case Forecast		Low Case Scenario Forecast		High Case Scenario Forecast	
	IFR	VFR	IFR	VFR	IFR	VFR
2018	260,966	71,295	260,869	71,268	260,052	71,045
2022	279,118	76,254	271,909	74,285	279,528	76,366
2027	303,682	82,965	285,811	78,083	320,758	87,630
2032	320,558	87,575	298,634	81,586	346,419	94,640
2037	341,528	93,304	310,085	84,714	376,667	102,904

Source: RS&H, 2018; FAA Opsnet, 2018; SLC TRACON, 2018

Table 2-34: Annual Instrument Approaches Forecasts (2018-2037)

FY	Base Case Forecast	Low Case Scenario Forecast	High Case Scenario Forecast
2018	130,483	130,434	130,026
2022	139,559	135,955	139,764
2027	151,841	142,906	160,379
2032	160,279	149,317	173,209
2037	170,764	155,042	188,333

Source: RS&H, 2018; FAA Opsnet, 2018; SLC TRACON, 2018

2.9 CRITICAL AIRCRAFT

The existing critical aircraft are determined by the usage of each of the Airport's four runways. It is defined as the most demanding aircraft with 500 or more operations annually. A representative group type can be used in some cases if no single aircraft model has sufficient operations to achieve the threshold. The dimensions of existing critical aircraft are depicted in FIGURE 2-63.

2.9.1 Runway 14-32 Critical Aircraft

Existing: Beechcraft 1900D
- Aircraft Approach Group - B
- Aircraft Design Group - II
- Taxiway Design Group - 2

Future: Beechcraft 1900D
- Aircraft Approach Group - B
- Aircraft Design Group - II
- Taxiway Design Group – 2

2.9.2 Runway 16L-34R Critical Aircraft

Existing: Airbus A330/Boeing 737-9
- Aircraft Approach Group - D
- Aircraft Design Group - V
- Taxiway Design Group - 5

Future: Airbus A350/Boeing 777-3
- Aircraft Approach Group - D
- Aircraft Design Group - V
- Taxiway Design Group - 6

2.9.3 Runway 16R-34L Critical Aircraft

Existing: Airbus A330/Boeing 737-9
- Aircraft Approach Group - D
- Aircraft Design Group - V
- Taxiway Design Group - 5

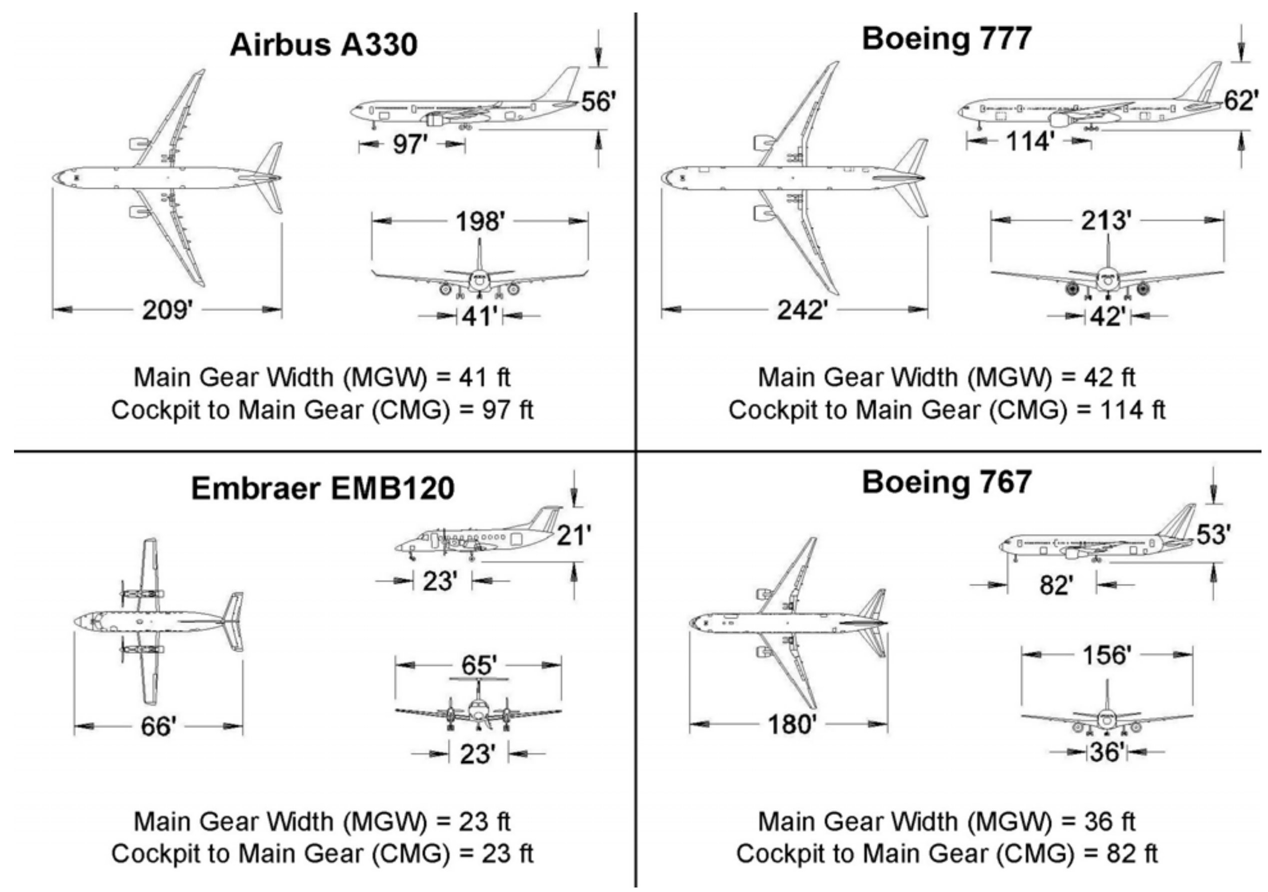
Future: Airbus A350/Boeing 777-3
- Aircraft Approach Group - D
- Aircraft Design Group - V
- Taxiway Design Group - 6

2.9.4 Runway 17-35 Critical Aircraft

Existing: Boeing 757/767
- Aircraft Approach Group - D
- Aircraft Design Group - IV
- Taxiway Design Group - 5

Future: Boeing 767
- Aircraft Approach Group - D
- Aircraft Design Group - IV
- Taxiway Design Group - 5

Figure 2-63: Existing Critical Aircraft Dimensions



2.10 AVIATION ACTIVITY FORECASTS SUMMARY

2.10.1 Comparison with FAA TAF

This section compares the FAA TAF 2017 published January 2018 with the Base Case Forecast. In accordance with FAA Order 5050.4B, National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions, paragraph 706.b(3), the FAA uses the following parameters to assess aviation forecasts, including those prepared for airport master plans. To be consistent with the FAA TAF:

- The 5-year forecast should be within 10 percent of the TAF; and,
- The 10-year forecast should be within 15 percent of the TAF[47].

Each of the forecasts used fiscal years for enplanements and operations to be directly comparable with the FAA TAF.

The Base Case Forecast of enplanements was generated through an extensive analysis of regional socioeconomic statistics, trends, and sources as well as in-depth interviews with key stakeholders within the Salt Lake City regional area. Based on these inputs, a best-fit model was produced using a multiple variable regression analysis and then evaluated using Monte Carlo simulation. In addition to the Base Case Forecast, alternative Low and High Case Scenario Forecasts were also produced in a similar manner for comparison.

Operation forecasts and derivatives were created using planning design day models for an ADPM passenger schedule from July, 2018. The projected passenger and air cargo operation projections align with the enplanement projections of the forecast scenarios. Existing and anticipated load factors, equipment, and markets were all considered, as well as industry-wide trends, and interviews with representatives of several of the larger passenger airlines as well as integrated carriers at SLC. The Base Case Forecast also adopts the Base Case *SLCDA General Aviation Strategy Plan* GA based aircraft and operations forecasts. Like the enplanement forecasts, alternative based aircraft and operations forecasts were identified and detailed in these forecasts. The existing military operations from TAF 2017 are projected to remain constant over the 20-year planning horizon.

A comparison of the FAA TAF 2017 is shown in TABLE 2-35 and was also presented in TABLE 2-1 at the beginning of this document. In all cases the preferred Base Case Forecast meets the 5 year and 10 year percent parameters established by the FAA for assessing forecast differences.

[47] December 23, 2004, memorandum from the FAA Director, Airport Planning and Programming, entitled Revision to Guidance on Review and Approval of Aviation Forecasts

Table 2-35: Base Case Forecast comparison with FAA TAF 2017

	2017		2022		2027		2037	
Category	Base Case	TAF 2017	Base Case	TAF 2017	Base Case	TAF 2017	Base Case	TAF 2017
Enplanements	11,515,639	11,515,639	14,228,574	13,121,857	15,662,157	14,499,142	18,666,369	17,623,339
Passenger Operations	257,863	277,269	282,077	298,163	309,395	324,653	343,535	388,313
Cargo Operations	19,406		23,122		24,280		31,142	
GA Operations	40,476	40,476	42,825	39,599	45,624	39,899	52,807	40,503
Military Operations	7,348	7,348	7,348	7,348	7,348	7,348	7,348	7,348
Total Operations	325,093	325,093	355,372	345,110	386,647	371,900	434,832	436,164
GA Based Aircraft[1]	290	359	294	387	295	415	303	478
Comparison with FAA TAF 2017 (percent different)								
Enplanements		0.0%		7.8%		7.4%		5.6%
Commercial Operations[2]		0.0%		2.3%		2.7%		-3.6%
GA Operations		0.0%		7.5%		12.5%		23.3%
Military Operations		0.0%		0.0%		0.0%		0.0%
Total Operations		0.0%		2.9%		3.8%		-0.3%
GA Based Aircraft		-23.8%		-31.6%		-40.7%		-57.8%

[1] The discrepancy between the Base Case Forecast and FAA TAF 2017 in GA Based Aircraft is the result of a verified count completed in mid-2018
[2] Commercial Operations are defined as scheduled air carrier passenger and cargo
Source: RS&H, 2018; FAA TAF, 2017

2.10.2 Forecast Usage within the Master Plan

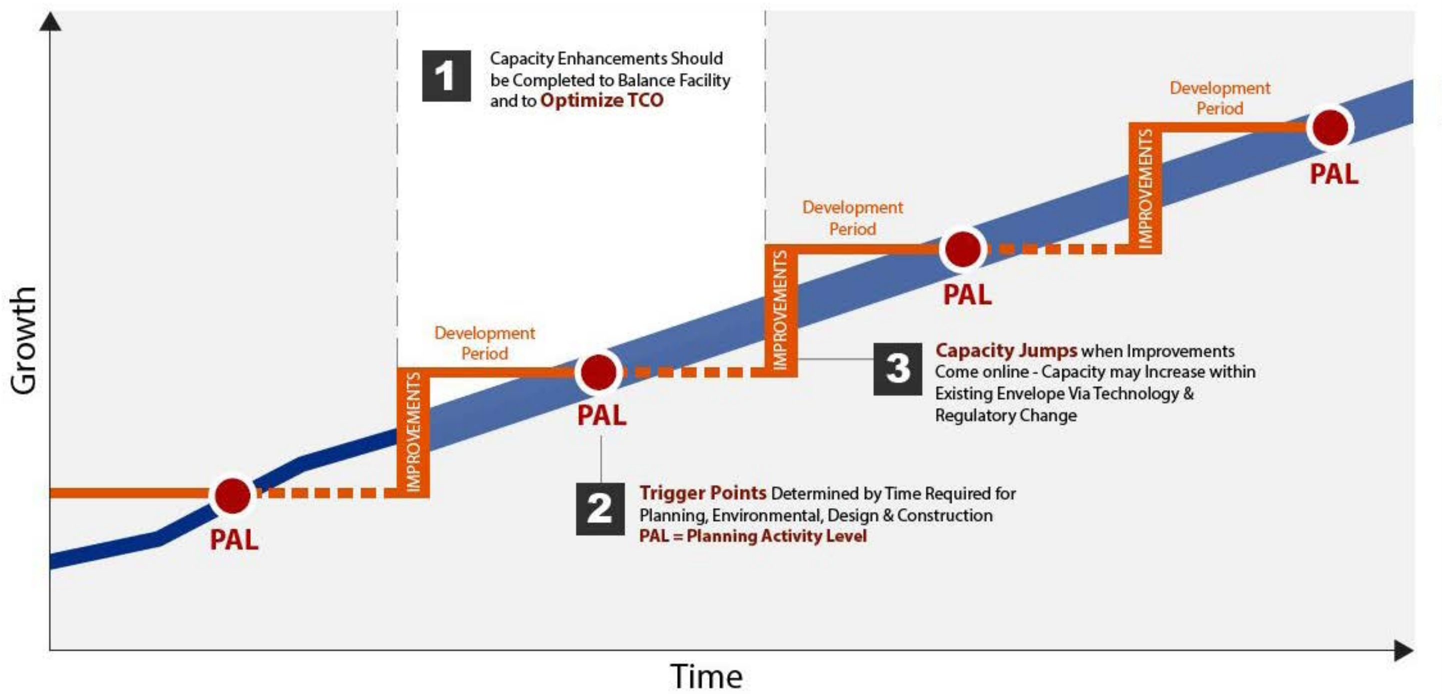
This forecast studied historical SLC aviation data, as well as Airport trends, while analyzing current and anticipated economic impacts within the industry. Since airport activity levels are heavily influenced by economic events and changes in the industry, planning recommended facility expansions or required upgrades on specific years can be challenging. It is generally accepted that new facility construction should be initiated only when specific activity levels have been reached that necessitate the improvement, rather than being initiated based on reaching a calendar date.

Therefore, three planning activity levels (PALs) will be used in the Facility Requirements chapter to identify the threshold for required changes to the Airport's facilities, instead of defining a particular year. These PALs represent a trigger level of activity that could occur sooner or later than the year associated with that level of activity in this forecast document. For planning purposes, the subsequent three PALs (PAL 1, PAL 2, and PAL 3) correspond to the forecast years (2022, 2027, and 2037).

As shown in FIGURE 2-64, the distance between one PAL and another is an unspecified length of time. In theory, the time difference between each PAL is five years between the base year and PAL 1, five years between PAL 1 and PAL 2, and 10 years between PAL 2 and PAL 3, although the times can be much longer. In times of fast economic growth or new airline service the next PAL level could be achieved in less than five years.

During this unspecified length of time, an expected Level of Service (LOS) begins to erode with increasing demand. In general terms, planning for the next level of improvements begins at approximately 60 percent of the difference between one PAL and another. Design would occur at the 80 percent level and the facility would be fully operational prior to achieving the next PAL level. At the time of facility improvement, the capacity of the facility increases and the LOS is enhanced to design parameters. Facility improvements are designed to meet the threshold of efficiency and cost effectiveness for that facility. Meaning facilities are constructed at an acceptable cost and LOS but not developed until they are needed.

Figure 2-64: Planning Activity Level (PAL) Development Path



FACILITY REQUIREMENTS

FACILITY REQUIREMENTS

3.1 INTRODUCTION

Future airport facility requirements, including the type, size, and quantity, are dependent on the future aviation activity levels projected in the aviation demand forecasts discussed in Chapter 2. The need for new or expanded facilities is often driven by capacity shortfalls that leave an airport unable to accommodate the forecasted growth using existing facilities. However, the requirements for new or improved facilities can also be driven by other circumstances, such as, updated standards which have been adopted by the FAA or another regulatory agency, an evolving strategic vision for the airport, the replacement of outdated or inefficient facilities, or the desire to introduce new services and facilities. These various circumstances can have a significant impact on future needs and have been considered in this analysis for the Airport.

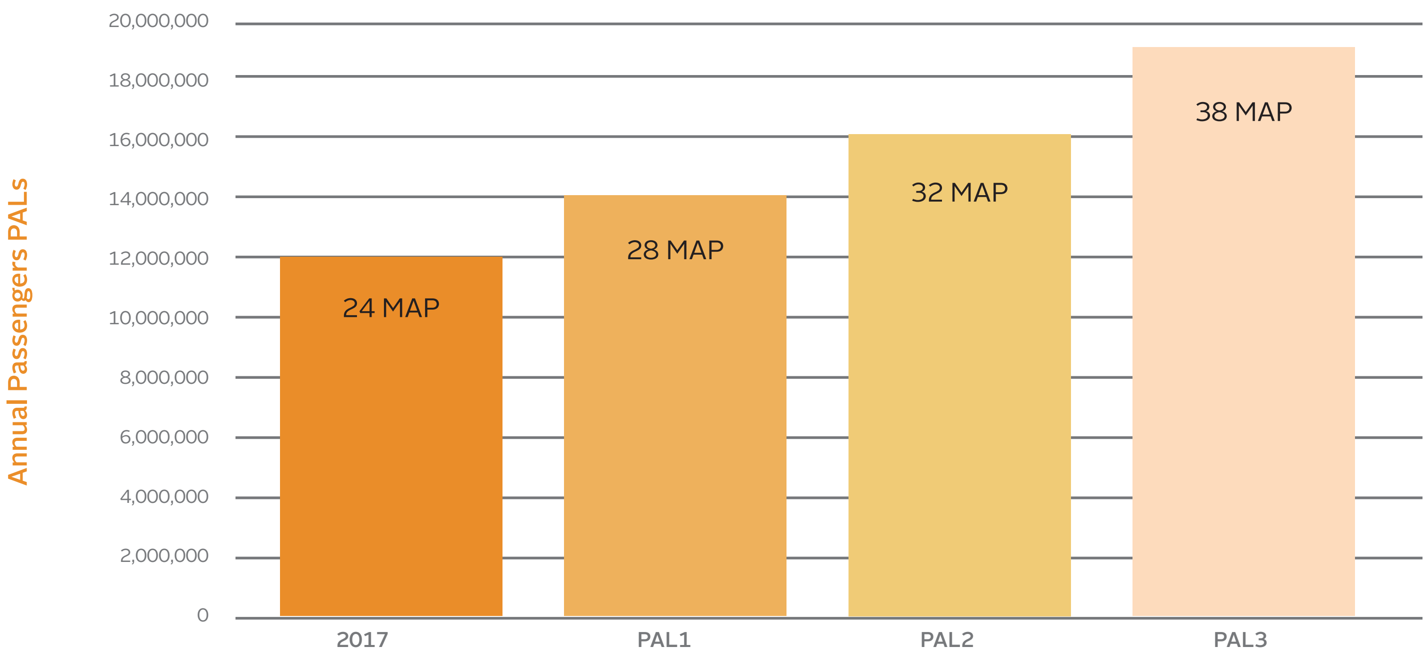
The aviation demand forecast used demographic, economic, and geographic statistical analysis to derive three forecast scenarios tied to real-world factors in the Salt Lake City metropolitan area. From this analysis, aviation activity was forecasted out for a twenty-year period (2017 – 2037). Although the forecast defines aviation activity milestones for the years 2022 (short-term), 2027 (mid-term), and 2037 (long-term), it is important to understand that facility requirements are driven by levels of aircraft operations and passenger enplanement demands, which may or may not coincide with those specific years.

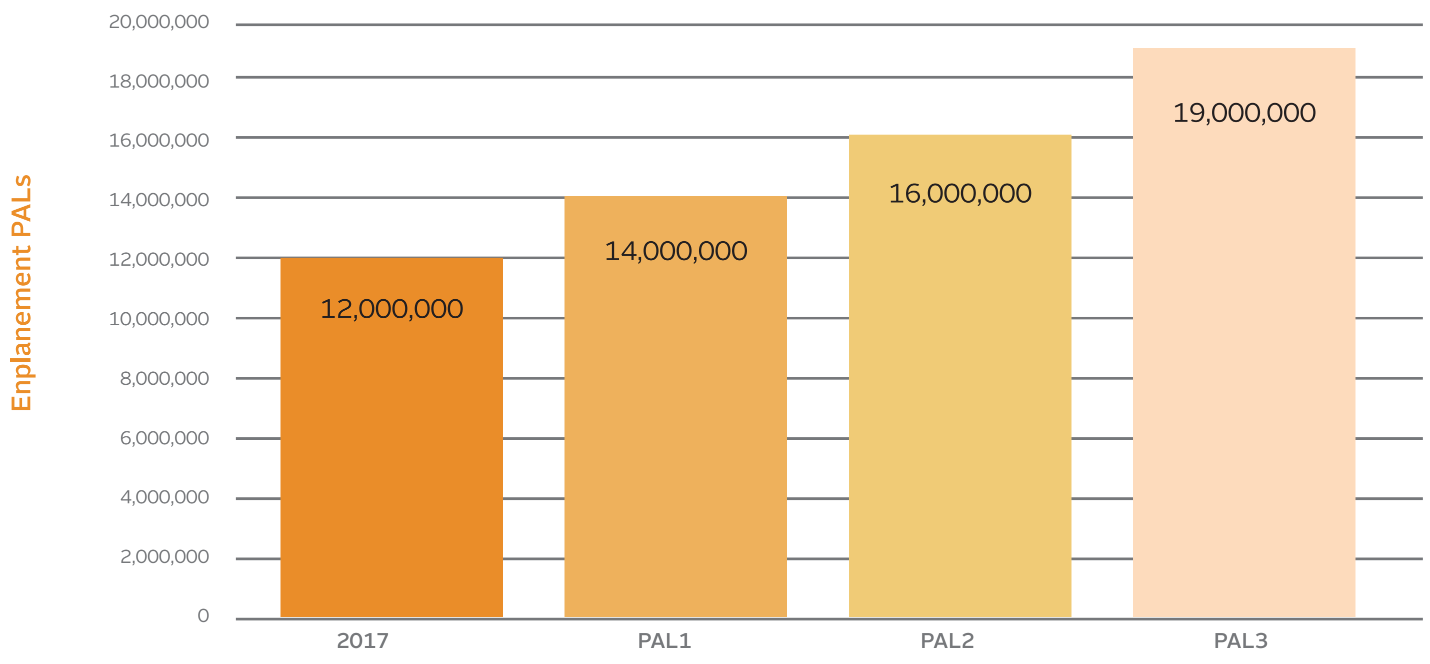
Therefore, to eliminate associations between demand levels and specific years, the levels of demand which trigger facility improvements, referred to as a Planning Activity Level (PAL), are broken into three activity levels: PAL 1, PAL 2, and PAL 3 respectively. The projected demand, based on the base-case forecast scenario, for the based year and each of the planning levels is shown in TABLE 3-1.

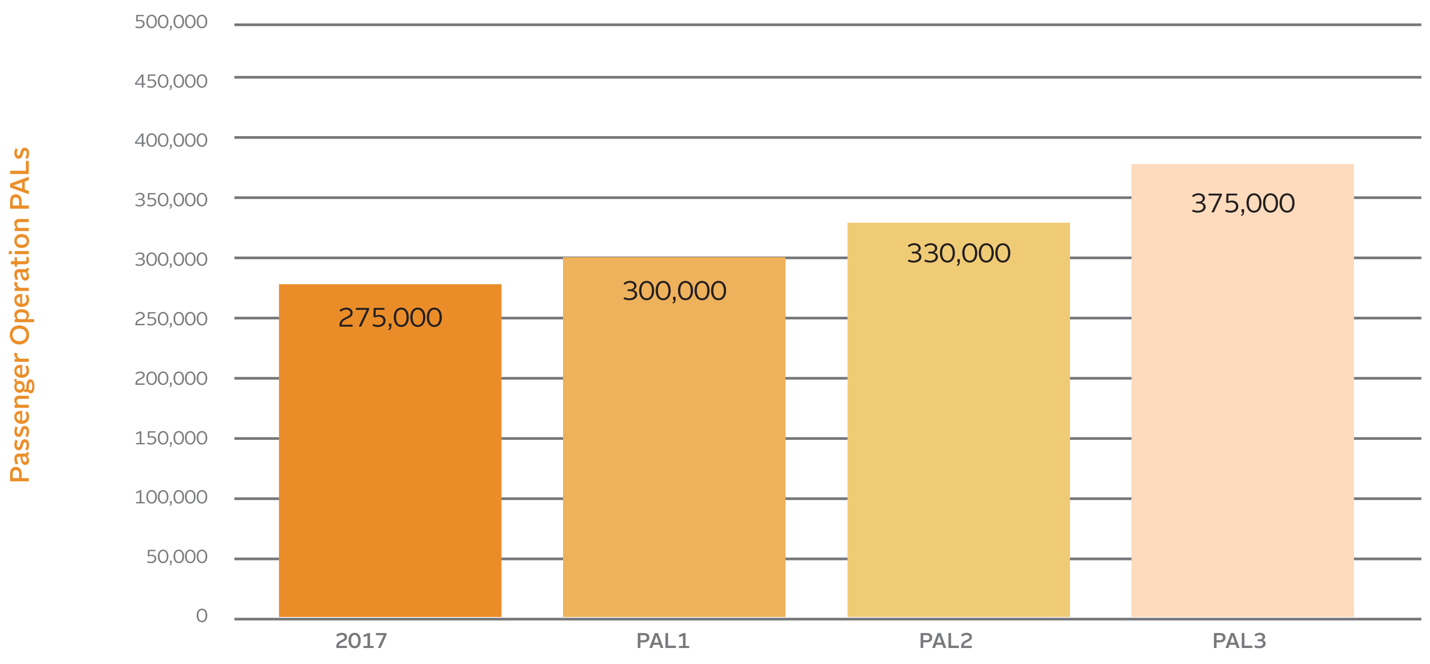
In this facility requirements chapter, some requirements are simply based on airport design standards, while others are requirements based on demand levels. Those based on demand are directly tied to a planning activity level. This approach enables Airport staff to track demand and implement development to ensure the right size facility is built to accommodate demand as it increases in the future. FIGURE 3-1 illustrates this principle. As demand, represented by the blue line, increases, a facility must also increase in size and/or capacity to accommodate that demand. The premise of this approach is to plan, design, and implement facility enhancements to ensure that each PAL level is adequately accommodated.

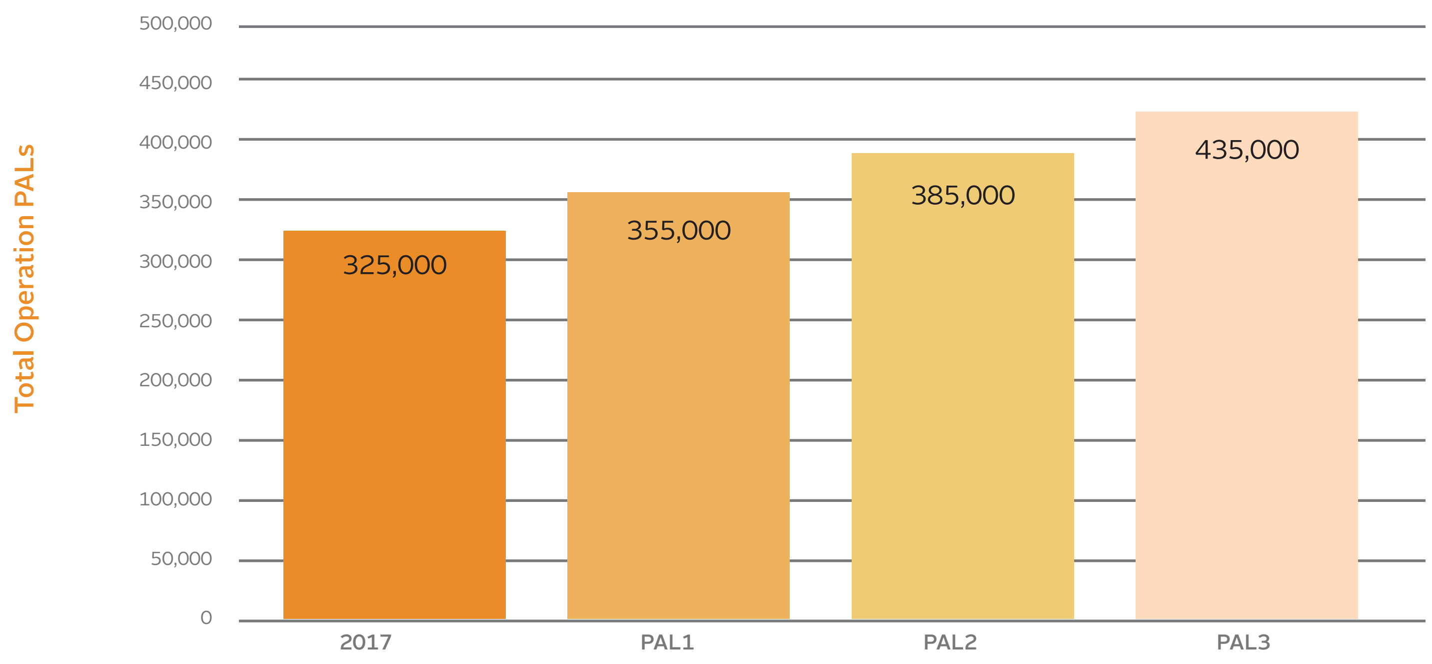
Developing facility requirements is a foundational element of this and any airport master plan. The resulting facility requirements were used as the basis for planning future development at the Airport including the development of a long-term airport layout and an evaluation of alternatives.

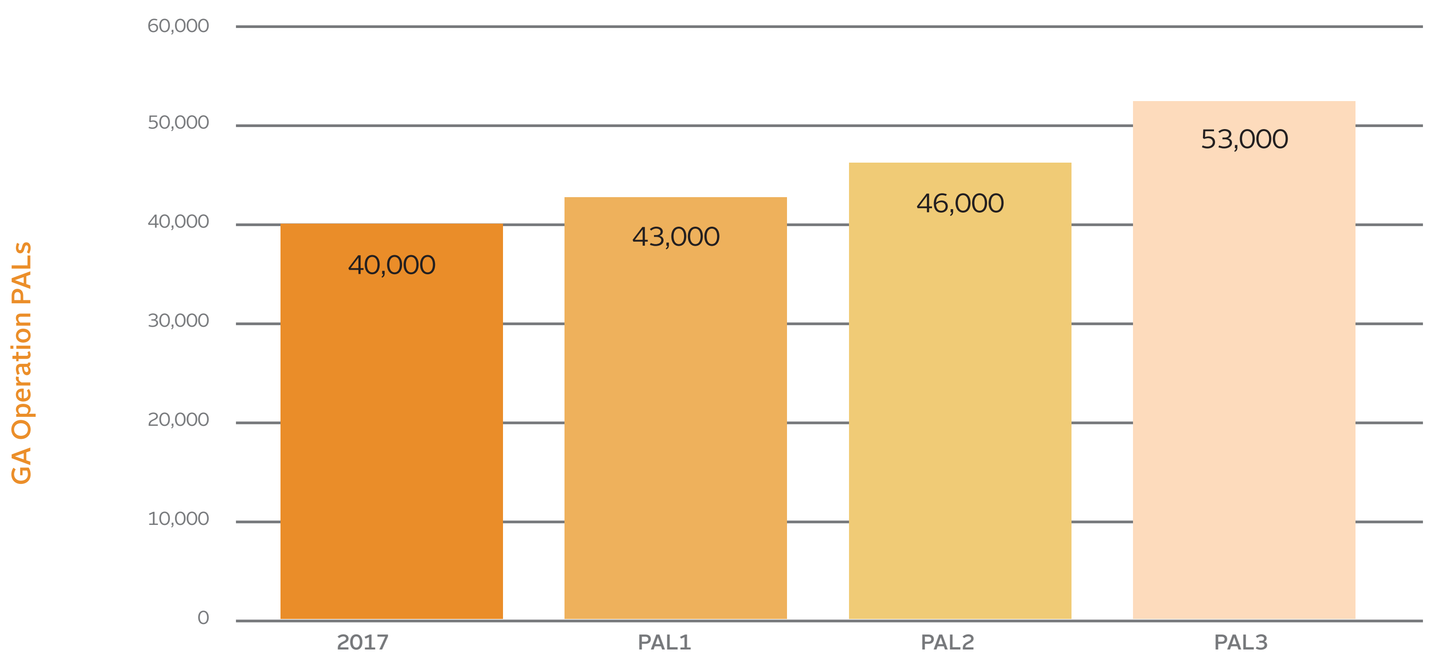
Table 3-1: Planning Activity Levels




Enplanement PALs
20,000,000
18,000,000
16,000,000
14,000,000
12,000,000
10,000,000
8,000,000
6,000,000
4,000,000
2,000,000
0
12,000,000
14,000,000
16,000,000
19,000,000
2017
PAL1
PAL2
PAL3


Passenger Operation PALs
500,000
450,000
400,000
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
275,000
300,000
330,000
375,000
2017
PAL1
PAL2
PAL3


Total Operation PALs
500,000
450,000
400,000
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
325,000
355,000
385,000
435,000
2017
PAL1
PAL2
PAL3


GA Operation PALs
60,000
50,000
40,000
30,000
20,000
10,000
0
40,000
43,000
46,000
53,000
2017
PAL1
PAL2
PAL3

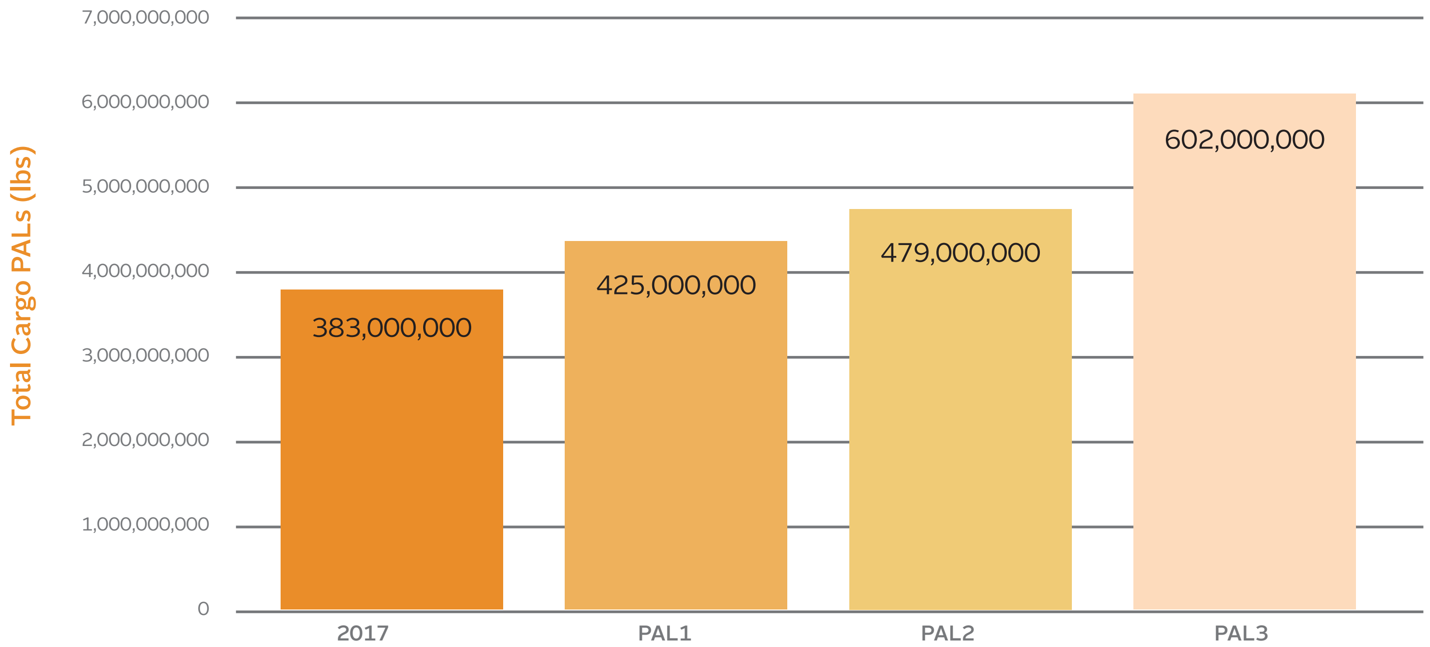
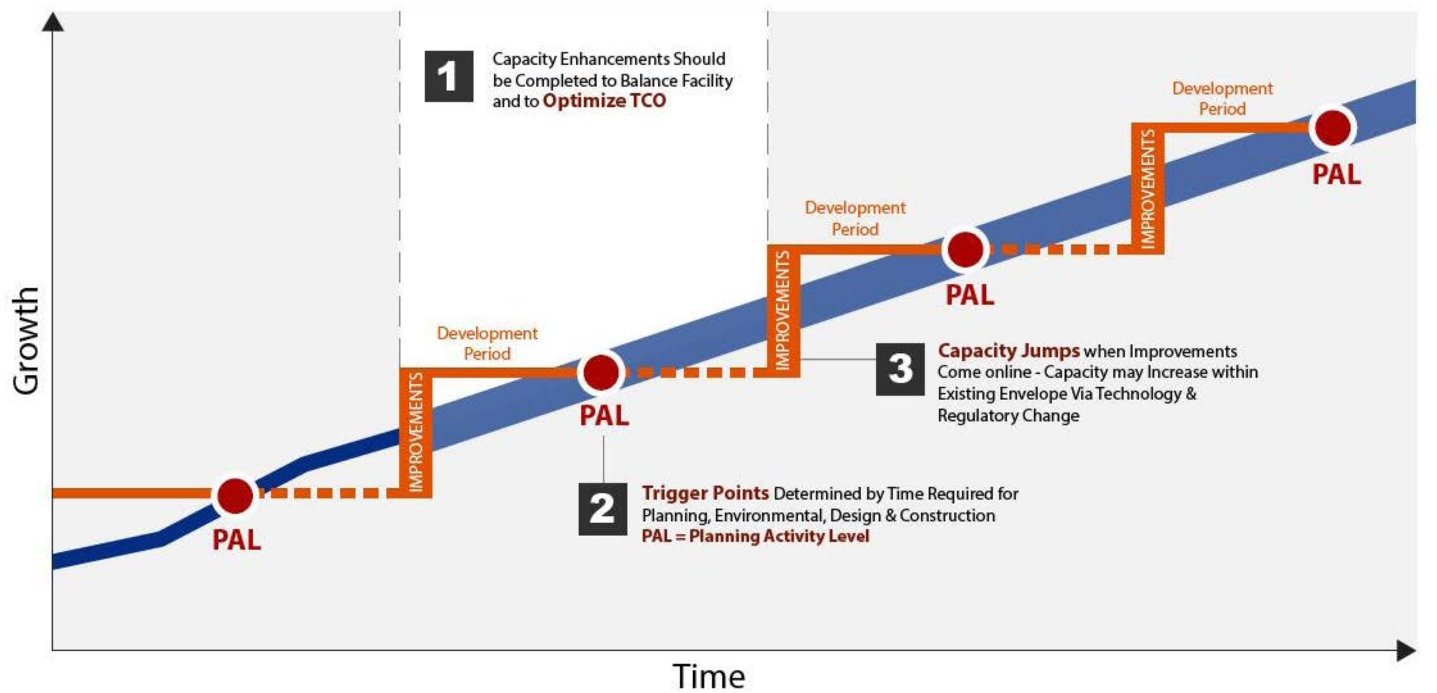


Figure 3-1: Planning Activity Level (PAL) Development Path



3.2 AIRFIELD REQUIREMENTS

This section details the analysis conducted on each airfield component to determine its ability to accommodate future demand and meet current design standards. Airfield components were evaluated based on their ability to meet forecast demand and meet FAA design standards outlined in AC 150/5300-13A Change 1, *Airport Design*. Design requirements were applied to the evaluation of SLC airfield infrastructure based on critical aircraft requirements, runway approach capabilities, and typical usage of pavement and aircraft flows.

3.2.1 Runway Requirements

Analyses of the runways addresses the ability of the existing runways to meet both current and forecast demand. The number of runways at an airport are directly correlated to capacity and wind coverage. The first parts of this section detail the capacity analysis and wind coverage analysis conducted as part of this master plan.

Specific runway related focus points in this master plan include study elements from previous reports, including the 2006 Airport Layout Plan Update and the 1996 Master Plan. These elements along with new elements of focus in this study include the following:

- Fifth Runway – An area for a new west parallel runway was preserved on the 2006 ALP to provide capacity relief when needed. The capacity analysis of the existing airfield, as detailed in this chapter, has determined that a fifth runway will not be needed within the planning period. However, this study will still consider a fifth runway as an ultra-long range capacity enhancement option. The alternatives analysis examines capacity relief benefits and integration of a fifth runway.
- Runway 17-35 – Runway 17-35 was studied in the 1996 Master Plan and 2006 ALP for its ability to be realigned with the other parallel runways to provide capacity benefit. During this master plan process, airport and airline stakeholders expressed that an extension of the existing runway would prevent having to limit larger narrow body aircraft from using the runway for departures in hot conditions. The operational and capacity related benefits of an extension to Runway 17-35 and a runway realignment is analyzed further within the alternatives analysis.
- Runway 14-32 – While not a focus of previous studies, this runway was a focus element for this master plan. Two "Hot Spots" associated with this runway have been identified by the FAA, which have the potential to encourage runway incursions. In order to eliminate the potential for runway incursions, modifications to the runway were evaluated as discussed in the alternatives chapter. The master plan analyses evaluated the runway for wind coverage and capacity to determine if the runway is needed or can be taken out of the system.

This study's approach for analyzing and recommending airfield and capacity related components is tiered, with a primary objective of enhancing safety and capacity through design modifications to the existing airfield prior to any major new runway development. The following details the priority of objectives for this study. This approach is carried into the alternatives, which will focus on the development of demand-dependent, cohesive solutions.

- Priority 1 – address all safety and design deficiencies. This includes the hot spots adjacent to Runway 14-32, as well as other taxiway configurations that do not adhere to FAA best practices. This facility requirements chapter outlines current deficiencies.
- Priority 2 – maximize capacity and efficiency of the existing airfield. The alternatives chapter details airfield solutions that have been explored and vetted in this study.
- Priority 3 – utilize demand reduction techniques to delay major capacity enhancements. The General Aviation Strategy Plan, included in Appendix X, provides recommended methods to transfer general aviation demand from SLC to the other two SLCDA general aviation airports.
- Priority 4- provide additional runway capacity with a realignment of Runway 17-35 and/or addition of a west parallel runway.

Beyond capacity and wind coverage, this Runway Requirements section also provides an overview of the analyses conducted to determine runway design related requirements. These include, runway designation, length, width, strength, and runway protection zones.

3.2.1.1 Airfield Capacity and Delay

Airport capacity is the number of aircraft an airport system can accommodate in a reference time period, e.g. hourly, daily, yearly. Capacity is influenced by many factors including airport layout, airspace, aircraft mix, ATC operational procedures, navigation equipment, and meteorological conditions. As an airport reaches its capacity there is an increase in the amount of delay, defined as the amount of time above the unimpeded travel time that exists when not delayed by other aircraft or airport operations. Unimpeded travel time accounts for required air traffic control flight and taxi spacing between aircraft. Delays can occur during each phase of aircraft operation, including push-back, taxi-out, departure, arrival, and taxi-in. Delay increases can have serious impacts to airline and cargo operations. By understanding the amount of delay being experienced at SLC, and during which segment of operation the delay occurs, determinations can be made if the current airfield configuration can accommodate existing and forecasted traffic levels or if, and where, improvements will be required.

3.2.1.1.1 Methodology

The capacity of the airport system was determined using SIMMOD modeling software, which considers airline flight schedules, aircraft taxi time and flight speeds, the various runway configurations used at SLC, and the required separation distances required between different sized aircraft to avoid wake turbulence generated by aircraft. For the modeling efforts, a baseline model was developed and calibrated to reflect existing conditions and operations using radar data, reported ground travel times, and field observations. The model was verified against the experienced throughput levels and taxi times for 2018 as reported by the FAA Aviation System Performance Metrics (ASPM).

Arrival operations were modeled starting from the aircraft's position entering the terminal airspace and continuing through landing, exiting the runway, and taxiing to the non-movement area and to the gate. Departure operations were modeled starting from aircraft gate pushback and continuing through taxi, transition from the non-movement ramp area to the controlled taxiways, taxi to the departure queues, take-off, initial departure heading, and flying out of terminal airspace.

As discussed in detail in the ***Chapter 2, Aviation Activity Forecast***, a Base Case Forecast Planning Day Model was completed to forecast the operational counts and times for each of the PAL levels. The results of that forecast are overviewed below and included in TABLE 3-2. Note that the peak hour times and corresponding operations are based on a combined total of commercial passenger, cargo, and general aviation operations.

- The average day peak month (ADPM) for 2018 includes 377 arriving and 377 departing scheduled airline operations as well as 121 arriving and 115 departing unscheduled operations, consisting of general aviation, cargo, and military. The peak hour for arrivals is 7:00-7:59 p.m. with 62 operations, the peak hour for departures is 11:00-11:59 a.m. with 56 operations, and the combined peak hour is 1:00-1:59 p.m. with 71 operations.
- PAL 2 forecasts a total of 453 arriving and 453 departing scheduled airline operations per day as well as 124 arriving and 120 departing unscheduled operations, consisting of general aviation, cargo, and military. The peak hour for arrivals is 7:00-7:59 p.m. with 64 operations, the peak hour for departures is 11:00-11:59 a.m. with 65 operations, and the combined peak hour is 1:00-1:59 p.m. with 91 operations.
- PAL 3 forecasts a total of 503 arriving and 503 departing scheduled airline operations per day as well as 147 arriving and 144 departing unscheduled operations, consisting of general aviation, cargo, and military. The peak hour for arrivals is 7:00-7:59 p.m. with 68 operations, the peak hour for departures is 11:00-11:59 a.m. with 70 operations, and the combined peak hour is 1:00-1:59 p.m. with 103 operations.

Table 3-2: Base Case Forecast Planning Day Model

	2018		PAL2		PAL3	
	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
Airline	377	377	453	453	503	503
GA	75	69	74	70	86	82
Cargo	34	34	38	39	49	51
Military	12	12	12	11	12	11
Total	498	492	577	573	650	647
Peak Hour	62	56	64	65	68	70

Runway use is dynamic and dependent on many factors such as weather and peak hour operations. ATC staff adjust the SLC runway use plan throughout the day to best accommodate the demand during the airline peak arrival periods and peak departure periods. Runway use for 2018 was calculated using the distribution experienced according to data obtained from the FAA National Offload Program. It should be noted that as traffic demand grows in each PAL, especially in future IMC scenarios, the existing runway use could not accommodate demand without significant delays showing up in the model. As such, the runway use was adjusted for PAL 2 and PAL 3 using detailed assumptions provided by SLC air traffic controllers. The resulting runway use for each flow, weather, and demand level is shown in TABLE 3-3.

Generally, Runway 16R-34L is the most used runway for arriving aircraft, Runway 16L-34R is the most used runway for departing aircraft, and Runway 17-35 is used for a mix between arriving and departing aircraft depending of if there are more arrivals or departures at that time. However, if few arrivals occur during a departure peak, Runway 16R-34L is used for departures rather than Runway 17-35 and if few departures occur during an arrival peak, Runway 16L-34R is used rather than Runway 17-35. Runway 14-32 was excluded from the table as all percentages would round to zero percent due to a negligible number of operations.

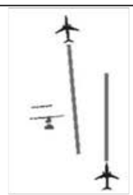
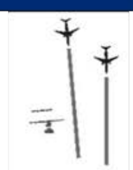
An in-depth discussion of the original and revised runway use, as well as additional details of the methodology and assumptions used in SIMMOD airfield capacity and delay analysis is included in the Methods, Assumptions and Performance Specifications report provided in Appendix D.

While aircraft using Runway 16R-34L can operate mostly independently of all other runways and Runway 14-32 is always dependent, the interdependencies of Runway 16L-34R and Runway 17-35 differ based on runway operations and weather conditions. TABLE 3-4 shows the independence or dependence of the two runways in each condition.

Table 3-3: Runway Use

Flow	Weather	Demand	Arrival			Departure		
			16R/34L	16L/34R	17/35	16R/34L	16L/34R	17/35
North	VMC	2018	39%	40%	20%	26%	58%	16%
		PAL 2	56%	20%	24%	17%	61%	22%
		PAL 3	54%	21%	24%	16%	62%	22%
	IMC	2018	39%	40%	21%	26%	58%	16%
		PAL 2	63%	15%	22%	14%	60%	26%
		PAL 3	62%	17%	22%	13%	60%	26%
South	VMC	2018	44%	37%	19%	23%	59%	18%
		PAL 2	48%	30%	21%	23%	59%	18%
		PAL 3	48%	32%	20%	23%	58%	19%
	IMC	2018	44%	38%	18%	22%	60%	18%
		PAL 2	49%	31%	20%	24%	58%	18%
		PAL 3	46%	27%	27%	22%	56%	22%

Table 3-4: Runway 17-35 and 16L-34R Dependencies

North Flow		VMC	IMC
	Arrival: RWY 35 Arrival: RWY 34L	Dependent	Dependent, staggered 3 NM
	Arrival: RWY 35 Departure: RWY 34L	Independent	Dependent, treat as single RWY. Arrival must have 2 NM from landing when straight-out departure is released. Independent if departure turning left.
	Departure: RWY 35 Arrival: RWY 34L	Independent	Dependent, treat as single RWY. Arrival must be 2 NM from landing when straight-out departure is released.
	Departure: RWY 35 Departure: RWY 34L	Dependent only when departing same heading, then used as single RWY	Dependent only when departing same heading, then used as single RWY
South Flow		**VMC**	**IMC**
	Arrival: RWY 17 Arrival: RWY 16L	Independent	Dependent, staggered 3 NM
	Arrival: RWY 17 Departure: RWY 16L	Independent	Dependent, departure on RWY 16L not allowed when arrivals on RWY 17 are within 2 NM. Independent if departure from Runway 16L turns west
	Departure: RWY 17 Arrival: RWY 16L	Independent	Dependent, departures on RWY 17 not allowed when arrivals on RWY 16L are within 2 NM
	Departure: RWY 17 Departure: RWY 16L	Dependent, considered as a single RWY with 2 NM separation	Dependent, considered as a single RWY with 3 NM separation

Source: TransSolutions, RS&H; 2019

3.2.1.1.2 Average Annualized Delay

The weighted average daily delay, or average annualized delay, is the average delay for the flight schedule across an entire 24-hour schedule. Each of the simulation exercises is run independently of one another for an entire 24-hour period, and the average delay per aircraft is calculated per simulation run. Average annualized delay is the weighted average delay per aircraft based on the annual percentage the airport is in each flow direction and weather condition. The delay is measured in air delay, arrival taxi delay, and departure delay as noted below. Additionally, taxi time is measured and can change based upon runway utilization.

- Arrival Air Delay – the amount of delay experienced in the air on approach to the Airport.
- Arrival Taxi Delay – the delay an aircraft may experience during taxi after landing, between the runway exit and the terminal.
- Departure Delay – the amount of delay associated with taxi delay and departure queue delay.
- Taxi Time – the amount of unimpeded taxi time between terminal and runway, and runway and terminal.

A table showing average daily and average annualized delay per aircraft is shown in TABLE 3-5. The aviation industry has settled on a standard metric for determining the amount of average delay that is generally acceptable before capacity enhancements are needed. At major connecting hubs with low incidence of IMC and reduced capacity in IMC, average annualized delay of five minutes is used as a general threshold of acceptable delay[1], but every additional minute has negative impacts for the airlines and traveling public.

Table 3-5: SIMMOD Average Daily And Average Annualized Delay Forecast

			Average Daily Times (Minutes)						
Demand	Weather	Flow	Arrival				Departure		
			Air Delay	Taxi Time	Taxi Delay	Total	Taxi Time	Delay	Total
2018 (Existing Terminal)	VMC	North	1.4	6.5	0.5	**7.0**	12.6	4.1	**16.7**
		South	1.0	6.9	0.6	**7.5**	13.9	2.5	**16.4**
	IMC	North	1.9	6.7	0.5	**7.2**	12.7	8.6	**21.3**
		South	1.5	6.9	0.6	**7.5**	13.8	8.5	**22.3**
	Average Annualized		*1.3*	*6.7*	*0.6*		*13.3*	*3.6*	
2018 (New Terminal)	VMC	North	1.5	5.7	0.2	**5.9**	12.0	2.7	**14.7**
		South	1.0	5.4	0.2	**5.6**	13.1	2.2	**15.3**
	IMC	North	2.0	5.7	0.3	**6.0**	12.0	6.6	**18.6**
		South	1.6	5.5	0.2	**5.7**	13.2	8.3	**21.5**
	Average Annualized		*1.3*	*5.5*	*0.2*		*12.5*	*2.7*	
PAL 2	VMC	North	2.7	6.1	0.5	**6.6**	12.7	2.9	**15.6**
		South	1.5	5.9	0.4	**6.3**	13.8	2.4	**16.2**
	IMC	North	4.2	6.0	0.4	**6.4**	12.7	6.1	**18.8**
		South	2.6	5.7	0.4	**6.1**	13.5	9.4	**22.9**
	Average Annualized		*2.1*	*5.9*	*0.4*		*13*	*2.9*	
PAL 3	VMC	North	3.6	6.1	0.6	**6.7**	12.8	3.9	**16.7**
		South	1.8	5.9	0.5	**6.4**	13.7	3.5	**17.2**
	IMC	North	6.2	5.9	0.4	**6.3**	12.8	9.2	**22.0**
		South	3.4	6.1	0.6	**6.7**	13.4	17.4	**30.8**
	Average Annualized		*2.8*	*5.8*	*0.5*		*13*	*4.2*	

Source: TransSolutions, RS&H; 2019

[1] ACRP Report 104: Defining and Measuring Aircraft Delay and Airport Capacity Thresholds

TABLE 3-6 details the overall annualized taxi times, total delay, and combined total. Note that taxi times change slightly between 2018 and the planning activity levels due to changes in runway utilization assumptions.

Average annualized delay increases exponentially as operations increase towards maximum capacity. FIGURE 3-2 shows the increase in delay as arrivals and departures increase. Through PAL 3 SLC is forecasted to remain below the five-minute threshold of acceptable delay. Five minutes of average annualized delay is expected to occur at around 1,500 daily operations, which is roughly an 11 percent increase beyond PAL 3. An inflection point is expected at around 1,800 to 1,900 daily operations. Within those levels, it is estimated that delay will exponentially increase.

While the results show that SLC has capacity through the planning period to keep delay below the five-minute threshold, capacity improvements must be planned for now to ensure enabling projects can be completed prior to the construction of any major improvement. This master plan alternatives section will explore alternative airfield solutions in effort to ensure a long-range plan is in place for SLC to add capacity to its system.

3.2.1.1.3 Peak Hour Delay

Due to the large amount of connecting flights and cargo operations at SLC, peak hour delay is an important metric. The peak hour delay metric reports the highest average hourly delay of all flights that operate during each hour over the 24-hour period. In other words, it represents the average amount of delay experienced by any given flight within the peak hour of delay. At major connecting hubs with a typical incidence of VMC and reduced capacity in IMC, peak hour delays of approximately 30 minutes in VMC or 45 minutes in IMC are considered delay thresholds not to be exceeded[2]. As shown in TABLE 3-7, peak hour departure delays reach as high as 40 minutes in south flow IMC conditions in PAL 3, but none exceed industry standard delay thresholds.

3.2.1.1.4 Hourly Throughput

A sensitivity analysis was performed to determine the existing airfield runway capacity. Both the north flow and south flow VMC models were utilized in this analysis. Initial findings indicated that the existing SLC airfield capacity could accommodate beyond PAL 3. In order to determine the true existing runway throughput, PAL 3 operations were increased by an additional 50 percent. TABLE 3-8 summarizes the highest hourly runway throughputs averaged over 10 simulated days. This analysis assumes perfect conditions and the actual sustainable runway capacity would likely be approximately 5 percent lower.

3.2.1.1.5 Summary

Overall, the SLC airfield has adequate capacity to accommodate demand through PAL 3. The new terminal configuration will significantly reduce aircraft taxi times and delays. The capacity of the existing airfield will be reached at around 1,500 daily operations. At that point, the five-minute industry standard average annualized delay threshold will be reached.

Simulation findings indicate that the runway capacity at SLC is very sensitive to runway use. While the runway use was developed using the principles of the SLC ATCT, adjustments to the runway use have a significant impact on delay and capacity.

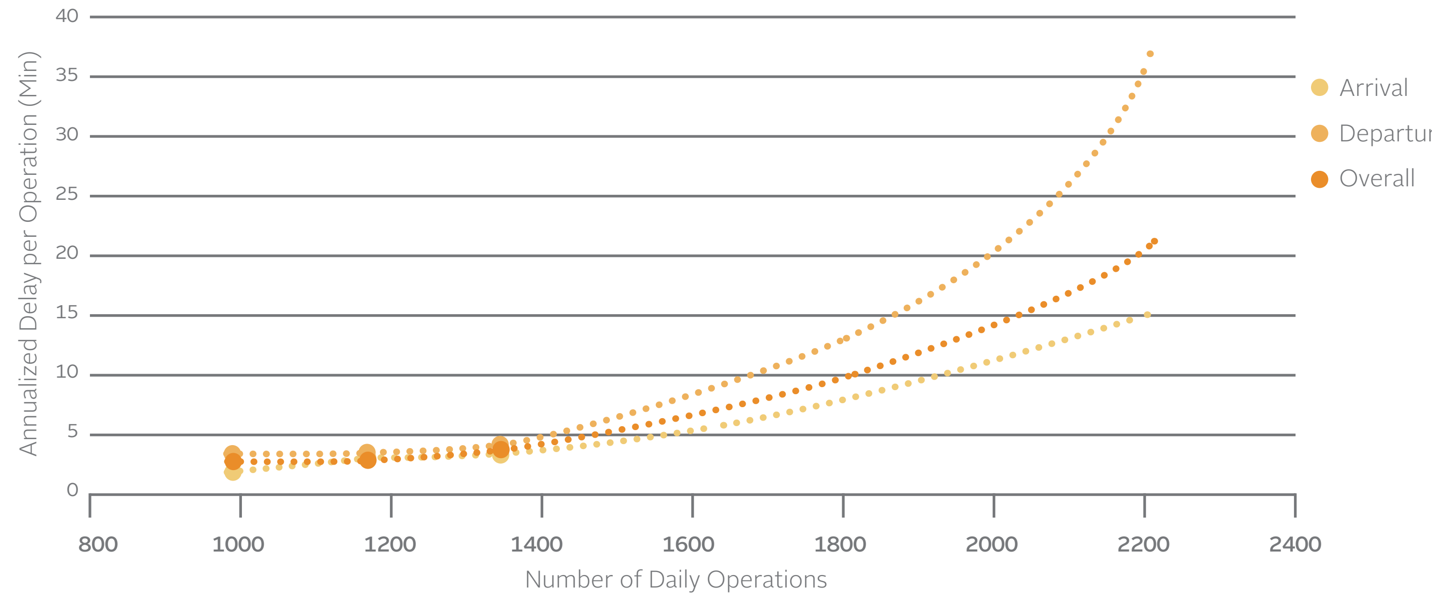
While the airport system is forecasted to reach the five-minute average delay threshold around 1,500 daily operations, which is beyond PAL 3, alternatives will have to be selected to take the necessary preparatory steps to be able to have improvements complete before delay becomes a major constraint.

Table 3-6: Average Annualized Travel Time

Demand	Annual Weighted Average (Minutes)		
	Taxi Time	Delay	Total
2018 (Existing Terminal)	10.0	2.7	12.7
2018 (New Terminal)	9.0	2.1	11.1
PAL 2	9.4	2.7	12.1
PAL 3	9.4	3.8	13.2

[2] ACRP Report 104: Defining and Measuring Aircraft Delay and Airport Capacity Thresholds

Figure 3-2: SLC Average Annualized Delay



Source: TransSolutions, RS&H; 2019

Table 3-7: SIMMOD Peak Hour Delay Forecast

Demand	Weather	Flow	Peak Hour Daily Times (Minutes)						
			Arrival				Departure		
			Air Delay	Taxi Time	Taxi Delay	Total	Taxi Time	Delay	Total
2018 (Existing Terminal)	VMC	North	4.3	6.9	0.9	**7.8**	13.2	7.5	**20.7**
		South	3.9	7.8	1.1	**8.9**	14.0	7.9	**21.9**
	IMC	North	6.8	6.2	2.3	**8.5**	13.3	17.0	**30.3**
		South	5.6	7.4	1.5	**8.9**	14.2	21.2	**35.4**
2018 (New Terminal)	VMC	North	4.6	5.6	1.0	**6.6**	12.3	5.1	**17.4**
		South	3.9	5.5	0.5	**6.0**	13.4	8.3	**21.7**
	IMC	North	6.6	5.5	1.7	**7.2**	13.0	10.0	**23.0**
		South	5.3	5.8	0.6	**6.4**	13.7	22.6	**36.3**
PAL 2	VMC	North	7.9	7.1	1.5	**8.6**	13.9	6.5	**20.4**
		South	6.8	7.4	0.8	**8.2**	14.3	5.4	**19.7**
	IMC	North	11.4	6.5	0.7	**7.2**	13.0	13.7	**26.7**
		South	11.4	7.4	0.8	**8.2**	13.5	21.7	**35.2**
PAL 3	VMC	North	10.9	6.9	2.1	**9.0**	13.7	8.3	**22.0**
		South	8.4	6.9	1.1	**8.0**	14.2	10.2	**24.4**
	IMC	North	14.1	6.4	0.6	**7.0**	13.3	19.5	**32.8**
		South	11.1	7.0	1.6	**8.6**	14.2	40.0	**54.2**

Table 3-8: SIMMOD Average Hourly Runway Throughput

Flow	Arrivals	Departures	Overall
North	77	71	124
South	79	80	135

3.2.1.2 Wind Analysis

Runway wind coverage analysis was conducted using the FAA's Wind Analysis Airport Design Tool. To analyze the wind coverage for each of the Airport's runways, wind data from 2008-2017 was supplied by the National Climatic Data Center from the weather reporting station located at Salt Lake City International Airport[3]. Over that ten-year period, more than 125,000 wind observations were recorded, 6,756 observations of which were Instrument Flight Rules (IFR) conditions. This equates to 5 percent of the observations being IFR conditions while 95 percent were of Visual Flight Rules (VFR) conditions. FAA runway design standards recommend an airport's runway system provide a minimum of 95 percent wind coverage. The 95 percent wind coverage is computed based on the crosswind component not exceeding the set value of the Runway Design Code (RDC)[4]. If a single runway cannot provide this level of coverage, then a crosswind runway is warranted.

The RDC for Runway 16R-34L and 16L-34R is D-V and Runway 17-35 is D-IV, meaning the allowable crosswind component is 20 knots. For Runway 14-32, which has an RDC of B-II, the allowable crosswind components is 13 knots. TABLE 3-9 details the crosswind analysis results for each runway. Combined, the four runways provide 99.96 percent or better wind coverage with a 20 knot crosswind component for all-weather conditions. Each runway at SLC provides sufficient wind coverage individually at all crosswind component categories. Thus, there is no need for a crosswind runway based on wind coverage as all runways today can individually meet FAA wind coverage requirements. The wind analysis concluded that Runway 14-32 is not needed as a crosswind runway to provide wind coverage at SLC.

Table 3-9: Wind Coverage Analysis

All Weather Wind Data				
Runway	**10.5 Knots**	**13 Knots**	**16 Knots**	**20 Knots**
Runway 16L-34R	97.89%	98.96%	99.62%	99.88%
Runway 16R-34L	97.89%	98.96%	99.62%	99.88%
Runway 17-35	97.57%	98.75%	99.54%	99.85%
Runway 14-32	96.46%	98.47%	99.50%	99.86%
Combined	99.10%	99.60%	99.86%	99.96%

Source NOAA National Climatic Data Center
All Weather Observations: 125,538
Station: Salt Lake City International Airport
Data Range: 2008-2017

IFR Wind Date				
Runway	**10.5 Knots**	**13 Knots**	**16 Knots**	**20 Knots**
Runway 16L-34R	96.01%	97.62%	98.95%	99.63%
Runway 16R-34L	96.01%	97.62%	98.95%	99.63%
Runway 17-35	95.24%	97.03%	98.54%	99.48%
Runway 14-32	96.29%	98.35%	99.35%	99.78%
Combined	98.20%	99.17%	99.68%	99.91%

Source NOAA National Climatic Data Center
IFR Observations: 6,756
Station: Salt Lake City International Airport
Data Range: 2008-2017

[3] Weather observation data was collected from the SLC Automated Surface Observation System (ASOS).
[4] The RDC is a design standard specific to a single runway, and per FAA Advisory Circular AC 150/5300-13A Change 1, Airport Design, "runway standards are related to aircraft approach speed, aircraft wingspan, and designated or planned approach visibility minimums." Designing to the RDC ensures runways meet necessary physical and operational characteristics for the most demanding aircraft operating at the Airport.

3.2.1.3 Runway Designation

Every runway has two associated directional headings. A true heading, or the direction toward which it is physically oriented that will not change unless the runway is realigned, and a magnetic heading, which is determined by the runway's orientation along with an adjustment for magnetic declination. A runway's magnetic heading is important for pilots since they use magnetic compasses to determine their heading while in flight. Runway designations are provided on each runway to indicate the runway orientation according to the magnetic compass bearing. Due to the slow drift of the magnetic poles on the Earth's surface in relation to the location of the Airport, the magnetic bearing of a runway can change over time and runway designations must occasionally be updated. It is industry standard that a runway designation be considered when the runway magnetic heading shifts more than 5° from the runway marking designation.

As of November 27, 2015, the magnetic declination at the Airport is 11° 35' E and is changing by 0° 11' W per year. As illustrated in TABLE 3-10, Runway 16R-34L, Runway 16L-34R, and Runway 14-32 will have magnetic bearings greater than the 5° tolerance, during the planning period. At the current rate of change in magnetic declination in Salt Lake City, it is estimated that Runway 16R-34L and Runway 16L-34R will exceed a 5° tolerance in the year 2026 and Runway 14-32 will exceed the tolerance in the year 2037. Runway 17-35 is not expected to exceed the 5° tolerance in the planning period.

The expected change in magnetic bearing for Runway 16L-34R and 16R-34L would purportedly require the runways to be designated as "17-35" runways. However, because existing Runway 17-35 is not parallel to these runways, a new runway designation scheme will have to be worked out by FAA. There is no hard-set rule on runway designation, and there are multiple stakeholders within FAA that coordinate the implementation of runway re-designations. Prior to runway designation changes, coordination should commence between the FAA Airport District Office (ADO), SLC ATC, FAA Operational Support Group/Flight Procedures Team (OSG-FPT), and SLCDA staff.

Further exploration and coordination in regard to the need to re-designate the runways in the planning period will be carried forward into the alternatives analysis. If it is determined that a runway re-designation is required in the planning period, the cost of that project will be included in the implementation plan developed during the last phase of this study.

Table 3-10: Existing and Future Magnetic Bearing

Existing			2022		2027		2037	
Runway Designatin	True Bearing	Magnetic Bearing	Magnetic Bearing	Runway Designatin	Magnetic Bearing	Runway Designatin	Magnetic Bearing	Runway Designatin
Runway 16R	174" 56' 58"	163" 21' 58"	164" 16' 58"	Runway 16R	165" 11' 58"	Runway 17R	167" 01' 58"	Runway 17R
Runway 34L	354" 57' 07"	343" 22' 07"	344" 17' 07"	Runway 34L	345" 12' 07"	Runway 35L	347" 02' 07"	Runway 35L
Runway 16L	174" 57' 50"	163" 22' 50"	164" 17' 50"	Runway 16L	165" 12' 50"	Runway 17C	167" 02' 50"	Runway 17C
Runway 34R	354" 57' 59"	343" 22' 59"	344" 17' 59"	Runway 34R	345" 12' 59"	Runway 35C	347" 02' 59"	Runway 35C
Runway 17	179" 59' 43"	168" 24' 43"	169" 19' 43"	Runway 17	170" 14' 43"	Runway 17L	172" 04' 43"	Runway 17L
Runway 35	359" 59' 43"	348" 24' 43"	349" 19' 43"	Runway 35	350" 14' 43"	Runway 35R	352" 04' 43"	Runway 35R
Runway 14	152" 58' 32"	141" 23' 32"	142" 18' 32"	Runway 14	143" 13' 32"	Runway 14	145" 03' 32"	Runway 15
Runway 32	332" 58' 51"	321" 23' 51"	322" 18' 51"	Runway 32	323" 13' 51"	Runway 32	325" 03' 51"	Runway 33

Source NOAA National Centers for Environmental Information; RS&H Analysis, 2018

3.2.1.4 Critical Aircraft

The FAA requires the identification of the existing and future critical aircraft, also known as the design aircraft, for airport planning purposes. In some cases, the critical aircraft may be a collection of aircraft with similar characteristics. For airports with multiple runway and taxiway complexes, like SLC, critical aircraft are identified for each runway or taxiway complex.

The critical aircraft for SLC is the most demanding aircraft having substantial use of each runway/taxiway complex. Per FAA Advisory Circular 150/5000-17 *Critical Aircraft and Regular Use Determination*, substantial use is defined as 500 annual operations, not counting touch-and-go operations, or operations related to atypical conditions such as construction projects. However, the designated critical aircraft can be a composite of several aircraft for each of the parameters that determined the critical aircraft.

Three parameters are used to classify the critical aircraft: Aircraft Approach Category (AAC) shown in TABLE 3-11, Airplane Design Group (ADG) shown in TABLE 3-12, and Taxiway Design Group (TDG) shown in TABLE 3-13. The AAC, depicted by a letter, relates to aircraft approach speeds. The ADG, depicted by a Roman numeral, relates to airplane wingspan and height. The TDG, classified by number, relates to the outer to outer main gear width and the distance between the cockpit and main gear. These parameters serve as the basis of the design and construction of airport infrastructure.

Table 3-11: Aircraft Approach Category

Aircraft Approach Category	Approach Speed
A	Approach speed less than 91 knots
B	Approach speed 91 knots or more but less than 121 knots
C	Approach speed 121 knots or more but less than 141 knots
D	Approach speed 141 knots or more but less than 166 knots
E	Approach speed 166 knots or more

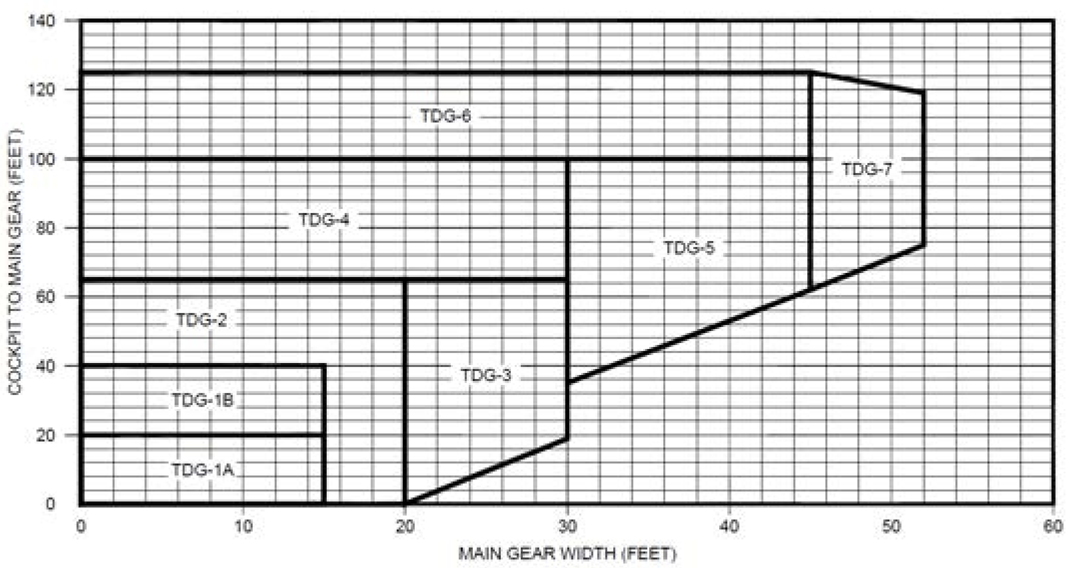
Source: FAA AC 150/5300- 13A, *Airport Design*

Table 3-12: Aircraft Design Group

Group	Tail Height	Wingspan
I	< 20'	< 49'
II	20' ≤ 30'	49' ≤ 79'
III	30' ≤ 45'	79' ≤ 118'
IV	45' ≤ 60'	118' ≤ 171'
V	60' ≤ 66'	171' ≤ 214'
VI	66' ≤ 80'	214' ≤ 262'

Source: FAA AC 150/5300- 13A, *Airport Design*

Table 3-13: Taxiway Design Group



Source: FAA AC 150/5300- 13A, *Airport Design*

The critical aircraft for each runway at SLC is detailed in Table 3-14. The previous Airport Layout Plan listed the Boeing 767-400 as the critical aircraft for Runway 16L-34R, 16R-34L, and 17-35. The B767 is an aircraft approach category (AAC) D and airplane design group (ADG) IV aircraft.

Since the Airport Layout Plan was updated in 2006, the critical aircraft for Runway 16L-34R and 16R-34L has increased to ADG V, as was verified in the analysis completed for the Aviation Activity Forecast. Growth in operations by aircraft such as the Airbus A330, Boeing 777, and Boeing 787 have resulted in this increase. This results in increased runway design characteristics, such as holding position distances and runway blast pad sizing, as discussed in detail in Section 3.2.1.2.

The critical aircraft characteristics for Runway 17-35 and Runway 14-32 remains the same today and through the planning period, despite slightly different aircraft models. However, it should be noted that if Runway 17-35 is realigned as a parallel runway, it is recommended it be designed to D-V standards as its functionality and capability would be enhanced to equal the exiting parallel runways.

Table 3-14: Critical Aircraft

		Runway 16L/34R	Runway 16R/34L	Runway 17/35	Runway 14/32
Previous Critical Aircraft		B767-400	B767-400	B767-400	EMB120
	AAC	D	D	D	B
	ADG	IV	IV	IV	II
	TDG	5	5	5	3
Existing Critical Aircraft		A330/B737-9	A330/B737-9	A330/B737-9	A330/B737-9
	AAC	D	D	D	B
	ADG	V	V	IV	II
	TDG	5	5	5	2
Future Critical Aircraft		A350/B777-3	A350/B777-3	B767	B1900D
	AAC	D	D	D	B
	ADG	V	V	IV	II
	TDG	6	6	5	2

Source: 2006 Airport Layout Plan, RS&H Analysis, 2019

3.2.1.5 Runway Length

The previous master plan for SLC recommends an extension of Runway 16L-34R to 15,100 feet. Since the completion of the last master plan, important industry events and trends have emerged which influence runway length requirements. New generation aircraft have generally reduced runway length requirements at airports. However, at SLC, high elevation, high maximum mean temperature, and existing obstructions such as the powerlines to the north present challenges to aircraft performance and result in limitations to the allowable take-off weight of some aircraft using the Airport.

In addition to the last master plan, several runway length analyses have been completed in support of air service development at the Airport. A validation of previously studied runway lengths of 12,002', 13,500', 15,100', and 16,000' feet was conducted based on both the existing and forecasted fleet, and updates to meteorological conditions. A temperature of 95.6° F, the 95 percentile of temperature at SLC, and dry runways were assumed. The existing and future aircraft fleet mix which would have the greatest likelihood to be benefited by a runway extension including the Airbus A330, Airbus A350, Boeing 737-900, Boeing 777-200F, and Boeing 787-900 were examined.

There are five factors that can restrict the allowable maximum take-off weight for aircraft. These include:

- Brake Energy – the aircraft brakes will be unable to absorb the amount of energy required to stop the aircraft during an aborted take-off
- Climb – the allowable weight of the aircraft to meet climb gradients for takeoff flight path segments
- Field Length – the runway length available does not allow the aircraft to meet regulations such as the accelerate stop distance, or take-off distance for weight beyond the restricted weight
- Obstacle – the aircraft will be unable to sufficiently clear the existing obstacles such as powerlines and trees to the north of the airfield beyond the allowable weight
- Tire Speed – the speed required for take-off will be greater than the maximum speed for which the aircraft tires are rated

The runway length calculations are based on departures on Runway 34R. For each of the aircraft studied, an allowable take-off weight for each runway length was determined with and without the powerlines located north of the Airport. At 95.6° F, all aircraft examined were limited from reaching the maximum take-off weight of the aircraft. However, lower temperatures would allow for an increase in allowable take-off weight. All aircraft faced a limitation other than field length at a runway length of 15,100 feet or longer. TABLE 3-15 shows the results of this analysis.

Table 3-15: Runway Length Allowable Take-Off Weight and Limitations

Aircraft		Airbus A330-243		Airbus A350-941		Boeing 737-900		Boeing 777-200F		Boeing 787-9	
Engine MTOW (lbs)		Trent 772 524,700		Trent XWB-84 617,294		CFM56-7B26 187,000		GE90-110BL 766,000		Genx-1B74/75 557,000	
Runway Length	Obstructions	Allowable Take-Off Weight (lbs)	Limitation	Allowable Take-Off Weight (lbs)	Limitation	Allowable Take-Off Weight (lbs)	Limitation	Allowable Take-Off Weight (lbs)	Limitation	Allowable Take-Off Weight (lbs)	Limitation
12,002'	Existing	482,750	Brake Energy	539,035	Obstacle	165,481	Climb	654,300	Field Length	477,500	Field Length
13,500'		483,976	Obstacle	545,999	Obstacle	166,858	Climb	668,300	Tire Speed	488,300	Field Length
15,100,		483,827	Obstacle	548,509	Obstacle	166,858	Climb	669,300	Tire Speed	495,600	Climb
16,000'		483,742	Obstacle	548,409	Obstacle	166,858	Climb	669,300	Tire Speed	495,600	Climb
12,002'	None	482,750	Brake Energy	541,366	Field Length	165,481	Climb	654,300	Field Length	477,500	Field Length
13,500'		488,304	Brake Energy	555,841	Field Length	166,858	Climb	668,300	Tire Speed	488,300	Field Length
14,500'		-	-	562,858	Brake Energy	-	-	-	-	-	-
15,100'		493,570	Brake Energy	564,953	Brake Energy	166,858	Climb	669,300	Tire Speed	495,600	Climb
16,000'		496,214	Brake Energy	567,350	Brake Energy	166,858	Climb	669,300	Tire Speed	495,600	Climb

Source: Flight Engineering, May 2019

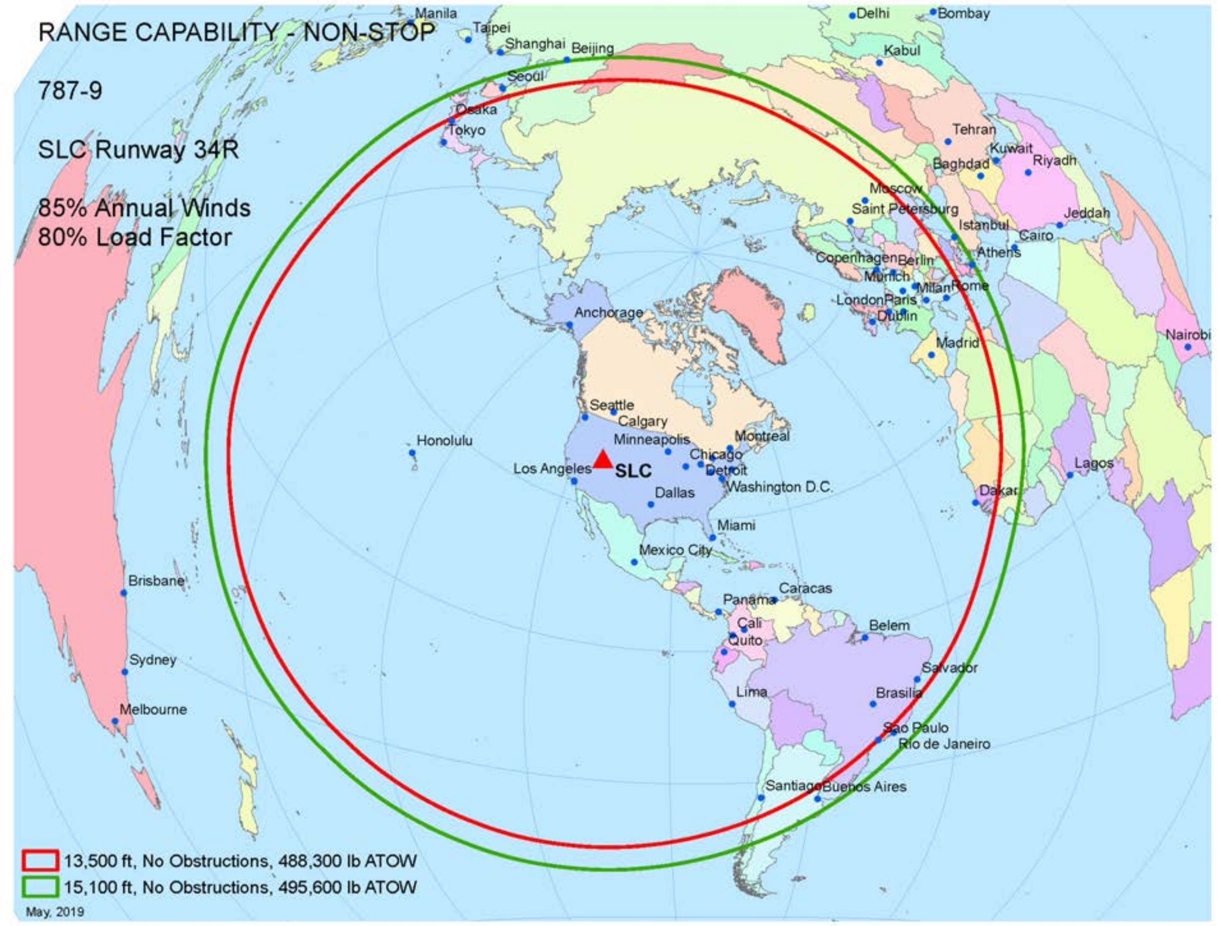
The existing obstacles, such as the powerlines, were found to impact the allowable take-off weight of the Airbus A330 and A350 at almost all runway lengths, but have no impact on the B737-900, B777-200F, or B787-900. If these obstacles are removed, the Airbus A330 and A350 would have a greater allowable take-off weight that require up to a 16,000-foot runway. However, the increases in allowable take-off weight become less between 13,500 feet and 15,100 feet. The B777-200F receives no benefit from a runway length beyond 13,100 feet, and the B787-9 receives no benefit from a runway length beyond 15,100 feet.

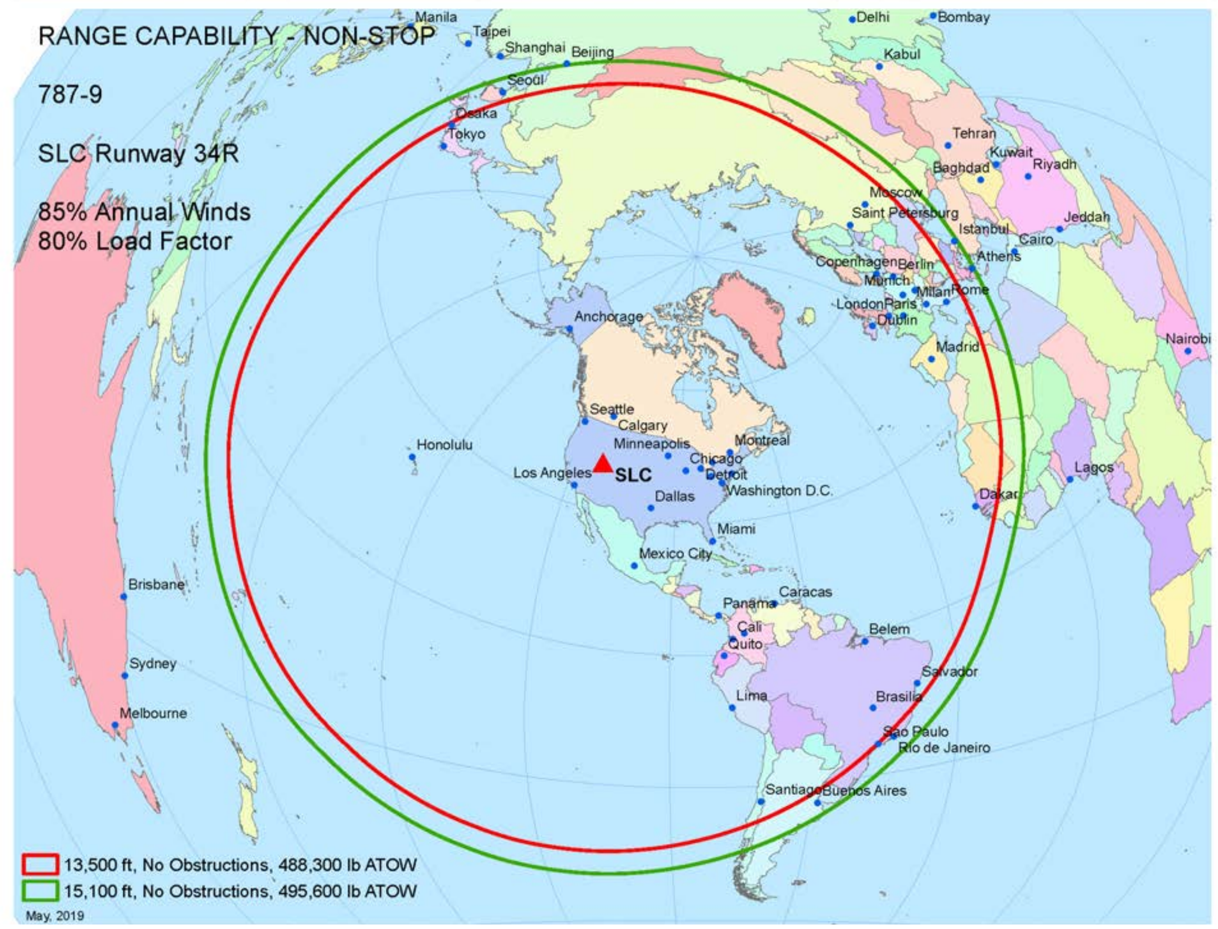
Using the determined allowable take-off weights, approximate range capabilities were determined for the A350 and B787-900 as shown in Figure 3-3. Routes between major cities in Asia including the Delta hub at Incheon International Airport serving Seoul, South Korea, Beijing China and other cities in the region, were identified in the Aviation Activity Forecast as locations likely to see demand growth. Assumptions in this calculation include mitigation of all existing obstructions, 85 percent of the annual winds, and an 80 percent load factor. For the A350, a 13,500-foot runway allows for a range that includes Seoul, South Korea; Rio de Janeiro, Brazil; and nearly all of Europe. With a reduction in payload, the A350 could reach Beijing, China. The B787-900 can reach Tokyo, Japan; Rio de Janeiro, Brazil; and westernmost Europe on a 13,500-foot runway. As with the A350, the B787-900 can reach markets like Beijing with a reduced payload. Although limited by brake energy, the A330 could increase its take-off weight to a point it would require a 16,000-foot runway.

However, this aircraft is not expected to be widely used in the Asian market from SLC.
The point at which the limiting take-off factor is not field length occurs between 13,500 feet and 15,100 feet (A350 and B787-900, no obstructions). Interpolating the take-off weight for those two aircraft yields a runway length requirement of 14,500 feet. The A350, the largest aircraft Delta is likely to utilize for flights to Asia, can accommodate a maximum passenger payload on both a 13,500-foot and 14,500-foot runway to Seoul, Beijing, and Tokyo. At 14,500 feet, the A350 can accommodate an additional 5,000 pounds to 6,000 pounds of cargo to these three markets.

To maximize allowable take-off weight for the future critical aircraft, it is recommended that the master plan provide for a future 14,500-foot runway.

Figure 3-3: Runway Extension Range Capabilities





Source: *Flight Engineering, May 2019*

3.2.1.6 Runway Pavement Strength

Runway pavement strength determines the aircraft weight that can land repeatedly with normal wear on a runway. If an aircraft landing regularly exceeds the pavement strength of the runway, the runway will age prematurely and can be damaged. This can compromise the integrity of the pavement, requiring reconstruction at an earlier and unscheduled time. In order to ensure that aircraft are capable of landing on a runway according to weight, aircraft are assigned their weights in conjunction to the configuration of their main gear.

TABLE 3-16 details the max takeoff weight (MTOW) of the existing and future critical aircraft at SLC. The heaviest of the existing critical aircraft are the Airbus A330-300 and the Boeing 767-300. In the future, it is expected that the Airbus A350-900 and Boeing 777-300 will be the heaviest aircraft using the runways at SLC with substantial use. The Boeing 777 is expected to be used by cargo operators by PAL 1, and forecast in the base case scenario to exceed the substantial use threshold of 500 annual operations by PAL 2. Use of the Airbus A350 is forecasted in the high case scenario to exceed the substantial use threshold in PAL 2.

Table 3-16: Existing and Future Critical Aircraft MTOW

Existing Critical Aircraft	ARC	Gear Type	Maximum Take-Off Weight
Boeing 737-900	D-III	Dual-Wheel	188,000 lbs
Airbus A330-300	C-V	Dual-Tandem Wheel	518,000 lbs
Boeing 767-300	D-IV	Dual-Tandem Wheel	412,000 lbs
Beech 1900	B-II	Dual-Wheel	27,000 lbs
Future Existing Aircraft	**ARC**	**Gear Type**	**Maximum Take-Off Weight**
Boeing 777-300	D-V	Triple-Tandem Wheel	660,000 lbs
Airbus A350-900	D-V	Dual-Tandem Wheel	591,000 lbs
Boeing 767-300	D-IV	Dual-Tandem Wheel	412,000 lbs
Beech 1900	B-II	Dual-Wheel	27,000 lbs

Source: RS&H 2019, Advisory Circular 150/5300-13A Change 1, *Airport Design*

The analysis of runway pavement strength is a high-level analysis which compares published weight capacity to the MTOW of critical aircraft, and does not include examination of aircraft condition numbers (ACN), pavement condition numbers (PCN), or typical takeoff and landing weights of aircraft operating at the Airport. The analysis found a delta between the published maximum runway strength and the MTOW of dual-tandem wheel critical aircraft, both existing and future. The published strength for dual-tandem wheel aircraft for all runways at SLC is 350,000 pounds. The existing critical aircraft, the A330-300 and Boeing 767-300, both dual-tandem wheel aircraft, have MTOW that exceed the published weight capacity. The future critical aircraft, the Airbus A350-900, also exceeds the published weight capacity. The Boeing 777-300, the heaviest of all future critical aircraft, is configured with a triple-tandem gear, of which there is no published weight capacity. TABLE 3-17 details the existing published runway strength and the recommended strength to accommodate the MTOW of the critical aircraft. Overall, it is recommended that Runway 16L-34R, Runway 16R-34L and Runway 17-35 be strengthened in the future.

Interesting to note, during the analysis completed for the Aviation Forecast, it was found that no aircraft with a MTOW of 20,000 pounds or greater conducted any operations on Runway 14-32 in 2017, although the pavement strength is comparable to the other three runways. Runway 14-32 is a remnant WWII era runway, assumed to have been built to accommodate very heavy aircraft. As the airport was further developed, Runway 14-32 was often used for taxiing aircraft from the terminal area to Runway 35. Today, Taxiway L allows this operation, but the previous history and use of Runway 14-32 is estimated to be related to the high weight bearing capacity of the runway. To serve existing and expected operations, Runway 14-32 need only accommodate single gear aircraft up to roughly 30,000 pounds, and dual-wheel gear up to 50,000 pounds.

3.2.1.7 Runway Protection Zones

For the protection of people and property on the ground, the FAA has identified an area of land located off each runway end as the Runway Protection Zone (RPZ) that should be under airport control and free of incompatible objects and activities. The size of these zones varies according to the critical aircraft characteristics and the lowest instrument approach visibility minimum defined for each runway.

Table 3-17: Runway Strength Requirements

Gear Type	Existing Pavement Strength	Recommended Pavement Stregth	Meets Requirements
Runway 16L-34R			
Single (S)	60,000 lbs	60,000 lbs	□
Dual (D)	200,000 lbs	200,000 lbs	□
Dual Tandem (2D)	350,000 lbs	600,000 lbs	X
Triple Tandem (3D)	Unknown	660,000 lbs	Unknown
Double-Dual Tandem (2D/2D2)	850,000 lbs	850,000 lbs	□
Runway 16R-34L			
Single (S)	60,000 lbs	60,000 lbs	□
Dual (D)	200,000 lbs	200,000 lbs	□
Dual Tandem (2D)	350,000 lbs	600,000 lbs	X
Triple Tandem (3D)	Unknown	660,000 lbs	Unknown
Double-Dual Tandem (2D/2D2)	850,000 lbs	850,000 lbs	□
Runway 17-35			
Single (S)	60,000 lbs	60,000 lbs	□
Dual (D)	200,000 lbs	200,000 lbs	□
Dual Tandem (2D)	350,000 lbs	600,000 lbs	X
Triple Tandem (3D)	Unknown	660,000 lbs	Unknown
Double-Dual Tandem (2D/2D2)	850,000 lbs	850,000 lbs	□
Runway 14-32			
Single (S)	60,000 lbs	30,000 lbs	□*
Dual (D)	200,000 lbs	50,000 lbs	□*
Dual Tandem (2D)	350,000 lbs	NA lbs	□*
Double-Dual Tandem (2D/2D2)	850,000 lbs	NA lbs	□*

Source: Airport Facilities Directory Effective 9/13/2018 to 11/7/2018, RS&H Analysis, 2019
*Runway 14-32 is built to a strength beyond that required to support current and forecasted operations

FAA desires airports to own in fee all the land within RPZs. Two of the eight RPZs at SLCIA are not entirely under control and/or owned in fee by SLCDA, as denoted in TABLE 3-18. An 8,117 square foot section of the Runway 34L RPZ, or approximately 0.2% of the total RPZ, extends off airport property onto property the airport sponsor does not control, as shown in FIGURE 3-4. This section extends onto a section of property for Interstate 80. Note that there is no object or use in this area that constitutes a safety issue. Considering this is such a small area of unowned land and that the primary use of the land is a right-of-way for an interstate, no action is recommended at this time. If Interstate 80 is ever relocated, it is recommended that SLCDA purchase the land remaining in the RPZ.

According to the Salt Lake County Assessors web viewer, the Utah Transit Authority owns slivers of land within the Runway 35 RPZ where the TRAX line runs. This land is assumed to have been sold to the Utah Transit Authority with a perpetual easement, and thus was acceptable for conveyance by FAA. Coordination between the Airport and FAA is ongoing on other parcels of land used but not owned by TRAX, and no further action is recommended.

Three RPZs have existing transportation facilities, within their boundaries. These include the 2100 N roadway inside the Runway 16L RPZ, the TRAX light rail Green Line and North Temple roadway inside the Runway 35R RPZ, and I-80 inside the Runway 34L RPZ (as noted). Note that Salt Lake City owns all the land used by 2100 N and North Temple roadways. While not an incompatible land use, as each was an existing condition prior to the 2012 FAA Memorandum *Interim Guidance on Land Uses within a Runway Protection Zone*, it is recommended that if any of these facilities are rebuilt in the future, they be relocated outside of the RPZ. Furthermore, if Runway 17-35 is realigned, it should be positioned such that the RPZ is clear of roadways and the TRAX line if possible.

A portion of the now closed Wingpointe Golf Course sits under and immediately adjacent to the Runway 35R RPZ. The portion shown in red in FIGURE 3-5 used to be part of the driving range. The intent of the 2012 FAA Memorandum is to reduce hazards to people and property. The document notes that new recreational land uses, including golf courses, require APP-400 approval. The reopening of the Wingpointe Golf Course would constitute a new land use compared to today's condition; thus APP-400 approval would be required.

To remain in compliance with current FAA policy, it is recommended that the former golf course remain vacant until compatible development is proposed for the site It is not recommended that any of the land within the airport property boundary be returned to use as a golf course. In addition to the issue of the golf course being under the Runway 35R RPZ, the land itself was and currently is a wildlife attractant due to the presence of open water ponds and grass expanses that can be used for feeding birds. Advisory Circular 150/5200-33B *Hazardous Wildlife Attractants On or Near Airports* notes specifically that FAA recommends against construction of new golf courses located within 5 miles of an airport operations area. Thus, reopening the Wingpointe Golf Course, which constitutes a new usage of this land compared to the exiting condition, directly conflicts with AC 150/5200-33B. Overall, it is not recommended that the golf course be reopened, as that action goes against FAA recommendations provided within AC 150/5200-33B *Hazardous Wildlife Attractants On or Near Airports* and is not a preferred land use within an RPZ. The area formally used as a golf course and the canal system on the south and west sides of the airport are recommended to be mitigated for wildlife to the fullest extent possible. This would include the modification of the canal systems and repurposing the land in a manner that discourages use by wildlife and meets RPZ requirements.

3.2.1.8 Runway Geometric and Separation Standards

This section analyzes the existing runway geometric layouts and separation distances against the dimensional standards that correspond with the critical aircraft category designated for each runway. Compliance with FAA airport geometric layouts and separation standards, without modification to standards, is intended to meet a minimum level of airport operational safety and efficiency.

Figure 3-4: Runway 34L RPZ

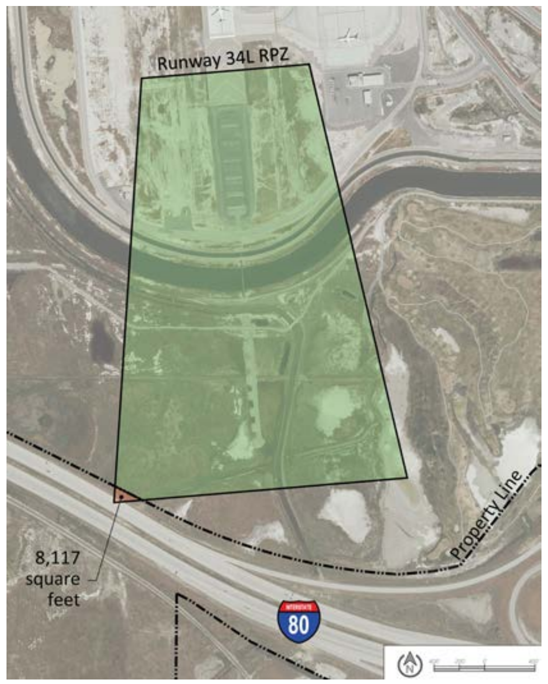
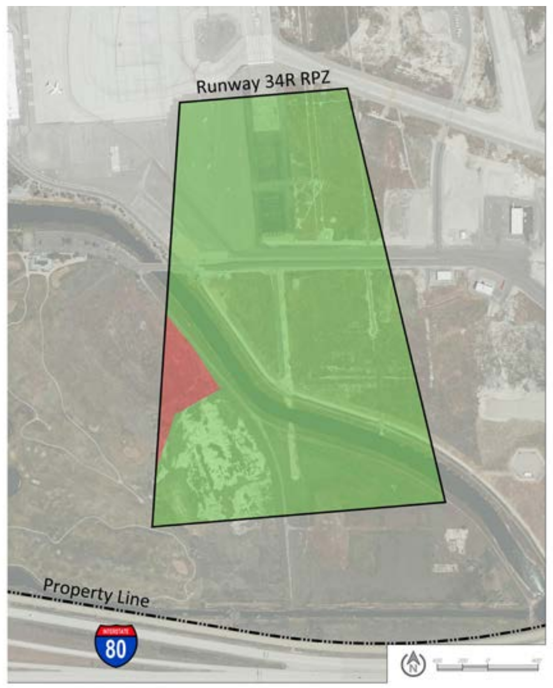


Figure 3-5: Runway 34R RPZ



Source: RS&H Analysis, 2019

Table 3-18: Runway Protection Zone Requirements

Runway	Runway							
	16R	34L	16L	34R	17	35	14	32
Length	2,500'	2,500'	2,500'	2,500'	2,500'	2,500'	1,000'	1,000'
Inner Width	1,000'	1,000'	1,000'	1,000'	1,000'	1,000'	500'	500'
Outer Width	1,750'	1,750'	1,750'	1,750'	1,750'	1,750'	700'	700'
Percent SLCDA Controlled	100%	99.08%	100%	100%	100%	Unknown	100%	100%
Meets Standard		*				*		

Source: Advisory Circular 150/5300-13A Change 1, *Airport Design*, RS&H Analysis 2019
*These instances of land not under direct control by SLCDA do not require immediate action. The land under the Runway 35 RPZ that is not owned by SLCDA is assumed to have a perpetual easement.

TABLE 3-20 compares the FAA airport design standards for the Runway 16L-34R and 16R-34L, based on existing design standards. Design standards not in compliance are denoted by a bold "X." Layouts that are not compliant include blast pads and blast pad markings. In addition, runway hold position marking separation and runway to taxiway separation at specific locations that only apply when visibility is decreased were determined to be non-compliant. The details of these instances are discussed below. Blast pads should be marked with chevrons aligned with the runway for the total width and length of the blast pad[5]. The markings on the Runway 16L blast pad are not currently full width, and the markings on the Runway 34R blast pad do not extend the full length of the paved surface. Additionally, the Runway 34R blast pad pavement is not full width. These issues do not require alternatives analysis, but the cost to fix the deficiencies will be included in the capital improvement program developed as part of this study.

As it relates to runway hold position markings and runway to taxiway separation, deficiencies were found that only apply when visibility decreases to specific levels. Runway 16L-34R and 16R-34L both meet base level ADG V standards for runway to taxiway and runway to hold position separation. Note that both runways meet all standards for ADG IV separation standards during any visibility. Thus, the deficiencies identified only apply for ADG V runway operations during specific visibility conditions, as detailed in TABLE 3-19.

The hold position lines for Runway 16L-34R meet the standards for an ADG V runway at 292 feet from the runway centerline, when visibility is ¾-statute miles or greater. However, when visibility drops below ¾- statute miles, the standard requires runway hold positions to be 322 feet from the runway centerline[6]. In an analysis evaluating the runway's Inner-transitional obstacle free zone (OFZ), it was found the current hold position markings are placed in a location sufficient to keep holding aircraft clear of that surface. Thus, the current placement of these markings do not require any special operational procedures.

The current runway to parallel taxiway separation for Runway 16L-34R and Runway 16R-34L is adequate for ADG V operations, except when visibility is less than ½-statute mile. Both runways have 600 feet of separation to the taxiways, centerline to centerline, except where the taxiways run adjacent to the deice pads. At those points, separation is reduced to 460 feet between Runway 16L-34R and Taxiway H, and 450 feet between Runway 16R-34L and Taxiway A. That amount of separation is adequate for ADG V runway operations when visibility is ½-statute mile or greater. When visibility drops below ½-statute mile, 500 feet separation is required[7]. Today, SLCDA Operations restricts operations on the parallel taxiway when ADG V are landing and runway visual range (RVR) is below 1,200 feet. For ADG V aircraft to land on Runway 16L-34R or 16R-34L when RVR is less than 1,200 feet, the correlated parallel taxiway must be clear of aircraft in those areas where separation is reduced adjacent to the deice pads.

The runway to taxiway and hold marking position separation issues described will be brought forward together into the alternatives analysis. Alternatives analysis will examine if fixing these issues is warranted based upon cost versus overall benefit to airport operations.

Table 3-19: Runway to Taxiway and Hold Marking Separations

Aircraft Design Group/Visibility	FAA Standard	Runway 16L/34R	Runway 16R/34L
Runway to Taxiway Seperation			
ADG IV -- Any Visibility	400 Feet		
ADG V -- 1/2 SM Visibility or Above	450 Feet		
ADG V -- Below 1/2 SM Visibility	500 Feet	**X***	**X***
Runway to Hold Position Separation			
ADG IV -- Any Visibility	292 Feet		
ADG V -- 3/4 SM Visibility or Above	292 Feet		
ADG V -- Below 3/4 SM Visibility	322 Feet	**X**	

Source: Advisory Circular 150/5300-13A Change 1, *Airport Design*, RS&H Analysis 2019
Note that runway to hold position requirement accounts for SLC field elevation
*Runway 16L/34R and 16R/34L are only deficient in the areas adjacent to deice pads where taxiway to runway separation is decreased
SM is Stature Mile

[5] Advisory Circular 150/5340-1L – Standards for Airport Markings
[6] For a D-V runway the required holding position separation from runway centerline when visibility is less than ¾ statute miles is 280' from the runway centerline plus 1 additional foot for each 100 feet above sea level of the airport elevation.
[7] Advisory Circular 150/5300-13A Change 1 – Airport Design, Footnote 5, page 94. Note applies to ADG V runways

Table 3-20: Runway 16L-34R and Runway 16R-34L Design Standards

Airfield Components	ADG D-V-2400 Requirement	Runway 16L-34R		Runway 16R-34L	
		Existing	Future Met ( )	Existing	Future Met ( )
Runway Design					
Runway Width	150'	150'		150'	
Runway Shoulder Width	35'	50'		35'	
Runway Blast Pad Width	220'	150'	X (34R)*	220'	*
Runway Blast Pad Length	400'	400'		400'	
Runway Protection					
Runway Safety Area (RSA)					
Length Beyond Departure End	1,000'	1,000'		1,000'	
Length Prior to Threshold	600'	600'		600'	
Width	500'	500'		500'	
Runway Object Free Area (ROFA)					
Length Beyond Runway End	1,000'	1,000'		1,000'	
Length Prior to Threshold	600'	600'		600'	
Width	800'	800'		800'	
Runway Obstacle Free Zone (ROFZ)					
Length	200'	200'		200'	
Width	400'	400'		400'	
Precision Obstacle Free Zone (POFZ)					
Length	200'	200'		200'	
Width	800'	800'		800'	
Approach Runway Protection Zone (ARPZ)					
Length	2,500'	2,500'		2,500'	
Inner Width	1,000'	1,000'		1,000'	
Outer Width	1,750'	1,750'		1,750'	
Acres	78,914	78,914		78,914	
Departure Runway Protection Zone (DRPZ)					
Length	1,700	1,700		1,700'	
Inner Width	500'	500'		500'	
Outer Width	1,010'	1,010'		1,010'	
Acres	29,465	29,465		29,465	
Runway Separation					
Runway Centerline to:					
Parallel Runway Centerline	4,300'	6,156'		6,156'	
Holding Position	322'	292'	X	322'	
Parallel Taxiway/Taxilane Centerline	500'	460'	X	450'	X
Aircraft Parking Area	500'	590'		645'	

Source: Advisory Circular 150/5300-13A Change 1, *Airport Design*, RS&H Analysis 2019
*Runway blast pad marking for Runway 16L and 34R are not to standard

TABLE 3-21 compares the FAA airport design standards for Runway 17-35 and Runway 14-32. The only non-compliant design standard found in analyzing these two runways is the blast pad for Runway 17. That blast pad does not meet the ADG IV runway blast pad length requirement of 200 feet.

FIGURE 3-6 shows the locations on the airfield of each of these deficiencies. Overall, the blast pad deficiencies are minor deficiencies that require small investment to correct. The hold position markings for Runway 16L-34R are recommended to be moved during large scale taxiway projects that involve fillet design, lighting, and signage changes if it is determined by Airport staff that these changes are warranted. The runway to taxiway separation deficiencies will be brought forward into the alternatives to determine if changes to allow unrestricted ADG V operations on Runway 16L-34R or 16R-34L are justified.

As it relates to the next phase of study, Chapter 4 – Identification and Evaluation of Alternatives, the relocation of runways and deice pads will be evaluated to determine how best to accommodate unrestricted ADG V operations at SLC.

Table 3-21: Runway 17-35 and Runway 14-32 Design Standards

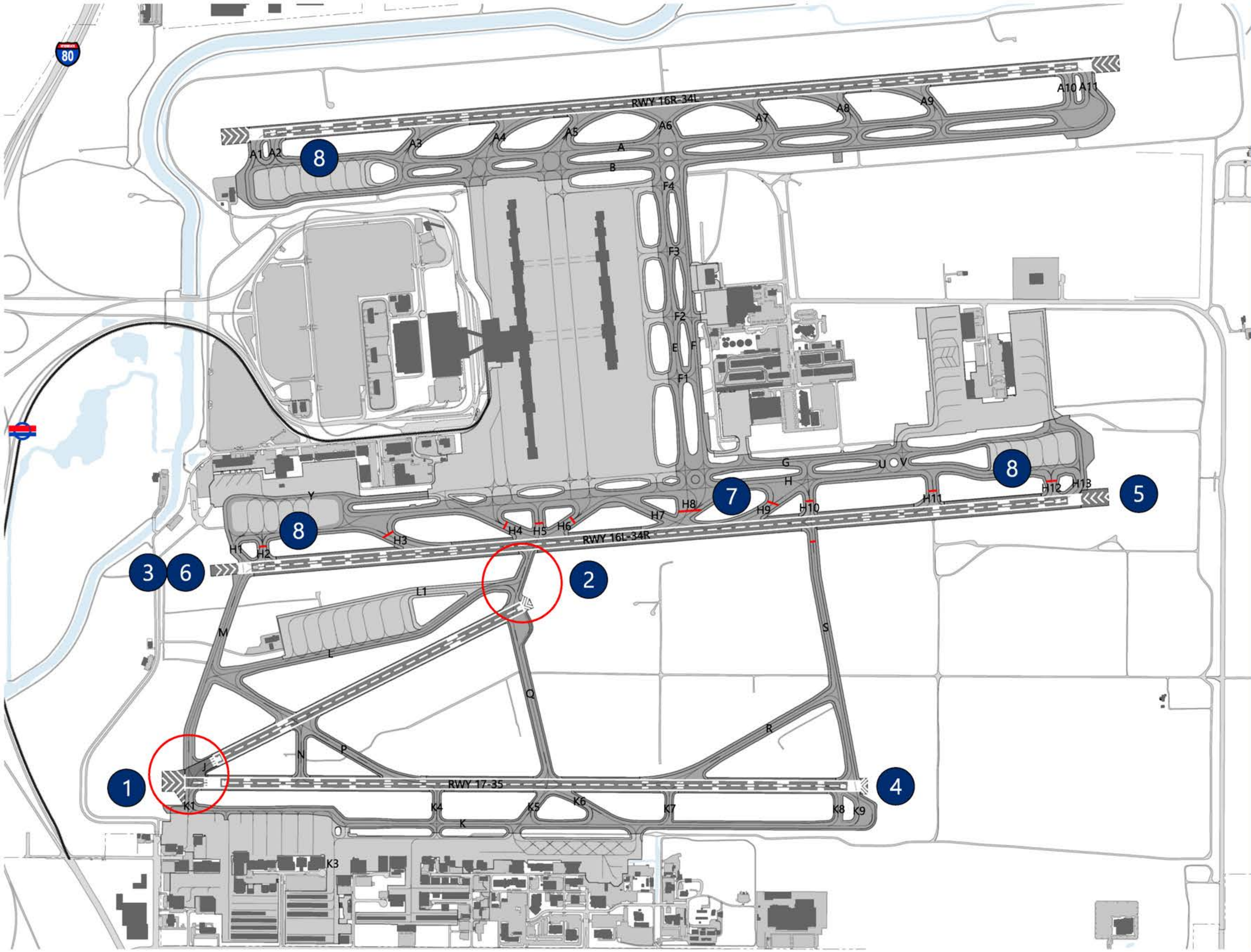
Airfield Components	ADG D-V-2400 Requirement	Runway 17-35		ADG B-II-VIS Requirement	Runway 14-32	
		Existing	Future Met ( )		Existing	Future Met ( )
Runway Design						
Runway Width	150'	150'		75'	150'	
Runway Shoulder Width	25'	35'		10'	25'	
Runway Blast Pad Width	200'	200'		95'	150'	
Runway Blast Pad Length	200'	104'	X (17)	150'	125'	
Runway Protection						
Runway Safety Area (RSA)						
Length Beyond Departure End	1,000'	1,000'		300'	300'	
Length Prior to Threshold	600'	600'		300'	300'	
Width	500'	500'		150'	150'	
Runway Object Free Area (ROFA)						
Length Beyond Runway End	1,000'	1,000'		300'	300'	
Length Prior to Threshold	600'	600'		300'	300'	
Width	800'	800'		500'	500'	
Runway Obstacle Free Zone (ROFZ)						
Length	200'	200'		200'	200'	
Width	400'	400'		400'	400'	
Precision Obstacle Free Zone (POFZ)						
Length	200'	200'		N/A	N/A	N/A
Width	800'	800'		N/A	N/A	N/A
Approach Runway Protection Zone (ARPZ)						
Length	2,500'	2,500'		1,000	1,000	
Inner Width	1,000'	1,000'		500'	500'	
Outer Width	1,750'	1,750'		700'	700'	
Acres	78,914	78,914		13,770'	13,770'	
Departure Runway Protection Zone (DRPZ)						
Length	1,700	1,700		1,000'	1,000'	
Inner Width	500'	500'		500'	500'	
Outer Width	1,010'	1,010'		700'	700'	
Acres	29,465	29,465		13,770	13,770	
Runway Separation						
Runway Centerline to:						
Parallel Runway Centerline	N/A	N/A	N/A	N/A	N/A	N/A
Holding Position	292'	292'		200'	240'	
Parallel Taxiway/Taxilane Centerline	400'	400'		N/A	N/A	N/A
Aircraft Parking Area	500'	558'		250'	525'	

Source: Advisory Circular 150/5300-13A Change 1, *Airport Design*, RS&H Analysis 2019

3.2.1.9 Hot Spots

The FAA defines a hot spot as a location on an airport movement area with a history of runway incursions or the potential risk of aircraft collisions, and where heightened attention by pilots and drivers is necessary. As previously mentioned in Chapter 1 – Inventory of Existing Conditions, two hot spots have been designated at SLC. Both hot spots are on the FAA Runway Incursion Mitigation list. The first hot spot is located near the threshold of Runway 32 and Runway 35, designated as "HS1". The second hot spot is located at the intersection of Taxiway Q and Taxiway L, near the approach end of Runway 14, designated as "HS2". The location of the two FAA hot spots are shown in FIGURE 3-6.

HS1 has been identified as a hot spot because of the risk of departing on the wrong runway. The v-shaped configuration for Runway 14-32 and Runway 17-35 has the potential risk for aircraft departing and landing on the wrong runway. HS2 has been identified as a hot spot because of the risk of runway incursions due to the short taxi distance on Taxiway Q between Runway 14-32 and Runway 16L-34R. SLCDA Operations staff noted that the incursions at HS2 are typically related to pilots taxiing east across Runway 16L-34R, missing the right turn on Taxiway L, and subsequently running the hold-short markings for Runway 14-32.



Runway Deficiencies and Hot Spots

Hot Spot

1. HS1 - Wrong runway departure risk. Hold lines for Runway 32 and Runway 35 are at the same location at Taxiway K1 and Taxiway M with short taxi distance to either runway.
2. HS2 - High risk of runway incursion at runway 14-32 on Taxiway Q due to short taxi distance between runways.

Blast Pad

3. Runway 34R blast pad is not full width.
4. Runway 17 blast pad is not full length.

Blast Pad Marking

5. Runway 16L blast pad markings are not full width.
6. Runway 34R blast pad markings are not full length.

Runway Hold Position

7. Runway 16L-34R hold positions at Taxiways H2-H6, H8-H12 and S less than ADG V requirement of 322'.

Runway / Taxiway Separation

8. Taxi restrictions on Taxiway H and A when RVR is below 1,200' and adjacent runway is in use by ADG V aircraft.

Deficiencies carried forward into alternatives are denoted by a red square above.

1,500' 750' 0' 1,500'
Scale 1":1,500'

3.2.2 Taxiway Requirements

The taxiway system requirements analysis addresses specific requirements relative to FAA design criteria and the ability of the existing taxiways to accommodate current and forecasted demand. At a minimum, taxiways must provide safe and efficient circulation by maintaining traffic flow using taxi routing with a minimum number of points requiring a change in the airplane's taxiing speed, provide access between runways, aircraft parking and hangar areas, and meet FAA design standards to safely accommodate the critical aircraft.

Examining taxiways requires two different types of perspectives of evaluation. The first is through a lens focused only on the design of the taxiway as it relates to pavement width and separation from other surfaces and obstacles. For this, the critical aircraft associated with each taxiway drives the design standards that are required. The second perspective of evaluation is related to how each taxiway integrates with other pavement surfaces, such as runways, aprons, and other taxiways. This section details the analysis conducted under the purview of both perspectives.

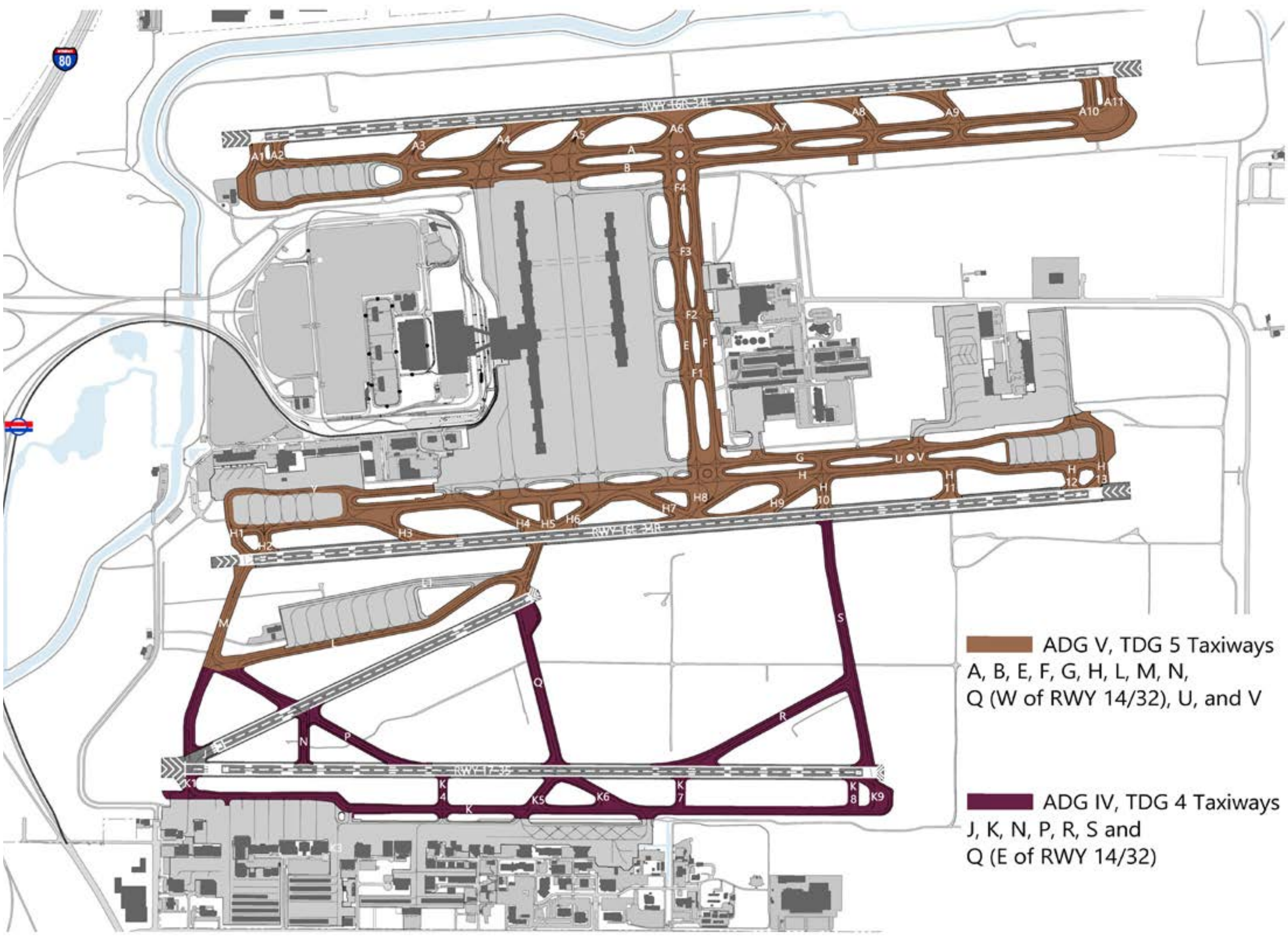
3.2.2.1 Taxiway Design Analysis

The taxiway design criteria analysis included an evaluation of each taxiway to meet the design criteria of the associated critical aircraft. Taxiway pavement width is determined by the TDG of the critical aircraft. Separation standards are determined by the ADG of the critical aircraft. Depending on use, portions of an airfield are designed for one specific aircraft type while other portions are designed for other aircraft types.

FIGURE 3-7 illustrates the ADG and TDG for which each taxiway at SLC was evaluated. The categorization between ADG V/TDG 5 and ADG IV/TDG 4 is correlated to the critical aircraft of the runway the taxiways serve, and typical aircraft routing patterns employed by Airport Traffic Control. The taxiways that serve the parallel runways and the terminal area were evaluated for ADG V and TDG 5 standards. The taxiways that serve Runway 17-35 and the general aviation area were evaluated for ADG IV and TDG 4 standards.

Note, new taxiway infrastructure for a future realigned Runway 17-35 is recommended to be built to ADG V and TDG 5 standards to ensure maximum airfield capability.

Figure 3-7: Taxiway Design Based on Runway Critical Aircraft



Prepared by: RS&H, 2018

TABLE 3-22 details the analysis findings of the ADG V/TDG 5 taxiway that serve the parallel runways and connect the terminal area to Runway 16R-34L and Runway 16L-34R. The design deficiencies identified includes Taxiway Q, which is primarily used to transition aircraft from the terminal area to the L Deicing Pad. That taxiway has 25-foot paved shoulder on the north side instead of a standard 30' TDG 5 shoulder. Taxiway B has a fence penetrating the TOFA in the area adjacent to the vehicle service road north of Taxiway F. Additionally, almost all taxiway fillet geometry does not meet current FAA standards. This issue is common for taxiways built prior to 2012 when AC 150/5300 *Airport Design* was updated and began using new fillet geometry standards. That AC was updated again in 2014 with additional fillet design changes. Correction to fillet geometry is recommended anytime there is need for full-depth taxiway reconstruction.

Table 3-22: SLC ADG V/TDG 5 Taxiways

Taxiway Components	Taxiway Width	Taxiway Shoulder Width	Taxiway Safety Area Width	Taxiway Object Free Area Width	Centerline to Parallel Taxiway	Centerline to Fixed or Movable Object	Taxiway Fillet Design	Meets TDG 6 Requirements
Requirement (ADG V, TDG 5)	**75'**	**30'(1)**	**21.4'**	**320'**	**267'**	**138'**	(2)	
A							X	*
B				X			X	*
E							X	*
F							X	*
G							□	*
H							X(3)	*
L					N/A		X	*
M					N/A		X	*
Q (W of RWY 14/32)		X**			N/A		X	X**
U							X	*
V							X	*

(1) FAA Advisory Circular 150/5300-13A, Change 1 recommends paved shoulders for ADG IV/V aircraft.
(2) See Section 406, paragraph (b) in FAA Advisory Circular 150/5300-13A, Change 1 for fillet design dimensions.
(3) Taxiway H12 and H13 meet TDG 5 Taxiway Fillet Design standards* Taxiway fillet design does not meet TDG 6 standards ** Taxiway Q west of Runway 14/32 does not meet TDG 5 or 6 shoulder width on the north side of the taxiway.
Source: FAA Advisory Circular 150/5300-13A, Change 1

The future critical aircraft for Runway 16L-34R and 16R-34L is the A350 and B777-300, which are both ADG V/TDG 6 aircraft. All taxiways that meet TDG 5 standards today, also meet TDG 6 standards in all categories except fillet design. It is recommended that when current TDG 5 taxiways are reconstructed throughout the planning period, they be designed to meet TDG 6 fillet geometry standards.

Table 3-23 details the findings of the analysis of the ADG IV/TDG 4 taxiways that serve Runway 17-35 and the general aviation areas. The only design deficiency found is related to fillet design. The fillets on these taxiways do not meet the newest design standards outlined in AC 150/5300-13A Change 1, *Airport Design*.

In addition, it was determined that all these taxiways, except Taxiway K, are designed with width and separation to support ADG V/ TDG 5/6 aircraft. Taxiway widths in many cases are greater than the ADG V/ TDG 5/6 required 75 feet, and in all instances where shoulder width is less than 30 feet, additional taxiway width makes up for the difference in overall pavement width. Taxiway K meets the ADG 5/TDG 5 standard width of

Table 3-23: SLC ADG IV/TDG 4 Taxiways

Taxiway Components	Taxiway Width	Taxiway Shoulder Width	Taxiway Safety Area Width	Taxiway Object Free Area Width	Centerline to Parallel Taxiway	Centerline to Fixed or Movable Object	Taxiway Fillet Design	ADG V / TDG 5 & 6 Capable*
Requirement (ADG IV, TDG 4)	**50'**	**20'(1)**	**171'**	**259'**	**215'**	**129.5'**	(2)	
J					N/A		X	
K					N/A		X	NO
N					N/A		X	
P					N/A		X	
Q (W of RWY 14/32)					N/A		X	
R					N/A		X	
S					N/A		X	

(1) FAA Advisory Circular 150/5300-13A, Change 1 recommends paved shoulders for ADG IV/V aircraft.
(2) See section 406, paragraph (b) in FAA Advisory Circular 150/5300-13A, Change 1 for fillet design dimensions.
*Taxiway fillet design also does not meet TDG 5 or 6 standards
Source: FAA Advisory Circular 150/5300-13A, Change 1

75 feet, but only has 25-foot shoulders as opposed to 30-foot which is required. Taxiway K also only meets ADG IV separation standards between taxiway centerline and all facilities, taxilanes, and apron on the east side. The Airport taxiway system is robust and overbuilt to the extent that taxiways provide a great deal of flexibility for accommodating a wide variety of aircraft types. In many cases, taxiway widths far exceed the base ADG/TDG requirements. Overall, no design deficiencies exist that require alternative analysis. However, the current design and use of taxiways will be considered in the development of alternatives.

The Airport taxiway system is robust and overbuilt to the extent that taxiways provide a great deal of flexibility for accommodating a wide variety of aircraft types. In many cases, taxiway widths far exceed the base ADG/TDG requirements. Overall, no design deficiencies exist that require alternative analysis. However, the current design and use of taxiways will be considered in the development of alternatives.

3.2.2.2 Taxiway Layout Analysis

In addition to design standards for taxiways related to pavement width and separation, FAA provides standards for recommended taxiway layout to enhance safety and decrease risk of runway incursions. An analysis was conducted of the taxiway layout at SLC to identify those taxiways and areas where taxiway layout does not meet the recommendations in Advisory Circular 150/5300-13A, Change 1, Airport Design.

FIGURE 3-8 details the layout related deficiencies identified in the analysis. Some of the deficiencies identified are related to the airfield hot spots discussed in Section 3.2.1.3, while others have been in place for decades at SLC with no issue. A primary component of this study is to develop alternatives that correct those areas that are prone to issues and work to fix airfield hot spots. The following bullets detail the FAA criteria for taxiway layouts, and where each criterion is applicable for consideration at SLC.

- Three-Node Concept

The three-node concept means that a pilot is presented with no more than three choices at an intersection. Using the three-node concept simplifies taxiway intersections, allowing for consistent placement of airfield markings, signage and lighting, and increasing pilot situational awareness. Complex intersections increase the possibility of pilot error, and if near a runway entrance can increase chance for a runway incursion.

The following taxiways have greater than three-node intersections: Taxiways H, H9, and H10; Taxiways H8, H, F, and E; Taxiways A5, A and the parallel terminal taxilanes; and Taxiway A4 and the parallel terminal taxilanes. The latter three intersections can be considered a three-node intersection, with one node having two options that run parallel to each other. The fact that these taxiways are all runway exits removes the chances of the intersection creating confusion that could lead to a runway incursion. As such, it was not found to be an issue that requires future correction. However, the intersection of Taxiway H8, H, F, and E, in addition to a three-node layout, creates a wide expanse of pavement. Alternatives to correct this non-conforming layout will be evaluated in the next chapter.

The intersection of Taxiways H, H9 and H10 presents a "fourth" node when pilots are taxiing from Taxiway G to H10 to cross Runway 16L-34R to Taxiway S. This is a common operation, as Taxiways H10 and S are used to route aircraft to Runway 17 for departure. Though the likelihood of a pilot turning from Taxiways G and/or H into the high-speed runway exit Taxiway H9 is low, this intersection is recommended to be further evaluated for alternatives to correct the deficiency.

High Energy Intersection

High energy intersections are considered those in the middle third of the runway. The middle third is most often a "high-energy" zone of a runway where an aircraft, landing or taking off, is traveling at a rate at which a pilot can least maneuver to avoid a collision with another aircraft. Runway crossings should be limited to the outer third of runways. Taxiways K5, K6, and Q form an intersection within the middle third of Runway 16L-34R. If Runway 16L-34R is extended in the future, what is considered the middle third of the runway will change, and the intersection of Taxiway S and H10 may become part of the middle third of the runway depending on the ultimate runway length. Runway 17-35 has an intersection in the center of the middle third of the runway where K5, K6, and Q connect.

Alternatives to remove the above referenced taxiways from the middle third of the runway and provide efficient and safe connectivity between the terminal area and Runway 17-35 will be evaluated in the next chapter.

Aligned Taxiway

An aligned taxiway is one where the centerline of a taxiway aligns directly with a runway centerline. FAA specifically prohibits these types of alignments for new airfield construction, and notes in AC 150/5330-13A that any existing configuration "should be removed as soon as practicable." An aligned taxiway layout is present at SLC where Taxiway J is aligned with Runway 14-32. Taxiway J also intersects with two runways which is not a permitted layout per current FAA standards. That layout creates a wide expanse of pavement which can lead to pilot disorientation and potentially wrong runway departures. These factors correlate to the reasoning behind the area being labeled a Hot Spot. Alternative layouts to correct these deficiencies will be evaluated in the Alternatives chapter.

Direct Access to Runway

Direct access between aircraft parking aprons and a runway is not recommended, as it has proven too easy for a pilot to lose situational awareness while taxiing out, miss the turn for a taxiway and mistakenly end up on a runway. FAA requires indirect access between aircraft parking aprons and a runway. To accomplish this, the taxiway layout must require a pilot to make a series of turns while taxiing from an apron to a runway.

Instances of direct access at SLC are denoted on Figure 3-8 and include the following: south cargo ramp to Runway 34R; south deice pad to Runway 34R; and the GA apron to Runway 17 via Taxiway K1, K4 and K5. Note that Taxiway A4 and A5 provide nearly direct access between runway and apron. However, the configuration of these taxiways was not found to create a direct access deficiency that increases risk of runway incursion. This determination is based on the fact that a turn is required to enter the runway, and that two parallel taxiways are between the runway and the apron. These factors greatly reduce the chance that a pilot would mistake the runway for Taxiway A or B.

In regard to the instances of direct access at the south cargo apron and the south deice pad, it was determined that the high degree of signage, markings, and in-pavement lighting at H2 and H1, and the fact that the apron is at the threshold of the runway lessen the chance that pilots would mistake the runway for a parallel taxiway and taxi onto it. Direct access from the south cargo ramp and the deice pad was not found to be a deficiency requiring realignment of infrastructure.

The instance of direct access involving Taxiways K1, K4, and K5, is recommended to be brought into the alternatives analysis to determine solutions to limit direct access to Runway 17-35.

Runway / Taxiway Right-Angle Intersections

Right-angle intersections are FAA standard for all runway entrances and runway/taxiway intersections except for high-speed exit taxiways. A right-angle intersection provides a pilot the best possible vantage point to scan for aircraft on the runway before entering or crossing the runway. Additionally, a right-angle intersection allows the optimum orientation of signage so that it is clearly visible to pilots. Runway/taxiway intersections that are at acute angles but are not high-speed taxiways are denoted with a red dot in FIGURE 3-8.

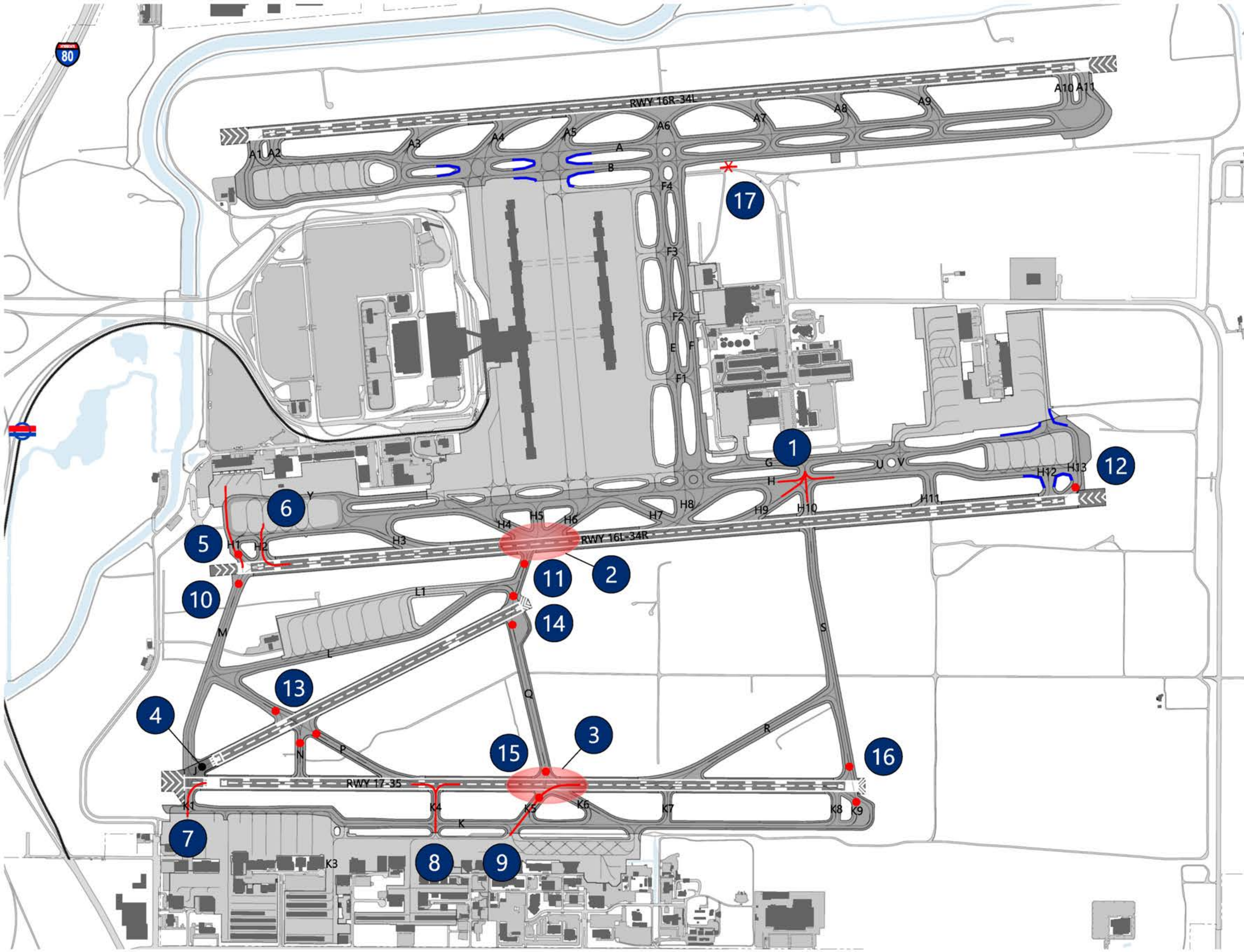
Of these, alternatives to realign runway entrance Taxiways Q, K5, M, P, and N will be evaluated in the Alternatives chapter. Other instances of acute angle taxiway entrances are currently negated by having hold position bars at a right angle to the runway, or are configured to position aircraft at an angle to face arriving traffic. As such, these are acceptable and do not require reconfiguration.

Wide Expanse of Pavement

Wide expanses of pavement require placement of signs far from a pilot's eye and reduce other visual cues. Under low visibility conditions a pilot's focus is on the centerline, which may result in the pilot not seeing a sign located beyond the pavement extents. This is especially critical at runway entrance points. A list of expansive pavement deficiencies is depicted in Figure 3-9. Some of the wide expanses of pavement are unavoidable at SLC, such as where dual taxilanes intersect parallel taxiways. An example of this configuration is where Taxiway A5 intersects Taxiway A and B. This type of configuration was determined to be an acceptable configuration at SLC.

Taxiways that have a wide expanse of pavement adjacent to runways were found to pose potential safety issues. These include the intersection of Taxiways P, N, and Runway 14-32; the intersection of Taxiway Q, K5, K6, and Runway 17-35; the intersection of Taxiway H4, H5, H6 and Runway 17L-34R; the intersection of Taxiway H7, H8 and Runway 17L-34R; and the intersection of Taxiway J, M, Runway 32, and Runway 35 thresholds. Alternatives to correct these layouts will be evaluated in the Alternatives chapter.

Figure 3-8: Taxiway System Deficiencies



Taxiway System Analysis

Three Node Concept

1. Taxiways H, H9, and H10 intersection

High Energy Intersection

2. Runway 16L-34R and Taxiways H4, H5, H6, and Q
3. Runway 17-35 and Taxiways K5, K6, and Q

Aligned Taxiway

4. Taxiway J / Runway 14-32

Direct Access

5. South cargo apron to Runway 34R via Taxiway H1
6. Runway 34R de-icing pad to Runway 34R via Taxiway H2
7. Apron access to Runway 17 via Taxiway K1
8. Apron access to Runway 17-35 via Taxiway K4
9. Apron access to Runway 17-35 via Taxiway K5

Runway / Taxiway Right-Angle Intersection

10. Runway 34R / Taxiways H1 and M
11. Runway 16L-34R / Taxiway Q
12. Runway 16L-34R / Taxiway H13
13. Runway 14-32 / Taxiways N and P
14. Runway 14-32 / Taxiway Q
15. Runway 17-35 / Taxiway Q and K5
16. Runway 17-35 / Taxiways K9 and S

TOFA

17. Fence within Taxiway B ADG V TOFA.

Taxiway Fillets

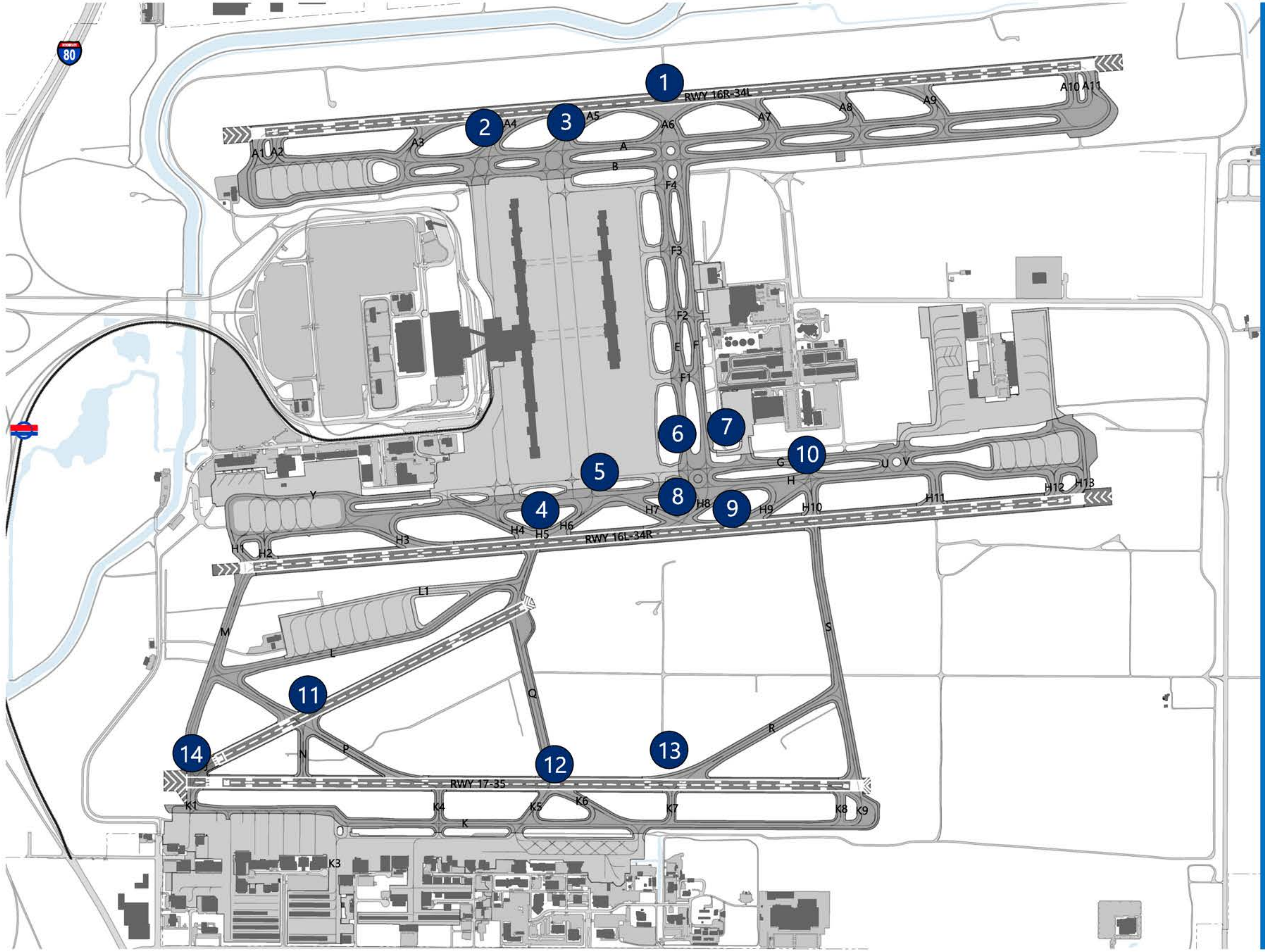
Except those shown in blue, all taxiway fillets deficient per AC 150/5300-13A, Change 1, *Airport Design* - 406.b Fillet Design.

Deficiencies carried forward into alternatives are denoted by a red square above.

1,500' 750' 0' 1,500'

Scale 1":1,500'

Figure 3-9: Wide Expanse of Pavement Deficiency



Instances of Wide Expanse of Pavement

1. Runway 16R/34L and Taxiways A6, E, and F intersection
2. Taxiways A, A4, and B intersection
3. Taxiways A, A5, and B intersection
4. Runway 16L-34R and Taxiways H4, H5, and H6 intersection
5. Taxiways H, H6, and H7 intersection
6. Taxiways E, F, and G have double taxiway edge markings.
7. Taxiway G between Taxiway F and Taxilane Delta have double taxiway edge markings.
8. Runway 16L-34R and Taxiways H7, H8 intersection
9. Taxiways E, F, H, and H8 intersection
10. Taxiways H, H9, and H10 intersection
11. Runway 14-32 and Taxiways P and N intersection
12. Runway 17-35 and Taxiways K5, K6, and Q intersection
13. Runway 17-35 and Taxiways K7 and R intersection
14. Runway 14-32 and Taxiways J and M intersection

Deficiencies carried forward into alternatives are denoted by a red square above.

1,500' 750' 0' 1,500'
Scale 1":1,500'

3.2.3 Operationally Related Facility Requirement Considerations

In conversations with ATC and SLCDA staff, a few important factors were noted that will be considered when developing airfield alternatives. The following bullets detail those factors:

- Having a single parallel taxiway (Taxiway K) to serve Runway 17-35 presents challenges for ATC when routing aircraft to and from the GA area, especially when Runway 17 is in use. In that condition, head-to-head traffic is possible when a small aircraft lands on Runway 17, exits and taxis south on Taxiway K while other GA aircraft are taxiing north on Taxiway K to depart Runway 17. Note that in that scenario, the need for having an aircraft exit as soon as possible, instead of rolling out long and exiting at the end of the runway, is related to capacity. During peak periods, ATC must have aircraft land and exit as quickly as possible to allow the next departure and/or landing operation.
- It is recommended that the alternatives development process consider how to add another parallel taxiway to serve Runway 17-35 to provide additional circulation. This could be accommodated with a parallel taxiway to the west of the existing runway, a runway shift and realignment that allows a dual parallel taxiway system on the east, or a combination thereof.
- The Taxiway Q intersection with Runway 16L-34R is within the 34R localizer critical area. When Runway 34R is in use during deicing operations, this becomes an issue, as aircraft must cross the runway to Taxiway Q to access the Taxiway L Deice Pad. To permit this operation, arrival separation for Runway 34R must be increased, which effectively drops the runway's arrival capacity. A South End Around Taxiway is recommended to improve the circulation between the terminal area and the Taxiway L Deice Pad.
- The Runway 34R Deice Pad is preferred for use unless the Taxiway L Deice Pad is also needed. A factor in that preference includes the fact that the holding position for Runway 34R on Taxiway M is relatively far back from the runway. The holding bar is placed correctly to protect the Runway 34R ILS, but consequently adds runway occupancy time for those aircraft departing 34R from Taxiway M. This factor will be considered in the alternatives analysis to determine if a better connection to Runway 34R is viable.
- Cross-field (east/west) circulation is important, specifically with the new terminal concourse layout. The taxilanes between the new concourses are also used for aircraft pushback, which increases the need for orchestrated aircraft routing between the terminal gates and the runways. The need for cross-field routing of aircraft other than on taxilanes between the concourses is expected to increase through the planning period. During snow events, additional east/west circulation is expected to be required to prevent bottlenecks and allow uninterrupted access to all terminal gates. It is recommended that the alternatives analysis determine whether Taxiways V and U should be constructed as planned and/or if other locations for cross-field taxiways may be advantageous.
- The Runway 16L deice pad does not have restroom facilities or truck deicing refill facilities. As such, during extended deice events, deicing operations in south flow must be conducted on the south deicing pads. This is not optimal as it creates congestion and delays during busy periods of the day. It is recommended that facilities be added to the Runway 16L deice pad, and a deice pad be added adjacent the Runway 16R threshold.

3.2.4 Airfield Requirements Summary

The analysis of the airfield identified all circumstances of any geometry that differed from the most current FAA design standards and recommendations. Each circumstance was further analyzed to determine if the existing geometry requires correction to meet the intent of the current FAA design standards. Some circumstances were found acceptable and do not require changes. Those circumstances that do require changes are detailed in Table 3-24. Those identified with a blue box will be carried forward into the alternatives analysis so that a remedy to the issue may be developed and incorporated into the SLC development plan. Additionally, all operational facility requirement considerations described in Section 3.2.3 will be integrated with these airfield requirements during the alternatives analysis.

The planning team in conjunction with Airport staff determined that the South End Around Taxiway is required and should be programed for near-term implementation. This airfield component will be brought into alternatives analysis to determine a preferred configuration.

Table 3-24: Airfield Requirements Summary

Elements	Description of Need and/or Recommendation
Runway Requirements	
■ Hot Spot HS1 and HS2	Hot Spot HS1 and HS2 require alternative analysis to determine if geometric related solutions can remedy the issues at these airfield locations.
■ Runway Length	A future runway length for Runway 16L-34R of 14,500 feet will be carried forward.
■ Runway 17-35	Runway 17-35 will be brought into the alternatives to examine realignment options and other options to enhance capacity and overall system performance.
Runway Designation	Re-designation of runway headings will be vetted for inclusion in the CIP as a capital project.
Blast Pads	Runway 34R blast pad is not full width. Runway 17 blast pad is not full length. Additionally, the Runway 16L blast pad markings are not full width, and Runway 34R blast pad markings are not full length. These deficiencies are easily remedied through addition of asphalt and new paint markings as appropriate.
Runway Pavement Strength	Runway 16L-34R, 16R-34L, and Runway 17-35 are recommended to be strengthened during future rehabilitation projects to support future forecasted aircraft operations.
■ Runway to Taxiway and Hold Postion Separation	Runway 16L-34R and 16R-34L have runway to taxiway centerline separation reductions adjacent to each deice pad that restricts ADG V operations during low visibility conditions. Additionally, the runway centerline to hold position separation on Runway 16L-34R does not meet ADG V standards in low visibility. These conditions will be brought forward into alternative analysis to determine if remedies to this situation are justified, and if so, what options are viable.
Taxiway Requirements	
■ Three Node Concept	The intersection of Taxiway H, H9 and H10 require a revised configuration to eliminate the current 4-node intersection.
■ High Energy Intersections	The following intersections require consideration in the alternatives analysis: Runway 16L-34R and Taxiways H4, H5, H6 and Q; Runway 17-35 and Taxiways K5, K6, and Q.
■ Aligned Taxiway	The configuration of Runway 32 and Taxiway J is not standard and contributes to the Hot Spot in this area.
■ Direct Access	The following taxiways have been identified as providing direct access from the apron to Runway 17-35: Taxiway K1, K4 and K5. These require alternatives analysis to remedy this condition.
■ Runway/Taxiway Right-Angle Intersection	The following intersections are identified for future correction: Runway 34R and TWY H1 and M; Runway 16L-34R and TWY Q; Runway 14-32 and TWY N and P; Runway 14 and TWY Q; Runway 17-35 and TWY Q and K5.
Wide Expanses of Pavement	
■ Runway 16L-34R	Wide expanse of pavement related to the following taxiway/runway intersections are identified for future correction: H4-H5-H6 and H7-H8.
■ Runway 14-32	Wide expanse of pavement related to the following taxiway/runway intersections are identified for future correction: P-N and J-M.
■ Runway 17-35	Wide correction of pavement related to the following taxiway/runway intersections are identified for future corrections: K5-K6-Q.

■ Elements that will be carried forward in the alternatives analysis

3.3 NAVIGATIONAL AIDS

Navigational aids, referred to as NAVAIDS, consist of equipment to help pilots locate and operate at the airport. NAVAIDS can provide information to pilots about the aircraft's horizontal alignment, height above the ground, location of airport facilities, and the aircraft's position relative to the airfield. SLCIA features all three types of navigational aids (visual, electronic, and meteorological), as detailed in Chapter 1 Inventory of Existing Conditions. The following narrative describes the three types of NAVAIDs as well as any deficiencies. This section also identifies new technology SLCIA could implement to provide a higher-level of service and increase efficiency for its users and tenants.

3.3.1 Visual Aids

Visual aids at SLCIA include those specific to each runway and those that serve the whole airport.

TABLE 3-25 lists the visual aids at SLCIA. Analysis determined the airport is equipped with all the required and recommended visual aids.

It was noted that some PAPI units at SLC use incandescent bulbs. As existing incandescent PAPI units begin to fail, it is recommended SLCIA coordinate the purchase and installation of LED units. The FAA has been conducting research to replace incandescent with light emitting (LED) technology in PAPI units. LED PAPI units reduce the time needed to warm up, resulting in decreased energy use. The light spectrum of LED compared to incandescent also provides an increased visual clarity for pilots as indicated from FAA field tests.

Table 3-25: Visual Aids

Visual Aids	Runway		Runway		Runway		Runway		Adequate ( ) Deficient (x)
	16L	34R	16R	34L	MALSR	MALSR	14	32	
Approach Lighting	ALSF-2	ALSF-2	ALSF-2	ALSF-2	ALSF-2	ALSF-2	-	-	
Lighting System	HIRL	HIRL	HIRL	HIRL	HIRL	HIRL	HIRL	HIRL	
Runway Centerline Lights	Yes	Yes	Yes	Yes	Yes	Yes	No	No	
Runway Guard Lights	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Runway Markings	Precision	Precision	Precision	Precision	Precision	Precision	Visual	Visual	
Runway Windcone	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Stop Bar	Yes	Yes	Yes	Yes	Yes	Yes	No	No	
Touchdown Zone Lighting	Yes	Yes	Yes	Yes	Yes	Yes	No	No	
Visual Slope Indicator	PAPI (P4L)	PAPI (P4L)	PAPI (P4L)	PAPI (P4L)	PAPI (P4L)	PAPI (P4L)	PAPI (P4L)	PAPI (P4L)	
Rotating Beacon	-	-	-	-	-	-	-	-	
Segmented Circle	-	-	-	-	-	-	-	-	

Source: FAA Chart Supplements, FAA gov, RS&H Analysis, 2019
Notes: ALSF-2 High intensity approach light system with sequenced flashers, MALSR = Medium intensity approach light system with runway alignment indicator lights, ODALS = Omnidirectional approach light system, PAPI = Precision approach path indicator, VASI = Visual approach slope indicator, REIL = Runway end identifier lights, RVR = Runway visual range is used for determining airfield visibility for all precision approaches.

3.3.2 Electronic NAVAIDS

Electronic aids include devices and equipment used for aircraft instrument approaches. Electronic aids at SLCIA are listed in Table 3-26. Analysis of the existing equipment and the needs of the airport indicate that there are no deficiencies and that all electronic aids are adequate considering the current configuration and usage of the airfield.

SLCIA does not have an on-airport VOR; however, these navigational services are provided by the Wasatch VOR, two miles to the north of the airport. Since the Wasatch VOR is near SLCIA, an on-airport VOR is not needed. All non-directional beacon (NDB) facilities identified in the previous master plan have since been decommissioned and replaced by GPS technology.

Instrument approach procedures have been designed for SLCIA that use GPS technology. As part of NextGEN, the FAA plans to further modernize the national airspace system (NAS) by implementing new technology, with one goal being to increase capacity. One method that has been tested and approved by the FAA, is to implement performance-based navigation (PBN).

Table 3-26: Electronic Aids

Electronic Aids	Runway		Runway		Runway		Runway		Adequate ( ) Deficient (x)
	16L	34R	16R	34L	17	35	14	32	
Glideslope	Yes	Yes	Yes	Yes	Yes	Yes	No	No	
Localizer	Yes	Yes	Yes	Yes	Yes	Yes	No	No	
LDA	Yes	Yes	Yes	Yes	Yes	Yes	No	No	

Source: FAA Chart Supplements, FAA gov, RS&H Analysis, 2019 | Notes: LDA = Localizer directional aid

PBN navigation provides additional precision compared to GPS alone. Required Navigation Performance (RNP), a form of PBN, requires additional navigational equipment for an aircraft but provides a more precise path of navigation. As the path of travel is more precise, the airspace protected around the aircraft becomes narrower. A RNAV[8] (RNP) approach compared to an RNAV (GPS) approach saves fuel and time for operators. The advantage for an airport to implement RNP based procedures is a reduction in required separation between aircraft. The protection around the aircraft in the terminal area reduces from five nautical miles to three. This allows more aircraft to operate in and out of an airport, enhancing the capacity of the airspace system. It is recommended SLCIA coordinate with the FAA to develop and implement RNAV (RNP) instrument approach procedures for each instrument runway end to enhance capacity and efficiency.

Ground-Based Augmentation System (GBAS) is another NextGEN system that provides navigation and precision approach capabilities at an airport, that could be considered for future implementation at SLCIA. The system is comprised of a ground facility and various antennas to communicate with the aircraft during takeoffs and landings. A single GBAS system can provide precision instrument approaches for multiple runway ends. This can provide a cost savings if implementing a new precision instrument approach compared to a traditional ILS system. The downside of the GBAS system is the amount of land needed to protect the antennas. Also, the antennas themselves need to have a clear line of sight of each runway end. To fly a GBAS approach also referred to as GLS, aircraft are required to be fitted with proper VHF data broadcast (VDB) equipment. At the time of this writing, the FAA has approved the use of GBAS Approach Service Type-C, which is the same as an ILS Category I approach. Testing has been completed for GBAS Approach Service Type-D, which is the same as an ILS Category III approach; however, has yet to be implemented at a non-test airport.

SLCIA has ILS Category III on both ends of the parallel runways and a Category I ILS approach on both ends of Runway 17-35. To enhance the approaches on Runway 17-35 to that of the parallel runway, a GBAS Approach Service Type-D system could be installed to service both runway ends. Implementing the system could potentially upgrade Runway 17-35 to support CAT II/III approaches. Though the initial cost of implementation may be greater than a single ILS system, over time operating and maintenance costs may be less than maintaining two ILS systems. Efficiencies would be even greater if a future GBAS serves all runway ends, including the parallel runways. It is recommended that SLCIA reserve a parcel of land for a GBAS Approach Service Type-D system. Opportunities to integrate a GBAS system at SLCIA will be examined in the alternatives analysis.

3.3.3 Meteorological Aids

Meteorological aids consist of equipment that reports weather conditions to users and tenants at an airport. The metrological aids at SLCIA are listed in Table 3-27.

The LLWAS system type is unknown but was found to be configured differently than as suggested in the 1989 document FAA Order 6560.21A. It is recommended the Airport continue to ensure the LLWAS is up-to-date and working as needed to support safe operations. The runway visual range (RVR) system and existing AWOS system at SLCIA are adequate for current operations.

While not an FAA requirement, SLCIA staff may want to consider installing a runway weather information system (RWIS). An RWIS provides real time monitoring information to airport personnel. Sensors are installed underneath the runway to report surface temperature, ambient air temperature and type of contaminants. This system is ideal for airports that experience regular snow fall, like SLCIA. This system could improve snow removal operations by providing real time weather conditions and historical trends. Historical trends can be used to determine the most effective time to apply an application of runway deicing fluid, potentially resulting in cost savings and more efficient operations.

This section details passenger aircraft gate requirements for

Table 3-27: Meteorological Aids

Metrological Aids	Runway		Runway		Runway		Runway		Adequate ( ) Deficient (x)
	16L	34R	16R	34L	17	35	14	32	
LLWAS	No	Yes	Yes	Yes	Yes	Yes	No	Yes	*
RVR Equipment	Yes	Yes	Yes	Yes	Yes	Yes	No	No	
ASOS	-	-	-	-	-	-	-	-	

Source: FAA Chart Supplements, FAA.gov, RS&H Analysis, 2019
Notes: ASOS = Automated surface observing system, RVR = Runway visual range, LLWAS = Low level wind shear alert system
*LLWAS system type is unknown. Noted that the system is configured differently than discussed in the 1989 document 'FAA Order 6560.21A, Siting Guidlines for Low Level Windshear Alert System (LLWAS)'

8 "Area navigation (RNAV) is a method of navigation the permits aircraft operation on any desired flight path within the coverage of ground- or space-based navigational aids or within the limits of the capability of self-contained aids, or a combination of these." Aeronautical Information Publication (AIP), 2012

3.4 TERMINAL CAPACITY AND REQUIREMENTS

each PAL. Additionally, an analysis was conducted on primary terminal processing components to determine what, if any, deficiencies may arise as passenger traffic increases through the planning horizon.

3.4.1 Aircraft Gate Requirements

The purpose of this section is to establish the timing for terminal gate development at SLC. Gate capacity requirements are based upon an analysis of the design day flight schedule generated as part of the aviation activity forecasts, which was approved by the FAA on May 1, 2019. This task will also identify the potential needs for long-term parking apron requirements for passenger aircraft that would be at the Airport during extended over-night hours identified as Remain Over-Night (RON), or during extended daytime hours, identified as Remain All-Day (RAD).

In particular, the exercise will focus on the potential timing for necessary gate additions to Concourse B after it opens in 2020 relative to PAL 1, PAL 2, and PAL 3.

3.4.1.1 New Terminal Layout 2020

Table 3-28 shows the distribution of the gates by their ADG capacity.

The current design of Concourse A includes the international arrivals sterile corridor on the third level of the north-western portion of the concourse. As such, the Airport's international gates are integrated on the north-western portion of Concourse A. In addition to the three international ADG-III/ADG-V MARS gates, there are two international ADG-III gates and one international ADG-IV gate, making up a total of six international gates.

Table 3-29 shows the distribution of gates for international and domestic use in 2020.

Table 3-28: Terminal Gates by ADG Capacity (2020)

Terminal Gates Leased and Operated by Delta Air Lines				
Concourse	ADG-III	ADG-IV	ADG-V	Total
Concourse A	31	13	3	47
Concourse B	6	2	0	8
Delta Air Lines Total	37	15	3	55

Terminal Gates Leased and Operated by Other Air Lines				
Concourse	ADG-III	ADG-IV	ADG-V	Total
Concourse A	0	0	0	0
Concourse B	19	2	2	23
Other Air Lines Total	19	2	2	23

Source: RS&H, 2019

Table 3-29: Terminal Gates by Domestic and International Use (2020)

Terminal Gates Leased and Operated by Delta Air Lines			
Concourse	Domestic	International[1]	Total
Concourse A	41	6	47
Concourse B	8	0	8
Delta Air Lines Total	49	6	55

Terminal Gates Leased and Operated by Other Air Lines			
Concourse	Domestic	International[1]	Total
Concourse A	0	0	0
Concourse B	23	0	23
Other Air Lines Total	23	0	23

Note: 1- Any airlines with international arrivals receive precedence at the Delta International gates over Delta Domestic flights.
Source: RS&H, 2019

3.4.1.2 Gate Chart Model Analysis

A gate chart model was completed to analyze the gate capacity and occupancy of the newly constructed terminal as well as the increasing requirements over the planning horizon. The model utilized the Master Plan Update Base Case Forecast, and the design day flight schedule, which was based upon an Average Day of the Peak Month (ADPM) of PAL 1, PAL 2, and PAL 3. To create a more detailed model of what the gate usage would look like, several assumptions were created based on airline and industry standards and meetings with Airport and airline staff. The assumptions used in this analysis include:

- All airlines will attempt to operate their own or Salt Lake City gates at maximum efficiency before moving an aircraft to the RON-RAD Apron or requiring a new gate.
- Separation time, or the minimum time allocated by an airline between consecutive arriving and departing aircraft at a gate, is 20 minutes.
- Airlines will only operate out of their leased gates. The three Salt Lake City designated gates may be used by any airline at the Airport.
- International gates are swing gates and may be as domestic gates by Delta when international arrival operations do not require them. Any airline with an international arrival will take precedence over any Delta domestic flight on these gates.
- Any aircraft may be considered RON-RAD when it is at SLCIA for more than three hours at a time. Those aircraft may be moved from the gate to a RON-RAD Apron if the gate is needed for other arrival or departure operations. If moved, it is assumed the aircraft vacate the gate no sooner than one hour after arrival and return no later than one hour prior to departure.
- Aircraft returning to a gate from the RON-RAD Apron may use a different gate other than which it used initially.

The gate chart model works by taking each arriving and/or departing flight and placing it at a gate leased by that airline, if it can accommodate that aircraft based on its ADG. The exception being the SLC gates, which may be used by any airline, or the Delta international gates which must first serve international arriving flights, before serving any Delta domestic flights. As more flights are added to the schedules of each of the forecast years consecutively, the duration that an aircraft is at any gate begins to create conflicts, especially during peak hours. When gate space becomes limited for an airline, it is assumed that the airline would tow the longest parked aircraft to the RON-RAD Apron as an initial solution. Ultimately, after the RON-RAD tows are no longer an option, any remaining aircraft that cannot be accommodated generates demand for an additional gate. The gate chart analysis for each forecast year identifies the number of new gate(s) needed, if any, to accommodate the design day flight schedule at peak hour times. Likewise, the number of RON-RAD aircraft towed to the apron at any given time fluctuates over the course of the day causing a peak hour(s) of usage in which a maximum number of parking spaces on the RON-RAD Apron is identified.

3.4.1.3 Peak Hour Usage

The peak hour indicates the hour each day in which the greatest strain on Airport facilities will occur. The results of the gate chart analysis showed that during peak hours all of the gates may not be necessarily used, but because of separation times, ADG capacity, and the use of gates exclusively by airlines whom they are leased to, peak hours are the driving force for new gates and RON-RAD Apron aircraft parking space.

Table 3-30 shows the peak hour terminal gate requirements, including international gates needs for each of the forecast years. Table 3-31 shows the peak hour terminal international gate requirements for the forecast years.

Table 3-30: Peak Hour Terminal Gate Requirements

	PAL 1	PAL 2	PAL 3
Existing Gates[9]	78	78	78
Required Gates	82	84	87
Peak Hour(s)	2100-2159 2200-2259	1000-1059 2200-2259	1000-1059

Source: RS&H, 2019

Table 3-31: Peak Hour Terminal International Gate Requirements

	PAL 1	PAL 2	PAL 3
Existing Gates	6	6	6
Required Gates	6	8	9
Peak Hour(s)	1300-1359	1600-1659	1300-1559 1400-1459 1500-1559 1600-1659

Source: RS&H, 2019

3.4.1.4 Terminal Gate Requirements

The analysis results concluded that the Airport will require nine new gates over the planning horizon in addition to what it is opening with in 2020. The following details the need for each PAL.

- PAL 1 - Four additional domestic ADG-III gates will be needed, totaling 82 for the Airport. Because this demand is after the opening of the new terminal in 2020, the need for up to four of these additional domestic ADG-III gates might also exist at a sooner time, and therefore should be considered. These gates would be leased by Delta Air Lines and added onto the east end of Concourse B.
- PAL 2 - Two new international ADG-III gates will be needed, totaling 84 for the Airport. For greater flexibility it is recommended that one of the two added gates be considered as another international MARS gate that could allow up to ADG V aircraft. The two newly added gates would be leased by Delta Air Lines, however, because they are international they must be incorporated into an FIS and sterile corridor facility. To utilize the existing international facilities, it is assumed that two of the existing domestic ADG-III gates leased by Delta Air Lines adjacent to the six international gates planned for Concourse A, would be converted. The two gates that were transformed into international, would then be relocated to the east end of Concourse B, as two new domestic ADG-III gates.
- PAL 3 - Three new gates will be needed, which include two domestic ADG-III gates, and one international ADG-III gate, totaling 87 for the Airport. All three gates will be leased by Delta Air Lines, and the two domestic gates would be added onto the east end of Concourse B. It is assumed that the new international gate would be added adjacent to one of the existing international gates, by transforming a domestic gate into an international one and expanding the international facilities and FIS as necessary. The transformed domestic gate would be relocated to the east end of Concourse B, like the two that were relocated in PAL 2.

In total, the analysis showed that by PAL 3 there will be a need for the three international ADG-III gates and six domestic ADG-III gates.

Table 3-32 shows the terminal gate requirements when the terminal opens in 2020 and at each planning activity level. Concourse B at full build out can accommodate 46 gates, making a total gate count at full build out of 93 gates. Thus, based on the base case forecast, the total gate demand will not exceed the combined capacity of Concourse A and Concourse B. However, concourse expansion to accommodate 9 new gates on Concourse B will be needed.

Table 3-32: Terminal Gate Requirements

Concourse	2020	PAL 1	PAL 2	PAL 3
Concourse A	47	47	47	47
Concourse B	31	35	37	40
Total	78	82	84	87
Surplus/(Deficit) Assuming Full Build Out		11	9	6

3.4.1.5 RAD-RON Apron Parking Requirements

The analysis concluded that the RON-RAD Apron peak hour of usage is between 2400 and 0059 and 1500-1559 consistently over the planning horizon based upon this studies design day flight schedules. While most of the aircraft that would use the RON-RAD Apron are ADG-III, there are times when ADG-V aircraft will also use it, therefore added space and concrete strength should be considered in the design.

- PAL 1 - 11 ADG-III parking spaces are required on the RON-RAD Apron during peak hours.
- PAL 2 - 12 ADG-III parking spaces are required on the RON-RAD Apron during peak hours.
- PAL 3 - 13 ADG-III parking spaces are required on the RON-RAD Apron during peak hours.

Table 3-33 shows the maximum number of RON-RAD aircraft parking spaces required during peak hours, and at which times those peak hours occur for each of the forecast years.

Table 3-33: Maximum Number of Aircraft Parking on RAD-RON Apron

Type	PAL 1	PAL 2	PAL 3
RON-RAD parking spaces required	11	12	13
Peak Hour(s)	2400-0059 1500-1559	2400-0059 1500-1559	2400-0059 1500-1559

3.4.1.6 Timing for Concourse C

Given the results of this analysis, it can be concluded that the timing for a future C Concourse would be beyond the 20-year Master Plan time frame based on the base case forecast. A high-level analysis was conducted to examine the gate requirements associated with the high-growth scenario forecast. That analysis also indicated that Concourse C would not yet be needed within the planning horizon. However, by around 2037-2038, it could be expected that all gates on the full build out of Concourse A and B would be 100 percent utilized if the high-growth scenario forecast materializes. If the base-case scenario forecast materializes, it is estimated Concourse A and B gates would not reach full utilization until roughly 2043-2044.

Though it is estimated that Concourse C is nearly two decades from being needed, planning for it must begin now as no matter where the new concourse is sited, numerous large-scale enabling projects are required. Previous studies and the Terminal Redevelopment Program planned for Concourse C to be positioned north of Concourse A and B. The alternatives analysis of this study will examine and refine the location for the future concourse and determine the sequencing of enabling projects that may be necessary before construction can begin.

3.4.2 Terminal Space Requirements

The construction of the new terminal facilities, on-going at the time of the writing of the master plan, will provide an increase in size and efficiency of terminal elements at SLC. As the terminal is still being constructed, expansions and changes to spaces have occurred that depart from the original design. Critical to this study, the terminal building is being built with an expansion to FIS, baggage claim, and Federal Inspection Services (FIS) space. As part of this study, a high-level validation of the new terminal design using the master plan forecasted traffic levels was conducted. Areas of potential future congestion during the planning period were identified. Facility requirements were determined for the primary components of the terminal building including airline ticketing and check-in, baggage claim, passenger security screening, and FIS. Some terminal elements, such as concessions, baggage handling, support, and employee screening spaces were omitted from the analysis due to the status of the terminal construction.

Passenger peak hours for each PAL were calculated from the design day flight schedule discussed in Chapter 2 of this report. Connecting domestic passengers who will depart on another flight after arriving at SLC were excluded from analysis as they will not utilize any terminal processor being analyzed. A 60-minute rolling peak hour for originating passengers, domestic terminating passengers, and international terminating passengers at each PAL was created. The 60-minute rolling peak hour considers the differing time in which passengers pass through the terminal before a departing flight and the time between when an aircraft arrives and when passengers arrive at baggage claim. The summary of the peak hour for each type of passenger is detailed in Table 3-34.

3.4.2.1 Airline Ticketing and Check-In

Airline ticketing and check-in space includes a combination of the conventional ticketing and check-in counters as well as self-service kiosks, which are provided near the conventional check-in counters and in the Gateway Building, which is attached to the parking garage and connected to the terminal by pedestrian sky bridges. The total space includes counter or kiosk space, active area, and queueing area. The number of conventional ticketing and check-in counter spaces were carried forward from the sizing in the previous terminal. This accounted for a total of 64 positions including 32 for Delta Air Lines and 32 for all other airlines. The scope of this study's analysis did not warrant a survey at SLC to determine current usage patterns. Current industry trends point towards roughly 20 percent of passengers using the ticket counter for check-in. For this analysis a conservative approach was used, and a distribution percentage of 30/30/40 was assumed for passengers using the ticket-counters, self-serve kiosks, and mobile boarding, respectively.

Overall, a surplus of counter space is estimated through the planning period at SLC. Self-serve kiosks are also estimated to have surplus due to having two locations, the airline ticketing area and the Gateway Building, accommodating those units. An overview of facility requirements for airline ticketing and check-in is shown in Table 3-35.

Table 3-34: Terminal Passenger Peak Hour

Peak Hour	Originating Passengers	Domestic Terminating Passengers	International Terminating Passengers
2018	2,670	2,500	670
PAL 1	2,360	2,710	780
PAL 2	2,710	2,980	790
PAL 3	3,210	3,650	1,040

Table 3-35: Airline Ticketing and Check-In

Terminal Area	Existing	Planning Activity Level		
		PAL 1	PAL 2	PAL 3
Ticketing				
Square Footage	43,400	11,000	12,200	14,400
Surplus/(Deficit)		32,400	31,200	29,000
Conventional Ticketing & Check-in Counter	64	30	33	39
Surplus/(Deficit)		34	31	25
Self-Service Kiosk	48	13	15	18
Surplus/(Deficit)		35	33	30

Table 3-36: Baggage Claim

Terminal Area	Existing	Planning Activity Level		
		PAL 1	PAL 2	PAL 3
Baggage Clain				
Square Footage	71,100	35,500	47,200	49,400
Surplus/(Deficit)		35,600	23,900	21,700

Table 3-37: Security Screening

Terminal Area	Existing	Planning Activity Level		
		PAL 1	PAL 2	PAL 3
Security Screening				
Square Footage	39,700	22,000	25,100	29,700
Surplus/(Deficit)		17,700	14,600	10,000
Inspection Lanes	14	13	15	17
Surplus/(Deficit)		1	(1)	(3)

3.4.2.2 Baggage Claim

The baggage claim will have a total of 10 traditional baggage carousels and more than 70,000 square feet of space. In order to accommodate future growth and to allow baggage carousels used by Delta Air Lines to be in one consolidated location, the baggage claim lobby was built to provide surplus capacity beyond the required demand in the planning period. Table 3-36 shows the projected surplus, including an additional 21,700 square feet at PAL 3. The additional claim units aid in providing redundancy and flexibility for irregular operations and any future magnification of the peak hour arrivals.

3.4.2.3 Security Screening

The security screening in the new terminal will have 14 checkpoint lanes and a total square footage of just under 40,000 square feet. The existing space is designed for an expansion to a total of 16 checkpoint lanes with no modifications to the existing layout or space envelope. The checkpoint lanes being installed at SLC are estimated to process an average of 190 passengers per hour. As passenger traffic grows, the available total space including queuing and inspection is forecasted to remain sufficient through the planning period. However, the number of built checkpoint lanes are forecasted to be insufficient as one additional lane is needed at PAL 2 and a total of 17 lanes, which is one above which the current layout was designed to accommodate, are needed at PAL 3 to meet 30-minute wait time maximums as shown in Table 3-37.

3.4.2.4 Federal Inspection Services (FIS)

The required sizing for the Federal Inspection Services (FIS) is determined through coordination with the United States Customs and Border Protection agency and is built to handle a passenger throughput peak hour. The required services and subsequent spacing required can vary significantly between airports depending on the customs and border protection needs of the facility. For the new terminal at SLC, a layout that can accommodate approximately 1,000 passengers per hour was constructed. With a forecasted PAL 3 international terminating peak hour of approximately 1,040 passengers, the FIS is not forecasted to require additional space or facilities.

3.5 LANDSIDE FACILITY REQUIREMENTS

Landside facility requirements include all elements that provide access and egress for the airport, circulation within the public portions of the airport, and storage of vehicles at the airport. These include the regional roadway and transit system, on-airport roadways, the terminal curb roadways, public and employee parking, rental car facilities, and commercial ground transportation facilities. Each of these is addressed in the subsequent subsections.

At the time of the analysis and writing of this chapter, the new terminal facility was scheduled to be open and in use by September 2020. This new terminal facility has a different curb and parking configuration than the existing facility. Thus, this study focused entirely on the new configuration to determine requirements for that facility through the planning period. Plans of the new terminal facility and roadway network were used in instances where new infrastructure, such as the terminal curb, was not yet constructed or in use.

The determination of the landside requirements varied slightly depending on the type of facility, but the analysis generally followed this process:

- The data gathered from the airport, its landside tenants and operators, and by the Master Plan staff in the field were used to determine the current capacity and level of service using procedures appropriate to the available data and the standards of the profession.
- Level of service standards were determined that reflect the Airport's commitment to a quality experience for its passengers.
- The base case (typically, peak hour of the average day of the peak month) O-D passenger activity levels were related to the landside activity levels assembled for the capacity and level of service analyses.
- The future O-D passenger activity levels from the aviation forecasts were then used to forecast landside activity for each planning activity level as documented in Chapter 2, Aviation Activity Forecasts.
- Using the same procedures that analyzed current capacity and level of service, the future capacity and level of service was estimated for each planning activity level.
- If either capacity or level of service did not meet standards, these same procedures were then run again to determine the characteristics of the future facility (size, etc.) that would be required to provide the target level of service and/or capacity.

It should be noted that for some facilities, (e.g., parking and rental car, which are spatial in nature), this process is like that used for terminal facilities and provides an independent estimate of requirements. For roadways of all types, the future requirements are not only a function of size (e.g., number of lanes, or length of curb), but also of physical arrangement, and operation. Thus, the requirements provided herein reflect the future physical arrangement of roads and curbs, and their proposed manner of operation. The next sections explain tradeoffs that can be explored in the development and analysis of future improvements. These changes could include either changes to physical plant, or to roadway or curb operations, in order to achieve desired capacity and/or level of service.

The requirements presented herein assume that there will be negligible changes in mode of access and egress and other landside behaviors by the traveling public over the next 20 years. The markets for the newest mode (TNC) are assumed to have stabilized, as has the degree of competition from off-airport parking. At the end of this section, those assumptions are examined, to demonstrate the degree to which requirements may change if those assumptions do not hold true. Development and evaluation of concepts will include consideration of options that can respond flexibly to how things may change at SLCIA.

3.5.1 Access and Circulation Roadways

This section presents the requirements for several regional access systems as well as for the on-airport roadway system that serves the terminal campus.

3.5.1.1 Regional Access

SLCIA has one principal access/egress route, Terminal Drive, which is a northern extension of Bangerter Highway (Utah Route 154). Terminal Drive brings in all traffic from Bangerter Highway as well as from I-80, which generates the largest inbound volumes. The interchange at I-80 and Terminal Drive/Bangerter Highway is complex, as it also includes ramps to/from North Temple Street. Furthermore, the airport interchange lies not quite two miles west of the I-80 system interchange with I-215. To assist in handling the movements among all these highways, there are collector-distributor roads adjacent to I-80 in both directions between the adjacent interchanges.

In considering how to assess the requirements for adequate capacity and level of service for the airport's interchange, the Master Plan team first examined the combined capacity of all the inbound ramps:

- One lane serving traffic from North Temple and I-215
- One lane serving traffic from westbound I-80
- Two lanes serving traffic from eastbound I-80 and Bangerter Highway.

Collectively, these four lanes have a combined maximum service volume flow of nearly 5,600 vehicles per hour at Level of Service C, which is the desired level of service on the Airport's connections to the regional road system. Given that at PAL 3 the total inbound volume at SLCIA is forecast to be only 3,980, the interchange itself was judged to be adequate across the planning period. Conversations with UDOT traffic engineering and planning staff indicated that there were no known or anticipated issues with the interchange continuing to provide adequate access to the Airport.

Regarding egress from the Airport, the team looked at whether the three ramps out of the Airport provide adequate levels of service. The ramps include:

- One lane serving traffic to westbound I-80
- Two lane serving traffic to Bangerter Highway
- Two lanes serving traffic to eastbound I-80, North Temple, and I-215.

The combined maximum service flow volume of these five lanes is nearly 7,000 vehicles per hour at Level of Service C. As such, the ramps themselves pose no issues to adequate Airport egress over the planning period.

However, observations and discussions with UDOT staff flagged one concern which can be problematic today, and which will continue to worsen over the planning period unless addressed by UDOT. The highest volume of traffic leaving SLCIA uses the two-lane ramp which feeds traffic to North Temple[11], eastbound I-80, and north- and southbound I-215. After the diverge to North Temple, the two lanes merge into eastbound I-80, quickly dropping one of the two lanes. There is a weaving area on eastbound I-80 created by this merging ramp and the exit ramp diverging 2,800 feet downstream to serve all movement to I-215. The merging area, by observation, can operate at levels of service which create queues backing up towards southbound Terminal Drive, the exit from the Airport. UDOT knows of the issue, and while it has a long-range project to potentially widen I-80 in this area, it is not likely that a widening alone will solve this problem. More than likely, braiding of the on-ramp from the Airport and the exit ramp to I-215 would be required to eliminate the weave entirely, and resolve the issue. The Airport will need to work with UDOT to ensure that some form of solution to this significant congestion is developed in order for the Airport's egress to not be constrained.

The Airport is also served by the TRAX light rail system, by UTA bus, and by a bike trail. The TRAX station served approximately 2,500 riders (boardings and alightings) per day in the 12-month period ending April 2018. The system averaged approximately a five percent month-over-month increase between 2017 and 2018. By observation, it serves a mix of employees and passengers. The Airport is the end of line station for the Green Line, and with overall no congestion points on the line, no issues are anticipated for continued high quality light rail service throughout the planning period.

UTA bus routes 453, 454, (both inter-county routes) and 551 (limited stop service in the peak hours) serve the airport. The first two routes continue west to Tooele or Grantsville, and east to the TRAX Red Line or the Central Station with connections to the Blue Line and the FrontRunner commuter rail. Route 551 serves commutes to/from the International Center just west of the Airport, connecting to TRAX at the Airport. Across the planning period, no issues are anticipated with continuing provision of UTA bus service.

For bike connectivity, the Airport Trail follows North Temple, 3700 West, and its own trail alignment to connect the Airport with roadways and developed areas east and west of the airport, such as International Center. Bike racks are provided at the Airport Station as well as in the parking garage. By observation, cycling is a mode used far more frequently by employees than by passengers. The Airport Trail, though, where it passes south of the east side of the AOA, has gates on it, which constrain the hours of its use and requires a SLC Airport Security Badge to access. There are no capacity or level of service issues anticipated with bicycle access to the Airport through the planning period, unless the operations of these gates were to change.

3.5.2 Terminal Area Roadways

From the entry of the Airport to about the entry to Economy Parking, the future terminal area roadway network will be the same as it was in 2018 when the traffic data were collected. Similarly, from the parking exit plaza all the way to off the Airport, the roadway network will remain the same. What changes with the opening of the new terminal is how the inbound roadway (Terminal Drive) divides to serve the various on-airport destinations, and how, once past the new terminal curbs, garage, and rental car facilities, the several roadways merge together before the parking exit plaza's ramp merges in. The future roadway configuration is presented in Chapter 1 - Inventory of Existing Conditions, Figure 1-20.

Using the forecast volumes from Chapter 2 – Aviation Activity Forecast, and the roadway configuration from Figure 1-20, the traffic operations of the critical roadway locations were analyzed, both for the base case and for the three PALs. Techniques for assessing level of service were sourced from the *Highway Capacity Manual*[12] and *ACRP Report 40*[13], depending on the nature, with each level of service color coded (shown in Table 3-38):

- Levels of service A and B are green, representing high quality operation
- Level of service C is yellow, indicating it is the lowest level of tolerable operation

[11] Traffic to North Temple, which provides access to the eastern and northern portions of the Airport (e.g., to the cargo and general aviation areas) and to the north end of the city, uses the single lane ramp which diverges right from the two-lane main ramp. This ramp and movement is not a concern.
[12] TRB, Highway Capacity Manual, 2010, Washington, DC
[13] TRB, ACRP Report 40, Airport Curbside and Terminal Area Roadway Operations, 2010, Washington, DC

- Level of service D is orange, representing operations which are approaching failure
- Levels of service E and F are red, representing significant congestion and delay or failure of the system.

Most of the roadway segments will operate well throughout the planning period, providing levels of service A – C. Five locations are flagged for consideration for improvements which will help them meet those standards:

- The rental car return: This operated at LOS F in 2018, with congestion internal to the garage creating queues that blocked the left lane of the outer curb roadway. With the new facilities operational, a single-lane ramp will feed a two-lane roadway across the north side of the garage, with entrances and exits for each rental car company. The single lane ramp will degrade in operation from LOS C to LOS D across the planning period.
- The exit from the rental car ready/return at the ground level of the new garage: This is being constructed as a two-lane roadway across the north face of the garage, which narrows down to one lane prior to merging into the two lanes of much heavier traffic from the outer (POV) arrivals curb. By PAL 3, it will operate at LOS E.
- Terminal Drive on the inbound approach has three critical locations:
    - Today, and in the future, there is a significant weaving area between the return-to-terminal ramp entering on the left and the exit to 3700 West on the right. This weave degrades in LOS over the planning period to LOS D.
    - The future Terminal Drive will have a four-lane segment downstream after the left exit to the Park'n'Wait lot. Under 2018 traffic loads, this segment would operate at LOS C, with further degradation to LOS E by PAL 3.
    - The next segment downstream, on the final approach to the terminal curbs, with three lanes, includes only the traffic for the POV curbs (upper curb at Departures, and outer curb at Arrivals). With 2018 volumes, it would operate at LOS C, but by PAL 3, the level of service would decrease to D.

In the development of alternatives, in conjunction with terminal planning, these level of service issues will be addressed, and options defined and evaluated for their amelioration.

3.5.3 Terminal Curb Roadways

The four terminal curb roadways were analyzed for their future[14] capacity and level of service for the three PALs. The analysis utilized a spreadsheet-based model which has been previously used at SLC in the development of the initial comprehensive landside improvement plan and the initial conceptual and schematic design of the new terminal and its curbs. The model simultaneously considers the capacity of a curb roadway to service vehicles stopped to unload or load passengers (service capacity), and the capacity of the same roadway to move those vehicles to, along, and away from the curb ("thru" capacity). The actual capacity of the overall curb is the equilibrium point between service capacity and thru capacity. Level of service is a function of the ratio of the demand volume to the equilibrium capacity (V/C). The target is to achieve a PHADPM V/C < 0.70, which is the threshold of LOS C. If the curbs operate no worse than this during the PHADPM, then during the very busiest hours of the year (e.g., peak hours during Thanksgiving or Christmas holidays), the quality of service will still be acceptable and manageable.

The analysis requires the following data:

- Curb length
- Number of lanes
- Assigned classes of vehicles and their function (drop off, pick up, or both)
- Volume of stopping vehicles by vehicle class (POVs, taxis, TNCs, hotel shuttles, et al.)
- Vehicle length by vehicle class
- Average dwell time by vehicle class (duration of stopped time for unloading and loading)
- Volume of non-stopping vehicles (typically those who are recirculating on the arrivals curb looking for their party, or service vehicles).

Curb lengths and lane configurations were taken from the design plans for the ARP. Assignments were provided by SLCIA staff, based on their currently proposed operations plan. Vehicle lengths (which provide for some small maneuvering distance between vehicles) are noted from field observations. All remaining data were those collected in June 2018, as adjusted to reflect any proposed changes in operational characteristics. Notably, dwell times were adjusted for certain classes of vehicles which in 2018 made separate stops for drop off and pick up, but which in the future would dwell at a single point to drop off one passenger or group, and then wait a short time to pick up the next. The dwell time data did reflect a continuation of the grace period for a rematch for TNCs.

Table 3-39 presents the key data on peak hour demand volumes, capacity, and level of service. Through PAL 2, all curb roadways are anticipated to operate well, at LOS A or B. By PAL 3, though, the center arrivals curb, serving TNCs and off-airport parking shuttles, will degrade to a LOS C in the late evening arrivals peak, and to LOS D in the midday departures peak. With the other commercial curbs operating well during these same conditions, a simple reassignment of the various modes to better balance volumes on the curbs could potentially achieve the targeted levels of service for all. An operational change such as this, and other physical improvements, will be considered in the development and evaluation of concepts.

[14] No analyses were conducted of the current curb roadways as they will be completely replaced through ARP development.

Table 3-38: Future Terminal Area Roadway Level of Service

Location	Name	Type of Analysis	Peak Hour	Free Flow Speed	Lanes	Volumes: Base Case	Volumes: PAL 1	Volumes: PAL 2	Volumes: PAL 3	Level of Service: Base Case	Level of Service: PAL 1	Level of Service: PAL 2	Level of Service: PAL 3	Technique
1	Inbound Terminal Dr.	uninterrupted flow	1245-1345	50	4	2,350	2,920	3,270	3,980	B	C	C	C	a
2	Outbound Terminal Dr.	uninterrupted flow	1315-1415	55	3	2,050	2,550	2,860	3,480	B	B	B	C	b
3	Exit to 3700 W	ramp	0600-0700	40	1	590	730	820	1,000	B	C	D	D	a
4	Entrance to Park'n'Wait Lot	ramp	1230-1330	25	1	260	330	370	450	B	B	B	C	a
5	Exit From Park'n'Wait Lot	ramp	1245-1345	25	1	310	390	430	530	B	B	C	C	a
6	Return to Terminal Ramp	uninterrupted flow	1300-1400	40	1	290	360	400	490	A	A	B	B	a
8	Exit from All Parking	ramp	1315-1415	40	1	460	570	640	780	B	B	C	C	a
10	Exit from Garage	uninterrupted flow	1300-1400	25	1	150	180	210	250	A	A	A	B	a
11	Rental Car Return	ramp	1415-1515	25	1	400	500	550	670	F	C	C	D	a
12	Rental Car Exit	uninterrupted flow	1030-1130	25	1	510	640	720	870	C	D	D	E	a
13	Terminal Curb Approach	uninterrupted flow	2100-2200	25	3	1,970	1,950	2,190	2,660	C	C	C	D	a
14	Terminal Approach	uninterrupted flow	1245-1345	30	4	2,230	2,770	3,100	3,770	C	C	D	E	a
N/A	Inbound Weave	weave	1245-1345	40	5	2,720	3,390	3,780	4,610	B	C	C	D	c

Techniques: (a) ACRP Report 40, Table 4-1, (b) 2010 HCM, Exh. 11-6, (c) ACRP Report 40, QATAR airport weave analysis.
Source: Curtis Transportation Consulting LLC; Prepared by RS&H, 2019

Table 3-39: Future Terminal Curb Volumes, Capacity, and Level of Service

Year & Condition	Curb	Stopping Volume	Thru Volume	Balanced Capacity	V/C	LOS
PAL 1 Departure Peak (Midday)	Departures	774	60	1,993	0.40	A
	Inner Arrivals	137	0	724	0.19	A
	Center Arrivals	291	0	477	0.61	B
	Outer Arrivals	N/A	N/A	N/A	N/A	N/A
PAL 1 Arrivals Peak (Late Evening)	Departures	N/A	N/A	N/A	N/A	N/A
	Inner Arrivals	166	0	744	0.22	A
	Center Arrivals	254	0	477	0.53	A
	Outer Arrivals	831	120	1,775	0.49	A
Year & Condition	**Curb**	**Stopping Volume**	**Thru Volume**	**Balanced Capacity**	**V/C**	**LOS**
PAL 2 Departure Peak (Midday)	Departures	868	60	1,993	0.44	A
	Inner Arrivals	153	0	724	0.21	A
	Center Arrivals	326	0	477	0.68	B
	Outer Arrivals	N/A	N/A	N/A	N/A	N/A
PAL 12 Arrivals Peak (Late Evening)	Departures	N/A	N/A	N/A	N/A	N/A
	Inner Arrivals	186	0	744	0.25	A
	Center Arrivals	285	0	477	0.60	B
	Outer Arrivals	934	120	1,775	0.54	A
Year & Condition	**Curb**	**Stopping Volume**	**Thru Volume**	**Balanced Capacity**	**V/C**	**LOS**
PAL 3 Departure Peak (Midday)	Departures	1,055	60	1,993	0.54	A
	Inner Arrivals	186	0	724	0.26	A
	Center Arrivals	397	0	477	0.83	D
	Outer Arrivals	N/A	N/A	N/A	N/A	N/A
PAL 3 Arrivals Peak (Late Evening)	Departures	N/A	N/A	N/A	N/A	N/A
	Inner Arrivals	226	0	744	0.30	A
	Center Arrivals	346	0	477	0.73	A
	Outer Arrivals	1,134	120	1,775	0.66	A

Source: Curtis Transportation Consulting LLC; Prepared by RS&H, 2019

There is one relevant caveat to the results in Table 3-39. The curb lengths used in the analysis are based on the CAD drawings of the facilities which are under construction. The nominal length of all but the center arrivals curb is roughly 1,000 feet; the center arrivals curb is 760 feet long. However, the terminal itself is only about 590 feet long. At the departures level, there typically is the greatest relationship between where a driver stops to drop off a passenger and what is happening inside the terminal (where the doors, ticket counters, bag check stations, and security screening checkpoint are located). Drivers look to stop in front of where their passenger is going. On this curb, though, more than 40 percent of its length will not be adjacent to anything in the terminal, implying the need for increased walking distances, passenger/driver disorientation, and the likely chance that the driver will choose to wait in front of the terminal for a space to become available, rather than drop off from a location that is perceived as being far away. As noted, the curb length was not assumed to be reduced to reflect the idea that many will not take full advantage of its length. But clearly, there is a need to reconsider such impacts as concepts are developed and evaluated to ensure the desired level of service is provided to the users.

3.5.4 Commercial Vehicle Staging Areas

The new landside that will open with the new terminal includes commercial vehicle staging areas upstream of the two at-grade curbs to be used by the all ground transportation modes except the TNCs. These include 30 spaces for the taxi queue, and 83 other pull-through stalls for use by the various shuttles and buses.

For on-demand modes (taxi, limo, certain shuttles), staging areas need to be able to provide the necessary number of waiting vehicles such that passengers coming to the curb do not have to wait for service. For the services which run on a schedule, to encourage efficient operations, operators like to minimize lost time sitting in a staging area. Thus, such vehicles tend to wait no more than one headway if the headways are small (< 30 minutes), and if the headways are longer, they tend to wait no more than 30 minutes. The requirements were therefore calculated with an assumption that the mean wait time across all modes (except taxis) was 20 minutes. The requirements are highly sensitive to this assumption, which in turn is related to the final set of fees to be charged and other operational policies and practices which have yet to be determined.

The SLCDA intends to create a geo-fenced area that would be the only place a TNC would be able to receive and accept a call for service[15]. The location of this geo-fenced area has not yet been determined. The requirements for the geo-fenced area assume that a third of the TNCs would accept a re-check, with the balance of the vehicles to be provided from a geo-fenced staging area in which the mean wait time would be 10 minutes.

The collective requirements for commercial vehicle staging are shown in Table 3-40. Whether these requirements will be met within the staging areas just upstream from the terminal curb or in other locations as well (i.e., for TNCs) will be examined in the development and evaluation of concepts.

3.5.5 Parking Requirements

Parking requirements reflect an airport's goals and policies regarding how well to serve the public relative to providing readily available parking. In the U.S. there are two logical and commonly used ways to decide how much parking an airport wants to provide:

- To provide enough parking that no customer is ever turned away from the lot, even on the busiest hour of the busiest time of the year.
- To provide enough parking based on a quality-of-service standard which is defined by the difficulty of finding a space in the peak hours of parking demand. For surface lots typically used for long-term parking, the rule of thumb is that when the lot is 90 percent occupied, the difficulty of tracking down an available space suggests that the lot is "effectively full". For garage parking, where the driver seeking a space must go up or down between levels, the rule of thumb is that 80 – 85 percent occupied is "effectively full". The lower end of this range is typically applied to garage areas with hourly or short-term parking; the upper end applies more to garages which serve daily or multi-day parking.

Based on discussions with airport staff and the parking operator, the following criteria were established as setting the requirements for public parking:

- The target for both garage and economy parking is to provide enough spaces to accommodate the 99th percentile of demand at the effectively full level, meaning that enough spaces are provided to meet nearly all demand at the effectively full level.
- For the Economy lot and Employee lots, effectively full is defined as when 90 percent of available spaces are occupied.
- For the Parking garage, effectively full is defined as when 83 percent of available spaces are occupied.

The public parking requirements are shown in Table 3-41. To meet future needs in PAL 3, the public parking in the terminal campus needs to increase from a total of 14,063 spaces to a total of 20,815, an increase of 6,752 spaces (48 percent increase). This need assumes that there will be no required closures of the parking garage to redirect traffic to a dedicated long-term parking facility.

The economy lot and garage parking have their own specific entrances but share an exit plaza. Customer transaction times were sampled for both parking entry locations and the parking exit plaza. Entry transactions for both locations averaged 14 seconds, equivalent to 257 vehicle entries per hour. Exit plaza transaction times varied by type, with cashier lane transactions averaging 40 seconds (90 vehicles per hour) and automated lane transactions averaging 36 seconds (100 vehicles per hour), Table 3-42 shows peak hour volumes at the economy lot and garage lot entrances, associated number of required lanes, and the expected length and time of queues. Table 3-43 shows peak hour volumes, lane requirements, and expected queue length and times at the parking exit plaza by transaction type.

Requirements for the Park'n'Wait lot are shown in Table 3-44. Using the combined capacity of the Park'n'Wait lot and the Service Center, no deficiencies occur over the planning period. This is because Service Center users make use of Park'n'Wait spaces during peak hour demand.

[15] TNCs would also be able to accept a call for service on the center arrivals curb with the continuation of a five-minute grace period for re-check.

Table 3-40: Commercial Vehicle Staging Area Requirements

	Base Year 2018	PAL 1	PAL 2	PAL 3
Mode				
Taxi	16	20	22	27
TNC	25	31	35	43
All Others	42	52	58	71
Total	**83**	**103**	**115**	**141**

Source: Curtis Transportation Consulting LLC; Prepared by RS&H, 2019

Table 3-41: Economy Lot and Garage Parking Facility Requirements

	Base Year 2018	PAL 1	PAL 2	PAL 3
Economy Lot				
Space Count	10,463	10,463	10,463	10,463
Effective Capacity	9,417	9,417	9,417	9,417
PHADPM Demand	9,771	11,366	12,893	15,238
Required Spaces	10,857	12,629	14,326	16,931
Surplus/(Deficit)	**(394)**	**(2,166)**	**(3,863)**	**(6,468)**
Parking Garage				
Space Count	1,770	3,600	3,600	3,600
Effective Capacity	1,469	2,988	2,988	2,988
PHADPM Unconstrained Demand	1,903	2,367	2,652	3,224
Required Spaces	2,293	2,851	3,195	3,884
Surplus/(Deficit)	**(523)**	**749**	**405**	**(284)**
Total System Required Spaces	13,149	15,480	17,521	20,815
Total System Surplus/(Deficit)	**(916)**	**(1,417)**	**(3,458)**	**(6,752)**

Source: Curtis Transportation Consulting LLC; Prepared by RS&H, 2019

Table 3-42: Public Parking Entry Plaza Requirements

	2018		PAL 1		PAL 2		PAL 3	
	PH Volume	Lanes	PH Volume	Lanes	PH Volume	Lanes	PH Volume	Lanes
Economy Entry								
Forecast Hourly Volume	560		690		780		940	
Effective Hourly Volume	659	3	812	4	918	4	1106	5
Exp Queue Length	4.3		2.2		6.5		4.2	
Time in Queue (sec)	24		10		25		14	
Garage Entry								
Forecast Hourly Volume	270		330		370		450	
Effective Hourly Volume	333	3	407	3	457	3	556	3
Exp Queue Length	0.1		0.3		0.5		1.4	
Time in Queue (sec)	1		2		4		9	

Source: Curtis Transportation Consulting LLC; Prepared by RS&H, 2019

Table 3-43: Public Parking Exit Plaza Requirements

	2018		PAL 1		PAL 2		PAL 3	
	PH Volume	Lanes	PH Volume	Lanes	PH Volume	Lanes	PH Volume	Lanes
Cashier								
Forecast Hourly Volume	178		220		247		301	
Effective Hourly Volume	197	3	224	4	274	4	335	5
Exp Queue Length	1.4		0.8		1.7		1.3	
Time in Queue (sec)	26		12		22		14	
Automated								
Forecast Hourly Volume	282		350		393		479	
Effective Hourly Volume	314	8	389	7	437	7	532	6
Exp Queue Length	0		0.2		0.3		5.5	
Time in Queue (sec)	0		1		2		37	
Total								
Forecast Hourly Volume	460		570		640		780	
Effective Hourly Volume	511		633		711		867	
Exisiting Lanes		12		12		12		12
Required Lanes		11		11		11		11
Surplus/(Deficit)		**1**		**1**		**1**		**1**

Source: Curtis Transportation Consulting LLC; Prepared by RS&H, 2019

Table 3-44: Park 'N' Wait Lot Requirements

	Base Year 2018	PAL 1	PAL 2	PAL 3
Park 'n' Wait Lot Capacity	131	131	131	131
PH Park 'n' Wait Demand	56	70	78	95
PH Surplus/(Deficit)	**75**	**61**	**53**	**36**
Service Center Capacity	31	31	31	31
PH Service Center Demand	34	42	47	58
PH Surplus/(Deficit)	**(3)**	**(11)**	**(16)**	**(27)**
Total Surplus/(Deficit)	**72**	**50**	**37**	**9**

Source: Curtis Transportation Consulting LLC; Prepared by RS&H, 2019

The requirements shown in Table 3-44 assumed that the Park'n'Wait lot remains in its current location, and would continue to serve some of the customers of the convenience center. Observations and feedback from users and staff indicate that the relocation of the lot decreased its utilization. Comments from customers indicated that the lot is hard to find, not well signed, and it is hard to get from the lot to the terminal. If the lot were to be relocated, perhaps to near where it used to be (off to the right of Terminal Drive after the exit for 3700 West), demand might increase. However, since a relocated lot would not share usage with the convenience center, the requirements in Table 3-44 stand as a reasonable estimate.

Employee parking requirements are shown in Table 3-45. Peak hour deficits already exist in the base year and into PAL 1. Future ARP changes in employee parking reduce overall deficiency in PAL 2. However, employee parking deficiencies increase again by PAL 3.

Table 3-45: Employee Parking Lot Requirements

	Base Year 2018	PAL 1	PAL 2	PAL 3
Employee Lot				
Capacity	2,950	2,950	2,950	2,950
Demand	2,708	2,925	3,168	3,826
Percent Occupied	92%	99%	107%	130%
Surplus/(Deficit)	**242**	**25**	**(218)**	**(876)**
Additional Employee Lots				
Capacity[1]	250	0	780	780
Demand	215	232	252	304
Percent Occupied	86%	0%	32%	39%
Surplus/(Deficit)	**35**	**(232)**	**528**	**476**
Total System Required Spaces	**2,923**	**3,157**	**3,420**	**4,130**
Total System Surplus/(Deficit)	**277**	**(207)**	**310**	**(400)**
Total Required Spaces	**3,248**	**3,508**	**3,800**	**4,589**
Requires Spaces Surplus/(Deficit)	**(48)**	**(558)**	**(70)**	**(859)**

Note: (1) Lot 3 closes by PAL 1 .Two lots east of garage and QTA assumed to open in PAL 2.
Source: RS&H and Curtis Transportation Consulting LLC, 2019

3.5.6 Rental Car Requirements

The sizing of rental car facilities is an exercise in balancing the cost of the physical plant with the costs of operating out of that physical plant over its lifetime. If the facilities are larger, then capital costs are higher, but fewer staff are needed to keep customers supplied with cars. The converse is also true. Under-sized facilities can significantly increase the cost of staff needed to move cars from storage to waiting customers. There are no accepted industry standards, and planners and designers of rental car facilities in the United States have used a variety of methods to estimate facility requirements.

The requirement for physical space to store cars is best viewed in the aggregate. The ready-return lot is not the only location where cars are stored, but it is the only one with direct customer access to the waiting vehicle. At SLCIA, cars are stored on-airport above the QTA, as well as in proprietary lots off-airport. In this analysis, the ready-return lot requirement was first estimated. Then the on-airport storage requirement was estimated, linking it with the scale of the required ready-return lot. Service areas were estimated independently. All requirements are for the on-airport companies in the aggregate.

A measure of the efficiency of the ready-return spaces is the number of times per day a space needs to have a car moved into it in order to meet demand. This is referred to as "turns per day." In the current facility, the industry experiences 6.6 turns per day overall, though some companies reported turning their spaces as many as 10 times per day. This is very high, above the experience at most large U.S. airports, and well above the number of turns per day the rental car companies prefer. Companies tend to look for 3 or fewer turns per day as representing a minimization of their staffing, while more than 4 turns per day brings them into the territory of increasing costs, and thus decreasing margins. For some companies, the turns per day in SLC are the highest at any U.S. airport.

The planning of the SLCIA landside system included a program review in 2007. That effort forecasted the need for ready-return spaces which would evolve over 20 years from 2.9 turns per day to 4.8 turns per day. The planning of other large airport consolidated rental car facilities used values of 3.1[16] turns per day to 3.8 turns per day[17] to size ready-return spaces. Feedback from current SLC rental car station managers suggested that 4.3 turns per day would greatly improve their operations. From these varying approaches, requirements for ready-return spaces were developed using 4.0 turns per day as the target that balanced customer satisfaction (with low wait times), capital cost, and rental car staffing operating costs. Those requirements are shown in Table 3-46.

Ideally, all rental cars would be stored on airport, near the customer, to minimize/eliminate wait times. Given the competition for land at the terminal campus, that is not feasible. Nonetheless, with approximately 900 storage spaces above the QTA, some companies deploy as many as 50 staff on the busy rental day (Monday) to shuttle cars from off-airport lots as much as 20 minutes away. Their customers can end up waiting an hour or more for a car. Clearly, more on-airport spaces are required.

Rental car storage requirements are based on providing adequate availability of cars for customers without requiring extensive waits for a vehicle. August 2018 data (factored from June 2018 vehicle counts) showed that available cars located at ready-return and the QTA storage area began to falter around 9am Monday morning as rental car companies were required to shuttle in vehicles from storage sites other than the QTA storage deck. This trend continued through Friday when more cars began to return, and vehicles began to require shuttling off-airport for weekend storage. Using weekly average rental car availability deficits derived from average daily deficits, the spaces required to meet average demand levels was determined, as shown in Table 3-46.

The requirements for the number of service positions in the QTA are based upon the idea that the surplus of cars returned over the weekend all need to be ready by the start of the peak Monday rental day. The analysis reflected several key assumptions:

- Each position can process five cars per hour
- Each position would be operated 12 hours per day
- The targeted utilization would be 80 percent. The estimated utilization of the current 62-position facility is 88 percent, which can lead to queuing of dirty cars and cars between fuel/vacuum and the wash racks.

The results of the QTA analysis are provided in Table 3-46. As with other landside facilities, there are trade-offs between physical plant and operating practices. In the case of the QTA, the number of service positions required would decrease to 75 percent of the value in Table 3-46 if the QTA were operated for 16 hours per day rather than the assumed 12 hours per day.

Immediately south of the QTA building is the Remote Service Site (RSS), the rental car maintenance and repair area. The area occupies approximately 11.5 acres, of which 1.8 acres is occupied by three maintenance buildings, and the rest is paved lot for storage and maneuvering of rental cars, and/or parking of employee and visitor vehicles. In the aggregate over the industry, the area can hold an estimated 1,468 cars. The area is

[16] 3.1 turns per day rental car planning metric used at Charlotte Douglas International Airport (CLT).
[17] 3.8 turns per day rental car planning metric used at Minneapolis-St. Paul International Airport (MSP).

secure and divided into seven parcels of varying size from one to nearly two acres. The parcels are allocated similarly to how QTA and ready-return spaces are allocated.

The rental car station managers report that the RSS is very heavily used, and undersized for current (2018) operations. Their estimates of additional required spaces for car storage range from 500 to 750 spaces needed, and from four to six service bays short. With additional forecast passenger growth, the range by PAL3 for additional spaces needed range from a 100 to 140 percent increase in spaces, or an additional 1,600 – 2,000 spaces. This would be result in a Remote Service Site of from 24 – 27 acres. The high and low forecasts of requirements are shown in Table 3-47. Whether the high or low estimate is closer to the mark remains to be seen, but in either case, it represents a significant increase in the total area required for efficient rental car operations, all of which are desirably contiguous to one another. Thus, rental car requirements compete significantly with public parking for space within the terminal loop roadway.

Table 3-46: Rental Car Facility Requirements

	August 2018	PAL 1	PAL 2	PAL 3
Ready-Return Spaces				
Rentals, Busy Day, Peak Month	4,620	5,750	6,440	7,830
Turns per Day	4	4	4	4
Ready-Return Spaces Required	1,155	1,438	1,610	1,958
Available Spaces	699	1,122	1,122	1,122
Surplus/(Deficit)	**(456)**	**(316)**	**(488)**	**(836)**
Rental Car Storage				
Total On-Airport Storage Required	2,213	2,095	2,574	3,005
Available Storage at Ready-Return	699	1,122	1,122	1,122
Available Storage Above QTA	900	900	900	900
Surplus/(Deficit)	**(614)**	**(73)**	**(552)**	**(983)**
QTA Positions				
Total Returns (Thu-Sun) to be Ready Monday AM	14,033	17,453	19,557	23,776
Required QTA Positions	68	84	94	115
Available Positions	62	62	62	62
Surplus/(Deficit)	**(6)**	**(22)**	**(32)**	**(53)**

Source: Curtis Transportation Consulting LLC; Prepared by RS&H, 2019

Table 3-47: Rental Car Maintenance and Repair Area Requirements

Item	Actual Aug '18	Low Estimate				High Estimate			
		Aug '18	PAL 1	PAL 2	PAL 3	Aug '18	PAL 1	PAL 2	PAL 3
Storage									
Spaces	1,468	1,968	2,289	2,597	3,069	2,218	2,580	2,927	3,459
Square Fee (sf)	366,490	492,000	572,306	649,211	767,265	554,500	645,008	731,682	864,733
Buildings/parking (sf)	78,000	91,000	105,853	120,078	141,913	97,500	113,414	128,655	152,050
Circulation/misc. (sf)	60,810	81,620	94,942	107,700	127,285	91,280	106,179	120,447	142,350
Total Square Feet	**505,300**	**664,620**	**773,102**	**876,989**	**1,036,463**	**743,280**	**864,601**	**980,784**	**1,159,132**
Total Acres	**11.6**	**15.3**	**17.7**	**20.1**	**23.8**	**17.1**	**19.8**	**22.5**	**26.2**

Source: Curtis Transportation Consulting LLC; Prepared by RS&H, 2019

3.5.7 Off-Airport Parking

The first off-airport parking operation began in 1989. A second operation began in 1991, and the third started in 2018. Collectively, they offer several thousand surface spaces (some covered) within 5 to 10 minutes of the terminal curb. They offer trunk-to-door service, which some passengers find attractive, and they tend to price their product below on-airport rates. Undoubtedly, they have siphoned off demand for parking which otherwise SLCIA might serve in their own facilities. Unfortunately, data are not available to provide the scale of the impact of these operations.

The parking requirements in Table 3-41 are all based on these operations continuing through the planning period, neither gaining nor losing market share. Stated otherwise, they assume the airport's parking products will continue to compete successfully for the passengers who prefer on-airport parking, providing those passengers with the right combination of price, location (convenience), and availability, relative to the off-airport operators.

The SLCDA may choose to challenge the off-airport providers, by increasing on-airport availability, lowering prices, and/or providing higher customer utility (closer locations, trunk-to-door service, amenities, etc.). In doing so, of course, the requirements for on-airport parking would commensurately increase.

Changes to the relative attractiveness of on-airport parking can best be considered in this Master Plan within the development and evaluation of concepts for meeting the requirements and satisfaction of Airport objectives. Any such moves could have significant financial implications, all of which will be considered in concept development and evaluation.

3.5.7.1 Potential Impacts of True Hourly Parking

With two-thirds of all garage parkers parking for less than 90 minutes, and three-quarters parking for under 3.5 hours, it is reasonable to consider whether the spaces in the garage should be developed in part to provide very convenient spaces for the exclusive use of those who are parking for only a few hours. Many airports provide their most convenient parking as Hourly Parking, with an upper limit of permitted time being typically in the 2 to 4-hour range. If a special ticket is pulled to access these spaces, then enforcement is accomplished through very aggressive prices for those who stay over the limit. Where a common ticket is pulled for all spaces in the garage, enforcement is required, with violations being issued, requiring special fines to be paid for overstaying the limit. Airports such as Dallas-Fort Worth International Airport (DFW), which has reserved the front row of all its garages for hourly parking since 1974, find that strong signing and friendly but firm enforcement lead to very little effort in the way of issuing violations.

The implications on parking requirements are somewhat less clear than the desirable impacts of making this change. Today, two issues constrain the availability of garage parking for short-term customers:

- Level 2 permits parking of any duration that does not include an overnight stay. These are the most convenient spaces, too, being at the pedestrian bridge level. Consequently, day-tripping flyers, most of them on business, can park on Level 2, catch an early flight out, a late flight back, and not park overnight. When short-term parkers come to the airport any time after 8 or 9am, they find many of the spaces on Level 2 already filled by day-tripping travelers.
- Overnight parkers are actively turned away by operations staff when the garage approaches maximum capacity. As upper garage Levels 3 and 4 fill, some longer-term parkers begin to overflow into the short-term area (Level 2) which further decreases hourly parking availability.

With true hourly parking, sized correctly, not only would the closures not happen, but the level of service provided the customers would greatly increase. This is because the air traveler who garage parks is typically 1.4 to 1.6 people per vehicle, or roughly 3 person trips between garage and terminal. When a meeter-greeter or well-wisher parks, the number of person trips between garage and terminal goes up, as the size of the air travel party (1.5 people on average) is more than doubled by the number of visitors sending them off or greeting them upon return. In addition, the visiting customer will make two trips, one for departure, one for arrival. Thus, an hourly space generates nearly five times the number of person trips between garage and terminal as a regular garage space. Providing this much higher number of people with the closest spaces greatly improves overall quality of service at the airport for the greatest number of customers.

The potential for true hourly parking spaces will be dealt with in detail in the development and evaluation of concepts. In general, since true hourly spaces turn over 5 to 10 times per day, it is not necessary to provide that many hourly spaces to meet demand. This drops the overall parking space requirement slightly from the values identified in this section. The implications of that decrease will be examined in concept development and evaluation.

3.5.7.2 Impacts of TNCs on Landside Facilities

Transportation Network Companies (e.g., Lyft, Uber) began service to SLCIA in the Fall of 2015. Their self-reported trips had grown to over 100,000 monthly by the summer of 2018. What is not known is whether the market has been saturated, and whether their growth will level off or continue to gain market share. They have chiefly taken market share from other for-hire modes, predominantly taxi and shared-ride shuttles.

Table 3-48: Growth in O-D Passengers Compared with Growth in Landside Indices

Period	O-D Passenger Volume at SSCP	Growth Ratio in a Year		
		Parking Revenue	Parking Transactions	Rental Car Revenue
Oct-15 - Oct-16	1.082	1.056	0.963	1.111
Nov-15 - Nov-16	1.095	1.000	1.157	1.131
Dec-15 - Dec-16	1.101	0.975	0.924	1.193
Jan-16 - Jan-17	1.124	1.175	0.967	1.184
Feb-16 - Feb-17	1.065	0.893	1.289	1.140
Mar-16 - Mar-17	1.132	0.980	1.082	1.229
Apr-16 - Apr-17	1.138	1.005	1.200	1.181
May-16 - May-17	1.109	1.099	1.206	1.148
Jun-16 - Jun-17	1.067	1.022	1.120	1.094
Jul-16 - Jul-17	1.110	1.178	1.153	1.164
Aug-16 - Aug-17	1.090	0.918	1.154	1.182
Sep-16 - Sep-17	1.063	1.034	1.162	1.083
Oct-16 -Oct-17	1.073	1.106	1.222	1.063
Nov-16 - Nov-17	1.093	1.014	1.149	1.133
Dec-16 - Dec-17	1.043	0.977	1.192	1.042
Jan-17 - Jan-18	1.032	1.025	1.242	0.919
Feb-17 - Feb-18	1.060	1.098	1.210	0.989
Mar-17 - Mar-18	1.048	0.984	1.196	1.014
Apr-17 - Apr-18	1.084	1.128	1.184	1.063
May-17 - May-18	1.079	0.976	1.187	1.066

Techniques: (a) ACRP Report 40, Table 4-1, (b) 2010 HCM, Exh. 11-6, (c) ACRP Report 40, QATAR airport weave analysis.
Source: Curtis Transportation Consulting LLC; Prepared by RS&H, 2019

The available data were analyzed to see if there have been impacts of TNCs that have affected parking at the airport, and rental cars. Using the TSA counts of O-D passengers (on a monthly basis) passing through the security screening checkpoints (SSCP), the month-over-month growth rates were examined and compared with the month-over-month growth rates for three indices: parking revenues, parking transactions, and rental car revenues. The results are shown in Table 3-48.

The green highlighted cells are months in which the growth of a landside index was higher than the growth of the O-D passenger count. Overall, the number of parking transactions more than kept pace with O-D passenger growth for the 19 months for which data were available. Parking revenues generally did not keep pace with passenger growth. One interpretation is that the number of short-term parkers (meeter-greeters, well-wishers, and visitors) is increasing, but not parkers who stay for longer periods and drive up mean revenues per transaction. But any impact of TNCs on these data can only be speculative.

Rental car revenues, for the first 13 months of data, grew faster than O-D passengers in 12 of the 13 months. In the final six months, rental car revenues have fallen behind. During that same period, there was a 20 percent increase in TNC trips to/from the airport, but again, it is unclear whether the TNC growth came from taking market share from the rental car companies.

Absent clearer indications of impacts by the TNCs on parking and rental cars, the requirements in this section remain as provided, but open for discussion with the SLCDA in terms of how best to consider them as the Master Plan moves into alternative concept development and evaluation.

3.5.8 Landside Facility Requirement Summary

The following is a brief summary of landside facility requirement conclusions.

3.5.8.1 Roadway Facility Requirements Summary

Terminal Area Roadways – Five locations are flagged for consideration for improvements which will help SLCDA meet LOS standards (Reference Table 3-38):

- The future rental car return ramp.
- The future exit from the rental car ready/return at the ground level of the new garage.
- Terminal Drive on the inbound approach has three critical locations:
  - Current and future weaving area between the return-to-terminal ramp entering on the left and the exit to 3700 West on the right
  - The future four-lane segment downstream of the left exit to the Park'n'Wait lot.
  - The future final approach to the terminal curbs (three lanes) serving only the traffic for the POV curbs (upper curb at Departures, and outer curb at Arrivals).

Terminal Curb Roadways – By PAL 3 the center arrivals curb serving TNCs and off-airport parking shuttles will degrade to a LOS C during the late evening arrivals peak, and to LOS D during the midday departures peak. With other commercial curbs operating well during these same conditions, reassignment of the various modes to better balance volumes on the curbs may achieve the targeted levels of service for all. (Reference Table 3-39)

3.5.8.2 Parking Facility Requirement Summary

Public Parking – To meet future needs in PAL 3, public parking in the terminal campus needs to increase from a total of 14,063 spaces to a total of 20,120, an increase of 6,057 spaces. This need assumes that there will be no required closures of the parking garage to redirect traffic to a dedicated long-term parking facility. (Reference Table 3-41)

Employee Parking – Peak hour deficits occur in PAL 2 as the main employee lot begins to exceed capacity. (Reference Table 3-45)

3.5.8.3 Rental Car Facility Requirements Summary

Rental Car Ready Return – Ready-return spaces were determined using 4.0 turns per day as the target that balanced customer satisfaction (low wait times), capital cost, and rental car staffing operating costs. These spaces are currently deficient and remain so throughout the planning period under future facility conditions. (Reference Table 3-46)

Rental Car Storage - Rental car storage requirements are based on providing adequate availability of cars for customers without requiring extensive waits for a vehicle. Using weekly average rental car availability deficits derived from average daily deficits, the spaces required to meet average demand levels was determined to be deficient throughout the planning period. (Reference Table 3-46)

Rental Car QTA – The number of service positions required in the QTA are based upon the idea that the surplus of cars returned over the weekend all need to be ready by the start of the peak Monday rental day. QTA service positions are, and remain deficient, throughout the planning period. In the case of the QTA, the number of service positions required would decrease to 75 percent of the value in Table 3-46 if the QTA were operated for 16 rather than 12 hours per day.

3.6 AIR CARGO CAPACITY AND REQUIREMENTS

This portion of the Facility Requirements chapter addresses air cargo requirements for both passenger aircraft that also carry cargo and mail or "belly cargo" and air cargo and mail carried by the dedicated air cargo airlines through the 20-year master plan time frame.

Dedicated air cargo airlines at SLC include integrated carriers, freighters, and e-commerce transportation providers. FedEx, UPS, and to some extent DHL are integrated carriers that provide the full range of logistic services, not just transportation. Freighters are airlines that are dedicated to carrying only cargo and do not operate as frequently, such as Atlas, or are other airlines operating on-demand services. E-commerce transportation are customer-focused shippers that provide transportation; these airlines are continuing to emerge and include Amazon.

E-commerce is accelerating quickly and has become an increasingly important part of global trade. Over two billion consumers will be regularly shopping online, completing approximately 13.5% of total retail consumption.[18] E-commerce is forecasted to ultimately drive a change in the air freight industry and require airlines to consider where air freight hubs can expand as "availability in existing logistics buildings at mature cargo hubs[19] are at historic lows.[20] SLC is one of twelve airports that is "well-suited to capitalize on this global cargo boom, provide authorities take proper action today to invest in required infrastructure.[21] "It is important to note that "historically e-commerce orders have overwhelmingly flowed from Asia into the US and other western nations. The boom in cross-border e-commerce is rebalancing these flows whereby more goods that originate in the West are flowing into Asia".[22]

Customer-focused shippers like Amazon are developing both sortation and fulfillment facilities on airports. This is having an impact on leasehold areas, building sizes, landside, and security[23] requirements. Recently, Amazon opened a new 855,000 square foot customer fulfillment center adjacent to SLC[24].

While there are no plans to connect the fulfillment center with the Airport, SLC should be prepared to address either through direct connections or a standalone Amazon facility. Already, Amazon Air is flying to 20 destinations across the U.S. using B-767 and B-737 aircraft and operated by ABX Air, Atlas Air, Air Transport Services Group, and Southern Air.[25]

At this time, SLC is primarily serviced by integrators but there are also occasional freighter and e-commerce operations. Facility requirements are identified for the two largest integrated carriers, FedEx and UPS. All other air cargo integrators, freighters, and e-commerce operators are combined in "dedicated air cargo carriers".

3.6.1 Background

These facility requirements address combination carriers and dedicated air cargo carriers. Different approaches are taken for each since the two function differently. Passenger airlines carry belly cargo and mail as part of their overall revenue strategy but it is not their main function whereas air cargo handling is the major function of the dedicated air cargo carriers. For dedicated air cargo airlines, the customers criteria is for delivery of parcels by a specified time with no regard for routes, type of aircraft, etc.

Mail is carried by both passenger and dedicated air cargo airlines. SLCDA tracks mail statistics separately by weight but not by airline. However, statistics by airline for cargo does include mail poundage. Therefore, air cargo tonnage forecasts do account for mail but does not separate it from cargo.

Air cargo facility requirements summarizes the estimated facilities necessary to meet forecasted demand levels through the 20-year planning period for: cargo warehousing building; aircraft parking and maneuvering areas; storage for containers and GSE equipment; truck docks and truck dock maneuvering areas; and, vehicular parking.

18 Internet: https://www.accenture.com/_acnmedia/PDF-10/Accenture-APAC-China,-d-,v10-Infographic.pdf. Accenture, The Future of Commerce has Arrived: Understanding the New Asian Customer.
19 Internet: https://www.supplychaindive.com/news/air-cargo-boom-real-estate-implications/542344/. International e-commerce is taking off and airports better get ready, Ben Cromwell, senior managing director and e-Commerce Advisory Group practice leader at Cushman & Wakefield, November 15, 2018, p 4.
20 John F. Kennedy International Airport (JFK); Los Angeles International Airport (LAX); Miami International Airport (MIA); San Francisco International Airport (SFO); Chicago O'Hare International Airport (ORD); New Liberty International Airport, (EWR); George Bush Intercontinental Airport (IAH); Dallas-Fort Worth International Airport (DFW); and Hartsfield-Jackson Atlanta International Airport (ATL), Internet: https://www.supplychaindive.com/news/air-cargo-boom-real-estate-implications/542344/. International e-commerce is taking off and airports better get ready, Ben Cromwell, November 15, 2018, pp. 1-7.
21 Internet: https://www.supplychaindive.com/news/air-cargo-boom-real-estate-implications/542344/. International e-commerce is taking off and airports better get ready, Ben Cromwell, November 15, 2018, p 6.
22 Internet: https://www.supplychaindive.com/news/air-cargo-boom-real-estate-implications/542344/. International e-commerce is taking off and airports better get ready, Ben Cromwell, November 15, 2018, p 2.
23 The U.S. Transportation Security Administration (TSA) and Customs and Border Protection (CPB) are both study the issues of screening e-Commerce. Customer expectations around e-Commerce include expedited handling and tracking that drive the need to reassess and redesign some of the traditional ways airlines, forwarders, cargo ground handlers and truck companies have done business, Internet: https://www.freightwaves.com/news/aircargo/ecommerce-cns-partnership-conference/, e-Commerce is the Hot Topic for Air Cargo at the Upcoming CNS Partnership Conference, Jesse Cohen, April 21, 2019.
24 Internet: https://www.sltrib.com/news/2019/04/17/amazon-opens-its-new-salt/, Amazon opens its new Salt Lake City center – ant it is loaded with Robots, The Salt Lake City Tribune, Tony Semerad, April 17, 2019.
25 Internet: Amazon's Prime Air cargo jet fleet is bigger than ever and has a new name, Jim Hammerand, Houston Business Journal. Houston, Texas, December 30, 2017.

Maneuvering areas refer to pavement that is used for positioning aircraft on the apron or trucks at a truck dock plus the pavement associated with circulation and movement. For aircraft, this includes taxilanes and the area extending out to the Taxilane Obstacle Free Areas (TOFA). For trucks, this includes truck vehicular lanes, service roads, and maneuvering areas.

Where practices by particular airlines are unique to that carrier, modifications of general industry-wide criteria are made. The best example is UPS. From interviews with UPS, the carrier has a practice to minimize space at airports and move as much cargo from off-site warehouses as it can. UPS sorts air cargo both on the air cargo apron as well as on the pavement adjacent to the truck docks. While aviation air cargo forecasts indicate significant future growth for UPS, the carrier indicates it does not have plans to expand the warehouse facility on-site. At the same time, UPS does plan to move containers currently stored on-site to the off-site facility, opening up additional pavement for sortation on the pavement.

Therefore, planning criteria use for air cargo are based in part on interviews with stakeholders, common industry practices, and general practices of specific airlines at SLC.

3.6.2 Planning Criteria

Aviation industry planning standards for air cargo facilities are adhered to wherever possible but also take into consideration interviews with tenants and presumed continuation of practices particular to an airline.

3.6.2.1 Cargo Buildings

Forecasts consider different characteristics for cargo buildings, passenger carriers and dedicated air cargo carriers since they are entirely different functions. Building needs will be addressed in terms of building square footage.

Most often air cargo facility capacity is measured through the amount of air cargo handled per square foot. Most studies indicate air cargo facilities that operate at approximately one metric ton of cargo per square foot of building are the best balanced. Major cargo airports including Los Angeles International Airport and Hong Kong International Airport can exceed this level of capacity through greater efficiency. At SLC, FedEx operates at 1.46 tons of cargo per square foot of building. Smaller airports that do not have specialized cargo equipment or have older or repurposed buildings have much lower utilization, as low as 0.4 tons per square foot. This is also true of belly cargo facilities of passenger airlines where cargo handling is an important but secondary function.

For belly cargo, Table 8-2 of the 2015 Report identified a range of 0.22-0.63 tons per square feet.[26] This may be function of the passenger airlines having cargo buildings that date from the 1970s or 1980s to match demand at that time. At SLC, this is the case regarding belly cargo facilities. Airlines have cargo space in multiple buildings. As a result, the facility requirement indicates a surplus of space but that surplus of space is not indicative of the large number of airlines, each needing separate belly cargo areas for its particular use.

However, there was a period when the average aircraft size went down and passenger airlines could not carry as much cargo. FedEx and UPS picked up the demand. Today, TSA screening requirements have suppressed demand for the combination carrier. Such low capacity ratios may be more an issue that the passenger carriers are just operating with buildings that are too large and it is not economical to alter them.

Replacement of older facilities for belly cargo at major international gateway airports like Los Angeles International or John F. Kennedy International is a consideration. As a result of the significant number of wide body passenger aircraft operations, belly cargo is a much bigger business. At this time, this is not an important issue for SLCDA but could be considered an emerging issue for consideration toward the end of the 20-year master plan time frame. If Delta's announced plans to begin non-stop operations to Asia materialize and result in greater success than anticipated, there may be opportunities for substantial belly cargo growth at SLC.

At SLC, each of the facilities were evaluated in terms of how they compare to these ratios. For belly cargo, Delta operates at 0.45 tons per square foot which is within the range anticipated. The 0.45 tons per square foot factor was applied to Delta forecasts and other belly cargo facilities at SLC. Interviews with Delta indicate they soon will need additional building space.

While both UPS and FedEx operate well beyond the 1.0 tons per square foot general capacity ratio, each carrier approaches their facilities differently. More recently, a higher capacity ratio of 1.25 tons per square foot has been used and better reflects the nature of today's air carrier carriers. This criteria will be used for air cargo building facility requirements.

26 National Academies of Sciences, Engineering, and Medicine, 2015, Air Cargo Facility Planning and Development Final Report, Washington, D.C.: The National Academies Press, Chapter 8: Air Cargo Facility Requirements, Table 8-2 Air Cargo Facility Requirements Ratio Matrix, pp, 8-11.

3.6.3 Cargo Apron

Peak hour fleet forecasts for each of the integrated carriers were used for estimating apron needs. Apron requirements assume the long-term parking positions will be like what is existing today. Aircraft parking positions for mainline and feeder aircraft will each be served by a taxilane, service road, and maneuvering areas.

There is little belly cargo apron for dedicated aircraft parking; it is primarily used for storage and loading/unloading of containers.

3.6.3.1 Other Cargo Facility Requirements

Factors for facility requirements for GSE/storage areas, truck docks and maneuvering areas, and vehicular parking requirements are also discussed in the *2015 Air Cargo Facility Planning and Development Final Report*. Similarly, general ranges for facility requirements were discussed and applied to replicate existing conditions at SLC. Not unexpectedly for a major hub airport with wide-ranging sizes of airline operations by both passenger and dedicated air cargo airlines, general criteria does not apply very well and often provide conflicting results. For example, if one applies the ratio in the 2015 Report of 10 truck docks per 20,000 square feet of building space, the number of estimated truck docks needed far exceeds current levels. This may very well be because SLC is a regional hub with substantial cargo coming in on mainline carriers and distributed via feeder carriers.

Interviews with the largest airline tenants both for passenger and dedicated air cargo carriers indicated their space requirements for buildings, aprons, storage areas, and vehicular parking would need to consider expansion within the next five years. During interviews, the largest passenger carriers (Delta and Southwest) and dedicated air cargo carriers (FedEx and UPS) indicated their cargo facilities were at or nearing capacity. For FedEx and UPS, space for container storage, truck docks, and vehicular parking was at or nearing capacity as well. Because of the unique characteristics for each operation and that major operators are nearing capacity, it was assumed for these other facility requirements that needs would be determined using the percentage of growth in cargo.

3.6.3.2 Passenger and Dedicated Air Cargo Carrier Facility Requirements

The following sections provide factors for passenger airline belly cargo facility requirements in the South Cargo Area and for dedicated air cargo carriers in the North Cargo Area.

3.6.4 South Cargo Area

Specific comments for each airline not identified in Table 3-49 are provided in bullet points below and includes information not found in the Inventory Chapter.

3.6.4.1 Delta

- Additional wide body aircraft operations in the future could increase the need for additional space dedicated to belly cargo.
- The current building will need to be relocated if/when Taxiway G is realigned.
- There is no apron parking and maneuvering/deicing at this facility.

3.6.4.2 Southwest

- Southwest leases approximately 35% of Joint Cargo Building #1 for a total of 10,500 square feet composed of three lease areas:
  - The largest lease area is on the north end of the building with 4,900 square feet of cargo area, 900 square yards of GSE/Container/Storage area between the building and the vehicle service road, and five truck docks
  - The second lease area is in the center of Cargo Building #1 comprising of 3,300 square feet of cargo area, 600 square yards of GSE/Container/Storage area between the building and the vehicle service road, and three truck docks
  - The third lease area is south of the center of Cargo Building #1 consisting of 2,300 square feet of cargo area, 600 square yards of GSE/Container/Storage area between the building and the vehicle service road, and two truck docks
- There is RON apron parking east of the building.

3.6.4.3 All Other Passenger Airline Cargo

- Three areas comprise the other passenger airline cargo area:
  - Air General handles cargo for Alaska Air, United cargo, and American cargo at the Consolidated Cargo Facility. This facility has 29,500 square feet of air cargo area, 2,600 square yards of GSE/Container/Storage area between the building and the vehicle service road, and ten truck docks
  - G-2 Secure handles cargo for American cargo, SkyWest, and Southwest in a small portion (approximately 5%) of the Joint Cargo Building #1 which consists of 1,300 square feet of cargo area, 300 square yards of GSE/Container/Storage area between the building and the vehicle service road, and one truck dock
  - SkyWest leases Joint Cargo Building #2. It has 7,000 square feet of cargo area, 1,500 square yards of GSE/Container/Storage area between the building and the vehicle service road, and three truck docks
- There is RON apron parking east of Joint Cargo Building #1 and #2 that SkyWest uses temporarily for containers.
- Other Passenger Airline Cargo operators are American, Alaska, Compass, Frontier, Horizon, SkyWest, and United.

Table 3-49 provides Facility Requirements for Passenger Airline Cargo.

Table 3-49: Passenger Cargo Requirements

	Criteria	Requirements				
		2018 Existing	2018	PAL 1	PAL 2	PAL 3
Freight (tons)	Forecast 0.45 (tons/sf)	21,200	21,200	23,100	25,150	29,850
Cargo Building (sf)(1)		83,000	47,100	51,300	55,900	66,300
GSE/Containers/Storage (sy)	Percent Increase of Cargo Forecast	17,400	17,400	18,900	20,600	24,500
Truck Docks		33	19	20	22	26
Truck Parking/Maneuvering (sy)		6,800	3,900	4,200	4,600	5,400
Vehicular Parking		128	73	79	86	102
Acreage		6	5	5	6(2)	7(2)

Source: RS&H Analysis, 2019
(1) This is cargo Storage area only. Does not include an airline's office space or other non-airline tenant's square footages within a building.
(2) Does not include potential space for an increase of belly cargo operations due to more frequent activity by wide body aircraft.

3.6.5 North Cargo Area

Specific comments for each airline not identified in Table 3-50 are provided in bullet points below and includes information not found in the Inventory Chapter.

3.6.5.1 FedEx

- The East apron is shared area between FedEx and UPS. For purposes of Facility Requirements, it was assumed that the east-west vehicle service road on the apron is an approximate boundary.
- The existing apron parking and maneuvering area is marked for five ADG IV wide body aircraft and 12 ≤ADG II aircraft with an existing peak demand of 5 ADG IV, 1 ADG III and 7 ADG II. Table 3-51 provides the existing peak hour demand and future demand for air carrier and feeder operations for PAL 1, PAL 2, and PAL 3. Assumptions for apron parking requirements for various existing and future aircraft that would be parked on the FedEx apron.
- Table 3-52 provides apron parking requirements for various existing and future aircraft that would be parked on the FedEx apron.
- Deicing takes place on the concrete collection area, 38,700 square yards, on the FedEx ramp.

3.6.5.2 UPS

- The East apron is shared area between UPS and FedEx. For purposes of Facility Requirements, it was assumed that the east-west vehicle service road on the apron is an approximate boundary.
- There is also a shared apron area between UPS and DHL on the South apron. It is assumed the north-south vehicle service road that runs between them an approximate border. During interviews, UPS indicated a need for immediate additional ramp for feeder aircraft as verified in Table 3-50 below.
- Existing apron parking and maneuvering area is marked for four ADG IV aircraft and 9 feeder aircraft with an existing peak hour parking demand of 3 ADG IV, 5 ADG II and 6 ADG I. Table 3-51 provides the existing peak hour and future demand for air carrier and feeder operations for PAL 1, PAL 2, and PAL 3.
- Table 3-52 provides assumptions for apron parking requirements for various existing and future aircraft that would be parked on the UPS apron.
- Deicing takes place in the designated deice boxes marked in green on the ramp. The deicing area is currently 37,600 square yards.

3.6.5.3 Other Dedicated Air Cargo Carriers

- The greatest percentage of other dedicated air cargo carriers is carried by DHL.
- Amazon may obtain their own aircraft, including narrow body aircraft such as the B737-800 or wide-body aircraft such as the B767-300.
- DHL Building, apron parking and maneuvering, truck docks, truck parking and maneuvering and vehicular parking exceed facility requirements throughout planning period. In addition to truck and vehicular parking area, DHL has 2,345 square yards of fenced-in parking for delivery vans.
- Existing apron parking and maneuvering area is marked for 2 ADG III aircraft and the existing aircraft parking demand during peak periods is one ADG III. Table 3-51 provides the existing peak hour demand and future demand for air carrier operations for PAL 1, PAL 2, and PAL 3; currently, there are no feeder operations during peak hour. Assumptions for apron parking requirements for various existing and future aircraft that would be parked on the apron serving other dedicated air cargo carriers.
- Table 3-52 provides apron parking requirements for various existing and future aircraft that would be parked on the apron of dedicated air cargo carriers.

Table 3-50: Dedicated Air Cargo Facility Requirements

	Criteria	Requirements				
		2018 Existing	2018	PAL 1	PAL 2	PAL 3
3Freight (tons)	Forecast	169,850	169,850	190,650	214,200	272,000
Cargo Building (sf) (1)	1.25 (tons/sf)	142,900	135,900	152,500	171,400	217,600
Narrow/Wide body Apron Parking and Maneuvering (sy) (2)(3)	Forecast	128,000	100,600	110,300	128,000	154,300
Feeder Apron Parking and Maneuvering (sy) (2)(3)	Forecast	43,200	60,000	62,700	83,000	87,600
Deicing (sy) (4)	Forecast	83,100	87,300	99,300	118,600	147,800
GSE/Container/Storage (sy)	Percent Increase of Cargo Forecast	56,300	56,300	63,200	71,000	90,200
Truck Docks		27	26	29	32	41
Truck Parking/Maneuvering (sy)		23,600	22,400	25,100	28,300	35,900
Vehicular Parking		349	332	372	418	531
Acreage		**55**	**52**	**57** (5)	**68** (5)	**81** (5)
Acreage Surplus / (Deficit)			**3**	**(2)**	**(13)**	**(26)**

Source: RS&H Analysis, 2019
(1) This is cargo storage area only. Does not include an airline's office space or other non-airline tenant's square footages within a building.
(2) Apron parking and maneuvering includes aircraft parking and taxilane.
(3) N/A - From interviews with UPS, there are no plans to increase the size of the building. In the future, all cargo will be sorted and containerized at their off-airport sort facility that is doubling in size. Additional truck maneuvering area is assumed to be accommodated by that portion of existing GSE/Container/Storage square yardage pavement which is now stored in containers that will be moved to the off-site sort facility.
(4) Deicing occurs on and is included within the facility requirement for narrow/wide body and feeder aprons. However, this category does indicate the incremental need for deicing areas as all cargo aprons expand.
(5) Does not include potential space for an increase of e-Commerce operations.

Table 3-51: Peak Hour Demand for Dedicated Air Cargo Aircraft

	Criteria	Requirements				
		2018 Existing	2018	PAL 1	PAL 2	PAL 3
FedEx						
Narrow/Wide body Aircraft	Forecast	2 A-300 2 B-757 1 MD-11	5 D-IV	6 D-IV	7 D-V	8 D-V
Feeder Aircraft	Forecast	1 ATA43 5 C-208 2 E120	8 B-III	8 B-III	9 B-III	10 B-III
UPS						
Narrow/Wide body Aircraft	Forecast	1 B-757 1 B-767 1 A-300	3 C-IV	4 C-IV	4 D-V	5 D-V
Feeder Aircraft	Forecast	5 B190 6 BE99	11 B-II	12 B-II	13 B-III	14 B-III
All Other						
Aircraft	Forecast	1 B-737	1 ADG III	1 ADG III	1 ADG III	2 ADG III

Source: RS&H Analysis, 2019

Table 3-52: Representative Aircraft In Airline Fleets for Dedicated Air Cargo Carriers

Aircraft Designator	Aircraft Model	ADG	Envelope (sy)
A333 (1)	Airbus A330-300	V	6,241
AT43	ATR-42-300/320	III	1,457
AT72	ATR-72	III	1,687
B190	Beechcraft 1900C	II	880
B734	Boeing 737-400	III	2,147
B763	Boeing 767-300	IV	4,464
B777(1)	Boeing 777F	V	6,241
C208	Cessna 208	II	715
CRJ2 (1)	CRJ 200 Freighter Conversion	II	1,210
E120	Embraer 120	II	990
MD11	McDonnell Douglas MD-11	IV	5,009

Source: FAA Aircraft Characteristics Database; RS&H, 2019
(1) Projected design aircraft to use air cargo apron

- Deicing takes place in the designated deice boxes marked in green on the ramp. The deicing area is currently 6,800 square yards.
- Any additional GSE/Container/Storage space requirements can be accommodated on the excess aircraft apron parking area.

Table 3-50 provides Facility Requirements for Dedicated Air Cargo Carriers. Table 3-51 provides the existing and forecast peak hour demand for apron parking positions for dedicated air cargo carriers, both for air carrier and feeder aircraft operations.

Table 3-52 provides apron parking requirements for various existing and future aircraft that would be parked on the apron of various integrated carriers. The CRJ-200 freighter conversion is not identified by an airline for SLC, however it is representative of a larger feeder aircraft that might be anticipated to become part of the fleet in the next 20-years since many larger feeder aircraft may need to be replaced in the future due to age or need for larger capacities.

3.6.6 Air Cargo Summary

While these facility requirements identify future facilities needs for passenger cargo and dedicated air cargo carriers, there are significant potential opportunities that cannot be quantified that need to be kept in mind during alternatives analysis.

For passenger airlines, in particular Delta, any future change in route structure that introduces additional wide body aircraft on a frequent basis, particularly to Asia, may generate a need for additional areas for handling belly cargo.

E-Commerce could have a significant impact upon the land requirements for air cargo facility development in the future. As mentioned above, SLC is being considered as a potential alternative airport to accommodate e-Commerce operators as a result of the lack of space available at other cargo hubs. Further, operations like Amazon conduct business around the clock. This may have an operational impact upon airlines such as DHL, UPS, and FedEx.

While these facility requirements for passenger and dedicated air cargo airlines cannot forecast any specific size areas needed, it is prudent to give this serious consideration in the development of master plan alternatives.

3.7 UTILITY INFRASTRUCTURE REQUIREMENTS

Utilities at SLCIA include electrical power, sanitary sewer, stormwater, water, communication, aviation fuel and natural gas. The existing utility infrastructure was evaluated to determine deficiencies. Evaluation of the utility infrastructure examined major trunk lines, redundancy, materials, and ability to accommodate existing and future demand.

The following subsections describe each utility at SLCIA, deficiencies and recommendations to improve the infrastructure. Additional details on utility infrastructure at SLCIA can be found in Appendix X.

3.7.1 Electrical Utilities

The on-airport electrical system is adequate for today's needs. The Airport has purchased additional capacity for future demand in an underground duct bank to be used as a secondary power source. From discussions with SLCIA staff, on-airport electrical system information and survey varies in age and detail. It is recommended a study be conducted to inventory the existing system and determine future needs of the on-airport electrical system.

Electrical power service to SLCIA is supplied by Rocky Mountain Power through overhead and buried lines. As reported by Rocky Mountain Power, the existing trunk lines that feed power to the airport are adequate. It is recommended that SLCIA staff continue to coordinate with Rocky Mountain Power during the planning phase of any development that would necessitate large power requirements.

The electrical utilities adjacent to the airport also include major transmission lines serving other customers. On the north side of the airport are two high voltage overhead transmission lines that run east to west in a near perpendicular configuration to the runways. The lines extend around the north west corner of airport and connect to a substation in the development west of Runway 16R-34L, as can be seen in Chapter 1, Figure 1-37. Discussions with Rocky Mountain Power suggest no deficiencies with the existing lines. They have an indefinite lifecycle and as components become warn or faulty, they are replaced at the expense of the utility provider.

While not a deficiency of the lines themselves, the height and location of the lines north of the airport are an obstruction for certain aircraft departing Runway 34R and/or 34L depending on take-off weight. As described in Section 3.2.1.2, Runway Length Requirements, the transmission lines restrict some aircraft from operating at SLC with maximum allowable take-off weight. Additionally, the location of the transmission lines and substation to the west are within the area proposed on the current Airport Layout Plan for a possible future west runway. These factors are critical elements for consideration in the alternatives analyses, especially due to the high cost associated with relocating transmission line infrastructure.

The next chapter, Evaluation and Identification of Alternatives, will explore alternatives for possibly extending Runway 34R and relocating the transmission lines north of the airport based on runway length and aircraft requirements identified in this chapter. Additionally, concepts for future expansion of the airport to the west will include consideration of cost and complexity related to the existing transmission lines and substation location in that area.

3.7.2 Water

Water is supplied by the Salt Lake City Department of Public Utilities (SLCDPU). Two 12-inch water lines enter SLCIA from the southeast and a single 12-inch line enters the Airport from the north. A 12-inch loop has been constructed around the Terminal, as previously shown in Chapter 1, Figure 1-38. Information provided by SLCIA staff suggests most of the water lines are polyvinyl chloride (PVC); however, some of the older segments are steel, cast iron, ductile iron and asbestos cement. Generally, the water supply to SLCIA is adequate to accommodate the forecasted growth in passengers. As SLCIA implements large capital improvement projects in areas known to have asbestos cement pipes, it is recommended these pipes be removed and replaced with PVC piping.

3.7.3 Sanitary Sewer

SLCIA sanitary sewer system is largely comprised of 18-inch and 24-inch lines on the south and a 12-inch line on the north end of the Airport. The sanitary sewer system is supported by several lift stations, as previously shown in Chapter 1, Figure 1-38. Most of the piping for the sanitary sewer is PVC, with some reinforced concrete, vitrified clay, cast iron, asbestos cement, and HDPE pipe. Since 2010, the airport has constructed two smaller lift stations. One located west of the South Economy Parking Lot and another west of the terminal.

The existing sewer pump stations can accommodate existing demand and has enough capacity to accommodate full build-out of the two terminal concourses. If an additional concourse is needed in the future, the sewer pump station system will need to be modified and utility lines expanded to accommodate the additional demand.

A utility specific study is needed to determine how to increase capacity to serve future development, which is outside the purview of this master plan. When that study is conducted, it is recommended that the age and condition of the older infrastructure be inventoried, and a plan be created for upgrades as needed. Lastly, as SLCIA implements large capital improvement projects in areas known to have asbestos cement pipes, it is recommended these pipes be removed and replaced with PVC piping.

3.7.4 Stormwater

The stormwater infrastructure is comprised of various sized lines, 14 pump stations and five outfalls. Four of the five outfalls discharge into the Surplus Canal and the other into the City Drain. The location of the City Drain, outfalls and pump stations in relation to facilities at SLCIA is shown in Chapter 1, Figure 1-38. Information provided by SLCIA staff suggests stormwater pipes are made of reinforced concrete, high- density polyethylene (HDPE) and PVC. Generally, the existing stormwater infrastructure is adequate to accommodate existing conditions, but improvements are likely needed to accommodate future growth.

Discussions with SLCIA staff suggest the existing detention basins can retain all storm water if necessary and pump water into the Surplus Canal and City Drain. Currently, SLCIA discharges approximately 3-4 cubic feet per second (cfs) to the City Drain and is reaching the maximum allowable discharge rate of 90 cfs into the Surplus Canal. As SLCIA continues to grow and construct more impervious surfaces, stormwater runoff will increase. With the last drainage study master plan having been conducted in 1997, there are now many elements that require new study. It is recommended a new drainage master plan be conducted to determine how to increase storm water discharge rates and on-site detention to ensure the Airport is equipped to handle future development.

The Surplus Canal located along the southern and western borders of SLCIA, collects most of the storm water runoff. The canal is owned and managed by Salt Lake County. The canal was originally constructed in the 1890s, and later enlarged with the addition of levees along the banks by the United States Army Corps of Engineers (USACE) in the 1960s. The USACE conducted a detailed inspection in 2012 that identified deficiencies with the levees and overall design of the canal. The study found the levees do not meet current USACE standards. Other deficiencies associated with the canal include vegetation growth, inadequate bank protection and slope, penetration to right-of-way, and lack of sod cover. A critical finding in the USACE study were high-risk flood hazard deficiencies. The sum of these deficiencies will need to be corrected to obtain FEMA certification.

Overall, the Surplus Canal is old and requires numerous upgrades and enhancements to ensure it functions safely and effectively in the future. Because deficiencies are located along the entire length of the Surplus Canal, there is opportunity to mitigate some deficiencies while expanding available land for aeronautical development. In the alternative's analysis, consideration will be given to modify the existing Surplus Canal to address deficiencies and increase available land for aeronautical use.

The North Point Canal is a divergence from the Surplus Canal which serves agricultural and wetland properties off airport property. The canal also feeds the ponds located on the golf course before crossing the Surplus Canal via a flume. The North Point Canal is owned and managed by the North Point Canal Company. Stormwater runoff does not flow into the North Point canal from SLCIA. The canal company has suggested they would like to see the elimination of the flume and improve how water diverts off the Surplus Canal. The ponds are currently used by the canal company for winter habitat of triploid carp. The carp are used during summer months when the canal is active to keep the canal clear of moss and algae. However, the ponds and the carp themselves are a concern for the Airport as they are an attractant for waterfowl. FAA AC 150/5300-33 Hazardous Wildlife Attracts On or Near Airports recommends a separation radius of 10,000 feet from an airport to the closest hazardous wildlife attractant. As the pond is located inside this imaginary radius, it is recommended that SLCIA staff coordinate with the appropriate agencies to remove the ponds. If the ponds cannot be removed, mitigation efforts should be undertaken to reduce the wildlife attractant elements of the ponds.

3.7.5 Other Airport Utilities

The following subsections summarize the evaluation of other utilities located at SLCIA. Location of other airport utilities is shown in Chapter 1, Figure 1-39.

3.7.5.1 Communication Infrastructure

Communication lines are owned and operated by either Century Link, MCI/Version and the FAA. From discussions with SLCIA staff, communication lines are adequate and meet the needs of the existing users and tenants. As SLCIA grows, additional communication lines may be needed. SLCIA should coordinate with the appropriate entity to ensure an acceptable level of service is maintained for its users and tenants.

3.7.5.2 Aviation Fuel Supply

A 6-inch steel jet fuel line supplies SLCIA from an oil refinery to the north. The line is connected from the oil refinery to the fuel tanks in the north support area. Two pump stations, one located west of the Air National Guard Based and another off 2200 West, north of the Boeing facility. The fuel line is adequate to accommodate existing and future demand. Note that currently, the oil refinery has reduced the amount of jet fuel blend produced, thus most of the fuel for the fuel farm tanks is being brought in via tanker trucks from Las Vegas and Wyoming. This is a fundamental shift in historical operational procedures and could impact fuel farm requirements in the future. As such, these factors will be considered in alternatives development regarding future fuel farm locations and connectivity to the refinery and vehicle roadways.

3.7.5.3 Natural Gas

SLCIA natural gas supply is supplied by Dominion Energy through a series of high to intermediate-high pressure lines. A 6-inch high pressure line runs east to west on the south side of SLCIA. This line provides natural gas for the Terminal and surrounding support facilities. Around the terminal are two high pressure gas loops that provide service to concessions and other terminal tenants. Another 6-inch line runs on the north side of West 2100 North and serves facilities in the north support area. Lastly, a 36-inch steel gas line, operated by Kern River, a supply company, runs along with north and west sides of SLCIA, providing service for various tenants, such as the FBOs. The natural gas infrastructure is adequate to accommodate existing and future demand.

3.7.6 Utility Infrastructure Summary

The existing utilities were determined to be a mix of new and old infrastructure. Future improvements will need to be made to the water, sewer and storm water systems to meet current design standards and support planned development. Additionally, the utility data is not comprehensive, and as such, a utility master plan is recommended to detail existing conditions and determine how best to upgrade existing infrastructure and provide future capacity. A utility master plan will identify the capacity of existing lines and determine triggering events for when systems need to be replaced and upgraded. Recommendations from the utility infrastructure master plan should be incorporated into SLCIA's CIP.

Development in both greyfield[27] and greenfield sites may require additional utility infrastructure enhancements. Additional utility considerations will be identified and determined in Chapter 4 – Identification and Evaluation of Alternatives.

3.8 GENERAL AVIATION REQUIREMENTS

This section outlines the requirements for the general aviation (GA) facilities for based and transient general aviation aircraft at SLC during the planning period based upon local, regional, and national trends. The areas evaluated in this section include general aviation aprons, aircraft hangars, and FBO facilities. The Master Plan forecast predicts a gradual and continuous change in the composition of the general aviation fleet. The number of single-engine aircraft and operations are projected to decrease throughout the planning period while multi-engine, jet engine, and helicopter based aircraft and operations are projected to increase. As a result of the change in fleet composition, the forecast predicts that at PAL 3 there will be a total of 12,331 additional aircraft operations and 13 additional based aircraft.

Separate from this Master Plan, a General Aviation Strategy Plan was completed in 2019 to recommend a SLCDA developmental action plan to accommodate GA users within the SLCDA airport system of SLC, South Valley Regional Airport (U42), and Tooele Valley Airport (TVY). Considerations from that report are included in this analysis to demonstrate that general aviation growth is expected throughout the system of airports and show those facilities that would be required if the policy decisions of the strategy plan were implemented. Implementation of the strategy plan is forecasted to result in growth of operations at U42 and TVY, resulting in a sharper decline of smaller general aviation aircraft at SLC.

3.8.1 Aircraft Storage

Understanding aircraft storage demand is an important element when considering facility requirements for general aviation based aircraft. The quantity and type of hangar space is driven by many different factors such as total number of based aircraft, fleet mix, local weather conditions, airport security, cost, and user preference. This section outlines requirements for the types of hangar storage provided at SLC including single T-hangars, twin T-hangars, shade hangars and box hangars. These hangar types are generic terms for different sized hangars. T-hangars are small hangars that are typically arranged so small aircraft are "nested" next to each other in alternating directions in individual bays within the facility. The twin T-hangars are similar, but approximately 30 percent larger than single T-hangars. Shade hangars are arranged in a similar fashion to T-hangars, but only provide a protective roof. Box hangars are standalone buildings of varied dimensions, which at SLC range from 5,000 to 46,000 square feet. The space within a box hangar may serve as shared hangar space that accommodates multiple aircraft or the hangar may only provide storage for one aircraft often with an office or lounge area built on the side of the building.

The hangar types used by based aircraft, determined by historical distributions of aircraft at SLC and industry trends, are included in Table 3-53. These percentages were used as planning parameters to determine future hangar requirements. More than 75 percent of the box hangar facilities at SLC are provided by TAC Air and Atlantic Aviation, most of which are shared hangar space. Due to this prevalence of shared hangar space facilities provided by the FBOs, the existing average box hangar space per based aircraft of 6,300 square feet is used to determine appropriate space requirements for future box hangars needs.

Using the planning parameters, hangar requirements were determined based on the forecasted number of based aircraft at each PAL. The hangar requirements needed at each PAL for each hangar type is shown in Table 3-54.

The most recent of the existing row of shade or T-hangars was constructed in 1984, and in many cases the condition of the hangars reflects this age. Of the 126 total single T-hangar bays at the Airport, 19 are deemed un-rentable due to structural deficiencies. The forecasted 51,000 square feet surplus of T-hangars will allow for the removal of unusable or difficult to maintain hangar facilities as well as areas for potential redevelopment.

The General Aviation Strategic Plan recommended the forecasted need through the planning period for more than 250,000 additional square feet of box hangars be developed by the FBOs at the Airport. As discussed in Section 1.9, General Aviation Facilities, zones of control for future development have been determined for each FBO to accommodate demand, removing the need of the SLCDA to construct additional hangar facilities. The alternatives analysis will determine if these zones will be able to accommodate the demand forecasted.

Though this analysis identified specific requirements based on hangar type, the real use of this analysis is to determine the total amount of land that will be required in order to meet future demand. This is because actual hangar development is based primarily on financial economics and business decisions of the developer. For these reasons, land reservations must be created to ensure space is available for future hangars. For example, either FBO may find greater economy in building one large hangar and housing multiple aircraft instead of building multiple smaller hangars. Future land reservations must be flexible, and conceptual layouts must be organized to provide a functional spatial layout.

3.8.2 General Aviation Apron Requirements

General aviation apron areas provide parking and circulation for transient aircraft, those aircraft that are not based at the airport, and local aircraft, those based at the airport. For convenience and ease of movements, the parking apron area is typically located in close proximity to general aviation terminal buildings, fuel delivery systems, and ground transportation. For this analysis, the general aviation apron was divided into three areas to determine the appropriate future requirements including aircraft parking apron, box hangar apron, and circulation apron. Aircraft parking apron is pavement that is used to temporarily park transient aircraft. Box hangar apron is space leased to a based aircraft tenant of a box hangar, located between the box hangar and the circulation apron. Box hangar apron allows an aircraft owner to park his or her aircraft in front of their hangar without impacting adjacent taxilane movement areas. The circulation apron is pavement that allows for the movement and taxiing of aircraft to parking areas, hangars, and services provided at the Airport.

The demand for apron space was determined using the existing and forecasted peak day operations and fleet mix for each aircraft type. Using the fleet mix allows for consideration of appropriate apron space needed as larger aircraft, such as business jets, take up more space on the apron than smaller single engine aircraft. The facility requirements for the general aviation apron area are shown in Table 3-55.

At forecasted growth levels, SLC experiences a deficiency in apron space in every category at almost every PAL level examined. As T-hangar demand decreases in PAL 1, the existing total apron square footage is nearly sufficient. However, an additional 491,000 square feet of apron space is forecasted to be required by PAL 3.

TABLE 3-53: SLC General Aviation Hangar Planning Parameters

	Single T	Twin T	Shade	Box
Single-Engine	55%	5%	15%	25%
Multi-Engine		40%	5%	55%
Jet Engine				100%
Helicopter				100%

Source: RS&H Analysis, 2019

[27] A greyfield site is a previously developed property that does not have known environmental containments. A greenfield site is one that has never been developed or disturbed.

3.8.3 General Aviation FBO Requirements

TAC Air and Atlantic Aviation provide FBO terminal facilities for daily aircraft operations of tenants, pilots, and passengers. Like apron requirements, FBO terminal facilities were determined using the number of peak month/average day operations and the projected fleet mix. The projected number of individuals flying on each aircraft type within the fleet mix was used to determine the amount of space that would be required. As shown in Table 3-56, FBO terminal facilities are expected to be enough throughout the planning period.

3.8.4 General Aviation Strategy Plan Considerations

The SLC Master Plan identifies facilities required to accommodate long-term general aviation requirements based upon aviation activity forecasts, as described above. Those forecasts are unconstrained and result in a slight reduction in the number of based aircraft over the 20-year time frame but a major change in the size of the fleet mix to larger aircraft.

In addition to the SLC Master Plan, the SLCDA has developed a separate General Aviation Strategy Plan. Its purpose is to maximize efficiency within the SLCDA system to the extent reasonable by providing enhanced facilities at SLCDA reliever airports. In part, the strategy plan assumes the smaller general aviation aircraft, essentially those in shade hangars and many of those in T-hangars will be attracted to SLCDA relievers as a result of enhanced facilities and services at those airports.

Table 3-54: General Aviation Hangar Requirements

Hangar Type	2017	Planning Activity Level		
		PAL 1	PAL 2	PAL 3
Single T-Hangar				
Hangar Rows	7	5	5	4
Hangar Bays	116	95	90	81
Square Footage	145,000[1]	110,000	104,000	94,000
Surplus/(Deficit)		35,000	41,000	51,000
Twin T-Hangar				
Hangar Rows	1	1	1	1
Hangar Bays	27	27	27	27
Square Footage	38,000	38,000	38,000	38,000
Surplus/(Deficit)		0	0	0
Shade Hangar				
Hangar Rows	2	1	1	1
Hangar Bays	54	28	27	25
Square Footage	54,000	28,000	27,000	25,000
Surplus/(Deficit)		26,000	27,000	29,000
Box Hangar				
Hangar Rows	28	37	39	43
Hangar Bays	103	125	129	142
Square Footage	834,000	785,000	814,000	897,000
Surplus/(Deficit)		(140,000)	(169,000)	(252,000
Total				
Square Footage Required	434,000	889,000	907,000	969,000
Surplus/(Deficit)		(55,000)	(73,000)	(135,000)

[1] Existing single T-hangars include 19 hangar bays that are unrentable due to structural deficiencies
Source: SLCDA; RS&H Analysis, 2019

Table 3-55: General Aviation Apron Requirements

General Aviation Apron Area (SqFt)	2017	Planning Activity Level Requirements		
		PAL 1	PAL 2	PAL 3
Aircraft Parking Apron				
Square Footage Required	635,000	675,000	772,000	996,000
Surplus/(Deficit)		(40,000)	(137,000)	(361,000)
Box Hangar Apron				
Square Footage Required	174,000	201,000	208,000	225,000
Surplus/(Deficit)		(27,000)	(34,000)	(51,000)
Circulation Apron				
Square Footage Required	1,706,000	1,647,000	1,731,000	1,785,000
Surplus/(Deficit)		59,000	(25,000)	(79,000)
Total				
Square Footage Required	2,515,000	2,523,000	2,711,000	3,006,000
Surplus/(Deficit)		(8,000)	(196,000)	(491,000)

Source: SLCDA, FAA OPSNET, RS&H Analysis, 2019

Table 3-56: General Aviation FBO Terminal Requirements

	2017	Planning Activity Level Requirements		
		PAL 1	PAL 2	PAL 3
FBO Terminal Facilities				
Square Footage	22,000	18,000	19,000	22,000
Surplus/(Deficit)		4,000	3,000	0

Source: RS&H Analysis, 2019

According to industry trends and airport development in the region, in the near-term, the General Aviation Strategy Plan forecasts single-engine aircraft based at SLC to decline by half, and multi-engine aircraft to decline by 25 percent. This sharp decline will directly affect T-hangar requirements throughout the planning period, resulting in a surplus of space for that which had been used for combined single T-hangar, twin T-hangar, and shade hangars by 2037. At the same time, the number of based jet aircraft are expected to significantly increase. Along with anticipated growth by helicopters, the General Aviation Strategy Plan forecasts an additional need to accommodate box hangars throughout the planning period.

In effect, the General Aviation Strategy Plan provides alternative scenarios that will be used in the Alternatives Evaluation process of the SLC Master Plan along with alternatives developed for accommodating general aviation requirements described in SECTION 3.1, General Aviation Requirements.

3.8.5 Summary of General Aviation Facility Requirements

Over the next 20 years at SLC, significant jet-oriented growth is anticipated to continue, requiring additional hangars and apron for larger aircraft. In total 3,997,000 square feet of space is forecasted to be needed at PAL 3. As shown in Table 3-57, this is a deficit of 626,000 square feet including 135,000 square feet of hangar space and 491,000 square feet of apron. The alternatives will examine ways to address this demand.

During alternatives analysis, it will also be necessary to consider the potential impacts to SLC that may occur as a result of implementing the General Aviation Strategy Plan. That plan considers actions at U42 and TVY that could result in attraction of aircraft from SLC. Implementation of that plan would result in a different configuration of GA facilities at SLC. Additionally, the impact of potential changes to airfield configuration, such as the realignment of Runway 17-35, may result in additional alternative for the GA area.

Table 3-57: Summary of General Aviation Requirements

	2017	PAL 1	PAL 2	PAL 3
Hangars				
Square Footage	834,000	889,000	907,000	969,000
Surplus/(Deficit)		(55,000)	(73,000)	(135,000)
Apron				
Square Footage	2,515,000	2,523,000	2,711,000	3,006,000
Surplus/(Deficit)		(8,000)	(196,000)	(491,000)
FBO				
Square Footage	22,000	16,000	18,000	22,000
Surplus/(Deficit)		6,000	4,000	0
Total				
Square Footage	3,371,000	3,428,000	3,636,000	3,997,000
Surplus/(Deficit)		(57,000)	(265,000)	(626,00)

Source: SLCDA, FAA OPSNET, RS&H Analysis, 2019

3.9 SUPPORT FACILITY REQUIREMENTS

Aviation support facilities at an airport encompass a broad set of functions that exist to ensure the airport can fill its primary role and mission in a smooth, safe and efficient manner. The following sections outline the requirements for different supporting facilities at Salt Lake City International Airport.

It should be noted that the overriding issue facing all support facilities is that long range development of Concourse C will require displacement of many existing support facilities. Therefore, the future facility requirements must consider not only what is needed to meet current deficits in capacity, but also to replace what exists today in a location that will work long term.

3.9.1 Aircraft Rescue and Fire Fighting

The required Aircraft Rescue and Fire Fighting (ARFF) facilities are determined based on Code of Federal Regulations Title 14 Part 139. This section evaluates the ARFF index, equipment, and station requirements.

3.9.1.1 Airport Index

Airports serving scheduled air carrier flights are required to provide facilities and equipment for ARFF. ARFF equipment requirements for FAR Part 139 airports are determined by an index ranking based on aircraft size, number and type of emergency vehicles, as well as number of scheduled daily aircraft departures.

SLC is classified as Index E based on the aircraft operations experienced at the airport. Except as provided in Part 139.319(c), the air carrier aircraft with the largest length and an average of five or more daily departures determines the ARFF Index required for an airport. The ARFF Index then determines the specific ARFF standards and equipment requirements for that airport. ARFF Index requirements for SLC are shown in Table 3-58. Based on the future fleet mix in the aviation activity forecast, it is expected that SLC will remain classified as an Index E facility throughout the forecast period.

3.9.1.2 Vehicle Requirements

Under Part 139.317, Index E requires the airport operator to have response equipment ready that hold specified amounts of dry chemical and water. Three vehicles are required for ARFF under Index E including;

- One vehicle carrying 500 pounds of sodium-based dry chemical, halon 1211, or clean agent; or
- 450 pounds of potassium-based dry chemical and water with a commensurate quantity of aqueous film forming foam (AFFF) to total 100 gallons for simultaneous dry chemical and AFFF application.
- Two vehicles carrying an amount of water and the commensurate quantity of AFFF so the total quantity of water for foam production carried by all three vehicles is at least 6,000 gallons.

The Airport currently has eight ARFF equipment vehicles, including four Oshkosh Striker 3000. In total, the ARFF vehicles at SLC provide 18,600 gallons of water capacity, 2,600 gallons of foam capacity, 3,620 gallons of sodium-based dry chemical capacity, 2,880 gallons of halotron, and 200 gallons of halon 1211. These amounts are greater than the requirements of Part 139.317 but allow for an increased ARFF response. Most of the ARFF equipment on the Airport is based at Fire Station #12, located in the North Support area. Based equipment at Fire Station #11, located in the General Aviation area, include a GMC 1-Ton 4x4 and an Oshkosh Striker 3000. Table 3-59 shows an overview of the SLC ARFF vehicles.

Table 3-58: ARFF Classifications and Requirements

ARFF Index	Aircraft Length in Feet	Example Aircraft	Required ARFF Vehicles
A	<90	Canadair Regional Jet 200 (CRJ-200)	2
B	90 - <126	McDonnel Douglas DC-9 (DC-9)	1-2
C	126 - <159	Boeing 757-200 (B-757-200)	2-3
D	159 - <200	Airbus A-300 (A-300)	3
E	>200	Boeing 777 (B-777)	3

Table 3-59: ARFF Vehicle Storage Capacity

Vehicle	Capacity (gallons)				
	Water	Foam	Dry Chemical	Halotron	Halon 1211
Fire Statoin #11					
GMC 1-Ton 4x4	300 g	40 g	450 g	-	-
Oshkosh Striker 3000	3000 g	420 g	450 g	500 g	-
Fire Station #12					
GMC 1-Ton 4x4	300 g	40 g	450 g	-	-
Rosenbauer Panther 300	3000 g	400 g	500 g	460 g	-
Oshkosh Striker 3000	3000 g	420 g	450 g	500 g	-
Oshkosh TB3000	3000 g	420 g	420 g	420 g	200 g
Oshkosh Striker 3000	3000 g	420 g	450 g	500 g	-
Oshkosh Striker 3000	3000 g	420 g	450 g	500 g	-

Source: SLC Airport Certification Manual, 2018

3.9.1.3 Station Response Time Requirements

The Index E response time requirements are described in Part 139.319. Within three minutes, at least one ARFF truck must reach the midpoint of the farthest runway serving air carrier aircraft from its assigned post or reach any other specified point of comparable distance on the movement area that is available to air carriers and begin application of an extinguishing agent. Within four minutes from the time of alarm, all other required vehicles must reach the point specified above from their assigned posts and begin application of an extinguishing agent. The two ARFF stations at SLC are optimally located to provide quick response to any point on the airfield and meet the response time requirements. Given the location of the ARFF stations, it is likely that these locations would be able to meet the response time requirements for potential future runway and taxiway expansions during the planning period. Beyond the planning period, as terminal expansion requires relocation of ARFF facilities, an alternative location that meets the response time requirements will need to be identified.

3.9.2 Fuel Storage

Fuel storage requirements at the Airport depend on the level of aircraft traffic, fleet mix, and fuel delivery schedules. Growth in commercial aviation operations and changes in general aviation aircraft fleet mix will both likely increase demand for Jet A fuel. Fuel storage requirements were determined for both commercial and general aviation. Fuel to support commercial aviation is stored in large storage tanks located in the North Support Area. Fuel for general aviation is managed by Atlantic Aviation and TAC Air and located in the General Aviation area.

3.9.2.1 Commercial Aviation Fuel Storage

The North Support Area includes a total storage capacity of 6.45 million gallons of Jet A fuel provided by six fuel tanks managed by Menzies Aviation. Fuel pipelines connect to the fuel farm and refill tanks directly from the Andeavor Logistics Salt Lake City Refinery. This allows for quick resupply of fuel into the tanks, but during times of lower production of aviation fuel due to profitability or other factors, tanker trucks are used to refill the fuel farm tanks. An underground pipe network extends from the fuel farm to the terminal area to provide hydrant fueling for aircraft gates at the passenger terminal. An analysis was conducted to determine the necessary storage facilities for commercial fuel storage. The connectivity to the refinery typically allows for quick refueling of the fuel farm, but for times of low aviation fuel production a five-day storage demand was assumed for fuel to be available if there is a disruption in the supply chain caused by some unusual circumstance, such as a major weather event. Approximately 3.0 million gallons in 2017 would be needed for a five-day storage based on per departure fuel flowage for the average day for July, the busiest month. As shown in Table 3-60, the existing storage levels are enough for the planning period. At PAL 3 activity levels, the existing available storage levels can accommodate approximately eight days of fuel storage. Beyond the planning period, as terminal expansion requires relocation of fuel storage facilities, an alternative location that meets requirements will need to be identified.

3.9.2.2 General Aviation

In the general aviation area, both TAC Air and Atlantic Aviation manage a fuel farm. Combined, a total of 14 fuel tanks provide 307,600 gallons of aviation storage, including 43,600 gallons of 100LL and 264,000 gallons of Jet A. As a result of changes in the fleet mix of aircraft that use the airport, SLC is experiencing an increase in the usage of Jet A fuel by general aviation, while operations by aircraft that use 100LL fuel are steadily decreasing. The percentage of general aviation operations by aircraft that use 100LL fuel are expected to decrease by 11 percent from 2017 amounts by PAL 3.

Table 3-60: Commercial Fuel Storage Capacity

	2017	Planning Activity Level		
		PAL 1	PAL 2	PAL 3
Peak Month average Day (PMAD) Fuel Flowage	605,000	663,000	728,000	809,000
(PMAD) Commercial Departures	377	413	453	503
5 - Day Fuel Need (Gallons)	3,025,000	3,315,000	3,640,000	4,045,000
Available Storage (Gallons)	6,450,000	6,450,000	6,450,000	6,450,000
Total Storage for 4 Day Need: Surplus/(Deficit)	3,425,000	3,135,000	2,810,000	2,405,000

Source:SLCDA, RS&H Analysis, 2019

Table 3-61: General Aviation Fuel Storage Capacity

	2017	Planning Activity Level		
		PAL 1	PAL 2	PAL 3
Peak Month Average Day (PMAD) Operations	136	143	153	175
100LL				
PMAD Operations	40	38	37	33
PMAD Fuel Flowage	758	720	690	630
5 - Day Fuel Need (Gallons)	3,800	3,700	3,500	3,200
Available Storage (Gallons)	43,600	43,600	43,600	43,600
Total Storage for 5 Day Need: Surplus/(Deficit)	39,800	39,900	40,100	40,400
Jet A				
PMAD Operations	96	105	116	142
PMAD Fuel Flowage	25,146	27,550	30,330	37,200
5 - Day Fuel Need (Gallons)	126,000	138,000	152,000	186,000
Available Storage (Gallons)	264,000	264,000	264,000	264,000
Total Storage for 5 Day Need: Surplus/(Deficit)	138,000	126,000	112,000	78,000

Source: RS&H Analysis, 2018

Like commercial fuel storage, a five-day surplus supply of fuel was used for the analysis of fuel storage. The analysis to determine the five-day fuel demand was based on the peak month of fuel flowage, which was determined by examining historical fuel sales. The average day of the peak month was then used to determine the required gallons to satisfy a five-day demand based on the number of operations forecasted for each type of fuel.

As shown in Table 3-61, the existing available storage provides enough supply for five days using the planning factors applied. Based on the analysis, the 43,600 gallon storage capacity of 100LL fuel provides a surplus of approximately 39,800 gallons throughout the forecast period. In practice, the FBOs only have the 100LL fuel tanks partially refueled approximately every two to three weeks as that is all that is needed to meet demand given existing tank capacity. At existing levels the amount of 100LL fuel capacity would sufficiently meet demand for more than eight weeks. Each FBO manages at least one 100LL fuel tank, providing additional fuel storage than the minimum that would be necessary.

While the amount of Jet A fuel needed to meet the five-day demand rises sharply by PAL 3, the available storage is estimated to remain enough through the planning period. Again, as each FBO manages a separate fuel farm there is redundancy in tank storage when compared to requirements.

3.9.2.3 Sustainable Aviation Fuel

As part of sustainability initiatives, an increasing number of airlines are using sustainable aviation fuel (SAF), or biofuel, blended with Jet A fuel to reduce aircraft emissions. Certain certified sustainable aviation fuels, derived from a variety of feedstocks such as crops, are chemically indistinguishable from existing jet fuel and are used in some aircraft flying today without any loss of performance.

The largest issue for SAF remains in economies of scale occurring to increase fuel available for airlines while reducing cost of SAF to similar pricing of existing Jet A fuel. There exists the potential for this to occur, but the fuel must develop further before it will become widely available. Fuel farm alternatives in this master plan study will preserve a location that can accommodate the storage, hydrant system, and blending facility necessary for the use of sustainable aviation fuel on the Airport.

3.9.3 Airline Maintenance

Facility requirements for airline maintenance facilities are determined by the business decisions of each individual airline and are difficult to project long-term. However, to plan for the future of the Delta and SkyWest maintenance facilities at SLC, conservative overviews and assumptions of required space were developed based on inputs from these companies.

The Delta lease area in the North Support area includes an aircraft maintenance hangar, work areas, and office space, totaling approximately 120,000 square feet as well as a Delta reservation center consisting of more than 60,000 square feet. The total footprint of the leased area including the Delta aircraft maintenance hangar, aircraft apron parking, reservation center, and vehicle parking is approximately 1.1 million square feet. In discussions with Delta airline representatives, it was identified that Delta is experiencing a growing demand for aircraft maintenance at SLC. The existing Delta aircraft maintenance hangar can accommodate two or three aircraft, but this space is insufficient to meet the nightly demand for the facility. Additional space is needed in both the short-term and over the long-term. In total, at least a doubling in overall size must be planned for within the planning period.

Delta performs ground support equipment (GSE) maintenance in the South Cargo area located in a section of the Delta Cargo building. In discussion with Delta representatives, it was found that the existing maintenance facility space is enough to service the roughly 1,400 pieces of equipment that are operated today by Delta. While Delta flight operations are expected to increase, only a small number of additional equipment are expected to be added, which will not impact the capacity of the facility. Currently, the GSE fleet is gas powered, but Delta is transitioning to electric GSE with the opening of the new terminal. The transition from gas to electric GSE equipment does not impact the space requirements of the facility. If future site alternatives for this facility are evaluated in this study, location near the terminal envelope and a unified location must be considered.

SkyWest performs airline maintenance in the North Support area as well, leasing approximately 600,000 square feet of space. On their leased area they have an approximately 175,000 square feet hangar which is used for aircraft maintenance, GSE maintenance, and training facilities. SkyWest also uses an additional five aircraft parking spaces in the South Cargo area due to space constraints of their hangar apron. This South Cargo location creates challenges as the aircraft must travel a long distance between the maintenance hangar and overnight parking location. The GSE maintenance area in the hangar is used to maintain equipment for not only SLC, but other smaller airports in the region as well. The limited size of the existing building requires that some equipment must be located outside. The existing and forecasted demand SkyWest experiences necessities expansion of all maintenance facilities. In discussions with SkyWest, it was approximated that facilities could be expanded by 50 percent in size.

For a conservative estimate, space for future facilities for Delta and SkyWest of double their existing footprint will be reserved in the alternatives analysis.

3.9.4 Airport Maintenance

Airport maintenance facilities encompass approximately 1.0 million square feet located in the North Support area of the Airport, including approximately 320,000 square feet of buildings. Through discussions with SLCDA maintenance staff, each building was examined to determine a rough level of additional space needs, useful life remaining, and location requirements. Table 3-62 shows the result of this analysis. Snow Removal Equipment (SRE) Storage, Airfield Maintenance, and Sand, Salt, & Urea Storage are among the buildings which will necessitate the largest growth to accommodate demand.

The existing airport maintenance space does not meet the storage and workspace needs at the Airport. With the increasing size of the new terminal, and likely increase in pavement areas to maintain as aprons, runways and taxiways are expanded necessitating additional staffing, equipment, and materials, increases in the sizing of space and facilities will be needed. To handle the current shortage and expected growth, the maintenance campus is estimated to require an increase of the total campus envelope by 30 percent, which equates to roughly 300,000 square feet.

Many of the existing maintenance facilities were built 30 to 40 years prior and are nearing the end of their useful life. This is exasperated by industry changes, such as environmental changes and the use of SRE equipment that is larger than the equipment for which the building was designed. Additionally, several of the material storage buildings are dealing with the corrosion effects caused by the stored materials. In addition to the building expansions that are required for various maintenance needs, the life expectancy of many of the existing facilities is less than eight years, Alternatives will need to be identified to replace existing facilities before they are no longer usable.

Current space is divided by the 1200 S roadway and separated between several buildings. Consolidation of the maintenance facilities would allow for an increased ease of use as employees often travel between multiple buildings during all weather conditions. Additionally, in consideration of the potential to provide 100% employee screening, the alternatives analysis will examine locations to provide this capability. Of the facilities included in Table 3-62, at least elements of all buildings except #13 – Airfield Electrical Vault, #16 Cold Storage #2, #21 SRE Storage, and #26 Snow Chemical Storage can be moved to a landside facility. In total, at PAL 3, future facilities should provide 298,900 square feet of buildings for the airside functions and 123,650 square feet of buildings for landside functions with associated apron and parking as well as the ability for expandability.

Table 3-62: Airport Maintenance Buildings

Building Number	Square Footage	Additional Square Footage Needed at PAL 3	Space Needed Type	Useful Life Remaining (Years)
1. Airfield Maintenance	39,000	20,000	Work	5 to 8
2. Sand, Salt, & Urea	35,000	17,500	Storage	5
3. Vehicle Storage East	37,000	10,000	Storage	5 to 8
4. Vehicle Maintenance	70,000	15,000	Work	10
5. Maintenance Cold Storage	15,000	3,750	Storage	5 to 8
7. Airfield Paint Storage	6,400	2,000	Storage	20
13. Airfield Electrical Vault	8,800	0	N/A	30
14. Airport Greenhouse	4,600	0	N/A	3 to 5
15. Facility Maintenance #2	30,000	7,500	Work	18 to 20
16. Cold Storage #2	12,000	0	N/A	18 to 20
21. SRE Storage	46,000	23,000	Storage	40 to 45
26. Snow Chemical Storage	16,000	4,000	Storage	15 to 20
Total	**319,800**	**102,750**		

Source: SLCDA, 2019

3.9.5 Airline Glycol Storage and Recovery

During aircraft de-icing operations, SLCDA collects de-icing fluid in order to remove used propylene glycol from runoff and resell the reclaimed fluid. From the four commercial service runway end de-icing pads at SLC, discussed in SECTION 1.11.3, Aircraft Deicing Facilities, deicing fluid is collected and pumped to the Glycol Reclamation Plant for recovery. At this facility, the propylene glycol is separated from the water used as part of the deicing fluid as well as any stormwater that was also collected. Available deicing fluid and glycol storage at the Glycol Reclamation Plant includes three lagoons totaling 10.2 million gallons of storage capacity, a tank farm with a storage capacity of 478,000 gallons, and modular tanks that can store an additional 740,000 gallons. In 2017 SLC recovered and sold a total of 119,227 gallons of glycol, or 21.3 percent of the 559,471 gallons of total glycol used. For the planning period, it is assumed that 20 to 25 percent of glycol used at the Airport will be recovered.

The existing storage capacity at the Airport is expected to remain enough through the planning period despite projected increases in the number of flight operations and associated deicing required to service larger aircraft as a result of fleet mix changes. The maximum storage capacity of the existing lagoons is in excess of 12 million gallons. Processed fluid is removed from the lagoon during the season after completion of the reclamation process. With 3 million gallons of fluid processed in 2017, the lagoons can accommodate approximately four times the existing level with no changes to plant operations. Similarly, the tanks used to store processed glycol are not forecasted to approach capacity levels during the planning period.

Through the installation of diversion valves at the four runway-end de-icing pads, the amount of stormwater processed has sharply declined as rainwater and other ground moisture has not been pumped to the reclamation plant. The installation of similar valve and pump system in the cargo de-icing location can further remove additional stormwater that would otherwise be processed, which would subsequently add capacity for the plant. As cargo ramp facilities are expanded to meet the demand referenced in SECTION 3.8, Air Cargo Capacity and Requirements, considerations should be made to incorporate diversion valves on the cargo de-icing collection system.

3.10 AIRPORT FACILITY REQUIREMENTS SUMMARY

The facility requirements for SLC were prepared based on the projected future aviation activity levels to determine future needs. This chapter identified areas of capacity shortfalls caused by increasing activity levels. A summary of the facility requirements, including the forecasted deficits or surpluses for each major functional component is shown in Table 3-63 at each PAL. Additionally, Figure 3-10 is a graphical representation of the findings expressed in the table. The bars shown for each major component indicate the general level of service experienced by tenants and users throughout the planning horizon. They also give an indication of when capacity-enhancing efforts should be initiated to accommodate demand. Three main colors are shown in the figure. The green-shaded areas indicate that facility space and/or configuration are adequate to meet demand and desired service expectations. Yellow-shaded areas indicate where demand is nearing capacity. Red-shaded areas indicate when a deficit occurs for the respective facility. Note that each facility deficiency is not dependent on the others, and some metrics may be reached sooner than others. For example, if cargo operations grow faster than passenger enplanements, then cargo parking positions may need attention before the capacity deficit in the passenger terminal needs to be addressed.

As noted previously, besides the capacity deficits that each facility might exhibit in each PAL, additional considerations such as the life expectancy of the facilities and the long-range development of Concourse C will require displacement of the existing support facilities. Therefore, alternatives for future facilities must consider not only what is needed to meet current deficits in capacity, but also what is needed to replace what exists today in locations that will work long-term.

The following bullets outline the generalized conclusions of the facility requirements analysis based on demand levels at each specified planning activity level.

PAL 1 - 355,000 Annual Operations | 28 Million Annual Passengers

- Mitigate Hot Spot 1 and 2 to increase safety of the Airport by reconfiguring the associated runways and taxiways. Implement the alternatives analysis preferred solution.
- Begin advanced planning of long-haul runway extension to 14,500 feet to provide additional allowable take-off weight for aircraft and increase reachability of Asian markets such as Seoul, South Korea.
- Begin advanced planning efforts for future airfield configuration enhancements such as Taxiway U and V crossfield taxiways, future parallel taxiways, rapid exit taxiways, and deicing facility upgrades.
- Construct the South End Around Taxiway (SEAT) on Runway 34R in order to reduce runway crossings, potential incursions, and aircraft fuel consumption. In addition, the SEAT will improve airfield efficiency, improve airline gate arrival times, and increase the airfields overall capacity and hourly throughput.
- Begin initial optimization of the airfield configuration to provide enhanced operational efficiencies, increase safety, and eliminate deficiencies with FAA standards.
- Expand dedicated air cargo facilities and apron area to serve immediate growth requirements. Begin enabling projects required for long-term expansion of existing facilities, and for potential future airline entrants.
- Begin to reconfigure the east side general aviation area to provide space to meet the changing demand for general aviation hangars and apron.
- Accommodate need for additional airline maintenance and support space while preparing for long-term development and expansion in a new site outside of the future terminal envelope.
- Accommodate need for additional airport maintenance space while preparing for long-term development and expansion in a new site outside of the future terminal envelope.
- Complete a utility master plan to prepare for growth related to future airfield and landside facilities.
- Begin the advanced planning for public parking and rental car parking expansion to satisfy long-term needs should begin to be programed and implemented.
- Expand employee lot.

PAL 2 - 385,000 Annual Operations | 32 Million Annual Passengers

- Implement long-haul runway extension to 14,500 feet.
- Continue advanced planning efforts and begin to implement airfield configuration enhancements as needed. Decrease airfield deficiencies during pavement rehabilitation and reconfiguration projects.
- Convert two ADG III capable gates on Concourse A to international gates. This will require two additional gates on Concourse B to supplement the total gate count.
- Further expand dedicated cargo facilities and apron area or expect that dedicated cargo operators are now growing into any surplus space built in PAL 1.
- Potentially expand passenger cargo area to accommodate any increased belly cargo tonnage generated from new international markets.
- If no expansion of public parking and rental car parking has materialized, parking expansion will be required in PAL 3.
- Consider long-term needs and advanced planning efforts for the terminal area roadway configuration.
- Begin to implement enabling projects for Concourse C. This includes clearing the terminal envelope of existing facilities such as airline support, airport maintenance, and the fuel farm facility.
- Examine functionality of terminal processors to determine future expansion needs as demand levels near PAL 3.

PAL 3 - 435,000 Annual Operations | 38 Million Annual Passengers

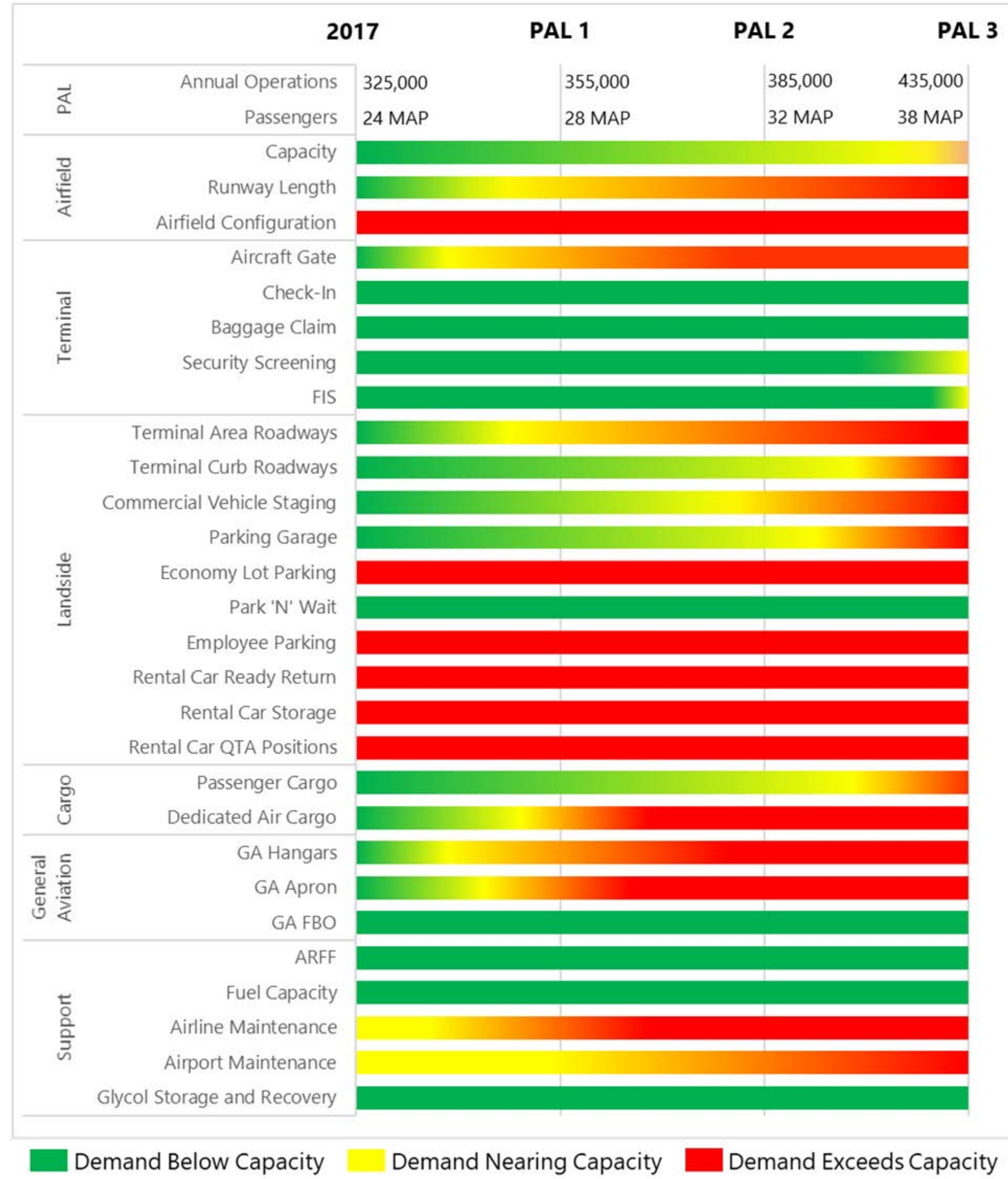
- Implement airfield configuration enhancements that have been vetted through advanced planning efforts as needed. Continue to decrease airfield deficiencies during pavement rehabilitation and reconfiguration projects.
- Convert one ADG III capable gate on Concourse A to an international gate. This will require an additional gate on Concourse B to supplement the total gate count. Additionally, it is expected that another two domestic gates will be needed on Concourse B. Concourse B may be fully built-out by PAL 3.
- Implement enhancements to terminal area roadways that have deteriorated in level of service.
- Increase passenger cargo area to accommodate increased belly cargo tonnage.
- Further expand dedicated cargo facilities and apron area or expect that dedicated cargo operators are now growing into any extra space built in PAL 2.
- Begin advanced planning efforts for Concourse C and/or begin initial design. Complete final enabling projects for Concourse C development.
- Examine functionality of terminal processors to determine future expansion needs.

Table 3-63: Facility Requirements Summary

Area		PAL 1	PAL 2	PAL 3	Surplus/Deficiency			
					Existing	PAL 1	PAL 2	PAL 3
Airfield	Longest Runway Length (ft)	14,500	14,500	14,500	12,002	(2,498)	(2,498)	(2,498)
Terminal	Aircraft Gates	82	84	87	78/93	(4)/11	(6)/9	(9)/6
	Check-In (sq ft)	11,000	12,200	14,400	43,400	32,400	31,200	29,000
	Baggage Claim (sq ft)	35,500	47,200	49,400	71,100	35,600	23,900	21,700
	Security Screening (sq ft)	22,000	25,100	29,700	39,700	17,700	14,600	10,000
	FIS (passengers per hour)	780	790	1,040	1,000	220	210	(40)
Landside	Terminal Area Roadways (LOS)	D	D	E	C	-	-	-
	Terminal Curb Roadways (LOS)	B	B	D	C	+	+	-
	Commercial Vehicle Staging Areas	103	115	141	113	10	(2)	(28)
	Economy Lot	12,629	14,326	16,931	10,463	(2,166)	(3,863)	(6,468)
	Parking Garage	2,851	3,195	3,884	3,600	749	405	(284)
	Park 'n' Wait	112	125	153	162	50	37	9
	Employee Lot	3,508	3,800	4,589	3,200	(558)	(70)	(859)
	Rental Car Ready-Return Spaces	1,438	1,610	1,958	1,122	(316)	(488)	(836)
	Rental Car Storage	2,348	2,828	3,381	2,022	(326)	(806)	(1,359
	Rental Car QTA Positions	84	94	115	62	(22)	(32)	(53)
Air Cargo	Passenger Cargo (acres)	5	6	7	6	1	0	(1)
	Dedicated Air Cargo (acres)	57	68	81	55	(2)	(13)	(26)
General Aviation	GA Hangers (sq ft)	889,000	907,000	969,000	834,000	(55,000)	(73,000)	(135,000)
	GA Apron (sq ft)	2,523,000	2,711,000	3,006,000	2,515,000	(8,000)	(196,000)	(491,000)
	GA FBO Buildings (sq ft)	18,000	19,000	22,000	22,000	4,000	3,000	0
Support	5-Day Commercial Fuel Storage (gal)	3,310,000	3,630,000	4,030,000	6,450,000	3,140,000	2,820,000	2,420,000
	5-Day GA Fuel Storage - 100LL (gal)	3,700	3,500	3,200	43,600	39,900	40,100	40,400
	5-Day GA Fuel Storage - Jet A (gal)	138,000	152,000	186,000	264,000	126,00	112,000	78,000
	Airline Maintenance (acres)			78	39	-	-	(39)
	Airport Maintenance (acres)			30	23	-	-	(7)
	Glycol Storage and Recovery (gal)				11,420,000	+	+	+

Source: RS&H Analysis, 2019
Notes: '+' indicates surplus. '-' indicates deficiency
Aircraft gates requirements are segmented with two numbers. The first number accounts for the initial planned build out of Concourse B. The second number accounts for the full build out of Concourse B.

Figure 3-10: Facility Requirements Summary Chart



Source: RS&H Analysis, 2019

IDENTIFICATION AND EVALUATION OF ALTERNATIVES

IDENTIFICATION AND EVALUATION OF ALTERNATIVES

4.1 INTRODUCTION

This chapter identifies and evaluates facility development alternatives for Salt Lake City International Airport based on the facility requirements determined in Chapter 3, Facility Requirements. The primary purpose behind identifying and evaluating various alternative development options is to ensure airport facilities are capable of meeting projected activity demand levels, are making efficient and effective use of available airport land and are meeting FAA airfield design standards. Every potential alternative in this chapter has been thoroughly analyzed, refined, and vetted through the stakeholder involvement process in order to develop a plan which reflects stakeholder and community values and preferences, and integrates well with the unique operational nature and role of Salt Lake City International Airport.

A hierarchy of priority is required when analyzing airport facilities and developing alternatives. Components of the airport are broken down into leading elements and trailing elements, with leading elements considered first. Leading elements are primary facilities that require significant amounts of land and/or capital investment to implement, and whose placement and configuration must take precedence when formulating alternatives. At Salt Lake City International Airport, these facilities include runways, primary taxiways, passenger terminal facilities, and air cargo facilities. Trailing elements are those whose placement and configuration are influenced by, and dependent on, the decisions made for primary facilities. Trailing elements at the airport include aviation support facilities such as airline maintenance, airport maintenance, and fuel storage. The division between leading and trailing elements allows the initial focus of analysis to be on determining solutions for those high cost, more demanding leading elements. The placement and decisions surrounding the leading elements influence the location and layout of the trailing elements.

4.2 BALANCED AIRPORT ANALYSIS

The SLC terminal program includes a full build out of Concourse A and a partial build out of Concourse B. Current planning for ultimate terminal development includes a Concourse C which would increase the total gate count at SLCIA to approximately 140 gates. To account for long-range land use preservation, a Concourse D was also considered in this master plan. Adding a Concourse D would provide up to 186 gates. An initial survey of large hub airports with gate counts ranging between 100 to 190 indicated that SLC airfield capacity may not be able to support a Concourse D. Analysis was completed to verify a reasonable level of gate buildout that should be planned considering long-term airfield and landside capacity.

When the Airport reaches planning activity level (PAL) 3 with 32 million annual passengers, it is expected that SLC will accommodate roughly 1,300 daily operations and require 87 gates. A full build out of Concourse B will provide the Airport a total of 93 gates, which is expected to be required a few years beyond PAL 3. At PAL 3, gate demand is in balance with runway capacity and the terminal landside components (curbs, roads, and vehicle parking), as illustrated in Figure 4-1.

If Concourse C is required in the future, a half build-out of Concourse C will take the airport to approximately 115 total gates. With that many gates, SLC could be expected to experience 10 minutes of annualized average delay. As noted in the Facility Requirements chapter, the industry accepted threshold of annualized runway delay is 5 minutes. Thus, capacity enhancement will be required before Concourse C is developed to maintain a balanced airport. Additionally, parking, terminal curb, and roadway enhancements will be required to support a partial Concourse C build out, but these are feasible expansions.

Demand levels that would require breaking ground on a partial concourse C are not expected until beyond PAL 3. Considering that factor, some existing facilities within the future Concourse C footprint may not require relocation during their useful life. However, new areas must be preserved through the future for relocation of these facilities when they need replacement. The alternatives development for this study accounted for the need to plan for a fully built future Concourse C beyond PAL 3 and considered the need to eventually relocate and provide expansion opportunities for the fuel farm, airline support/maintenance, Fire Station #12, and airport maintenance facilities.

Additionally, the analysis indicated a Concourse D may not ever be able to be supported by the runway capacity, airspace capacity, and terminal systems at SLC. A fully built Concourse D would bring the total number of gates up to 186, which is roughly the same as Hartsfield-Jackson Atlanta International Airport (ATL) in 2020. While the alternatives development in this master plan accounted for a Concourse D within the planned terminal envelope, the land area required for a future Concourse D is better used as developable land within the planning period. If airspace and runway capacity are increased to the point of supporting construction of a Concourse D, by that time it can be expected that any building placed within the area needed for the concourse would have reached the end of its useful life and need replacement. Considering these factors, this study assumes the land within the Concourse D footprint is available through the planning period for development of other facilities.

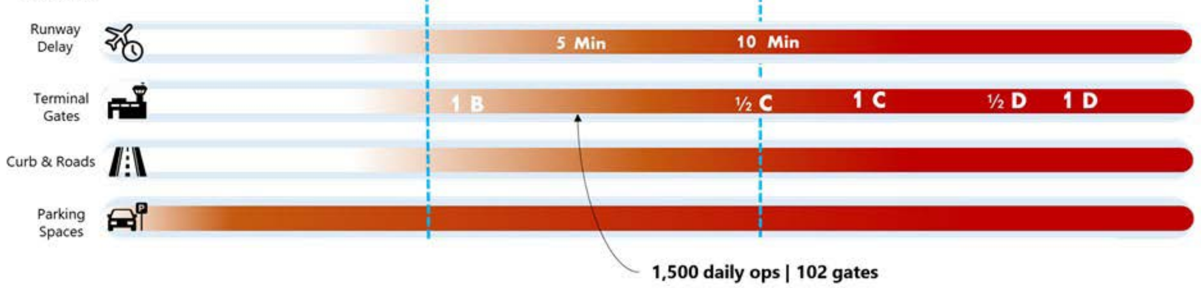
Table 4-1: Balanced Airport Analysis

SLC Master Plan Horizon (2017–2037)

PAL 3: 1,300 daily ops | 87 gates

Half Build Out Concourse C: 1800 daily ops | 115 gates

	2017	2022	2027	2032	2037	2042	2047	2052	2057	2062	2067	2072	2077	2082	2087
Daily Ops	990	1,050	1,150	1,220	1,300	1,400	1,500	1,600	1,720	1,850	2,000	2,130	2,290	2,450	2,630
Annual Ops (in thousands)	325	355	385	410	435	465	500	540	580	620	670	715	770	825	880
Annual Enplanements (in millions)	11.5	14.2	15.7	17.2	18.7	20.5	22.5	24.7	27.1	29.7	32.6	35.8	39.3	43.1	47.3



Source: RS&H Analysis, 2020
Note: Existing vehicle parking areas combined with available land to the south of those parking facilities are estimated to be sufficient for parking demand beyond PAL 3. Though not all Concourse B gates are built today, plans are in place for full build-out as needed. Concourse C will require further planning and development of taxilanes, taxiways, and apron.

4.3 RUNWAY ALTERNATIVES

This section discusses the alternatives generated to address the Airport's need for a long-haul runway extension, enhancements for Runway 17-35, and to resolve Runway 14-32 design issues and adjacent hot spots.

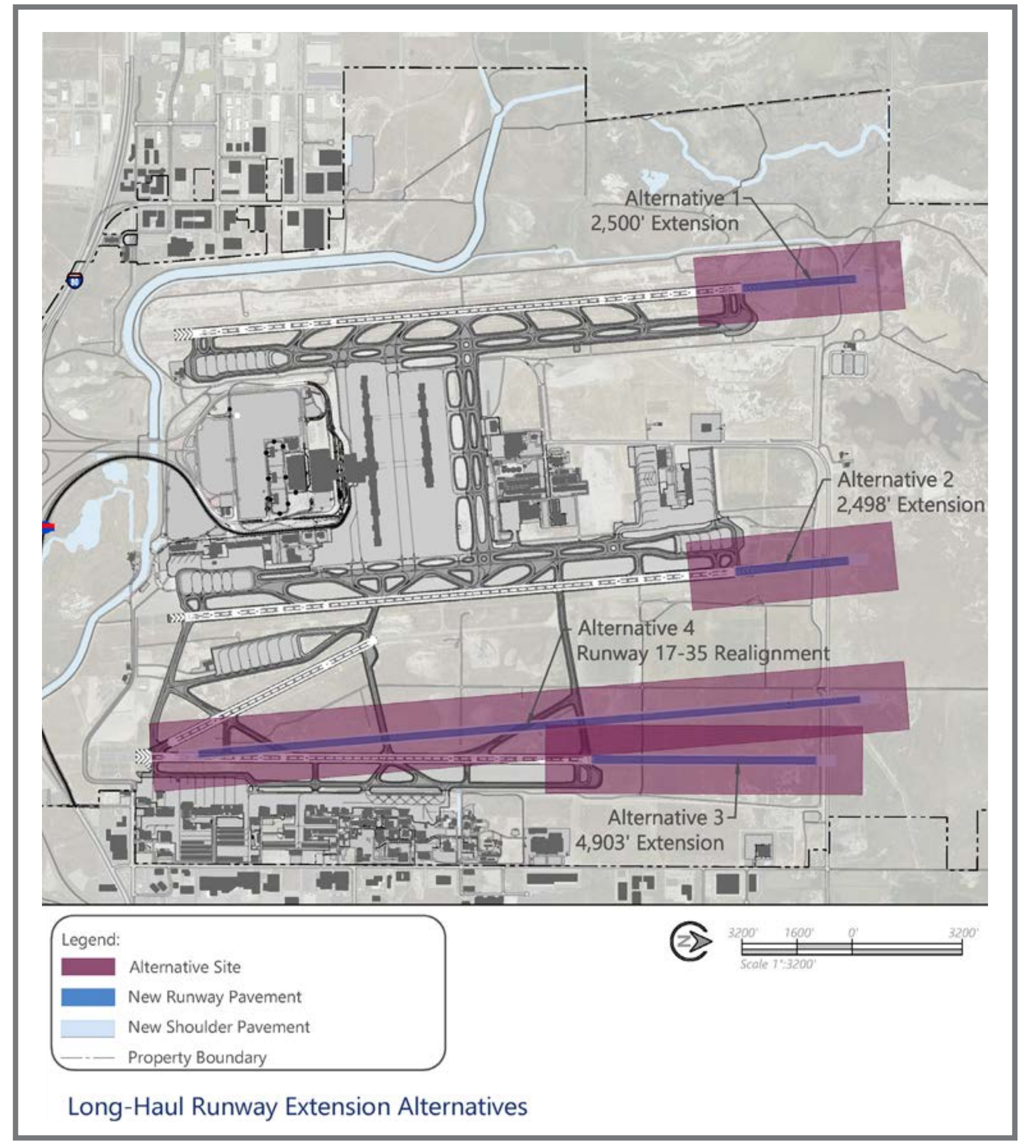
4.3.1 Runway Extension for Long Haul Routes

The Aviation Activity Forecast (Chapter 2) indicates market support for flights to Asia direct from SLC. These flights would entail larger and heavier passenger aircraft which, coupled with the high elevation and maximum mean temperatures at SLC, necessitate additional runway length to meet aircraft performance requirements. The required runway length determination for SLC is based on the future critical aircraft, the Airbus A350, and its departure performance. In general, departure operations require longer runway lengths than arrival operations. The runway length requirement for SLC to accommodate the Airbus A350 on long-haul routes was determined to be 14,500 feet. Today, the primary parallel runways are roughly 12,000 feet in length.

The 1996 Master Plan recommended Runway 16L-34R be extended to the north to a final length of 14,302 feet. The 2006 Airport Layout Plan Update recommended Runway 16L-34R be extended to the north to a final length of 15,100 feet. The difference in runway length requirements determined within the two studies was due to the critical aircraft being planned for, but both studies carried forward Runway 16L-34R as the runway to extend to the north. The primary reason for reexamination of these alternatives within this master plan is to ensure due diligence is taken in examining any option that could be more beneficial, or have fewer implementation impacts, than extending Runway 16L-34R to the north.

This master plan study includes a validation of the previous two studies findings. An examination of possible extension to the other runways, including a realigned Runway 17-35 as an alternative, is illustrated in Figure 4-2.

Figure 4-2: Long-Haul Runway Extension Alternatives



Source: SLCDA; RS&H Analysis, 2020

Alternatives 1, 2, and 3 include extensions to the north of existing runways to a final length of 14,500 feet. Extension to the south is constrained by airspace requirements and Interstate 80, and thus was not explored further. Alternative 4 assumes that Runway 17-35 would be realigned in parallel with the 16-34 runways and built to 14,500 feet. Alternative 4 was included in this evaluation as proof-of-concept to determine whether that runway is the best runway for long-haul aircraft departures should the runway complex be realigned.

One critical consideration for a north runway extension is the high-tension power lines located immediately north of the airport. The lines run east-west and are furthest from the airport north of Runway 17-35 and closest north of Runway 16R-34L. Today, the power lines impact one-engine inoperative (OEI) requirements for airlines under certain circumstances on the 16-34 runways.

Because long-haul and larger aircraft require a longer runway length than is provided by Runway 17-35 and the lines are furthest from this runway, power line related constraints do not impact Runway 17-35 in its current configuration. Of the four alternatives, power line related impacts are greatest for Alternative 1 where the lines are the closest to the runway, and the least for Alternative 3 where the lines are the furthest north from the runway. The previous studies recognized these lines as an implementation hurdle for extending Runway 16L-34R to the north and is one reason this study included evaluation of Alternative 3 and 4. Moving or burying the power lines is a feasible but costly option that was accounted for in the evaluation.

The timeframe for implementation was also considered in the evaluation. As noted, market support for a flight to Asia direct from SLC was found likely to materialize in the near-term. At the time of this writing in 2020, COVID-19 had reduced demand for domestic and international travel, but it is expected that as the industry recovers, market demand will materialize for a direct Asian flight. Alternative 4, which is a complete realignment of Runway 17-35, is not needed to support capacity in the near-term and thus would not be programmed until the tail end of PAL 3. This factor eliminated Alternative 4 from being included as a viable alternative. Further description of the realigned runway evaluation is provided in Section 4.3.3.

The evaluation criteria developed for this analysis are described below along with a summary of associated findings and considerations. Review of the alternatives with SLCDA management and SLC FAA ATCT controllers resulted in Alternative 2 being chosen as the preferred alternative.

Evaluation Criteria and Assessment:

- Climb Gradients/Airspace: How does the option integrate with the airspace and does it work to support minimal climb gradients required by heavy aircraft?
  - Heavy aircraft departures today are conducted on Runway 16L-34R as the departure path is straight out down the valley. This departure avoids the need to climb rapidly to avoid mountainous terrain. Additionally, no turn is needed for heavy aircraft on climb out from 16L-34R. This is a benefit as large heavy aircraft on climb out have less maneuverability than narrow body aircraft in the initial phase of flight.
- High-tension power lines exist north of the airfield and create obstructions. Mitigation of the power lines is needed for all options but less so as the departure path is moved east. Alternative 3 has the least impact on the power lines and Alternative 1 has the greatest impact.
- Runway Usage and Integration: Does the option fit with how ATCT controllers operate the airfield and the airspace?
  - As noted above, heavy aircraft at SLC generally require a straight-out departure. It would be possible to depart a heavy aircraft on the west or east runway (including a realigned east runway), however the departure would need to fly down the valley along the course used for Runway 16L and 34R departures. This would disrupt operations of the center runway, essentially shutting down that runway for departures while the heavy aircraft departs. This is the primary deciding factor to support Alternative 2 as the preferred option.
- Wetlands Impacts: What is the extent of wetlands impact of the option?
  - The estimated wetlands impact of a runway extension and associated parallel taxiway complex extension for each option is:
    - Alternative 1 - 10 acres
    - Alternative 2 - 1 acre
    - Alternative 3 - 13 acres
    - Alternative 4 - 20 acres
- Constructability: The runway extension is assumed to be needed within the near-term. How does the option work to allow near-term implementation?
  - As noted, Alternative 4 is unfeasible for implementation in the near-term. The other three options perform relatively equally based on the feasibility of their construction in the near-term.
- Cost Factors: How does the option perform on a basis of cost compared to the other options?
  - Alternative 4 will be far more expensive than the other options, while the other three options are estimated to be similar in ROM costs.
- Carbon Footprint: Does the option effectively reduce or increase carbon emissions?
  - Alternatives 1 and 2 were found to perform equally, as both Runway 16L-34R and Runway 16R-34L are adjacent to the terminal and do not require an excessively longer taxi to the new threshold than is required currently. Alternatives 3 and 4 require taxi across the center runway and in general, a longer taxi. The increased taxi time for all aircraft needing to depart on the longer runway correlates with greater carbon emissions.
- Safety: How does the option maintain a safe operating environment?
  - Alternatives 3 and 4 require aircraft to cross the center runway whereas Alternative 1 and 2 do not require a runway crossing. Avoiding a runway crossing is preferred. An end around taxiway, considered in this study, could alleviate runway crossing but increases taxi distance and cost.
  - Alternatives 3 and 4 require aircraft to conduct a longer taxi and more turning maneuvers prior to take-off than Alternatives 1 and 2. On taxi-out, an aircraft is fully burdened with fuel and is at its heaviest weight during the operation. Best practices[1] are for heavy aircraft not to exceed 3 miles in taxi distance and to minimize turns in effort to reduce tire heat build-up. Alternatives 3 and 4 both require less than 3 miles of taxi if not taxiing via a new end around taxiway, but both have a greater taxi distance than Alternatives 1 and 2.

Overall, the evaluation of the options validated that Runway 16L-34R should be the runway extended to allow greater flexibility for long-haul routes. That runway is the only runway that can accommodate heavy aircraft departures without impacting departure and arrival operations of the adjacent runways. ATCT controllers validated this assessment.

Table 4-1 visually summarizes the evaluation and conclusions of SLC management and the planning team. Further alternative analysis was conducted to determine how to best mitigate the power line obstructions and determine ROM costs for mitigation. That analysis is provided in Appendix A.

[1] ICAO Aerodrome Design Manual, Part 2 Taxiways, Aprons and Holding Bays. Fourth Edition 2005

Table 4-1: Long-Haul Runway Extension Alternatives Evaluation

Criteria	Alternative 1 Extend Runway 16R-34L	Alternative 2 Extend Runway 16L-34R	Alternative 3 Extend Runway 17-35	Alternative 4 New Realigned Runway
Climb Gradients/Airspace	Fair	Good	Fair	Fair
RWY Usage and Integration	Poor	Good	Poor	Poor
Wetlands Impacts	Fair	Good	Fair	Poor
Constructability	Fair	Fair	Fair	Poor
ROM Costs	Fair	Fair	Fair	Poor
Carbon Footprint	Good	Good	Poor	Poor
Safety	Good	Good	Fair	Fair

Performance Legend: Good, Fair, Poor

4.3.2 Prior Planning for New West Runway and Runway 17-35 Realignment

Since the development of the *1998 Salt Lake City Airport Master Plan*, Runway 17-35 has been analyzed for realignment and a new west runway complex was examined for potential future integration. However, the 1998 Master Plan only brought forward a realigned concept for Runway 17-35 into the Airport Layout Plan, as shown in Figure 4-3. The decision to move forward with a realigned Runway 17-35 was based on the cost/benefit compared to building a new west runway complex.

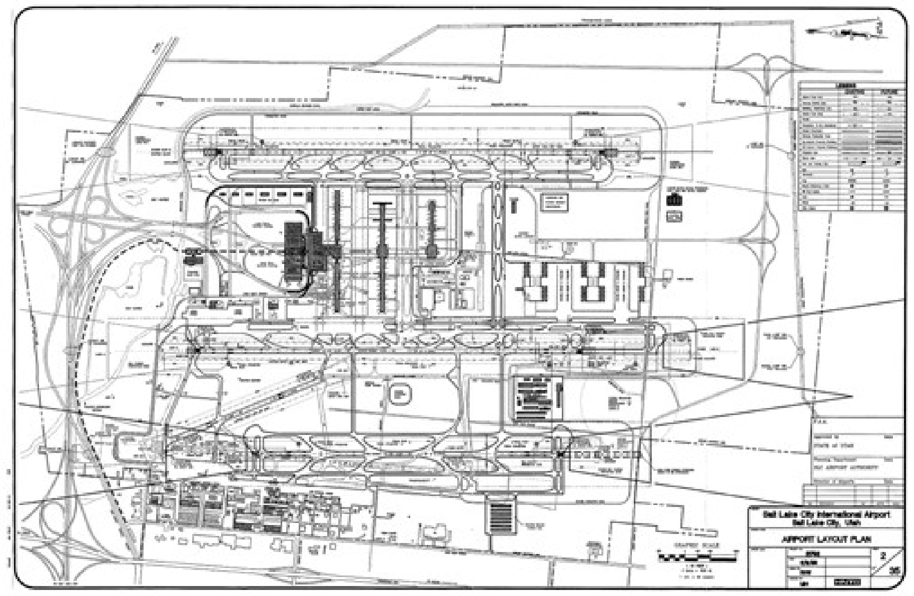
The next planning study at SLC was the *2006 Airport Layout Plan Update*. That study completed further analysis and examination of a realigned Runway 17-35 and a new west runway complex. As shown in Figure 4-4, the concept of a new west runway was further defined, as was the location and length of a realigned Runway 17-35. The narrative report of the 2006 Update recommended that both a new west runway and a realigned Runway 17-35 be preserved for long term development. The report indicated that the realigned runway should be implemented before the new west runway. However, as show in Figure 4-5, the current ALP last updated in 2012, a realigned Runway 17-35 is not shown, but instead a new west runway is depicted.

The planning rationale is not clear as to why the west runway was depicted on the current ALP and the realigned Runway 17-35 was removed. However, it is important to note that both the 1998 Study and the 2006 Update found advantage to a realigned Runway 17-35 and a new west runway. Both studies also recognized the significant facilities work required to implement a new west runway and concluded that work is greater than what would be required for a realigned runway.
The facility requirements found that no additional runway capacity is needed at SLC within the 20-year planning period. Thus, the need for major runway improvements isn't required immediately. However, as the balanced airport analysis indicated, additional capacity is needed prior to expanding into a Concourse C. Planning and programming for that capacity increase could be required within this study's planning period. For this reason, this study built upon the prior two decades of planning and further examined the potential benefit of a realigned runway and a new west runway.

Analysis conducted in this study determined that a realigned Runway 17-35 would provide more benefit to the SLC system than a new west runway. The airspace analysis concluded that overall, a new west runway would not provide independent operations due to the other parallel runways missed approach requirements and the surrounding terrain. The 2006 Study recommendation that a realigned runway should be programed before a new west runway was validated. The following sub-section describes the comprehensive analysis conducted on a Runway 17-35 realignment to further define an ideal separation, and length to be planned for, based on today's airspace technologies.

Although a new west runway was not explored further in this study, it is recommended the concept be carried forward on the updated ALP, like that on the 2012 ALP. A new west runway may provide some benefit over the life of the Airport and depending on technology and airspace redesigns in the future, could be more beneficial than currently identified. The preservation of the west runway concept on the ALP will help ensure future actions make a new west runway more, and not less, feasible as an option in the future.

Figure 4-3: 1998 Master Plan Airport Layout Plan Sheet

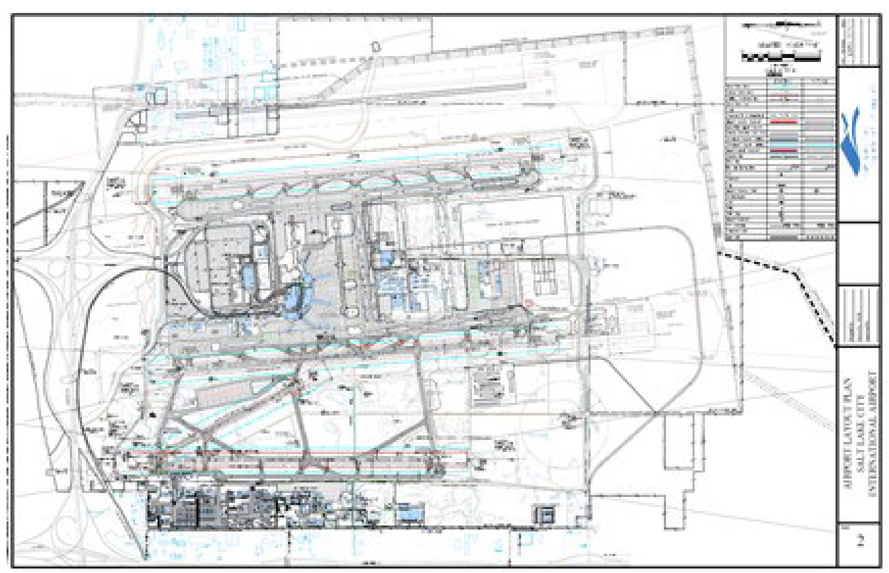


Source: 1998 Salt Lake City Airport Master Plan

Figure 4-4: 2006 Airport Layout Plan Update Four-Runway Concept

Source: 2006 Airport Layout Plan Update, Figure 2-2 Four-Runway Consideration

Figure 4-5: SLC Airport Layout Plan Updated 2012



Source: Existing Airport Layout Plan last updated in 2012

4.3.3 Runway 17-35 Alternatives

As noted above, Runway 17-35 was studied extensively in the 1996 Master Plan and the 2006 Airport Layout Plan Update. The focus of those studies was on the capacity improvements a realigned Runway 17-35 may provide as a third parallel runway. Air traffic separation rules, instrument procedure design criteria, and fleet mix at SLC have changed since those studies were completed, and this master plan study re-analyzed the ideal separation from Runway 16L-34R as well as the capacity and operational benefits that could be realized with that separation.

Parallel runway separation requirements, detailed in Table 4-2, are correlated with different levels of dependency and independency for parallel runway operations under visual (VMC) and instrument meteorological conditions (IMC). The 2006 Airport Layout Plan Update recommended the realigned runway be sited between 2,500 and 4,300 feet from existing Runway 16L-34R. At a minimum of 2,500 feet, simultaneous dependent approach operations between runways in IMC can be provided. As separation between runways increases beyond 3,000 feet, additional ATC and capacity benefits may be realized, but there are substantial impacts to existing ground facilities and additional potential restrictions to the instrument approach procedures needed to fully realize the benefits of a realigned runway.

As part of this master plan, a comprehensive airspace analysis was conducted which included flight procedure redevelopment concepts and a study of the existing airspace. The baseline for separation analysis began with 2,500 feet from Runway

Table 4-2: Runway Separation Requirements

Runway Separation Requirements					
Runway Separation	VMC		IMC		Comment
	Approach	Departure	Approach	Departure	
700'	See Comment	See Comment	Dependent	Dependent	Independent operations for ADG-I through IV aircraft
1,200'	See Comment	See Comment	Dependent	Dependent	Independent operations for ADG-I through IV aircraft
2,500'	Independent	Independent	Dependent	See Comment	Simultaneous radar departures only
3,500'	Independent	Independent	Dependent	Independent	Simultaneous radar and non-radar departures
3,600'	Independent	Independent	See Comment	Independent	PBN instrument dual approach to an offset final approach course (FAC) or a procedure paried with an offset FAC.
3,900'	Independent	Independent	See Comment	Independent	PBN instrument triple approach to an offset final approach course (FAC) or a procedure paired with and offset FAC.
4,300'	Independent	Independent	See Comment	Independent	Dual simultaneous precision instrument approaches
5,000'	Independent	Independent	See Comment	Independent	Triple simultaneous precision instrument approaches for airports below 1,000 feet MSL.
9,000'	Independent	Independent	See Comment	Independent	Triple approaches requires indentification and clearances of No Transgression and Normal Operating Zones. No PRM required.

Source: FAA Order 711065Y Air Traffice Control, FAA Order 8260, 3D United States Standard for Terminal Instrument Procedures (TERPS), FAA AC 150/5300-13A Change 1 Airport Design, 2020
1) Table valutes assume runways have a true parallel alignment.
2) Values and conditions provided are general planning values. Actual operating conditions may vary and upon FAA review and approval
3) When runway thresholds are staggered and the approach is to the near threshold, separation can be reduced by 100 feet for each 500 feet threshold stagger.
4) When runway thresholds are staggered and the approach is to the far threshold, separation must be increased by 100 feet for each 500 feet of threshold staggered.
5) The minimum runway centerline separation distance recommended for ADG-V and VI runways is 1,200 feet. Air Traffic Control (ATC) practices, such as holding aircraft between the runways, frequently justify greater separation distances. Runway with the centerline spacings under 2,500 feet are normally treated as a single runway by ATC when wake turbulence is a factor.
6) Operations less thatn 9,000 feet require a No Transgression Zone (NTZ)
7) PRM approach must be assigned wehn conducting instrument approaches to dual and triple parallel runways centerlines spaced by less than 4,300 feet.

16L-34R, as that separation is the minimum required for independent simultaneous departures, and mixed departure/arrival operations in IMC conditions between the center runway and a realigned Runway 17-35.

The analysis provided a deeper understanding of the potential performance characteristics of a realigned Runway 17-35 using current and emerging Performance Based Navigation (PBN) technologies. In evaluating the potential of a realigned runway with various separations from Runway 16L-34R, a *carte blanche* approach was taken assuming an entirely new set of instrument approach procedures would be developed to support the new runway and, where necessary, missed approach procedures to Runway 34R could be modified to achieve 8260.3D (TERPS) triple simultaneous procedure criteria.

The analysis also examined geospatial considerations, including obstacle and terrain impacts from the perspective of TERPS procedure design criteria, as well as resulting approach procedure minima for all relevant runway separations for various types of applicable instrument procedures. The flight procedure analysis assessed the viability and potential utility of instrument approaches, missed approaches, and departure procedures that must integrate with operations on the other runways in ways that maximize the benefits of—a now parallel—Runway 17-35.

Table 4-3 details at a high level the arrival and departure capability determined with a realigned Runway 17-35 in IMC at various levels of separation. Current technologies influence the capabilities within each level of separation and can sometimes provide performance benefits attributed to higher levels of separation within a lower level. Appendix B details the specific findings of the comprehensive analysis and describes flight procedure and air traffic control considerations for each level of separation.

Table 4-4 details the findings of the approach and departure capabilities at each level of separation. It was found that all separation levels provide ILS CAT I/II/III approaches in north and south flows. This would be an enhancement over the approach capability offered by Runway 17-35 today, providing the Airport greater all-weather capability and redundancy.

Table 4-3: Departure and Arrival Capabilities for Realigned Runway

Runway Separation	North Flow		South Flow	
	Arrival	Departure	Arrival	Departure
2,500 Feet to < 3,600 Feet	ILS CAT I/II/III APP CAT A-E and all PBN options 2.5-3.0 Degree offset appraoches possible Triple Simultaneous Approach	Standard departure	ILS CAT I/II/III APP CAT A-E and all PBN options 2.5-3.0 Degree offset appraoches possible Dual Simultaneous Approach	Standard departure
3,600 Feet to <3,900 Feet	ILS CAT I/II/III APP CAT A-E and all PBN options 2.5-3.0 Degree offset appraoches possible Triple Simultaneous Approach	Standard departure	ILS CAT I/II/III APP CAT A-E and all PBN options 2.5-3.0 Degree offset appraoches possible Dual Simultaneous Approach	Standard departure
3,900 Feet to <4,300 Feet	ILS CAT I/II/III APP CAT A-E and all PBN options Triple Simultaneous Approach	Standard departure	ILS CAT I/II/III APP CAT A-E and all PBN options Dual Simultaneous Approach	Standard departure
4,300 Feet to <5,000 Feet	ILS CAT I/II/III APP CAT A-E and all PBN options Triple Simultaneous Approach	Increased climb gradient requirement	ILS CAT I/II/III APP CAT A-E and all PBN options Dual Simultaneous Approach	Increased climb gradient requirement
5,000 Feet *Plus*	ILS CAT I/II/III APP CAT A-E and all PBN options Triple Simultaneous Approach	Increased climb gradient requirement	ILS CAT I/II/III APP CAT A-E and all PBN options Dual Simultaneous Approach	Increased climb gradient requirement

Source: LEAN Corp, 2020. Prepared by RS&H, 2020
Notes: CSPO refers to closely spaced runway operations detailed in FAA Order 7110.308. PRM is precision runway monitor. EoR refers to an Established on RNP approach.

Table 4-4: Procedure Capabilities for Realigned Runway 17-35

Runway Separation	North Flow		South Flow	
	Arrival	Departure	Arrival	Departure
2,500 Feet to < 3,600 Feet	ILS CAT I/II/III APP CAT A-E and all PBN options 2.5-3.0 Degree offset appraoches possible Triple Simultaneous Approach	Standard departure	ILS CAT I/II/III APP CAT A-E and all PBN options 2.5-3.0 Degree offset appraoches possible Dual Simultaneous Approach	Standard departure
3,600 Feet to <3,900 Feet	ILS CAT I/II/III APP CAT A-E and all PBN options 2.5-3.0 Degree offset appraoches possible Triple Simultaneous Approach	Standard departure	ILS CAT I/II/III APP CAT A-E and all PBN options 2.5-3.0 Degree offset appraoches possible Dual Simultaneous Approach	Standard departure
3,900 Feet to <4,300 Feet	ILS CAT I/II/III APP CAT A-E and all PBN options Triple Simultaneous Approach	Standard departure	ILS CAT I/II/III APP CAT A-E and all PBN options Dual Simultaneous Approach	Standard departure
4,300 Feet to <5,000 Feet	ILS CAT I/II/III APP CAT A-E and all PBN options Triple Simultaneous Approach	Increased climb gradient requirement	ILS CAT I/II/III APP CAT A-E and all PBN options Dual Simultaneous Approach	Increased climb gradient requirement
5,000 Feet *Plus*	ILS CAT I/II/III APP CAT A-E and all PBN options Triple Simultaneous Approach	Increased climb gradient requirement	ILS CAT I/II/III APP CAT A-E and all PBN options Dual Simultaneous Approach	Increased climb gradient requirement

Source: LEAN Corp, 2020. Prepared by RS&H, 2020

The results of the analysis found the recommended level of separation to site the runway to be between 3,000 and 3,600 feet. Separation below 3,000 feet introduces ATC challenges and dependencies that do not exist today and would substantially reduce the achievable capacity benefits. Overall, 3,000 feet separation was found to provide the best balance between benefit and impact to east side facilities.

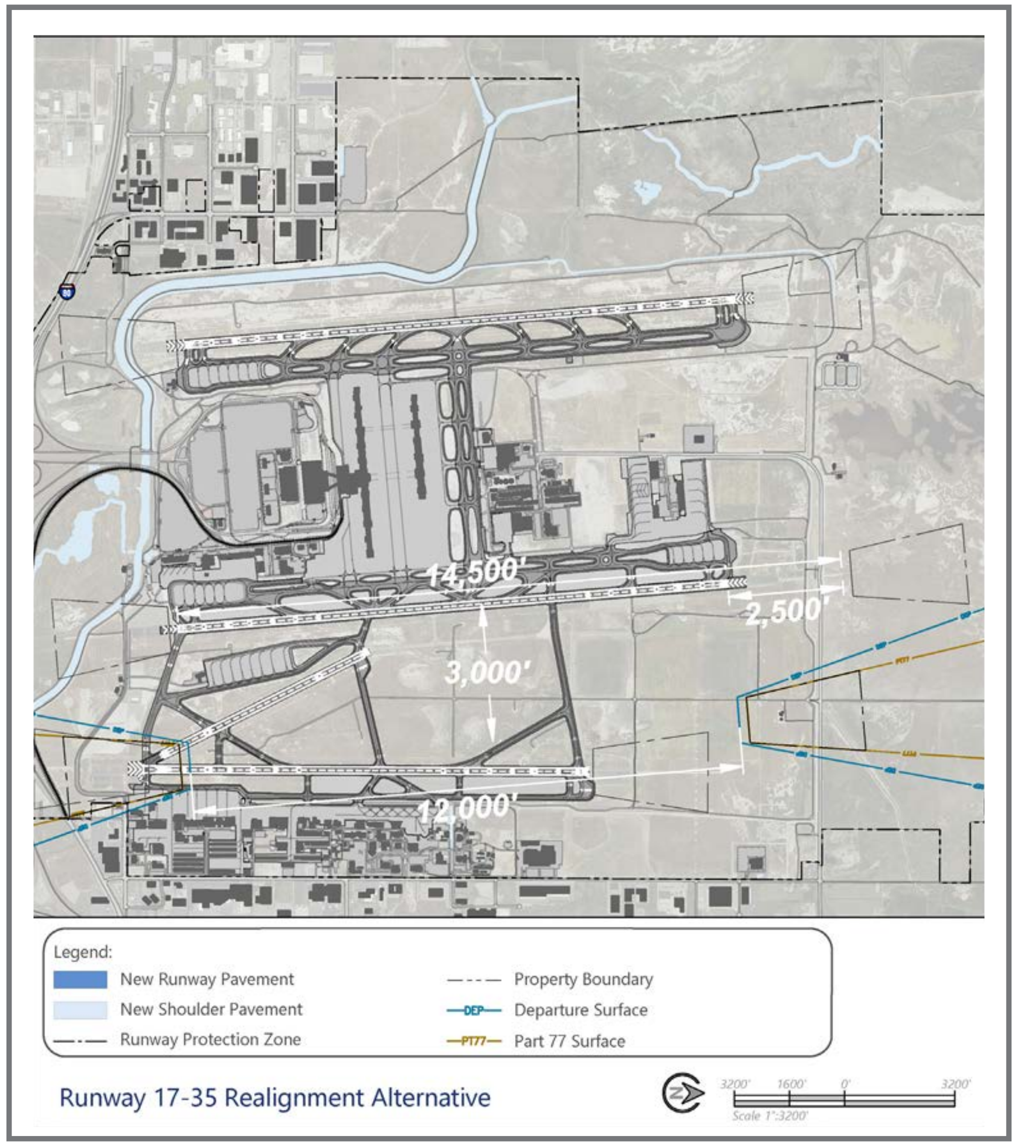
The next higher category of separation, 3,600 to 3,900 feet, may allow for Established on RNP (EoR) approaches. However, this is a marginal advantage when compared to the substantial impacts to east side facilities at that level of separation. Additionally, this category of separation only provides additional benefit during north flow operations. South flow operations cannot be further improved due to the configuration of the mountains flanking the Salt Lake Valley. Considering that SLC is nearly evenly split between time in north flow and south flow, the potential benefit of gaining an EoR approach is diminished by the fact that it can only be applied for use in north flow.

The 4,300 to 5,000 feet separation window was found to present substantial challenges with obstacle avoidance and procedure design. The analysis indicated that flight procedures may be designed to standard at this separation, but the complexity and extremity of the procedures would not be recommended for implementation. Thus, the 4,300 to 5,000 feet separation window and beyond are considered unfeasible at SLC.

A 3,000-foot separation provides the minimum 9,000 feet separation between the realigned runway and Runway 16R-34L, which prevents the need for additional monitor controllers for simultaneous operations between the west (16R-34L) and east runways (realigned 17-35)[2]. A preferred concept, illustrated in Figure 4-6, was developed assuming the center runway was extended to 14,500 feet in length, and a realigned runway designed to 12,000 feet in length. That concept assumed the southern thresholds would be aligned to minimize impacts to the east facilities. With the 2,500 feet of runway stagger presented in this concept, a separation of 3,000 feet is required.

[2] Runways separated by at least 9,000 feet prevent the need from having precision radar monitoring (PRM) for simultaneous operations. At SLC this equates to a minimum of 2,845 feet of separation between the center runway and a realigned Runway 17-35. Separation of parallel runways must also account for differences in runway threshold alignments. Thresholds that are not aligned are considered staggered. For every 500 feet of threshold stagger, runways must be further separated by 100 feet. The realigned runway was studied at a length of 12,000 feet. That length was determined suitable to accommodate the commercial fleet mix at SLC. Considering Runway 16L-34R is recommended for extension to 14,500 feet, a total of 2,500 feet of stagger would exist between Runway 16L-34R and the realigned Runway 17-35 if either the north or south thresholds are aligned. Thus, 3,000 feet of separation would be required to account for the 2,500 feet of stagger.

Figure 4-6: Runway 17-35 Realignment Preferred Alternative



Source: SLCDA; RS&H Analysis, 2020

4.3.4 Runway 14-32 and Adjacent Hot Spot Alternatives

As discussed in Chapter 3 Facility Requirements, FAA hot spots HS1 and HS2 locations have had runway incursions in number and frequency to also be listed on the FAA Runway Incursion Mitigation (RIM) list. As a RIM location, these hot spots require changes in airfield geometry to enhance safety and mitigate chances of runway incursions.

The FAA has categorized airfield geometry that has been found to increase chances of runway incursions (RI) as geocodes. The geocodes applicable to HS1 and HS2 are detailed below in Table 4-5. Alternatives have been developed that work to eliminate the geocodes associated with the existing airfield geometry. Additionally, other airfield geometry changes are introduced that would be required in implementation of the alternatives to conform to FAA design standards. This includes Runway 14-32 and its dedicated entrance taxiways being designed to ADG II standards, which supports the critical aircraft designated for that runway.

An analysis of historical runway incursions at HS1 and HS2 between 2013 and 2019 was completed to gain a deeper understanding of which geocodes specifically were creating issues. At HS1, it was found that the typical RI's included deviations by pilots of small general aviation aircraft crossing the hold-short line at Taxiway K1 without clearance or departing from the incorrect runway. The Airport has implemented enhanced signage, lighting, and painted markings at Taxiway K1; however, it is likely that pilots may find the intersection confusing due to the need to denote two runways at one intersection.

An analysis of historical runway incursions at HS1 and HS2 between 2013 and 2019 was completed to gain a deeper understanding of which geocodes specifically were creating issues. At HS1, it was found that the typical RI's included deviations by pilots of small general aviation aircraft crossing the hold-short line at Taxiway K1 without clearance or departing from the incorrect runway. The Airport has implemented enhanced signage, lighting, and painted markings at Taxiway K1; however, it is likely that pilots may find the intersection confusing due to the need to denote two runways at one intersection.
The analysis of historical RI's at HS2 indicates most were related to aircraft crossing Runway 16L-34R from Taxiway H5, proceeding on Taxiway Q, then missing their directed right turn onto Taxiway L and subsequently crossing the hold-short marking for Runway 14-32. Geocodes found to significantly influence runway incursions at HS2 include Geocode 3 and 7. The distance required to cross Runway 16L-34R from Taxiway H5 to Taxiway Q is longer than typical perpendicular runway crossings which allows, and sometimes requires, pilots to increase taxi speed. The increase in speed and distance is compounded by the short distance between hold-short markings on Taxiway Q and the wide expanse of pavement at the junction of Taxiway L and entrance to Runway 14-32.

Table 4-5: Runway 14-32 Applicable Geocodes

HS1 Geocodes	Description
Geocode 2	Wrong runway events
Geocode 6	Two runway thresholds in proximity
Geocode 7	Short taxiway (stubs) between runways
Geocode 8	Direct taxiing access to runways from ramp areas
Geocode 12	Taxiway connection to V-shaped runways
Geocode 14	Short taxi distance from ramp/apron area to runway
Geocode 16	Taxiway coinciding with the intersection of two runways
HS2 Geocodes	**Description**
Geocode 3	Wide expanses of taxi pavement entering runway
Geocode 4	Convergence of numerous taxiways entering a runway
Geocode 7	Short taxiway (stubs) between runways
Geocode 13	Taxiway intersect at other than a right angle

Source: FAA Runway Incursion Mitigation Program, RS&H Analysis, 2020

Alternative 1 – Bring Geometry Up to Standards

This alternative is based on maintaining Runway 14-32 at its current length and reconfiguring the runway end entrance taxiways to an alignment that meets FAA standards and eliminates the associated geocodes. The HS2 hot spot, at the location of Taxiway Q and the Runway 14 threshold, is mitigated with a reconfigured Taxiway Q. The configuration eliminates the straight-in alignment of the current crossing with Runway 14-32 and requires a multitude of 90 degree turns to access Runway 14-32.

Most of the HS1 hotspot geocodes are mitigated as the existing Taxiway J, which is aligned with Runway 34, is removed and runway access is provided with a future Taxiway J built to FAA standards. This eliminates the potential for aircraft to line up and depart from the wrong runway. Geocodes related to the position of Taxiway K1 and the apron remain. These include Geocodes 8 and 14, which are direct access and short taxi distance from the apron to runway, respectively. Options exist to mitigate geocodes at Taxiway K1 but will require a large reduction in apron space. However, it is expected that the removal of signage at the intersection related to Runway 14-32 will reduce clutter and pilot confusion.

This option also includes geometry changes to Taxiways P and N to correct for the wide expanse of pavement created by the taxiways converging on the runway, and the runway crossing at other than a 90-degree angle.

The estimated construction cost for this alternative is $18,100,000. Soft costs, including mobilization, environmental documentation, design, and project administration are estimated to be approximately $4,700,000 for a total project ROM cost of $22,800,000. This does not include escalation or contingency costs.

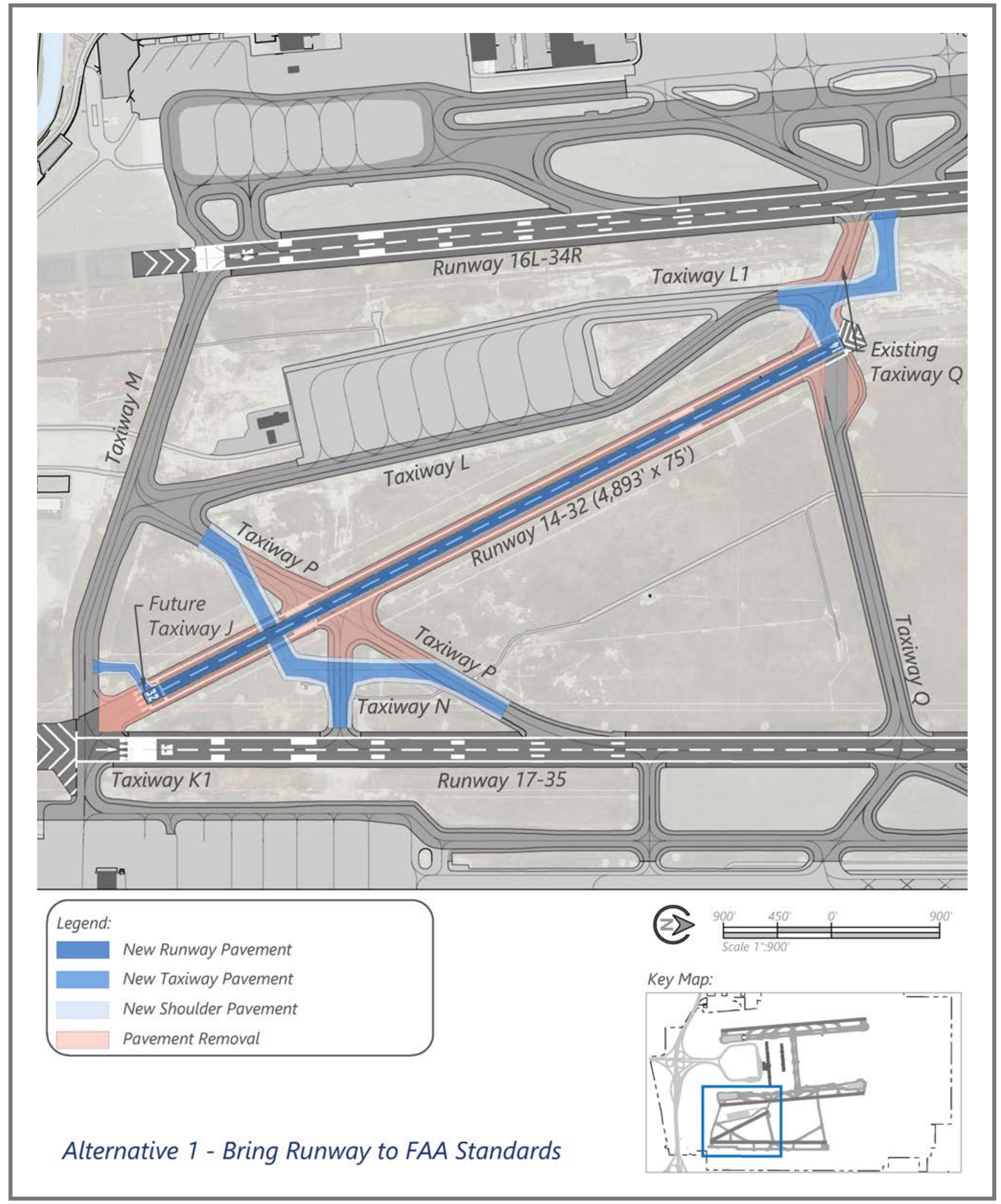
Advantages of this alternative include:

- Runway 14-32 remains at its current length of 4,893 feet.
- HS2 hotspot geocodes are fully mitigated.
- HS1 hotspot geocodes are mitigated to the fullest extent possible without impacting the aircraft apron area adjacent to Taxiway K1.

Disadvantages of this alternative include:

- Taxi flows of commercial passenger aircraft landing Runway 17-35 are slowed due to the geometry changes required for Taxiways P and N, thereby increasing taxi times.
- A non-standard holding position marking on Runway 14-32 must remain due to the runway's proximity to Runway 17-35.
- The option requires significant investment.

Figure 4-7: Runway 14-32 Alternative One



Source: SLCDA; RS&H Analysis, 2020

Alternative 2 – Shorten Runway 14-32

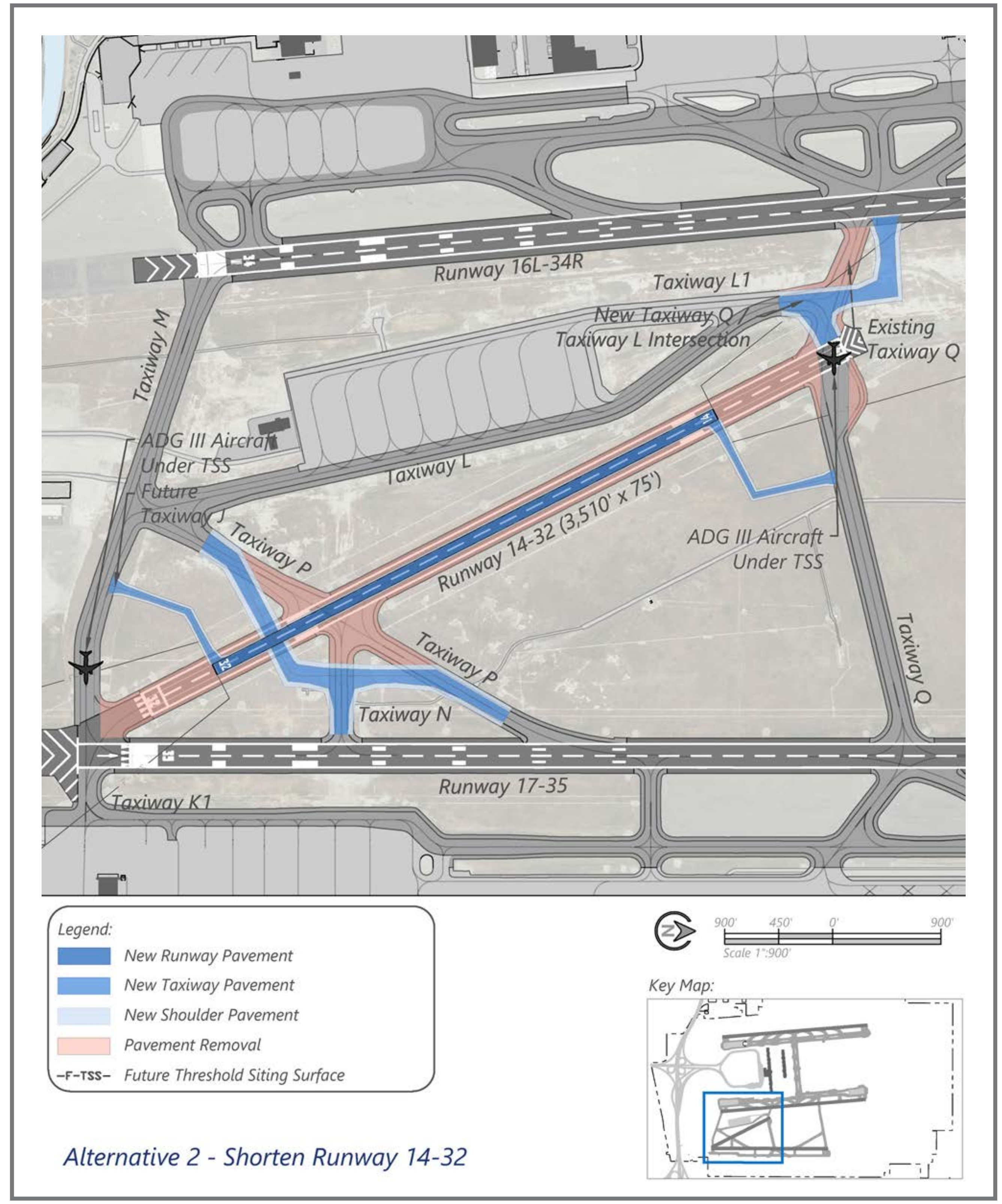
This alternative proposes that Runway 14-32 be shortened to 3,510 feet, which is sufficient to support that runway's critical aircraft. Taxiway Q is designed similar to that in Alternative 1, albeit, in this alternative a separate taxiway entrance off Taxiway Q will access the Runway 14 threshold. The reduction in runway length allows for ADG III aircraft to taxi on Taxiway M and Taxiway Q independently of Runway 14-32 operations. Additionally, the Runway 32 threshold is further separated from Runway 35, which provides enhanced safety and simplicity as any taxiing aircraft or snow removal equipment on Runway 14-32 will not interfere with Runway 17-35 operations. Like Alternative 1, Geocodes 7 and 16 remain for HS1 due to the configuration of Runway 17-35, Taxiway K1, and the aircraft parking apron.

The estimated construction cost for this alternative is $19,300,000. Soft costs, including mobilization, environmental documentation, design, and project administration is estimated to be approximately $5,000,000 for a total project ROM cost of $24,300,000. This does not include escalation or contingency costs.

Advantages of this alternative include:
- HS2 hotspot geocodes are fully mitigated.
- HS1 hotspot geocodes are mitigated to the fullest extent possible without impacting the aircraft apron area adjacent to Taxiway K1.
- Runway 14-32 operations are fully independent and are not affected by aircraft taxiing on Taxiway Q and M.
- A non-standard hold marking on Runway 14-32 is not needed because there is enough separation from Runway 17-35 that aircraft on the pavement of Runway 14-32 will not interfere with Runway 17-35 operations.

Disadvantages of this alternative include:
- Taxi flows of commercial passenger aircraft landing Runway 17-35 are slowed due to the taxiway geometry changes, thereby increasing taxi times.
- The option requires significant investment.

Figure 4-8: Runway 14-32 Alternative Two



Source: SLCDA; RS&H Analysis, 2020

Alternative 3 – Close Runway 14-32

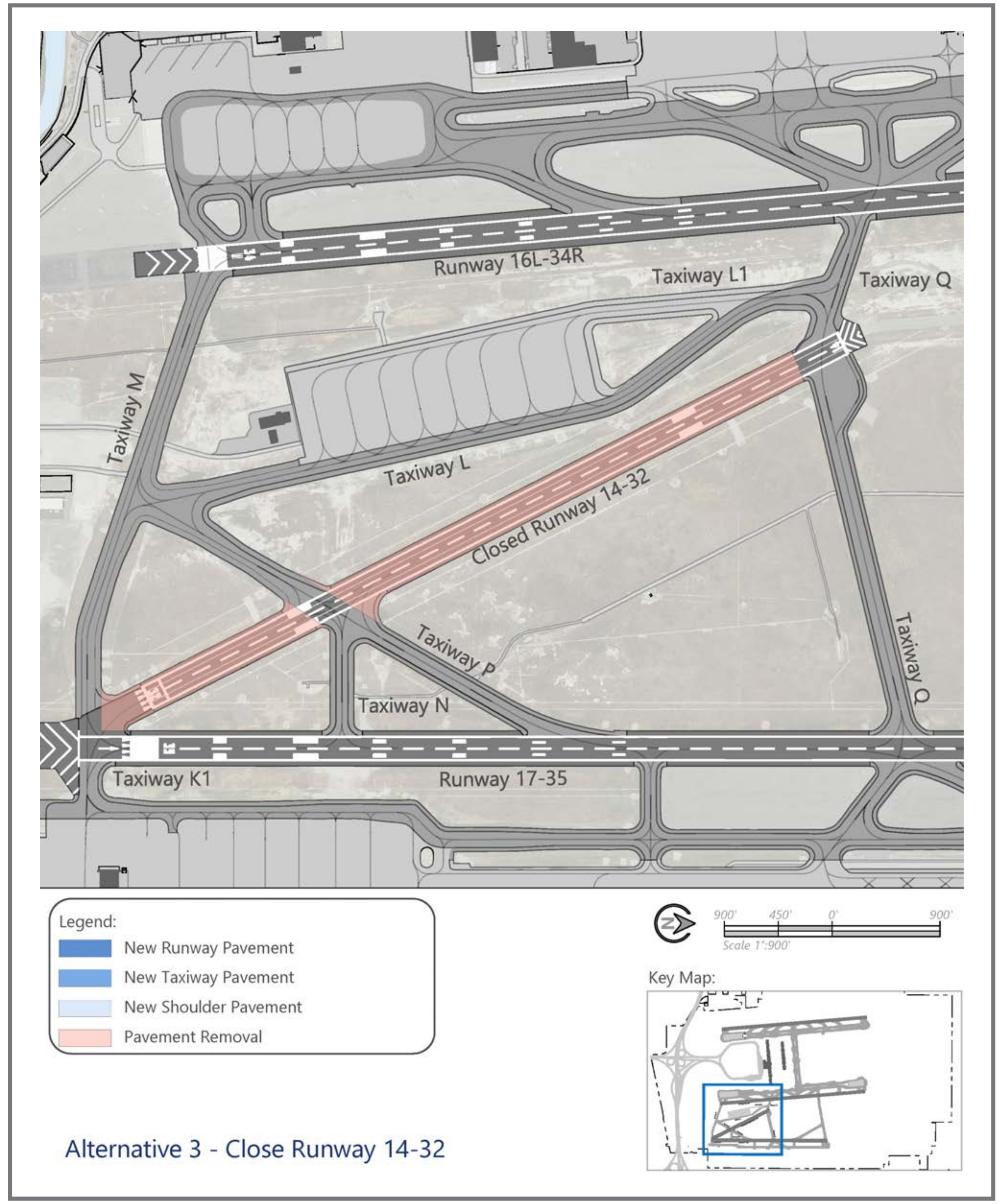
This alternative includes the closure of Runway 14-32 and removal of the runway from the SLC system. Portions of the runway would be converted to taxiway to keep Taxiway Q and Taxiway P functional. Geocodes 7 and 16 remain at HS1 due to the configuration of Runway 17-35, Taxiway K1 and the aircraft parking apron.

The estimated construction cost for this alternative is $2,200,000. Soft costs, including mobilization, environmental documentation, design, and project administration is estimated to be approximately $500,000 for a total project ROM cost of $2,700,000. This does not include escalation or contingency. It is possible the project cost could be reduced if the project is value engineered to a minimum effort that sufficiently meets FAA standards and provides a high level of safety.

Advantages of this alternative include:
- HS2 hotspot geocodes are fully mitigated.
- HS1 hotspot geocodes are mitigated to the fullest extent possible without impacting the aircraft apron area adjacent to Taxiway K1.
- Removal of Runway 14-32 allows expedited taxi of commercial passenger aircraft landing Runway 17 and transitioning to the terminal area.
- Minimal capital investment required.

Disadvantages of this alternative include:
- Runway 14-32 is primarily used by ATCT controllers to land small cargo feeder aircraft during the evening peak hours. The runway would not be available for that purpose and those aircraft would need to sequence into arrival streams for the primary runways.

Figure 4-9: Runway 14-32 Alternative Three



Source: SLCDA; RS&H Analysis, 2020

4.3.4.1 Runway 14-32 Hot Spot Alternatives Evaluation

The alternatives developed all work to remove the geocodes related to the configuration of Runway 14-32 at HS1 and HS2. Geocode 8 and Geocode 14 remain in place in these alternatives due to the configuration of Runway 17-35, Taxiway K1, and the proximity of the aircraft parking apron. The master plan team and Airport management anticipate that with implementation of any of the alternatives, the Taxiway K1 intersection will become less confusing as signage and markings will be focused on alerting pilots of only one runway, as opposed to two. This is expected to help reduce the number, and likelihood, of future incursions. Options exist to mitigate geocodes at Taxiway K1 but they require a large reduction in apron space. Thus, a "wait and see" approach is recommended after implementation of the preferred option. If incursions continue, a more refined approach can be developed based on data gathered after the elimination of the other geocodes.

Evaluation of the alternatives required consideration of how Runway 14-32 is used within the SLC system of runways. Historical data indicated that in 2018, there were 3,350 annual operations on Runway 14-32 conducted almost exclusively by small cargo feeder aircraft landing in the evening. In north flow during VMC conditions, ATCT controllers explained they use Runway 32 to land small cargo aircraft, allowing them to separate the slow aircraft out from the arrival flows of the primary runways. This was found to be the main benefit of Runway 14-32 within the SLC runway system.

Examination of cargo schedules for December 2017 and February 2018, in conjunction with the 2018 commercial airline schedules, indicated that during the evening commercial passenger aircraft arrival peak, which occurs between 1900 and 2000, four small cargo aircraft arrive at SLC. The primary role of SLC is to serve commercial cargo and passenger airlines and large corporate jet activity. Runway 14-32 supports this role by enabling ATCT controllers to separate small, slow, commercial cargo feeders from arrival streams of commercial passenger jet traffic during evening peak arrival flows. However, changes required to Taxiway P for compliance with FAA standards, as shown in Alternatives 1 and 2, will increase taxi times for the thousands[3] of commercial passenger aircraft that land each year on Runway 17 and use Taxiway P to transition to the terminal area.

The taxi time increase of Alternatives 1 and 2 is quantifiable, but the impacts associated with integrating slow cargo aircraft into the primary north flow arrival streams, associated with Alternative 3, is difficult to quantify due to the dynamic nature of the airspace. Therefore, a comparison of delay or fuel burn was not completed within this analysis. Instead, known factors were accounted for including: surplus capacity is available through the planning period; and slow cargo aircraft are effectively being integrated into the primary arrival streams during south flow and IMC conditions. These factors indicate that Runway 32 is not essential within the SLC runway system, but it is very convenient and provides a tool for ATCT to enhance efficiency.

The evaluation criteria developed for this analysis are described below along with a summary of how each alternative performed. Review of the alternatives with SLC management resulted in Alternative 3 being chosen as the preferred alternative. The rationale for Alternative 3 being carried forward is predominantly related to cost versus overall benefit. Runway 14-32 is not needed at SLC to provide wind coverage and does not have an operational level to be supported by FAA AIP funding as a secondary runway. Yet, the runway deficiencies noted in this evaluation must be corrected in the near term. Because the runway is not AIP eligible, it is unlikely that FAA will fund the improvements Alternatives 1 and 2 propose to correct the deficiencies. This means SLCDA would need to fund 100 percent of the project components in either Alternative 1 or 2 to keep the runway.

While it is desirable to keep Runway 14-32 to provide ATCT an effective tool for filtering slow cargo aircraft in north flow VMC conditions, SLC staff determined it was impractical from a cost/benefit perspective. The large capital investment required to implement Alternatives 1 or 2 can instead be leveraged toward FAA AIP eligible projects where that money can allow for larger projects.

Table 4-6 visually summarizes the evaluation and conclusions of SLC management and the planning team.

Evaluation Criteria and Assessment:

- FAA Design Standards: Does the alternative correct all related deficiencies and conform to FAA Design standards?
  - All three alternatives perform equally.
- General Safety Considerations: Does the alternative have any remaining safety concerns?
  - Alternative 1 maintains the non-standard hold position bar on Runway 14-32 due to the proximity of Runway 17-35.
- Airfield/Airspace Efficiencies: How well does the alternative work to enhance operational efficiency measured by taxi time and delay?
  - Alternatives 1 and 2 create additional taxi time for commercial passenger aircraft landing on Runway 17 as design standards require additional turns to taxi across and around Runway 14-32. However, they aid airspace efficiency during VMC north flow operations by allowing the separation of slow cargo aircraft from the primary arrival flows.
  - Alternative 3 maintains efficient taxi procedures on Taxiway P but prevents separation of slow cargo aircraft during VMC north flow operations.
- Long Term Development/Vision: How well does the alternative integrate with long-term development and the ultimate vision of SLC?
  - Keeping Runway 14-32 in place reduces the efficiency of moving commercial aircraft to and from Runway 17-35 and the terminal area. An end around taxiway (discussed later in this chapter) is proposed in this master plan around the Runway 34R threshold. Efficiencies of that enhancement cannot be fully realized with Alternatives 1 or 2.
- Cost/Return on Investment: How do rough order magnitude costs compare between alternatives, and is the return on the investment equal to, or greater than, the investment itself?
  - Alternatives 1 and 2 are significantly more expensive than Alternative 3. The investment required for Alternatives 1 or 2 was deemed to be better spent on other airfield enhancements that could further reduce taxi times and delay.

Table 4-6: Runway 14-32 Hot Spot Evaluation

Criteria	Alternative 1 Bring to FAA Standards	Alternative 2 Shorten Runway	Alternative 3 Close Runway
FAA Design Standards	Good	Good	Good
General Safety Considerations	Fair	Good	Good
Airfield/Airspace Efficiencies	Fair	Fair	Fair
Long Term Development/Vision	Poor	Poor	Good
Cost & Return on Investment	Poor	Poor	Good

Performance Legend: Good · Fair · Poor

4.3.5 South End Around Taxiway

At the onset of the master plan, during initial visioning sessions, interest in studying the potential for end around taxiways (EATs) around Runway 16L-34R was expressed by Airport staff and stakeholders. An end around taxiway allows aircraft to taxi around a runway end without interfering with operations on the runway. Airports construct end around taxiways to improve aircraft operational flows on the ground. Airports in the United States that currently have end around taxiways include Dallas Fort Worth International Airport (DFW), Detroit Metropolitan Airport (DTW), and Atlanta International Airport (ATL).

End around taxiways are implemented to reduce runway crossings and the risk of an incursion, reduce air traffic controller workload, provide for more timely and predictable gate arrivals, reduce fuel consumption and emissions, and to increase runway capacity and hourly throughput. EATs can be effective in reducing delay due to their capabilities in enabling free-flow taxiing that does not require an aircraft to slow down or stop and wait to cross a runway.

An EAT was evaluated in this master plan study for application to both the north and south ends of Runway 16L-34R. The primary purpose of the EATs in this configuration would be to allow commercial passenger aircraft landing or departing on Runway 17-35 to taxi without restriction to and from the terminal area. Additionally, a south EAT would provide access to the L Deice Pad without requiring runway crossings. Initial analysis of EAT placement and function indicated that an EAT placed on the north end of Runway 16L-34R would not be justified when considering the future extension of the runway to 14,500 feet. At that length, aircraft landing Runway 35 or departing Runway 17 would require roughly the same amount of taxi distance to the terminal using a north EAT as they would using a south EAT. For that reason, a north EAT was eliminated from further consideration.

A south EAT was brought forward in the study for further analysis. Additionally, the option of shifting Runway 16L-34R to north to allow similar traffic flow benefits as provided by a south EAT was explored. However, it was determined that option would be highly impractical, if not infeasible, as it creates numerous issues. To provide independent taxi and runway operations, the runway complex would need to be shifted more than 2,500 feet to the north. This would create airspace conflicts with the south deice pads and adjacent buildings, dramatically increase cumulative taxi time to the Runway 16L threshold for departures and require changes to the airspace procedures at the airport which may not be feasible. Additionally, the shift of the runway north would place it into wetland

[3] 2018 data indicated 13,131 passenger airline aircraft landed Runway 17. The predominate runway exit and flow for these aircraft is Taxiway P to either Taxiway L or Taxiway M.

areas and closer to Great Salt Lake, increasing environmental impacts. For these reasons, that option was discarded, and final analysis was focused entirely on a south EAT (SEAT) designed to conventional FAA standards.

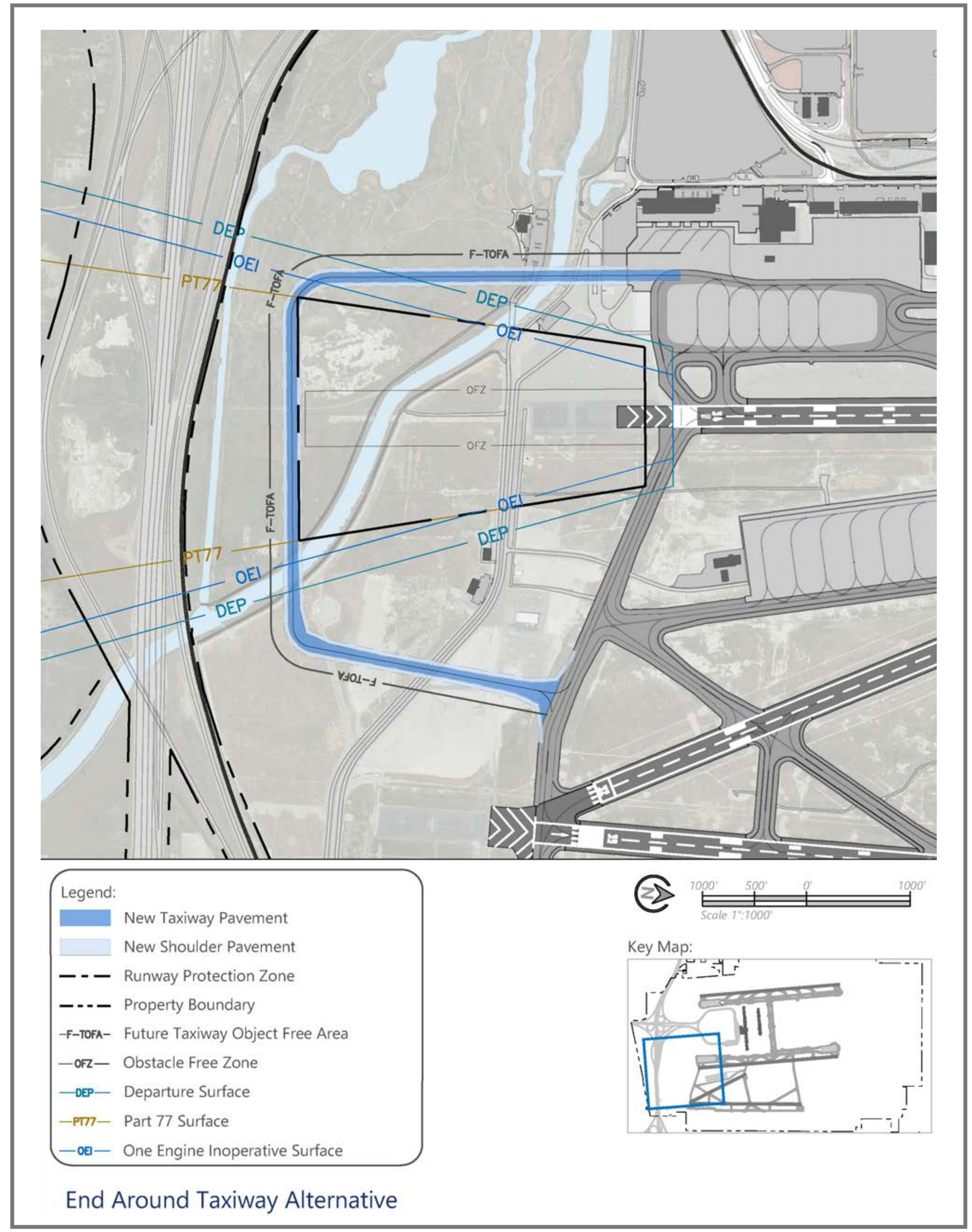
The design intent of the SEAT was to provide fully independent taxi and runway operations in all weather conditions. This requires the SEAT be designed to ensure the tail of the design aircraft does not penetrate TERPS surfaces, approach surfaces for Runway 34R, and the departure surface and one-engine-inoperative (OEI) surface for Runway 16L. It was determined that the SEAT should be designed to accommodate ADG III aircraft (as well as Boeing 757 aircraft which are ADG IV aircraft with tail heights just over 45 feet). Accommodating larger aircraft tail heights requires the SEAT to be placed further to the south, which increases overall taxi time. In examining historical data, it was found only a few ADG V aircraft or larger ADG IV aircraft transition between the terminal area and Runway 17-35 (or the GA area) per year. Thus, accommodating up to ADG III commercial passenger aircraft provides the maximum needed flexibility for unrestricted operations. That said, design of the pavement to accommodate the Airport's ADG V design aircraft is recommended by the Airport staff to provide flexibility for those aircraft to operate on the SEAT, albeit with restricted runway operations. The proposed concept is illustrated in Figure 4-10.

Two options were brought forward for final evaluation. A "do-nothing" option, and the option that proposes implementation of the SEAT as described. Specific evaluation criteria were developed for this analysis. Each are described below along with a summary of how each alternative performed. Review of the alternatives with SLC management resulted in the option that implements the SEAT as the preferred alternative. Table 4-7 visually summarizes the evaluation and conclusions of SLC management and the planning team.

Evaluation Criteria and Assessment:

- Safety: How does the option work to provide a safe operating environment?
    - The do-nothing option maintains the status quo and requires crossings of Runway 16L-34R in all weather conditions and during peak hours. Crossing a runway is not an unsafe practice. However, reducing runway crossings reduces chances of runway incursion.
    - The SEAT dramatically reduces runway crossings on Runway 16L-34R. In practical application, some crossings will still be conducted during off-peak times when use of the SEAT is not needed. However, during peak hours and weather events requiring deicing operations, the SEAT can eliminate the need to cross Runway 16L-34R.
    - Analysis of average day peak month operations indicated roughly 85 daily crossings in 2018 and up to 165 daily crossings in PAL 3 could be eliminated with use of a SEAT. Respectively, this equates to roughly 27,000 annual crossings in 2018, and 55,000 annual crossings by PAL 3.
- Efficiency: How does the option increase operational efficiency?
- The SEAT allows ATCT controllers to reduce radio communications and workload, thereby minimizing chances for miscommunication between aircraft taxiing between the terminal area and the east runway. Taxi operations will not require coordination with runway operations. Additionally, a streamlined process of taxi operation can be developed using the SEAT which can reduce the need for ATCT ground control to monitor and guide aircraft over extended periods of time.
- Delay Impacts: Does the option work to decrease delay?
    - Viewed holistically as part of the SLC airport and its integration into the NAS, the SEAT will provide enhanced "gate-to-gate" performance. It works well to reduce potential taxi delays which creates more predictable operational outcomes for aircraft on the ground and in the air.
- Land Use and Wetland Impacts: Does the option make good use of future land areas and are there wetland impacts?
    - The area required to build the SEAT consists of previously disturbed land, portions of the abandoned golf course, and the canal system that circulates portions of the airport. The highest and best use of this land is to serve airport operations, and the SEAT in this location is a highly qualified use. Minimal wetland areas exist, besides those related to the canal. As compared to the option of moving the runway complex to the north, which is unviable, the SEAT has minimal environmental impacts and land use constraints.
- Cost Factors: Qualitatively, what are the cost factors of the option and is it feasible?
    - The cost of implementing the SEAT can be weighed first by its ability to increase efficiency, and second by fuel savings from decreased taxi time. The latter is difficult to quantify due to the dynamic nature of ground operations and decision making by pilots and ATC controllers. However, qualitative estimates of the SEAT's ability to provide free flow taxi operations and enhance gate-to-gate performance indicate potential for a positive rate of return on investment to construct and maintain.

Figure 4-10: South End Around Taxiway Alternative



Source: SLCDA; RS&H Analysis, 2020

While the current condition requiring runway crossings for aircraft transitioning between the terminal and Runway 17-35 is a safe, common-place operation, minimizing runway crossings is beneficial as it reduces the chance for runway incursion. During peak times when radio communication is the highest and planes are positioning for departure and/or landing, the SEAT alleviates otherwise necessary coordination of taxi operations with runway operations. This helps to streamline operations at the airport which, in turn, reduces risks of miscommunication, pilot deviations, and runway incursions.

Overall, the safety enhancements and efficiencies gained with a SEAT support carrying forward the option with recommendation for near-term implementation.

Table 4-7: South End Around Taxiway Evaluation

Criteria	Alternative 1 Do Nothing	Alternative 2 SEAT
Safety - Runway Crossings	Poor	Good
Operational Efficiency	Poor	Good
Delay Impacts	Fair	Good
Land and Wetland Impacts	Good	Fair
Cost Factors	Fair	Fair

Performance Legend: Good, Fair, Poor

4.4 AIRFIELD ENHANCEMENTS

This section describes other airfield enhancements brought forward in this master plan including future deicing pads, highspeed taxiways, parallel taxiways, and removal of pavements to correct for non-standard conditions. The configuration, shown in Figure 4-11, builds on the alternatives described to this point, and incorporates the south end around taxiway, Runway 16L-34R extension, and the removal of Runway 14-32. Also shown is the ultimate relocation for 2100 N and N 4000 W roadways. A relocation of 2100 N is required to accommodate the extension of Runway 16L-34R. The ultimate concept places 2100 N on the northern perimeter of Airport property adjacent to the power lines and has connection to the development west of the Airport. The roadway would conceivably be the northern limit of Airport development. The relocation of N 4000 W was originally proposed in previous studies, and as determined in the cargo analysis described in Section 4.6, was validated for its benefit in allowing future cargo expansion.

4.4.1 New and Removed Taxiways

New taxiways were required to support the preferred alternatives identified in this study, as well as to replace taxiways that require removal to meet FAA standards. Additionally, the crossfield Taxiways U and V were carried forward from the existing ALP. The placement of those taxiways was validated through analysis of future requirements for concourse and cargo expansion. The following bullets detail the considerations for the other taxiway improvements.

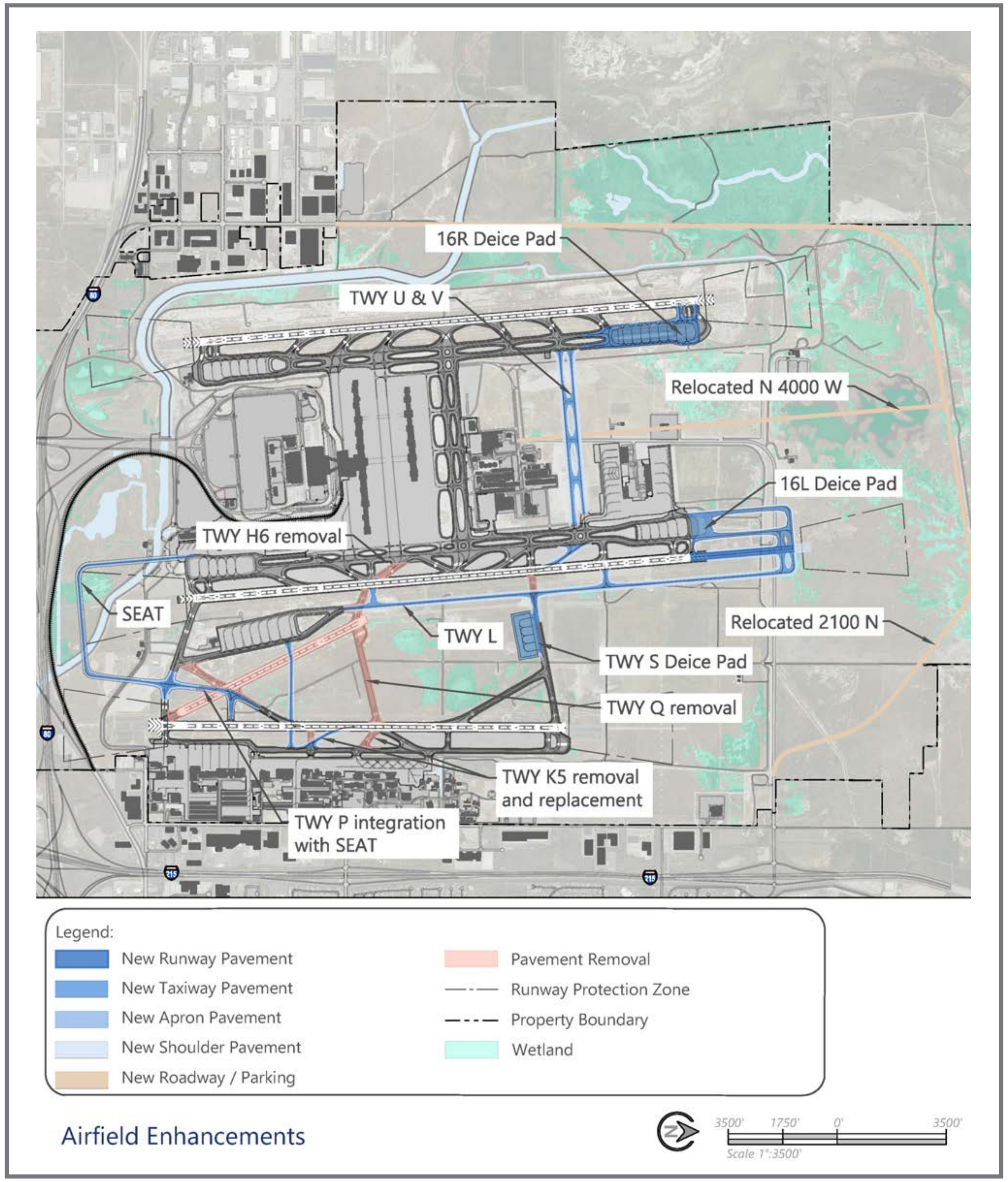
- A full length inboard parallel taxiway for Runway 16L-34R, extending north from the L Deice Pad, was incorporated for future implementation. This taxiway, Taxiway L, will serve multiple functions including allowing aircraft deiced on L Deice Pad to taxi to Runway 17 or Runway 16L without a runway crossing. It also will provide additional flexibility and connection for aircraft transferring between the terminal area and Runway 17.
- Taxiway Q serves as a third option for crossing aircraft between the terminal area and the east side facilities. However, Taxiway Q intersects Runway 17-35 in the middle of the runway's high energy zone which contradicts FAA design standards and must be remedied. FAA ATCT controllers noted a need to keep the functionality of Taxiway Q as a third crossfield option. The solution identified includes removing Taxiway Q and adding a new crossfield connection to the south, outside the runway's high energy zone.
- Highspeed exits K5 and H6 were identified for future removal. The configuration of Taxiway K5 creates a wide expanse of pavement on Runway 17-35, does not meet highspeed taxiway geometry standards, and is not optimally positioned to serve the corporate jet fleet landing Runway 17. As such, it is recommended for removal with a replacement highspeed K5 to be built to the south to also replace K4. H6 creates a wide expanse of pavement on the Runway 16L-34R where it meets H5 and H4. Of the three taxiway exits in that location, H6 was identified as not required as it does not serve the exit needs of the commercial fleet landing on Runway 34R. In effort to simplify the area and reduce the expanse of pavement next to the runway, H6 is recommended for removal.
- One new highspeed exit is recommended on Runway 16L-34R, between H10 and H11. This highspeed would feed into the new Taxiway U and V crossfield connectors. The highspeed exit usage on Runway 16L-34R is expected to change slightly with the new terminal configuration coming on-line. When the runway is extended, major shifts in usage can be expected, and runway exits may need to be modified to ensure that runway occupancy time (ROT) is optimal. It is recommended that prior to implementation of the runway extension, a comprehensive study be conducted to determine potential impacts and new requirements for runway exits to support the extension.
- The intersection of the SEAT with Taxiway M was vetted by ATCT controllers and SLCDA airport management. The location was found to balance access to Runway 35 and the L Deice Pad. Additionally, the location provides opportunity to directly tie Taxiway P into the SEAT. For this purpose, the portion of Taxiway P on the west side of Runway 14-32 will be removed, which will reduce the chance pilots might miss the connection to the SEAT.

4.4.2 Deicing Facilities

Through discussions with SLC management, deicing improvements and future facilities were identified to be carried forward on the airport layout plan and implementation plan. The conclusions brought forward in this study are as follows:

- Deice truck refill and deice personnel facilities are needed at the 16L Deice Pad to ensure that pad can remain operational through extended deice operations. These facilities are recommended for implementation as soon as possible.
- A new eight-position runway-end deice pad will be planned for Runway 16R.
- An expansion to the 16L Deice Pad of two positions will be planned for implementation when Runway 16L-34R is extended.
- A new five position deice pad between Runway 16L-34R and the Runway 17 threshold will be reserved along Taxiway S. The previous ALP depicted this facility on the north side of Taxiway S. This study found benefit in placing the new pad on the south side of Taxiway S to maximize the land available for other uses on the north side of the taxiway.
- The runway-end deice pads serving Runway 16L-34R were considered for relocation to the west to allow greater separation between Runway 16L-34R and Taxiway H. As noted in the facility requirements, current separation between the runway and the stretches of Taxiway H adjacent the deice pads is such that there are taxi restrictions on Taxiway H when ADG V aircraft are landing in low visibility conditions. These events are rare, and taxiway impacts were deemed to be insignificant. Thus, the deice pads are planned to remain in their current location.

Figure 4-11: Airfield Enhancements



Source: RS&H, 2020

4.5 TERMINAL CONCOURSE EXPANSION ALTERNATIVES

The evaluation of terminal concourse expansion was needed to determine the maximum footprint that should be reserved for passenger terminal facilities though the planning period and beyond. Spacing for future concourses ultimately determines where Taxiway U and Taxiway V, future crossfield taxiway connectors, should be located.

The planning team and Airport management identified the following planning parameters used for this analysis:

- SLCIA will not plan for a second terminal processor on the north side of the airport. Land use analysis determined that terminal landside functions would expand to the south and terminal airside functions would extend north.
- Future Concourse C and Concourse D would represent maximum build out. The balanced airfield analysis determined the airfield may not be able to ever support operations related to building out of Concourse D. However, that is based on current operational characteristics. Thus, for ultimate planning purposes, planning for a Concourse D was considered, but with the understanding that other facilities with a useful life of roughly 50 years could be built within its footprint.
- The crossfield circulation provided today by Taxiway E and Taxiway F must be maintained. The circulation can be provided via taxilane, but unimpeded flow from push back operations was deemed vital.

The intent of the alternatives exercise was not to determine one preferred layout, but rather to understand the room required to develop flexible options. Concourse layout alternatives were developed using spacing suggested in the 2013 *Program Validation & Preliminary Planning Update*, and 2017 *NCP Program and Preliminary Planning Update* developed by HOK. Those alternatives aided in understanding the limits of full Concourse D buildout, and a refined ultimate alternative was identified. The alternatives and key takeaways from the analysis are described below.

Concourse Alternative 1 - Spacing from 2013 Program and Preliminary Planning Update

The 2013 *Program Validation & Preliminary Planning Update* document reflects concourse spacing that Airport management initially intended to apply between Concourse A and Concourse B. That spacing was later valued engineered to a different standard, but the initial design incorporated dedicated push back areas that allow unimpeded flow of aircraft on the parallel taxilanes. Specifically, the initial design allows taxi and apron depth for ADG V aircraft on one side and ADG IV variants on the other side of each corridor. Dedicated push back area was sized to allow all ADG III (and some ADG IV) on the ADG IV side, and for all ADG IV (and some ADG V) on the ADG V side. Figure 4-12 illustrates an alternative that applies the 2013 spacing between Concourses B and C, and Concourses C and D. Applying this spacing between concourses proved the currently planned positioning of Taxiway U and V could remain unchanged. However, it was found that the north side of Concourse D would be limited to only ADG III aircraft but would have the ability to have some dedicated push back area adjacent to the ADG III taxilane.

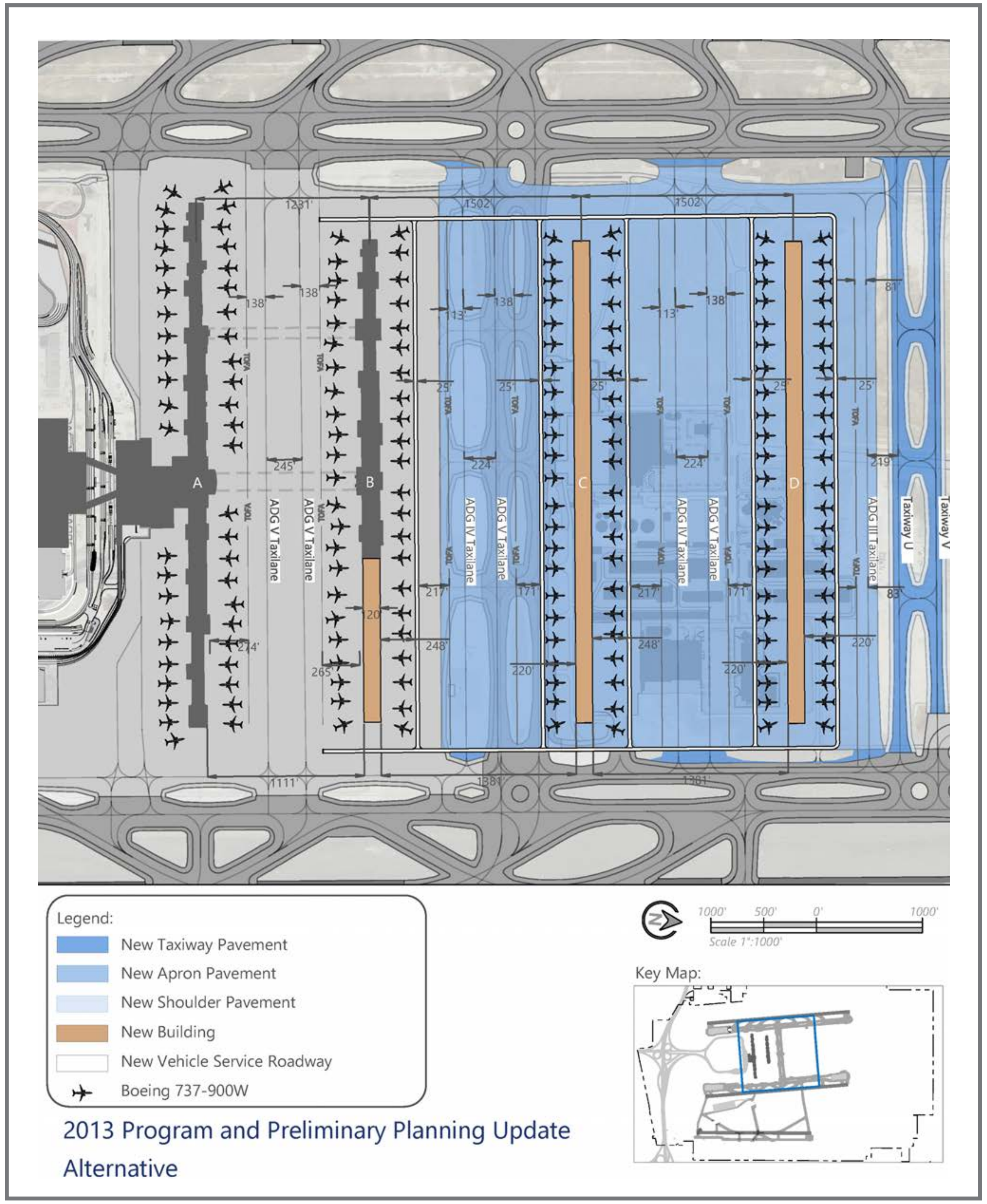
Advantages found in this alternative include:

- Unimplemented crossflow functionality of Taxiway E and F is maintained, albeit taxiway connection to the parallel runways and taxiway complexes would require modification.
- All future concourses have flexibility to serve aircraft in size up to ADG V.
- Location of Taxiway U and V do not require a future siting to the north which would infringe upon the cargo area.
- Dedicated pushback area is provided for all new concourses.
- Although ADG IV aircraft may become less frequent in commercial use, planning for such provides additional flexibility for wider spans.

Disadvantages found in this alternative include:

- The north side of Concourse D is limited to only ADG III aircraft and depending on final design, may not have enough dedicated pushback area for all ADG III aircraft variants.
- Although not a disadvantage, it was recognized that planning for dedicated push back between Concourse C and D may be deemed by some to be excessive. Airlines are using value engineered solutions, such as what was applied between Concourse A and B, successfully today and that trend may continue.

Figure 4-12: 2013 Program and Preliminary Planning Update Alternative



Source: SLCDA; RS&H Analysis, 2020

Concourse Alternative 2 – Spacing from 2017 Program and Preliminary Planning Update

The 2017 *Program and Preliminary Planning Update* document defined the final layout between Concourses A and B and included a spacing concept between Concourse B and Concourse C (or what was then defined within that document as the "North-North Concourse"). That spacing was intended to keep Taxiway E and Taxiway F fully intact as independent taxiways. This master plan concept uses that spacing, and the spacing chosen between Concourses A and B was used between Concourses C and D.

As can be seen in Figure 4-13, the alternative proved that Concourses C and D can fit within the future terminal envelope without requiring Taxiway U and V to be moved. This was achieved with similar spacing applied between Concourses C and D, as is used between Concourses A and B. Additionally, the north side of Concourse D would be restricted to ADG III aircraft and push back would be onto the taxilane. Lastly, by keeping Taxiways E and F, parallel taxilanes are needed north of Concourse B and south of Concourse C.

Advantages found in this alternative include:

- Unimplemented cross flow functionality of Taxiway E and F is maintained.
- Location of Taxiway U and V do not require a future siting to the north which would infringe upon the cargo area.
- Dedicated pushback area is provided between Concourse B and C.
- Though ADG IV aircraft may become less frequent in commercial use, planning for such provides additional flexibility for wider spans.

Disadvantages found in this alternative include:

- The north side of Concourse D is limited to only ADG III aircraft and no push back area is provided.
- Apron depth on the north side of Concourse C and south side of Concourse D is less than that proposed in the 2013 layout.
- By placing Concourse C to the north such that Taxiway E and F remain untouched, additional automated people mover (APM) structure will be needed which increases cost and passenger connection times between concourses.
- Concourse C location is pushed further into the north support facility area, requiring more infrastructure relocation than if it was sited further south.
- The layout of taxiways and taxilanes between Concourses B and C is not an efficient use of space. Aircraft must push back onto taxilanes and taxi to connectors to access the east/west taxiways.

Preferred Airfield Concourse Alternative

The balanced airfield analysis indicated SLC will reach peak, or slightly beyond peak capacity, at roughly 1,800 daily operations. The analysis indicated that level of operations would equate to a gate requirement of roughly half that of Concourse C. It is expected that Concourse B will serve demand through and beyond PAL 3, and that a portion of Concourse C may be needed immediately beyond this study's planning period. Thus, the need for Concourse D is well beyond PAL 3 and may never be realized due to existing airspace limitations of the Salt Lake City valley.

A balance between long-range land preservation and facility relocation must be matched with a pragmatic estimation of future growth. With this in mind, only Concourse C is being brought forward as a future condition. The open land area within the Concourse D footprint can be developed with an understanding that most buildings have no more than a 50-year useful life and could be demolished and relocated if ever a Concourse D is needed.

Figure 4-15 illustrates the Preferred Airfield Concourse Alternative. The alternative informs what facilities will need to be relocated to accommodate a full build out of Concourse C.

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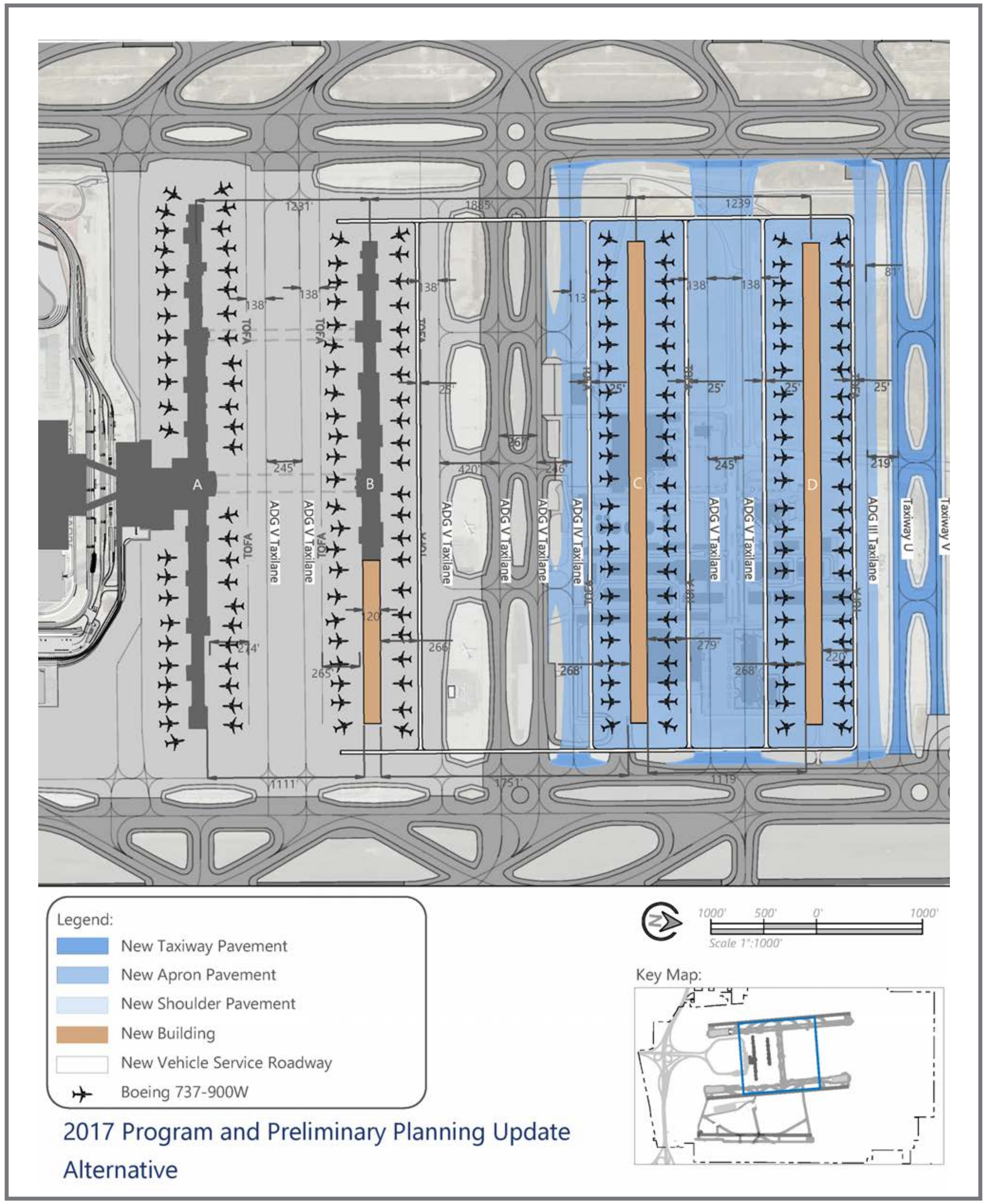
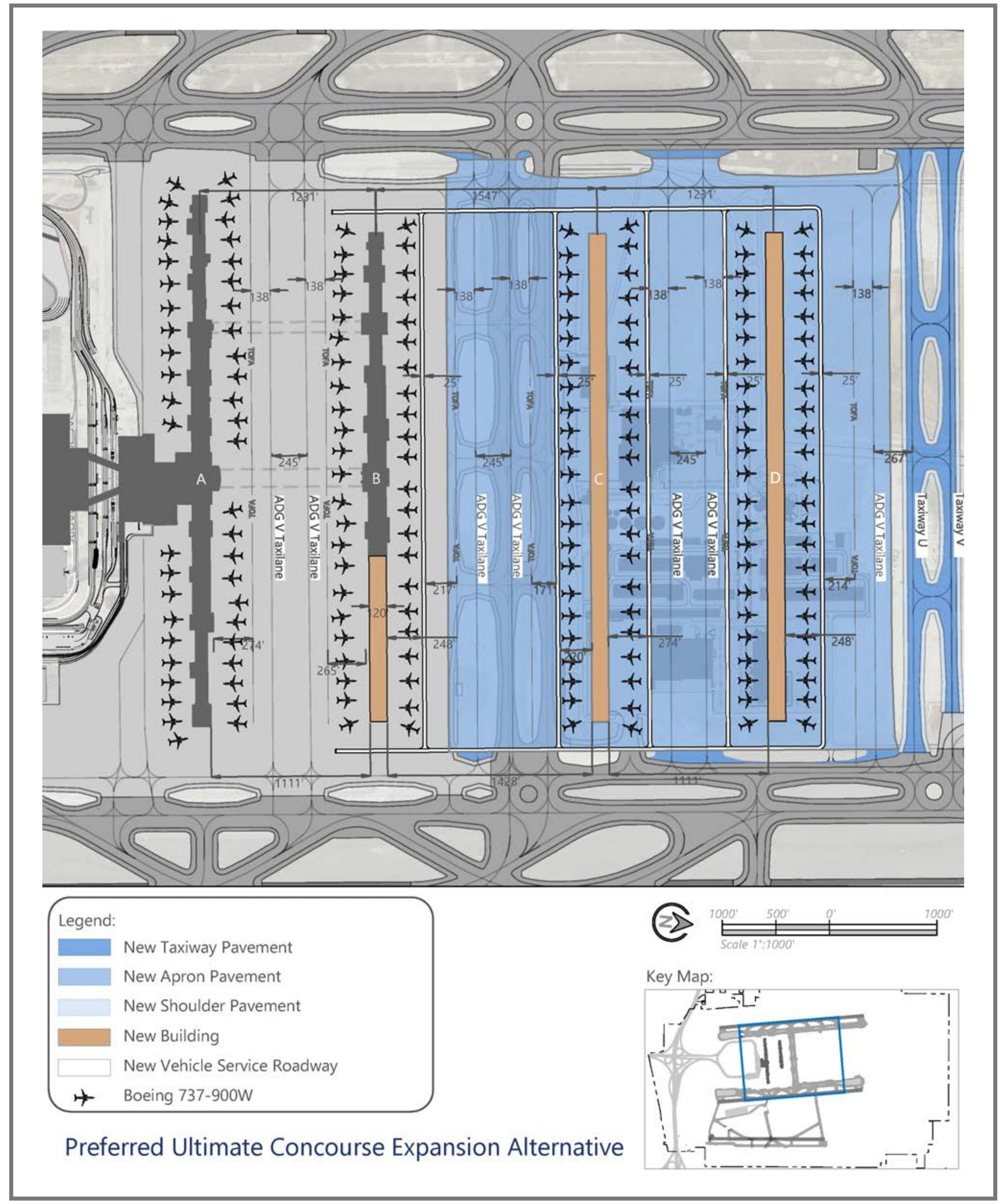
Figure 4-13: 2017 Program and Preliminary Planning Update Alternative



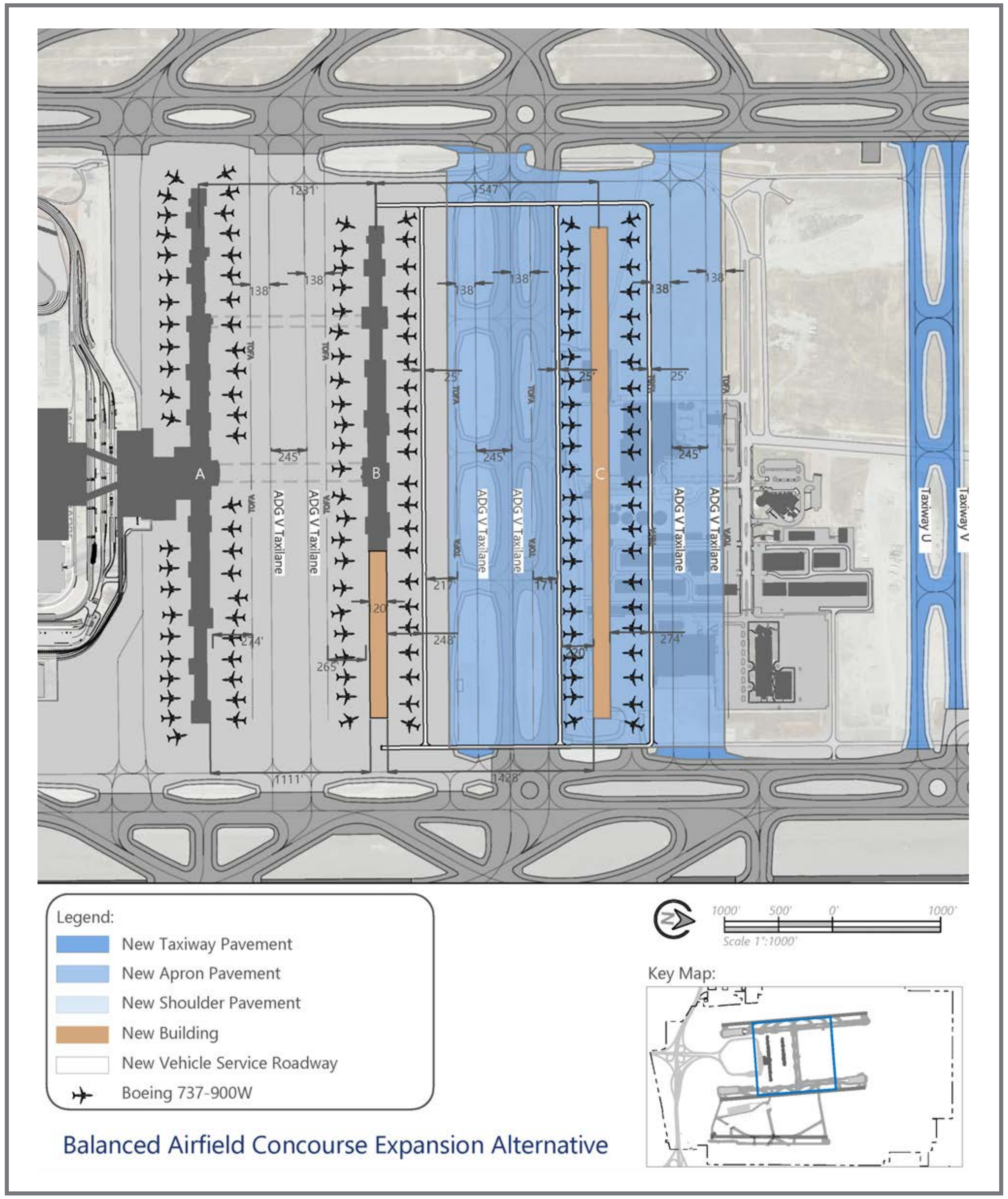
Source: SLCDA; RS&H Analysis, 2020

Ultimate Concourse Expansion Alternative



Source: SLCDA; RS&H Analysis, 2020

Figure 4-15: Preferred Airfield Concourse Expansion Alternative



Source: SLCDA; RS&H Analysis, 2020

4.6 NORTH AIR CARGO ALTERNATIVES

The facility requirements analysis determined existing operators in the north cargo area will require expansion of their facilities within the planning period. Additionally, e-commerce driven cargo operations were recognized as potentially requiring significant land area for future air cargo facility development.

The alternatives analysis for the north cargo facilities includes consideration of the expansion needs of existing operators within the planning period, as well as land requirements necessary to accommodate future large-scale facilities. A site analysis was conducted to validate the location of the north cargo campus and determine if it fits the Airport's long-term vision. Areas depicted in Figure 4-16 were assessed and vetted with Airport staff and stakeholders. Sites 2 and 3 flank the existing cargo area, and either would allow cargo to expand into the site. Sites 1 and 4 are proposed as greenfield developments where all cargo operations would eventually be relocated.

An evaluation of the development sites was conducted against set evaluation criteria. Table 4-8 illustrates the conclusions of the evaluation. The evaluation criteria developed for this analysis are described below along with a summary of how each site performed.

Evaluation Criteria and Assessment:

- Operational efficiency: How well can efficiency for cargo operations be maintained at each site?
  - The existing cargo area, and Sites 2 and 3 are centered between the parallel runways, which allows the shortest taxi to either runway. This is ideal as taxi times are minimized.
  - Sites 1 and 4 flank one of the two parallel runways. Thus, depending on traffic flows, aircraft may require further taxi to/from the opposite side of the airfield. Site 4 has an advantage over Site 1 as it sits between Runway 16L-34R and 17-35.
- Flexibility and expansion potential: Does the site provide room to grow and flexibility to accommodate different/multiple cargo operators?
  - Sites 2 and 3 offer the ability for cargo to expand in place. Independently, each site is limited when compared to the other sites. Together, however, they provide room for expansion by existing operators and can provide space for a large-scale cargo facility.
  - Sites 1 and 4 both offer ample area for future expansion.
- Financial feasibility: Is development in the site feasible when considering investment requirements?
  - Sites 1 and 4 both lack taxiway access to the runways and would incur significantly higher development costs.
  - Development in Site 1 would entail a very large investment due to the wetland mitigation, utility infrastructure, roadway, and taxiway connections required. Site 2 shares these financial implications though they are estimated to be at a lesser degree.
  - Development in Sites 2 and 3 is the least costly because utility, roadway, and taxiway infrastructure is already in place.
- Environmental/sustainability: What implications does development in the site have related to environmental impacts and long-term sustainability?
  - Sites 2 and 3 are near to, and can be tied into, the existing glycol recovery system.
  - Site 1 is in an area extensively occupied by wetlands.
  - Sites 1 and 4 may require greater taxi distances for aircraft arriving and departing depending on runway use, which would correlate to higher emission outputs.
- Ease of implementation: Can the site be ready for development in the near-term or are multiple enabling projects required?
  - Site 2 and most of Site 3 are relatively build-ready.
  - Sites 1 and 4 both lack taxiway access to the runway end and would require extensive taxiway development.
  - Site 1 would require multiple phases of enabling projects, including extensive environmental mitigation and assessment.
  - Site 4 also would require multiple phases of enabling projects.
- Meets near/long-term requirements: Will the site meet today's need and satisfy future spatial requirements?
  - Sites 2 and 3 can meet near-term requirements, but independently they fail to meet long-term requirements. Combined, they meet long-term requirements.
  - Sites 1 and 4 meet long-term requirements but fail to meet near-term expansion requirements due to the lead time required for the site to be ready to accommodate cargo operations.

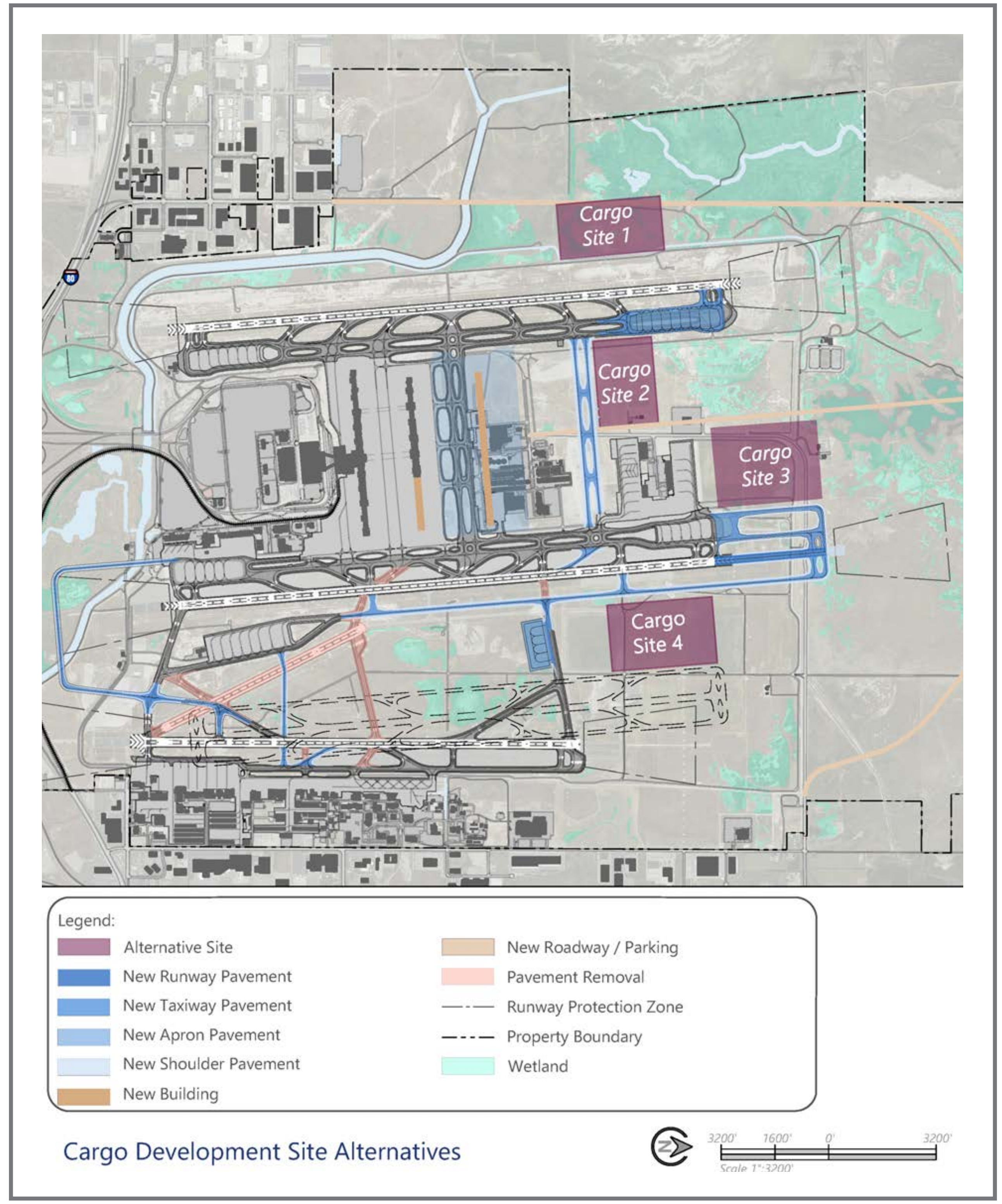
Overall, Site 4 was found to provide no more benefit than the current location. Site 1, while closer to the Salt Lake City Inland Port and the ground cargo operations located in that vicinity, was found to have sizable implementation challenges. Wetlands impacts, taxiway infrastructure, Surplus Canal, and roadway access all posed challenges beyond the potential benefit offered by the location. As such, the option was discarded. Sites 2 and 3 were both carried forward, as it was determined both sites should be preserved for long-term cargo development.

Table 4-8: North Air Cargo Evaluation

Criteria	Site 1	Site 2	Site 3	Site 4
Operational Efficiency	Fair	Good	Good	Fair
Flexibility & Expansion Potential	Good	Fair	Fair	Good
Financial Feasibility	Poor	Good	Good	Fair
Environmental/Sustainability	Poor	Good	Good	Fair
Ease of Implementation	Poor	Good	Fair	Poor
Meets Near/Long-term Requirements	Poor	Fair	Fair	Poor

Performance Legend: Good | Fair | Poor

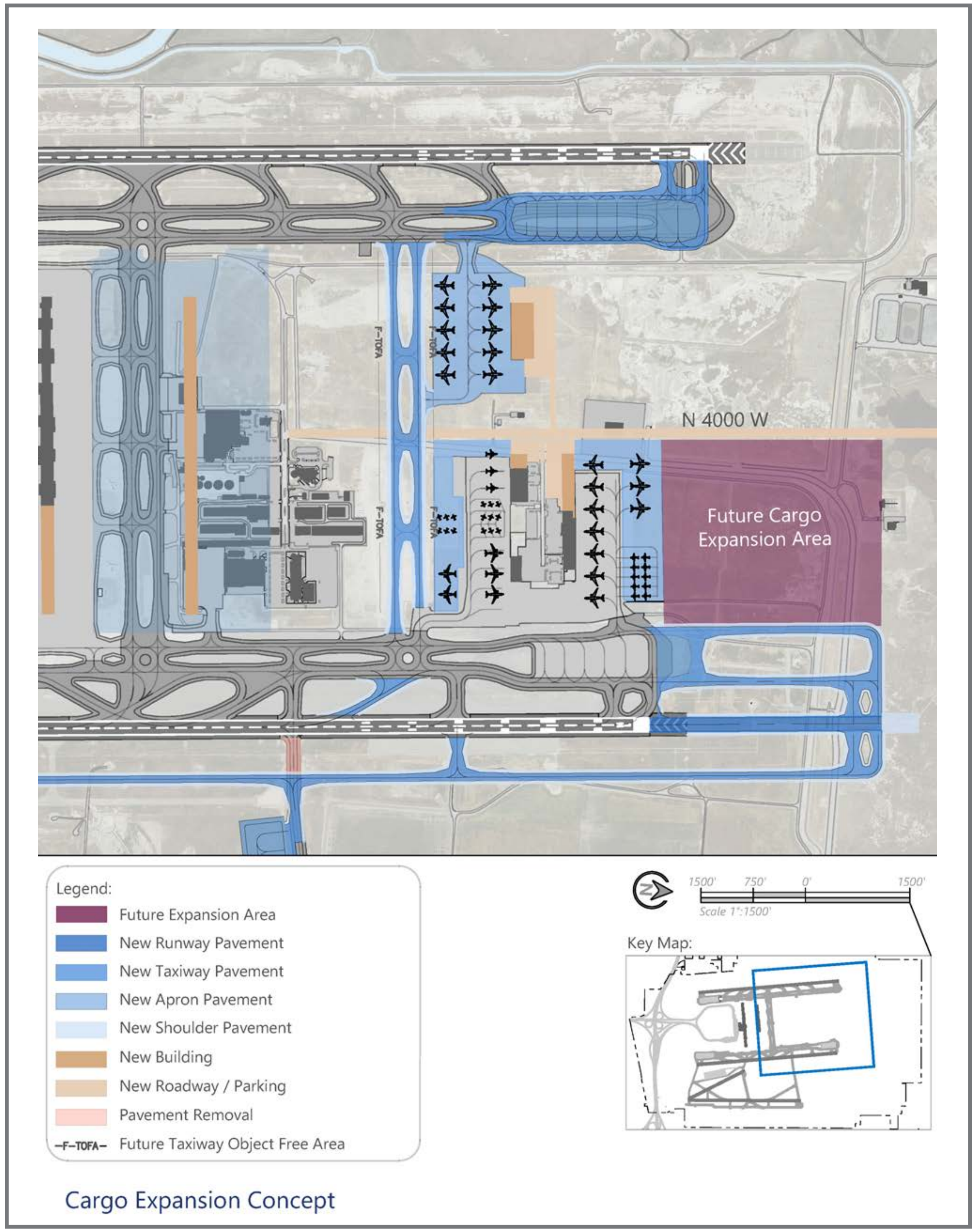
Figure 4-16: Cargo Site Alternatives



Source: SLCDA; RS&H Analysis, 2020

Spatial programming analysis determined the existing cargo area has enough room to accommodate future expansion needs of current operators. This assumes the apron would be expanded to the north and south and vehicle parking and maneuvering areas would be reconfigured. However, it was determined the cargo area must also be able to expand to the west of the area to ensure improvements are efficient and not cramped. This requires relocation of 4000 W to the west. Figure 4-17 illustrates an expansion concept including expansion of the existing north cargo facilities, the relocation of 4000 W to the west, and a potential layout for future cargo development on the west side of the area. The north side of the area is preserved for additional future expansion or a new large-scale facility.

Figure 4-17: Cargo Expansion Concept



Source: SLCDA; RS&H Analysis, 2020

4.7 LANDSIDE ALTERNATIVES

This section describes alternatives generated to address the Airport's landside needs over the planning period. These alternatives were developed according to landside planning objectives and guiding principles determined and refined with input from SLCDA and key stakeholders. The alternatives development process also considered airport highest and best land uses, facility function and intent, and a series of constraining factors such as geography, environmental impact, and FAA airfield design guidance. After considering a variety of concepts to address facility requirements for each specific landside facility, two comprehensive alternatives were developed and evaluated. This section describes that process and the resulting preferred comprehensive landside development plan.

4.7.1 Landside Planning Objectives and Guiding Principles

The landside system consists of trailing planning elements, whose location is driven by the orientation and design of the terminal building, as well as other physical and environmental constraints. The landside facility requirements analysis focused on meeting customer level of service standards established by the Airport and stakeholders during the planning process. That analysis determined a need to provide additional space for public parking, rental car facilities, and employee parking.

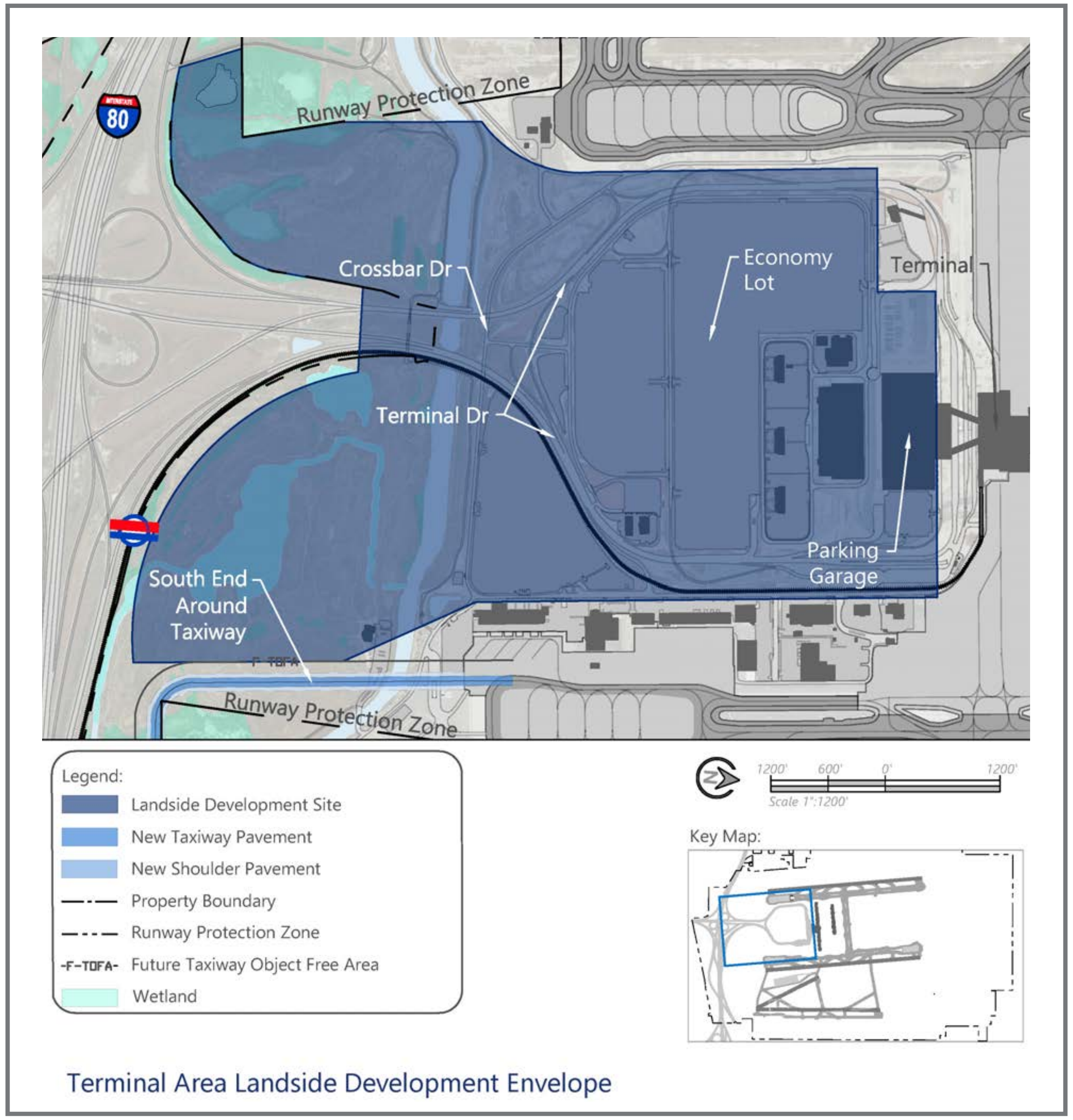
Secondary issues to be addressed through landside alternatives development include facility organization and design improvements that meet safety, efficiency, and overall customer ease of use. Airport terminal curb roadways were analyzed and determined to be adequate to serve vehicular demand over the planning period.

The SLC landside area is land constrained and fits within a defined envelope bounded by the terminal building, I-80, and the two surrounding runways and adjacent aeronautical land uses (shown in Figure 4-18). The Airport Redevelopment Plan includes a new terminal and supporting landside elements which fit within this same envelope. The organization of the landside elements was developed approximately 20 years ago in the preliminary planning for what became the ARP. The landside envelope is largely filled with the Terminal Drive loop which surrounds an infield containing most public landside elements. A band of service roadways (Crossbar, 3700 West, et al.) provides a secondary network of interconnections mainly for use by employees and contractors. This overall existing landside system was based on certain landside planning principles developed during the early planning for the ARP. Those planning principles were reconfirmed in this effort, as they remain relevant to guiding the landside development over the planning period. The landside planning principles are as follows:

- Provide a common approach experience to all landside destinations.
- Keep all terminal-related traffic on the right of the airport entry roadway.
- Keep all parking and rental car traffic on the left of the airport entry roadway.
- Provide an intuitive wayfinding system with visual cues for confirmation.
- Create binary choices at all decision points.
- Provide safe decision and maneuvering distances between sequential decision points.
- Avoid bypass traffic on any terminal curb roadway.
- Keep highest value landside functions closest to the terminal building.
- Minimize walking distances for the greatest number of passengers/customers.
- Provide a simple range of public parking options that provide the highest level of customer service and the maximum net revenue.
- Minimize parking shuttle circulation distance, time, and cost.
- Keep service vehicle traffic on independent roadways.

The SLCIA landside is organized in a way that already fulfills many of these principles. This helped provide a solid starting point for developing concepts to correct areas of deficiency and enhance landside functions already performing well.

Figure 4-18: Terminal Area Landside Development Envelope



Source: SLCDA; RS&H Analysis, 2020

4.7.2 2100 North Roadway Realignment

Access to the North Support Area of the Airport is provided by 2100 North, via Interchange 25 on I-215. A mile west of 2200 West, 2100 North passes through the RPZ for Runway 16L-34R. The airfield alternatives analysis indicates that this runway could be extended to the north across the existing roadway, necessitating the roadway realignment. The roadway realignment must stay out of the future RPZ of the extended runway, and its alignment should be set to best serve the evolving land uses in the North Support Area, particularly the expansion of cargo facilities.

Today, approximately 1.7 miles to the west of Interchange 25, 2100 North transitions to 4000 West at a large radius horizontal curve. To connect the realigned 2100 North with 4000 West opens the question as to whether to keep 4000 West in its current north-south alignment, or whether to modify it to be parallel to the runways. A realignment to be parallel to the runways and extend out to the realigned 2100 North would likely incur greater impacts on the existing wetlands than would simply extending it on its current alignment but aligning the road with the runways does have the advantage of creat-

ing better parcel uniformity in the North Support Area. Either alignment of 4000 West works with the proposed realignment of the east-west roadway and can be accommodated in this plan if the environmental issues are not constraining. The only change would be the location of the horizontal curve that would join the two perpendicular roads. Ultimately, determination of a preferred roadway realignment is dependent upon a combination of the previously mentioned considerations and a final preferred land use plan for the northern area of the airport. The final preferred roadway realignment is represented on the Airport Layout Plan.

4.7.3 Employee Parking

While there are scattered employee parking lots contiguous with various employment sites around the Airport, the bulk of employee parking is provided in two lots at the terminal campus. These two lots accommodate Airport and tenant employees working in the SLCIA terminal area. According to landside planning principles, which desire to keep the highest revenue generating and valued land uses closest to the terminal and provide the highest level of customer service to passengers, the location of employee parking should not take precedence over customer-oriented facilities in the passenger terminal area. Therefore, it is best to locate employee parking as close and operationally efficient to the terminal as possible without disrupting or displacing customer-focused services. The distance of employee parking from the terminal at SLC necessitates shuttling operations for terminal area employees.

Terminal area employees are categorized as primarily working in either the non-secure area or the secure area. While employees can, and often do, serve roles in both areas of the terminal, their workday typically begins in a specific location on either the non-secure or secure side and thereby necessitates security screening for only a segment of the employee population entering the terminal and concourses. There are two possible methods that can be used to perform these screening requirements, including:

- Option One - Screen employees requiring secure-side access at a TSA security screening checkpoint (SSCP) in the terminal building.
- Option Two - Screen employees requiring secure-side access at the employee parking lot prior to entering a secure shuttle bus and drop off in a secure location at the terminal or on the ramp.

Screening at the terminal building TSA SSCP for airport and tenant employees is a routine practice and there are already facilities and procedures in place to perform this process. The procedures for screening employees at the employee parking lot would be the same although the equipment may differ. Employees screened prior to entering a secure shuttle bus would remain within the secure bus as it transitions from the non-secure employee lot through access gates to the secure airside environment to the final secure terminal/apron drop off/pickup destination.

Each employee screening option differs in how it may be implemented through the employee shuttling operation. If screening occurs at a designated terminal building TSA SSCP, secure and non-secure employees can co-mingle on a single shuttle bus from the employee lot until they are dropped off on the non-secure side where only secure-side employees will use the TSA SSCP to enter the sterile area.

When screening occurs at a single shared employee parking lot (secure and nonsecure-side employee), employees must be split between two shuttles, one dedicated to screened employees to be dropped off on the secure-side of the terminal, and one dedicated to unscreened employees to be dropped off on the nonsecure-side of the terminal building. Operational costs do increase when two dedicated shuttles are used, however, designated shuttle buses do allow the Airport to separate non-secure and secure employees into separate parking areas.

Understanding that employee lot location(s) options are dependent upon preferred shuttling operations, a series of alternatives were developed which are flexible enough to implement under any comprehensive landside configuration. The primary differentiators between each analyzed option are vehicle miles traveled (VMT) for shuttling operations, operating cost, and vehicle emissions resulting from the shuttles.

The three operationally feasible alternatives for locating and operating employee parking include:

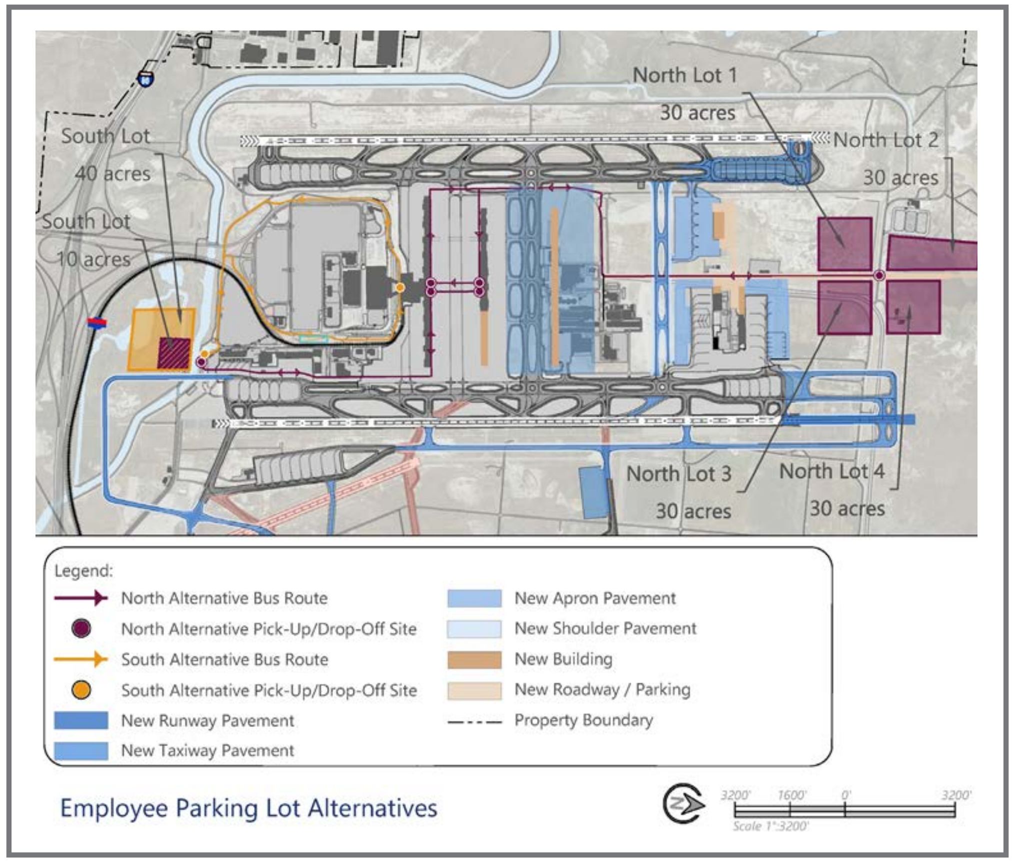
- Single lot south of the terminal complex with one shuttle route to the non-secure side. This is how the employee shuttle has worked historically.
- Single lot south of the terminal complex with two dedicated shuttle routes, one for secure and one for non-secure drop-offs and pickups.
- Segregated secure and non-secure employee parking lots. The south lot would be for non-secure employees to be dropped off and picked up in the non-secure area of the terminal building. The secure employee lot would be located north of the terminal complex and dedicated for secure-side only employees.

A fourth option exists but early analysis showed it would be operationally inefficient. It is possible to create a single lot north of the terminal complex with two dedicated shuttle routes (secure and non-secure), however, this option requires non-secure employees to be unnecessarily screened. This is operationally inefficient and adds unnecessary cost. Therefore, this option was not moved forward as a viable alternative.

Figure 4-19 shows the employee lot location alternatives and the associated shuttle routes for each option. A total of 40 acres will be necessary to meet parking space requirements at 380 square feet per stall. This planning factor accounts for additional parking lot elements such as two-way circulation aisles, lighting, and end-of-aisle space for sightlines, bus stops, safe vehicle movements, and perimeter landscaping.

Only one of the four lots shown in the north area is required to meet space needs over the planning period. In terms of operations, each site is equally as viable as the next with negligible differences in operating cost and efficiency. Selection of a north lot site is dependent upon whether an alternate site has a higher and better land use, the degree of environmental impacts, and by overall cost to implement. Of the four sites, Sites 1 and 3 have the lowest environmental impacts and costs to implement but may well be in locations with higher and better uses over the planning period. Alternatively, Sites 2 and 4 have a lower likelihood of being used for a higher land use but have the highest environmental impact and overall cost to implement.

Figure 4-19: Employee Parking and Busing Route Options



Source: RS&H and Curtis Transportation Consulting, 2020
Notes: The sites shown in maroon correlate to the segregated parking option, with the secure lot on the north side of the airport, and non-secure lot on the south side. The 10-acre south lot combined with one of the north lot site options will meet the 40-acre parking requirement.

To evaluate the employee parking alternatives, certain logical planning assumptions were built into the analysis. For the north area, it is assumed that:

- 75 percent of employees require security screening and would therefore park in the North Lot. This means that 30 acres, accommodating approximately 3,400 spaces (PAL 3), would be required.
- All secure-side employees will be screened at the lot prior to riding the sterile shuttle bus to the terminal.
- The busing route for secure-side employees follows 4000 West to the west airside access gate or the closest airport service road on the airfield via a new secure access point. For the 4000 West route, this gate is positioned to best serve the terminal and mid-field portions of the concourses where employees will be dropped off/picked up.

For the south area, it is assumed that:

- If all employees (secure and non-secure) park in a single south lot, 40 acres accommodating approximately 4,600 spaces (PAL 3), will be required. This lot can be served by two bus routes (secure and non-secure). The secure bus would enter and exit the airside area via Gate 8 located on 3700 West near the intersection of North Temple Street.
- 25 percent of the employees do not require security screening and can therefore park in the South Lot. This means that 10 acres, accommodating approximately 1,200 spaces would be required, with the remaining secure employee parking provided in a North Lot. The shuttle bus for these non-secure employees would drop off/pick up at the terminal building on the commercial vehicle curb.

To better understand the operational, financial, and environmental impacts of these alternatives, three key factors were evaluated, including:

- Shuttle bus trip distances and times
- Annual shuttle system vehicle miles traveled (VMT)
- Annual employee journey-to-work change in VMT

The following sections describe the three alternative employee parking scenarios in greater detail. Table 4-9 shows analysis of the evaluated factors for each alternative.

Table 4-9: Employee Parking Lot Alternatives Key Analysis Factors

Factor	North & South			South			
	North	South	Total	Secure	Non-Secure	1 Bus	2 Buses
Bus route roundtrip lenght (mi.)	5.7	4.4	-	4.4	4.4	4.4	-
Bus travel roundtrip time (min.)	30	23	-	26	23	23	-
Fleet size (7 min. headway)	4	3	7	4	3	3	7
Total annual miles	312,075	240,900	552,975	240,900	240,900	240,900	481,800
Bus system cost ($8/mi.)	$2,496,600	$1,927,200	$4,423,800	$1,927,200	$1,927,200	$1,927,200	$3,854,400
Added employee trip length (mi.)							
from West (1.3%)	6.3	0.4	-	0.4	0.4	-	-
from South/East (69.1%)	2.5	0.4	-	0.4	0.4	-	-
from North (29.6%)	-4.0	0.4	-	0.4	0.4	-	-
Overall	0.6	0.4	-	0.4	0.4	-	-
Annual	4,344,00	927,000	5,271,000	2,781,000	927,000	3,708,000	3,708,000

Note: Employee trip lengthening analysis based Airport badging records.
Source: RS&H and Curtis Transportation Consulting, 2020

4.7.3.1 Employee Parking Alternative One – Single South Lot Served by One Shuttle Bus

The first option for employee parking is operationally the simplest and most cost-effective solution. Providing employee parking in a single location with no on-site screening prior to busing is how SLCDA currently operates. The only difference between this concept and the current situation is that the lot is moved approximately one quarter mile away in order to give locational preference to customer parking.

Employee Lot Alternative One has the lowest annual shuttle VMT, headway, fleet size requirement, and overall system cost. The lot entry point is very close to the current employee lot site so changes in employee trip lengths are negligible. Employee shuttling patterns remain as they are in the current lot, therefore the TSA SSCP would continue to host screening responsibilities in the terminal. One major downside to this configuration is travel times for secure-side terminal employees who must now traverse longer distances in the new terminal building.

4.7.3.2 Employee Parking Alternative Two – Single South Lot Served by Two Shuttle Buses

The second option for employee parking is an operational modification of the first alternative. In this concept, all employee parking is located in a single lot south of the existing employee lot, but employees are shuttled to/from the lot via two dedicated shuttle routes. The first route serves unscreened, non-secure side employees, and drops off/picks up on the nonsecure side of the terminal building. The second shuttle bus system provides transportation for secure-side employees screened at the employee lot prior to entering the sterile bus. These secure-side employees can remain sterile for return to the employee lot via the same shuttle, or they could exit the sterile area of the terminal, at which time they would either need to be rescreened at the TSA SSCP to reenter the sterile area or use the non-secure side shuttle bus to reach the single south employee lot.

For this alternative, the non-secure shuttling remains the same as Employee Parking Alternative One, and the new secure-side shuttling travels roughly the same distance to drop off secure-side employees in the sterile area. Table 4-9 demonstrates how the overall bus system VMT remains the same as the fleet is split between the two employee groups. Employee trip lengths still remain comparable to the current employee lot.

4.7.3.3 Employee Parking Alternative Three – North-South Split Lots Served by Separate Shuttle Buses

The third option explored for employee parking separates the non-secure and secure employee lot locations. Non-secure employees would park in a 10-acre lot south of the terminal area and would be shuttled to the terminal building without screening requirements. The secure-side employees would park in a lot north of the terminal complex accessed via 2100 North. Secure-side employees would be screened prior to boarding a sterile shuttle bus and dropped off/picked up at secure-side terminal locations.

As shown in Table 4-9, the key factor analysis of this alternative estimates shuttle bus system VMT and operating costs are roughly 15 percent higher than the single south lot alternative using dedicated shuttles. Employee trip lengths to reach a north lot also increase by an estimated 1,500,000 miles annually.

Table 4-10: Employee Parking Alternatives Evaluation

Criteria	South Only		North & South
	1 Bus	2 Buses	2 Buses
Operational Efficiency & Ease of Use	Good	Fair	Poor
Flexibility & Expansion Potential	Fair	Fair	Good
Financial Feasibility	Good	Fair	Poor
Environmental/Sustainability	Good	Fair	Poor
Ease of Implementation	Good	Good	Good
Meets Near/Long-term Facility Requirements	Good	Good	Good
Meets Objective and Planning Principles	Good	Good	Good
Provides Targeted Level of Service	Good	Good	Good
Operational and Public Safety	Good	Good	Good

Performance Legend: Good, Fair, Poor

Source: RS&H and Curtis Transportation Consulting, 2020

4.7.4 Employee Parking Evaluation

Employee parking options were evaluated for their ability to meet Master Plan established performance criteria. This evaluation is shown in Table 4-10. Each concept performed equally well in its ability to meet near-term and long-term facility requirements, meet objectives and planning principles, and provide a targeted level of service for airport customers. The key differentiators between the three alternatives lie within operational performance, financial feasibility, and environmental/sustainability impacts.

Operational efficiency for the alternatives is determined by overall bus route lengths and travel times, required shuttle fleet size, and changes in the time and distance employees make in their journey to work. Alternative One performs the best for operational efficiency, primarily because it defers all employee screening to the TSA SSCP which optimizes employee shuttling operations; however, this does come at the cost of impacts to terminal TSA screening capacity. Alternative Two operational efficiency is reduced as TSA screening at the employee lot introduces complexity to the system with a secondary SSCP location and necessitates two dedicated busing routes. Alternative Three performs the worst for operational efficiency in large part due to the segregation of secure and non-secure facilities into two completely separate locations on the Airport.

The flexibility and expansion potential of the alternatives depends highly on the availability of adjacent land that can be used for future employee parking. All alternatives are flexible enough to allow future expansion as necessary for all employee lot locations. The key differentiator that ranks Alternative Three above the other two alternatives is the geographic limitation placed by the canal and the proposed South End Around Taxiway. Without relocation of the canal and ponds in the proposed South Lot area, future expansion would be unnecessarily complex and laid out in an inefficient configuration. Financial feasibility of each alternative is determined by the overall capital and annual operating costs of the shuttle bus system. Alternative One is the least costly to build and operate. Alternative Two is more expensive due to dedicated employee busing routes and the initial capital cost to build a security screening checkpoint. Alternative Three is the highest cost to operate due to the initial capital cost to build a security screening checkpoint and the increase in secure-side employee travel distance by 1.3 miles roundtrip from the other options.

Environmental and sustainability impacts are governed by the increase or decrease of VMT by the bus system and by employees traveling to/from the employee parking lot(s). The rankings shown in Table 4-10 reflect increases in required VMT for busing and employee journey to work travel distances.

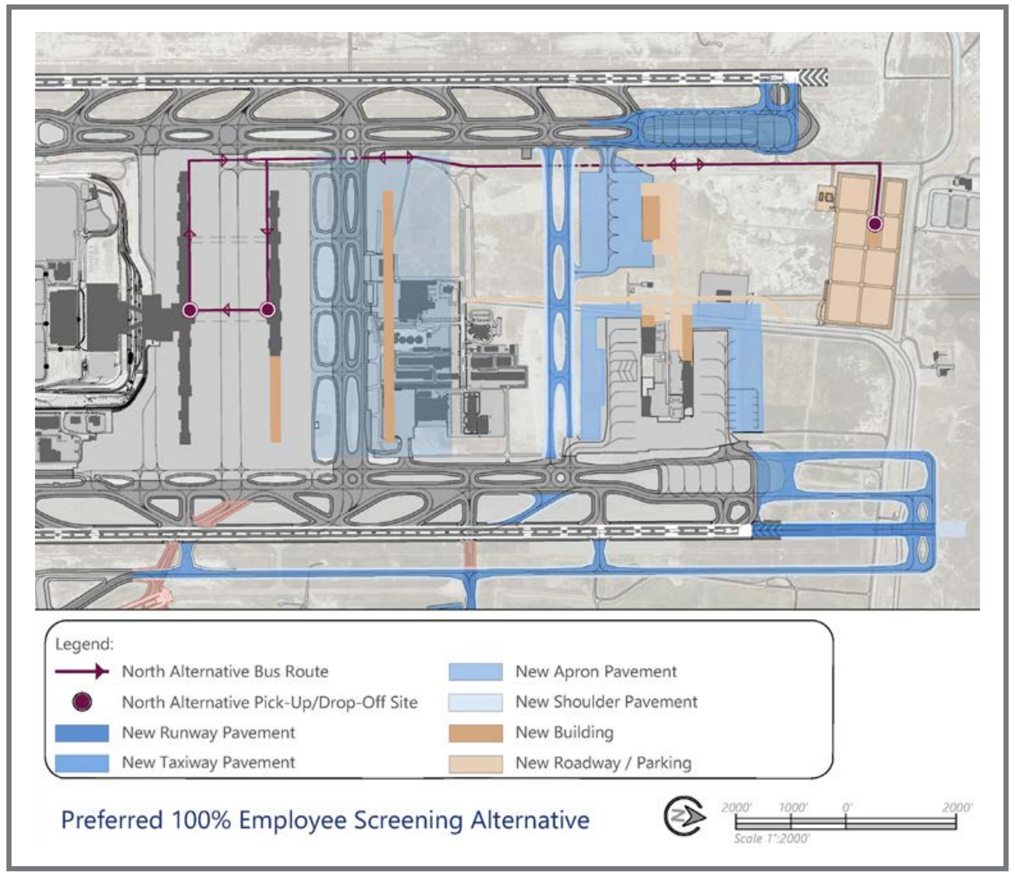
Ease of implementation for the alternatives is driven by the site(s) ability to quickly begin construction. When NEPA requirements initiate further review of environmental impacts at a site, implementation schedules need to account for that process time. Locating employee parking at sites where construction cannot easily access necessary utilities also impacts cost and could impact schedule. All alternative sites provide adequate land to meet employee parking needs through the planning period. It should be noted that two of the four optional employee lot sites in the north area likely impact wetlands and the options in the south area would likely impact the surplus canal and ponds. Any project impacting these wetlands would require an Environmental Assessment.

4.7.5 Preferred Employee Parking Alternative

There are two preferred employee parking alternatives and implementation of each is dependent upon potential employee screening requirements instituted by TSA. Under current TSA screening requirements, the preferred employee parking lot location is on the eastern half of the former golf course site, south of Crossbar Road and the canal (see Figure 4-25, *Preferred Comprehensive Landside Alternative*). As demonstrated in Section 4.7.3, Employee Parking, the south employee parking lot using a 1-bus system performs the best under all evaluation criteria. However, in the wake of the 2015 incident at Hartsfield-Jackson Atlanta International Airport (ATL) involving an airline employee gun-smuggling ring, TSA has studied and considered implementing 100 percent physical employee screening.

If 100 percent employee screening is instituted, this has significant operational and facility impacts on terminal and employee parking facilities. This is a primary reason that the four additional locations were studied north of the SLC terminal complex. Airport staff working group sessions indicated that locating employee parking and screening in the northern portion of the airfield offers the ability for secure employee buses to remain inside the Secure Identification Display Area (SIDA). Employees would be screened prior to entering the SIDA (and therefore the bus) at which point the bus could shuttle the employees to sterile terminal destinations. Figure 4-20 shows the preferred north employee parking lot location and the secure busing route to Concourse A and Concourse B. Note the ultimate relocation of 4000 W would traverse though the eastern portion of the lot. That portion of the lot would be the third phase built
required at the end of the planning period. By that time, it can be determined if the roadway realignment will affect the lot within its useful life, and if so, the lot expansion can be reconfigured and/or potentially expanded to the west.

Figure 4-20: Preferred 100 Percent Employee Screening Alternative



Source: RS&H and Curtis Transportation Consulting, 2020

4.7.6 Landside Facility Alternatives Dismissed from Further Consideration

A number of facility alternatives were eliminated from consideration during early analysis and evaluation because they did not adequately meet landside planning objectives and guiding principles. This section reviews those facilities not carried forward for further evaluation and describes areas where they fell short of meeting long-term planning goals for SLCIA.

4.7.6.1 Park 'n' Wait Lot and Service Center

When considering alternatives for the Park 'n' Wait Lot and the adjacent Service Center, the option of leaving them in their current locations over the long-term was assessed. This alternative was dismissed because the current shared location fails to meet the following landside planning principles:

- Keep all terminal destinations on the right of the airport entry roadway.
- Create binary choices at all decision points.
- Keep all parking and rental car destinations on the left of the airport entry roadway.
- Provide an intuitive wayfinding system with visual clues for confirmation.
- Provide a simple range of public parking options that provide the highest level of customer service and the maximum net revenue.
- Minimize parking shuttle circulation distance, time, and cost.

The current location of the Park 'n' Wait Lot and Service Center complicates the customer wayfinding experience by placing an additional service (other than customer-oriented public parking and rental car) within the terminal loop roadway. Users waiting to pick up arriving passengers are then required to follow an exit pathway leading away from the terminal, which can confuse and cause anxiety to drivers unfamiliar with the airport because it is counter-intuitive to take a route leading away from their final destination, the terminal curb. The two lots placement creates a non-binary choice (left to Park 'n' Wait and the service center, right to 3700 West) and secondly, the locations complicate the major weave which takes place in that section of Terminal Drive. Cars enter on the left from Crossbar Road and the return-to-terminal ramp, and cars exit left to the Park 'n' Wait and Service Center, while others exit right to 3700 West. Simply put, there is too much happening in the same small area, so the decision points are neither sequenced nor binary.

Finally, having these ancillary services within the terminal loop roadway eliminates the space from use as passenger parking. This pushes passenger parking space further from the terminal building which results in higher operational costs and lower customer level of service.

4.7.6.2 Employee Parking

One employee parking option that was dismissed during alternatives analysis was a concept which keeps the lot in its current location. The current employee parking lot location fails to meet the following landside planning principles:

- Keep highest value landside functions closest to the terminal building.
- Minimize parking shuttle circulation distance, time, and cost.

The land currently serving employee parking is located north of the canal and within a relatively close proximity of the airport terminal building. Comprehensive land use analysis showed that this land could be better used for customer-oriented landside airport facilities. Public parking demand at SLC has grown and is projected to further increase to a level requiring all reasonable available space within the landside facilities area north of the canal. While the lot was an appropriate land use at the time of its construction, keeping the employee parking lot in its current location now would prioritize a secondary parking use over the Airport's primary purpose of providing a high level of service to customers.

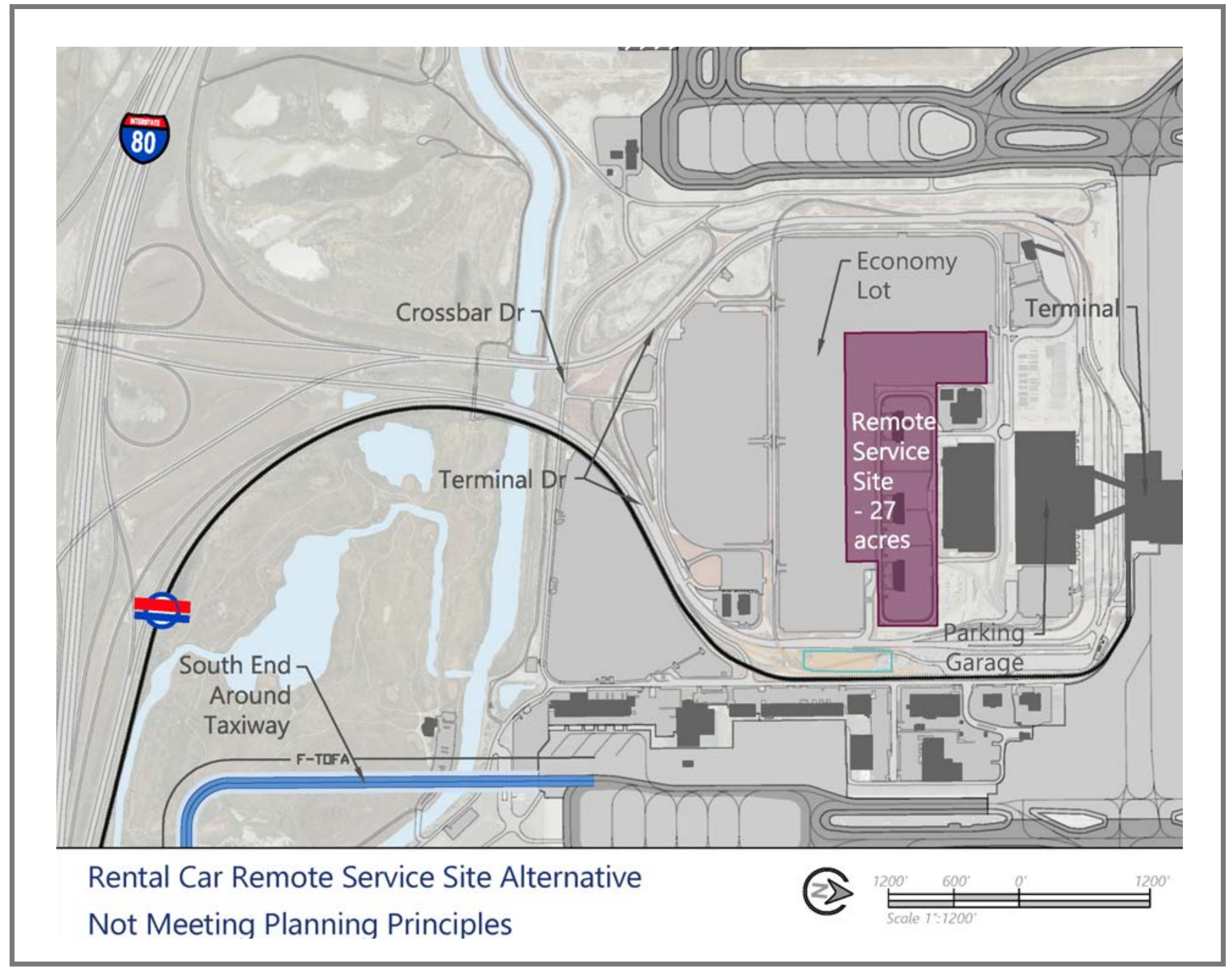
4.7.6.3 Rental Car Remote Service Site

It is possible to replace economy parking spaces with an expansion of the existing rental car Remote Service Site (RSS), as shown in Figure 4-21. This option was dismissed as inadequate because it fails to meet important landside planning principles including:

- Keep highest value landside functions closest to the terminal building.
- Minimize parking shuttle circulation distance, time, and cost.

To its detriment, this option prioritizes "back of house" rental car service activities that do not immediately serve airport customers. Given how the RSS is used, having it proximate to the ready-return area does not improve car availability for customers. Instead, its presence removes a large area of convenient, customer-oriented parking spaces. Displacing customer parking from inside the Terminal Drive to outside the loop roadway complicates the overall Airport parking wayfinding system, increases parking shuttle route distance, times, and operating cost, and degrades the customer experience. At the surface, this option appears to have the lowest capital costs to implement as it simply replaces surface parking spaces with new rental car space. However, operational costs to conduct parking operations would increase as costs to shuttle passengers increases. For these reasons, this alternative was eliminated from further consideration.

Figure 4-21: Rental Car Remote Service Site Alternatives Not Meeting Planning Principles



Source: RS&H and Curtis Transportation Consulting, 2020

4.7.7 Comprehensive Landside Alternatives

Unlike most airport master plans, this one was prepared while a significant new development program, the ARP, was in final stages of construction. For the landside elements of the ARP, their planning and significant portions of their construction took place nearly two decades ago. The roadway system with a place for garage parking, economy parking, and rental car facilities located within the Terminal Drive loop set the stage for all alternative concepts developed in this master plan update.

The following two comprehensive landside concepts are naturally compatible with and supportive of the concepts of the facilities related to the ARP. The two alternatives are designed to continue the general landside concept that exists today, while addressing the facility needs over the planning period. Because these concepts adhere to the general landside planning guidelines which led to the current configuration, they work in harmony with the new SLCIA terminal to organize and maximize use of the limited landside area near the Airport terminal. The ultimate goal of these concepts is to organize airport resources (land, financial, and otherwise) to provide a safe, efficient, and high-quality customer experience.

At the core of the two concepts is the idea that the land inside the loop be allocated to the uses which best serve the customers and provide the highest quality service for the most customers. Ancillary supporting facilities are therefore moved outside the loop if there is no room for them inside it. Thus, in both concepts, the convenience/service center is moved to the northeast corner of the current employee parking lot on 3700 West, to provide for more Economy Parking. This location also places these services where they can better serve their primary users, who are employees, tenants, commercial drivers, and contractors.

As well, in both concepts, the Park 'n' Wait is relocated back to its previous location. Not only does this free up more spaces for Economy Parking inside the loop, it also:

- Eliminates the traffic congestion and safety issue of the major weaving area on inbound Terminal Drive.
- Greatly improves the visibility of, access to, and egress from the lot, thereby enhancing its utilization.
- Reintroduces the potential use of the lot for security screening under a Code Red condition, as requested by the police.

With the current employee parking, service/convenience center, and Park 'n' Wait all relocated, the development of concepts centered around how best to utilize the available area within the Terminal Drive loop. Facility requirements suggested the need to maximize Economy Parking. Alternatively, the overall public parking program could be met with more walkable (structured) parking, and less surface parking. The tradeoff is in customer service levels and the customers' collective willingness to pay for the higher quality of service. These trade-offs are explored in the two comprehensive landside concepts.

Table 4-11: Comprehensive Landside Alternative One Summary

Land Use	Land Area (sf)	Projected Spaces	PAL 3 Required Spaces	Surplus/ (Deficiency)
Public Parking				
Economy Parking	4,998,000	13,279	16,931	(3,652)
Garage Parking	585,000	7,370	3,884	3,486
Total Public Parking	5,583,000	20,649	20,815	(166)
Employee Parking[1]				
Single South Lot Option	1,589,370	4,589	4,589	0
Split North-South Lots Option	1,664,370	4,589	4,589	0
Rental Car				
RAC Ready Return	585,000	2,004	1,958	46
RAC Storage	444,600	5,142	3,005[2]	2,137
RAC QTA Position	430,000	115	115	0
RAC RSS	1,176,120	-	-	-
Park 'n' Wait	78,200	95	95	0
Service Center	77,400	58	58	0
COmmercial Vehicle Staging	160,000	141	141	0

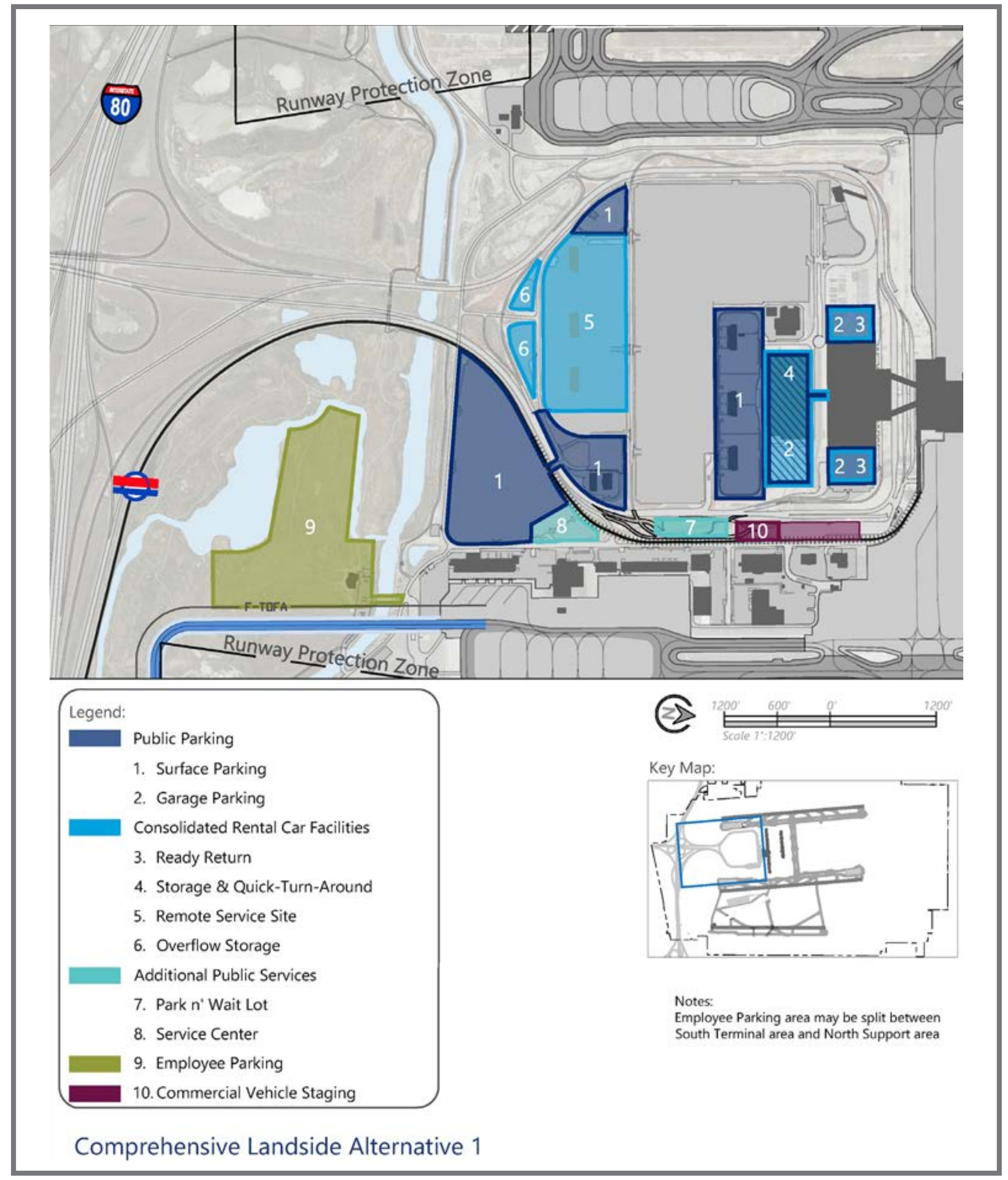
Notes: 1) Land available to accommodate either employee parking option. 2) RAC storage requirements based on off-airport shuttling requirement.
Source: Curtis Transportation Consulting and RS&H Analysis, 2020

4.7.7.1 Comprehensive Landside Alternative One

The first comprehensive landside alternative features the additional garage parking in lieu of the full program of economy parking. In doing so, it permits non-customer-oriented facilities (the rental car RSS) to remain inside the loop, as it was originally planned 20 years ago. This concept contains all landside facilities within the existing landside programmed land area, with the exception of the employee parking lot which is located south of the existing lot in the former golf course area. The facility layout for this concept is shown in Figure 4-22. The summary of required land area for each facility and the estimated total space allocations is shown in Table 4-11. The following description of this alternative is organized to provide a logical flow and order of how the facilities could be implemented.

Employee parking requirements show an immediate need for additional space. Beginning with design and construction of new employee parking allows the existing lot to accommodate needed public parking as other landside facilities are implemented. This concept is flexible to incorporate any of the previously described employee lot configurations but shows the recommended single south employee lot option. Access to the south lot is provided via 3700 West by a new bridge over the existing canal. Alterations to the canal should consider the impacts to the proposed south employee parking lot bridge.

Figure 4-22: Comprehensive Landside Alternative One



Source: RS&H and Curtis Transportation Consulting, 2020

The existing public parking configuration has a ratio of 2.9:1 surface parking spaces to garage spaces. Landside Alternative One incorporates more vertical garage parking spaces to meet overall parking demand within the landside envelop and decreases that ratio to 1.8:1. This means that, in the future under this concept, a higher percentage of overall parking at SLCIA would be provided by the parking garage. Increasing the ratio of garage parking provides an opportunity to incorporate hourly parking spaces close to the terminal to serve short-term parkers. This is important because analysis showed that roughly 68 percent of garage parkers stayed for less than 1.5 hours and proves that there is customer demand for this type of parking space.

New vertical parking in this concept is provided by two equally sized expansions on the east and west ends of the garage. Each expansion is five bays and five levels. Vehicle parking space estimates (shown in Table 4-11) incorporate 60-foot bays, akin to those in the existing garage, for light and air penetration into the structure. Each expansion footprint is approximately 117,000 square feet for an expanded area footprint of 234,000 square feet and a total garage footprint of 585,000 square feet. Public parking is provided on levels 2 through 5 of the garage and the entire ground level is dedicated to rental car ready return functions. In this alternative, additional public garage parking is provided on the 5th level of a rental car quick turnaround (QTA) and storage garage, which will be described in more detail in the rental car facilities discussion to follow. In total, at a planning factor of 360 square feet per space, an estimated total of 7,370 garage parking spaces will be provided in this concept. For surface parking, a planning factor of 330 square feet per space was used, providing a total of 13,279 surface parking spaces over the planning period. Exact locations for these surface parking spaces will be described throughout this section. In total, although this alternative shows a slight deficiency of 166 parking spaces (0.8 percent deficient) to meet total parking demand over the planning period, this estimated total is within the errors of our estimates and the concept meets overall needs of the parking program.

Comprehensive Landside Alternative One meets on-airport rental car storage requirements through construction of a new 5-level rental car garage. QTA functions are located on the ground level and rental car storage takes place on levels 2 through 4. Level 5 in the QTA garage is dedicated to public parking. Public garage parkers would access the top level of the QTA via a bridge connecting to the primary public parking garage. This bridge would be best positioned central to the terminal gateway building to create a movement corridor capable of automating passenger movements and reducing overall walking distances.

The new QTA garage would likely be constructed in three phases as follows:

- Construct a new wing east of the existing QTA garage.
- Demolish and replace the west portion of the existing QTA garage with new construction matching the new east wing.
- Demolish and replace the remaining center portion of the existing QTA garage to tie into the previously constructed new QTA garage portions.

Phasing the new QTA garage construction this way would allow continued operations while the new facility is being built.

In this alternative, the rental car RSS is relocated to the south end of the existing surface parking lot. The new RSS absorbs 24 acres of land used for surface parking, equating to a loss of roughly 3,100 parking spaces. An additional three acres is available for rental car overflow storage in the areas immediately south of the new RSS location. Once the RSS is relocated, the old RSS site can be reconstructed for surface parking. This recovers approximately 2,076 of the surface parking spaces lost by the RSS relocation for a net loss of 1,024 spaces. As the RSS is designed, any ability to reduce the overall RSS surface space would help lessen the overall loss of surface parking under this concept.

The Service Center and the Park 'n' Wait lot are currently located inside the terminal loop roadway (Terminal Drive). As previously noted, this concept relocates both facilities to new locations along the right side of the terminal entry (outside the terminal loop roadway). The Service Center is separated from the Park 'n' Wait lot and located on approximately 80,000 square feet of the northeast corner of the current employee parking lot. This area is accessed by the existing Terminal Drive exit to 3700 West where the entry/exit to the Service Center would be located. The Park 'n' Wait lot is relocated back to the site of the former Park 'n' Wait lot and covers approximately 80,000 square feet, which includes 25,000 square feet for entry, exit, and landscaping. Entry to the relocated Park 'n' Wait lot would also be accessed by the exit from Terminal Drive to 3700 West and the exit would reenter vehicles into the stream of traffic nearing the terminal curb roadway. Each new location is highly visible, safely accessible, intuitive to users, and adheres well to landside planning principles.

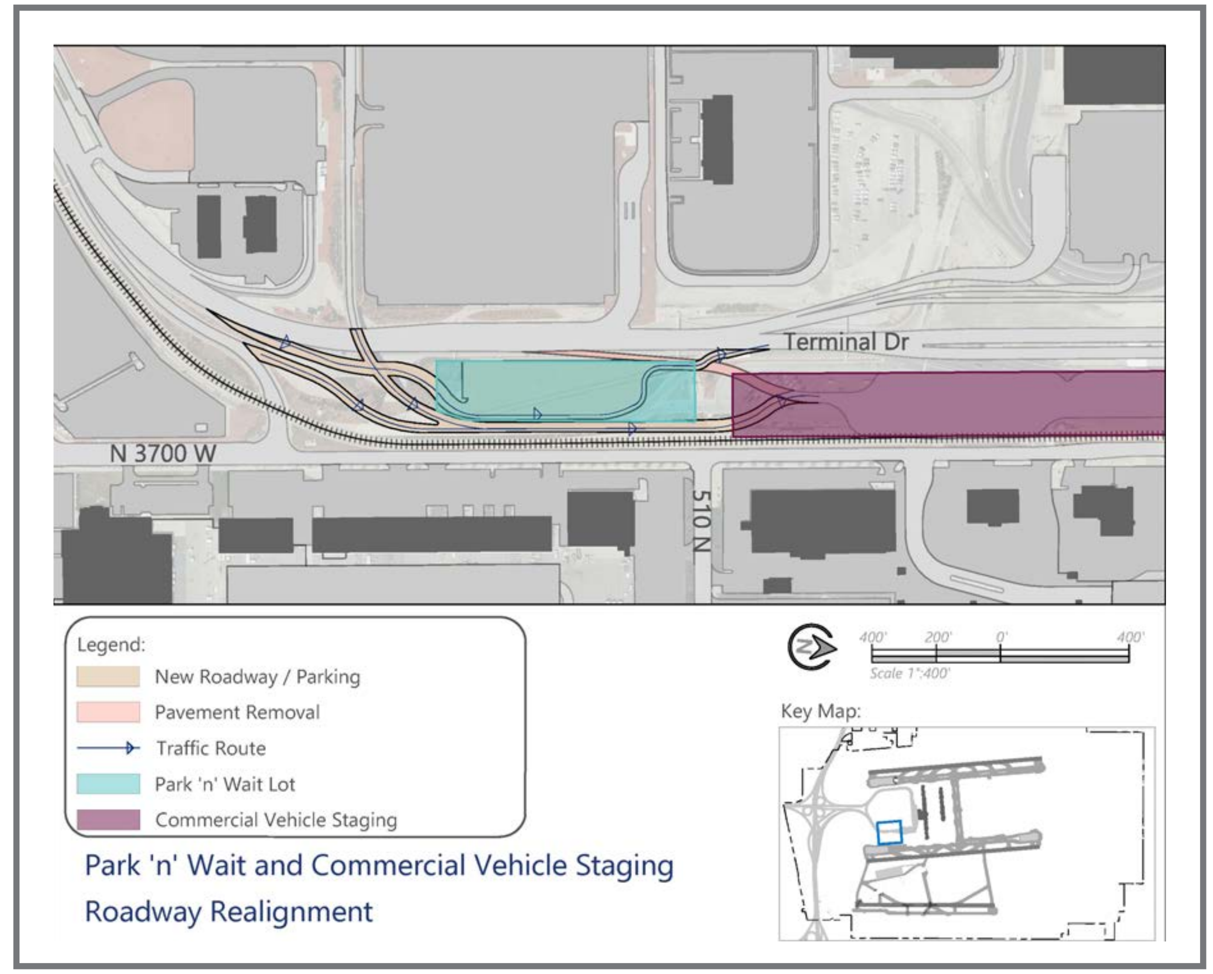
Relocating the Service Center and Park 'n' Wait lot allows for redevelopment of those sites for additional surface parking that remains contiguous with the existing surface parking area. Additionally, unused space west of the relocated RSS site can be incorporated into the surface parking lot.

The commercial vehicle staging lot remains in its present location but expands into open land to the south in order to meet the 141 space requirements. Total land area for the commercial vehicle staging area is approximately 160,000 square feet.

A common aspect of both alternative concepts is that the entry to the commercial vehicle staging would revert back to its original location prior to when the Park 'n' Wait lot was moved, as an exit left from the ramp from Terminal Drive to 3700 West. The location of the entry to the staging area was built in that location in order to separate out larger, slower commercial vehicles from POVs and rental cars at the earliest opportunity. Not only does this reduce traffic on the terminal approach lanes, it improves driver visibility (wayfinding and orientation) by taking out the larger vehicles, and thus also improves safety as inbound drivers look to find where they need to go, and maneuver to get there. Relocating the entry to the staging area back to its former location off the exit ramp to 3700 West will also reduce the volume on the terminal approach lanes enough to avoid having to widen that roadway during the planning period. Figure 4-23 shows the roadway configuration for the Park 'n' Wait lot and the commercial vehicle staging area entry.

During emergency operations defined by Airport police as "Code Red", vehicles entering the terminal curb area must be rerouted away from the terminal curb. The configuration of the commercial vehicle staging area allows this to occur, but the existing road (located immediately north of the staging lot and south of the light rail station) crossing the light rail tracks to 3700 West must be either preserved or replaced. This rail

Figure 4-23: Park 'N' Wait Lot and Commercial Vehicle Staging Lot Roadway Realignment



Source: RS&H and Curtis Transportation Consulting, 2020

crossing is the critical link that allows inbound vehicular traffic to flow away from the terminal curb on 3700 West during a Code Red exercise.

4.7.7.2 Comprehensive Landside Alternative Two

Comprehensive Landside Alternative Two provides for significantly more public parking than Alternative One by removing the rental car RSS from inside the Terminal Drive Loop. This increases the number of available economy parking spaces and reduces the number of required garage spaces. Otherwise, the landside facilities are located in the same general areas as in Alternative One.

Public parking in Comprehensive Landside Alternative Two is provided more so by surface parking in this concept than in Alternative One. Alternative Two provides total parking at a rate of 2.6 surface spaces per 1 garage space. This ratio is higher than Alternative One and nearly as high as the current allocation ratio (2.9:1). The reason this alternative maintains a higher surface space to garage space ratio is because, in this concept, the rental car RSS is relocated to the vacant land south of the Surplus Canal and northwest of the I-80 and Bangerter Highway interchange. Developing a new RSS in this location provides more land for SLCIA to provide surface parking demand throughout PAL 3 than Alternative One. The facility layout for this concept is shown in Figure 4-24. Table 4-12 shows a summary of facility land areas and vehicle spaces provided in Comprehensive Landside Alternative Two.

Similar to Alternative One, the current employee parking lot is converted to public parking. However, a bridge is constructed over Terminal Drive to connect the inner loop surface parking to the converted employee lot. This bridge connects all surface parking together seamlessly, therefore providing singular access and egress points for public parkers and connecting the lots for shuttle operation efficiency.

Under this concept, the rental car QTA and storage garage is 4 levels on a 444,600 square feet footprint (same as Alternative One) but it does not incorporate a 5th level for additional public garage parking. The rental car RSS is located on the former golf course site and, unlike Alternative One, does not decrease the surface parking area. However, the new RSS in Alternative Two is 0.5 miles further by service roads than the RSS proposed in Alternative One.

Table 4-12: Comprehensive Landside Alternative Two Summary

Land Use	Land Area (sf)	Projected Spaces	PAL 3 Required Spaces	Surplus/ (Deficiency)
Public Parking				
Economy Parking	4,998,000	16,316	16,931	(615)
Garage Parking	585,000	6,275	3,884	2,391
Total Public Parking	5,583,000	22,591	20,815	1,776
Employee Parking[1]				
Single South Lot Option	1,589,370	4,589	4,589	0
Split North-South Lots Option	1,664,370	4,589	4,589	0
Rental Car				
RAC Ready Return	585,000	2,004	1,958	46
RAC Storage	444,600	5,142	3,005[2]	2,137
RAC QTA Position	430,000	115	115	0
RAC RSS	1,176,120	-	-	-
Park 'n' Wait	78,200	95	95	0
Service Center	77,400	58	58	0
COmmercial Vehicle Staging	160,000	141	141	0

Notes: 1) Land available to accommodate either employee parking option. 2) RAC storage requirements based on off-airport shuttling requirement.
Source: Curtis Transportation Consulting and RS&H Analysis, 2020

Aside from those key differences, the other proposed facility elements are identical. These include the Park 'n' Wait lot, the Service Center, commercial vehicle staging expansion, and the areas inside the terminal loop roadway to be filled in as surface parking and rental car storage overflow.

4.7.8 Landside Alternatives Evaluation

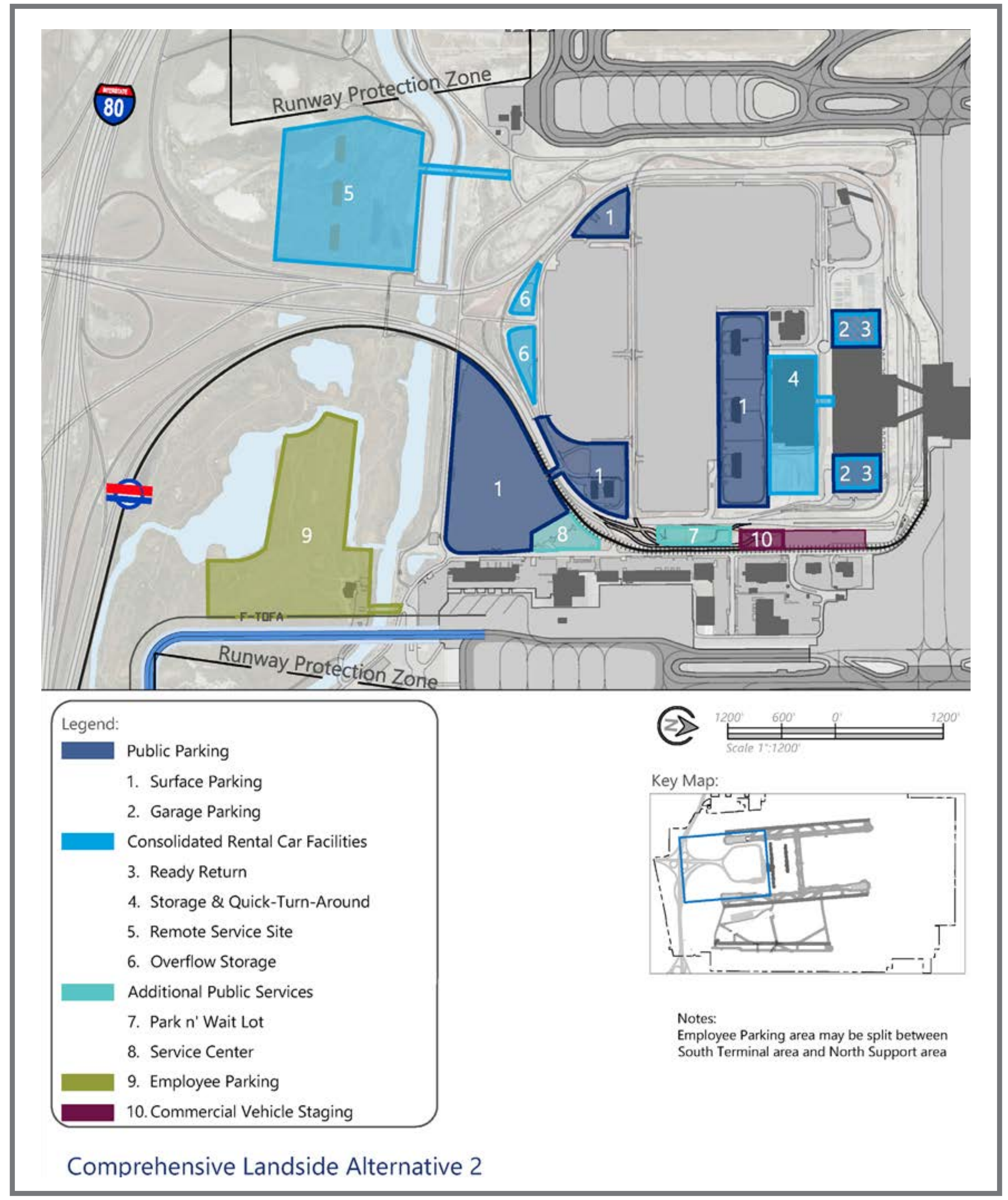
The landside alternatives were developed to achieve each landside planning principle and perform well with regard to evaluation criteria. Criteria used to evaluate each option are as follows:

- Meets near-and long-term facility requirements
- Meets objectives and planning principles
- Provides targeted level of service
- Operational efficiency / ease of use
- Operational and public safety
- Flexibility and future expansion potential
- Financial feasibility (capital/operating cost, net revenue)
- Environmental / sustainability
- Ease of implementation

Each landside facility is located and designed to meet the particular needs of the customer it serves. Therefore, different factors influenced each facility's degree of success in meeting specific evaluation criteria. Overall, both landside alternatives perform well. Table 4-13 shows how each facility performed relative to each criterion. It should be noted that, while many of the criteria graded as "fair" performed well, they did not perform as well as the other alternative. To differentiate an alternative performing better to meet certain evaluation criteria, the better performing concept was graded "good" and the weaker concept was graded as "fair". The key differentiators as to why one alternative performed better than the other are identified in Table 4-13 as well.

The key differences between the two alternatives are, 1) How much surface versus garage parking is provided to meet demand, and 2) Where the rental car RSS is sited. Public parking and rental car facilities are competing for limited space in the terminal landside area and trade-offs occur when one is prioritized above the other. If more surface parking is desired, then the RSS must be located outside the terminal loop road. If slightly closer proximity for the RSS is desired, then more vertical parking must be provided to meet customer demand. Landside best planning principles place public parking within the loop road as the higher priority therefore making the RSS location in Alternative Two the better option from a custom-

Figure 4-24: Comprehensive Landside Alternative Two



Source: RS&H and Curtis Transportation Consulting, 2020

er-service perspective. These two elements, public parking and rental car RSS, are the differentiating factors in evaluating the two landside alternatives. Each landside facility serves a specific purpose within the overall landside system and each facility is influenced by a different set of factors that must be quantified and analyzed individually in order to assign an appropriate performance grade. These factors vary by facility but include both qualitative and quantitative elements. Qualitative factors considered included pedestrian walking distance, estimated capital and operating costs, impact to vehicle miles traveled, shuttling time and distance, and distance to/from dependent facilities.

Pedestrian walking distance relates primarily to the garage parking. Alternative Two limits passenger walking distances from parking to the gateway building to a maximum of 1,300 feet while Alternative One increases that maximum distance from parking to the terminal building to approximately 1,850 feet. Those factors aside, it is possible to overcome this challenge with automated passenger movement systems that can quickly move people to the terminal without requiring considerable walking.

Table 4-13: Comprehensive Landside Alternatives Evaluation

Evaluation Criteria	Comprehensive Alternatives	
	One	Two
Meets Near/Long-term Facility Requirements	Fair	Good
Meets Objectives/Follows Planning Principles	Fair	Good
Provides Targeted Level of Service	Good	Good
Operational Efficiency/Ease of Use	Fair	Fair
Operational & Public Safety	Fair	Good
Flexibility & Expansion Potential	Fair	Good
Financial Feasibility	Fair	Fair
Environmental/Sustainability	Good	Fair
Ease of Implementation	Good	Good

Performance Legend Good Fair Poor

Source: RS&H and Curtis Transportation Consulting, 2020

VMT is a factor that mostly relates to rental car shuttling to the RSS and to storage. Because both concepts provide storage parking in adequate quantities and in the same location as they currently exist, each alternative performs equally as well. Both alternatives are a vast improvement over current circumstances which require shuttling to off-airport storage locations. The RSS in Alternative Two is 0.5 miles further along service roads than Alternative One so it does have a lower overall VMT which quantified, would depend on the annual number of cars shuttled to the RSS for service or storage. Assuming 2 percent of the rental car fleet would require shuttling for service at the RSS, at PAL 3 projected demand levels, this could create roughly 28,590 additional annual miles traveled in Alternative Two verses Alternative One. This additional mileage is very minor when considering the scale of rental car operations occurring at SLCIA.

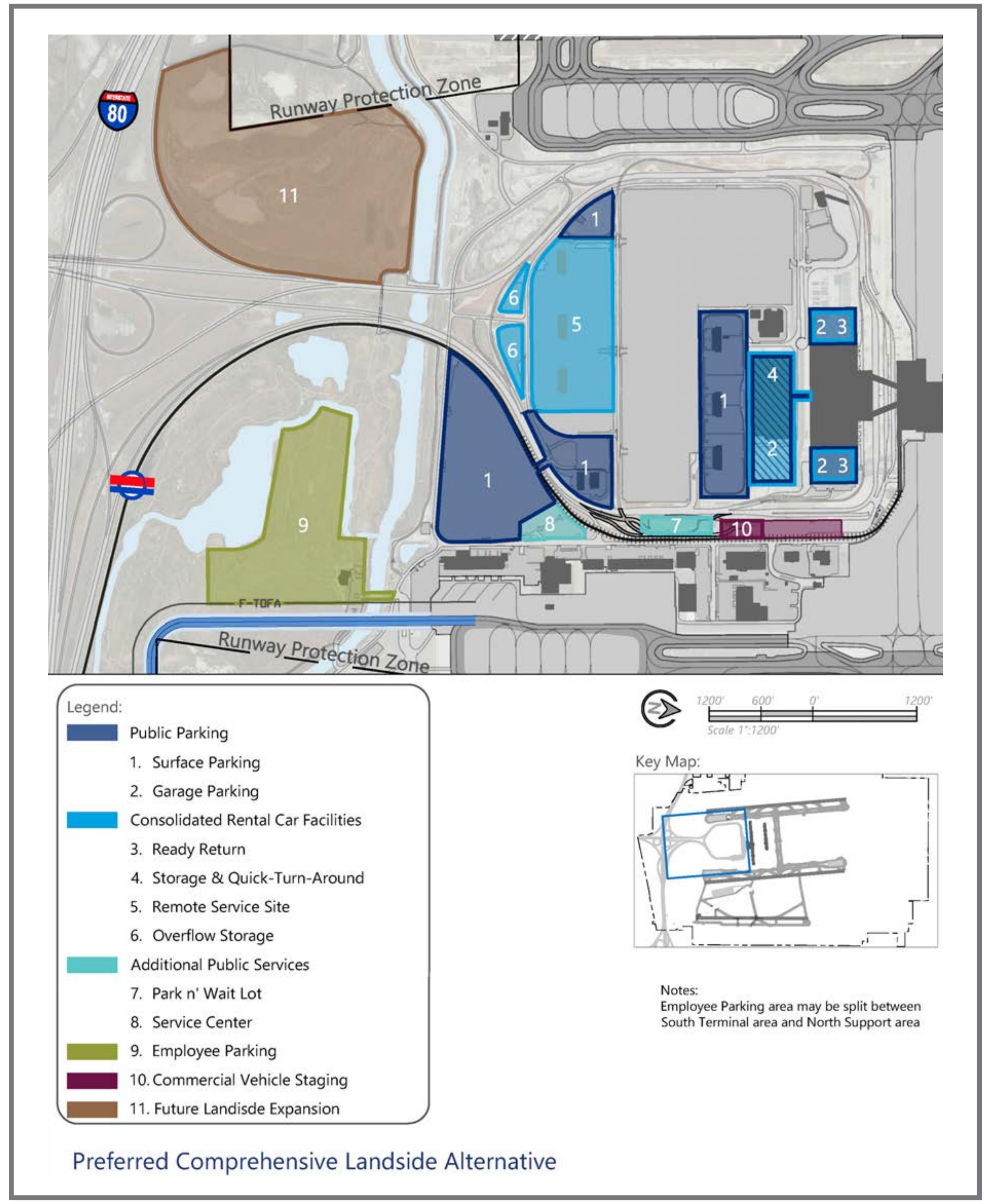
Shuttling time and distances relate to the surface parking lot shuttles and employee lot shuttles. Employee lot comparisons are made in Section 4.7.3, Employee Parking. Both alternatives have a degree of surface parking and will require shuttling operations. The cost of shuttling is less dependent upon the spaces provided by both concepts and more dependent upon the number of routes scheduled and the headways offered by the Airport to meet a preferred service standard. Alternative One requires two separate routes to service the two surface parking lots and Alternative Two can be serviced by one route because the surface lots are connected by an overpass. Therefore, between the two concepts, Alternative One is likely to have the higher operating cost (shuttling) but the initial lower capital costs (no overpass to build). The rental car RSS in Alternative One also takes surface parking spaces farthest from the terminal, further reducing shuttling distances and times. Overall, Alternative One would reduce shuttling times and distances, but this is due to the fact that less surface parking is provided in favor of more garage parking.

4.7.9 Preferred Comprehensive Landside Development Plan

The preferred comprehensive landside development, shown in Figure 4-25 is the result of stakeholder feedback about the two concepts. The preferred landside development is, essentially, Comprehensive Landside Alternative One with the western portion of the former golf course (where Alternative Two proposes a replacement rental car RSS) preserved for ultimate landside use. Preserving this land for future landside uses alleviates many of the concerns that resulted in lower evaluation scores for Alternative One when compared to Alternative Two, especially as it relates to meeting long-term requirements, following planning principles, and flexibility and expansion potential.

The rationale behind placing the rental car RSS within the terminal loop road farthest from the terminal is that the closer the RSS is to the QTA, storage, and ready-return, the less distance companies have to travel to perform maintenance and store additional vehicles. This compromise balances keeping rental car operating costs low while still providing a high level of service to airport customers through on-airport surface parking near the terminal. It is anticipated that rental car operating costs will substantially benefit from an expanded ready-return area and the ability to service and store the majority of needed cars within close proximity of ready-return in the expanded QTA. The preferred RSS location also avoids the requirement for rental car employees to shuttle cars on public roadways, as it did in Alternative Two, since there is right-of-way currently established solely for this purpose. Finally, while this option does not provide the amount of public surface parking spaces to meet forecast demand levels, it offsets this shortage with walkable structured parking which offers a higher customer level of service. The key to maximizing customer use of structured parking, and the subsequent revenues will be setting a simple program and rate structure that encourages airport patrons to use the new garage spaces as opposed to parking in economy shuttle lots or with off-airport providers.

Figure 4-25: Preferred Comprehensive Landside Alternative



Source: RS&H and Curtis Transportation Consulting, 2020

4.8 SUPPORT FACILITY ALTERNATIVES

The facility requirements analysis identified specific support facilities that will require relocation and/or expansion in the future at SLC. These include airline maintenance, airport maintenance, ARFF Station #12, the commercial service fuel farm, and general aviation facilities. Except for GA, these facilities are all within the planned envelope for a future Concourse C. While the actual construction of a Concourse C is outside the planning period, the site of any planned concourse construction must be cleared prior to implementation. As noted in Section 4.2, a full Concourse C build out may not be needed until beyond the planning period. However, it is recommended that new and replacement facilities be placed outside the Concourse C site envelope.

This section begins with an overview of the site analysis conducted for airline maintenance, airport maintenance and ARFF facilities. The fuel facility was examined separately as its location is more flexible. Finally, the GA related alternatives are discussed.

4.8.1 Airline Maintenance, Airport Maintenance, and ARFF Sites

Four new sites, illustrated in Figure 4-26, were examined for their ability to accommodate relocation and expansion needs of airline maintenance, airport maintenance, and the ARFF Station. Sites 1, 3, and 4 are large enough to support a full relocation and varying levels of expansion of airline and airport maintenance, while Site 2 is large enough to support relocation or partial relocation and expansion.

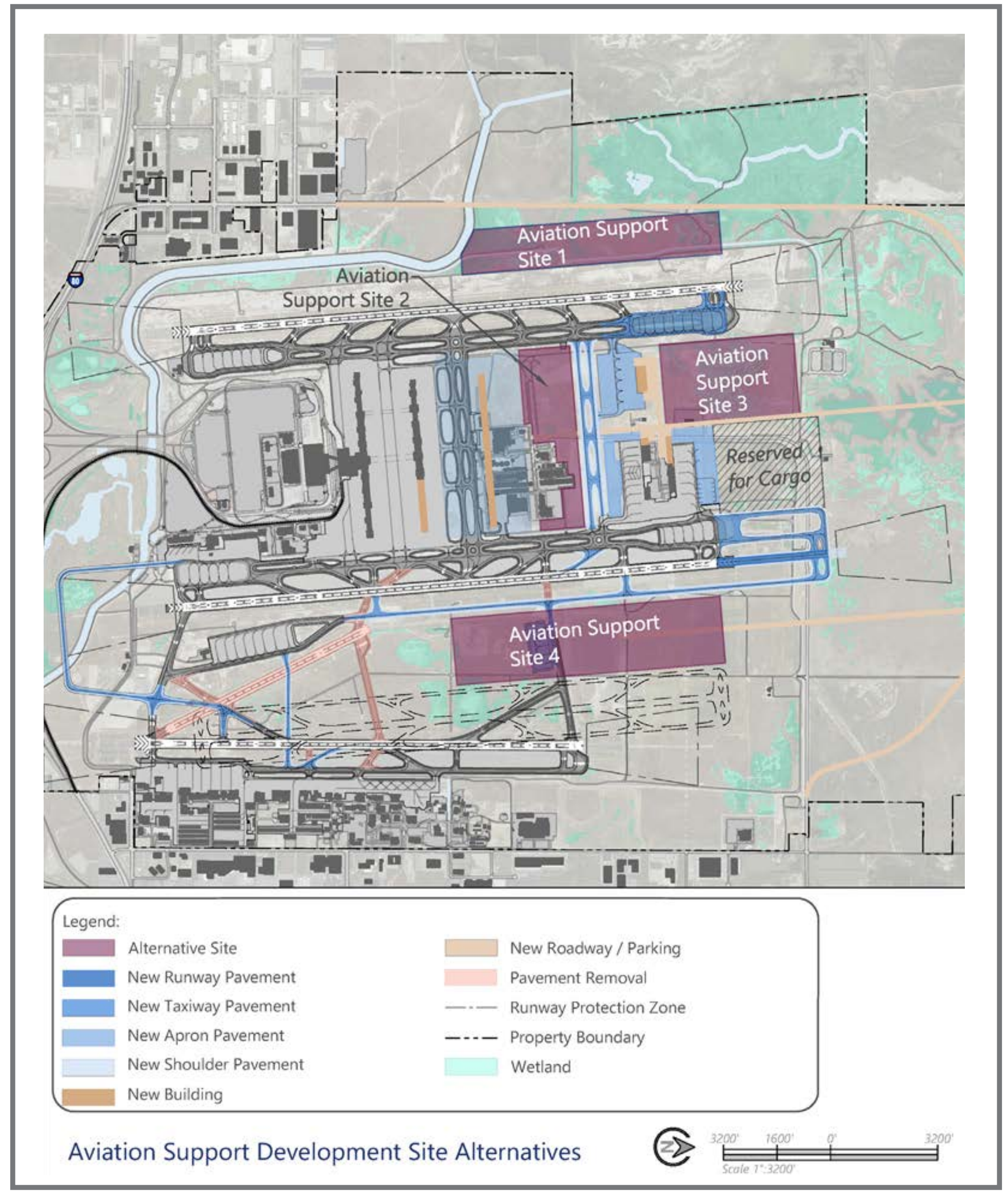
Site 2 was found to be the only site suitable for relocation of ARFF Station #12 due to the response time requirements to Runway 16L-34R and 16R-34L. The other sites were further examined for their ability to support airline maintenance and airport maintenance facilities. The evaluation of the sites is illustrated in Table 4-14. Site 1 performed the worst, primarily due to its location in an area that contains large amounts of wetlands and no utility infrastructure nearby making implementation for any new facility very difficult. Site 1 and Site 4 both would require new taxiways to support airline maintenance which increases cost and decreases ease of implementation. Additionally, airline maintenance in Sites 1 or 4 are furthest from the terminal area, requiring longer drive and aircraft tow distances, which increases emissions and operating costs. Site 1 was deemed incompatible overall for airline maintenance as aircraft would need to be towed across an active runway, whereas in Site 4, aircraft in tow could utilize the SEAT (although, because of the very long distance, this is also impractical). Sites 2 and 3 both performed well. The only areas where these sites underperformed Sites 1 and 4 was in relation to the space for future expansion and meeting long term requirements. However, if combined, the space constraints are mitigated. Thus, both Site 2 and Site 3 were carried forward as the preferred location for airline maintenance, airport maintenance, and the eventual ARFF Station #12 relocation. Airport maintenance was planned in the last master plan to be eventually relocated into Site 4. Site 4 would accommodate that facility well, although it would require new utility and roadway infrastructure. This study found that existing airport maintenance facilities are a mix of old, dilapidated buildings that require replacement and some newer buildings in good condition. As opposed to fully relocating the maintenance facility into Site 4 as a greenfield development, which would require significant expense, replacement infill development within Site

Table 4-14: Aviation Support Development Site Evaluation

Criteria	Site 1	Site 2	Site 3	Site 4
Operational Efficiency	Poor	Good	Good	Poor
Flexibility & Expansion Potential	Good	Fair	Fair	Good
Financial Feasibility	Poor	Good	Good	Fair
Environmental/Sustainability	Poor	Good	Good	Fair
Ease of Implementation	Poor	Good	Good	Poor
Meets Near/Long-term Requirements	Good	Fair	Good	Good

Performance Legend Good Fair Poor

Figure 4-26: Aviation Support Site Alternative



Source: SLCDA; RS&H Analysis, 2020

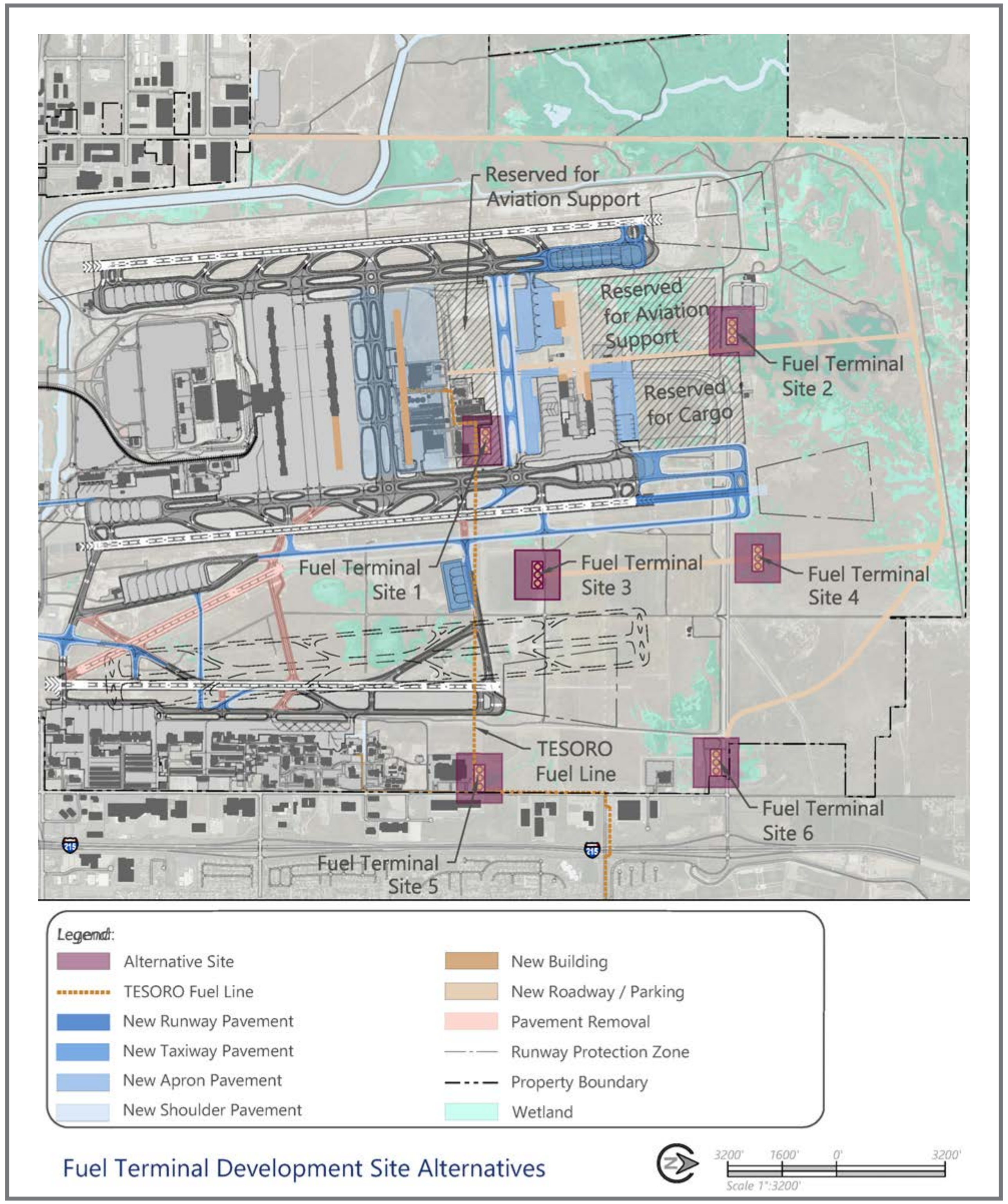
2 was found to be more practical. Replacement buildings could be developed near existing buildings, keeping the maintenance campus consolidated. Additionally, keeping the maintenance function near the terminal building provides greater efficiency for workers who service that facility.

4.8.2 Commercial Service Fuel Farm

The current commercial service fuel farm facility is located with other north support facilities and lies within the footprint of the future Concourse C. As discussed in the balanced airport analysis, build out of a partial Concourse C is not expected to be needed until the end, or beyond, the planning period. Additionally, airfield capacity enhancements would be required to accommodate operational levels that would be associated with even a half Concourse C build out. Thus, it is likely that the commercial service fuel farm will be able to remain in its current location though the planning period, and depending on initial Concourse C construction, for many years beyond. However, to account for any change that may require relocation of the commercial service fuel farm earlier than expected, relocation sites were analyzed.

Six sites were identified, as shown in Figure 4-27. Considerations for each site include the need for non-secure landside access for fuel tanker trucks and other personnel to access the facility. The new facility must tie into the existing pipeline. infrastructure that connects to the terminal concourses and to the oil refinery north of SLC. The farther the new site is from the existing pipeline, the greater the cost and complexity of connection. The results of the evaluation, shown in Table 4-15, determined that Site 3 should be reserved for the relocation of the fuel facility. Sites 2, 4, and 6 all have wetland impacts greater than the others, and being further from the existing pipeline, will require greater infrastructure and incur more cost. Site 1 may be the easiest to implement, but the site is constrained for future growth and is better suited for other aviation related purposes such as airport maintenance facilities. Although Site 5 performed well in the evaluation, the land is valuable real estate for future aeronautical facilities because it has roadway and taxiway access, and thus should not be used for a fuel farm. Overall, Site 3 is identified as the preferred site since it is close to the existing pipeline, has little or no wetland impact, has room for expansion, and is an appropriate use of the land in that area. Ease of implementation is the only challenge as a roadway and utilities would need to be built to serve the site. Future consideration is required for crossfield connection to a realigned Runway 17-35. The site may need to be adjusted and/or a roadway tunnel may be required if future crossfield taxiways are built to the north.

Figure 4-27: Commercial Fuel Terminal Relocation Sites



Source: SLCDA; RS&H Analysis, 2020

Table 4-15: Commercial Fuel Farm Relocation Evaluation

Criteria	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6
Operational Efficiency	Fair	Good	Good	Good	Good	Good
Flexibility & Expansion Potential	Poor	Good	Good	Good	Good	Good
Project Cost Considerations	Good	Poor	Good	Poor	Good	Poor
Wetlands Impacts	Good	Poor	Good	Fair	Fair	Fair
Ease of Implementation	Good	Fair	Fair	Fair	Fair	Fair
Meets Near/Long-term Requirements	Poor	Good	Good	Good	Good	Good

Performance Legend Good Fair Poor

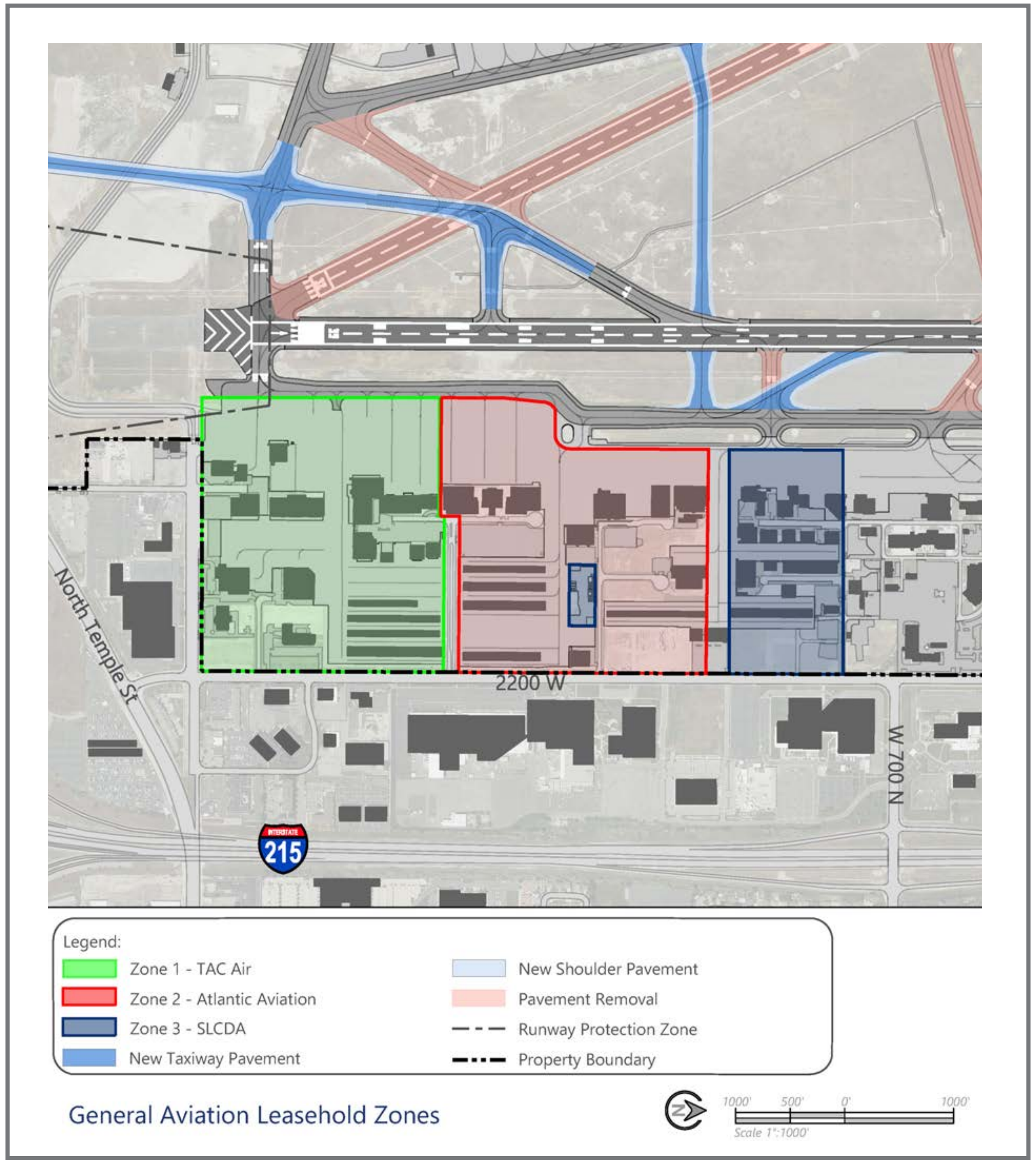
4.8.3 General Aviation

The facility requirements chapter identifies a transition in required general aviation (GA) facilities over the planning period, as jet-oriented growth, combined with a decline in the number of smaller aircraft, results in a surplus of T-hangars and shade hangars, and a significant deficiency of box hangars. In addition to the facility requirements, a *General Aviation Strategy Plan* exists for the SLCDA airport system. The strategy plan develops a methodology to use the three airports within the system to maximize efficiency by providing enhanced facilities at South Valley Regional Airport and Tooele Valley Airport.

The strategy plan finds that enhanced facilities at reliever airports, combined with adjusting lease rates to fair market values, can result in an even further decrease in the demand for market rate T-hangar and shade facilities at SLC than what is forecasted in the Master Plan. This is expected to result in a surplus of existing T-hangar facilities that can be redeveloped to meet demand for box hangars over the course of the planning period. The Recommended Action Plan proposed in the strategy plan is being carried forward in this study. Through implementation of the action plan, unneeded T-hangar and shade hangar facilities can be redeveloped to accommodate forecasted demand of box hangars through the planning period.

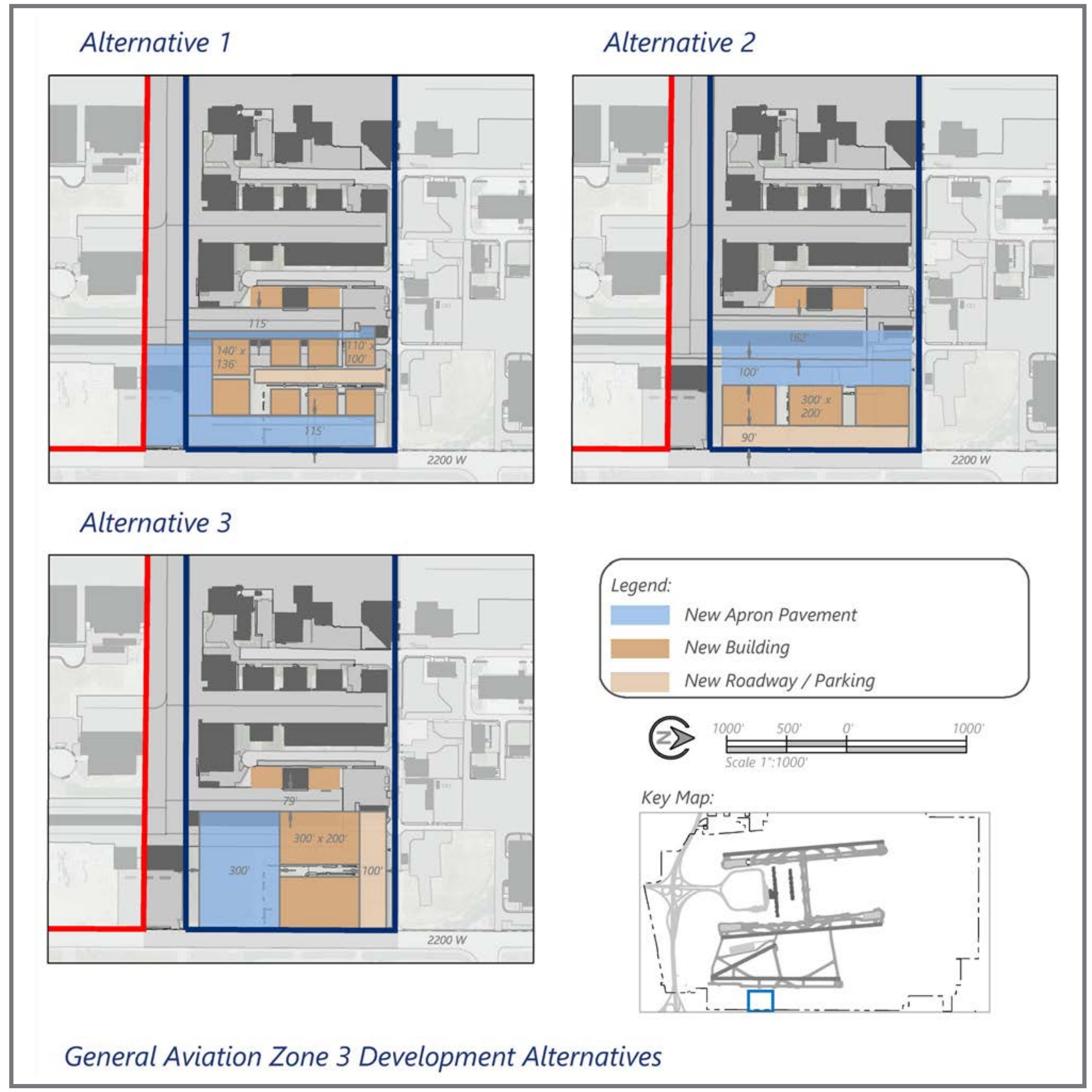
SLCDA has adopted a general aviation management policy that divides the land within the GA area into zones of control to consolidate leaseholds and future development which will allow independent management of general aviation facilities by the existing FBOs at SLC(i.e., TAC Air and Atlantic Aviation). The policy will allow the FBOs to develop the types of facilities needed to satisfy market demand. Although, this system is designed to reduce the involvement of SLCDA in the overall management and future development of GA hangars at the Airport, it does retain a smaller zone as an area of control for the SLCDA. The future development required to meet the facility demands of GA will predominately occur by the FBOs in Zone 1 and Zone 2. Figure 4-28 shows the three GA leasehold zones for TAC Air, Atlantic Aviation, and SLCDA.

Figure 4-28: General Aviation Leasehold Zones



Source: SLCDA; RS&H Analysis, 2020

Figure 4-29: General Aviation Zone 3 Development Alternatives



Source: SLCDA; RS&H Analysis, 2020

With Zone 1 and Zone 2 being managed by the respective FBOs, Zone 3 is the only section of the GA area not currently within an FBO lease area and is the zone for which SLCDA will have direct development control. Zone 3 encompasses roughly 1.2 million total square feet, including approximately 280,000 square feet of developable land in its eastern portion, including a T-hangar ultimately slated for demolition due to structural deficiencies. To examine the development potential of this area, a total of three high-level concepts were analyzed including concepts for development of a cluster of small box hangars, development of 30,000 square feet hangars, and development of large 60,000 square feet hangars. These three concepts are shown in Figure 4-29. These concepts are based on the primary objective of having an area of land under SLC control (and not FBOs) that would allow leases and private development of individual corporate hangars for larger aircraft. Since the *General Aviation Strategy Plan* recommends that services and facilities for small general aviation aircraft be provided at its reliever airports, no small hangar development is proposed in these concepts.

Ultimately business demands will drive the specific sizing and development of Zone 3, but larger hangar sizes such as shown in these alternatives are preferred and would provide viable hangar layouts.

4.8.4 ARFF Training Facility

An ARFF training facility is a location which provides realistic, repeatable, and safe training for aircraft rescue and firefighting operations. For more than 20 years an ARFF training center existed at SLC until the facility was closed in 2018 due to the significant costs to operate what had become an aging facility. However, the benefits of having an ARFF training facility remain for the ARFF staff at SLC, as well as firefighters throughout the region who would use the facility. This Master Plan will preserve a site for potential development in case the financial case becomes practicable for an ARFF training facility in the future.

The previous facility encompassed approximately nine acres and provided live-fire training. For a future facility, the reserved site will incorporate space for both live-fire and classroom training. This site is forecasted to necessitate approximately 11.5 acres and considers sufficient space for a burn area, maneuvering area, pavement for additional special use ARFF equipment, parking for three ARFF vehicles with airside access, classroom space with associated furnishings, and landside parking.

In coordination with ARFF staff, five sites were identified, as shown in Figure 4-27. The evaluation process, summarized in Table 4-16, considers operational efficiency, flexibility and expandability, costs, impacts to wetlands, ease of implementation, and the ability of the site to accommodate space required. Operational efficiency analysis considers airside access for ARFF vehicles, landside access and parking, public viewshed, and compatibility with *Advisory Circular 150/5220-17B, Aircraft Rescue and Fire Fighting (ARFF) Training Facilities* siting requirements including:

- Outside of all restricted areas noted in AC 150/5300-13, *Airport Design*.
- Where smoke and the associated thermal plume will not hinder aircraft operations or ATC surveillance of the movement area.
- Where the aircraft mockup (e.g., tail height) and support components (e.g., buildings) will not interfere with navigational aids.
- Greater than 1,000 ft from residential areas and 300 feet from airport buildings and public vehicle parking lots.

To increase controllability of the impact of smoke plumes and reduce environmental impacts, a propane-fired system is recommended. The preferred site location should also not be sited in a location desirable for other usage, such as aviation-related or non-aeronautical development and above the 100-year floodplain.

Sites 4 and 5 were discarded due to challenges in providing airside access across a public roadway and the distance of the sites from existing utility infrastructure. Sites 1, 2, and 3 were determined to be viable alternatives, but all lack the ideal combination of airside vehicle service road and landside access while still preserving future development potential. Although each of the sites are outside of the ATCT line of sight for the airfield and the flight path of a realigned Runway 17-35, Sites 2 and 3 would be on the flight path of the existing runway if a facility is constructed prior to the runway being realigned. Existing wetlands at Sites 1 and 2 would also require mitigation prior to construction.

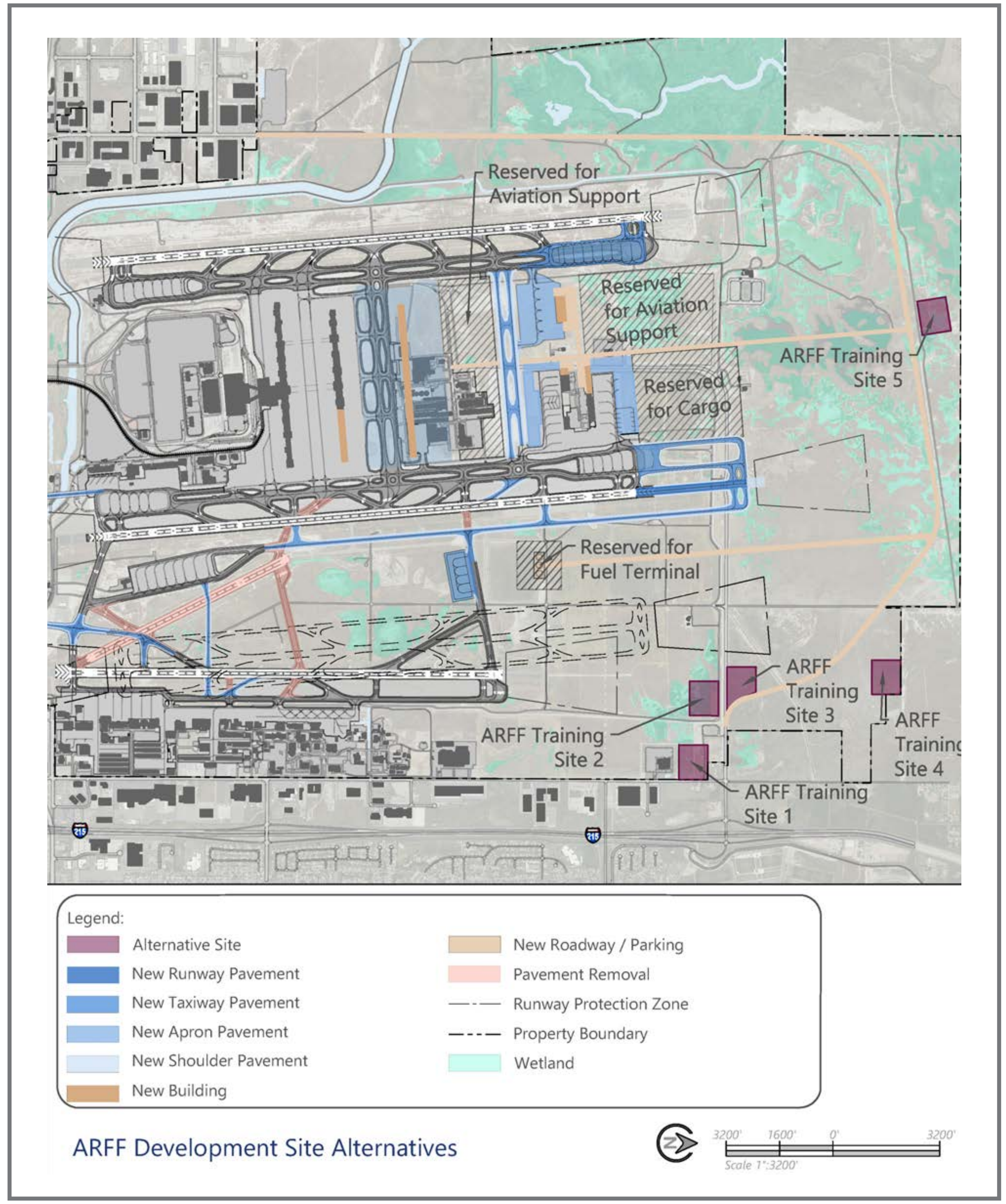
After evaluation, a hybrid alternative was created roughly between Sites 1 and 2, behind the SLCDA Airport Training and Activities Center. The hybrid location allows ideal connection to the airfield and VSR and requires only a short connection to 2200 W or 2100 N roadways. Although an access road will be needed from the site to 2200 W or 2100 N, the site itself is remote which preserves opportunities for development better suited for roadway frontage. It is important to note that the live-fire training facility must remain more than 300' from any other parking area or building, which can be met by the hybrid site. The proposed location for the replacement ARFF training facility is also shifted further from both the existing and realigned runway centerline of Runway 17-35 than Sites 2 and 3.

Table 4-16: ARFF Training Facility Site Evaluation

Criteria	Site 1	Site 2	Site 3	Site 4	Site 5
Operational Efficiency	Fair	Fair	Fair	Poor	Poor
Flexibility & Expansion Potential	Fair	Good	Fair	Good	Fair
Project Cost Considerations	Good	Good	Good	Poor	Poor
Wetlands Impacts	Fair	Fair	Good	Good	Fair
Ease of Implementation	Good	Fair	Good	Poor	Poor
Meets Near/Long-term Requirements	Good	Good	Good	Good	Good

Performance Legend Good Fair Poor

Figure 4-30: ARFF Training Facility Site Alternatives



Source: RS&H, 2020

4.9 NON-AERONAUTICAL LAND USE OPPORTUNITIES

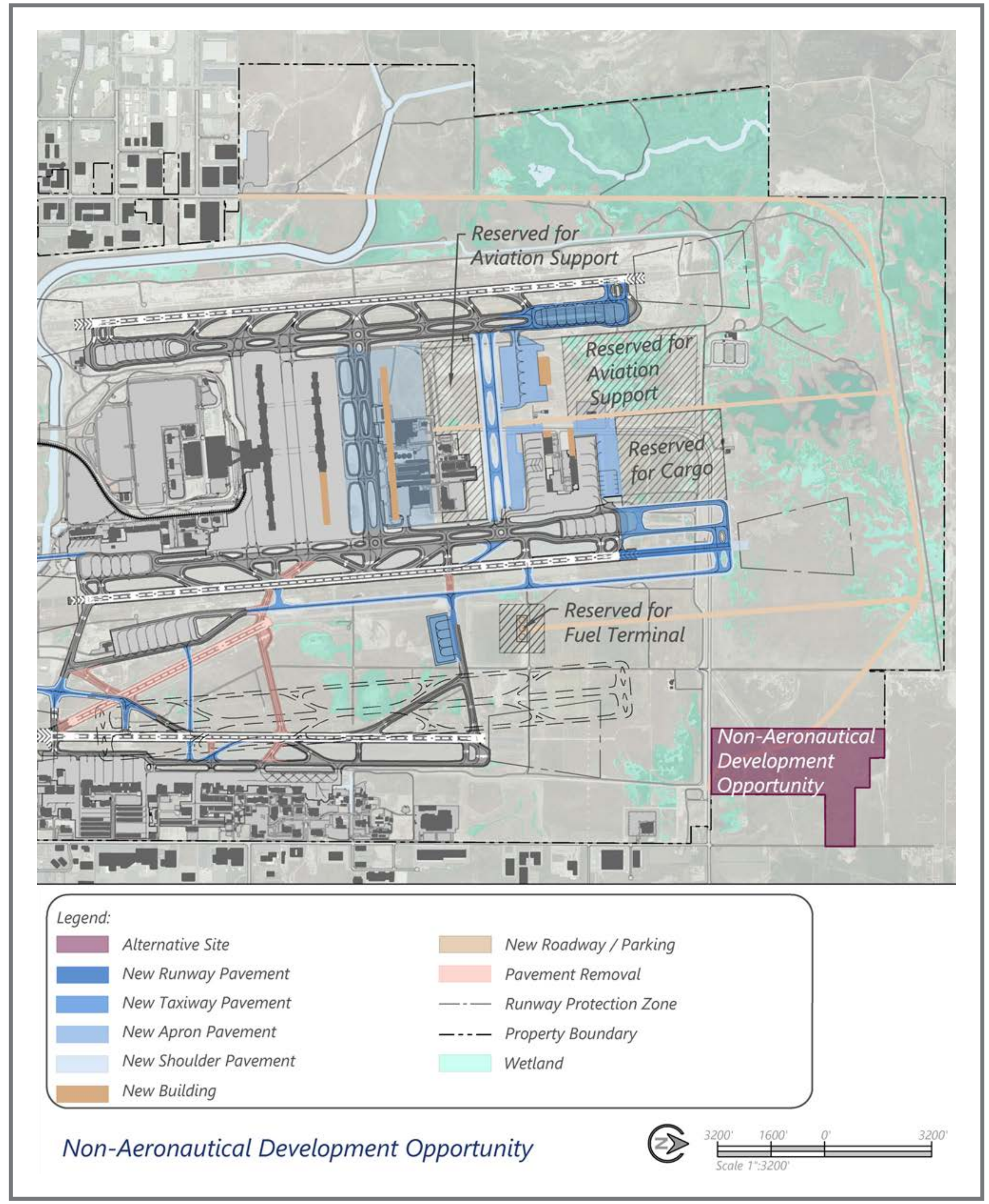
As part of this master plan, undeveloped landside parcels were assessed for their ability to serve as future development opportunity sites able to accommodate near- and long-term non-aeronautical development without impacting the future aeronautical needs of the Airport. The results of the analysis identified approximately 140 acres of land that is located within the northeast quadrant of airport property, illustrated in Figure 4-31.

Other sites were investigated, including the area between I-80 and the passenger terminal area, and the area north of the Air National Guard base on the east side of the Airport. The facility requirements determined the area between I-80 and the passenger terminal would be required to remain available for aeronautical purposes, namely for the SEAT and future terminal related parking infrastructure. The area north of the Air National Guard is ripe for future development and should remain preserved for aeronautical purposes.

The size of the site can accommodate many large-scale uses including large manufacturing facilities, a research and development campus, or Airport support facilities. These types of facilities are compatible with the Airport and could be designed to coexist with airspace limitations. Additionally, the location and configuration of the site accounts for the reservation of land for a realigned Runway 17-35 northern RPZ. Utility and roadway infrastructure exist in proximity to the site, although not within the site itself. However, the proximity of utilities and roadway access is advantageous for initial development. With consideration of these factors combined, it is recommended that the site be designated as non-aeronautical land use.

The reality of achieving development at the Airport will require inducing the market to act. This requires a proactive, planned, and executed marketing and implementation effort be undertaken by the Airport; otherwise, this area may remain undeveloped into the future. Forming public/private partnerships, mutually beneficial relationships with institutions such as universities and non-profit organizations, creating financial and economic benefit programs and packages, and targeting solicitation efforts aimed at attracting the most synergistic landside development partners for the Airport are all ways the Airport can catalyze development.

Figure 4-31: Non-Aeronautical Land Use



Soure: Strategy 5 LLC, RS&H, 2020

DEVELOPMENT PLANNING AND IMPLEMENTATION

DEVELOPMENT PLANNING AND IMPLEMENTATION

5.1 INTRODUCTION

In Chapter 3, Facility Requirements, each of SLCIA's facilities were analyzed for their ability to accommodate both existing and future demand over the 20-year planning horizon. Some facilities were found in need of expansion or upgrade today to accommodate current demand, while others will require expansion later. Alternatives were developed in Chapter 4, Identification and Evaluation of Alternatives, to satisfy the Airport's facility requirement needs. A set of preferred alternatives for various facilities were brought forward to be included in the Airport's Development Plan.

For projects related to demand levels, planning activity levels (PALs) were used to tie expansion requirements to demand, as opposed to actual years according to the forecast. At the time of this writing, the world is roughly one year though the COVID-19 pandemic, and aviation demand is severely depressed from 2019 levels. A recovery in passenger traffic to 2019 levels is expected by 2024. Meanwhile, air cargo is expanding and segments of general aviation have seen growth nationwide. By using PALs, SLCDA can track demand and plan for projects accordingly. Additionally, some projects are not demand related, and are programmed according to priority and anticipated SLCDA funding capability.

This chapter describes the projects and programs recommended in this study and organizes them in a sequence of priority based on PALs, strategic objectives, enabling requirements, and anticipated funding capability of SLCDA though the planning period.

5.2 STRATEGIC VISION

The last master plan conducted for SLCIA in 1998 outlaid the vision for new terminal and concourse facilities. Over the past two decades the Salt Lake City Department of Airports (SLCDA) has been focused on formalizing that vision and at the time of this writing, has finished construction of new terminal, concourse, and landside facilities. As SLCDA actively implements its historic Terminal Redevelopment Program (TRP), this master plan developed a new vision for the next 20 years and beyond. The focus of this master plan is finding an ultimate balance of airfield and supporting facilities to match passenger demand anticipated within and beyond the planning period.

The last master plan, and the planning for the TRP, considered land use requirements for an ultimate Concourse C and D. However, this study found additional airfield capacity is required to support the traffic demand that would necessitate a Concourse C, and that a Concourse D may not be feasible due to the limits of the airspace and land constraints of the Salt Lake Valley. Yet, the forecast for commercial demand indicates that Concourse B will be nearly fully utilized by PAL 3, and a portion of Concourse C may be needed shortly thereafter.

In PAL 3, when the Airport reaches 38 million annual passengers, it is expected that SLCIA will accommodate roughly 1,300 daily operations. At that point Concourse B will be nearly fully utilized. With the addition of even a few new gates in a new partial Concourse C, it can be expected that daily operations will reach 1,500. At that point, the Airport can expect five minutes of annualized delay, which is the threshold at which capacity improvements are needed. Thus, before SLCDA can construct Concourse C, additional airfield capacity must be provided.

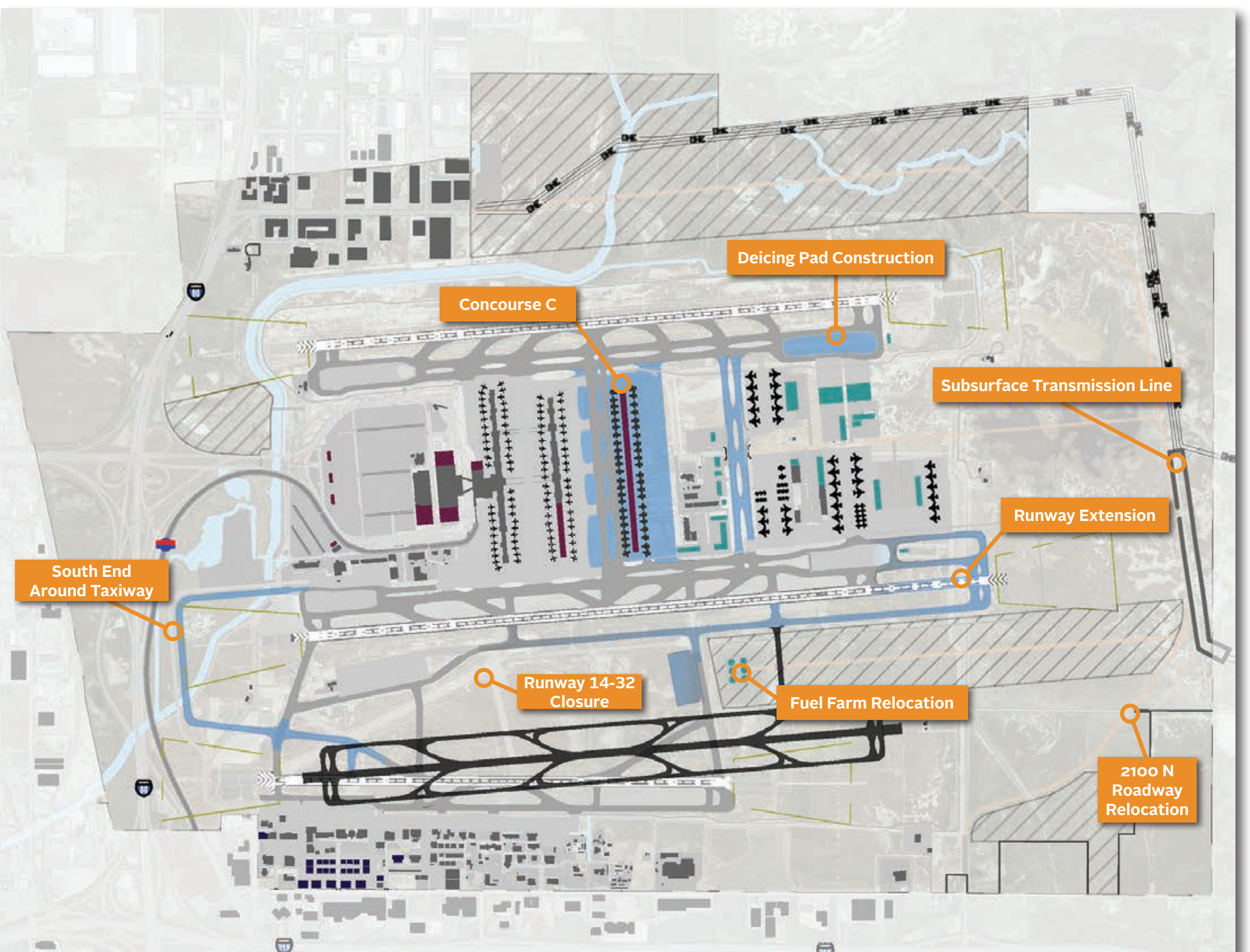
The primary goal of this master plan MP is to provide guidelines for future airport development which will satisfy future aviation demand and increase airport capacity in a financially feasible manner, while at the same time being responsive to the aviation related environmental and socioeconomic conditions that exist in the community. To achieve that goal, incremental improvements were identified that increase the efficiency of the Airport and maximize the usefulness of the existing runway system.

These improvements were studied and vetted though a series of collaborative workshops with Airport leadership and supplemented by the public involvement process. The combined result is a new Strategic Vision for SLCIA. The vision is graphically depicted in Figure 5-1, which illustrates how SLCDA will balance passenger demand with airfield projects that improve operational efficiency, enhance safety, and increase overall capacity. The primary tenant of the Vision are projects to enhance ground operations which, along with improvements of airspace procedures and implementation of modern technologies, will increase efficiency and subsequently capacity. Additionally, the Vision includes the ultimate realignment of Runway 17-35, which is a key component of long range capacity enhancement to support a Concourse C.

The future depicted in the Strategic Vision graphic is only achieved through incremental development that directly aligns with this Vision. The implementation of these facility improvements does not have a rigid timeline. They are dependent on growth and demand experienced at SLCIA. Projects should be implemented when demand warrants to allow SLCDA to remain fiscally responsible and flexible to changing market conditions. Each facility improvement depicted corresponds to an objective, and improvements to various facilities may begin concurrently. This Strategic Vision serves as a guide for the community and Airport Leadership to use as passenger demand continues to grow throughout the planning period and beyond.

Developing facility requirements is a foundational element of this and any airport master plan. The resulting facility requirements were used as the basis for planning future development at the Airport including the development of a long-term airport layout and an evaluation of alternatives.

Figure 5-1: Strategic Vision



5.3 PROGRAM OVERVIEW

The projects identified in this study are categorized under an associated program. Each program consists of correlated projects to be phased toward one objective. The programs identified are as follows:

- Taxiway U & V Program: This includes three phased projects to complete both crossfield taxiways. SLCDA and FAA ATCT deems this program essential to the operational efficiency of the airfield. The new taxiways will provide flexibility for moving aircraft between runway complexes without having to taxi though the passenger terminal area, and provide redundancy during snow removal operations. The taxiways are critical to ensuring operational efficiency in all-weather, all conditions at SLCIA.
- Taxiway L Extension Program: This includes three phased projects extending Taxiway L to the new threshold of the extended Runway 16L-34R. These projects link the Taxiway L Deice Pad to Taxiway S and Runway 17-35 and provide access to future crossing points of Runway 16L-34R.
- Runway/Taxiway Safety Program: This includes fixing both airfield hot spots though the implementation of the preferred alternative to remove Runway 14-32 and Taxiway Q. SLCDA and FAA have slated this program as high priority as it directly relates to the safety of the airfield.
- Cargo Expansion Program: This includes projects to expand current dedicated cargo areas and aprons, as well as provide new cargo apron and infrastructure. This program is demand driven, with some projects needed immediately to support growth in air cargo at SLCIA.
- Deicing Enhancement Program: This includes new deicing pads adjacent to Runway 16R threshold and Taxiway S, as well as new facilities to be built on the 16L Pad. The projects within this program are related to both capacity and strategic decisions related to operational efficiencies. Airline and cargo carrier needs largely drive the timing of new deice pad implementation.
- Runway 16L-34R Extension Program: This program includes projects to enable, and then construct a runway extension to increase the length from 12,000 feet to 14,500 feet. The extension will allow long-haul international commercial operations, as well as provide operational take off efficiencies to all carriers operating at SLCIA by allowing reduced thrust departures.
- Landside Program: This includes a series of projects sequenced to systematically expand public and employee parking, provide needed rental car operations and storage space, and optimize the locations of the service center and cell phone waiting lot. The program includes projects that are needed today to remedy existing deficiencies in PAL 1.
- Airport Enhancement and Readiness Program: This program includes projects that increase operational efficiency and airfield capacity, and ready the Airport for future growth. This includes the South End Around Taxiway and power line mitigation. The program also includes projects that enable construction of a future Concourse C. These projects are dependent on stakeholder (airport departments and/or airline tenants) funding capacity and need, and except for power line mitigation, were not programmed in the CIP. Power line mitigation is programmed in front of the runway extension, as it is an enabling project for the completion of that program. However, power line mitigation is not part of the runway extension program as it is required even if the runway is not extended.

The projects and programs identified in this study correlate to the priorities outlined in Chapter 3 Facility Requirements. The following details those priorities:

- Priority 1 – address all safety and design deficiencies. This includes the hot spots adjacent to Runway 14-32, as well as other taxiway configurations that do not adhere to FAA best practices.
- Priority 2 – maximize capacity and efficiency of SLCIA. All the programs defined in this study work towards this priority.
- Priority 3 – utilize demand reduction techniques to delay major capacity enhancements. The General Aviation Strategy Plan, included in Appendix X, provides recommended methods to transfer general aviation demand from SLC to the other two SLCDA general aviation airports.
- Priority 4 - provide additional runway capacity. Projects related to this priority include the ultimate realignment of Runway 17-35, which is outside this study's planning horizon and therefore not included as a program for implementation. It is anticipated the next SLCIA master plan, anticipated to begin in or around year 2030 will define the projects and overall program for a realigned Runway 17-35.

5.4 SHORT-TERM DEVELOPMENT

The projects identified for short-term implementation are shown in Figure 5-2. These are projects that will be implemented within a 1 to 5 year time frame post the completion of this study. Projects brought into the 5 year phase of capital projects include those identified for need in PAL 1. These projects include demand related projects such as cargo and parking lot expansion, as well as projects needed for airfield safety and optimization.

5.4.1 Airfield Projects

5.4.1.1 Runway/Taxiway Safety Program Projects

The following projects are programmed to be accomplished together within one construction season. Combined, these projects address the Airport's hot spots and provide a safer airfield configuration. The projects include:

- (1) Remove Runway 14-32: This includes pavement removal in key areas, and reconfiguration of lighting and markings at key connection points such as Taxiway P and a new K2 Crossfield connector.
- (2) Construct K2/Q Crossfield Connector: This taxiway serves as a replacement for Taxiway Q. It must be designed to accommodate up to TDG 5 aircraft.
- (3) Remove Taxiway Q: The removal of this taxiway eliminates the mid-runway crossing on Runway 17-35. The taxiway's functionality is replaced by the K2 Crossfield Connector.

5.4.1.2 16L Deice Pad Facility Upgrades

- (4) This project includes the construction of facilities currently lacking at the 16L Deice Pad. This includes restrooms, deicing truck refill tanks, and associated buildings to house these improvements.

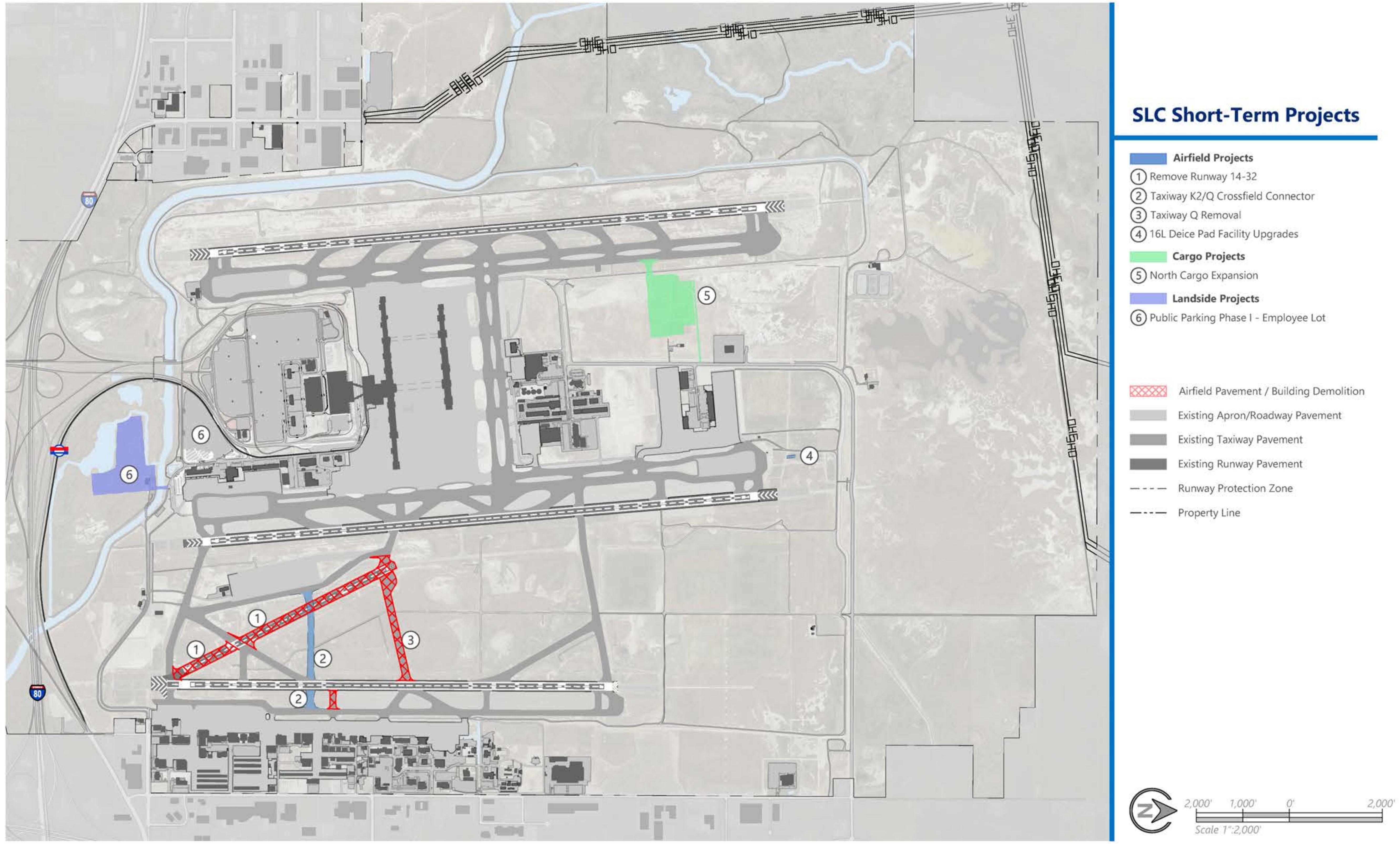
5.4.2 Cargo Projects

- (5) North Cargo Expansion – This project includes the apron and taxilane connection for a new cargo apron planned adjacent to Taxiway B. At the time of this writing, this project is planned and programed by SLCDA for near term implementation.

5.4.3 Landside Projects

- (6) Public Parking Phase I / Employee Lot – This project includes a new employee lot built on the south side of the Airport upon the land used previously for a golf course. The current employee lot can then be converted to public parking, with a small portion reserved for the eventual relocation of the Service Center. Creation of the new employee lot provides approximately 4,500 employee parking spaces and allows reprogramming of the current employee lot for approximately 3,400 public parking spaces.

Figure 5-2: Short Term Projects



5.5 MEDIUM-TERM DEVELOPMENT

The projects identified for medium-term implementation are shown in Figure 5-3. These are projects expected for implementation within a 6 to 10 year time frame. Projects brought into this phase of capital projects include those identified for need in PAL 2. These projects include demand related projects such QTA storage and public parking enhancements, as well as projects needed for airfield efficiency including the construction of Taxiway U and V. These and the other projects programed in the medium-term are described below.

5.5.1 Airfield Projects

- (7) West Portion of Taxiway V – This is the first project under the Taxiway U & V program and entails completion of the western portion of Taxiway V. The project limits remain north of W 4000 road to not impact the roadway. The taxiway is planned to accommodate ADG V / TDG V aircraft, and this initial phase will allow connection to future cargo development north of the taxiway.
- (8) East Portion of Taxiway V including tunnel – This project completes the eastern portion of Taxiway V, which includes a tunnel section to allow 4000 West to connect to the north support facilities. The tunnel should be designed and constructed at a length that allows the future Taxiway U to be built without any additional tunnel work.
- (9) Full Taxiway U – This project includes the construction of Taxiway U in its entirety, including tie-ins to Taxiway V. Taxiway U would also be designed to accommodate ADG V / TDG 5 aircraft.
- (10) Taxiway S Deice Pad – This project includes a new 5-position deice pad adjacent to Taxiway S for ADG III aircraft. The new pad will provide enhanced deicing operations for aircraft departing Runway 17. The planned pad location is the south side of Taxiway S because it provides the maximum amount of open area for future development north of the Taxiway S.

5.5.2 Cargo Projects

- (11) 4000 West Roadway Relocation – This project includes realigning 4000 West. The new alignment provides additional expansion area for existing cargo facilities to grow to the west. Additionally, the new alignment ensures the full area reserved for cargo expansion to the north of existing facilities is ready for development. This project includes tying the roadway into the existing alignment of 2100 North.

5.5.3 Landside Projects

- (12) RAC QTA/Storage – This project includes a new, larger QTA garage to meet rental car quick-turn-around (QTA) area and rental car storage space requirements. The project includes a phased rebuilding of the facility to 5 levels. Rental car fueling and washing facilities are placed at ground level, and rental car storage is on the next 3 levels above. Public parking is provided on Level 5. The project is expected to occur in three phases to mitigate operational disturbances. First, a new east portion is built. Then, the west portion is demolished and replaced, followed by the demolition and replacement of the center portion of the garage
- (13) Public Parking Phase II – RSS Relocation – This project includes relocation and expansion of the rental car Remote Service Site (RSS). The RSS lot is moved to the southernmost area inside the terminal loop road, and the existing RSS is converted to public parking.

Figure 5-3: Medium Term Projects

5.6 LONG-TERM DEVELOPMENT

The projects identified for long-term implementation are shown in Figure 5-4. These are projects planned for implementation in the 11 through 20 year time frame post the completion of this study. Some projects are demand related such as additional cargo expansion, providing more public parking though relocation of the Service Center and Park 'n' Wait, and expansion of the CV staging. The majority, however, are airfield projects under the umbrella of the Runway 16L-34R extension program. That program is driven by market demand and the goal of operational performance enhancement.

5.6.1 Airfield Projects

5.6.1.1 Taxiway L Extension Program Projects

The implementation of Taxiway L is broken into the following three projects to be phased incrementally.

- (14) Phase I: This project extends Taxiway L north to Taxiway S. Additionally, the portion of Taxiway Q that intersects Runway 16L-34R is redesigned to be perpendicular to the runway, allowing for a standardized crossing of the runway to/from H5. This project is planned for implementation prior to the extension of Runway 16L-34R to enhance the primary runway crossing that will be outside the future middle third "high-energy zone" of the runway when the runway is extended.
- (15) Phase II: This project extends Taxiway L from Taxiway S north to allow for a future runway crossing to/from H11. Once Runway 16L-34R is extended, the current Taxiway H10 / Taxiway S crossing will fall within the middle third "high-energy zone" of the runway. Further study will be needed to determine if crossing at that intersection should be prohibited, but to plan for that possibility, the Phase II project provides a crossing at H11 which remains outside the middle third of the runway once it is extended.
- (16) Phase III: This project extends Taxiway L from H11 to the new threshold of Runway 16L, thereby completing the full length parallel taxiway.

5.6.1.2 Other Airfield Projects

- (17) Power Line Mitigation – This project includes relocating and/or burying the transmission powerlines that are north of Runway 16L-34R. Successful completion of the project will prevent airline operators from taking weight penalties and other operational restrictions on the existing runway, as well as remove restrictions for larger aircraft that would make use of the runway after extension.
- (18) 2100 North Realignment – This project entails the relocation of 2100 North to the northern portion of Airport property in anticipation of the Runway 16L-34R extension.
- (19) Runway 16L-34R and Taxiway Extension – This project includes the extension of Runway 16L-34R to the north to a final length of 14,500 feet. Taxiways G and H are included for extension to the new runway threshold.
- (20) Taxiway K5 Enhancement – This project includes the removal of the non-standard K5 and K4 taxiways and replaces both with a new high-speed taxiway.

5.6.2 Cargo Projects

- (21) Cargo Apron Expansion – This project is not yet clearly defined but serves as a placeholder for future apron expansion work. It is expected that one or multiple cargo aprons will need expansion in the early portion of the long-term planning horizon.

5.6.3 Landside Projects

- (22) Public Parking Phase III – Service Center Relocation – This project relocates the service center to the outer portion of Terminal Drive and fills in the peripheral areas o the surface lot to meet program requirements. The move frees up the existing area inside the terminal loop road for public parking and positions the service center in a more accessible and appropriate location for its customers
- (23) CV Staging and Park 'n' Wait – This project relocates and expands the park 'n' wait lot and increases the size of the CV staging lot. The roadway entrance to the CV staging lot will be via a ramp from Terminal Drive to 3700 West.
- (24) Public Parking Phase IV – Garage Parking Expansion – This project includes two 5-bay garage expansions with 5 levels each. The expansion will allow for rental car ready-return on the ground level, public parking on levels 2-5 with dedicated hourly parking on level 2. This project is demand related but also has business related factors associated with it. Garage parking is premium space and return on investment will drive the implementation strategy. As such, SLCDA may wish to implement this project sooner than the end of the planning horizon depending on market conditions and demand levels.

Figure 5-4: Long Term Projects

5.7 OTHER DEMAND DRIVEN PROJECTS

The projects shown in Figure 5-5 and described below were not programmed within a specific time horizon. These projects are dependent on stakeholder (airport departments and/or airline tenants) funding capacity and needs and/or will be required outside this study's planning horizon. The projects were not accounted for in the programming of projects detailed in Section 5.8.

5.7.1 Airfield Projects

- (25) South End Around Taxiway – This project will construct the south end around taxiway, including bridging over the canals and a connection directly into Taxiway P. The end around will be constructed to support ADG V / TDG 5 aircraft on the pavement. The design of the end around will provide unrestricted operations for up to ADG III aircraft.
- (26) 16R Deicing Pad – This project includes an eight position deicing pad located adjacent the Runway 16R threshold. This project is demand related but correlates directly with operational efficiency. As such, implementation timing should be coordinated with airline operators. This is anticipated to occur beyond the planning period.
- (27) Runway 16L-34R High Speed Taxiway Optimization – This project removes Taxiway H6 and creates a new high-speed taxiway between H10 and H11. This project isn't critical to meeting demand, and the two taxiways programmed within the project could be split apart in the future and included in other future projects if efficiencies can be gained. When Runway 16L-34R is extended, the locations of runway exits for aircraft landing on Runway 16L could dramatically change. Thus, consideration of taxiway exit improvements and future requirements may require changes and adjustments to this project.

5.7.2 Landside Projects

- (28) Rental Car / Public Parking Expansion – This project includes making use of the former golf course land north of Terminal Drive and south of the canal. That area of land is reserved for future landside needs, and depending on demand, can be used for either rental car storage, public parking, or both.

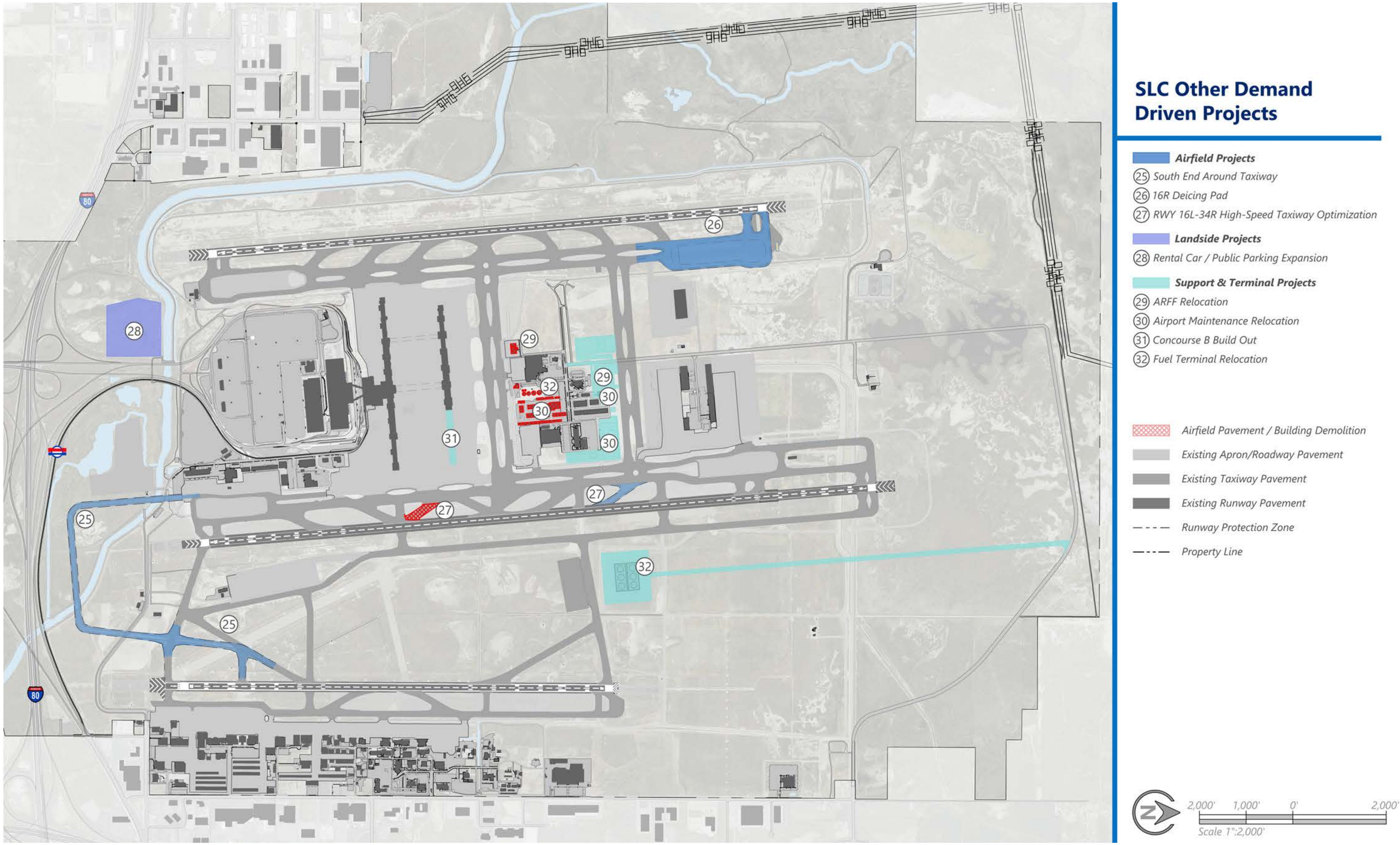
5.7.3 Support and Terminal Projects

- (29) ARFF Relocation – This project includes relocating the ARFF station north to move the building outside the future Concourse C footprint. Need for a Concourse C is not anticipated within the planning period, and airfield capacity constraints may require resolution prior to a Concourse C implementation. Considering these factors, ARFF relocation is not needed in the planning horizon. This project is set to provide guidance and consideration for the future.
- (30) Airport Maintenance Relocation – As described in the facility requirements chapter of this study, many of the airport maintenance buildings are reaching the end of their useful life and are undersized for today's needs. The majority of buildings identified for replacement are within the Concourse C footprint. Thus, relocating them is advantageous for long-range planning. This project includes the relocation of these buildings to the north, adjacent to the future Taxiway U. The new location is adjacent to the rest of the maintenance campus allowing integration of the facilities.

It is recommended that SLCDA complete a maintenance campus plan, to include an inventory of building size and condition, assessment of future requirements, and determine a new campus layout to integrate with existing buildings within the area reserved.

- (31) Concourse B Build Out – The full build out of Concourse B is anticipated to be needed in PAL 3. This project includes up to a full build out of the concourse. The timing and extent of this project is recommended for further study in the next SLC Master Plan, as at that time market demand and conditions will be clearer for defining the project.
- (32) Fuel Terminal Relocation – The current fuel terminal is within the future Concourse C footprint. This project is a placeholder for that time when the fuel terminal must be relocated for future concourse development and/or when the fuel facility needs the degree of repair warranting the cost of relocation.

Figure 5-5: Other Demand Driven Projects



5.8 CAPITAL PROGRAMMING

The projects described in the short- and long-term time frames were programmed with consideration of SLCDA anticipated funding capacity. At the time of this writing, SLCDA anticipates funding capacity of $25M per year for capital projects within the first 5 years as the Airport recovers from the capital outlay associated with building the new terminal. Beyond 5 years, it is anticipated that capital funding capacity will return to approximately $40M per year, which is typical of years prior to building the new terminal. Table 5-1 lists the proposed order of projects.

The order of projects is based on SLCDA funding capacity per year with consideration of other capital projects already planned, such as recurring maintenance projects. The order also is sequenced by priority of the projects and phasing implications. It is recognized that some years have funding requirements beyond the target. Those years of high funding requirements have years with less capital outlay before or after in effort to allow capital or expense to carry over to the next year as needed. Cost estimate breakdowns for these projects are included in Appendix X.

Table 5-1: Project Programming

Year	Program	ROM	Project
Short Term 1-5 Years			
2021/2022	Cargo Expansion Program	**$25,000,000**	North Cargo Area Expansion
2023	Landside Program	**$28,400,000**	Public Parking Phase I - Employee Lot
2023	Runway/Taxiway Safety Program	**$1,900,000**	Remove Runway 14-32
2023	Runway/Taxiway Safety Program	**$14,700,000**	Taxiway K2 Crossfield Connection
2023	Runway/Taxiway Safety Program	**$1,100,000**	TWY Q Removal
2024	Deicing Enhancement Program	**$15,000,000**	16L North Deicing Pad Facilities Upgrades
Mid Term 6-10 Years			
2026	Cargo Expansion Program	**$8,200,000**	Inititial 4000W Roadway Relocation
2027	Taxiway U&V Program	**$13,100,000**	West Portion V Construction
2028	Taxiway U&V Program	**$26,200,000**	East Portion V Construction
2029	Taxiway U&V Program	**$39,300,000**	Full Taxiway U construction
2030	Deicing Enhancement Program	**$38,300,000**	Taxiway S Deice Pad
Long Term 11-20+ Years			
2031	Cargo Expansion Program	**$46,300,000**	North Cargo Area Expansion/RON
2032	Taxiway L Extension Program	**$29,000,000**	Taxiway L Extenstion Phase I
2033	Runway 16L-34R Extension Program	**$25,700,000**	Full Roadway Relocation
2034	Airport Enhancement & Readiness Program	**$40,000,000**	Powerline Mitigation
2035/2036	Runway 16L-34R Extension Program	**$53,000,000**	Runway & Taxiway Complex Extension
2037	Runway 16L-34R Extension Program	**$14,700,000**	16L Deice Pad Extension
2038	Taxiway L Extension Projram	**$14,400,000**	Taxiway L Extenstion Phase II
2039	Taxiway L Extension Projram	**$29,700,000**	Taxiway L Extenstion Phase III
2040	Runway/Taxiway Safety Program	**$8,000,000**	Taxiway K5 Enhancement
Demand Driven Airfield Projects Not Programed			
	Deicing Enhancement Program	**$107,000,000**	16R North Deicing Pad
	Airfield Enhancement Program	**$105,400,000**	SEAT Construction

Landside projects in the Landside Program were also estimated, as shown in Table 5-2. However, aside from the employee lot which is programmed in Public Parking Phase I, these projects were not programmed because they are highly dependent on business factors and have different funding arms. For example, customer facility charges (CFC) is a primary funding tool for rental car associated projects. SLCDA will determine how and when to program these landside projects based on demand, tenant negotiations, and business related policy decisions. Facility requirements analysis demonstrated a need for near-term development of employee parking, public parking, and rental car ready-return and storage space. It is recommended these areas are addressed within the short-term years of the overall program.

Table 5-2: Landside Project Cost Estimates

Program	ROM	Project
Landside Program	$ 98,200,000	RAC QTA/Storage
Landside Program	$ 50,400,000	Public Parking Phase II / RSS Site Relocation and Expansion
Landside Program	$ 8,800,000	Public Parking Phase III Enabling / Service Center, CV Staging and Cell Lot
Landside Program	$ 7,900,000	Public Parking Phase III - Public Parking in old Service Center Site
Landside Program	$ 61,300,000	Public Parking Phase IV - Garage Parking Expansion

Source: RS&H Analysis, SLCDA, 2021

Note all costs in 2020 dollars. ROM costs include construction costs, and soft costs at the following percentage of construction: Design 10 percent; CA/Admin/QA/QC 10 percent; Contingency 30 percent.

5.8.1 Summary

This analysis indicates that funding will be available to plan, design, and construct the projects identified in the Master Plan. A total of over $900M capital projects have been identified of which about $90M are programmed in the next five-year period. Additional advanced planning and environmental analysis is expected as these programs move towards implementation. The funding for the Runway 16L-34R extension program and certain other projects will require additional refinements and a more detailed cash flow and source-of-revenue plan once the airlines request these improvements.

This financial analysis is based on the SLCDA anticipated funding capacity and continued FAA support. Based on the assumptions and the analyses presented herein, the capital plan is considered practicable and it is anticipated that the Salt Lake City International Airport will be able to construct necessary aviation facilities over the 20-year planning period to accommodate demand.

5.9 NEAR TERM IMPLEMENTATION PRIORITIES AND CONSIDERATIONS

The larger programs outlined in the CIP require extensive advanced planning and environmental study prior to those projects beginning. Considering those needs, the following narrative details initiatives recommended in the near-term to ready the Airport for projects slated for implementation later in medium- and long-term years. Also detailed are considerations for the Runway/Taxiway Safety Program, which is the most critical airfield project to be completed within the near-term time horizon.

Implementation of the Runway/Taxiway Safety Program requires close coordination with FAA to determine the timing and sequencing of closing and removing Runway 14-32 from service. The following bullets detail considerations and recommendations for that effort:

- Coordinate with FAA ATCT, FAA ADO, and other interested FAA lines of business to develop a coordinated plan for removing the runway from service.
- Sequence projects listed in the CIP in a phased approach to maximize efficiency, reduce costs, and ensure operational continuity and functionality of the airfield throughout the implementation of the program.
- Analyze all the projects in the program together in coordination with FAA to determine environmental process requirements.
- Develop an outreach campaign if needed to inform tenants and other users of SLC of why the runway is being removed, the timing, and the impacts to operations they can expect.

After Runway 14-32 is removed and the Runway/Taxiway Safety Program is complete, it is recommended efforts be focused on the coordination needed for the power line mitigation project. The mitigation of the power lines north of the airfield is critical to preserving efficiency of operations at SLC though the summer months. Today, passenger aircraft must take weight penalties during hot days depending on their routing and fuel requirements. The following bullets provide recommendations pertaining to the power line mitigation project.

- Though the project to mitigate the power lines is currently programed in the long-term time frame of the CIP, it is recommended the project be moved up as early as possible.
- To be ready for this project to come online earlier than planned, coordination with the utility companies and other parties is recommended to begin as soon as 2022. This coordination can be the next focus of priority after Runway 14-32 is removed from service.

Moving into the medium- and long-term portions of the CIP, several large programs are planned for implementation, including the extension of Runway 16L-34R. A runway extension can take many years for implementation, and it is recommended the planning process begin in the near-term. The runway extension itself has multiple enabling projects and advanced planning and environmental requirements. These and other considerations are bulleted below:

- An advanced planning study is recommended in the near-term to examine and define the runway extension project. The scope of this master plan study was limited to determining if a runway should be extended and which runway that should be. Advanced planning is needed to determine the specifics of that solution, examine threshold placement, and study airspace considerations related to environmental impacts and arrival and departure procedure impacts. The advanced planning study should be scoped to provide the information FAA will require prior to the start of the environmental process.
- The environmental process should begin after or near the completion of the advanced planning study. However, coordination for both efforts should begin simultaneously with FAA in the near-term.
- Mitigation of the power lines and the roadway relocation must be completed prior to the extension of the runway. These projects may begin years prior to the extension project. Planning and implementation of these projects can begin as soon as practical.

ENVIRONMENTAL OVERVIEW AND NEPA APPROACH

ENVIRONMENTAL OVERVIEW AND NEPA APPROACH

6.1 ENVIRONMENTAL OVERVIEW AND NEPA GUIDANCE

The purpose of considering environmental factors in airport master planning is to assist in evaluating current and future airport development, as well as provide information that will help expedite subsequent environmental processing. FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*, and FAA Order 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions*, are the FAA's environmental guidance for aviation projects/actions to comply with NEPA. However, it is important to note that while the environmental analysis included in this Master Plan Update is not in and of itself a NEPA document.

As part of Section 163 of the FAA Reauthorization Act of 2018, certain types of airport non-aeronautical development projects have limited regulation by the FAA and therefore, may not be subject to NEPA documentation.[1] If a project is subject NEPA, there are three levels of NEPA documentation depending on the scope of a proposed project and the potential environmental impacts associated with a proposed project. These include categorical exclusion (CATEX), environmental assessment (EA), and environmental impact statement (EIS). FAA Order 1050.1F[2] lists actions that the FAA has found in the past to not normally have a significant effect on the environment. Proposed projects that fall within the list found in FAA Order 1050.1F and do not have an extraordinary circumstance[3] can be processed with a CATEX. For proposed projects that do not fall within the list specified as a CATEX in FAA Order 1050.1F, an EA must be prepared. At the completion of the EA, the FAA will issue a Finding of No Significant Impact (FONSI) or continue with an EIS. An EIS must be prepared if the environmental impacts associated with a proposed project are significant impacts that cannot be mitigated below the established significant threshold. At the completion of an EIS, the FAA will issue a Record of Decision (ROD).

6.2 EXISTING ENVIRONMENTAL CONDITIONS

SECTION 1.15 of this Master Plan Update describes the current environmental conditions at and around in the Airport in detail. The following subsections summarize the conditions described in detail in SECTION 1.15 and provides the basis for determining the potential environmental effects of the Airport's Development Plan projects.

6.2.1 Air Quality

According to the U.S. Environmental Protection Agency (USEPA), the Airport, located in Salt Lake County, is in a "maintenance" area for CO and PM_{10}, and in a nonattainment area for $PM_{2.5}$, O_3, and SO_2.[4]

6.2.2 Biological Resources

There are 28 federally- and state-threatened and- endangered species with the potential to be found in Salt Lake County, and 22 migratory bird species with the potential to be found at the Airport.[5] [6] According to the U.S. Fish and Wildlife Service (USFWS), there is no designated critical habitat at the Airport.[7]

6.2.3 Climate

Activities that require fuel or power are the primary stationary sources of greenhouse gases (GHGs) at airports. The majority of GHG emissions at airports are generated by aircraft and ground service vehicles (GSE); however, the Airport is transition to all electric GSE by March 2022.

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[1] Exceptions to Section 163: where FAA has regulation to ensure the safe and efficient operations of aircraft or the safety of people on the ground or property as it relates to aircraft operations, to ensure the Airport Sponsor receives fair market value for the use or disposal of property, if the project is being proposed on property that was originally purchased with Airport Improvement Program (AIP) dollars, or if the project will be using federal funds.

[2] FAA, Order 1050.1F, Environmental Impacts: Policies and Procedures, Sections 5-6.1 through 5-6.6.

[3] FAA, Order 1050.1F, Environmental Impacts: Policies and Procedures, Sections 5-2.

[4] U.S. Environmental Protection Agency, Air Quality Green Book, Utah. Accessed: https://www3.epa.gov/airquality/greenbook/anayo_ut.html, May 2021.

[5] State of Utah Natural Resources, Division of Wildlife Resources, Utah Sensitive Species List. Accessed: https://dwrcdc.nr.utah.gov/ucdc/ViewReports/sscounty.pdf, August 2018.

[6] U.S. Fish and Wildlife Service, Information for Planning and Conservation (IPaC), Salt Lake County. Accessed: https://ecos.fws.gov/ipac/location/HPRQ53L6KFC-CPNQX6PQUGXVLDA/resources#migratory-birds, August 2018.

[7] U.S. Fish and Wildlife Service, Information for Planning and Conservation (IPaC), Salt Lake County. Accessed: https://ecos.fws.gov/ipac/location/HPRQ53L6KFC CPNQX6PQUGXVLDA/resources, August 2018.

6.2.4 Coastal Resources

Utah is not a coastal state. As such, the Airport is not within a coastal zone. Additionally, there are no Coastal Barrier Resource System (CBRS) segments within Airport property.[8]

6.2.5 Department of Transportation, Section 4(f)

The closest Section 4(f) property to the Airport is the Airport Trail bike path, a 2.8-mile bike path located in the southern portion of Airport property (see Figure 1-47).[9] The closest Land and Water Conservation Fund (LWCF) site to the Airport is the Red Butte Canyon Research Area, located about six miles east of the Airport.[10]

6.2.6 Farmlands

According to the Natural Resource Conservation Service (NRCS), portions of Airport property contain farmland of statewide importance and prime farmland soil types.[11] However, according to Section 523.10(B) of the Farmland Protection Policy Act (FPPA), lands identified as urbanized areas by the U.S. Census Bureau are not subject to the provisions of the FPPA. The Airport is located in an urbanized area and therefore, on-Airport projects are not subject to the FPPA.

6.2.7 Hazardous Materials, Solid Waste, and Pollution Prevention

6.2.7.1 Hazardous Materials

Aircraft fuel constitutes the largest quantity of hazardous substances stored and consumed at the Airport. Fuel is stored on Airport property within a 261,491-square-foot fuel farm and an additional 10,700-square-foot general aviation fuel farm.

6.2.7.2 Solid Waste

The Salt Lake County Landfill is the only municipal solid waste landfill located in Salt Lake County.[12] This landfill is located two miles southwest of the Airport. This landfill is not expected to reach capacity until 2077.

6.2.7.3 Pollution Prevention

The Airport is required under the Airport's Utah Pollutant Discharge Elimination System (UPDES) stormwater discharge permit (UPDES Permit #UT0024988, approved on March 14, 2014) to have a Stormwater Pollution Prevention Plan (SWPPP). The Airport additionally has a Spill Prevention, Control, and Countermeasure Plan (SPCC).

6.2.8 Historical, Architectural, Archaeological, and Cultural Resources

The closest National Register of Historic Places (NRHP)-listed historic site is the Fisher, Albert, Mansion and Carriage House located approximately 1.75 miles southeast of the Airport.[13] Additionally, the Fisher, Albert, Mansion and Carriage House is the closest Salt Lake City Historic Site.[14]

6.2.9 Land Use

Land uses within the immediate vicinity of the Airport include open space, commercial, mixed use transit station, single family and multi-family residential, and agricultural.[15] The Airport is within Salt Lake County, zoned as a Special Purpose District (specifically an "Airport District") under the Salt Lake Municipal Code Title 21A – Zoning.

6.2.10 Natural Resources and Energy Supply

Natural resources (e.g., water, asphalt, aggregate, etc.) and energy use (e.g., fuel, electricity, etc.) at an airport is a function of the needs of aircraft, support vehicles, airport facilities, support structures, and terminal facilities. Rocky Mountain Power supplies electricity to the Airport. Dominion Energy provides natural gas services. Salt Lake City Department of Public Utilities provides water and sewer services. None of the natural resources that the Airport uses are in rare or short supply.

6.2.11 Noise and Noise-Compatible Land Use

There are residential land uses near the Airport. These areas may be sensitive to aircraft noise associated with the Airport. The Airport adopted a Noise Compatibility Program (NCP) in January 1999 as a result of their completed Part 150 Study outlining procedures to mitigate the impact of aircraft noise on non-compatible land uses, such as residential areas. Additionally, the Airport actively implements mitigation measures from the FAA-approved NCP, such as reducing night-time activity, utilizing departure tracks which avoid residential areas, etc. See FIGURE 1-43 for current noise contours for the Airport.

[8] U.S. Fish and Wildlife Service, Coastal Barrier Resources System Mapper. Accessed: https://www.fws.gov/cbra/Maps/Mapper.html, August 2018.
[9] Salt Lake City Government, Transportation, Urban Trails. Accessed: https://www.slcairport.com/assets/pdfDocuments/bike_map.pdf, September 2018
[10] Land Water Conservation Fund, Utah. Accessed: https://static1.squarespace.com/static/58a60299ff7c508c3c05f2e1/t/5b29566eaa4a99e30737b026/1529435758782/Utah+fact+sheet+6.13.18.pdf, August 2018.
[11] Natural Resources Conservation Service, Web Soil Survey. Accessed: https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx, August 2018.
[12] Salt Lake County, Utah, Public Works & Municipal Services Department, Landfill. Accessed: https://slco.org/landfill/, September 2018.
[13] U.S. Environmental Protection Agency, NEPAssist. Accessed: https://nepassisttool.epa.gov/nepassist/nepamap.aspx?wherestr=salt+lake+city+airport, August 2018.
[14] Salt Lake City, Historic Districts and Buildings, Landmark Sites. Accessed: https://www.slc.gov/historic-preservation/historic-districts-and-buildings/, September 2018.
[15] Salt Lake City, Salt Lake City Maps, Zoning. Accessed: http://maps.slcgov.com/mws/zoning.htm, September 2018.

6.2.12 Socioeconomic, Environmental Justice, and Children's Environmental Health and Safety Risks

The Airport is entirely within Census Tract 9800, Block Group 1, which has a population of zero. Therefore, the Salt Lake City, Utah Metropolitan Area, as defined by the U.S. Census Bureau, was used to describe the socioeconomic and environmental justice characteristics in the Airport area. The Salt Lake City, Utah Metropolitan Area has a total population of 1,154,504, 18.34 percent of which are minorities, and 11.14 percent of which are living below the poverty line. With regards to children's environmental health and safety risks, the closest school to the Airport is Meadowlark Elementary, approximately 1,500 feet east of the Airport.[16]

6.2.13 Visual Effects

6.2.13.1 Light Emissions

Various lighting features currently illuminate Airport facilities, such as the airfield (e.g., runways and taxiways), buildings, access roadways, automobile parking areas, and apron areas for the safe and secure movement of people and vehicles (e.g., aircraft, passenger cars, etc.).

6.2.13.2 Visual Resources and Visual Character

Structures at the Airport include, but are not limited to, the terminal building, fixed base operators, hangars, and maintenance buildings. As previously mentioned, the Airport is zoned as an Airport District and is developed in a manner that is consistent with this zoning.

6.2.14 Water Resources

6.2.14.1 Wetlands

Wetlands were identified during a survey of Airport property and have been mapped for future development considerations (see FIGURE 1-44). Wetlands shown on this figure were determined to be jurisdictional by the U.S. Army Corps of Engineers in 2004; however, jurisdictional determinations are only valid for a five-year period.

6.2.14.2 Floodplains

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) for the Airport area, there are floodplains within the Airport property (see FIGURE 1-45).[17] The floodplains are located in the northwestern, western, and southern portions of Airport property.

6.2.14.3 Surface Waters

Three canals exist on Airport property: the Surplus Canal, the North Point Canal, and a city drain. In addition, two unnamed ponds are in the southern portion of Airport property (see FIGURE 1-46).

6.2.14.4 Groundwater

Airport property intersects two hydrologic units.[18] The western portion of Airport property is within the Crystal Creek watershed (HUC 12 ID: 160202040404) and the eastern portion of Airport property is within the Jordan River watershed (HUC 12 ID: 160202040405).

6.2.14.5 Wild and Scenic Rivers

There are no wild and scenic rivers or river segments within the Airport area.[19] The closest wild and scenic river, the Snake River, is over 170 miles northeast of the Airport.[20]

[16] U.S. Environmental Protection Agency, NEPAssist, Places, Schools. Accessed: https://nepassisttool.epa.gov/nepassist/nepamap.aspx?wherestr=salt+lake+city+airport, September 2018.
[17] Federal Emergency Management Agency, Flood Map Service Center, Flood Insurance Rate Maps 49035C0140E (effective 9/21/2001), 49035C0137E (effective 9/21/2001), 49035C150G (effective 9/25/2009), 49035C0125G (effective 9/25/2009), 49035C0120E (effective 9/21/2001), 49035C0129G (effective 9/25/2009), and 49035C0139E (effective 9/21/2001).
[18] U.S. Environmental Protection Agency, NEPAssist, Water Features, Watersheds (HUC 12). Accessed: https://nepassisttool.epa.gov/nepassist/nepamap.aspx?wherestr=salt+lake+city+airport, September 2018.
[19] U.S. Environmental Protection Agency, NEPAssist, Water Features, Wild and Scenic Rivers. Accessed: https://nepassisttool.epa.gov/nepassist/nepamap.aspx?wherestr=salt+lake+city+airport, September 2018.
[20] U.S. National Park Service, Wild and Scenic Rivers Program, Interactive Map of NPS Wild and Scenic Rivers. Accessed: https://www.nps.gov/orgs/1912/plan-your-visit.htm, September 2018.

6.3 ENVIRONMENTAL ANALYSIS OF THE AIRPORT DEVELOPMENT PLAN

For purposes of this Master Plan Update, the level of analysis described in this section is to advise the Airport of potential environmental impacts associated with the Development Plan (see Chapter 4). The following sections identify the key and applicable environmental resource categories as described in FAA Order 1050.1F for development projects that are outlined in the Development Plan and describes the appropriate level of NEPA documentation for each development project. Environmental resource categories include:

- Air Quality
- Biological Resources
- Climate
- Department of Transportation Section 4(f)
- Farmland
- Hazardous Materials, Pollution Prevention, and Solid Waste
- Historical, Architectural, Archaeological, and Cultural Resources
- Land Use
- Natural Resources and Energy Supply
- Noise and Noise-Compatible Land Use
- Socioeconomics, Environmental Justice, and Children's Health and Safety Risks
- Visual Effects
- Water Resources (includes Wetlands, Floodplains, Surface Waters, and Groundwater,)

Coastal resources and wild and scenic rivers are not included in this discussion because, as SECTION 6.2 describes in detail and SECTION 1.2 briefly describes, those resources are not within or near Airport property and would not be affected by the development projects. Additionally, only those environmental resource categories that could be affected by each development project are described in the following sections. It is also important to note that the environmental analysis included in this Master Plan Update is not in and of itself a NEPA document.

6.3.1 Runway Development Projects

6.3.1.1 Runway 16R-34L 2,500-foot Extension

This alternative would result in a 2,500-foot extension to the north of Runway 16R-34L resulting in a total length of 14,500 feet (see FIGURE 4-2). This project would require the relocation of existing high-tension power lines north of Runway 16R-34L to outside of the new Runway Protection Zone (RPZ).

Air Quality: This project would temporarily increase emissions from construction vehicles and equipment. A construction emissions inventory may be necessary for the NEPA documentation associated with this project. Additionally, the change in aircraft fleet mix combined with the forecast increase operations at the Airport, may require an operational air quality emissions analysis for the NEPA documentation associated with this project.

Biological Resources: Because threatened and endangered species have the potential to be found at the Airport, a biological survey may be necessary for the NEPA documentation associated with this project.

Climate: The project would result in a temporary increase in emissions from construction vehicles and equipment, and a permanent increase in emissions as a result of the forecast increase in aircraft operations and change to the fleet mix. An estimate of GHG emissions could be included in the construction and operational emission inventory.

Historical, Architectural, Archaeological, and Cultural Resources: Because this project would include ground disturbing activity on pervious ground, an archaeological survey may be required for the NEPA documentation associated with this project.

Hazardous Materials, Pollution Prevention, and Solid Waste: Construction associated with the project would generate solid waste. Increased operations and enplanements would also increase the generation of solid waste at the Airport. Waste would be handled and disposed of according to federal, state, and local rules and regulations.

Noise and Noise-Compatible Land Use: The aviation noise contours are anticipated to change as a result of this project. It is recommended that the Airport model new noise contours using the most recent version of the Aviation Environmental Design Tool (AEDT) that accounts for the runway extension. However, there are no known noise sensitive resources[21] in the direction of the runway extension.

Water Resources: This runway extension alternative would encroach upon a 100-year floodplain and a floodplain analysis may be required. Additionally, a little over two acres of wetlands would be affected by this runway extension. Additional wetland impacts could occur as a result of required changes to the surrounding roadways and taxiways. The Airport would be responsible for having these wetlands officially delineated in order to determine their jurisdictional status, and any appropriate mitigation for potential effects. Assuming that the wetlands are jurisdictional, the Airport would be responsible for obtaining a nationwide permit or individual permit, depending on the extent of the potential impacts. With regards to surface water and groundwater, the project would increase impervious surface area at the Airport. This increase in impervious surface would increase the volume of stormwater runoff; however, the existing stormwater drainage system is anticipated to be able to accommodate the increase in stormwater runoff. The contractor would be responsible for preparing a SWPPP under a UPDES Construction Storm Water Permit prior to the start of ground disturbing activities, and all construction activities would be required to comply with the provisions set forth in that permit.

NEPA Documentation Guidance: The reconstruction, resurfacing, extension, strengthening, or widening of an existing runway can be categorically excluded under FAA Order 1050.1F, paragraph 5-6.4(e), provided that the project would not cause significant erosion or sedimentation, would not cause a significant noise increase over noise sensitive area, or cause significant impacts to air quality. Absent extraordinary circumstances or significant impacts that cannot be mitigated, a CATEX is anticipated to be the appropriate NEPA documentation for this project.

6.3.1.2 Runway 16L-34R 2,498-foot Extension

This alternative would result in a 2,498-foot extension to the north of Runway 16L-34R resulting in a total length of 14,500 feet (see FIGURE 4-2). This project would require the relocation of existing high-tension power lines north of Runway 16R-34L to outside of the new Runway Protection Zone (RPZ).

Air Quality: This project would temporarily increase emissions from construction vehicles and equipment. A construction emissions inventory may be necessary for the NEPA documentation associated with this project. Additionally, the change in aircraft fleet mix combined with the forecast increase operations at the Airport, may require an operational air quality emissions analysis for the NEPA documentation associated with this project.

Biological Resources: Because threatened and endangered species have the potential to be found at the Airport, a biological survey could be necessary for the NEPA documentation associated with this project.

Climate: The project would result in a temporary increase in emissions from construction vehicles and equipment, and a permanent increase in emissions as a result of the forecast increase in aircraft operations and change to the fleet mix. An estimate of GHG emissions could be included in the construction and operational emission inventory.

Historical, Architectural, Archaeological, and Cultural Resources: Because this project would include disturbing pervious ground, an archaeological survey may be required for the NEPA documentation associated with this project.

Hazardous Materials, Pollution Prevention, and Solid Waste: Construction associated with the project would generate solid waste. Increased operations and enplanements would also increase the generation of solid waste at the Airport. Waste would be handled and disposed according to federal, state, and local rules and regulations.

Noise and Noise-Compatible Land Use: The noise contours are anticipated to change as a result of this project and it is recommended that the Airport model new noise contours that accounts for the runway extension; however, there are no known noise sensitive resources in the direction of the runway extension.

Water Resources: Less than one acre of wetlands would be affected by the runway extension. Additional wetland impacts could occur as a result of required changes to the surrounding roadways and taxiways. The Airport would be responsible for delineating the wetlands and coordinating with the USACE in order to determine their jurisdictional status, and any appropriate mitigation for potential effects. Assuming that the wetlands are jurisdictional, the Airport would be responsible for obtaining a nationwide permit or individual permit, depending on the extent of the potential impacts. With regards to surface water and groundwater, the project would increase impervious surface area at the Airport. This increase in impervious surface would increase the volume of stormwater runoff; however, the existing stormwater drainage system is anticipated to be able to accommodate the increase in stormwater runoff. The contractor would be responsible for preparing a SWPPP under a UPDES Construction Storm Water Permit prior to the start of ground disturbing activities, and all construction activities would be required to comply with the provisions set forth in that permit.

NEPA Documentation Guidance: The reconstruction, resurfacing, extension, strengthening, or widening of an existing runway can be categorically excluded under FAA Order 1050.1F, paragraph 5-6.4(e), provided that the project would not cause significant erosion or sedimentation, would not cause a significant noise increase over noise sensitive area, or cause significant impacts to air quality. Absent extraordinary circumstances or significant impacts that cannot be mitigated, a CATEX is anticipated to be the appropriate NEPA documentation for this project.

6.3.1.3 Runway 17-35 4,903-foot Extension

This alternative would result in a 4,903-foot extension to the north of Runway 17-35 resulting in a total length of 14,500 feet (see FIGURE 4-2).

[21] FAA. (1985). Federal Aviation Regulations Part 150, Airport Noise Compatibility Planning, CFR 14, Chapter I, Subchapter I, Part 150, Table 1, January 18, 1985, as amended.

Air Quality: This project would temporarily increase emissions from construction vehicles and equipment. A construction emissions inventory may be necessary for the NEPA documentation associated with this project. Additionally, the change in aircraft fleet mix combined with the forecast increase operations at the Airport, may require an operational air quality emissions analysis for the NEPA documentation associated with this project.

Biological Resources: Because threatened and endangered species have the potential to be found at the Airport, a biological survey may be necessary for the NEPA documentation associated with this project.

Climate: The project would result in a temporary increase in emissions from construction vehicles and equipment, and a permanent increase in emissions as a result of the forecast increase in aircraft operations and change to the fleet mix. An estimate of GHG emissions could be included in the construction and operational emission inventory.

Historical, Architectural, Archaeological, and Cultural Resources: Because this project would include disturbing pervious ground, an archaeological survey may be required for the NEPA documentation associated with this project.

Hazardous Materials, Pollution Prevention, and Solid Waste: Construction associated with the project would generate solid waste. Waste would be handled and disposed according to federal, state, and local rules and regulations.

Noise and Noise-Compatible Land Use: The noise contours are anticipated to expand as a result of this project and it is recommended that the Airport model new noise contours that accounts for the runway extension; however, there are no known noise sensitive resources in the direction of the runway extension.

Water Resources: About two acres of wetlands would be affected by this runway extension. Additional wetland impacts could occur as a result of required changes to the surrounding roadways and taxiways. The Airport would be responsible for delineating the wetlands and coordinating with the USACE in order to determine their jurisdictional status, and any appropriate mitigation for potential effects. Assuming that the wetlands are jurisdictional, the Airport would be responsible for obtaining a nationwide permit or individual permit, depending on the extent of the potential impacts. With regards to surface water and groundwater, the project would increase impervious surface area at the Airport. This increase in impervious surface would increase the volume of stormwater runoff; however, the existing stormwater drainage system is anticipated to accommodate the increase in stormwater runoff. The contractor would be responsible for preparing a SWPPP under a UPDES Construction Storm Water Permit prior to the start of ground disturbing activities, and all construction activities would be required to comply with the provisions set forth in that permit.

NEPA Documentation Guidance: The reconstruction, resurfacing, extension, strengthening, or widening of an existing runway can be categorically excluded under FAA Order 1050.1F, paragraph 5-6.4(e), provided that the project would not cause significant erosion or sedimentation, would not cause a significant noise increase over noise sensitive area, or cause significant impacts to air quality. Absent extraordinary circumstances or significant impacts that cannot be mitigated, a CATEX is anticipated to be the appropriate NEPA documentation for this project.

6.3.1.4 Runway 17-35 Realignment and Extension

This alternative would result in the realignment and extension to the north of Runway 17-35 resulting in a total length of 14,500 feet (see FIGURE 4-2).

Air Quality: This project would temporarily increase emissions from construction vehicles and equipment. A construction emissions inventory may be necessary for the NEPA documentation associated with this project. Additionally, the change in aircraft fleet mix combined with the forecast increase operations at the Airport, may require an operational air quality emissions analysis for the NEPA documentation associated with this project.

Biological Resources: Because threatened and endangered species have the potential to be found at the Airport, a biological survey may be necessary for the NEPA documentation associated with this project.

Climate: The project would result in a temporary increase in emissions from construction vehicles and equipment, and a permanent increase in emissions as a result of the forecast increase in aircraft operations and change to the existing fleet mix. An estimate of GHG emissions could be included in the construction and operational emission inventory.

Historical, Architectural, Archaeological, and Cultural Resources: Because this project would include disturbing pervious ground, an archaeological survey may be required for the NEPA documentation associated with this project.

Hazardous Materials, Pollution Prevention, and Solid Waste: Construction associated with the project would generate solid waste. Waste would be handled and disposed according to federal, state, and local rules and regulations.

Noise and Noise-Compatible Land Use: The noise contours are anticipated to expand as a result of this project and it is recommended that the Airport model new noise contours that accounts for the runway realignment and extension; however, there are no known noise sensitive resources in the direction of the runway realignment and extension.

Water Resources: Less than about one acre of wetland would be affected by this runway extension. Additional wetland impacts could occur as a result of required changes to the surrounding roadways and taxiways. The Airport would be responsible for delineating the wetlands and coordinating with USACE in order to determine their jurisdictional status, and any appropriate mitigation for potential effects. Assuming that the wetlands are jurisdictional, the Airport would be responsible for obtaining a nationwide permit or individual permit, depending on the extent of the potential impacts. With regards to surface water and groundwater, the project would increase impervious surface area at the Airport. This increase in impervious surface would increase the volume of stormwater runoff; however, the existing stormwater drainage system is anticipated to be able to accommodate the increase in stormwater runoff. The contractor would be responsible for preparing a SWPPP under a UPDES Construction Storm Water Permit prior to the start of ground disturbing activities, and all construction activities would be required to comply with the provisions set forth in that permit.

NEPA Documentation Guidance: Realignment of an existing runway is not a project on the list of categorically excluded projects found in FAA Order 1050.1F. As such, an EA is anticipated to be the appropriate NEPA documentation for this project.

6.3.1.5 Runway 14-32 Closure and Conversion to a Taxiway

The FAA has identified two hot spots related to the configuration of Runway 14-32 (see FIGURE 4-9) resulting in incursions. This project would correct the hotspots relating to Runway 14-32 by closing the runway and converting a portion of the runway to a taxiway. Aircraft traffic would be accommodated on the other runways at the Airport.

Air Quality: This project would temporarily increase emissions from construction vehicles and equipment. A construction emissions inventory may be necessary for the NEPA documentation associated with this project.

Biological Resources: Because threatened and endangered species have the potential to be found at the Airport, a biological survey may be necessary for the NEPA documentation associated with this project.

Climate: The project would result in a temporary increase in emissions from construction vehicles and equipment. An estimate of GHG emissions could be included in the construction emission inventory.

Hazardous Materials, Pollution Prevention, and Solid Waste: Construction associated with the project would generate solid waste. Waste would be handled and disposed according to federal, state, and local rules and regulations.

Noise and Noise-Compatible Land Use: The noise contours are anticipated to change as a result of this project, and it is recommended that the Airport model new noise contours that accounts for the shifting of aircraft operations to other runways.

Water Resources: There are wetlands in the area of the runway. The Airport would be responsible for having these wetlands officially delineated in order to determine their jurisdictional status, and any appropriate mitigation for potential effects. Assuming that the wetlands are jurisdictional, the Airport would be responsible for obtaining a nationwide permit or individual permit, depending on the extent of the potential impacts. The contractor would be responsible for preparing a SWPPP under a UPDES Construction Storm Water Permit prior to the start of ground disturbing activities, and all construction activities would be required to comply with the provisions set forth in that permit.

NEPA Documentation Guidance: Permanently closing a runway and using it as a taxiway can categorically excluded under FAA Order paragraph 5-6.4(cc) at small, low-activity airport. However, the Airport is not considered a small, low-activity airport and as such, an EA is anticipated to be the appropriate NEPA documentation for this project.

6.3.1.6 South Runway 16L-34R End Around Taxiway

This project includes the construction of an end around taxiway around the south end of Runway 16L-34R (see FIGURE 4-10) to reduce runway crossings and the risk of an incursion, reduce air traffic controller workload, provide for more timely and predictable gate arrivals, reduce fuel consumption and emissions, and to increase runway capacity and hourly throughput.

Air Quality: This project would temporarily increase emissions from construction vehicles and equipment. A construction emissions inventory may be necessary for the NEPA documentation associated with this project.

Biological Resources: Because threatened and endangered species have the potential to be found at the Airport, a biological survey could be necessary for the NEPA documentation associated with this project.

Climate: The project would result in a temporary increase in emissions from construction vehicles and equipment. An estimate of GHG emissions could be included in the construction emission inventory.

Section 4(f) Resources: Construction of this project would require the Airport Trail bike path, which is a Section 4(f) property, to be rerouted. This would constitute a physical use of a Section 4(f) property and would require coordination with the FAA and a potential DOT Section 4(f) analysis.

Historical, Architectural, Archaeological, and Cultural Resources: Because this project would include disturbing pervious ground, an archaeological survey may be required for the NEPA documentation associated with this project.

Hazardous Materials, Pollution Prevention, and Solid Waste: Construction associated with the project would generate solid waste. Waste would be handled and disposed according to federal, state, and local rules and regulations.

Water Resources: The south end around taxiway would cross the Surplus Canal, which runs through Airport property and is under the jurisdiction of the USACE. The Airport would be responsible for coordinating with the USACE in order to obtain a nationwide permit or individual permit and determine any appropriate mitigation for potential effects. Additionally, the Surplus Canal is part of the 100-year floodplain and this project would encroach upon the floodplain; therefore, a floodplain analysis would be required. With regards to surface water and groundwater, the project would increase impervious surface area at the Airport. This increase in impervious surface would increase the volume of stormwater runoff; however, the existing stormwater drainage system is anticipated to be able to accommodate the increase in stormwater runoff. The contractor would be responsible for preparing a SWPPP under a UPDES Construction Storm Water Permit prior to the start of ground disturbing activities, and all construction activities would be required to comply with the provisions set forth in that permit.

NEPA Documentation Guidance: The construction of a taxiway can be categorically excluded under FAA Order paragraph 5-6.4(e), provided that the project would not cause significant erosion or sedimentation, would not cause a significant noise increase over noise sensitive area, or cause significant impacts to air quality. Absent extraordinary circumstances or significant impacts that cannot be mitigated, a CATEX is anticipated to be the appropriate NEPA documentation for this project.

6.3.2 Airfield Enhancement Development Projects

6.3.2.1 New and Removed Taxiways

Construction of Taxiways L, P, U, and V as well as a full parallel taxiway and highspeed exit taxiway for Runway 16L-34R, and the removal of Taxiways H6 and Q are proposed as part of the airfield enhancements project (see FIGURE 4-11). Additionally, Taxiway K5 is proposed for removal and replacement to meet current geometry standards. See SECTION 4.4.2 for more details.

Air Quality: These taxiway projects would temporarily increase emissions from construction vehicles and equipment. A construction emissions inventory may be necessary for the NEPA documentation associated with this project.

Biological Resources: Because threatened and endangered species have the potential to be found at the Airport, a biological survey may be necessary for the NEPA documentation associated with these projects.

Climate: These projects would result in a temporary increase in emissions from construction vehicles and equipment. An estimate of GHG emissions could be included in the construction emissions inventory.

Historical, Architectural, Archaeological, and Cultural Resources: Because these projects would include ground disturbing activity on pervious ground, an archaeological survey may be required for the NEPA documentation associated with these projects.

Hazardous Materials, Pollution Prevention, and Solid Waste: Construction associated with these projects would generate solid waste. Waste would be handled and disposed according to federal, state, and local rules and regulations.

Water Resources: Construction of Taxiways L, P, U, and V could affect wetlands. The Airport would be responsible for having these wetlands delineated in order to determine their jurisdictional status, and any appropriate mitigation for potential effects. Assuming that the wetlands are jurisdictional, the Airport would be responsible for obtaining a nationwide permit or individual permit, depending on the extent of the potential impacts. With regards to surface water and groundwater, the project would increase impervious surface area at the Airport. This increase in impervious surface would increase the volume of stormwater runoff; however, the existing stormwater drainage system is anticipated to be able to accommodate the increase in stormwater runoff. The contractor would be responsible for preparing a SWPPP under a UPDES Construction Storm Water Permit prior to the start of ground disturbing activities, and all construction activities would be required to comply with the provisions set forth in that permit.

NEPA Documentation Guidance: The new and removed taxiways can be categorically excluded under FAA Order 1050.1F, paragraph 5-6.4(e), provided that the projects would not cause significant erosion or sedimentation, would not cause a significant noise increase over noise sensitive area, or cause significant impacts to air quality. Absent extraordinary circumstances or significant impacts that cannot be mitigated, a CATEX is anticipated to be the appropriate NEPA documentation for this project.

6.3.2.2 Deicing Facilities

Projects associated with deicing facilities at the Airport would include a new eight-position runway-end deice pad for Runway 16R, an expansion to the Runway 16L deice pad between Runway 16L-34R and the Runway 17 threshold, and potential relocation of the deice pads serving Runway 16L-34R to the west (see FIGURE 4-11).

Air Quality: This project would temporarily increase emissions from construction vehicles and equipment. A construction emissions inventory may be necessary for the NEPA documentation associated with this project.

Biological Resources: Because threatened and endangered species have the potential to be found at the Airport, a biological survey may be necessary for the NEPA documentation associated with this project.

Climate: The project would temporarily increase emissions from construction vehicles and equipment, including GHG emissions. The increase would be temporary and minor. An estimate of GHG emissions could be calculated in the construction emissions inventory.

Hazardous Materials, Pollution Prevention, and Solid Waste: Construction associated with the project would generate solid waste. Waste would be handled and disposed according to federal, state, and local rules and regulations.

Water Resources: This project could potentially affect existing wetlands in the areas where the deicing facilities would be constructed. The Airport would be responsible for delineating the wetlands and coordinating with the USACE in order to determine their jurisdictional status and any appropriate mitigation for potential effects. Assuming that the wetlands are jurisdictional, the Airport would be responsible for obtaining a nationwide permit or individual permit, depending on the extent of the potential impacts. The deicing facilities would increase impervious surface at the Airport; however, the existing stormwater drainage system is anticipated to be able to accommodate the increase in stormwater runoff. The project would not increase the amount of glycol-contaminated stormwater runoff at the Airport; but would provide more efficient and effective ways to handle glycol-contaminated stormwater runoff. The contractor would be responsible for preparing a SWPPP under a UPDES Construction Storm Water Permit prior to the start of ground disturbing activities, and all construction activities would be required to comply with the provisions set forth in that permit.

NEPA Documentation Guidance: The construction of the deicing facilities can be categorically excluded under FAA Order 1050.1F, paragraph 5-6.4(d). Absent extraordinary circumstances or significant impacts that cannot be mitigated, a CATEX is anticipated to be the appropriate NEPA documentation for this project.

6.3.3 Terminal Concourse Expansion Development Project

The terminal concourse expansion development would include new building construction, along with taxiway pavement/rehabilitation, new apron pavement/rehabilitation, new shoulder pavement/rehabilitation, a new vehicle service road, replacement crossfield taxiways, removal of a fuel farm, and existing on-Airport structures (see FIGURE 4-15).

Air Quality: This project would temporarily increase emissions from construction vehicles and equipment. A construction emissions inventory may be necessary for the NEPA documentation associated with this project. Additionally, the change in aircraft fleet mix combined with the forecast increase operations at the Airport, may require an operational air quality emissions analysis for the NEPA documentation associated with this project.

Biological Resources: Because threatened and endangered species have the potential to be found at the Airport, a biological survey may be necessary for the NEPA documentation associated with this project.

Climate: The project would result in a temporary increase in emissions from construction vehicles and equipment, and a permanent increase in emissions as a result of an increase in forecast aircraft operations. An estimate of GHG emissions could be included in the construction and operational emission inventory.

Historical, Architectural, Archaeological, and Cultural Resources: Because this project would include ground disturbing activity on pervious ground, an archaeological survey may be required for the NEPA documentation associated with this project.

Hazardous Materials, Pollution Prevention, and Solid Waste: Construction associated with the project would generate solid waste. The addition of new gates to the terminal would also result in the generation of additional solid waste. Waste would be handled and disposed according to federal, state, and local rules and regulations.

Noise and Noise Compatible Land Use: The noise contours are anticipated to change as a result of this project, and it is recommended that the Airport model new noise contours that accounts for aircraft operations associated with the new terminal concourse.

Water Resources: This project could potentially affect existing wetlands in the area of the project. The Airport would be responsible for delineating wetlands and coordinating with the USACE in order to determine their jurisdictional status, and any appropriate mitigation for potential effects. Assuming that the wetlands are jurisdictional, the Airport would be responsible for obtaining a nationwide permit or individual permit, depending on the extent of the potential impacts. Additionally, the construction of the concourse expansion would increase impervious surface at the Airport; however, the existing stormwater drainage system is anticipated to be able to accommodate the increase in stormwater runoff. The contractor would be responsible for preparing a SWPPP under a UPDES Construction Storm Water Permit prior to the start of ground disturbing activities, and all construction activities would be required to comply with the provisions set forth in that permit.

NEPA Documentation Guidance: Non-aeronautical development, such as new service roadways, may not be subject to FAA approval authority in compliance with Section 163.[22] However, if the FAA does have approval authority, the construction of the service road can be categorically excluded under FAA Order 1050.1F, paragraph 5-6.4(a). The new building construction can be categorically excluded under FAA Order 1050.1F, paragraph 5-6.4(h), provided it does not substantially expand those facilities outside of the FAA's presumed to conform list (72 Federal Register 41565). The construction, repair, reconstruction, resurfacing, extension, strengthening, or widening of a taxiway can be categorically excluded under FAA Order 1050.1F, paragraph 5-6.4(e), provided that the project would not cause significant erosion or sedimentation, would not cause a significant noise increase over noise sensitive area, or cause significant impacts to air quality. Absent extraordinary circumstances or significant impacts that cannot be mitigated, a CATEX is anticipated to be the appropriate NEPA documentation for this project. If this project is considered to substantially expand the terminal concourse buildings, an EA may be necessary.

6.3.4 North Air Cargo Alternatives

There are two preferred alternatives for the future cargo expansion locations (see SECTION 4.6 for details).

6.3.4.1 Ultimate Cargo Site 2

Future cargo expansion would include new air cargo building construction along with a new taxiway pavement/rehabilitation, new apron pavement/rehabilitation, new shoulder pavement/rehabilitation, and new roadway and vehicle parking construction (see FIGURE 4-16).

Air Quality: This project would temporarily increase emissions from construction vehicles and equipment. A construction emissions inventory may be necessary for the NEPA documentation associated with this project. Should the Airport experience either a change in aircraft fleet mix or a significant increase in cargo operations associated with this project, an operational air quality emissions analysis for the NEPA documentation associated with this project.

Biological Resources: Because threatened and endangered species have the potential to be found at the Airport, a biological survey may be necessary for the NEPA documentation associated with this project.

Climate: The project would temporarily increase emissions from construction vehicles and equipment, including GHG emissions, and a permanent increase in emissions as a result of forecast cargo aircraft operations. An estimate of GHG emissions could be calculated in the construction and operational emissions inventory.

Historical, Architectural, Archaeological, and Cultural Resources: Because this project would include disturbing pervious ground, an archaeological survey may be required for the NEPA documentation associated with this project.

Hazardous Materials, Pollution Prevention, and Solid Waste: Construction associated with the project would generate solid waste. Operation of the new cargo facilities would result in an increase in solid waste at the Airport as well. Waste would be handled and disposed according to federal, state, and local rules and regulations.

Noise: The noise contours are anticipated to change as a result of this project, and it is recommended that the Airport model new noise contours that accounts for the increase in cargo operations.

Water Resources: This project could potentially affect existing wetlands in the area. The Airport would be responsible for delineating the wetlands and coordinating with the USACE in order to determine their jurisdictional status, and any appropriate mitigation for potential effects. Assuming that the wetlands are jurisdictional, the Airport would be responsible for obtaining a nationwide permit or individual permit, depending on the extent of the potential impacts. Additionally, the contractor would be responsible for preparing a SWPPP under a UPDES Construction Storm Water Permit prior to the start of ground disturbing activities, and all construction activities would be required to comply with the provisions set forth in that permit.

NEPA Documentation Guidance: Non-aeronautical development, such as new roadways and vehicle parking, may not be subject to FAA approval authority in compliance with Section 163.[23] However, if the FAA does have approval authority, the construction of the new roadway can be categorically excluded under FAA Order 1050.1F, paragraph 5-6.4(a). The new cargo building construction can be categorically excluded under FAA Order 1050.1F, paragraph 5-6.4(h), provided it does not substantially expand those facilities outside of the FAA's presumed to conform list (72 Federal Register 41565). Construction of vehicle parking associated with the new cargo building can be categorically excluded under FAA Order 1050.1F, paragraph 5-6.4(f). The construction, repair, reconstruction, resurfacing, extension, strengthening, or widening of a taxiway and apron can be categorically excluded under FAA Order 1050.1F, paragraph 5-6.4(e), provided that the project would not cause significant erosion or sedimentation, would not cause a significant noise increase over noise sensitive area, or cause significant impacts to air quality. Absent extraordinary circumstances or significant impacts that cannot be mitigated, a CATEX is anticipated to be the appropriate NEPA documentation for this project. If this project is considered to substantially expand the cargo facilities, an EA may be necessary.

[22] See Section 163 of the FAA Reauthorization Act of 2018.
[23] See Section 163 of the FAA Reauthorization Act of 2018.

6.3.4.2 Ultimate Cargo Site 3

Future cargo expansion would include a new cargo building along with new taxiway pavement/rehabilitation, new apron pavement/rehabilitation, new shoulder pavement/rehabilitation, and new roadway and vehicle parking construction (see FIGURE 4-16).

Air Quality: This project would temporarily increase emissions from construction vehicles and equipment. A construction emissions inventory may be necessary for the NEPA documentation associated with this project. Should the Airport experience either a change in aircraft fleet mix or a significant increase in cargo operations associated with this project, an operational air quality emissions analysis for the NEPA documentation associated with this project.

Biological Resources: Because threatened and endangered species have the potential to be found at the Airport, a biological survey may be necessary for the NEPA documentation associated with this project.

Climate: The project would temporarily increase emissions from construction vehicles and equipment, including GHG emissions, and a permanent increase in emissions as a result of forecast cargo aircraft operations. An estimate of GHG emissions could be calculated in the construction and operational emissions inventory.

Historical, Architectural, Archaeological, and Cultural Resources: Because this project would include disturbing pervious ground, an archaeological survey may be required for the NEPA documentation associated with this project.

Hazardous Materials, Pollution Prevention, and Solid Waste: Construction associated with the project would generate solid waste. Operation of the new cargo facilities would result in an increase in solid waste at the Airport as well. Waste would be handled and disposed according to federal, state, and local rules and regulations.

Noise and Noise-Compatible Land Use: The noise contours are anticipated to change as a result of this project, and it is recommended that the Airport model new noise contours that accounts for the increase in cargo operations.

Water Resources: This project could potentially affect existing wetlands in the area. The Airport would be responsible for delineating wetlands and coordinating with USACE in order to determine their jurisdictional status, and any appropriate mitigation for potential effects. Assuming that the wetlands are jurisdictional, the Airport would be responsible for obtaining a nationwide permit or individual permit, depending on the extent of the potential impacts. Additionally, the contractor would be responsible for preparing a SWPPP under a UPDES Construction Storm Water Permit prior to the start of ground disturbing activities, and all construction activities would be required to comply with the provisions set forth in that permit.

NEPA Documentation Guidance: Non-aeronautical development, such as new roadways and vehicle parking, may not be subject to FAA approval authority in compliance with Section 163.[24] However, if the FAA does have approval authority, the construction of the new roadway can be categorically excluded under FAA Order 1050.1F, paragraph 5-6.4(a). The new cargo building construction can be categorically excluded under FAA Order 1050.1F, paragraph 5-6.4(h), provided it does not substantially expand those facilities outside of the FAA's presumed to conform list (72 Federal Register 41565). Construction of vehicle parking associated with the new cargo building can be categorically excluded under FAA Order 1050.1F, paragraph 5-6.4(f). The construction, repair, reconstruction, resurfacing, extension, strengthening, or widening of a taxiway and apron can be categorically excluded under FAA Order 1050.1F, paragraph 5-6.4(e), provided that the project would not cause significant erosion or sedimentation, would not cause a significant noise increase over noise sensitive area, or cause significant impacts to air quality. Absent extraordinary circumstances or significant impacts that cannot be mitigated, a CATEX is anticipated to be the appropriate NEPA documentation for this project. If this project is considered to substantially expand the cargo facilities, an EA may be necessary.

6.3.5 Landside Development Projects

6.3.5.1 2100 North Roadway Realignment

Should Runway 16L-34R be extended (see SECTION 6.3.1.2), a portion of 2100 north would pass through the proposed new RPZ and would need to be realigned (see FIGURE 4-11).

Air Quality: This project would temporarily increase emissions from construction vehicles and equipment. A construction emissions inventory may be necessary for the NEPA documentation associated with this project.

Biological Resources: Because threatened and endangered species have the potential to be found at the Airport, a biological survey may be necessary for the NEPA documentation associated with this project.

[24] See Section 163 of the FAA Reauthorization Act of 2018.

Climate: The project would temporarily increase emissions from construction vehicles and equipment, including GHG emissions. The increase would be temporary and minor. An estimate of GHG emissions could be calculated in the construction emissions inventory.

Historical, Architectural, Archaeological, and Cultural Resources: Because this project would include disturbing pervious ground, an archaeological survey may be required for the NEPA documentation associated with this project.

Hazardous Materials, Pollution Prevention, and Solid Waste: Construction associated with the project would generate solid waste. Waste would be handled and disposed according to federal, state, and local rules and regulations.

Water Resources: The road realignment could encroach upon a 100-year floodplain and a floodplain analysis would be required. Additionally, this project could potentially affect existing wetlands in the area. The Airport would be responsible for delineating the wetlands and coordinating with the USACE in order to determine their jurisdictional status, and any appropriate mitigation for potential effects. Assuming that the wetlands are jurisdictional, the Airport would be responsible for obtaining a nationwide permit or individual permit, depending on the extent of the potential impacts. Additionally, the contractor would be responsible for preparing a SWPPP under a UPDES Construction Storm Water Permit prior to the start of ground disturbing activities, and all construction activities would be required to comply with the provisions set forth in that permit.

NEPA Documentation Guidance: Non-aeronautical development, such as roadway realignments, may not be subject to FAA approval authority in compliance with Section 163.[25] However, if the FAA does have approval authority, the construction of the road realignment can be categorically excluded under FAA Order 1050.1F, paragraph 5-6.4(a). Absent extraordinary circumstances or significant impacts that cannot be mitigated, a CATEX is anticipated to be the appropriate NEPA documentation for this project.

6.3.5.2 Employee Parking

The South Employee Parking Lot would be located in a new lot in the southern portion of the Airport near the proposed south Runway 16L-34R End Around (see Figure 4-25). This south employee parking lot would use a 1-bus system and would not include on-site screening prior to busing of employees.

Air Quality: This project would temporarily increase emissions from construction vehicles and equipment. A construction emissions inventory may be necessary for the NEPA documentation associated with this project.

Biological Resources: Because threatened and endangered species have the potential to be found at the Airport, a biological survey could be necessary for the NEPA documentation associated with this project.

Climate: The project would result in a temporary increase in emissions from construction vehicles and equipment. An estimate of GHG emissions could be included in the construction emission inventory.

Section 4(f) Resources: Construction of this project would require the Airport Trail bike path, which is a Section 4(f) property, to be rerouted. This would constitute a physical use of a Section 4(f) property and would require coordination with the FAA and a potential DOT Section 4(f) analysis.

Historical, Architectural, Archaeological, and Cultural Resources: Because this project would include disturbing pervious ground, an archaeological survey may be required for the NEPA documentation associated with this project.

Hazardous Materials, Pollution Prevention, and Solid Waste: Construction associated with the project would generate solid waste. Waste would be handled and disposed according to federal, state, and local rules and regulations.

Water Resources: The south employee parking lot has the potential to affect existing wetlands in the area and would cross the Surplus Canal, which runs through Airport property and is under the jurisdiction of the USACE. The Airport would be responsible for delineating wetlands and coordinating with the USACE in order to obtain a nationwide permit or individual permit and determine any appropriate mitigation for potential effects. Additionally, the Surplus Canal is part of the 100-year floodplain and this project would encroach upon the floodplain; therefore, a floodplain analysis would be required. With regards to surface water and groundwater, the project would increase impervious surface area at the Airport. This increase in impervious surface would increase the volume of stormwater runoff; however, the existing stormwater drainage system is anticipated to be able to accommodate the increase in stormwater runoff. The contractor would be responsible for preparing a SWPPP under a UPDES Construction Storm Water Permit prior to the start of ground disturbing activities, and all construction activities would be required to comply with the provisions set forth in that permit.

NEPA Documentation Guidance: Non-aeronautical development, such as an employee parking lot, may not be subject to FAA approval authority in compliance with Section 163.[26] However, if the FAA does have approval authority, the construction of the employee parking area can be categorically excluded under FAA Order 1050.1F, paragraph 5-6.4(h). Absent extraordinary circumstances or significant impacts that cannot be mitigated, a CATEX is anticipated to be the appropriate NEPA documentation for this project.

6.3.5.3 Preferred Comprehensive Landside Development

The comprehensive landside development includes the following projects: public parking, consolidated rental car facilities, additional public services (Park 'n' Wait lot and Service Center), employee parking (see SECTION 6.3.5.2), commercial vehicle staging, and future landside expansion (see FIGURE 4-25). All of the projects, except for the employee parking (see SECTION 6.3.5.2) and the future landside expansion projects, would occur on existing paved and developed land.

Air Quality: These projects would temporarily increase emissions from construction vehicles and equipment. A construction emissions inventory may be necessary for the NEPA documentation associated with these projects.

Biological Resources: Because threatened and endangered species have the potential to be found at the Airport, a biological survey may be necessary for the NEPA documentation associated with this project with the exception of the employee parking and future landside expansion projects, since these projects are proposed to be located on pervious ground.

Climate: These projects would temporarily increase emissions from construction vehicles and equipment, including GHG emissions. The increase would be temporary and minor. An estimate of GHG emissions could be calculated in the construction emissions inventory.

Historical, Architectural, Archaeological, and Cultural Resources: Because the future landside expansion and the employee parking projects (see SECTION 4.7) would include disturbing pervious ground, an archaeological survey may be required for the NEPA documentation associated with this project.

Hazardous Materials, Pollution Prevention, and Solid Waste: Construction associated with the comprehensive landside development would generate solid waste. Waste would be handled and disposed according to federal, state, and local rules and regulations.

Water Resources: The future landside expansion and the employee parking projects (see SECTION 4.7) could potentially affect existing wetlands in the area. The Airport would be responsible for delineating wetlands and coordinating with the USACE in order to determine their jurisdictional status, and any appropriate mitigation for potential effects. Assuming that the wetlands are jurisdictional, the Airport would be responsible for obtaining a nationwide permit or individual permit, depending on the extent of the potential impacts. Additionally, the contractor would be responsible for preparing a SWPPP under a UPDES Construction Storm Water Permit prior to the start of ground disturbing activities, and all construction activities would be required to comply with the provisions set forth in that permit.

NEPA Documentation Guidance: Non-aeronautical development, such as parking areas, may not be subject to FAA approval authority in compliance with Section 163.[27] However, if the FAA does have approval authority, the construction of the public parking, consolidated rental car facilities, additional public services (Park n' Wait Lot and service center), and commercial vehicle staging can all be categorically excluded under FAA Order 1050.1F, paragraph 5-6.4(h). Absent extraordinary circumstances or significant impacts that cannot be mitigated, a CATEX is anticipated to be the appropriate NEPA documentation for this project. The future landside expansion project may not be subject to FAA approval authority in compliance with Section 163, depending on the proposed use and if certain conditions are met.[28] However, if the FAA does have approval authority, the project can categorically excluded under FAA Order 1050.1F, paragraph 5-6.1(b) provided the use of the land does not trigger extraordinary circumstances and the proposed land use is a use found in FAA Order 1050.1F as a categorically excluded use. However, if the proposed land use is not a categorically excluded action, an EA may be necessary.

6.3.6 Support Facility Development Projects

6.3.6.1 Airline Maintenance, Airport Maintenance, and ARFF Facility

The relocation and expansion of the airline and airport maintenance buildings, as well as relocation of the aircraft rescue firefighting (ARFF) Station #12 would occur under this project (see FIGURE 4-26).

Air Quality: This project would temporarily increase emissions from construction vehicles and equipment. A construction emissions inventory may be necessary for the NEPA documentation associated with this project.

Biological Resources: Because threatened and endangered species have the potential to be found at the Airport, a biological survey may be necessary for the NEPA documentation associated with this project.

Climate: The project would temporarily increase emissions from construction vehicles and equipment, including GHG emissions. The increase would be temporary and minor. An estimate of GHG emissions could be calculated in the construction emissions inventory.

[25] See Section 163 of the FAA Reauthorization Act of 2018.
[26] See Section 163 of the FAA Reauthorization Act of 2018.
[27] See Section 163 of the FAA Reauthorization Act of 2018.
[28] See Section 163 of the FAA Reauthorization Act of 2018.

Historical, Architectural, Archaeological, and Cultural Resources: Because this project would include disturbing pervious ground, an archaeological survey may be required for the NEPA documentation associated with this project.

Hazardous Materials, Pollution Prevention, and Solid Waste: Construction associated with the project would generate solid waste. Waste would be handled and disposed according to federal, state, and local rules and regulations.

Water Resources: This project could potentially affect existing wetlands in the area. The Airport would be responsible for delineating the wetlands and coordinating with the USACE in order to determine their jurisdictional status, and any appropriate mitigation for potential effects. Assuming that the wetlands are jurisdictional, the Airport would be responsible for obtaining a nationwide permit or individual permit, depending on the extent of the potential impacts. With regards to surface water and groundwater, the project would increase impervious surface area at the Airport. This increase in impervious surface would increase the volume of stormwater runoff; however, the existing stormwater drainage system is anticipated to be able to accommodate the increase in stormwater runoff. Additionally, the contractor would be responsible for preparing a SWPPP under a UPDES Construction Storm Water Permit prior to the start of ground disturbing activities, and all construction activities would be required to comply with the provisions set forth in that permit.

NEPA Documentation Guidance: Non-aeronautical development, such as the airline and airport maintenance buildings, may not be subject to FAA approval authority in compliance with Section 163.[29] However, if the FAA does have approval authority, the construction of the relocated airline and airport maintenance buildings and the ARFF Station #12 can be categorically excluded under FAA Order 1050.1F, paragraph 5-6.4(f). Absent extraordinary circumstances or significant impacts that cannot be mitigated, a CATEX is anticipated to be the appropriate NEPA documentation for this project.

6.3.6.2 Commercial Service Fuel Farm Relocation

Relocation of the commercial service fuel farm facility would occur under this project (see FIGURE 4-27). The relocated fuel farm would tie into the existing pipeline.

Air Quality: This project would temporarily increase emissions from construction vehicles and equipment. A construction emissions inventory may be necessary for the NEPA documentation associated with this project.

Biological Resources: Because threatened and endangered species have the potential to be found at the Airport, a biological survey may be necessary for the NEPA documentation associated with this project.

Climate: The project would result in a temporary increase in emissions from construction vehicles and equipment. The increase would be temporary and minor. An estimate of GHG emissions could be included in the construction emissions inventory.

Historical, Architectural, Archaeological, and Cultural Resources: Because this project would include disturbing pervious ground, an archaeological survey may be required for the NEPA documentation associated with this project.

Hazardous Materials, Pollution Prevention, and Solid Waste: Construction associated with the project would generate solid waste. Waste would be handled and disposed according to federal, state, and local rules and regulations. The project would increase the amount of hazardous materials stored at the Airport. Additionally, the Airport would need to update is SPCC plan and SWPPP to account for the project.

Water Resources: This project could potentially affect existing wetlands in the area. The Airport would be responsible for delineating wetlands and coordinating with the USACE in order to determine their jurisdictional status, and any appropriate mitigation for potential effects. Assuming that the wetlands are jurisdictional, the Airport would be responsible for obtaining a nationwide permit or individual permit, depending on the extent of the potential impacts. With regards to surface water and groundwater, the project would increase impervious surface area at the Airport. This increase in impervious surface would increase the volume of stormwater runoff; however, the existing stormwater drainage system is anticipated to be able to accommodate the increase in stormwater runoff. Additionally, the contractor would be responsible for preparing a SWPPP under a UPDES Construction Storm Water Permit prior to the start of ground disturbing activities, and all construction activities would be required to comply with the provisions set forth in that permit.

NEPA Documentation Guidance: Bulk fuel storage facilities are not a project on the list of categorically excluded projects found in FAA Order 1050.1F. As such, an EA is anticipated to be the appropriate NEPA documentation for this project.

6.3.6.3 General Aviation Leasehold Development

Three zones have been identified for general aviation (GA) development (see FIGURES 4-28 and 4-29). Zones 1 and 2 are to be managed by the Airport's fixed base operators (FBO's) while Zone 3 will be under direct development by the Airport. Development is to include new apron pavement/rehabilitation, new building construction, and new roadway and parking construction.

[29] See Section 163 of the FAA Reauthorization Act of 2018.

Air Quality: This project would temporarily increase emissions from construction vehicles and equipment. A construction emissions inventory may be necessary for the NEPA documentation associated with this project. Should the Airport experience either a change in aircraft fleet mix or a significant increase in GA operations associated with this project, an operational air quality emissions analysis for the NEPA documentation associated with this project.

Climate: The project would temporarily increase emissions from construction vehicles and equipment, including GHG emissions. The increase would be temporary and minor. An estimate of GHG emissions could be calculated in the construction emissions inventory.

Hazardous Materials, Pollution Prevention, and Solid Waste: Construction associated with the project would generate solid waste. Waste would be handled and disposed according to federal, state, and local rules and regulations.

Noise and Noise-Compatible Land Uses: The noise contours are anticipated to change as a result of this project, and it is recommended that the Airport model new noise contours that accounts for the additional GA operations.

Water Resources: The project would increase impervious surface area at the Airport. This increase in impervious surface would increase the volume of stormwater runoff; however, the existing stormwater drainage system is anticipated to be able to accommodate the increase in stormwater runoff. Additionally, the contractor would be responsible for preparing a SWPPP under a UPDES Construction Storm Water Permit prior to the start of ground disturbing activities, and all construction activities would be required to comply with the provisions set forth in that permit.

NEPA Documentation Guidance: The construction of the new roadway and parking can be categorically excluded under FAA Order 1050.1F, paragraph 5-6.4(a). The new building construction can be categorically excluded under FAA Order 1050.1F, paragraph 5-6.4(h). The construction, repair, reconstruction, resurfacing, extension, strengthening, or widening of an apron can be categorically excluded under FAA Order 1050.1F, paragraph 5-6.4(e), provided that the project would not cause significant erosion or sedimentation, would not cause a significant noise increase over noise sensitive area, or cause significant impacts to air quality. Absent extraordinary circumstances or significant impacts that cannot be mitigated, a CATEX is anticipated to be the appropriate NEPA documentation for this project.

6.3.6.4 ARFF Training Facility

The new aircraft rescue firefighting (ARFF) training facility location was identified for development near ARFF Training Sites 1 and 2 shown in FIGURE 4-30. A new access roadway and parking would also be constructed as part of this project.

Air Quality: This project would temporarily increase emissions from construction vehicles and equipment. A construction emissions inventory may be necessary for the NEPA documentation associated with this project.

Biological Resources: Because threatened and endangered species have the potential to be found at the Airport, a biological survey may be necessary for the NEPA documentation associated with this project.

Climate: The project would temporarily increase emissions from construction vehicles and equipment, including GHG emissions. The increase would be temporary and minor. An estimate of GHG emissions could be calculated in the construction emissions inventory.

Hazardous Materials, Pollution Prevention, and Solid Waste: Construction associated with the project would generate solid waste. Waste would be handled and disposed according to federal, state, and local rules and regulations.

Historical, Architectural, Archaeological, and Cultural Resources: Because this project would include disturbing pervious ground, an archaeological survey may be required for the NEPA documentation associated with this project.

Water Resources: This project could potentially affect existing wetlands in the area (see FIGURE 4-30). The Airport would be responsible for delineating wetlands and coordinating with USACE in order to determine their jurisdictional status, and any appropriate mitigation for potential effects. Assuming that the wetlands are jurisdictional, the Airport would be responsible for obtaining a nationwide permit or individual permit, depending on the extent of the potential impacts. The project would increase impervious surface area at the Airport. This increase in impervious surface would increase the volume of stormwater runoff. Stormwater runoff analysis may be needed to ensure that the new non-aeronautical development can accommodate the new impervious surface with the existing infrastructure. Additionally, the contractor would be responsible for preparing a SWPPP under a UPDES Construction Storm Water Permit prior to the start of ground disturbing activities, and all construction activities would be required to comply with the provisions set forth in that permit.

NEPA Documentation Guidance: Non-aeronautical development, such as new roadways and parking areas, may not be subject to FAA approval authority in compliance with Section

[30] See Section 163 of the FAA Reauthorization Act of 2018.

163.[30] However, if the FAA does have approval authority, the construction of the new roadway and parking can be categorically excluded under FAA Order 1050.1F, paragraph 5-6.4(a). The new building construction can be categorically excluded under FAA Order 1050.1F, paragraph 5-6.4(h). Absent extraordinary circumstances or significant impacts that cannot be mitigated, a CATEX is anticipated to be the appropriate NEPA documentation for this project.

6.3.7 Non-Aeronautical Land Use Development Project Opportunities

A portion of the north east quadrant of the Airport was identified for non-aeronautical use to supplement the Airport's existing revenue stream (see FIGURE 4-31).

Air Quality: This project would temporarily increase emissions from construction vehicles and equipment. A construction emissions inventory may be necessary for the NEPA documentation associated with this project.

Biological Resources: Because threatened and endangered species have the potential to be found at the Airport, a biological survey may be necessary for the NEPA documentation associated with this project.

Climate: The project would temporarily increase emissions from construction vehicles and equipment, including GHG emissions. The increase would be temporary and minor. An estimate of GHG emissions could be calculated in the construction emissions inventory.

Hazardous Materials, Pollution Prevention, and Solid Waste: Construction associated with the project would generate solid waste. Waste would be handled and disposed according to federal, state, and local rules and regulations.

Historical, Architectural, Archaeological, and Cultural Resources: Because this project would include disturbing pervious ground, an archaeological survey may be required for the NEPA documentation associated with this project.

Land Use: The project would need to ensure that proposed non-aeronautical development was compatible with land use zoning as well as with FAA regulations.[31]

Water Resources: This project could potentially affect existing wetlands in the area. The Airport would be responsible for delineating wetlands and coordinating with USACE in order to determine their jurisdictional status, and any appropriate mitigation for potential effects. Assuming that the wetlands are jurisdictional, the Airport would be responsible for obtaining a nationwide permit or individual permit, depending on the extent of the potential impacts. The project would increase impervious surface area at the Airport. This increase in impervious surface would increase the volume of stormwater runoff. Stormwater runoff analysis may be needed to ensure that the new non-aeronautical development can accommodate the new impervious surface with the existing infrastructure. Additionally, the contractor would be responsible for preparing a SWPPP under a UPDES Construction Storm Water Permit prior to the start of ground disturbing activities, and all construction activities would be required to comply with the provisions set forth in that permit.

NEPA Documentation Guidance: The release of Federally obligated land for non-aeronautical development may not be subject to FAA approval authority in compliance with Section 163.[32] However, if the FAA does have approval authority, the development can categorically excluded under FAA Order 1050.1F, paragraph 5-6.1(b) provided the use of the land does not trigger extraordinary circumstances and the proposed land use is a use found in FAA Order 1050.1F as a categorically excluded use. However, if the proposed land use is not a categorically excluded action, an EA may be necessary.

[31] FAA. (1985). Federal Aviation Regulations Part 150, Airport Noise Compatibility Planning, CFR 14, Chapter I, Subchapter I, Part 150, Table 1, January 18, 1985, as amended.
[32] See Section 163 of the FAA Reauthorization Act of 2018.

6.4 APPROACHES TO NEPA DOCUMENTATION

This section outlines the NEPA approach associated with the development projects described in the short term (1-10 years) period of the Construction Implementation Plan (CIP) (see SECTION 5.3). Projects included in SECTION 5.4 include projects in both the short-term and long-term CIP periods; however, due to the likelihood of changes to project implementation time frames, the long-term projects are not discussed in this section. It is recommended that projects connected in function, place, and/or time be evaluated in the same NEPA document in an effort to save time and money. Connected actions (projects that do not have independent utility from another project) must be considered in the same NEPA document to avoid segmentation. TABLE 6-1 describes the projects within the short-term CIP and their appropriate NEPA documentation. Prior to starting NEPA documentation for a development project at the Airport, the Airport or its contractor should coordinate with the FAA Denver Airports District Office (ADO) Environmental Protection Specialist (EPS) to officially determine if the project qualifies under Section 163 and if not, determine the appropriate level NEPA documentation (e.g., CATEX, EA, EIS).

6.4.1 North Cargo Area Expansion

The construction of the new roadway can be categorically excluded under FAA Order 1050.1F, paragraph 5-6.4(a). The new cargo building construction can be categorically excluded under FAA Order 1050.1F, paragraph 5-6.4(h), provided it does not substantially expand those facilities outside of the FAA's presumed to conform list (72 Federal Register 41565). Construction of vehicle parking associated with the new cargo building can be categorically excluded under FAA Order 1050.1F, paragraph 5-6.4(f). The construction, repair, reconstruction, resurfacing, extension, strengthening, or widening of a taxiway and apron can be categorically excluded under FAA Order 1050.1F, paragraph 5-6.4(e), provided that the project would not cause significant erosion or sedimentation, would not cause a significant noise increase over noise sensitive area, or cause significant impacts to air quality. Absent extraordinary circumstances, a CATEX is anticipated to be the appropriate NEPA documentation for this project. If this project is considered to substantially expand the cargo facilities, an EA may be necessary.

6.4.2 Public Parking Construction Phase I – Employee Lot

Non-aeronautical development, such as an employee parking lot, can be approved under Section 163 if certain conditions are met.[33] However, if Section 163 does not apply, the construction of the employee parking area can be categorically excluded under FAA Order 1050.1F, paragraph 5-6.4(h). Absent extraordinary circumstances, a CATEX is anticipated to be the appropriate NEPA documentation for this project.

Table 6-1: CIP NEPA Approach

<table>
<tr><th>CIP Year</th><th>CIP Project</th><th>NEPA Document</th><th>FAA Approval Authority Per Section 163 Guidelines</th></tr>
<tr><td>2021/2022</td><td>North Cargo Area Expansion</td><td>CATEX</td><td>Yes</td></tr>
<tr><td>2023</td><td>Public Parking Construction Phase 1- Employee lot</td><td>CATEX</td><td>No</td></tr>
<tr><td>2023</td><td>Runway 14-32 Removal</td><td rowspan="4">EA</td><td>Yes</td></tr>
<tr><td>2023</td><td>Taxiway K2 Crossfield Connection Construction</td><td>Yes</td></tr>
<tr><td>2023</td><td>Taxiway Q Removal</td><td>Yes</td></tr>
<tr><td>2024</td><td>Runway 16L North Deicing Pad Facilities Upgrades</td><td>Yes</td></tr>
<tr><td>2026</td><td>Initial 4000W Roadway Relocation</td><td>CATEX</td><td>No</td></tr>
<tr><td>2027</td><td>West Portion Taxiway V Construction</td><td rowspan="3">CATEX</td><td>Yes</td></tr>
<tr><td>2028</td><td>East Portion Taxiway V Construction</td><td>Yes</td></tr>
<tr><td>2029</td><td>East Portion Taxiway U Construction</td><td>Yes</td></tr>
<tr><td>2030</td><td>Taxiway S Deice Pad Construction</td><td>CATEX</td><td>Yes</td></tr>
</table>

6.4.3 Runway 14-32 Removal, Taxiway K2 Crossfield Connection Construction, Taxiway Q Removal, and Runway 16L Deicing Pad Facilities Upgrades

The appropriate form of NEPA documentation would be an EA that combines the Runway 14-32 removal, Taxiway K2 crossfield connection construction, removal of Taxiway Q, and upgrades to Runway 16L deicing pad facilities projects. These projects should be combined due to joint utility and proximity in time. An EA is anticipated to be the required NEPA documentation for this group of projects because permanently closing a runway and using it as a taxiway can only be categorically excluded under FAA Order paragraph 5-6.4(cc) at small, low-activity airports. The Airport is not considered a small, low-activity airport and as such, an EA is anticipated to be the appropriate NEPA documentation for this project.

6.4.4 Initial 4000W Roadway Relocation

Non-aeronautical development, such as new roadways and vehicle parking, can be approved under Section 163 if certain conditions are met.[34] However, if Section 163 does not apply, the relocation of the roadway can be categorically excluded under FAA Order 1050.1F, paragraph 5-6.4(a).

6.4.5 West Portion Taxiway V Construction, East Portion Taxiway V Construction, East Taxiway U Construction

The appropriate form of NEPA documentation would be a CATEX that combines the construction the west portion of Taxiway V, east portion of Taxiway V, and east Taxiway U. These projects should be combined due to joint utility and proximity in time. The construction of the taxiways can be categorically excluded under FAA Order 1050.1F, paragraph 5-6.4(e).

6.4.6 Taxiway S Deice Pad Construction

The appropriate form of NEPA documentation would be a CATEX. The construction of the deicing facilities can be categorically excluded under FAA Order 1050.1F, paragraph 5-6.4(d). Absent any extraordinary circumstances, a CATEX is anticipated to be the appropriate NEPA documentation for this project.

---

[33] See Section 163 of the FAA Reauthorization Act of 2018.
[34] See Section 163 of the FAA Reauthorization Act of 2018.

AIRPORT LAYOUT PLAN

U.S. Department of Transportation
Federal Aviation Administration

Northwest Mountain Region
Colorado · Idaho · Montana · Oregon · Utah
Washington · Wyoming

Denver Airports District Office
26805 E. 68th Ave., Suite
224 Denver, CO 80249

8/10/2021

Brady Fredrickson
Salt Lake City Department of Airport
P.O. Box 145550
Salt Lake City, UT 84114

Salt Lake City International Airport
Salt Lake City, UT
AIP: 3-49-0033-112-2017
Airspace Case: 2021-ANM-1252-NRA
Airport Layout Plan (ALP)

Dear Mr. Fredrickson:

The ALP for the subject airport, prepared by RS&H and bearing Bill Wyatt's signature, is conditionally approved. A signed copy of the Federal Aviation Administration (FAA) approved ALP is attached.

Notwithstanding, all items of development shall comply with the requirements of the National Environmental Policies Act of 1969 (P.L. 91-190), FAA order 1050.1F and 5050.4B. Early coordination is critical to ensure that project schedules as well as NEPA compliance can be met.

The referenced FAA aeronautical study (Airspace Case) was conducted during the review. This study found proposed development will not adversely affect the safe and efficient use of airspace by aircraft. This airspace study determination does not constitute FAA approval or disapproval of the physical development involved in the proposal. It is a determination with respect to the safe and efficient use of navigable airspace by aircraft and with respect to the safety of persons and property on the ground.

In making this determination, the FAA has considered matters such as the effects the proposal would have on existing or planned traffic patterns of neighboring airports, existing airspace structure and projected programs of the FAA, the safety of person and property on the ground, and existing or proposed manmade objects (on file with the FAA), and the known natural objects within the affected area.

The FAA has only limited means to prevent the construction of structures near an airport. The airport sponsor has the primary responsibility to protect the airport environs through such means as local zoning ordinances, property acquisition, avigation easements, letters of agreement or other means. We encourage communication with the appropriate local agencies to adopt zoning or other policies based on the revised plan.

Approval of the plan does not indicate that the United States will participate in the cost of any development proposed. AIP funding requires evidence that a project is eligible, justified, and reasonable at the time a funding request is ready for consideration.

When construction of any proposed structure or development indicated on the plan is undertaken, such construction requires normal 45 day advance notification to FAA for review in accordance with applicable Federal Aviation Regulation (FAR) (i.e., Parts 77, 157, 152, etc.). More notice is generally beneficial to ensure that all statutory, regulatory, technical and operational issues can be addressed in a timely manner.

Please attach this letter to the ALP and retain it at the airport.

If you have questions, please call me at 303-342-1263.

Sincerely,

John Sweeney,
Community Planner
Denver ADO

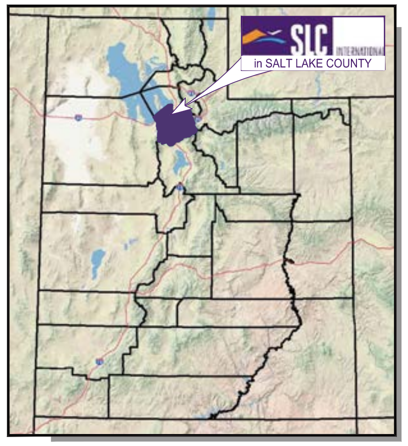
AIRPORT LAYOUT PLAN
FOR
SALT LAKE CITY INTERNATIONAL AIRPORT (SLC)
SALT LAKE CITY, UTAH

AIP#: 54-9001-1536

SLC INTERNATIONAL

AUGUST 2021

The contents of this plan do not necessarily reflect the official views or policy of the Federal Aviation Administration (FAA). Acceptance of this document by the FAA does not in any way constitute a commitment on the part of the United States to participate in any development depicted herein nor does it indicate that the proposed development is environmentally acceptable in accordance with appropriate public laws.



LOCATION MAP
SCALE: NTS

VICINITY MAP
SCALE: NTS

PLANS PREPARED BY:

RS&H

RS&H, Inc.
5215 Wiley Post Way, Suite 510
Salt Lake City, Utah 84116
801-924-8555
www.rsandh.com

APPROVED ______ 8/6/21
STEVEN DOMINO, AAE — DATE

REVISIONS		
NO.	DESCRIPTION	DATE

INDEX TO SHEETS

SHEET NUMBER	DRAWING TITLE	REVISION DATE
1	COVER SHEET	
2	FACILITY LAYOUT PLAN	
3	AIRPORT LAYOUT PLAN	
4	ULTIMATE AIRPORT LAYOUT PLAN	
5	AIRPORT DATA SHEET - 1 OF 2	
6	AIRPORT DATA SHEET - 2 OF 2	
7	TERMINAL AREA PLAN	
8	GENERAL AVIATION AREA PLAN	
9	NORTH SUPPORT AREA PLAN	
10	AIRPORT AIRSPACE DRAWING - OUTER VIEW (EXISTING)	
11	AIRPORT AIRSPACE DRAWING - INNER VIEW (EXISTING)	
12	AIRPORT AIRSPACE DRAWING - OUTER VIEW (FUTURE)	
13	AIRPORT AIRSPACE DRAWING - INNER VIEW (FUTURE)	
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15	AIRSPACE PROFILE RUNWAY 16R-34L	
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24	INNER APPROACH PLAN AND PROFILE RUNWAY 34R	
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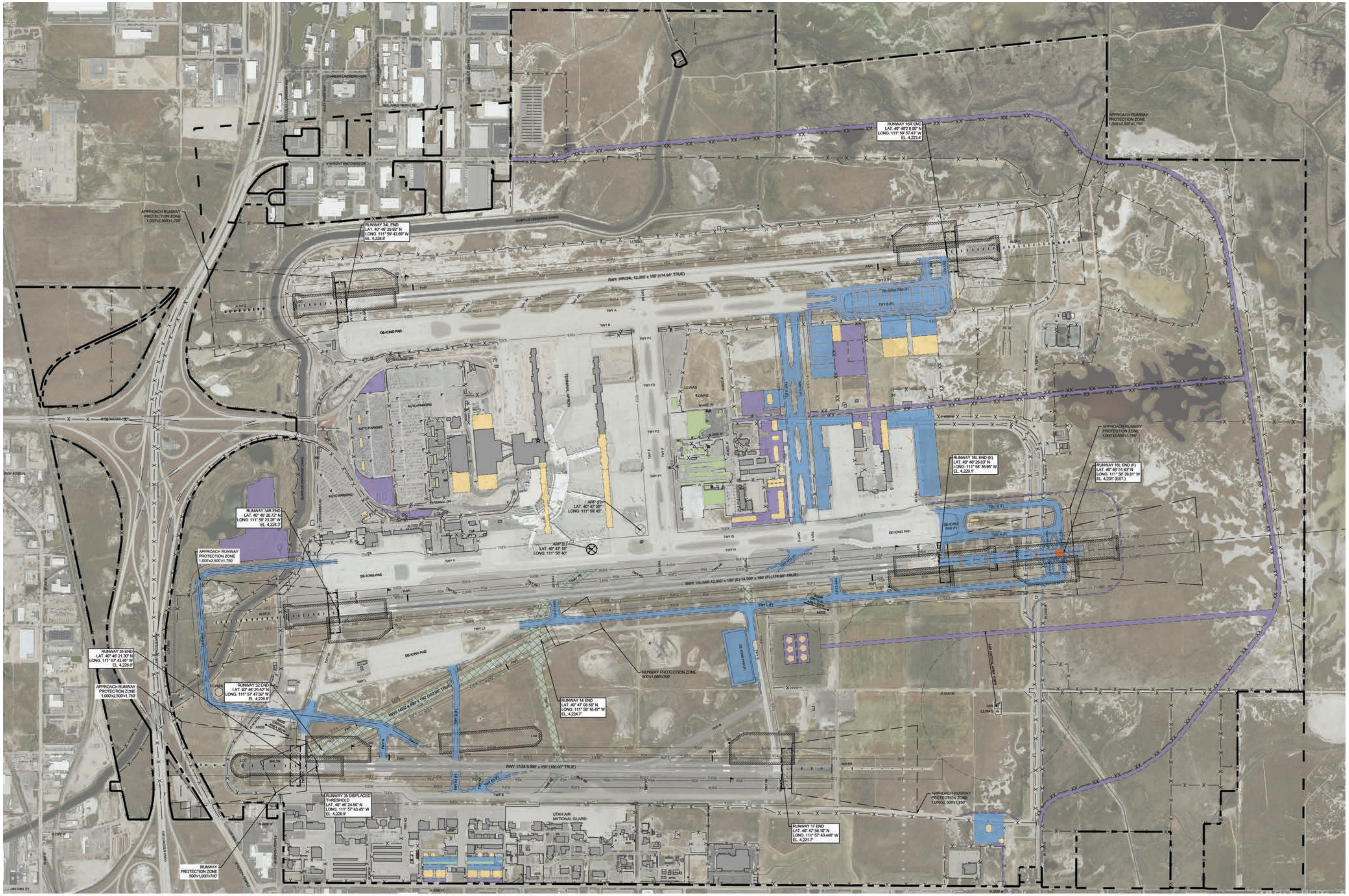

DESCRIPTION	EXISTING	FUTURE
PROPERTY LINE		
RUNWAY SAFETY AREA	RSA	F-RSA
RUNWAY OBJECT FREE AREA	ROFA	F-ROFA
RUNWAY OBSTACLE FREE ZONE	ROFZ	F-ROFZ
PRECISION OBSTACLE FREE ZONE		
RUNWAY PROTECTION ZONE		
TAXIWAY OBJECT FREE AREA	TOFA	F-TOFA

DESCRIPTION	EXISTING	FUTURE
35' BUILDING RESTRICTION LINE	BRL 35'	F-BRL 35'
AIRFIELD PAVEMENT		
AIRFIELD PAVEMENT TO BE REMOVED	N/A	
BUILDINGS		
BUILDINGS TO BE REMOVED	N/A	
ROADWAY/PARKING		
ROADWAY/PARKING TO BE REMOVED	N/A	

DESCRIPTION	EXISTING	FUTURE
ARP	⊗	⊗
BEACON	☆	N/A
WINDCONE		N/A
LOCALIZER/GLIDE SLOPE CRITICAL AREA		
FENCE	— X — X — X —	— XX — XX —

PHOTO DATE: MAY 28, 2017
PHOTO BY: WOOLPERT, INC.

MAGNETIC DECLINATION
11° 14' EAST
OCTOBER, 2020
ANNUAL CHANGE 0° 6' WEST

900' 450' 0 900'

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Salt Lake City, Utah 84116
801-924-8555
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SLC INTERNATIONAL

SALT LAKE CITY INTERNATIONAL AIRPORT

SALT LAKE CITY, UT

AIRPORT LAYOUT PLAN

CONSULTANTS

REVISIONS

NO.	DESCRIPTION	DATE

DATE ISSUED: AUGUST 2021
REVIEWED BY: DSC
DRAWN BY: MP
DESIGNED BY: TJM

AEP PROJECT NUMBER
224-0039-000

SHEET TITLE

FACILITY LAYOUT PLAN

SHEET NUMBER

2 OF 41

FAA CONDITIONAL APPROVAL

SUBJECT TO LETTER DATED: ____________

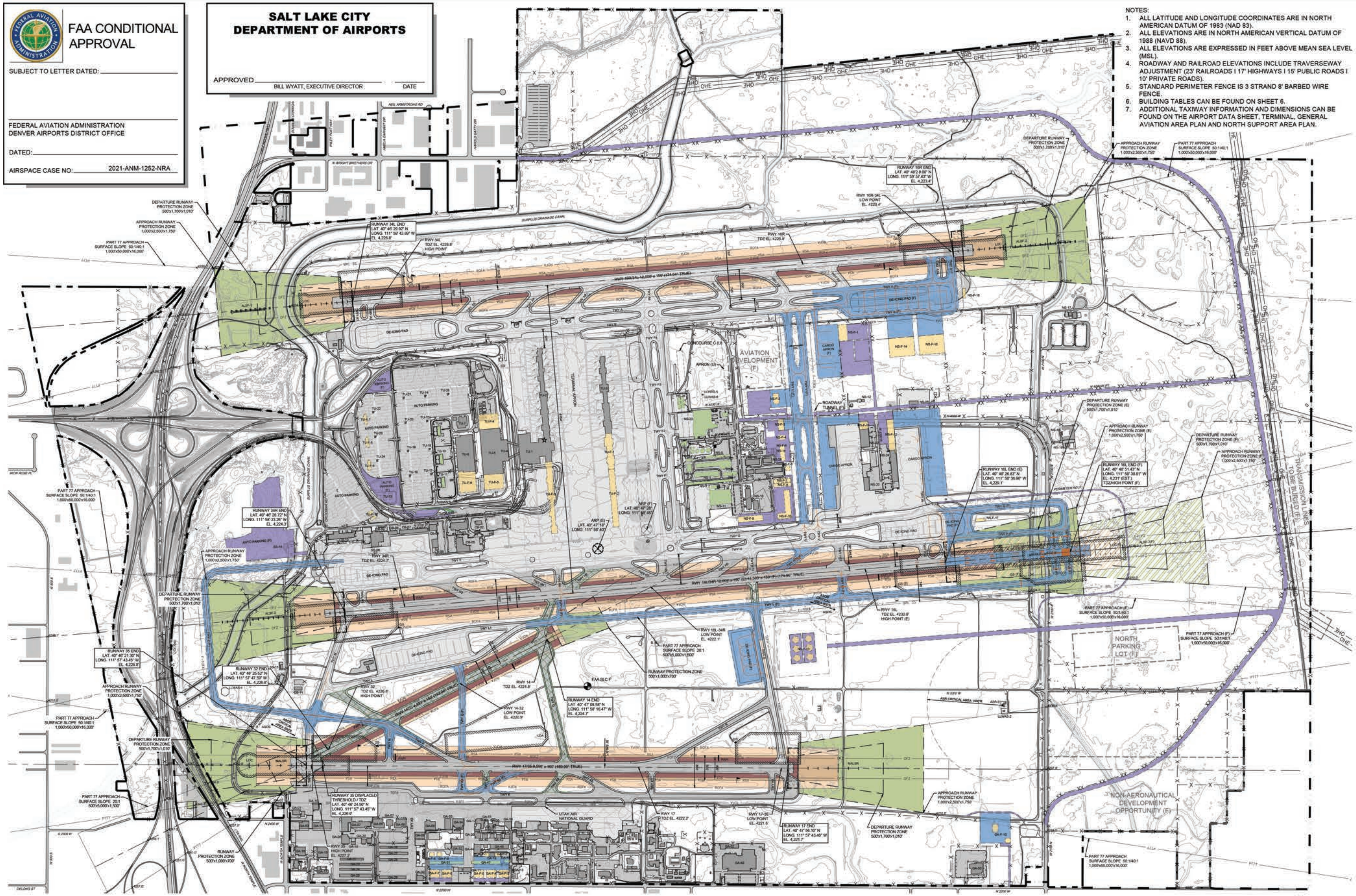
FEDERAL AVIATION ADMINISTRATION
DENVER AIRPORTS DISTRICT OFFICE

DATED: ____________

AIRSPACE CASE NO: 2021-ANM-1252-NRA

SALT LAKE CITY DEPARTMENT OF AIRPORTS

APPROVED ____________ BILL WYATT, EXECUTIVE DIRECTOR ____________ DATE



NOTES:

1. ALL LATITUDE AND LONGITUDE COORDINATES ARE IN NORTH AMERICAN DATUM OF 1983 (NAD 83).
2. ALL ELEVATIONS ARE IN NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).
3. ALL ELEVATIONS ARE EXPRESSED IN FEET ABOVE MEAN SEA LEVEL (MSL).
4. ROADWAY AND RAILROAD ELEVATIONS INCLUDE TRAVERSEWAY ADJUSTMENT (23' RAILROADS I 17' HIGHWAYS I 15' PUBLIC ROADS I 10' PRIVATE ROADS).
5. STANDARD PERIMETER FENCE IS 3 STRAND 8' BARBED WIRE FENCE.
6. BUILDING TABLES CAN BE FOUND ON SHEET 6.
7. ADDITIONAL TAXIWAY INFORMATION AND DIMENSIONS CAN BE FOUND ON THE AIRPORT DATA SHEET, TERMINAL, GENERAL AVIATION AREA PLAN AND NORTH SUPPORT AREA PLAN.

DESCRIPTION	EXISTING	FUTURE
PROPERTY LINE		
RUNWAY SAFETY AREA		
RUNWAY OBJECT FREE AREA		
RUNWAY OBSTACLE FREE ZONE		
PRECISION OBSTACLE FREE ZONE		
RUNWAY PROTECTION ZONE		
TAXIWAY OBJECT FREE AREA		

DESCRIPTION	EXISTING	FUTURE
35' BUILDING RESTRICTION LINE		
PART 77 SURFACE		
AIRFIELD PAVEMENT (ASPHALT / CONCRETE)	/	
AIRFIELD PAVEMENT TO BE REMOVED	N/A	
BUILDINGS		
BUILDINGS TO BE REMOVED	N/A	
ROADWAY/PARKING (UNPAVED)		N/A

DESCRIPTION	EXISTING	FUTURE
ROADWAY/PARKING (ASPHALT / CONCRETE)	/	
ROADWAY/PARKING TO BE REMOVED	N/A	
ARP		
BEACON		N/A
WINDCONE		N/A
LOCALIZER/GLIDE SLOPE CRITICAL AREA		
TREES		N/A

DESCRIPTION	EXISTING	FUTURE
FENCE	— X — X — X —	— XX — XX —
CANAL		N/A
DRAINAGE DITCH		N/A
GROUND CONTOURS		N/A
NGS MONUMENT	PACS	N/A

MAGNETIC DECLINATION
11° 14' EAST
OCTOBER, 2020
ANNUAL CHANGE 0° 6' WEST

900' 450' 0 900'

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SALT LAKE CITY, UT

AIRPORT LAYOUT PLAN

CONSULTANTS

REVISIONS

NO.	DESCRIPTION	DATE

DATE ISSUED: AUGUST 2021
REVIEWED BY: DSC
DRAWN BY: TJM
DESIGNED BY: TJM

AEP PROJECT NUMBER
224-0039-000

SHEET TITLE

AIRPORT LAYOUT PLAN

SHEET NUMBER

FAA CONDITIONAL APPROVAL

SUBJECT TO LETTER DATED: August 10, 2021

John P Bauer

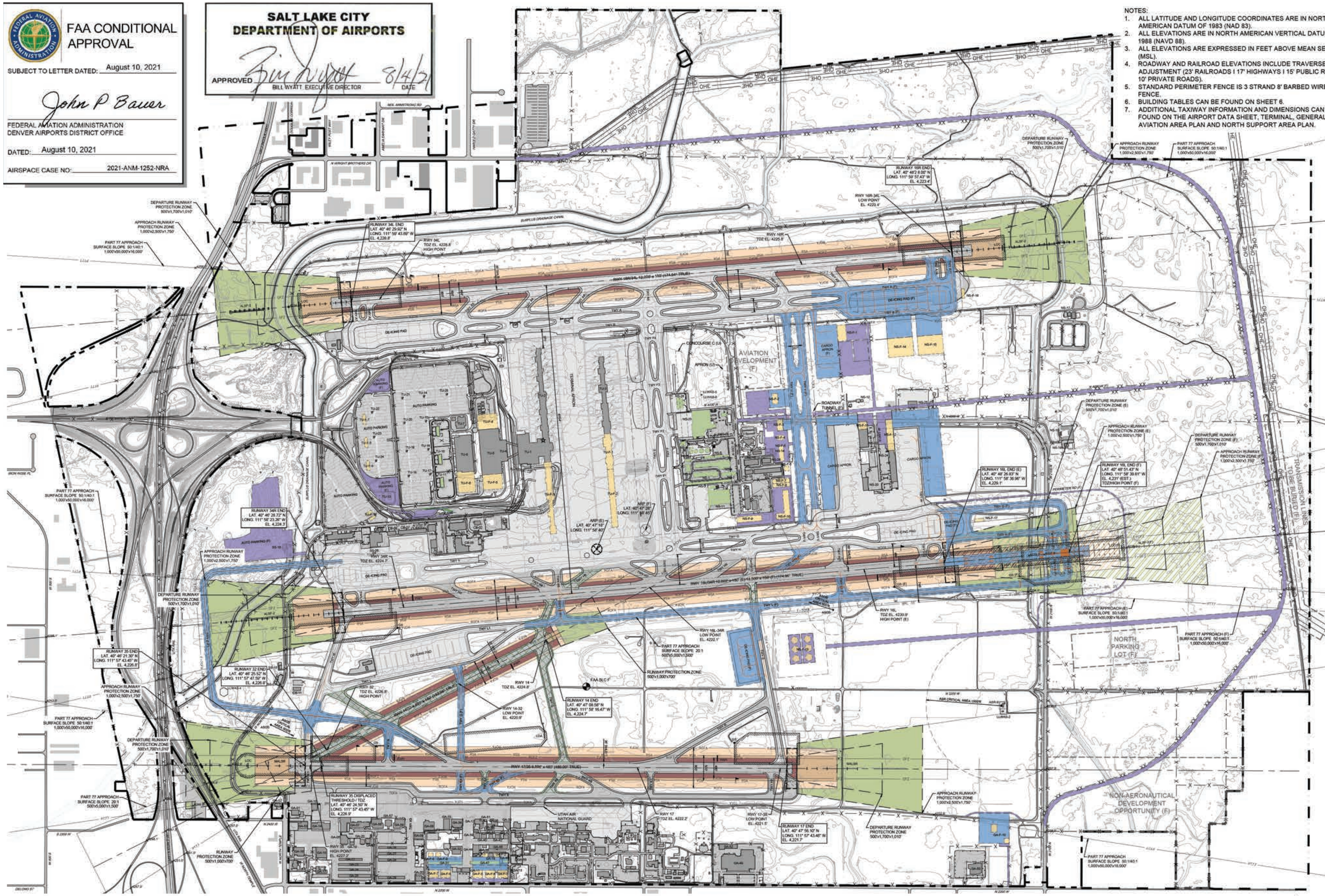
FEDERAL AVIATION ADMINISTRATION
DENVER AIRPORTS DISTRICT OFFICE

DATED: August 10, 2021

AIRSPACE CASE NO: 2021-ANM-1252-NRA

SALT LAKE CITY DEPARTMENT OF AIRPORTS

APPROVED: Bill Wyatt 8/4/21
BILL WYATT, EXECUTIVE DIRECTOR DATE



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DESCRIPTION	EXISTING	FUTURE
PROPERTY LINE		
RUNWAY SAFETY AREA		
RUNWAY OBJECT FREE AREA		
RUNWAY OBSTACLE FREE ZONE		
PRECISION OBSTACLE FREE ZONE		
RUNWAY PROTECTION ZONE		
TAXIWAY OBJECT FREE AREA		

DESCRIPTION	EXISTING	FUTURE
35' BUILDING RESTRICTION LINE		
PART 77 SURFACE		
AIRFIELD PAVEMENT (ASPHALT / CONCRETE)	/	
AIRFIELD PAVEMENT TO BE REMOVED	N/A	
BUILDINGS		
BUILDINGS TO BE REMOVED	N/A	
ROADWAY/PARKING (UNPAVED)		N/A

DESCRIPTION	EXISTING	FUTURE
ROADWAY/PARKING (ASPHALT / CONCRETE)	/	
ROADWAY/PARKING TO BE REMOVED	N/A	
ARP		
BEACON		N/A
WINDCONE		N/A
LOCALIZER/GLIDE SLOPE CRITICAL AREA		
TREES		N/A

DESCRIPTION	EXISTING	FUTURE
FENCE	—X—X—X—	—XX—XX—
CANAL		N/A
DRAINAGE DITCH		N/A
GROUND CONTOURS		N/A
NGS MONUMENT	PACS	N/A

N

MAGNETIC DECLINATION
11° 14' EAST
OCTOBER, 2020
ANNUAL CHANGE 0° 6' WEST

900' 450' 0 900'

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CONSULTANTS

REVISIONS

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DATE ISSUED: AUGUST 2021
REVIEWED BY: DSC
DRAWN BY: TJM
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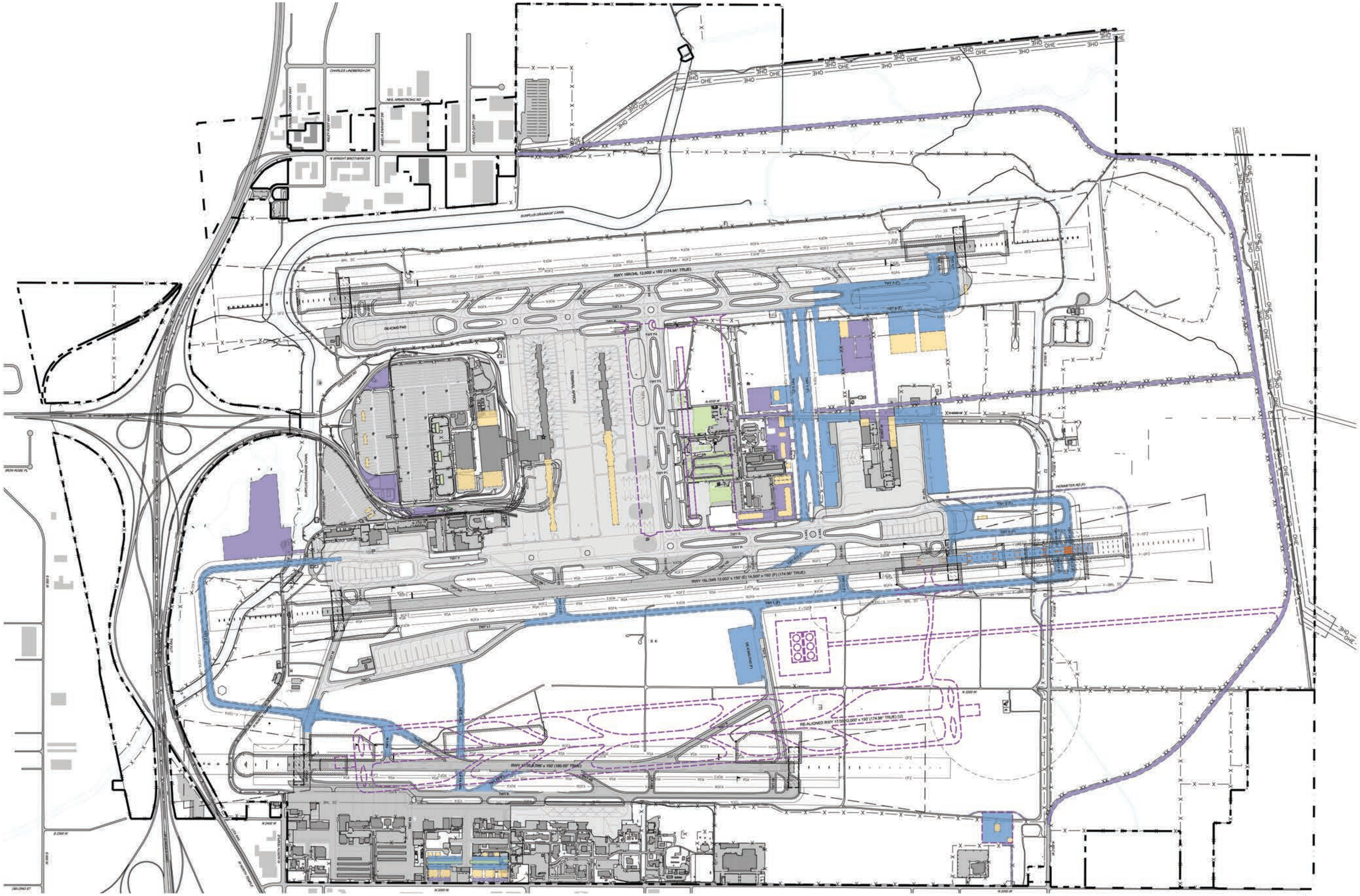
AEP PROJECT NUMBER
224-0039-000

SHEET TITLE

AIRPORT LAYOUT PLAN

SHEET NUMBER

3 OF 41



DESCRIPTION	ULTIMATE
ULTIMATE PROJECT WORK	

MAGNETIC DECLINATION
11° 14' EAST
OCTOBER, 2020
ANNUAL CHANGE 0° 6' WEST

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Salt Lake City, Utah 84116
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SALT LAKE CITY INTERNATIONAL AIRPORT

SALT LAKE CITY, UT

AIRPORT LAYOUT PLAN

CONSULTANTS

REVISIONS

NO.	DESCRIPTION	DATE

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REVIEWED BY: MLB
DRAWN BY: TJM
DESIGNED BY: TJM
AEP PROJECT NUMBER
224-0039-000

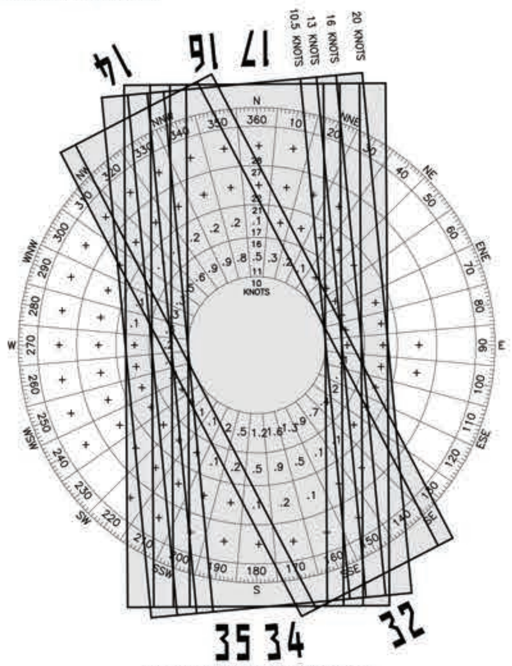
SHEET TITLE

ULTIMATE AIRPORT LAYOUT PLAN

SHEET NUMBER

4 OF 41

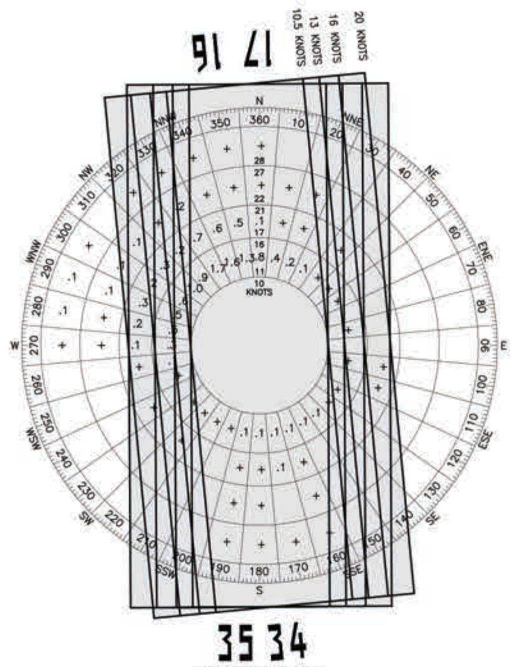
WIND ROSE
DATA SOURCE: NOAA NATIONAL CLIMATIC DATA CENTER
STATION: SALT LAKE CITY INTERNATIONAL AIRPORT - ASOS
DATA RANGE: 2009 - 2018



ALL WEATHER WIND ROSE

ALL WEATHER WIND DATA				
RUNWAY	10.5 KNOTS	13 KNOTS	16 KNOTS	20 KNOTS
RUNWAY 16R-34L	97.27%	98.59%	99.49%	99.83%
RUNWAY 16L-34R	97.27%	98.59%	99.49%	99.83%
RUNWAY 17-35	96.79%	98.37%	99.42%	99.81%
RUNWAY 14-32	97.80%	99.01%	N/A	N/A
COMBINED	98.77%	99.42%	99.51%	99.84%

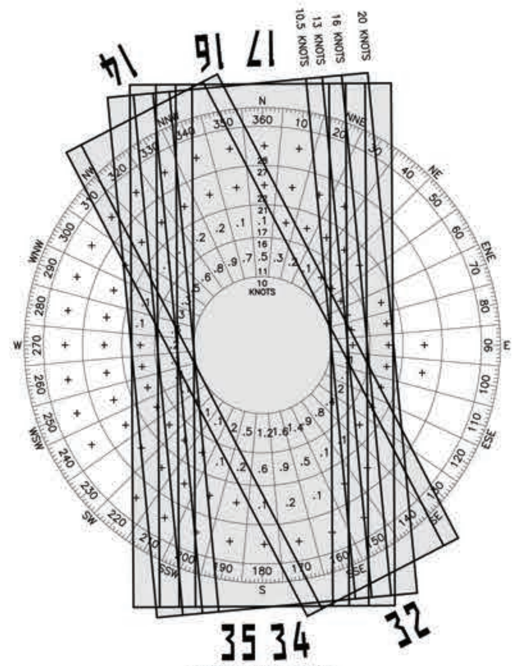
ALL WEATHER OBSERVATIONS: 125,344



IFR WIND ROSE

IFR WIND DATA				
RUNWAY	10.5 KNOTS	13 KNOTS	16 KNOTS	20 KNOTS
RUNWAY 16R-34L	95.98%	97.54%	98.78%	99.56%
RUNWAY 16L-34R	95.98%	97.54%	98.78%	99.56%
RUNWAY 17-35	95.36%	97.23%	98.62%	99.48%
RUNWAY 14-32	N/A	N/A	N/A	N/A
COMBINED	96.03%	97.57%	98.79%	99.56%

IFR OBSERVATIONS: 8,427



VFR WIND ROSE

VFR WIND DATA				
RUNWAY	10.5 KNOTS	13 KNOTS	16 KNOTS	20 KNOTS
RUNWAY 16R-34L	97.36%	98.65%	99.53%	99.84%
RUNWAY 16L-34R	97.36%	98.65%	99.53%	99.84%
RUNWAY 17-35	96.90%	98.45%	99.47%	99.83%
RUNWAY 14-32	97.82%	99.02%	N/A	N/A
COMBINED	98.82%	99.45%	99.55%	98.85%

VFR OBSERVATIONS: 96,442

ABBREVIATIONS AND ACRONYMS:

2D	2 DUAL WHEELS IN TANDEM
2D/2D2	2 DUAL WHEELS IN TANDEM/2 DUAL WHEELS IN DOUBLE TANDEM
ADG	AIRPLANE DESIGN GROUP
AGL	ABOVE GROUND LEVEL
ALSF-2	HIGH INTENSITY APPROACH LIGHTING SYSTEM WITH SEQUENCED FLASHERS II
ARP	AIRPORT REFERENCE POINT
ASDA	ACCELERATE STOP DISTANCE AVAILABLE
ASDE-X	AIRPORT SURFACE DETECTION EQUIPMENT, MODEL X
ASOS	AUTOMATED SURFACE OBSERVING SYSTEM
ASR	AIRPORT SURVEILLANCE RADAR
ATCT	AIR TRAFFIC CONTROL TOWER
CAT I	CATEGORY I
CAT II	CATEGORY II
CAT III	CATEGORY III
DME	DISTANCE MEASURING EQUIPMENT
D	DUAL WHEEL
GAST	GBAS APPROACH SERVICE TYPE
GBAS	GROUND-BASED AUGMENTATION SYSTEM
GLS	GBAS LANDING SYSTEM
GPS	GLOBAL POSITIONING SYSTEM
GS	GLIDE SLOPE
HIRL	HIGH INTENSITY RUNWAY LIGHTS
IFR	INSTRUMENT FLIGHT RULES
ILS	INSTRUMENT LANDING SYSTEM
LDA	LANDING DISTANCE AVAILABLE *or* LOCALIZER TYPE DIRECTIONAL AID
LOC	LOCALIZER
MALSR	MEDIUM INTENSITY APPROACH LIGHTING SYSTEM WITH RUNWAY ALIGNMENT INDICATOR LIGHTS
MITL	MEDIUM INTENSITY TAXIWAY LIGHTS
MSL	MEAN SEA LEVEL
NGS	NATIONAL GEODETIC SURVEY
NOAA	NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
PACS	PRIMARY AIRPORT CONTROL STATION
PAPI	PRECISION APPROACH PATH INDICATOR
PCN	PAVEMENT CLASSIFICATION NUMBER
RNAV	AREA NAVIGATION
RSMU	REMOTE SATELLITE MEASUREMENT UNIT
RR	RAILROAD
RVR	RUNWAY VISUAL RANGE
S	SINGLE WHEEL
SACS	SECONDARY AIRPORT CONTROL STATION
TDG	TAXIWAY DESIGN GROUP
TDZ/CL	TOUCHDOWN ZONE AND RUNWAY CENTERLINE LIGHTING
TODA	TAKEOFF DISTANCE AVAILABLE
TORA	TAKEOFF RUN AVAILABLE
TSS	THRESHOLD SITING SURFACE
VFR	VISUAL FLIGHT RULES
VORTAC	VERY HIGH FREQUENCY OMNIDIRECTIONAL RANGE COLLOCATED TACTICAL AIR NAVIGATION
(E)	EXISTING CONDITIONS
(F)	FUTURE CONDITIONS (1-20 YEARS)
(U)	ULTIMATE CONDITIONS (50 YEARS)

GENERAL NOTES

1. ALL COORDINATES ARE IN NORTH AMERICAN DATUM OF 1983 (NAD 83).
2. ALL ELEVATIONS ARE IN NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88).
3. ALL ELEVATIONS EXPRESSED IN FEET ABOVE MEAN SEA LEVEL (MSL).

AIRPORT DATA TABLE			
		EXISTING	FUTURE
AIRPORT REFERENCE CODE		D-V	SAME
MEAN MAXIMUM TEMPERATURE / HOTTEST MONTH		92.6° / JULY	SAME
AIRPORT ELEVATION (NAVD 88)		4,230.9'	4,231' (EST.)
AIRPORT NAVIGATIONAL AIDS (OWNERSHIP)		ASR (AIRPORT), BEACON (AIRPORT), WASATCH VORTAC	SAME
AIRPORT REFERENCE POINT (NAD 83)	LAT.	40° 47' 18" N	40° 47' 28" N
	LONG.	111° 58' 40" W	111° 58' 45" W
MISCELLANEOUS FACILITIES (OWNERSHIP)		ASDE-X (AIRPORT), ASOS (AIRPORT), ATCT (FAA), LLWAS (AIRPORT), LIGHTED WINDCONE (AIRPORT)	SAME
AIRPORT REFERENCE CODE AND CRITICAL AIRCRAFT		D-V / A330 / B737-9	SAME
MAGNETIC VARIATION		11° 14' EAST OCTOBER 2020 ANNUAL CHANGE 0° 6' WEST	SAME
NPIAS SERVICE LEVEL		PRIMARY / LARGE HUB	SAME
STATE EQUIVALENT SERVICE ROLE		INTERNATIONAL	SAME

MAGNETIC VARIATION SOURCE: NOAA NATIONAL CENTERS FOR ENVIRONMENTAL INFORMATION, WORLD MAGNETIC MODEL (WMM) (2019-2024)

RUNWAY DATA TABLE

		RUNWAY 16R EXISTING	RUNWAY 16R FUTURE	RUNWAY 34L EXISTING	RUNWAY 34L FUTURE	RUNWAY 16L EXISTING	RUNWAY 16L FUTURE	RUNWAY 34R EXISTING	RUNWAY 34R FUTURE
RUNWAY DESIGN CODE (RDC)		D-V-1200		D-V-1200		D-V-1200		D-V-1200	
APPROACH REFERENCE CODE (APRC)		D-VI-1600		D-V-2400 D-IV-1600		D-V-2400 D-IV-1600		D-V-2400 D-IV-1600	
DEPARTURE REFERENCE CODE (DPRC)		D-VI		D-IV D-V		D-IV D-V		D-IV D-V	
PAVEMENT SURFACE		CONCRETE		CONCRETE		ASPHALT		ASPHALT	
SURFACE TREATMENT		GROOVED		GROOVED		GROOVED		GROOVED	
PAVEMENT STRENGTH - WHEEL LOADING (POUNDS)	S	60,000		60,000		60,000	SAME	60,000	SAME
	D	200,000		200,000		200,000		200,000	
	2D	350,000		350,000		350,000		350,000	
	2D/2D2	850,000		850,000		850,000		850,000	
PAVEMENT STRENGTH - PCN		105/R/D/W/T		105/R/D/W/T		75/F/C/W/T		75/F/C/W/T	
RUNWAY GRADIENT		0.0%		0.0%		0.0%		0.0%	
PERCENT WIND COVERAGE (ALL WEATHER)	10.5 KNOTS	97.27%		97.27%		97.27%		97.27%	
	13 KNOTS	98.59%		98.59%		98.59%		98.59%	
	16 KNOTS	99.49%		99.49%		99.49%		99.49%	
	20 KNOTS	99.83%		99.83%		99.83%		99.83%	
RUNWAY LENGTH		12,000'		12,000'		12,002'	14,500'	12,002'	14,500'
RUNWAY WIDTH		150'		150'		150'	SAME	150'	
RUNWAY END - COORDINATES (NAD 83)	LAT.	40° 48' 28.00" N		40° 46' 29.92" N		40° 48' 26.83" N	40° 48' 51.43" N	40° 46' 28.72" N	
	LONG.	111° 59' 57.43" W		111° 59' 43.69" W		111° 58' 36.96" W	111° 58' 39.81" W	111° 58' 23.26" W	
RUNWAY END - ELEVATION (NAVD 88)		4,223.4'		4,228.8'		4,229.1'	4,231' (EST.)	4,224.3'	
DISPLACED THRESHOLD - LENGTH		N/A		N/A		N/A		N/A	
DISPLACED THRESHOLD - COORDINATES (NAD 83)	LAT. LONG.	N/A		N/A		N/A		N/A	
DISPLACED THRESHOLD - ELEVATION (NAVD 88)		N/A		N/A		N/A		N/A	
RUNWAY LIGHTING		HIRL	SAME	HIRL	SAME	HIRL		HIRL	
RUNWAY PROTECTION ZONE (RPZ) [1]		1,000' x 2,500' x 1,750'		1,000' x 2,500' x 1,750'		1,000' x 2,500' x 1,750'		1,000' x 2,500' x 1,750'	
RUNWAY MARKING		PRECISION		PRECISION		PRECISION		PRECISION	
14 CFR PART 77 APPROACH CATEGORY		50:1		50:1		50:1		50:1	
APPROACH TYPE		PRECISION		PRECISION		PRECISION		PRECISION	
VISIBILITY MINIMUMS		<1/4 MILE (RVR 1200)		<1/4 MILE (RVR 1200)		<1/4 MILE (RVR 1200)		<1/4 MILE (RVR 1200)	SAME
AERONAUTICAL SURVEY		VERTICALLY GUIDED		VERTICALLY GUIDED		VERTICALLY GUIDED	SAME	VERTICALLY GUIDED	
RUNWAY DEPARTURE SURFACE		YES		YES		YES		YES	
RUNWAY SAFETY AREA (RSA)	WIDTH	500' [1]		500' [1]		500' [1]		500' [1]	
	LENGTH BEYOND DEPARTURE END	1,000' [1]		1,000' [1]		1,000' [1]		1,000' [1]	
RUNWAY OBJECT FREE AREA (ROFA)	WIDTH	800' [1]		800' [1]		800' [1]		800' [1]	
	LENGTH BEYOND RWY END	1,000' [1]		1,000' [1]		1,000' [1]		1,000' [1]	
RUNWAY OBSTACLE FREE ZONE (ROFZ)	WIDTH	400' [1]		400' [1]		400' [1]		400' [1]	
	LENGTH BEYOND RWY END	200' [1]		200' [1]		200' [1]		200' [1]	
PRECISION OBSTACLE FREE ZONE (POFZ)	WIDTH	800' [1]		800' [1]		800' [1]		800' [1]	
	LENGTH BEYOND RWY END	200' [1]		200' [1]		200' [1]		200' [1]	
THRESHOLD SITING SURFACE (TSS) [2]		34:1 (TYPE 5) [3]		34:1 (TYPE 5) [3]		34:1 (TYPE 5) [3]		34:1 (TYPE 5) [3]	
VISUAL AND INSTRUMENT NAVAIDS		ILS (CAT II-III), LOC, GS, ALSF-2, PAPI, RNAV (GPS), RVR, TDZ/CL		ILS (CAT II-III), LOC, GS, ALSF-2, PAPI, RNAV (GPS), RVR, TDZ/CL		ILS (CAT II-III), LOC, GS, ALSF-2, PAPI, RNAV (GPS), RVR, TDZ/CL		ILS (CAT II-III), LOC, GS, ALSF-2, PAPI, RNAV (GPS), RVR, TDZ/CL	
CRITICAL AIRCRAFT		A330/B737-9		A330/B737-9		A330/B737-9		A330/B737-9	
TOUCHDOWN ZONE ELEVATION (NAVD 88)		4,225.8'		4,228.8'		4,230.9'	4,231' (EST.)	4,224.7'	

		RUNWAY 17 EXISTING	RUNWAY 17 FUTURE	RUNWAY 35 EXISTING	RUNWAY 35 FUTURE	RUNWAY 14 EXISTING	RUNWAY 14 FUTURE	RUNWAY 32 EXISTING	RUNWAY 32 FUTURE
RUNWAY DESIGN CODE (RDC)		D-IV-1200		D-IV-2400		B-II-VIS		B-II-VIS	
APPROACH REFERENCE CODE (APRC)		D-VI-1600		D-IV-2400 D-V-2400		N/A		N/A	
DEPARTURE REFERENCE CODE (DPRC)		D-VI		D-IV D-V		N/A		N/A	
PAVEMENT SURFACE		ASPHALT		ASPHALT		ASPHALT		ASPHALT	
SURFACE TREATMENT		GROOVED		GROOVED		GROOVED		GROOVED	
PAVEMENT STRENGTH - WHEEL LOADING (POUNDS)	S	60,000		60,000		60,000		60,000	
	D	200,000		200,000		200,000		200,000	
	2D	350,000		350,000		350,000		350,000	
	2D/2D2	850,000		850,000		850,000		850,000	
PAVEMENT STRENGTH - PCN		53/F/D/X/T		53/F/D/X/T		81/F/D/X/T		81/F/D/X/T	
RUNWAY GRADIENT		0.1%		0.1%		0.0%		0.0%	
PERCENT WIND COVERAGE (ALL WEATHER)	10.5 KNOTS	96.79%		96.79%		97.80%		97.80%	
	13 KNOTS	98.37%		98.37%		99.01%		99.01%	
	16 KNOTS	99.42%		99.42%		N/A		N/A	
	20 KNOTS	99.81%		99.81%		N/A		N/A	
RUNWAY LENGTH		9,596'		9,596'		4,893'		4,893'	
RUNWAY WIDTH		150'		150'		150'		150'	
RUNWAY END - COORDINATES (NAD 83)	LAT.	40° 47' 56.10" N		40° 46' 21.30" N		40° 47' 08.58" N		40° 46' 25.52" N	
	LONG.	111° 57' 43.46" W		111° 57' 43.45" W		111° 58' 16.47" W		111° 57' 47.59" W	
RUNWAY END - ELEVATION (NAVD 88)		4,221.7'		4,226.8'		4,224.7'		4,226.8'	
DISPLACED THRESHOLD - LENGTH		N/A		324'		N/A		N/A	
DISPLACED THRESHOLD - COORDINATES (NAD 83)	LAT. LONG.	N/A		40° 46' 24.50" N 111° 57' 43.45" W		N/A		N/A	
DISPLACED THRESHOLD - ELEVATION (NAVD 88)		N/A		4,226.9'		N/A		N/A	
RUNWAY LIGHTING		HIRL	SAME	HIRL	SAME	HIRL	TO BE REMOVED	HIRL	TO BE REMOVED
RUNWAY PROTECTION ZONE (RPZ) [1]		1,000' x 2,500' x 1,750'		APPROACH 1,000' x 2,500' x 1,750' DEPARTURE 500' x 1,700' x 1,010'		500' x 1,000' x 700'		500' x 1,000' x 700'	
RUNWAY MARKING		PRECISION		PRECISION		VISUAL		VISUAL	
14 CFR PART 77 APPROACH CATEGORY		50:1		50:1		20:1		20:1	
APPROACH TYPE		PRECISION		PRECISION		VISUAL		VISUAL	
VISIBILITY MINIMUMS		1/4 MILE (RVR 1200)		1/2 MILE (RVR 2400)		VISUAL		VISUAL	
AERONAUTICAL SURVEY		VERTICALLY GUIDED		VERTICALLY GUIDED		NON-VERTICALLY GUIDED		NON-VERTICALLY GUIDED	
RUNWAY DEPARTURE SURFACE		YES		YES		NO		NO	
RUNWAY SAFETY AREA (RSA)	WIDTH	500' [1]		500' [1]		150' [1]		150' [1]	
	LENGTH BEYOND DEPARTURE END	1,000' [1]		1,000' [1]		300' [1]		300' [1]	
RUNWAY OBJECT FREE AREA (ROFA)	WIDTH	800' [1]		800' [1]		500' [1]		500' [1]	
	LENGTH BEYOND RWY END	1,000' [1]		1,000' [1]		300' [1]		300' [1]	
RUNWAY OBSTACLE FREE ZONE (ROFZ)	WIDTH	400' [1]		400' [1]		400' [1]		400' [1]	
	LENGTH BEYOND RWY END	200' [1]		200' [1]		200' [1]		200' [1]	
PRECISION OBSTACLE FREE ZONE (POFZ)	WIDTH	800' [1]		800' [1]		N/A		N/A	
	LENGTH BEYOND RWY END	200' [1]		200' [1]					
THRESHOLD SITING SURFACE (TSS) [2]		34:1 (TYPE 5) [3]		34:1 (TYPE 5) [3]		20:1 (TYPE 3)		20:1 (TYPE 3)	
VISUAL AND INSTRUMENT NAVAIDS		ILS (SA CAT I-II), LOC, GS, MALSR, PAPI, RNAV (GPS), RVR, TDZ/CL		LDA, GS, MALSR, PAPI, RNAV (GPS), RVR, TDZ/CL		PAPI		PAPI	
CRITICAL AIRCRAFT		B757/767		B757/767		B1900D		B1900D	
TOUCHDOWN ZONE ELEVATION (NAVD 88)		4,222.2		4,226.9		4,224.8		4,226.8	

1. DIMENSION SHOWN MEETS FAA STANDARDS.
2. TABLE 3-2 FROM ENGINEERING BRIEF #99A WAS USED TO DETERMINE RUNWAY TYPE. THERE ARE NO TSS PENETRATIONS.
3. 30:1 SLOPE (RUNWAY TYPE 6) IS REQUIRED IN ADDITION TO THE APPLICABLE APPROACH SURFACE ESTABLISHED IN TABLE 3-2 IN ENGINEERING BRIEF #99A.
4. RUNWAYS MEET LINE OF SIGHT REQUIREMENTS.

DECLARED DISTANCES					
RUNWAY END		TORA	TODA	ASDA	LDA
RUNWAY 16R	(E)	12,000'	12,000'	12,000'	12,000'
	(F)	SAME			
RUNWAY 34L	(E)	12,000'	12,000'	12,000'	12,000'
	(F)	SAME			
RUNWAY 16L	(E)	12,002'	12,002'	12,002'	12,002'
	(F)	14,500'	14,500'	14,500'	14,500'
RUNWAY 34R	(E)	12,002'	12,002'	12,002'	12,002'
	(F)	14,500'	14,500'	14,500'	14,500'
RUNWAY 17	(E)	9,596'	9,596'	9,596'	9,596'
	(F)	SAME			
RUNWAY 35	(E)	9,596'	9,596'	9,596'	9,272'
	(F)	SAME			
RUNWAY 14	(E)	4,893'	4,893'	4,893'	4,893'
	(F)	TO BE REMOVED			
RUNWAY 32	(E)	4,893'	4,893'	4,893'	4,893'
	(F)	TO BE REMOVED			

MODIFICATION TO STANDARDS	
APPROVAL DATE	NONE REQUIRED
AIRSPACE CASE NO.	
STANDARD TO BE MODIFIED	
DESCRIPTION	

SURVEY MONUMENTS	
IDENTIFIER	FAA SLC F
NGS PID	AA3671
PACS OR SACS	PACS
LATITUDE	40° 47' 16.55"
LONGITUDE	111° 58' 04.38"
ELEVATION	4,222.1'

SOURCE: NATIONAL GEODETIC SURVEY, NAD 83 (2011), NAVD (88)

NOTE: NO SACS ESTABLISHED FOR THIS AIRPORT.

RS&H, Inc.
5215 Wiley Post Way, Suite 510
Salt Lake City, Utah 84116
801-924-8555
www.rsandh.com

SLC INTERNATIONAL

SALT LAKE CITY INTERNATIONAL AIRPORT

SALT LAKE CITY, UT

AIRPORT LAYOUT PLAN

CONSULTANTS

REVISIONS

NO.	DESCRIPTION	DATE

DATE ISSUED: AUGUST 2021
REVIEWED BY: DSC
DRAWN BY: TJM
DESIGNED BY: TJM
AEP PROJECT NUMBER
224-0039-000

SHEET TITLE

AIRPORT DATA SHEET - 1 OF 2

SHEET NUMBER

5 OF 41

TAXIWAY / TAXILANE DATA TABLES

TAXIWAY / TAXILANE DATA TABLE - RUNWAY 16R/34L

	TWY A	TWY A1	TWY A2	TWY A3	TWY A4	TWY A5	TWY A6	TWY A7	TWY A8	TWY A9	TWY A10	TWY A11	TWY B
TAXIWAY / TAXILANE WIDTH	75' (TDG 5)	130' (TDG 5)	115' (TDG 5)	130' (TDG 5)	130' (TDG 5)	130' (TDG 5)	200' (TDG 5)	115' (TDG 5)	115' (TDG 5)	115' (TDG 5)	115' (TDG 5)	130' (TDG 5)	75' (TDG 5)
TAXIWAY EDGE SAFETY MARGIN	15'	15'	15'	15'	15'	15'	15'	15'	15'	15'	15'	15'	15'
TAXIWAY SHOULDER WIDTH	35'	35'	35'	35'	35'	35'	35'	35'	35'	35'	35'	35'	35'
TAXIWAY / TAXILANE SAFETY AREA	214'	214'	214'	214'	214'	214'	214'	214'	214'	214'	214'	214'	214'
OBJECTS WITHIN TSA	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE
TAXIWAY / TAXILANE OBJECT FREE AREA	320'	320'	320'	320'	320'	320'	320'	320'	320'	320'	320'	320'	320'
OBJECTS WITHIN TOFA	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	FENCE 150' EAST
RUNWAY HOLDING POSITION	N/A	325'	325'	325'	327'	324'	360'	327'	327'	327'	325'	325'	N/A
TAXIWAY / TAXILANE LIGHTING	MITL	MITL	MITL	MITL	MITL	MITL	MITL	MITL	MITL	MITL	MITL	MITL	MITL

TAXIWAY / TAXILANE DATA TABLE - RUNWAY 16L/34R

	TWY G	TWY H	TWY H1	TWY H2	TWY H3	TWY H4	TWY H5	TWY H6	TWY H7 (E) / TWY H6 (F)	TWY H8 (E) / TWY H7 (F)	TWY H9 (E) / TWY H8 (F)	TWY H10 (E) / TWY H9 (F)	TWY H10	TWY H11	TWY H12	TWY H13	TWY H14	TWY H15
TAXIWAY / TAXILANE WIDTH	75' (TDG 5)	100' (TDG 5) 75' RWY 34R DE-ICING PAD	115' (TDG 5)	100' (TDG 5)	115' (TDG 5)	115' (TDG 5)	115' (TDG 5)	115' (TDG 5)	115' (TDG 5)	200' (TDG 5)	115' (TDG 5)	115' (TDG 5)	75' (TDG 6)	115' (TDG 5)	100' (TDG 5)	115' (TDG 5)	75' (TDG 6)	75' (TDG 6)
TAXIWAY EDGE SAFETY MARGIN	15'	15'	15'	15'	15'	15'	15'	15'	15'	15'	15'	15'	15'	15'	15'	15'	15'	15'
TAXIWAY SHOULDER WIDTH	35'	35'	35'	35'	35'	35'	35'	35'	35'	35'	35'	35'	30'	35'	35'	35'	30'	30'
TAXIWAY / TAXILANE SAFETY AREA	214'	214'	214'	214'	214'	214'	214'	214'	214'	214'	214'	214'	214'	214'	214'	214'	214'	214'
OBJECTS WITHIN TSA	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE
TAXIWAY / TAXILANE OBJECT FREE AREA	320'	320'	320'	320'	320'	320'	320'	320'	320'	320'	320'	320'	320'	320'	320'	320'	320'	320'
OBJECTS WITHIN TOFA	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE
RUNWAY HOLDING POSITION	N/A	N/A	401'	292'	307'	302'	298'	300'	341'	296'	301'	296'	322'	296'	296'	393'	322'	322'
TAXIWAY / TAXILANE LIGHTING	MITL	MITL	MITL	MITL	MITL	MITL	MITL	MITL	MITL	MITL	MITL	MITL	MITL	MITL	MITL	MITL	MITL	MITL

TAXIWAY / TAXILANE DATA TABLE - RUNWAY 16L/34R (CONT.)

	TWY L	TWY L2	TWY L3	TWY L4	TWY L5	TWY U	TWY V	TWY W (SPOT 98)	TWY Y	TWY Z
TAXIWAY / TAXILANE WIDTH	75' (TDG 6)	75' (TDG 6)	75' (TDG 6)	75' (TDG 6)	75' (TDG 6)	150' (TDG 5)	150' (TDG 5)	75' (TDG 5)	75' (TDG 5)	75' (TDG 6)
TAXIWAY EDGE SAFETY MARGIN	15'	15'	15'	15'	15'	15'	15'	15'	15'	15'
TAXIWAY SHOULDER WIDTH	30'	30'	30'	30'	30'	35'	35'	35'	35'-60'	30'
TAXIWAY / TAXILANE SAFETY AREA	214'	214'	214'	214'	214'	214'	214'	171'	214'	214'
OBJECTS WITHIN TSA	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE
TAXIWAY / TAXILANE OBJECT FREE AREA	320'	320'	320'	320'	320'	320'	320'	259'	320'	320'
OBJECTS WITHIN TOFA	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	SEE NOTE 6	NONE
RUNWAY HOLDING POSITION	N/A	322'	322'	322'	322'	N/A	N/A	N/A	N/A	N/A
TAXIWAY / TAXILANE LIGHTING	MITL	MITL	MITL	MITL	MITL	MITL	MITL	MITL	MITL	MITL

TAXIWAY / TAXILANE DATA TABLE - CENTRAL TERMINAL

	TWY E	TWY F	TWY F1	TWY F2	TWY F3	TWY F4	TWY U	TWY V
TAXIWAY / TAXILANE WIDTH	75' (TDG 5)	75' (TDG 5)	150' (TDG 5)	150' (TDG 5)	150' (TDG 5)	150' (TDG 5)	75' (TDG 5)	75' (TDG 5)
TAXIWAY EDGE SAFETY MARGIN	15'	15'	15'	15'	15'	15'	15'	15'
TAXIWAY SHOULDER WIDTH	30'-35'	35'	30'	35'	35'	30'-35'	30'	30'
TAXIWAY / TAXILANE SAFETY AREA	214'	214'	214'	214'	214'	214'	214'	214'
OBJECTS WITHIN TSA	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE
TAXIWAY / TAXILANE OBJECT FREE AREA	320'	320'	320'	320'	320'	320'	320'	320'
OBJECTS WITHIN TOFA	SEE NOTE 7	NONE	NONE	NONE	NONE	NONE	NONE	NONE
RUNWAY HOLDING POSITION	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TAXIWAY / TAXILANE LIGHTING	MITL	MITL	MITL	MITL	MITL	MITL	MITL	MITL

TAXIWAY / TAXILANE DATA TABLE - RUNWAY 17/35

	TWY K	TWY K1	TWY K3	TWY K4	TWY K4	TWY K5	TWY K5	TWY K6	TWY K7	TWY K8	TWY K9	TWY P	TWY Q	TWY R	TWY S
TAXIWAY / TAXILANE WIDTH	75' (TDG 3/4)	118' (TDG 3/4)	75' (TDG 3/4)	75' (TDG 3/4)	75' (TDG 5)	100' (TDG 3/4)	75' (TDG 5)	90' (TDG 3/4)	75' (TDG 3/4)	90' (TDG 3/4)	90' (TDG 3/4)	75' (TDG 6)	75' (TDG 5)	75' (TDG 5)	75' (TDG 5)
TAXIWAY EDGE SAFETY MARGIN	10'	10'	10'	10'	15'	10'	15'	10'	10'	10'	10'	15'	15'	15'	15'
TAXIWAY SHOULDER WIDTH	25'	25'	25'	25'	30'	25'	30'	25'	25'	25'	25'	30'	30'	35'	35'
TAXIWAY / TAXILANE SAFETY AREA	171'	171'	171'	171'	171'	171'	171'	171'	171'	171'	171'	214'	171'	214'	214'
OBJECTS WITHIN TSA	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE
TAXIWAY / TAXILANE OBJECT FREE AREA	259'	259'	259'	259'	259'	259'	259'	259'	259'	259'	259'	320'	259'	320'	320'
OBJECTS WITHIN TOFA	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE
RUNWAY HOLDING POSITION	N/A	292'	N/A	292'	292'	324'	292'	337'	294'	292'	400'	N/A	292'	336'	292' (RWY 16L) 304' (RWY 17)
TAXIWAY / TAXILANE LIGHTING	MITL	MITL	MITL	MITL	MITL	MITL	MITL	MITL	MITL	MITL	MITL	MITL	MITL	MITL	MITL

TAXIWAY / TAXILANE DATA TABLE - RUNWAY 14/32

	TWY J	TWY L	TWY L1	TWY M	TWY N	TWY P (WEST OF RWY 14-32)	TWY P (EAST OF RWY 14-32)	TWY Q (WEST OF RWY 14-32)	TWY Q (EAST OF RWY 14-32)
TAXIWAY / TAXILANE WIDTH	150' (TDG 5)	75' (TDG 5)	75' (TDG 5)	75' (TDG 5)	75' (TDG 5)	75' (TDG 5)	90' (TDG 3/4)	75' (TDG 5)	100' (TDG 3/4)
TAXIWAY EDGE SAFETY MARGIN	15'	15'	15'	15'	15'	15'	15'	10'	10'
TAXIWAY SHOULDER WIDTH	22'	35'	35'	35'	35'	35'	25'	25'-35'	25'
TAXIWAY / TAXILANE SAFETY AREA	214'	214'	214'	214'	214'	214'	171'	214'	171'
OBJECTS WITHIN TSA	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE
TAXIWAY / TAXILANE OBJECT FREE AREA	320'	320'	320'	320'	320'	320'	259'	320'	259'
OBJECTS WITHIN TOFA	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE
RUNWAY HOLDING POSITION	N/A	N/A	N/A	SEE NOTE 5	292' (RWY 35) 315' (RWY 32)	292'	343' (RWY 32) 298' (RWY 35)	322' (RWY 34R) 231' (RWY 14)	250' (RWY 14) 306' (RWY 17)
TAXIWAY / TAXILANE LIGHTING	MITL	MITL	MITL	MITL	MITL	MITL	MITL	MITL	MITL

TAXIWAY / TAXILANE TO BE REMOVED

FUTURE TAXIWAY / TAXILANE

1. EXISTING TAXIWAY DESIGN GROUP IS BASED ON WIDTH OF PAVEMENT. EXISTING FILLET DESIGN DOES NOT MEET AC 150/5300-13A, CHANGE 1 STANDARDS.
2. FUTURE TAXIWAY SYSTEM CORRECTS NON-STANDARD GEOMETRY AND FILLET DESIGN.
3. TAXIWAY A AND B NEAR RUNWAY 16R APPROACH END IS REALIGNED TO ACCOMMODATE A DEICING PAD
4. TAXIWAY J IS AN ALIGNED TAXIWAY WITH RUNWAY 14-32.
5. RUNWAY HOLDING POSITION IS 400 FEET FROM RUNWAY 16L-34R CENTERLINE. HOLDING POSITION IS 274 FEET FROM RUNWAY 14-32 AND 434 FEET FROM RUNWAY 17-35.
6. ADG IV TOFA BETWEEN TAXIWAYS H3 AND H4.
7. ADG IV NON-MOVEMENT LINE INSIDE ADG V TOFA SOUTH SIDE OF TAXIWAY E BETWEEN TAXIWAYS F3 AND G

BUILDINGS DATA TABLES

BUILDING LEGEND - TERMINAL

BUILDING NO	BUILDING DESCRIPTION	ELEVATION HIGHEST POINT
TU-1	Terminal (New)	4,297
TU-2	Concourse A (New) South Concourse West	4,281
TU-3	Concourse B (New) North Concourse	4,288
TU-4	Gateway Building (New)	4,303
TU-5	Parking Garage (New)	4,305
TU-6	Parking Administration Building	4,244
TU-7	Central Utility Plant (New)	4,273
TU-8	Rental Car Quick Turn Around Facility	4,258
TU-9	Rental Car Service Center A	4,248
TU-10	Rental Car Service Center B	4,248
TU-11	Rental Car Service Center C	4,248
TU-12	TRAX Airport Station	4,242
TU-13	Touch N' Go Convenience Store	4,255
TU-14	Bus Station 1	4,231
TU-15	Bus Station 2	4,230
TU-16	Bus Station 3	4,232
TU-17	Bus Station 4	4,232
TU-18	Bus Station 5	4,231
TU-19	Bus Station 6	4,232
TU-20	Bus Station 7	4,233
TU-21	Bus Station 8	4,231
TU-22	Bus Station 9	4,237
TU-23	Bus Station 10	4,237
TU-24	Bus Station 11	4,236
TU-25	Bus Station 12	4,233
TU-F-1	Concourse B - Phase 2	4,288
TU-F-2	Concourse B - Phase 3	4,288
TU-F-3	Concourse A East	4,281
TU-F-4	Parking Garage West Expansion	4,305
TU-F-5	Parking Garage East Expansion	4,305
TU-F-6	Rental Car Quick Turn Around Facility Expansion	4,258
TU-F-7	Remote Service Site #1	4,255
TU-F-8	Remote Service Site #2	4,255
TU-F-9	Remote Service Site #3	4,255
TU-F-10	Service Center Relocation	4,255

BUILDING LEGEND - NORTH SUPPORT

BUILDING NO	BUILDING DESCRIPTION	ELEVATION HIGHEST POINT
ATCT	ATCT	4,549
NS-1	Airfield Maintenance	4,250
NS-2	Sand, Salt, & Urea Building	4,252
NS-3	Vehicle Storage East	4,242
NS-4	Vehicle Maintenance	4,262
NS-5	Maintenance Cold Storage	4,243
NS-6	Menzies Fuel Farm	4,241
NS-7	Airfield Paint Storage	4,239
NS-9	Fuel Island	4,244
NS-10	Delta Air Lines Reservation Center	4,265
NS-11	Delta Air Lines Hangar	4,329
NS-12	Motorola Building	4,242
NS-13	North Electrical Vault	4,248
NS-14	Airport Greenhouse	4,239
NS-15	Facility Maintenance #2	4,250
NS-16	Cold Storage #2	4,244
NS-17	Glycol EQ Influent Facility	4,281
NS-18	Firing Range	4,240
NS-19	Canine Training Facility	4,244
NS-20	UPS Facility	4,263
NS-21	SRE Storage	4,257
NS-22	DHL Cargo	4,263
NS-23	SkyWest Hangar	4,280
NS-24	FedEx	4,261
NS-25	Former ARFF Training/Burn Pit	4,256
NS-26	Snow Chemical Storage	4,258
NS-28	Fire Station 12	4,254
NS-F-1	Cargo Expansion #1	4,260
NS-F-2	ARFF Station #12 Relocation	4,255
NS-F-3	Airport Maintenance #2	4,260
NS-F-4	Airport Maintenance #3	4,260
NS-F-5	Airport Maintenance #4	4,260
NS-F-6	Airport Maintenance #5	4,260
NS-F-7	Airport Maintenance #6	4,260
NS-F-8	Airport Maintenance #7	4,260

BUILDING LEGEND - NORTH SUPPORT (CONT.)

BUILDING NO	BUILDING DESCRIPTION	ELEVATION HIGHEST POINT
NS-F-9	Airport Maintenance #8	4,260
NS-F-10	Airport Maintenance #9	4,260
NS-F-11	DHL Cargo Expansion	4,263
NS-F-12	FedEx Cargo Expansion	4,261
NS-F-13	Fuel Island Relocation	4,250
NS-F-14	Airline Maintenance Facility #1	4,250
NS-F-15	Airline Maintenance Facility #2	4,250
NS-F-16	Deicing Facility - Runway 16R	4,255
NS-F-17	Deicing Facility - Runway 16L	4,261

BUILDING LEGEND - CARGO

BUILDING NO	BUILDING DESCRIPTION	ELEVATION HIGHEST POINT
CB-2	Airfield Operations Base	4,254
CB-3	Sky Chef Building	4,262
CB-4	HMS	4,251
CB-5	Delta Air Lines Cargo Facility	4,258
CB-6	Central Screening Warehouse Facility	4,252
CB-7	Joint Cargo #1	4,249
CB-8	Joint Cargo #2	4,250
CB-9	Post Office	4,252
CB-10	Airport Operations Center	4,256
CB-11	South Electrical Vault	4,251

BUILDING LEGEND - SOUTH SUPPORT

BUILDING NO	BUILDING DESCRIPTION	ELEVATION HIGHEST POINT
SS-06	Gate #11 Building	4,235
SS-07	Sand, Salt, & Urea Storage	4,262
SS-15	Maintenance Storage	4,243
SS-16	Wingpoint Clubhouse	4,261

BUILDING LEGEND - GENERAL AVIATION

BUILDING NO	BUILDING DESCRIPTION	ELEVATION HIGHEST POINT
GA-01	Utah Division of Aeronautics	4,250
GA-02	Technical Systems Building	4,240
GA-03	National Weather Service	4,248
GA-05	TAC Air 5	4,258
GA-07	TAC Air 1, 2	4,268
GA-08	Atlantic Aviation	4,263
GA-09	Atlantic Aviation	4,264
GA-10	TAC Air 17	4,262
GA-11	Salt Lake City Community College	4,248
GA-12	Fire Station #11	4,248
GA-13	Ballpark Restrooms	4,234
GA-14	TAC Air 14, 15, 16	4,253
GA-15	TAC Air 10	4,272
GA-16	TAC Air 11	4,273
GA-17	Flight Safety International	4,262
GA-18	Flightline, LLC	4,249
GA-19	TAC Air 12	4,246
GA-20	TAC Air 6	4,249
GA-21	TAC Air 7	4,249
GA-22	Single	4,239
GA-23	Single	4,240
GA-24	Single	4,240
GA-25	Twin	4,243
GA-26	Single	4,240
GA-27	Shade	4,242
GA-28	Shade	4,243
GA-29	Single	4,245
GA-30	Harper Companies, Inc.	4,254
GA-31	Single	4,239
GA-32	TAC Air 19	4,275
GA-33	TAC Air 18	4,267
GA-34	Leucadia Aviation	4,263
GA-35	Butler Hughes Hangar	4,251
GA-36	Upper Limit TAC Air 21	4,244
GA-38	TAC Air 23	4,248

BUILDING LEGEND - GENERAL AVIATION (CONT.)

BUILDING NO	BUILDING DESCRIPTION	ELEVATION HIGHEST POINT
GA-39	ALSCO	4,252
GA-40	TAC Air 20	4,250
GA-41	Terra Diamond	4,252
GA-42	TAC Air 22	4,245
GA-43	Civil Air Patrol	4,252
GA-44	DKH Services	4,266
GA-45	Young Electric Sign Company (YESCO) Hangar	4,246
GA-46	Hangar 4 Associates	4,240
GA-47	T-Hangar Row 28	4,239
GA-48	FAA Field Maintenance	4,245
GA-49	Boeing Company	4,270
GA-50	SLCDA Airport Training & Activities Center	4,247
GA-51	Communications Building	4,232
GA-52	Boeing Company	4,271
GA-53	TAC Air 13	4,263
GA-55	FAA Maintenance	4,247
GA-56	Atlantic Aviation	4,256
GA-57	Atlantic Aviation	4,255
GA-58	Atlantic Aviation	4,256
GA-F-1	Box Hangar #1	4,250
GA-F-2	Box Hangar #2	4,250
GA-F-3	Corporate Hangar #1	4,260
GA-F-4	Corporate Hangar #2	4,260
GA-F-5	Corporate Hangar #3	4,260
GA-F-6	Corporate Hangar #4	4,260
GA-F-7	Corporate Hangar #5	4,260
GA-F-8	Box Hangar #3	4,250
GA-F-9	Box Hangar #4	4,250
GA-F-10	Fire Training Facility	4,255

BUILDINGS TO BE REMOVED

FUTURE BUILDINGS

NOTE: FUTURE BUILDING ELEVATIONS ARE ESTIMATED.

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SLC INTERNATIONAL

SALT LAKE CITY INTERNATIONAL AIRPORT

SALT LAKE CITY, UT

AIRPORT LAYOUT PLAN

CONSULTANTS

REVISIONS

NO.	DESCRIPTION	DATE

DATE ISSUED: AUGUST 2021
REVIEWED BY: DSC
DRAWN BY: TJM
DESIGNED BY: TJM

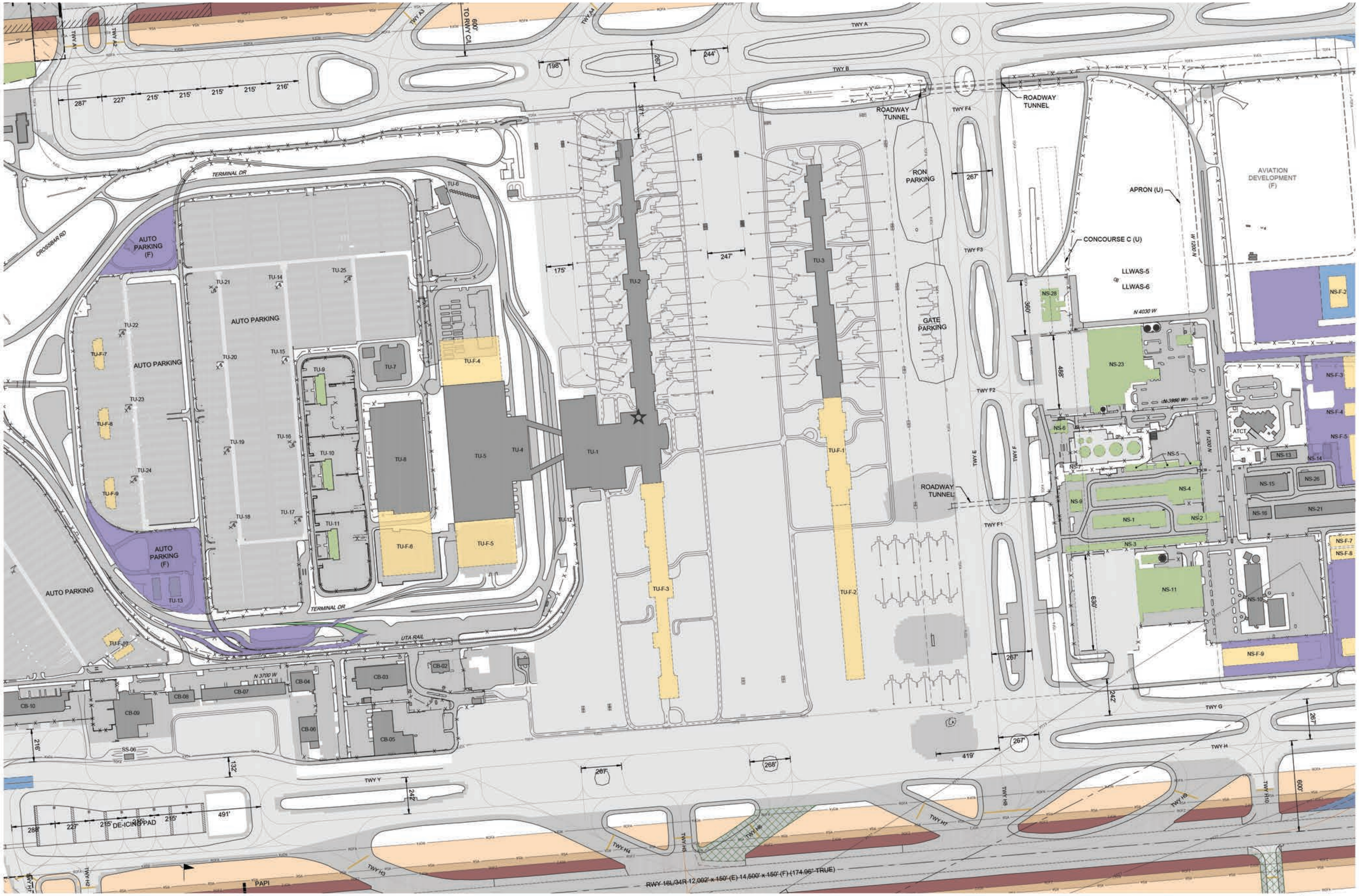
AEP PROJECT NUMBER
224-0039-000

SHEET TITLE

AIRPORT DATA SHEET - 2 OF 2

SHEET NUMBER

6 OF 41



DESCRIPTION	EXISTING	FUTURE
PROPERTY LINE		
RUNWAY SAFETY AREA		
RUNWAY OBJECT FREE AREA		
RUNWAY OBSTACLE FREE ZONE		
PRECISION OBSTACLE FREE ZONE		
RUNWAY PROTECTION ZONE		
TAXIWAY OBJECT FREE AREA		

DESCRIPTION	EXISTING	FUTURE
35' BUILDING RESTRICTION LINE		
PART 77 SURFACE		
AIRFIELD PAVEMENT (ASPHALT / CONCRETE)		
AIRFIELD PAVEMENT TO BE REMOVED	N/A	
BUILDINGS		
BUILDINGS TO BE REMOVED	N/A	
ROADWAY/PARKING (UNPAVED)		N/A

DESCRIPTION	EXISTING	FUTURE
ROADWAY/PARKING (ASPHALT / CONCRETE)		
ROADWAY/PARKING TO BE REMOVED	N/A	
BEACON	☆	N/A
TREES		N/A
FENCE	—X—X—X—	—XX—XX—
DRAINAGE DITCH		N/A

NOTES:
1. BUILDING TABLES CAN BE FOUND ON SHEET 6.

MAGNETIC DECLINATION
11° 14' EAST
OCTOBER, 2020
ANNUAL CHANGE 0° 6' WEST

300' 150' 0 300'

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REVISIONS

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DATE ISSUED: AUGUST 2021
REVIEWED BY: DSC
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AEP PROJECT NUMBER
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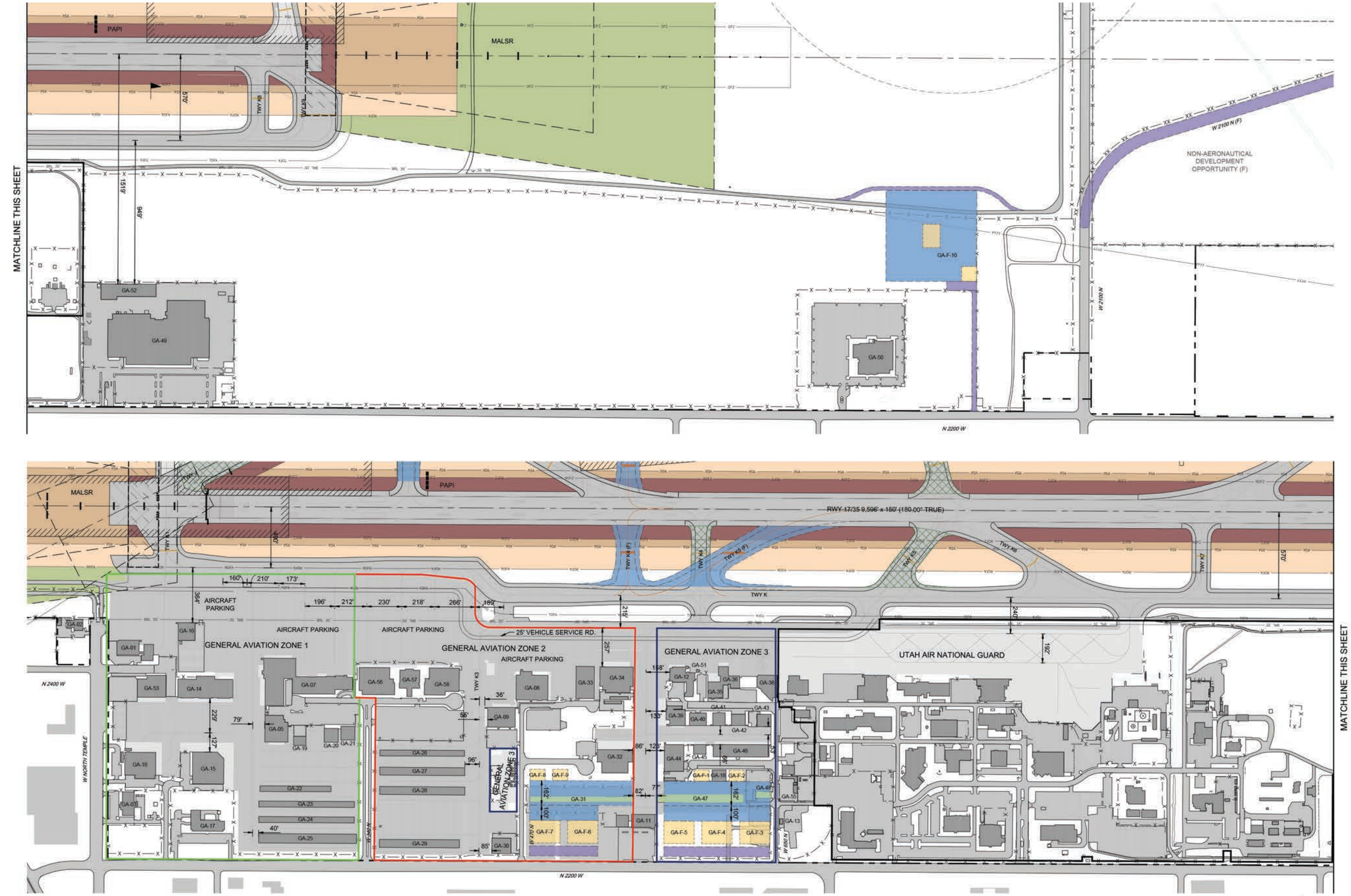
SHEET TITLE

TERMINAL AREA PLAN

SHEET NUMBER

7 OF 41



DESCRIPTION	EXISTING	FUTURE
PROPERTY LINE		
RUNWAY SAFETY AREA		
RUNWAY OBJECT FREE AREA		
RUNWAY OBSTACLE FREE ZONE		
PRECISION OBSTACLE FREE ZONE		
RUNWAY PROTECTION ZONE		
TAXIWAY OBJECT FREE AREA		

DESCRIPTION	EXISTING	FUTURE
35' BUILDING RESTRICTION LINE		
PART 77 SURFACE		
AIRFIELD PAVEMENT (ASPHALT / CONCRETE)	/	
AIRFIELD PAVEMENT TO BE REMOVED	N/A	
BUILDINGS		
BUILDINGS TO BE REMOVED	N/A	
ROADWAY/PARKING (UNPAVED)		N/A

DESCRIPTION	EXISTING	FUTURE
ROADWAY/PARKING (ASPHALT / CONCRETE)	/	
ROADWAY/PARKING TO BE REMOVED	N/A	
BEACON	☆	N/A
TREES		N/A
FENCE	—X—X—X—	—XX—XX—
DRAINAGE DITCH		N/A

NOTES:
1. BUILDING TABLES CAN BE FOUND ON SHEET 6.

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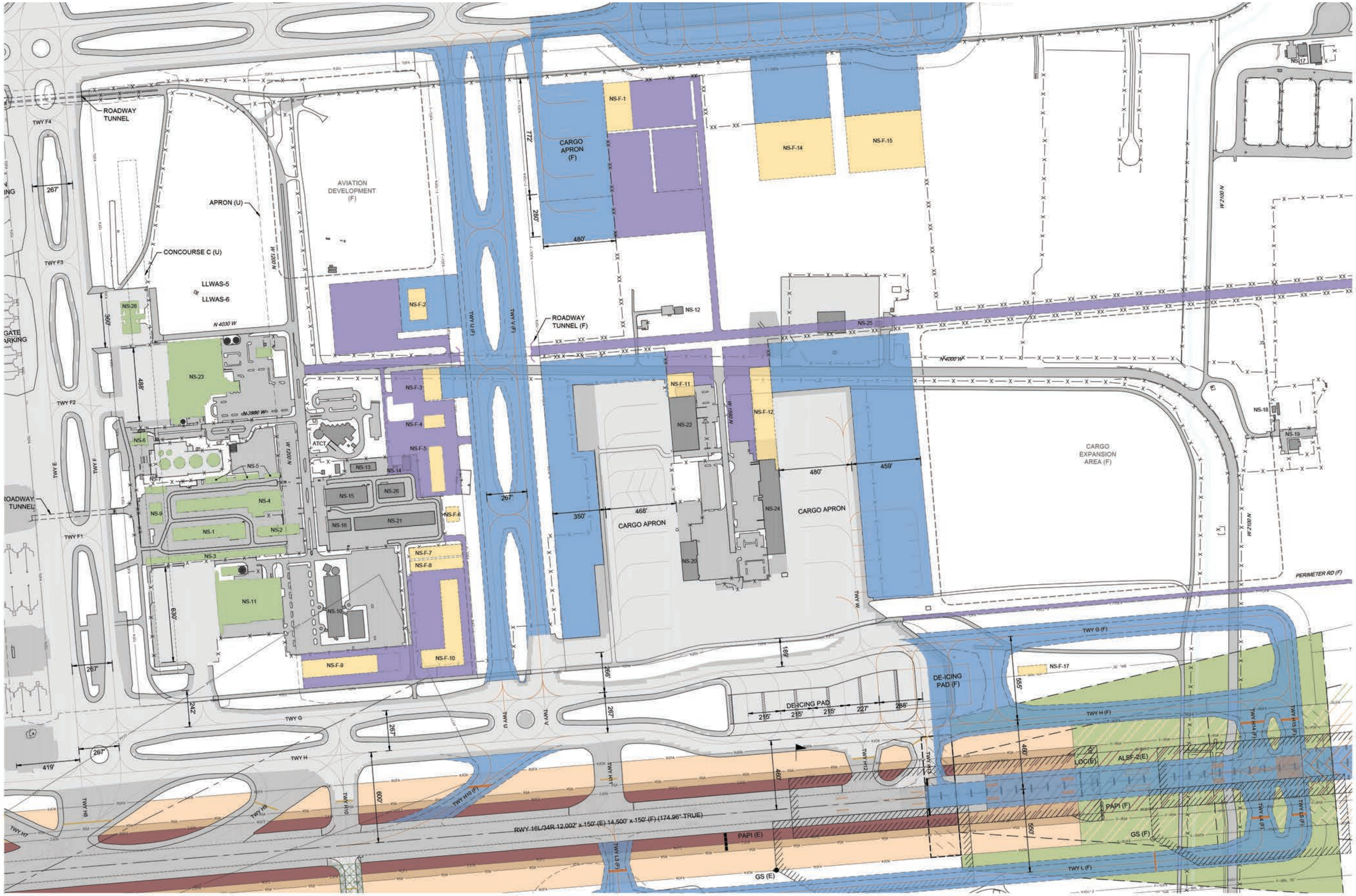
SHEET TITLE

GENERAL AVIATION AREA PLAN

SHEET NUMBER

8 OF 41



DESCRIPTION	EXISTING	FUTURE
PROPERTY LINE		
RUNWAY SAFETY AREA		
RUNWAY OBJECT FREE AREA		
RUNWAY OBSTACLE FREE ZONE		
PRECISION OBSTACLE FREE ZONE		
RUNWAY PROTECTION ZONE		
TAXIWAY OBJECT FREE AREA		

DESCRIPTION	EXISTING	FUTURE
35' BUILDING RESTRICTION LINE		
PART 77 SURFACE		
AIRFIELD PAVEMENT (ASPHALT / CONCRETE)	/	
AIRFIELD PAVEMENT TO BE REMOVED	N/A	
BUILDINGS		
BUILDINGS TO BE REMOVED	N/A	
ROADWAY/PARKING (UNPAVED)		N/A

DESCRIPTION	EXISTING	FUTURE
ROADWAY/PARKING (ASPHALT / CONCRETE)	/	
ROADWAY/PARKING TO BE REMOVED	N/A	
BEACON	☆	N/A
TREES		N/A
FENCE	— X — X — X —	— XX — XX —
DRAINAGE DITCH		N/A

MAGNETIC DECLINATION
11° 14' EAST
OCTOBER, 2020
ANNUAL CHANGE 0° 6' WEST

300' 150' 0 300'

NOTES:
1. BUILDING TABLES CAN BE FOUND ON SHEET 6.

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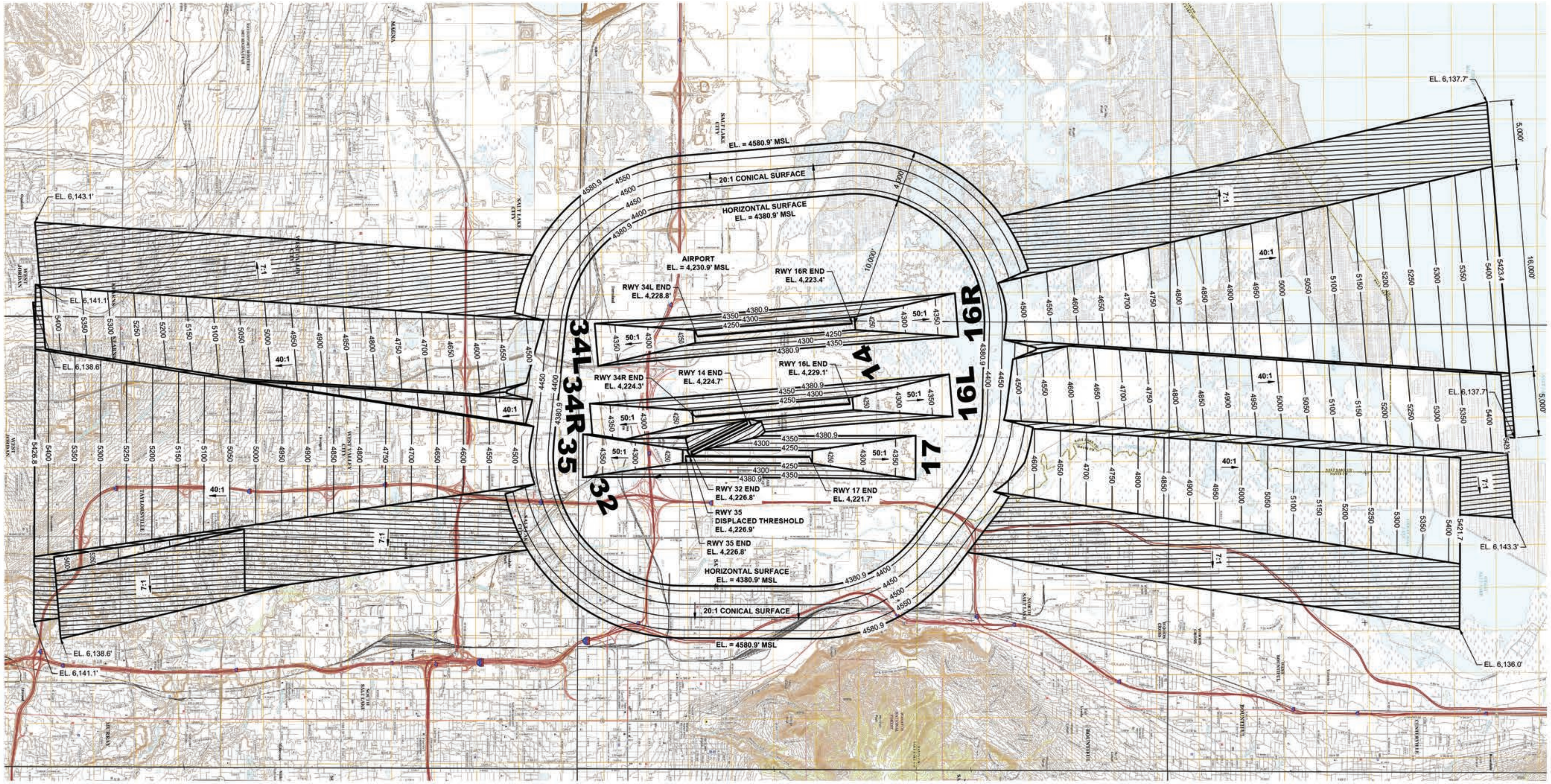
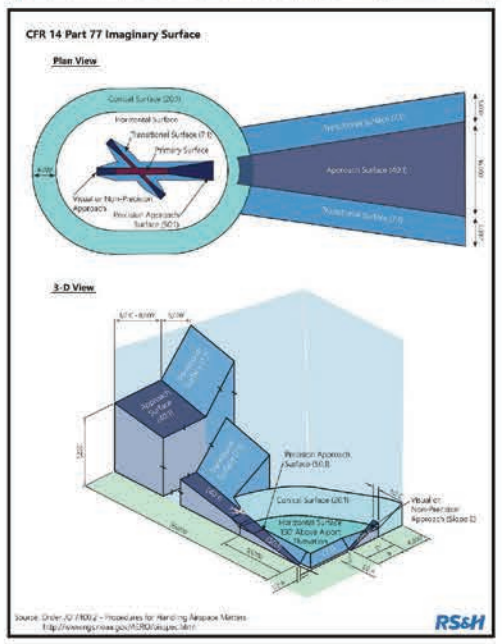
SHEET TITLE

NORTH SUPPORT AREA PLAN

SHEET NUMBER

9 OF 41





DIM	ITEM	DIMENSIONAL STANDARDS (FEET)					
		VISUAL RUNWAY		NON-PRECISION INSTRUMENT RUNWAY			PRECISION INSTRUMENT RUNWAY
		A	B	A	B		
					C	D	
A	WIDTH OF PRIMARY SURFACE AND APPROACH SURFACE AT INNER END	250	500	500	500	1,000	1,000
B	RADIUS OF HORIZONTAL SURFACE	5,000	5,000	5,000	10,000	10,000	10,000
		VISUAL APPROACH		NON-PRECISION INSTRUMENT APPROACH			PRECISION INSTRUMENT RUNWAY
		A	B	A	B		
					C	D	
C	APPROACH SURFACE WIDTH AT END	1,250	1,500	2,000	3,500	4,000	16,000
D	APPROACH SURFACE LENGTH	5,000	5,000	5,000	10,000	10,000	*
E	APPROACH SLOPE	20:1	20:1	20:1	34:1	34:1	*

A - UTILITY RUNWAYS
B - RUNWAYS LARGER THAN UTILITY
C - VISIBILITY MINIMUMS GREATER THAN 3/4 MILE
D - VISIBILITY MINIMUMS AS LOW AS 3/4 MILE
* - PRECISION INSTRUMENT APPROACH SLOPE IS 50:1 FOR INNER 10,000 FEET AND 40:1 FOR AN ADDITIONAL 40,000 FEET

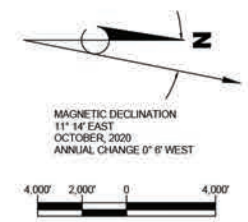
ZONING RESTRICTIONS

THE SALT LAKE CITY ZONING ORDINANCE (LATEST REVISION JUNE 16, 2020) HAS ESTABLISHED AN AFPP (AIRPORT FLIGHT PATH PROTECTION) OVERLAY DISTRICT FOR SALT LAKE CITY INTERNATIONAL AIRPORT. THE AFPP DISTRICT IS FOUND IN SECTION 21A.34.040 OF THE ZONING ORDINANCE.

THE COUNTY OF SALT LAKE ZONING ORDINANCE (LATEST REVISION SEPTEMBER 25, 2020) HAS ESTABLISED AN AOZ (AIRPORT OVERLAY ZONE) OVERLAY DISTRICT FOR AIRPORTS WITHIN THE COUNTY. THE AOZ IS FOUND IN CHAPTER 19.70 OF THE CITY CODE.

THE CITY OF NORTH SALT LAKE ZONING ORDINANCE (LATEST REVISION MARCH 19, 2019) HAS ESTABLISED AN AOZ (AIRPORT OVERLAY ZONE) AND AE (AIRPORT ENVIRONS OVERLAY ZONE) OVERLAY DISTRICT FOR AIRPORTS WITHIN THE CITY. THE AOZ AND AE OVERLAY DISTRICTS ARE FOUND IN CHAPTERS 15 AND 16, RESPECTIVELY, OF THE CITY CODE.

SOURCE: CITY CODE OF SALT LAKE CITY, UTAH; COUNTY CODE OF SALT LAKE COUNTY; CITY CODE OF NORTH SALT LAKE



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SLC INTERNATIONAL

SALT LAKE CITY INTERNATIONAL AIRPORT
SALT LAKE CITY, UT

AIRPORT LAYOUT PLAN

CONSULTANTS

REVISIONS

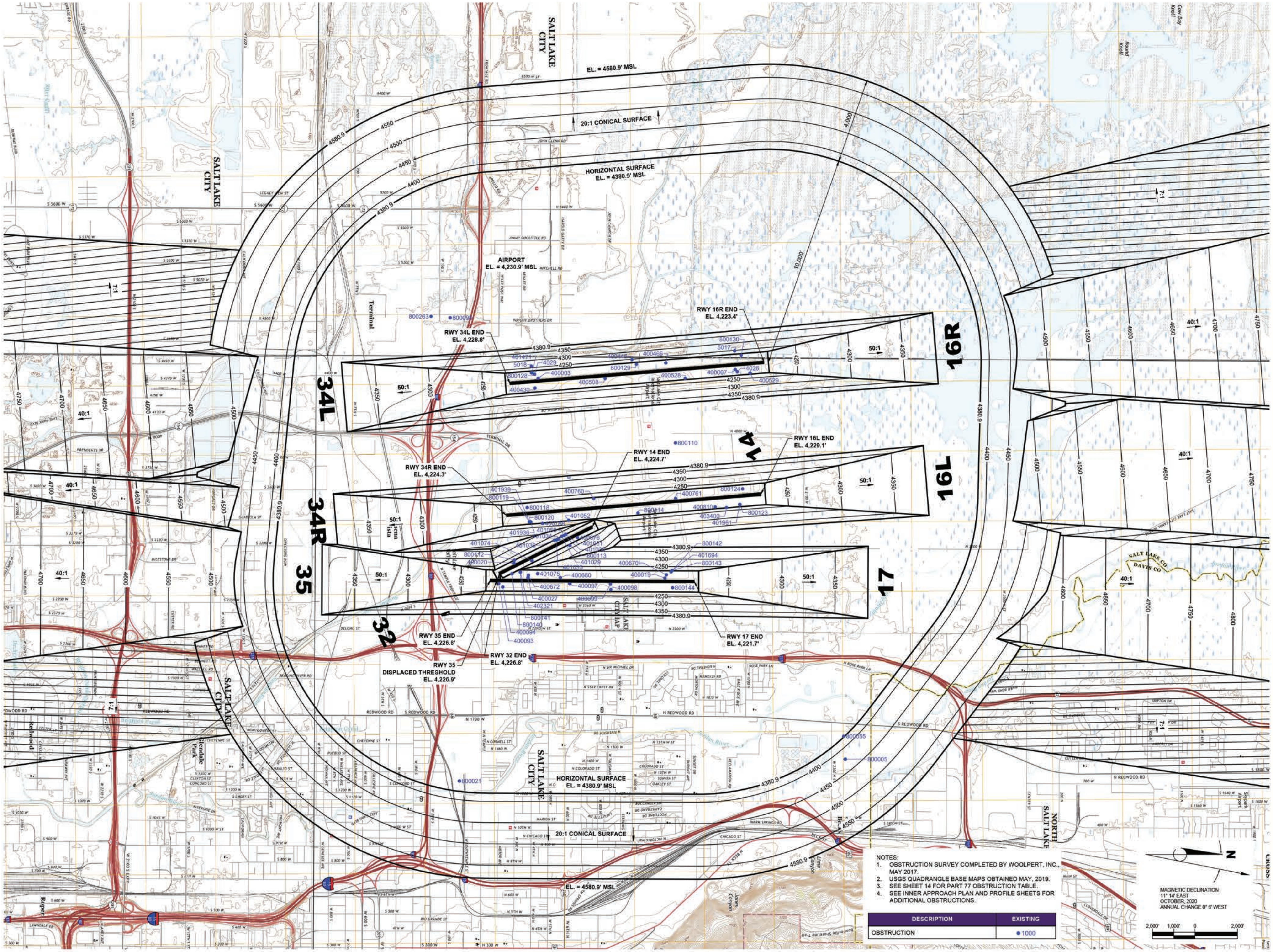
NO.	DESCRIPTION	DATE

DATE ISSUED: AUGUST 2021
REVIEWED BY: DSC
DRAWN BY: ACS
DESIGNED BY: TJM
AEP PROJECT NUMBER
224-0039-000

SHEET TITLE

AIRPORT AIRSPACE DRAWING - OUTER VIEW (EXISTING)

SHEET NUMBER
10 OF 41



NOTES:
1. OBSTRUCTION SURVEY COMPLETED BY WOOLPERT, INC., MAY 2017.
2. USGS QUADRANGLE BASE MAPS OBTAINED MAY, 2019.
3. SEE SHEET 14 FOR PART 77 OBSTRUCTION TABLE.
4. SEE INNER APPROACH PLAN AND PROFILE SHEETS FOR ADDITIONAL OBSTRUCTIONS.

DESCRIPTION	EXISTING
OBSTRUCTION	● 1000

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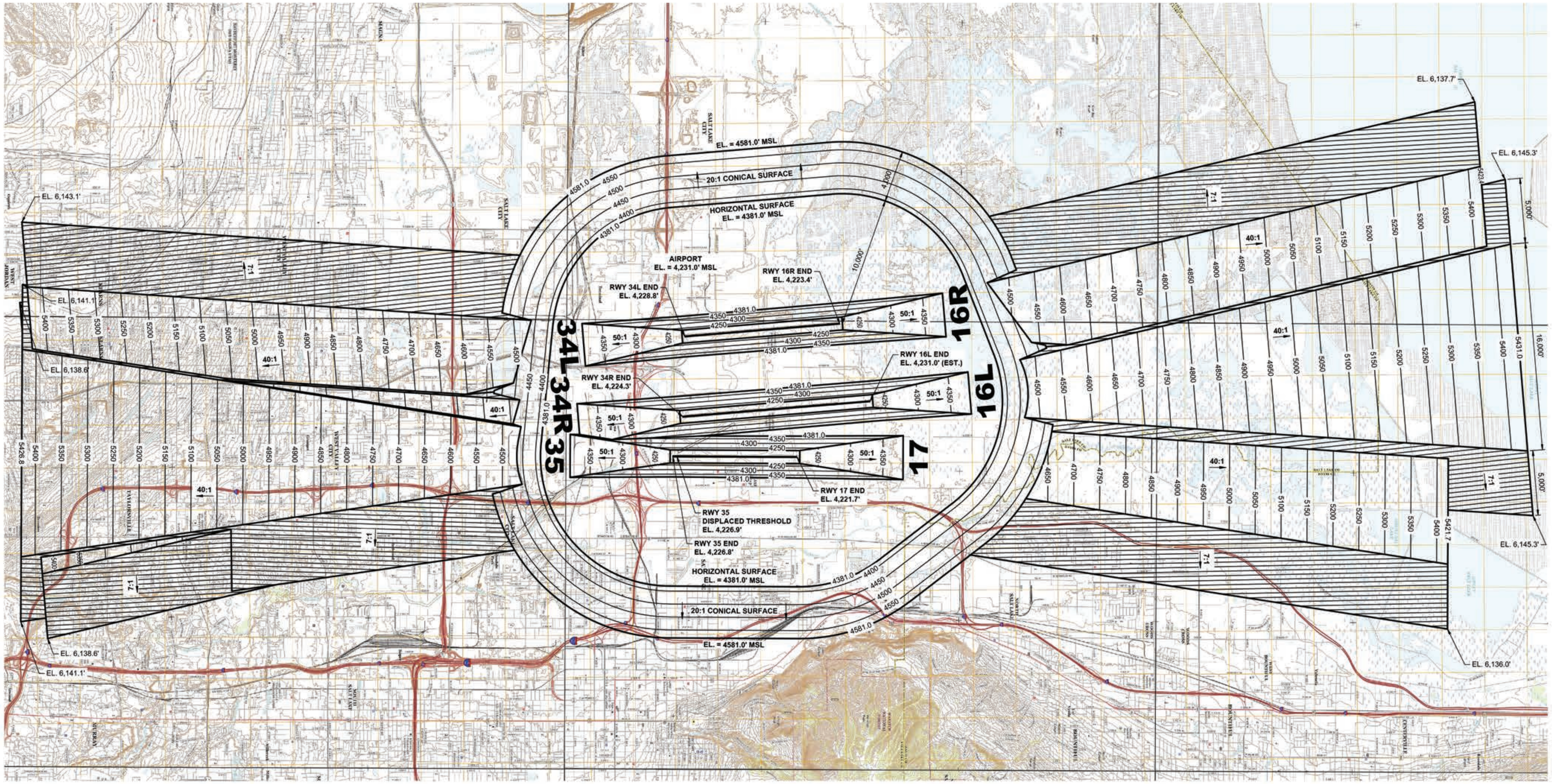

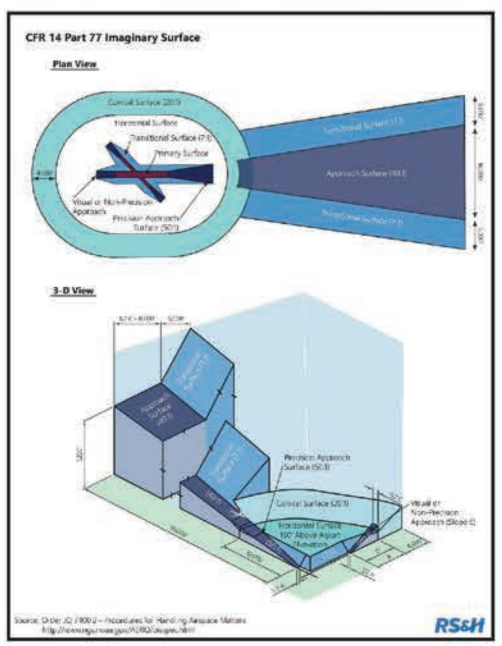

DIM	ITEM	DIMENSIONAL STANDARDS (FEET)					
		VISUAL RUNWAY		NON-PRECISION INSTRUMENT RUNWAY			PRECISION INSTRUMENT RUNWAY
		A	B	A	B		
					C	D	
A	WIDTH OF PRIMARY SURFACE AND APPROACH SURFACE AT INNER END	250	500	500	500	1,000	1,000
B	RADIUS OF HORIZONTAL SURFACE	5,000	5,000	5,000	10,000	10,000	10,000
		VISUAL APPROACH		NON-PRECISION INSTRUMENT APPROACH			PRECISION INSTRUMENT RUNWAY
		A	B	A	B		
					C	D	
C	APPROACH SURFACE WIDTH AT END	1,250	1,500	2,000	3,500	4,000	16,000
D	APPROACH SURFACE LENGTH	5,000	5,000	5,000	10,000	10,000	*
E	APPROACH SLOPE	20:1	20:1	20:1	34:1	34:1	*

A - UTILITY RUNWAYS
B - RUNWAYS LARGER THAN UTILITY
C - VISIBILITY MINIMUMS GREATER THAN 3/4 MILE
D - VISIBILITY MINIMUMS AS LOW AS 3/4 MILE
* - PRECISION INSTRUMENT APPROACH SLOPE IS 50:1 FOR INNER 10,000 FEET AND 40:1 FOR AN ADDITIONAL 40,000 FEET

ZONING RESTRICTIONS

THE SALT LAKE CITY ZONING ORDINANCE (LATEST REVISION JUNE 16, 2020) HAS ESTABLISHED AN AFPP (AIRPORT FLIGHT PATH PROTECTION) OVERLAY DISTRICT FOR SALT LAKE CITY INTERNATIONAL AIRPORT. THE AFPP DISTRICT IS FOUND IN SECTION 21A.34.040 OF THE ZONING ORDINANCE.

THE COUNTY OF SALT LAKE ZONING ORDINANCE (LATEST REVISION SEPTEMBER 25, 2020) HAS ESTABLISED AN AOZ (AIRPORT OVERLAY ZONE) OVERLAY DISTRICT FOR AIRPORTS WITHIN THE COUNTY. THE AOZ IS FOUND IN CHAPTER 19.70 OF THE CITY CODE.

THE CITY OF NORTH SALT LAKE ZONING ORDINANCE (LATEST REVISION MARCH 19, 2019) HAS ESTABLISED AN AOZ (AIRPORT OVERLAY ZONE) AND AE (AIRPORT ENVIRONS OVERLAY ZONE) OVERLAY DISTRICT FOR AIRPORTS WITHIN THE CITY. THE AOZ AND AE OVERLAY DISTRICTS ARE FOUND IN CHAPTERS 15 AND 16, RESPECTIVELY, OF THE CITY CODE.

SOURCE: CITY CODE OF SALT LAKE CITY, UTAH; COUNTY CODE OF SALT LAKE COUNTY; CITY CODE OF NORTH SALT LAKE

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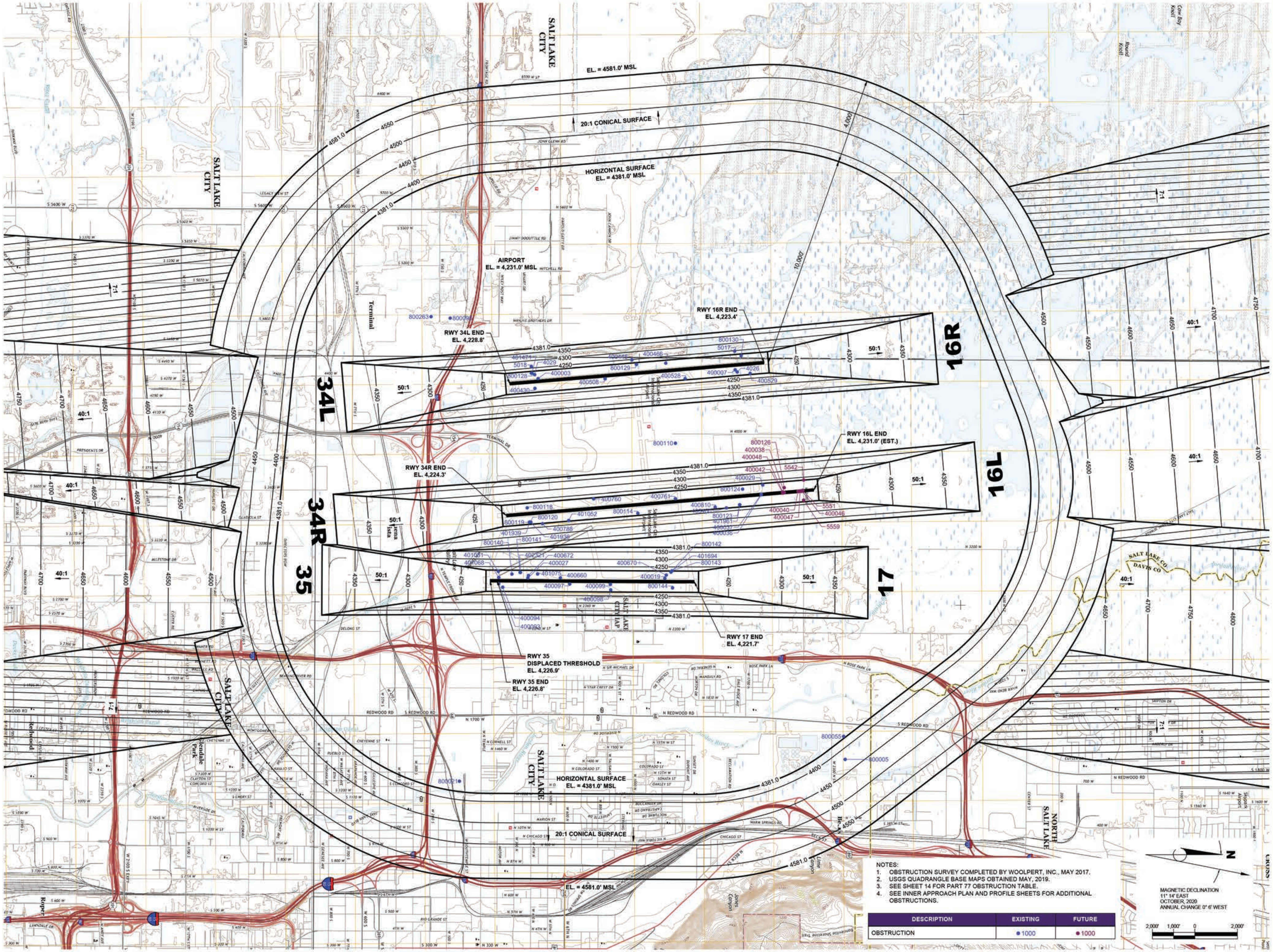
SHEET TITLE

AIRPORT AIRSPACE DRAWING - OUTER VIEW (FUTURE)

SHEET NUMBER
12 OF 41



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224-0039-000

SHEET TITLE

AIRPORT AIRSPACE DRAWING - INNER VIEW (FUTURE)

SHEET NUMBER

13 OF 41

OBSTRUCTIONS FOR EXISTING PART 77 AIRSPACE

EXISTING PART 77 OBSTRUCTION TABLE

OBJECT NO.	OBJECT DESCRIPTION	GROUND SURFACE ELEVATION (FT.)	OBJECT TOP ELEVATION (FT.)	PART 77 SURFACE ELEVATION (FT.)	PART 77 CLEARANCE (+ PENETRATE) (- CLEAR)	PART 77 SURFACE VIOLATION	PROPOSED DISPOSITION
4026	OBSTRUCTION LIGHT_WINDSOCK	4219.0	4230.7	4224.4	6.3	PRIMARY	FIXED BY FUNCTION
4029	OBSTRUCTION LIGHT_WINDSOCK	4224.0	4234.7	4228.6	6.1	PRIMARY	FIXED BY FUNCTION
5017	OBSTRUCTION LIGHT	4220.0	4264.3	4247.0	17.3	TRANSITIONAL	NONE
5018	OBSTRUCTION LIGHT	4225.0	4270.1	4260.6	9.5	TRANSITIONAL	NONE
400003	AIRFIELD LIGHT	4226.0	4229.9	4228.5	1.4	PRIMARY	FIXED BY FUNCTION
400007	AIRFIELD LIGHT	4221.0	4225.9	4224.5	1.4	PRIMARY	FIXED BY FUNCTION
400019	AIRFIELD LIGHT	4219.0	4225.5	4221.8	3.7	PRIMARY	FIXED BY FUNCTION
400020	AIRFIELD LIGHT	4223.0	4228.9	4225.1	3.8	PRIMARY	FIXED BY FUNCTION
400027	AIRFIELD LIGHT	4223.0	4228.1	4225.8	2.3	PRIMARY	FIXED BY FUNCTION
400078	AIRFIELD LIGHT	4221.0	4224.1	4223.1	0.9	PRIMARY	FIXED BY FUNCTION
400093	AIRPORT SIGN	4224.0	4229.3	4226.8	2.5	PRIMARY	FIXED BY FUNCTION
400094	AIRPORT SIGN	4224.0	4230.1	4226.7	3.4	PRIMARY	FIXED BY FUNCTION
400097	AIRPORT SIGN	4220.0	4225.1	4224.4	0.7	PRIMARY	FIXED BY FUNCTION
400098	AIRPORT SIGN	4220.0	4225.1	4222.9	2.2	PRIMARY	FIXED BY FUNCTION
400099	AIRPORT SIGN	4221.0	4225.3	4222.9	2.4	PRIMARY	FIXED BY FUNCTION
400430	AIRPORT SIGN	4224.0	4231.0	4228.6	2.4	PRIMARY	FIXED BY FUNCTION
400445	ANTENNA (NAVAID)	4219.0	4261.0	4247.3	13.7	TRANSITIONAL	FIXED BY FUNCTION
400466	TREE	4221.0	4226.5	4226.4	0.1	PRIMARY	REMOVE
400508	AIRPORT SIGN	4225.0	4229.6	4227.4	2.2	PRIMARY	FIXED BY FUNCTION
400528	SIGN	4221.0	4229.5	4226.1	3.4	PRIMARY	NONE
400529	SIGN	4219.0	4226.8	4223.9	2.8	PRIMARY	NONE
400660	AIRPORT SIGN	4220.0	4227.6	4224.7	2.9	PRIMARY	FIXED BY FUNCTION
400670	GENERAL_UTILITY	4218.0	4223.7	4221.8	1.9	PRIMARY	NONE
400672	GENERAL_UTILITY	4222.0	4229.2	4225.8	3.4	PRIMARY	NONE
400760	AIRPORT SIGN	4222.0	4226.4	4223.2	3.3	PRIMARY	FIXED BY FUNCTION
400761	AIRPORT SIGN	4221.0	4226.5	4226.0	0.6	PRIMARY	FIXED BY FUNCTION
400788	GENERAL_UTILITY	4221.0	4228.1	4226.5	1.6	TRANSITIONAL	NONE
400810	GENERAL_UTILITY	4225.0	4231.1	4229.7	1.4	PRIMARY	NONE
401029	NATURAL_HIGH_POINT	4223.9	4223.9	4221.9	1.9	TRANSITIONAL	NONE
401030	NATURAL_HIGH_POINT	4224.5	4224.5	4222.0	2.5	PRIMARY	NONE
401031	NATURAL_HIGH_POINT	4223.9	4223.9	4222.7	1.3	TRANSITIONAL	NONE
401034	NATURAL_HIGH_POINT	4222.2	4222.2	4221.5	0.8	PRIMARY	NONE
401035	NATURAL_HIGH_POINT	4222.6	4222.6	4221.2	1.3	PRIMARY	NONE
401036	NATURAL_HIGH_POINT	4222.6	4222.6	4221.0	1.6	PRIMARY	NONE
401050	AIRPORT SIGN	4224.0	4227.4	4222.0	5.4	PRIMARY	FIXED BY FUNCTION
401052	NATURAL_HIGH_POINT	4223.9	4223.9	4223.9	0.1	PRIMARY	NONE
401074	AIRPORT SIGN	4222.0	4226.2	4223.5	2.7	PRIMARY	FIXED BY FUNCTION
401075	UTILITY_POLE	4221.0	4227.2	4225.5	1.7	PRIMARY	NONE
401471	BUILDING (RWY 34L GLIDE SLOPE SHELTER)	4223.0	4233.1	4228.6	4.5	PRIMARY	OBSTRUCTION LIGHT
401694	BUILDING (RWY 17 GLIDE SLOPE SHELTER)	4216.0	4227.5	4221.7	5.8	PRIMARY	OBSTRUCTION LIGHT
401936	BUILDING	4220.0	4231.8	4224.7	7.1	PRIMARY	OBSTRUCTION LIGHT
401939	BUILDING (RWY 34R GLIDE SLOPE SHELTER)	4220.0	4229.7	4224.7	5.0	PRIMARY	OBSTRUCTION LIGHT
401961	BUILDING (RWY 16L GLIDE SLOPE SHELTER)	4225.0	4235.1	4230.3	4.9	PRIMARY	OBSTRUCTION LIGHT
402321	BUILDING (RWY 35 GLIDE SLOPE SHELTER)	4222.0	4232.1	4226.1	6.1	PRIMARY	OBSTRUCTION LIGHT
403400	ROAD_AT_GROUND	4231.0	4231.0	4230.8	0.3	PRIMARY	NONE
800005	TOWER;49-000014;331	4220.0	4543.3	4422.2	121.0	CONICAL	NONE
800021	STACK;49-000075;258	4231.0	4477.0	4380.9	96.1	INNER HORIZONTAL	NONE
800055	TOWER;49-000196;332	4221.0	4544.2	4380.9	163.3	INNER HORIZONTAL	NONE
800098	TRANSMISSION_LINE;49-020364	4236.0	4387.3	4380.9	6.4	INNER HORIZONTAL	OBSTRUCTION LIGHT
800110	CONTROL_TOWER;49-020384;328	4223.0	4547.4	4380.9	166.5	INNER HORIZONTAL	FIXED BY FUNCTION
800112	POLE;49-021039	4223.0	4234.0	4225.5	8.5	TRANSITIONAL	OBSTRUCTION LIGHT
800113	POLE;49-021040	4219.0	4230.2	4229.3	0.9	TRANSITIONAL	OBSTRUCTION LIGHT
800114	POLE;49-021041	4216.0	4238.5	4222.2	16.3	PRIMARY	OBSTRUCTION LIGHT
800118	WINDSOCK (POLE;49-021045)	4221.0	4227.6	4224.7	2.9	PRIMARY	FIXED BY FUNCTION
800119	GLIDE SLOPE ANTENNA (TOWER;49-021046)	4220.0	4264.0	4224.7	39.3	PRIMARY	FIXED BY FUNCTION
800120	POLE;49-021047	4220.0	4244.8	4224.7	20.1	PRIMARY	OBSTRUCTION LIGHT
800123	GLIDE SLOPE ANTENNA (TOWER;49-021050)	4225.0	4273.0	4230.2	42.8	PRIMARY	FIXED BY FUNCTION
800124	WINDSOCK (POLE;49-021051)	4222.0	4232.8	4230.0	2.7	PRIMARY	FIXED BY FUNCTION
800128	GLIDE SLOPE ANTENNA (TOWER;49-021055)	4222.0	4273.0	4228.6	44.4	PRIMARY	FIXED BY FUNCTION
800129	POLE;49-021056	4218.0	4240.7	4226.9	13.8	PRIMARY	OBSTRUCTION LIGHT
800130	GLIDE SLOPE ANTENNA (TOWER;49-021057)	4218.0	4269.4	4224.2	45.2	PRIMARY	FIXED BY FUNCTION
800140	WINDSOCK (POLE;49-021067)	4223.0	4233.8	4226.4	7.5	PRIMARY	FIXED BY FUNCTION
800141	GLIDE SLOPE ANTENNA (TOWER;49-021068)	4222.0	4270.7	4226.1	44.6	PRIMARY	FIXED BY FUNCTION
800142	GENERAL_UTILITY;49-021069	4216.0	4240.7	4221.7	19.0	PRIMARY	NONE
800143	GLIDE SLOPE ANTENNA (TOWER;49-021070)	4216.0	4262.5	4222.6	39.9	TRANSITIONAL	FIXED BY FUNCTION
800144	WINDSOCK (POLE;49-021071)	4216.0	4227.0	4221.7	5.3	PRIMARY	FIXED BY FUNCTION
800263	TRANSMISSION_LINE;49-021962	4236.0	4383.6	4380.9	2.7	INNER HORIZONTAL	OBSTRUCTION LIGHT

OBSTRUCTIONS FOR FUTURE PART 77 AIRSPACE

EXISTING / FUTURE PART 77 OBSTRUCTION TABLE

OBJECT NO.	OBJECT DESCRIPTION	GROUND SURFACE ELEVATION (FT.)	OBJECT TOP ELEVATION (FT.)	PART 77 SURFACE ELEVATION (FT.)	PART 77 CLEARANCE (+ PENETRATE) (- CLEAR)	PART 77 SURFACE VIOLATION	PROPOSED DISPOSITION
4026	OBSTRUCTION LIGHT_WINDSOCK	4219.0	4230.7	4224.4	6.3	PRIMARY	RELOCATE
4029	OBSTRUCTION LIGHT_WINDSOCK	4224.0	4234.7	4228.6	6.1	PRIMARY	FIXED BY FUNCTION
5017	OBSTRUCTION LIGHT	4220.0	4264.3	4247.0	17.3	TRANSITIONAL	NONE
5018	OBSTRUCTION LIGHT	4225.0	4270.1	4260.6	9.5	TRANSITIONAL	NONE
400003	AIRFIELD LIGHT	4226.0	4229.9	4228.5	1.4	PRIMARY	FIXED BY FUNCTION
400007	AIRFIELD LIGHT	4221.0	4225.9	4224.5	1.4	PRIMARY	FIXED BY FUNCTION
400019	AIRFIELD LIGHT	4219.0	4225.5	4221.8	3.7	PRIMARY	FIXED BY FUNCTION
400027	AIRFIELD LIGHT	4223.0	4228.1	4225.8	2.3	PRIMARY	FIXED BY FUNCTION
400029	AIRFIELD LIGHT	4227.0	4232.3	4229.2	3.1	PRIMARY	REMOVE
400036	AIRFIELD LIGHT	4230.5	4230.5	4229.1	1.5	PRIMARY	REMOVE
400037	AIRFIELD LIGHT	4230.5	4230.5	4229.1	1.5	PRIMARY	REMOVE
400093	AIRPORT SIGN	4224.0	4229.3	4226.8	2.5	PRIMARY	FIXED BY FUNCTION
400094	AIRPORT SIGN	4224.0	4230.1	4226.7	3.4	PRIMARY	FIXED BY FUNCTION
400097	AIRPORT SIGN	4220.0	4225.1	4224.4	0.7	PRIMARY	REMOVE
400098	AIRPORT SIGN	4220.0	4225.1	4222.9	2.2	PRIMARY	FIXED BY FUNCTION
400099	AIRPORT SIGN	4221.0	4225.3	4222.9	2.4	PRIMARY	FIXED BY FUNCTION
400430	AIRPORT SIGN	4224.0	4231.0	4228.6	2.4	PRIMARY	FIXED BY FUNCTION
400445	ANTENNA (NAVAID)	4219.0	4261.0	4247.3	13.7	TRANSITIONAL	FIXED BY FUNCTION
400466	TREE	4221.0	4226.5	4226.4	0.1	PRIMARY	REMOVE
400508	AIRPORT SIGN	4225.0	4229.6	4227.4	2.2	PRIMARY	FIXED BY FUNCTION
400528	SIGN	4221.0	4229.5	4226.1	3.4	PRIMARY	NONE
400529	SIGN	4219.0	4226.8	4223.9	2.8	PRIMARY	REMOVE
400660	AIRPORT SIGN	4220.0	4227.6	4224.7	2.9	PRIMARY	FIXED BY FUNCTION
400670	GENERAL_UTILITY	4218.0	4223.7	4221.8	1.9	PRIMARY	NONE
400672	GENERAL_UTILITY	4222.0	4229.2	4225.8	3.4	PRIMARY	NONE
400760	AIRPORT SIGN	4222.0	4226.4	4223.2	3.3	PRIMARY	FIXED BY FUNCTION
400761	AIRPORT SIGN	4221.0	4226.5	4226.0	0.6	PRIMARY	FIXED BY FUNCTION
400788	GENERAL_UTILITY	4221.0	4228.1	4226.5	1.6	TRANSITIONAL	NONE
400810	GENERAL_UTILITY	4225.0	4231.1	4229.7	1.4	PRIMARY	REMOVE
401052	NATURAL_HIGH_POINT	4223.9	4223.9	4223.9	0.1	PRIMARY	NONE
401061	GROUND	4227.1	4227.1	4226.9	0.3	PRIMARY	REMOVE
401068	AIRPORT SIGN	4225.0	4229.0	4226.8	2.2	PRIMARY	REMOVE
401075	UTILITY_POLE	4221.0	4227.2	4225.5	1.7	PRIMARY	NONE
401471	BUILDING (RWY 34L GLIDE SLOPE SHELTER)	4223.0	4233.1	4228.6	4.5	PRIMARY	OBSTRUCTION LIGHT
401694	BUILDING (RWY 17 GLIDE SLOPE SHELTER)	4216.0	4227.5	4221.7	5.8	PRIMARY	OBSTRUCTION LIGHT
401936	BUILDING	4220.0	4231.8	4224.7	7.1	PRIMARY	OBSTRUCTION LIGHT
401939	BUILDING (RWY 34R GLIDE SLOPE SHELTER)	4220.0	4229.7	4224.7	5.0	PRIMARY	OBSTRUCTION LIGHT
401961	BUILDING (RWY 16L GLIDE SLOPE SHELTER)	4225.0	4235.1	4230.3	4.9	PRIMARY	RELOCATE
402321	BUILDING (RWY 35 GLIDE SLOPE SHELTER)	4222.0	4232.1	4226.1	6.1	PRIMARY	OBSTRUCTION LIGHT
403400	ROAD_AT_GROUND	4231.0	4231.0	4230.8	0.3	PRIMARY	REMOVE
800005	TOWER;49-000014;331	4220.0	4543.3	4422.0	121.3	CONICAL	NONE
800021	STACK;49-000075;258	4231.0	4477.0	4381.0	96.0	INNER HORIZONTAL	NONE
800055	TOWER;49-000196;332	4221.0	4544.2	4381.0	163.2	INNER HORIZONTAL	NONE
800098	TRANSMISSION_LINE;49-020364	4236.0	4387.3	4381.0	6.3	INNER HORIZONTAL	OBSTRUCTION LIGHT
800110	CONTROL_TOWER;49-020384;328	4223.0	4547.4	4381.0	166.4	INNER HORIZONTAL	FIXED BY FUNCTION
800114	POLE;49-021041	4216.0	4238.5	4222.2	16.3	PRIMARY	RELOCATE
800118	WINDSOCK (POLE;49-021045)	4221.0	4227.6	4224.7	2.9	PRIMARY	FIXED BY FUNCTION
800119	GLIDE SLOPE ANTENNA (TOWER;49-021046)	4220.0	4264.0	4224.7	39.3	PRIMARY	FIXED BY FUNCTION
800120	POLE;49-021047	4220.0	4244.8	4224.7	20.1	PRIMARY	OBSTRUCTION LIGHT
800123	GLIDE SLOPE ANTENNA (TOWER;49-021050)	4225.0	4273.0	4230.2	42.8	PRIMARY	RELOCATE
800124	WINDSOCK (POLE;49-021051)	4222.0	4232.8	4230.0	2.7	PRIMARY	FIXED BY FUNCTION
800128	GLIDE SLOPE ANTENNA (TOWER;49-021055)	4222.0	4273.0	4228.6	44.4	PRIMARY	FIXED BY FUNCTION
800129	POLE;49-021056	4218.0	4240.7	4226.9	13.8	PRIMARY	OBSTRUCTION LIGHT
800130	GLIDE SLOPE ANTENNA (TOWER;49-021057)	4218.0	4269.4	4224.2	45.2	PRIMARY	FIXED BY FUNCTION
800140	WINDSOCK (POLE;49-021067)	4223.0	4233.8	4226.4	7.5	PRIMARY	FIXED BY FUNCTION
800141	GLIDE SLOPE ANTENNA (TOWER;49-021068)	4222.0	4270.7	4226.1	44.6	PRIMARY	FIXED BY FUNCTION
800142	GENERAL_UTILITY;49-021069	4216.0	4240.7	4221.7	19.0	PRIMARY	NONE
800143	GLIDE SLOPE ANTENNA (TOWER;49-021070)	4216.0	4262.5	4222.6	39.9	TRANSITIONAL	FIXED BY FUNCTION
800144	WINDSOCK (POLE;49-021071)	4216.0	4227.0	4221.7	5.3	PRIMARY	FIXED BY FUNCTION
800263	TRANSMISSION_LINE;49-021962	4236.0	4383.6	4381.0	2.6	INNER HORIZONTAL	OBSTRUCTION LIGHT

FUTURE PART 77 OBSTRUCTION TABLE

OBJECT NO.	OBJECT DESCRIPTION	GROUND SURFACE ELEVATION (FT.)	OBJECT TOP ELEVATION (FT.)	PART 77 SURFACE ELEVATION (FT.)	PART 77 CLEARANCE (+ PENETRATE) (- CLEAR)	PART 77 SURFACE VIOLATION	PROPOSED DISPOSITION
5542	CL_ROAD	4222.0	4237.0	4231.0	6.0	TRANSITIONAL	REMOVE
5551	CL_ROAD	4223.1	4238.1	4230.6	7.5	PRIMARY	REMOVE
5559	CL_ROAD	4222.6	4237.6	4230.6	7.0	PRIMARY	REMOVE
400038	AIRFIELD LIGHT (LOCALIZER)	4224.0	4234.5	4229.9	4.6	PRIMARY	RELOCATE
400040	AIRFIELD LIGHT (ALSF-2)	4221.0	4239.1	4230.4	8.7	PRIMARY	RELOCATE
400042	AIRFIELD LIGHT (ALSF-2)	4224.0	4238.6	4229.9	8.7	PRIMARY	RELOCATE
400046	AIRFIELD LIGHT (ALSF-2)	4221.0	4239.3	4230.6	8.7	PRIMARY	RELOCATE
400047	AIRFIELD LIGHT (ALSF-2)	4222.0	4239.1	4230.5	8.6	PRIMARY	RELOCATE
400048	AIRFIELD LIGHT (ALSF-2)	4224.0	4238.8	4229.9	8.9	PRIMARY	RELOCATE
800126	BUILDING;49-021053	4224.0	4236.0	4229.9	6.1	PRIMARY	RELOCATE

NOTES:
1. OBSTRUCTION SURVEY COMPLETED BY WOOLPERT, INC., MAY 2017.

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REVISIONS

NO.	DESCRIPTION	DATE

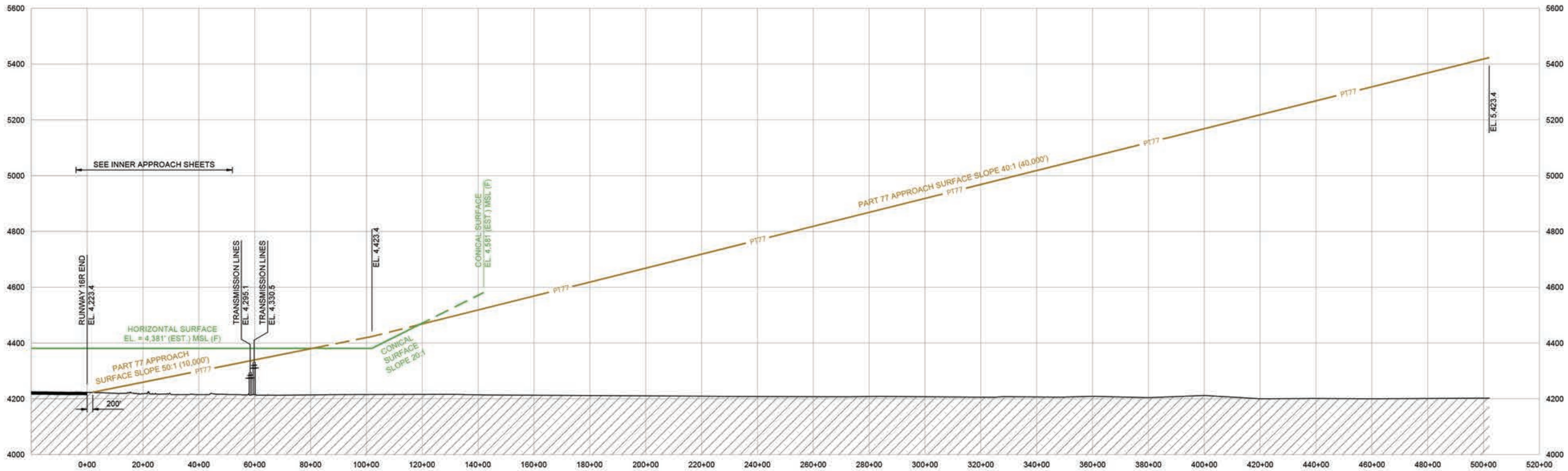
DATE ISSUED: AUGUST 2021
REVIEWED BY: DSC
DRAWN BY: ACS
DESIGNED BY: TJM
AEP PROJECT NUMBER
224-0039-000

SHEET TITLE

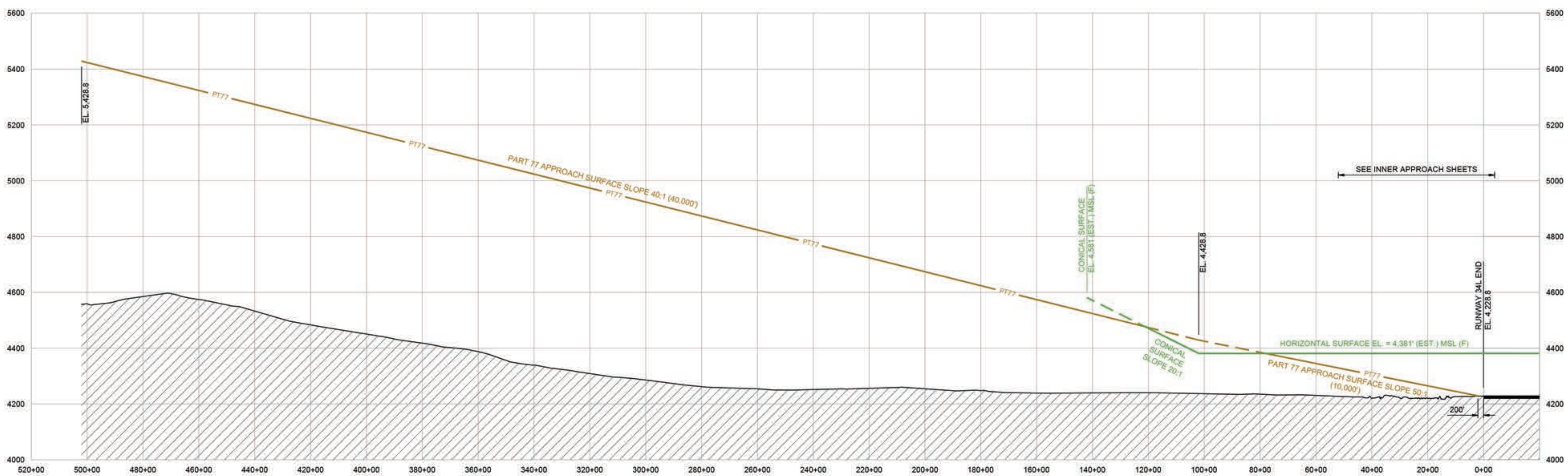
EXISTING AND FUTURE PART 77 OBSTRUCTION TABLES

SHEET NUMBER

14 OF 41



RUNWAY 16R AIRSPACE PROFILE



RUNWAY 34L AIRSPACE PROFILE

HORIZONTAL SCALE

VERTICAL SCALE

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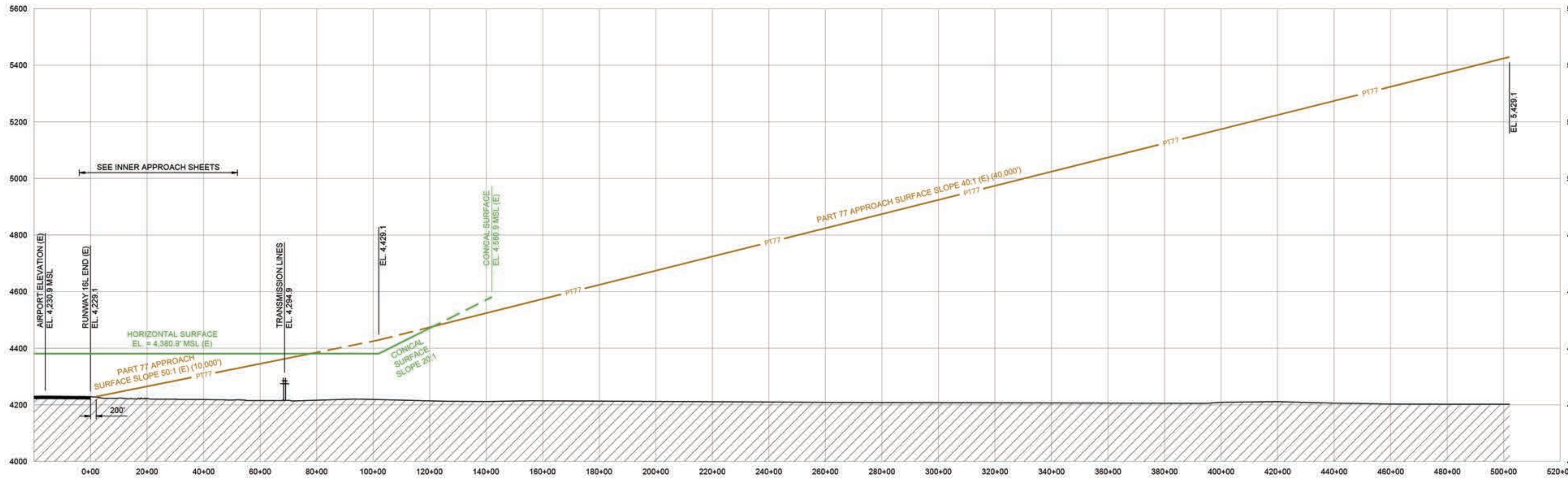
224-0039-000

SHEET TITLE

AIRSPACE PROFILE RUNWAY 16R-34L

SHEET NUMBER

15 OF 41



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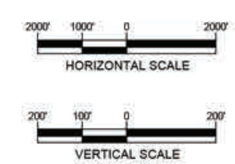

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DESIGNED BY: TJM

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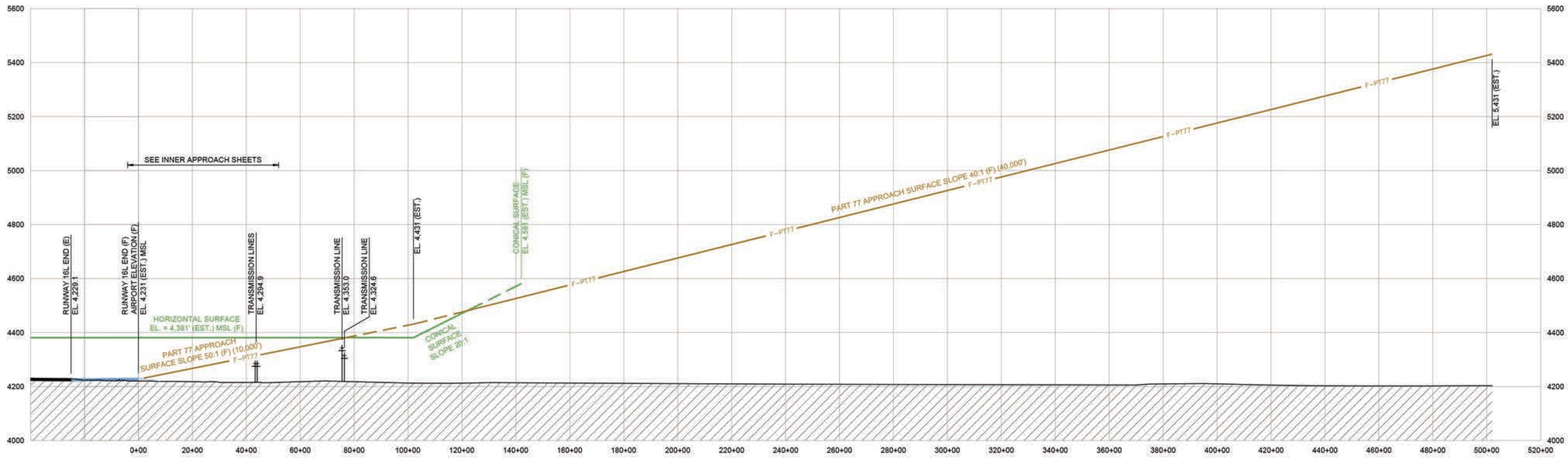
224-0039-000

SHEET TITLE

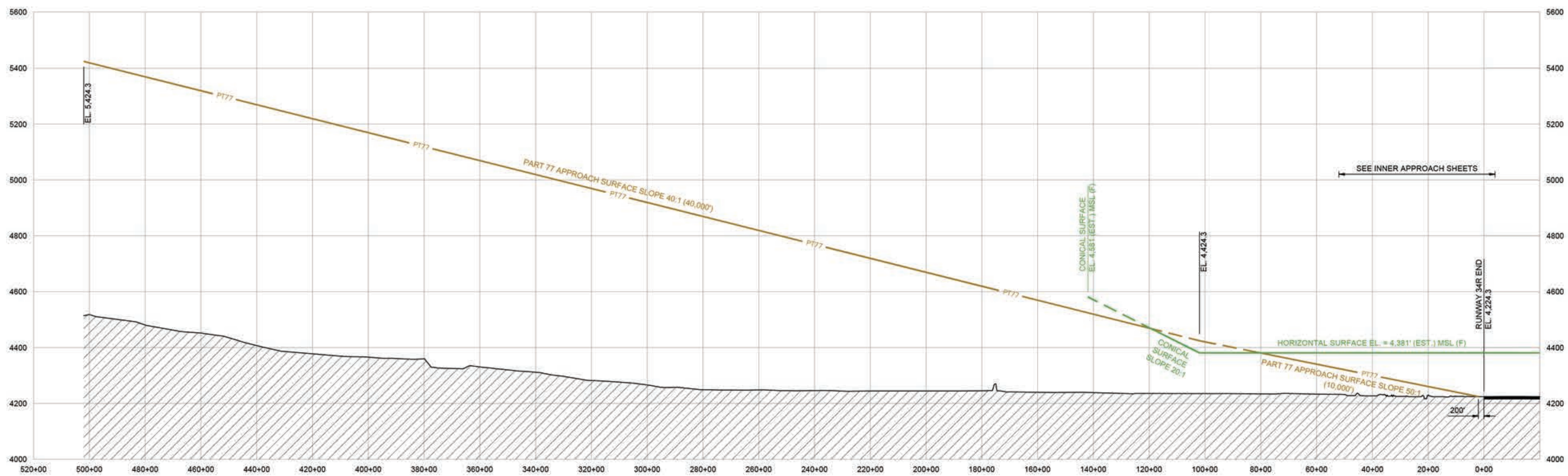
AIRSPACE PROFILE RUNWAY 16L (EXISTING)

SHEET NUMBER

16 OF 41



FUTURE RUNWAY 16L AIRSPACE PROFILE



RUNWAY 34R AIRSPACE PROFILE

HORIZONTAL SCALE

VERTICAL SCALE

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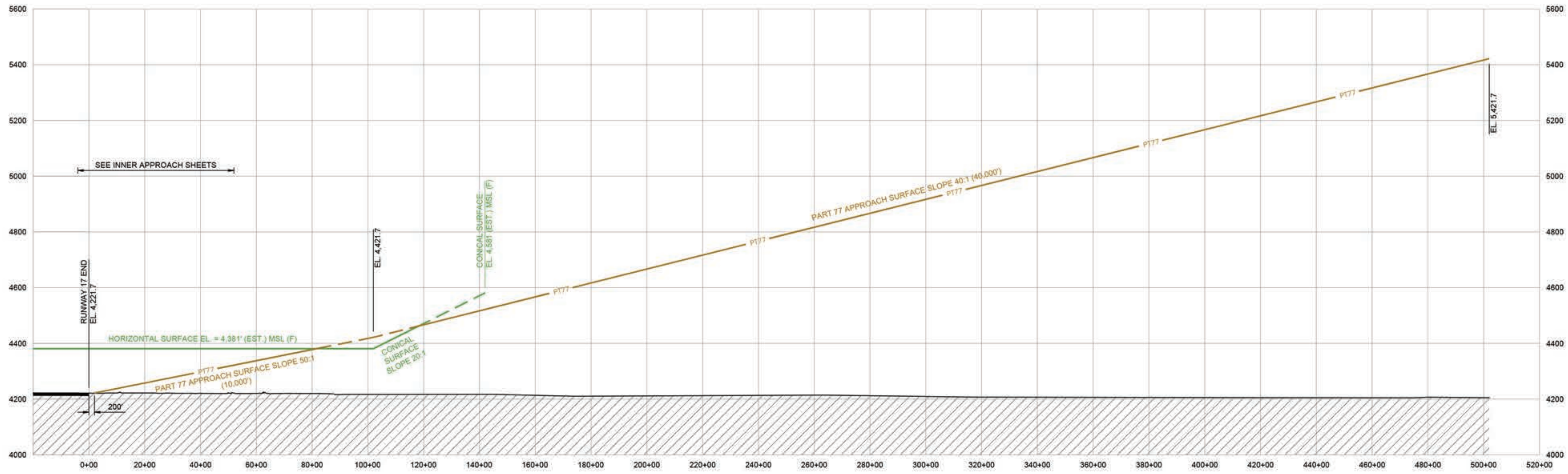
AEP PROJECT NUMBER
224-0039-000

SHEET TITLE

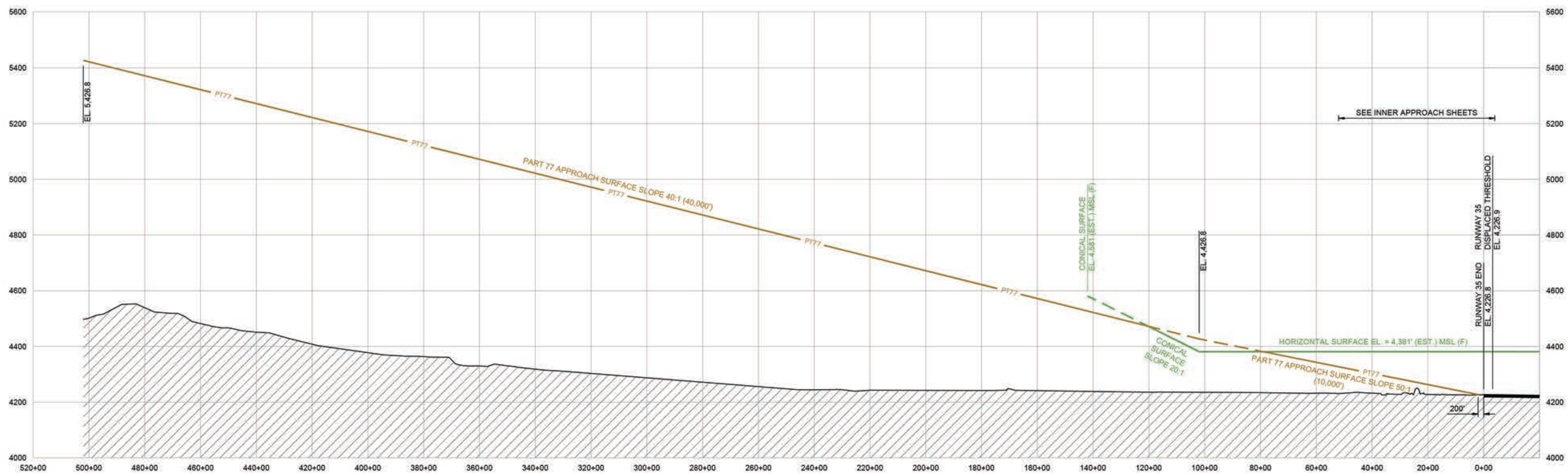
AIRSPACE PROFILE RUNWAY 16L-34R

SHEET NUMBER

17 OF 41



RUNWAY 17 AIRSPACE PROFILE



RUNWAY 35 AIRSPACE PROFILE

2000' 1000' 0 2000'
HORIZONTAL SCALE

200' 100' 0 200'
VERTICAL SCALE

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DRAWN BY: TJM
DESIGNED BY: TJM

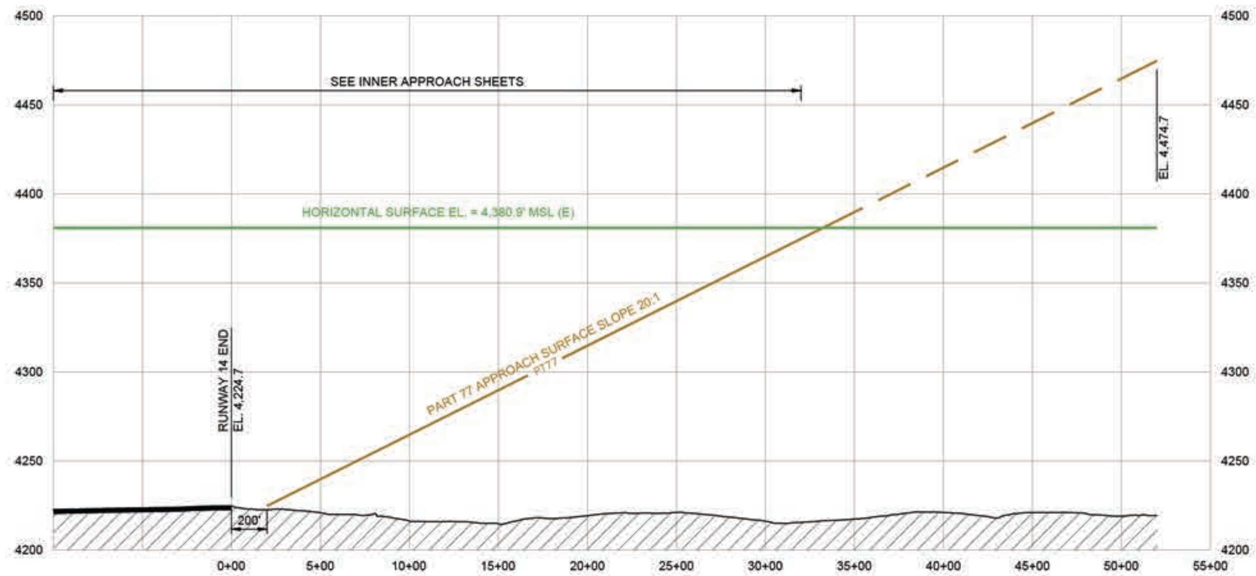
AEP PROJECT NUMBER
224-0039-000

SHEET TITLE

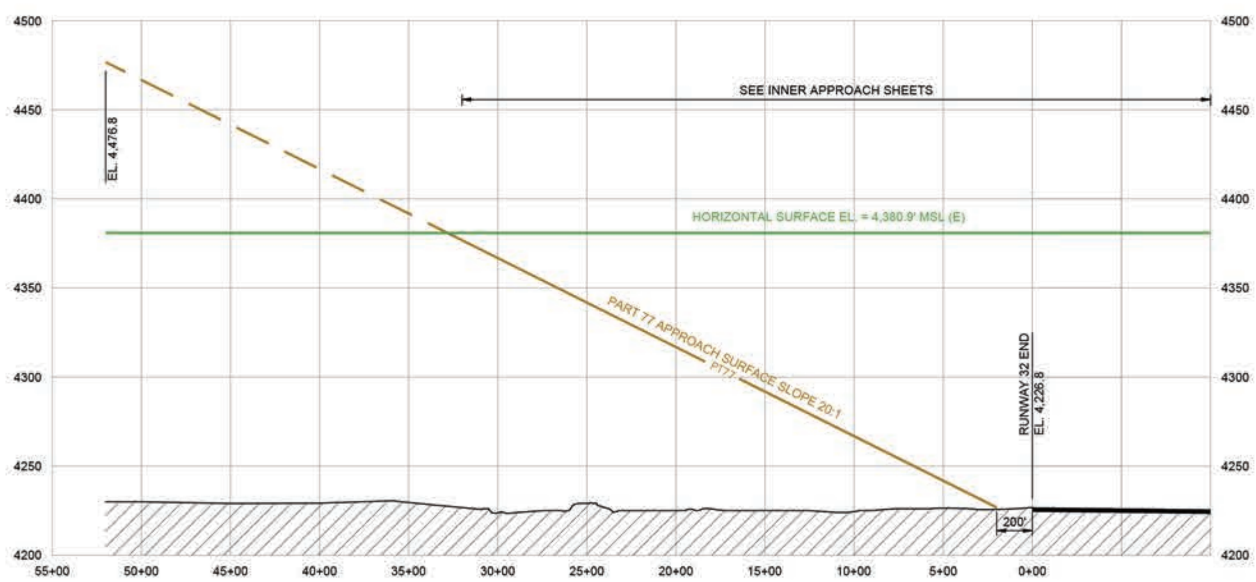
AIRSPACE PROFILE RUNWAY 17-35

SHEET NUMBER

18 OF 41



RUNWAY 14 AIRSPACE PROFILE



RUNWAY 32 AIRSPACE PROFILE

HORIZONTAL SCALE 500' 250' 0 500'

VERTICAL SCALE 50' 25' 0 50'

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DATE ISSUED: AUGUST 2021
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DESIGNED BY: TJM

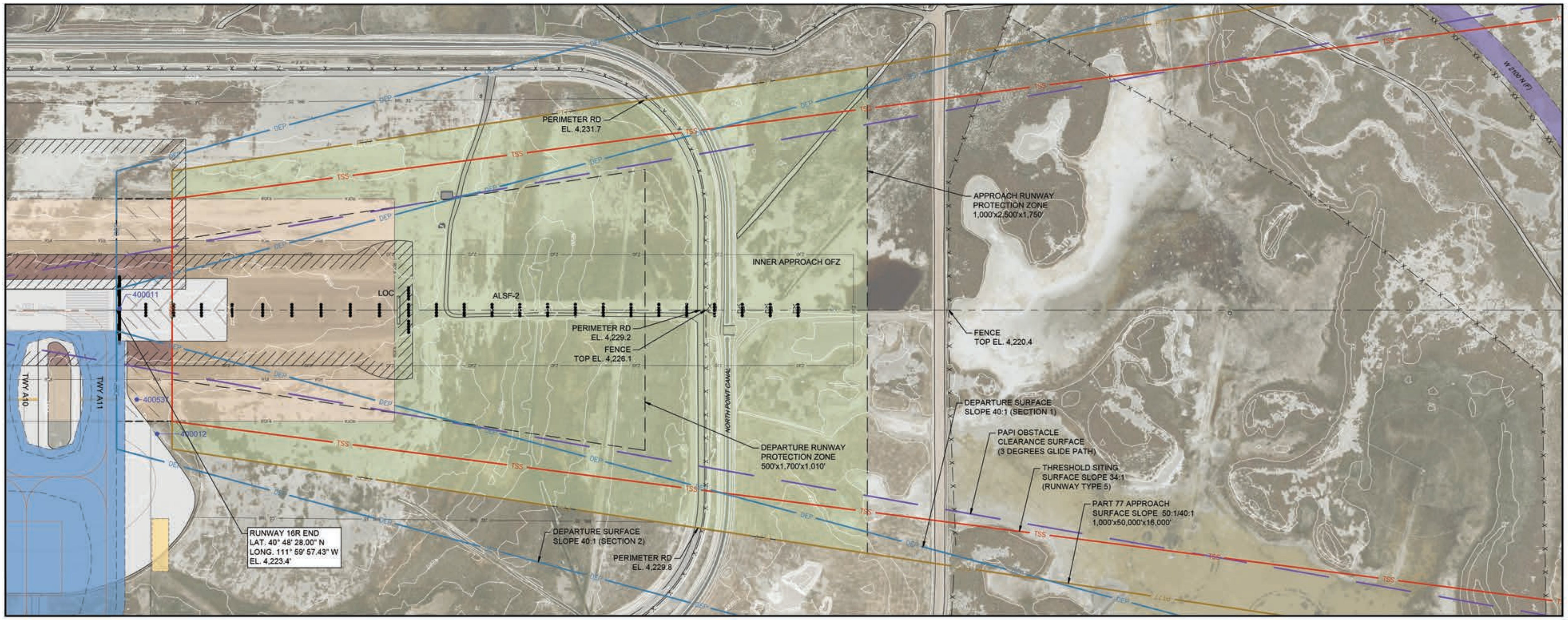
AEP PROJECT NUMBER
224-0039-000

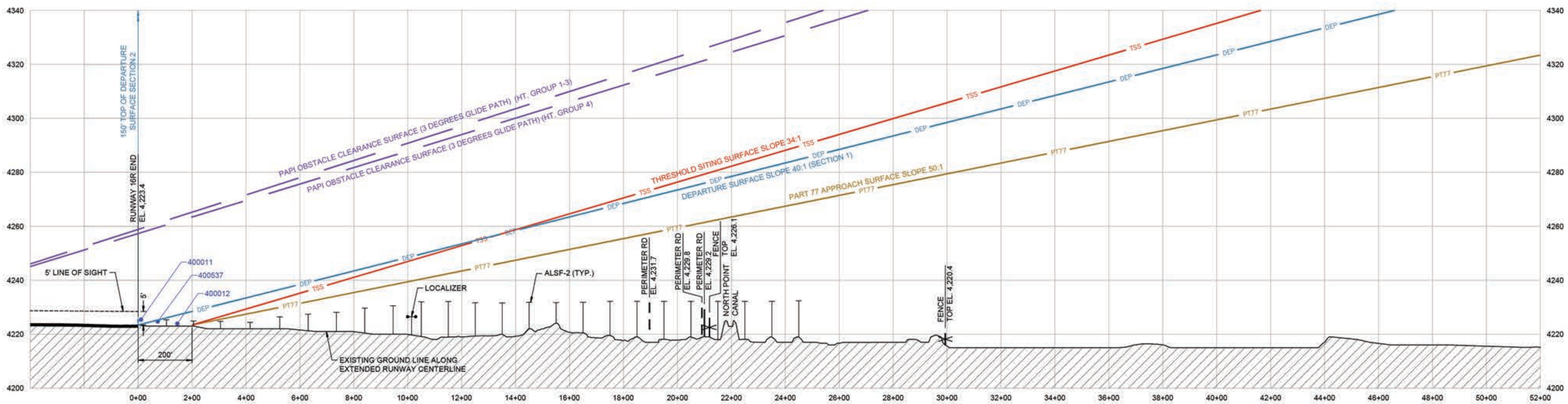
SHEET TITLE

AIRSPACE PROFILE RUNWAY 14-32 (EXISTING)

SHEET NUMBER

19 OF 41



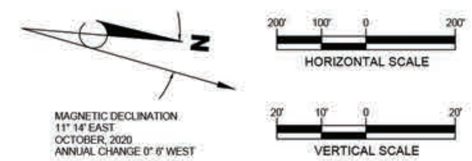


RUNWAY 16R OBSTRUCTION TABLE									
OBJECT NO.	OBJECT DESCRIPTION	ABOVE GROUND LEVEL (FT.)	OBJECT TOP ELEVATION (FT.)	CLEARANCE (+ PENETRATE) (- CLEAR)			PROPOSED DISPOSITION	PART 77 SURFACE VIOLATION	TRIGGERING EVENT
				PART 77 APPROACH SURFACE (FT.)	DEPARTURE SURFACE (FT.)	THRESHOLD SITING SURFACE (FT.)			
400011	AIRFIELD LIGHT	0.0	4225.4	2.0	1.7	N/A	FIXED BY FUNCTION	PRIMARY	NONE
400012	AIRFIELD LIGHT	3.9	4223.9	0.5	-120.1	N/A	FIXED BY FUNCTION	PRIMARY	NONE
400537	AIRPORT SIGN	5.6	4224.7	1.2	-80.9	N/A	FIXED BY FUNCTION	PRIMARY	NONE

1. OBSTRUCTION SURVEY COMPLETED BY WOOLPERT, INC., MAY 2017.
2. THERE ARE NO OBSTRUCTIONS TO THE PAPI OBSTACLE CLEARANCE SURFACE.

DESCRIPTION	EXISTING	FUTURE
PART 77 SURFACE	PT77	F-PT77
THRESHOLD SITING SURFACE	TSS	F-TSS
DEPARTURE SURFACE	DEP	F-DEP
PAPI OBSTACLE CLEARANCE SURFACE		
OBSTRUCTION	● 1000	● 1000

ROADWAY AND RAILROAD ELEVATIONS INCLUDE TRAVERSEWAY ADJUSTMENT (23' RAILROADS I 17' HIGHWAYS I 15' PUBLIC ROADS I 10' PRIVATE ROADS).



MAGNETIC DECLINATION
11° 14' EAST
OCTOBER, 2020
ANNUAL CHANGE 0° 6' WEST

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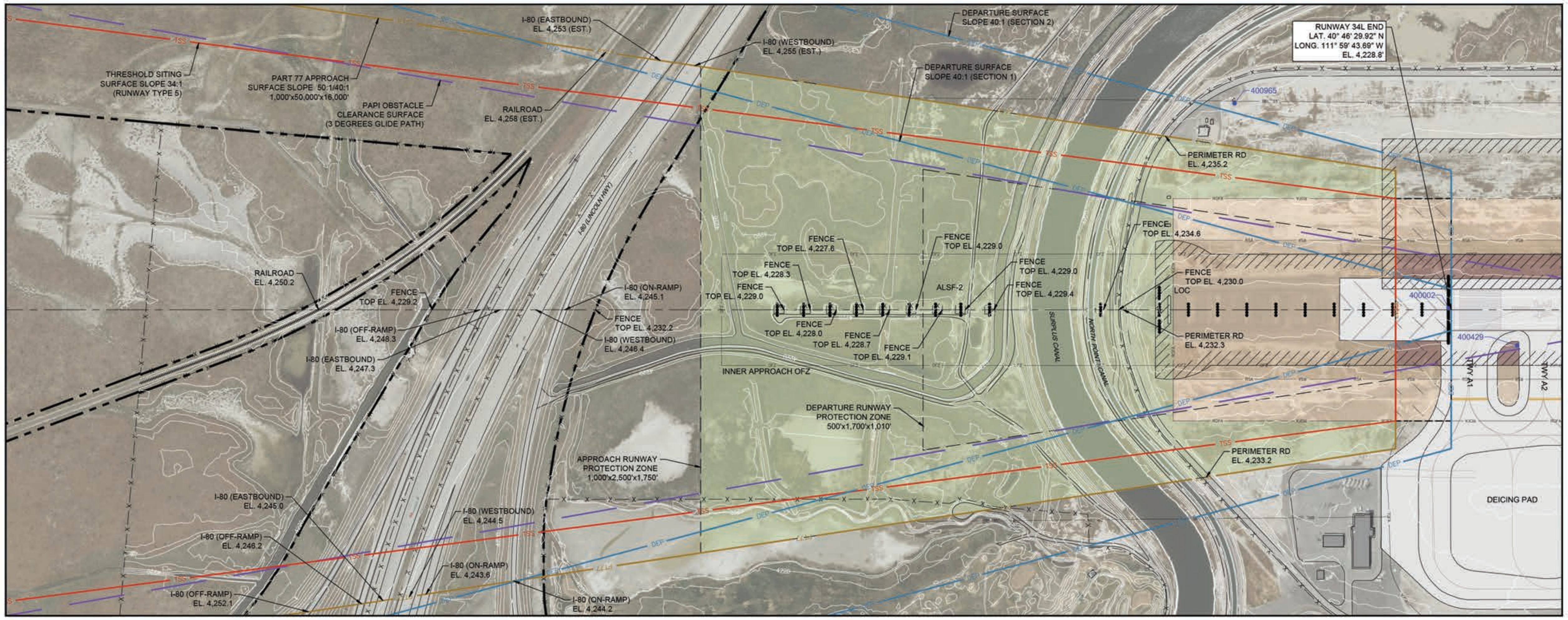
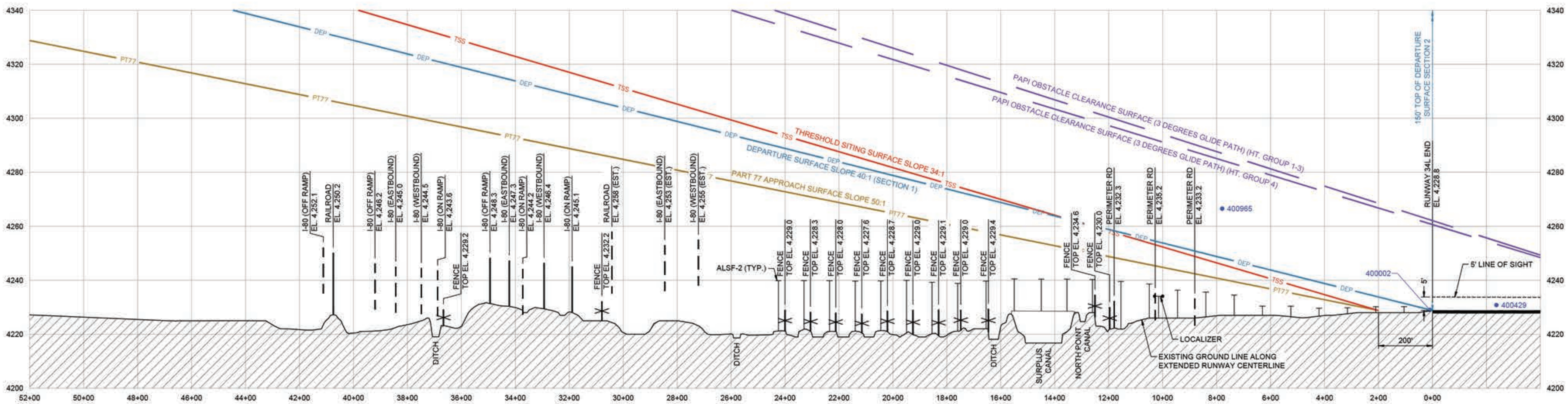
SHEET TITLE

INNER APPROACH PLAN AND PROFILE RUNWAY 16R

SHEET NUMBER

20 OF 41



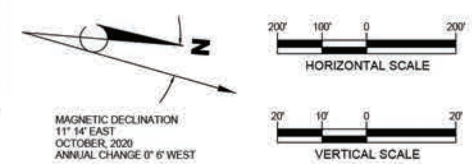


RUNWAY 34L OBSTRUCTION TABLE									
OBJECT NO.	OBJECT DESCRIPTION	ABOVE GROUND LEVEL (FT.)	OBJECT TOP ELEVATION (FT.)	CLEARANCE (+ PENETRATE) (- CLEAR)			PROPOSED DISPOSITION	PART 77 SURFACE VIOLATION	TRIGGERING EVENT
				PART 77 APPROACH SURFACE (FT.)	DEPARTURE SURFACE (FT.)	THRESHOLD SITING SURFACE (FT.)			
400002	AIRFIELD LIGHT	0.0	4229.0	0.2	0.0	N/A	FIXED BY FUNCTION	PRIMARY	NONE
400429	AIRPORT SIGN	4.8	4230.8	2.1	N/A	N/A	FIXED BY FUNCTION	PRIMARY	NONE
400965	UTILITY POLE	40.5	4266.5	3.8	N/A	N/A	NONE	TRANSITIONAL	NONE

1. OBSTRUCTION SURVEY COMPLETED BY WOOLPERT, INC., MAY 2017.
2. THERE ARE NO OBSTRUCTIONS TO THE PAPI OBSTACLE CLEARANCE SURFACE.

DESCRIPTION	EXISTING	FUTURE
PART 77 SURFACE	PT77	F-PT77
THRESHOLD SITING SURFACE	TSS	F-TSS
DEPARTURE SURFACE	DEP	F-DEP
PAPI OBSTACLE CLEARANCE SURFACE		
OBSTRUCTION	• 1000	• 1000

ROADWAY AND RAILROAD ELEVATIONS INCLUDE TRAVERSEWAY ADJUSTMENT (23' RAILROADS I 17' HIGHWAYS I 15' PUBLIC ROADS I 10' PRIVATE ROADS).



MAGNETIC DECLINATION
11° 14' EAST
OCTOBER, 2020
ANNUAL CHANGE 0° 6' WEST

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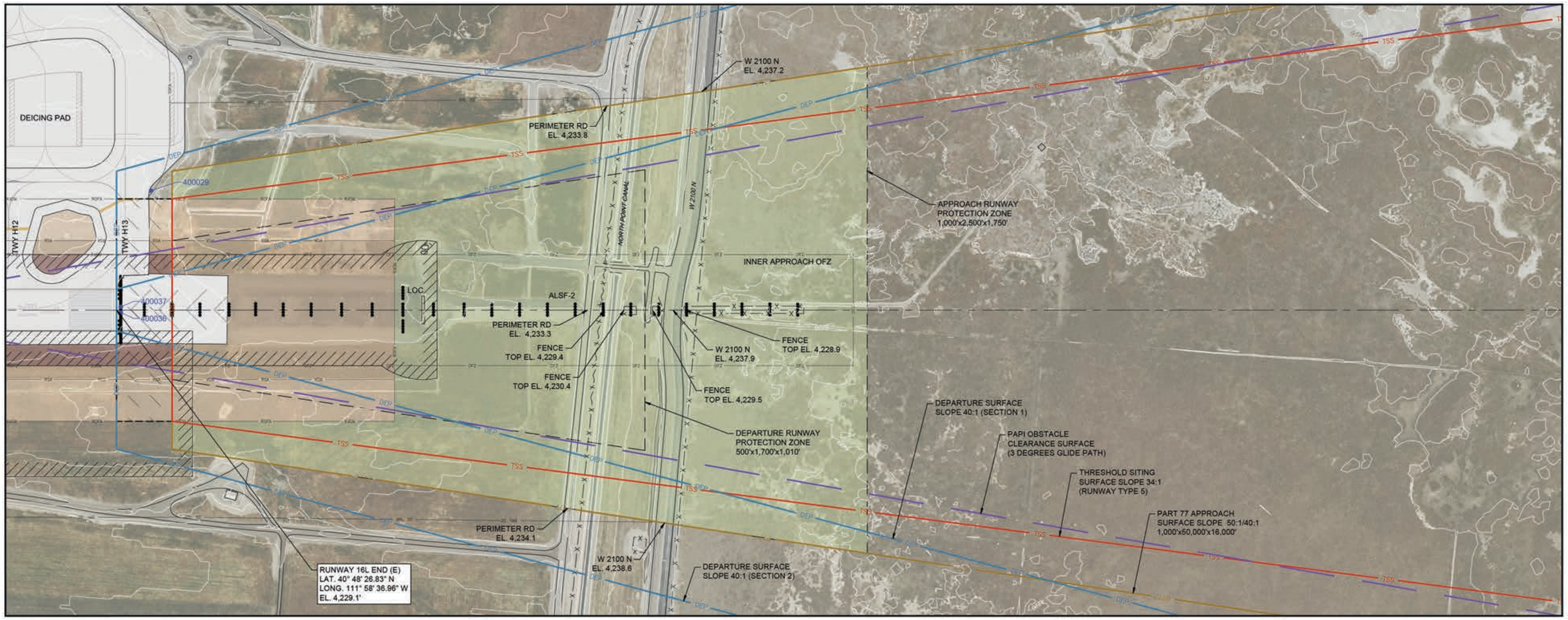
224-0039-000

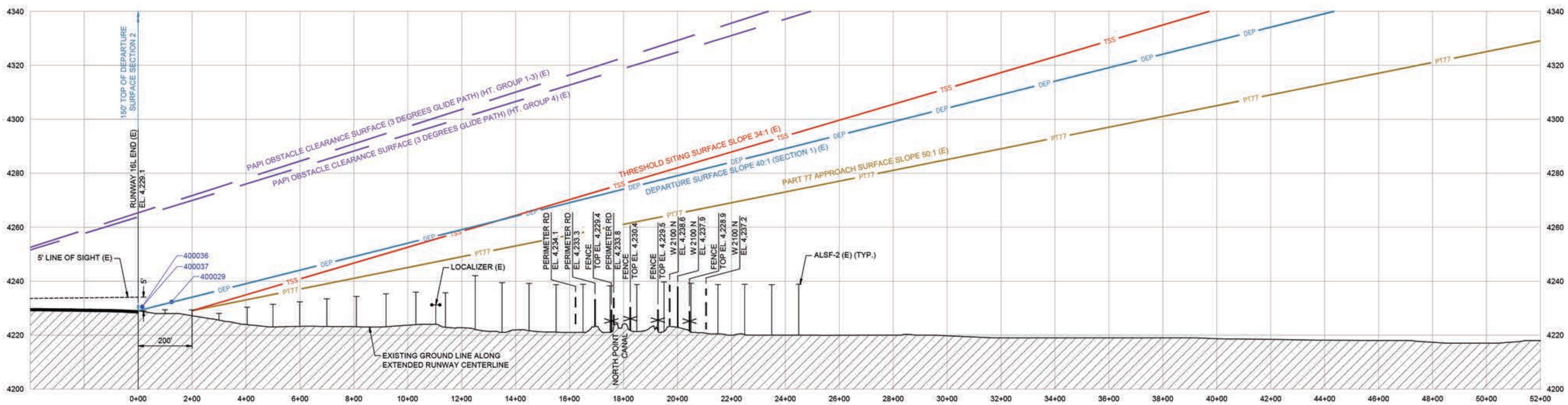
SHEET TITLE

INNER APPROACH PLAN AND PROFILE RUNWAY 34L

SHEET NUMBER

21 OF 41





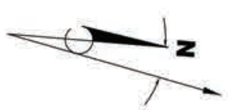
EXISTING RUNWAY 16L OBSTRUCTION TABLE

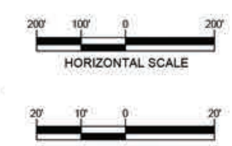
OBJECT NO.	OBJECT DESCRIPTION	ABOVE GROUND LEVEL (FT.)	OBJECT TOP ELEVATION (FT.)	CLEARANCE (+ PENETRATE) (- CLEAR) PART 77 APPROACH SURFACE (FT.)	DEPARTURE SURFACE (FT.)	THRESHOLD SITING SURFACE (FT.)	PROPOSED DISPOSITION	PART 77 SURFACE VIOLATION	TRIGGERING EVENT
400029	AIRFIELD LIGHT	5.3	4232.3	3.2	-113.4	N/A	FIXED BY FUNCTION	PRIMARY	NONE
400036	AIRFIELD LIGHT	0.0	4230.5	1.5	1.1	N/A	FIXED BY FUNCTION	PRIMARY	NONE
400037	AIRFIELD LIGHT	0.0	4230.5	1.5	1.1	N/A	FIXED BY FUNCTION	PRIMARY	NONE

1. OBSTRUCTION SURVEY COMPLETED BY WOOLPERT, INC., MAY 2017
2. THERE ARE NO OBSTRUCTIONS TO THE PAPI OBSTACLE CLEARANCE SURFACE.

DESCRIPTION	EXISTING	FUTURE
PART 77 SURFACE	PT77	F–PT77
THRESHOLD SITING SURFACE	TSS	F–TSS
DEPARTURE SURFACE	DEP	F–DEP
PAPI OBSTACLE CLEARANCE SURFACE		
OBSTRUCTION	● 1000	● 1000

ROADWAY AND RAILROAD ELEVATIONS INCLUDE TRAVERSEWAY ADJUSTMENT (23' RAILROADS I 17' HIGHWAYS I 15' PUBLIC ROADS I 10' PRIVATE ROADS).





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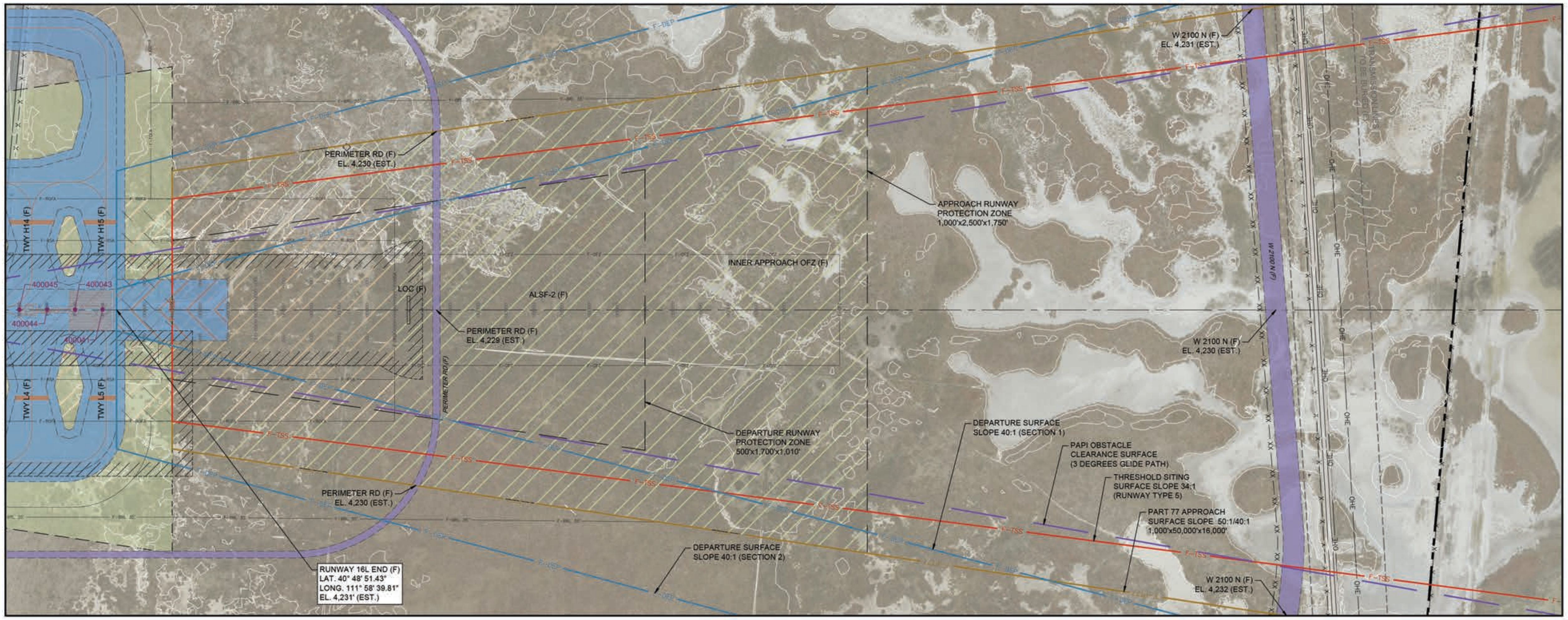
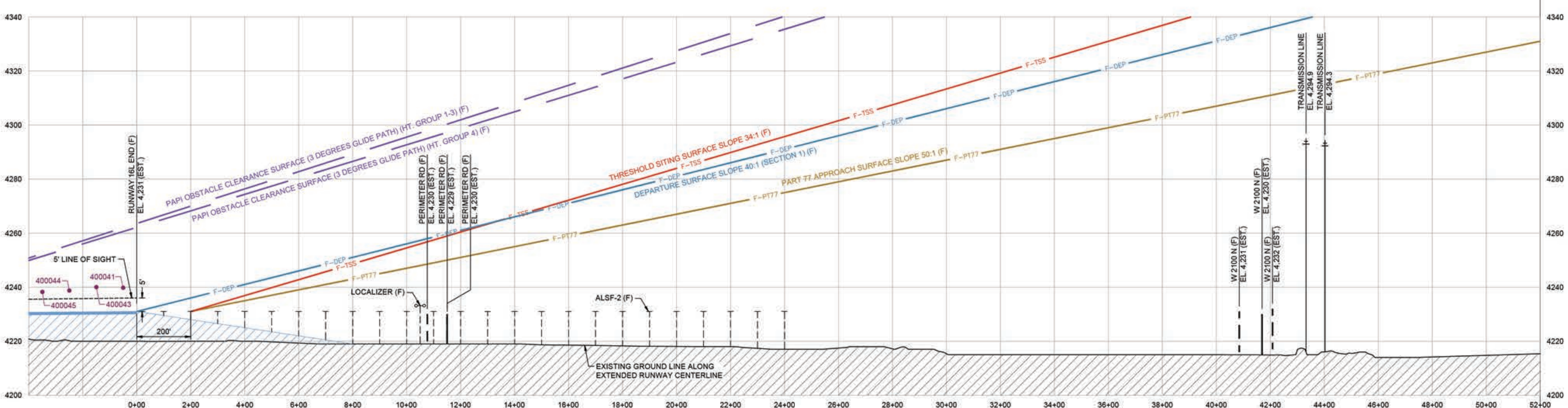
INNER APPROACH PLAN AND PROFILE RUNWAY 16L (EXISTING)

SHEET NUMBER

22 OF 41





FUTURE RUNWAY 16L OBSTRUCTION TABLE									
OBJECT NO.	OBJECT DESCRIPTION	ABOVE GROUND LEVEL (FT.)	OBJECT TOP ELEVATION (FT.)	CLEARANCE (+ PENETRATE) (- CLEAR)			PROPOSED DISPOSITION	PART 77 SURFACE VIOLATION	TRIGGERING EVENT
				PART 77 APPROACH SURFACE (FT.)	DEPARTURE SURFACE (FT.)	THRESHOLD SITING SURFACE (FT.)			
400041	AIRFIELDLIGHT	19.8	4239.8	8.8	N/A	N/A	REMOVE	PRIMARY	RUNWAY EXTENSION
400043	AIRFIELDLIGHT	20.0	4240.0	9.1	N/A	N/A	REMOVE	PRIMARY	RUNWAY EXTENSION
400044	AIRFIELDLIGHT	18.5	4238.7	7.9	N/A	N/A	REMOVE	PRIMARY	RUNWAY EXTENSION
400045	AIRFIELDLIGHT	17.7	4238.2	7.5	N/A	N/A	REMOVE	PRIMARY	RUNWAY EXTENSION

1. OBSTRUCTION SURVEY COMPLETED BY WOOLPERT, INC., MAY 2017
2. THERE ARE NO OBSTRUCTIONS TO THE PAPI OBSTACLE CLEARANCE SURFACE

DESCRIPTION	EXISTING	FUTURE
PART 77 SURFACE	PT77	F-PT77
THRESHOLD SITING SURFACE	TSS	F-TSS
DEPARTURE SURFACE	DEP	F-DEP
PAPI OBSTACLE CLEARANCE SURFACE		
OBSTRUCTION	1000	1000

ROADWAY AND RAILROAD ELEVATIONS INCLUDE TRAVERSEWAY ADJUSTMENT (23' RAILROADS I 17' HIGHWAYS I 15' PUBLIC ROADS I 10' PRIVATE ROADS).

MAGNETIC DECLINATION
11° 14' EAST
OCTOBER, 2020
ANNUAL CHANGE 0° 6' WEST

200' 100' 0 200'
HORIZONTAL SCALE

20' 10' 0 20'
VERTICAL SCALE

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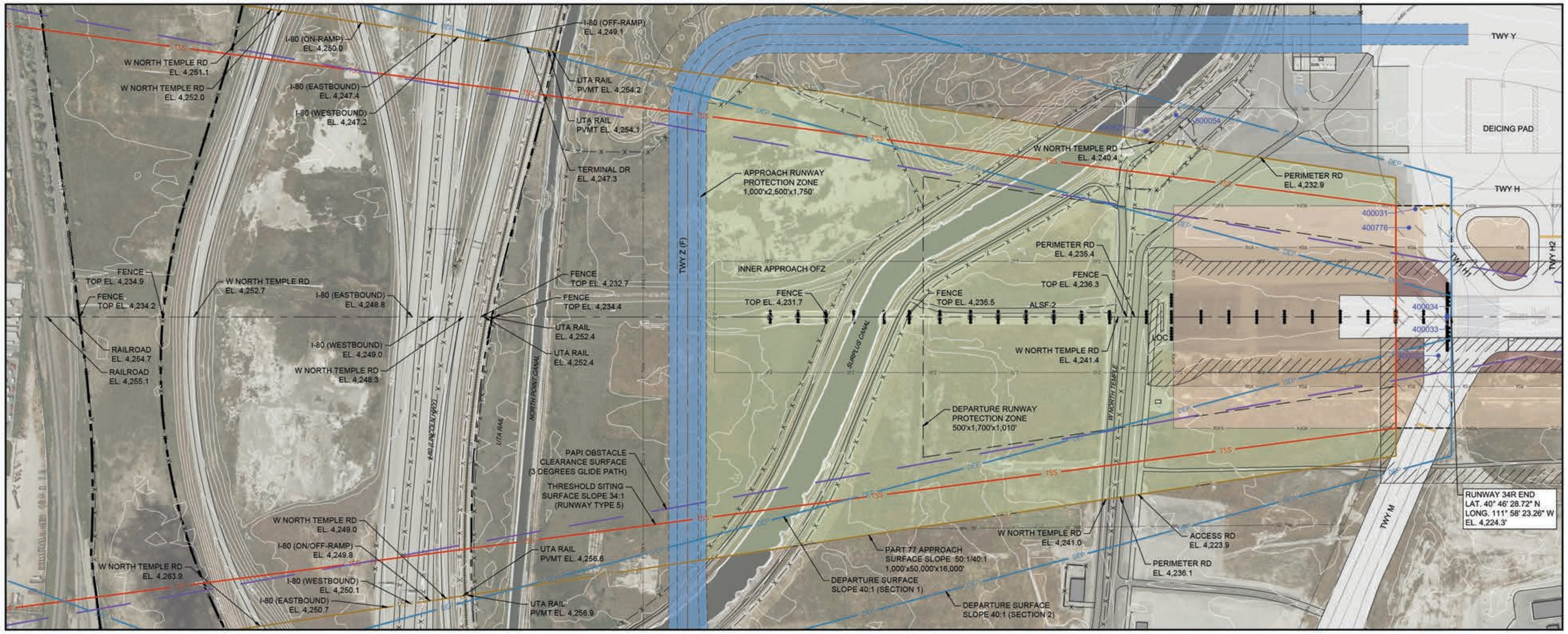
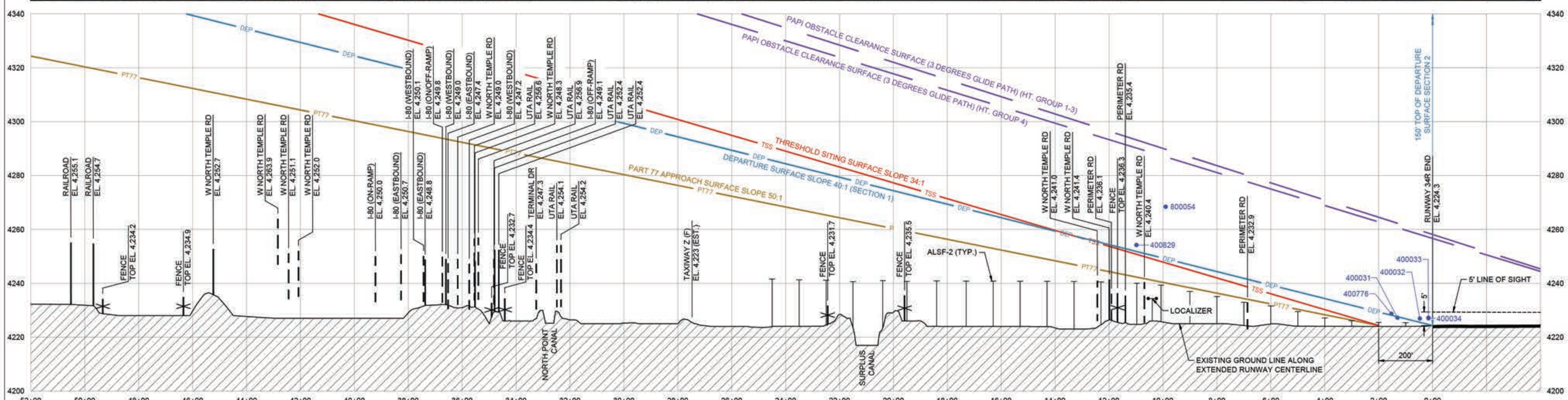
SHEET TITLE

INNER APPROACH PLAN AND PROFILE RUNWAY 16L (FUTURE)

SHEET NUMBER

23 OF 41

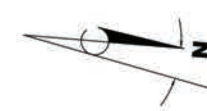




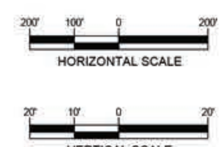
RUNWAY 34R OBSTRUCTION TABLE									
OBJECT NO.	OBJECT DESCRIPTION	ABOVE GROUND LEVEL (FT.)	OBJECT TOP ELEVATION (FT.)	CLEARANCE (+ PENETRATE) (- CLEAR)			PROPOSED DISPOSITION	PART 77 SURFACE VIOLATION	TRIGGERING EVENT
				PART 77 APPROACH SURFACE (FT.)	DEPARTURE SURFACE (FT.)	THRESHOLD SITING SURFACE (FT.)			
400031	AIRFIELD LIGHT	4.2	4227.2	2.8	-98.6	N/A	FIXED BY FUNCTION	PRIMARY	NONE
400032	AIRFIELD LIGHT	4.9	4226.9	2.5	-16.9	N/A	FIXED BY FUNCTION	PRIMARY	NONE
400033	AIRFIELD LIGHT	0.0	4227.2	2.8	2.5	N/A	FIXED BY FUNCTION	PRIMARY	NONE
400034	AIRFIELD LIGHT	0.0	4227.0	2.7	2.3	N/A	FIXED BY FUNCTION	PRIMARY	NONE
400776	AIRPORT SIGN	5.6	4228.7	4.3	-71.8	N/A	FIXED BY FUNCTION	PRIMARY	NONE
400829	TREE	25.2	4254.2	7.4	-102.5	N/A	TRIM	TRANSITIONAL	1-5 YEARS
800054	POLE 49-000195	40.4	4268.4	12.9	-116.7	N/A	NONE	TRANSITIONAL	NONE

1. OBSTRUCTION SURVEY COMPLETED BY WOOLPERT, INC., MAY 2017.
2. THERE ARE NO OBSTRUCTIONS TO THE PAPI OBSTACLE CLEARANCE SURFACE.

ROADWAY AND RAILROAD ELEVATIONS INCLUDE TRAVERSEWAY ADJUSTMENT (23' RAILROADS | 17' HIGHWAYS | 15' PUBLIC ROADS | 10' PRIVATE ROADS)



MAGNETIC DECLINATION 11° 14' EAST OCTOBER, 2020 ANNUAL CHANGE 0° 6' WEST



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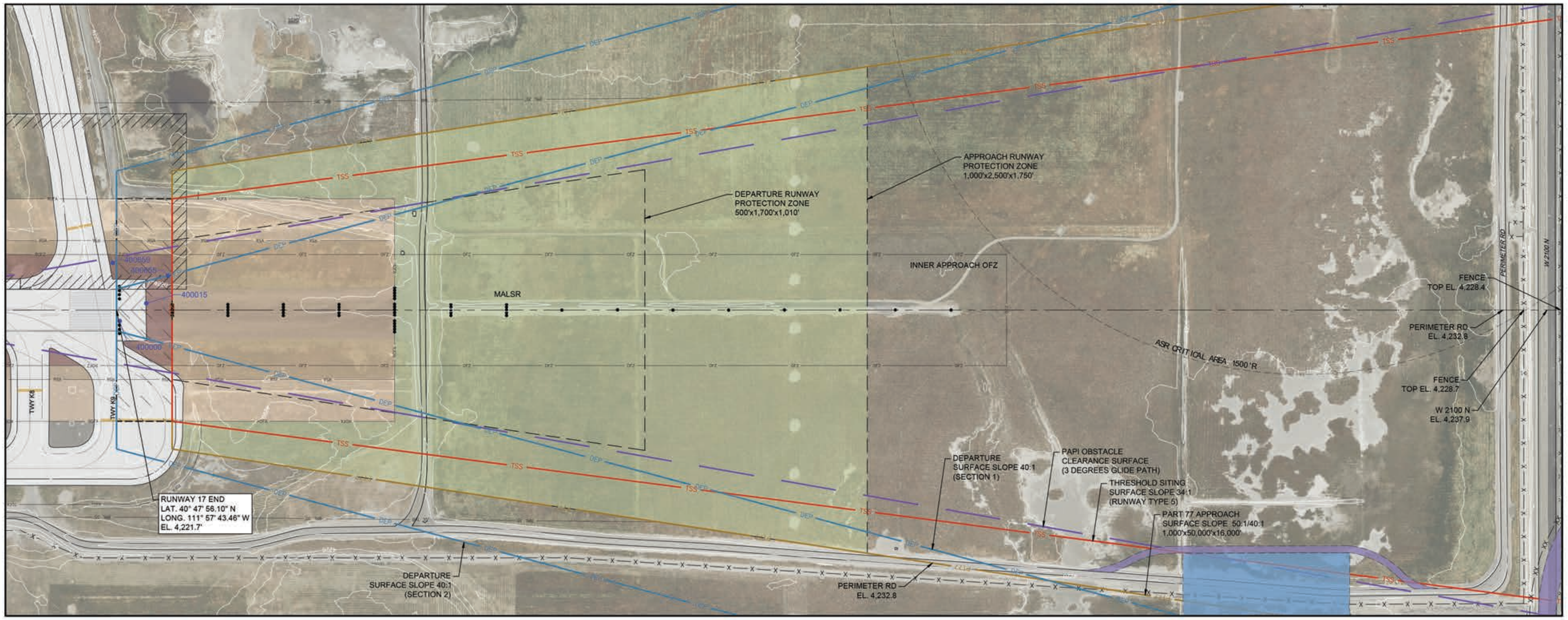
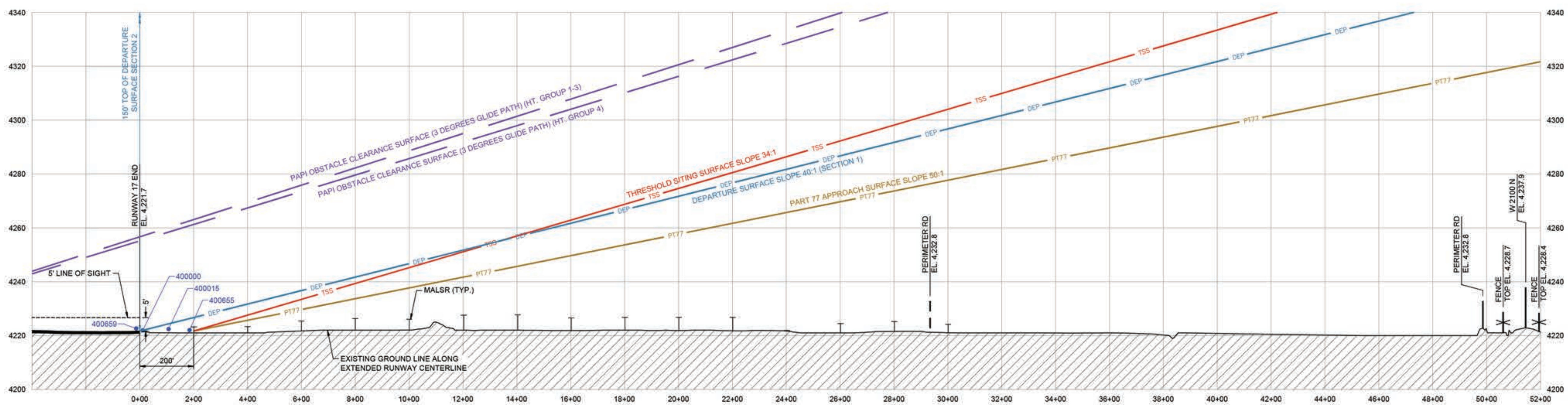
SHEET TITLE

INNER APPROACH PLAN AND PROFILE RUNWAY 34R

SHEET NUMBER
24 OF 41





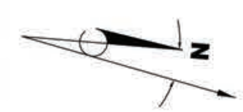
RUNWAY 17 OBSTRUCTION TABLE

OBJECT NO.	OBJECT DESCRIPTION	ABOVE GROUND LEVEL (FT.)	OBJECT TOP ELEVATION (FT.)	CLEARANCE (+ PENETRATE) (- CLEAR)			PROPOSED DISPOSITION	PART 77 SURFACE VIOLATION	TRIGGERING EVENT
				PART 77 APPROACH SURFACE (FT.)	DEPARTURE SURFACE (FT.)	THRESHOLD SITING SURFACE (FT.)			
400000	AIRFIELD LIGHT	0.0	4221.9	0.2	-0.1	N/A	FIXED BY FUNCTION	PRIMARY	NONE
400015	AIRFIELD LIGHT	1.4	4222.4	0.7	-2.0	N/A	FIXED BY FUNCTION	PRIMARY	NONE
400655	BUSH	4.0	4222.0	0.3	-4.3	N/A	REMOVE	PRIMARY	1-5 YEARS
400659	BUSH	4.6	4222.6	0.9	N/A	N/A	REMOVE	PRIMARY	1-5 YEARS

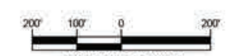
1. OBSTRUCTION SURVEY COMPLETED BY WOOLPERT, INC., MAY 2017.
2. THERE ARE NO OBSTRUCTIONS TO THE PAPI OBSTACLE CLEARANCE SURFACE.

DESCRIPTION	EXISTING	FUTURE
PART 77 SURFACE	PT77	F-PT77
THRESHOLD SITING SURFACE	TSS	F-TSS
DEPARTURE SURFACE	DEP	F-DEP
PAPI OBSTACLE CLEARANCE SURFACE		
OBSTRUCTION	● 1000	● 1000

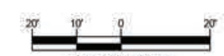
ROADWAY AND RAILROAD ELEVATIONS INCLUDE TRAVERSEWAY ADJUSTMENT (23' RAILROADS I 17' HIGHWAYS I 15' PUBLIC ROADS I 10' PRIVATE ROADS).



MAGNETIC DECLINATION
11° 14' EAST
OCTOBER, 2020
ANNUAL CHANGE 0° 6' WEST



HORIZONTAL SCALE



VERTICAL SCALE

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SALT LAKE CITY INTERNATIONAL AIRPORT
SALT LAKE CITY, UT

AIRPORT LAYOUT PLAN

CONSULTANTS

REVISIONS

NO.	DESCRIPTION	DATE

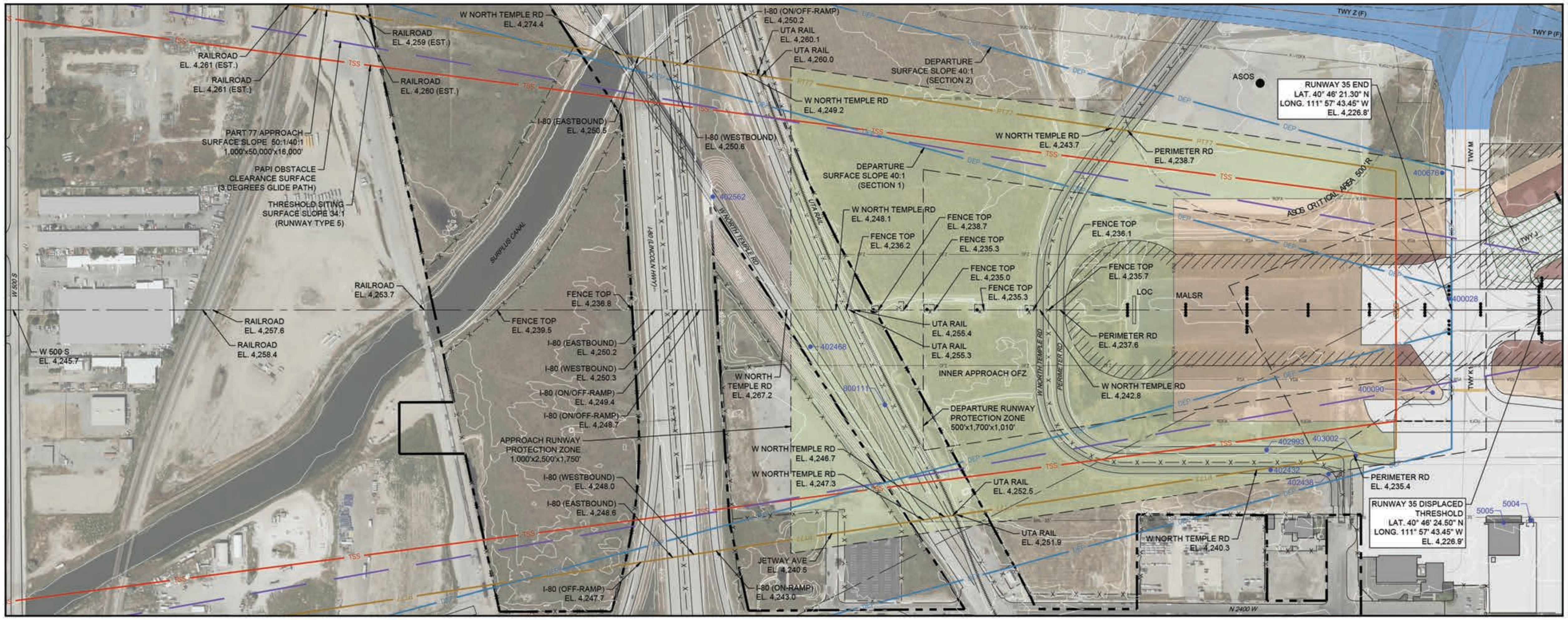
DATE ISSUED: AUGUST 2021
REVIEWED BY: DSC
DRAWN BY: ACS
DESIGNED BY: TJM
AEP PROJECT NUMBER
224-0039-000

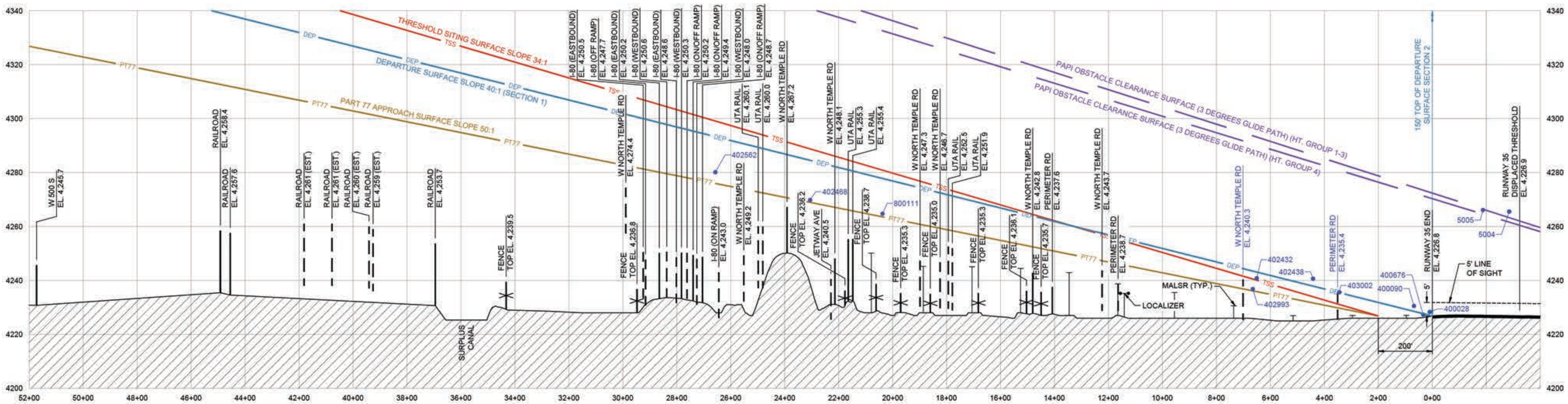
SHEET TITLE

INNER APPROACH PLAN AND PROFILE RUNWAY 17

SHEET NUMBER

25 OF 41



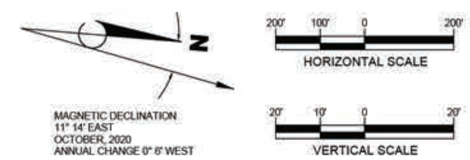


ROADWAY AND RAILROAD ELEVATIONS INCLUDE TRAVERSEWAY ADJUSTMENT (23' RAILROADS | 17' HIGHWAYS | 15' PUBLIC ROADS | 10' PRIVATE ROADS).

RUNWAY 35 OBSTRUCTION TABLE									
OBJECT NO.	OBJECT DESCRIPTION	ABOVE GROUND LEVEL (FT.)	OBJECT TOP ELEVATION (FT.)	CLEARANCE (+ PENETRATE) (- CLEAR)			PROPOSED DISPOSITION	PART 77 SURFACE VIOLATION	TRIGGERING EVENT
				PART 77 APPROACH SURFACE (FT.)	DEPARTURE SURFACE (FT.)	THRESHOLD SITING SURFACE (FT.)			
5004	OL	41.5	4265.5	1.7	N/A	N/A	NONE	TRANSITIONAL	NONE
5005	OL	42.1	4266.1	1.1	N/A	N/A	NONE	TRANSITIONAL	NONE
400028	AIRFIELD LIGHT	0.0	4228.3	1.5	1.3	N/A	FIXED BY FUNCTION	PRIMARY	NONE
400090	AIRPORT SIGN	5.5	4230.5	3.7	-69.8	N/A	FIXED BY FUNCTION	PRIMARY	NONE
400676	GROUND	0.0	4227.3	0.5	-144.7	N/A	REMOVE	PRIMARY	1-5 YEARS
402432	ROAD	15.0	4240.8	3.8	-117.4	N/A	NONE	TRANSITIONAL	NONE
402438	ROAD	15.0	4240.6	1.2	-137.3	N/A	NONE	TRANSITIONAL	NONE
402468	INTERSTATE	17.0	4269.8	0.9	-14.7	-18.9	NONE	APPROACH	NONE

RUNWAY 35 OBSTRUCTION TABLE									
OBJECT NO.	OBJECT DESCRIPTION	ABOVE GROUND LEVEL (FT.)	OBJECT TOP ELEVATION (FT.)	CLEARANCE (+ PENETRATE) (- CLEAR)			PROPOSED DISPOSITION	PART 77 SURFACE VIOLATION	TRIGGERING EVENT
				PART 77 APPROACH SURFACE (FT.)	DEPARTURE SURFACE (FT.)	THRESHOLD SITING SURFACE (FT.)			
402562	INTERSTATE	17.0	4280.1	4.1	-13.2	-19.0	NONE	APPROACH	NONE
402993	ROAD	10.0	4236.8	0.7	-94.9	N/A	NONE	APPROACH	NONE
403002	ROAD	10.0	4235.6	5.5	-125.9	N/A	NONE	TRANSITIONAL	NONE
800111	SIGN,49-020387	33.7	4264.7	1.2	-13.0	-16.1	NONE	APPROACH	NONE

1. OBSTRUCTION SURVEY COMPLETED BY WOOLPERT, INC., MAY 2017.
2. THERE ARE NO OBSTRUCTIONS TO THE PAPI OBSTACLE CLEARANCE SURFACE.
3. ELEVATIONS IN TABLE REFLECT THE RECOMMENDED AIRSPACE CLEARANCES 23' RAILROADS | 17' HIGHWAYS | 15' PUBLIC ROADS | 10' PRIVATE ROADS.



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SALT LAKE CITY, UT

AIRPORT LAYOUT PLAN

CONSULTANTS

REVISIONS

NO.	DESCRIPTION	DATE

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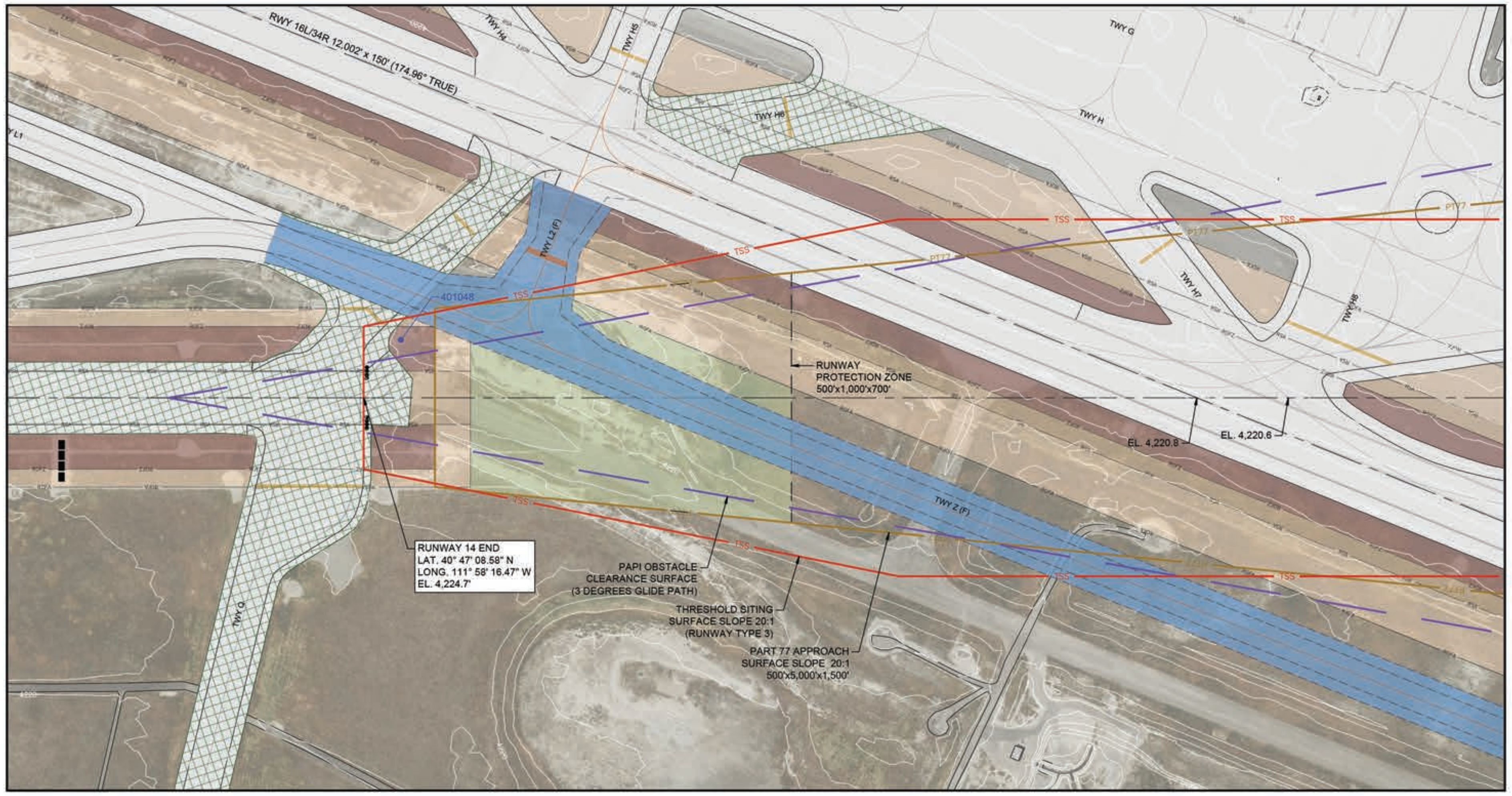
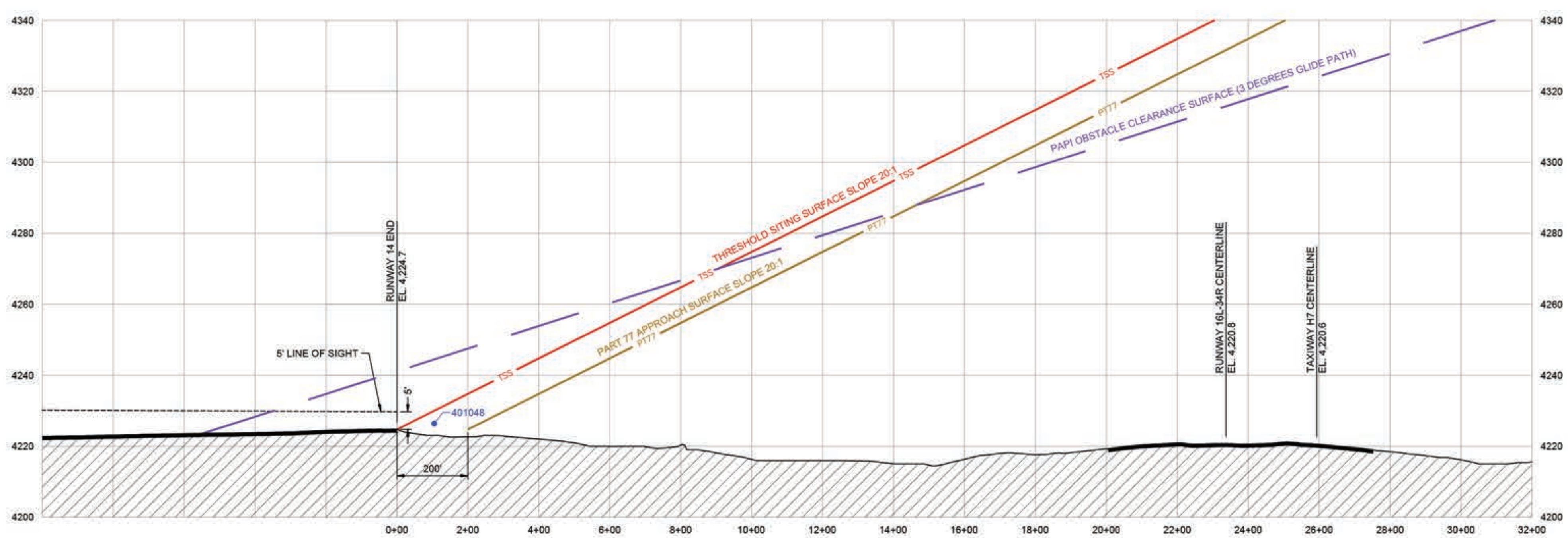
DRAWN BY: ACS
DESIGNED BY: TJM
AEP PROJECT NUMBER
224-0039-000

SHEET TITLE

INNER APPROACH PLAN AND PROFILE RUNWAY 35

SHEET NUMBER
26 OF 41



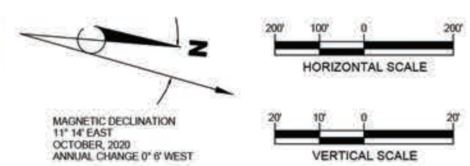


RUNWAY 14 OBSTRUCTION TABLE								
OBJECT NO.	OBJECT DESCRIPTION	ABOVE GROUND LEVEL (FT.)	OBJECT TOP ELEVATION (FT.)	CLEARANCE (+ PENETRATE) (- CLEAR)		PROPOSED DISPOSITION	PART 77 SURFACE VIOLATION	TRIGGERING EVENT
				PART 77 APPROACH SURFACE (FT.)	THRESHOLD SITING SURFACE (FT.)			
401048	AIRPORT SIGN	4.4	4226.4	1.7	-3.6	REMOVE	PRIMARY	RUNWAY REMOVAL

1. OBSTRUCTION SURVEY COMPLETED BY WOOLPERT, INC., MAY 2017.
2. THERE ARE NO OBSTRUCTIONS TO THE PAPI OBSTACLE CLEARANCE SURFACE.

DESCRIPTION	EXISTING	FUTURE
PART 77 SURFACE	PT77	F-PT77
THRESHOLD SITING SURFACE	TSS	F-TSS
DEPARTURE SURFACE	DEP	F-DEP
PAPI OBSTACLE CLEARANCE SURFACE		
OBSTRUCTION	● 1000	● 1000

ROADWAY AND RAILROAD ELEVATIONS INCLUDE TRAVERSEWAY ADJUSTMENT (23' RAILROADS | 17' HIGHWAYS | 15' PUBLIC ROADS | 10' PRIVATE ROADS)



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DATE ISSUED: AUGUST 2021
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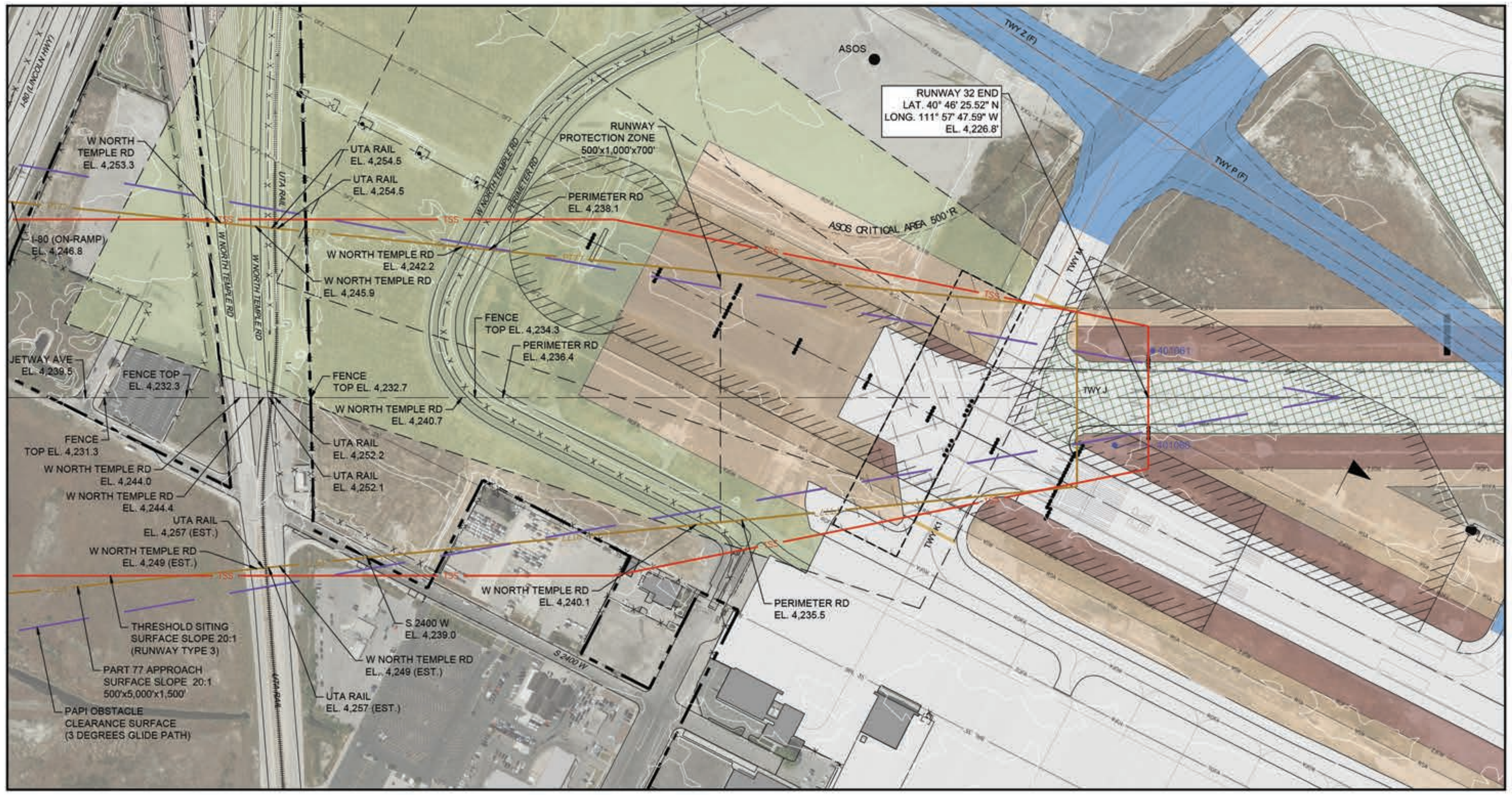
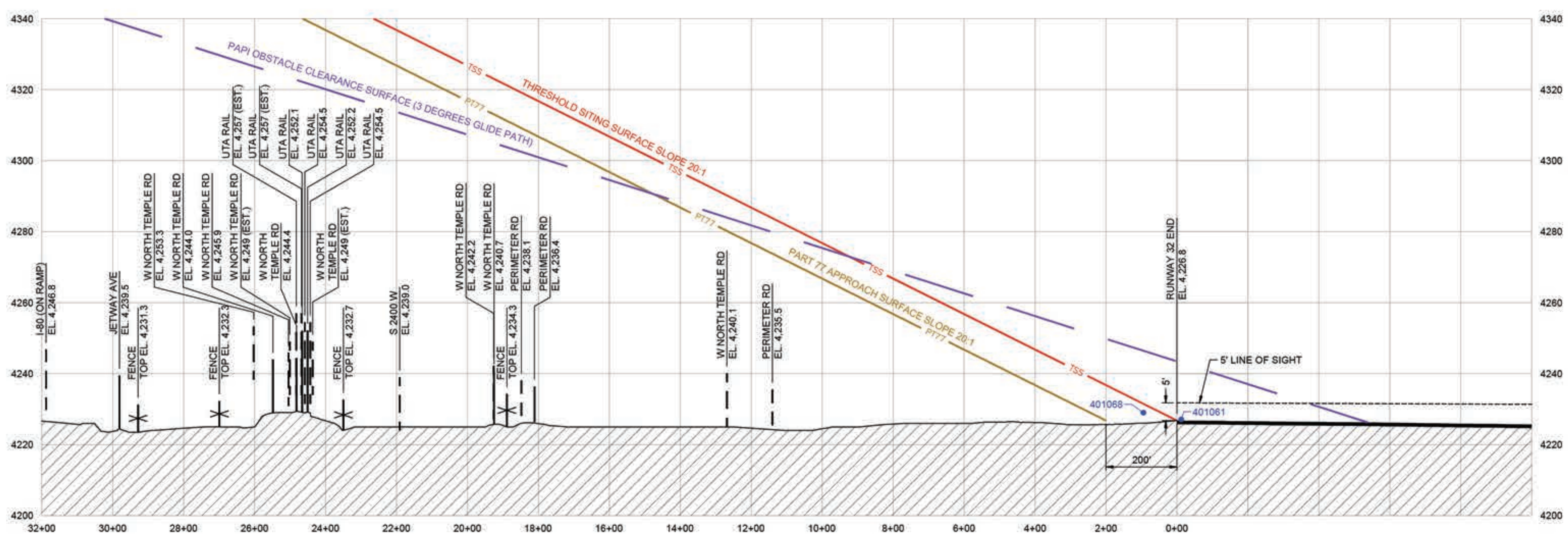
AEP PROJECT NUMBER
224-0039-000

SHEET TITLE

INNER APPROACH PLAN AND PROFILE RUNWAY 14

SHEET NUMBER
27 OF 41





RUNWAY 32 OBSTRUCTION TABLE								
OBJECT NO.	OBJECT DESCRIPTION	ABOVE GROUND LEVEL (FT.)	OBJECT TOP ELEVATION (FT.)	CLEARANCE (+ PENETRATE) (- CLEAR) PART 77 APPROACH SURFACE (FT.)	CLEARANCE (+ PENETRATE) (- CLEAR) THRESHOLD SITING SURFACE (FT.)	PROPOSED DISPOSITION	PART 77 SURFACE VIOLATION	TRIGGERING EVENT
401061	GROUND	0.0	4227.1	0.4	N/A	REGRADE	PRIMARY	RUNWAY REMOVAL
401068	AIRPORT SIGN	4.0	4229.0	2.2	-2.5	REMOVE	PRIMARY	RUNWAY REMOVAL

1. OBSTRUCTION SURVEY COMPLETED BY WOOLPERT, INC., MAY 2017.
2. THERE ARE NO OBSTRUCTIONS TO THE PAPI OBSTACLE CLEARANCE SURFACE.

DESCRIPTION	EXISTING	FUTURE
PART 77 SURFACE	PT77	F-PT77
THRESHOLD SITING SURFACE	TSS	F-TSS
DEPARTURE SURFACE	DEP	F-DEP
PAPI OBSTACLE CLEARANCE SURFACE		
OBSTRUCTION	1000	1000

ROADWAY AND RAILROAD ELEVATIONS INCLUDE TRAVERSEWAY ADJUSTMENT (23' RAILROADS I 17' HIGHWAYS I 15' PUBLIC ROADS I 10' PRIVATE ROADS).

MAGNETIC DECLINATION
11° 14' EAST
OCTOBER, 2020
ANNUAL CHANGE 0° 6' WEST

200' 100' 0 200'
HORIZONTAL SCALE

20' 10' 0 20'
VERTICAL SCALE

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CONSULTANTS

REVISIONS

NO.	DESCRIPTION	DATE

DATE ISSUED: AUGUST 2021
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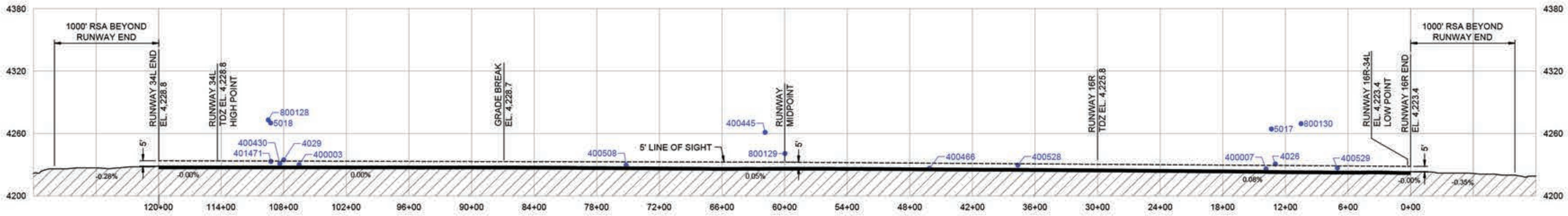
DRAWN BY: ACS
DESIGNED BY: TJM

AEP PROJECT NUMBER
224-0039-000

SHEET TITLE

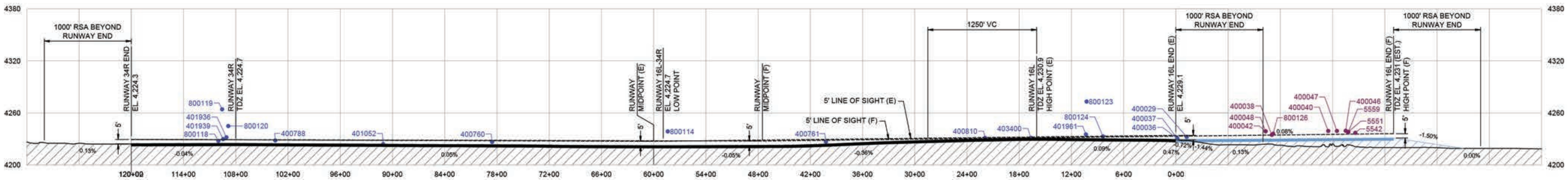
INNER APPROACH PLAN AND PROFILE RUNWAY 32

SHEET NUMBER
28 OF 41



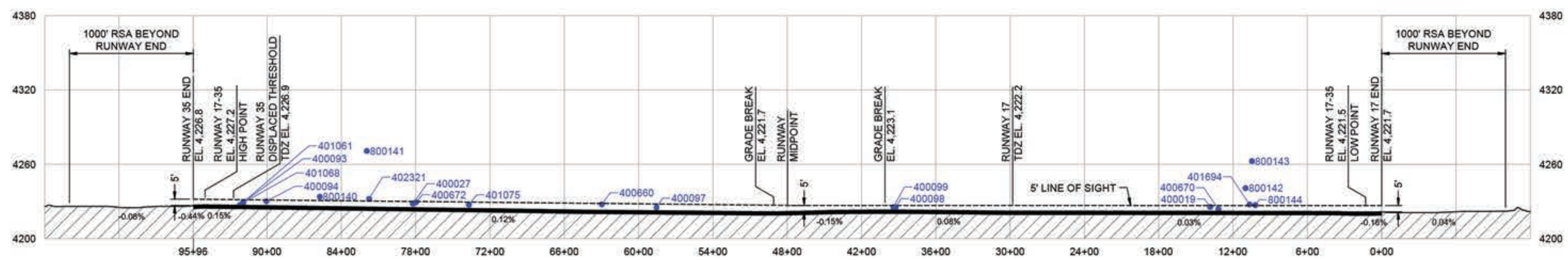
RUNWAY 16R-34L CENTERLINE PROFILE

SEE SHEET 14 FOR PART 77 OBSTRUCTION TABLE.



RUNWAY 16L-34R CENTERLINE PROFILE

SEE SHEET 14 FOR PART 77 OBSTRUCTION TABLE.

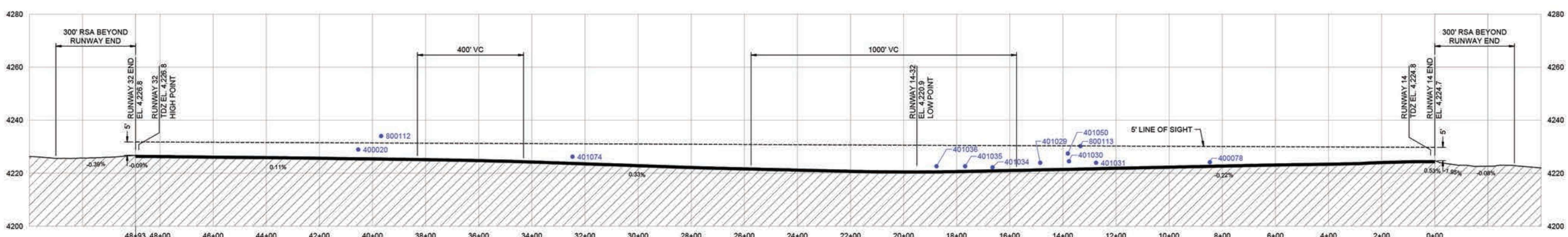


RUNWAY 17-35 CENTERLINE PROFILE

SEE SHEET 14 FOR PART 77 OBSTRUCTION TABLE.

HORIZONTAL SCALE

VERTICAL SCALE



RUNWAY 14-32 CENTERLINE PROFILE

SEE SHEET 14 FOR PART 77 OBSTRUCTION TABLE.

NOTE: RUNWAY AND RUNWAY SAFETY AREA GRADIENTS AND VERTICAL CURVES HAVE BEEN ESTIMATED AND SHOULD BE USED FOR PLANNING PURPOSES ONLY.

DESCRIPTION	EXISTING	FUTURE
OBSTRUCTION	● 1000	● 1000

HORIZONTAL SCALE

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SHEET TITLE

RUNWAY PROFILES

SHEET NUMBER

29 OF 41

DESCRIPTION	EXISTING	FUTURE
AIRPORT ACCESS ROADWAYS		
TRAX RAIL LINE		N/A
AIRPORT SERVICE ROAD		
AIRPORT VEHICLE ACCESS GATES		N/A
WFRC 2019-2050 REGIONAL PLAN PROJECT	N/A	
PROPERTY LINE		

DESCRIPTION	EXISTING	FUTURE
ROADWAYS		
ROADWAY/PARKING TO BE REMOVED	N/A	
AIRFIELD PAVEMENT		
AIRFIELD PAVEMENT TO BE REMOVED	N/A	
BUILDINGS		
BUILDINGS TO BE REMOVED	N/A	

NOTES:
1. INTERSTATE 80 AND 215 IMPROVEMENTS FROM WASATCH FRONT REGIONAL COUNCIL (WFRC) 2019-2050 REGIONAL TRANSPORTATION PLAN.
2. ULTIMATE TRAX BLACK LINE WOULD CONNECT SALT LAKE CITY INTERNATIONAL AIRPORT AND UNIVERSITY OF UTAH USING EXISTING RAIL INFRASTRUCTURE.

N

MAGNETIC DECLINATION
11° 14' EAST
OCTOBER, 2020
ANNUAL CHANGE 0° 6' WEST

1000' 500' 0 1000'

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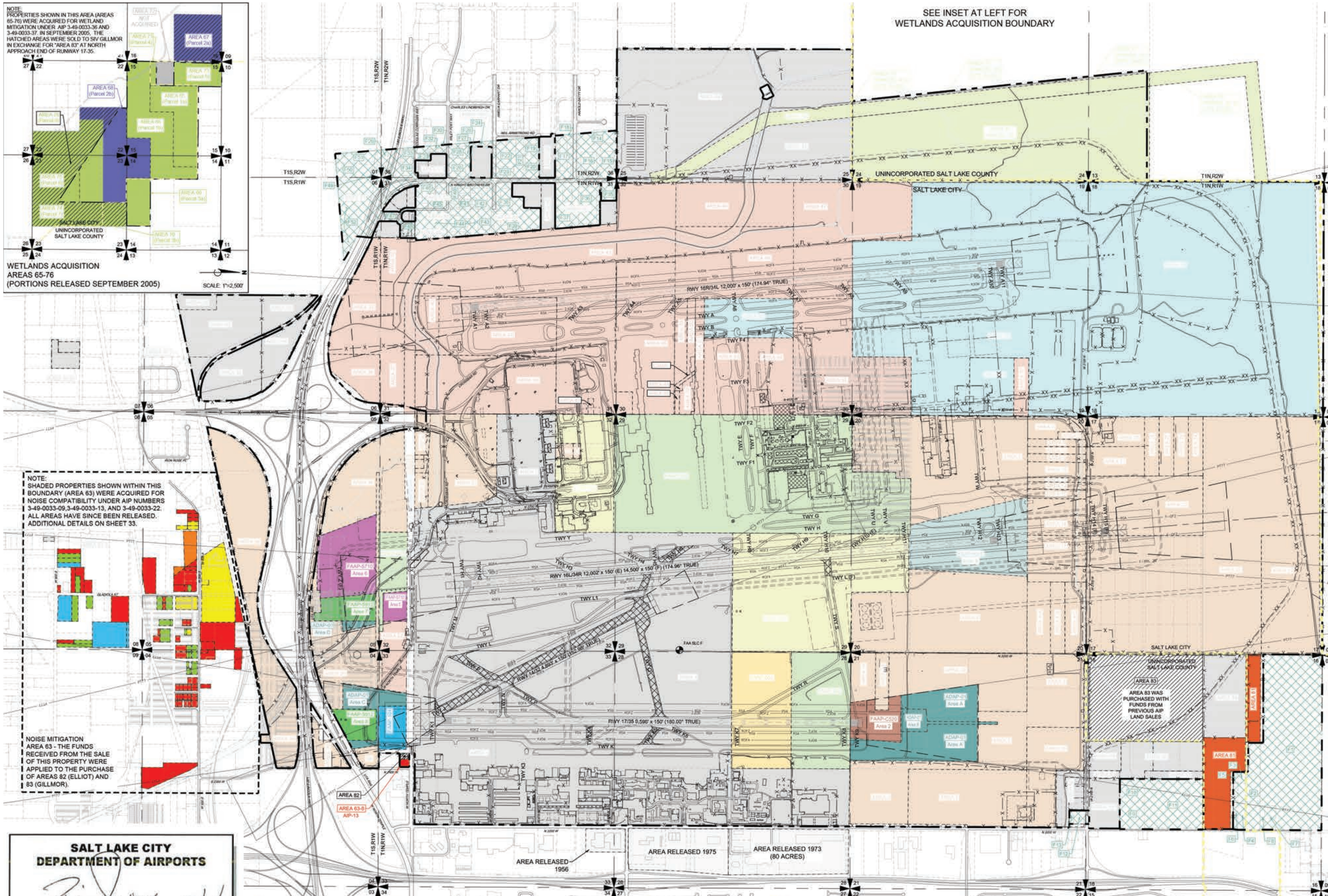
AEP PROJECT NUMBER
224-0039-000

SHEET TITLE

AIRPORT ACCESS PLAN

SHEET NUMBER

30 OF 41



SALT LAKE CITY DEPARTMENT OF AIRPORTS

APPROVED: BILL WYATT, EXECUTIVE DIRECTOR — 8/4/21 — DATE

PREPARER RS&H

APPROVED: STEVEN DOMINO, AAE — 8/6/21 — DATE

DESCRIPTION	EXISTING	FUTURE
PROPERTY LINE	— - - —	- — -
MUNICIPALITY BOUNDARY	- - - - -	N/A
SECTION LINE	— - - —	N/A
SECTION CORNER	✛	N/A
PARCEL LINE	- - - - - -	N/A

AGREEMENT	LEGEND COLOR
NOT ACQUIRED WITH FEDERAL FUNDS	
FAAP 9-42-018-002	
FAAP 9-42-018-104	
FAAP 9-42-018-205	
FAAP 9-42-018-306	
FAAP 9-42-018-5710	

AGREEMENT	LEGEND COLOR
FAAP 9-42-018-5912	
FAAP 9-42-018-6016	
FAAP 9-42-018-C520	
FAAP 9-42-018-C622	
ADAP 8-49-0033-01	
ADAP 8-49-0033-03	
ADAP 8-49-0033-04	

AGREEMENT	LEGEND COLOR
ADAP 8-49-0033-05	
AIP 3-49-0033-09	
AIP 3-49-0033-13	
AIP 3-49-0033-09/13	
AIP 3-49-0033-13/22	
AIP 3-49-0033-22	
AIP 3-49-0033-36	

AGREEMENT	LEGEND COLOR
AIP 3-49-0033-37	
AIP 3-49-0033-81	
SALES PROCEEDS FROM AIP-09, 13 & 22 APPLIED TO THE PURCHASE OF AREAS 82& 83	
POTENTIAL PROPERTY ACQUISITIONS	

NOTES:
1. THIS DRAWING IS A PLANNING DEPICTION OF AIRPORT PROPERTY.
2. AIRPORT PROPERTY LOCATED IN TOWNSHIP 1 NORTH (T1N), TOWNSHIP 1 SOUTH (T1S), RANGE 1 WEST (R1W) AND RANGE 2 WEST (R2W) IN SALT LAKE COUNTY.

SOURCE: PREVIOUS ALP, DATED AUGUST, 2006; SALT LAKE CITY INTERNATIONAL AIRPORT

MAGNETIC DECLINATION
11° 14' EAST
OCTOBER, 2020
ANNUAL CHANGE 0° 6' WEST

1,000' 500' 0 1,000'

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AEP PROJECT NUMBER
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SHEET TITLE

EXHIBIT 'A' AIRPORT PROPERTY INVENTORY MAP

SHEET NUMBER
31 OF 41

AIRPORT PROPERTY

AREA	PARCEL NO.	PURCHASED FROM	DATE	BOOK/PAGE	INTEREST	ACRES	AGREEMENT	LEGEND COLOR	GRANT DESCRIPTION (IF DIFFERENT FROM AREA NUMBER)	PURPOSE	SOLD TO	BOOK/PAGE	DATE
	08-21-201-010	ORA BALEY	07/10/00	B-8409/P-0530	WARRANTY DEED	0.81	PFC-4 (NO AIP FUNDS)						
	08-21-201-011,012	GERALD GUFFEY	01/7/02	B-8514/P-8457	WARRANTY DEED	1.51	PFC-4 (NO AIP FUNDS)						
	08-21-201-013	PAUL HOREHLED	03/10/97	B-7615/P-0075	WARRANTY DEED	0.173	NO FEDERAL FUNDING						
	08-21-201-014	JERRY STUART	10/16/96	B-7511/P-0329	WARRANTY DEED	0.09	NO FEDERAL FUNDING						
81	08-16-100-001	VYRNA CAMPBELL	09/20/03	B-8886/P-0850	WARRANTY DEED	14.89	AIP 3-49-0033-81, PFC-10			APPROACH PROTECTION			
81	08-16-200-004	WANDA NEWMAN	06/21/04	B-7582/P-0158	WARRANTY DEED	37.44	AIP 3-49-0033-81, PFC-10						
82	08-33-300-006	DAVID AND SANDRA ELLIOTT	04/29/05	B-9125/P-4243	WARRANTY DEED	0.65	REINVESTED AIP FUNDS, PFC-10			APPROACH PROTECTION			
83	08-16-300-001	SW GILLMOR	09/08/05	B-9185/P-3426	WARRANTY DEED	116.54	REINVESTED AIP FUNDS, PFC-5			APPROACH PROTECTION			
84	08-31-154-006	SALT LAKE CITY CORP.	11/01/07	B-9550-1	WARRANTY DEED	6.74	NO FEDERAL FUNDING			AERONAUTICAL			
84	07-25-200-008	SKYPARK/MNT. ENTERPRISES	01/02/08	B-9555/P-1322	WARRANTY DEED	204.99	NO FEDERAL FUNDING			AERONAUTICAL			
84	07-25-200-009	SKYPARK/MNT. ENTERPRISES	01/02/08	B-9555/P-1324	QT. CLAIM DEED	45.32	NO FEDERAL FUNDING			AERONAUTICAL			
84	07-25-200-010	SKYPARK/MNT. ENTERPRISES	01/02/08	B-9555/P-1324	WARRANTY DEED	102.16	NO FEDERAL FUNDING			AERONAUTICAL			
85	08-31-154-004	MOCA INVESTMENTS	06/26/08	B-9621/P-4290	WARRANTY DEED	8.51	NO FEDERAL FUNDING			AERONAUTICAL			
86	08-31-353-012	INTERNATION BUS. PARK	07/01/08	B-9623/P-2809	WARRANTY DEED	4.66	NO FEDERAL FUNDING			AERONAUTICAL			
87	08-31-353-010	KENNY and HYE YU	07/03/08	B-9624/P-1359	WARRANTY DEED	3.83	NO FEDERAL FUNDING			AERONAUTICAL			
87	08-31-353-009	KENNY and HYE YU	07/03/08	B-9624/P-1359	WARRANTY DEED		NO FEDERAL FUNDING			AERONAUTICAL			
88	07-36-276-012	STS PROPERTIES, LLC	07/22/08	B-9628/P-6512	WARRANTY DEED	7.73	NO FEDERAL FUNDING			AERONAUTICAL			
88	07-36-251-007	STS PROPERTIES, LLC	07/22/08	B-9628/P-6512	WARRANTY DEED		NO FEDERAL FUNDING			AERONAUTICAL			
89	08-31-353-013	SLIC INVESTORS II, Lot D	07/03/08	B-9624/P-1363	WARRANTY DEED	1.6	NO FEDERAL FUNDING			AERONAUTICAL			
90	08-31-101-009	PROLOGIS TRUST	07/03/08	B-9624/P-1330	WARRANTY DEED	4.19	NO FEDERAL FUNDING			AERONAUTICAL			
91	07-36-476-006	TIM DRAPER PROPERTIES, LLC	01/20/09	B-9676/P-268	WARRANTY DEED	4.85	NO FEDERAL FUNDING			AERONAUTICAL			
	07-36-476-009					0.3							
	07-36-476-012					0.39							
	07-36-476-024					1.96							
92	08-31-353-008	BBAD INVESTMENTS, LLC	10/05/09	B-9768/P-6110	WARRANTY DEED	2.18	NO FEDERAL FUNDING			AERONAUTICAL			
93	15-06-200-003	U.D.O.T.	12/17/79	B-5009/P-788-789	QUIT CLAIM DEED	15.3	NO FEDERAL FUNDING						
94	15-06-200-006	U.D.O.T.	12/19/79	B-5009/P-784-785	QUIT CLAIM DEED	20.29	NO FEDERAL FUNDING						
95	15-06-400-007	O.I.P. COMPANY	09/26/14	B-10262/P-9647-9647	QUIT CLAIM DEED	42.73	NO FEDERAL FUNDING						
96	15-06-400-008	JMK DEVELOPMENT, LLC	09/26/14	B-10262/P-9645-9649	QUIT CLAIM DEED	26.8	NO FEDERAL FUNDING						
97	15-06-400-009	R.C.R MANAGEMENT, L.C.	09/26/14	B-10262/P-9649-9645	QUIT CLAIM DEED	4.5	NO FEDERAL FUNDING						
98	15-06-400-014	JMK DEVELOPMENT, LLC	09/26/14	B-10262/P-9649-9643	QUIT CLAIM DEED	6.96	NO FEDERAL FUNDING						
99	08-16-100-002	NUPETCO	03/27/17	B-10541/P-4665-4666	SPECIAL WARRANTY DEED	42.58	NO FEDERAL FUNDING						
100	07-36-427-005	WELLS FARGO BANK	06/30/17	B-10573/P-2950-2952	SPECIAL WARRANTY DEED	7.87	NO FEDERAL FUNDING						
101	08-16-400-016	BANKS GROUP, L.C	09/16/19	B-10830/P-9225-9226	SPECIAL WARRANTY DEED	18.01	NO FEDERAL FUNDING						

RELEASED PROPERTY

** IN ORDER TO GROUP ALL PROPERTY ACQUISITIONS IN AIP-36 TOGETHER, AREAS 67 & 68 (AIP-37) ARE SHOWN OUT OF SEQUENCE.
*** ONLY SMALL PORTIONS OF PARCEL NUMBERS 08-21-201-013 and 08-21-201-14 WERE PURCHASED TO WIDEN 2200 WEST STREET.

1. PARCELS PURCHASED IN AREA 63 WERE ACQUIRED FOR NOISE MITIGATION UNDER AIP NUMBERS 3-49-0033-09, 3-49-0033-13, and 3-49-0033-22.
2. AREA 64-A NOT SHOWN, FALLS OUTSIDE VIEW LIMITS.
3. AREAS 65-76 WERE PURCHASED FOR WETLAND MITIGATION UNDER AIP NUMBERS 3-49-0033-36 and 3-49-0033-37.
4. SEE ALP SHEET 31 FOR SLCIA PROPERTY MAP.
5. PROPERTY WITHIN ALL EIGHT RUNWAY PROTECTION ZONES AT SLCIA IS OWNED BY THE AIRPORT AND WAS ACQUIRED BY FEE SIMPLE.

PLANEVIEW - 5 PARCELS DIVIDED INTO 2 LOTS

			DATE SOLD	BOOK/PAGE
15-08-230-001	LOT 1	ROBINSON FANS	04/19/96	B-7380/P-794
15-08-230-007	LOT 2	BRIAN GETZELMAN	10/06/95	B-7286/P-2206
15-08-230-008	LOT 3			
15-08-230-012	LOT 4			
15-08-230-014	LOT 5	This parcel was 15-08-230-011 & 15-08-230-013		

FUTURE AIRPORT PROPERTY

AREA	PARCEL NO.	PURPOSE OF ACQUISITION	ACRES	TYPE OF INTEREST TO BE ACQUIRED	LEGEND COLOR
F-1	08-16-100-003	APPROACH PROTECTION	117	FEE	
F-2	08-16-200-001	APPROACH PROTECTION	15	FEE	
F-3	08-16-200-019	APPROACH PROTECTION	1	FEE	
F-4	08-16-200-020	APPROACH PROTECTION	3.88	FEE	
F-5	08-16-200-030	APPROACH PROTECTION	0.91	FEE	
F-6	08-16-200-031	APPROACH PROTECTION	3.97	FEE	
F-7	08-16-201-002	APPROACH PROTECTION	3.03	FEE	
F-8	08-16-201-003	APPROACH PROTECTION	1.32	FEE	
F-9	08-16-400-009	AERONAUTICAL	6	FEE	
F-10	08-16-400-014	APPROACH PROTECTION	6.87	FEE	
F-11	08-16-400-017	APPROACH PROTECTION	33.66	FEE	
F-12	08-21-201-015	AERONAUTICAL	1.73	FEE	
F-13	08-21-201-014	AERONAUTICAL	0.82	FEE	
F-14	07-36-226-001	AERONAUTICAL	±5.4	FEE	
F-15	07-36-226-004	AERONAUTICAL	5.69	FEE	
F-16	07-36-226-005	AERONAUTICAL	8.8	FEE	
F-17	07-36-229-002	AERONAUTICAL	6.05	FEE	
F-18	07-36-229-004	AERONAUTICAL	±0.2	FEE	
F-19	07-36-276-009	AERONAUTICAL	±3.2	FEE	
F-20	07-36-276-010	AERONAUTICAL	4.17	FEE	
F-21	07-36-276-014	AERONAUTICAL	±3.7	FEE	
F-22	07-36-276-015	AERONAUTICAL	±6.2	FEE	
F-23	07-36-276-016	AERONAUTICAL	2.21	FEE	
F-24	07-36-427-001	AERONAUTICAL	±1.7	FEE	
F-25	07-36-427-003	AERONAUTICAL	2.37	FEE	
F-26	07-36-427-004	AERONAUTICAL	3.75	FEE	

SOURCE: SALT LAKE COUNTY OPEN DATA, 2021

FUTURE AIRPORT PROPERTY

AREA	PARCEL NO.	PURPOSE OF ACQUISITION	ACRES	TYPE OF INTEREST TO BE ACQUIRED	LEGEND COLOR
F-27	07-36-427-007	AERONAUTICAL	0.72	FEE	
F-28	07-36-427-008	AERONAUTICAL	1.13	FEE	
F-29	07-36-452-001	AERONAUTICAL	±1.7	FEE	
F-30	07-36-476-003	AERONAUTICAL	±0.1	FEE	
F-31	07-36-476-007	AERONAUTICAL	1.21	FEE	
F-32	07-36-476-016	AERONAUTICAL	±2.4	FEE	
F-33	07-36-477-006	AERONAUTICAL	±1.5	FEE	
F-34	07-36-477-007	AERONAUTICAL	3.78	FEE	
F-35	08-31-101-003	AERONAUTICAL	2.76	FEE	
F-36	08-31-101-010	AERONAUTICAL	14.23	FEE	
F-37	08-31-101-011	AERONAUTICAL	7.19	FEE	
F-38	08-31-154-003	AERONAUTICAL	5.12	FEE	
F-39	08-31-154-005	AERONAUTICAL	14.26	FEE	
F-40	08-31-303-012	AERONAUTICAL	4.5	FEE	
F-41	08-31-303-013	AERONAUTICAL	1.62	FEE	
F-42	08-31-303-016	AERONAUTICAL	8.18	FEE	
F-43	08-31-303-017	AERONAUTICAL	4.12	FEE	
F-44	08-31-303-019	AERONAUTICAL	19.63	FEE	
F-45	08-31-352-004	AERONAUTICAL	4.01	FEE	
F-46	08-31-352-005	AERONAUTICAL	4.43	FEE	
F-47	08-31-353-011	AERONAUTICAL	2.01	FEE	
F-48	08-31-353-014	AERONAUTICAL	2.81	FEE	
F-49	14-01-200-004	AERONAUTICAL	3.08	FEE	
F-50	14-01-200-005	AERONAUTICAL	±5.5	FEE	
F-51	14-01-201-007	AERONAUTICAL	±5.2	FEE	
F-52	15-06-100-003	AERONAUTICAL	±21.3	FEE	

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SLC INTERNATIONAL

SALT LAKE CITY INTERNATIONAL AIRPORT
SALT LAKE CITY, UT

AIRPORT LAYOUT PLAN

CONSULTANTS

REVISIONS

NO.	DESCRIPTION	DATE

DATE ISSUED: AUGUST 2021
REVIEWED BY: MLB
DRAWN BY: SD
DESIGNED BY: SD
AEP PROJECT NUMBER
224-0039-000

SHEET TITLE
EXHIBIT 'A' AIRPORT PROPERTY INVENTORY MAP

SHEET NUMBER
32 OF 41

KEY MAP

AREA 63 PARCEL TABLE												
MAP NO.	PARCEL NO.	2009 PARCEL NO.	PURCHASED FROM	DATE	BOOK(B)/PAGE(P)	INTEREST	ACRES	FEDERAL AGREEMENT	LEGEND COLOR	SOLD TO	BOOK(B)/PAGE(P)	DATE
1	15-05-377-006	15-5-377-012	ANDREW & HELEN KATSOS	12/2/1986	B-5852/P-2596		0.5	AIP 3-49-0033-09		THOMAS GRAY	B-7039/P-1678	6/22/1994
2	15-05-377-007	SAME	JAMES & DIXIE KATSOS	12/2/1986	B-5852/P-2591	WARRANTY DEED	0.5	AIP 3-49-0033-09		ALDER CONSTRUCTION	B-6920/P-0526	4/15/1994
3	15-05-377-008	SAME	JAMES & DIXIE KATSOS	12/2/1986	B-5852/P-2591	WARRANTY DEED	0.5	AIP 3-49-0033-09		ALDER CONSTRUCTION	B-6920/P-0526	4/15/1994
4	15-05-402-002	SAME	GEORGE & JOEY KATSOS	12/2/1986	B-5852/P-2597	WARRANTY DEED	0.36	AIP 3-49-0033-09		LON STALSBERG - Norita Ass'n	B-7439/P-2001	7/9/1996
5	15-05-402-004	15-5-402-(001?)	GEORGE KATSOS	12/2/1986	B-5852/P-2593	WARRANTY DEED	25.6	AIP 3-49-0033-09		LON STALSBERG - Norita Ass'n	B-7439/P-2001	7/9/1996
6	15-05-476-001	15-5-476-003	ADA KATSOS	12/2/1986	B-5852/P-2593	WARRANTY DEED	3.06	AIP 3-49-0033-09		KIMBALL INVESTMENTS	B-7480/P-2870	9/6/1996
7	15-05-478-005	SAME	BERT & MELBA GREENHAGEN	6/25/1987	B-5852/P-2593	WARRANTY DEED	0.24	AIP 3-49-0033-09		KIMBALL INVESTMENTS	B-7480/P-2870	9/6/1996
8	08-33-300-008	08-33-300-014	JOSEPH LASAGNA	7/5/1988	B-5994/P-0002	WARRANTY DEED	0.65	AIP 3-49-0033-13		SALT LAKE CITY CORP. *Note: See Sheet 31 Area 63-8 for location		
9	15-04-303-001	15-04-303-010	RUTH McQUISTON	11/28/1987	B-5893/P-2241	WARRANTY DEED	1.6	AIP 3-49-0033-13		JAN LEONARD GARAVENTA	B-7315/P-0955	1/24/1996
10	15-04-303-003	15-04-303-010	CASE FAMILY, LTD	9/1/1987	B-5962/P-2146	WARRANTY DEED	1.45	AIP 3-49-0033-13		MATT DEWING	B-7294/P-2212	12/20/1995
11	15-04-303-004	15-04-303-010	AA KEY CASE - RON CASE	9/30/1987	B-5967/P-0681	WARRANTY DEED	0.27	AIP 3-49-0033-13		MATT & FRANCI DELONG	B-7294/P-2212	12/20/1995
12	15-04-303-006	15-04-303-010	COLLEEN CAMPBELL	6/30/1987	B-5936/P-2299	WARRANTY DEED	0.46	AIP 3-49-0033-13		HOWA CONSTRUCTION	B-6306/P-2962	4/17/1991
13	15-04-351-004	15-04-351-004	MILTON GISSEMAN	8/5/1988	B-6053/P2298-90	WARRANTY DEED	0.8	AIP 3-49-0033-13		KIMBALL INVESTMENTS	B-7480/P-2870	9/6/1996
14	15-04-353-001	15-04-353-015	JAMES & CANDANCE KILGROW	10/9/1987	B-5969/P-2644	WARRANTY DEED	0.73	AIP 3-49-0033-13		KIMBALL INVESTMENTS	B-7480/P-2870	9/6/1996
15	15-04-353-002	15-04-353-015	DAVID & LIZ RIBBE	10/9/1987	B-5969/P-2009	WARRANTY DEED	0.24	AIP 3-49-0033-13		KIMBALL INVESTMENTS	B-7480/P-2870	9/6/1996
16	15-04-353-003	15-04-353-015	DAVID & LIZ RIBBE				0.22	AIP 3-49-0033-13				
17	15-04-353-010	15-04-353-015	BEATRICE GILL	6/4/1987	B-5926/P-2774	WARRANTY DEED	0.27	AIP 3-49-0033-13		KIMBALL INVESTMENTS	B-7480/P-2870	9/6/1996
18	15-04-353-011	15-04-353-015	BEATRICE GILL	6/4/1987	B-5926/P-2773	WARRANTY DEED	0.34	AIP 3-49-0033-13		KIMBALL INVESTMENTS	B-7480/P-2870	9/6/1996
19	15-04-353-013	15-04-353-015	MILTON GISSEMAN	9/1/1987	B-5957/P-2727	WARRANTY DEED	0.29	AIP 3-49-0033-13		KIMBALL INVESTMENTS	B-7480/P-2870	9/6/1996
20	15-04-353-014	15-04-353-015	DARREL GISSEMAN	6/26/1987	B-5935/P-1124	WARRANTY DEED	0.29	AIP 3-49-0033-13		KIMBALL INVESTMENTS	B-7480/P-2870	9/6/1996
21	15-04-354-001	15-04-354-026	KATHERINE HILL	6/18/1987	B-5932/P-0952	WARRANTY DEED	0.29	AIP 3-49-0033-13		KIMBALL INVESTMENTS	B-7480/P-2870	9/6/1996
22	15-04-354-002	15-04-354-026	KATHERINE HILL	6/18/1987	B-5932/P-0952	WARRANTY DEED	0.27	AIP 3-49-0033-13		KIMBALL INVESTMENTS	B-7480/P-2870	9/6/1996
23	15-04-354-003	15-04-354-026	RUBY McQUISTION	8/21/1987	B-5954/P-0523	WARRANTY DEED	0.46	AIP 3-49-0033-13		KIMBALL INVESTMENTS	B-7480/P-2870	9/6/1996
24	15-04-354-004	15-04-354-026	ALVIE & COLLEEN CARTER	7/9/1987	B-5939/P-1601	WARRANTY DEED	0.27	AIP 3-49-0033-13		KIMBALL INVESTMENTS	B-7480/P-2870	9/6/1996
25	15-04-354-005	15-04-354-026	ALVIE & COLLEEN CARTER	7/9/1987	B-5939/P-1601	WARRANTY DEED	0.34	AIP 3-49-0033-13		KIMBALL INVESTMENTS	B- 7480/P-2870	9/6/1996
26	15-04-354-006	15-04-354-026	ALVIE & COLLEEN CARTER	7/9/1987	B-5939/P-1601	WARRANTY DEED	0.08	AIP 3-49-0033-13		KIMBALL INVESTMENTS	B- 7480/P-2870	9/6/1996
27	15-04-354-007	15-04-354-026	ALVIE & COLLEEN CARTER	7/9/1987	B-5939/P-1601	WARRANTY DEED	0.17	AIP 3-49-0033-13		KIMBALL INVESTMENTS	B-7480/P-2870	9/6/1996
28	15-04-354-008	15-04-354-026	DALE BRIDGE	9/24/1987	B-5964/P-1468	WARRANTY DEED	0.17	AIP 3-49-0033-13		KIMBALL INVESTMENTS	B-7480/P-2870	9/6/1996
29	15-04-354-009	15-04-354-026	DALE BRIDGE	9/24/1987	B-5964/P-1468	WARRANTY DEED	0.17	AIP 3-49-0033-13		KIMBALL INVESTMENTS	B-7480/P-2870	9/6/1996
30	15-04-354-010	15-04-354-026	EVERETT SANCHEZ	5/11/1987	B-5916/P-1117	WARRANTY DEED	0.27	AIP 3-49-0033-13		KIMBALL INVESTMENTS	B-7480/P-2870	9/6/1996
31	15-04-354-012	15-04-354-026	PRENTICE WARE	6/19/1969	B-6136/P-1625	WARRANTY DEED	0.17	AIP 3-49-0033-13		KIMBALL INVESTMENTS	B-7480/P-2870	9/6/1996
32	15-04-354-018	15-04-354-026	JON & GAILENE HOOPER	6/23/1987	B-5933/P-2066	WARRANTY DEED	17	AIP 3-49-0033-13		KIMBALL INVESTMENTS	B-7480/P-2870	9/6/1996
33	15-04-354-019	15-04-354-026	ALVIE & COLLEEN CARTER	7/9/1987	B-5939/P-1600	WARRANTY DEED	0.34	AIP 3-49-0033-13		KIMBALL INVESTMENTS	B-7480/P-2870	9/6/1996
34	15-04-451-001	SAME	BISH SHEET METAL WORKS	3/4/1988	B-6009/P-0139	WARRANTY DEED	8.6	AIP 3-49-0033-13		RICHARD BROWN	B-8368/P-1597	6/13/2000
35	15-05-377-005	15-05-377-012	JERRY & SHAUNA SERVICE	6/1/1987	B-5924/P-0145	WARRANTY DEED	0.5	AIP 3-49-0033-13		THOMAS GRAY	B-7039/P-1678	6/22/1994
36	15-05-377-003	SAME	ELESIO REGULES	6/30/1987	B-5928/P-1423	WARRANTY DEED	1.01	AIP 3-49-0033-13		TOLMAN ADVERTISING	B-7084/P-1637	12/19/1994
37	15-05-377-004	SAME	ELESIO REGULES				0.5	AIP 3-49-0033-13		THOMAS GRAY	B-7039/P-1678	6/22/1994
38	15-05-429-002	15-05-426-006	RUTH McQUISTON	11/28/1987	B-5983/P-2241	WARRANTY DEED	0.65	AIP 3-49-0033-13		UT PRECISION MARKMANSHIP	B-7294/P-2220	12/20/1995
39	15-05-429-001	SAME	RUTH McQUISTON				10.7	AIP 3-49-0033-13		LON STALSBERG- Norita Ass'n	B-7439/P-2001	7/9/1996
40	15-05-451-002	15-05-451-013,22	KEN STURZENEGGER	12/9/1991	B-6385/P1229-36	WARRANTY DEED	0.45	AIP 3-49-0033-13		AIRPORT PARK-DAVID BRUNDLE	B-7263/P-2045	10/6/1995
41	15-05-451-003	15-05-451-013,22	ATLAS ENTERPRISES	9/29/1987	B-5966/P-1644	WARRANTY DEED	0.55	AIP 3-49-0033-13		AIRPORT PARK-DAVID BRUNDLE	B-7263/P-2045	10/6/1995
42	15-05-451-004	15-05-451-014,15,22	LAVELL LEARY	10/30/1990	B-6264/P-0817	WARRANTY DEED	5.35	AIP 3-49-0033-13		AIRPORT PARK-DAVID HUNT	B-7265/P-982	10/25/1995
43	15-05-451-007	15-05-451-015	STEPHEN WALKENHORST	11/5/1987	B-5995/P-0209	WARRANTY DEED	0.65	AIP 3-49-0033-13		AIRPORT PARK-DEE HARWOOD	B-7286/P-676	11/10/1995
44	15-05-451-008	15-05-451-015	STEPHEN WALKENHORST				0.28	AIP 3-49-0033-13		AIRPORT PARK-MICHAEL WISS	B-7254/P-2876	10/6/1995
45	15-05-451-011	SAME	EVELYN PHELPS	8/18/1987	B-5953/P-0322	WARRANTY DEED	5.52	AIP 3-49-0033-13		PRIME ARTEMIA	B-7370/P-2846	4/8/1996
46	SEE #23											
47	15-05-477-007	SAME	GORDON NEWMAN	10/19/1987	B-5967/P-2393	WARRANTY DEED	0.08	AIP 3-49-0033-13		KIMBALL INVESTMENTS	B-7480/P-2870	9/6/1996
48	15-05-477-008	SAME	GORDON NEWMAN				0.24	AIP 3-49-0033-13		KIMBALL INVESTMENTS	B-7480/P-2870	9/6/1996
49	15-05-477-009	SAME	JOHN RETZ	6/30/1987	B-5946/P-1627	WARRANTY DEED	0.32	AIP 3-49-0033-13		KIMBALL INVESTMENTS	B-7480/P-2870	9/6/1996
50	15-05-478-021	SAME	MILTON GISSEMAN	7/28/1987	B-5945/P-1378	WARRANTY DEED	0.32	AIP 3-49-0033-13		KIMBALL INVESTMENTS	B-7480/P-2870	9/6/1996
51	15-05-479-003	SAME	MILTON GISSEMAN				0.8	AIP 3-49-0033-13		KIMBALL INVESTMENTS	B-7480/P-2870	9/6/1996
52	15-05-480-002	SAME	GARY DEKORVER	3/20/1989	B-6107/P-2928	WARRANTYDEED	0.24	AIP 3-49-0033-13		KIMBALL INVESTMENTS	B-7480/P-2870	9/6/1996
53	15-05-480-011	SAME	GARY DEKORVER	3/20/1989	B-6107/P-2928	WARRANTY DEED	0.24	AIP 3-49-0033-13		KIMBALL INVESTMENTS	B-7480/P-2870	9/6/1996
54	15-05-482-009	SAME	THOMAS HART	8/17/1987	B-5952/P-1412	WARRANTY DEED	0.96	AIP 3-49-0033-13		KIMBALL INVESTMENTS	B-7480/P-2870	9/6/1996
55	15-08-230-001	15-08-230-029,30,31	LESTER SHOENFLED	7/21/1987	B-5944/P-1545	WARRANTY DEED	5.5	AIP 3-49-0033-13		PLANEVIEW	PLANEVIEW	SEE NOTE, SHT 32
56	15-08-230-012	15-08-230-028	DAN POLLOCK	3/19/1991	B-6299/P-1569	WARRANTY DEED	0.71	AIP 3-49-0033-13		PLANEVIEW	PLANEVIEW	SEE NOTE, SHT 32
57	15-08-251-003	15-08-251-018	WILFORD WINKELKOTTER	7/1/1987	B-5937/P-0072	WARRANTY DEED	1.22	AIP 3-49-0033-13		G&R SALES-GENE SCRIBNER	B-6424/P-0897	3/13/1992
58	15-08-251-009	SAME	FLOYD & BONNIE THOMPSON	10/26/1987	B-5974/P-0601	WARRANTY DEED	1.1	AIP 3-49-0033-13		ROYCE & SUSAN MACKAY	B-6734/P-1429	8/19/1993
59	15-08-251-010	SAME	MAX BARTON	10/2/1987	B-5967/P-2782	WARRANTY DEED	1.94	AIP 3-49-0033-13		DAVID BOREN	B-7299/P-1448	12/18/1995
60	15-08-251-012	SAME	LEONARD BLODGETT	12/4/1987	B-5985/P-1929	WARRANTY DEED	1.33	AIP 3-49-0033-13		DONALD & PHYLLIS BALFOUR	B-6621/P-0729	11/30/1990
61	15-08-251-016	SAME	EARL JOHNSON	7/22/1987	B-5944/P-0498	WARRANTY DEED	0.22	AIP 3-49-0033-13		DONALD & PHYLLIS BALFOUR	B-6621/P-0731	4/18/1991
62	15-04-351-001	SAME	AFTON J. WALKENHORST	6/24/1987	B-5934/P-1395	WARRANTY DEED	0.58	AIP 3-49-0033-09/13		KIMBALL INVESTMENTS	B-7480/P-2870	9/6/1996
63	15-04-351-002	SAME	AFTON J. WALKENHORST	6/24/1987	B-5934/P-1395	WARRANTY DEED	0.16	AIP 3-49-0033-09/13		KIMBALL INVESTMENTS	B-7480/P-2870	9/6/1996
64	15-04-351-003	SAME	AFTON J. WALKENHORST	6/24/1987	B-5934/P-1395	WARRANTY DEED	0.16	AIP 3-49-0033-09/13		KIMBALL INVESTMENTS	B-7480/P-2870	9/6/1996
65	15-04-352-001	SAME	AFTON J. WALKENHORST	6/24/1987	B-5934/P-1395	WARRANTY DEED	0.84	AIP 3-49-0033-09/13		KIMBALL INVESTMENTS	B-7480/P-2870	9/6/1996
66	15-04-352-004	SAME	AFTON J. WALKENHORST	6/24/1987	B-5934/P-1395	WARRANTY DEED	0.08	AIP 3-49-0033-09/13		KIMBALL INVESTMENTS	B-7480/P-2870	9/6/1996
67	15-04-352-005	SAME	AFTON J. WALKENHORST	6/24/1987	B-5934/P-1395	WARRANTY DEED	0.24	AIP 3-49-0033-09/13		KIMBALL INVESTMENTS	B-7480/P-2870	9/6/1996
68	SEE #5											
69	15-05-451-005	15-05-451-023	STEVE & LINDA NICHOLL	6/24/1987	B-5934/P-2161	WARRANTY DEED	0.23	AIP 3-49-0033-09/13		AIRPORT PARK-MICHAEL WISS	B-7254/P-2876	10/6/1995
70	15-05-478-006	SAME	WILLIAM & VIOLA LAXTON	6/2/1987	B-5929/P-1364	WARRANTY DEED	0.24	AIP 3-49-0033-09/13		KIMBALL INVESTMENTS	B-7480/P-2870	9/6/1996
71	15-05-479-001	SAME	AFTON J. WALKENHORST	6/24/1987	B-5934/P-1395	WARRANTY DEED	0.42	AI P 3-49-0033-09/13		KIMBALL INVESTMENTS	B-7480/P-2870	9/6/1996
72	15-05-479-002	SAME	AFTON J. WALKENHORST	6/24/1987	B-5934/P-1395	WARRANTY DEED	0.32	AIP 3-49-0033-09/13		KIMBALL INVESTMENTS	B-7480/P-2870	9/6/1996
73	15-05-480-001	SAME	THERESA CHAVEZ	5/29/1987	B-5924/P-1922	WARRANTY DEED	1.01	AIP 3-49-0033-09/13		KIMBALL INVESTMENTS	B-7480/P-2870	9/6/1996
74	15-05-480-003	SAME	AVCO FINANCIAL SERVICES	5/27/1987	B-5923/P-0967	WARRANTY DEED	0.84	AIP 3-49-0033-09/13		KIMBALL INVESTMENTS	B-7480/P-2870	9/6/1996
75	15-05-481-013	SAME	WALT WINKELKOTTER	7/31/1987	B-5945/P-1377	WARRANTY DEED	0.16	AI P 3-49-0033-09/13		KIMBALL INVESTMENTS	B-7480/P-2870	9/6/1996
76	15-05-481-014	SAME	WALT WINKELKOTTER	7/31/1987	B-5945/P-1375	WARRANTY DEED	0.6	AIP 3-49-0033-09/13		KIMBALL INVESTMENTS	B-7480/P-2870	9/6/1996
77	15-05-482-002	SAME	GERTRUDE PERDUE/E. DARTNELL	8/13/1987	B-5941/P-0933	WARRANTY DEED	1.51	AIP 3-49-0033-09/13		KIMBALL INVESTMENTS	B-7480/P-2870	9/6/1996
78	15-08-230-004	SAME	RYAN JOHANSEN	7/9/1987	B-5940/P-0351	WARRANTY DEED	0.9	AIP 3-49-0033-09/13		JAMES HEMPHILL	B-7027/P-2195	9/14/1994
79	15-08-230-006	SAME	ROY & KAY WAGER	6/15/1987	B-5930/P-1473	WARRANTY DEED	1.75	AIP 3-49-0033-09/13		A. Z RICHARDS, JR.	B-6303/P-1361	4/30/1991
80	15-08-230-011	15-08-230-028	JOHN DEOLLAS	6/10/1987	B-5929/P-1917	WARRANTY DEED	0.71	AIP 3-49-0033-09/13		PLANEVIEW	PLANEVIEW	SEE NOTE, SHT 32
81	15-08-230-013	15-08-230-028	JOHN DEOLLAS				1.5	AIP 3-49-0033-09/13		PL ANEVIEW	PLANEVIEW	SEE NOTE, SHT 32
82	15-08-251-004	15-08-251-018	WALT WINKELKOTTER	7/31/1987	B-5945/P-1430	WARRANTY DEED	1.22	AIP 3-49-0033-09/13		G&R SALES-GENE SCRIBNER	B-6424/P-0897	3/13/1992
83	15-08-251-005	SAME	WALT WINKELKOTTER	7/31/1987	B-5945/P-1431	WARRANTY DEED	1.22	AIP 3-49-0033-09/13		G&R SALES-GENE SCRIBNER	B-6424/P-0897	3/13/1992
84	15-08-251-011	SAME	JAMES PATRICIA KLARR	7/2/1987	B-5937/P-1937	WARRANTY DEED	0.95	AIP 3-49-0033-09/13		SALT LAKE CITY CORP.		
85	15-08-230-007	15-08-230-029,30	CARL DANIEL BALLSTEADT			WARRANTY DEED	0.87	AIP 3-49-0033-22		PLANEVIEW	PLANEVIEW	SEE NOTE, SHT 32
86	15-08-230-008	15-08-230-027,30	CARL DANIEL BALLSTEADT	6/19/1969	B-6136/P-2695	WARRANTY DEED	15	AIP 3-49-0033-22		PL ANEVIEW	PLANEVIEW	SEE NOTE, SHT 32
			5.00 OF PARCEL 15-08-230-008				---	AIP 3-49-0033-22		TERRANCE HENDERSON	B-7075/P-2684	12/8/1994
87	15-08-251-006	15-08-251-024	GARY PILCHER	6/21/1969	B-6137/P-1588	WARRANTY DEED	1.22	AIP 3-49-0033-22		JIM SWEDIN	B-6303/P-1360	4/3/1991
88	15-05-451-001	15-05-451-016,17,24	CARL & CAROL CHILD	7/13/1969	B-6143/P-0387	WARRANTY DEED	5	AIP 3-49-0033-13/22		DAVID BRUNDLE	B-7263/P-2045	10/6/1995
89	15-05-451-006	15-05-451-015	CARL & CAROL CHILD				0.54	AIP 3-49-0033-13/22		ALFRED BECKER	B- 7254/P-2866	10/6/1995
90	08-33-300-006	SAME	DAVID & SANDRA ELLIOTT	4/29/2005	B-9125 P-4243	WARRANTY DEED	0.65	Reinvested AIP funds		SALT LAKE CITY CORP. *Note: See Sheet 31 Area 82 for location		
91	08-16-300-001	SAME	SIV GILLMOR	9/8/2005	B-9165 P-3426	WARRANTY DEED	116.5	Reinvested AIP funds		SALT LAKE CITY CORP. *Note: See Sheet 31 Area 83 for location		

1. ALL PARCELS HAVE BEEN RELEASED WITH THE EXCEPTION OF MAP NOS. 8, 90 AND 91.

N

MAGNETIC DECLINATION
11° 14' EAST
OCTOBER, 2020
ANNUAL CHANGE 0° 6' WEST

400' 200' 0 400'

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SALT LAKE CITY, UT

AIRPORT LAYOUT PLAN

CONSULTANTS

REVISIONS

NO.	DESCRIPTION	DATE

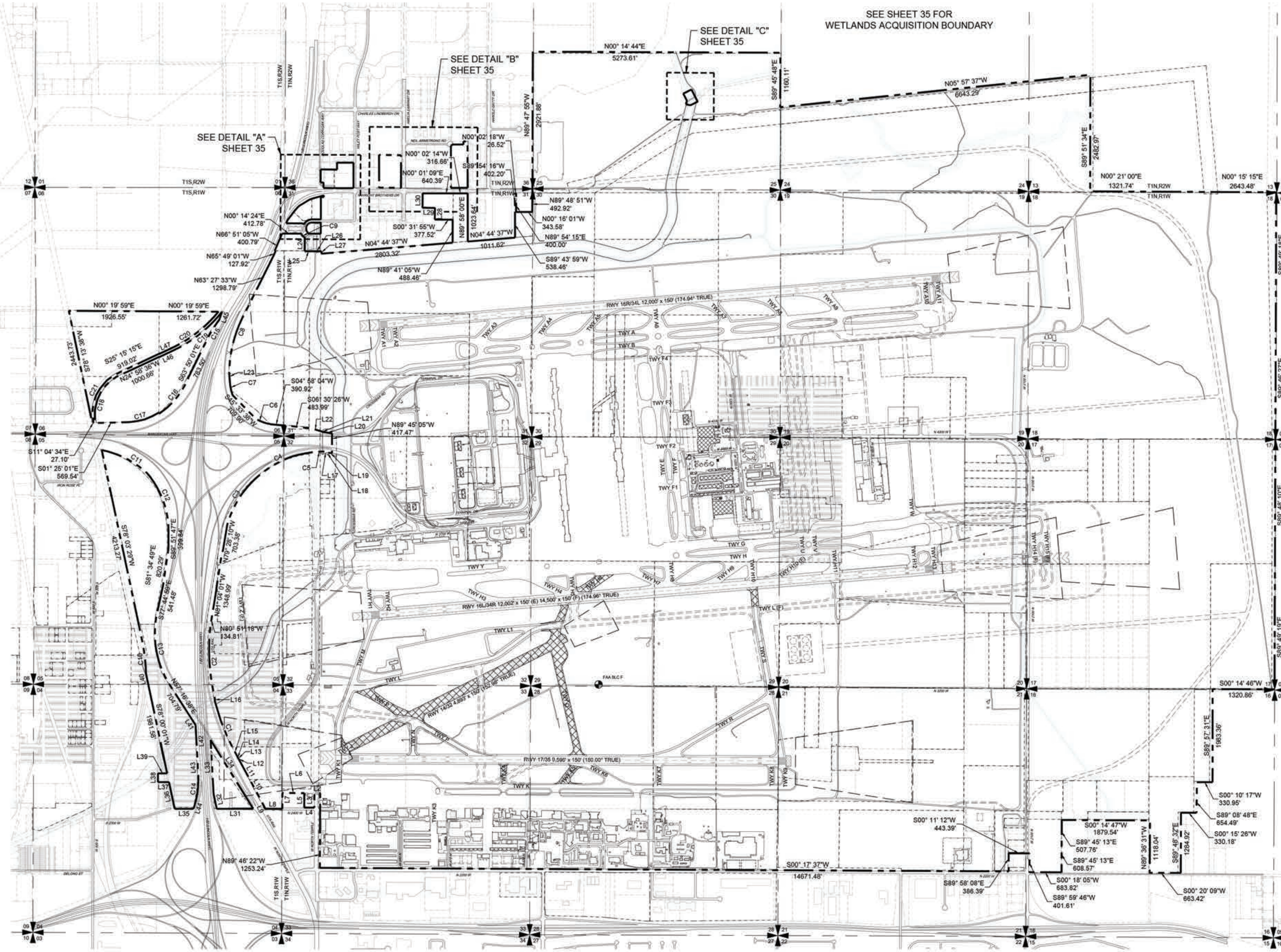
DATE ISSUED: AUGUST 2021
REVIEWED BY: MLB
DRAWN BY: SD
DESIGNED BY: SD

AEP PROJECT NUMBER
224-0039-000

SHEET TITLE

NOISE LAND INVENTORY

SHEET NUMBER
33 OF 41



LINE TABLE		
LINE	BEARING	DISTANCE
L1	N89° 46' 25"W	340.63'
L2	S00° 58' 49"E	123.58'
L3	S89° 45' 25"E	307.64'
L4	S00° 12' 21"W	214.44'
L5	N89° 45' 25"W	307.78'
L6	S00° 39' 14"W	467.15'
L7	S89° 39' 08"E	340.63'
L8	S00° 19' 47"W	363.12'
L9	S66° 36' 58"W	57.24'
L10	S61° 46' 02"W	589.20'
L11	S61° 43' 04"W	544.94'
L12	S84° 50' 53"W	19.53'
L13	S01° 21' 24"W	24.76'
L14	N86° 53' 24"W	26.15'
L15	S61° 51' 24"W	252.70'
L16	S88° 34' 49"W	70.13'
L17	N70° 46' 28"E	52.53'
L18	N16° 38' 37"W	62.24'
L19	N00° 44' 50"E	65.48'
L20	S06° 30' 49"W	196.76'
L21	S24° 59' 49"W	23.03'
L22	S16° 59' 53"W	224.82'
L23	S85° 37' 33"W	146.47'
L24	S89° 45' 36"E	300.68'
L25	N00° 14' 11"E	166.00'
L26	N00° 14' 12"E	192.16'
L27	S89° 48' 13"E	51.96'
L28	N89° 04' 44"W	246.31'
L29	S00° 58' 50"W	265.79'
L30	N89° 15' 45"W	307.80'
L31	S00° 05' 09"E	777.58'
L32	N78° 09' 37"E	326.61'
L33	N86° 52' 28"E	1148.29'
L34	S58° 14' 01"W	1723.22'
L35	S00° 02' 30"W	401.18'
L36	S78° 00' 01"W	581.82'
L37	S00° 03' 22"W	236.85'
L38	N89° 48' 19"W	185.49'
L39	N00° 03' 26"E	196.78'
L40	S78° 00' 01"W	182.55'
L41	S57° 17' 31"W	303.78'
L42	S86° 59' 42"W	683.41'
L43	S87° 03' 12"W	433.53'
L44	N72° 10' 29"W	87.18'
L45	S71° 18' 17"E	173.61'
L46	N25° 02' 16"W	323.50'
L47	S25° 02' 16"E	295.31'

CURVE TABLE				
CURVE	ARC LENGTH	RADIUS	CHORD LENGTH	CHORD BEARING
C1	1040.28'	5256.03'	1038.58'	N69° 09' 55"E
C2	1556.92'	4478.44'	1549.09'	N86° 36' 41"E
C3	1584.74'	2138.10'	1548.72'	S52° 36' 11"E
C4	495.79'	2339.76'	494.86'	N25° 45' 11"W
C5	710.19'	2642.53'	708.06'	N08° 30' 33"W
C6	343.84'	983.11'	342.09'	S19° 44' 14"W

CURVE TABLE				
CURVE	ARC LENGTH	RADIUS	CHORD LENGTH	CHORD BEARING
C7	327.86'	1120.91'	326.69'	N79° 18' 25"E
C8	1385.34'	2774.79'	1370.99'	S74° 58' 22"E
C9	107.62'	68.51'	96.89'	N45° 13' 40"E
C10	654.80'	4098.35'	654.10'	S83° 47' 25"W
C11	1091.79'	2026.06'	1078.63'	N26° 53' 31"E
C12	1316.99'	1909.42'	1291.04'	N69° 07' 45"E

CURVE TABLE				
CURVE	ARC LENGTH	RADIUS	CHORD LENGTH	CHORD BEARING
C13	1645.65'	2040.52'	1601.41'	N80° 23' 17"E
C14	590.89'	1842.29'	588.36'	N82° 35' 51"W
C15	603.36'	2506.81'	601.91'	S59° 20' 28"E
C16	1019.80'	1686.86'	1004.35'	S51° 06' 14"E
C17	827.30'	1395.18'	815.23'	N14° 52' 41"W
C18	1157.65'	939.73'	1085.83'	S65° 21' 16"E

CURVE TABLE				
CURVE	ARC LENGTH	RADIUS	CHORD LENGTH	CHORD BEARING
C19	1341.26'	2894.12'	1329.29'	N38° 18' 52"W
C20	1273.21'	2834.14'	1262.53'	S37° 54' 28"E
C21	1324.56'	954.67'	1220.85'	S62° 15' 55"E

SURVEY MONUMENTS	
IDENTIFIER	FAA SLC F
NGS PID	AA3671
PACS OR SACS	PACS
LATITUDE	40° 47' 16.55"
LONGITUDE	111° 58' 04.38"
ELEVATION	4,222.1'

SOURCE: NATIONAL GEODETIC SURVEY, NAD 83 (2011), NAVD 88
NOTE: NO SACS ESTABLISHED FOR THIS AIRPORT.

NOTES:
1. THIS DRAWING IS A PLANNING DEPICTION OF THE AIRPORT PROPERTY BOUNDARY AND NOT INTENDED TO BE USED FOR SURVEY PURPOSES.
2. AIRPORT PROPERTY LOCATED IN TOWNSHIP 1 NORTH (T1N), TOWNSHIP 1 SOUTH (T1S), RANGE 1 WEST (R1W) AND RANGE 2 WEST (R2W) IN SALT LAKE COUNTY.
3. BEARINGS BASED ON STATE PLANE COORDINATE SYSTEM, NAD83, UTAH CENTRAL ZONE, U.S. FOOT.

N

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11° 14' EAST
OCTOBER, 2020
ANNUAL CHANGE 0° 6' WEST

1,000' 500' 0 1,000'

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REVISIONS

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DESIGNED BY: SD

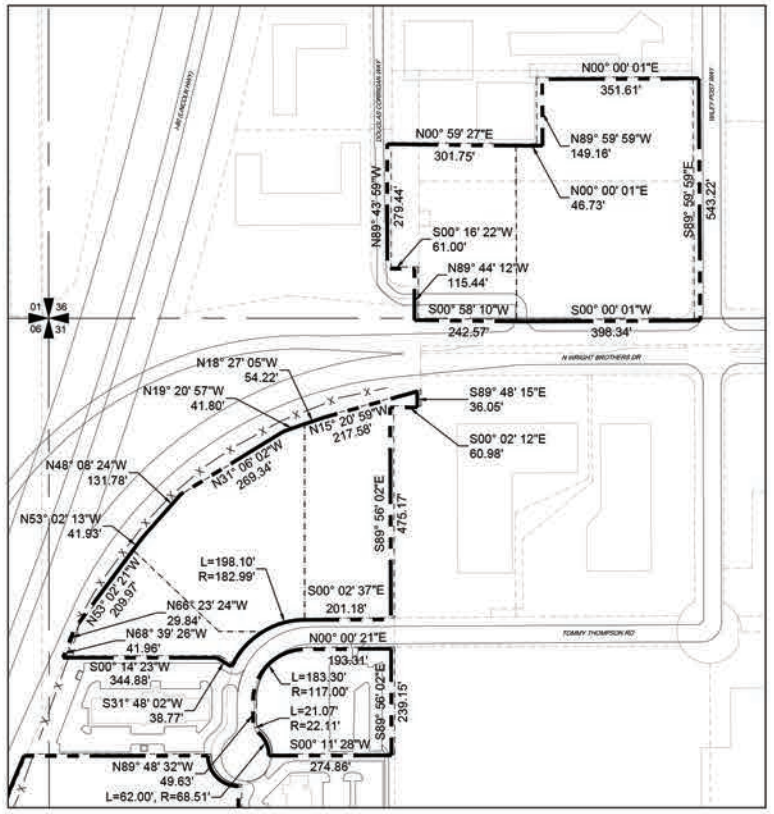
AEP PROJECT NUMBER
224-0039-000

SHEET TITLE

EXHIBIT 'A' AIRPORT PROPERTY INVENTORY MAP

SHEET NUMBER

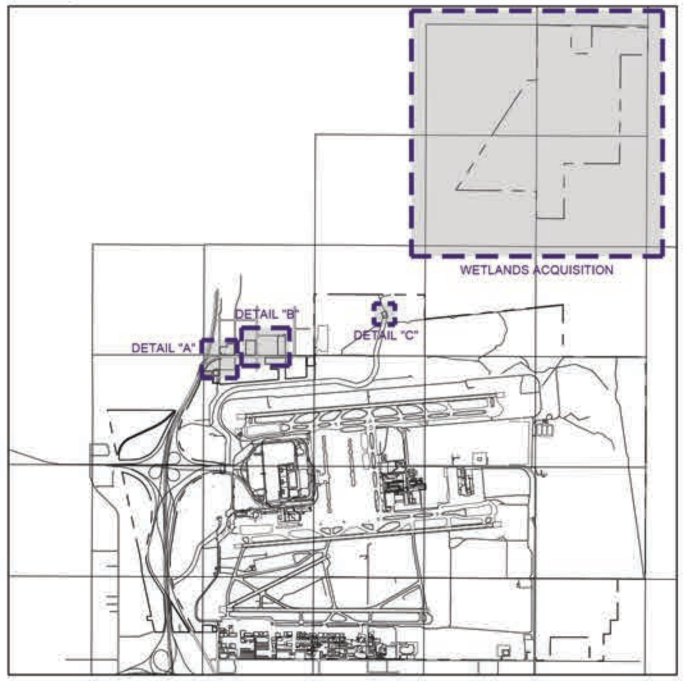
34 OF 41

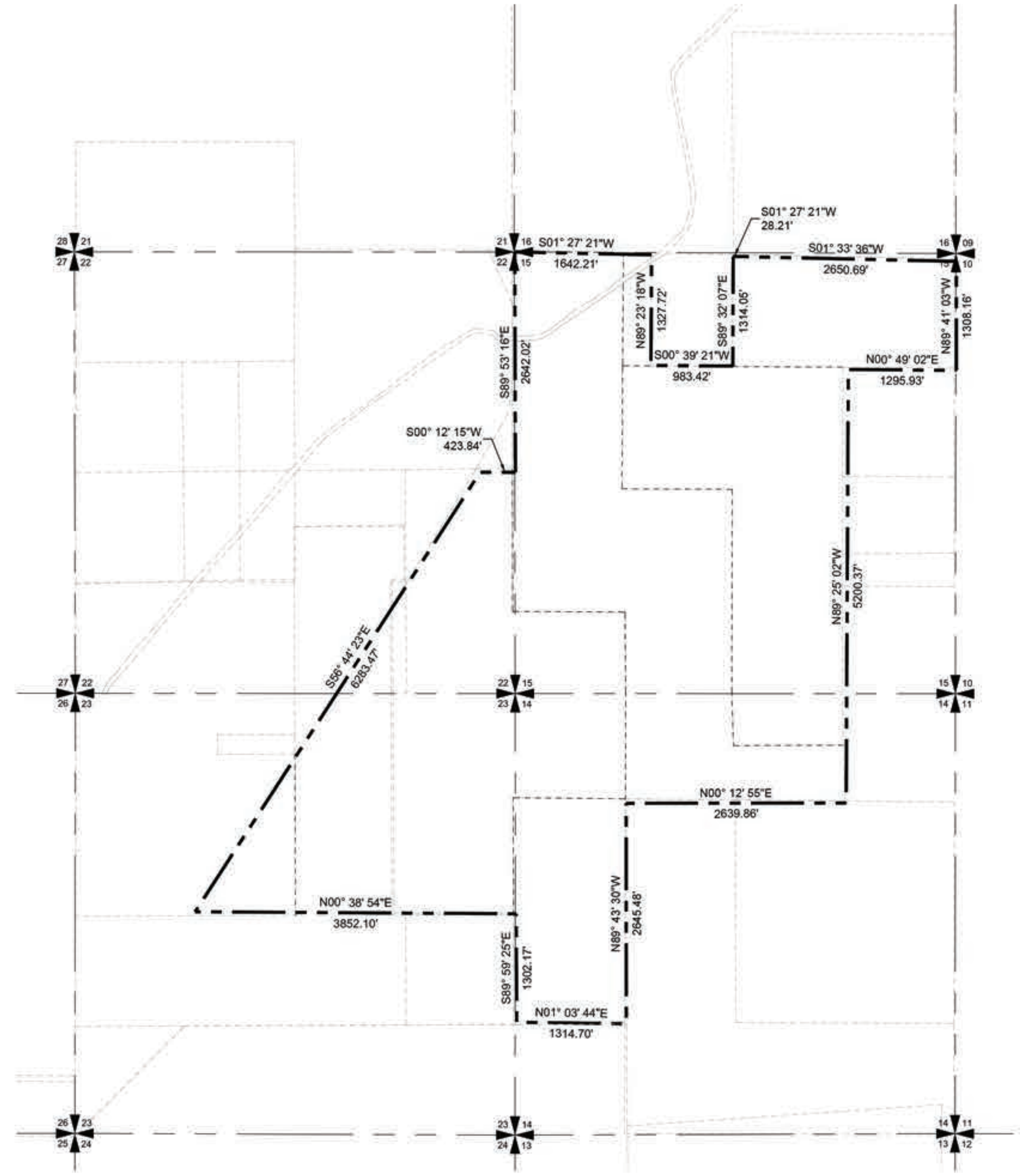


DETAIL "A"

SCALE: 1"=200'

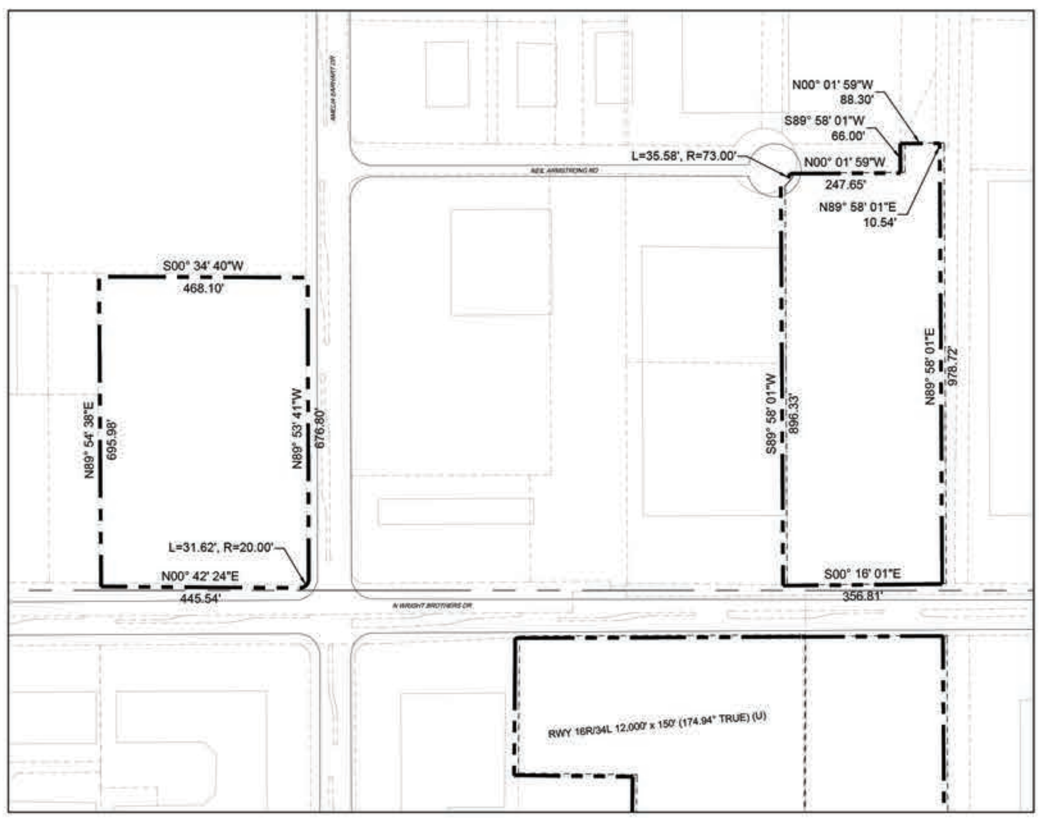
KEY MAP





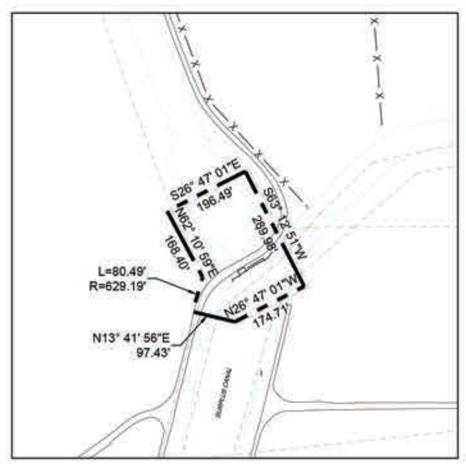
WETLANDS ACQUISITION

SCALE: 1"=1,000'



DETAIL "B"

SCALE: 1"=200'



DETAIL "C"

SCALE: 1"=200'

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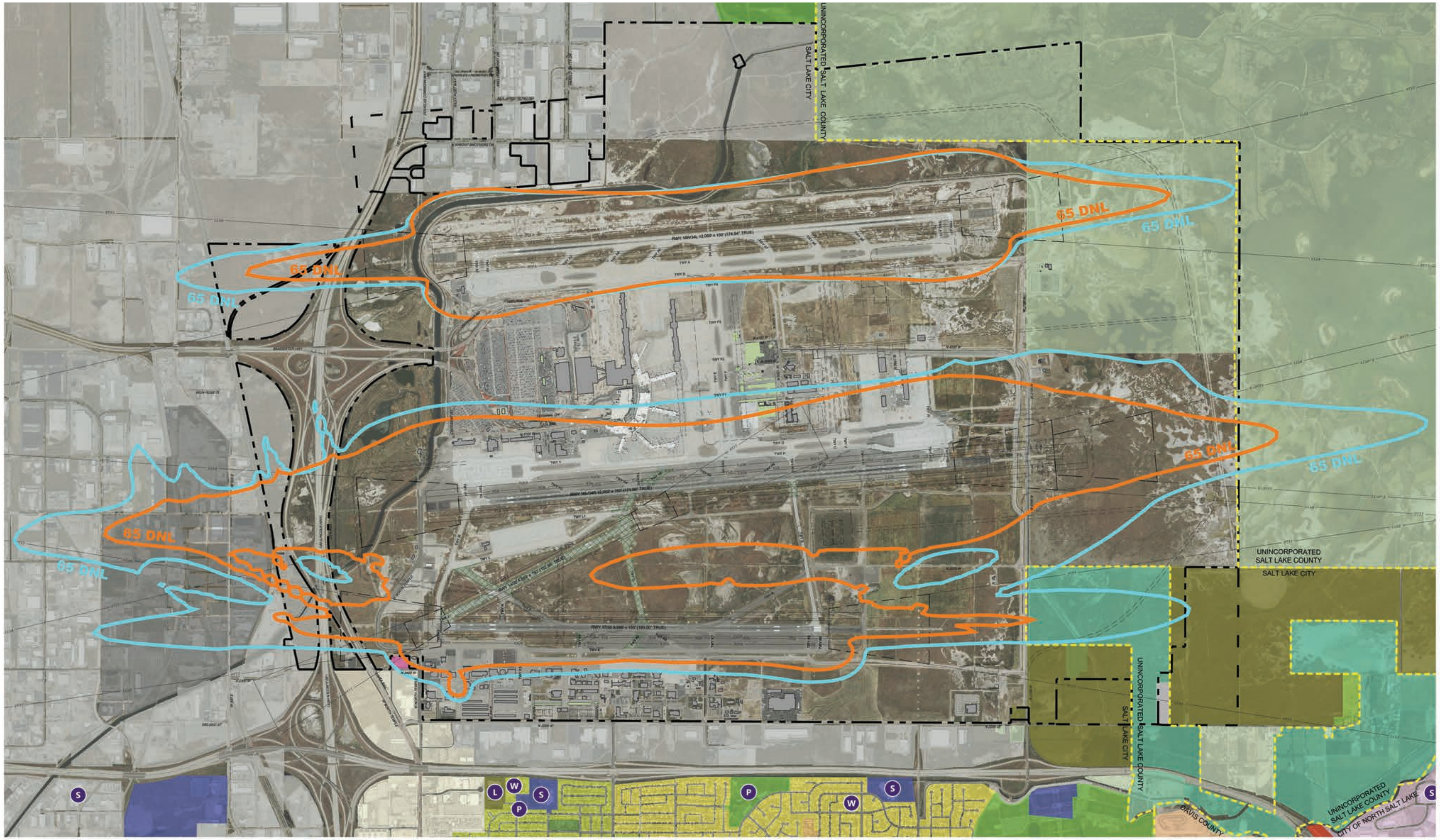
SHEET TITLE

EXHIBIT 'A' AIRPORT PROPERTY INVENTORY MAP

SHEET NUMBER

35 OF 41



SALT LAKE CITY ZONING LEGEND	
AIRPORT	
AGRICULTURAL (AG)	
AGRICULTURAL 2 ACRE MIN. (AG-2)	
AGRICULTURAL 5 ACRE MIN. (AG-5)	
BUSINESS PARK (BP)	
COMMUNITY CORRIDOR (CC)	
LIGHT MANUFACTURING (M-1)	
HEAVY MANUFACTURING (M-2)	
OPEN SPACE (OS)	
PUBLIC LANDS (PL)	
SINGLE FAMILY RESIDENTIAL (R-1-5000)	
SINGLE FAMILY RESIDENTIAL (R-1-7000)	
LOW DENSITY MULTIFAMILY (RMF-30)	
MODERATE DENSITY MULTIFAMILY (RMF-35)	
MIXED USE EMPLOYMENT CENTER TRANSIT STATION (TSA-MUEC)	

CITY OF NORTH SALT LAKE ZONING LEGEND	
GENERAL COMMERCIAL (CG)	
MANUFACTURING DISTRIBUTION (MD)	

SALT LAKE COUNTY ZONING LEGEND	
AGRICULTURAL (A-2)	
AGRICULTURAL (A-5)	
AGRICULTURAL (A-20)	
MANUFACTURING (M-1)	

DAVIS COUNTY ZONING LEGEND	
AGRICULTURAL (A-10)	

LEGEND	
MUNICIPAL BOUNDARIES	
2017 - 65 DNL NOISE CONTOUR	
2037 - 65 DNL NOISE CONTOUR	
LIBRARY	L
PARK	P
SCHOOL	S
PLACE OF WORSHIP	W

ZONING RESTRICTIONS
THE SALT LAKE CITY ZONING ORDINANCE (LATEST REVISION JUNE 16, 2020) HAS ESTABLISHED AN AFPP (AIRPORT FLIGHT PATH PROTECTION) OVERLAY DISTRICT FOR SALT LAKE CITY INTERNATIONAL AIRPORT. THE AFPP DISTRICT IS FOUND IN SECTION 21A.34.040 OF THE ZONING ORDINANCE.
THE COUNTY OF SALT LAKE ZONING ORDINANCE (LATEST REVISION SEPTEMBER 25, 2020) HAS ESTABLISED AN AOZ (AIRPORT OVERLAY ZONE) OVERLAY DISTRICT FOR AIRPORTS WITHIN THE COUNTY. THE AOZ IS FOUND IN CHAPTER 19.70 OF THE CITY CODE.
THE CITY OF NORTH SALT LAKE ZONING ORDINANCE (LATEST REVISION MARCH 19, 2019) HAS ESTABLISED AN AOZ (AIRPORT OVERLAY ZONE) AND AE (AIRPORT ENVIRONS OVERLAY ZONE) OVERLAY DISTRICT FOR AIRPORTS WITHIN THE CITY. THE AOZ AND AE OVERLAY DISTRICTS ARE FOUND IN CHAPTERS 15 AND 16, RESPECTIVELY, OF THE CITY CODE.

SOURCE: CITY CODE OF SALT LAKE CITY, UTAH; COUNTY CODE OF SALT LAKE COUNTY; CITY CODE OF NORTH SALT LAKE

NOTES:
1. ONLY APPLICABLE ZONING DISTRICTS ARE SHOWN.
2. PUBLIC SERVICES SOURCED FROM UTAH AUTOMATED GEOGRAPHIC REFERENCE CENTER (AGRC).

N

MAGNETIC DECLINATION
11° 14' EAST
OCTOBER, 2020
ANNUAL CHANGE 0° 6' WEST

1,200' 600' 0 1,200'

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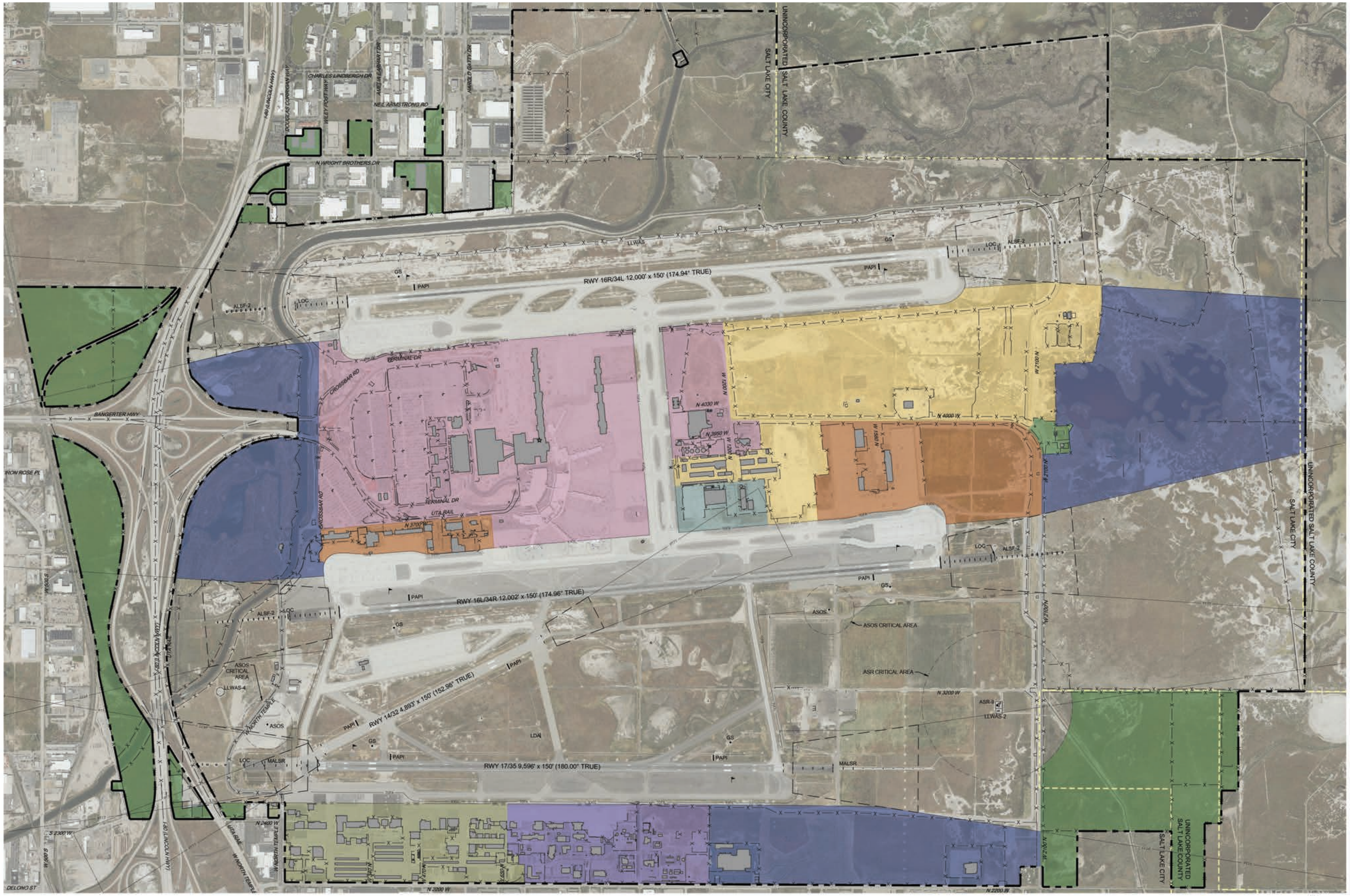
224-0039-000

SHEET TITLE

EXISTING AND FUTURE ZONING

SHEET NUMBER

36 OF 41



EXISTING ON-AIRPORT LAND USE LEGEND	
TERMINAL AREA	
AIRPORT SUPPORT	
AIRLINE SUPPORT	
CARGO AREA	
GENERAL AVIATION	
AERONAUTICAL USE	
AIR NATIONAL GUARD	

EXISTING ON-AIRPORT LAND USE LEGEND	
NON-AERONAUTICAL	

DESCRIPTION	EXISTING
PROPERTY LINE	
MUNICIPAL BOUNDARIES	
RUNWAY PROTECTION ZONE	
TAXIWAY OBJECT FREE AREA	
35' BUILDING RESTRICTION LINE	
PART 77 SURFACE	
AIRFIELD PAVEMENT	

DESCRIPTION	EXISTING
BUILDINGS	
ROADWAY/PARKING	
BEACON	
WINDCONE	
FENCE	

ZONING RESTRICTIONS
THE SALT LAKE CITY ZONING ORDINANCE (LATEST REVISION JUNE 16, 2020) HAS ESTABLISHED AN AFPP (AIRPORT FLIGHT PATH PROTECTION) OVERLAY DISTRICT FOR SALT LAKE CITY INTERNATIONAL AIRPORT. THE AFPP DISTRICT IS FOUND IN SECTION 21A.34.040 OF THE ZONING ORDINANCE.
THE COUNTY OF SALT LAKE ZONING ORDINANCE (LATEST REVISION SEPTEMBER 25, 2020) HAS ESTABLISED AN AOZ (AIRPORT OVERLAY ZONE) OVERLAY DISTRICT FOR AIRPORTS WITHIN THE COUNTY. THE AOZ IS FOUND IN CHAPTER 19.70 OF THE CITY CODE.

SOURCE: CITY CODE OF SALT LAKE CITY, UTAH; COUNTY CODE OF SALT LAKE COUNTY

N

MAGNETIC DECLINATION
11° 14' EAST
OCTOBER, 2020
ANNUAL CHANGE 0° 6' WEST

900' 450' 0 900'

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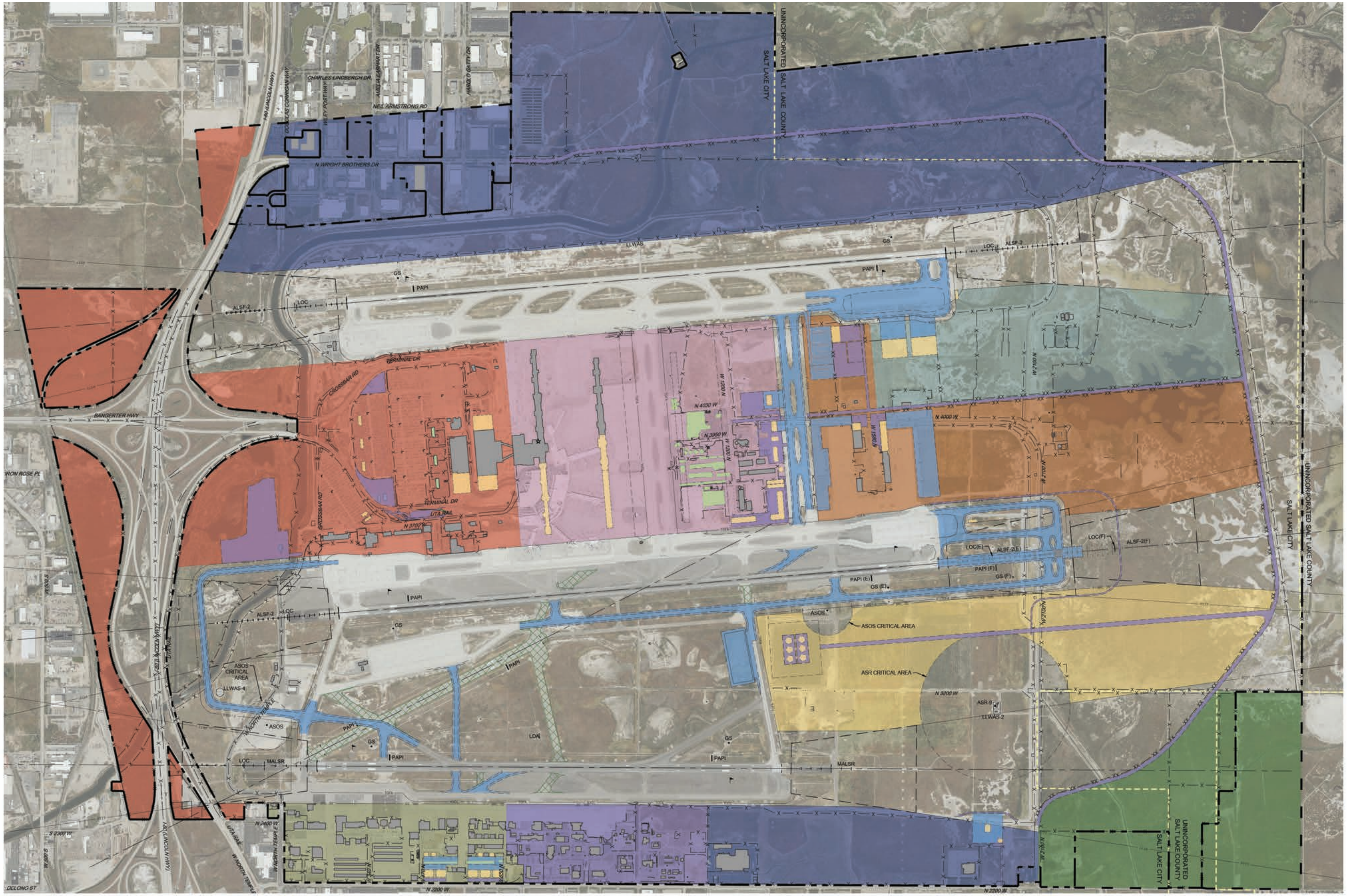
SHEET TITLE

EXISTING ON-AIRPORT LAND USE

SHEET NUMBER

37 OF 41



FUTURE ON-AIRPORT LAND USE LEGEND	
TERMINAL	
AIRPORT SUPPORT	
AIRLINE SUPPORT	
CARGO	
GENERAL AVIATION	
AERONAUTICAL USE	
AIR NATIONAL GUARD	

FUTURE ON-AIRPORT LAND USE LEGEND	
LANDSIDE	
NON-AERONAUTICAL	

DESCRIPTION	EXISTING	FUTURE
PROPERTY LINE		
MUNICIPAL BOUNDARIES		N/A
RUNWAY PROTECTION ZONE		
TAXIWAY OBJECT FREE AREA		
35' BUILDING RESTRICTION LINE		
PART 77 SURFACE		
AIRFIELD PAVEMENT		
AIRFIELD PAVEMENT TO BE REMOVED	N/A	

DESCRIPTION	EXISTING	FUTURE
BUILDINGS		
BUILDINGS TO BE REMOVED	N/A	
ROADWAY/PARKING		
ROADWAY/PARKING TO BE REMOVED	N/A	
BEACON	☆	N/A
WINDCONE		N/A
FENCE	—x—x—x—	—xx—xx—

ZONING RESTRICTIONS
THE SALT LAKE CITY ZONING ORDINANCE (LATEST REVISION JUNE 16, 2020) HAS ESTABLISHED AN AFPP (AIRPORT FLIGHT PATH PROTECTION) OVERLAY DISTRICT FOR SALT LAKE CITY INTERNATIONAL AIRPORT. THE AFPP DISTRICT IS FOUND IN SECTION 21A.34.040 OF THE ZONING ORDINANCE.
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SOURCE: CITY CODE OF SALT LAKE CITY, UTAH; COUNTY CODE OF SALT LAKE COUNTY

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OCTOBER, 2020
ANNUAL CHANGE 0° 6' WEST

900' 450' 0 900'

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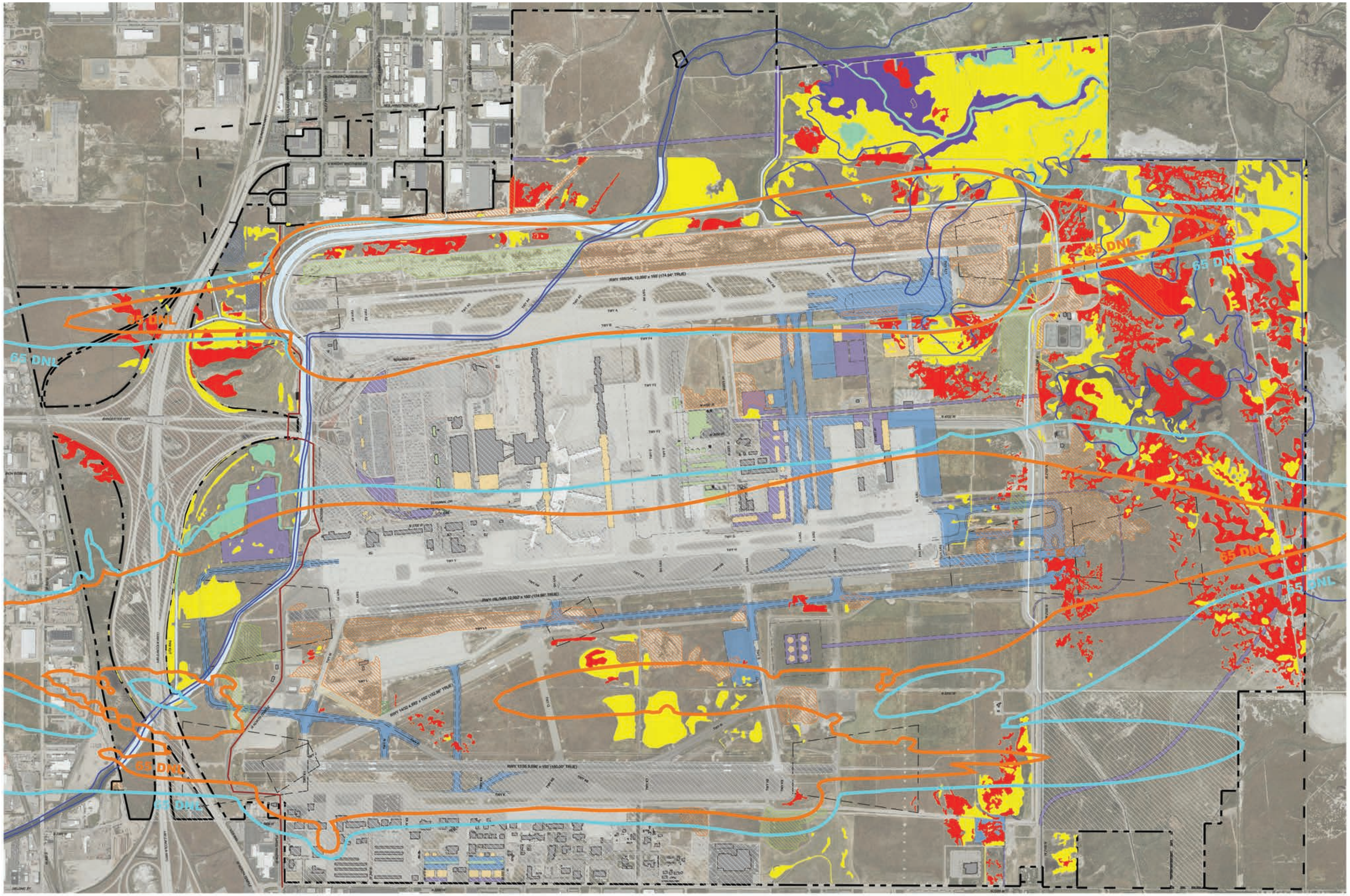
SHEET TITLE

FUTURE ON-AIRPORT LAND USE

SHEET NUMBER

38 OF 41



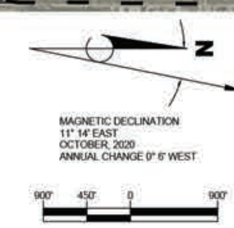
ENVIRONMENTAL LEGEND	
CANAL	
WETLAND DELINEATION - PEM	
WETLAND DELINEATION - PAB	
WETLAND DELINEATION - PUS	
WETLAND DELINEATION - PSS	
WETLAND DELINEATION - NOT SURVEYED	
WETLAND DELINEATION - DISTURBED	

ENVIRONMENTAL LEGEND	
WETLAND DELINEATION - DISTURBED - FILL	
WETLAND DELINEATION - DISTURBED - DUMP	
WETLAND DELINEATION - DISTURBED - RECLAIMED	
WETLAND DELINEATION - DISTURBED - RUNWAY	
FLOODPLAIN DELINEATION - ZONE A	
4(f) PROPERTY - BIKE PATH	
2017 - 65 DNL NOISE CONTOUR	

ENVIRONMENTAL LEGEND	
2037 - 65 DNL NOISE CONTOUR	

SOURCES:
1. 2004 SLCDA AIRPORT WETLAND DELINEATION USACE-VERIFIED RESULTS.
2. FLOODPLAIN - ARCGIS ONLINE
3. BIKE PATH - UTAH DEPARTMENT OF TRANSPORTATION (UDOT)

NOTES:
1. THERE ARE NO REGISTERED HISTORICAL, ARCHEOLOGICAL AND CULTURAL RESOURCES ON THE SALT LAKE CITY INTERNATIONAL AIRPORT.



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SLC INTERNATIONAL

SALT LAKE CITY INTERNATIONAL AIRPORT
SALT LAKE CITY, UT

AIRPORT LAYOUT PLAN

CONSULTANTS

REVISIONS

NO.	DESCRIPTION	DATE

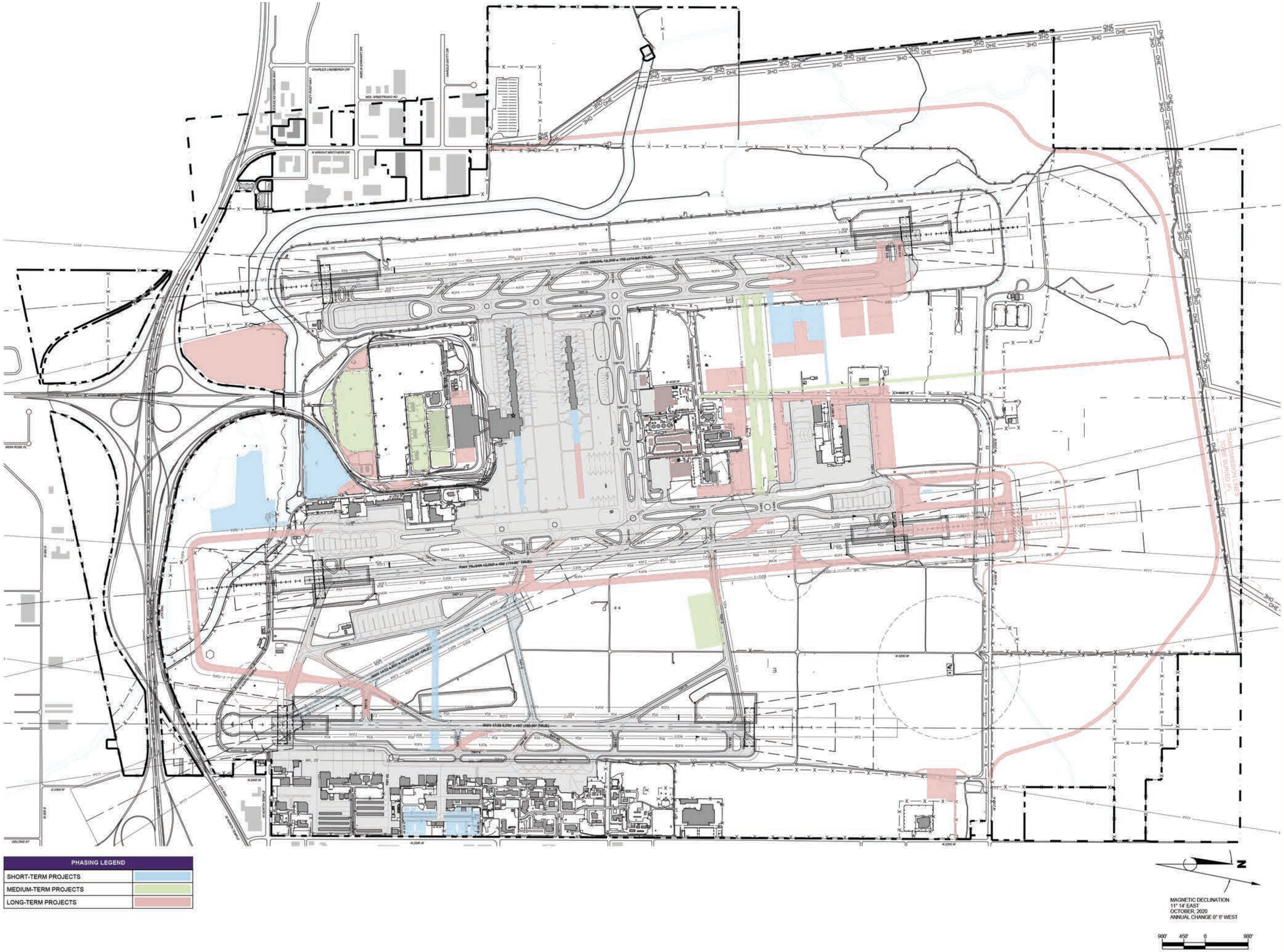
DATE ISSUED: AUGUST 2021
REVIEWED BY: MLB
DRAWN BY: MP
DESIGNED BY: TJM
AEP PROJECT NUMBER
224-0039-000

SHEET TITLE

ENVIRONMENTAL CONSIDERATIONS

SHEET NUMBER

39 OF 41



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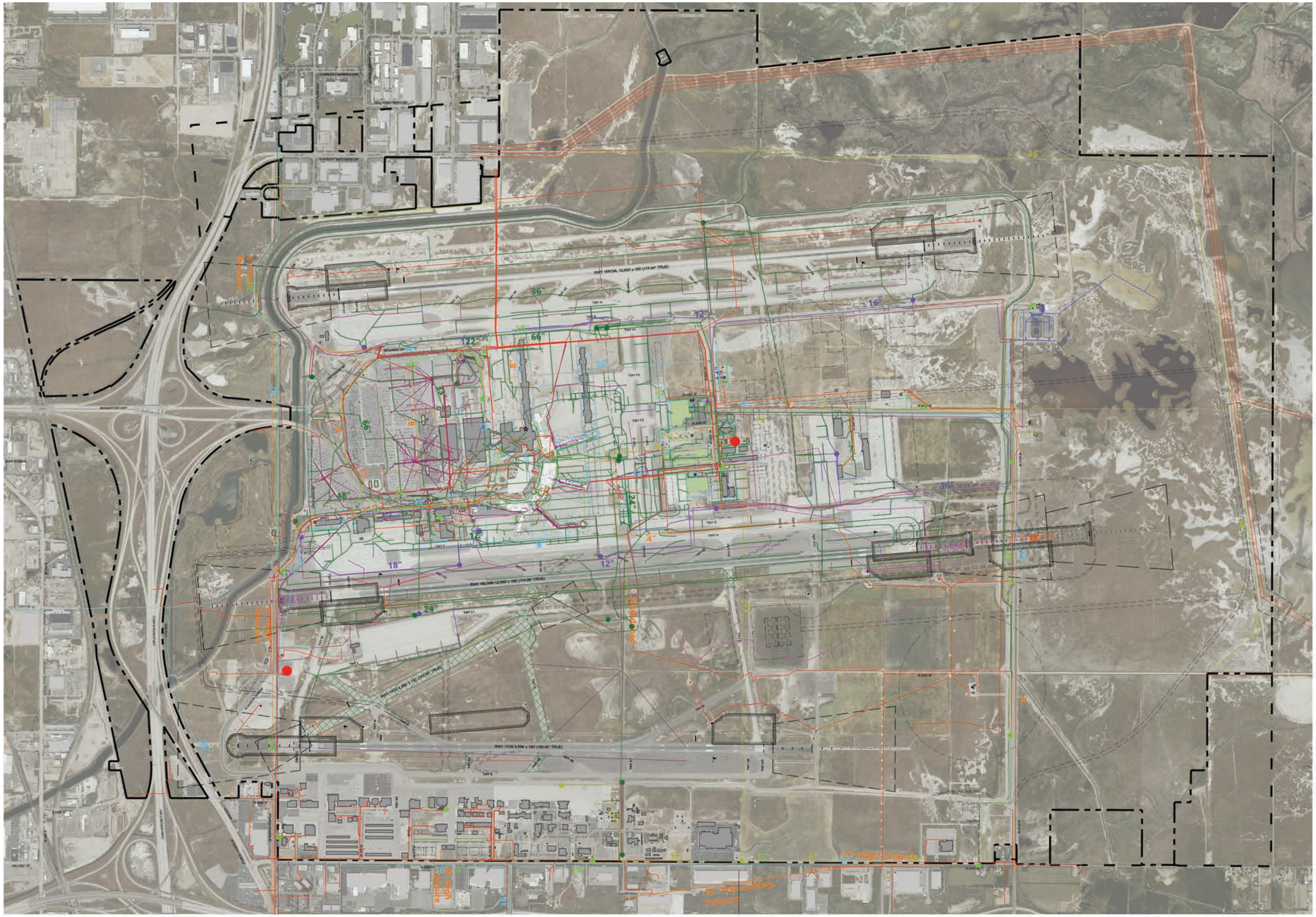
224-0039-000

SHEET TITLE

CONCEPTUAL DEVELOPMENT PHASING PLAN

SHEET NUMBER

40 OF 41



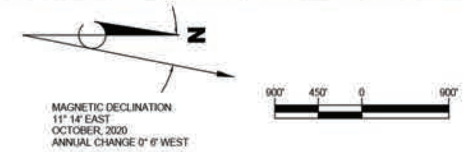
UTILITIES LEGEND	
COMMUNICATION LINE (AIRPORT OWNED)	
COMMUNICATION LINE (FAA OWNED)	
ROCKY MOUNTAIN POWER ELECTRICAL LINE	
ELECTRICAL VAULT (AIRFIELD)	

UTILITIES LEGEND	
FUEL LINE	
FUEL PUMP STATION	
GLYCOL LINE	
GLYCOL PUMP STATION	

UTILITIES LEGEND	
NATURAL GAS	
SANITARY SEWER LINE	
SANITARY PUMP STATION	
STORM DRAIN LINE	

UTILITIES LEGEND	
STORM DRAIN PUMP STATION	
WATER LINE	

NOTE: ALL UTILITIES SHOWN ARE EXISTING UTILITIES ONLY.



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SHEET TITLE

UTILITY PLAN

SHEET NUMBER

41 OF 41

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