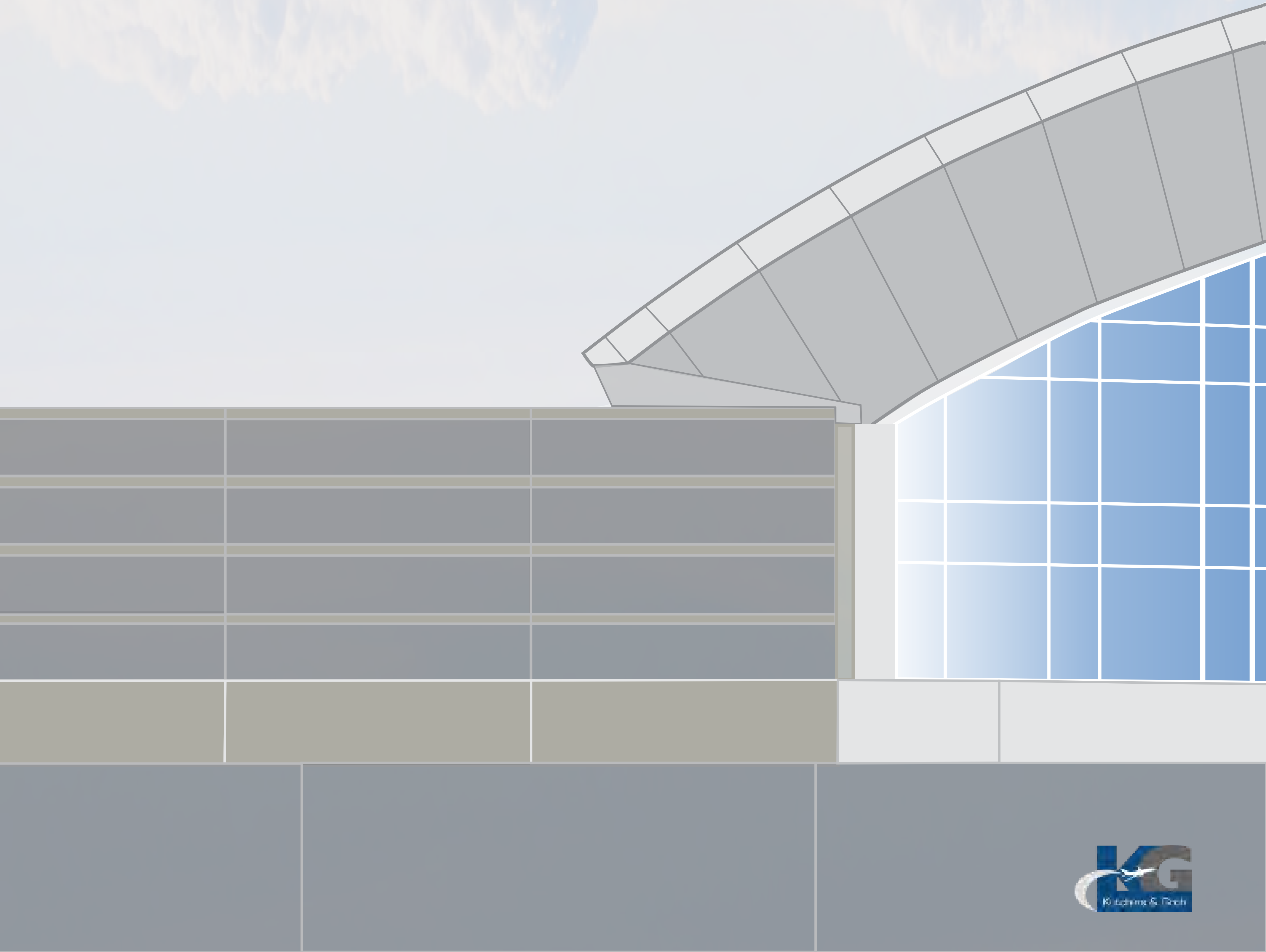
Richmond International Airport

1 Richard E. Byrd Terminal Drive
Richmond, VA 23250-2400



Richmond International Airport

Master Plan Revision

Volume I:

Master Plan Report

July 2022

Kimley-Horn & Fitch

Richmond International Airport

Master Plan Revision

Volume I:

Master Plan Report

July 2022

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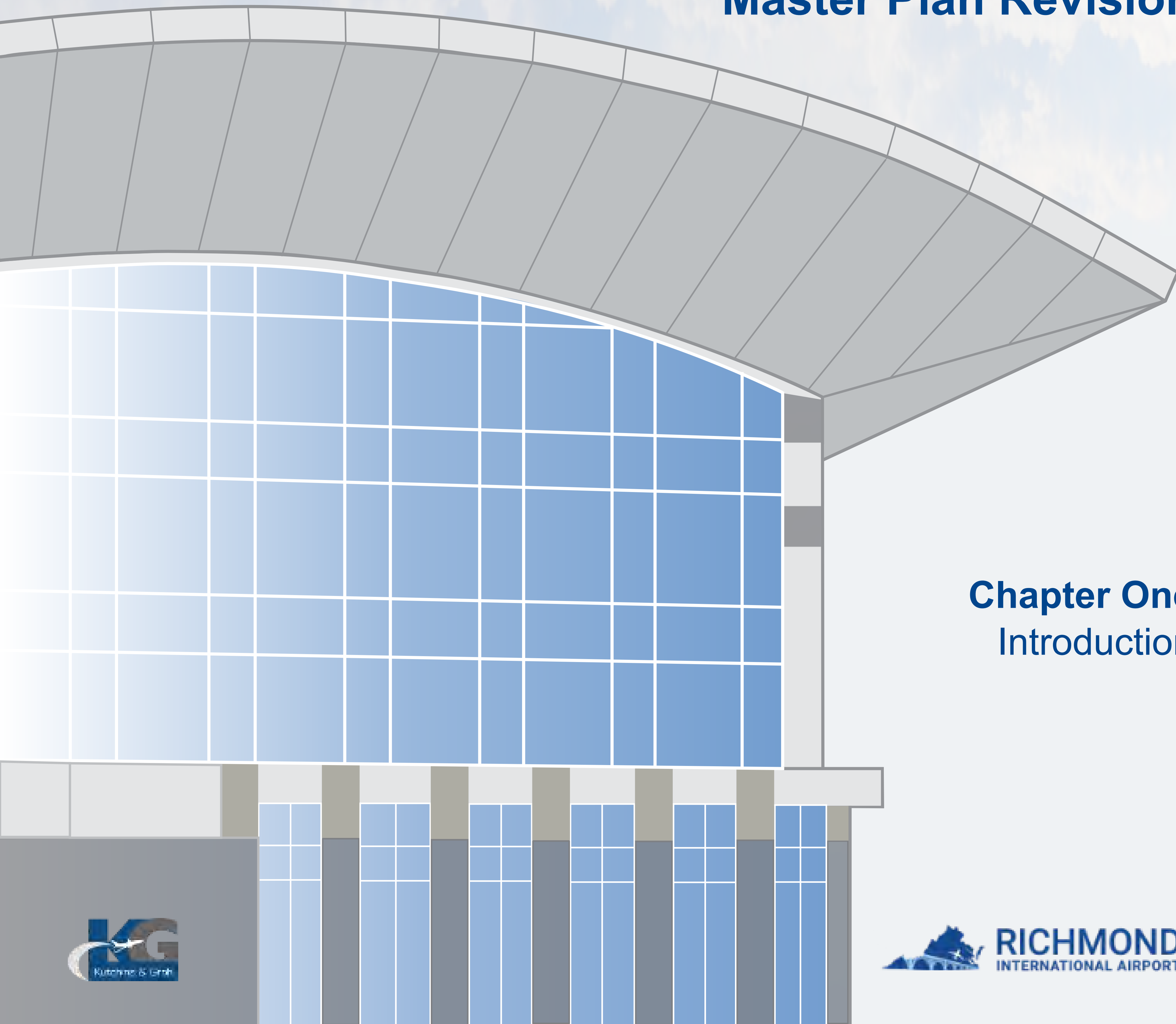
Richmond International Airport

Master Plan Revision



Kutchins & Groh

Chapter One

Introduction

RICHMOND INTERNATIONAL AIRPORT

CHAPTER ONE
Introduction

The purpose of this revision to the Airport Master Plan is to provide guidance for the continued improvement of the Richmond International Airport (RIC) over a 20-year planning horizon. This chapter provides the background and summary of the processes and findings of the Master Plan Revision.

In accordance with Federal Aviation Administration (FAA) Advisory Circular (AC) 150-5070-6B, *Airport Master Plans,* the information, findings, and recommendations contained in this report, as developed by Kutchins & Groh, LLC, represent an update of the *2009 Richmond International Airport Master Plan*.

Since that Master Plan was completed, major changes to the Airport and the aviation industry have occurred. These include the mergers of multiple air carriers and the reduction of frequency of flights. More important than these events is the completion of several major projects, including the construction of Taxiway M, construction of a new south ramp for Concourse B, expansion of Concourse A and the addition of 6 gates and associated holdrooms, multiple development projects on the east side of the airfield, conversion of Runway 7-25 to Taxiway H, expansion of both Security Checkpoints, addition of cargo aprons, and Baggage Screening improvements. To address future changes that are anticipated, the Airport Sponsor has elected to revise the Master Plan.

1.1 AIRPORT SETTING

RIC is owned and operated by the Capitol Region Airport Commission (the Commission). This governmental body consists of a 14-member board of directors appointed by four Richmond area jurisdictions. The Commission elects a chairman on an annual basis from among its membership. Since its opening as a commercial facility in 1927, RIC has provided the commercial, General Aviation and military facilities for the Richmond area.

The Airport is located approximately ten miles east of the Central Business District of the City of Richmond. RIC occupies 2,758 acres, has two active runways, an extensive taxiway and airfield system, and serves the aviation needs of the surrounding communities. The Airport is easily accessible from U.S. Highway 60 (Williamsburg Road) and Airport Drive.

RIC is considered an Origination and Destination (O & D) airport, meaning that for the most part passengers are either starting or ending their journeys in Richmond. (see ***Exhibit 1-1, Airport Location Map***). As the capital of Virginia, the City of Richmond had a population of 228,783 as of the date of the most recent U.S. Census (July 2019).

RICHMOND INTERNATIONAL AIRPORT
MASTER PLAN REVISION

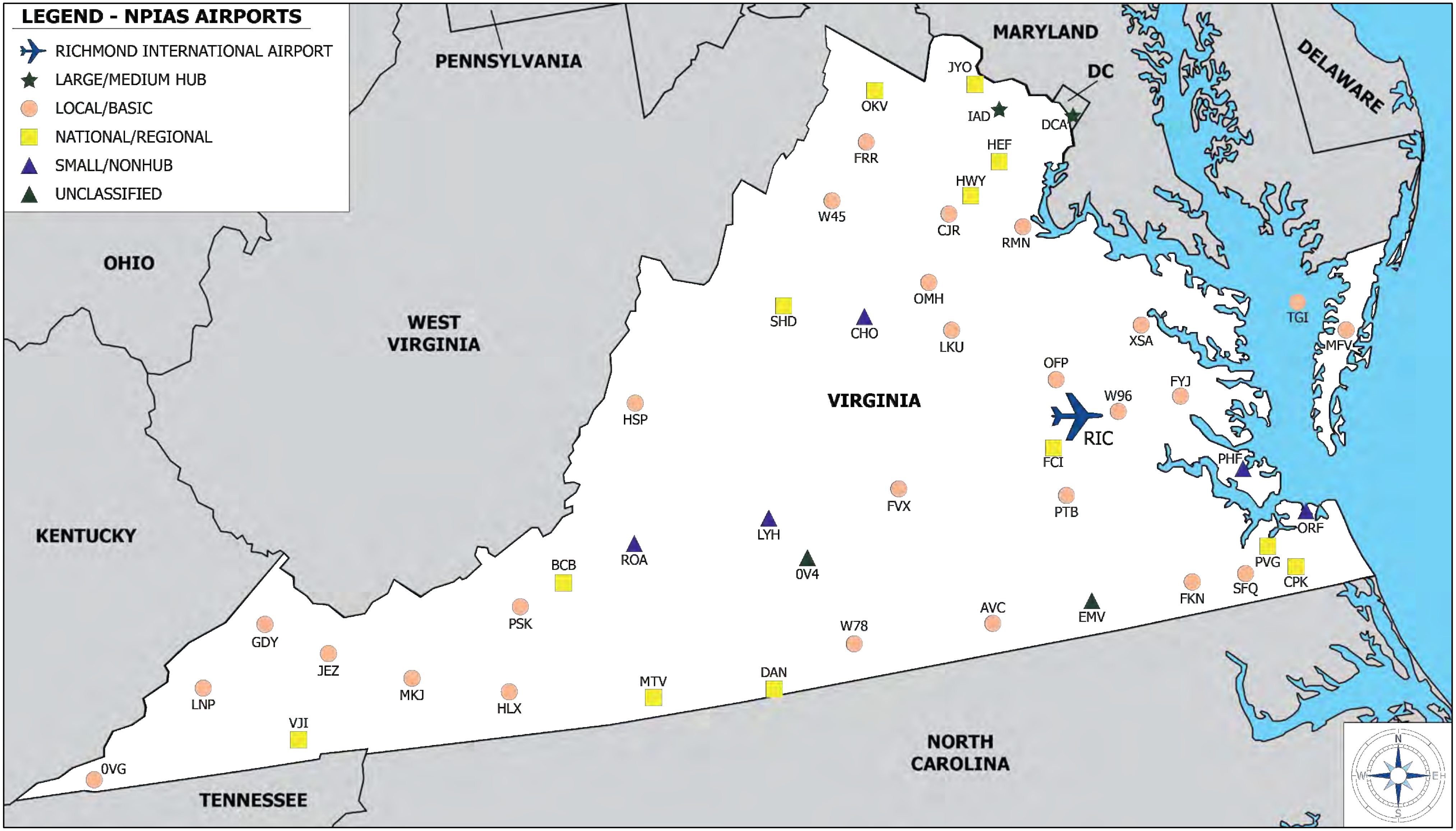


EXHIBIT 1-1
AIRPORT LOCATION MAP

RICHMOND
INTERNATIONAL AIRPORT

NTS 0 NTS NTS NTS

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The Airport is home to three Fixed Base Operators (FBO): Million Air, Richmond Jet Center, and Aero Industries. An FBO is defined as a commercial business granted the right by an airport to operate on site to provide aeronautical services such as hangar space, fueling, tie-downs and parking, aircraft rental, aircraft maintenance, and flight instruction.

Aero Industries Inc. provides an FAA Certified Repair Station offering airframe, engine and propeller maintenance, avionics, Shell-branded Aviation Jet A and 100LL sales, charter service and de-icing. Services are available 24 hours a day.

Million Air Inc. is a 24-hour operation offering maintenance facilities, avionics, charters, an FAA-approved repair station for Class 3 airframes and engines, sales of Avfuel-branded Jet A and 100LL Sales, de-icing, and hangar space.

Richmond Jet Center provides catering, flight planning services, conference rooms, rental car availability, sales of Shell-branded Aviation Jet A and 100LL, maintenance, hangar space, and de-icing. Services are offered 24 hours a day.

Infrastructure is in place for most of the developed portions of the Airport, including roads, electrical service, natural gas, water, and sewer. Airport Police occupy space in the Terminal Building and full-time service is provided.

1.2 BACKGROUND AND HISTORY

The Airport was originally named Richard Evelyn Byrd Flying Field after the Virginia aviator and was dedicated on October 15, 1927. The first regularly scheduled passenger service began in 1932 by Eastern Airlines. During World War II, RIC was used as an Army Air Corps base and the airfield was which enlarged the airfield and expanded the facility.

In 1975, the Capital Region Airport Commission was created. The airport was renamed the as Richmond International Airport RIC in 1985. Although the airfield configuration has remained relatively the same over the years, the terminal and concourse facilities have been rebuilt to accommodate the current fleet of aircraft in use today.

RIC provides for the travel needs of the residents of the Richmond Metropolitan Area, which includes 16 counties and four cities, including the City of Richmond, the capital of Virginia.

Currently, the airport is served by 7 airlines with direct service to 23 cities across the country. Commercial service is provided by regional air carriers under the flags of American Airlines, Allegiant, Delta Airlines, JetBlue, Southwest, Spirit, and United Airlines, with direct flights to Atlanta, Boston, Charlotte, Chicago (MDW and ORD), Denver, Dallas-Fort Worth, Detroit, Fort Lauderdale, Houston, Las Vegas, Los Angeles, Miami, Minneapolis, Nashville, Newark, New

York (JFK and LGA), Orlando, Philadelphia, Punta Gorda, Sarasota, St Petersburg, Tampa, and Washington DC (Dulles).

Many of the proposed projects identified in the 2009 Master Plan have been implemented and this update will identify development needs for the future planning horizon, such as:

- Existing conditions
- Phased development
- Aviation forecasts for the five, ten and 20-year planning horizons

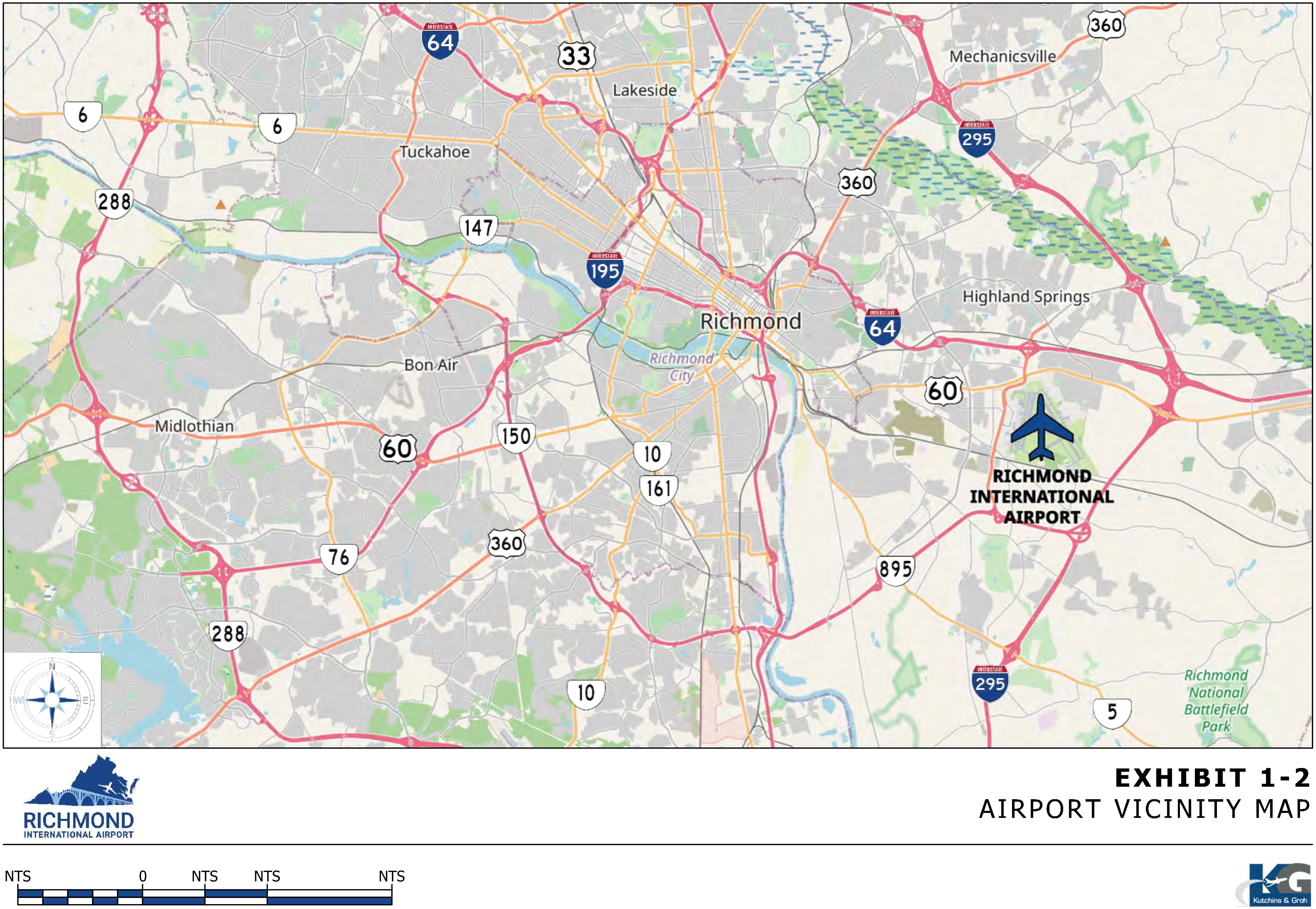
Although the Master Plan Update will focus on the Airport and its environs, it will also consider its relationship with the surrounding community. The overall planning goal will be the continued development of an aviation facility that can accommodate future demand while being mindful of constraints that may be imposed by the environment surrounding the airport proper. Four basic elements will be examined in the document:

- Airside facilities (runways, taxiways & features directly related to aviation activities)
- Landside facilities (activities on Airport property but not directly related to aviation)
- The relationship between the Airport & the surrounding community
- The Airport's environs

1.3 INDUSTRY, STATE AND LOCAL

The Richmond Metropolitan Statistical Area (MSA) includes the City of Richmond, Virginia's capital, and its surrounding and economically-interdependent region. The Richmond MSA is comprised of 16 counties and four cities, including the City of Richmond -- Virginia's capital -- and is geographically spread over a 5,717 square mile area. The Richmond MSA is located approximately 100 miles south of Washington, DC and 90 miles northwest of Norfolk, Virginia (please see ***Exhibit 1-2, Airport Vicinity Map***.)

The Richmond MSA includes 3 other cities (Petersburg, Hopewell, and Colonial Heights) and adjacent counties and is home to approximately 1.3 million Virginians, or 15.1% of Virginia's population. Richmond, Chesterfield, Hanover, and Henrico account for 79% of the Richmond MSA's population with the population growth rate slightly higher than the Richmond MSA's growth rate. The Richmond MSA is the nation's 46th largest metro area.



RICHMOND INTERNATIONAL AIRPORT

EXHIBIT 1-2
AIRPORT VICINITY MAP

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1.4 MASTER PLAN OBJECTIVES

The primary purpose of the Master Plan is to serve as a general guide to the orderly, timely, and logical development of RIC so that it can continue to serve the aviation needs and support the economic development of the region for the next 20 years. Major objectives of the Master Plan include:

- Establishment of a flexible facility development plan that will accommodate reasonably expected changes in the aviation market over the 20-year planning horizon
- Development of a reasonable set of planning activity levels (i.e., levels of enplanements and aircraft operations) suitable for guiding the development of the Master Plan
- Preparation of a plan that can be accomplished in an environmentally sensitive and responsible manner
- Maximization of opportunities for RIC to serve as a catalyst for economic development in the region
- Consensus-building with key stakeholders regarding major development recommendations to develop the foundation for funding agreements and environmental approvals for key projects
- Development of a financial plan that is sound and achievable given the Airport's resources, demands, and needs

1.5 COORDINATION OF PROJECT WORKING GROUP

A Project Working Group was also established at the onset of the planning process to serve as the core management team for the planning process, with the responsibility of directing the preparation of the Master Plan. Its members included the Airport Director, his key staff, and the planning consultant team lead by Kutchins & Groh, LLC. This group met regularly throughout the project term to discuss planning issues, present work products, solicit comments, discuss coordination with the FAA, and refine the planning process.

1.6 DOCUMENT ORGANIZATION

The remainder of this Master Plan is organized as follows:

- Chapter II: Inventory and Existing Conditions
- Chapter III: Aviation Demand Forecasts
- Chapter IV: Demand Capacity Analysis and Facility Requirements
- Chapter V: Recommended Development Plan
- Chapter VI: Environmental Overview
- Chapter VII: Implementation and Financial Plan
- Chapter VIII: Airport Layout Plan

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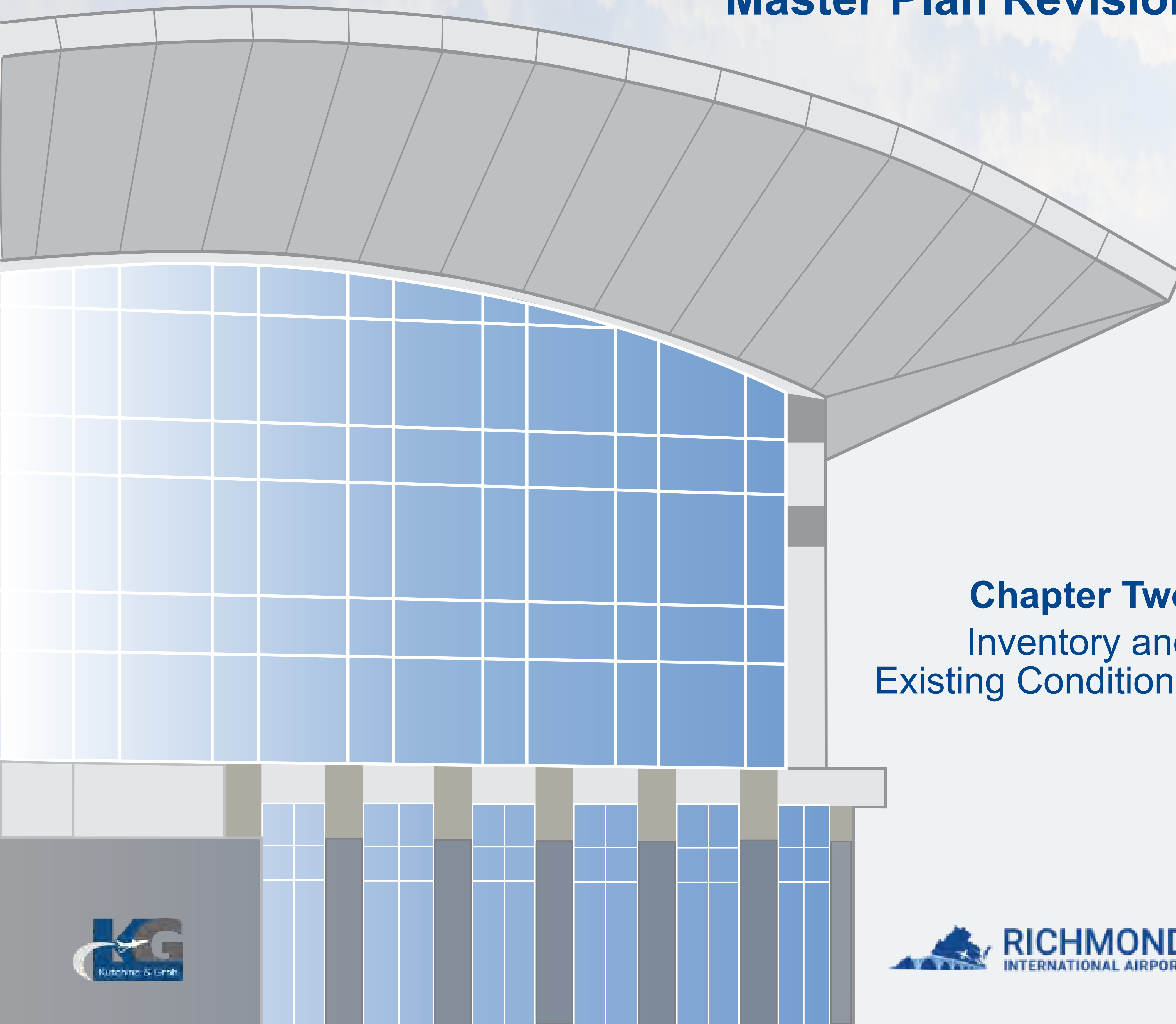
E. Environmental Coordination
F. Noise Study
G. Airport Layout Plan
H. Airport Layout Plan Narrative
I. Runway Length Analysis

Richmond International Airport

Master Plan Revision



Chapter Two

Inventory and Existing Conditions

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An early step in the Airport Master Plan process is the inventory of existing conditions and critical environs. This inventory information provides the basis for evaluating existing facility conditions and subsequently determining future needs.

This chapter is dedicated to existing conditions at the Airport and an inventory of existing facilities. Subsequent chapters will address aviation forecasts, safety and operational requirements, land use compatibility and recommendations for future development of the Airport and the surrounding property.

2.1 AIRPORT SETTING

The Richmond International Airport (RIC) is a key Origination and Destination (O&D) airport for the Commonwealth of Virginia and the neighboring State of Maryland. The airport provides air service to the City of Richmond, Henrico County, and the surrounding region. While primarily a commercial service airport, it also supports General Aviation activity. Due to its strategic location, RIC is frequently used as a diversion airport.

RIC is situated on approximately 2,750 acres and is located in the eastern half of Virginia within Henrico County, approximately eight miles south of the Richmond Central Business District. Airports located within 15 miles of RIC include Chesterfield County Airport (FCI), Hanover County Municipal Airport (OFP) and New Kent County Airport (W96). Each of these serves an important role in the National Plan of Integrated Airport Systems (NPIAS), helping to eliminate congestion of General Aviation aircraft at RIC.

2.2 HISTORICAL BACKGROUND

In early 1927, the Richmond City Council purchased approximately 100 acres in Henrico County for a new airfield, at the price of $30,000, and agreed to lease an additional 300 acres to reserve the space it would eventually need to grow. The airport was commissioned as the Richard Evelyn Byrd Flying Field (Byrd Field) that same year and dedicated in honor of aviator Richard E. Byrd, brother of then Governor Harry F. Byrd. Richmond Mayor, John Fulmer Bright, was instrumental in the establishment of Byrd Field.

Later in 1927, Pitcairn Aviation Company constructed the first hangar and two paved runways, each 100 feet wide and 2,000 feet long. As the first official visitor, Charles Lindbergh was on hand for the dedication of the airport.

Richmond Air Transport Sales & Service Corporation operated the first known commercial flights, with service between Richmond and Virginia Beach. Regularly scheduled passenger service began in 1932, with flights to New York City.

During World War II, the City of Richmond leased the Airport to the United States Government to support the war effort. An additional 1,00 acres was acquired to accommodate the renamed Richmond Army Airbase, a training center for fighter pilots. The facility was returned to the city after the war.

In 1950, the Terminal Building, aircraft aprons, an access road and customer parking lots were constructed. Passenger service grew substantially during the 1960s and 1970s and several Terminal Building and airfield expansion projects were implemented to accommodate the increased traffic. In the mid-1970s the Capital Regional Airport Commission was formed to operate the growing facility. The Airport was renamed in 1985 as the Richmond International Airport.

The Airport is currently owned and operated by the Capital Region Airport Commission. The Commission is an independent body consisting of 14 members who are appointed by the local governmental jurisdictions of the City of Richmond and the counties of Chesterfield, Hanover, and Henrico. The Commission's charge is to direct the growth, development, operation, and business activities of RIC.

2.3 LAND USE AND ZONING

An inventory of existing land uses, and zoning is important in airport planning in order to establish the framework for maintaining land use compatibility while determining the best course of action for future development of the airport. This section documents the existing land uses and zoning classification of the Airport and the surrounding community.

2.3.1 EXISTING LAND USE

The Richmond International Airport is surrounded mostly by a mixture of agricultural and industrial land uses. Some residential areas lie to the north and west of RIC, but do not directly abut Airport property. Henrico County regulates height of structures within its jurisdictions through zoning ordinances. In addition to these regulations, through navigation easements, RIC controls certain land uses within Runway Protection Zone (RPZ) areas that may extend beyond the airport property line. Residential land uses have also developed in all directions in the vicinity of RIC. The residential developments in the vicinity of the airport vary in density according to the characteristics of the communities.

2.3.2 EXISTING CEMETERY

An existing cemetery is located in the southwest quadrant of the airfield, in the bend of Taxiway H created by its alignment. It is not known at this time how many graves are located within the cemetery. There are no headstones or other markers to indicate the presence of the graves. At this time, the Airport has no plans to develop this area and for the foreseeable future, the cemetery will remain undisturbed.

2.3.3 EXISTING ZONING

The Henrico County Zoning Map, last updated in 2016, illustrates that RIC property is zoned A-1 (Agricultural), as is some of the area to the south and southeast of RIC. Most property to the northwest of RIC is zoned M-1 (Light Industrial) and is dedicated to manufacturing, assembling, compounding, processing, and packaging. Some areas to the northeast and south are zoned M-2 (General Industrial) and support such uses as automobile or aircraft assembly, lightweight metal foundry plants, building material sales yards, lumberyards, contractors equipment storage yard, railroad yards and shops, and freight stations.

A strip of property to the north of RIC that follows Williamsburg Road is zoned B-3 (Business District) and C-1 (Conservation). The B-3 classification applies to land that lies on the north side of Williamsburg Road. B-3 allows such uses as automotive parts sales, gun sales, restaurants, automotive/truck/recreational vehicle sales/service/repair, automotive body and paint shops, boat and boat trailer sales/service/storage, car wash, and building materials stores. The C-1 classification applies to the property between the southern side of Williamsburg Road and Airport Drive.

2.3.4 FUTURE LAND USE

According to the Henrico County *2026 Comprehensive Plan* and its *Future Land Use Map*, RIC is designated as “Government” which is defined as non-recreational public uses and facilities that are government owned (local, state, or federal). The majority of the abutting property that lies to the north, south, and southwest of RIC is slated for Heavy Industrial use, with some Light Industrial to the west of RIC. Property to the east and northeast are designated as Suburban Residential (in the current Woodlawn Terrace neighborhood.) The plan shows Commercial Concentration along the Williamsburg Road corridor.

2.4 METEOROLOGICAL CONDITIONS

Weather is classified by the applicable air traffic control rules, which are determined by the prevailing ceiling and visibility. Visual Meteorological Conditions (VMC) exists when the ceiling is at least 1,000 feet above ground level and the visibility is at least three statute miles. Visual Flight Rules (VFR) generally apply under VMC and allow maximum operational capacity.

Weather conditions below VMC standard are considered Instrument Meteorological Conditions (IMC) and, consequently, Instrument Flight Rules (IFR) must be applied. The direction and velocity of prevailing winds, as well as cloud ceiling and visibility conditions, directly influence runway use, air traffic control rules, and, ultimately, airfield capacity. Wind direction and velocity determine the magnitude of the crosswind and tailwind components relative to a particular runway and, therefore, influence runway selection. **Exhibit 2-1** contains windrose data that summarize these operational conditions at the airport.

2.5 AIRSPACE AND AIR TRAFFIC CONTROL TOWER

Updates to the Richmond International Airport Master Plan must consider the ability of the local airspace to provide for anticipated demand. Additionally, consideration must be given to potential changes in airport facilities and the effects such changes may have on airspace and on the procedures that govern the direction and operation of aircraft within the area. Therefore, a brief overview of airspace surrounding RIC is necessary. This overview includes a description the airspace above and around the airport.

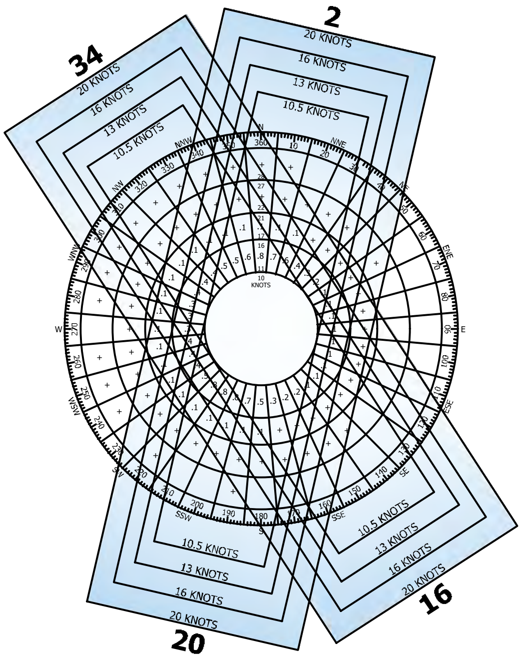
2.5.1 AIR ROUTE TRAFFIC CONTROL CENTER AIRSPACE

In general, en-route aircraft transitioning to and from RIC are controlled by the Washington Air Route Traffic Control Center (ARTCC) located in Washington, D.C., which is one of 22 centers located across the continental United States. The Washington ARTCC provides air traffic control services to aircraft operating on Instrument Flight Rules (IFR) flight plans within controlled airspace, principally between departing and arriving airports. When equipment capabilities and controller workload permit, certain advisory/assistance services may be provided to Visual Flight Rules (VFR) flight plan aircraft.

2.5.2 TERMINAL RADAR APPROACH CONTROL AIRSPACE (TRACON)

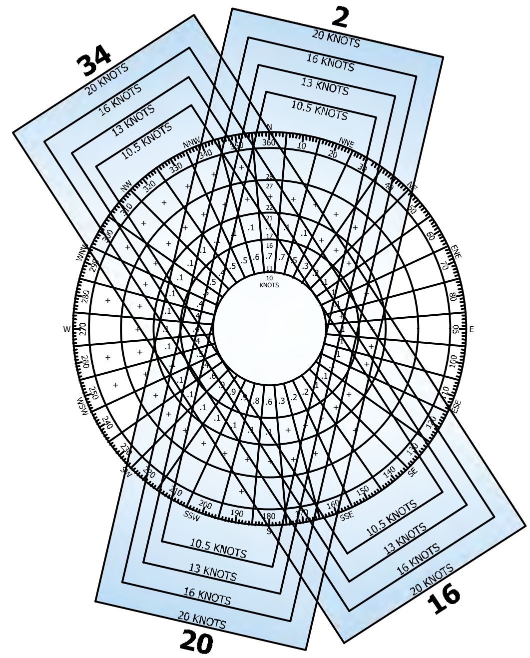
An aircraft transitioning from en-route to one of the airports in the greater Richmond area is under the control of the Potomac TRACON facility located in Warrenton, Virginia. The Potomac TRACON provides radar services to aircraft within a 30-50 nautical mile radius of RIC between the ground surface and a flight level of 10,000 feet above mean sea level (MSL).

This TRACON is one of the busiest in the United States, as it also serves Ronald Reagan Washington National Airport (DCA), Washington Dulles International Airport (IAD), and Baltimore Washington International Airport (BWI). The TRACON airspace surrounding the airport changes depending on the runway configuration that is being utilized.



DATA SOURCE

STATION	
NAME	NUMBER
RICHMOND INTERNATIONAL AIRPORT	USAF 724010 WBAN 13740
PERIOD	**SOURCE**
2010-2019	NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA) INTEGRATED SURFACE DATABASE (ISD)

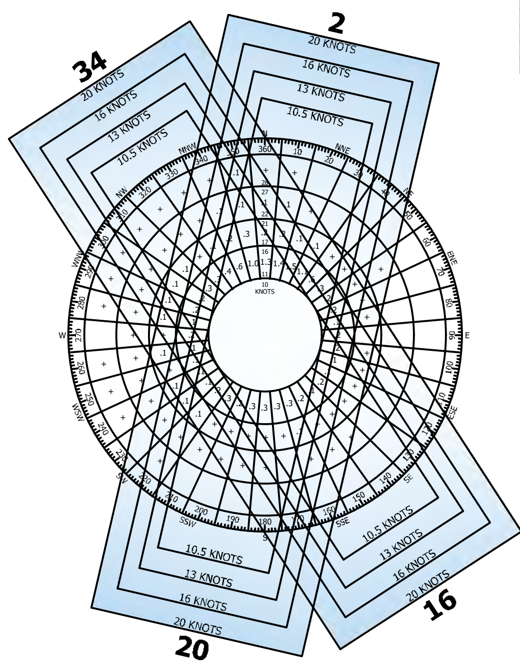


WIND COVERAGE - ALL WEATHER

RUNWAY	CROSSWIND COMPONENT			
	10.5 KNOTS	13 KNOTS	16 KNOTS	20 KNOTS
16	53.67%	55.41%	56.82%	57.19%
34	54.62%	56.44%	57.76%	58.10%
16/34	**92.85%**	**96.41%**	**9912%**	**99.82%**
2	52.89%	54.05%	55.00%	55.35%
20	57.59%	58.71%	59.59%	59.85%
2/20	**95.09%**	**97.36%**	**99.17%**	**99.79%**
COMBINED	**97.97%**	**99.22%**	**99.80%**	**99.97%**

WIND COVERAGE - IFR CONDITIONS

RUNWAY	CROSSWIND COMPONENT			
	10.5 KNOTS	13 KNOTS	16 KNOTS	20 KNOTS
16	46.18%	47.05%	47.74%	47.98%
34	59.70%	62.24%	63.88%	64.37%
16/34	**93.23%**	**96.64%**	**98.95%**	**99.68%**
2	66.21%	67.33%	68.10%	68.38%
20	42.39%	43.05%	43.60%	43.86%
2/20	**96.01%**	**97.78%**	**99.09%**	**99.63%**
COMBINED	**98.32%**	**99.24%**	**99.71%**	**99.91%**



WIND COVERAGE - VFR CONDITIONS

RUNWAY	CROSSWIND COMPONENT			
	10.5 KNOTS	13 KNOTS	16 KNOTS	20 KNOTS
16	54.73%	56.65%	58.20%	58.58%
34	53.80%	55.52%	56.79%	57.11%
16/34	**92.72%**	**96.35%**	**99.15%**	**99.85%**
2	50.53%	51.72%	52.74%	53.11%
20	60.08%	61.29%	62.23%	62.50%
2/20	**94.84%**	**97.23%**	**99.17%**	**99.81%**
COMBINED	**97.89%**	**99.21%**	**99.81%**	**99.98%**

EXHIBIT 2-1
AIRPORT WINDROSE DATA

NTS 0 NTS NTS NTS

2.5.3 AIRPORT TRAFFIC CONTROL TOWER AIRSPACE

The Airport Traffic Control Tower (ATCT) provides aircraft with clearances to land and/or take off from RIC and handles airside ground operations. The airspace controlled by the ATCT is designated as Class C airspace and is defined as the area that is within a five-mile radius of the airport and less than 4,000 feet above the airport elevation. It also includes the area that is from 1,200 feet above MSL up to and including 4,000 feet above MSL and extends out to a ten-mile radius from the airport.

The RIC ATCT utilizes two runway configurations, the North configuration, and the South configuration. The North configuration utilizes Runways 2 and 34, and the South configuration utilizes Runways 20 and 16. Wind velocity and direction affects both runway and route configuration. The runway configuration that is utilized is directly correlated to the wind direction and velocity which consequently dictates the approach/departure routes that are utilized between the RIC ATCT and the Potomac TRACON.

2.5.3.1 Arrivals Airspace Structure

Arriving aircraft, at RIC, currently have three published Standard Terminal Arrival Routes (STAR), which are classified as the DUCXS Five Arrival (RNAV), the POWTN Five Arrival (RNAV), and the SPIDR Four Arrival (RNAV). These STAR procedures consist of an ATC coded IFR arrival route established for application to arriving IFR aircraft destined for certain airports.

STARs simplify clearance delivery procedures, and also facilitate transition from the en-route structure to an outer fix or an instrument approach fix/arrival waypoint in the terminal area to simplify clearance delivery procedures/flow.

2.5.3.2 Departure Airspace Structure

Aircraft departing RIC are issued a departure heading and altitude by the RIC ATCT. This heading and altitude set the aircraft up for the ATCT to “hand off” control to the Potomac TRACON. The heading and altitude that are assigned depend on the runway configuration being utilized at the airport.

After the aircraft departs, the ATCT “hands off” control to the corresponding sector. The TRACON controller in turn issues vectors/routes to place the aircraft in a position to be handed off to the ARTCC.

2.6 AIRFIELD FACILITIES

The primary airfield facilities include runways, taxiways, apron areas, and associated navigational aids (NAVAID). This section also discusses Federal Aviation Regulations (FAR) Part 77 imaginary surfaces, obstructions, and airfield critical areas such as Runway Protection Zones (RPZ) and Runway Safety Areas (RSA)

The Federal Aviation Administration (FAA) classifies airports as a part of the National Transportation System. This classification is used to identify the individual role of the airport within the larger national system of airports and allows the FAA a mechanism to assess the specific needs of the facility relative to other airports of similar demand and utilization.

This applies to such things as funding allocation, safety requirements, and passenger handling standards. RIC is classified as a small-hub, primary commercial service airport in the National Plan of Integrated Airport System (NPIAS).

When planning new facilities on an airport or improvements to an existing airport, the FAA requires the selection of one or more "design aircraft." As stated in Advisory Circular (AC) 150/5300-13A, Airport Design, design aircraft for the purposes of airport geometric design is a composite aircraft representing a collection of aircraft classified by three parameters: Aircraft Approach Category (AAC), Airplane Design Group (ADG), and Taxiway Design Group (TDG). These parameters represent the aircraft that are intended to be accommodated at RIC.

2.6.1 RUNWAY DESIGN CODE

The FAA has established several imaginary surfaces to protect aircraft operational areas and keep them free from obstructions. These include the runway safety area (RSA), runway object free area (ROFA), runway obstacle free zone (ROFZ), and runway protection zone (RPZ). In addition, standards for separation of facilities and aircraft have been established.

Table 2-1, Current Runway and Taxiway Design Standards outlines the runway design standards currently in place at the Richmond International Airport.

When calculating the Runway Design Group for a runway or airport, the selected AAC, ADG, and approach visibility minimums are combined to form the RDC. The first component, depicted by a letter, is the AAC and relates to aircraft approach speed (operational characteristics). See **Table 2-2, Airport Approach Category**.

The second component, depicted by a Roman numeral, is the ADG and relates to either the aircraft wingspan or tail height; whichever is most restrictive, of the largest aircraft expected to operate on the runway and taxiways adjacent to the runway (see **Table 2-3, Airplane Design Group**).

Table 2-1: Current Runway and Taxiway Design Standards

FAA Design Standards		Runway 16-34		Runway 2-20	
		16	34	2	20
Aircraft Approach Category (AAC)/Airplane Design Group (ADG)		D-IV		D-IV	
	Visibility Minimums	1/2 Mile	1/2 Mile	3/4 Mile	7/8 Mile
Runway Safety Area (RSA)	Length Beyond Departure End (Feet)	1,000		1,000	
	Length Prior to Threshold (Feet)	600		600	
	Width (Feet)	500		500	
Runway Object Free Area (ROFA)	Length Beyond Runway End (Feet)	1,000		1,000	
	Length Prior to Threshold (Feet)	600		600	
	Width (Feet)	800		800	
Runway Obstacle Free Zone (ROFZ)	Length (Feet)	200		200	
	Width (Feet)	400		400	
Precision Obstacle Free Zone (POFZ)	Length (Feet)	200	200	N/A	N/A
	Width (Feet)	800	800	N/A	N/A
Approach Runway Protection Zone (RPZ)	Length (Feet)	2,500	2,500	1,700	1,700
	Inner Width (Feet)	1,000	1,000	1,000	1,000
	Outer Width (Feet)	1,750	1,750	1,510	1,510
	Acres	78.914	78.914	48.978	48.978
Departure Runway Protection Zone (RPZ)	Length (Feet)	1,700	1,700	1,700	1,700
	Inner Width (Feet)	500	500	500	500
	Outer Width (Feet)	1,010	1,010	1,010	1,010
	Acres	29.465	29.465	29.465	29.465
Runway Separation	***Runway Centerline to:***				
	Parallel Runway Centerline (Feet)	1,200		1,200	
	Holding Position (Feet)	250		250	
	Parallel Taxiway/Taxilane Centerline (Feet)	400		400	
	Aircraft Parking Area (Feet)	500		500	
TSA	Taxiway Safety Area – Width (Feet)	171		171	
TOFA	Taxiway Object Free Area – Width (Feet)	259		259	
Taxilane OFA	Taxilane Object Free Area – Width (Feet)	225		225	
Taxiway Separation	***Taxiway Centerline to:***				
	Parallel Taxiway/Taxilane Centerline (Feet)	215		215	
	Fixed or Movable Object (Feet)	129.5		129.5	
	Taxilane Centerline to:				
	Parallel Taxiway/Taxilane Centerline (Feet)	198		198	
	Fixed or Movable Object (Feet)	112.5		112.5	
Wingtip Clearance	Taxiway Wingtip Clearance (Feet)	44		44	
	Taxilane Wingtip Clearance (Feet)	27		27	

The third component relates to the visibility minimums expressed by RVR values in feet of 1200, 1600, 2400, 4000, and 5000 (corresponding to lower than 1/4 mile, lower than 1/2 mile but not lower than 1/4 mile, lower than 3/4 mile but not lower than 1/2 mile, lower than 1 mile but not lower than 3/4 mile, and not lower than 1 mile, respectively) (see **Table 2-4, Visibility Minimums**). The third component should read "VIS" for runways designed with visual approach use only. Generally, runway standards are related to aircraft approach speed, aircraft wingspan, and designated or planned approach visibility minimums. Runway to taxiway and taxiway/taxilane to taxiway/taxilane separation standards are related to ADG, TDG, and approach visibility minimums.

Table 2-2: Airport Approach Category (AAC)

Aircraft Approach Category	V_{REF} / Approach Speed
A	Approach Speed less than 91 knots
B	Approach Speed 91 knots or more but less than 121
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

Table 2-3: Airplane Design Group (ADG)

Group	Tail Height (Feet)	Wingspan (Feet)
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

Table 2-4: Visibility Minimums

RVR (Feet)[1]	Instrument Flight Visibility Category (Statute Mile)
5000	Not lower than 1 mile
4000	Lower than 1 mile but not lower than ¾ 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

[1] RVR Values are not exact equivalents

Based on the recommendations and guidelines outlined in AC 150/5300-13A, the Runway Design Code (RDC) for the Airport is set at a D-IV. The airfield facilities meet Runway Design Code (RDC) D-IV criteria—runways and taxiways can accommodate aircraft with approach speeds of up to 166 knots and wingspans of up to 171 feet. ARC Design Group IV aircraft include the Boeing 767-300/400 and the Airbus A310-200F.

2.6.2 RUNWAYS

RIC has two active runways. The nomenclature used for these runways is defined by compass headings; they are referred to as 2-20 and 16-34. ATCT personnel consider Runway 16-34 the primary runway due to its Category III Instrument Landing System; however, operations are generally split between Runways 2-20 and 16-34. (see **Exhibit 2-2: Existing Airfield Facilities**).

2.6.2.1 RUNWAY 16-34

Runway 16-34 is oriented along a northwest-southeast alignment and is the longest runway at RIC with dimensions of 9,003 feet in length and 150 feet in width. It is outfitted with High Intensity Runway Lighting (HIRL) and several instrument approaches including: RNAV (RNP) Approach, RNAV (GPS) Approach, VOR Approach and an ILS Approach for Runway 16, as well as a SA Category I ILS Approach, Category II and III ILS Approach, RNAV (RNP) Approach, RNAV (GPS) Approach, and a VOR Approach for Runway 34. The runway is constructed of asphaltic concrete with a grooved surface. The current Runway Pavement Classification Number (PCN) is 92/F/B/W/T and has the following published pavement strengths:

- 125,000 pounds for single-wheel main gear aircraft,
- 200,000 pounds for dual-wheel main gear aircraft, and
- 340,000 pounds for dual-tandem wheel main gear aircraft

2.6.2.2 RUNWAY 2-20

Runway 2-20, which is generally oriented in a north-south alignment, is the most heavily utilized runway at RIC due to its proximity to the terminal area. It is 6,607 feet in length and 150 feet wide. This runway is outfitted with High Intensity Runway Lighting (HIRL), RNAV (RNP) Approaches, RNAV (GPS) Approaches, and VOR Approaches for both runway ends, as well as a Category I Instrument Landing System (ILS) for approaches to Runway 2. The runway is constructed of asphaltic concrete with a grooved surface. The current Runway Pavement Classification Number (PCN) is 70/F/C/W/T and has the following published pavement strengths:

- 125,000 pounds for single-wheel main gear aircraft,
- 200,000 pounds for dual-wheel main gear aircraft, and
- 340,000 pounds for dual-tandem wheel main gear aircraft.

Table 2-5 depicts a summary of the characteristics of each runway.

RICHMOND INTERNATIONAL AIRPORT
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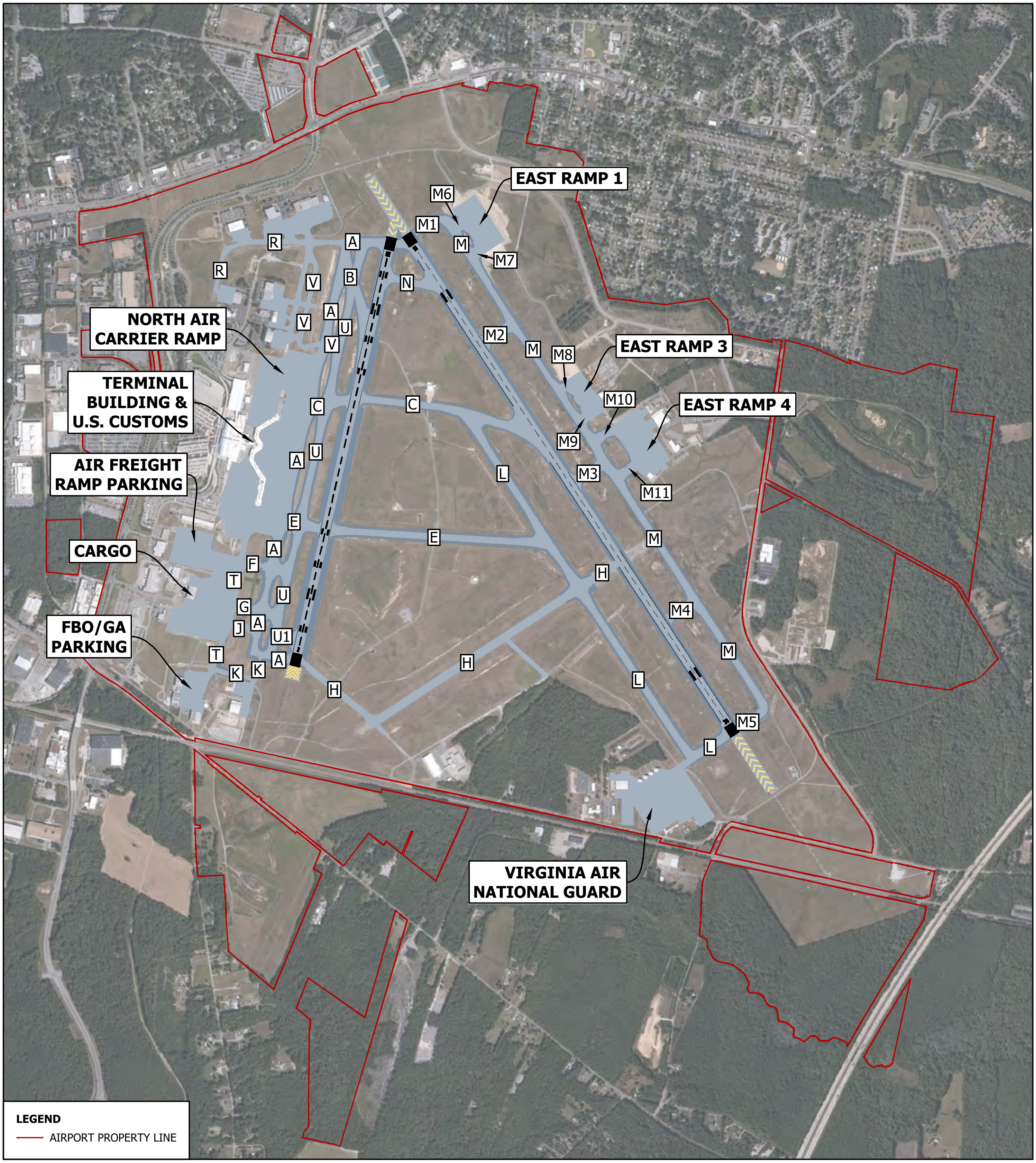


EXHIBIT 2-2
EXISTING AIRFIELD FACILITIES

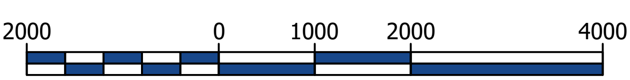


Table 2-5: Runway Characteristics

Item		Runway 16-34		Runway 2-20	
		Runway 16	Runway 34	Runway 2	Runway 20
Runway Dimensions	Length	9,003		6,607	
	Width	150		150	
Displaced Threshold		N/A	N/A	N/A	N/A
% Wind Coverage (All WX / VFR / IFR)	10.5 Knot Crosswind	92.85% / 92.72% / 93.23%		95.09% / 94.84% / 96.01%	
	13 Knot Crosswind	96.41% / 96.35% / 96.64%		97.36% / 97.23% / 97.78%	
	16 Knot Crosswind	99.12% / 99.15% / 98.95%		99.17% / 99.17% / 99.09%	
	20 Knot Crosswind	99.82% / 99.85% / 99.68%		99.79% / 99.81% / 99.63%	
Pavement Type		Asphalt		Asphalt	
Pavement Treatment		Grooved		Grooved	
Pavement Design Strength (Pounds)	Single Wheel	125,000		125,000	
	Double Wheel	200,000		200,000	
	Double Tandem	340,000		340,000	
Runway Classification Number (PCN)		92/F/B/W/T		70/F/C/W/T	
Runway Marking		Precision	Precision	Precision	Precision
Runway Lighting		HIRL		HIRL	
NAVAIDS – Visual Approach		VASI (4L), MALSR	VASI (4L), ALSF2	PAPI (4L), MALSR	PAPI (4L), REILS
NAVAIDS – Instrument Approach		ILS, RNAV (RNP), RNAV (GPS), VOR	ILS, RNAV (RNP), RNAV (GPS), VOR	ILS, RNAV (RNP), RNAV (GPS), VOR	RNAV (RNP), RNAV (GPS), VOR

2.6.3 TAXIWAY SYSTEM

The runway system and developed aviation uses on the airport are served by a system of taxiways that provides access between the airfield and other aviation facilities. Taxiways link the independent airport elements and provide for controlled movement to and from the runways, terminal/cargo areas, general aviation facilities and aircraft parking areas. This section evaluates the existing taxiway system at RIC. The taxiways have been divided into four classifications: full and partial parallel taxiways; entrance and exit taxiways; transverse taxiways (or bypass and crossover); and aprons and hold pads. **Table 2-6** provides the characteristics of each of the existing taxiways.

2.6.3.1 Taxiway Descriptions

Parallel or partial parallel taxiways are generally parallel to the runway they serve. They connect one runway end to the other runway end, or to a point along the runway that is served by the partial parallel taxiway.

Entrance and exit taxiways are located at points along a runway and connect the runway to the parallel or partial parallel taxiway that serves the runway.

Bypass, crossover, or transverse taxiways are used to connect one operation area on the airport with another operation area on the airport.

Hangar and apron access taxiways are used to provide access from the parallel taxiway system to parking ramps and aircraft hangar areas that are located around the airport. The existing taxiway system is shown in **Exhibit 2-2**.

Table 2-6: Taxiway Data/Characteristics

Taxiway	Classification	Width	ADG	TDG	TSA[1] (Width)	TOFA[1] (Width)	TESM[1]	Lighting
A	Full Parallel	75	IV	5	171	259	15	MITL
B	Entrance/Exit	150	IV	5	171	259	15	MITL
C	Transverse	75	IV	5	171	259	15	MITL
E	Transverse	75	IV	5	171	259	15	MITL
F	Access	90	IV	5	171	259	15	MITL
G	Access	90	IV	5	171	259	15	MITL
H	Transverse	75	IV	5	171	259	15	MITL
J	Access	50	IV	4	171	259	10	MITL
K	Access	75	IV	5	171	259	15	MITL
L	Partial Parallel	75	IV	5	171	259	15	MITL
M	Full Parallel	75	IV	5	171	259	15	MITL
N	Transverse	75	IV	5	171	259	15	MITL
R	Access	50	IV	4	171	259	10	MITL
T	Access	90	IV	5	171	259	15	MITL
U	Full Parallel	75	IV	5	171	259	15	MITL
U1	Entrance/Exit	75	IV	5	171	259	15	MITL
V	Transverse	50	IV	4	171	259	10	MITL

[1] TSA – Taxiway Safety Area; TOFA – Taxiway Object Free Area; TESM – Taxiway Edge Safety Margin

2.6.3.2 Primary Taxiways

The primary Taxiways at RIC are A, C, E, H, L, M, and U. Each of these taxiways serves a specific purpose that facilitates the safe and efficient flow of aircraft in and around the airfield.

Taxiway A is a full-length parallel taxiway that is located along the west side of Runway 2-20. It is 75 feet wide and 7,420 feet in length. The pavement is constructed of Portland Cement Concrete (PCC) and equipped with Medium Intensity Taxiway Lighting (MITL) to provide visual guidance during night operations at the airport.

Taxiway U is also considered a full-length parallel taxiway located between Runway 2-20 on the east, and Taxiway A on the west. It is also 75 feet wide and has a length of 6,605 feet. This taxiway is constructed of Hot Mix Asphaltic Concrete (HMAC) and is also equipped with MITL.

Taxiway M is the parallel taxiway to Runway 16-34. It is located along the north side of the runway and is 75 feet wide and 9,500 feet long. It is constructed of HMAC and is equipped with MITL.

Taxiway C serves as a transverse taxiway from the east side of Runway 2-20 and intersects with Taxiway L and Runway 16-34. It provides a direct taxi route for aircraft travelling between Runway 34 and the airport terminal area. This PCC pavement is 2,550 feet long and 75 feet wide. It is available for use by all aircraft using the airfield and is equipped with MITL.

Taxiway E commences on the east side of Runway 2-20 and extends to Taxiway L while serving as a transverse taxiway. It is approximately 3,240 feet in length and 75 feet wide. The pavement is constructed of PCC and is equipped with MITL.

Taxiway H serves as a transverse taxiway and commences on the east side of Runway 2-20, extends southeast for approximately 1,400 feet before turning to the northeast for approximately 4,300 feet and intersecting Runway 16-24. The airport's current utilization of taxiways identifies Taxiway H as the primary connection between the air cargo area and the approach end of Runway 34. It is constructed of PCC and is approximately 5,700 feet in length and 75 feet wide. Taxiway H is available for use by all aircraft presently using the airport. Taxiway H is equipped with MITL.

Taxiway L is a partial parallel taxiway for the south end of Runway 16-34 and is 6,100 feet in length and 75 feet wide. This PCC pavement is utilized by all aircraft on the field and is equipped with MITL.

2.6.3.3 Secondary Taxiways

The remainder of the airfield's taxiway system is made up of secondary taxiways that aid in the flow of aircraft in and around the airfield. All the secondary taxiways are equipped with MITL and can accommodate all aircraft utilizing RIC.

2.6.3.4 Aprons and Hold Pads

For the purpose of this document, four categories of aprons and hold pads are identified:

- Terminal Apron
- Cargo/Maintenance Aprons
- General Aviation Aprons
- Runway Hold Pads.

All Terminal aprons are considered non-movement areas and are not controlled by the Airport Traffic Control Tower (ATCT.) Non-movement Terminal aprons are typically controlled by airport operational procedures and the airlines.

The cargo portion of the South Apron is divided into two areas: the southern portion, which is constructed of PCC and used by Continental Express, UPS, and FedEx and the northern area, which is constructed of bituminous pavement and serves several hardstand parking positions used by Cargex, FedEx, DHL, and the United States Postal Service. Airfield access to these areas is provided to Taxiway A via Taxilanes F, G and J to Taxiway.

Further south are two separate areas accessed via two taxilanes that serve Million Air (FBO) and TransStates (an aircraft maintenance facility). All of the aprons are constructed of bituminous pavement and have airfield access via taxilanes that connect the south ends of Taxiways A and U with the South Cargo Apron.

The North General Aviation (GA) apron areas serve two GA/FBO operators that either have their own apron areas or share apron areas with another operator. These aprons are serviced by a single taxilane that connects to the north end of Taxiway A.

Currently, RIC does not have any commercial and/or small aircraft hold pads.

2.6.4 AIRPORT AIDS TO NAVIGATION AND NAVIGATIONAL AIDS

RIC is served by an array of electronic and visual systems that aid pilots in landing safely and navigating into and around the airfield. These systems are discussed in the following sections.

2.6.4.1 IDENTIFICATION LIGHTING

The location and presence of an airport at night is universally indicated by the airport beacon. The 36-inch airport beacon at RIC is situated on top of the ATCT. The rotating beacon is equipped with an optical system that projects two beams of light, one green and one white, 180 degrees apart.

2.6.4.2 OBSTRUCTION LIGHTING

Obstructions in the vicinity of the Airport are marked and/or lighted to warn pilots about objects that may affect navigable airspace. Existing obstructions that cannot be removed are lighted. These obstructions are identified for pilots on approach charts and includes all aeronautical data the NOAA National Geodetic Survey (NGS) acquires and maintains for airports and NAVAIDs under FAA/NGS Interagency Agreements. Currently, there is a pole approximately 3,300 feet from the Runway 2 threshold at RIC that is lighted and/or marked.

2.6.4.3 APPROACH LIGHTING

Approach lighting systems (ALS) are used in the vicinity of runway thresholds in conjunction with electronic navigational aids for the final portion of ILS approaches under IFR conditions, and as visual guides for nighttime approaches under VFR conditions. These systems provide the basic means to transition from instrument flight to visual flight for landing. The approach lighting system supplies the pilot with visual cues concerning aircraft alignment, roll, height, and position relative to the runway threshold.

A Medium Intensity Approach Lighting System with Runway Alignment Indicator (MALSR) is located on the approach to Runway 16 and Runway 2. This system assists pilots transitioning from the cockpit instrument landing segment to the runway environment. The system provides a lighted approach path 2,400 feet in length along the extended centerline of the runway.

An Approach Lighting System with sequenced Flashers (ALSF-2) is located on the approach to Runway 34 in conjunction with each of the ILS approaches. The lighting scheme for the ALSF-2 extends between 2,400 feet and 3,000 feet from the end of the runway.

2.6.4.4 RUNWAY TOUCHDOWN ZONE AND CENTERLINE LIGHTING

The ILS approaches to Runway 34 are also supported by pavement touchdown zone lights and runway centerline lighting. Runway centerline lighting provides positive visual guidance to pilots regarding the location and alignment of the runway centerline during periods of low visibility. Flush mounted bi-directional centerline lights are spaced at 50-foot intervals beginning 75 feet from the landing threshold and extending to within 75 feet of the opposite end of the runway. Touchdown Zone Lighting consists of two rows of unidirectional three fixture light barrettes placed in the pavement symmetrically about the runway centerline normally at 100-foot intervals. The basic system extends 3,000 feet along the runway.

2.6.4.5 RUNWAY AND THRESHOLD LIGHTING

The identification of runway ends, or thresholds assists the approaching aircraft in much the same manner as other approach aids. The runway end/threshold is given special lighting consideration. Instrument threshold lighting is available on Runways 2, 16, and 34 consisting of two groups of four fixtures and visual threshold lighting across the entire end of the runway pavement. In addition, all other runway thresholds on the airport are equipped with four fixture runway threshold lights.

2.6.4.6 RUNWAY END IDENTIFIER LIGHTS

Runway End Identifier Lights (REIL) provide additional delineation of the runway threshold. They consist of a pair of synchronized flashing lights, often referred to as strobes, each located laterally on the side of the runway threshold. REILs are installed on Runway 20.

2.6.4.7 APPROACH DESCENT INDICATORS

The term "Approach Descent Indicators" is a generic reference that addresses systems that are used to provide pilots a visual reference of their approach to a runway during night operations. The more common systems for providing visual descent information are known as Visual Approach Slope Indicator (VASI), Precision Approach Path Indicator (PAPI), and Pulsating Visual Approach Slope Indicator (PLASI). RIC has installed four-box PAPI systems to serve aircraft approaches on Runways 16, 34, 2, and 20. These systems provide visual guidance to pilots during approach to landing by radiating a directional pattern of high intensity red and white focused light beams that indicate whether a pilot is on the approach path.

2.6.4.8 RUNWAY EDGE LIGHTING

Runway Edge Lighting is used to outline the edges of a runway during periods of darkness and/or restricted visibility. These systems are classified in accordance with their intensity or brightness: High Intensity Runway Lights (HIRL), Medium Intensity Runway Lights (MIRL), and Low Intensity Runway Lights (LIRL). Both runways 16-34 and 2-20 are equipped with HIRL. Runway Edge Lights are white, except on instrument runways where amber replaces white on the last 2,000 feet or half the runway length, whichever is less, to form a caution zone for landings.

2.6.4.9 TAXIWAY LIGHTING

The final segment of a flight commences with the taxiing operation to the aircraft's destination (terminal ramp, parking apron, or hangar). Taxiway lighting, which delineates the taxiway edge and/or centerline, provides guidance to pilots at night and during periods of low visibility. The most commonly used type of taxiway lighting consists of a series of blue fixtures located at two hundred feet intervals along the taxiway edges. This is the system typical of the lighted taxiways at RIC. These lights provide taxiway alignment up to the aircraft apron. All taxiways at RIC are equipped with MITL. However, the north/south sections of Taxiway V are not lighted (reflectors only).

2.6.4.10 ELECTRONIC NAVIGATIONAL AIDS

Navigational aids (NAVAIDS) also include electronic devices, which provide point-to-point guidance information or position data to an aircraft in flight. Various types of NAVAIDS are available for use at an airport, and many of these have been installed and are employed at RIC. This includes a Very High Frequency Omni-Range Station and Tactical Air Navigation System (VORTAC), Instrument Landing Systems (ILS), Global Positioning Systems (GPS), and Airport Surveillance Radar (ASR). Each of these NAVAIDs is detailed in the following sections, as well as listed in **Table 2-7**.

Runway approaches are published on charts produced by the United States Department of Transportation, National Aeronautical Charting Office, and the Federal Aviation Administration (FAA) on an eight (8) week cycle. These charts contain a great deal of information about the navigational facilities on and around airports. Each of the airports approaches is listed on a separate sheet referred to as an approach plate.

The specific landing criteria for each approach are commonly referred to as minimums, which include two (2) components: ceiling height (decision height) and visibility requirement. There are different approach minimums required for each aircraft approach category. An aircraft approach category is defined as a grouping of aircraft based on 1.3 times the stall speed in the landing configuration at the certified maximum flap setting and maximum landing weight at standard atmospheric conditions.

Table 2-7: Approach Procedures

Instrument Approach Procedures[1]			
Runway 16	Runway 34	Runway 2	Runway 20
ILS/LOC	ILS/LOC	ILS/LOC	RNAV (RNP) Y
RNAV (RNP) Y	ILS (SA CAT I)	RNAV (RNP) Y	RNAV (RNP) Z
RNAV (RNP) Z	ILS (CAT II & III)	RNAV (RNP) Z	VOR
VOR	RNAV (RNP) Y	VOR	
	RNAV (RNP) Z		
	VOR		

[1] Source: US Terminal Procedures (September 10, 2020, to October 8, 2020)

2.6.4.11 INSTRUMENT LANDING SYSTEM (ILS) APPROACHES

The Instrument Landing System (ILS) is an approach and landing aid designed to identify an aircraft's approach path alignment. The ILS system is installed to allow straight in approaches during periods of poor visibility and at RIC, to allow landings on at least one runway, with ceilings as low as 100 feet above the runway surface and visibility to 1/4 mile away from the runway threshold for all four categories of aircraft approach speeds. Runways 2, 16, and 34 are equipped with varying types of this system. An ILS system provides horizontal and vertical guidance — vertically by a glide slope beacon and horizontally by a localizer beacon. Proximity to the threshold (range) is furnished by the outer, middle, and inner marker beacons; and visual identification is supplied by the approach lighting system and runway edge lights.

At RIC, localizers are in place for Runways 2, 16, and 34. To provide horizontal guidance to a runway threshold, a localizer is positioned off the opposite end of the runway threshold. The localizer antenna for Runway 2 broadcasts at a frequency of 110.9 megahertz (MHZ), while the Runway 16 and Runway 34 localizer antennae broadcast at 110.7 MHZ. These systems emit extremely high frequency (VHF) signals that tell the pilot to what extent he/she is left or right of the runway centerline. See **Table 2-8** for the decision height and approach minimums for the Runways 16, 34, and 2 ILS Approaches.

To further assist the ILS approach, two marker beacons, the outer marker (OM) and the middle marker (MM), furnish range information to indicate how far along the approach path the aircraft has progressed. The Runway 16 ILS approach has a three-degree glide slope that intercepts the outer marker at a distance of about 6.9 nautical miles northwest from, and approximately 2,293 feet above, the Runway 16 threshold.

The middle marker for the Runway 16 ILS at RIC is located roughly 0.6 nautical miles to the northwest of the Runway 16 threshold. Both the Category I and Category II ILS to Runway 34 have 3.0-degree glide slopes that intersect the outer marker at a distance of 4.6 nautical miles southeast from, and 1,532 feet above, the runway threshold. The middle marker for both ILSs is situated 0.4 miles to the southeast of the runway threshold.

2.6.4.12 GLOBAL POSITIONING SYSTEM (GPS) APPROACHES

The FAA is currently publishing Global Positioning System (GPS) approaches for airports across the country. GPS is a relatively new technology for both en route and terminal navigation procedures. It is a space-based radio positioning, navigation, and time-transfer system to provide highly accurate position and velocity information and precise time on a continuous global basis.

The system will be unaffected by weather and will provide a worldwide common grid reference system. RIC has GPS overlay approaches published for all four of its runways. See **Table 2-9** for the decision height and approach minimums for each RNAV (GPS) approach.

Table 2-8: Instrument Landing System (ILS) Approaches

Runway	Approach Category	Aircraft Category	Approach Minimums	
			Decision Altitude[1]	Visibility Minimums[2]
16	S-ILS 16	A/B/C/D	200	1/2
	S-LOC 16	A	800	1/2
		B	800	3/4
		C/D	800	1 3/4
	Circling	A/B	800	1
		C	800	1 1/4
		D	800	2 1/2
	GORDD Fix Minimums %			
	S-LOC 16	A/B	500	1/2
		C/D	500	3/4
	Circling	A/B	500	1
		C	600	1 1/2
		D	600	1
Runway	**Approach Category**	**Aircraft Category**	**Approach Minimums**	
			Decision Altitude[1]	Visibility Minimums[2]
34	S-ILS 34	A/B/C/D/E	200	1/2
	S-LOC 34	A/B	400	1/2
		C/D/E	400	5/8
	Circling	A/B	500	1
		C	500	1 1/2
		D/E	600	2
	Special Authorization (SA) Category (CAT) I			
	S-ILS 34	A/B/C/D	150 DA 311	
	Category (CAT) II			
	S-ILS 34	A/B/C/D	100 DA 261	
	Category (CAT) IIIa			
	S-ILS 34	A/B/C/D	RVR 07	
	Category (CAT) IIIb			
	S-ILS 34	A/B/C/D	RVR 06	
	Category (CAT) IIIc			
	S-ILS 34	A/B/C/D	N/A	
2	S-ILS 2	A/B/C/D	300	3/4
	S-LOC 2	A/B/C/D	400	3/4
	Circling	A	500	1
		B	600	1 1/2
		C/D	600	2

[1] Mean Sea Level (MSL), Feet
[2] Statute Miles

Table 2-9: RNAV (RNP) & RNAV (GPS) Approaches

Runway	Approach Category	Aircraft Category	Approach Minimums	
			Decision Altitude[1]	Visibility Minimums[2]
16	RNAV (RNP) Y			
	RNP 0.11 DA	A/B/C/D	400	3/4
	RNP 0.30 DA	A/B/C/D	500	1
	RNAV (GPS) Z			
	LPV DA	A/B/C/D	200	1/2
	LNAV/VNAV DA	A/B/C/D	400	5/8
	LNAV MDA	A/B	500	1/2
		C/D	500	3/4
	Circling	A/B	500	1
		C	600	1 1/2
		D	600	2
34	RNAV (RNP) Y			
	RNP 0.11 DA	A/B/C/D	400	1/2
	RNP 0.30 DA	A/B/C/D	500	1
	RNAV (GPS) Z			
	LPV DA	A/B/C/D	200	1/2
	LNAV/VNAV DA	A/B/C/D	400	3/4
	LNAV MDA	A/B	400	1/2
		C/D	400	5/8
	Circling	A/B	500	1
		C	600	1 1/2
		D	600	2
2	RNAV (RNP) Y			
	RNP 0.11 DA	A/B/C/D	400	3/4
	RNP 0.30 DA	A/B/C/D	500	1
	RNAV (GPS) Z			
	LPV DA	A/B/C/D	300	3/4
	LNAV/VNAV DA	A/B/C/D	400	7/8
	LNAV MDA	A/B	500	3/4
		C/D	500	1
	Circling	A/B	500	1
		C	600	1 1/2
		D	600	2

[1] Mean Sea Level (MSL), Feet
[2] Statute Miles

Table 2-9: RNAV (RNP) & RNAV (GPS) Approaches (*Continued*)

Runway	Approach Category	Aircraft Category	Approach Minimums	
			Decision Altitude[1]	Visibility Minimums[2]
20	RNAV (RNP) Y			
	RNP 0.11 DA	A/B/C/D	400	1
	RNP 0.30 DA	A/B/C/D	500	1 1/2
	RNAV (GPS) Z			
	LPV DA	A/B/C/D	300	7/8
	LNAV/VNAV DA	A/B/C/D	500	1 1/2
	LNAV MDA	A/B	600	1
		C/D	600	1 3/8
	Circling	A/B	600	1
		C	600	1 1/2
		D	600	2

[1] Mean Sea Level (MSL), Feet
[2] Statute Miles

2.6.4.13 VERY HIGH FREQUENCY (VHF) OMNIDIRECTIONAL RANGE (VOR) APPROACHES

The VHF Omnidirectional Range (VOR) is one of the most widely used non-precision approach types in the National Airspace System (NAS). VOR approaches use VOR facilities both on and off the airport to establish approaches and include the use of a wide variety of equipment, such as Distance Measuring Equipment (DME) and Tactical Air Navigation Systems (TACAN).

Despite the various configurations, all VOR approaches are non-precision approaches, require the presence of properly operating VOR equipment, and can provide minimum descent altitudes (MDAs) as low as 250 feet above the runway. Because of the high radio frequencies involved, the RIC's VOR is constrained to line-of-sight distances. This facility is located in the midfield area, south of taxiway E. Currently, RIC has VOR approach procedure to all four runways. See **Table 2-10** for the decision height and approach minimums for each approach.

2.6.4.14 AIRPORT SURVEILLANCE RADAR (ASR)

The Airport Surveillance Radar (ASR) is used to provide the ATCT with information regarding aircraft operating within the airspace around the airport. The ASR rotates through 360 degrees, and information is displayed on radar scopes in the ATCT. RIC is served by an ASR-9.

Table 2-10: Very High Frequency (VHF) Omnidirectional Range (VOR)

Runway	Approach Category	Aircraft Category	Approach Minimums	
			Decision Altitude[1]	Visibility Minimums[2]
16	S-16	A/B/C	500	3/4
		D	500	1
	Circling	A/B	500	1
		C	600	1 1/2
		D	600	2
34	S-34	A/B	400	1/2
		C	400	3/4
		D	400	1
	Circling	A/B	500	1
		C	600	1 1/2
		D	600	2
2	S-2	A/B	500	3/4
		C/D	500	1
	Circling	A/B	500	1
		C	600	1 1/2
		D	600	2
20	S-20	A/B	500	1
		C/D	500	1 3/8
	Circling	A/B	500	1
		C	600	1 1/2
		D	600	2

[1] Mean Sea Level (MSL), Feet
[2] Statute Miles

2.6.4.15 AIRFIELD ELECTRICAL SYSTEM

The Airfield Electrical Systems are housed in the South and North Vaults. The South and North Vaults are cinder block, one-story structures of approximately 2,100 square feet each. Both facilities house the Constant Current Regulators (CCRs) that are the power source for the airfield lighting circuits. The runway and taxiway circuits come into the vaults via a 2” conduit from a manhole located outside the vault. The conduits terminate in 12” x 16” x 6” panel, where it connects to the field leads from the CCR by L-823 connectors.

2.6.5 AIRFIELD PAVEMENT

There are two types of pavement on the airfield. The first is bituminous pavement, commonly referred to as asphalt. The second type of pavement on the airfield is Portland cement concrete (PCC). PCC is a higher cost pavement to install but typically has a longer life span and much lower maintenance cost. If properly designed, installed, and maintained, PCC should last 20 years or more before it needs to be replaced.

PCC makes up approximately 30% of the airfield pavement, and all but a small section at the north end of the terminal is considered to be in good condition. The remaining 70% of the pavement on the airfield is Hot Mix Asphalt Concrete (HMAC), including both runways.

2.6.6 PERIMETER ROADS

The Airfield Perimeter Road is a part of the airfield roadway system and is located along the interior perimeter boundary of the airport. The purpose of this road is to permit access to all areas of the airport without traversing areas designated for controlled aircraft movement. Perimeter Roads are used by RIC Airport Operations staff to access its facilities and the FAA staff to access its equipment.

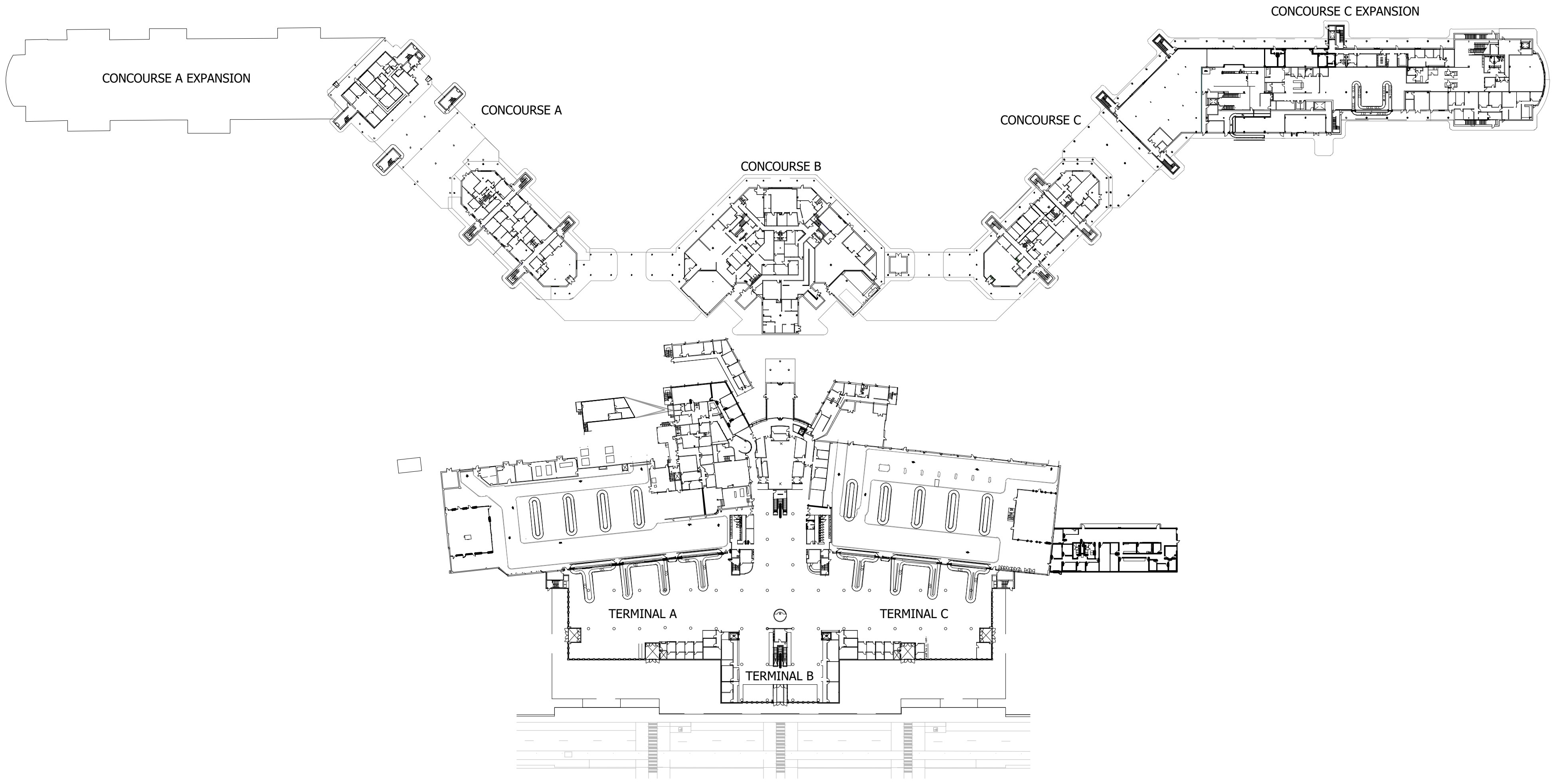
2.7 TERMINAL FACILITIES

In the spring of 2007, RIC officially opened its new terminal and concourse facilities. **Exhibits 2-3** through **2-5** depict the existing terminal building and concourse areas.

The two-level passenger terminal and concourses accommodate all commercial flights at RIC. While primarily serving domestic operations, the terminal and concourses occasionally accommodate international charter activity as well. The terminal accommodates both airline arrival and departure functions such as ticketing, security screening, baggage make-up, and baggage claim. Concourses A and B are both dual-level facilities and share a central concessions area and connecting corridor with the terminal. The upper level of the concourse includes holdrooms and other airline space, concessions areas, and public corridors and spaces to accommodate passengers. The lower level (a.k.a. the apron level) includes primarily ramp operations space to accommodate airline operations personnel. The lower level of the concourse also includes holdroom space and a Federal Inspection Services (FIS) area as well. The terminal and concourse facilities provide a total of 28 gates.

The newly renovated and expanded concourses have independent security screening check point (SSCP) areas designed for a total of four lanes per concourse. There is no sterile corridor between the two concourses.

RICHMOND INTERNATIONAL AIRPORT
MASTER PLAN REVISION



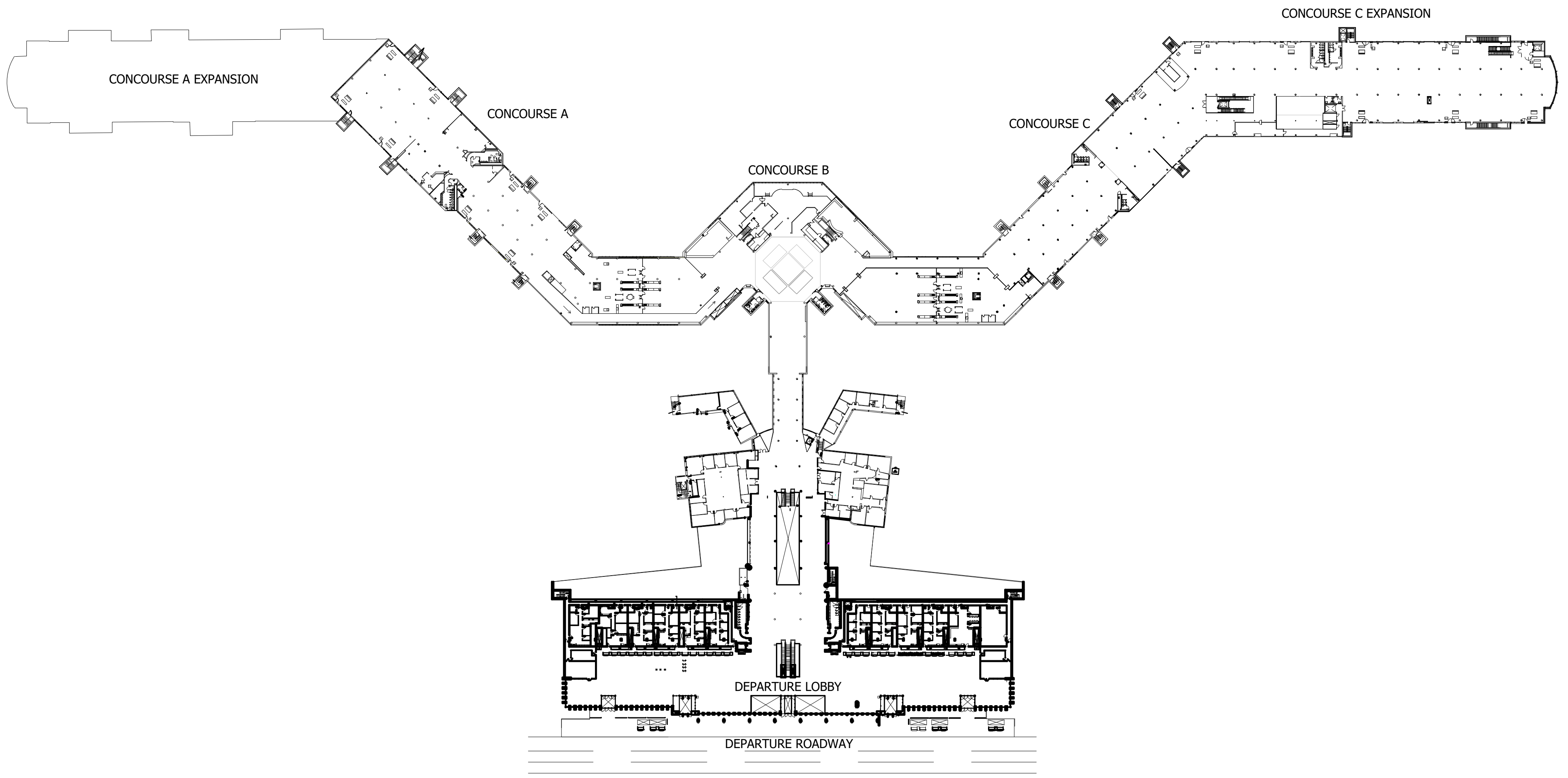
RICHMOND INTERNATIONAL AIRPORT

EXHIBIT 2-3
TERMINAL FLOOR PLAN: LOWER LEVEL

NTS 0 NTS NTS NTS

Kutchins & Groh

RICHMOND INTERNATIONAL AIRPORT
MASTER PLAN REVISION



RICHMOND INTERNATIONAL AIRPORT

EXHIBIT 2-4
TERMINAL FLOOR PLAN: UPPER LEVEL

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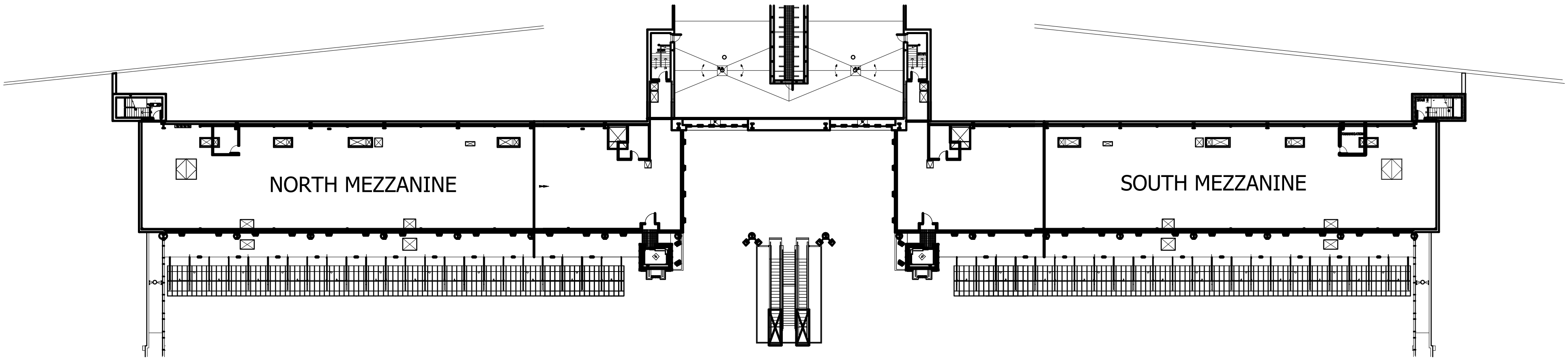
Kutchins & Groh

RICHMOND INTERNATIONAL AIRPORT
MASTER PLAN REVISION



RICHMOND
INTERNATIONAL AIRPORT

EXHIBIT 2-5
TERMINAL FLOOR PLAN: MEZZANINE LEVEL

NTS 0 NTS NTS NTS

Kutchins & Groh

2.7.1 AIRLINE EXCLUSIVE USE AREAS

Airline exclusive use areas include those facilities in the terminal that are leased by the air carriers to conduct their business operations and to service their respective passengers. Airline Exclusive Use space includes:

- Airline Ticket Counters
- Airline Ticket Offices
- Airline Self-Service Check-in Kiosks
- Baggage Claims
- Airline VIP Lounges
- Baggage Service Offices
- Outbound Baggage Sortation
- Inbound Baggage Drop-off
- Holdrooms
- Ramp Operations
- Other Airline Support/Operations Space

2.7.2 PUBLIC USE AREAS

Public use areas include those areas in the terminal that are used for the circulation of visitors and passengers. These areas are not exclusively leased by airlines or tenants. Public Use space in the terminal and concourses includes:

- Arrival and Departure Lobbies
- Circulation/Corridors (including moving walkways)
- Security Screening Checkpoints
- Public Restrooms
- Vertical Circulation (stairs, elevators, and escalators)

2.7.3 CONCESSION AREAS

Concession areas include those areas in the terminal that are leased by the food and beverage, the news and gifts, and retail concession operators. Concessions space in the terminal and concourses includes:

- Food and Beverage
- News and Gifts
- Retail/Specialty Shops
- Rental Car Agencies
- Newspaper Sales Boxes

- Advertisement Displays/Boards
- Public Telephones
- ATMs
- Concession Storage/Distribution/Offices

The concession areas at the airport are located in pre- and post-security areas such as the atrium between the terminal and in the concourses. Current security requirements prohibit non-passengers (e.g., well-wishers and meeters/greeters) from proceeding through the security screening checkpoints. There is no immediate indication that this requirement will be revised in the future. Rental car agencies are located on the lower level of the terminal building in the baggage claim area. The remaining concessions are sporadically located throughout the terminal for passenger convenience.

2.7.4 UTILITIES AND BUILDING SERVICE AREAS

Utilities and building service areas include those areas that are used for the operation of the building systems of the airport. Utilities and building service space in the terminal and concourses includes:

- Mechanical rooms
- Electrical rooms
- Telephone and communication equipment rooms
- Horizontal and vertical right-of-way for distribution of MEP-IT
- Janitorial closets
- Storage areas
- Trade shops

These facilities are located throughout the terminal and concourses. Additionally, some of these facilities are located in rooftop systems and underground vaults, but this space is not included in the computation of terminal and concourse area square footage.

2.7.5 FEDERAL INSPECTION FACILITIES

The Federal Inspection Services (FIS) facilities are located in the apron level of Concourse B. The space reserved for U.S. Customs is currently vacant. FIS facilities include approximately 41,000 square feet of space with one baggage claim unit. Since Richmond has no scheduled International Air Service, U.S. Customs and Naturalization does not have offices stationed at the airport. Agents are required to travel to the airport when needed to process arriving international passengers.

2.8 SUPPORT/ANCILLARY FACILITIES

This section documents the remaining on-airport facilities that are not located within the terminal facility or do not comprise part of the airfield or ground transportation infrastructure. They include facilities currently operated by airport tenants, the Commission, the FAA, and the City of Richmond Fire Department. Other miscellaneous facilities that are either vacant or located off-airport that have an operational dependency with other on-airport facilities are also discussed. A tabular summary of RIC's building inventory can be found at the end of this chapter and includes:

- Aircraft Maintenance Facilities
- Airport Maintenance Facilities
- Cargo Facilities
- General Aviation (GA)/Fixed Base Operator Facilities
- Airport Traffic Control Tower Facilities
- Miscellaneous Facilities (Owner by the Commission)
- Aircraft Rescue and Fire Fighting Facilities
- Perimeter Fencing and Airfield Access Facilities
- Heating and Refrigeration Plant
- Oversized Vehicle Parking/Staging
- Service Roads
- Ivor/Massey Administration Building/U.S. Customs & Border Protection (CBP)
- Stormwater Detention and Management Facilities
- Public Safety Building
- Fuel Storage Areas
- Army National Guard
- Richmond International Airport Air Guard Station
- Deicing Facilities
- Utilities

The following subsections provide general information pertaining to the present configuration of the airport and a summary of the gross areas of various facility components for each facility type. A general description of each facility and the primary tenant is provided, although the gross areas dedicated to automobile parking are not presented in this section.

2.8.1 AIRCRAFT MAINTENANCE FACILITIES

Aircraft maintenance facilities include all hangars, administrative/operations offices, and aprons that serve aircraft maintenance activities at the airport. There are currently two operators that use facilities for aircraft maintenance – Transtates Airlines and Continental Express.

2.8.2 AIRPORT MAINTENANCE FACILITIES

There are currently four buildings dedicated to Airport Maintenance. They are located on the southern end of the airfield, east of the Runway 7 threshold. These facilities house the airport's maintenance equipment and shops.

2.8.3 CARGO FACILITIES

Air cargo facilities provide air cargo carriers with the ability to store and manage the flow of goods to the marketplace. There are several air cargo operators at RIC, including: Federal Express, United Parcel Service, DHL, Cargex, and the United States Postal Service. These air cargo carriers are located in four buildings on two apron areas at the south end of the airport. Both apron areas are accessed by Taxiways F, G, and T. Surface access to the cargo area is through South Airport Drive to Lisle Road, Air Express Road, Fox Road, and Federal Road.

Passenger airlines also offer air cargo service, which is transported in the cargo hold (belly) of the aircraft. Some carriers also utilize bulk bays on the aircraft.

Cargo Building Number One is approximately 65 feet by 500 feet (32,500 square feet), with a 30,000 square foot parking lot located north of the building. This lot is available for employee parking as well as truck loading/unloading at the building. Surface access to this building is through Federal Road.

Cargo Building Number Two is approximately 65 feet by 155 feet (10,000 square feet), with a 10,000 square foot parking lot located west of the building. Surface access to this building is through Air Express Road.

Cargo Building Number Three is approximately 115 feet by 220 feet (25,000 square feet), with additional attached office space totaling 31,500 square feet. The building has its own adjoining 10,000 square foot parking area. Surface access to this building is through Air Express Road.

Cargo Building Number Four is approximately 165 feet by 215 feet (35,475 square feet), with an adjoining 70,000 square foot staging/parking area located west of the building. Surface access to this building is through Fox Road.

2.8.4 GENERAL AVIATION/FIXED BASE OPERATOR FACILITIES

A Fixed Based Operator (FBO) provides support services to General Aviation (GA) airports, such as fuel, hangars, aircraft maintenance and rental, aircraft tie-downs, and flight instruction. FBOs are usually located on airport property or, occasionally, adjacent to an airport.

There are currently three (3) Fixed Base Operators at RIC (Aero Industries, Million Air Richmond, and Richmond Jet Center.) Both are located on the west side of the airfield. The contracts between both FBOs and the Capital Region Airport Commission expire in 2026.

Million Air Richmond is located in the southwest corner of the airfield on a 17.8-acre site, near the southern end of Taxiway A. It provides the following services: airframe and engine maintenance, avionics, aircraft storage, fuel sales (AvGas and Jet A), and jet charter services. It owns and operates four aircraft at RIC. Million Air's facility includes a terminal building, offices, three hangars, an aircraft apron, fuel storage, and a vehicular parking lot.

Richmond Jet Center (RJC) is located in the northwest portion of the airfield on a 9.8-acre site, near the northern end of Taxiway A. It provides the following services: aircraft parts and maintenance, aircraft parking, fuel sales (AvGas and Jet A), and jet charter services. Richmond Jet Center's facility includes a terminal building, three hangars, an aircraft apron, fuel storage, and a vehicular parking lot. Aero Industries and MartinAir both hold subleases on the RJC property. Aero Industries provides aircraft repairs and MartinAir provides charter operations.

Please refer to **Exhibit 2-2, Existing Airfield Facilities**, for the general location of the FBO facilities.

There are three (3) General Aviation facilities at RIC. Altria Client Services, Dominion, and a second MartinAir facility are located in the northwest quadrant of the airfield. Please refer to **Exhibit 2-2, Existing Airfield Facilitie**s, for the general location of these facilities.

2.8.5 AIRPORT TRAFFIC CONTROL TOWER (ATCT)

In 2005, the FAA commissioned the current Airport Traffic Control Tower (ATCT) at RIC. It is located north of the terminal core. The facility includes the tower cab with associated support facilities and an adjacent parking lot for employees and visitors.

2.8.6 MISCELLANEOUS FACILITIES (OWNED BY THE COMMISSION)

Miscellaneous Commission-owned Facilities include all other buildings/facilities owned and operated by the Commission. This includes airport maintenance complexes, skilled trade centers, police offices, triturators, warehouses, storage facilities, an explosives chamber, police canine services, and field offices. The Commission-owned facilities are dispersed throughout the airport.

2.8.7 AIRCRAFT RESCUE AND FIREFIGHTING FACILITIES

Aircraft Rescue and Firefighting (ARFF) is a special category of firefighting that involves the response, hazard mitigation, evacuation, and possible rescue of passengers and crew of an aircraft involved in an airport ground emergency. The existing ARFF facility is located in the center of the airfield between Runways 16-34 and 2-20. The facility was commissioned in 1981 and has four truck bays.

2.8.8 PERIMETER FENCING AND AIRFIELD ACCESS FACILITIES

The airport boundary is securely fenced with restricted access to the Air Operations Area (AOA) and Security Identification Display Area (SIDA). Access to the AOA is restricted through a combination of perimeter fences, buildings with airside and landside components clearly delineated, and apron security fencing put in place to keep GA/FBO operations separate from the AOA.

Access to the AOA is provided through a variety of controlled access points located along the perimeter fence and within specific facilities that provide access to the AOA (see **Exhibit 2-6, Perimeter Fencing and Airfield Access**). The Commission is responsible for the development, installation, and maintenance of all access facilities at the airport, though coordination with the Transportation Security Administration (TSA) is now required. Any tenant with AOA access is responsible for monitoring/controlling all airfield access within its leasehold. These facilities include: FBO/GA facilities, cargo warehouses, aircraft maintenance hangars, ground service equipment maintenance facilities, etc.

2.8.9 CENTRAL UTILITY PLANT

The Central Utility Plant houses the following equipment for the operation of the heating and cooling of the Terminal Building.

- (3) 700-ton Chillers
- (3) 4800 MBH Boilers
- (1) 4000 MBH Boiler
- (1) 750-ton Cooling Tower
- 1680 gpm primary chill water pumps
- 1680 gpm secondary chill water pumps
- (3) 2100 gpm condensing water pumps
- (2) 1545 gpm hot water pumps

RICHMOND INTERNATIONAL AIRPORT
MASTER PLAN REVISION

EXHIBIT 2-6
PERIMETER FENCING AND AIRFIELD ACCESS

RICHMOND INTERNATIONAL AIRPORT

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Kutchins & Groh

2.8.10 OVERSIZED VEHICLE PARKING/STAGING

RIC does not have a dedicated Oversized Vehicle Parking/Staging; however, in the event space is needed for such vehicles, the overflow area of Economy Lot B is utilized.

2.8.11 SERVICE ROADS

Service Roads provide the ability to service navigation equipment, provide runway inspections, access different elements of the airfield in the event of an accident, and provide a variety of other uses. RIC has a system of service roads that aid in the ability of airport Operations staff to access airfield facilities, limiting the amount of time vehicles are on active runways and taxiways.

2.8.12 IVOR/MASSEY ADMINISTRATION BUILDING/U.S. CUSTOMS AND BORDER PROTECTION (CBP)

The U.S. Customs and Border Protection (CBP) facility is currently housed in the Ivor/Massey Administration Building in the northwest quadrant of the airfield. Its function is to process international General Aviation operations at RIC. It currently screens incoming GA flights at the rate of approximately one per day, with anywhere from five (5) to fifteen (15) passengers and crew per flight. CBP officials at RIC meet the incoming aircraft on one of the FBO aprons, where passenger screening is performed. If no issues are discovered during screening, the passengers can enter the CBP facility and exit airport property or to return to the aircraft and continue their journey. If any issues are flagged, the passenger in question is taken inside the CBP facility for additional screening measures.

2.8.13 STORMWATER DETENTION AND MANAGEMENT FACILITIES

The airport storm sewer system is owned and maintained by the Commission, with the majority of the airport's tributary storm water runoff being directed across the airfield from southwest to northeast through ditches and 72- and 96-inch pipes, and out falling in the Beulah Road detention facility and into White Oak Swamp Creek. North sections of the airport are controlled by a second system through 30- and 54-inch pipes to an on-airport detention basin.

2.8.14 PUBLIC SAFETY BUILDING

RIC does not have a dedicated Public Safety Building. The Airport Police occupy space in the Terminal Building.

2.8.15 FUEL STORAGE AREAS

A fuel storage area is an allocation of space strictly dedicated to the storage of 100 Low Level Gasoline, Jet Aviation Gasoline, and other fuels for aircraft. The Commission does not maintain a single central fuel farm. Fueling of general aviation aircraft is provided by two Fixed Base Operators on the airport as well as by individual tenants who own their own on-site fuel farm. Air cargo and air carrier aircraft are fueled by either of the FBOs. Both FBOs have developed fuel farms to provide for the needs of their operations. These two fuel farms provide the majority of fuel for the airport civil users. The fuel capacity on the airport is located south of the cargo apron and includes:

- 310,000 Gallons of Jet A
- 25,000 Gallons of Aviation Gasoline
- 10,000 Gallons of 100 Low Level
- 5,000 Gallons of Unleaded Fuel (Vehicles)

2.8.16 ARMY NATIONAL GUARD

The Army National Guard is located on the eastern side of the airfield and operates a Black Hawk Helicopter Training Base (non-aviation).

2.8.17 RICHMOND INTERNATIONAL AIRPORT AIR GUARD STATION

Under the Base Realignment Closure Act of 2005, the Virginia Air National Guard Station (VANG) based at RIC was recommended for realignment. The VANG no longer occupies the facility, and a new tenant has been identified for portions of the installation.

2.8.18 DEICING FACILITIES

Currently, all deicing is provided by the air carriers' personnel or through third-party contractors and is performed at the gate. The Air Cargo Operators perform deicing functions at the air cargo areas. These operators utilize basins and drains that tie back into a central collection area, where it is collected and taken off-site.

2.8.19 UTILITIES

As facilities are improved and further developed, all utility improvements (e.g., sanitary sewer, natural gas, water, telecommunications, and electrical service) will be included in the development as required to accommodate the additional service demand. The utilities listed below identify the existing service providers and capacities.

2.8.19.1 Sanitary Sewer

Henrico County owns and operates a 24-inch sanitary sewer main, which services the majority of facilities on-airport. Facilities that are not connected to the sanitary sewer system rely on septic systems. The 24-inch trunk line runs north along Airport Drive and through the former Virginia Air National Guard site to a lift station on Beulah Road, where it is sent back across the airport in a 30-inch force main that parallels the south side of Runway 7-25. The sanitary sewer system on the airport is a combination of County and Airport-owned facilities of different sizes. The sewer ultimately feeds into a main along Williamsburg Road and then east to the pump station located on Beulah Road across from the former Virginia Air National Guard site, which is adjacent to RIC's storm water management facility.

2.8.19.2 Natural Gas

The City of Richmond, Department of Public Utilities provides the natural gas service to the airport and its tenants.

2.8.19.3 Water Service

The airport water service is supplied by a 12-inch water main loop that is owned and maintained by Henrico County. Each facility on the airport is serviced and individually metered from this 12-inch water main. All tenants outside of the terminal building have independent water meters. Currently, the Commission owns and maintains the water system on the airport. The system is fed through three master meters owned by Henrico County with various water line sizes (6, 8, 10, & 12-inch) serving the Airport's tenants. Each tenant is billed monthly by the Commission based on its individual water meter. The Commission is performing renovations to the water system, which will improve the on-airport water system and bring it up to Henrico County Standards (including new water meters). Upon completion of this system upgrade, the Commission will transfer ownership of the water system to Henrico County, who will take over its operation and maintenance.

2.8.19.4 Telecommunication Service

Telecommunication Service is provided primarily through underground lines, but there are also some overhead lines. Verizon is the telecommunication provider for RIC and its tenants.

2.8.19.5 Electrical Service

Electrical service is provided by Dominion Virginia Power.

2.9 GROUND ACCESS

The airport is surrounded by a ground transportation system that includes regional highways and expressways, major arterial roadways, and railroads. The on-airport, transportation network interfaces with the regional system utilizing roadways, parking areas, and rental car facilities. This section discusses these on- and off-airport ground transportation facilities. The discussion of ground access facilities is categorized into the following groups:

- Roadways
- Public Parking
- Employee Parking
- Rental Car Facilities
- Commercial Vehicle Staging
- Railroads
- Public Transit

2.9.1 ROADWAYS

The airport maintains the terminal roadway system that connects the terminal core to the regional roadway network. The discussion of roadways is categorized into regional (i.e., off-airport) roadways, airport roadways, and terminal core roadways. **Exhibit 2.6** depicts the roadway system and ground access.

2.9.1.1 Regional Roadway Facilities

The Regional Roadway network primarily carries non-airport related trips, but also provides the direct link to the local Airport Roadway system. Historically, the regional roadway network traffic patterns are typical with the workday flows of morning and afternoon. Interstates 64 and 295 carry/accommodate the bulk of the traffic to and from the airport. Currently, Airport Drive is being realigned and reconstructed. Upon completion of this project, Interstate 895 (Pocahontas Parkway) may pull traffic from the other interstates.

- Airport Drive provides a north-south corridor connecting the terminal roadway network with Interstate 64 and Interstate 295. The roadway is currently being reconstructed and is slated to be completed in 2008. These improvements should provide seamless access to the terminal roadways from the surrounding interstates.
- Interstate 64 provides access to the City of Richmond and further west to Charlottesville. Access to Williamsburg/Newport News (to the East of the airport) is also provided by Interstate 64.
- Interstate 295 provides access south to Petersburg and north around the City of Richmond.

- Interstate 895, a toll road, currently provides indirect airport access along the southern side of the City of Richmond and Henrico County through connection to South Laburnum Avenue.

2.9.1.2 On-Airport Roadways

The airport's terminal roadways were reconstructed and opened in 2007 in conjunction with the new terminal building. This roadway network consists of an upper/lower level configuration separating departures and arrivals, respectively. The lower (arrivals) level also separates private vehicles (inner lanes) from commercial vehicles (outer lanes) and manages the commercial vehicles through Automatic Vehicle Identification (AVI) access control. These public access roadways also provide landside access to the public and employee parking lots, rental car, and support/ancillary facilities.

2.9.1.3 Terminal Curb-Front Roadways

The recently completed terminal building provides for separated departure and arrival levels, effectively doubling the available curb-front at the terminal. The current configuration boasts 875 linear feet of curb on the upper level and 566 linear feet on the lower level interior curb, with 708 linear feet on the lower level commercial vehicle lane.

2.9.2 PARKING FACILITIES

Terminal area parking facilities include employee parking, short- and long-term public parking, and satellite parking facilities not situated in the immediate terminal facility for terminal users.

2.9.2.1 Public Parking

There are several on-airport options for vehicle parking. The airport's parking garages are located across from the terminal complex. These facilities offer daily, hourly, and valet parking options. There are also two remote parking lots (Economy Lot A and Economy Lot B) located across Airport Drive with free shuttle service to the terminal.

The North and South Parking Garages have a total of 4,352 parking spaces. Additionally, there is a Center Surface Lot (between the garages) that accommodates 144 parking spaces. Economy Lots A and B accommodate 1,250 and 985 spaces, respectively.

2.9.2.1 Employee Parking

Employee parking is provided in multiple locations. Parking facilities are located on the south side of the terminal roadways near the cargo area, and there is also a remote lot on the southwestern corner of the airport in the aircraft maintenance area.

2.9.3 RENTAL CAR FACILITIES

The Rental Car Companies have customer counters and offices located on the lower level of the terminal building adjacent to the baggage claim area. Currently, eight rental car companies have operations at the airport, housing a ready/return operation in a consolidated Rental Car Garage located on the north side of the Terminal. The maintenance locations of the Rental Car Agencies are separate from their operations with some residing on-airport and others located off-airport.

2.9.4 COMMERCIAL VEHICLE STAGING AREAS

RIC currently does not have an on-airport dedicated Commercial Vehicle Staging Area. Taxis authorized to pick up passengers at the airport are available curbside, adjacent to the North Garage. Executive sedan/limousine service is also available curbside.

2.9.5 RAILROADS

One Class I freight railroad abuts the airport. This rail and right-of-way, owned and operated by CSX Transportation, is located along the southern airport boundary. The rail line provides service to the shipyards located in Newport News to the east and continues into the City of Richmond to the west traveling along the James River. The railroad right-of-way represents the southern limits of all airport operations and activities. The airport owns several parcels south of the railroads, which are held to address navigation easement issues.

2.9.6 PUBLIC TRANSIT

The Greater Richmond Transit Company offers public bus access from the terminal to the City of Richmond and other locations throughout the metro area. Currently, the Purple Route #56 serves the airport. Eastbound buses depart every 30 minutes from 6:43 a.m. until 8:23 a.m., and at 4:37 p.m. and 5:07 p.m. Westbound buses have the same departure times with an additional afternoon bus departing at 3:55 p.m. The buses drop off and pick up passengers at the lower level of the terminal.

2.10 BUILDING CONDITION SURVEY

To better understand the conditions of the facilities at the Airport, the Master Plan Team completed a Building Condition Survey of all on-Airport facilities. A copy of the survey can be found in **Appendix C.** The survey is a breakdown of a visual observation of the condition and estimated useful life of each building at the Richmond International Airport, both airside and landside. This was accomplished by using the following criteria to establish the likely useful life of each building:

- Good = estimated useful life in excess of 10 years with no major capital expenditure
- Fair = estimated useful life of 5-9 years with no major capital expenditure
- Poor = estimated useful life of 1-4 years with no major capital expenditure

The actual condition of each of the buildings was estimated by a qualified project representative based on a visual inspection of the exterior and general interior condition when it could be readily seen. The purpose of the building inventory is to assess general useful life of the facilities. This information will, in turn, be used to program replacement or major maintenance requiring a significant capital expenditure on the part of the Airport or its tenants, at some time in the future.

The building life expectancy was rated based on normal routine maintenance. **Table 2-11, Building Condition Index**, identifies the condition of each building as of the date of the survey (March 2020) and provides an estimation of its remaining life span.

Table 2-11: Building Condition Index

Building #	Tenant	Use/Name	Hangar Condition	Building Condition
102	RIC	Now Removal Equipment Building	Good	Good
103	RIC	East Side GA Hangar	Good	Good
104	RIC	East Side GA Hangar	Good	Good
116	FBI	Communications Facility	Good	Good
124		Reserve Forces Operational Training	N/A	Good
127		Base Operations/U.S. Air Force Command Post	N/A	Good
176		Hush House	Good	N/A
200		Virginia Air National Guard	Good	Good
310A	Million Air	Million Air FBO	Good	Good
310B	Million Air	Million Air	Good	Good
310C	Million Air	Million Air	Good	Good
313	Trans State Airlines	Aircraft Maintenance Facility	Good	Good
317	Cargex	Air Cargo Building #1	N/A	Fair
318	Airbourne	Air Cargo Building #2	N/A	Fair
319	USPS	Air Cargo Building #3	N/A	Fair
320	Continental	Air Cargo/Maintenance Facility #4	N/A	Good
324		Air Cargo Building #5	N/A	Good
325		Air Cargo Building #6	N/A	Good
327	USPS	Air Cargo Building	N/A	Fair
329		GSE Building	N/A	Good
407	Multiple	Passenger Terminal	N/A	Good
407A	Multiple	Passenger Terminal – Concourse A	N/A	Good
407B	Multiple	Passenger Terminal – Concourse B	N/A	Good
429	Multiple	Rental Car Service	N/A	Good
431A	RIC	Parking Garage - South	N/A	Good
431B	RIC	Parking Garage – South Central	N/A	Good
431C	RIC	Parking Garage – North Central	N/A	Good
431D	RIC	Parking Garage - North	N/A	Good
432	RIC	Parking Services Administration	N/A	Good
502	RIC	Richmond Jet Center	Good	Good
503	CSX	CSX Hangar	Good	Good
504	Phillip Morris	Phillip Morris Hangar	Good	Good
505A	State of Virginia	Commonwealth of Virginia Hangar	Good	Good
505B	State of Virginia	Commonwealth of Virginia Office	N/A	Good
506	Dominion	Dominion Resources	Good	Good

Table 2-11: Building Condition Index (cont.)

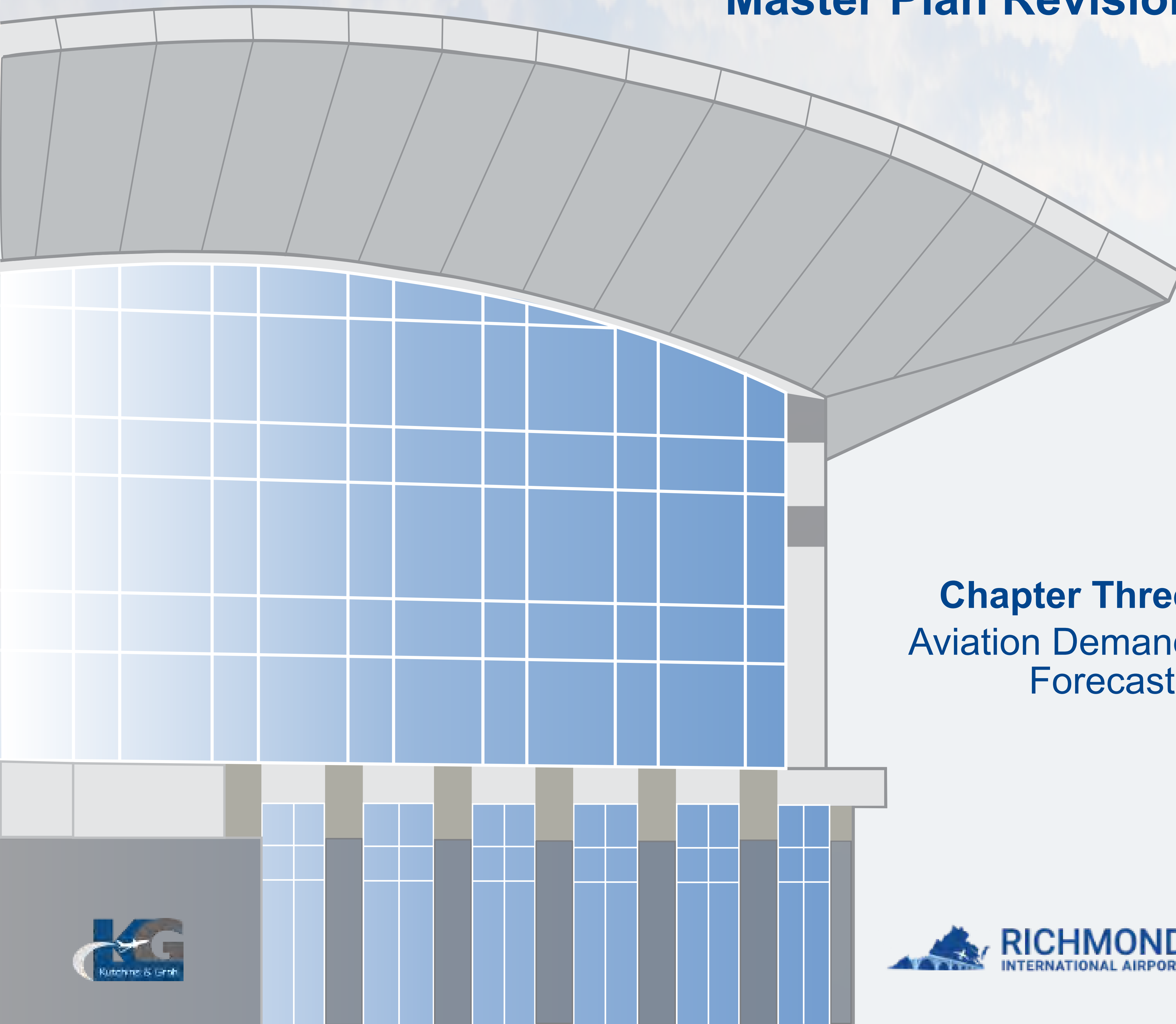
Building #	Tenant	Use/Name	Hangar Condition	Building Condition
507A	FAA	FAA Air Traffic Control Tower	N/A	Good
507B	FAA	FAA Air Traffic Control Tower Support Facility	N/A	Good
512	Ethyl	Ethyl Hangar	Fair	Fair
516	Multiple	Ivor/Massey Administration Building	N/A	Good
521	Henrico Police	Henrico Police Aviation Unit	N/A	Good
522		MartinAir/Helo	Good	Good
523	National	National/Alamo Rental Car Service	N/A	Good
530	Hertz	Hertz Rental Car Service	N/A	Good
615A	RIC	Airport Maintenance Facility	Fair	N/A
615B	RIC	Snow Facility	Good	Good
615C	RIC	Airport Maintenance Facility	Good	Good
616	WAWA	Wawa Gas Station	N/A	Good

Source: Airport records and March 2020 Survey by Kutchins & Groh

End of Table 2-11: Building Condition Index

Richmond International Airport

Master Plan Revision



Chapter Three

Aviation Demand Forecasts

CHAPTER THREE
Aviation Demand Forecasts

Projecting aviation demand is a critical element in the overall master planning process. Its use defines an airport's ability to accommodate existing and future aircraft and operations, thus determining the type, size, and timing of future airside and landside development. In this study, projections of aviation demand for the period of 2020-2040 were prepared for passenger enplanements, air cargo volumes, aircraft operations and based aircraft at Richmond International Airport (RIC.)

The COVID-19 pandemic has dramatically disrupted the air service industry. Across the country, on April 16, 2020, the Transportation Security Administration (TSA) processed only 96.37% of air passengers over the same day as in 2019. Every airport in the country was affected. For the year 2020, Richmond International was down 78% from 2019 enplanements.

As the forecast for this Master Plan Revisions was initiated at the early stages of the pandemic, it was decided to delay the completion of the forecast to get a better understanding of the effects on the industry. As of the end of December 2021, air service across the country was near 82% of the levels that were seen for 2019. Although air service and passenger traffic are slowly rising across the country, new variants of COVID are still affecting the recovery. In September 2021, the Delta variant affected the industry with a dip to around 63% of passengers flying. A new variant (Omicron) was discovered in November 2020 and has spread throughout the United States and the world. The full effect of Omicron is still known, although this variant seems to be milder with fewer and less severe symptoms. Therefore, the effects of Omicron on air travel are not known at the time of this writing, but expectations are that it will not be as severe as the Delta variant.

Elements of the forecast include the following:

- Commercial Passenger Traffic Forecast
- Cargo Volume Forecast
- Commercial Passenger Aircraft Operations Forecast
- Freighter Operations Forecast
- Military Operations Forecast
- General Aviation Operations Forecast
- Forecast of Based Aircraft at Richmond

The forecast is based on analysis that considers historical aviation trends at RIC and throughout the nation, local historical and socioeconomic data, Federal Aviation Administration (FAA) Terminal Area Forecast (TAF), and Airport records. The base year chosen for this forecast was 2019 because it represents the most current year for which a full year of detailed data is available that was not affected by the ongoing pandemic. Additionally, projections of aviation activity for the Airport were prepared for short-term (2020-2024), mid-term (2025-2029), and long-term (2030-2039) timeframes.

These forecasts are intended to serve as a meaningful guide to the future development; however, short-term fluctuations in an airport's activity may be caused by a variety of factors and may be inconsistent with the overall forecast.

To accomplish the overall goals and objectives of the Master Plan and to effectively plan for future development, the 2019 FAA Terminal Area Forecast (TAF) was used as the primary forecast source to quantify future activity for the Richmond International Airport. The 2020 TAF represents the official demand forecasts published by the FAA for RIC at the time of this analysis. It was prepared at the conclusion of the 2019 Federal fiscal year (FY 19). Because the Federal Government operates on the fiscal calendar, which runs from October 1 through September 30, the following data was calculated using this fiscal calendar.

COVID-19 has created an unprecedented global challenge, particularly to the aviation industry. The quick spread of the virus caused governments to rapidly restrict travel and close borders in order to limit the spread. This has had a drastic and detrimental effect on airports worldwide. Air travel will recover after medical treatments make travelers more comfortable. Passenger demand will remain below 2019 levels until medical treatments, including vaccines, allay consumer safety concerns about travel and allow less travel restrictions, quarantine requirements, and reopening at tourist destinations.

In September of 2020, Moody's Investors Service published a series of recovery scenarios for airports across the United States. This forecast utilizes three of those scenarios to develop different recovery rates to identify three forecasts: Rapid Recovery, Medium Recovery, and Slow Recovery.

3.1 ROLE OF THE AIRPORT

3.1.1 MARKET AREA AND AIRPORT DESCRIPTION

The Richmond Metropolitan Statistical Area (MSA) includes the City of Richmond, Virginia's capital, and its surrounding and economically interdependent region. The Richmond MSA, identified in **Exhibit 3-1**, is comprised of 16 counties and four cities, including the City of Richmond — Virginia's capital — and is geographically spread over a 5,717 square mile area. The Richmond MSA is located approximately 100 miles south of Washington, DC and 90 miles northwest of Norfolk, Virginia.

SOURCE: THE GREATER RICHMOND PARTNERSHP, INC., RICHMOND MSA, JUNE 2017

EXHIBIT 3-1
MARKET AREA (RICHMOND MSA)

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The Richmond MSA includes 3 other cities (Petersburg, Hopewell, and Colonial Heights) and adjacent counties and is home to approximately 1.3 million Virginians, or 15.1% of Virginia's population. Richmond, Chesterfield, Hanover, and Henrico account for 79% of the Richmond MSA's population, with the population growth rate slightly higher than the Richmond MSA's growth rate. The Richmond MSA is the nation's 46th largest metropolitan area.

3.1.2 ECONOMIC ACTIVITY AND DEMOGRAPHICS

The Richmond International Airport is an integral part of the economic and commercial fiber of the Richmond area. The Airport is about 7 miles southeast of downtown Richmond, the capital of the Commonwealth of Virginia. Per the FAA's Air Traffic Activity Data System, Richmond International Airport is the busiest airport in central Virginia and the third busiest in the state behind Washington DC's two major airports, Washington Dulles and Washington National.

The Richmond region is growing at a steady rate, adding nearly 400,000 residents in the past two decades. This has resulted in major suburban sprawl, particularly in Henrico and Chesterfield Counties, both of which have populations over 300,000. This also resulted in boosts in its economy, the building of malls, more national attention, and major sporting events and concerts coming to Richmond. Its arts and culture scene has also seen a major gain, with the building or renovations of many new arenas, including the Landmark Theater, Carpenter Center, CenterStage, and the creation of a monthly celebration of the arts, the First Fridays Art Walk, occurring on the first Friday of every month on Broad Street in Downtown Richmond, and regularly drawing crowds of over 20,000 people.

The region is approximately equidistant to Northern Virginia, Hampton Roads, and Lynchburg. The area is home to the state's center of gravity of population—which, in 1980, was located thirty miles west of Richmond near the Powhatan-Goochland County border.

Richmond's economy is primarily driven by law, finance, and government, with federal, state, and local governmental agencies, as well as notable legal and banking firms in the downtown area. The city is home to both a U.S. Court of Appeals, one of 13 such courts, and a Federal Reserve Bank, one of 12 such banks. Dominion Energy and WestRock, both Fortune 500 companies, are headquartered in the city, with others located in the metropolitan area.

The Capital Region Airport Commission (CRAC) owns and operates Richmond International Airport. Established in 1975 by the Virginia General Assembly, the Commission is overseen by representatives of the counties of Chesterfield, Hanover, and Henrico, and the City of Richmond. It is imperative that the Airport Sponsor, the CRAC, continually strive to develop its facility to keep pace with the aviation demands of the surrounding community.

3.2 HISTORIC AVIATION ACTIVITY

In order to project airport-specific activity, it is useful to develop an understanding of the overall demand for aviation services. This is measured by analyzing indicators such as based aircraft, aircraft operations, and passenger enplanements. Based aircraft are those that are stored at a particular airport on a regular basis. This count of aircraft is important to an airport operator as it determines needs for aircraft hangars, services, and support facilities.

An aircraft operation is defined as one takeoff or one landing and is used to determine an airport's activity level. An enplanement is defined as one passenger boarding a commercial aircraft flight. A summary of historic aviation activity at RIC is shown in **Table 3-1**. **Table 3-2** shows total aircraft operations at RIC from 2009 to 2019 by type of operation.

Table 3-1: Historic Aviation Activity

Year	Based Aircraft	Total Operations	Total Enplanements
2009	78	105,605	1,666,022
2010	78	102,871	1,639,557
2011	68	103,774	1,597,152
2012	88	98,426	1,583,114
2013	92	98,989	1,583,315
2014	92	97,896	1,647,904
2015	65	100,662	1,718,820
2016	92	95,584	1,763,247
2017	58	94,860	1,799,021
2018	58	101,299	2,048,066
2019	58	106,138	2,201,777
2020	58	70,177	857,185

Source: FAA Aerospace Forecast, Fiscal Years 2019-2039, January 2020

3.2.1 COMMERCIAL AVIATION ACTIVITY

In 2019, RIC served 4,379,663 passengers, an all-time record for the Airport, which broke its previous record of 4,077,763 in 2018. The Airport is served by airlines flying primarily domestic routes to cities in the South, Northeast, and Midwest, and connecting flights to major hubs for international destinations. 2020 brought far lower passengers due to the Covid-19 pandemic.

Table 3-2: Richmond International Airport Operations by Type

Year	Itinerant AC/AT	Local Military	Itinerant Military	Total Military	Local GA	Itinerant GA	Total GA	TOTAL
2009	74,377	1,975	4,272	6,247	1,365	25,954	27,319	107,943
2010	68,346	2,605	4,788	7,393	1,780	24,922	26,702	102,441
2011	68,711	3,334	4,481	7,815	2,806	25,026	27,832	104,358
2012	66,944	2,045	4,508	6,553	2,161	23,851	26,012	99,509
2013	66,521	1,841	5,085	6,926	1,997	22,797	24,794	98,241
2014	65,344	1,709	4,038	5,747	3,924	22,829	26,753	97,844
2015	64,252	2,467	4,783	7,250	6,088	23,802	29,890	101,392
2016	62,150	1,883	4,405	6,288	3,678	23,547	27,225	95,663
2017	62,192	1,591	3,915	5,506	4,147	22,669	26,816	94,514
2018	65,846	1,482	3,995	5,477	6,828	22,001	28,829	100,152
2019	68,708	1,282	3,510	4,792	9,030	23,224	32,254	105,754
2020	39,382	1,396	4,073	5,469	9,252	16,075	25,326	70,177

Source: FAA Aerospace Forecast, Fiscal Years 2019-2039, January 2020

3.2.1.1 Current and Projected Passenger Air Service

Beginning the week of March 14-20, 2022, RIC will be served by eight passenger airlines. These airlines are Allegiant, American Airlines, Breeze Airways, Delta, JetBlue Airways, Southwest, Spirit, and United. The Airport will have an average of 477 scheduled weekly commercial passenger aircraft departures and approximately fifty thousand scheduled weekly seat departures, as contrasted with 569 scheduled weekly commercial passenger aircraft departures and more than 53 thousand scheduled weekly seat departures in 2019. This change is due to the reductions in air travel related to the Covid-19 pandemic. Since August, air travel in the US has been steadily on the rise. As of this writing, RIC is anticipating that air serve will be at about 83% of where RIC was in 2019 by March of 2022. Carrier shares of scheduled aircraft departures and seats projected in March of 2020, are shown in **Table 3-3**.

As of March 2022, non-stop passenger service would be offered from Richmond to 26 destinations, all within the United States, as contrasted with 22 destinations in February of 2020. The majority of these destinations are to Atlanta (Delta and Southwest), Charlotte (American), Chicago (United and American), Dallas/Ft. Worth (American), Orlando (Jet Blue, Spirit, and Southwest). These 5 destinations collectively account for 57% of scheduled passenger aircraft departures and 64 % of scheduled seats at RIC.

Table 3-3: Current Passenger Air Service at Richmond International Airport

Airline	Share of Aircraft Departures	Share of Seats
Allegiant	2.1%	3.7%
American	32.5%	28.5%
Breeze	2.7%	2.9%
Delta	30%	32.7%
Jet Blue	5.9%	4.5%
Southwest	5.9%	8.5%
Spirit	2.9%	4.1%
United	18%	13%

Source: Airline Data Inc.

3.3 AVIATION INDUSTRY TRENDS

According to Airports Council International – North America (ACINA), in the last two years, global passenger traffic posted growth. Traffic grew to 8.8 billion passengers in 2018 and then increased to more than 9.1 billion passengers in 2019. This represented growth of +6.4% and +3.4% year-over-year, respectively. Prior to the pandemic, ACINA forecasted that global passenger traffic would reach the 9.5 billion passenger mark in 2020, reflective of a +4.6% forecasted growth year-over-year.

The COVID-19 pandemic resulted in a full-scale transportation crisis with the imposition of travel restrictions and suspension of flights in a global effort to contain the spread of the virus beginning in March of 2020. At that time, an overwhelming majority of national governments implemented strict confinement measures which eventually resulted in what the International Monetary Fund later characterized as the "Great Lockdown" — the worst economic downturn since the Great Depression.

The unique feature of the crisis is the fact that both the supply and the demand sides of the equation are suppressed. On one hand, during the first months of the pandemic, shutdowns resulted in most flights being suspended while travel was severely restricted. Air transport demand, particularly the passenger segment, effectively collapsed. The latter is a result of a combination of economic and behavioral factors. The deteriorating economic situation and loss of income was compounded by consumer concerns of being susceptible to the virus while flying. Both conditions lead to avoidance or postponement of travel plans. Though hard lockdowns began to lift in June around the U.S., demand for travel is expected to be down 60 to 70% as compared with 2019 nationally.

Air travel has slowly moved into a "pre-recovery phase," as quarantine restrictions have eased to allow economies to restart. Once vaccinations began in 2021, traffic rebounded positively to about 70% of 2019 levels at RIC. Unfortunately, the Delta variant caused Covid-19 infections to begin to climb again and reached epidemic levels in some states in the US. That has stalled the recovery and many airlines are reporting lower than anticipated bookings and a larger number of cancellations moving into the fall. The "full recovery phase" will not be possible until infection numbers begin to stabilize.

There is much discussion about what the air traffic recovery from COVID-19 will look like and how long it will take. To that end, this study examined a COVID-19 traffic recovery forecast that quantifies the impact on traffic over the coming years relative to pre-crisis levels and provides three different scenarios: Rapid Recovery, Medium Recovery, and Slow Recovery. A Draft FAA Terminal Area Forecast, likely to be finalized and published in 2021, is included as **Appendix C (Aviation Demand Forecasts.)** It identifies the forecast for RIC and has been included for comparison.

There are many challenges in developing a reliable forecast at a time when key questions influencing supply and demand cannot be answered. Therefore, this study is not concerned with precise traffic numbers, but rather provides an order-of-magnitude for what the near-term traffic shortfall will look like. The forecast scenarios are informed by a broad range of input from respected third parties.

3.4 FORECAST OF FUTURE DEMAND

Based on the historical activity levels and industry conditions discussed in previous sections, the following projections of future demand and activity have been developed. The future demand forecast includes projections of aircraft operations and future aircraft fleet mix.

3.4.1 PROJECTIONS OF PASSENGER ENPLANEMENTS

The Rapid Recovery, Medium Recovery, and Slow Recovery forecasts produce a range of passenger traffic forecasts. The Slow Recovery Forecast anticipates that passenger enplanements will not recover to 2019 levels until 2026. The Medium Recovery Forecast anticipates that passenger enplanements will not recover to 2019 levels until 2025. The Rapid Recovery Forecast anticipates that passenger enplanements will not recover to 2019 levels until 2024. The Draft FAA Terminal Area Forecast anticipates that recovery to 2019 levels will occur between 2023 and 2024. The Forecasted Passenger Enplanement Forecast is depicted in **Table 3-4**.

Table 3-4: Historic and Forecast Passenger Enplanements 2040 for Richmond International Airport

	Year	Historic Average Enplanements	Rapid Recovery Forecast	Medium Recovery Forecast	Slow Recovery Forecast	Draft 2021 Terminal Area Forecast
	2000	1,301,140				
	2005	1,399,533				
	2010	1,639,557				
	2015	1,718,820				
Historic	2020	857,185				
Forecast	2021		1,432,720	1,375,258	1,317,797	1,400,980
	2022		1,795,023	1,603,902	1,689,842	1,687,028
	2023		2,067,828	1,957,739	1,928,972	2,025,899
	2024		2,201,777	2,091,688	2,067,828	2,328,440
	2025		2,256,821	2,201,777	2,112,594	2,521,458
	2030		2,553,386	2,430,940	2,300,265	2,864,881
	2035		2,888,922	2,683,954	2,429,594	3,158,319
	2040		3,268,550	2,963,302	2,566,194	3,450,009

Sources: FAA Aerospace Forecast, Fiscal Years 2019-2039, January 2020.
K&G Analysis, 2021.
Draft 2020 FAA Terminal Area Forecast.

In June of 2021, Campbell-Hill Aviation Group developed a short-term forecast identifying economic recovery scenarios for RIC. The passenger enplanement outlook is included in **Table 3-5** and the full document is included in **Appendix C (Aviation Demand Forecasts.)**

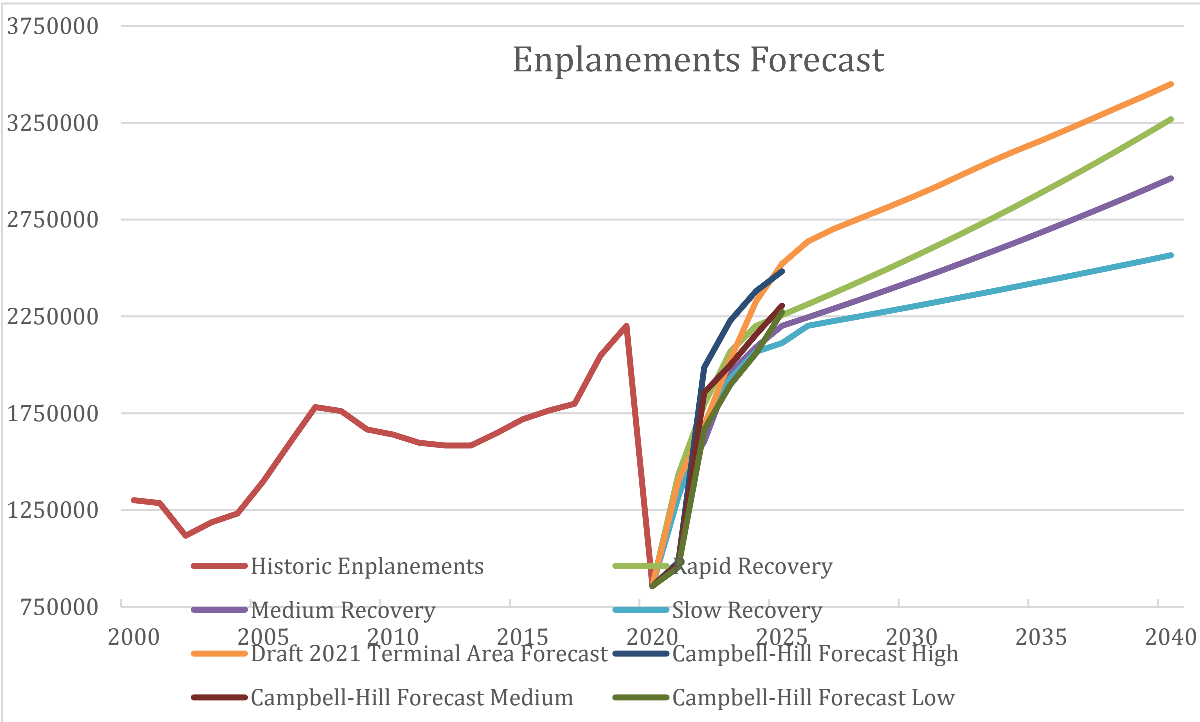
Table 3-5: RIC Enplanement Forecast and Outlook Scenarios (Campbell-Hill Aviation Group)

Year	Outlook – High Scenario	Outlook – Medium Scenario	Outlook – Low Scenario
2020	981,103	972,065	953,751
2021	1,987,076	1,857,311	1,665,987
2022	2,227,016	1,998,281	1,895,893
2023	2,380,680	2,156,844	2,059,414
2024	2,483,049	2,305,667	2,272,563
2025	981,103	972,065	953,751

Source: CH Aviation Group Analysis, 2021.

Figure 3-1 graphically depicts the forecast scenario, including that of the Campbell-Hill Aviation Group.

Figure 3-1: Passenger Enplanement Forecast for Richmond International Airport



Sources: *FAA Aerospace Forecast, Fiscal Years 2019-2039, January 2020.*
K&G Analysis, 2021.
Draft 2020 FAA Terminal Area Forecast.
CH Aviation Group Analysis, 2021.

Table 3-6 depicts the Historic and Forecast Passenger Enplanements average annual growth rates.

Table 3-6: Historic and Forecast Passenger Enplanements: Average Annual Growth Rates

	Year	Historic Average Annual Growth Rate	Rapid Recovery Forecast	Medium Recovery Forecast	Slow Recovery Forecast	Draft 2021 Terminal Area Forecast
	2000 - 2005	1.9%				
	2006 - 2010	3.5%				
	2011 - 2015	1.0%				
Historic	2016 - 2019	6.5%				
Forecast	2020		-59.6%	-63.0%	-63.0%	-24.8%
	2021 - 2025		23.3%	22.2%	21.1%	7.4%
	2026 - 2030		2.5%	2.0%	1.7%	0.8%
	2031 - 2035		2.5%	2.0%	1.1%	1.4%
	2036 - 2040		2.5%	2.0%	1.1%	1.3%

Source: FAA Aerospace Forecast, Fiscal Years 2019-2039, January 2020, K&G Analysis, 2021.

3.4.2 COMMERCIAL PASSENGER AIRCRAFT OPERATIONS FORECAST

The commercial passenger aircraft operations forecast is a derived demand that is tightly linked to projections of future passenger traffic levels. Operations projections are based on estimates of the average number of passengers per aircraft departure or arrival, applied to forecasts of total passenger traffic. The number of passengers per departure is in turn a function of aircraft seating capacity and load factor.

Each of the forecast recovery scenarios, Rapid Recovery, Medium Recovery, and Slow Recovery, does not anticipate meeting the Draft FAA Terminal Area Forecast for commercial passenger aircraft operations in 2020 or 2021, while the Rapid Recovery begins to exceed this forecast in 2022. Historic and Forecast Commercial Passenger Aircraft Operations are depicted in **Table 3-7**.

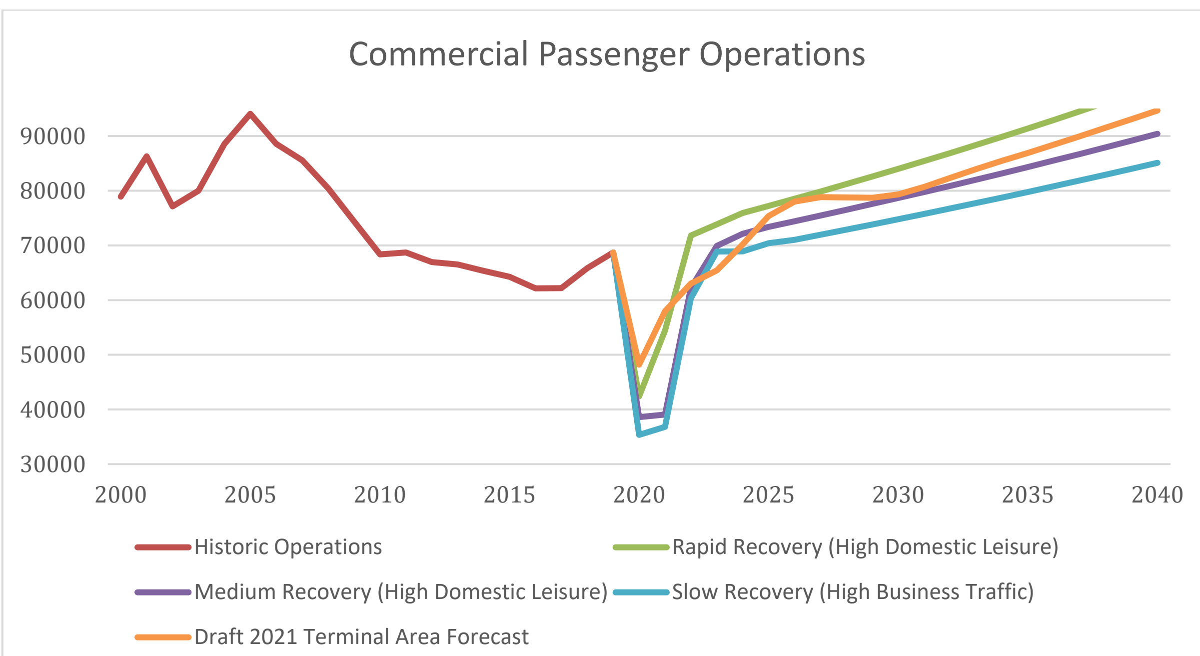
Figure 3-2 depicts the Commercial Passenger Aircraft Operations forecast scenarios graphically.

Table 3-7: Historic and Forecast Commercial Passenger Aircraft Operations, 2000 - 2040

	Year	Historic Commercial Passenger Operations	Rapid Recovery Forecast	Medium Recovery Forecast	Slow Recovery Forecast	Draft 2021 Terminal Area Forecast
	2000	81,782				
	2005	93,804				
	2010	68,776				
	2015	63,522				
Historic	2020	39,382				
Forecast	2021		54,429	39,065	36,818	57,957
	2022		71,801	62,247	60,352	63,028
	2023		73,851	69,919	68,892	65,443
	2024		75,923	72,127	68,928	70,196
	2025		77,214	73,393	70,420	75,380
	2030		84,004	78,676	74,791	79,328
	2035		91,392	84,340	79,781	86,907
	2040		99,429	90,411	85,103	94,669

Sources: FAA Aerospace Forecast, Fiscal Years 2019-2039, January 2020, K&G Analysis, 2021. Draft 2020 FAA Terminal Area Forecast.

Figure 3-2: Commercial Passenger Aircraft Operations Forecast for RIC



Sources: FAA Aerospace Forecast, Fiscal Years 2019-2039, January 2020, K&G Analysis, 2021. Draft 2020 FAA Terminal Area Forecast.

3.4.3 AIR TAXI AND OTHER COMMERCIAL PASSENGER OPERATIONS FORECAST

The remaining commercial operations at Richmond consist of air taxi service and some corporate aircraft services provided by fractional ownership companies. It is estimated that that there were approximately 22,000 such operations in 2019, or an average of about 63 takeoffs and landings per day.

This forecast considers that such services will increase as the local economy grows and will be in line with the increase in demand for scheduled air service. This forecast also assumes that air taxi and other commercial passenger operations will grow at the same rates as the base forecast of scheduled passenger aircraft operations in each of the forecasted scenarios.

3.4.4 PROJECTIONS OF GENERAL AVIATION ACTIVITY

General Aviation (GA) operations have continued to trend downwards since the 1990s, with a 38 % drop (2 % per year average) in landings and takeoffs between 2000 and 2019. This forecast assumes that GA operations at Richmond will recover to 2019 levels in the coming years and begin to increase at a moderate rate, driven by the growing economy in the region and an increasingly favorable business climate, with the number of Fortune 500 companies locating offices or facilities in the region. Historic and Forecast General Aviation Aircraft Operations are depicted in **Table 3-8**.

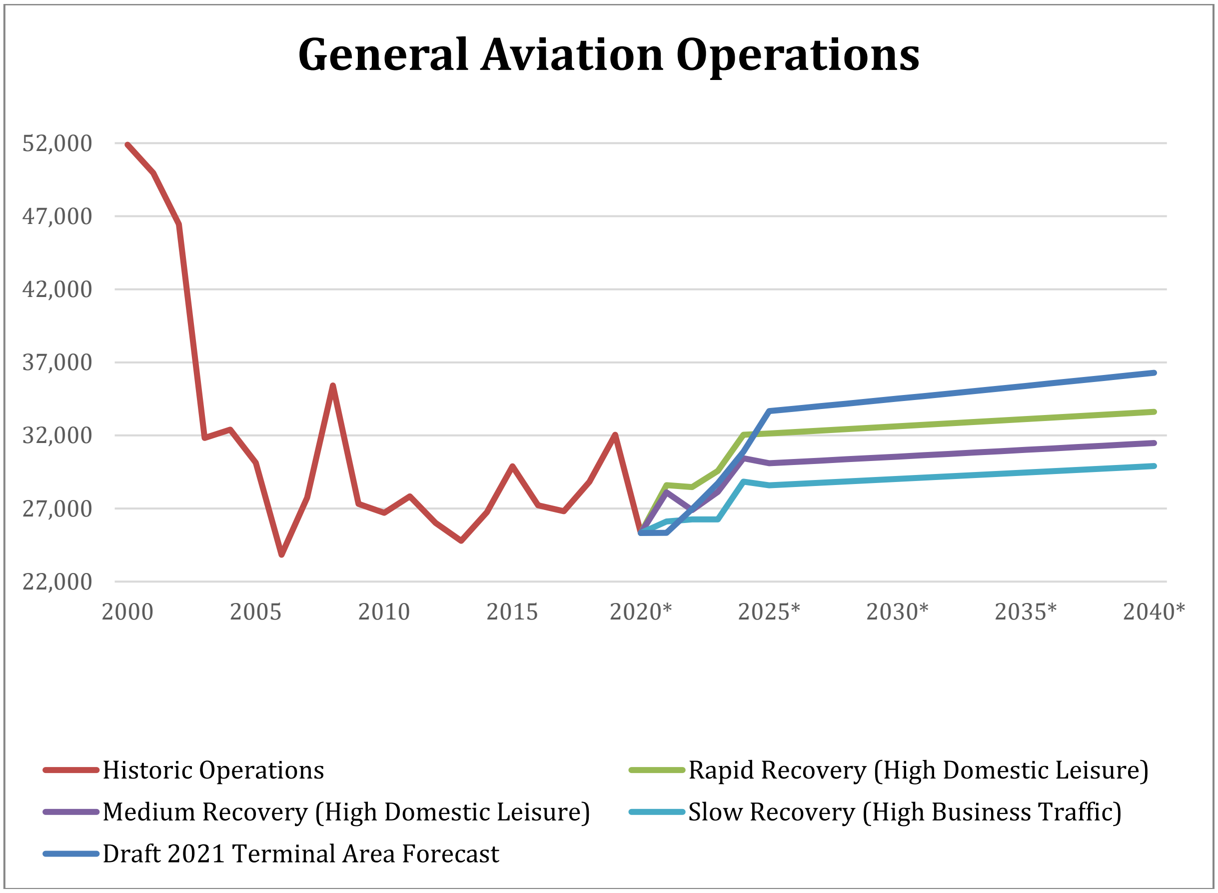
Table 3-8: Historic and Forecast General Aviation Aircraft Operations, 2000 - 2040

	Year	General Aviation Operations	Rapid Recovery Forecast	Medium Recovery Forecast	Slow Recovery Forecast	Draft 2021 Terminal Area Forecast
	2000	51,893				
	2005	30,129				
	2010	26,702				
	2015	29,890				
	2019	32,043				
Historic	2020	25,905				
Forecast	2021		28,602	28,110	26,117	25,333
	2022		28,473	26,891	26,259	26,966
	2023		29,571	28,143	26,259	28,736
	2024		32,043	30,441	28,839	30,892
	2025		32,139	30,098	28,593	33,665
	2030		32,624	30,552	29,025	34,517
	2035		33,116	31,013	29,463	35,391
	2040		33,616	31,481	29,907	36,287

Sources: FAA Aerospace Forecast, Fiscal Years 2019-2039, January 2020, K&G Analysis, 2021.
Draft 2020 FAA Terminal Area Forecast.

The General Aviation Aircraft Operations forecast scenarios are depicted graphically in **Figure 3-3**.

Figure 3-3: 20-Year General Aviation Forecast for Richmond International Airport



Sources: FAA Aerospace Forecast, Fiscal Years 2019-2039, January 2020, K&G Analysis, 2021.
Draft 2020 FAA Terminal Area Forecast.

3.4.5 BASED AIRCRAFT FORECAST

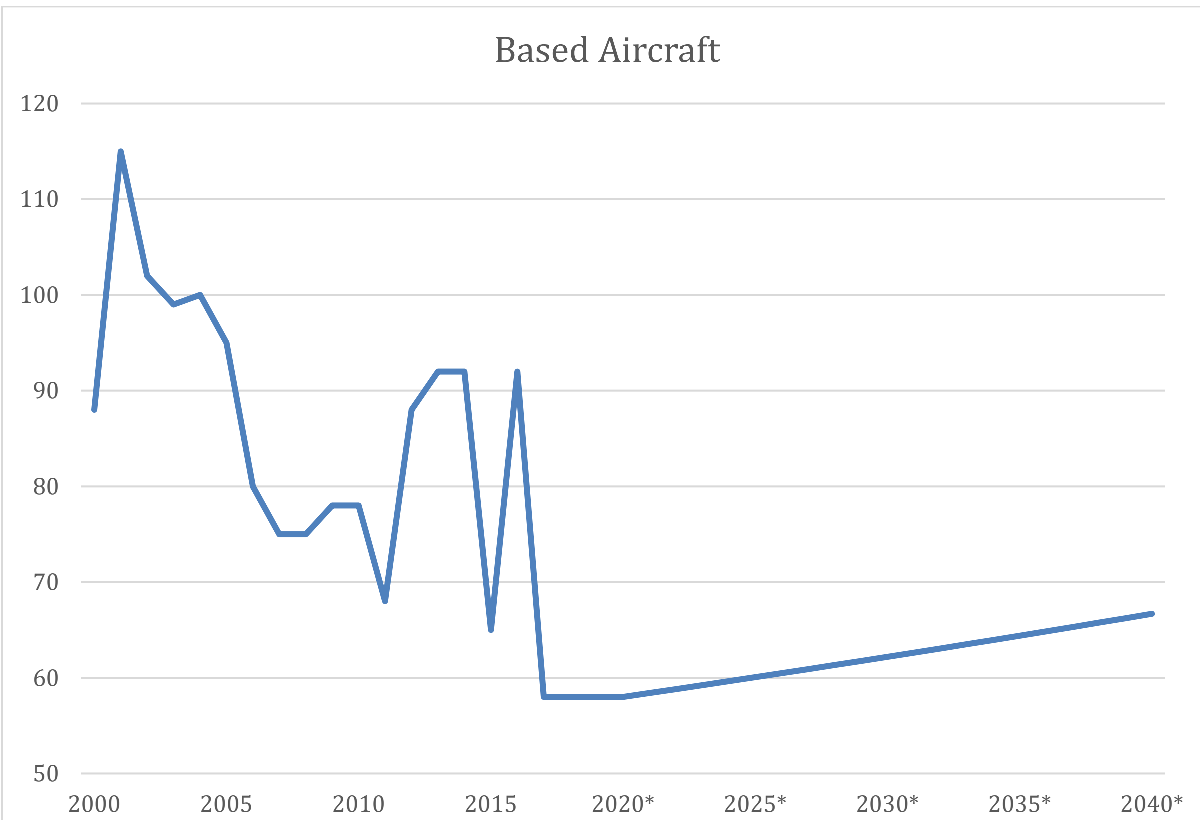
As GA activity at RIC has declined, the number of aircraft based at RIC has also decreased. This forecast assumes that the number of based aircraft at RIC will cease to decline in the future, for the same reasons that GA operations will cease to decline. The growing regional economy and growth of locally based businesses, as well as increased disposable income in the community, should have a positive impact on the number of based aircraft. This forecast projects that the number of based aircraft at RIC will increase at the same rate as the Draft 2021 Terminal Area Forecast for GA operations, or 0.7% per year. The Based Aircraft Forecast is depicted in **Table 3-9**. The Based Aircraft forecast is illustrated graphically in **Figure 3-4**.

Table 3-9: Based Aircraft Forecast for Richmond International Airport

	Year	Based Aircraft
	2000	88
	2005	95
	2010	78
	2015	65
Historic	2020	58
Forecast	2025	60
	2030	62
	2035	64
	2040	67

Sources: FAA Aerospace Forecast, Fiscal Years 2019-2039, January 2020.
K&G Analysis, 2021.

Figure 3-4: 20-Year Based Aircraft Forecast for Richmond International Airport



Sources: FAA Aerospace Forecast, Fiscal Years 2019-2039, January 2020.
K&G Analysis, 2021.

3.4.6 CARGO VOLUME FORECAST

Cargo volume at Richmond has been volatile in recent years, with an average annual growth rate of 1%, despite a more rapidly-growing regional economy. Some of this volatility may have been caused by increasing modal shift, where integrated cargo carriers have substituted ground trucking for some air shipments, for short-medium distances within which trucking is sufficiently quick to meet customers' delivery commitments. This phenomenon is not unique to the Richmond market but is rather a national trend. However, in June 2020, Amazon Air began operations at RIC. The cargo airline for Amazon operates two flights a day, seven days a week, at RIC. Other cargo carriers at RIC – DHL, FedEx, and UPS – all reported growth in shipments for the first quarter of the 2020 fiscal year.

This forecast is based on the premise that cargo volumes will indeed grow in the future at RIC. The growth of the local economy, and in particular the booming business climate, should drive growth in both inbound and outbound volumes. This is furthered by the increased demand for e-commerce since the beginning of the Coronavirus Pandemic.

3.4.7 PROJECTED AIRCRAFT FLEET MIX

Appendix F **(*2019 Aircraft Noise Technical Report*)** and ***Appendix I*** (***Runway Length Analysis***) include traffic counts, aircraft types, and the analysis methodology and assumptions that are used to determine runway length.

3.4.8 MILITARY OPERATIONS FORECAST

A range of factors enter into the analysis of military aviation activity, including national defense funding, troop activation, and training frequency. The military makes no data available to the public regarding aviation activity, and the FAA offers no forecasting guidance for this parameter. Furthermore, federal funding for aviation projects is distributed without regard for military activity. Therefore, historic data is the only guidance for preparing forecasts of military activity and is inherently unreliable as a predictor of future activity.

Military operations at Richmond have been trending downward since the 1990s. In 2019, there were fewer than 5,000 military operations at RIC – less than 13 landings and takeoffs per day on average.

The Army National Guard remains at RIC and continues to operate fixed wing and rotorcraft sorties. Manned military operations are assumed to remain fixed at this level for the remainder of the forecast period to 2040, as defined in the FAA Aerospace Forecast, Fiscal Years 2019-2039. The Military Operations Forecast is depicted in **Table 3-10**.

Figure 3-5 illustrates the Military Operations forecast graphically.

Table 3-10: Military Operations Forecast for Richmond International Airport

	Year	Military Operations
	2000	12,518
	2005	12,905
	2010	7,393
	2015	7,250
	2019	4,761
Historic	2020	5,469
Forecast	2021	7,497*
	2022	4,792
	2023	4,792
	2024	4,792
	2025	4,792
	2030	4,792
	2035	4,792
	2040	4,792

Source: FAA Aerospace Forecast, Fiscal Years 2019-2039, January 2020.
** Based on current operational levels*

Figure 3-5: Military Operations Forecast for Richmond International Airport

Source: FAA Aerospace Forecast, Fiscal Years 2019-2039, January 2020, K&G Analysis, 2021.

3.4.9 PROJECTIONS OF PEAK OPERATIONAL DEMAND

Peak period operations assist in planning the size of aprons, pilot lounges, airfield infrastructure, and automobile parking lots. In this analysis, three specific peak periods were used to determine the appropriately-sized facilities that will be needed to meet forecasted demand. These are peak month, average day, and peak hour operations. Definitions for these are as follows:

- Peak Month Operations – The month during which the most aircraft operations occur. Standard forecasting practice assumes a 20% increase over the other months during the year.
- Average Day Operations – Aircraft activity that can be expected on a typical day. Dividing the peak month operations by 30 derives average day operations.
- Peak Hour Operations – The hour during which most activity that occurs within the average day. The total peak hour operations generally equate to 20% of the average day total operations.

With the determination of the peak operational demands, a capacity analysis is conducted, and facility requirements are analyzed to determine the ability of airport facilities to accommodate existing and projected aircraft operations. The capacity of the existing airfield and access facilities is then reviewed with respect to the ability of each to accommodate current and forecasted demand. This aids in the identification of possible deficiencies in the present and/or future airport layout.

The results of this analysis will be addressed in Chapter 4, Demand Capacity Analysis and Facility Requirements. **Table 3-11** shows the peak period operations at RIC during the planning period.

Table 3-11: Peak Period Operational Demand Forecasts for RIC

Year	Annual	Peak Month	Average Day	Peak Hour
2010	103,829	9,823	327	65
2011	102,507	9,344	311	62
2012	98,145	8,928	298	60
2013	97,956	8,804	293	59
2014	100,802	9,341	311	62
2015	99,512	8,980	299	60
2016	94,899	8,464	282	56
2017	96,675	8,805	294	59
2018	100,808	9,738	325	65
2019	106,137	9,607	320	64
FORECAST:				
Rapid Recovery				
2025	114,145	11,415	380	76
2030	121,420	12,142	405	81
2035	129,300	12,930	431	86
2040	137,837	13,784	459	92
Medium Recovery				
2025	108,283	10,828	361	72
2030	114,020	11,402	380	76
2035	120,145	12,015	400	80
2040	126,685	12,668	422	84
Slow Recovery				
2025	103,805	10,381	346	69
2030	108,608	10,861	362	72
2035	114,035	11,404	380	76
2040	119,802	11,980	399	80

Sources: FAA Aerospace Forecast, Fiscal Years 2019-2039, January 2020.
Kutchins & Groh, LLC Analysis, 2021.

3.5 Summary and Recommendations

For reference, **Table 3-12** depicts the recommended aviation forecasts for the planning horizon. The forecasts discussed and depicted in this chapter play a vital role in planning for future demand at the Airport and are used in the following chapters of the Master Plan to assess the capacity of existing facilities and to determine facility expansions and/or improvements that may be needed to satisfy future activity levels.

Table 3-12: Summary of Aviation Forecasts for RIC

Enplanements Forecast

Year	Rapid Recovery Forecast	Medium Recovery Forecast	Slow Recovery Forecast	Draft 2021 Terminal Area Forecast
2019	2,201,777			
FORECAST:				
2025	2,256,821	2,201,777	2,112,594	2,256,821
2030	2,553,386	2,430,940	2,300,265	2,553,386
2035	2,888,922	2,683,954	2,429,594	2,888,922
2040	3,268,550	2,963,302	2,566,194	3,268,550

Commercial Passenger Operations Forecast

Year	Rapid Recovery Forecast	Medium Recovery Forecast	Slow Recovery Forecast	Draft 2021 Terminal Area Forecast
2019	68,708			
FORECAST:				
2025	77,214	73,393	70,420	75,380
2030	84,004	78,676	74,791	78,004
2035	91,392	84,340	79,781	78,834
2040	99,428	90,411	85,103	78,782

General Aviation Operations Forecast

Year	Rapid Recovery Forecast	Medium Recovery Forecast	Slow Recovery Forecast	Draft 2021 Terminal Area Forecast
2019	32,043			
FORECAST:				
2025	32,139	30,098	28,593	33,665
2030	32,624	30,552	29,025	34,517
2035	33,116	31,013	29,463	35,391
2040	33,616	31,481	29,907	36,287

Military Operations Forecast (Table 3-12 continued)

Year	Forecast
2020	5,469
FORECAST:	
2025	4,761
2030	4,761
2035	4,761
2040	4,761

Total Operations Forecast (Table 3-12 continued)

Year	Rapid Recovery Forecast	Medium Recovery Forecast	Slow Recovery Forecast	Draft 2021 Terminal Area Forecast
2019	106,137			
FORECAST:				
2025	114,145	108,283	103,805	113,536
2030	121,420	114,020	108,608	116,329
2035	129,300	120,145	114,035	117,329
2040	137,837	126,685	119,802	117,447

Aircraft Operations Forecast –Annual Average Growth Rate (Table 3-12 continued)

Year	Rapid Recovery Forecast	Medium Recovery Forecast	Slow Recovery Forecast	Draft 2021 Terminal Area Forecast
2025	2.9%	2.6%	2.2%	0.9%
2030	1.2%	1.0%	1.0%	2.2%
2035	1.3%	1.1%	1.0%	1.3%
2040	1.3%	1.1%	1.0%	1.3%
Total	**1.7%**	**1.5%**	**1.3%**	**1.4%**

Based Aircraft Forecast (Table 3-12 continued)

	Year	Based Aircraft
Historic	2020	58
Forecast	2025	60
	2030	62
	2035	64
	2040	67

Peak Period Operational Demand Forecast (Table 3-12 continued)

Year	Annual	Peak Month	Average Day	Peak Hour
2010	103,829	9,823	327	65
2011	102,507	9,344	311	62
2012	98,145	8,928	298	60
2013	97,956	8,804	293	59
2014	100,802	9,341	311	62
2015	99,512	8,980	299	60
2016	94,899	8,464	282	56
2017	96,675	8,805	294	59
2018	100,808	9,738	325	65
2019	106,137	9,607	320	64
FORECAST:				
Rapid Recovery				
2025	114,145	11,415	380	76
2030	121,420	12,142	405	81
2035	129,300	12,930	431	86
2040	137,837	13,784	459	92
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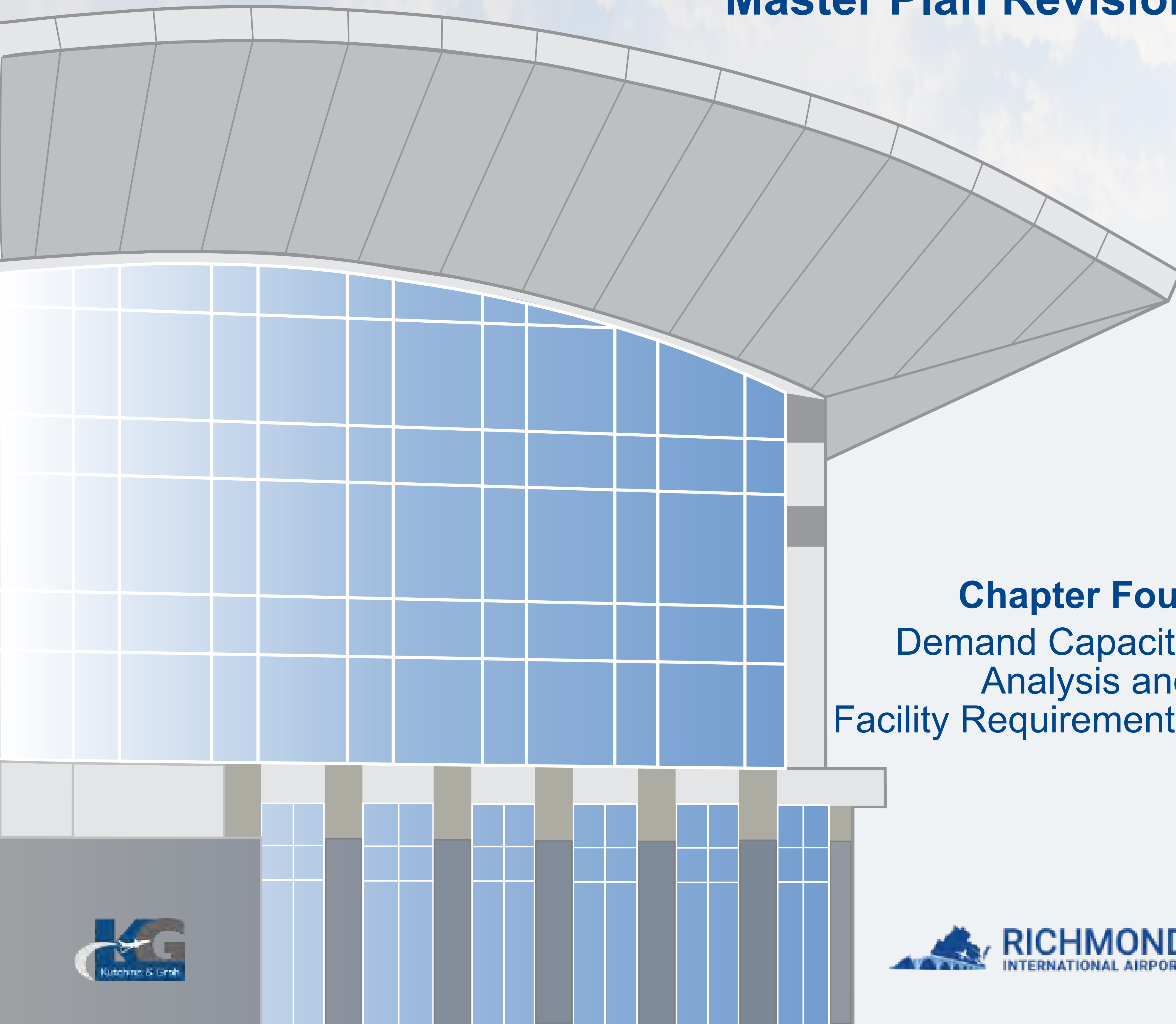
2025	108,283	10,828	361	72
2030	114,020	11,402	380	76
2035	120,145	12,015	400	80
2040	126,685	12,668	422	84
Slow Recovery				
2025	103,805	10,381	346	69
2030	108,608	10,861	362	72
2035	114,035	11,404	380	76
2040	119,802	11,980	399	80

Sources: FAA Aerospace Forecast, Fiscal Years 2019-2039, January 2020.
K&G Analysis, 2021.

Richmond International Airport

Master Plan Revision



Chapter Four

Demand Capacity Analysis and Facility Requirements

Kutchins & Groh

RICHMOND INTERNATIONAL AIRPORT

CHAPTER FOUR

Demand Capacity Analysis and Facility Requirements

This chapter contains the 20-year airfield demand/capacity analysis and facility requirements for the Richmond International Airport (RIC) and assesses the adequacy of facilities based on future demand, as projected in *Chapter Three, Aviation Demand Forecasts* (the Forecast). The findings presented in this chapter provide the basis for the definition and evaluation of airfield and facility alternatives. Any shortfall in facilities, as determined from the Forecast and the demand capacity analysis, dictates the timing and degree to which facility expansion and improvements are needed in the 20-year planning horizon. Facility requirements were calculated for the Base Year of 2019 and the forecast periods of 2020-2024 (short-term), 2025-2029 (mid-term), and 2030-2040 (long-term.) Facility requirements for the major land uses at RIC are presented in this chapter and are as follows:

- Airfield Facilities – Runway and taxiway system and the ability of the airfield system to serve projected demand levels in terms of runway capacity and design standards
- Support/Ancillary Facilities – Cargo facilities, aircraft/airport maintenance facilities, GA/FBO facilities, and other support facilities
- Ground Access Facilities – Access roadways and vehicle parking areas

4.1 AIRFIELD FACILITIES

4.1.1 AIRFIELD CAPACITY

Airfield capacity is typically defined as the number of hourly or annual aircraft operations the airfield can accommodate. Airfield capacity is a function of runway configuration, aircraft fleet mix, and other factors unique to an airport. When airport demand approaches capacity, high levels of delay may occur. An acceptable level of delay for long-term planning purposes is defined as an average of four to six minutes per aircraft[1].

4.1.1.1 Methodology

Airfield capacity is determined by a number of factors, including meteorology, airfield layout, runway use, aircraft fleet mix, runway instrumentation, arrival, and departure percentages, and exit taxiway locations. The calculation of airfield capacity and delay is essential in evaluating the ability of the airfield to effectively serve future activity levels. The basis for the

[1] Source: *Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5070-6B, Airport Master Plans*.

capacity of the existing runway system was analyzed using *FAA AC 150/5060-5, Airport Capacity and Delay*.

4.1.1.2 Existing and Forecast Demand

The Forecast prepared for this study addressed several scenarios for recovery at RIC over the 20-year planning horizon. **Table 4-1** summarizes the findings from the Forecast used to determine these facility requirements.

Table 4-1: Base Year Forecast of Aviation Activity Summary

Enplanements Forecast

Year	Rapid Recovery Forecast	Medium Recovery Forecast	Slow Recovery Forecast	Draft 2021 Terminal Area Forecast
2019	2,201,777			
FORECAST:				
2025	2,256,821	2,201,777	2,112,594	2,521,458
2030	2,313,242	2,245,813	2,201,777	2,637,207
2035	2,371,073	2,290,729	2,225,997	2,702,189
2040	2,430,350	2,336,543	2,250,483	2,756,262

Commercial Passenger Operations Forecast

Year	Rapid Recovery Forecast	Medium Recovery Forecast	Slow Recovery Forecast	Draft 2021 Terminal Area Forecast
2019	68,708			
FORECAST:				
2025	77,214	73,393	70,420	75,380
2030	78,527	74,420	71,025	78,004
2035	79,862	75,462	71,948	78,834
2040	81,219	76,519	72,884	78,782

General Aviation Operations Forecast

Year	Rapid Recovery Forecast	Medium Recovery Forecast	Slow Recovery Forecast	Draft 2021 Terminal Area Forecast
2019	32,043			
FORECAST:				
2025	25,905	25,905	25,905	26,808
2030	26,852	25,905	25,589	25,333
2035	28,473	26,891	26,259	26,966
2040	29,571	28,143	27,589	28,736

Military Operations Forecast

Year	Forecast
2019	4,761
FORECAST:	
2025	4,761
2030	4,761
2035	4,761
2040	4,761

Total Operations Forecast

Year	Rapid Recovery Forecast	Medium Recovery Forecast	Slow Recovery Forecast	Draft 2021 Terminal Area Forecast
2019	106,137			
FORECAST:				
2025	114,145	108,283	103,805	113,536
2030	121,420	114,020	108,608	116,329
2035	129,300	120,145	114,035	117,329
2040	137,837	126,685	119,802	117,447

Aircraft Operations Forecast –Annual Average Growth Rate

Year	Rapid Recovery Forecast	Medium Recovery Forecast	Slow Recovery Forecast	Draft 2021 Terminal Area Forecast
2025	2.9%	2.6%	2.2%	0.9%
2030	1.2%	1.0%	1.0%	2.2%
2035	1.3%	1.1%	1.0%	1.3%
2040	1.3%	1.1%	1.0%	1.3%
Total	**1.7%**	**1.5%**	**1.3%**	**1.4%**

The aircraft fleet mix is an important factor in determining an airfield's operational capacity. To determine the capacity, aircraft are separated into categories by their approach speed and size. As the range within the aircraft size and approach speed increases, operational capacity decreases. This is due to the separation requirements for sequential aircraft approaching or departing an airport. The greater the variation in size and approach speed between two aircraft arriving or departing, the greater the amount of separation required.

The existing and forecasted aircraft fleet mix was grouped into five categories as shown in **Table 4-2**. The Base Year indicates that 61% of aircraft utilizing RIC were considered Air Carrier or Regional Jet, 15% were GA Jet, 5% were Turboprop, 14% were Piston, and 5% were Military aircraft.

Table 4-2: Fleet Mix by Category

Category	2019	2021	2030	2040
Air Carrier/Regional Jet	61%	64%	70%	73%
GA Jet	15%	13%	11%	10%
Turboprop	5%	5%	4%	4%
Piston	14%	12%	11%	10%
Military	5%	6%	4%	3%

Source: RIC Airport Records for 2020, CMT Analysis 2020.

4.1.1.3 Weather Conditions

Wind and weather conditions play a significant role in dictating runway orientation, navigational aid requirements, and operating configurations. The key weather characteristics affecting airfield facility requirements are wind (speed and direction), cloud cover, precipitation, and visibility. Historical weather data was analyzed to assess the nature, frequency, and duration of weather conditions that influence runway use and operating procedures.

As discussed in *Chapter Two,* ceiling, and visibility minima are grouped into two categories: Visual Meteorological Conditions (VMC) and Instrument Meteorological Conditions (IMC). VMC exists when the cloud ceiling is greater than or equal to 1,000 feet and visibility is greater than or equal to three miles. IMC conditions prevail when the visibility or cloud ceiling falls below the VMC minima. The annual occurrence of VFR (Visual Flight Rules) and Instrument Flight Rules (IFR) weather conditions for RIC is shown in **Table 4-3**.

Table 4-3: Annual Occurrences of Weather Conditions

Category	Ceiling	Visibility	Annual Occurrence
VFR	> 1,000'	> 3 miles	91%
IFR	< 1,000'	< 3 miles	9%

Source: NOAA National Climatic Data Center (NCDC), National Weather Service Hourly Surface Operations, 10-year Averaged Data 2010-2019, Station #724010

4.1.1.4 Runway Configuration

The Airport has two active runways. As the nomenclature used for these runways is defined by compass headings, they are referred to as Runway 2-20 and Runway 16-34 (see **Exhibit 4-1: Existing Airfield Facilities.**)

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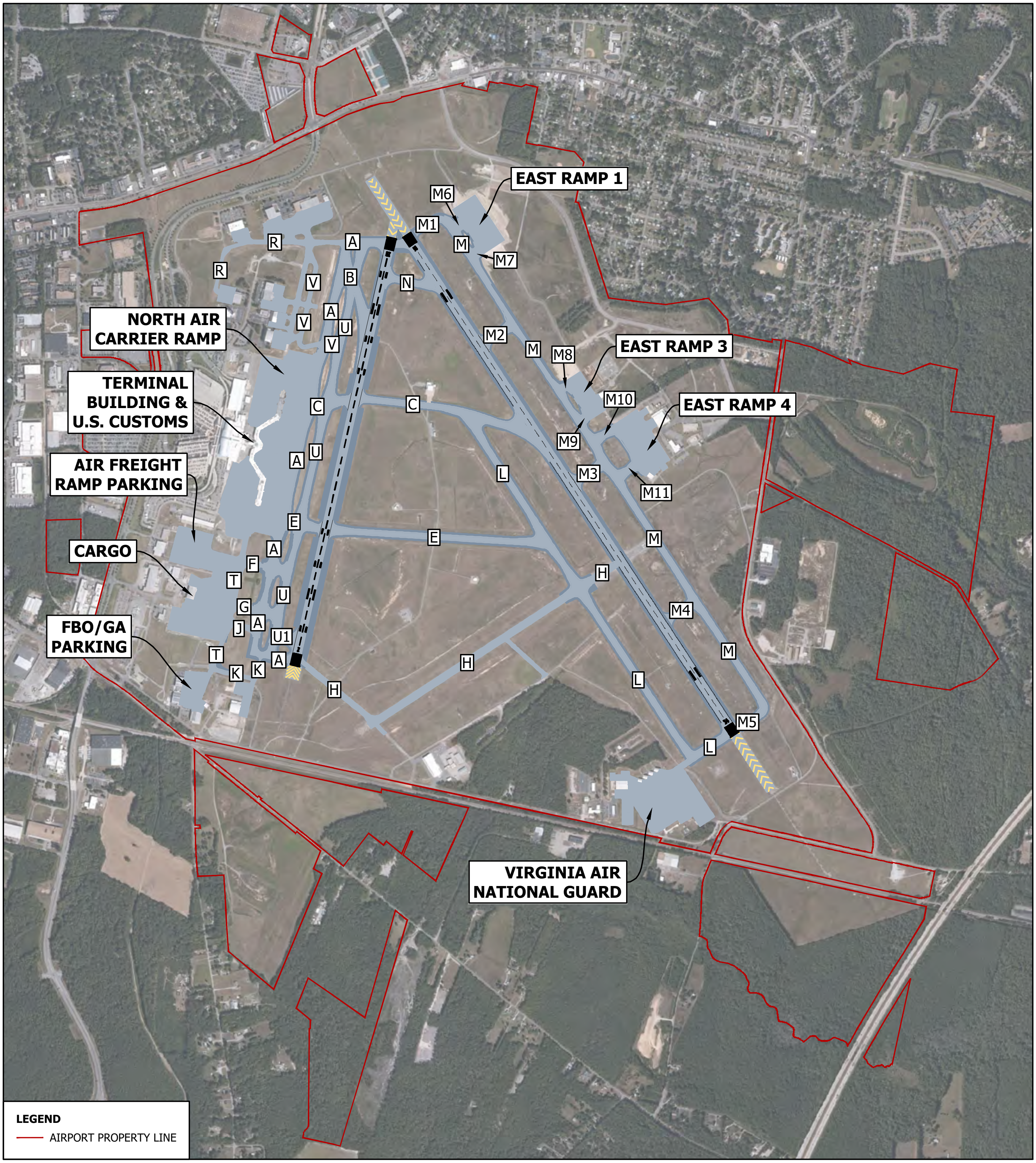


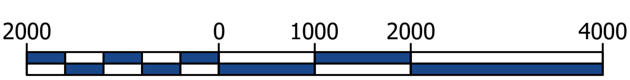


EXHIBIT 4-1
EXISTING AIRFIELD FACILITIES

Runway 16-34 is considered the primary runway due to its Category III ILS; however, operations are generally split between Runways 2-20 and 16-34. Runway 16-34 is oriented in a northwest-southeast alignment, and it is 9,003 feet long and 150 feet wide.

The secondary runway, 2-20, is oriented in a southwest-northeast alignment. It is 6,607 feet in length and 150 feet wide.

Former Runway 7-25 was decommissioned in 2020 and has been converted to a taxiway (Hotel).

4.1.1.5 Runway Exits and Taxiways

Runway exits and taxiways affect how long aircraft remain on the runway and, therefore, are important components of capacity. When calculating the capacity of an airfield, it is assumed that there are sufficient full-length parallel taxiways for each runway, sufficient runway entrances and exits, and no taxiway/runway crossing problems. The capacity may be lower without these elements in place.

4.1.1.6 Airfield Demand/Capacity Analysis

There are a number of different methodologies that can be used to assess runway capacity and the need for runway expansion. These may include detailed computer simulation, an analysis of hourly runway demand capacity, Annual Service Volumes (ASV), or aircraft delay. Given the operational nature of RIC and its role in both the state's as well as the National Airport System, the Airport's ASV is an appropriate measure for determining airfield capacity. These calculations are used to project future requirements of existing airfield facilities (runways, taxiways, and instrumentation).

ASV is used by the FAA as a gross measure of an airport's operating capacity and is defined as the maximum level of annual aircraft operations that can take place at an airport and does not consider levels of delay. As actual annual operations approach the ASV of the airport, aircraft delays begin to occur. As the number of operations get closer to the ASV, the length of average delay increases to the point that capacity enhancements (e.g., additional runway exits and/or additional runways) are warranted. As a general rule, when demand at an airport reaches 60% of its capacity, as defined by the ASV, delays may be noticeable during the day and new airfield facilities (i.e., runways) should be planned. When airport activity reaches 80% of operational capacity, new airfield facilities should be constructed.

Based on FAA Advisory Circular 150/5060-5, Airport Capacity and Delay, the Annual Service Volume is estimated to be 220,000 operations. The annual operations at RIC for 2019 were 105,754. According to the Base Year demand calculation for RIC, the Airport was operating at 48% capacity. In 2040 the annual demand for RIC is projected in the Rapid Recovery scenario to reach 60%. Therefore, no runway capacity enhancement projects are foreseen over the planning horizon.

According to the 2020 Terminal Area Forecast (TAF), which can be found in ***Appendix C, Forecast of Aviation Activity***, the FAA is forecasting that operations at RIC will increase by an average annual compound growth rate of 1.4% throughout the planning horizon. For the purposes of the Forecast, an average annual compound growth rate of 1.7% was utilized for the Rapid Recovery scenario, 1.5% for the Medium Recovery scenario and 1.3% for the Slow Recovery scenario. These three scenarios were included based on the uncertainty related to the effects of the COVID-19 global crisis and the effect it will have on the aviation industry.

4.1.2 RUNWAY LENGTH REQUIREMENTS

The purpose of a runway length analysis is to evaluate the lengths of the current runways for adequacy and to determine the lengths required for any future runways. Guidance on determining runway length is provided by airport planning manuals from the aircraft manufacturers. Runway length requirements are determined by and calculated based on the most demanding aircraft operating at an airport on a regular basis. A regular basis is generally defined as a minimum of 500 annual operations.

As part of this Master Plan Revision, a Runway Length Analysis was conducted for RIC in May of 2020. The results of the analysis indicate that:

- All potential west coast destinations could be met by current carriers with aircraft within their existing fleet.
- A potential European destination would require an airline utilizing Boeing 757-300 to put a minor passenger limitation in place to reduce weight in order to utilize the existing runway length.
- It is not anticipated that Runway 16-34 will be extended within the 20-year horizon.

These results confirm that the existing runway length is sufficient for existing operations and potential future aircraft operations. In concert with the forecasting effort associated with the RIC Master Plan Update, it is not anticipated that Runway 16-34 will require an extension within the 20-year horizon.

The Trigger Point Analysis also determines the timeframe during which runway capacity enhancement projects might be justified. According to FAA standards, planning and design for an additional runway should begin when the existing airfield reaches 60% capacity. The TAF indicates that 60% capacity will be achieved by the year 2041. Per FAA guidance, construction of a new runway should begin when the existing airfield reaches 80% capacity. Using a projection of 2% growth, the analysis indicates that 80% capacity will be achieved by 2055. The full Runway Length Analysis can be found in ***Appendix C, Forecast of Aviation Activity***.

4.1.2.1 Existing Runway Lengths

RIC is equipped with a total of two active runways, one of which is the primary runway. Runway 16-34 and Runway 2-20 have been designed to accommodate Class D-IV aircraft.

- Runway 16-34, the primary runway, is 9,003 feet in length and 150 feet wide.
- Runway 2-20, the secondary runway, is 6,607 feet in length and 150 feet wide.

4.1.2.2 Summary

Based on the current fleet mix, current annual operations, projected operational demand, and Runway Length Analysis, and the Trigger Point Analysis discussed earlier in this document, the existing runway lengths are adequate for the planning horizon

The future ALP depicts a new additional runway, Runway 16R-34L, and extensions to existing Runway 34R and 16L. Good planning practices dictate that these projects remain on the ALP to allow the FAA to continue to protect the airspace for the future extension even though its implementation is not anticipated during the planning horizon.

4.1.3 TAXIWAY REQUIREMENTS

4.1.3.1 Full and Partial Parallel Taxiways

Parallel or partial parallel taxiways are generally parallel to the runway they serve. They connect one runway end to the other, or to a point along the runway that is served by the partial parallel taxiway. The full-length parallel taxiways at RIC are A, M and U. The full and partial parallel taxiways at RIC will be adequate through the planning horizon. New parallel taxiways will be required when a new runway is constructed.

4.1.3.2 Entrance and Exit Taxiways

Most of the airfield’s taxiway system is made up of secondary taxiways that aid in the flow of aircraft to and from the runway system. These are identified as Taxiways C, E and F. The entrance and exit taxiways at RIC are adequate, but Taxiway E should be realigned due to FAA design requirements.

4.1.3.3 Bypass, Crossover, and Transverse Taxiways

The bypass, crossover, and transverse taxiways are adequate, but Taxiway V should be reconfigured to make it more maneuverable.

4.1.3.4 Aprons and Hold Pads

Demand-driven aprons will be constructed for each new tenant. A new apron is planned for a dedicated deicing pad. Currently the hold pads are adequate. East Ramp 4 is being expanded for more capacity.

4.1.3.5 Summary

The taxiway/apron analysis identifies the following needs:

- Concourse B Apron Expansion
- Deicing and Diversion Pad
- Taxiway V Reconfiguration
- Taxiway E Reconfiguration
- East Ramp 4 Expansion

4.1.4 INSTRUMENTATION AND LIGHTING

Instrumentation, lighting, and other navigational aids assist pilots in maneuvering their aircraft safely and efficiently under various weather conditions. This section evaluates the existing instrumentation and lighting systems at RIC.

4.1.4.1 Instrumentation

A variety of Navigational Aids (NAVAIDS) are currently in place in and around RIC, including Approach Lighting system (ALS), Precision Approach Path Indicator 4 (PAPI 4), Very High Frequency Omni-Directional Radar (VOR)/Distance Measuring Equipment (DME), Glide Slope (GS), Localizer, Runway End Indicator Lights (REILS) and Medium Intensity Approach Lighting System (MALSR). NAVAIDS used for arriving aircraft provide course guidance and, in some instances, vertical guidance to the runway threshold. This allows aircraft to land at RIC. The Airport operates under IFR 91%[2] of the time. Aircraft also use the instrument approaches during VFR for additional guidance. The type of instrumentation available for a runway determines the minimum ceiling and visibility, or “lowest minimums,” during which landings can occur while under IFR. At RIC, instrument approach systems are provided in **Table 4-4**.

[2] *Source: 2010-2019, Station #724010*

Table 4-4: Instrument Approach Procedures & Best Available Minimums

Runway	Approach Category	Aircraft Category	Approach Minimums: Decision Altitude[1]	Approach Minimums: Visibility Minimums[2]
16	RNAV (RNP) Y			
	RNP 0.11 DA	A/B/C/D	400	3/4
	RNP 0.30 DA	A/B/C/D	500	1
	RNAV (GPS) Z			
	LPV DA	A/B/C/D	200	1/2
	LNAV/VNAV DA	A/B/C/D	400	5/8
	LNAV MDA	A/B	500	1/2
		C/D	500	3/4
	Circling	A/B	500	1
		C	600	1 1/2
		D	600	2
34	RNAV (RNP) Y			
	RNP 0.11 DA	A/B/C/D	400	1/2
	RNP 0.30 DA	A/B/C/D	500	1
	RNAV (GPS) Z			
	LPV DA	A/B/C/D	200	1/2
	LNAV/VNAV DA	A/B/C/D	400	3/4
	LNAV MDA	A/B	400	1/2
		C/D	400	5/8
	Circling	A/B	500	1
		C	600	1 1/2
		D	600	2
2	RNAV (RNP) Y			
	RNP 0.11 DA	A/B/C/D	400	3/4
	RNP 0.30 DA	A/B/C/D	500	1
	RNAV (GPS) Z			
	LPV DA	A/B/C/D	300	3/4
	LNAV/VNAV DA	A/B/C/D	400	7/8
	LNAV MDA	A/B	500	3/4
		C/D	500	1
	Circling	A/B	500	1
		C	600	1 1/2
		D	600	2

[1] Mean Sea Level (MSL), Feet
[2] Statute Miles

Table 4-4: Instrument Approach Procedures & Best Available Minimums (*Continued*)

Runway	Approach Category	Aircraft Category	Approach Minimums	
			Decision Altitude[1]	Visibility Minimums[2]
20	RNAV (RNP) Y			
	RNP 0.11 DA	A/B/C/D	400	1
	RNP 0.30 DA	A/B/C/D	500	1 1/2
	RNAV (GPS) Z			
	LPV DA	A/B/C/D	300	7/8
	LNAV/VNAV DA	A/B/C/D	500	1 1/2
	LNAV MDA	A/B	600	1
		C/D	600	1 3/8
	Circling	A/B	600	1
		C	600	1 1/2
		D	600	2

[1] Mean Sea Level (MSL), Feet
[2] Statute Miles

Currently, Runway 16-34 is the primary runway for RIC operations. It can accommodate aircraft landings during inclement weather conditions due to its Special Authorization CAT I (SA CAT I) and Category II/III ILS approaches to Runway 34. Runway 2-20 has an ILS approach to Runway 2 and a more restrictive GPS (Global Positioning System), RNP (Required Navigational Performance) and LPV (Localizer Performance with Vertical Guidance) precision approaches to both Runway 2 and Runway 20. To preserve the airfield's capabilities under all conditions, any future runway(s) should be equipped with state-of-the-art instrumentation capability on each runway end.

4.1.4.2 Approach Lighting Systems (ALS)

The Airport Lighting System aids in the transition from the instrument approach to touch-down, the most critical point of landing. The Airport Lighting System aids for all runways at RIC are shown in **Table 4-5**.

Table 4.5: Airport Lighting Systems (ALS)

Runway	Approach Procedure
16	VASI (4L), MALSR
34	VASI (4L), ALSF2
2	PAPI (4L), MALSR
20	PAPI (4L), REILS

The current ALS aids are adequate for the Airport's approach capabilities. Any improvements to the airfield will require all design standards to be met for the ALS.

4.1.5 FAA RUNWAY DESIGN STANDARDS

The FAA provides airport geometric design standards and recommendations regarding the safety, efficiency, economy, and longevity of airports. Safety design standards were analyzed specifically for the design group aircraft that utilize the Airport. Based on the recommendations and guidelines outlined in AC 150/5300-13A, the Runway Design Code (RDC) for the Airport is set at a D-IV. The airfield facilities meet Runway Design Code (RDC) D-IV criteria—runways and taxiways can accommodate aircraft with approach speeds of up to 166 knots and wingspans of up to 171 feet. ARC Design Group IV aircraft include the Boeing 767-300/400 and the Airbus A310-200F. Based on this design group, the key safety design standards examined for each runway were the Runway Safety Area (RSA), Object Free Area (OFA), Runway Protection Zones (RPZ), and Precision Obstacle Free Zones (POFZ).

4.1.5.1 Runway Safety Area (RSA)

The Runway Safety Area (RSA) is defined as the surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway. The dimensions of the RSA for each runway are determined by the type and size of the design aircraft, or the ARC.

At RIC, the ARC is Class D-IV for Runway 16-34 and Runway 2-20; therefore, the FAA requires a 500-foot-wide RSA, centered on the runway centerline, which has an area measuring 1,000 feet beyond the departure end and 600 feet prior to the threshold for Runway 16-34 and Runway 2-20.

The RSAs for the existing runways at RIC meet FAA requirements.

4.1.5.2 Runway Object Free Area (OFA)

The Runway Object Free Area (OFA) is defined as the area on the ground centered over the runway centerline provided to enhance the safety of aircraft operations by having the area free of objects. Like the RSA, the dimensions of the OFA for each runway are determined by the type and size of the design aircraft.

For Runway 16-34 (ARC D-IV) and Runway 2-20 (ARC D-IV), the FAA requires that the OFA encompass an area 1,000 feet beyond the runway end, 600 feet prior to the threshold and have a width of 800 feet.

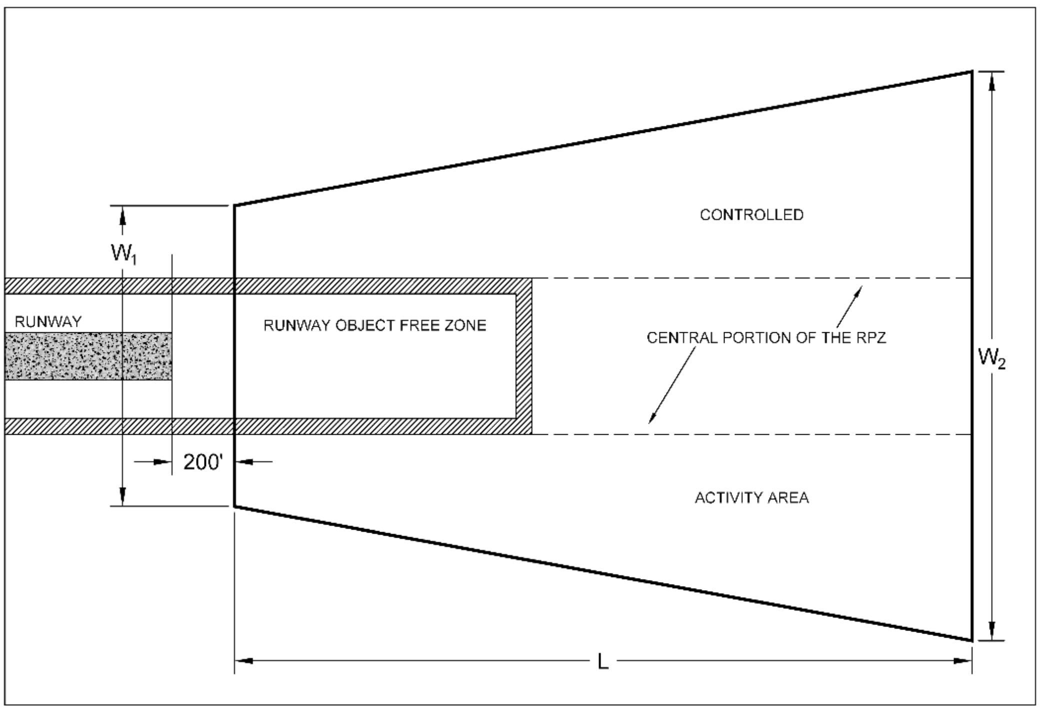
The OFAs for the existing runways at RIC meet FAA requirements.

4.1.5.3 Runway Protection Zone (RPZ)

The Runway Protection Zone (RPZ) is defined as an area off the runway end to enhance the protection of people and property on the ground. The RPZ begins 200 feet from the end of the runway and is trapezoidal in shape. The RPZ should be kept clear of all incompatible objects, activities, and land uses. **Figure 4-1** depicts the shape of an RPZ, and **Table 4-6** provides standard dimensions for RPZs.

The RPZs for the existing runways at RIC meet FAA requirements, except for the Runway 34 RPZ and Runway 20 RPZ, which lies over existing train tracks; and the Runway 16 RPZ, which lies over an existing public roadway.

Figure 4-1: Runway Protection Zone



Precision Obstacle Free Zone (POFZ)

The Precision Obstacle Free Zone (POFZ) is defined as the volume of airspace above an area beginning at the runway threshold and centered on the extended runway centerline. Its shape is dependent on the approach minimums for the runway end and the aircraft on approach. The purpose of the POFZ is to provide additional safety measures by keeping obstacles free and clear from the runway environment and is only in effect when all the following operational conditions:

- The approach includes vertical guidance.
- Reported ceiling below 250 feet or visibility is less than three-fourths statute mile (or Runway Visual Range [RVR] is below 4,000 feet.)
- An aircraft is on final approach within two miles of the runway threshold.

The POFZs for the existing runways at RIC meet FAA requirements.

Table 4-6: Runway Protection Zone (RPZ) Dimensions

Approach Visibility Minimums[1]	Facilities Expected to Serve	Dimensions (Feet)			
		Length (L)	Inner Width (W1)	Outer Width (W2)	RPZ Acres
Visual and Not Lower Than 1-Mile	Small Aircraft Exclusively	1,000	250	450	8,035
Visual and Not Lower Than 1-Mile	Aircraft Approach Categories A & B	1,000	500	700	13,770
Visual and Not Lower Than 1-Mile	Aircraft Approach Categories A & B	1,700	500	1,010	29,465
Not Lower Than ¾ Mile	All Aircraft	1,700	1,000	1,510	48,978
Lower Than ¾ Mile	All Aircraft	2,500	1,000	1,750	78,914

1/ The RPZ dimensional standards are the runway end with the specified approach visibility minimums. The departure RPZ dimensional standards are equal to or less than the approach RPZ dimensional standards. When an RPZ begins other than 200 feet beyond the runway end, separate approach, and departure RPZs should be provided.

Source: FAA Advisory Circular 150/5300-13, Airport Design.

4.1.6 SUMMARY OF AIRFIELD REQUIREMENTS

In order to preserve the existing investment in the airfield facilities, certain improvements to the existing airfield will be necessary throughout the planning horizon. These include:

- Concourse B Apron Expansion
- Deicing and Diversion Pad
- Taxiway V Reconfiguration
- Taxiway E Reconfiguration
- Relocated ARFF

- Relocated ASR
- East Ramp 4 Apron Expansion
- Relocated Cargo Facilities and GSE
- Future Cargo Expansion – South Apron
- Runway 2-20 Rehabilitation
- Runway 16-34 Rehabilitation
- Future Runway 16R-34L
- Future Runway 16 Extension
- Future Runway 34 Extension

4.2 PASSENGER TERMINAL FACILITY REQUIREMENTS

Terminal space planning, as an element of Airport Master Planning, develops a baseline to support future activity levels. The intent of space planning is to establish building blocks for the functional elements of the systems that are representative of the size necessary to accommodate future activity levels. Before the facility requirements for future planning levels can be established, a baseline of the existing facilities' capacities must be determined. The capacity of each element of a terminal facility can vary depending on the acceptable level of service, level of congestion, and length of processing time.

Chapter Three, Aviation Demand Forecasts, addresses growth at RIC over the 20-year planning horizon. Data from the Forecast is used to develop future gate requirements for the terminal. Table 4-1 (Base Year Forecast of Aviation Activity Summary) summarizes the findings from the Forecast that will be used in this analysis.

4.2.1 TERMINAL UTILIZATION

To determine future terminal requirements, it is important to understand the historical and existing airport terminal utilization. The overall majority of airlines operating out of RIC have point-to-point routing strategies. These airlines utilize RIC as a spoke in their hub and spoke system, meaning a higher percentage of origin and destination (O&D) passengers. While peaks of activity do occur daily, enplanement and operational activity tend to be fairly constant. Along with the above-mentioned airline operating configuration, the remaining domestic and international activity, as well as their associated planning needs, will be taken into account.

4.2.2 AIRCRAFT GATE UTILIZATION

Aircraft are typically classified according to FAA Aircraft Design Groups (ADG) as shown in Table 4.7. To define the term "gate," approximations can be developed by applying Narrow-Body Equivalent Gate (NBEG) factors. This index converts the gate requirements of many aircraft, from small commuters to wide-body and jumbo aircraft, so they are equivalent to the apron capacity of a typical narrow-body aircraft gate. The number of gates required to meet future demand (as presented in this analysis) is based on the A320/B737-700 aircraft. The NBEG technique provides a common denominator for the number of gates and aircraft seats useful for sizing terminal components and evaluating capacities in airport master planning.

Table 4-7: NBEG Factor Description

Aircraft Design Group	Design Aircraft	Max. Wingspan (feet)	Typical Aircraft	NBEG Factor
I/II	Small/Medium Commuter	79	ERJ/CRJ	0.7
III	Narrowbody/Large Commuter	113	A319/A320/B737	1.0
IIIA[1]	Boeing 757	125	B757	1.1
IV	Widebody	171	B767	1.4
V	Jumbo	214	B747/A330/A340/B777	1.8

[1]The Aircraft Design Group IIIA has been added to account for the Boeing 757, which has a wider wingspan than Group III but is smaller than a typical Group IV aircraft.

Source: Advisory Circular 150/5300-13

Table 4.8 illustrates existing aircraft gates grouped by relative aircraft size. The aircraft size groupings are determined by the maximum wingspan of aircraft permitted to park at each gate. As the number of gates required to support increased activity grows, the type of additional gates needed should mirror industry trends as described in the Forecast.

Table 4-8: RIC Terminal Existing Gates (Base Year 2019)

Aircraft Design Group	Design Aircraft	Gates	NBEG Factor	NBEG Calculation	% of Total NBEG
I/II	Small/Medium Commuter	2	0.7	1.4	5%
III	Narrowbody/Large Commuter	12	1.0	12	42%
IIIA	Boeing 757	14	1.1	15.4	53%
IV	Widebody	0	1.4	0	
V	Jumbo	0	1.8	0	
Total		28		28.8	100%

4.2.3 METHODOLOGY

Enplanements at RIC continue to get back to 2019 pre-covid levels. There are presently eight airlines serving RIC with 26 destinations. As traffic continues to come back to RIC availability of gates will be critical to meet the future needs of the airlines. The last Airport Master Plan, completed in 2007 and in the latest PFC application, completed in 2018, provided an analysis of the annual enplanements per gate (AEPG) ratio defined by a commonly-used methodology, referred to as the Narrow-Body Equivalent Gate (NBEG) factor. The analysis determined that the AEPG for RIC was 72,268.

As mentioned previously, future gate requirements are developed by applying NBEG factors, which are based on the A320/B737-700 aircraft. This will provide the baseline for determining future gate requirements. A more detailed analysis will convert NBEG future gate requirements to specific gate sizing to accommodate ADG V aircraft or ADG I/II aircraft. The methodologies employed by this analysis to determine future gate requirements include:

- Annual Enplanements per NBEG
- Peak Month Enplanements per NBEG

Annual Enplanements per NBEG – This method calculates the ratio of annual enplaned passengers per gate. That ratio is then applied to the forecast annual enplaned passenger levels. This method uses the gate utilization previously determined and remains constant over the planning horizon.

Peak Month Enplanements per NBEG – This method calculates the ratio of peak month enplaned passengers per gate. The ratio is then applied to the forecast peak month enplaned passenger levels. This method assumes that the current usage of the gates in the peak month is acceptable and remains constant over the planning horizon.

It is recommended that once air travel gets back to Pre-COVID activity that the design day forecast model and operations forecast models are calculated. The results can then be compared to the other methods to make a determination on gates needed.

4.2.4 FUTURE GATE REQUIREMENTS

4.2.4.1 Annual Enplanements per Narrow-Body Equivalent Gate (NBEG)

Table 4.9 depicts the results of the Annual Enplanements per NBEG method.

Table 4-9: Annual Enplanements Per NBEG Method

Year	Annual Enplanements	Annual Enplanements Per Gate Ratio	Required NBEG
2025	2,521,458	72,268	35
2030	2,864,813	72,268	40
2035	3,158,319	72,268	44
2040	3,450,009	72,268	48

Source: 2021 TAF

4.2.4.2 Peak Month Enplanements per NBEG

Table 4.10 depicts the results of the Peak Month (PM) Enplanements per NBEG method

Table 4-10: Peak Month Enplanements Per NBEG

Year	Peak Month Enplanements	PM Annual Enplanements Per Gate Ratio	Required NBEG
2025	227,260	6.793	34
2030	258,207	6,793	38
2035	284,660	6,793	42
2040	310,951	6,793	46

4.2.4.3 Terminal Gate Requirements Summary

Table 4.11 shows a summary of the gate requirements derived from the different methodologies.

Table 4-11: Gate Requirements Summary

Method	2025	2030	2035	2040
Annual Enplanements per NBEG	35	40	44	48
Peak Month Enplanements per NBEG	34	38	42	45

It is important to note that even though the analysis indicates a requirement of up to 48 NBEG, airline operating characteristics and the addition of air carriers will necessitate looking at gate expansion and locations. The most likely accommodations for growth in activity will occur through increases in gate utilization, the activation of all programmed gates, and the potential expansion of both concourses to accommodate new gates.

4.2.5 APRON FRONTAGE REQUIREMENTS

The gate requirements stated previously are convenient planning tools for developing future apron frontage and terminal area configurations. The apron frontage was calculated using the narrow-body equivalent methodology. Using the B-757 as the representative aircraft requiring a narrow-body equivalent gate (125 feet wingspan plus 25 feet wingtip clearance between aircraft, for a total width of 150 feet), Table 4.12 shows the future terminal configurations for each of the planning years. The gate frontage required for the airport may vary due to changes in schedules, future fleet mixes, the geometric configuration of the terminal, and other factors.

Table 4-12: Apron Frontage Base Upon Annual Enplanements Per NBEG Method

Year	Annual Enplanements	Annual Enplanements per Gate	Required NBEG	Apron Frontage
2025	2,521,458	72,268	35	5,250
2030	2,864,813	72,268	40	6,000
2035	3,158,319	72,268	44	6,600
2040	3,450,009	72,268	48	7,350

Existing Apron Frontage based upon 28 gates and the B-757 as the representative aircraft utilizing a narrow-body equivalent gate (125’ wingspan plus 25’ wingtip clearance between aircraft for a total width of 15’).

4.2.6 PASSENGER TERMINAL BUILDING AREA

For this Master Plan Revision, a projection of gross building area will be sufficient to plan the amount of future or expanded terminal facilities. Development of a detailed terminal area space program is more appropriate during subsequent planning and design phases of a terminal expansion project. The broad-level methodology used to calculate overall terminal building size utilizes the following:

- FAA Advisory Circular Planning criteria in conjunction with activity forecasts developed in Chapter Three, Aviation Demand Forecasts.
- An estimate of terminal area per gate, while considering ongoing planning and design efforts and industry standards.

This methodology takes into account all of the functions in the terminal (airline space, security, hold rooms, concessions, etc.).

4.2.6.1 Terminal Facility Requirements

The Terminal Area encompasses approximately 510,000 square feet of building area to support 28 gates. This equates to a factor of 18,215 square feet per gate, which is slightly less than the industry average of 20,000 square feet of terminal area per gate. Table 4.13 depicts the calculation of total passenger terminal space needed for each planning horizon, assuming a 20,000 square feet per gate planning factor.

Table 4-13: Terminal Square Foot Per Gate Requirements

Year	# Gates	Terminal Square Feet
2025	35	700,000
2030	40	800,000
2035	44	880,000
2040	48	960,000

Table 4.14 depicts the future utilization characteristics for RIC. Future requirements are determined by using the existing utilization metrics and applying them against future estimates of gate demands and enplanement projections. Comparing the planned area to the FAA criteria of between 0.08 to 0.12 square feet per enplaning passenger suggests the existing terminal is constructed to a factor of 0.28 square feet per enplaning passenger. Due to this factor, RIC's terminal is sized larger than what the FAA's criteria state, meaning that if and when improvements are made to the terminal building, focus will be on efficiency rather than accommodating demand.

Table 4-14: Future Terminal Utilization Characteristics

Year	# Gates	Annual Enplanements	Terminal Bldg Area (sf)	Terminal Area per Enplanement (sf)
2025	35	2,521,458	706,009	.28
2030	40	2,864,813	802,148	.28
2035	44	3,158,319	884,330	.28
2040	48	3,450,009	966,003	.28

As with the analysis of future gate needs, the methods of determining terminal requirements were explored to provide a range of future needs. Table 4.15 summarizes each methodology used to determine the future space requirements in the terminal building.

Table 4-15: Terminal Requirements Summary (Total Terminal sf Required)

Method	2025	2030	2035	2040
Sf per Gate Method	700,000	800,000	880,000	960,000
Future Terminal Utilization	706,009	802,148	884,330	966,003

Understanding the limitations of the methodologies presented allows for a more detailed analysis of the number of gates required for 2040. Each methodology is grounded in the principal that Base Year airline operating characteristics are sufficient to handle the activity presented. Industry trends show that airlines are utilizing their gates more efficiently to handle increased activity. This trend in airline operating characteristics may affect terminal facility requirements for 2040.

4.2.7 TERMINAL PROCESSING FACILITY REQUIREMENTS

The COVID pandemic has dramatically affected how terminals will operate in the future. Spacing between passengers, TSA screening, self-check-in facilities, restroom facilities, concession operations, and airline queuing are just some of the operating characteristics that are evolving as this Master Plan is being completed. Passenger processing components for the terminal will require further analysis to understand how much of the gross building area should be allocated to these components. The broad-level methodology used to calculate passenger processing facility requirements as utilized in the FAA Advisory Circular 150-5360-13, Planning and Design Guidelines for Airport Terminal Facilities was developed before the COVID pandemic. As mentioned previously, development of a detailed terminal area space program is more appropriate during subsequent planning and design phases of a terminal expansion project.

4.3 SUPPORT/ANCILLARY FACILITY REQUIREMENTS

Support facilities are vital to the overall operability and maintenance of the Richmond International Airport. It is important to identify needs for these facilities to maintain flexibility with other airfield improvements as the airport expands in the future.

Support facilities that warrant consideration include the following:

- Rental Car Staging/Third Party Development
- Future Enterprise Rental Car Facility
- CONRAC Expansion – Short Term
- Urban Air Mobility Development
- Future Airport Support
- Future Remote Parking Garage
- Amazon Air Facility

4.3.1 AIRPORT TRAFFIC CONTROL TOWER (ATCT)

The Richmond International Airport has an Airport Traffic Control Tower on the airfield, located near the northern end of Taxiway E. This is a Federal Aviation Administration (FAA) tower with radar service. The control tower is open seven (7) days a week from 7:00 am until 9:00 pm. Frequencies and operations are coordinated with the Potomac Terminal Radar Approach/Departure Control (TRACON), located in Warrenton, Virginia. When unable to contact the assigned Flight Service Station (FAA) on the assigned radio frequency, clearance delivery is coordinated with the Houston Air Route Traffic Control Center (ARTCC), via phone.

The Airport Traffic Control Tower at RIC meets FAA requirements.

4.3.2 Airport Surveillance Radar (ASR)

The Airport Surveillance Radar (ASR) is used to provide the ATCT with information regarding aircraft operating within the airspace around the airport. The ASR rotates through 360 degrees, and information is displayed on radar scopes in the ATCT. RIC is served by an ASR-9.

The ASR serving RIC needs to be relocated or raised since it relies on direct-line-of-sight to detect aircraft. If any new projects are constructed to the southwest of the ASR in its current location, line-of-sight interference could occur if the ASR is not raised or relocated.

4.3.3 AIRPORT MAINTENANCE

Airport Maintenance facilities provide a sheltered environment for repair and storage of Airport service vehicles and equipment. These facilities help protect valuable Airport property from moisture, debris, and other environmental contaminants.

Although no detailed analysis has been completed regarding Airport Maintenance facilities, any future improvements would require additional maintenance equipment, and thus additional facilities. Therefore, for planning purposes it is recommended that the Airport preserve space for Airport Maintenance facilities based on the projected average annual growth in aircraft operations over the planning period.

4.3.4 GENERAL AVIATION/FIXED BASE OPERATORS

A Fixed Based Operator (FBO) provides support services to General Aviation (GA) airports, such as fueling, hangars, aircraft maintenance and rental, aircraft tie-downs, and flight instruction. FBOs are generally located on airport property. There are a number of General Aviation/Fixed Base Operator facilities at RIC, and several firms occupy corporate hangars.

The two FBOs operating at RIC are Flightline First and Signature Flight Support. Flightline First is located to the east of the Terminal Building on the East Apron, which is adjacent to Taxiway F. It offers tie-down and hangar space, fuel, aircraft maintenance, a pilot lounge, rental cars, and catering. Signature Flight Support is located to the west of the Terminal Building on the South and West Aprons. Similar to Flightline First, Signature Flight Support is a full service FBO, which offers fuel, hangar space, ground handling, a pilot lounge, rental cars, catering, and aircraft maintenance.

ATP Flight School is located on Huntsman Road, on the north end of the airfield. ATP provides pilot training and aircraft dispatcher training.

It is the intention of this Master Plan Study to incorporate flexibility to allow the Airport to respond to projected growth in operations and based aircraft. Every effort will be made to accommodate these FBOs and GA tenants effectively and efficiently throughout the planning horizon. **Table 4-16** shows the projected based aircraft at RIC for the future planning years.

Table 4-16: General Aviation Based Aircraft

	Year	Based Aircraft
	2000	88
	2005	95
	2010	78
	2015	65
Historic	2020	58
Forecast	2025	60
	2030	62
	2035	64
	2040	67

Source: FAA Aerospace Forecast, Fiscal Years 2019-2039, January 2020. K&G Analysis, 2020.

4.3.5 FUEL STORAGE REQUIREMENTS

Currently none of the airside tenants at RIC have fuel storage for Aviation fuels. All fueling facilities are owned and maintained by the Airport. Fuel available includes Avgas, Jet-A, and MO gas (high octane automotive) and is available for purchase through any of the Fixed Based Operators (FBO's) currently operating at the Airport. The Airport does not currently sell or provide fuel to the general public.

4.3.6 UTILITIES

It is important to program future development to include the utilization/expansion of existing utilities. In order to respond to future needs, this infrastructure must be able to accommodate the current demand of the Airport facilities as well as the programmed development. Through discussions with the Airport operator, it appears that there is adequate capacity to respond to current and anticipated demand on existing infrastructure.

As new facilities are developed, utilities may have to be added to accommodate the new demand. The facility requirements for utilities (e.g., sanitary sewer, natural gas, water, telecommunications, and electrical service) are more appropriately defined by the specific nature and timing of the improvements and should be determined during the respective planning and design phases of that development.

The existing utility services at RIC should be adequate through the planning horizon. Any new FBO and GA developments will require the extension of utilities to provide service to their tenants.

The utilities listed below identify the existing service providers.

4.4 GROUND ACCESS FACILITY REQUIREMENTS

This section describes requirements for roadways and vehicle parking areas in support of the future development program.

4.4.1 ROADWAYS

Airport roadway facilities typically are designed for the peak-hour traffic on the design day, allowing for the splitting and recirculation of traffic within the various areas of the Airport property. For the purposes of the Master Plan, roadway planning is typically conceptual and follows basic demand/capacity calculations comparing the peak hour demand of a roadway segment with the per-lane capacity, which is based on general guidelines for airport roadway networks. Detailed roadway requirements and concepts are developed following the completion of detailed analyses and modeling efforts.

As the concept development and evaluation process commences, the focus of roadway development will be one of identifying access requirements that support facility development in areas where access does not yet exist. The evaluation of the roadways within any of the concepts considered the following:

- Cost effectiveness from a construction, operation, and maintenance perspective
- Magnitude of impacts to adjacent communities including, but not limited to, right-of-way impacts, construction impacts, and access/circulation impacts
- Provision of future expansion of the roadway system by state and local transportation agencies to accommodate roadways proposed in the region's long-range transportation plans

The existing roadway network at RIC is adequate and there are currently no capacity issues, but when the Terminal Building is expanded to the east, the existing road system will have to be adjusted to provide access to all areas of the facility.

4.4.2 PARKING

Parking for visitors and other tenants at the Airport is located within or adjacent to each leasehold at the Airport. Each FBO and each tenant have adequate parking for their staff and customers. The Terminal Building has sufficient parking for its staff and visitors. Due to the increased use of ride-sharing services, such as Uber and Lyft, by passengers flying in and out of RIC, the demand for parking at the Terminal has been reduced.

4.5 SUMMARY OF FACILITY REQUIREMENTS

Tables 4-17 through **4-19** summarize the recommended future facility requirements for the forecast years of 2025, 2030, and 2040.

Table 4-17: Summary of Facility Requirements for 2025

Facilities	Facility Requirements
***AIRFIELD*:**	
Runways	None required.
Runway Length Requirements	None required.
Taxiways	Reconfiguration of Taxiways E and V.
Navigational Aids	None Required.
Approach Lighting	None Required.
Runway Design Standards	Any improvements will require compliance with design standards.
SUPPORT/ANCILLARY:	
Airport Traffic Control Tower	None required.
Utilities	None required.
Roadways	None required.

Table 4-18: Summary of Facility Requirements for 2030

Facilities	Facility Requirements
***AIRFIELD*:**	
Runways	None required.
Runway Length Requirements	None required.
Taxiways	None required.
Navigational Aids	None Required.
Approach Lighting	None Required.
Runway Design Standards	Any improvements will require compliance with design standards.
SUPPORT/ANCILLARY:	
Airport Traffic Control Tower	None required.
Utilities	None required.
Roadways	None required.

Table 4-19: Summary of Facility Requirements for 2040

Facilities	Facility Requirements
***AIRFIELD*:**	
Runways	None required.
Runway Length Requirements	None required.
Taxiways	None required.
Navigational Aids	None Required.
Approach Lighting	None Required.
Runway Design Standards	Any improvements will require compliance with design standards.
SUPPORT/ANCILLARY:	
Airport Traffic Control Tower	None required.
Utilities	None required.
Roadways	None required.

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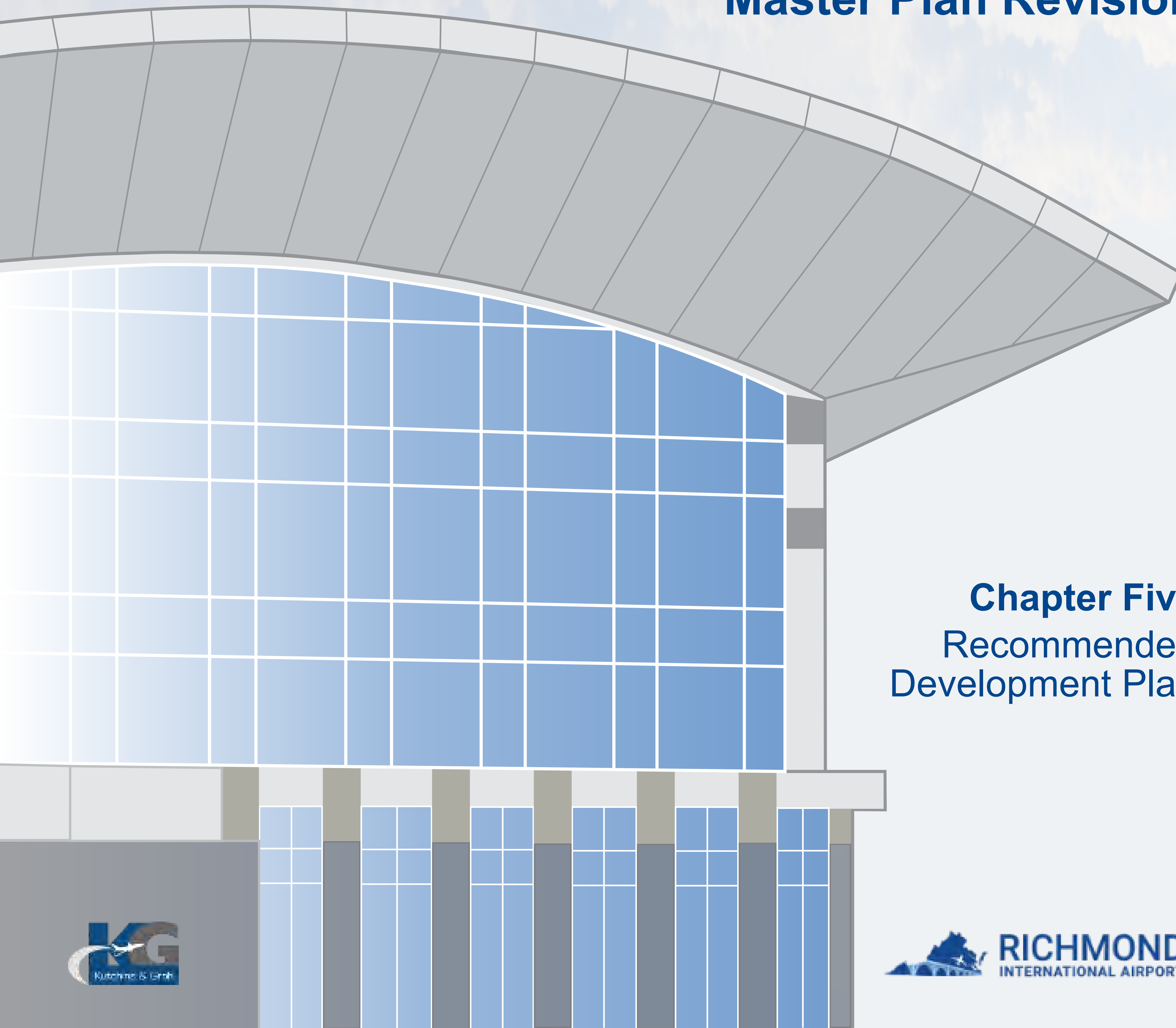

Chapter Five

Recommended Development Plan

CHAPTER FIVE
Recommended Development Plan

The culmination of the Airport Master Planning Process is the Recommended Development Plan (RDP). This chapter presents the Richmond International Airport's (RIC) vision for the future and recommendations for its development.

5.1 KEY RECOMMENDATIONS

The major goals and key recommendations identified during the Master Planning Process include the following:

- Addressing the needed improvements for existing Airport users
- Identifying the runway and taxiway configuration that best meets the airfield capacity requirements through the planning horizon
- Continuing expansion of the Airport to accommodate growth

The Recommended Development Plan for RIC is depicted on **Exhibit 5-1**. Specific projects included in the preferred development concept and suggested phasing for implementation are discussed in the following sections.

5.2 RECOMMENDED PROJECTS

The following projects are recommended for implementation over the planning horizon to meet the requirements presented in Chapter Five. These projects are intended to meet both near- and long-term demand.

5.2.1 RECOMMENDED AIRFIELD IMPROVEMENTS

In order to obtain maximum operational efficiency and continue to provide safe and efficient flow of aircraft in and around the airfield, several improvement projects were identified during the planning process. These improvements will also allow the Airport to meet the immediate needs of its tenants and customers in a fashion that allows for future growth and expansion as demand dictates. The components of this element of the recommended plan include:

- Taxiway 'V' Reconfiguration
- Deicing and Diversion Pad
- Taxiway 'C' and 'H' Rehabilitation
- Runway 2-20 Rehabilitation

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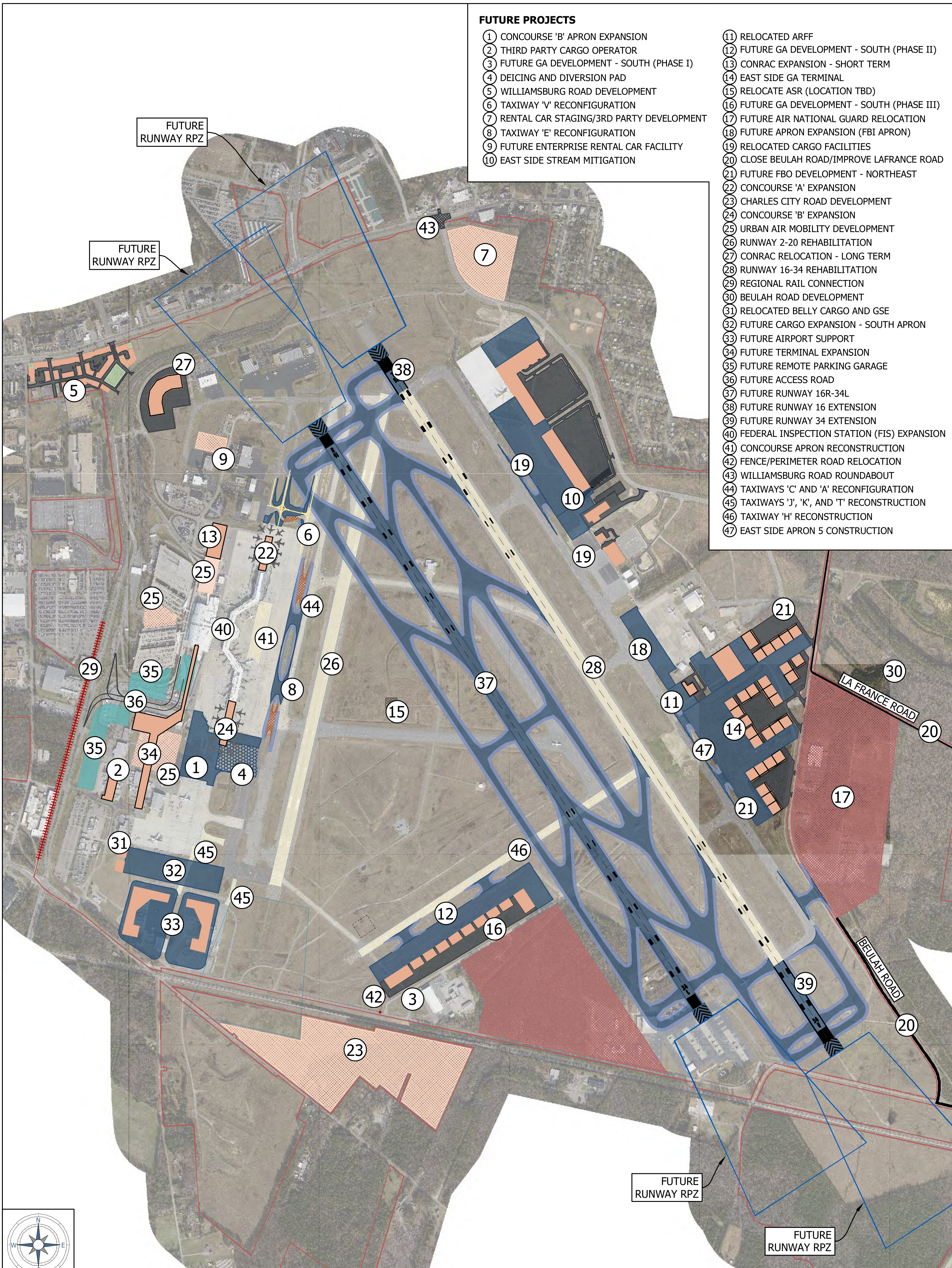

RICHMOND INTERNATIONAL AIRPORT

EXHIBIT 5-1
RECOMMENDED DEVELOPMENT PLAN

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Kutchins & Groh

- Runway 16-34 Rehabilitation
- Relocate ASR (Location TBD)
- Taxiway 'E' Reconfiguration
- Taxiway 'U' Rehabilitation
- Future Runway 16R-34L
- Future Runway 16 Extension
- Future Runway 34 Extension

5.2.2 RECOMMENDED AIRSIDE DEVELOPMENT

The Recommended Development Plan (RDP) represents projects that are depicted on **Exhibit 5-1** and include:

- Future Ga Development - Southeast
- East Side Development
- Relocated ARFF
- Relocated Cargo Facilities
- Third Party Cargo Operator
- Ga Terminal and CBP Facility
- Future Ga Development - South
- Concourse 'B' Apron Expansion
- Future Terminal Expansion
- Concourse 'B' Expansion
- Concourse 'A' Expansion
- Relocated Belly Cargo and GSE
- Future Cargo Expansion - South Apron
- Future Airport Support
- Future Air National Guard Relocation
- Future Apron Expansion (FBI Apron)
- Enclose Existing Ditch

5.2.2.1 Runway and Taxiway System Improvements

Although the existing runway lengths at RIC are adequate for the planning horizon, as discussed in Chapter 4, good planning practices dictate that the Airport depict any future runway extensions on planning documents in order to allow the FAA to continue protecting the airspace. By continuing to protect the airspace, the FAA and the Authority will be able to greatly minimize future obstructions to the proposed approach and departure surfaces.

Sound capital decisions and business integration into this planning process further dictate that certain demand-driven projects be programmed only when there is sufficient need to justify their implementation. However, projects such as upgrading taxiway lighting and rehabilitating taxiways are not demand-driven, but rather improve safety and increase the usable life of airfield infrastructure. The runway and taxiway system improvements identified include:

- Taxiway 'V' Reconfiguration
- Taxiway 'C' and 'H' Rehabilitation
- Runway 2-20 Rehabilitation
- Runway 16-34 Rehabilitation
- Taxiway 'E' Reconfiguration
- Taxiway 'U' Rehabilitation
- Future Runway 16R-34L
- Future Runway 16 Extension
- Future Runway 34 Extension

5.2.2.2 Expansion of General Aviation & Corporate Aviation Areas

As business and economic facets of the Richmond metropolitan area continue to grow, it is reasonable to expect additional demand for General Aviation facilities. Driving this need are tourism and oil and gas processing. These demands resulted in the identification of several improvements on the Airport including the following:

- Future Ga Development - Southeast
- East Side Development
- Ga Terminal and CBP Facility
- Future Ga Development - South
- Enclose Existing Ditch

5.2.2.3 Preservation of Existing Infrastructure

The RDP includes several projects to preserve existing infrastructure and to improve the overall operational effectiveness of the Airport. Included in this category are:

- Taxiway 'C' and 'H' Rehabilitation
- Runway 2-20 Rehabilitation
- Runway 16-34 Rehabilitation
- Taxiway 'U' Rehabilitation

5.2.2.4 Ancillary Projects

- Deicing and diversion pad
- Relocated ARFF
- Relocated ASR

5.2.3 RECOMMENDED LANDSIDE DEVELOPMENT

The landside portion of the RDP represents those projects that will improve the Airport's ability to remain financially self-sustaining through non-aviation commercial opportunities. A graphical representation of these proposed developments is depicted on **Exhibit 5-1**.

- Williamsburg Road Development
- Urban Air Mobility Development
- CONRAC Relocation – Long Term
- Rental Car Staging Area / 3rd Party Development
- Future Remote Parking Garage
- Future Access Road
- Regional Rail Connection
- CONRAC Expansion – Short Term
- Future Enterprise Rental Car Facility
- Close Beulah Road / Improve Lafrance Road

5.3 RECOMMENDED PHASING

The recommended phasing for the Master Plan generally identifies projects to be accomplished in timeframes identified as the near-term (years 1 – 5), the mid-term (years 6 – 10), and the long-term (years 11 – 20). The projects identified in the Recommended Development Plan have been grouped into their expected planning periods. It should be noted that as demands change at the Airport, so too can the order and priority of the proposed development elements. Please see **Exhibit 5-2, RDP Phasing Plan**.

Near-Term (2020 through 2024):

1. Concourse B Apron Expansion
2. Third Party Cargo Operator
3. Future GA Development South – Phase I
4. Deicing and Diversion Pad
5. Williamsburg Road Development
6. Taxiway V Reconfiguration
7. Rental Car Staging/Third Party Development

8. Taxiway E Reconfiguration
9. Future Enterprise Rental Car Facility
10. East Side Stream Mitigation
11. Relocated ARFF
12. Future GA Development South – Phase II
13. CONRAC Expansion – Short Term
14. East Side GA Terminal
15. Relocated ASR
16. Future GA Development South – Phase III
17. Future Air National Guard Relocation
18. Future FBI Apron Expansion

Mid-Term (2025 through 2029):

19. Relocated Cargo Facilities
20. Closure of Beulah Road/Improvements to LaFrance Road
21. Future Northeast FBO Development
22. Concourse A Expansion
23. Charles City Road Development
24. Concourse B Expansion
25. Urban Air Mobility Development
26. Runway 2-20 Rehabilitation

Long-Term (2030 through 2039):

27. CONRAC Relocation – Long Term
28. Runway 16-34 Rehabilitation
29. Regional Rail Connection
30. Beulah Road Development
31. Relocated Belly Cargo and GSE
32. Future Cargo Expansion – South Apron
33. Future Airport Support
34. Future Terminal Expansion
35. Future Remote Parking Garage
36. Future Access Road
37. Future Runway 16R-34L
38. Future Runway 16 Extension
39. Future Runway 34 Extension

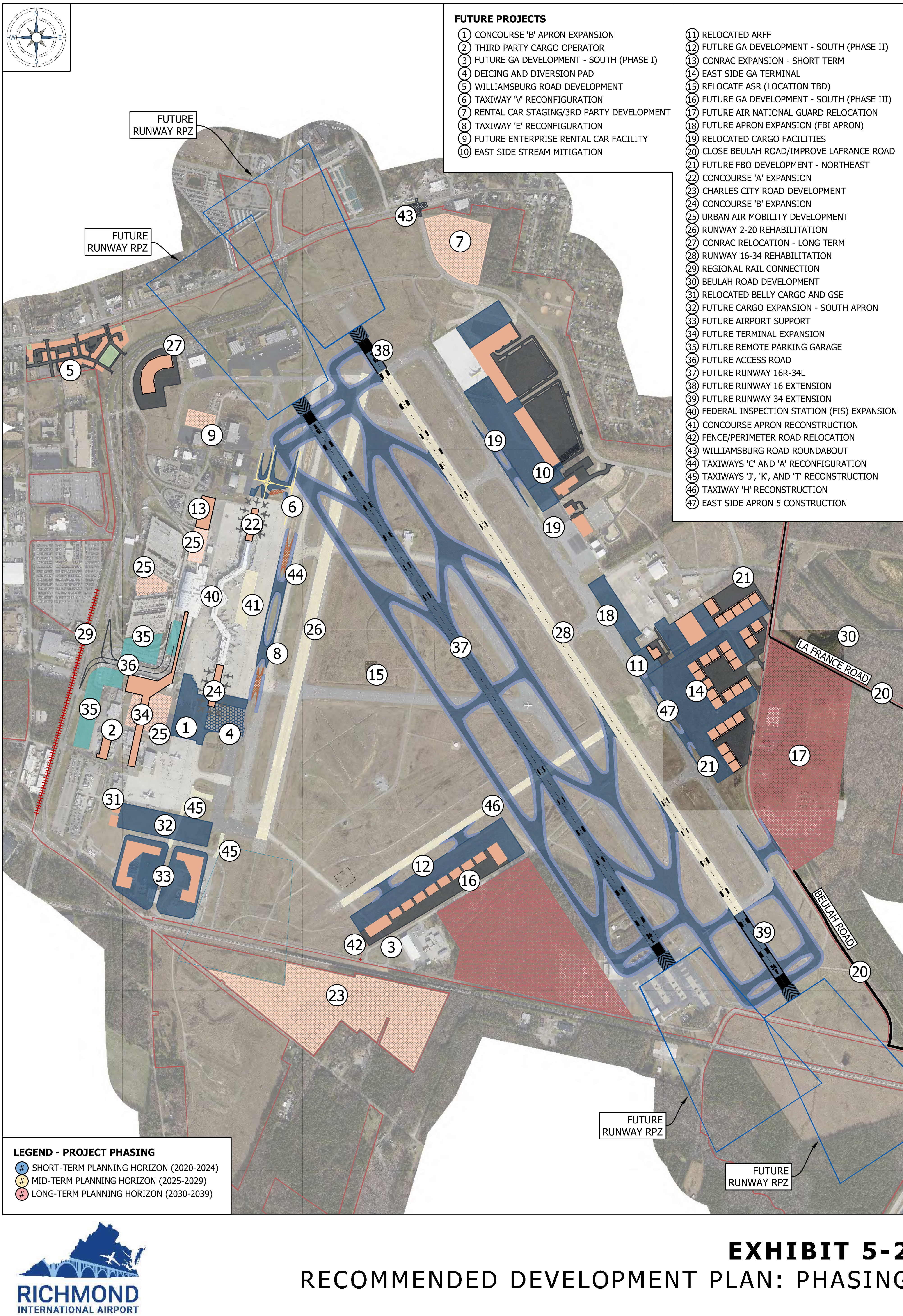

EXHIBIT 5-2
RECOMMENDED DEVELOPMENT PLAN: PHASING

5.4 AIRPORT LAYOUT PLAN

The Airport Layout Plan (ALP) has been updated to reflect the proposed projects identified by the Recommended Development Plan. The ALP plan set can be found in **Appendix F.**

The Recommended Development Plan (RDP) differs slightly from the Future Development Plan as depicted in the ALP. The RDP shows projects that are recommended for development but have not fully been vetted through the FAA's Master Plan process. The projects on the RDP do not conflict with the Future Development Plan projects but complement it and allow for future development of the airport as it continues to grow. The projects listed below should be added to the ALP with pen and ink changes and/or studied more closely in the next FAA funded Master Plan:

- South General Aviation (GA) Hangar Development
- National Guard Taxiway and Development

5.5 SUMMARY

The Recommended Development Plan is the result of coordination and input from the following entities:

- Airport staff
- Consultant Team led by Kutchins & Groh, LLC

Numerous meetings and discussions were conducted among these parties at varying stages of the planning process to allow for stakeholder input. Feedback was gathered on the background data, forecasts, airfield and landside development alternatives, and the Recommended Development and Phasing Plans prior to completion of this document.

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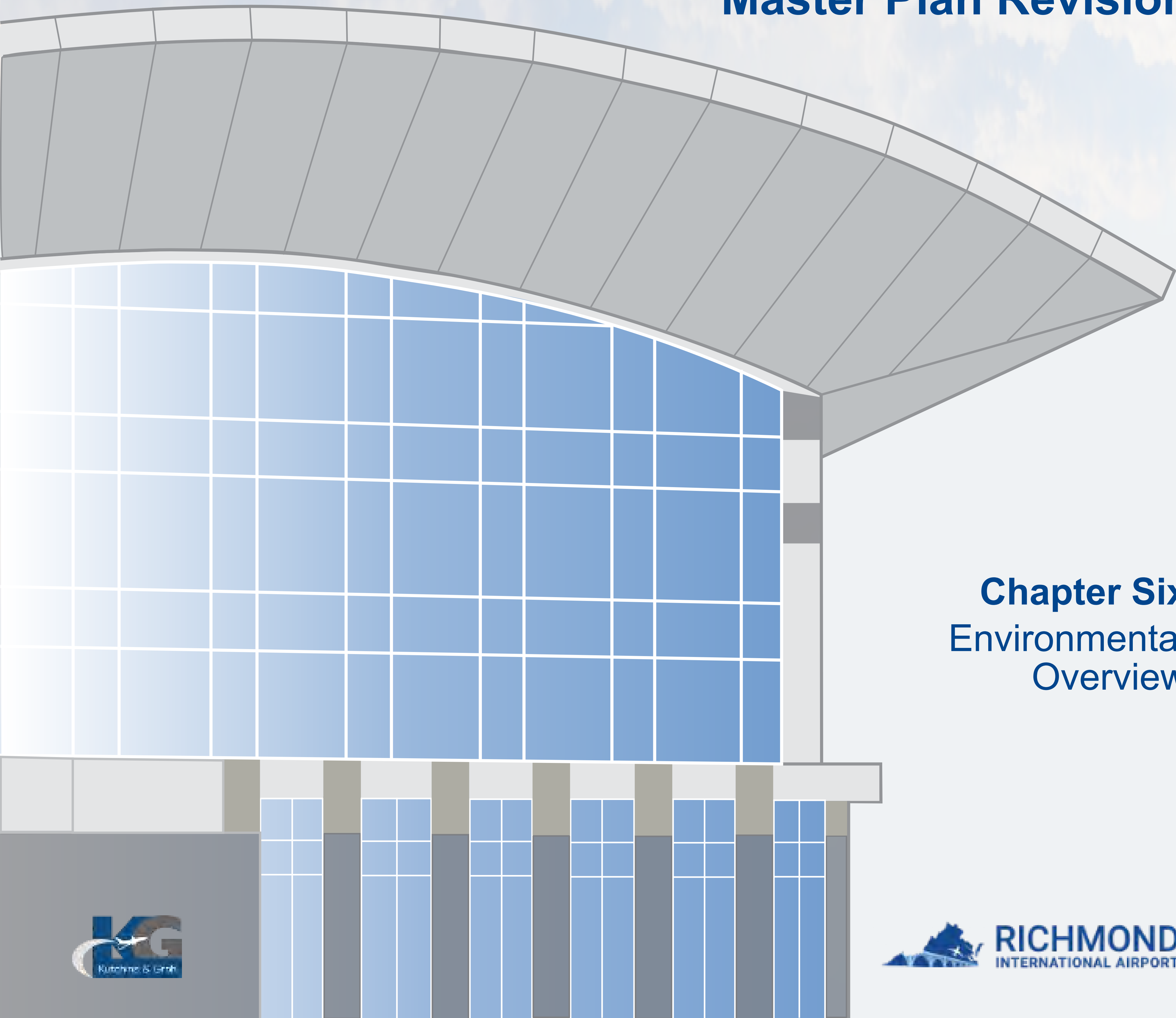


Chapter Six

Environmental Overview

CHAPTER SIX
Environmental Overview

One of the major products of this planning process will be the Capital Development Plan. The potential environmental effects of the improvements proposed by this plan will be reviewed in accordance with FAA Order 5050.4B, *Airport Environmental Handbook*. The following sections present a preliminary overview of these effects, which will be considered with respect to the environmental impact categories identified in the *Handbook.* This review comprises an integral part of the recommended development plan.

This chapter is not intended to be an Environmental Assessment (EA) or Environmental Impact Statement (EIS) of the Master Plan projects. However, *Chapter Six, Environmental Overview* is intended to provide information on environmental concerns.

The information from this chapter will serve as a factor when evaluating alternatives and identifying National Environmental Policy Act (NEPA) requirements for Master Plan projects. Further documentation and analysis (e.g., Documented Categorical Exclusions, Environmental Assessments, and/or Environmental Impact Statements) must be accomplished for all proposed projects prior to implementation.

6.1 AGENCY COORDINATION

At the beginning of this study, an initial review of available environmental documentation from previous studies was conducted in order to determine potential issues with respect to individual natural resources. This resulted in the development of a list of Federal and State agencies with potential concerns. A letter describing the purpose of the Master Plan was sent to solicit input on environmental concerns from each of the respective agencies. Input was requested and received from each of the agencies contacted, which included:

- U.S. Army Corps of Engineers – Southern Virginia District (USACE)
- United States Fish and Wildlife Service (USFW)
- USDA-Natural Resources Conservation Service
- Virginia Department of Conservation and Recreation (DCR)
- Virginia Department of Game and Inland Fisheries
- Virginia Department of Health (VDH)
- Virginia Department of Historic Resources (DHR)
- Virginia Department of Environmental Quality (DEQ)
- Virginia Department of Natural Resources, Coastal Management Division (DNR)
- Henrico County Planning Department and County Manager

Copies of the relevant correspondence and the agency responses are included as ***Appendix E, Environmental Coordination Documentation***.

6.2 AREAS OF INTEREST

6.2.1 NOISE AND COMPATIBLE LAND USE

One of the most common impact categories to consider with all Master Planning efforts is the combination of noise and compatible land use. This is the first issue that people living and working in and near an airport notice and speak about passionately.

An Aircraft Noise Exposure Contour was prepared for calendar year 2019 (Existing Condition) to describe the noise exposure caused by operations at RIC and to develop aircraft noise contours. The report identified the areas within the Day-Night Average Sound Level (DNL) contour ranges and concluded that the total area within 65 DNL and above contours is approximately 1.88 square miles (1,199 acres) in size with only 0.14 square miles of that being outside airport property. The report estimated that 107 noise sensitive sites are within the 2019 65 DNL contour, including 106 residences and one place of worship (Village of Faith.) Seven residences are located south of the airport along Monahan Road, and 99 residences and the single place of worship are located north of the Runway 20 threshold. All noise sensitive sites identified in the study are located between the 65 and 70 DNL contours. No noise sensitive sites are within the 70 or higher DNL.

Aircraft Noise Exposure Contours were also prepared for 2030 and 2014 utilizing the Rapid Recovery forecast scenario. In the 2030 Aircraft Noise Exposure Contour, the area within the 65 DNL and above contours grows to 2.7 square miles with only 0.51 square miles of that being outside airport property. In the 2040 Aircraft Noise Exposure Contour, the area within the 65 DNL and above contours grows to approximately 3.15 square miles in size with only 0.75 square miles being outside airport property. These changes can be attributed to the increased airport operations anticipated over the 20-year horizon of the Airport Master Plan.

The effect of the growth in the 2030 Aircraft Noise Exposure Contours is that an estimated 139 noise sensitive sites are within the 2030 65 DNL and above contours, including 137 residences, Village of Faith, and one school (Fair Oaks Elementary). Of those, 127 of the sites are located north of the Runway 20 threshold and 12 are located south of the airport along Monahan Road. For conservative estimating purposes, if a portion of a residential property was crossed by the contour boundary, it was considered within the contour.

The effect of the growth in the 2040 Aircraft Noise Exposure Contours is that an estimated 165 noise sensitive sites are within the 2040 65 DNL and above contours, including 163 residences, one place of worship (Village of Faith), and one school (Fair Oaks Elementary). Of these, 152 of the sites are located north of the Runway 20 threshold and 13 are located south of the airport along Monahan Road. For conservative estimating purposes, if a portion of a residential property was crossed by the contour boundary, it was considered within the contour.

For any recommended project which results in an increase of noise over a sensitive receptor, such as a residence, church, school, or similar place of public assembly, it will be necessary to prepare a noise analysis in accordance with FAA requirements to document potential impacts and identify required mitigation. Typical projects that could cause such an increase include new runways, runway extensions, runway upgrades, etc.

6.2.2 SOCIAL IMPACTS

Potential social impacts for the Master Plan development projects include:

- Relocation or disruption of communities
- Alteration of surface transportation patterns
- Disruption of established communities
- Interference with orderly and planned development
- Creation of appreciable changes in employment

Any proposed project in the development plan must be examined to determine if it impacts any of the above-mentioned issues. All of the planned improvements documented by this plan are expected to occur within the existing Airport boundaries. If any projects require the acquisition of an ownership interest (either in fee title or via easement purchase), such land acquisition will be conducted in accordance with the Federal requirements for Land Acquisition and Relocation (49 CFR Part 24). Furthermore, land acquisition will be thoroughly examined and vetted via a separate environmental analysis process (e.g., an environmental assessment or an environmental impact statement).

6.2.3 HISTORIC, ARCHITECTURAL, ARCHEOLOGICAL, AND CULTURAL RESOURCES

The Virginia Department of Historic Resources is the agency responsible for the oversight of Historical and Cultural resources within the State of Virginia. This planning effort consulted with this agency, which responded that "DHR requires the FAA to consult with us directly regarding this in accordance with Section 106 of the National Historic Preservation Act and its implementing regulation, "Protection of Historic Properties." No further communication was received from this agency. On 2-5-20, an Environmental Protection Specialist with the FAA Washington ADO stated that "your agency coordination is likely premature." There has been no further response from this agency.

As with any construction effort, emergency discovery procedures will apply to any project implemented at the Airport. If any archeological remains — such as concentrations of shell, ceramics, worked stone, or bone — were to be observed during construction, it would be necessary to immediately stop work and notify the Virginia Department of Historic Resources so that the archaeological remains could be documented and dealt with accordingly.

6.2.4 DEPARTMENT OF TRANSPORTATION ACT, § 4(f)

Section 4(f) of the *Department of Transportation Act* provides that the Secretary of Transportation shall not approve any program or project that requires the use of any publicly owned park or other protected resource, unless there is no feasible and prudent alternative to the use of such land, and that such a program or project include all possible planning to minimize any adverse effects resulting from the use of the land. Section 4(f) lands include public parks; recreation areas; wildlife and waterfowl refuges; and lands of national, state, or local significance as determined by the officials having jurisdiction. If there is no physical taking of such public land, but there is a possibility of adverse impacts, such as increased noise or air pollution, the FAA will determine whether any increase in activity associated with the project is compatible with the normal activity associated with the land.

It is not expected that the Master Plan development projects will affect Section 4(f) land. If any such land would be affected, the Airport would act in accordance with Section 4(f) to determine its proper course of action.

6.2.5 AIR QUALITY

There has been no response to an SOV letter sent to the Department of Environmental Quality (DEQ), but Henrico County is classified attainment with the National Ambient Air Quality Standards and has no general conformity determination obligations. The primary source of ozone in the region is surface transportation, rather than the Airport itself. This classification typically dictates that any federally-funded airport improvement project may be subject to the State's general conformity regulations as promulgated under LAC 33:111.14. A, *Determining Conformity of General Federal Actions to State or Federal Implementation Plans.*

6.2.6 WATER QUALITY

The *Federal Water Pollution Control Act* (the Clean Water Act) requires that airport operators establish water quality standards and control discharges into surface and sub-surface waters. Particular concerns include the preservation of existing drainage; the protection of aquifers from fuel spills, aircraft washing, and deicing runoff; and the control of sedimentation and erosion during construction.

Industrial plant operations, including airports, are required to obtain stormwater permits under the 1987 amendments to the Clean Water Act. A National Pollutant Discharge Elimination System (NPDES) permit requires (1) submission of information regarding existing programs to control pollutants, and (2) field monitoring of major outfalls to detect improper discharges. All stormwater runoff discharge must be identified and characterized, including those containing de-icing fluids, liquid fuels, and chemicals used for maintenance. Any discharge to waters of Virginia may also require a Virginia Pollutant Discharge Elimination System (VPDES) permit in addition to the NPDES permit.

Potential impacts to water quality and the water supply that could result from the development plan projects relate to runoff from new paved surfaces or structures. Pollutants that could possibly affect surface waters as a result of the development plan include oils and greases that build up on the Airport's roadways, parking surfaces, aircraft parking aprons, taxiways, and runways. The impact of the development plan on groundwater may include potential sedimentation and erosion during construction, as well as leakage or seepage of fuels and lubricants during airfield operations.

On-site drainage within the Airport boundary reflects the land use, cover, and soil characteristics, consisting primarily of impervious pavements, structures, grassed open space and some wooded areas near the edges of the property. Overland slopes, pipe slopes and channel slopes are relatively flat (a typical characteristic of airports), and the existing storm sewer systems and ditches divide the Airport into discrete drainage basins that drain offsite at several locations.

The Airport has a Stormwater Pollution Prevention Plan (SWPPP) in place (prepared in December 2021). All engineering performed for the Airport is completed in accordance with the SWPPP and with the Airport's standard operating procedures utilizing best management practices during design and construction. Any additional pavement/impervious surfaces will be accommodated by the Airport's drainage infrastructure with improvements implemented on a per project basis in order to comply with regulatory and environmental requirements.

6.2.7 WETLANDS

Wetlands are defined in Executive Order 11990, *Protection of Wetlands*, as "those areas that are inundated by surface or ground water with a frequency sufficient to support and under normal circumstances does or would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction." A combination of this Executive Order and DOT Order 5660.1A, *Preservation of the Nation's Wetlands,* implements wetlands protection for the nation. The Executive Order requires federal agencies to avoid, to the extent possible, the adverse effects associated with the destruction or modification of wetlands wherever there is a practical alternative.

If deposition or redistribution of dredged or fill material occurs in a wetland, then a permit under Section 404 of the Clean Water Act must be obtained from the Department of the Army Corps of Engineers.

A Solicitation of Views letter was sent to the U.S. Army Corps of Engineers on 1-27-20. There has been no response.

6.2.8 FLOODPLAINS

Executive Order 11988, *Floodplain Management*, defines floodplains as "the lowlands and relatively flat areas adjoining inland and coastal waters, including at a minimum, that area subject to a one percent or greater chance of flooding in any given year." This is the equivalent of a 100-year flood standard. DOT Order 5650.2 contains DOT's policies in regard to floodplains. These two orders, taken together, establish a policy that activities taken in a 100-year floodplain should be avoided, wherever practicable.

According to the FEMA Flood mapping website, portions of the Airport property lie within the 100-year floodplain, with 1% annual chance of flood hazard. These two areas lie: on the south end of RIC property, near Portugee Road and the railroad tracks; and on the east side, near Beulah Road. Coordination with the Virginia Department of Conservation and Recreation, Floodplain Management Office, will be required before construction begins for any new projects.

6.2.9 COASTAL ZONE MANAGEMENT AND COASTAL ISLANDS

Henrico County lies within the limits of the Virginia Coastal Zone Management (CZM) Program. The Virginia Department of Environmental Quality has jurisdiction over any encroachments in, on, or over the beds of the bays, ocean, rivers, streams, or creeks that are the property of the State of Virginia. The Virginia Department of Environmental Quality has not responded to the Solicitation of Views letter.

6.2.10 WILD AND SCENIC RIVERS

No rivers have been identified that are classified as wild and scenic within the vicinity of the Airport.

6.2.11 BIOTIC COMMUNITIES AND ENDANGERED AND THREATENED SPECIES OF FLORA AND FAUNA

Under federal law, impacts to wildlife habitat or endangered or threatened species must be coordinated with the proper authorities. Because the majority of the Master Plan projects would be in areas that have been in the Airport's use for many years, no adverse effects upon biotic communities are expected. An automatically-generated list of species and other resources that could potentially be affected is provided in ***Appendix E***.

6.2.12 FARMLAND

There are open, undeveloped areas adjacent to the Airport. However, they generally do not have the potential to be used for agricultural purposes as the Airport is surrounded by Lake Pontchartrain and industrial uses. Development of these properties is not anticipated as a result of this planning effort.

6.2.13 ENERGY SUPPLY AND NATURAL RESOURCES

The effects of airport development on energy and natural resources are generally related to the amount of energy required for aircraft, ground support vehicles, airport lighting, and terminal and other facilities. While it is too early to definitively state that implementation of the recommended development plan will not materially increase demands on the energy supply of the region, at this time, no material increases are expected. Additionally, it is anticipated that the construction of any recommended projects would consume conventional building materials that are not scarce and therefore would not be problematic.

6.2.14 LIGHT EMISSIONS

In accordance with the Environmental Handbook, FAA Order 5050.4A, light emissions should be considered if they create an annoyance among people in the vicinity of the installation. Relocation of or establishment of new runway lighting could cause a change in lighting patterns, but these potential changes would not be expected to create any significant impact on the surrounding community.

6.2.15 SOLID WASTE IM7PACT

Solid waste impacts are monitored for projects that significantly increase solid waste production, such as significant terminal expansions, large manufacturing facilities, etc. Any proposed projects that create a significant amount of solid waste will need to be analyzed for impacts in this category; however, no significant impacts are anticipated at this time.

6.2.16 HAZARDOUS WASTE

Hazardous waste impacts at airport facilities can be found in numerous situations ranging from sanitary landfills to abandoned underground storage tanks (UST). USTs are probably the most commonly found source of hazardous waste impacts at airports. No known issues associated with hazardous waste have been documented to date, and no significant impacts are expected at this time.

6.2.17 CONSTRUCTION IMPACTS

Implementation of the recommended development plan will potentially result in construction-related impacts, but they are not expected to be significant so long as all activities are conducted in accordance with best management practices. Construction impacts are not generally considered to be significant because they: (1) result solely from construction operations; and (2) are limited to specific construction periods. Their impacts would primarily result from the associated noise, dust, and construction vehicle exhaust emissions.

6.3 AIRPORT RECYCLING PROGRAM

An airport has many opportunities to reduce its environmental footprint in the community that it serves, and among the easiest and least expensive is recycling. Airport personnel, tenants, and guests generate tons of materials and waste every day, much of which can be recycled, which helps to reduce solid waste generation and minimize contributions to landfills.

RIC has applied for full *Virginia Green Certification*, a voluntary partnership initiative to encourage green practices in tourism. Under this program, the Airport has agreed to place recycling receptables in highly-visible locations; offer users the opportunity to recycle glass, plastic, aluminum, newspaper, office paper, toner cartridges, cardboard, fluorescent lamps, batteries, and electronic equipment; provide recycling bins in vehicle clean-out areas; and place recycling bins in traveler departure areas.

Based on historical data from the Airport's recycling contractor, prior to 2020 and before COVID-19, recyclables were removed from RIC three times per week, which amounted to approximately 60,000 pounds of recycled material, or roughly 30 tons. As of the writing of this chapter, the frequency of removal has been lowered to an 'as-needed' basis due to lower enplanements during the pandemic.

Richmond International Airport

Master Plan Revision

Chapter Seven

Implementation and Financial Plan

CHAPTER SEVEN
Implementation and Financial Plan

This chapter presents a financial plan for the implementation of the Recommended Development Plan (RDP). An analysis of available capacity to finance projects was accomplished as a component of this planning process. This information was utilized as a guide in determining the scope and level of proposed development projects for the Richmond International Airport (RIC).

7.1 ASSUMPTIONS

Available funding for Capital Improvement Projects at RIC comes from multiple sources:

- $131,787,410 from Airport Improvement Program (AIP) Non-Primary Entitlement funding
- $89,669,443 from the 2022 Infrastructure Bill
- $56,404,287 from the State of Virginia Department of Transportation (VDOT)
- $82,214,000 from the Capital Region Airport Commission (the Commission)
- $96246,800 from the Passenger Facility Charge Program (PFC)
- $71,156,250 from Customer Facility Charges (CFC)
- $55,107,500 from Third Party Developers

The Airport has an active Passenger Facility Charge (PFC) Program that has been in place since 1994. It is currently collecting and disbursing revenue associated with Application Eight. With the recent coronavirus disease of 2019 (COVID-19) and its impacts to passenger traffic, the collection rate was significantly reduced across the entire industry over the period of 2020 - 2021. However, RIC has experienced a rebound in passenger traffic, and its PFC collections are returning to pre-pandemic levels. If this trend continues, the current application collection authority should be realized by 2024. For planning purposes, a conservative estimate of between $6 and $7 million of PFC revenue capacity should be available for pay-as-you-go and/or bond financing associated with eligible development moving forward.

As of October 2020, the operating income for 2021 was budgeted at $34 million. This was down approximately $9 million from 2019 to account for COVID-19 and the decreased numbers in air travel. The Airport received $18,558,774 in CARES Act (Coronavirus Aid, Relief, and Economic Security) funding and $6,613,060 in ACRGP (Airport Coronavirus Response Grant Program) funding.

7.2 HISTORICAL FUNDING

A review of RIC historical receipts indicates that funding came from multiple sources. This includes AIP funding, State of Virginia Aviation Trust funding, and local funding from the Capital Region Airport Commission. During the 15-year history (2005-2020) of the AIP, the Airport has received $8,693,253 in grants. Of this amount, approximately $3,843,126 came from the entitlement and State apportionment categories and $2,245,138 came from the discretionary category.

The Airport's annual operating funding is derived from parking income, landing fees, concession income, rental income, apron income, and other operating revenue. Other funding sources include traditional revenue from General Aviation and Corporate tenants, fuel sales, ground leases and other non-aviation revenue producing activities, State VDOT funding, and occasional contributions from the Henrico County Government. These resources, including FAA AIP and State VDOT funds, are all available for capital improvements.

7.3 PREFERRED DEVELOPMENT PLAN DESCRIPTION

7.3.1 RECOMMENDED AIRFIELD IMPROVEMENTS

In order to obtain maximum operational efficiency and continue to provide safe and efficient flow of aircraft in and around the airfield, several improvement projects were identified during the planning process. These improvements will also allow the Airport to meet the immediate needs of its tenants and customers in a fashion that allows for future growth and expansion as demand dictates. The components of this element of the recommended plan include:

- Concourse B Apron Expansion & Deicing Pad
- Airfield Vacuum, Sweeper and Rubber Removal Vehicle
- East Side Apron 5 - Design
- ARC Flash Study
- Relocate Taxiway E Connector-Design/Construction
- East Side Apron 5 - Construction
- Reconstruct Mid-Concourse Apron - Design
- Reconstruct Taxiway C and Connector - Design and Construction
- Reconstruct Mid-Concourse Apron - Asphalt to Concrete - Construction
- Concourse A Apron - Old Concrete - Reconstruction
- LED Runway Edge Lights
- East Side Apron 1 Expansion - Design/Construction
- Airport Surveillance Radar Relocation
- Taxiways J, K, T Reconstruction - Design/Construction
- Master Plan Update

- Reconstruct Taxiway H - Design and Construction
- East Apron #4 Reconstruction Phase I - Design/Construction
- East Apron #4 Reconstruction Phase II - Construction
- Runway 2-20 Drainage Improvements and Shoulder Removal - Design/Construction
- South Air Cargo Apron Expansion - Construction
- FBI Apron Expansion
- East Side Cargo Apron #3 - Design/Construction
- Runway 2-20 Rehabilitation
- New Runway 16R-34L - Environmental

7.3.2 RECOMMENDED AIRSIDE DEVELOPMENT

The projects recommend for airside development intended to meet both near- and long-term demand include:

- FIS Facility Renovations (Design/Construction)
- New Aircraft Rescue and Fire Fighting Facility (Design)
- New ARFF Facility - Construction
- CNG Fueling Station Airport Maintenance Facility - Design and Construction
- Concourse B Pet Relief Area
- Concourse A Restroom Remodel
- Concourse B Restroom Remodel
- Concourse B Passenger Boarding Bridges
- Concourse A Checkpoint - Design
- AMF Equipment Storage Building - Design/Construction
- Concourse B Passenger Boarding Bridges Replacement - Concourse B
- South Cargo Apron Expansion - Design
- East Side GA Terminal - Construction
- Air National Guard Relocation
- Concourse B Expansion
- Relocate Cargo Facilities
- Concourse A Expansion - Design
- Concourse A Expansion - Construction
- Relocate Belly Cargo

7.3.3 RECOMMENDED LANDSIDE DEVELOPMENT

These projects include those that will improve RIC's ability to remain financially self-sustaining through commercial opportunities both on and off airport property. These include:

- Vehicle Car Was at Airport Maintenance Facility
- Land Acquisition

- East side Waterline Improvements
- Information Technology Upgrades
- GA Development South - Phase I Roads and Utilities
- Consolidated Rental Car Facility (CONRAC) - Walkway Enclosure and Ticket Counter Relocation
- Urban Air Mobility Facility - Garage Expansion - Engineering Report - Environmental
- East Side GA Terminal - Design
- Urban Air Mobility Facility - Garage Expansion - Design/Construction
- Close Beulah Road/Improve Lafrance Road
- Charles City Road Development
- Consolidated Rental Car Facility (CONRAC) Relocation

7.4 CAPITAL DEVELOPMENT SOURCES OF FUNDS

A review of all available funding sources indicates that the Airport can reasonably expect annual contributions of approximately $5 to $6 million dollars from the Commission's resources to dedicate to its capital improvements without the initiation of debt-financing. Each of the grant funding sources has eligibility and timing requirements that must be considered when applying for and using the funds.

7.4.1 Airport Improvement Program Grants

The Airport Improvement Program (AIP) is the FAA grant-in-aid program for civil airports included in the National Plan of Integrated Airport System (NPIAS) that represents a major source of funding for airport development and planning. Originally established in 1982 with the passage of the Airport and Airway Improvement Act, the Office of the Law Revision Counsel re-codified the AIP in 1994 as Chapter 471 of Title 49 of the United States Code (USC). Several amendments have occurred since this time to address annual authorizations and other program changes. AIP funds originate from the Airport and Airway Trust Fund, which draws support from user fees, fuel taxes, and other revenue sources.

The FAA refers to recipients of AIP grants as "Sponsors." A Sponsor's eligibility to receive funds under the AIP varies by type of airport and category of proposed project. In general, a Sponsor may be a public agency, a private owner, or a State entity that is associated with a public-use airport. Sponsors must be legally, financially, and otherwise able to conduct the assurances and obligations contained in the project application and grant agreement.

Non-Primary Entitlement funds are part of the AIP and are specifically reserved for primary airports listed in the latest published National Plan of Integrated Airports (NPIAS) and that have airfield development needs. Non-Primary Entitlement is available for use in the fiscal year it becomes available and the following three fiscal years. Sponsors may choose to delay using their entitlement the first, second or third year and use all of the money in the final year in order to fund a larger project. Unused funds expire after four years unless the Sponsor obligates the funds under a grant or transfers the funds to another NPIAS airport.

Beyond this element of the AIP is discretionary funding, which is awarded based on project justification and demand. Generally, these funds can be used for airside, terminal, and related infrastructure development. This includes airfield pavement construction and rehabilitation; terminal construction; roadway and access projects; safety and security projects; land acquisition; planning, environmental, and noise mitigation programs. There are exceptions to these eligibility categories, but this list captures the majority of eligible items. The analysis contained in this report assumes that the current funding methodology will remain in place.

In 2022, the $20 billion Infrastructure Bill was passed, which allocated funds to airport Capital Improvement Programs. RIC was granted $6,883,925, to be disbursed over a 5-year timeframe (2022-2026). Additionally, the airport can compete for discretionary money for use on the Terminal Building. These projects are subject to the same guidelines that apply to AIP projects.

7.4.2 Department of Transportation and Development Aviation Trust Fund

The Virginia Department of Transportation (DOT) administers a trust fund for airports in the State. It is financed through aviation fuel sales tax revenues. Grants from this fund are issued by VDOT, based on eligibility criteria set out by the department. Additionally, the trust fund provides the local match for AIP grants for all airports in the state requesting this assistance. RIC typically requests and receives this funding support.

7.4.3 Other Sources

There are other sources that airports can utilize in funding capital improvements and development. Among these are Airport Revenue Bonds, fees from airlines, Corporate tenants, fuel sales, ground leases, and other financing methods.

Table 7-1, **Projected Financial Demand**, considers each of these funding sources and depicts the anticipated financial need of $600,000,000 in airport revenue and grants over a 10-year planning horizon. It is anticipated that additional resources from third party developers and tenants will be made available to support other development outlined in the Capital Improvement Program (CIP) as demand presents itself.

In support of these third-party developments, there are several demand-driven projects identified in the Capital program that will require significant Federal, State, and Local resources. The demand for these elements will provide independent utility and consequently, provide the required justification for the higher grant funding needed to implement the program.

Table 7-1: Projected Financial Demand

Federal Fiscal Year	FAA Airport Improvement Program		Infastructure Bill		State	Local	Sponsor			Other	Total
	Entitlement	Discretionary	Entitlement	Discretionary			PFC	CFC	Third Party		
2021	$5,500,000.00	$7,303,783.00									$12,803,783.00
2022	$5,500,000.00	$4,334,017.00	$6,412,500.00	$17,750,000.00	$1,805,169.00	$6,984,000.00					$42,785,686.00
2023	$5,500,000.00	$12,213,125.00	$3,990,235.00	$5,000,000.00	$2,411,485.00	$5,720,000.00	$1,350,000.00	$17,000,000.00		$2,641,448.00	$55,826,293.00
2024	$3,818,750.00	$30,944,460.00	$10,249,040.00		$11,325,250.00	$5,500,000.00	$9,000,000.00	$14,156,250.00			$84,993,750.00
2025	$7,181,250.00	$4,911,565.00	$6,832,925.00		$6,626,939.00	$56,510,000.00					$82,062,679.00
2026	$5,500,000.00	$3,500,000.00	$49,683,783.00		$13,500,000.00				$55,107,500.00		$127,291,283.00
2027	$5,500,000.00	$15,000,000.00			$2,277,778.00		$43,845,050.00				$66,622,828.00
2028	$3,080,460.00				$2,983,722.00		$8,410,350.00				$14,474,532.00
2029	$5,500,000.00	$10,000,000.00			$1,722,222.00		$33,641,400.00	$40,000,000.00			$90,863,622.00
2030	$2,000,000.00				$13,751,723.00	$7,500,000.00					$23,251,723.00
Total	$49,080,460.00	$88,206,950.00	$77,168,483.00	$22,750,000.00	$56,404,288.00	$82,214,000.00	$96,246,800.00	$71,156,250.00	$55,107,500.00	$2,641,448.00	$600,976,179.00

7.5 SUMMARY OF CAPITAL IMPROVEMENT PROGRAM

The financing capacity described earlier in this chapter serves as the guide for the Recommended Development Plan. Utilizing this information allows the Airport to phase projects so that available financial resources are coupled with the appropriate projects and result in an achievable capital development program. Cost estimates for the proposed projects were prepared as a part of the Master Planning Process and can be found in **Appendix D, Recommended Development Plan Cost Estimates**.

The following tables summarize the proposed Capital Improvement Program for the Airport over the 10-year planning horizon. **Table 7-2** shows the Near-Term Planning Horizon projects planned through 2025; **Table 7-3** shows the Intermediate-Term Planning Horizon projects planned for 2026 – 2030. This planning level correlates with the approved forecast and shows that the program can be financially implemented.

7.6 SUMMARY

As the Airport's traffic and operations continue to grow, it is logical to assume that available resources will increase. The creation of new General Aviation aprons and infrastructure, with the potential for additional industrial, commercial, and cargo development bring the possibility of additional revenue from tenant leases, as well as fuel flowage and ground leases. This coupled with other revenue generation opportunities position the Airport to continue its success of financial self-sufficiency.

Table 7-2: Near-Term Planning Horizon Projects

Federal Fiscal Year	Project Identification	Project Description	FAA Airport Improvement Program		Infastructure Bill		STATE	LOCAL	Sponsor			Other	Total
			Entitlement	Discretionary	Entitlement	Discretionary			PFC	CFC	Third Party		
2022	1	Concourse B Apron Expansion & Deicing Pad	$ 5,500,000	$ 734,017			$ 692,669	$ -	$ -	$ -	$ -		$ 6,926,686
	2	FIS Facility Renovation(Design/Construction			$ 6,412,500		$ 712,500	$ 750,000		$ -	$ -		$ 7,875,000
	3	New Aircraft Rescue and Fire Fighting Facility - Design						$ 750,000		$ -	$ -		$ 750,000
	4	Airfield Vacuum, Sweeper & Rubber Removal Vechile						$ 750,000		$ -	$ -		$ 750,000
	5	Vechicle Car Wash at Airport Maintenance Facility						$ 500,000		$ -	$ -		$ 500,000
	6	East Side Apron 5 - Design						$ 500,000		$ -	$ -		$ 500,000
	7	Land Acquisition						$ 3,250,000		$ -	$ -		$ 3,250,000
	8	ARC Flash Study						$ 184,000		$ -	$ -		$ 184,000
	9	Relocate Taxiway E Connector - Design/Construction (CE - $14,522,828)		$ 3,600,000			$ 400,000		$ -	$ -	$ -		$ 4,000,000
	10	Renovate/Upfit SRE Bunk Rooms	$ -	$ -			$ -	$ 300,000	$ -	$ -	$ -		$ 300,000
	11	Concourse B Passenger Boarding Bridges - Terminal funds	$ -	$ -		$ 17,750,000	$ -	$ -	$ -	$ -	$ -		$ 17,750,000
		2022 - Subtotal	**$ 5,500,000**	**$ 4,334,017**	**$ 6,412,500**	**$ 17,750,000**	**$ 1,805,169**	**$ 6,984,000**	**$ -**	**$ -**	**$ -**		**$ 42,785,686**
2023	12	New ARFF Facility - Design Reimb./Construction	$ 5,400,000	$ 4,663,125			$ 1,118,125		$ -	$ -	$ -		$ 11,181,250
	13	East Side Apron 5 - Design Reimb./Construction	$ 100,000	$ 7,550,000			$ 850,000		$ -	$ -	$ -		$ 8,500,000
	14	Reconstruct Mid-Concourse Apron - Asphalt to Concrete - Design/Construction			$ 3,990,235		$ 443,360		$ -	$ -	$ -		$ 4,433,595
	15	CNG Fueling Station Airport Maintenance Facility - Design/Construction						$ 1,500,000	$ -	$ -	$ -		$ 1,500,000
	16	Snow Removal Equipment						$ 1,000,000	$ -	$ -	$ -		$ 1,000,000
	17	Concourse B Pet Relief Area							$ 250,000	$ -	$ -		$ 250,000
	18	Concourse A Restroom Remodel							$ 300,000	$ -	$ -		$ 300,000
	19	Concourse B Restroom Remodel							$ 300,000	$ -	$ -		$ 300,000
	20	Eastside Waterline Improvements						$ 1,220,000		$ -	$ -		$ 1,220,000
	21	Information Technology Upgrades						$ 1,000,000	$ -	$ -	$ -		$ 1,000,000
	22	GA Development South - Phase I Roads and Utilities							$ -	$ -	$ -	$2,641,448.00	$ 2,641,448
	23	Concourse A Checkpoint - Design/Construction - Terminal funds				$ 5,000,000			$ 500,000	$ -	$ -		$ 5,500,000
	24	CONCRAC - Walkway Enclosure and Ticket Counter Relocation							$ -	$ 17,000,000	$ -		$ 17,000,000
	25	ARFF Vehicle						$ 1,000,000	$ -	$ -	$ -		$ 1,000,000
		2023 - Subtotal	**$ 5,500,000**	**$ 12,213,125**	**$ 3,990,235**	**$ 5,000,000**	**$ 2,411,485**	**$ 5,720,000**	**$ 1,350,000**	**$ 17,000,000**	**$ -**	**$ 2,641,448**	**$ 55,826,293**
2024	26	Taxiway 'C' and 'A' Reconfiguration	$ 1,766,250	$ 9,981,000			$ 1,305,250			$ -	$ -		$ 13,052,500
	27	Concourse A Apron - Old Concrete - Reconstruction	$ 218,750	$ 2,031,250			$ 250,000			$ -	$ -		$ 2,500,000
	28	LED Runway Edge Lights		$ 585,000			$ 65,000			$ -	$ -		$ 650,000
	29	Urban Air Mobility Facility - Garage Expansion - Engineering Report - Environmental					$ 500,000			$ -	$ -		$ 500,000
	30	Williamsburg Road/Easide Road Roundabout						$ 3,000,000		$ -	$ -		$ 3,000,000
	31	East Side GA Terminal - Design						$ 500,000		$ -	$ -		$ 500,000
	32	East Side Apron 1 Expansion - Design/Constrution					$ 6,000,000	$ 1,500,000		$ -	$ -		$ 7,500,000
	33	AMF Equipment Storage Building - Design/construction							$ 4,000,000	$ -	$ -		$ 4,000,000
	34	Airport Survellellevance Radar Relocation	$ 1,833,750	$ 866,250			$ 300,000			$ -	$ -		$ 3,000,000
	35	South Cargo Apron Expanion - Design						$ 500,000		$ -	$ -		$ 500,000
	36	CONRAC Expansion - Short Term								$ 14,156,250	$ -		$ 14,156,250
	37	East Side Apron 5 - Construction		$ 11,880,000			$ 1,320,000	$ -	$ -		$ -		$ 13,200,000
	38	Terminal Systems Upgrade - HVAC, Electrical, Plumbing, IT	$ -	$ -			$ -		$ 5,000,000	$ -	$ -		$ 5,000,000
	39	East Apron #4 FBI - Reconstruction/Expansion - Design/Construction		$ 5,600,960	$ 10,249,040		$ 1,585,000						$ 17,435,000
		2024 - Subtotal	**$ 3,818,750**	**$ 30,944,460**	**$ 10,249,040**	**$ -**	**$ 11,325,250**	**$ 5,500,000**	**$ 9,000,000**	**$ 14,156,250**	**$ -**	**$ -**	**$ 84,993,750**
2025	40	Taxiways J, K, T Reconstruction - Design/Construction	$ 2,541,250	$ 887,160			$ 380,934			$ -	$ -		$ 3,809,344
	41	Master Plan Update	$ 1,350,000				$ 150,000			$ -	$ -		$ 1,500,000
	42	Reconstruct Taxiway H - Design & Construction	$ 1,608,750	$ 3,455,655			$ 562,712			$ -	$ -		$ 5,627,117
	43	East Side GA Terminal - Construction						$ 5,000,000		$ -	$ -		$ 5,000,000
	44	Runway 2-20 Drainage Improvements & Shoulder Removal - Design/Construction	$ 1,681,250	$ 568,750			$ 250,000			$ -	$ -		$ 2,500,000
	45	Urban Air Mobility Facility - Garage Expansion - Design/Construction						$ 45,000,000		$ -	$ -		$ 45,000,000
	46	South Air Cargo Apron Expansion - Construction						$ 5,310,000		$ -	$ -		$ 5,310,000
	47	Air National Guard Relocation					$ 4,800,000	$ 1,200,000		$ -	$ -		$ 6,000,000
	48	Enclose Existing Ditch			$ 2,000,000					$ -	$ -		$ 2,000,000
	49	Concourse B Expansion - Design - Phase I Construction	$ -	$ -	$ 4,832,925		$ 483,293	$ -	$ -	$ -	$ -		$ 5,316,218
		2025 - Subtotal	**$ 7,181,250**	**$ 4,911,565**	**$ 6,832,925**	**$ -**	**$ 6,626,939**	**$ 56,510,000**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 82,062,679**
		Short-Term (2022 - 2025) - Subtotal	**$ 22,000,000**	**$ 59,706,950**	**$ 27,484,700**	**$ 22,750,000**	**$ 22,168,842**	**$ 74,714,000**	**$ 10,350,000**	**$ 31,156,250**	**$ -**	**$ 2,641,448**	**$ 278,472,190**

Table 7-3: Intermediate-Term Planning Horizon Projects

Federal Fiscal Year	Project Identification	Project Description	FAA Airport Improvement Program		Infastructure Bill		STATE	LOCAL				Other	Total
			Entitlement	Discretionary	Entitlement	Discretionary			PFC	CFC	Third Party		
2026	50	East Side Cargo Apron #3 - Design/Construction	$ 5,500,000	$ 3,500,000			$ 1,000,000			$ -	$ -		**$ 10,000,000**
	51	Concourse B Expansion Phase II Construction - split with terminal funds			$ 49,683,783					$ -	$ -		**$ 49,683,783**
	52	Relocate Cargo Facilities								$ -	$ 35,107,500		**$ 35,107,500**
	53	Close Beulah Road/Improve Lafrance Road					$ 12,500,000			$ -	$ -		**$ 12,500,000**
	54	Charles City Road Development								$ -	$ 20,000,000		**$ 20,000,000**
		2026 - Subtotal	**$ 5,500,000**	**$ 3,500,000**	**$ 49,683,783**	**$ -**	**$ 13,500,000**	**$ -**	**$ -**	**$ -**	**$ 55,107,500**		**$ 127,291,283**
2027	55	Runway 2-20 Rehabilitation	$ 5,500,000	$ 15,000,000			$ 2,277,778		$ -	$ -	$ -		**$ 22,777,778**
	56	Concourse B Expansion - Construction	$ -	$ -			$ -		$ 43,845,050	$ -	$ -		**$ 43,845,050**
		2027 - Subtotal	**$ 5,500,000**	**$ 15,000,000**	**$ -**	**$ -**	**$ 2,277,778**	**$ -**	**$ 43,845,050**	**$ -**	**$ -**		**$ 66,622,828**
2028	57	Concourse A Expansion - Design	$ -	$ -			$ -	$ -	$ 8,410,350	$ -	$ -		**$ 8,410,350**
	58	Taxiway "V" Reconfiguration	$ 3,080,460	$ -			$ 342,274	$ -	$ -	$ -	$ -		**$ 3,422,734**
	59	GA Development South - Phase I Roads and Utilities	$ -	$ -			$ 2,641,448	$ -	$ -	$ -	$ -		**$ 2,641,448**
		2028 - Subtotal	**$ 3,080,460**	**$ -**	**$ -**	**$ -**	**$ 2,983,722**	**$ -**	**$ 8,410,350**	**$ -**	**$ -**		**$ 14,474,532**
2029	60	Concourse A Expansion - Construction	$ -	$ -			$ -	$ -	$ 33,641,400	$ -	$ -		**$ 33,641,400**
	61	Runway 16-34 Rehabilitation	$ 5,500,000	$ 10,000,000			$ 1,722,222	$ -	$ -	$ -	$ -		**$ 17,222,222**
	62	CONRAC Relocation	$ -	$ -			$ -	$ -	$ -	$ 40,000,000	$ -		**$ 40,000,000**
		2029 - Subtotal	**$ 5,500,000**	**$ 10,000,000**	**$ -**	**$ -**	**$ 1,722,222**	**$ -**	**$ 33,641,400**	**$ 40,000,000**	**$ -**		**$ 90,863,622**
2030	63	Relocate Belly Cargo	$ -	$ -			$ -	$ 7,500,000	$ -	$ -	$ -		**$ 7,500,000**
	64	New Runway 16R/34L - Enviromental	$ 2,000,000	$ -			$ 200,000	$ -	$ -	$ -	$ -		**$ 2,200,000**
	65	GA Development South - Phase II - Apron	$ -	$ -			$ 13,551,723	$ -	$ -	$ -	$ -		**$ 13,551,723**
		2030 - Subtotal	**$ 2,000,000**	**$ -**	**$ -**	**$ -**	**$ 13,751,723**	**$ 7,500,000**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 23,251,723**
		Mid-Term (2025 - 2030) - Subtotal	**$ 21,580,460**	**$ 28,500,000**	**$ 49,683,783**	**$ -**	**$ 34,235,445**	**$ 7,500,000**	**$ 85,896,800**	**$ 40,000,000**	**$ 55,107,500**	**$ -**	**$ 322,503,988**

Richmond International Airport

Master Plan Revision

Chapter Eight

Airport Layout Plan

Kutchins & Groh

RICHMOND
INTERNATIONAL AIRPORT

CHAPTER EIGHT
Airport Layout Plan

The Airport Layout Plan (ALP) package is a series of drawings that reflects existing conditions as well as the preferred future development for a given airport. Using plan and profile views of the facility, the ALP provides a graphic portrayal of the written content found in an airport Master Plan.

The ALP package of drawings for the Richmond International Airport (RIC) was created in accordance with the criteria set forth in the Federal Aviation Administration (FAA) Advisory Circulars (ACs) 150/5300-13 Airport Design and 150/5300-18 General Guidance and Specifications for Submission of Aeronautical Surveys to NGS: Field Data Collection and Geographic Information System (GIS) Standards. The content of individual sheets was determined using the guidelines found in AC 150/5070-6b, Airport Master Plans, ***Appendix G, Airport Layout Plan Drawing Set,*** and requirements contained in the FAA's ALP checklist.

On July 7, 2022, the FAA conditionally approved ALP revision No. 5, which is considered a pen and ink revision to the previously approved ALP.

As a part of this planning process, the Future Airport Layout Drawing (ALD) of the package is reviewed by the FAA from a regulatory and safety perspective. Following the receipt of FAA-approval, the Future ALD serves as the initial step in securing access to federal funding through the FAA for existing and future airport studies and construction projects.

The ALP package for RIC consists of the following drawings and can be found as ***Appendix G***. The sections following the list of drawings describe each individual sheet in more detail:

- Cover/Title Sheet
- Airport Data Sheet
- Existing Airport Layout Drawing
- Future Airport Layout Drawing
- Terminal Area Drawing
- Land Use Drawing
- Airport Property Map

8.1 COVER SHEET

The cover sheet contains approval blocks, airport location maps and other pertinent information as required by local FAA District Offices and State aviation agencies.

8.2 DATA SHEET

The data sheet contains basic airport and runway data tables and includes:

- Wind Rose Information – Wind roses and corresponding wind data are provided for all weather conditions, Visual Flight Rules (VFR) conditions, and Instrument Flight Rules (IFR) conditions for each runway.
- Runway Protection Zone (RPZ) Data – The FAA defines this zone as an area off the runway end to enhance the protection of people and property on the ground. The data table outlines RPZ dimensions for existing and future runways.
- Airport Data Table – Geographical, operational, meteorological, and classification data are shown in this table for both existing and future airfield layouts.
- Runway Data Table – Physical, geometrical, and operational data for each runway are listed in this table. Data includes runway dimensions, runway classifications, wind coverage for each runway, maximum runway elevation, pavement types and loading strengths, runway gradients, approach and obstruction clearance slopes, runway approach categories, runway safety area dimensions, runway lighting and marking data, navigational aids data, approach visibility minima, and declared distances information.
- Runway End Data – Provides a detailed listing of existing and future runway end coordinates and runway Touchdown Zone Elevations (TDZ). The runway TDZ is defined as the highest point within the first 3,000 feet of a given runway end.
- Other Data – Notes that apply to the entire ALP package (e.g., North Arrow or other pertinent data such as FAA Airspace Approval Cases).

8.3 EXISTING AIRPORT LAYOUT DRAWING

The Existing Airport Layout Drawing (ALD) provides a general layout of the environment in and around a given airport. It depicts existing facilities as well as nearby surroundings and is shown with a scale 1:1000 feet. This drawing shows required facility identifications, labels, imaginary surfaces, RPZs, and Runway Safety Areas (RSAs).

Elements of the Existing ALD include airfield infrastructure such as runways, taxiways, aprons, and holding areas. The Existing ALD also includes passenger terminals, and access to these facilities, as well as existing General Aviation areas and aviation-related items.

Other features illustrated on the Existing ALD are airfield navigational aids; maintenance facilities; and support infrastructure, such as buildings, roads, and fencing. The Existing ALD also includes the Airport property boundary, which depicts the geographical limits of the property owned by the Airport.

8.4 FUTURE AIRPORT LAYOUT DRAWING

The Future ALD illustrates the proposed airport configuration and recommended development of Airport facilities. It graphically depicts all of the elements of the Existing ALD and also includes proposed future development.

The Future ALD depicts proposed infrastructure requirements such as airfield pavement, safety surfaces, and critical areas. Other future elements shown on the drawing include terminal development, support facilities, building identification, access facilities, easements, and property boundary lines.

8.5 TERMINAL AREA PLAN

This plan is represented by a large-scale depiction of areas with significant terminal facility development. This drawing is an enlarged area of the passenger terminal area portion of the Future ALD. The scale for this drawing is 1:200 feet. A keyed legend identifies the prominent development in the terminal area and known building heights.

8.6 LAND USE PLANS

The Land Use Drawing depicts land uses within the property boundary and land uses and zoning in the area around an airport.

8.7 AIRPORT PROPERTY MAP

This drawing depicts the Airport property boundary, tracts of land acquired by the Airport, and the method of acquisition. It is utilized by the Airport and the FAA in planning development on the Airport and protecting the property for Airport use.

8.8 RECOMMENDED DEVELOPMENT PLAN

The culmination of the Airport Master Planning process is the Recommended Development Plan, which depicts the most favorable development option for the Airport. It is not included in the official Airport Layout Plan, but the projects shown on the Recommended Development Plan are depicted on the Future Airport Layout Drawing as stated in Section 9.4. The Recommended Development Plan includes improvements to the runway and taxiway system, expansion of other airside facilities, and preservation of the existing infrastructure. The proposed improvements, including the addition of General Aviation/Industrial Aviation hangars and apron, as well as recovery/relocation of the Runway 31 threshold in conjunction with the relocation of Plank Road will allow the Airport to meet future demand requirements, while complying with current FAA design standards. Preferred support/ancillary facilities will assist with the operational efficiency of the Airport.

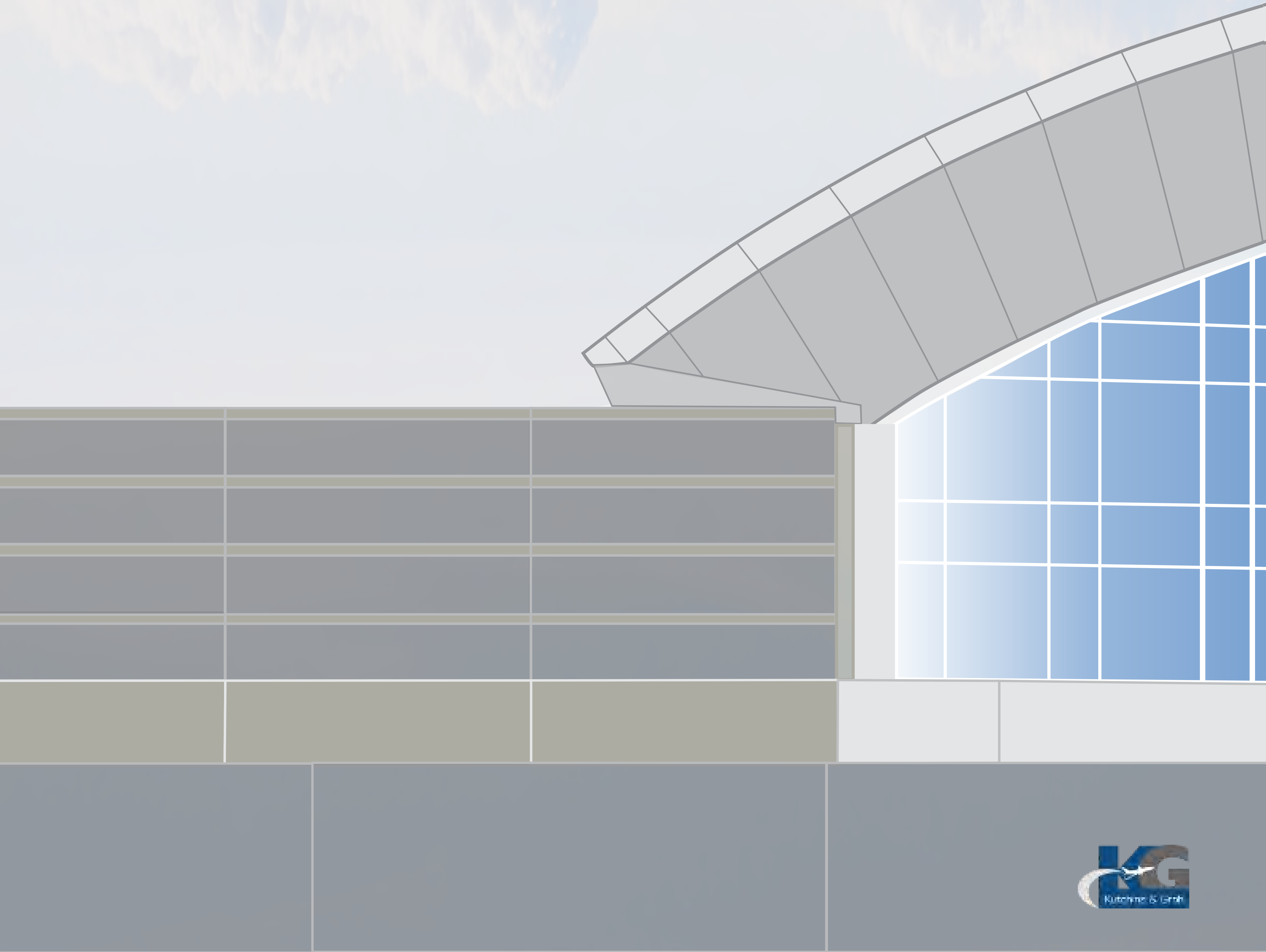
Proposed improvements in terms of roadways and vehicle parking areas will enhance Airport accessibility and will increase the level of service at the Airport. In an effort to provide for future expansion of the non-aviation revenue, the Airport has reserved space for future commercial development to the north of the airfield and south of the Airport Terminal. It is prudent to plan for additional compatible revenue sources on property that cannot be used for Airport operations.

8.9 ALP NARRATIVE

An ALP Narrative report has been included in this document as ***Appendix H***, which also includes an FAA comment letter, dated January 26, 2022. The letter lists several requested revisions to the narrative report, which have been incorporated into the report dated February 2022.

Richmond International Airport

1 Richard E. Byrd Terminal Drive
Richmond, VA 23250-2400



Richmond International Airport

Master Plan Revision

Volume II:

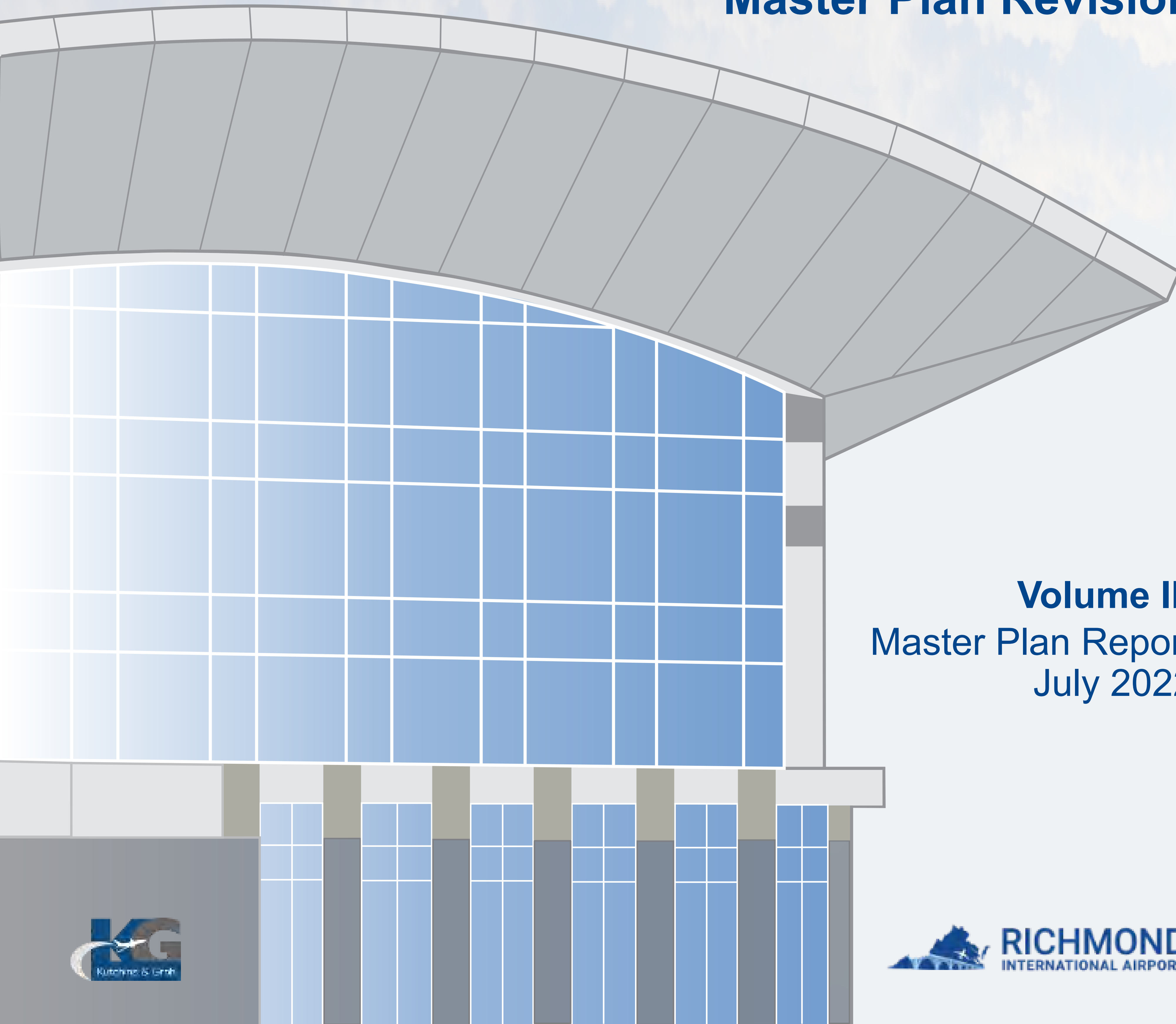
Master Plan Report

July 2022

Kutchins & Groh

Richmond International Airport

Master Plan Revision



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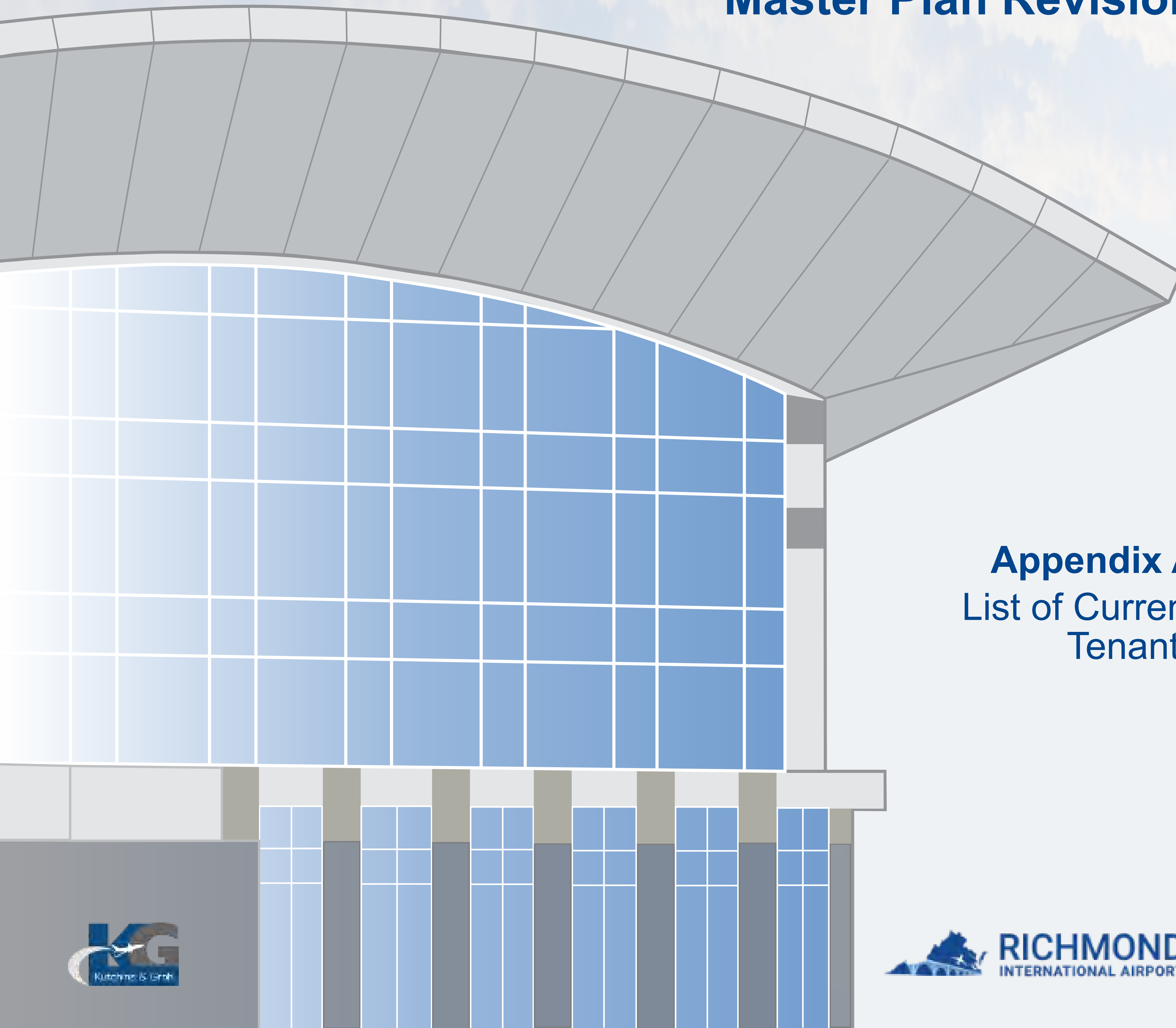
Master Plan Report

July 2022

RICHMOND
INTERNATIONAL AIRPORT

Richmond International Airport

Master Plan Revision



Appendix A

List of Current Tenants

Kutchins & Groh

RICHMOND INTERNATIONAL AIRPORT

List of Current Tenants

Source: RIC Real Estate & Facilities Records

Updated November 21, 2019

AERO INDUSTRIES, INC. (FBO) ____ *4*

AIRPORT TAXI (CARGO Building #2) ____ *4*

ALAMO RENT A CAR/ National ____ *4*

ALLEGIANT AIR ____ *4*

ALTRIA CLIENT SERVICES ____ *4*

AMERICAN AIRLINES, INC. ____ *4*

API INCORPORATED ____ *5*

AVIATION FACILITIES COMPANY (AFCO) ____ *5*

AVIS RENT-A-CAR ____ *5*

BB&T BANK ____ *5*

BLU LOGISTICS ____ *5*

BUDGET RENT-A-CAR ____ *5*

COMMONWEALTH CARGO, INC. ____ *5*

COWAN SYSTEMS, LLC. (TRAILER DROP LOT) ____ *6*

CP&Y (Ivor Massey Building) ____ *6*

DELAWARE NORTH COMPANY (DNC) ____ *6*

DELTA AIR LINES, INC. ____ *6*

DELTA GLOBAL SERVICES ____ *6*

DHL EXPRESS ____ *6*

DOLLAR RENT-A-CAR ____ *7*

DOMINION RESOURCES HANGAR ____ *7*

ENTERPRISE CAR RENTAL, FORMERLY NATIONAL, ANC (ALAMO/NATIONAL) ____ *7*

EXPRESS JET AIRLINES (HAWTHORNE Hangar) ____ *7*

FEDERAL AVIATION ADMINISTRATION ____ *7*

FEDERAL EXPRESS MAINTENANCE (CARGO Building #1) ____ *7*

GAT AIRLINE GROUND SUPPORT ____ *7*

HELO AIR, INC. (Helicopter Ride) ____ *7*

HENRICO VOLUNTEER RESCUE SQUAD, INC. ____ *8*

HERTZ RENT-A-CAR ____ *8*

THE HUDSON GROUP ____ *8*

JAMES RIVER TRANSPORTATION ____ *8*

JETBLUE AIRWAYS CORPORATION ____ *8*

JETSTAR______________________________ 9

MARTINAIR, INC. (AERO) ______________________________ 8

METRO AVIATION UNIT - HENRICO COUNTY POLICE DIVISION________________8

MILLION AIR, INC. (FBO) (Commonwealth Aviation Service, Inc.) ________________ 9

NATIONAL RENTAL CAR______________________________ 9

PIEDMONT AIRLINES (CARGO Building #4 / WADS Hangar) ________________ 9

PRIME FLIGHT SERVICES ______________________________ 9

QUANTEM AVIATION SERVICES (CARGO Building #1) ________________ 9

RICHMOND JET CENTER (FBO) ______________________________ 9

RICHMOND CONVENTION & VISITORS BUREAU______________________________ 9

SAME DAY DELIVERY ______________________________ 9

SKYCAPS (see PRIME FLIGHT) 804-222-5179______________________________ 9

SMARTE CARTE, INC. ______________________________ 10

SOUTHWEST AIRLINES CO. ______________________________ 10

SPIT-DYE-N-SHINE SHOP (Shoe Shine)______________________________ 10

STANDARD PARKING ______________________________ 10

THRIFTY CAR RENTAL/DOLLAR ______________________________ 10

TRANSPORATION SECURITY ADMINISTRATION (TSA) ________________ 10

UNITED AIRLINES, INC.______________________________ 10

UNITED PARCEL SERVICE (UPS) ______________________________ 11

U.S. CUSTOMS SERVICE ______________________________ 11

UNITED SERVICES ORGANIZATION (USO) ______________________________ 11

VIRGINIA ARMY NATIONAL GUARD ______________________________ 11

VIRGINIA DEPARTMENT OF AVIATION ______________________________ 11

VIRGINIA RACING COMMISSION______________________________ 11

AERO INDUSTRIES, INC. (FBO)

5745 Huntsman Road, Richmond International Airport, VA 23250-2411

Jon M. Clarke, Vice President – 804-226-7200; Fax: 804-236-1670

AIRPORT TAXI (CARGO Building #2)

5250 Air Express Road, Richmond International Airport, VA 23250-2411

Earmias Getahun 804-405-4052

ALAMO RENT A CAR/ National

1 Richard E. Byrd Terminal Drive, Suite 115
Richmond International Airport, VA 23250

Terminal Counter – 804-222-7477
Jordan Griggs, Area Service Manager – 757-619-5360
Jordan.t.griggs@ehi.com

ALLEGIANT AIR

1 Richard E. Byrd Terminal Drive, Suite 110
Richmond International Airport, VA 23250

Faisal Riaz (Trego-Dugan) General Manager – ric.mgr@trego-dugan.com
702-830-5897 (o) 262-744-5832 (c)

ALTRIA CLIENT SERVICES

5720 Gulfstream Road, Richmond International Airport, VA 23250-2422

Jeffrey Sands, Director of Aviation and Travel Support Services – 804-727-2290; Fax: 804-727-2242
Mark Gale, Chief Pilot – 804-727-2238
Clayton Wilson, Director of Technical & Financial Svcs. – 804-727-2230
Kim Bivins, Manager of Aviation Dispatch, Travel Services & Meeting Planning – 804-727-2222
Dodie Thomas, Supervisor of Cabin Safety and Svcs. – 804-727-2277

AMERICAN AIRLINES, INC.

1 Richard E. Byrd Terminal Drive, Suite 118
Richmond International Airport, VA 23250-2402

Sam Burton, General Manager – 804-614-3736; Fax: 804-614-3739
John Gum, Customer Service Manager – 804-614-3722
Norma Latham, Customer Service Manager – 804-614-3722
Baggage Service……………………………………………………...804-614-3724
Ticket Counter/Gate……………………………….…………….804-614-3701/3760
Reservations / Passenger Service / Air Freight…………………….. 800-433-7300
Baggage Service…………………………………………………. 800-371-4771

NOTE: Chautauqua (Republic), PSA, Mesa, Republic, Envoy, and Piedmont offer service as US Airways Express carriers.

API INCORPORATED (Cargo Building #2)

5250 Air Express Road, 1 Richard E. Byrd Terminal Drive, Richmond International Airport, VA 23250
Keith Jones – General Manager – 804-914-364

AVIATION FACILITIES COMPANY (AFCO)

45025 Aviation Drive, Suite 100
Washington Dulles International Airport, Dulles, VA 20166
John Northcott, Facilities – 703-902-1180
Chuck Stipancic, Business Development

AVIS RENT-A-CAR

1 Richard E. Byrd Terminal Drive, Suite 135
Richmond International Airport, VA 23250-2402
Christian Osinkosky, General Manager – Cell: 347-930-7405
Fax: 804-222-8998
Airport Counter – 804-222-7417

BB&T BANK

1 Richard E. Byrd Terminal Drive, Suite 185
Richmond International Airport, VA 23250
Terra Jones, Marketing Leader – 804- 226-2251
Amanda Shock, Area Operations Manager – 804-536-2658
Downtown Location: 901 E. Byrd Street Richmond, VA 23219
Kim Wright – 804-787-1004

BLU LOGISTICS

5707 Huntsman Road, Suite 102
Richmond International Airport, VA 23250
Stacy Kohn – 804-349-0294, FAX: 804-562-9328

BUDGET RENT-A-CAR

5851 Lewis Road, Sandston, VA 23150
Christian Osinkowski, General Manager – Cell: 347-930-7405
Airport Counter – 804-222-2491
1 Richard E. Byrd Terminal Drive, Suite 135
Richmond International Airport, VA 23250

COMMONWEALTH CARGO, INC.

5501 Fox Road, Cargo 5, Richmond International Airport, VA 23250
Ken Frise, President – 804-222-1160; Cell: 804-370-5333; Fax: 804-222-4540

COWAN SYSTEMS, LLC. (TRAILER DROP LOT)
4530 Oakley's Lane, Henrico, VA 23231
Travis Madison – 804-737-4272 x 3304

CP&Y (Ivor Massey Building)
5707 Huntsman Road, Suite 202
Richmond International Airport, VA 23250
Nagesh Tummala – 804-222-2340
ntummala@cpyi.com

DELAWARE NORTH COMPANY (DNC)
1 Richard E. Byrd Terminal Drive, Suite 103
Richmond International Airport, VA 23250-2402
Johanna Wheeler, GM – 804-222-1227 x 103; Cell: 804-652-5336
Fax: 804-222-3470
Restaurant Take-Out – 804-222-8040

DELTA AIR LINES, INC.
1 Richard E. Byrd Terminal Drive, Suite 106
Richmond International Airport, VA 23250-2402
Ticket Counter – 804-236-2121/2123/2124/2125
Faiz Syed, Manager – 804-236-2150; Cell 240-463-1775
Delta Global Services, Ramp Manager –
DGS Operations – 804-236-2140 and 804-236-2141
Air Freight...804-222-3677
Baggage Service...800-325-8224
Passenger Service..800-221-1212
Reservations..800-221-1212

NOTE: Comair, Chautauqua, Freedom and Atlantic Southeast (ASA) offer service as Delta Connection carriers.

DELTA GLOBAL SERVICES
United – 1 Richard E. Byrd Terminal Drive, Suite 105
Richmond International Airport, VA 23250
Greg Duesenberry, Manager (United) –Gregory.duesenberry@delta.com
804-418-9512 Cell
Lauren Rokenbrod – Admin – lauren.rokenbrod00@delta.com - 804-484-1711
Delta – 1 Richard E Byrd Terminal Drive, Suite 145
Richmond International Airport, VA 23250
Ryan Hall, Manager (Delta) – 804-370-0266
Ellen Williams, Administrative Assistant – 804-663-5085

DHL EXPRESS
295 Thunderbolt Street
Richmond International Airport, VA 23250
Steve Elkins, Director of Airport Operations – 859-817-8414 Office
859-866-0796 Cell

DOLLAR RENT-A-CAR

1 Richard E. Byrd Terminal Drive, Suite 111
Richmond International Airport, VA 23150
Jeff Koonce General Manager – 540-524-8878
Airport Counter – 1-800-434-2226

DOMINION RESOURCES HANGAR

5700 Clarkson Road, Richmond International Airport, VA 23250-2412
John Leder, Chief Maintenance – 804-226-9849; Fax: 804-226-9853
Doug Vaughan, Director/Chief Pilot

ENTERPRISE CAR RENTAL, FORMERLY NATIONAL, ANC (ALAMO/NATIONAL)

5912 Lewis Road, Sandston, VA 23250
Jordan Griggs General Manager – 757-619-5360
Airport Counter – 804-222-0865
1 Richard E. Byrd Terminal Drive, Suite 115
Richmond International Airport, VA 23250

EXPRESS JET AIRLINES (HAWTHORNE Hangar)

450 Portugee Road, Richmond Int'l Airport, VA 23250-2410
Steve Natale – Office: 804-433-1130 ext. 64710; Cell 832-594-5873
Fax: 804-433-1135; steven.natale@expressjet.com

FEDERAL AVIATION ADMINISTRATION

(1) ***FAA Airport Traffic Control***
5701 Gulfstream Road, Richmond International Airport, VA 23250-2402
Joseph Sharek, Air Traffic Manager – 804-226-6537; Fax: 804-222-8960

(2) ***FAA Airway Traffic Organization (ATO)*** SSC.82FB
5701 Gulfstream Road, Richmond International Airport, VA 23250-2402
Brian Sotdorus, Manager – 804-226-6528; Fax: 804-222-6596

(3) ***FAA Flight Standard District Office (FSDO)***
5707 Huntsman Road, Suite 100
Richmond International Airport, VA 23250-2415
Jeff Slaughter, Manager-804 222-7494 ext. 200; Fax: 804-222-4843
Tammy Miller, Administrative Assistance – 804-222-7494 ext. 204

FEDERAL EXPRESS MAINTENANCE (CARGO Building #1)

5300 Federal Road, Suite 103, Richmond International Airport, VA 23250-2410
Ken Mast, Manager – 330-327-8248
Trevor England – AM Flight OPS Mgr – trevor.england@fedex.com

GAT AIRLINE GROUND SUPPORT

1 Richard E. Byrd Terminal Drive, Suite 101
Richmond International Airport, VA 23250-2410
Andrew Gartin – General Manager – Andrew.gartin@gatags.com – 309-540-9381

HELO AIR, INC. (Helicopter Ride)

5721 Gulfstream Road Richmond, VA 23250
Whit Baldwin, President – 804-226-3400; Fax: 804-226-3494

HENRICO VOLUNTEER RESCUE SQUAD, INC.

P.O. Box 911, Sandston, VA 23150

Jack Vorous, fmvorous@verizon.net

HERTZ RENT-A-CAR

1 Richard E. Byrd Terminal Drive, Suite 111
Richmond International Airport, VA 23250-2402
Service Center Address - 5683 Gulfstream Road, Richmond, VA

Jeff Koonce, General Manager – jkoonce@hertz.com
Office: 540-524-8878; Fax: 804-222-3793
Airport Counter – 804-222-7228

THE HUDSON GROUP

1 Richard E. Byrd Terminal Drive, Suite 112
Richmond International Airport, VA 23250-2402

Jameel Staten, Manager – 804-222-9132; 804-548-6715
jstaten@hudsongroup.com

JAMES RIVER TRANSPORTATION

915 North Allen Avenue, Richmond, VA 23220

Jason Hall, Richmond Airport Manager
Terminal Office 804-249-1052; Fax: 804-342-7373; Cell: 804-229-2031
jhall@jamesrivertrans.com
1 Richard E. Byrd Terminal Drive, Suite 172
Richmond International Airport, VA 23250

JETBLUE AIRWAYS CORPORATION

1 Richard E. Byrd Terminal Drive, Suite 122
Richmond International Airport, VA 23250

MAIN NUMBER: 804-222-3621 Fax: 804-222-7561
Kelly Clark, General Manager – Office: 804-222-3621 ext. 1513601
Cell: 804-380-3681; kelly.clark@jetblue.com
Operations: ext. 1513604
Baggage: ext. 1513603
Ticket Counter: ext. 1513606/1513607
Gate A4 Counter: ext. 1513608

JETSTAR AVIATION (PIEDMONT GSE – Cargo Building 1)

5300 Federal Road, Richmond International Airport, VA 23250

Delbert Hammer: 803-227-9214

MARTINAIR, INC. (AERO)

5733 Huntsman Road, Richmond International Airport, VA 23250-2416

Alec Kempe, General Manager – 804 222-7401; 804-226-9156; Fax: 804-222-3688
Elis Olsson, Director of Operations

METRO AVIATION UNIT – HENRICO COUNTY POLICE DIVISION

299 Thunderbolt Road, Richmond International Airport, VA 23250

Sergeant Michael Sommerville – 804-501-7725; 804-641-6463
Sommerville.MB@HenricoPolice.org

MILLION AIR, INC. (FBO) (Commonwealth Aviation Service, Inc.)
400 Portugee Road, Richmond International Airport, VA 23250-2417
Eugene McDonough, President – 804-222-3700; Fax: 804-222-4044

NATIONAL RENTAL CAR
5410 Ready Road, Richmond International Airport, VA 23250
Jordan Riggs, General Manager – 757-619-5360
1 Richard E. Byrd Terminal Drive, Suite 115
Richmond International Airport, VA 23250

PIEDMONT AIRLINES (CARGO Building #4 / WADS Hangar)
5555 Fox Road, Richmond International Airport, VA 23250
Michael Minton, Base Manager – Cell: 540-580-8523; Office 804-727-3800
Michael.minton@aa.com

PRIME FLIGHT SERVICES
1 Richard E. Byrd Terminal Drive, Suite 109
Richmond International Airport, VA 23250-2402
Isaac Lee Jr., General Manager – Office 804-222-5179
ileejr@primeflight.com
Tony Valente, Division Vice President – Cell: 585-509-1458; Fax: 615-301-1191;
Toll Free Fax: 855-229-3231
Local Dispatch #: 804-222-5179

QUANTEM AVIATION SERVICES (CARGO Building #1)
5300 Federal Road, Suite 104, Richmond International Airport, VA 23250-2410
Gail Jones, Operations Manager – gjones@qasllc.aero 804-226-4800; 804-221-6828 Cell; Fax: 222-6543
American Airlines – 804-222-0190 Delta – 804-222-3677
United – 804-226-0391

RICHMOND JET CENTER (FBO)
5745 Huntsman Road, Richmond International Airport, VA 23250-2416
Michael Clarke, Manager – 804-226-7200; Fax: 804-226-7255

RICHMOND CONVENTION & VISITORS BUREAU
1 Richard E. Byrd Terminal Drive, Suite 120
Richmond International Airport, VA 23250
Jack Berry, President – 804-783-7400; Fax: 804-780-2577
Toni Bastian, Airport Location Manager – 804-783-7454; Fax: 804-780-2577
Airport Desk – 804-236-3260

SAME DAY DELIVERY
1 Richard E. Byrd Terminal Drive
Richmond International Airport, VA 23250-2402
John Shoemaker, Operations Manager – 919-508-7535

SKYCAPS (see PRIME FLIGHT) 804-222-5179

SMARTE CARTE, INC.
5406 Mistyhill Road Richmond, VA 23234
Home Office: 4455 White Bear Hwy, St. Paul, MN 55110; 612-429-3614; 800-328-9006
Locally: Jonathan Holt, Cell: 804-914-0054, Home: 804-275-5254

SOUTHWEST AIRLINES CO.
1 Richard E. Byrd Terminal Drive, Suite 102
Richmond International Airport, VA 23250-2402
Shaun Harding, Station Manager – 214-218-2409
Fax: 804-663-5072;
Reservations……………………………………………………………800-435-9792

SPIT-DYE-N-SHINE SHOP (Shoe Shine)
2119 Dinwiddie Avenue, Richmond, VA 23224
Michael Leeper, Operator – 804-920-4218; 804-763-0473

STANDARD PARKING
1 Richard E. Byrd Terminal Drive, Suite 125
Richmond International Airport, VA 23250-2402
Eric Johnson, Facility Manager – 804-236-4037; Fax 804-236-4031
Customer Complaints – 804-236-4032

THRIFTY CAR RENTAL/DOLLAR
1 Richard E. Byrd Terminal Drive, Suite 111
Richmond International Airport, VA 23250
Jeff Koonce, Area Manager – jkoonce@hertz.com; 540-524-8878
Airport Counter – 1-877-283-0898

TRANSPORATION SECURITY ADMINISTRATION (TSA)
5707 Huntsman Road, Suite 200, Richmond Int’l Airport, VA 23250
Main Business Line: 804-612-5912; Business Fax: 804-226-8548
Coordination Center: 804-612-5905
Robin “Chuck” Burke, Federal Security Director – 804-612-5871
Richard Hartman, AFSD – Screening – 804-612-5872
Andrew Burton, DAFSD – Screening – 804-612-5106
Jackie Cosby, AFSD-Mission Support – 804-612-5876
Elizabeth Braswell, Stakeholder Liaison – 804-612-5883
1 Richard E. Byrd Terminal Drive, Suite 175
Richmond International Airport, VA 23250

UNITED AIRLINES, INC.
1 Richard E. Byrd Terminal Drive, Suite 117
Richmond International Airport, VA 23250-2402
Sydney Isaacson (United ground Express GM) 920-915-4887
Greg Duesenberry - DGS Station Manager – 804-418-9512 Cell
Delta Global Services (DGS)
1 Richard E. Byrd Terminal Drive, Suite 105
Richmond International Airport, VA 23250
Ryan Hall, Manager (Delta) – 804-370-0266
Supervisors: 804-484-1750

Osvaldo Gabriel, Maricela Wyand, Maureen Joyner, Rory Francisco
Jessica Wiggins, Admin – 804-484-1718
OPS 804-484-1727/1728
OPS FAX...804-484-1730
Air Freight..804-236-2827
Baggage Service..804-484-1721
Complaints 800-932-2732
Passenger Service...800-525-0280
Reservations 800-525-0280
Paging/Ticket Counter 804-484-1701

UNITED PARCEL SERVICE (UPS)
1400 Lisle Road, Richmond International Airport, VA 23250-2418
Jeff Matz – UPS Airport Properties Manager 804-222-7017; Cell 804-397-0634
Rick Witt, Gateway Manager – 804-222-7017; Cell 804-397-0634
Horace Hall Jr. AM Gateway Supervisor 804-222-7017; Cell 804-370-8828
Daniel Miller – PM Gateway Supervisor 804-222-7017; Cell 804-986-8201
Andy White – MAT AIR Division Manager 717-712-6048

U.S. CUSTOMS SERVICE
5707 Huntsman Road, Suite 104
Richmond International Airport, VA 23250-2410
Brett Marshall, Port Director – 804-226-9675 x 201
Email: brett.c.marshall@dhs.gov

UNITED SERVICES ORGANIZATION (USO)
1 Richard E. Byrd Terminal Drive, Suite 104
Richmond International Airport, VA 23250
Tricia Riggs, Center Manager – Office: 804-236-7234, Cell: 804-931-8099, tricia@usohrcv.org
Karen Lacri, COO – Karen@usohrcv.org

VIRGINIA ARMY NATIONAL GUARD
700 Portugee Road, PIN 130, Sandston, VA 23150-5050
Lt. Col. Kevin Warfield, Commander – 804-236-7301; Fax: 804-236-3520
Allen Liszeski, Building & Grounds Super. – 804-236-7324; Fax: 804-236-7382

VIRGINIA DEPARTMENT OF AVIATION
5702 Gulfstream Road, Richmond International Airport, VA 23250-2422
Randall P. Burdette, Director of Aviation – 804-236-3624; Fax: 804-236-3635
State Hangar:
Steve Harris, Director of Operations – 804-236-3639; Fax: 804-236-3643
Mike Lauranzon, Chief Pilot – 804-774-4641

VIRGINIA RACING COMMISSION
5707 Huntsman Road, Suite 201-B
Richmond International Airport, VA 23250-2410
Kimberley Mackey – 804-966-7400; FAX: 804-966-7418

Richmond International Airport

Master Plan Revision

Appendix B

Building Condition Survey

Richmond International Airport

Airport Master Plan Update

Appendix X - Building Inventory/Condition Survey

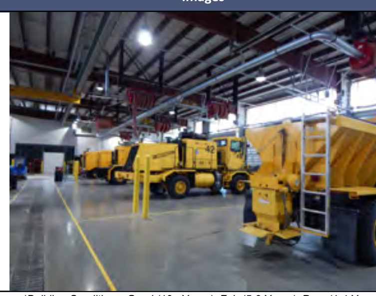
Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
102	**E5/F5**	**Snow Removal Equipment Building**	**RIC**	**RIC**

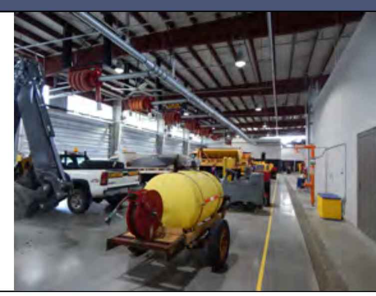
Building Description and Condition		
Square Footage (ft²)	**Building**	40,900
Height (AGL)	**Hangar/Building**	N/A
	Antenna	N/A
Building Material	**Structural**	Steel
	Roofing	Metal
HVAC	**Hangar**	No
	Storage/Office	Yes
Fire Protection	**Hangar**	Yes
	Storage/Office	Yes
Airspace Study	**Study Number**	
	Determined	
Building Condition	**Hangar**	Good
	Storage/Office	Good
Useful Life	**Useful Life (Estimated)**	10 +
	Age of Construction	approx. 5-10 yrs

Building Location

Notes	
General	It has been well maintained and should not need any major repairs for another 10 years.

Images





*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)

*Square Foot Measurments are Estimates

Richmond International Airport

Airport Master Plan Update

Appendix X - Building Inventory/Condition Survey

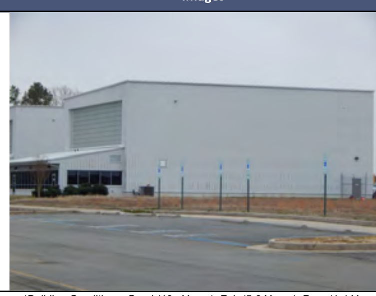
Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
103	**C6**	**East Side GA Hangars**	**RIC**	

Building Description and Condition		
Square Footage (ft²)	**Building**	8,635
Height (AGL)	**Hangar/Building**	38.41 ft
	Antenna	N/A
Building Material	**Structural**	Metal Siding
	Roofing	Metal
HVAC	**Hangar**	No
	Storage/Office	Yes
Fire Protection	**Hangar**	No
	Storage/Office	Unkown
Airspace Study	**Study Number**	
	Determined	
Building Condition	**Hangar**	Good
	Storage/Office	Good
Useful Life	**Useful Life (Estimated)**	10 +
	Age of Construction	20 +

Building Location

Notes	
General	

Images



*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)

*Square Foot Measurments are Estimates

Richmond International Airport

Airport Master Plan Update

Appendix X - Building Inventory/Condition Survey

Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
104	**C6**	**East Side GA Hangars**	**RIC**	

Building Description and Condition		
Square Footage (ft²)	**Building**	8,635
Height (AGL)	**Hangar/Building**	38.41 ft
	Antenna	N/A
Building Material	**Structural**	Metal Siding
	Roofing	Metal
HVAC	**Hangar**	No
	Storage/Office	Yes
Fire Protection	**Hangar**	No
	Storage/Office	Unkown
Airspace Study	**Study Number**	
	Determined	
Building Condition	**Hangar**	Good
	Storage/Office	Good
Useful Life	**Useful Life (Estimated)**	10 +
	Age of Construction	20 +

Building Location

Notes	
General	

Images

*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)

*Square Foot Measurments are Estimates

Richmond International Airport

Airport Master Plan Update

Appendix X - Building Inventory/Condition Survey

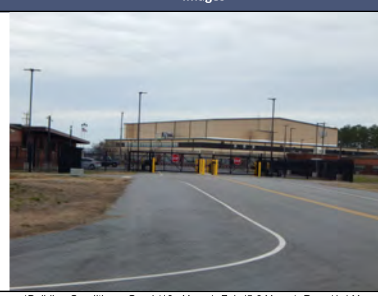
Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
116	**C7**	**Communications Facility**	**RIC**	**FBI**

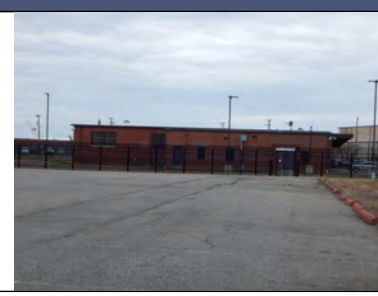
Building Description and Condition		
Square Footage (ft²)	**Building**	43,635.33
Height (AGL)	**Hangar/Building**	51.43 ft
	Antenna	
Building Material	**Structural**	Masonry/Steel
	Roofing	Membrane
HVAC	**Hangar**	no
	Storage/Office	yes
Fire Protection	**Hangar**	N/A
	Storage/Office	Unkown
Airspace Study	**Study Number**	
	Determined	
Building Condition	**Hangar**	Good
	Storage/Office	Good
Useful Life	**Useful Life (Estimated)**	10 +
	Age of Construction	50 +

Building Location

Notes	
General	

Images





*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)
*Square Foot Measurments are Estimates

Richmond International Airport

Airport Master Plan Update

Appendix X - Building Inventory/Condition Survey

Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
124	**C7**	**Reserve Forces Operational Training**	**RIC**	

Building Description and Condition		
Square Footage (ft²)	**Building**	22,918.92
Height (AGL)	**Hangar/Building**	14.87 ft
	Antenna	
Building Material	**Structural**	Masonry/Steel
	Roofing	Flat Roof
HVAC	**Hangar**	N/A
	Storage/Office	Unkown
Fire Protection	**Hangar**	N/A
	Storage/Office	Unkown
Airspace Study	**Study Number**	
	Determined	
Building Condition	**Hangar**	N/A
	Storage/Office	Good
Useful Life	**Useful Life (Estimated)**	10 +
	Age of Construction	50 +

Building Location

Notes	
General	

Images

*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)

*Square Foot Measurments are Estimates

Richmond International Airport

Airport Master Plan Update

Appendix X - Building Inventory/Condition Survey

Location and Ownership

Number	Location (Grid)	Name	Owner	Tenant
127	C7	Base Operations/U.S. Air Force Command Post	RIC	

Building Description and Condition

Square Footage (ft²)	Building	16,518.37
Height (AGL)	Hangar/Building	12.96 ft
	Antenna	
Building Material	Structural	Masonry/Steel
	Roofing	Flat roof
HVAC	Hangar	N/A
	Storage/Office	Unkown
Fire Protection	Hangar	N/A
	Storage/Office	Unkown
Airspace Study	Study Number	
	Determined	
Building Condition	Hangar	N/A
	Storage/Office	Good
Useful Life	Useful Life (Estimated)	10 +
	Age of Construction	50 +

Building Location

Notes

General	

Images

*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)

*Square Foot Measurments are Estimates

Richmond International Airport

Airport Master Plan Update

Appendix X - Building Inventory/Condition Survey

Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
176	**D7**	**Hush House**	**RIC**	

Building Description and Condition		
Square Footage (ft²)	**Building**	10,334.68
Height (AGL)	**Hangar/Building**	25.99 ft
	Antenna	
Building Material	**Structural**	Steel
	Roofing	Metal
HVAC	**Hangar**	No
	Storage/Office	N/A
Fire Protection	**Hangar**	No
	Storage/Office	No
Airspace Study	**Study Number**	
	Determined	
Building Condition	**Hangar**	Good
	Storage/Office	N/A
Useful Life	**Useful Life (Estimated)**	10+
	Age of Construction	30 +

Building Location

Notes	
General	

Images

*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)

*Square Foot Measurments are Estimates

Richmond International Airport

Airport Master Plan Update

Appendix X - Building Inventory/Condition Survey

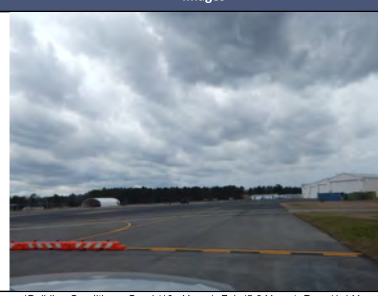
Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
200	**F6 - F7**	**Virginia Air National Guard**	**RIC**	

Building Description and Condition		
Square Footage (ft²)	**Area**	2,431,925.42
Height (AGL)	**Hangar/Building**	
	Antenna	
Building Material	**Structural**	
	Roofing	
HVAC	**Hangar**	
	Storage/Office	
Fire Protection	**Hangar**	
	Storage/Office	
Airspace Study	**Study Number**	
	Determined	
Building Condition	**Hangar**	Good
	Storage/Office	Good
Useful Life	**Useful Life (Estimated)**	
	Age of Construction	

Building Location

Notes	
General	

Images



*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)

*Square Foot Measurments are Estimates

Richmond International Airport

Airport Master Plan Update

Appendix X - Building Inventory/Condition Survey

Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
310A	**310A**	**Million Air FBO**	**RIC**	**Million Air**

Building Description and Condition			
Square Footage (ft²)	**Building**	23,414.06	**Building Location**
Height (AGL)	**Hangar/Building**	37.02 ft	
	Antenna		
Building Material	**Structural**	Metal Siding	
	Roofing	Metal	
HVAC	**Hangar**	No	
	Storage/Office	Yes	
Fire Protection	**Hangar**	No	
	Storage/Office	Unkown	
Airspace Study	**Study Number**		
	Determined		
Building Condition	**Hangar**	Good	
	Storage/Office	Good	
Useful Life	**Useful Life (Estimated)**	10 +	
	Age of Construction	50 +	

Notes

General	

Images

*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)

*Square Foot Measurments are Estimates

Richmond International Airport

Airport Master Plan Update

Appendix X - Building Inventory/Condition Survey

Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
310B	**E3**	**Million Air**	**RIC**	

Building Description and Condition			
Square Footage (ft²)	**Building**	18,228.04	**Building Location**
Height (AGL)	**Hangar/Building**	36.71 ft	
	Antenna		
Building Material	**Structural**	Metal Siding	
	Roofing	Metal	
HVAC	**Hangar**	No	
	Storage/Office	Unkown	
Fire Protection	**Hangar**	No	
	Storage/Office	Unkown	
Airspace Study	**Study Number**		
	Determined		
Building Condition	**Hangar**	Good	
	Storage/Office	Good	
Useful Life	**Useful Life (Estimated)**	10 +	
	Age of Construction	50 +	

Notes	
General	

Images

*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)

*Square Foot Measurments are Estimates

Richmond International Airport

Airport Master Plan Update

Appendix X - Building Inventory/Condition Survey

Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
310C	**E3**	**Million Air**	**RIC**	

Building Description and Condition			
Square Footage (ft²)	**Building**	29,346.59	**Building Location**
Height (AGL)	**Hangar/Building**	42.64 ft	
	Antenna		
Building Material	**Structural**	Metal Siding	
	Roofing	Metal	
HVAC	**Hangar**	No	
	Storage/Office	Unkown	
Fire Protection	**Hangar**	No	
	Storage/Office	Unkown	
Airspace Study	**Study Number**		
	Determined		
Building Condition	**Hangar**	Good	
	Storage/Office	Good	
Useful Life	**Useful Life (Estimated)**	10 +	
	Age of Construction	50 +	

Notes	
General	

Images

*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)

*Square Foot Measurments are Estimates

Richmond International Airport

Airport Master Plan Update

Appendix X - Building Inventory/Condition Survey

Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
313	**E4**	**Aircraft Maintenance Facility (Trans State Airlines)**	**RIC**	**Trans State Airlines**

Building Description and Condition			
Square Footage (ft²)	**Building**	31,355.78	**Building Location**
Height (AGL)	**Hangar/Building**	43.31 ft	
	Antenna		
Building Material	**Structural**	Metal Siding	
	Roofing	Metal	
HVAC	**Hangar**	No	
	Storage/Office	Unkown	
Fire Protection	**Hangar**	No	
	Storage/Office	Unkown	
Airspace Study	**Study Number**		
	Determined		
Building Condition	**Hangar**	Good	
	Storage/Office	Good	
Useful Life	**Useful Life (Estimated)**	10 +	
	Age of Construction	50 +	

Notes	
General	

Images

*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)

*Square Foot Measurments are Estimates

Richmond International Airport

Airport Master Plan Update

Appendix X - Building Inventory/Condition Survey

<table>
<tr><th colspan="5">Location and Ownership</th></tr>
<tr><th>Number</th><th>Location (Grid)</th><th>Name</th><th>Owner</th><th>Tenant</th></tr>
<tr><td>317</td><td>D3/D4</td><td>Air Cargo Building #1 (Cargex)</td><td></td><td>Cargex</td></tr>
</table>

<table>
<tr><th colspan="4">Building Description and Condition</th></tr>
<tr><td>Square Footage (ft²)</td><td>Building</td><td>31,981.43</td><td>Building Location</td></tr>
<tr><td rowspan="2">Height (AGL)</td><td>Hangar/Building</td><td>19.15 ft</td><td rowspan="14"></td></tr>
<tr><td>Antenna</td><td></td></tr>
<tr><td rowspan="2">Building Material</td><td>Structural</td><td>Metal Siding</td></tr>
<tr><td>Roofing</td><td>Membrane</td></tr>
<tr><td rowspan="2">HVAC</td><td>Hangar</td><td>N/A</td></tr>
<tr><td>Storage/Office</td><td>Unkown</td></tr>
<tr><td rowspan="2">Fire Protection</td><td>Hangar</td><td>N/A</td></tr>
<tr><td>Storage/Office</td><td>Unkown</td></tr>
<tr><td rowspan="2">Airspace Study</td><td>Study Number</td><td></td></tr>
<tr><td>Determined</td><td></td></tr>
<tr><td rowspan="2">Building Condition</td><td>Hangar</td><td>N/A</td></tr>
<tr><td>Storage/Office</td><td>Fair</td></tr>
<tr><td rowspan="2">Useful Life</td><td>Useful Life (Estimated)</td><td>5 - 9</td></tr>
<tr><td>Age of Construction</td><td>50 +</td></tr>
</table>

<table>
<tr><th colspan="2">Notes</th></tr>
<tr><td>General</td><td></td></tr>
</table>

Images

*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)

*Square Foot Measurments are Estimates

Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
318	**D3**	**Air Cargo Building #2 (Airbourne)**	**RIC**	**Airbourne**

Building Description and Condition		
Square Footage (ft²)	**Building**	30,388.88
Height (AGL)	**Hangar/Building**	23.04 ft
	Antenna	
Building Material	**Structural**	Metal Siding
	Roofing	Metal
HVAC	**Hangar**	N/A
	Storage/Office	Yes
Fire Protection	**Hangar**	N/A
	Storage/Office	Unkown
Airspace Study	**Study Number**	
	Determined	
Building Condition	**Hangar**	N/A
	Storage/Office	Fair
Useful Life	**Useful Life (Estimated)**	5 - 9
	Age of Construction	50 +

Building Location

Notes	
General	

Images

*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)
*Square Foot Measurments are Estimates

Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
319	**D3**	**Air Cargo Building #3 (U.S.P.S)**	**RIC**	**U.S.P.S**

Building Description and Condition			
Square Footage (ft²)	**Building**	10,422.43	**Building Location**
Height (AGL)	**Hangar/Building**	19.51 ft	
	Antenna		
Building Material	**Structural**	Metal Siding	
	Roofing	Metal	
HVAC	**Hangar**	N/A	
	Storage/Office	Yes	
Fire Protection	**Hangar**	N/A	
	Storage/Office	Unkown	
Airspace Study	**Study Number**		
	Determined		
Building Condition	**Hangar**	N/A	
	Storage/Office	Fair	
Useful Life	**Useful Life (Estimated)**	5 - 9	
	Age of Construction		

Notes	
General	

Images

*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)
*Square Foot Measurments are Estimates

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Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
320	**D3**	**Air Cargo/Maintenance Facility #4 (Continental)**	**RIC**	**Continental**

Building Description and Condition		
Square Footage (ft²)	**Building**	25,700
Height (AGL)	**Hangar/Building**	43.78 ft
	Antenna	
Building Material	**Structural**	Metal Siding
	Roofing	Metal
HVAC	**Hangar**	N/A
	Storage/Office	Yes
Fire Protection	**Hangar**	N/A
	Storage/Office	Unkown
Airspace Study	**Study Number**	
	Determined	
Building Condition	**Hangar**	N/A
	Storage/Office	Good
Useful Life	**Useful Life (Estimated)**	10 +
	Age of Construction	50 +

Building Location

Notes	
General	

Images

*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)

*Square Foot Measurments are Estimates

Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
324	**D3**	**Air Cargo Building #5**		

Building Description and Condition		
Square Footage (ft²)	**Building**	16,364.74
Height (AGL)	**Hangar/Building**	25.84 ft
	Antenna	
Building Material	**Structural**	Metal Siding
	Roofing	Metal
HVAC	**Hangar**	N/A
	Storage/Office	Yes
Fire Protection	**Hangar**	N/A
	Storage/Office	Unkown
Airspace Study	**Study Number**	
	Determined	
Building Condition	**Hangar**	N/A
	Storage/Office	Good
Useful Life	**Useful Life (Estimated)**	10 +
	Age of Construction	25 +

Building Location

Notes	
General	

Images

*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)
*Square Foot Measurments are Estimates

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Appendix X - Building Inventory/Condition Survey

Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
325	**D3**	**Air Cargo Building #6**		

Building Description and Condition			
Square Footage (ft²)	**Building**	51,687.88	**Building Location**
Height (AGL)	**Hangar/Building**	30.58 ft	
	Antenna		
Building Material	**Structural**	Metal Siding	
	Roofing	Metal	
HVAC	**Hangar**	N/A	
	Storage/Office	Yes	
Fire Protection	**Hangar**	N/A	
	Storage/Office	Unkown	
Airspace Study	**Study Number**		
	Determined		
Building Condition	**Hangar**	N/A	
	Storage/Office	Good	
Useful Life	**Useful Life (Estimated)**	10 +	
	Age of Construction	25 +	

Notes	
General	

Images

*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)

*Square Foot Measurments are Estimates

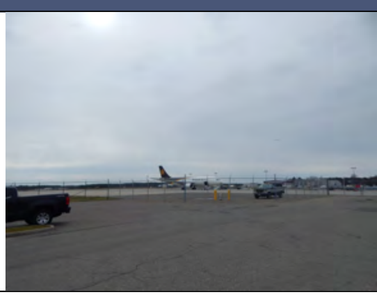
Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
327	**D3/E3**	**Air Cargo Building (U.S.P.S)**		

Building Description and Condition		
Square Footage (ft²)	**Building**	9,742.04
Height (AGL)	**Hangar/Building**	24.81 ft
	Antenna	
Building Material	**Structural**	Metal Siding
	Roofing	Metal
HVAC	**Hangar**	N/A
	Storage/Office	Yes
Fire Protection	**Hangar**	N/A
	Storage/Office	Unkown
Airspace Study	**Study Number**	
	Determined	
Building Condition	**Hangar**	N/A
	Storage/Office	Fair
Useful Life	**Useful Life (Estimated)**	5 - 9
	Age of Construction	25 +

Building Location

Notes	
General	

Images



*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)
*Square Foot Measurments are Estimates

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Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
329	**E3/E4**	**GSE Building**	**RIC**	

Building Description and Condition			
Square Footage (ft²)	**Building**		**Building Location**
Height (AGL)	**Hangar/Building**	26.63 ft	
	Antenna		
Building Material	**Structural**	Steel	
	Roofing	Metal	
HVAC	**Hangar**	N/A	
	Storage/Office	Unkown	
Fire Protection	**Hangar**	N/A	
	Storage/Office	Unkown	
Airspace Study	**Study Number**		
	Determined		
Building Condition	**Hangar**	N/A	
	Storage/Office	Good	
Useful Life	**Useful Life (Estimated)**	10 +	
	Age of Construction	20 +	

Notes	
General	

Images

*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)
*Square Foot Measurments are Estimates

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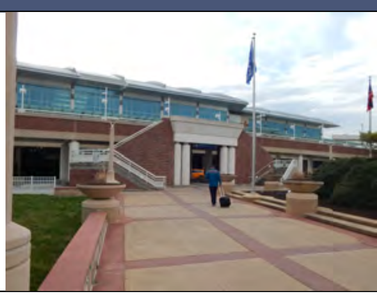
Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
407	**C4**	**Passenger Terminal**	**RIC**	**Multiple**

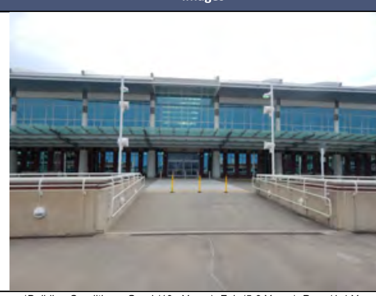
Building Description and Condition		
Square Footage (ft²)	**Building**	243,885.79
Height (AGL)	**Hangar/Building**	43.42 ft
	Antenna	
Building Material	**Structural**	Masonry/Steel
	Roofing	Flat Roof
HVAC	**Hangar**	N/A
	Storage/Office	Yes
Fire Protection	**Hangar**	N/A
	Storage/Office	Yes
Airspace Study	**Study Number**	
	Determined	
Building Condition	**Hangar**	N/A
	Storage/Office	Good
Useful Life	**Useful Life (Estimated)**	10 +
	Age of Construction	15 +

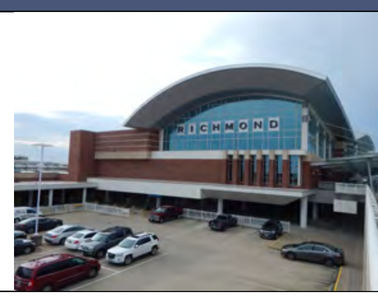
Building Location

Notes	
General	

Images







*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)

*Square Foot Measurments are Estimates

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Appendix X - Building Inventory/Condition Survey

Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
407A	**C4**	**Passenger Terminal - Concourse "A"**	**RIC**	**Mulitple**

Building Description and Condition			
Square Footage (ft²)	**Building**	42,996.68	**Building Location**
Height (AGL)	**Hangar/Building**	43.42 ft	
	Antenna		
Building Material	**Structural**	Masonry/Steel	
	Roofing	Flat Roof	
HVAC	**Hangar**	N/A	
	Storage/Office	Yes	
Fire Protection	**Hangar**	N/A	
	Storage/Office	Yes	
Airspace Study	**Study Number**		
	Determined		
Building Condition	**Hangar**	N/A	
	Storage/Office	Good	
Useful Life	**Useful Life (Estimated)**	10 +	
	Age of Construction	10 + & Under Construction	

Notes	
General	Additional gates are under consruction and will be completed in 2020

Images

*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)

*Square Foot Measurments are Estimates

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Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
407B	**C4/D4**	**Passenger Terminal - Concourse "B"**	**RIC**	**Muliple**

Building Description and Condition			
Square Footage (ft²)	**Building**	85,560.78	**Building Location**
Height (AGL)	**Hangar/Building**	43.42	
	Antenna		
Building Material	**Structural**	Masonry/Steel	
	Roofing	Flat Roof	
HVAC	**Hangar**	N/A	
	Storage/Office	Yes	
Fire Protection	**Hangar**	N/A	
	Storage/Office	Yes	
Airspace Study	**Study Number**		
	Determined		
Building Condition	**Hangar**	N/A	
	Storage/Office	Good	
Useful Life	**Useful Life (Estimated)**	10 +	
	Age of Construction	10 +	

Notes	
General	

Images

*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)

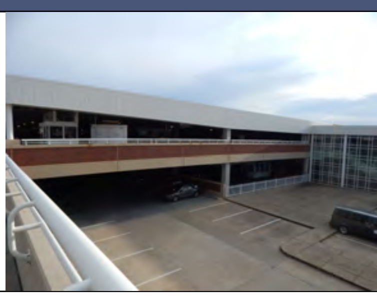
*Square Foot Measurments are Estimates

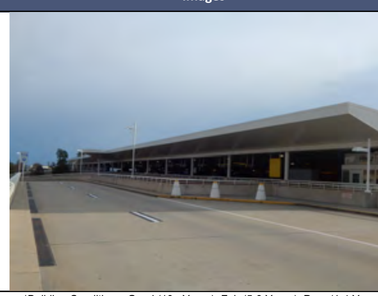
Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
429	**C4**	**Rental Car Service**	**RIC**	**Multiple**

Building Description and Condition			
Square Footage (ft²)	**Building**	93,696.93	**Building Location**
Height (AGL)	**Hangar/Building**	43.42 ft	
	Antenna		
Building Material	**Structural**	Concrete	
	Roofing	N/A	
HVAC	**Hangar**	N/A	
	Storage/Office	N/A	
Fire Protection	**Hangar**	N/A	
	Storage/Office	N/A	
Airspace Study	**Study Number**		
	Determined		
Building Condition	**Hangar**	N/A	
	Storage/Office	Good	
Useful Life	**Useful Life (Estimated)**	10 +	
	Age of Construction	10 +	

Notes	
General	

Images





*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)
*Square Foot Measurments are Estimates

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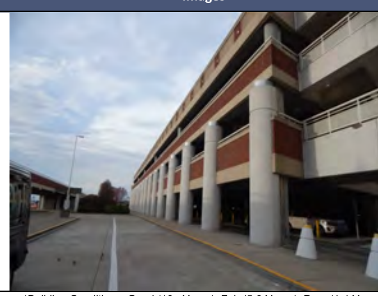
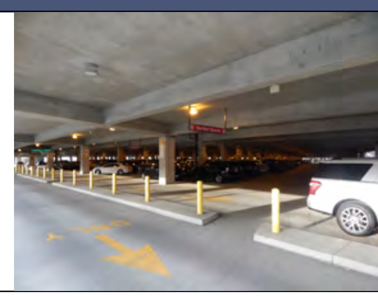
Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
431A	C3/D3	Parking Garage - South	RIC	RIC

Building Description and Condition			
Square Footage (ft²)	**Building**	145,791.97	**Building Location**
Height (AGL)	**Hangar/Building**	61.30 ft	
	Antenna		
Building Material	**Structural**	Concrete	
	Roofing	Parking	
HVAC	**Hangar**	N/A	
	Storage/Office	N/A	
Fire Protection	**Hangar**	N/A	
	Storage/Office	N/A	
Airspace Study	**Study Number**		
	Determined		
Building Condition	**Hangar**	N/A	
	Storage/Office	Good	
Useful Life	**Useful Life (Estimated)**	10 +	
	Age of Construction	10 +	

Notes	
General	

Images





*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)

*Square Foot Measurments are Estimates

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Appendix X - Building Inventory/Condition Survey

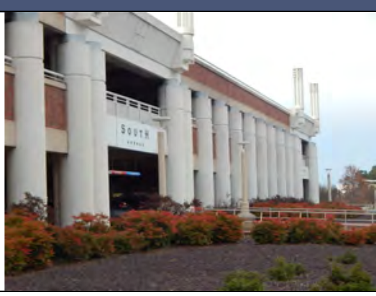
Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
431B	**C3**	**Parking Garage - South Central**	**RIC**	**RIC**

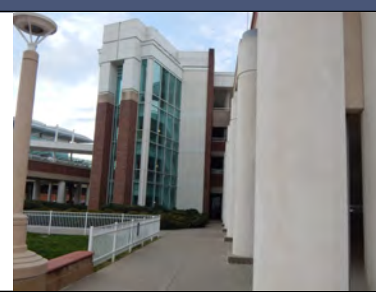
Building Description and Condition		
Square Footage (ft²)	**Building**	107,436.64
Height (AGL)	**Hangar/Building**	61.30 ft
	Antenna	
Building Material	**Structural**	Concrete
	Roofing	Parking
HVAC	**Hangar**	N/A
	Storage/Office	N/A
Fire Protection	**Hangar**	N/A
	Storage/Office	N/A
Airspace Study	**Study Number**	
	Determined	
Building Condition	**Hangar**	N/A
	Storage/Office	Good
Useful Life	**Useful Life (Estimated)**	10 +
	Age of Construction	10 +

Building Location

Notes	
General	

Images





*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)

*Square Foot Measurments are Estimates

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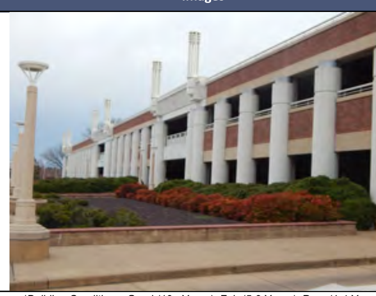
Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
431C	**C3/C4**	**Parking Garage - North Central**	**RIC**	**RIC**

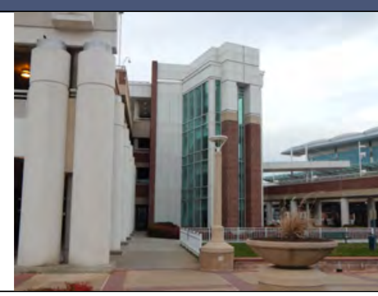
Building Description and Condition		
Square Footage (ft²)	**Building**	107,062.66
Height (AGL)	**Hangar/Building**	54.61 ft
	Antenna	
Building Material	**Structural**	Concrete
	Roofing	Parking
HVAC	**Hangar**	N/A
	Storage/Office	N/A
Fire Protection	**Hangar**	N/A
	Storage/Office	N/A
Airspace Study	**Study Number**	
	Determined	
Building Condition	**Hangar**	N/A
	Storage/Office	Good
Useful Life	**Useful Life (Estimated)**	10 +
	Age of Construction	10 +

Building Location

Notes	
General	

Images





*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)

*Square Foot Measurments are Estimates

Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
431D	C3/C4	Parking Garage - North	RIC	RIC

Building Description and Condition

Square Footage (ft²)	**Building**	209,439.80
Height (AGL)	**Hangar/Building**	54.61 ft
	Antenna	
Building Material	**Structural**	Concrete
	Roofing	Parking
HVAC	**Hangar**	N/A
	Storage/Office	N/A
Fire Protection	**Hangar**	N/A
	Storage/Office	N/A
Airspace Study	**Study Number**	
	Determined	
Building Condition	**Hangar**	N/A
	Storage/Office	Good
Useful Life	**Useful Life (Estimated)**	10 +
	Age of Construction	10 +

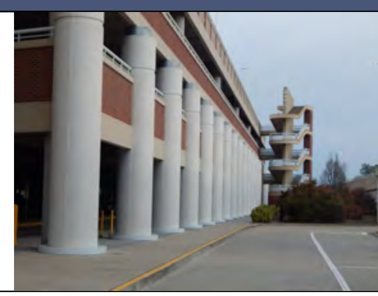
Building Location

Notes

General	

Images





*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)
*Square Foot Measurments are Estimates

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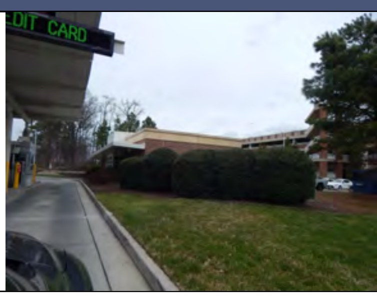
Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
432	**C3**	**Parking Service Adminstration**	**RIC**	**RIC**

Building Description and Condition			
Square Footage (ft²)	**Building**	14,289.44	**Building Location**
Height (AGL)	**Hangar/Building**	20.51 ft	
	Antenna		
Building Material	**Structural**	Masonry	
	Roofing	Flat Roof	
HVAC	**Hangar**	N/A	
	Storage/Office	Yes	
Fire Protection	**Hangar**	N/A	
	Storage/Office	Yes	
Airspace Study	**Study Number**		
	Determined		
Building Condition	**Hangar**	N/A	
	Storage/Office	Good	
Useful Life	**Useful Life (Estimated)**	10 +	
	Age of Construction	10 +	

Notes	
General	

Images



*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)

*Square Foot Measurments are Estimates

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Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
502	**B4**	**Richmond Jet Center**	**RIC**	**RIC**

Building Description and Condition			
Square Footage (ft²)	**Building**	57,393.47	**Building Location**
Height (AGL)	**Hangar/Building**	34.98	
	Antenna		
Building Material	**Structural**	Masonry/Steel	
	Roofing	Metal	
HVAC	**Hangar**	No	
	Storage/Office	Yes	
Fire Protection	**Hangar**	No	
	Storage/Office	Unkown	
Airspace Study	**Study Number**		
	Determined		
Building Condition	**Hangar**	Good	
	Storage/Office	Good	
Useful Life	**Useful Life (Estimated)**	10 +	
	Age of Construction	10 +	

Notes	
General	

Images

*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)

*Square Foot Measurments are Estimates

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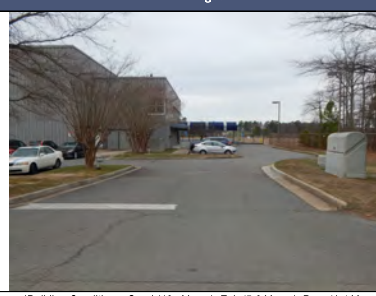
Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
503	**B4**	**CSX Hangar**	**RIC**	**CSX**

Building Description and Condition			
Square Footage (ft²)	**Building**	22,112.78	**Building Location**
Height (AGL)	**Hangar/Building**	36.03 ft	
	Antenna		
Building Material	**Structural**	Steel	
	Roofing	Metal	
HVAC	**Hangar**	No	
	Storage/Office	Yes	
Fire Protection	**Hangar**	Unkown	
	Storage/Office	Unkown	
Airspace Study	**Study Number**		
	Determined		
Building Condition	**Hangar**	Good	
	Storage/Office	Good	
Useful Life	**Useful Life (Estimated)**	10 +	
	Age of Construction	10 +	

Notes	
General	

Images



*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)

*Square Foot Measurments are Estimates

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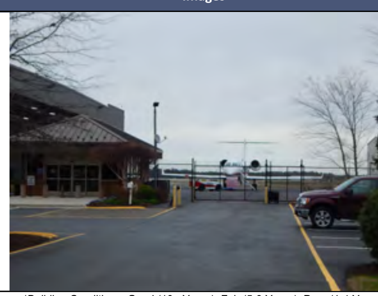
Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
504	**B4**	**Phillip Morris Hangar**	**RIC**	**Phillip Morris**

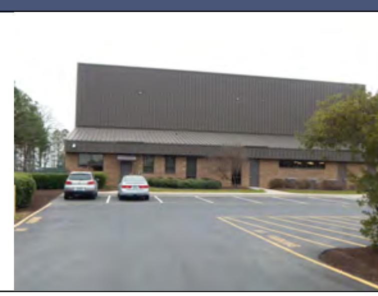
Building Description and Condition		
Square Footage (ft²)	**Building**	39,226.23
Height (AGL)	**Hangar/Building**	47.81 ft
	Antenna	
Building Material	**Structural**	Masonry/Steel
	Roofing	Metal
HVAC	**Hangar**	No
	Storage/Office	Yes
Fire Protection	**Hangar**	No
	Storage/Office	Unkown
Airspace Study	**Study Number**	
	Determined	
Building Condition	**Hangar**	Good
	Storage/Office	Good
Useful Life	**Useful Life (Estimated)**	10 +
	Age of Construction	10 +

Building Location

Notes	
General	

Images





*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)

*Square Foot Measurments are Estimates

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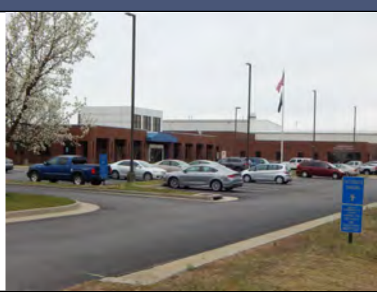
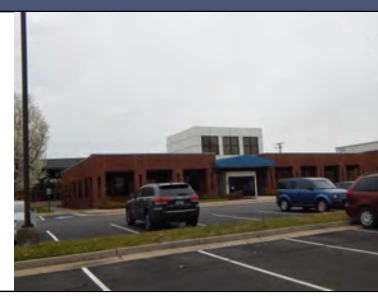
Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
505A	**B4**	**Commonwealth of Virginia Hangar**	**RIC**	**State of Virginia**

Building Description and Condition			
Square Footage (ft²)	**Building**	12,500	**Building Location**
Height (AGL)	**Hangar/Building**	31.84 ft	
	Antenna		
Building Material	**Structural**	Masonry	
	Roofing	Flat Roof	
HVAC	**Hangar**	N/A	
	Storage/Office	Yes	
Fire Protection	**Hangar**	N/A	
	Storage/Office	Unkown	
Airspace Study	**Study Number**		
	Determined		
Building Condition	**Hangar**	Good	
	Storage/Office	Good	
Useful Life	**Useful Life (Estimated)**	10 +	
	Age of Construction	15 +	

Notes	
General	

Images





*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)

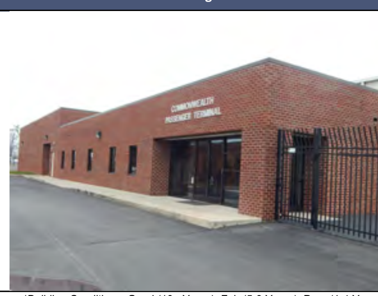
*Square Foot Measurments are Estimates

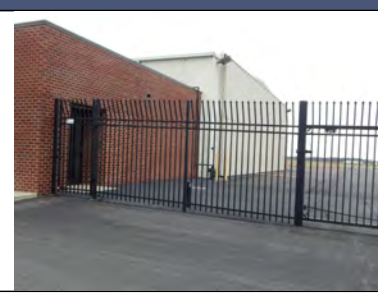
Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
505B	**B4**	**Commonwealth of Virginia Office**	**RIC**	**State of Virginia**

Building Description and Condition			
Square Footage (ft²)	**Building**	8,000	**Building Location**
Height (AGL)	**Hangar/Building**	24.49 ft	
	Antenna		
Building Material	**Structural**	Masonry/Steel	
	Roofing	Flat and Metal Roofs	
HVAC	**Hangar**	No	
	Storage/Office	Yes	
Fire Protection	**Hangar**	No	
	Storage/Office	Unkown	
Airspace Study	**Study Number**		
	Determined		
Building Condition	**Hangar**	N/A	
	Storage/Office	Good	
Useful Life	**Useful Life (Estimated)**	10 +	
	Age of Construction	15 +	

Notes	
General	

Images





*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)
*Square Foot Measurments are Estimates

Richmond International Airport

Airport Master Plan Update

Appendix X - Building Inventory/Condition Survey

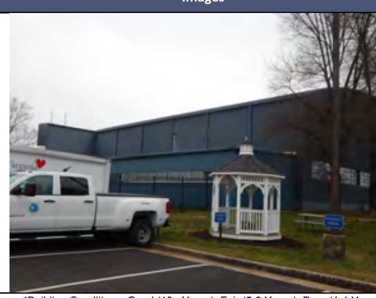
Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
506	**C4**	**Dominion Resources**	**RIC**	**Dominion**

Lease Information			
Lease Type	**Lease Terms**	**Rental Rate**	**Annual Rent**

Building Description and Condition			
Square Footage (ft^2)	**Building**	20,245.57	**Building Location**
Height (AGL)	**Hangar/Building**	47.06 ft	
	Antenna		
Building Material	**Structural**	Steel	
	Roofing	Metal	
HVAC	**Hangar**	No	
	Storage/Office	Yes	
Fire Protection	**Hangar**	No	
	Storage/Office	Unkown	
Airspace Study	**Study Number**		
	Determined		
Building Condition	**Hangar**	Good	
	Storage/Office	Good	
Useful Life	**Useful Life (Estimated)**	10 +	
	Age of Construction	40 +	

Notes	
General	

Images



*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)

*Square Foot Measurments are Estimates

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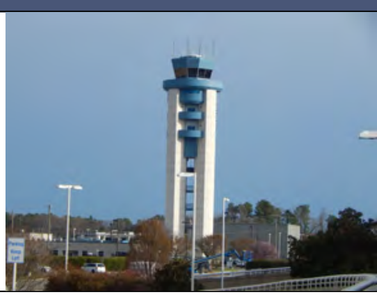
Appendix X - Building Inventory/Condition Survey

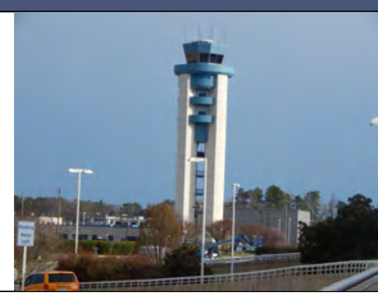
Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
507A	**B4**	**FAA Air Traffic Control Tower**		**FAA**

Building Description and Condition			
Square Footage (ft²)	**Building**	17,252.72	**Building Location**
Height (AGL)	**Hangar/Building**	171.85 ft	
	Antenna		
Building Material	**Structural**	Cement	
	Roofing	Metal	
HVAC	**Hangar**	N/A	
	Storage/Office	Yes	
Fire Protection	**Hangar**	N/A	
	Storage/Office	Yes	
Airspace Study	**Study Number**		
	Determined		
Building Condition	**Hangar**	N/A	
	Storage/Office	Good	
Useful Life	**Useful Life (Estimated)**	10 +	
	Age of Construction		

Notes	
General	

Images





*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)
*Square Foot Measurments are Estimates

Richmond International Airport

Airport Master Plan Update

Appendix X - Building Inventory/Condition Survey

Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
507B	**B4**	**FAA Air Traffic Control Tower Support Facility**		**FAA**

Building Description and Condition			
Square Footage (ft^2)	**Building**	10,351.51	**Building Location**
Height (AGL)	**Hangar/Building**	21.91 ft	
	Antenna		
Building Material	**Structural**		
	Roofing		
HVAC	**Hangar**	N/A	
	Storage/Office	Yes	
Fire Protection	**Hangar**	N/A	
	Storage/Office	Yes	
Airspace Study	**Study Number**		
	Determined		
Building Condition	**Hangar**	N/A	
	Storage/Office		
Useful Life	**Useful Life (Estimated)**	10+	
	Age of Construction		

Notes	
General	

Images

*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)

*Square Foot Measurments are Estimates

Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
512		**Ethyl Hangar (To be Removed)**		**Ethyl**

Building Description and Condition		
Square Footage (ft²)	**Building**	9,570.23
Height (AGL)	**Hangar/Building**	28.80 ft
	Antenna	
Building Material	**Structural**	Metal
	Roofing	Metal
HVAC	**Hangar**	No
	Storage/Office	Yes
Fire Protection	**Hangar**	No
	Storage/Office	N/A
Airspace Study	**Study Number**	
	Determined	
Building Condition	**Hangar**	Fair
	Storage/Office	Fair
Useful Life	**Useful Life (Estimated)**	5 - 9
	Age of Construction	

Building Location

Notes	
Structural	
Interior	
Exterior	
Ground	
Slab	
General	

Images

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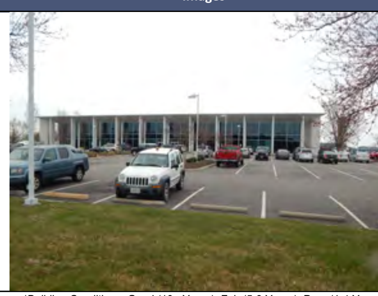
Appendix X - Building Inventory/Condition Survey

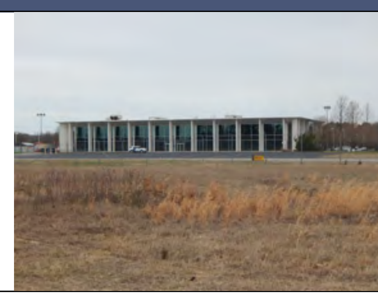
Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
516	**B4**	**Ivor/Massey Administration Building**	**RIC**	**Muliple**

Building Description and Condition			
Square Footage (ft²)	**Building**	28,445.79	**Building Location**
Height (AGL)	**Hangar/Building**	32.83 ft	
	Antenna		
Building Material	**Structural**	Steel/Glass	
	Roofing	Flat Roof	
HVAC	**Hangar**	N/A	
	Storage/Office	Yes	
Fire Protection	**Hangar**	N/A	
	Storage/Office	Yes	
Airspace Study	**Study Number**		
	Determined		
Building Condition	**Hangar**	N/A	
	Storage/Office	Good	
Useful Life	**Useful Life (Estimated)**	10 +	
	Age of Construction	15 +	

Notes	
General	

Images





*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)

*Square Foot Measurments are Estimates

Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
521	**B4**	**Henrico Police Aviation Unit**	**RIC**	**Henrico Police**

Building Description and Condition			
Square Footage (ft²)	**Building**	6,834.87	**Building Location**
Height (AGL)	**Hangar/Building**	24.11 ft	
	Antenna		
Building Material	**Structural**	Brick and Cement	
	Roofing		
HVAC	**Hangar**	N/A	
	Storage/Office	Unkown	
Fire Protection	**Hangar**	N/A	
	Storage/Office	Unkown	
Airspace Study	**Study Number**		
	Determined		
Building Condition	**Hangar**	N/A	
	Storage/Office	Good	
Useful Life	**Useful Life (Estimated)**	10 +	
	Age of Construction	20 +	

Notes	
General	

Images

*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)
*Square Foot Measurments are Estimates

Richmond International Airport

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Appendix X - Building Inventory/Condition Survey

Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
522	**B4**	**Martinair/Helo**	**RIC**	

Building Description and Condition		
Square Footage (ft²)	**Building**	26,145.20
Height (AGL)	**Hangar/Building**	36.16 ft
	Antenna	
Building Material	**Structural**	Cement and Metal
	Roofing	
HVAC	**Hangar**	No
	Storage/Office	Yes
Fire Protection	**Hangar**	No
	Storage/Office	Unkown
Airspace Study	**Study Number**	
	Determined	
Building Condition	**Hangar**	Good
	Storage/Office	Good
Useful Life	**Useful Life (Estimated)**	10 +
	Age of Construction	20 +

Building Location

Notes	
General	

Images

*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)

*Square Foot Measurments are Estimates

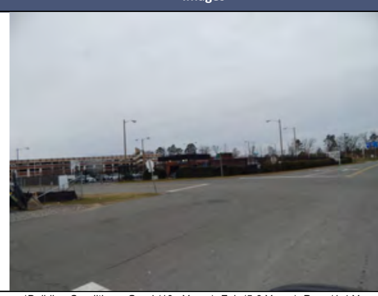
Richmond International Airport
Airport Master Plan Update
Appendix X - Building Inventory/Condition Survey

Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
523	**C4**	**National/Alamo Rental Car Service**	**RIC**	**National**

Building Description and Condition			
Square Footage (ft²)	**Building**	6,597.68	**Building Location**
Height (AGL)	**Hangar/Building**	13.15 ft	
	Antenna		
Building Material	**Structural**	Masonry	
	Roofing	Flat Roof	
HVAC	**Hangar**	N/A	
	Storage/Office	Yes	
Fire Protection	**Hangar**	N/A	
	Storage/Office	Unkown	
Airspace Study	**Study Number**		
	Determined		
Building Condition	**Hangar**	N/A	
	Storage/Office	Fair	
Useful Life	**Useful Life (Estimated)**	5	
	Age of Construction	40 +	

Notes	
General	

Images



*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)
*Square Foot Measurments are Estimates

Richmond International Airport

Airport Master Plan Update

Appendix X - Building Inventory/Condition Survey

Location and Ownership

Number	Location (Grid)	Name	Owner	Tenant
530	B4	Hertz Rental Car Service	RIC	Hertz

Building Description and Condition

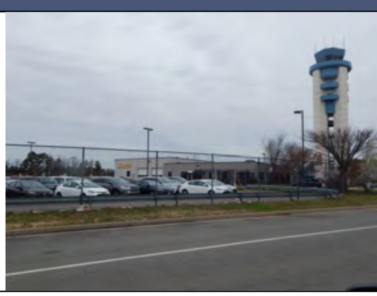
Square Footage (ft^2)	Building	10,429.81
Height (AGL)	Hangar/Building	13.96 ft
	Antenna	
Building Material	Structural	Masonry/Steel
	Roofing	Metal
HVAC	Hangar	N/A
	Storage/Office	Yes
Fire Protection	Hangar	N/A
	Storage/Office	Unkown
Airspace Study	Study Number	
	Determined	
Building Condition	Hangar	N/A
	Storage/Office	Good
Useful Life	Useful Life (Estimated)	10 +
	Age of Construction	5 +

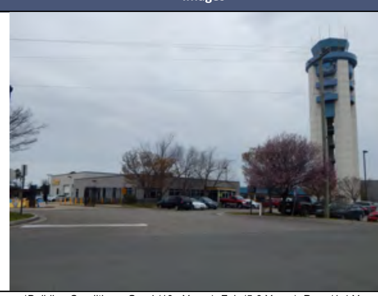
Building Location

Notes

General	

Images





*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)

*Square Foot Measurments are Estimates

Richmond International Airport

Airport Master Plan Update

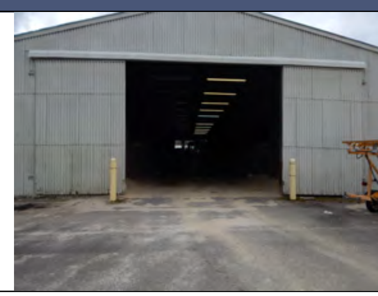
Appendix X - Building Inventory/Condition Survey

Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
615A	**F5**	**Airport Maintenance Facility**	**RIC**	**RIC**

Building Description and Condition			
Square Footage (ft²)	**Building**	8,700	**Building Location**
Height (AGL)	**Hangar/Building**	24.20 ft	
	Antenna	N/A	
Building Material	**Structural**	Metal Siding	
	Roofing	Metal	
HVAC	**Hangar**	No	
	Storage/Office	No	
Fire Protection	**Hangar**	N/A	
	Storage/Office	N/A	
Airspace Study	**Study Number**		
	Determined		
Building Condition	**Hangar**	Fair	
	Storage/Office	N/A	
Useful Life	**Useful Life (Estimated)**	1 -5	
	Age of Construction	30 +	

Notes	
General	

Images



*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)

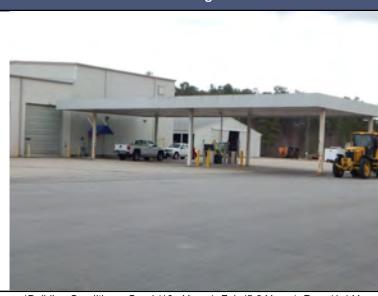
*Square Foot Measurments are Estimates

Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
615B	**F5**	**Snow Facility**	**RIC**	**RIC**

Building Description and Condition			
Square Footage (ft²)		15,730	**Building Location**
Height (AGL)	**Hangar/Building**	33.82 ft	
	Antenna	N/A	
Building Material	**Structural**	Metal Siding	
	Roofing	Metal	
HVAC	**Hangar**	No	
	Storage/Office	Yes	
Fire Protection	**Hangar**	No	
	Storage/Office	Yes	
Airspace Study	**Study Number**		
	Determined		
Building Condition	**Hangar**	Good	
	Storage/Office	Good	
Useful Life	**Useful Life (Estimated)**	10 +	
	Age of Construction	5 +	

Notes	
General	

Images



*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)
*Square Foot Measurments are Estimates

Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
615C	E5/F5	Airport Maintenance Facility	RIC	RIC

Building Description and Condition		
Square Footage (ft²)	**Building**	12,050
Height (AGL)	**Hangar/Building**	20.86 ft
	Antenna	N/A
Building Material	**Structural**	Metal Siding
	Roofing	Metal
HVAC	**Hangar**	No
	Storage/Office	N/A
Fire Protection	**Hangar**	No
	Storage/Office	N/A
Airspace Study	**Study Number**	
	Determined	
Building Condition	**Hangar**	Good
	Storage/Office	N/A
Useful Life	**Useful Life (Estimated)**	10 +
	Age of Construction	5 +

Building Location

Notes	
General	

Images

*Building Conditions: Good (10+ Years); Fair (5-9 Years); Poor (1-4 Years)
*Square Foot Measurments are Estimates

Richmond International Airport

Airport Master Plan Update

Appendix X - Building Inventory/Condition Survey

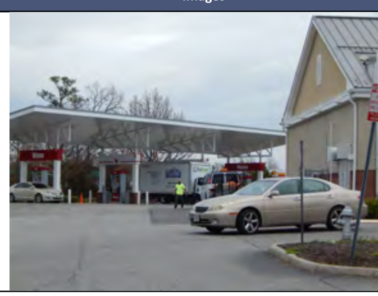
Location and Ownership				
Number	**Location (Grid)**	**Name**	**Owner**	**Tenant**
616	**A4**	**Wawa Gas Station**	**RIC**	**WAWA**

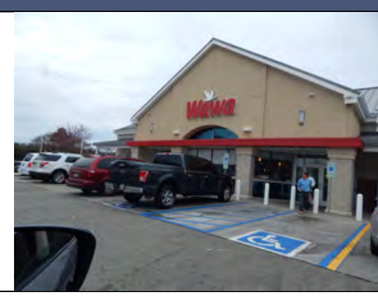
Building Description and Condition		
Square Footage (ft²)	**Area**	58,764.37
Height (AGL)	**Hangar/Building**	N/A
	Antenna	
Building Material	**Structural**	Concrete
	Roofing	Metal
HVAC	**Hangar**	N/A
	Storage/Office	Yes
Fire Protection	**Hangar**	N/A
	Storage/Office	Yes
Airspace Study	**Study Number**	
	Determined	
Building Condition	**Hangar**	N/A
	Storage/Office	Good
Useful Life	**Useful Life (Estimated)**	10 +
	Age of Construction	5 +

Building Location

Notes	
General	

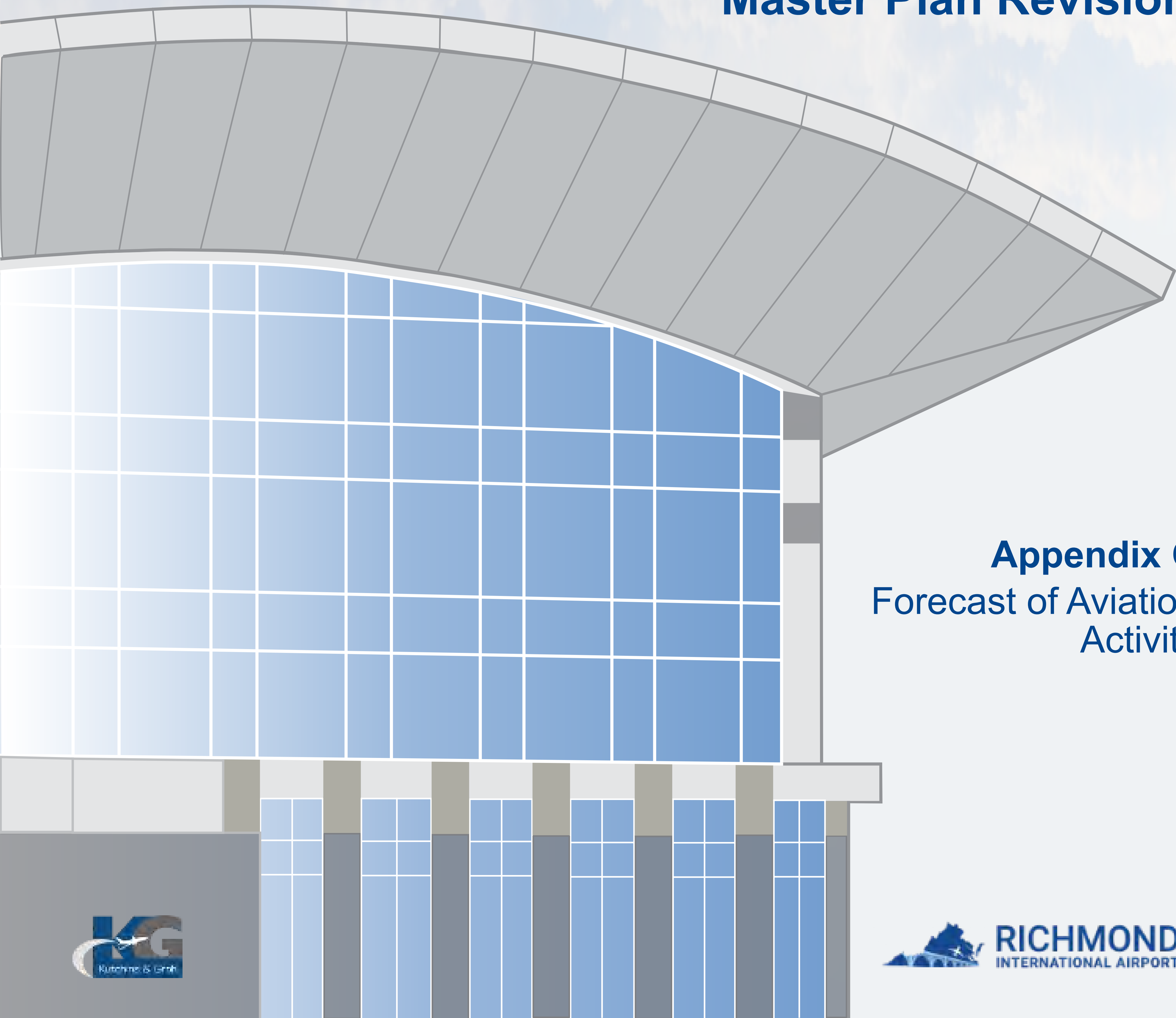
Images





Richmond International Airport

Master Plan Revision



Appendix C

Forecast of Aviation Activity

To:	John Rutledge, Director, Planning and Engineering Richmond International Airport
From:	Kutchins & Groh
Date:	May 1, 2020
Re:	Richmond International Airport Runway Length Analysis

Memorandum

This memorandum presents the assumptions used for and the results of runway length analyses prepared for Richmond International Airport's Runway 16/34. The purpose of the analysis was to review and validate runway length requirements for incorporation into the Airport Master Plan Update and to evaluate the potential for possible leasing of airport-owned property in the vicinity of a proposed runway extension. The results of this runway length analysis will be used to determine the timing associated with proposed future extensions.

RUNWAY LENGTH ANALYSIS

The methodology, assumptions, input data, and results of the runway length analysis are discussed in the following sections.

Methodology

As specified in FAA planning criteria, the recommended length for a primary runway must be determined by considering either the family of aircraft having similar performance characteristics or a specific aircraft requiring the longest runway. In either case, the choice should be based on aircraft that are anticipated to use the runway on a regular basis, which is defined by the FAA as at least 250 departures per year.

The required runway length as calculated using the methodology described in FAA AC 150/5325-4A is a function of the maximum operating temperature and elevation of the airport as well as the specific aircraft takeoff weight.

Input Data and Assumptions For the initial calculations, the following input data and assumptions were used for the runway length analysis:

- The aircraft weight was assumed to be the maximum allowable gross takeoff weight for the specific aircraft type and model
- The temperature at takeoff was assumed to be the average maximum daily temperature in August in Richmond (90 degrees Fahrenheit)
- The runway elevation was assumed to be 167 feet at the Runway 16 end, and 160.6 feet at the Runway 34 end.

- The windspeed was assumed to be zero and the optimal flap settings were assumed

The aircraft types analyzed included:

- Airbus A300-622R
- Airbus A319-100
- Airbus A320-200
- Airbus A321-100
- Boeing 737-400
- Boeing 737-500
- Boeing 737-700
- Boeing 737-800
- Boeing 737-800MAX
- Boeing 737-900
- Boeing 757-200
- Boeing 757-300
- Boeing 767-200
- Boeing 767-300
- Bombardier CRJ 700
- Bombardier CRJ 900
- Cessna Citation X
- Embraer ERJ-170
- Embraer ERJ-175
- Embraer ERJ-190

The aircraft selected were based on a review of the aircraft types currently operating at the Airport and the aircraft types identified as potential future operators. Although not all of the aircraft currently operating at the Airport and not all of the aircraft that could be expected to operate at the airport are listed, the list is representative of the overall aircraft fleet for the purposes of the runway length analysis.

The analysis showed that some aircraft currently operating at RIC require longer distances at Maximum Take Off Weight (MTOW) than is available on Runway 16/34 now. That is understandable considering the destinations those aircraft currently serve do not require the aircraft's full fuel capacity and thus a lower weight for takeoff. **Exhibit 1: Existing Aircraft Operating at Richmond International Airport** depicts the aircraft evaluated that currently operate at Richmond International Airport.

Exhibit 1: Existing Aircraft Operating at Richmond International Airport

Aircraft						Takeoff Distance (Feet)	
Manufacturer	Make/Model	Engine Type	ATCT Weight Class	Range (NM)	Fuel Capacity	MTOW, SL, & ISA	Adjusted for RIC
Airbus	A300-622R	Jet	Large Jet	2,900	10,685	7,900	9,319
Airbus	A319-100	Jet	Large Jet	3,750	7,980	7,400	8,734
Airbus	A320-200	Jet	Large Jet	3,300	7,190	6,860	8,101
Airbus	A321-100	Jet	Large Jet	3,200	7,930	8,400	9,905
Beechcraft	Beechjet 400	Jet	Medium Commuter	1,180	733	3,802	4,518
Boeing	DC-9-15	Jet	Large Jet			7,200	8,499
Boeing	DC-9-32	Jet	Large Jet			8,100	9,554
Boeing	737-400	Jet	Large Jet	2,060	5,311	8,333	9,827
Boeing	737-500	Jet	Large Jet	2,375	5,311	6,004	7,098
Boeing	737-700	Jet	Large Jet	2,935	7,837	8,500	10,022
Boeing	737-800	Jet	Large Jet	2,935	6,875	7,598	8,966
Boeing	737-800MAX	Jet	Large Jet	3,550	6,820	8,300	9,788
Boeing	737-900	Jet	Large Jet	2,950	7,837	9,800	11,545
Boeing	757-200	Jet	Large Jet	3,915	11,489	6,800	8,031
Boeing	767-200	Jet	Large Jet	3,900	16,700	6,300	7,445
Boeing	767-300	Jet	Large Jet	3,900	16,700	9,200	10,842
Bombardier	Challenger 300	Jet	Medium Commuter	3,276	2,112	4,950	5,863
Bombardier	Challenger 604	Jet	Medium Commuter	4,000	2,000	5,699	6,741
Bombardier	Challenger 800	Jet	Medium Commuter	3,235	9,251	6,295	7,439
Bombardier	Learjet 25	Jet	Medium Commuter	1,767	715	3,200	3,813
Bombardier	Learjet 31A	Jet	Medium Commuter	1,447	695	3,490	4,153
Bombardier	Learjet 35A	Jet	Medium Commuter	2,056	925	4,972	5,889
Bombardier	Learjet 40	Jet	Small	1,707	802	4,285	5,084
Bombardier	Learjet 45	Jet	Small	2,001	905	4,350	5,160
Bombardier	Learjet 45XR	Jet	Small	1,968	905	5,060	5,992

Exhibit 1: Existing Aircraft Operating at Richmond International Airport (cont.)

Aircraft						Takeoff Distance (Feet)	
Manufacturer	Make/Model	Engine Type	ATCT Weight Class	Range (NM)	Fuel Capacity	MTOW, SL, & ISA	Adjusted for RIC
Bombardier	Learjet 55	Jet	Medium Commuter	2,492	1,052	4,540	5,383
Bombardier	Learjet 60	Jet	Medium Commuter	2,381	1,181	5,450	6,449
Bombardier	CRJ 100	Jet	Large Commuter	2,250	2,135	5,800	6,859
Bombardier	CRJ 700	Jet	Large Commuter	1,378	2,903	5,130	6,074
Bombardier	CRJ 900	Jet	Large Commuter	1,553	1,959	5,820	6,883
Cessna	Citation Mustang	Jet	Medium Commuter	1,200	385	3,120	3,719
Cessna	Citation CJ1	Jet	Medium Commuter	1,550	3,296	3,280	3,907
Cessna	Citation CJ2	Jet	Medium Commuter	1,781	3,930	3,420	4,071
Cessna	Citation CJ3	Jet	Small	2,040	4,710	3,450	4,106
Cessna	Citation II/Bravo	Jet	Medium Commuter	1,865	771	3,600	4,282
Cessna	Citation III	Jet	Medium Commuter	1,520	741	5,030	5,957
Cessna	Citation Encore	Jet	Small	1,736	805	3,490	4,153
Cessna	Citation Excel	Jet	Medium Commuter	1,839	1,006	3,590	4,270
Cessna	Citation Sovereign	Jet	Medium Commuter	3,010	1,675	3,694	4,392
Cessna	Citation Citation X	Jet	Medium Commuter	3,250	1,990	5,200	6,156
Dassault Aviation	Falcon 10	Jet	Medium Commuter	2,209	3,340	4,615	5,471
Dassault Aviation	Falcon 20C	Jet	Medium Commuter	1,285	1,237	3,800	4,516
Dassault Aviation	Falcon 20D	Jet	Medium Commuter	2,080	1,400	6,400	7,562
Dassault Aviation	Falcon 20F	Jet	Medium Commuter	2,475	1,357	4,600	5,453
Dassault Aviation	Falcon 50EX	Jet	Medium Commuter	3,075	3,084	4,890	5,793
Dassault Aviation	Falcon 2000	Jet	Medium Commuter	3,250	1,456	5,440	6,437

Exhibit 1: Existing Aircraft Operating at Richmond International Airport (cont.)

Aircraft						Takeoff Distance (Feet)	
Manufacturer	Make/Model	Engine Type	ATCT Weight Class	Range (NM)	Fuel Capacity	MTOW, SL, & ISA	Adjusted for RIC
Dassault Aviation	Falcon 2000DX	Jet	Medium Commuter	3,250	1,215	5,760	6,812
Dassault Aviation	Falcon 900C	Jet	Medium Commuter	4,080	2,860	4,935	5,846
Dassault Aviation	Falcon 900EX	Jet	Medium Commuter	4,500	2,314	5,215	6,174
Dassault Aviation	Falcon 7X	Jet	Medium Commuter	6,846	3,194	5,200	6,156
Embraer	ERJ-135	Jet	Large Commuter	1,300	1,690	5,774	6,829
Embraer	ERJ-140	Jet	Large Commuter	1,250	1,690	6,070	7,175
Embraer	ERJ-145	Jet	Large Commuter	1,550	1,690	7,448	8,790
Embraer	ERJ-170	Jet	Large Commuter	2,150	2,058	5,394	6,383
Embraer	ERJ-175	Jet	Large Commuter	2,200	2,058	7,362	8,689
Embraer	ERJ-190	Jet	Large Commuter	2,450	2,859	7,194	8,492
Gulfstream	G100	Jet	-	3,394	1,300	5,395	6,385
Gulfstream	G150	Jet	Medium Commuter	3,394	1,300	5,830	6,894
Gulfstream	G200	Jet	Medium Commuter	3,400	1,500	6,083	7,191
Gulfstream	G300	Jet	Medium Commuter	3,820	3,985	5,100	6,039
Gulfstream	G400	Jet	Medium Commuter	4,220	2,928	5,450	6,449
Gulfstream	G450	Jet	Medium Commuter	4,350	4,403	5,600	6,625
Gulfstream	G500	Jet	Medium Commuter	5,000	4,306	5,200	6,156
Gulfstream	G500	Jet	Medium Commuter	5,000	4,306	5,910	6,988

Denotes calculated length greater than 9,003 ft available on Runway 16/34

Exhibit 2: Future Potential Aircraft Operating at Richmond International Airport

Aircraft						Takeoff Distance (Feet)	
Manufacturer	Make/Model	Engine Type	ATCT Weight Class	Range (NM)	Fuel Capacity	MTOW, SL, & ISA	Adjusted for RIC
Airbus	A300-622R	Jet	Large Jet	2,900	10,685	7,900	9,319
Airbus	A319-100	Jet	Large Jet	3,750	7,980	7,400	8,734
Airbus	A320-200	Jet	Large Jet	3,300	7,190	6,860	8,101
Airbus	A321-100	Jet	Large Jet	3,200	7,930	8,400	9,905
Boeing	737-400	Jet	Large Jet	2,060	5,311	8,333	9,827
Boeing	737-500	Jet	Large Jet	2,375	5,311	6,004	7,098
Boeing	737-700	Jet	Large Jet	2,935	7,837	5,500	6,508
Boeing	737-800	Jet	Large Jet	2,935	6,875	7,598	8,966
Boeing	737-800MAX	Jet	Large Jet	3,550	6,820	8,300	9,788
Boeing	737-900	Jet	Large Jet	2,950	7,837	9,800	11,545
Boeing	757-200	Jet	Large Jet	3,915	11,489	6,800	8,031
Boeing	767-200	Jet	Large Jet	3,900	16,700	6,300	7,445
Boeing	767-300	Jet	Large Jet	3,900	16,700	9,200	10,842
Bombardier	Challenger 300	Jet	Medium Commuter	3,276	2,112	4,950	5,863
Bombardier	CRJ 700	Jet	Large Commuter	1,434	2,903	5,130	6,074
Bombardier	CRJ 900	Jet	Large Commuter	1,553	1,959	5,820	6,883
Cessna	Citation X	Jet	Medium Commuter	3,250	1,990	5,200	6,156
Embraer	ERJ-170	Jet	Large Commuter	2,150	2,058	5,394	6,246
Embraer	ERJ-175	Jet	Large Commuter	2,200	2,058	7,362	8,525
Embraer	ERJ-190	Jet	Large Commuter	2,450	2,859	7,194	8,331

Denotes calculated length greater than 9,003 ft available on Runway 16/34

When evaluating future aircraft operations, depicted in **Exhibit 2: Future Potential Aircraft Operating at Richmond International Airport**, some aircraft required more runway than available at MTOW. For this reason, the Consultant Team expanded the analysis for Runway 16/34 to evaluate runway length for destinations which are currently being pursued by the airport. This analysis utilized *Boeing Airplane Characteristics for Airport Planning* for aircraft which are within the fleet of current or prospective operators most likely to be utilized for specific destinations. This analysis looked at the specific pressure altitude calculated for RIC to determine if prospective destinations could be reached by aircraft most likely to be utilized for these routes. **Exhibit 3: Potential Destinations** details the Airport Destinations analyzed and the associated Great Circle Distance for each.

Exhibit 3: Potential Destinations

Airport Destination	Great Circle Distance
SFO	2440
LAX	2300
SEA	2350
DUB	3400

This analysis determined that all potential west coast destinations could be met by current carriers with aircraft within their existing fleet. However, a potential European destination would require the airline utilizing Boeing 757-300 to put a passenger limitation in place to reduce weight in order to utilize the existing runway length.

Exhibit 4: Future Potential Aircraft Operating at Richmond International Airport for Specific Destinations

Aircraft															
Manufacturer	Make/Model	Engine Type	ATCT Weight Class	Model	Range (NM)	Usable Fuel (lbs)	OEW	PAX Number	Payload	OEW + Payload	Brake Release Gross Weight	MTOW	Takeoff Length	Temp Adj (58 + 25 F) 83	Temp Adj (58 + 27 F) 85
Boeing	737-800	Jet	Large Jet	CFM56-7B	2,440	46,063	91,300	184	40,480	131,780	173,000	174,200	5,300	--	8,250
Boeing	757-200	Jet	Large Jet	RB211-535C	3,400	75,550	132,280	186	40,920	173,200	240,000	240,000	4,600	8,000	--
Boeing	757-200	Jet	Large Jet	RB211-535E4B	3,400	75,550	136,940	186	40,920	177,860	240,000	255,000	6,000	6,000	--
Boeing	757-300	Jet	Large Jet	RBR211-535E4, 4B	3,400	79,980	142,350	243	53,460	195,810	270,000	270,000	9,200	9,900	--

Denotes calculated length greater than 9,003 ft available on Runway 16/34

- Assumes Dry Runway

- Utilizing Boeing Airplane Characteristics for Airport Planning for 737-800, 757-200 (two models), and 757-300

CONCLUSIONS

The results of the runway length analyses for Richmond International Airport can be summarized as follows:

- This analysis determined that all potential west coast destinations could be met by current carriers with aircraft within their existing fleet.

- A potential European destination would require the airline utilizing Boeing 757-300 to put a minor passenger limitation in place to reduce weight in order to utilize the existing runway length.

- It is not anticipated that a European destination is likely to occur in coming years considering the COVID-19 impact on the Aviation industry. Should an airline choose to begin European service, the social distancing which will likely be integrated into airline standard operating procedures will not make a passenger limitation an issue for RIC operations.

- It is not anticipated that Runway 16/34 will require an extension within the 20-year horizon.

These results confirm that the existing runway length is sufficient for existing operations and potential future aircraft operations. In concert with the forecasting effort associated with the RIC Master Plan Update, it is not anticipated that Runway 16/34 will require an extension within the 20-year horizon.

Should the airport choose to lease property within the area of a proposed runway extension, best management practices suggest that a clause should be added to the lease to allow the airport to terminate the lease should a runway extension become required.

APO TAF Quick Data Summary Report - Facility

For AEA -- 2020 Scenario

Region State: AEA-VA **LOCID: RIC Tower with Radar**
City: RICHMOND **Airport: Richmond International** **2019 Based Aircraft: 88**

	--ENPLANEMENTS--			--AIRPORT OPERATIONS--									--TRACON--
				Itinerant Operations					Local Operations				
Fiscal Year	Air Carrier	Commuter	Total	Air Carrier	AT & Commuter	GA	Military	Total	Civil	Military	Total	Total OPS	Total OPS
2013	882,296	701,019	1,583,315	28,990	37,531	22,797	5,085	94,403	1,997	1,841	3,838	98,241	-
2014	932,333	715,571	1,647,904	31,909	33,435	22,829	4,038	92,211	3,924	1,709	5,633	97,844	-
2015	1,029,789	689,031	1,718,820	35,789	28,463	23,802	4,783	92,837	6,088	2,467	8,555	101,392	-
2016	1,072,760	690,487	1,763,247	34,852	27,298	23,547	4,405	90,102	3,678	1,883	5,561	95,663	-
2017	1,098,829	700,192	1,799,021	38,377	23,815	22,669	3,915	88,776	4,147	1,591	5,738	94,514	-
2018	1,173,791	798,912	1,972,703	42,433	23,413	22,001	3,995	91,842	6,828	1,482	8,310	100,152	-
2019	1,343,641	820,385	2,164,026	45,876	22,832	23,224	3,510	95,442	9,030	1,282	10,312	105,754	-
2020 *	761,117	464,002	1,225,119	33,129	15,058	17,381	3,301	68,869	9,427	1,190	10,617	79,486	-
2021 *	861,630	539,350	1,400,980	40,142	17,815	15,860	3,301	77,118	9,473	1,190	10,663	87,781	-
2022 *	1,037,910	649,118	1,687,028	44,412	18,616	17,446	3,301	83,775	9,520	1,190	10,710	94,485	-
2023 *	1,246,006	779,893	2,025,899	47,164	18,279	19,169	3,301	87,913	9,567	1,190	10,757	98,670	-
2024 *	1,432,032	896,408	2,328,440	51,984	18,212	21,278	3,301	94,775	9,614	1,190	10,804	105,579	-
2025 *	1,550,609	970,849	2,521,458	56,471	18,909	24,004	3,301	102,685	9,661	1,190	10,851	113,536	-
2026 *	1,621,756	1,015,451	2,637,207	59,696	18,308	24,125	3,301	105,430	9,709	1,190	10,899	116,329	-
2027 *	1,661,651	1,040,538	2,702,189	62,624	16,210	24,247	3,301	106,382	9,757	1,190	10,947	117,329	-
2028 *	1,694,879	1,061,383	2,756,262	66,274	12,508	24,369	3,301	106,452	9,805	1,190	10,995	117,447	-
2029 *	1,727,700	1,081,969	2,809,669	69,895	8,823	24,492	3,301	106,511	9,853	1,190	11,043	117,554	-
2030 *	1,761,618	1,103,263	2,864,881	72,586	6,742	24,615	3,301	107,244	9,902	1,190	11,092	118,336	-
2031 *	1,797,315	1,125,676	2,922,991	74,299	6,394	24,739	3,301	108,733	9,951	1,190	11,141	119,874	-
2032 *	1,835,857	1,149,862	2,985,719	75,875	6,461	24,864	3,301	110,501	10,000	1,190	11,190	121,691	-
2033 *	1,873,318	1,173,362	3,046,680	77,410	6,529	24,989	3,301	112,229	10,049	1,190	11,239	123,468	-
2034 *	1,908,984	1,195,729	3,104,713	78,878	6,597	25,115	3,301	113,891	10,099	1,190	11,289	125,180	-
2035 *	1,941,916	1,216,403	3,158,319	80,242	6,665	25,242	3,301	115,450	10,149	1,190	11,339	126,789	-
2036 *	1,976,993	1,238,404	3,215,397	81,691	6,734	25,369	3,301	117,095	10,199	1,190	11,389	128,484	-
2037 *	2,012,494	1,260,678	3,273,172	83,158	6,804	25,497	3,301	118,760	10,249	1,190	11,439	130,199	-
2038 *	2,048,506	1,283,284	3,331,790	84,647	6,875	25,626	3,301	120,449	10,300	1,190	11,490	131,939	-
2039 *	2,084,312	1,305,786	3,390,098	86,129	6,946	25,755	3,301	122,131	10,351	1,190	11,541	133,672	-
2040 *	2,121,113	1,328,896	3,450,009	87,651	7,018	25,885	3,301	123,855	10,402	1,190	11,592	135,447	-
2041 *	2,157,866	1,351,962	3,509,828	89,174	7,091	26,016	3,301	125,582	10,453	1,190	11,643	137,225	-
2042 *	2,195,104	1,375,323	3,570,427	90,717	7,165	26,147	3,301	127,330	10,505	1,190	11,695	139,025	-
2043 *	2,231,982	1,398,472	3,630,454	92,248	7,239	26,279	3,301	129,067	10,557	1,190	11,747	140,814	-
2044 *	2,269,171	1,421,826	3,690,997	93,793	7,314	26,411	3,301	130,819	10,609	1,190	11,799	142,618	-
2045 *	2,308,779	1,446,698	3,755,477	95,434	7,390	26,544	3,301	132,669	10,661	1,190	11,851	144,520	-
GR1	2.10	2.21	2.14	2.86	-4.25	0.52	-0.24	1.27	0.64	-0.29	0.54	1.21	0.00
GR2	4.54	4.65	4.58	4.32	-2.81	1.71	0.00	2.66	0.49	0.00	0.44	2.42	0.00

GR1: Growth Rate from 2019 to 2045 GR2: Growth Rate from 2020 to 2045
Report created 10/05/2020 9:26:31 am

RIC ENPLANEMENT FORECAST AND OUTLOOK SCENARIOS

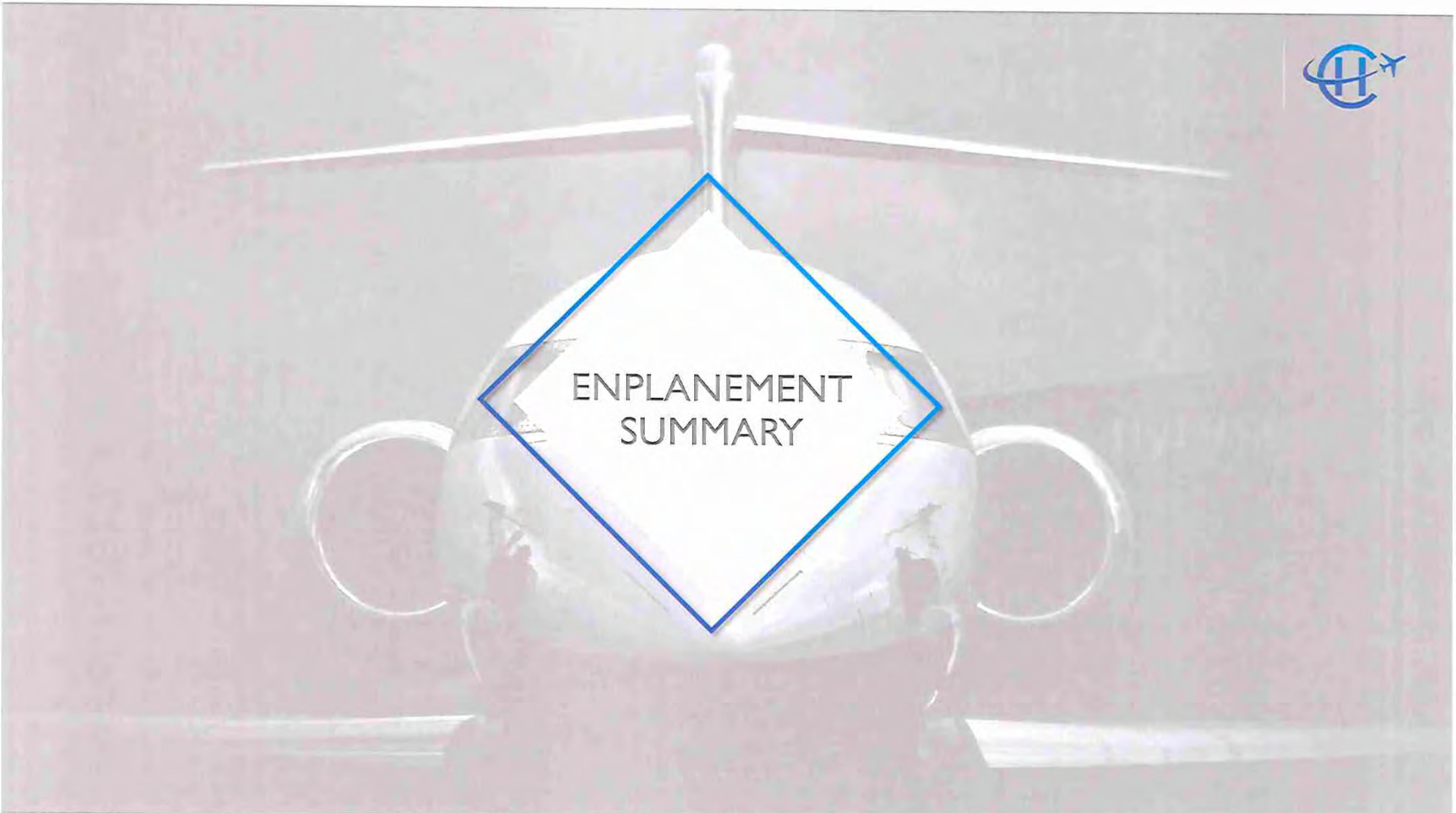
Updated October 7, 2020

Campbell-Hill
Aviation Group, LLC

SUMMARY OF METHODOLOGY

- The following analysis projects RIC enplaned passengers for FY 2020-FY 2025*.
- The Projections Incorporate:
  - RIC Enplanement Data
  - Airport Cancellation Trends
  - Historical U.S. Department of Transportation, T-100 Data
  - Historical, Current, and Future monthly schedule data
  - Campbell-Hill assessment of the evolving service patterns and information from airlines
  - Past recoveries (especially Post 9-11 and Post natural disasters).
- The key statistic estimated is enplaned passengers. We also estimated monthly onboard passengers (both directions combined) and flights operated by scheduled passenger carriers in Appendix I (charter flights and general aviation are not included).
- We included medium, high and low scenarios. Medium is our best estimate at this point.
- The low, medium and high scenarios are similar in the immediate term but differ in how steep and quickly recovery occurs.

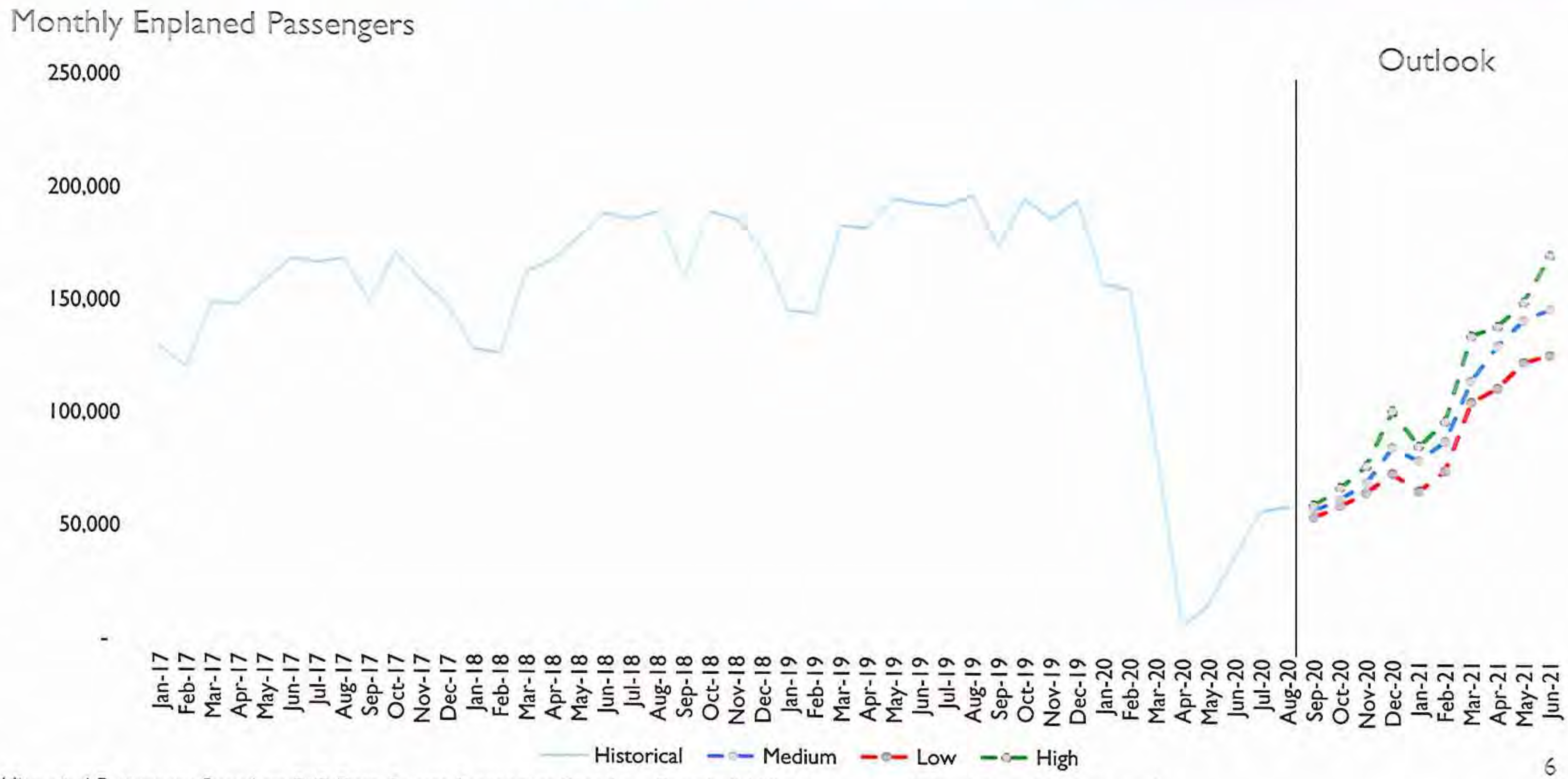
* For enplaned passenger details and more detailed methodology see Appendix I.


ENPLANEMENT
SUMMARY

SUMMARY OF RIC ENPLANEMENT PROJECTIONS

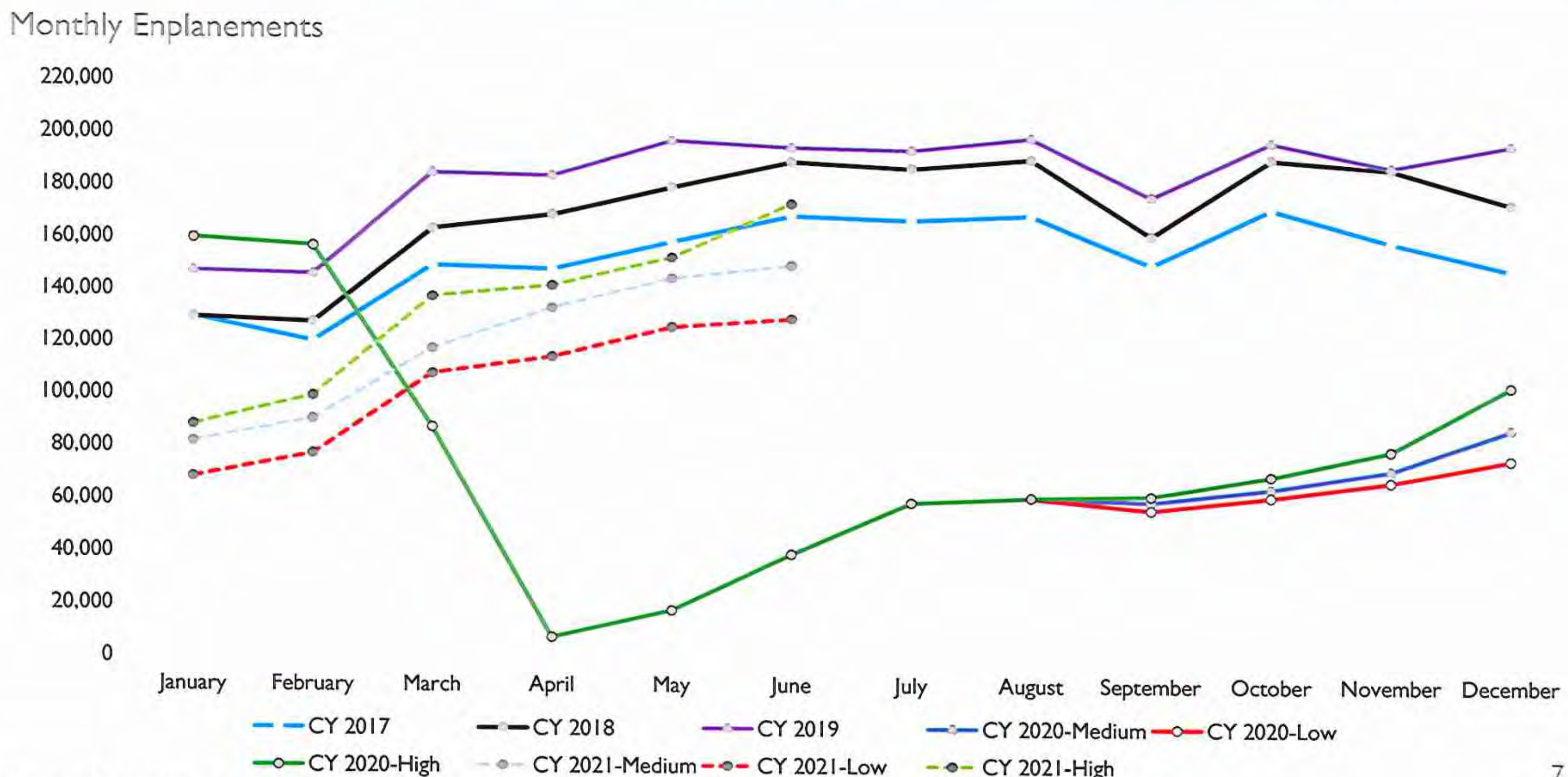
- RIC had strong enplanement growth in January and February 2020 (both months over 7%).
- Despite a strong beginning of March, COVID-19 significantly reduced the monthly total.
- From March-September 2020 we estimate RIC enplanements were down 75% from March-September 2019.
- Enplanements were down 96% in April and improved to slightly better than 70% down in September.
- RIC enplanements were down 25% from 2.14 million in FY 2019 to 1.62 million in FY 2020.
- The medium scenario forecast for FY 2021 is 1.12 million or 47% below FY 2019. We forecast that FY 2021 enplanements could be as high as 1.23 million (down 43% from FY 2019) and as low as 1.00 million (down 53% from FY 2019).
- We expect a significant rebound in FY 2022 based on other large shocks.
  - We forecast FY 2022 enplanements in the medium scenario to be 1.56 million or within 27% of RIC's FY 2019 peak. The medium scenario would surpass FY 2019 levels in FY 2025.
  - The FY 2022 high scenario forecast has enplaned passengers of 1.81 million or within 16% of FY 2019 levels. The high scenario would exceed FY 2019 levels in FY 2023.
  - The low scenario would be still under FY 2019 levels in FY 2025 but would be very similar to FY 2017 RIC enplanements (1.84 million).
- Details are in the charts that follow and in Appendix I.

RIC HISTORICAL AND OUTLOOK- MONTHLY ENPLANED PASSENGERS



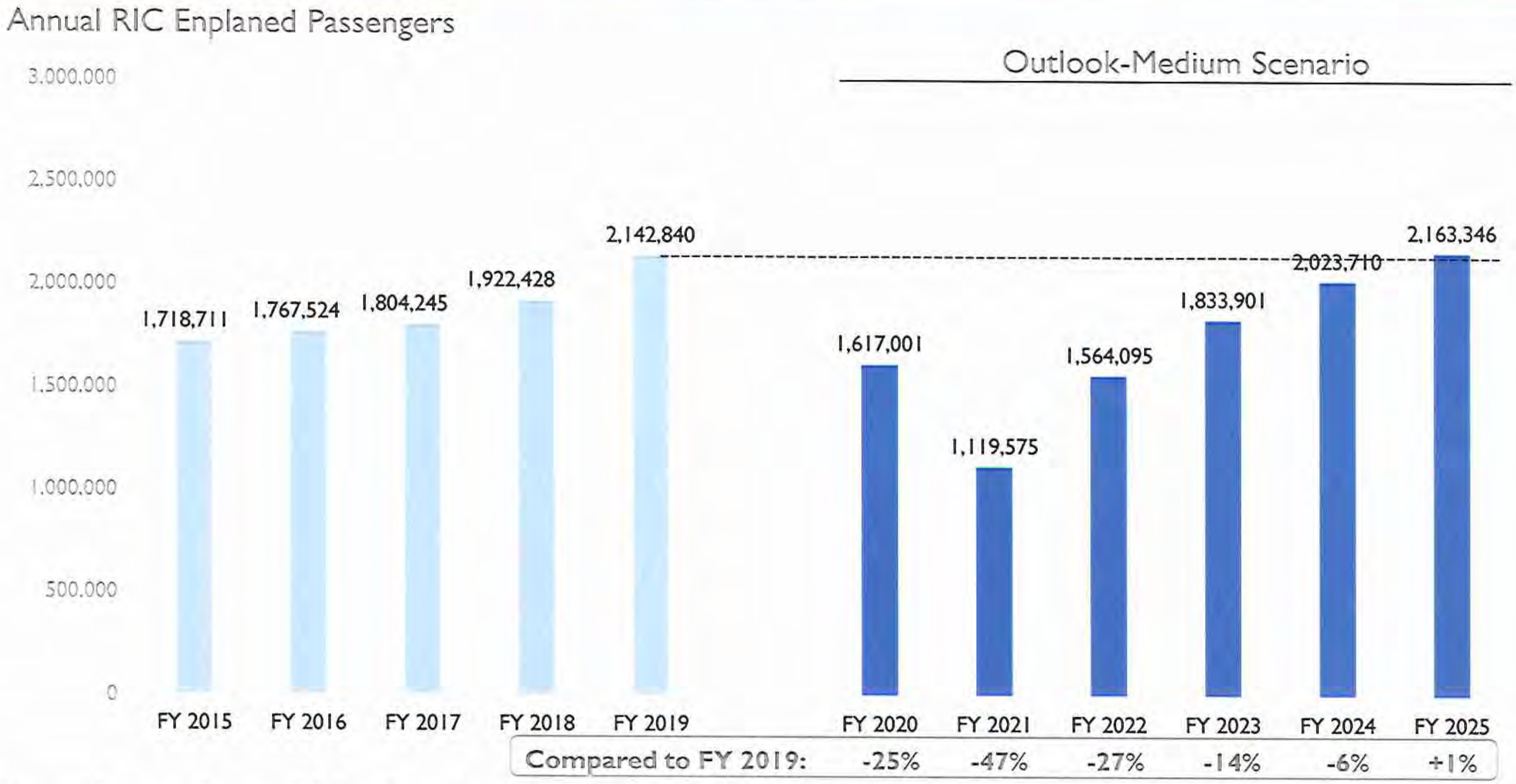
Source: Historical Passengers Based on RIC Data. Future Passengers Based on Campbell-Hill assessment of schedule and airline trends.

RIC ENPLANEMENT OUTLOOK 2017-JUNE 2021



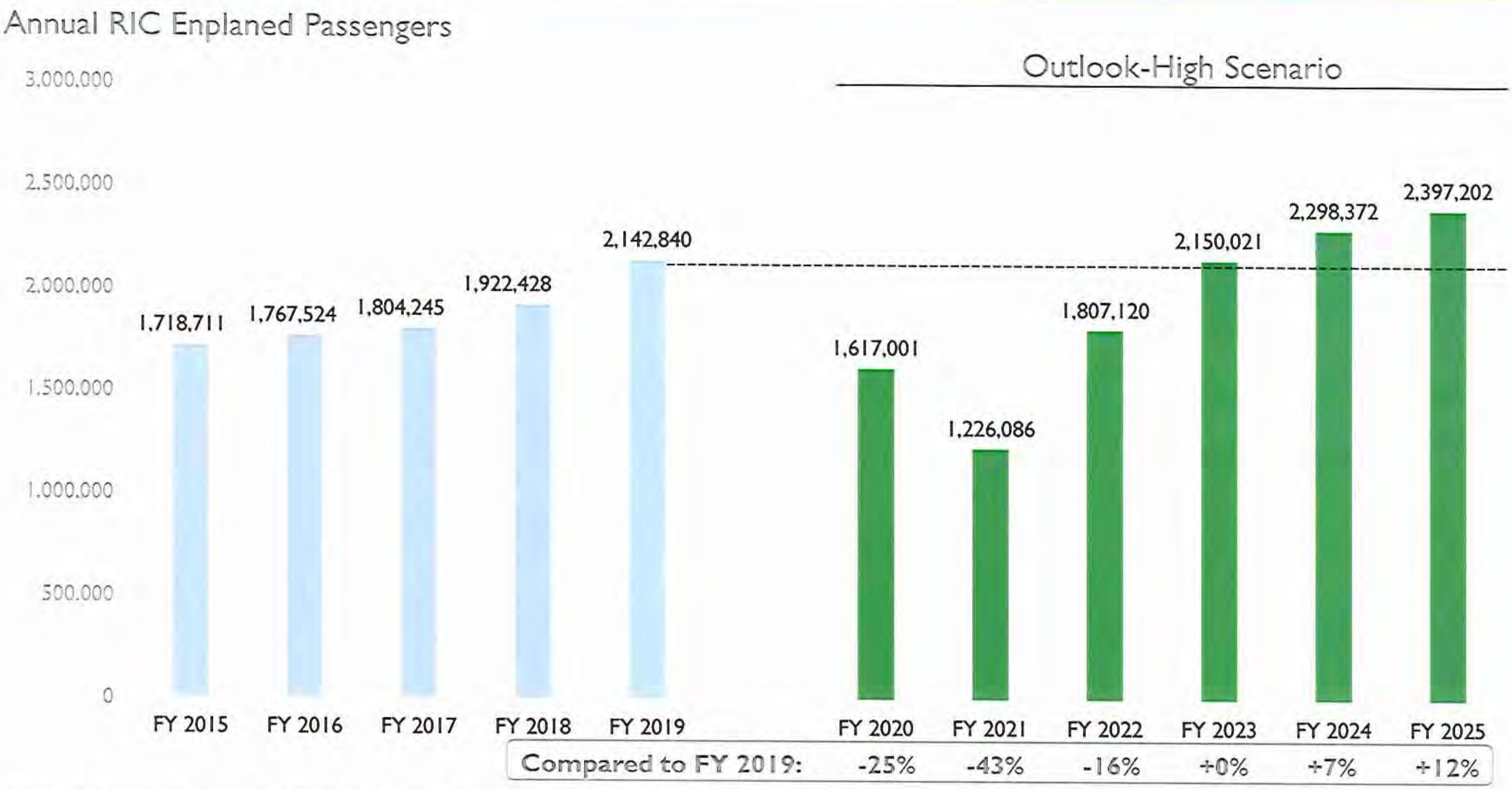
Source: Historical Passengers Based on RIC Data. Future Passengers Based on Campbell-Hill assessment of schedule and airline trends.

RIC HISTORICAL ENPLANEMENTS AND OUTLOOK-MEDIUM SCENARIO



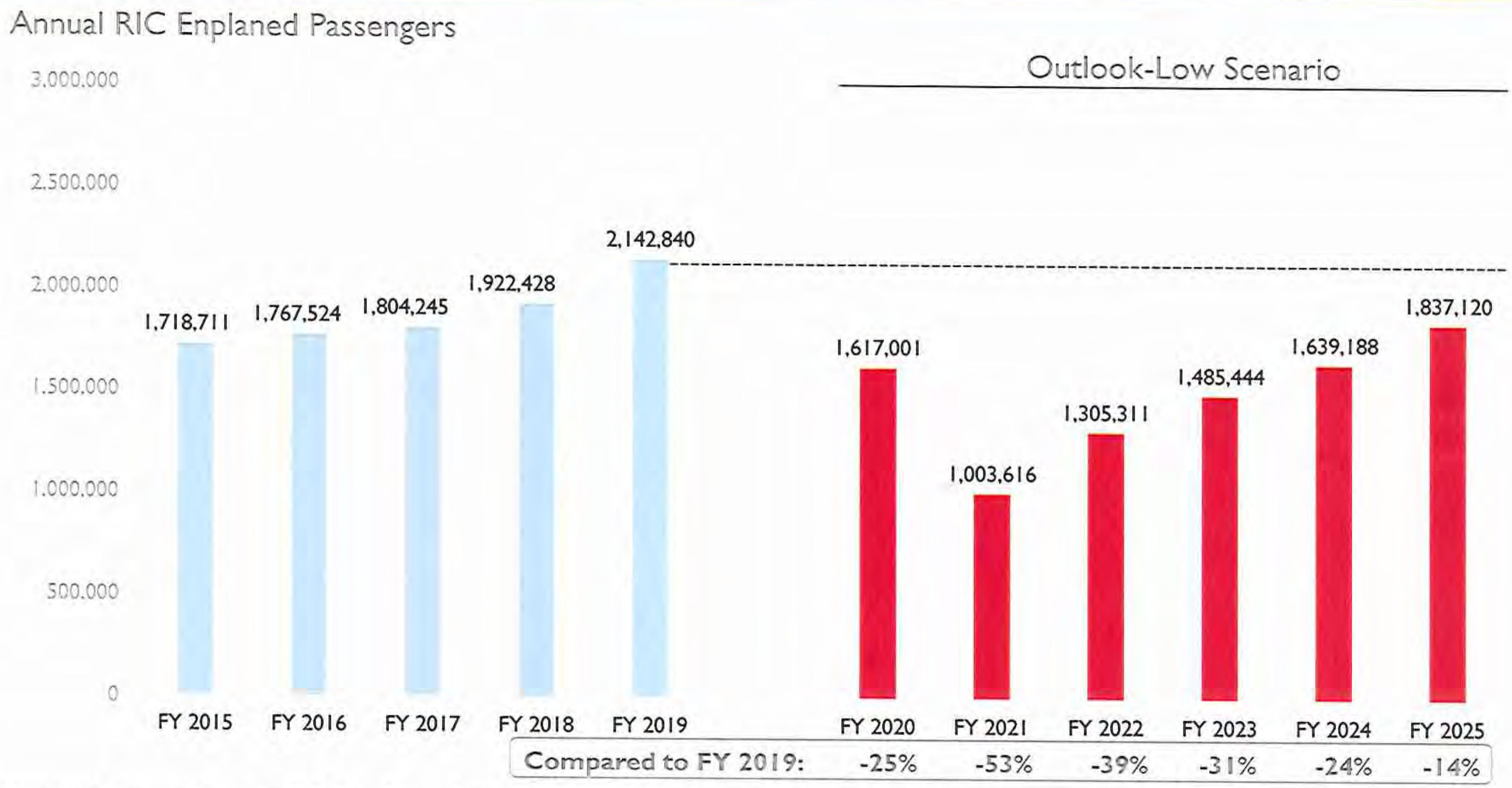
Source: Historical Passengers Based on RIC Data. Future Passengers Based on Campbell-Hill assessment of schedule and airline trends.

RIC HISTORICAL ENPLANEMENTS AND OUTLOOK-HIGH SCENARIO

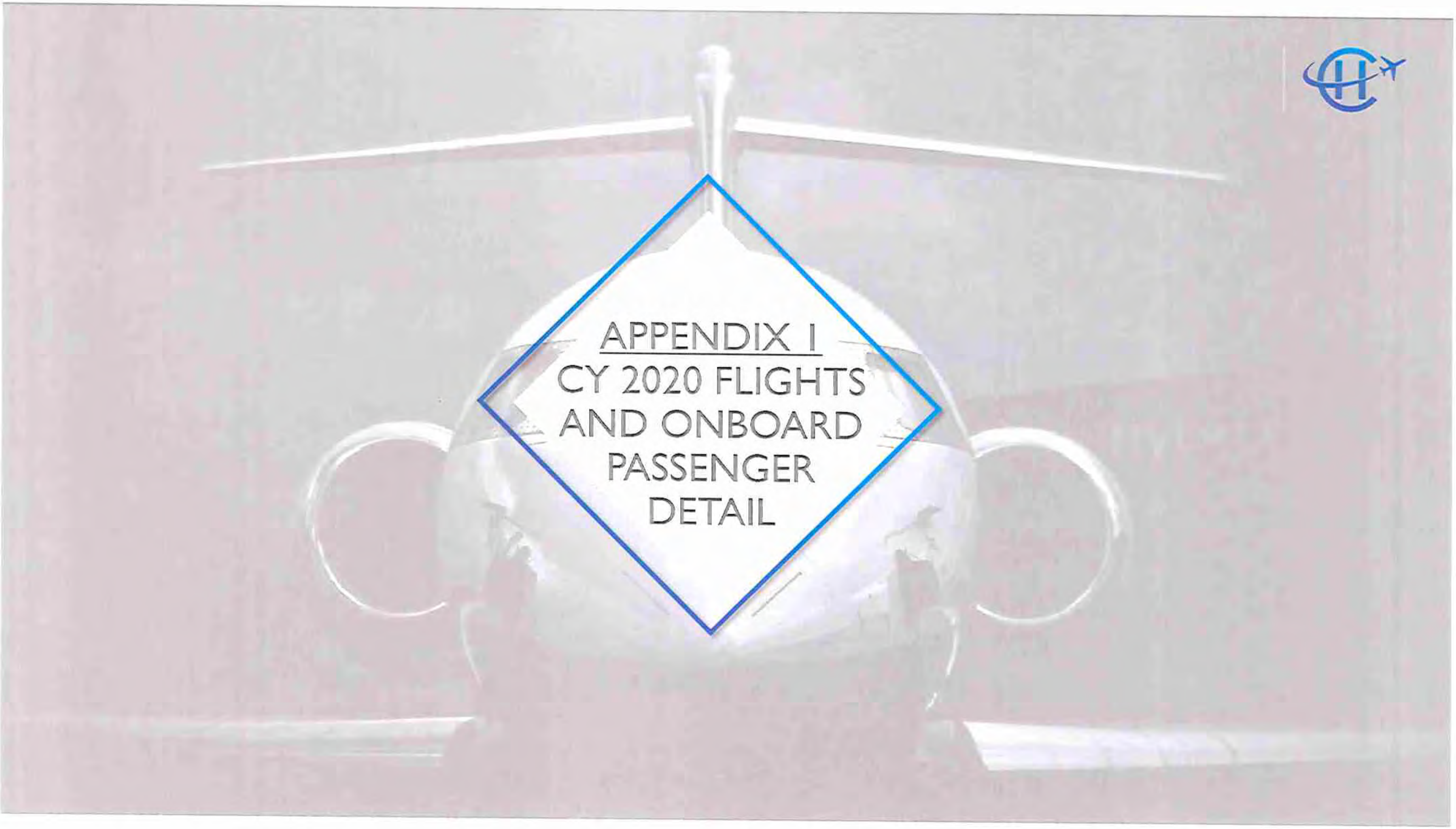


Source: Historical Passengers Based on RIC Data. Future Passengers Based on Campbell-Hill assessment of schedule and airline trends.

RIC HISTORICAL ENPLANEMENTS AND OUTLOOK-LOW SCENARIO



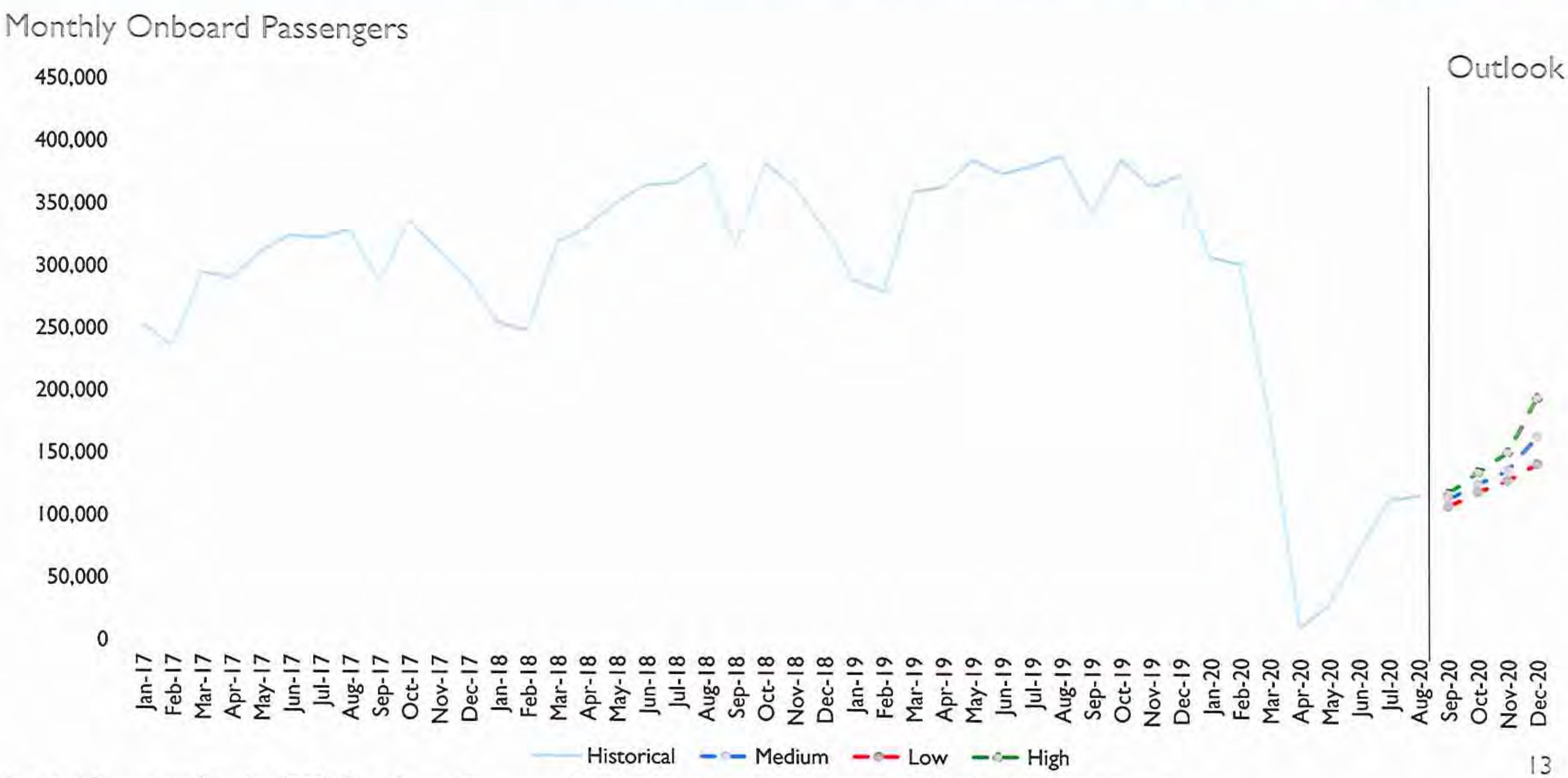
Source: Historical Passengers Based on RIC Data. Future Passengers Based on Campbell-Hill assessment of schedule and airline trends.


APPENDIX I
CY 2020 FLIGHTS
AND ONBOARD
PASSENGER
DETAIL

CY 2020 ONBOARD PASSENGER AND FLIGHT ESTIMATE SUMMARY

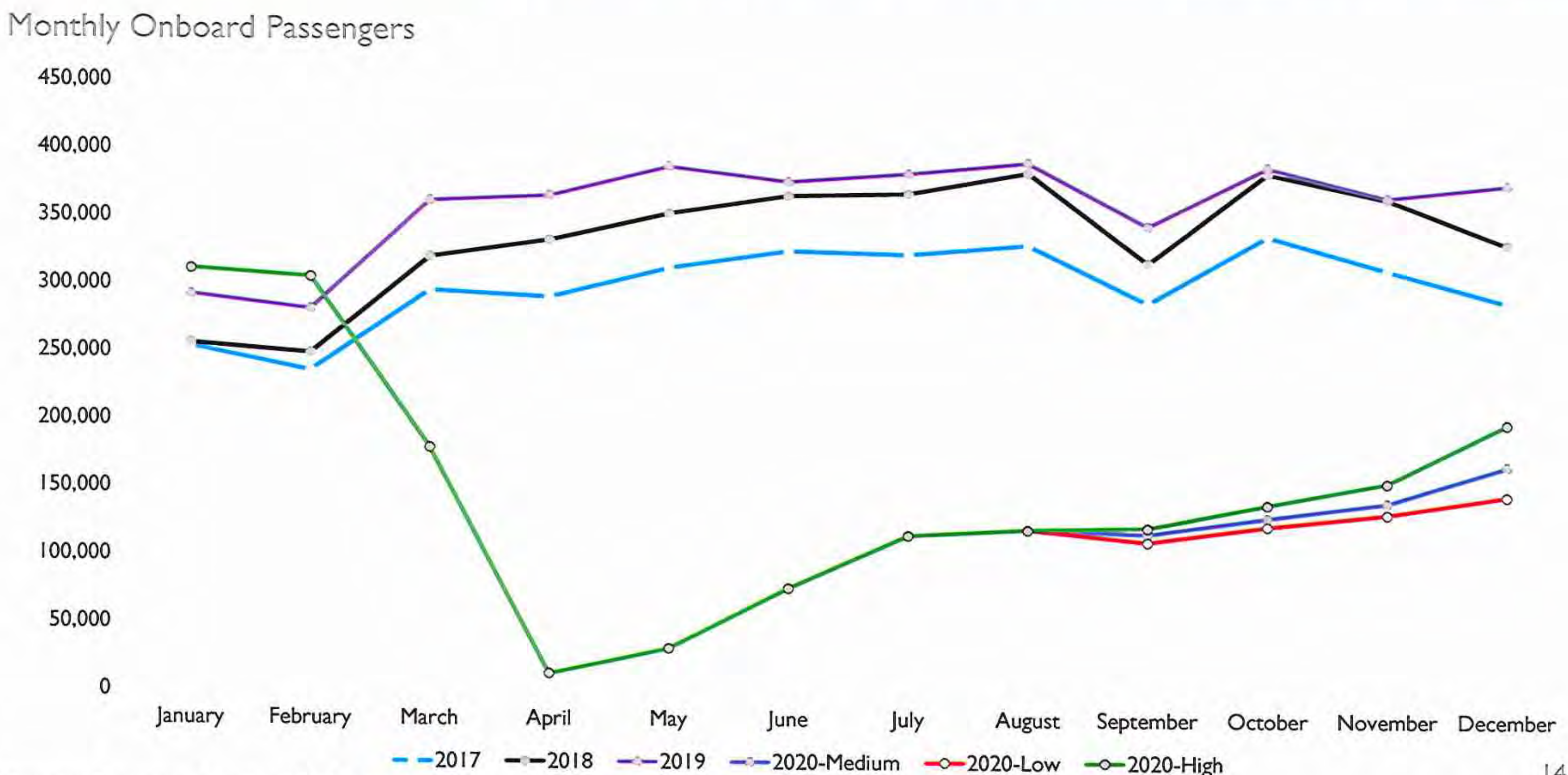
- COVID-19 virus continues to have a significant effect on total U.S. traffic and RIC traffic specifically.
- The current outlook for annual (CY 2020) onboard passenger change ranges from -59% to -62% compared to CY 2019.
- The current outlook for annual (CY 2020) flight change ranges from -49% to -51% compared to CY 2019.
- The outlook is that the gradual recovery continues and year over year passenger declines could be limited to 47% by December based on the high scenario and would be down 55% based on the medium scenario.
- The final charts in this section plot our recovery outlook vs. recovery after September 2001. All three scenarios are forecast to recover slower than September 11 given the more severe initial drop.

RIC HISTORICAL AND OUTLOOK- MONTHLY ONBOARD PASSENGERS (INBOUND + OUTBOUND)



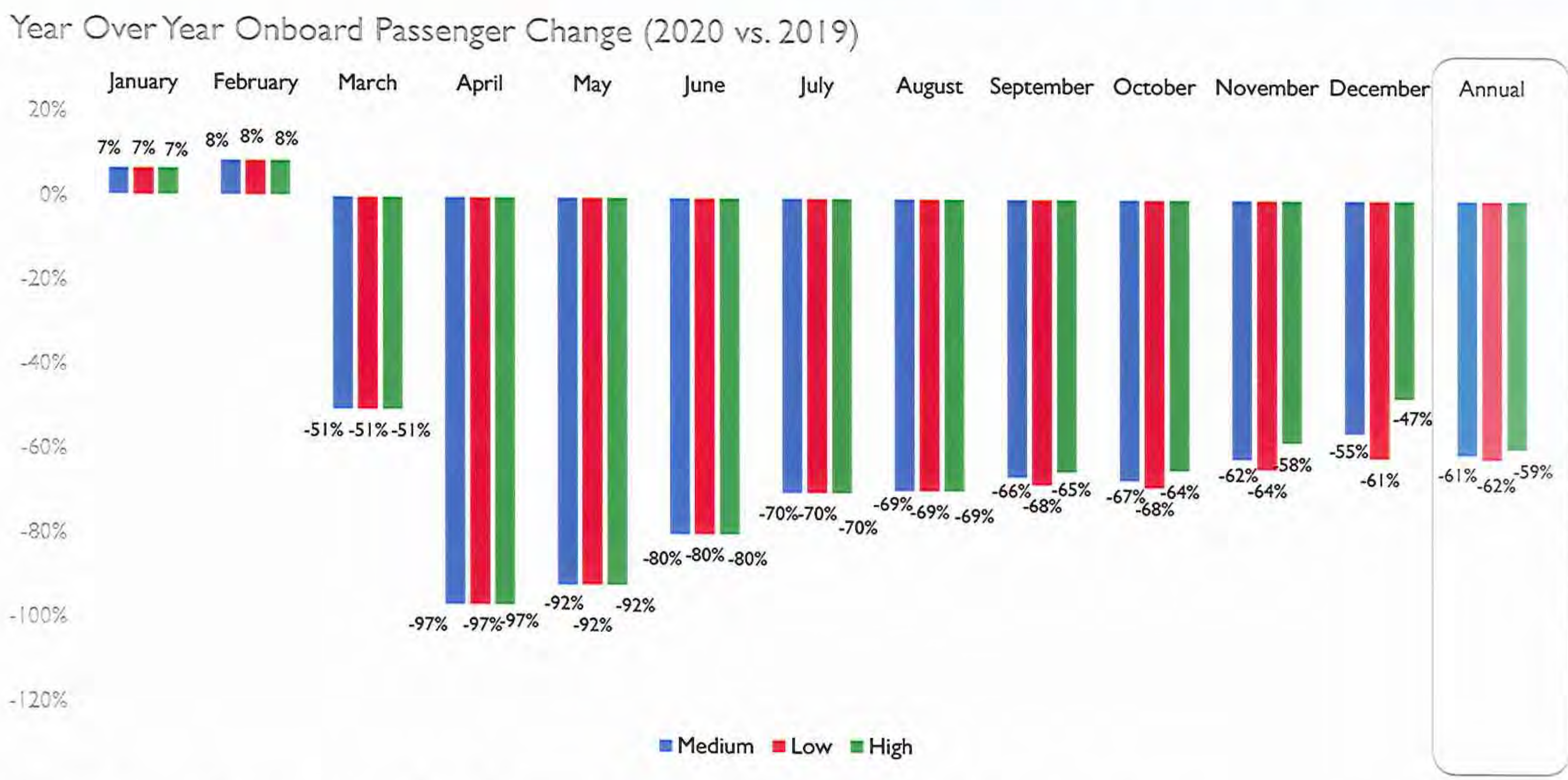
Source: Historical Passengers Based on T-100 Data. Future Passengers Based on Campbell-Hill assessment of schedule and airline trends.

RIC HISTORICAL AND OUTLOOK- MONTHLY ONBOARD PASSENGERS (INBOUND + OUTBOUND)



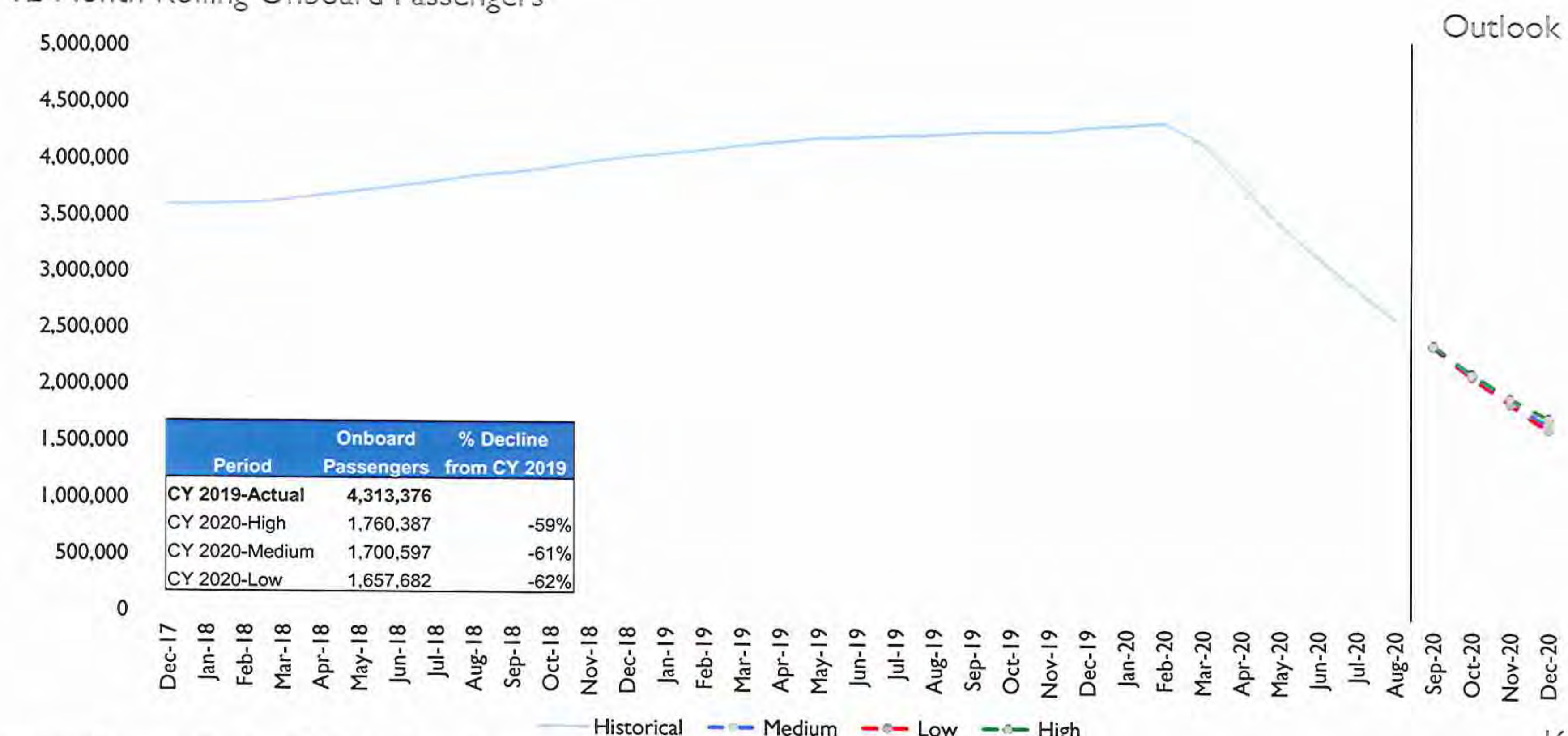
Source: Historical Passengers Based on T-100 Data. Future Passengers Based on Campbell-Hill assessment of schedule and airline trends.

RIC PERCENTAGE CHANGE- ONBOARD PASSENGERS (INBOUND + OUTBOUND)



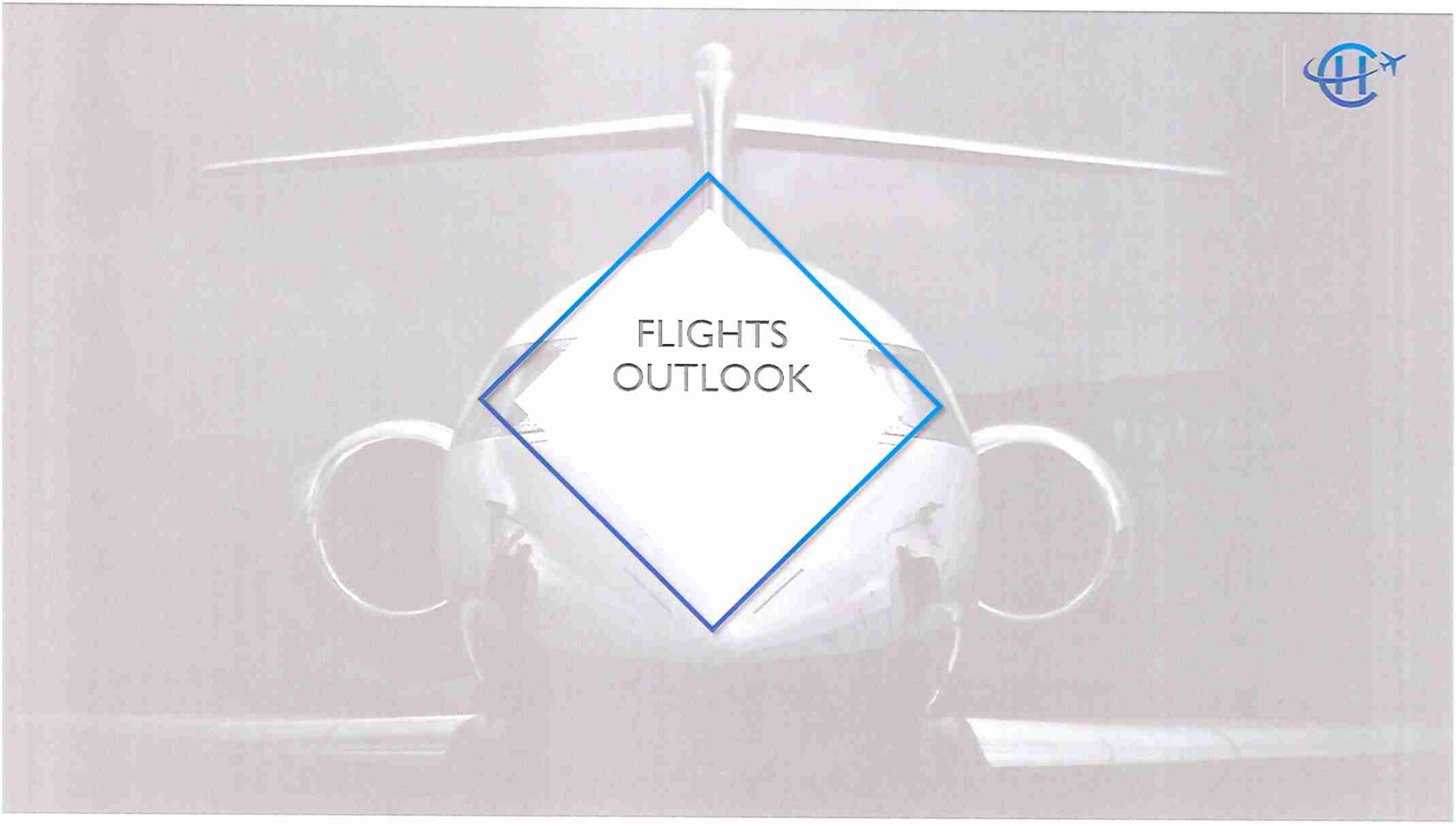
Source: Historical Passengers Based on T-100 Data. Future Passengers Based on Campbell-Hill assessment of schedule and airline trends.

RIC HISTORICAL AND OUTLOOK- ANNUAL ONBOARD PASSENGERS (INBOUND + OUTBOUND)

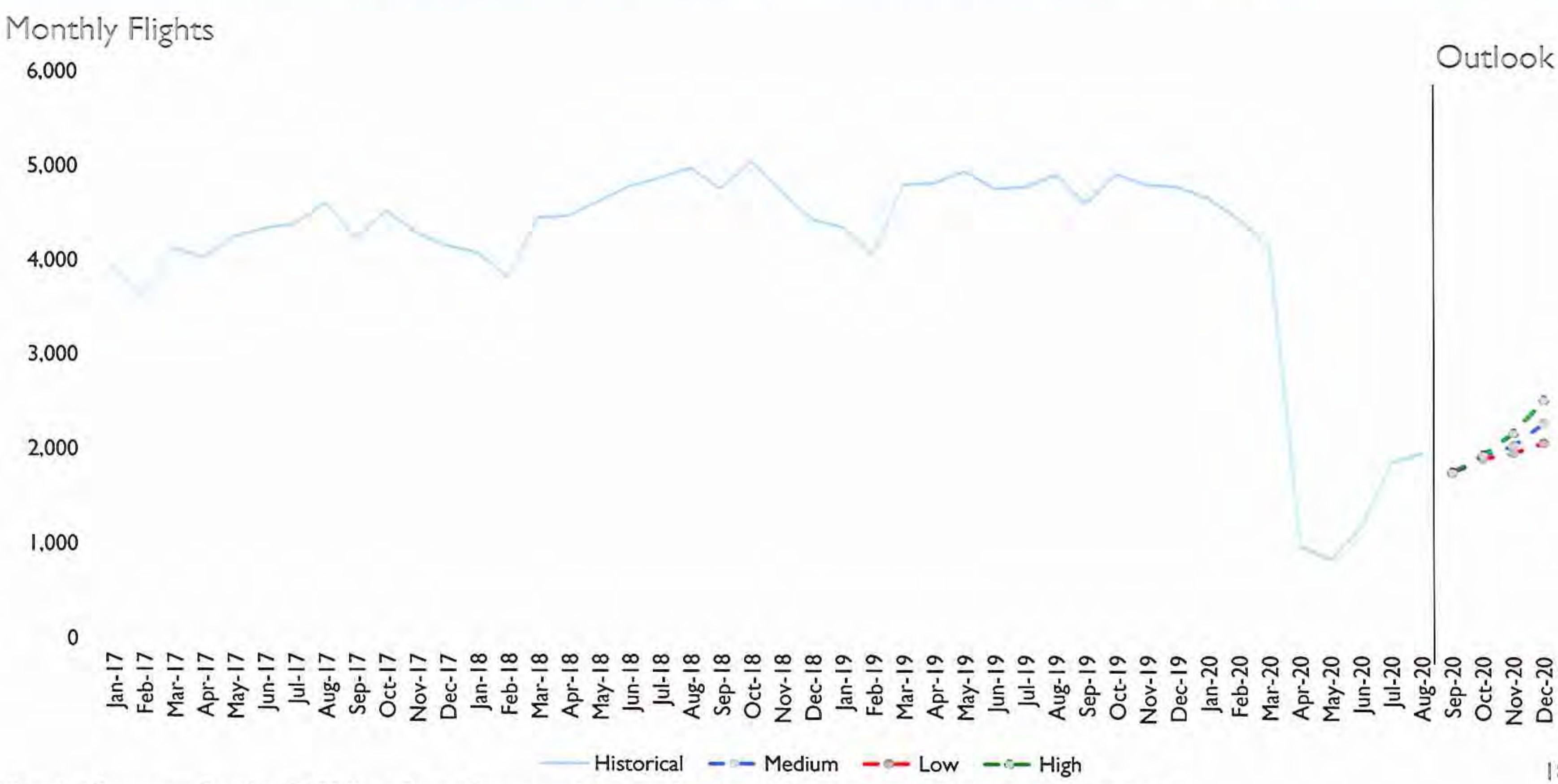


Period	Onboard Passengers	% Decline from CY 2019
CY 2019-Actual	**4,313,376**	
CY 2020-High	1,760,387	-59%
CY 2020-Medium	1,700,597	-61%
CY 2020-Low	1,657,682	-62%

Source: Historical Passengers Based on T-100 Data. Future Passengers Based on Campbell-Hill assessment of schedule and airline trends.

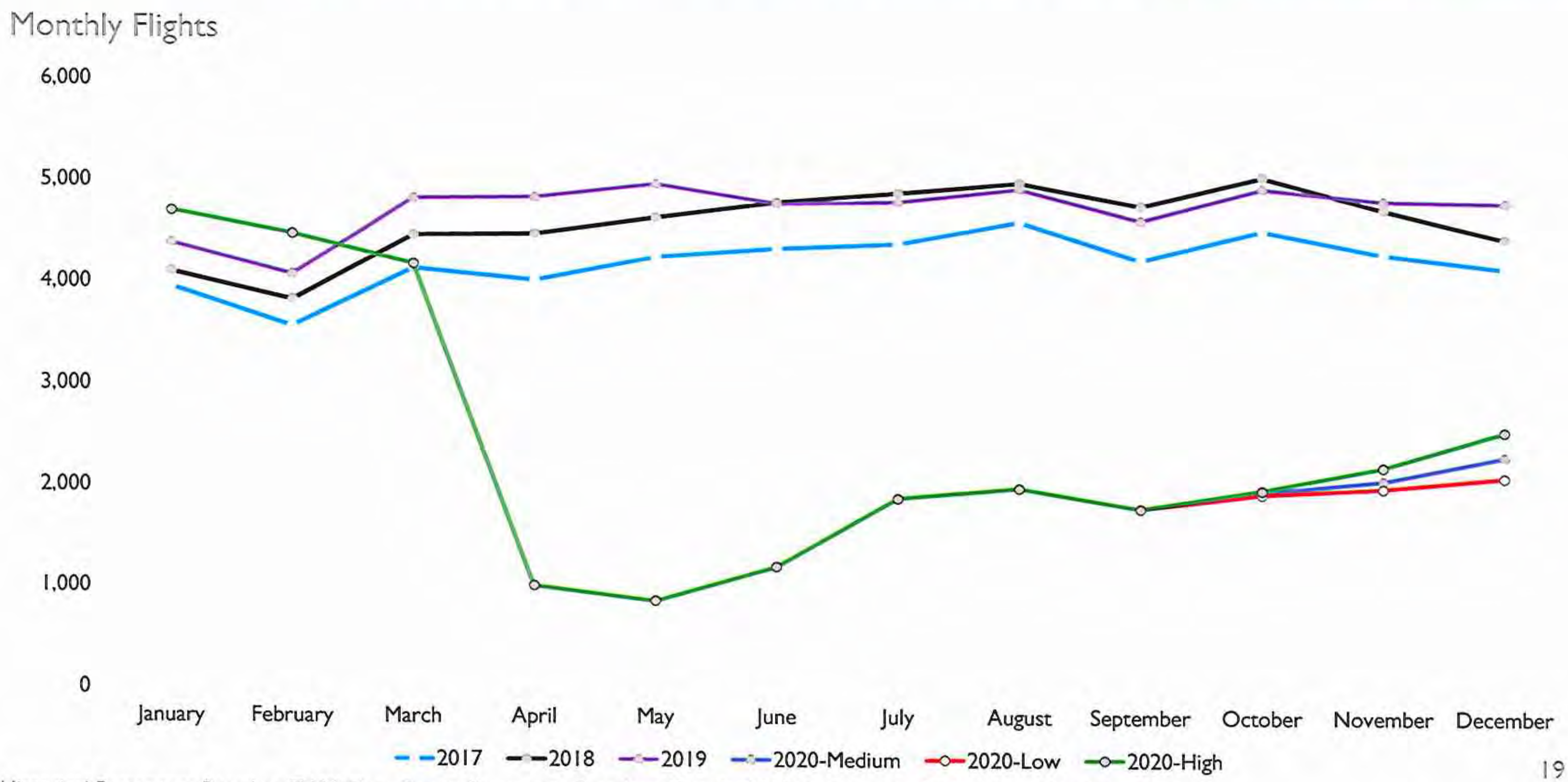

FLIGHTS
OUTLOOK

RIC HISTORICAL AND OUTLOOK- MONTHLY FLIGHTS (INBOUND + OUTBOUND)



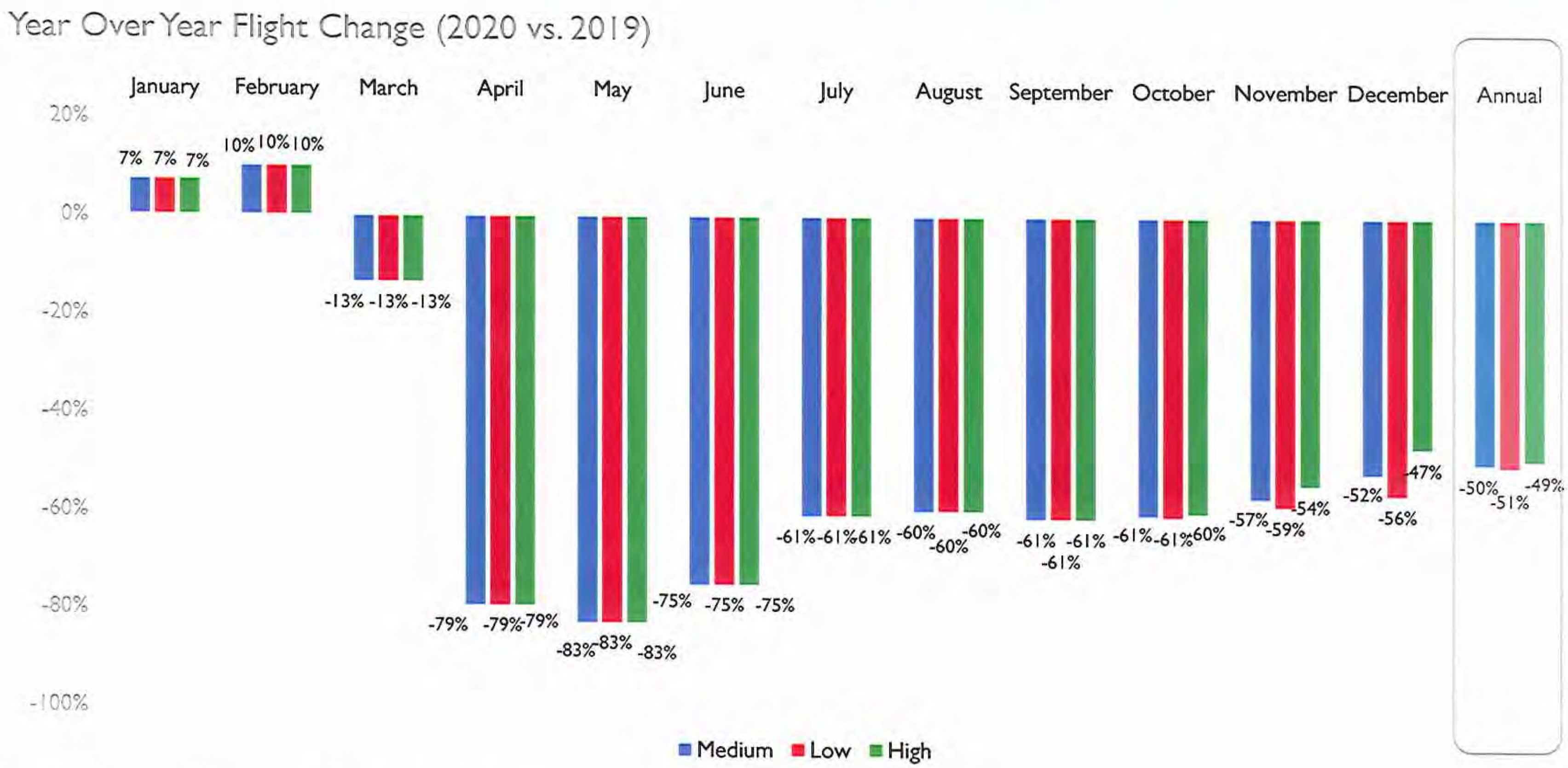
Source: Historical Passengers Based on T-100 Data, Future Passengers Based on Campbell-Hill assessment of schedule and airline trends.

RIC HISTORICAL AND OUTLOOK- MONTHLY FLIGHTS (INBOUND + OUTBOUND)



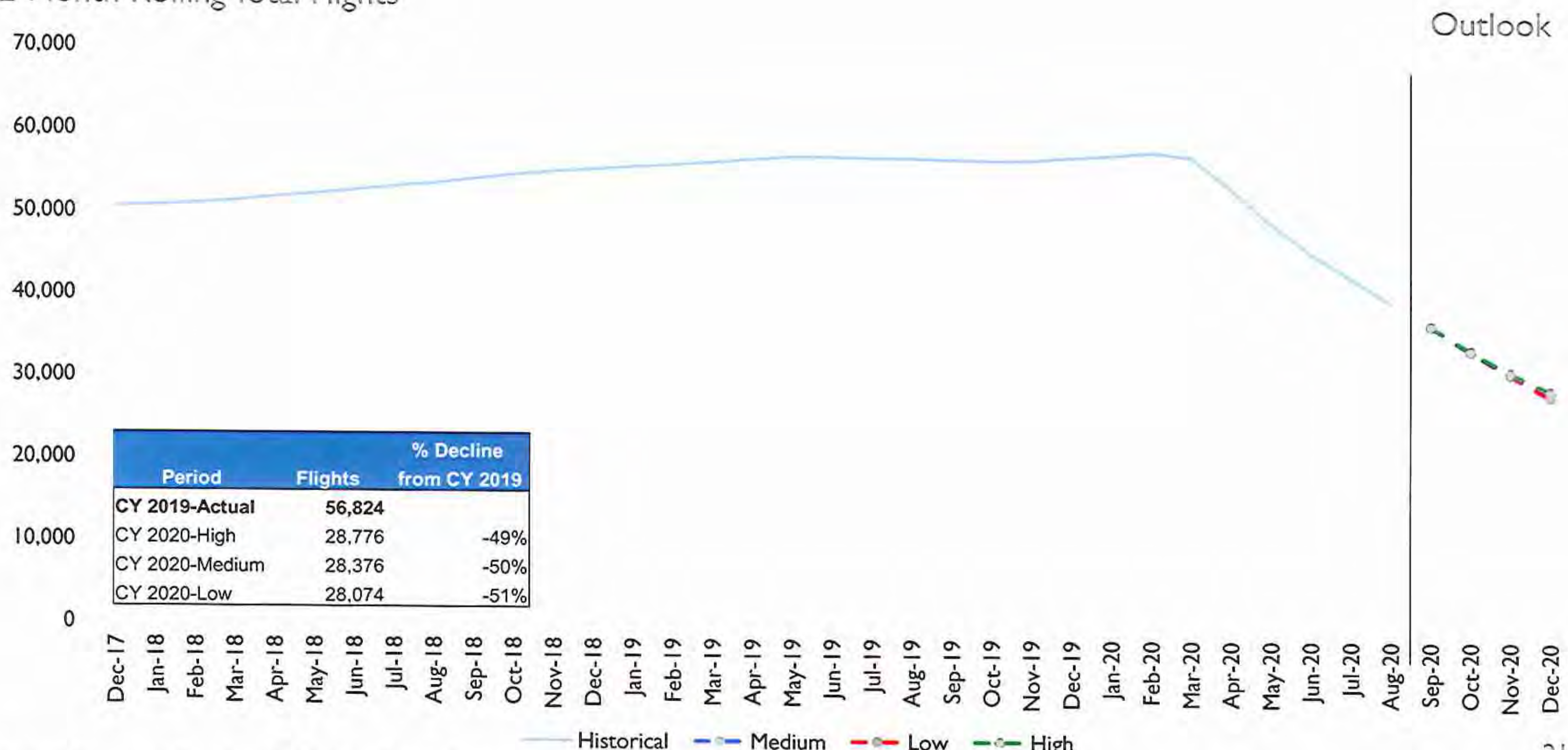
Source: Historical Passengers Based on T-100 Data. Future Passengers Based on Campbell-Hill assessment of schedule and airline trends.

RIC PERCENTAGE CHANGE-FLIGHTS (INBOUND + OUTBOUND)



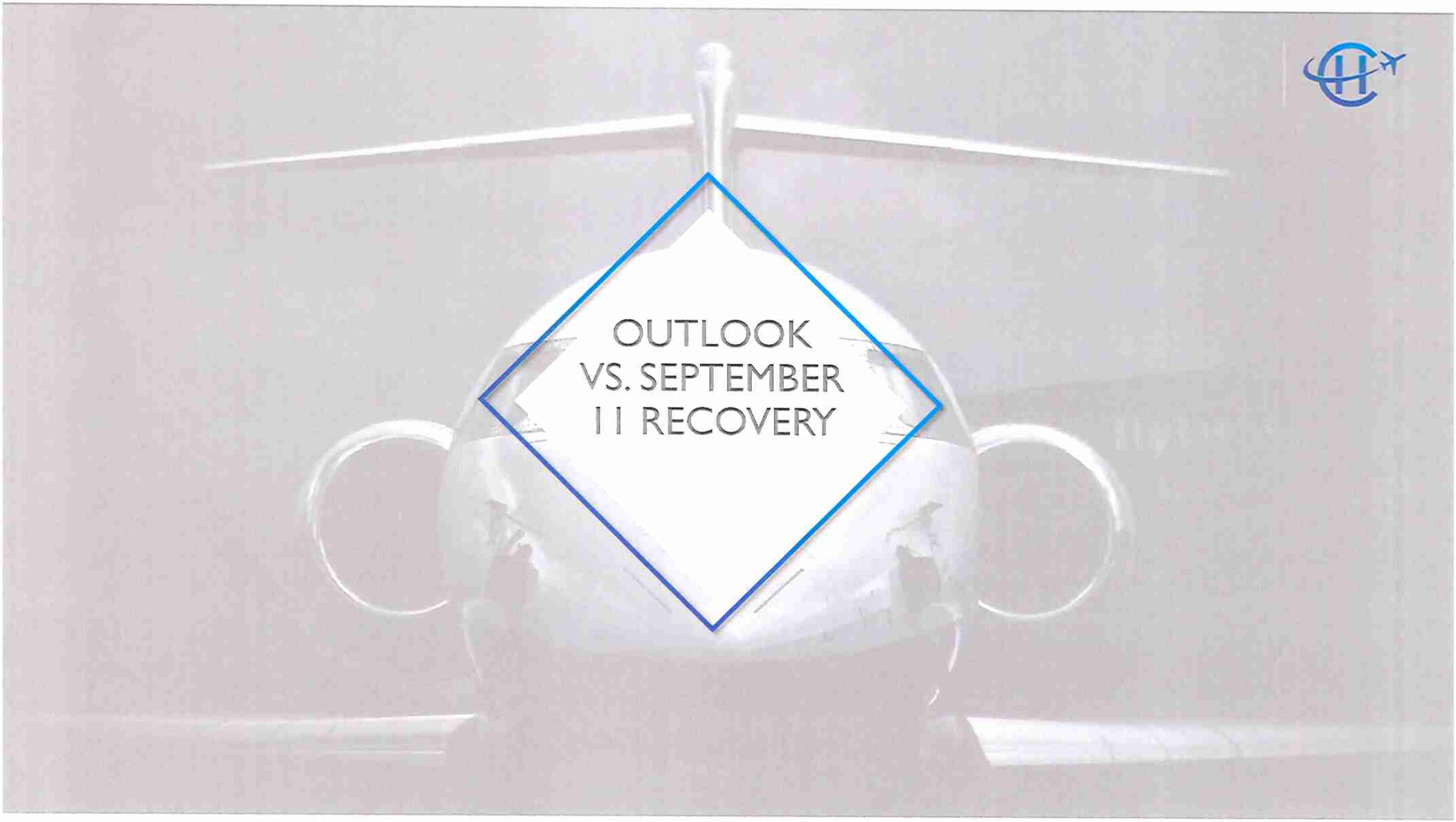
Source: Historical Passengers Based on T-100 Data. Future Passengers Based on Campbell-Hill assessment of schedule and airline trends.

RIC HISTORICAL AND OUTLOOK- ANNUAL FLIGHTS (INBOUND + OUTBOUND)

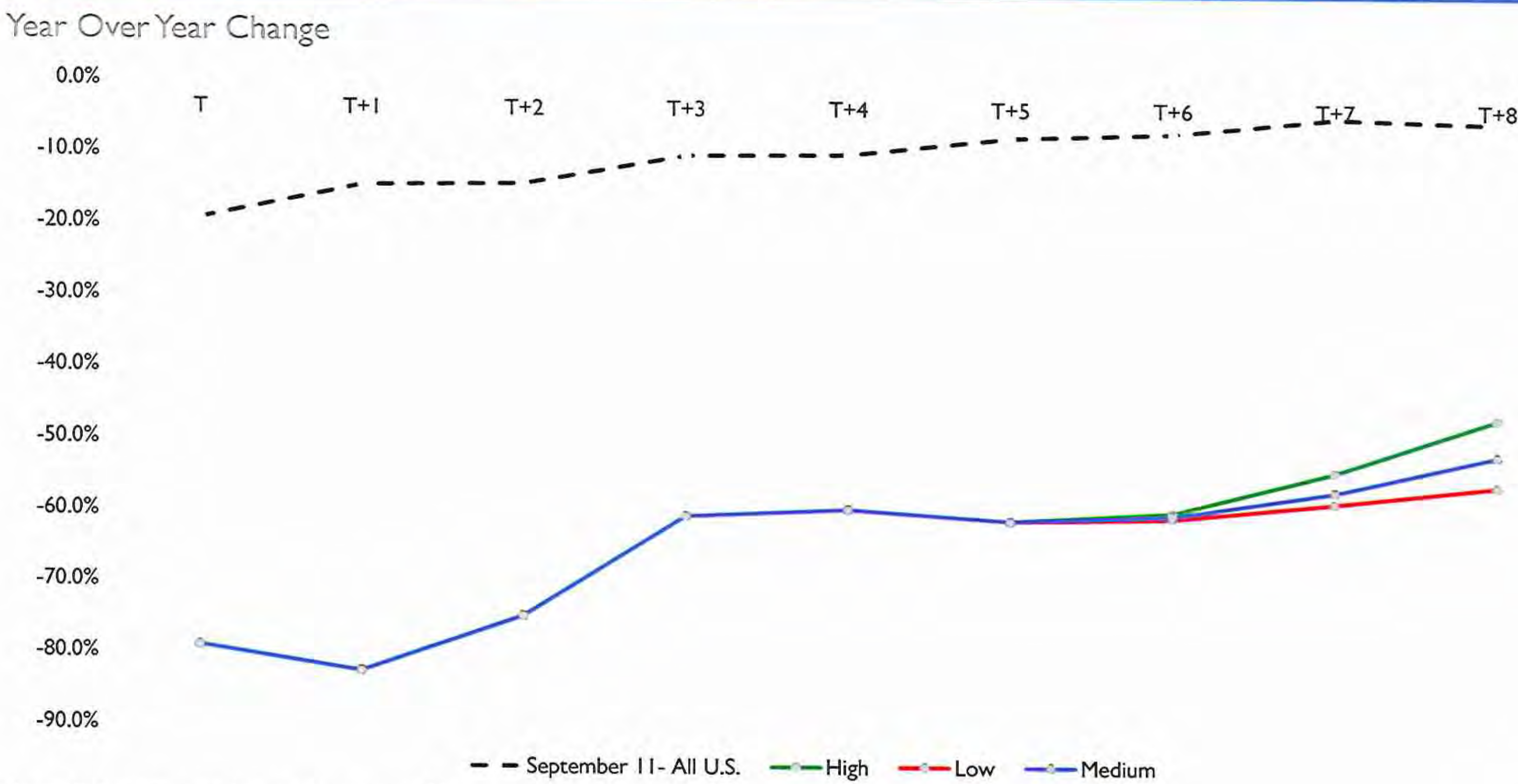


Period	Flights	% Decline from CY 2019
CY 2019-Actual	**56,824**	
CY 2020-High	28,776	-49%
CY 2020-Medium	28,376	-50%
CY 2020-Low	28,074	-51%

Source: Historical Passengers Based on T-100 Data. Future Passengers Based on Campbell-Hill assessment of schedule and airline trends.

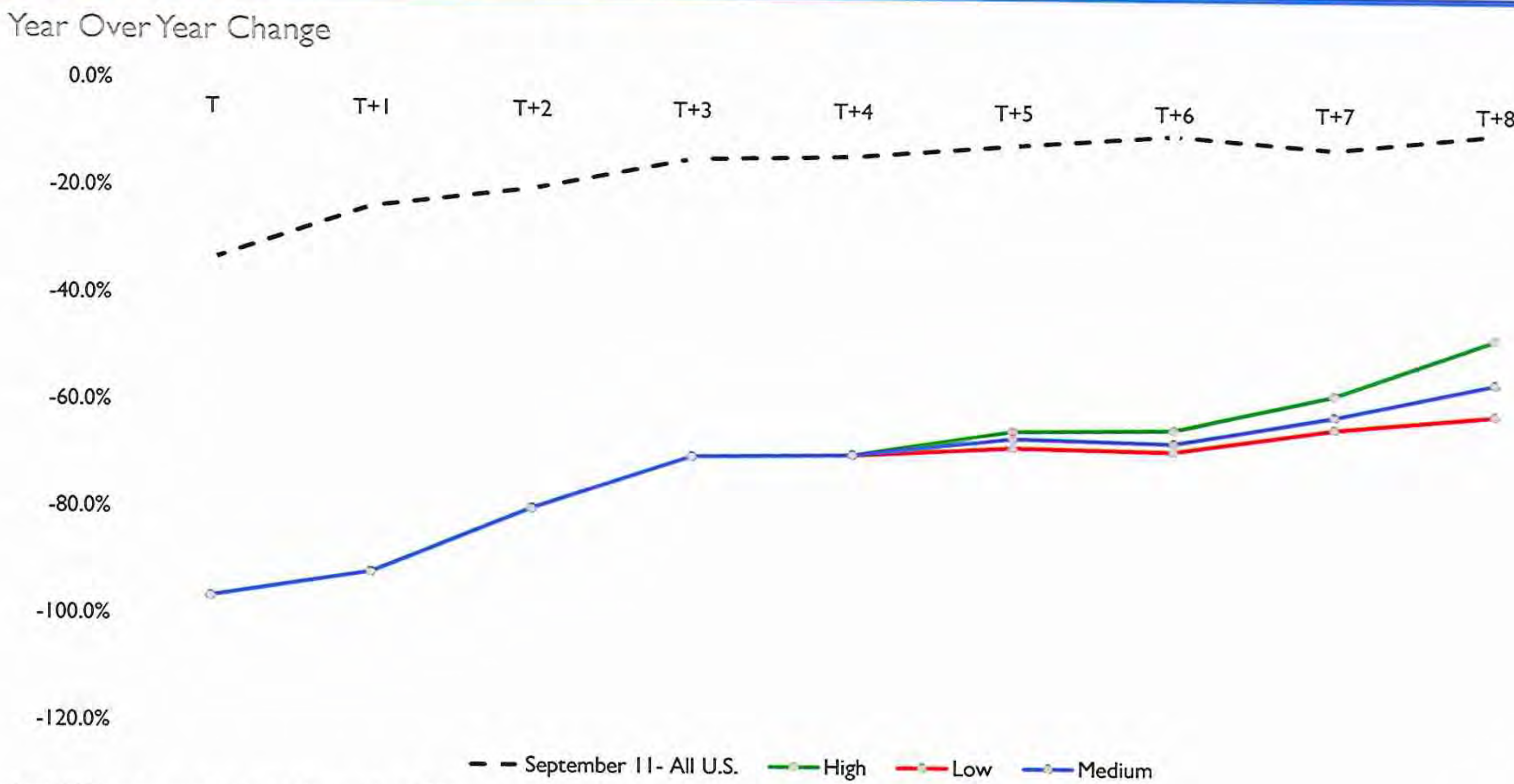

OUTLOOK
VS. SEPTEMBER
11 RECOVERY

FORECAST CHANGE TREND -FLIGHTS



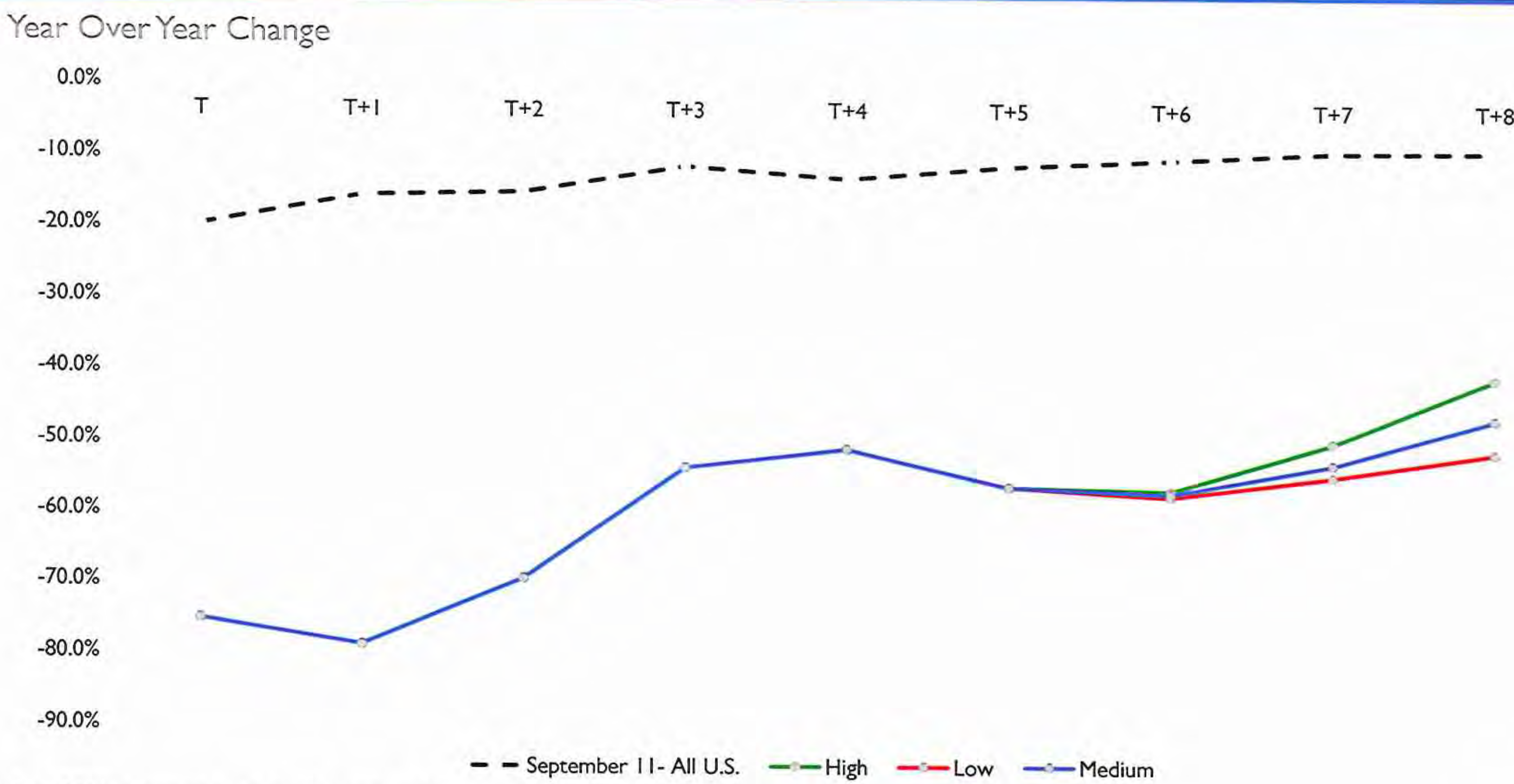
Note: T= April 2020 in current crisis and September 2001.
Source: Historical Passengers Based on T-100 Data, Future Passengers Based on Campbell-Hill assessment of schedule and airline trends.

FORECAST CHANGE TREND -ONBOARD PASSENGERS

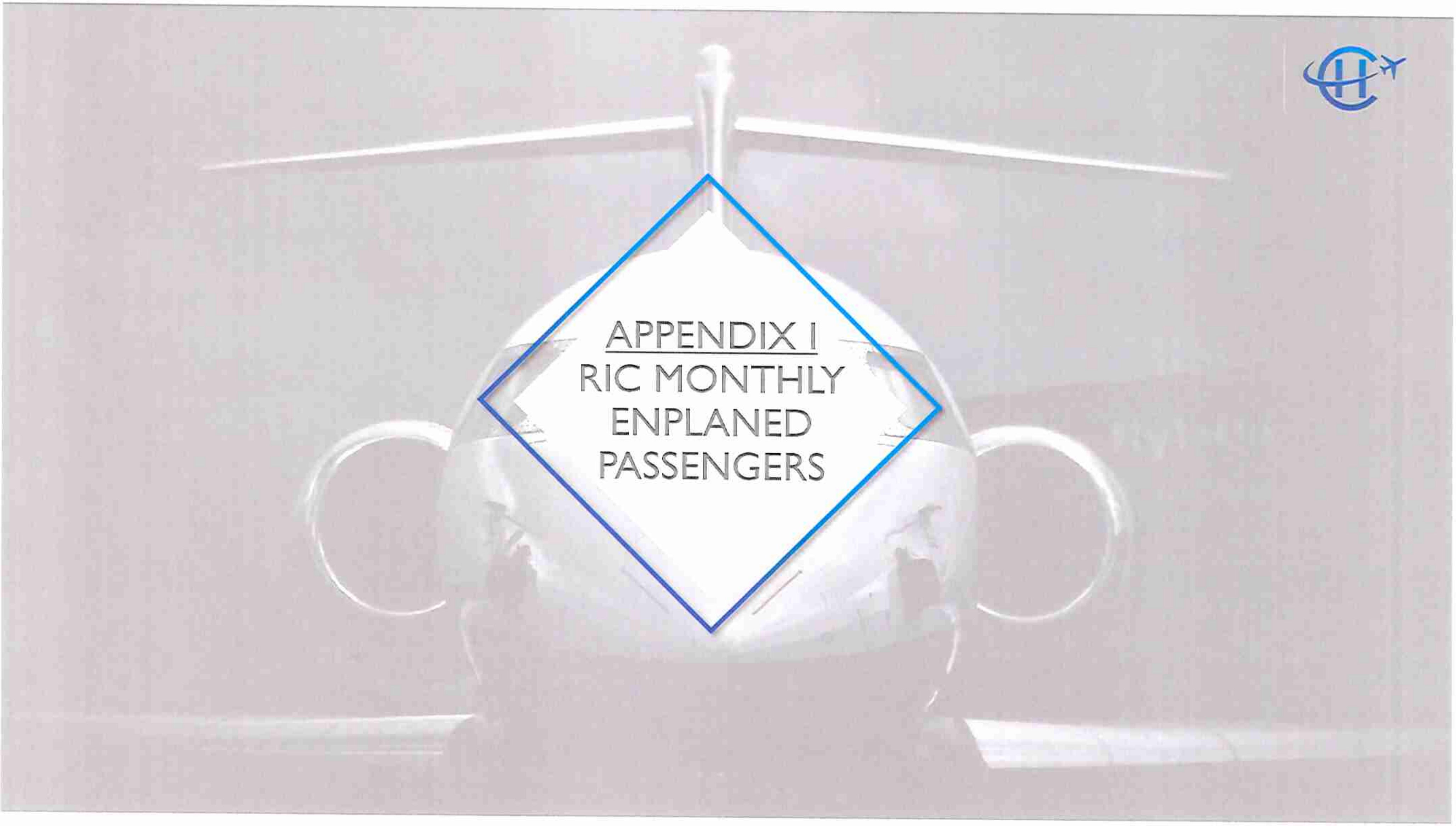


Note: T= April 2020 in current crisis and September 2001.
Source: Historical Passengers Based on T-100 Data, Future Passengers Based on Campbell-Hill assessment of schedule and airline trends.

FORECAST CHANGE TREND -SEATS



Note: T= April 2020 in current crisis and September 2001.
Source: Historical Passengers Based on T-100 Data. Future Passengers Based on Campbell-Hill assessment of schedule and airline trends.


APPENDIX I
RIC MONTHLY
ENPLANED
PASSENGERS

RIC ENPLANED PASSENGER MONTHLY DETAIL JANUARY 2020-JUNE 2021

RIC Enplanements by Scenario				
Month	Actual	High	**Medium**	Low
Jan-20	159,587			
Feb-20	156,776			
Mar-20	87,351			
Apr-20	7,289			
May-20	17,664			
Jun-20	39,097			
Jul-20	58,983			
Aug-20	60,949			
Sep-20		*61,714*	***59,428***	*56,381*
Oct-20		*69,405*	***64,572***	*61,461*
Nov-20		*79,204*	***71,771***	*67,428*
Dec-20		*103,905*	***87,611***	*75,973*
Jan-21		*88,112*	***81,699***	*68,289*
Feb-21		*99,209*	***90,372***	*77,153*
Mar-21		*137,337*	***117,387***	*107,854*
Apr-21		*141,644*	***133,005***	*114,315*
May-21		*152,453*	***144,360***	*125,813*
Jun-21		*173,171*	***149,437***	*129,019*

Source: Historical Passengers Based on RIC Data. Future Passengers Based on Campbell-Hill assessment of schedule and airline trends.

RIC ENPLANED PASSENGER GROWTH ASSUMPTIONS

- As shown in the previous slide, we forecasted monthly RIC passengers through FY 2021 based on a gradual recovery.
- FY 2022 enplaned passengers were forecasted as follows:
  - Medium Scenario: 39.7% estimated growth. This assumes capacity is 15% below FY 2019 levels during FY 2022. High growth rates are typical after significant shocks. New Orleans after Hurricane Katrina, San Juan after Hurricane Maria and Houston after Hurricane Harvey had 17%-50% rebounds in passengers after initial drastic declines.
  - High Scenario: 47.4% estimated growth. This assumes capacity is 5% below FY2019 levels during FY 2022.
  - Low Scenario: 30.1% estimated growth. This assumes capacity is 25% below FY2019 levels during FY 2022.
- FY 2023-25 enplaned passenger growth rates are as follows:
  - Medium Scenario: +17.3% in FY 2023, +10.4% in FY 2024 and +6.9% in FY 2025. The 6.9% in FY 2025 matches the RIC FY 2016-FY 2019 annual passenger growth rate.
  - High Scenario: +19.0% in FY 2023, +6.9% in FY 2024 and +4.3% in FY 2025. The 4.3% in FY 2025 matches the average RIC FY 2016-FY 2019 annual passenger growth rate and a long-term demographic/Terminal Area Forecast rate of 1.8%.
  - Low Scenario: +13.8% in FY 2023, +10.4% in FY 2024 and +12.1% in FY 2025.

RIC ENPLANEMENT FORECAST AND OUTLOOK SCENARIOS

Updated October 7, 2020

Campbell-Hill
Aviation Group, LLC

Preliminary 2020 TAF Scenarios:
Forecast Recovery Timeframe

The table below shows the year that total passenger enplanements and total commercial operations are forecast to return to their FY 2019 level under three scenarios for the large, medium, and small hubs. The forecast years for individual airports may vary from the forecast years for their aggregate hub group shown in the table.

	Large Hubs (30 airports): Aggregate back to FY 2019 level	
	Total Passenger Enplanements	Total Commercial Operations
Baseline scenario	FY 2025	FY 2025
Early Recovery scenario	FY 2024	FY 2024
Late Recovery scenario	FY 2029	FY 2029

	Medium Hubs (31 airports): Aggregate back to FY 2019 level	
	Total Passenger Enplanements	Total Commercial Operations
Baseline scenario	FY 2025	FY 2025
Early Recovery scenario	FY 2024	FY 2024
Late Recovery scenario	FY 2028	FY 2027

	Small Hubs (69 airports): Aggregate back to FY 2019 level	
	Total Passenger Enplanements	Total Commercial Operations
Baseline scenario	FY 2025	FY 2025
Early Recovery scenario	FY 2024	FY 2024
Late Recovery scenario	FY 2029	FY 2028

Technical Memorandum for 2020 TAF: Explanation of TAF Terminology and Forecasts for Passenger Enplanements and Commercial Operations

The purpose of this technical memorandum is to clarify the terminology used for passenger enplanements and commercial operations in the TAF. In recent years a misunderstanding regarding this terminology and forecasting assumptions has led to confusion about the TAF forecasts. This is especially true about the forecasts prepared using the Modernized TAF (TAF M) network model. This model is used to forecast those airports with more than 100,000 enplanements in the latest historic FY. In addition to clarifying the terminology an explanation of the forecast assumptions for aircraft reallocation and on demand air taxi operations is provided. This explains what may appear as an imbalance between the passenger enplanements and commercial operations presented in the TAF.

Terminology:

Air carrier enplanements: Sum of domestic and international revenue passenger enplanements on mainline US commercial air carriers plus international revenue passenger enplanements on mainline foreign flag air carriers. Mainline air carriers provide service primarily using aircraft with 90 or more seats.

Commuter enplanements: Sum of domestic and international revenue passenger enplanements on airlines whose primary function is providing feed to mainline carriers, regardless of aircraft size. Commuter airlines primarily operate aircraft with 89 or fewer seats.

Air carrier operations: Airport operations performed by aircraft with seating capacity of more than 60 seats or a maximum payload capacity of more than 18,000 pounds, carrying passengers or cargo for hire or compensation.

Air taxi/commuter operations: Airport operations performed by aircraft with seating capacity of 60 seats or less or a maximum payload of 18,000 pounds or less, carrying passengers or cargo for hire or compensation. Includes both scheduled commuter and on demand air taxi operations.

The discussion above highlights that the distinction between air carrier and commuter enplanements is generally a 90 seat breakpoint whereas the distinction between air carrier and air taxi/commuter operations is a 60 seat breakpoint. Therefore one cannot simply divide air carrier passenger enplanements by air carrier departures or commuter enplanements by commuter departures (i.e., air taxi/commuter departures minus on demand air taxi departures) to assess enplanements per departure by category. In addition, for many TAF M airports the air taxi/commuter operations show a decline for a period of time because of aircraft reallocation. As smaller RJs are replaced by larger RJs they shift from the air taxi/commuter operations category to the air carrier operations category. By FY 2032 all small RJs are assumed to leave and what is left in the air taxi/commuter operations category is primarily on demand air taxi operations. These operations are forecast to increase 1% per year.

Richmond International Airport

Master Plan Revision

Appendix D

Recommended Development Plan Cost Estimates

Kutchins & Groh

RICHMOND INTERNATIONAL AIRPORT

Richmond International Airport
Airport Master Plan Update
Opinion of Probable Costs

Project Number: 1-83
Project Description/Title: Concourse 'B' Apron Expansion

Work Item Description	Quantity	Unit	Unit Price	Total
Concourse 'B' Apron Expansion				
Apron Pavement	40,000	Square-Yard	$ 150.00	$ 6,000,000
			$ -	$ -
			$ -	$ -
			$ -	$ -
			$ -	$ -
			$ -	$ -
			$ -	$ -
			$ -	$ -
			$ -	$ -
			$ -	$ -

Sub-Total		**$ 6,000,000**
Mobilization	0%	$ -
Safety & Security	0%	$ -
Insurance & Bond	0%	$ -
Construction Total		**$ 6,000,000**
Design	10%	**$ 600,000**
Program Management	5%	**$ 300,000**
Contingency	10%	**$ 600,000**
Grand Total (FY21 USD)		**$ 7,500,000**

Assumptions

1. Proposed Concrete Pavement Section is 6-inch Crushed Aggregate Base Course (P-209) + 5-inch Cement Treated Base Course (P-304) + 15-inch
2.

Notes

1.
2.

Opinion of Probable Costs

Opinions of probable costs for individual projects are based on unconstrained funding and have been prepared for improvements identified to meet facility requirements. Since these probable costs are based on current year dollars, they are intended for planning purposes only and should not be used or construed as construction cost estimates. Formalized opinions of probable costs will be developed as part of each project’s scoping process during the design phase of the program. It is important to note that market demand, not occurrence within a specific time frame, will drive facility need. Additionally, the project list is flexible and evolving. For example, if a project is slated for year three of the Phasing Plan, this does not mean it needs to occur during this time. Project importance changes over time which may allow certain items to move up or down in the priority order.

Description

Insert Project Description Here

Richmond International Airport
Airport Master Plan Update
Opinion of Probable Costs

Project Number: 3-77
Project Description/Title: Future GA Development - South - Phase I - Road and Utilities

Work Item Description	Quantity	Unit	Unit Price	Total
Future GA Development - South - Phase I - Road and Utilities				
Access Road	2,800	Linear-Foot	$ 170.00	$ 476,000
Acces Road Grading	7,500	Cubic-Yard	$ 10.00	$ 75,000
Acces Road Drainage	2,800	Linear-Foot	$ 10.00	$ 28,000
Water Main	1,200	Linear-Foot	$ 140.00	$ 168,000
Sanitary Main	1,200	Linear-Foot	$ 40.00	$ 48,000
Dry Utilities	2,800	Linear-Foot	$ 200.00	$ 560,000
Utility Appurtenances	1	Lump Sum	$ 100,000.00	$ 100,000
Erosion & Sediment Control	3	Acre	$ 25,000.00	$ 75,000
Wetland Mitigation (GIS Wetlands)	1.3	Acre	$ 110,000.00	$ 143,000
Landscaping	1	Lump Sum	$ 75,000.00	$ 75,000
36" Culverts	300	Linear-Foot	$ 150.00	$ 45,000
		Sub-Total		**$ 1,793,000**
		Mobilization	10%	$ 179,300
		Safety & Security	3%	$ 53,790
		Insurance & Bond	3%	$ 53,790
		Construction Total		**$ 2,079,880**
		Design	12%	**$ 249,586**
		Program Management	5%	**$ 103,994**
		Contingency	10%	**$ 207,988**
		Grand Total (FY21 USD)		**$ 2,641,448**

Assumptions

1. Sanitary sewer is able to gravity-drain and connect to existing NE-SW main adjacent to the development.
2. Proposed water main is 8" DI and proposed sanitary main is 8" PVC.

Notes

1.
2.

Opinion of Probable Costs

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Description

This project is to construct a 2,800 foot long by 24 foot wide road with appropriate street lighting and drainage. Also included in this project are utilities to support the new GA Development including electricty, water, sewage, gas, and fire suppression.

Richmond International Airport
Airport Master Plan Update
Opinion of Probable Costs

Project Number: 6-70
Project Description/Title: Taxiway 'V' Reconfiguration

Work Item Description	Quantity	Unit	Unit Price	Total
Taxiway 'V' Reconfiguration				
Pavement Demo (asphalt & concrete)	7,500	Square-Yard	$ 20.00	$ 150,000
Site Utilities Demo (Storm, Airfield Electrical, etc.)	1	Lump Sum	$ 150,000.00	$ 150,000
Earthwork	4,000	Cubic-Yard	$ 25.00	$ 100,000
Storm Drainage	1	Lump Sum	$ 250,000.00	$ 250,000
Subgrade Stabilization	3,500	Square-Yard	$ 50.00	$ 175,000
Taxiway Pavement - Taxiway	9,500	Square-Yard	$ 110.00	$ 1,045,000
Taxiway Pavement - Shoulder	850	Square-Yard	$ 50.00	$ 42,500
Airfield Lighting, Signage & ALCMS Modifications	1	Lump Sum	$ 400,000.00	$ 400,000
Pavement Markings and Thermoplastic Signs	1	Lump Sum	$ 100,000.00	$ 100,000
			$ -	$ -
		Sub-Total		**$ 2,412,500**
		Mobilization	10%	$ 241,250
		Safety & Security	2%	$ 48,250
		Insurance & Bond	1.5%	$ 36,188
		Construction Total		**$ 2,738,188**
		Design	10%	**$ 273,819**
		Program Management	5%	**$ 136,909**
		Contingency	10%	**$ 273,819**
		Grand Total (FY21 USD)		**$ 3,422,734**

Assumptions

1. Existing Taxiway A Pavement is Concrete. It is assumed that this pavement section will remain as is, and only the left shoulder within the project limits will be reconstructed.
2. Pavement Design Criteria is FAA Airplane Design Group (ADG) IV and Taxiway Design Group (TDG) 5

Notes

1. Proposed Taxiway Pavement Section is 10-inch Cement Treated Base Course (P-304) + 6-inch Bituminous Asphalt Base Course (P-403) + 5-inch Bituminous Asphalt Surface Course (P-401)

2. Proposed Taxiway Shoulder Pavement Section is 6-inch Cement Treated Base Course (P-304) + 4-inch Bituminous Asphalt Surface Course (P-403)

Opinion of Probable Costs

Opinions of probable costs for individual projects are based on unconstrained funding and have been prepared for improvements identified to meet facility requirements. Since these probable costs are based on current year dollars, they are intended for planning purposes only and should not be used or construed as construction cost estimates. Formalized opinions of probable costs will be developed as part of each project's scoping process during the design phase of the program. It is important to note that market demand, not occurrence within a specific time frame, will drive facility need. Additionally, the project list is flexible and evolving. For example, if a project is slated for year three of the Phasing Plan, this does not mean it needs to occur during this time. Project importance changes over time which may allow certain items to move up or down in the priority order.

Description

The existing taxiway needs to meet FAA standard, this project consist of the removal of the existing pavement and adding new pavement for the taxiway and shoulder, lighting will also be included per the new taxiway geometery.

Richmond International Airport
Airport Master Plan Update
Opinion of Probable Costs

Project Number: 8-80
Project Description/Title: Taxiway 'E' Reconfiguration

Work Item Description	Quantity	Unit	Unit Price	Total
Taxiway 'E' Reconfiguration				
Pavement Demo (asphalt & concrete)	11,500	Square-Yard	$ 30.00	$ 345,000
Site Utilities Demo (Storm, Airfield Electrical incl Signs)	1	Lump Sum	$ 250,000.00	$ 250,000
Earthwork	7,000	Cubic-Yard	$ 25.00	$ 175,000
Storm Drainage	1	Lump Sum	$ 300,000.00	$ 300,000
Subgrade Stabilization	5,000	Square-Yard	$ 50.00	$ 250,000
Taxiway Pavement - Taxiway	51,250	Square-Yard	$ 110.00	$ 5,637,500
Taxiway Pavement - Shoulder	53,000	Square-Yard	$ 50.00	$ 2,650,000
Airfield Lighting, Signage & ALCMS Modifications	1	Lump Sum	$ 500,000.00	$ 500,000
Pavement Markings & Thermoplastic Signs	1	Lump Sum	$ 150,000.00	$ 150,000
			$ -	$ -

Sub-Total		**$ 10,257,500**
Mobilization	10%	$ 1,025,750
Safety & Security	2%	$ 205,150
Insurance & Bond	1.5%	$ 153,863
Construction Total		**$ 11,642,263**
Design	10%	**$ 1,164,226**
Program Management	5%	**$ 582,113**
Contingency	10%	**$ 1,164,226**
Grand Total (FY21 USD)		**$ 14,552,828**

Assumptions

1. Pavement Design Criteria is FAA Airplane Design Group (ADG) IV and Taxiway Design Group (TDG) 5
2.

Notes

1. Proposed Taxiway Pavement Section is 10-inch Cement Treated Base Course (P-304) + 6-inch Bituminous Asphalt Base Course (P-403) + 5-inch
2. Proposed Taxiway Shoulder Pavement Section is 6-inch Cement Treated Base Course (P-304) + 4-inch Bituminous Asphalt Surface Course (P-403)

Opinion of Probable Costs

Opinions of probable costs for individual projects are based on unconstrained funding and have been prepared for improvements identified to meet facility requirements. Since these probable costs are based on current year dollars, they are intended for planning purposes only and should not be used or construed as construction cost estimates. Formalized opinions of probable costs will be developed as part of each project's scoping process during the design phase of the program. It is important to note that market demand, not occurrence within a specific time frame, will drive facility need. Additionally, the project list is flexible and evolving. For example, if a project is slated for year three of the Phasing Plan, this does not mean it needs to occur during this time. Project importance changes over time which may allow certain items to move up or down in the priority order.

Description

The existing taxiway needs to meet FAA standard. This project consists of the removal of the existing pavement and adding new pavement for the taxiway and shoulder. Lighting will also be included per the new taxiway geometery.

Richmond International Airport
Airport Master Plan Update
Opinion of Probable Costs

Project Number: 10-96
Project Description/Title: Enclose Existing Ditch

Work Item Description	Quantity	Unit	Unit Price	Total
Enclose Existing Ditch				
Erosion & Sediment Control	1	Acre	$ 25,000.00	$ 25,000
Clearing and Grubbing	1	Acre	$ 20,000.00	$ 20,000
Fill & Rough Grading	20,000	Cubic-Yard	$ 25.00	$ 500,000
Proposed Storm Sewer	800	Linear-Foot	$ 550.00	$ 440,000
Stream Mitigation	800	Linear-Foot	$ 700.00	$ 560,000
Wetland Mitigation	0.2	Acre	$ 110,000.00	$ 22,000
			$ -	$ -
			$ -	$ -
			$ -	$ -
			$ -	$ -

Sub-Total		**$ 1,567,000**
Mobilization	0%	$ -
Safety & Security	0%	$ -
Insurance & Bond	0%	$ -
Construction Total		**$ 1,567,000**
Design	10%	**$ 156,700**
Program Management	5%	**$ 78,350**
Contingency	10%	**$ 156,700**
Grand Total (FY21 USD)		**$ 1,958,750**

Assumptions

1. Wetland and stream impacts are estimated based on delineation performed by Timmons Group and dated 03/05/2020.
2. Ex. ditch assumed to be piped through 60" RCP which willl connect to ex. culvert below East Side Lane.

Notes

1.
2.

Opinion of Probable Costs

Opinions of probable costs for individual projects are based on unconstrained funding and have been prepared for improvements identified to meet facility requirements. Since these probable costs are based on current year dollars, they are intended for planning purposes only and should not be used or construed as construction cost estimates. Formalized opinions of probable costs will be developed as part of each project’s scoping process during the design phase of the program. It is important to note that market demand, not occurrence within a specific time frame, will drive facility need. Additionally, the project list is flexible and evolving. For example, if a project is slated for year three of the Phasing Plan, this does not mean it needs to occur during this time. Project importance changes over time which may allow certain items to move up or down in the priority order.

Description

To be enclosed to make drainage on the Airfield more efficient, This project includes clearing and grubbing 46,700 sqft and also enclosing the existing 550 foot long ditch with box culverts.

Richmond International Airport
Airport Master Plan Update
Opinion of Probable Costs

Project Number: 11-100
Project Description/Title: Relocated ARFF

Work Item Description	Quantity	Unit	Unit Price	Total
Relocated ARFF				
Ex. Building Demolition	1	Lump Sum	$ 550,000.00	$ 550,000
Ex. Pavement Demolition	1	Lump Sum	$ 250,000.00	$ 250,000
Erosion Control	1	Lump Sum	$ 35,000.00	$ 35,000
Concrete Pavement (Vehicular)	75,000	Square-Foot	$ 10.00	$ 750,000
Asphalt Pavement (Vehicular)	30,000	Square-Foot	$ 6.00	$ 180,000
Fuel Island and Equipment (pumps, tanks, etc)	2	Each	$ 50,000.00	$ 100,000
Sanitary Sewer Extension	500	Linear-Foot	$ 40.00	$ 20,000
Sanitary Service to Building	1	Lump Sum	$ 40,000.00	$ 40,000
Water Service to Building	1	Lump Sum	$ 40,000.00	$ 40,000
Dry Utility (gas/fiber/telecom) Service	1	Lump Sum	$ 20,000.00	$ 20,000
Earthwork	4,000	Cubic-Yard	$ 10.00	$ 40,000
Lighting	1	Lump Sum	$ 20,000.00	$ 20,000
Building	21,000	Square-Foot	$ 300.00	$ 6,300,000

Sub-Total		**$ 8,345,000**
Mobilization	0%	$ -
Safety & Security	0%	$ -
Insurance & Bond	0%	$ -
Construction Total		**$ 8,345,000**
Design	10%	**$ 834,500**
Program Management	5%	**$ 417,250**
Contingency	10%	**$ 834,500**
Grand Total (FY21 USD)		**$ 10,431,250**

Assumptions

1. Cost estimate based on relocated ARFF location shown on Recommended Devlopment Plan laytout.
2. Building unit cost is based on recently completed ARFF projects at other airports and has not been provided by an architect.

Notes

1.
2.

Opinion of Probable Costs

Opinions of probable costs for individual projects are based on unconstrained funding and have been prepared for improvements identified to meet facility

Description

Insert Project Description Here

Richmond International Airport
Airport Master Plan Update
Opinion of Probable Costs

Project Number: 12-78
Project Description/Title: Future GA Development - South - Phase II - Apron

Work Item Description	Quantity	Unit	Unit Price	Total
Future GA Development - South - Phase II - Apron				
Pavement, Site Utilities & Electrical Demo	1	Lump Sum	$ 125,000.00	$ 125,000
Earthwork	30,000	Cubic-Yard	$ 25.00	$ 750,000
Storm Drainage	1	Lump Sum	$ 500,000.00	$ 500,000
Subgrade Stabilization	50,000	Square-Yard	$ 50.00	$ 2,500,000
Apron Pavement	78,725	Square-Yard	$ 55.00	$ 4,329,875
Taxiway Pavement (Connector Taxiways: 2) - Taxiway	6,700	Square-Yard	$ 110.00	$ 737,000
Taxiway Pavement (Connector Taxiways: 2) - Shoulder	4,200	Square-Yard	$ 50.00	$ 210,000
Airfield & Apron Lighting and Signage	1	Lump Sum	$ 300,000.00	$ 300,000
Pavement Markings	1	Lump Sum	$ 100,000.00	$ 100,000
			$ -	$ -

Sub-Total		**$ 9,551,875**
Mobilization	10%	$ 955,188
Safety & Security	2%	$ 191,038
Insurance & Bond	1.5%	$ 143,278
Construction Total		**$ 10,841,378**
Design	10%	**$ 1,084,138**
Program Management	5%	**$ 542,069**
Contingency	10%	**$ 1,084,138**
Grand Total (FY21 USD)		**$ 13,551,723**

Assumptions

1.
2.

Notes

1. Proposed Apron Pavement Section is 10-inch Cement Treated Base Course (P-304) + 4-inch Bituminous Asphalt Surface Course (P-401)

2. Proposed Taxiway Pavement Section is 10-inch Cement Treated Base Course (P-304) + 6-inch Bituminous Asphalt Base Course (P-403) + 5-inch
3. Proposed Taxiway Shoulder Pavement Section is 6-inch Cement Treated Base Course (P-304) + 4-inch Bituminous Asphalt Surface Course (P-403)

Opinion of Probable Costs

Opinions of probable costs for individual projects are based on unconstrained funding and have been prepared for improvements identified to meet facility requirements. Since these probable costs are based on current year dollars, they are intended for planning purposes only and should not be used or construed as construction cost estimates. Formalized opinions of probable costs will be developed as part of each project's scoping process during the design phase of the program. It is important to note that market demand, not occurrence within a specific time frame, will drive facility need. Additionally, the project list is flexible and evolving. For example, if a project is slated for year three of the Phasing Plan, this does not mean it needs to occur during this time. Project importance changes over time which may allow certain items to move up or down in the priority order.

Description

Phase II of this project consist of apron pavement of 708,500 sqft of pavment with two connector taxiway and shoulder. Also included in this project is lighting and striping for the two connecting taxiways.

Richmond International Airport
Airport Master Plan Update
Opinion of Probable Costs

Project Number: 13-86
Project Description/Title: CONRAC Expansion - Short Term

Work Item Description	Quantity	Unit	Unit Price	Total
CONRAC Expansion - Short Term				
CONRAC Building (Total SF includes both floors)	171,000	Square-Foot	$ 55.00	$ 9,405,000
Pavement Demolition	40,000	Square-Foot	$ 2.00	$ 80,000
Erosion & Sediment Control	10	Acre	$ 25,000.00	$ 250,000
Heavy-Duty Pavement	60,000	Square-Foot	$ 6.00	$ 360,000
Light-Duty Pavement	75,000	Square-Foot	$ 5.00	$ 375,000
Water Main	750	Linear-Foot	$ 140.00	$ 105,000
Water Appurtenances	1	Lump Sum	$ 50,000.00	$ 50,000
Storm Sewer & Inlets	1	Lump Sum	$ 200,000.00	$ 200,000
Earthwork & Rough Grading	50,000	Cubic-Yard	$ 10.00	$ 500,000
			$ -	$ -

Sub-Total		**$ 11,325,000**
Mobilization	0%	$ -
Safety & Security	0%	$ -
Insurance & Bond	0%	$ -
Construction Total		**$ 11,325,000**
Design	10%	**$ 1,132,500**
Program Management	5%	**$ 566,250**
Contingency	10%	**$ 1,132,500**
Grand Total (FY21 USD)		**$ 14,156,250**

Assumptions

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Notes

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Opinion of Probable Costs

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Description

The existing CONRAC garage is need of expansion to the north side of the existing garage. This project includes 171,000 sqft, 2 floor garage which will include all necessory utilities. (electricty, lighting, IT infastructure, fire suppression)

Richmond International Airport
Airport Master Plan Update
Opinion of Probable Costs

Project Number: 16-79
Project Description/Title: Future GA Development - South - Phase III - Hangars

Work Item Description	Quantity	Unit	Unit Price	Total
Future GA Development - South - Phase III - Hangars				
Hangars (8 at 15,000 Square-Feet)	120,000	Square-Foot	$ 165.00	$ 19,800,000
Hangars (1 at 40,000 Square-Feet)	40,000	Square-Foot	$ 165.00	$ 6,600,000
Hangars (1 at 50,000 Square-Feet)	50,000	Square-Foot	$ 165.00	$ 8,250,000
Parking	397,500	Square-Foot	$ 6.00	$ 2,385,000
Parking Drainage	397,500	Square-Foot	$ 2.00	$ 795,000
Parking Lot Lighting	1	Lump Sum	$ 50,000.00	$ 50,000
Earthwork & Rough Grading	80,000	Cubic-Yard	$ 10.00	$ 800,000
			$ -	$ -
			$ -	$ -
			$ -	$ -

Sub-Total		**$ 38,680,000**
Mobilization	0%	$ -
Safety & Security	0%	$ -
Insurance & Bond	0%	$ -
Construction Total		**$ 38,680,000**
Design	10%	**$ 3,868,000**
Program Management	5%	**$ 1,934,000**
Contingency	10%	**$ 3,868,000**
Grand Total (FY21 USD)		**$ 48,350,000**

Assumptions

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Notes

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Opinion of Probable Costs

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Description

This project will include 8 hangars of 15,000 sqft, 1 hangar of 40,000 sqft, and 1 hangar 50,000 sqft. All hangars will include Utilities such as elecitrity, lighting, IT Infastructure, and necessary fire suppression system.Also included in this project is a 397,500 sqft parking area with all the nessary striping, lighting, and drainage infastructure.

Richmond International Airport
Airport Master Plan Update
Opinion of Probable Costs

Project Number: 18-95
Project Description/Title: Future Apron Expansion (FBI Apron)

Work Item Description	Quantity	Unit	Unit Price	Total
Future Apron Expansion (FBI Apron)				
Pavement Demo (Taxiway Connectors)	10,275	Square-Yard	$ 20.00	$ 205,500
Utilities Demo (Storm, Water etc.)	1	Lump Sum	$ 100,000.00	$ 100,000
Earthwork	20,250	Cubic-Yard	$ 25.00	$ 506,250
Storm Drainage	1	Lump Sum	$ 845,000.00	$ 845,000
Glycol Collection Catch Basin Inserts	2	Each	$ 135,000.00	$ 270,000
Subgrade Stabilization	20,250	Square-Yard	$ 50.00	$ 1,012,500
Concrete Pavement	30,350	Square-Yard	$ 150.00	$ 4,552,500
Airfield Lighting, Signage & ALCMS Modifications	1	Lump Sum	$ 250,000.00	$ 250,000
Pavement Markings and Thermoplastic Signs	1	Lump Sum	$ 200,000.00	$ 200,000
			$ -	$ -
		Sub-Total		**$ 7,941,750**
		Mobilization	10%	$ 794,175
		Safety & Security	2%	$ 158,835
		Insurance & Bond	1.5%	$ 119,126
		Construction Total		**$ 9,013,886**
		Design	10%	**$ 901,389**
		Program Management	5%	**$ 450,694**
		Contingency	10%	**$ 901,389**
		Grand Total (FY21 USD)		**$ 11,267,358**

Assumptions

1. Existing Taxiway Connectors (2) are less than 20 years. So, the intent is to perform pavement demo upto Movement/ Non-Movement limits of TWY M
2. Pavement Design Criteria is FAA Airplane Design Group (ADG) IV and Taxiway Design Group (TDG) 5

Notes

1. Proposed Apron is 1100' x 250'
2. Proposed Concrete Pavement Section is 6-inch Crushed Aggregate Base Course (P-209) + 5-inch Cement Treated Base Course (P-304) + 15-inch
3. Aircraft Deicing Infrastructure included in this estimate

Opinion of Probable Costs

Opinions of probable costs for individual projects are based on unconstrained funding and have been prepared for improvements identified to meet facility requirements. Since these probable costs are based on current year dollars, they are intended for planning purposes only and should not be used or construed as construction cost estimates. Formalized opinions of probable costs will be developed as part of each project's scoping process during the design phase of the program. It is important to note that market demand, not occurrence within a specific time frame, will drive facility need. Additionally, the project list is flexible and evolving. For example, if a project is slated for year three of the Phasing Plan, this does not mean it needs to occur during this time. Project importance changes over time which may allow certain items to move up or down in the priority order.

Description

This project is to expand the existing FBI Apron, including 258,500 sqft of apron pavment and two connector taxiway with all the necessary lighting and striping.

Richmond International Airport
Airport Master Plan Update
Opinion of Probable Costs

Project Number: 19-75
Project Description/Title: Relocated Cargo Facilities

Work Item Description	Quantity	Unit	Unit Price	Total
Relocated Cargo Facilities				
Warehousing (1 at 270,000 SF)	270,000	Square-Foot	$ -	$ -
Office (Within warehouse - 5%)	21,600	Square-Foot	$ -	$ -
Warehousing (1 at 160,500 SF)	160,500	Square-Foot	$ -	$ -
Office (Within warehouse - 5%)	8,025	Square-Foot	$ -	$ -
Parking (Total SF)	800,000	Square-Foot	$ 6.00	$ 4,800,000
Parking Lot Drainage	800,000	Square-Foot	$ 2.00	$ 1,600,000
Taxiway Pavement (Connector Taxiways: 2) - Taxiway	7,050	Square-Yard	$ 110.00	$ 775,500
Taxiway Pavement (Connector Taxiways: 2) - Shoulder	3,200	Square-Foot	$ 50.00	$ 160,000
Apron Pavement (Concrete)	103,200	Square-Yard	$ 150.00	$ 15,480,000
Glycol Collection Catch Basin Inserts	4	Each	$ 135,000.00	$ 540,000
Access Road	4,650	Linear-Foot	$ 170.00	$ 790,500
Earthwork & Rough Grading	350,000	Cubic-Yard	$ 10.00	$ 3,500,000
Wet Utility Connections	3	Lump Sum	$ 40,000.00	$ 120,000
Utility Relocations	4,000	Linear-Foot	$ 25.00	$ 100,000
Wetland Mitigation (GIS Wetlands)	2.00	Acre	$ 110,000.00	$ 220,000

Sub-Total		**$ 28,086,000**
Mobilization	0%	$ -
Safety & Security	0%	$ -
Insurance & Bond	0%	$ -
Construction Total		**$ 28,086,000**
Design	10%	**$ 2,808,600**
Program Management	5%	**$ 1,404,300**
Contingency	10%	**$ 2,808,600**
Grand Total (FY21 USD)		**$ 35,107,500**

Assumptions

1. Pavement Design Criteria is FAA Airplane Design Group (ADG) IV and Taxiway Design Group (TDG) 5
2.Wetland impacts are estimated based on NWI wetlands database and have not been field-verified.

Notes

1. Proposed Concrete Pavement Section is 6-inch Crushed Aggregate Base Course (P-209) + 5-inch Cement Treated Base Course (P-304) + 15-inch
2. Proposed Taxiway Pavement Section is 10-inch Cement Treated Base Course (P-304) + 6-inch Bituminous Asphalt Base Course (P-403) + 5-inch
3. Proposed Taxiway Shoulder Pavement Section is 6-inch Cement Treated Base Course (P-304) + 4-inch Bituminous Asphalt Surface Course (P-403)

Opinion of Probable Costs

Opinions of probable costs for individual projects are based on unconstrained funding and have been prepared for improvements identified to meet facility

Description

Insert Project Description Here

Richmond International Airport
Airport Master Plan Update
Opinion of Probable Costs

Project Number: 22-87
Project Description/Title: Concourse 'A' Expansion

Work Item Description	Quantity	Unit	Unit Price	Total
Concourse 'A' Expansion				
Terminal Building	43,300	Square-Foot	$ 525.00	$ 22,732,500
Terminal Gates (7) Jetbridges	7	Each	$ 900,000.00	$ 6,300,000
Aircraft Parking Positions (9)	1	Lump Sum	$ 150,000.00	$ 150,000
Apron Pavement	3,050	Square-Yard	$ 150.00	$ 457,500
			$ -	$ -
			$ -	$ -
			$ -	$ -
			$ -	$ -
			$ -	$ -
			$ -	$ -

Sub-Total		**$ 29,640,000**
Mobilization	10%	$ 2,964,000
Safety & Security	2%	$ 592,800
Insurance & Bond	1.5%	$ 444,600
Construction Total		**$ 33,641,400**
Design	10%	**$ 3,364,140**
Program Management	5%	**$ 1,682,070**
Contingency	10%	**$ 3,364,140**
Grand Total (FY21 USD)		**$ 42,051,750**

Assumptions

1.
2.

Notes

1. Proposed Concrete Pavement Section is 6-inch Crushed Aggregate Base Course (P-209) + 5-inch Cement Treated Base Course (P-304) + 15-inch
2.

Opinion of Probable Costs

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Description

7 gate expansion

Richmond International Airport
Airport Master Plan Update
Opinion of Probable Costs

Project Number: 24-83
Project Description/Title: Concourse 'B' Expansion

Work Item Description	Quantity	Unit	Unit Price	Total
Concourse 'B' Expansion				
Terminal Building	56,400	Square-Foot	$ 525.00	$ 29,610,000
Terminal Gates (9) Jetbridges	9	Each	$ 900,000.00	$ 8,100,000
Aircraft Parking Positions (11)	1	Lump Sum	$ 200,000.00	$ 200,000
Apron Pavement	4,800	Square-Yard	$ 150.00	$ 720,000
			$ -	$ -
			$ -	$ -
			$ -	$ -
			$ -	$ -
			$ -	$ -
			$ -	$ -

Sub-Total		**$ 38,630,000**
Mobilization	10%	$ 3,863,000
Safety & Security	2%	$ 772,600
Insurance & Bond	1.5%	$ 579,450
Construction Total		**$ 43,845,050**
Design	10%	**$ 4,384,505**
Program Management	5%	**$ 2,192,253**
Contingency	10%	**$ 4,384,505**
Grand Total (FY21 USD)		**$ 54,806,313**

Assumptions

1. Apron Pavement area is extrapolated from Concouse "A" Expansion estimated quantity
2.

Notes

1. Proposed Concrete Pavement Section is 6-inch Crushed Aggregate Base Course (P-209) + 5-inch Cement Treated Base Course (P-304) + 15-inch
2.

Opinion of Probable Costs

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Description

Insert Project Description Here

Richmond International Airport
Airport Master Plan Update
Opinion of Probable Costs

Project Number: 40-12
Project Description/Title: Federal Inspection Station (FIS) expansion

Work Item Description	Quantity	Unit	Unit Price	Total
Federal Inspection Station (FIS) expansion				
Total Cost Estimate	1	Lump Sum	$ 6,300,000.00	$ 6,300,000
			$ -	$ -
			$ -	$ -
			$ -	$ -
			$ -	$ -
			$ -	$ -
			$ -	$ -
			$ -	$ -
			$ -	$ -
			$ -	$ -

Sub-Total		**$ 6,300,000**
Mobilization	0%	$ -
Safety & Security	0%	$ -
Insurance & Bond	0%	$ -
Construction Total		**$ 6,300,000**
Design	10%	**$ 630,000**
Program Management	5%	**$ 315,000**
Contingency	10%	**$ 630,000**
Grand Total (FY21 USD)		**$ 7,875,000**

Assumptions

1.
2.

Notes

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Opinion of Probable Costs

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Description

Insert Project Description Here

Richmond International Airport
Airport Master Plan Update
Opinion of Probable Costs

Project Number: 41-102
Project Description/Title: Reconstruct Mid-Concourse Apron - Asphalt to Concrete - Construction

Work Item Description	Quantity	Unit	Unit Price	Total
Reconstruct Mid-Concourse Apron - Asphalt to Concrete - Construction				
Pavement Demo (asphalt)	15,000	Square-Yard	$ 20.00	$ 300,000
Earthwork	5,000	Cubic-Yard	$ 25.00	$ 125,000
Subgrade Stabilization	5,000	Square-Yard	$ 50.00	$ 250,000
Concrete Pavement (26" Thickness)	15,000	Square-Yard	$ 150.00	$ 2,250,000
Pavement Markings including Gate Markings	1	Lump Sum	$ 200,000.00	$ 200,000
			$ -	$ -
			$ -	$ -
			$ -	$ -
			$ -	$ -
			$ -	$ -

Sub-Total		**$ 3,125,000**
Mobilization	10%	$ 312,500
Safety & Security	2%	$ 62,500
Insurance & Bond	1.5%	$ 46,875
Construction Total		**$ 3,546,875**
Design	10%	**$ 354,688**
Program Management	5%	**$ 177,344**
Contingency	10%	**$ 354,688**
Grand Total (FY21 USD)		**$ 4,433,594**

Assumptions

1. Pavement Design Criteria is FAA Airplane Design Group (ADG) IV
2.

Notes

1. Proposed Concrete Pavement Section is 6-inch Crushed Aggregate Base Course (P-209) + 5-inch Cement Treated Base Course (P-304) + 15-inch Portland Cement Concrete Pavement (PCC).
2.

Opinion of Probable Costs

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Description

This project is to replace the existing asphalt pavement with concrete pavement.

Richmond International Airport
Airport Master Plan Update
Opinion of Probable Costs

Project Number: 44-61
Project Description/Title: Taxiway 'C' and 'A' Reconfiguration

Work Item Description	Quantity	Unit	Unit Price	Total
Taxiway 'C' and 'A' Reconfiguration				
Pavement Demo (asphalt & concrete)	10,000	Square-Yard	$ 30.00	$ 300,000
Site Utilities Demo (storm, airfield electrical incl signs)	1	Lump Sum	$ 250,000.00	$ 250,000
Earthwork	7,000	Cubic-Yard	$ 25.00	$ 175,000
Storm Drainage	1	Lump Sum	$ 300,000.00	$ 300,000
Subgrade Stabilization	5,000	Square-Yard	$ 50.00	$ 250,000
Taxiway Pavement - Taxiway	45,000	Square-Yard	$ 110.00	$ 4,950,000
Taxiway Pavement - Shoulder	46,500	Square-Yard	$ 50.00	$ 2,325,000
Airfield Lighting, Signage & ALCMS Modifications	1	Lump Sum	$ 500,000.00	$ 500,000
Pavement Markings & Thermoplastic Signs	1	Lump Sum	$ 150,000.00	$ 150,000
			$ -	$ -

Sub-Total		**$ 9,200,000**
Mobilization	10%	$ 920,000
Safety & Security	2%	$ 184,000
Insurance & Bond	1.5%	$ 138,000
Construction Total		**$ 10,442,000**
Design	10%	**$ 1,044,200**
Program Management	5%	**$ 522,100**
Contingency	10%	**$ 1,044,200**
Grand Total (FY21 USD)		**$ 13,052,500**

Assumptions

1. 150' wide taxiway with 35' shoulders
2. Pavement Design Criteria is FAA Airplane Design Group (ADG) IV and Taxiway Design Group (TDG) 5

Notes

1. Proposed Taxiway Pavement Section is 10-inch Cement Treated Base Course (P-304) + 6-inch Bituminous Asphalt Base Course (P-403) + 5-inch Bituminous Asphalt Surface Course (P-401)

2. Proposed Taxiway Shoulder Pavement Section is 6-inch Cement Treated Base Course (P304) + 4-inch Bituminous Asphalt Surface Course (P-403)

Opinion of Probable Costs

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Description

The existing taxiway needs to meet FAA standard. This project consists of the removal of the existing pavement and adding new pavement for the taxiway and the shoulder. Lighting will also be included per the new taxiway geometry.

Richmond International Airport
Airport Master Plan Update
Opinion of Probable Costs

Project Number: 45-51
Project Description/Title: Taxiway 'J' 'K' and 'T' Reconstruction

Work Item Description	Quantity	Unit	Unit Price	Total
Taxiway 'J' 'K' and 'T' Reconstruction				
Pavement Demo (asphalt)	14,000	Square-Yard	$ 20.00	$ 280,000
Utilities Demo (storm, airfield electrical incl signs)	1	Lump Sum	$ 100,000.00	$ 100,000
Earthwork	5,000	Cubic-Yard	$ 25.00	$ 125,000
Storm Drainage	1	Lump Sum	$ 300,000.00	$ 300,000
Subgrade Stabilization	5,000	Square-Yard	$ 50.00	$ 250,000
Taxiway Pavement - Taxiway	8,000	Square-Yard	$ 110.00	$ 880,000
Taxiway Pavement - Shoulder	2,000	Square-Yard	$ 50.00	$ 100,000
Airfield Lighting, Signage & ALCMS Modifications	1	Lump Sum	$ 500,000.00	$ 500,000
Pavement Markings & Thermoplastic Signs	1	Lump Sum	$ 150,000.00	$ 150,000
			$ -	$ -
		Sub-Total		**$ 2,685,000**
		Mobilization	10%	$ 268,500
		Safety & Security	2%	$ 53,700
		Insurance & Bond	1.5%	$ 40,275
		Construction Total		**$ 3,047,475**
		Design	10%	**$ 304,748**
		Program Management	5%	**$ 152,374**
		Contingency	10%	**$ 304,748**
		Grand Total (FY21 USD)		**$ 3,809,344**

Assumptions

1. Reconstructed taxiways sizes and configuration will remain the same as existing
2.

Notes

1. Proposed Taxiway Pavement Section is 10-inch Cement Treated Base Course (P-304) + 6-inch Bituminous Asphalt Base Course (P-403) + 5-inch Bituminous Asphalt Surface Course (P-401)

2. Proposed Taxiway Shoulder Pavement Section is 6-inch Cement Treated Base Course (P-304) + 4-inch Bituminous Asphalt Surface Course (P-403)

Opinion of Probable Costs

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Description

Insert Project Description Here

Richmond International Airport
Airport Master Plan Update
Opinion of Probable Costs

Project Number: 46-39
Project Description/Title: Taxiway 'H' Reconstruction

Work Item Description	Quantity	Unit	Unit Price	Total
Taxiway 'H' Reconstruction				
Pavement Demo (concrete)	10,750	Square-Yard	$ 20.00	$ 215,000
Site Utilities Demo (Storm, Airfield Electrical incl Signs)	1	Lump Sum	$ 250,000.00	$ 250,000
Earthwork	12,250	Cubic-Yard	$ 25.00	$ 306,250
Storm Drainage	1	Lump Sum	$ 500,000.00	$ 500,000
Subgrade Stabilization	6,500	Square-Yard	$ 50.00	$ 325,000
Taxiway Pavement - Taxiway	10,750	Square-Yard	$ 110.00	$ 1,182,500
Taxiway Pavement - Shoulder	8,750	Square-Yard	$ 50.00	$ 437,500
Airfield Lighting, Signage & ALCMS Modifications	1	Lump Sum	$ 600,000.00	$ 600,000
Pavement Markings & Thermoplastic Signs	1	Lump Sum	$ 150,000.00	$ 150,000
			$ -	$ -

Sub-Total		**$ 3,966,250**
Mobilization	10%	$ 396,625
Safety & Security	2%	$ 79,325
Insurance & Bond	1.5%	$ 59,494
Construction Total		**$ 4,501,694**
Design	10%	**$ 450,169**
Program Management	5%	**$ 225,085**
Contingency	10%	**$ 450,169**
Grand Total (FY21 USD)		**$ 5,627,117**

Assumptions

1. Taxiway width is 75 feet and Shoulder width is 30 feet to match with Runway 725 Conversion to Taxiway H pavement design.
2. Pavement Design Criteria is FAA Airplane Design Group (ADG) IV and Taxiway Design Group (TDG) 5

Notes

1. Proposed Taxiway Pavement Section is 10-inch Cement Treated Base Course (P-304) + 6-inch Bituminous Asphalt Base Course (P-403) + 5-inch Bituminous Asphalt Surface Course (P-401)

2. Proposed Taxiway Shoulder Pavement Section is 6-inch Cement Treated Base Course (P-304) + 4-inch Bituminous Asphalt Surface Course (P-403)

Opinion of Probable Costs

Opinions of probable costs for individual projects are based on unconstrained funding and have been prepared for improvements identified to meet facility requirements. Since these probable costs are based on current year dollars, they are intended for planning purposes only and should not be used or construed as construction cost estimates. Formalized opinions of probable costs will be developed as part of each project’s scoping process during the design phase of the program. It is important to note that market demand, not occurrence within a specific time frame, will drive facility need. Additionally, the project list is flexible and evolving. For example, if a project is slated for year three of the Phasing Plan, this does not mean it needs to occur during this time. Project importance changes over time which may allow certain items to move up or down in the priority order.

Description

This project consists of concrete pavement removal and replacement with asphalt pavement and new asphalt pavement shoulders. The airfield lighting will also be included per the new taxiway geometry.

Richmond International Airport
Airport Master Plan Update
Opinion of Probable Costs

Project Number: 47-101
Project Description/Title: East Side apron 5 Construction

Work Item Description	Quantity	Unit	Unit Price	Total
East Side apron 5 Construction				
Site Utilities Demo (Storm, Water, Electrical)	1	Lump Sum	$ 150,000.00	$ 150,000
Earthwork	25,000	Cubic-Yard	$ 25.00	$ 625,000
Storm Drainage	1	Lump Sum	$ 500,000.00	$ 500,000
Glycol Collection Catch Basin Inserts	2	Each	$ 135,000.00	$ 270,000
Subgrade Stabilization	25,000	Square-Yard	$ 50.00	$ 1,250,000
Apron Pavement (concrete)	65,000	Square-Yard	$ 150.00	$ 9,750,000
Taxiway Pavement (Connector Taxiways: 2) - Taxiway	6,000	Square-Yard	$ 110.00	$ 660,000
Taxiway Pavement (Connector Taxiways: 2) - Shoulder	3,000	Square-Yard	$ 50.00	$ 150,000
Airfield & Apron Lighting and Signage	1	Lump Sum	$ 300,000.00	$ 300,000
Pavement Markings	1	Lump Sum	$ 150,000.00	$ 150,000
			$ -	$ -

Sub-Total		**$ 13,805,000**
Mobilization	10%	$ 1,380,500
Safety & Security	2%	$ 276,100
Insurance & Bond	1.5%	$ 207,075
Construction Total		**$ 15,668,675**
Design	10%	**$ 1,566,868**
Program Management	5%	**$ 783,434**
Contingency	10%	**$ 1,566,868**
Grand Total (FY21 USD)		**$ 19,585,844**

Assumptions

1. Pavement Design Criteria is FAA Airplane Design Group (ADG) IV and Taxiway Design Group (TDG) 5
2.

Notes

1. Proposed Taxiway Pavement Section is 10-inch Cement Treated Base Course (P-304) + 6-inch Bituminous Asphalt Base Course (P-403) + 5-inch
2. Proposed Taxiway Shoulder Pavement Section is 6-inch Cement Treated Base Course (P-304) + 4-inch Bituminous Asphalt Surface Course (P-403)
3. Proposed Concrete Pavement Section is 6-inch Crushed Aggregate Base Course (P-209) + 5-inch Cement Treated Base Course (P-304) + 15-inch
4. Aircraft Deicing Infrastructure included in this estimate

Opinion of Probable Costs

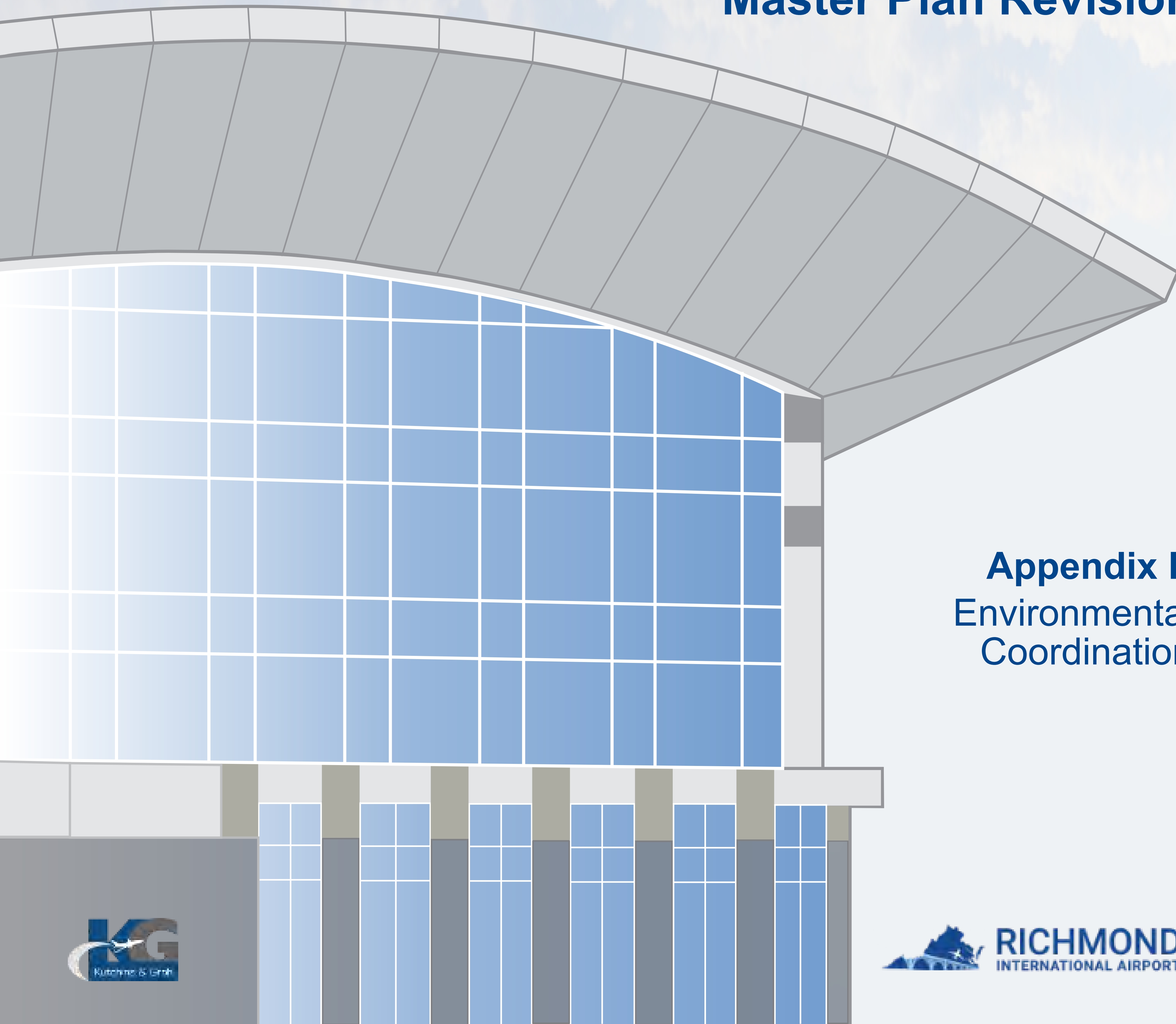
Opinions of probable costs for individual projects are based on unconstrained funding and have been prepared for improvements identified to meet facility requirements. Since these probable costs are based on current year dollars, they are intended for planning purposes only and should not be used or construed as construction cost estimates. Formalized opinions of probable costs will be developed as part of each project's scoping process during the design phase of the program. It is important to note that market demand, not occurrence within a specific time frame, will drive facility need. Additionally, the project list is flexible and evolving. For example, if a project is slated for year three of the Phasing Plan, this does not mean it needs to occur during this time. Project importance changes over time which may allow certain items to move up or down in the priority order.

Description

Insert Project Description Here

Richmond International Airport

Master Plan Revision



Appendix E

Environmental Coordination

Kutchins & Groh

RICHMOND INTERNATIONAL AIRPORT

January 27, 2020

Silvia. B. Gazzera, Ph.D.
Environmental Scientist
U.S. Army Corps of Engineers
9100 Arboretum Parkway, Suite 235
Richmond Virginia 23236

RE: Richmond International Airport (RIC) Master Plan Revision
Solicitation of Views Letter for Environmental Inventory and Overview Coordination

Dear Ms. Gazzera:

The Richmond International Airport (RIC) in Richmond, Virginia, is preparing a revision to its Master Plan, which will examine demands and needs of the Airport over the next 20 years and identify a multi-step Capital Development Program.

On behalf of the Airport, Kutchins & Groh is assessing needs and identifying issues that may impact the development of the Airport over the short-term (0–5 years), intermediate-term (6–10 years), and long-term (11–20 years) planning horizons.

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Please mail your responses to me at:

Lisa Lawson
Kutchins & Groh, LLC
400 Poydras Street, Suite 1380
New Orleans, LA 70130

Or lisa@kutchins-groh.com

Should you have any questions, or require additional information, please feel free to call me on my direct line (504.799.4096). Thank you.

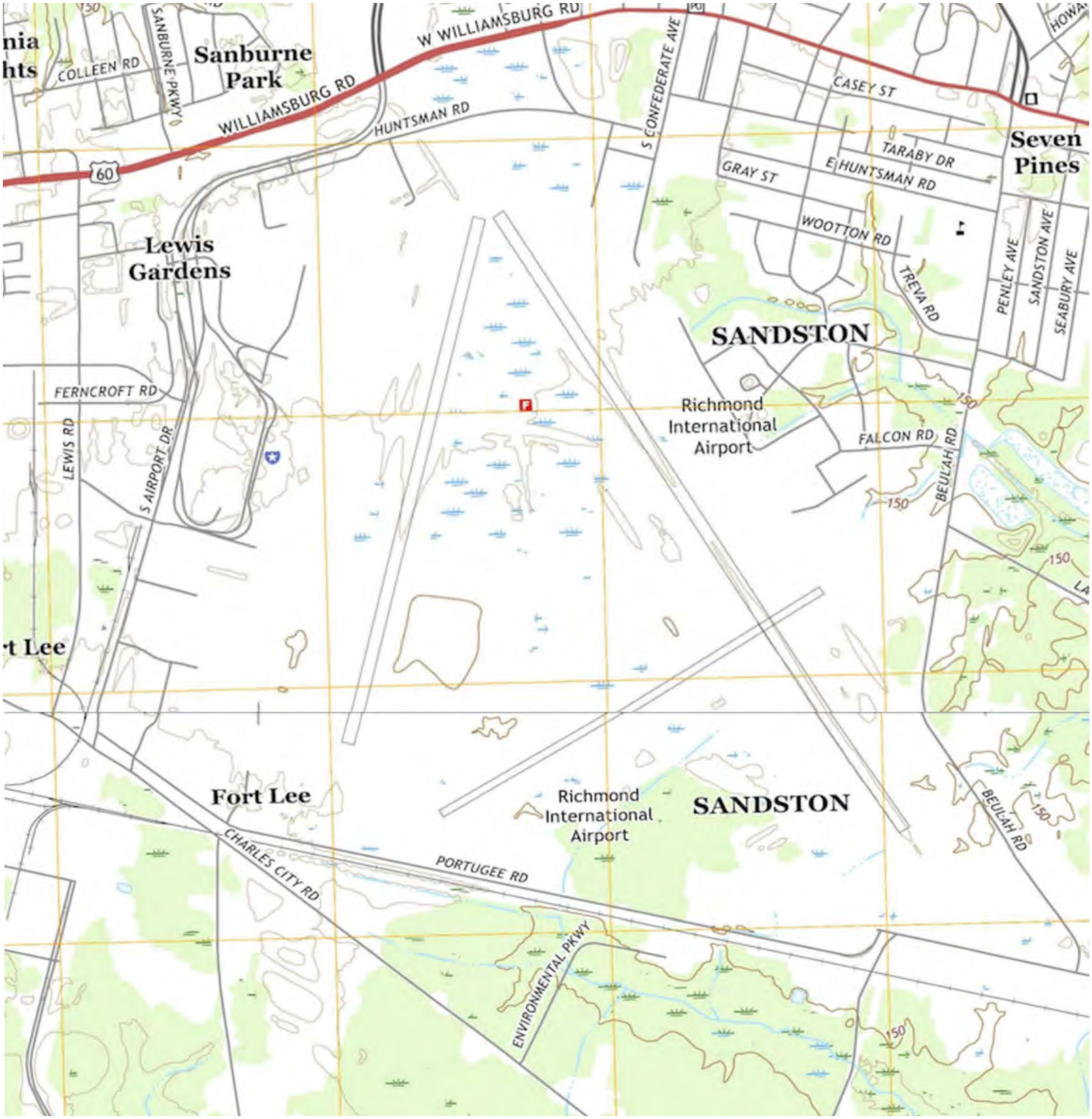
Sincerely,
KUTCHINS & GROH, LLC

Lisa Lawson

Lisa Lawson

cc: Mr. Perry Miller, Richmond International Airport
Mr. John Rutledge, Richmond International Airport
Mr. George Groh, K&G

Enclosures: Composite drawing from quadrangle maps
Aerial view of the Airport



Richmond International Airport

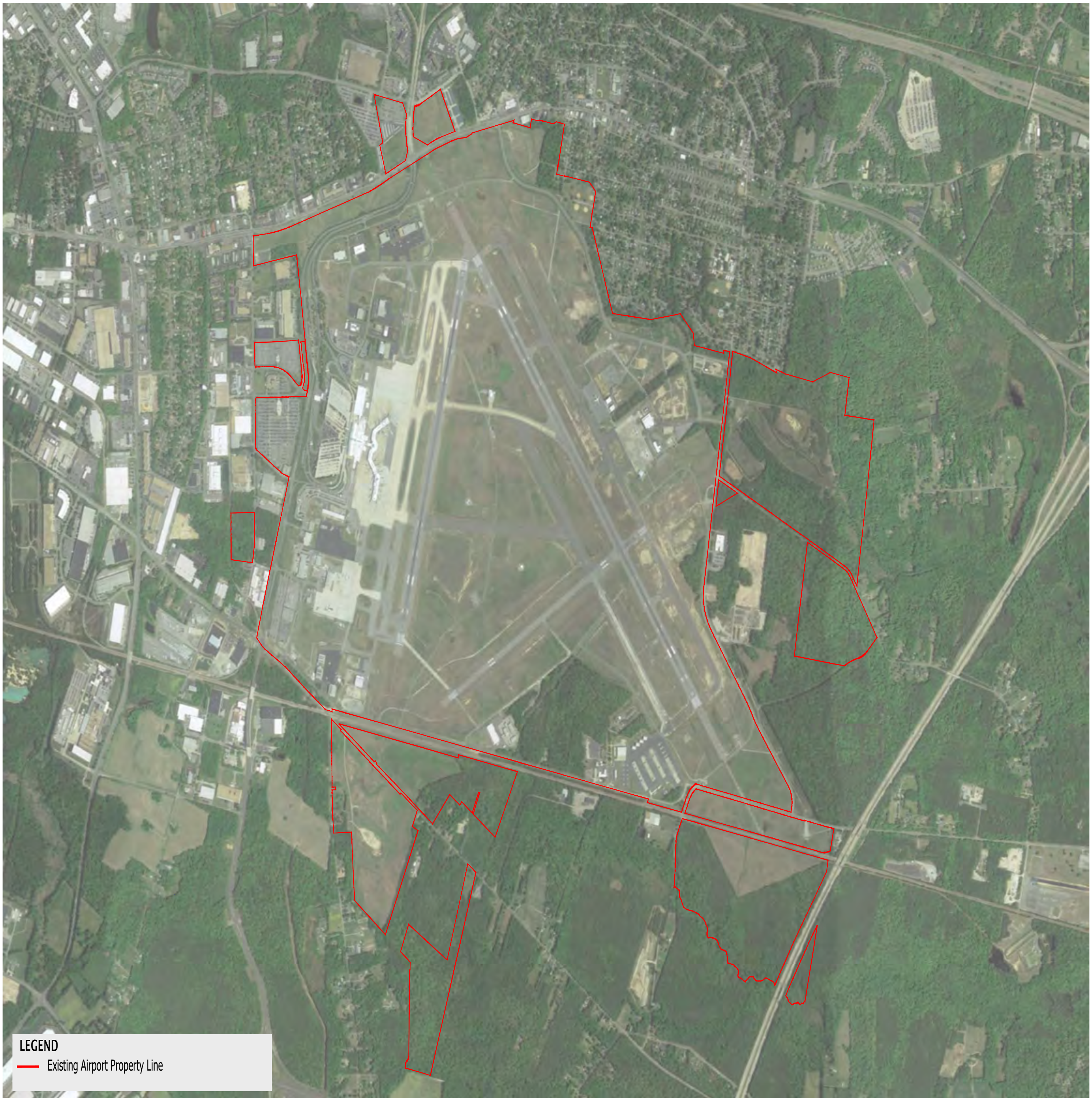
USGS Topographic Map

0 — 3,000

GRAPHIC SCALE IN FEET

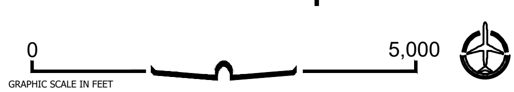
RICHMOND INTERNATIONAL AIRPORT

Kutchins & Groh
consulting associates for airports



Richmond International Airport

Aerial Map



RICHMOND INTERNATIONAL AIRPORT

Kutchins & Groh
consulting associates for airports

January 27, 2020

Julia Wellman
Department of Environmental Quality
Division of Environmental Enhancement
Office of Environmental Impact Review
P.O. Box 1105
Richmond, Virginia 23218

RE: Richmond International Airport (RIC) Master Plan Revision
Solicitation of Views Letter for Environmental Inventory and Overview Coordination

Dear Ms. Wellman:

The Richmond International Airport (RIC) in Richmond, Virginia, is preparing a revision to its Master Plan, which will examine demands and needs of the Airport over the next 20 years and identify a multi-step Capital Development Program.

On behalf of the Airport, Kutchins & Groh is assessing needs and identifying issues that may impact the development of the Airport over the short-term (0–5 years), intermediate-term (6–10 years), and long-term (11–20 years) planning horizons.

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400 Poydras Street, Suite 1380
New Orleans, LA 70130

Or lisa@kutchins-groh.com

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Sincerely,
KUTCHINS & GROH, LLC

Lisa Lawson

Lisa Lawson

cc: Mr. Perry Miller, Richmond International Airport
Mr. John Rutledge, Richmond International Airport
Mr. George Groh, K&G

Enclosures: Composite drawing from quadrangle maps
Aerial view of the Airport

January 27, 2020

Kelley West
Environmental Planner
Department of Environmental Quality
Piedmont Regional Office
4949-A Cox Road
Glen Allen, VA 23060-6295

RE: Richmond International Airport (RIC) Master Plan Revision
Solicitation of Views Letter for Environmental Inventory and Overview Coordination

Dear Kelley:

The Richmond International Airport (RIC) in Richmond, Virginia, is preparing a revision to its Master Plan, which will examine demands and needs of the Airport over the next 20 years and identify a multi-step Capital Development Program.

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Sincerely,
KUTCHINS & GROH, LLC

Lisa Lawson

Lisa Lawson

cc: Mr. Perry Miller, Richmond International Airport
Mr. John Rutledge, Richmond International Airport
Mr. George Groh, K&G

Enclosures: Composite drawing from quadrangle maps
Aerial view of the Airport

January 27, 2020

John Vithoulkas
County Manager
Henrico County
P. O. Box 90775
Henrico, VA 23273-0775

RE: Richmond International Airport (RIC) Master Plan Revision
Solicitation of Views Letter for Environmental Inventory and Overview Coordination

Dear Ms. Vithoulkas:

The Richmond International Airport (RIC) in Richmond, Virginia, is preparing a revision to its Master Plan, which will examine demands and needs of the Airport over the next 20 years and identify a multi-step Capital Development Program.

On behalf of the Airport, Kutchins & Groh is assessing needs and identifying issues that may impact the development of the Airport over the short-term (0–5 years), intermediate-term (6–10 years), and long-term (11–20 years) planning horizons.

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Lisa Lawson

Lisa Lawson

cc: Mr. Perry Miller, Richmond International Airport
Mr. John Rutledge, Richmond International Airport
Mr. George Groh, K&G

Enclosures: Composite drawing from quadrangle maps
Aerial view of the Airport

January 27, 2020

John David Harper
State Soil Scientist
USDA-Natural Resources Conservation Service
1606 Santa Rosa Road, Suite 209
Richmond, VA 23229-5014

RE: Richmond International Airport (RIC) Master Plan Revision
Solicitation of Views Letter for Environmental Inventory and Overview Coordination

Dear Mr. Harper:

The Richmond International Airport (RIC) in Richmond, Virginia, is preparing a revision to its Master Plan, which will examine demands and needs of the Airport over the next 20 years and identify a multi-step Capital Development Program.

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Sincerely,
KUTCHINS & GROH, LLC

Lisa Lawson

Lisa Lawson

cc: Mr. Perry Miller, Richmond International Airport
Mr. John Rutledge, Richmond International Airport
Mr. George Groh, K&G

Enclosures: Composite drawing from quadrangle maps
Aerial view of the Airport

January 27, 2020

Arlene Fields Warren
GIS Program Support Technician
Office of Drinking Water
Virginia Department of Health
109 Governor Street
Richmond, Virginia 23219

RE: Richmond International Airport (RIC) Master Plan Revision
Solicitation of Views Letter for Environmental Inventory and Overview Coordination

Dear Ms. Warren:

The Richmond International Airport (RIC) in Richmond, Virginia, is preparing a revision to its Master Plan, which will examine demands and needs of the Airport over the next 20 years and identify a multi-step Capital Development Program.

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Sincerely,
KUTCHINS & GROH, LLC

Lisa Lawson

Lisa Lawson

cc: Mr. Perry Miller, Richmond International Airport
Mr. John Rutledge, Richmond International Airport
Mr. George Groh, K&G

Enclosures: Composite drawing from quadrangle maps
Aerial view of the Airport

January 27, 2020

Amy Ewing
Environmental Services Biologist
Manager, Fish and Wildlife Information Services
Department of Game & Inland Fisheries
7870 Villa Park Drive
PO Box 90778
Henrico, Virginia 23228

RE: Richmond International Airport (RIC) Master Plan Revision
Solicitation of Views Letter for Environmental Inventory and Overview Coordination

Dear Ms. Ewing:

The Richmond International Airport (RIC) in Richmond, Virginia, is preparing a revision to its Master Plan, which will examine demands and needs of the Airport over the next 20 years and identify a multi-step Capital Development Program.

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New Orleans, LA 70130

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Sincerely,
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Lisa Lawson

Lisa Lawson

cc: Mr. Perry Miller, Richmond International Airport
Mr. John Rutledge, Richmond International Airport
Mr. George Groh, K&G

Enclosures: Composite drawing from quadrangle maps
Aerial view of the Airport

January 27, 2020

Roger Kirchen
Director, Review & Compliance Division
Virginia Department of Historic Resources
2801 Kensington Avenue
Richmond, VA 23221

RE: Richmond International Airport (RIC) Master Plan Revision
Solicitation of Views Letter for Environmental Inventory and Overview Coordination

Dear Mr. Kirchen:

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Lisa Lawson

Lisa Lawson

cc: Mr. Perry Miller, Richmond International Airport
Mr. John Rutledge, Richmond International Airport
Mr. George Groh, K&G

Enclosures: Composite drawing from quadrangle maps
Aerial view of the Airport

January 27, 2020

Roberta Rhur
Environmental Review Coordinator
Department of Conservation and Recreation
Natural Heritage Program
600 E. Main Street, 24th Floor
Richmond, VA 23219

RE: Richmond International Airport (RIC) Master Plan Revision
Solicitation of Views Letter for Environmental Inventory and Overview Coordination

Dear Ms. Ruhr:

The Richmond International Airport (RIC) in Richmond, Virginia, is preparing a revision to its Master Plan, which will examine demands and needs of the Airport over the next 20 years and identify a multi-step Capital Development Program.

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Lisa Lawson

Lisa Lawson

cc: Mr. Perry Miller, Richmond International Airport
Mr. John Rutledge, Richmond International Airport
Mr. George Groh, K&G

Enclosures: Composite drawing from quadrangle maps
Aerial view of the Airport

Matthew J. Strickler
Secretary of Natural Resources

Clyde E. Cristman
Director

COMMONWEALTH of VIRGINIA
DEPARTMENT OF CONSERVATION AND RECREATION

Rochelle Altholz
Deputy Director of Administration and Finance

Russell W. Baxter
Deputy Director of Dam Safety & Floodplain Management and Soil & Water Conservation

Thomas L. Smith
Deputy Director of Operations

March 4, 2020

Lisa Lawson
Kutchins and Groh, LLC
400 Poydras Street, Suite 1380
New Orleans, LA 70130

Re: Richmond International Airport Master Plan

Dear Ms. Lawson:

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

According to the information currently in Biotics, natural heritage resources have not been documented within the submitted project boundary including a 100-foot buffer. Please note, a predictive model identifying potential habitat for natural heritage resources intersects the project boundary. However, based on DCR biologist's review of the proposed project a survey is not recommended for the resource.

In addition, if tree clearing is proposed, the project may fragment a C4 and C5 Ecological Core as identified in the Virginia Natural Landscape Assessment (https://www.dcr.virginia.gov/natural-heritage/vaconvisvnla), one of a suite of tools in Virginia ConservationVision that identify and prioritize lands for conservation and protection.

Ecological Cores are areas of unfragmented natural cover with at least 100 acres of interior that provide habitat for a wide range of species, from interior-dependent forest species to habitat generalists, as well as species that utilize marsh, dune, and beach habitats. Cores also provide benefits in terms of open space, recreation, water quality (including drinking water protection and erosion prevention), and air quality (including carbon sequestration and oxygen production), along with the many associated economic benefits of these functions. The cores are ranked from C1 to C5 (C5 being the least ecologically relevant) using many prioritization criteria, such as the proportions of sensitive habitats of natural heritage resources they contain.

Fragmentation occurs when a large, contiguous block of natural cover is dissected by development, and other forms of permanent conversion, into one or more smaller patches. Habitat fragmentation results in biogeographic changes that disrupt species interactions and ecosystem processes, reducing biodiversity and habitat quality due to limited recolonization, increased predation and egg parasitism, and increased invasion by weedy species.

Therefore minimizing fragmentation is a key mitigation measure that will reduce deleterious effects and preserve the natural patterns and connectivity of habitats that are key components of biodiversity. DCR recommends efforts to minimize edge in remaining fragments, retain natural corridors that allow movement between fragments and designing the intervening landscape to minimize its hostility to native wildlife (natural cover versus lawns).

Mapped cores in the project area can be viewed via the Virginia Natural Heritage Data Explorer, available here: http://vanhde.org/content/map.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the DCR, DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

There are no State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

New and updated information is continually added to Biotics. Please re-submit a completed order form and project map for an update on this natural heritage information if the scope of the project changes and/or six months has passed before it is utilized.

A fee of $90.00 has been assessed for the service of providing this information. Please find attached an invoice for that amount. Please return one copy of the invoice along with your remittance made payable to the Treasurer of Virginia, DCR Finance, 600 East Main Street, 24th Floor, Richmond, VA 23219. Payment is due within thirty days of the invoice date. Please note late payment may result in the suspension of project review service for future projects.

The Virginia Department of Game and Inland Fisheries (VDGIF) maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from http://vafwis.org/fwis/ or contact Ernie Aschenbach at 804-367-2733 or Ernie.Aschenbach@dgif.virginia.gov.

Should you have any questions or concerns, please contact me at 804-225-2429. Thank you for the opportunity to comment on this project.

Sincerely,

Tyler Meader

Tyler Meader
Natural Heritage Locality Liaison

From:	Walker, Genevieve J (FAA)
To:	lisa@kutchins-groh.com
Subject:	Richmond Airport (RIC) Master Plan
Date:	Wednesday, February 5, 2020 6:25:50 AM
Attachments:	20200130 Letter re Master Plan Revision.pdf

Good Morning Ms. Lawson, I received this letter from the Department of Historic Resources (DHR) yesterday and they were confused as to why it was coming from you (the FAA is responsible for all correspondence that goes to DHR), and what exactly you were requesting as it appeared to cover the entire airport property with no definitive Area of Potential Effect identified. I understand there has been preliminary discussions with the FAA regarding an update to RIC's Master Plan, but as we have not had any submittals yet, your Agency coordination is likely premature. While I understand your desire to understand the potential issues that might exist at the airport (and therefore might inform the Master Plan), such broad coordination with the Agencies tends to result in confusion and additional work for all parties. In the future, please coordinate such requests through my office.

Thank you,
Genevieve

Genevieve Walker
Environmental Protection Specialist
Washington ADO
13783 Park Center Road, Suite 490S
Herndon, VA 20171
(703) 487-3979

From:	Birge-wilson, Adrienne
To:	lisa@kutchins-groh.com
Cc:	Walker, Genevieve J (FAA)
Subject:	RIC Master Plan Revision
Date:	Thursday, February 27, 2020 2:45:04 PM

Lisa- Thank you for sending the scoping letter regarding the master plan revision.

DHR requires the FAA to consult with us directly regarding this in accordance with Section 106 (54 U.S.C. 306108) of the National Historic Preservation Act (54 U.S.C. 300101 et seq.) and its implementing regulation, "Protection of Historic Properties" (36 CFR Part 800).

V/R,

Adrienne Birge-Wilson
Review and Compliance Division
Virginia Department of Historic Resources
2801 Kensington Avenue
Richmond, VA 23221
(804) 482-6092
adrienne.birge-wilson@dhr.virginia.gov

IPaC **U.S. Fish & Wildlife Service**

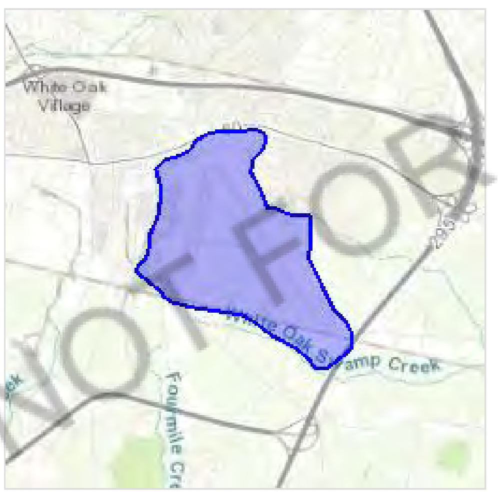
IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Henrico County, Virginia



Local office

Virginia Ecological Services Field Office

(804) 693-6694
(804) 693-9032

6669 Short Lane
Gloucester, VA 23061-4410

http://www.fws.gov/northeast/virginiafield/

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS

Northern Long-eared Bat Myotis septentrionalis — Threatened
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/9045

Flowering Plants

NAME	STATUS
Swamp Pink Helonias bullata No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4333	Threatened

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)
Bald Eagle Haliaeetus leucocephalus This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Oct 15 to Aug 31
Kentucky Warbler Oporornis formosus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 20 to Aug 20
King Rail Rallus elegans This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8936	Breeds May 1 to Sep 5
Lesser Yellowlegs Tringa flavipes This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere

Prairie Warbler *Dendroica discolor* — Breeds May 1 to Jul 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Prothonotary Warbler *Protonotaria citrea* — Breeds Apr 1 to Jul 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Rusty Blackbird *Euphagus carolinus* — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Semipalmated Sandpiper *Calidris pusilla* — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Wood Thrush *Hylocichla mustelina* — Breeds May 10 to Aug 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ “Proper Interpretation and Use of Your Migratory Bird Report” before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.

3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season ( )

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

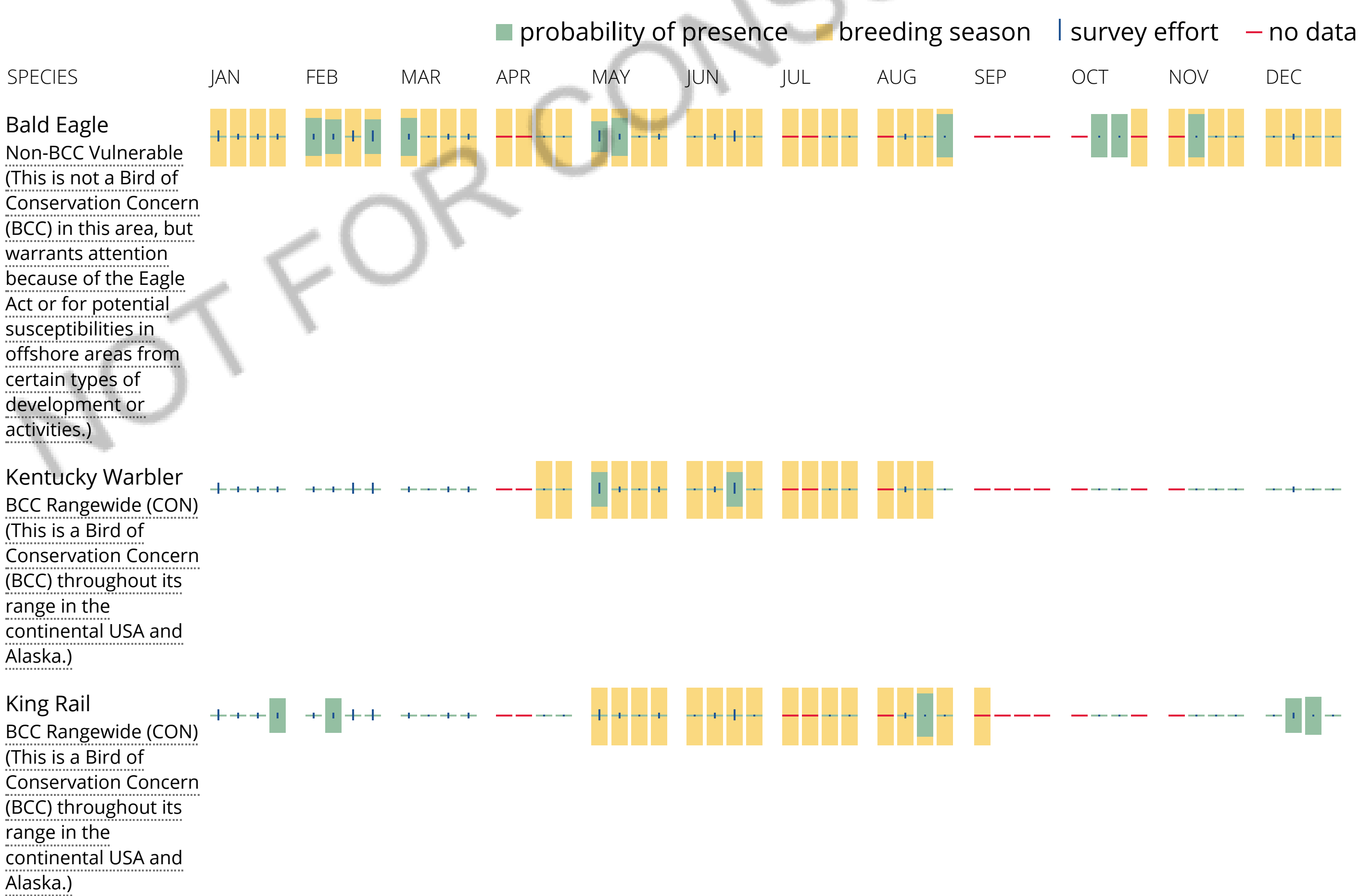
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)

A week is marked as having no data if there were no survey events for that week.

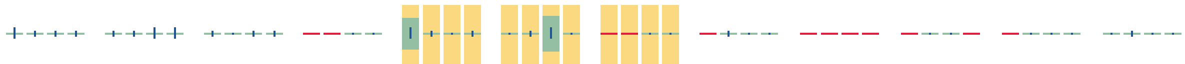
Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

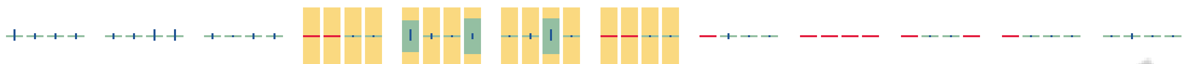


Lesser Yellowlegs
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Prairie Warbler
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



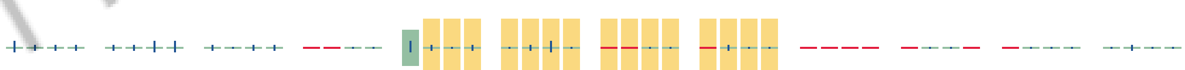
Prothonotary Warbler
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Rusty Blackbird
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Semipalmated Sandpiper
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Wood Thrush
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review.

Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

FRESHWATER EMERGENT WETLAND

- PEM1Ad
- PEM1Cd
- PEM1/SS1C
- PEM1E
- PEM1F
- PEM1C
- PEM1Cx
- PEM1A

FRESHWATER FORESTED/SHRUB WETLAND

- PFO1E
- PFO4C
- PFO4Cd
- PFO1C
- PSS5/UBHb
- PFO1/4D
- PFO4/1C
- PSS1/FO1Ed
- PSS1Ex

FRESHWATER POND

- PUBHb
- PUBHx

RIVERINE

- R2UBH
- R4SBC
- R5UBH

A full description for each wetland code can be found at the National Wetlands Inventory website

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

COMMONWEALTH OF VIRGINIA
COUNTY OF HENRICO

John A. Vithoulkas
County Manager

February 20, 2020

Kutchins & Groh
c/o Lisa Lawson
400 Poydras Street, Suite 1380
New Orleans, LA 70130

Re: Richmond International Airport (RIC) Master Plan Revision
Solicitation of View Letter for Environmental Inventory and Overview Coordination

Dear Ms. Lawson,

In response to your letter dated January 27, 2020 and received January 30, 2020, my staff has reviewed the applicable files and plans for projects within the area you have defined in order to determine potential impact(s) as you have identified.

We note the following issues:

- The only threatened or endangered species we know of in the area is Swamp Pink. It is a federally threatened plant that has been found in the White Oak Swamp Creek watershed downstream of the airport. We have not been made aware of it on the airport property, but it could still exist.

- Water quality is addressed by onsite stormwater management facilities designed to accommodate future development. Additional development will require comparison of available nutrient credits from these oversized facilities to ensure they can adequately address the change in land use. Please reference attachments A and B.

- Jurisdictional features and RPAs were mapped in 2017. They are shown on the last page of the provided RIA Coastal Zone Management Act Consistency Certification, labelled attachment C. Though it is not in our purview, air quality is addressed in this document as well. Stream perenniality determinations in the area are shown in the attached file labelled attachment D.

- Cultural resources were identified on two plans and in both instances, the plans referred to Civil War earthen works. Sheets from those plans have been provided and are labelled attachments E and F.

In general, staff will review these items when detailed construction plans are submitted for review and as a result, additional items that fit your criteria may be identified at that time.

If you would like to view our files and plans, please contact Tony Greulich, County Planner, at 804-501-5290. Electronic copies of this letter and the attachments are also available upon request.

If you have any questions, feel free to contact me. You may also contact R. Joseph Emerson, Director of Planning, at 804-501-4605 or Steven J. Yob, County Engineer and Director of Public Works at 804-501-4552.

Sincerely,

John A. Vithoulkas
County Manager

pc: Deputy County Manager for Community Development
Deputy County Manager for Community Operations
Director of Planning
Director of Public Works

From:	Warren, Arlene
To:	lisa@kutchins-groh.com
Cc:	rr Environmental Impact Review
Subject:	Richmond International Airport (RIC) Master Plan Revision
Date:	Friday, February 7, 2020 2:24:52 PM

Project Name: Richmond International Airport (RIC) Master Plan Revision
Project #: N/A
UPC #: N/A
Location: Henrico Co.

VDH – Office of Drinking Water has reviewed the above project. Below are our comments as they relate to proximity to **public drinking water sources** (groundwater wells, springs and surface water intakes). Potential impacts on public water distribution systems or sanitary sewage collection systems **must be verified by the local utility.**

There are no public groundwater wells within a 1-mile radius of the project site.

There are no surface water intakes located within a 5-mile radius of the project site.

The project is within the watershed of the following public surface water sources:

PWS ID Number	System Name	Facility Name
3700500	NEWPORT NEWS, CITY OF	CHICKAHOMINY R
3670800	VIRGINIA-AMERICAN WATER CO	APPOMATTOX RIVER

Best Management Practices should be employed, including Erosion & Sedimentation Controls and Spill Prevention Controls & Countermeasures on the project site.

Virginia Department of Health – The Office of Drinking Water appreciates the opportunity to provide comments. If you have any questions, please let me know.

Best Regards,

Arlene Fields Warren

GIS Program Support Technician

Office of Drinking Water

Virginia Department of Health

109 Governor Street

Richmond, VA 23219

(804) 864-7781

From: Walker, Genevieve J (FAA)
To: lisa@kutchins-groh.com
Subject: Richmond Airport (RIC) Master Plan
Date: Wednesday, February 5, 2020 6:25:50 AM
Attachments: 20200130 Letter re Master Plan Revision.pdf

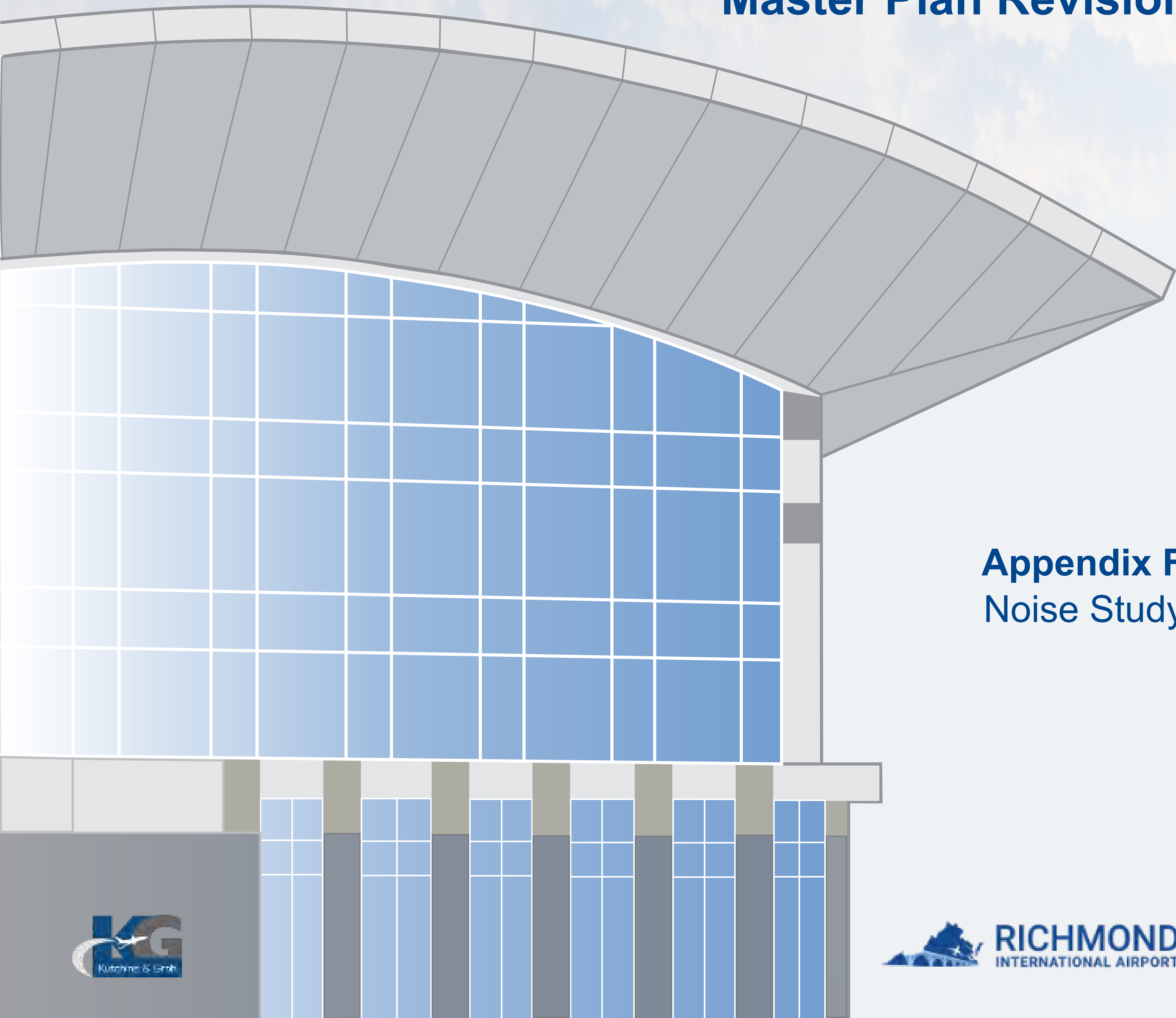
Good Morning Ms. Lawson, I received this letter from the Department of Historic Resources (DHR) yesterday and they were confused as to why it was coming from you (the FAA is responsible for all correspondence that goes to DHR), and what exactly you were requesting as it appeared to cover the entire airport property with no definitive Area of Potential Effect identified. I understand there has been preliminary discussions with the FAA regarding an update to RIC's Master Plan, but as we have not had any submittals yet, your Agency coordination is likely premature. While I understand your desire to understand the potential issues that might exist at the airport (and therefore might inform the Master Plan), such broad coordination with the Agencies tends to result in confusion and additional work for all parties. In the future, please coordinate such requests through my office.

Thank you,
Genevieve

Genevieve Walker
Environmental Protection Specialist
Washington ADO
13783 Park Center Road, Suite 490S
Herndon, VA 20171
(703) 487-3979

Richmond International Airport

Master Plan Revision



Appendix F

Noise Study

2019 Aircraft Noise Technical Report
Richmond International Airport

Prepared by:

KB Environmental Sciences, Inc.

January 7, 2020

KB Environmental Sciences

This technical report describes the noise exposure and methodology used to develop the 2019 aircraft noise contours for the Richmond International Airport (RIC).

Noise Model and Day-Night Average Sound

The methodology for assessing noise exposure included preparing day-night average sound level (DNL) contours using the FAA's Aviation Environmental Design Tool (AEDT) Version 3b. DNL, expressed in A-weighted decibels (dBA), accounts for the noise exposure of all individual aircraft events, the number of times those events occur, and the period of day/night in which they occur. The calculation of DNL logarithmically averages aircraft sound exposure at grid locations over a 24-hour period, with an additional weight of 10 decibels for those aircraft events occurring between 10:00 P.M. and 6:59 A.M. Corrections within the AEDT are applied for atmospheric acoustical attenuation, acoustical shielding of the aircraft engines by the aircraft itself, and aircraft speed variations. The cumulative exposure at all grid points are then used to develop noise contours for selected values (e.g. DNL 65, 70 and 75).

The FAA's guidelines regarding the compatibility of land uses within various DNL contour intervals are specified in *Appendix A of 14 CFR Part 150*. As shown in **Table 1**, the FAA guidelines show that the all the land uses listed in the table are normally compatible with aircraft noise exposure below the 65 DNL contour. When evaluating noise exposure and land use compatibility, attention is therefore focused on uses within the 65 DNL contour.

Table 1: FAA Land Use Compatibility with Yearly Day-Night Average Sound Levels

Land Use	DNL expressed in dB(A)					
	Below 65	65–70	70–75	75–80	80–85	Over 85
Residential						
Residential, other than mobile homes and transient lodgings	Y	N(1)	N(1)	N	N	N
Mobile home parks	Y	N	N	N	N	N
Transient lodgings	Y	N(1)	N(1)	N(1)	N	N
Public Use						
Schools	Y	N(1)	N(1)	N	N	N
Hospitals and nursing homes	Y	25	30	N	N	N
Churches, auditoriums, and concert halls	Y	25	30	N	N	N
Governmental services	Y	Y	25	30	N	N
Transportation	Y	Y	Y(2)	Y(3)	Y(4)	Y(4)
Parking	Y	Y	Y(2)	Y(3)	Y(4)	N
Commercial Use						
Offices, business and professional	Y	Y	25	30	N	N
Wholesale and retail—building materials, hardware and farm equipment	Y	Y	Y(2)	Y(3)	Y(4)	N
Retail trade—general	Y	Y	25	30	N	N
Utilities	Y	Y	Y(2)	Y(3)	Y(4)	N
Communication	Y	Y	25	30	N	N

Manufacturing and Production						
Manufacturing, general	Y	Y	Y(2)	Y(3)	Y(4)	N
Photographic and optical	Y	Y	25	30	N	N
Agriculture (except livestock) and forestry	Y	Y(6)	Y(7)	Y(8)	Y(8)	Y(8)
Livestock farming and breeding	Y	Y(6)	Y(7)	N	N	N
Mining and fishing, resource production and extraction	Y	Y	Y	Y	Y	Y
Recreational						
Outdoor sports arenas and spectator sports	Y	Y(5)	Y(5)	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits and zoos	Y	Y	N	N	N	N
Amusements, parks, resorts and camps	Y	Y	Y	N	N	N
Golf courses, riding stables and water recreation	Y	Y	25	30	N	N

Table Notes:

SLUCM=Standard Land Use Coding Manual. Y (Yes) = Land Use and related structures compatible without restrictions. N (No) = Land Use and related structures are not compatible and should be prohibited. NLR = Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.

25, 30, or 35=Land use and related structures generally compatible; measures to achieve NLR of 25, 30, or 35 dB must be incorporated into design and construction of structure.

(1) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor to indoor Noise Level Reduction (NLR) of at least 25 dB and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide a NLR of 20 dB, thus, the reduction requirements are often stated as 5, 10 or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year-round. However, the use of NLR criteria will not eliminate outdoor noise problems. (2) Measures to achieve NLR 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low. (3) Measures to achieve NLR of 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal noise level is low. (4) Measures to achieve NLR 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas or where the normal level is low. (5) Land use compatible provided special sound reinforcement systems are installed. (6) Residential buildings require an NLR of 25. (7) Residential buildings require an NLR of 30. (8) Residential buildings not permitted.

Source: 14 CFR Part 150

Existing (2019) Noise Exposure

This section includes the existing baseline 2019 DNL contours, the data used to develop the contours, and any noise sensitive land uses located within the limits of the 65 DNL.

AEDT Input Data

In the development of DNL contours, the AEDT uses both default and airport-specific factors. The default factors include engine noise levels, thrust settings, aircraft arrival and departure flight profiles and aircraft speed. The airport-specific factors include the number of aircraft operations, the type of aircraft, runway use, the assignment of aircraft operations to flight tracks, and operational time (day/night). The following describe these airport-specific data.

Annual Operations and Aircraft Fleet Mix

The 2019 RIC annual operations were developed using 12-months of data (October 2018 – September 2019) form the Richmond International Airport Aviation Activity Report. The 2019 annual aircraft operations by category is provided in **Table 2.** As shown, in 2019 annual operations totaled 105,724 (an average of approximately 289 operations per day).

Table 2: 2019 Annual Aircraft Operations

Year	Air Carrier	Air Taxi	General Aviation	Military	Total
2019	45,876	22,831	32,225	4,792	105,724

Source: Richmond International Airport Aviation Activity Report (October 2018 – September 2019).

For the purposes of preparing DNL contours, operational data were segregated by aircraft type. The FAA's Traffic Flow Management System Count (TFMSC) data for the 12-month period from October 2018 through September 2019 was used to develop the 2019 AEDT aircraft fleet mix. TFMSC data provides information on traffic counts by airport and includes the aircraft types operating at that airport. The TFMSC data for RIC was reviewed and each aircraft type was assigned the corresponding AEDT aircraft type. The 2019 annual aircraft operations by aircraft type are provided in **Table 3**.

Table 3 - 2019 Annual Aircraft Operations and Fleet Mix

Category	AEDT ID	Aircraft Type(s)	AEDT ANP ID	Operations
Air Carrier / Regional Jet	1255	Bombardier CRJ-700/900	CRJ9-ER	9,841
	1769	Embraer ERJ 170/175	EMB175	8,953
	196	Boeing 737-800/900/Max 8	737800	6,041
	1016	Airbus A320-200	A320-232	4,273
	168	Boeing 737-700	737700	2,099
	2077	Boeing (Douglas) MD 83/88	MD83	3,378
	949	Airbus A319-100	A319-131	3,344
	75	Embraer ERJ190	EMB190	3,148
	384	Boeing 757-200	757PW	2,185
	703	Airbus A300-600	A300-622R	1,583
	3923	Boeing 767-300	767300	669
	2099	Boeing (Douglas) MD 90	MD9028	157
	153	Boeing 737-400	737400	140
	1021	Airbus A321-200	A321-232	65
	1713	Embraer ERJ135/145	EMB145	12,951
	1250	Bombardier CRJ-200, Challenger 300/600	CL600	5,260
GA Jet	1292	Citation II/Bravo, Beechjet 400	CNA55B	2,465
	2028	Learjet 31/35/45/55/60/75, Dassault Falcon/Mystère 10	LEAR35	2,421
	1236	Cessna Citation Sovereign/ Latitude	CNA680	1,744
	4640	Cessna 560 Citation XLS	CNA560XL	1,603
	1974	Gulfstream 150/280, Westwind	IA1125	1,313
	1916	Gulfstream GIV/G400	GIV	1,189
	3162	Cessna Citation Mustang, Phenom 100/300	CNA510	1,104
	1291	Cessna Citation CJ1/CJ2/CJ3	CNA500	924
	1306	Cessna 750 Citation X, Dassault Falcon 2000	CNA750	671
	1234	Cessna III/VI/VII	CIT3	609
	1298	Cessna 560 Citation V/Ultra	CNA560U	597
	1923	Gulfstream GV / 500	GV	458
	4034	Dassault Falcon 50/900, Falcon F7X	FAL900EX	315
	3802	Eclipse 500	ECLIPSE500	229
	3974	Cessna Citation CJ4/M2	CNA525C	131
	2100	Raytheon Premier 1, Mitsubishi Diamond	MU3001	85
	1773	Bombardier BD-700 Global Express/Global 5000	BD-700-1A10	108
Turboprop	1497	Raytheon King Air 90, Super King Air 200/350	DHC6	2,978
	2106	Pilatus PC-12, Cessna 208, Socata TBM9	CNA208	2,553
	1278	Cessna 441 Conquest, Socata TBM-850	CNA441	178
Piston	1196	Baron 58, Piper Seminole, Cessna 414/421	BEC58P	3,552
	1882	Piper Cherokee, AA-5 Traveler, Beech Sundowner	GASEPF	2,530
	1898	Beech Bonanza, Columbia 400, Mooney, Piper Malibu	GASEPV	6,902
	3819	Cirrus SR20/22	COMSEP	786
	1261	Cessna 152/172/177	CNA172	1,400
Military	3170	C-130 (Military Transport)	C130E	2,336
	1401	C-17 (Military Heavy)	C17	350
	1800	F-16 (Military Jet)	F16PW0	350
	20	S-70 (Military Helicopter)	S70	1,756
			Total	**105,724**

Source: Richmond International Airport Aviation Activity Report (October 2018 – September 2019); FAA TSFMC; KB Environmental Sciences, Inc.

Time of Day

Aircraft operations modeled in AEDT are assigned as occurring during daytime (7:00 A.M. to 9:59 P.M.) or nighttime (10:00 P.M. to 6:59 A.M.). The calculation of DNL includes an additional weight of 10 decibels for those aircraft events occurring at night. **Table 4** summarizes the time-of-day splits in which aircraft arrivals and departures were modeled. The time of day/night for air carriers and general aviation operations were determined through the use of the 2019 air carrier schedules and a sample of published IFR data for general aviation aircraft.

Table 4 – Percent Operations by Time of Day

Operation Type	Day	Night
Arrivals	81%	19%
Departures	83%	17%
Touch and Go	98%	2%

Source: KB Environmental Sciences, Inc. 2019.

Runway Layout and Use

RIC currently has three runways - Runway 2/20 which is and is 6,607 feet long, Runway 16/34 which is 9,003 feet long and Runway 7/25 which serves as the crosswind runway and is 5,184 feet long. The AEDT modeled runway use by aircraft category was based upon information included in the June 2013 Environmental Assessment for Washington, D.C., Optimization of Airspace and Procedures in the Metroplex, Aircraft Noise Technical Report, ATAC Corporation (2013 Metroplex Report).

Tables 5 and 6 summarize the 2019 modeled runway use by aircraft category for daytime and nighttime respectively.

Table 5 - 2019 Percent Runway Use - Daytime

Aircraft Category	Runway						
	2	20	16	34	7	25	Total
				Departures			
Air Carrier / Regional Jet / GA Jet	31%	14%	36%	19%			100%
GA Turboprop	48%	29%	23%				100%
GA Piston	42%	35%	23%		minimal	minimal	100%
Military (Fixed Wing)	25%	25%	25%	25%			100%
				Arrivals			
Air Carrier / Regional Jet / GA Jet	20%	30%	20%	30%			100%
GA Turboprop	31%	35%	13%	21%			100%
GA Piston	36%	32%	13%	19%	minimal	minimal	100%
Military (Fixed Wing)	25%	25%	25%	25%			100%
				Local Touch-and-Go			
GA Piston	32%	29%	12%	17%	5%	5%	100%
Military (Fixed Wing)	25%	25%	25%	25%			100%

Source: Metroplex Report 2013, ATAC.

Table 6 - 2019 Percent Runway Use - Nighttime

Aircraft Category	Runway						
	2	20	16	34	7	25	Total
	Departures						
Air Carrier / Regional Jet / GA Jet	31%	15%	38%	16%			100%
GA Turboprop	26%	33%	41%				100%
GA Piston	16%	60%	24%		minimal	minimal	100%
Military (Fixed Wing)	25%	25%	25%	25%			100%
	Arrivals						
Air Carrier / Regional Jet / GA Jet	21%	30%	22%	27%			100%
GA Turboprop	40%	33%	12%	15%			100%
GA Piston	43%	34%	14%	9%	minimal	minimal	100%
Military (Fixed Wing)	25%	25%	25%	25%			100%
	Local Touch-and-Go						
GA Piston	32%	29%	12%	17%	5%	5%	100%
Military (Fixed Wing)	25%	25%	25%	25%			100%

Source: Metroplex Report 2013, ATAC.

Departure Stage Length

The noise exposure from aircraft departures varies depending on takeoff weight. For example, a fully-loaded aircraft departing on a long-haul flight typically weighs more on departure than the same fully-loaded aircraft departing on a short-haul flight, due to the weight of the additional fuel needed to travel a longer distance. A heavier aircraft typically requires higher power (thrust settings) to reach its takeoff speed, uses more runway length, and climbs at a slower rate than lighter aircraft. To account for this, the AEDT contains 11 standard departure climb profiles (corresponding to different departure weights), depending on the type of aircraft. These profiles represent aircraft origin-to-destination trip (stage) lengths from less than 500 nautical miles (nm) to over 8,500 nautical miles. The air carrier trip (stage) length distances for RIC were determined by a review of the air carrier schedule identifying the non-stop destinations served from RIC by individual aircraft. At RIC, the air carrier aircraft departures traveled non-stop between <500nm and 1,500nm. The distances for each stage length and the percent of operations modeled for RIC are shown in **Table 7**.

Table 7 – Air Carrier Aircraft Departure Trip (Stage) Length Percentages

Aircraft Type(s)	AEDT ANP ID	Stage 1 <500nm	Stage 2 501-1,000nm	Stage 3 1,001-1,500nm	Total
Bombardier CRJ-700/900	CRJ9-ER	70%	30%		100%
Embraer ERJ 170/175	EMB175	60%	15%	25%	100%
Boeing 737-800/900/Max 8	737800	50%	10%	40%	100%
Airbus A320-200	A320-232	45%	55%		100%
Boeing 737-700	737700	65%	35%		100%
Boeing (Douglas) MD 83/88	MD83	34%	66%		100%
Airbus A319-100	A319-131	40%	60%		100%
Embraer ERJ190	EMB190	100%			100%
Boeing 757-200	757PW	85%	15%		100%
Airbus A300-600	A300-622R	50%	50%		100%
Boeing 767-300	767300	100%			100%
Boeing (Douglas) MD 90	MD9028	100%			100%
Boeing 737-400	737400	100%			100%
Airbus A321-200	A321-232	100%			100%

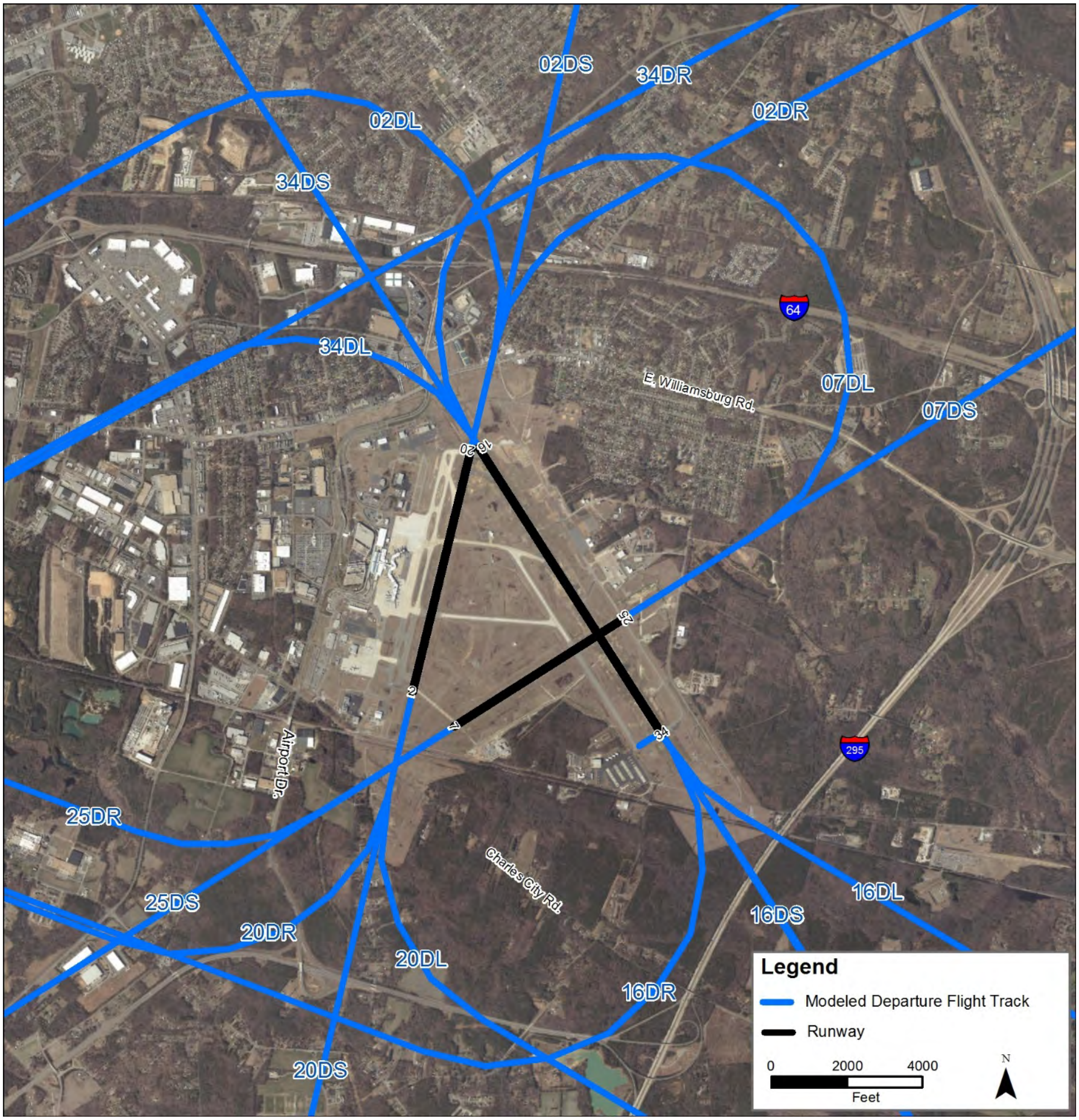
Source: KB Environmental Sciences, Inc.

Flight Tracks

The AEDT uses airport-specific ground tracks and vertical flight profiles to compute three-dimensional flight paths for each modeled aircraft operation. The “default” AEDT vertical profiles, which consist of altitude, speed, and thrust settings, are compiled from data provided by aircraft manufacturers.

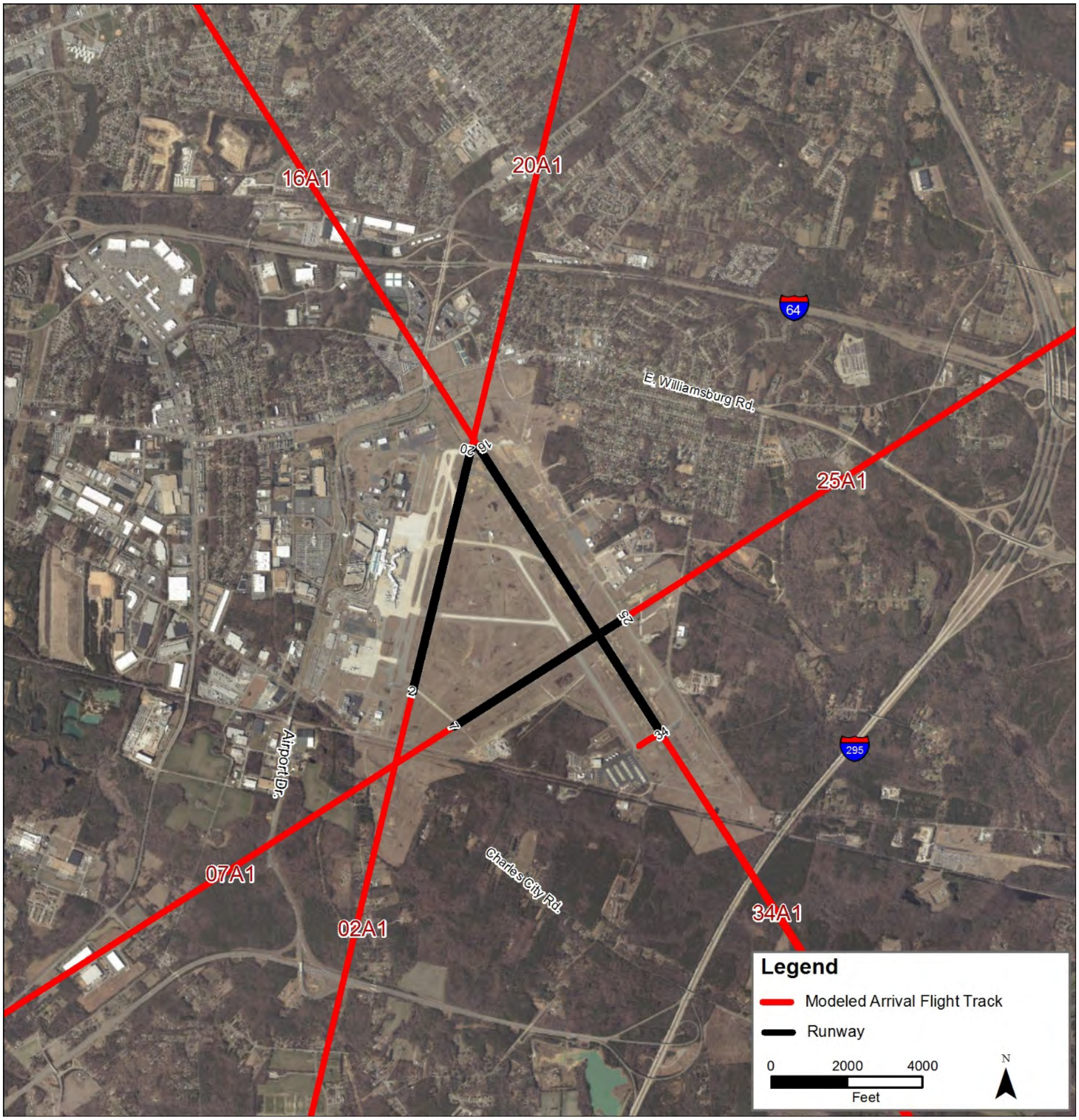
The 2019 aircraft flight tracks utilized by itinerant departure operations were developed based on flight track data included in the 2013 Metroplex Report and a review of the current published departure procedures. The modeled itinerant departure flight tracks are shown on **Figure 1**. Aircraft flight tracks utilized by itinerant arrivals were modeled straight-in in the immediate vicinity of the runway ends and are shown on **Figure 2**. The local touch and go flight tracks were modeled following a standard left-traffic pattern from all runway ends and are shown on **Figure 3.**

Figure 1: Modeled Flight Tracks – Departures



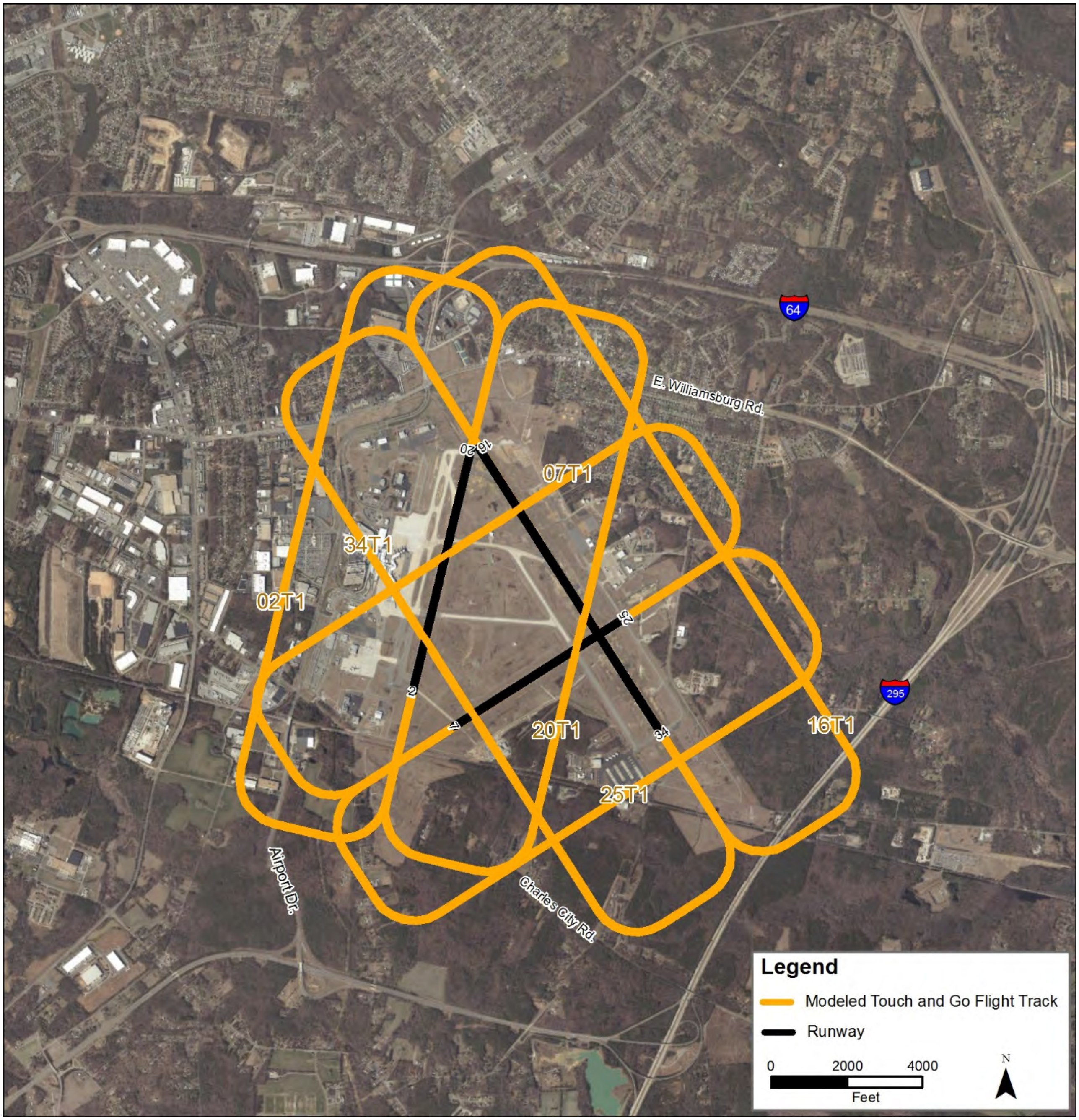
Source: KB Environmental Sciences, Inc.

Figure 2: Modeled Flight Tracks – Arrivals



Source: KB Environmental Sciences, Inc.

Figure 3: Modeled Flight Tracks – Local Touch and Go



Source: KB Environmental Sciences, Inc.

2019 DNL Contours

The 2019 65-75 DNL contours are provided on **Figure 4**. **Table 9** identifies the areas within the DNL contour ranges. As shown in the table, the total area within 65 DNL contour is approximately 1.88 square miles (1,199 acres).

It is estimated that 107 noise sensitive sites are within the 2019 65 DNL contour, including 106 residences and one place of worship. Seven residences are located south of the airport along Monahan Road, and 99 residences and the one place of worship (Village of Faith) are located north of the Runway 20 threshold. For conservative estimating purposes, if a portion of a residential property was crossed by the contour boundary, it was considered within the contour.

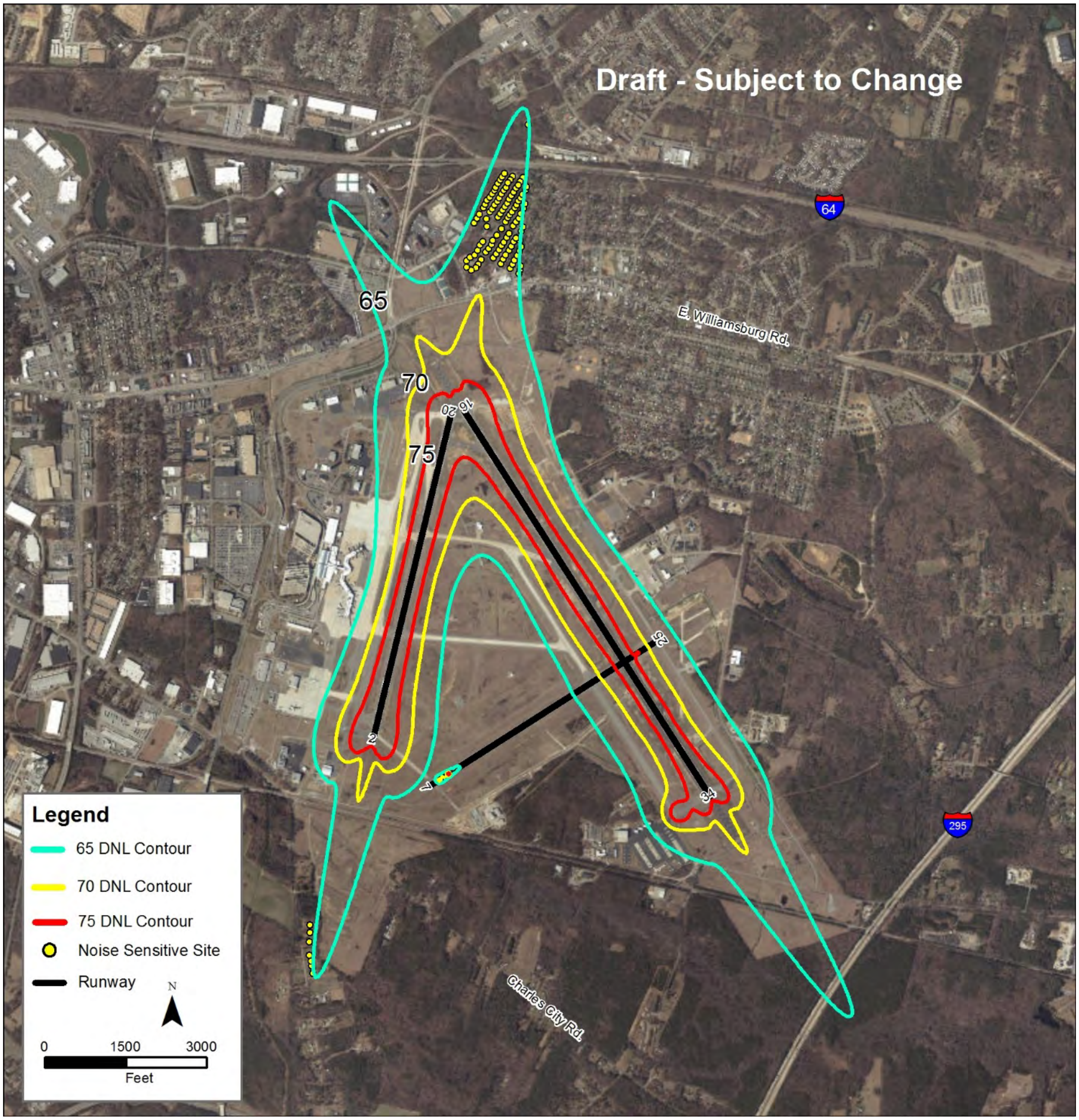
All noise sensitive sited identified are located between the 65 and 70 DNL contours. No noise sensitive sites are within the 70 or higher DNL.

Table 9: 2019 DNL Contour Areas

DNL	Area (Sq. Miles)	Area (Acres)
65 to 70	1.12	716
70 to 75	0.42	267
75 and greater	0.34	216
Total	1.88	1,199

Source: KB Environmental Sciences, Inc.

Figure 4: 2019 DNL Contour



Source: KB Environmental Sciences, Inc.

Richmond International Airport

Master Plan Revision

Appendix G

Airport Layout Plan

Kutchins & Groh

RICHMOND INTERNATIONAL AIRPORT

RICHMOND INTERNATIONAL AIRPORT

AIRPORT LAYOUT PLAN

LETTER OF APPROVAL

FEDERAL AVIATION ADMINISTRATION

U. S. Department of Transportation

Federal Aviation Administration

WASHINGTON AIRPORTS DISTRICT OFFICE
13873 Park Center Road, Suite 490 S
Herndon, VA. 20171
Telephone: (703) 487-3978
Fax: (703) 487-3982

July 8, 2022

Mr. Perry J. Miller, AAE
President and CEO
Capital Region Airport Commission
Richmond International Airport
1 Richmond E. Bryd Terminal Drive
Richmond, VA 23250-2400

Re: ALP Revision No. 5
Richmond International Airport
Richmond, Virginia

Dear Mr. Miller:

Our office is in receipt of the proposed Airport Layout Plan (ALP) Revision No. 5 to the ALP for the Richmond International Airport in Richmond Virginia. The changes to the ALP include depicting the following projects:

As-Built Projects/Future Project Updates
Airside Development/Improvements
Taxiway 'V' Reconfiguration
Taxiway 'C' and 'H' Rehabilitation
Runway 2-20 Rehabilitation
Runway 16-34 Rehabilitation
Relocate ASR (Location TBD)
Taxiway 'E' Reconfiguration
Taxiway 'U' Rehabilitation
Future GA Development - Southeast
East Side Development
Relocated ARFF (Updated Location)
East Apron 3 Expansion and Hangar Facilities
Third-Party Cargo Operator
East Side GA Terminal and Hangar Facilities
Future GA Development - South
Future Cargo Expansion - South Apron
Future Army National Guard Relocation
East Apron 4 Reconstruction Expansion
East Side Stream Mitigation
Mid-Concourse Apron Reconstruction
East Side Apron 5 Development
Landside Development/Improvements
Williamsburg Road Development
Urban Air Mobility Development
CONRAC Relocation – Long Term

LETTER OF APPROVAL

FEDERAL AVIATION ADMINISTRATION

Rental Car Staging Area / 3rd Party Development
Future Access Road
Future Enterprise Rental Car Facility
Close Beulah Road / Improve Lafrance Road

These changes are noted in revision block 5 on the ALP dated July 7, 2022. ALP Revision No. 5 is being considered a pen and ink revision to the current ALP and is hereby conditionally approved.

The contents of the ALP revision do not necessarily reflect the official views or policies of the FAA. Approval of the ALP by the FAA does not in any way constitute a commitment on the part of the United States to participate in any development depicted therein. No additional modifications to FAA design standards are noted on the revised ALP.

All proposed development identified on the ALP requires environmental review and shall not be undertaken without prior written environmental approval by the FAA. Approval of the ALP interim revision does not relieve any sponsor responsibilities for ensuring compatible use of land adjacent to or in the vicinity of the airport.

Approval of an ALP showing future non-aeronautical use does not constitute FAA approval. A separate FAA approval is required at the time the land is to be used for non-aeronautical purpose.

This determination does not relieve the sponsor of any compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local governing body.

You are reminded of your continuing responsibility to keep your ALP current at all times. Each revision must be submitted to this office for review and approval prior to the start of construction. Your ALP should be reviewed at regular intervals and updated as necessary.

FAA's approval of this ALP represents acceptance of the general location of future facilities depicted. During the preliminary design phase, the airport owner is required to resubmit for approval the final locations, heights, and exterior finishes of structures. FAA's concerns are obstructions, impact on electronic aids, which could adversely affect the safety, efficiency or utility of the airport.

If you should have any questions in regards to this letter, please do not hesitate to contact me at (703) 487-3978.

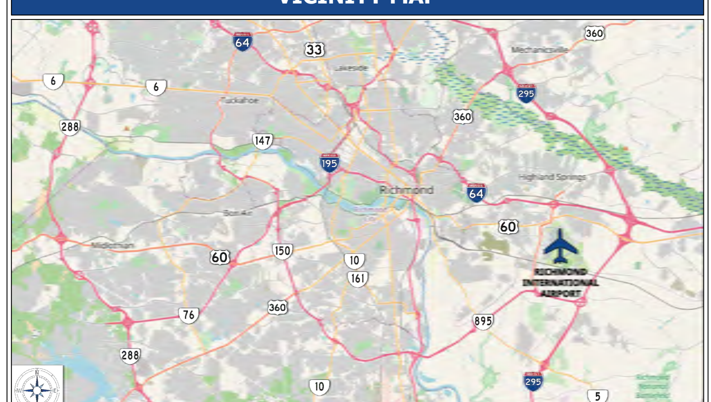
Sincerely,

JEFFREY W BREEDEN
Digitally signed by JEFFREY W BREEDEN
Date: 2022.07.08 08:31:09 -04'00'

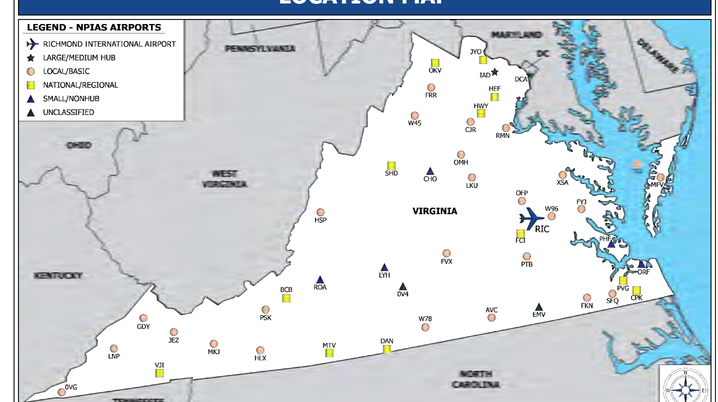
Jeffrey W. Breeden, AICP
Washington Airports District Office

cc: John Rutledge, CRAC
Scott Denny, DOAV
George Groh, K & G
Darren Persick, K & G
Guillermo Felix, AEA-620

VICINITY MAP



LOCATION MAP



SHEET INDEX

SHEET	SHEET NAME/TITLE
1	TITLE SHEET
2	AIRPORT DATA SHEET
3	EXISTING AIRPORT LAYOUT DRAWING
4	FUTURE AIRPORT LAYOUT DRAWING
5	TERMINAL AREA DRAWING
6	LAND USE DRAWING
7	AIRPORT PROPERTY MAP

FEDERAL AVIATION ADMINISTRATION DISCLAIMER

THE PREPARATION OF THIS DOCUMENT MAY HAVE BEEN SUPPORTED, IN PART, THROUGH THE AIRPORT IMPROVEMENT PROGRAM (AIP). AS PROVIDED UNDER 49 U.S. CODE § 47104, THE CONTENTS DO NOT REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FEDERAL AVIATION ADMINISTRATION (FAA) OR THE VIRGINIA DEPARTMENT OF AVIATION. ACCEPTANCE OF THE ALP BY THE FAA AND THE VA DEPARTMENT OF AVIATION DOES NOT CONSTITUTE A COMMITMENT FROM THE FAA OR THE STATE OF VIRGINIA TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED, NOR DOES IT INDICATE THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE OR WOULD HAVE JUSTIFICATION IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

REVISION	BY	DATE
ALP Revision No. 1	K&G GG/DP	08/07/2012
ALP Revision No. 2	K&G GG/DP	12/01/2014
ALP Revision No. 3	K&G GG/DP	03/01/2019
ALP Revision No. 4	K&G GG/DP	02/07/2020
ALP Revision No. 5	K&G GG/DP	07/07/2022

RICHMOND INTERNATIONAL AIRPORT

TITLE SHEET

RICHMOND INTERNATIONAL AIRPORT

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ISSUE DATE	07-2022
SHEET	1 OF 7

AIRSPACE APPROVAL (ON-AIRPORT)

ASN							DESCRIPTION/PROJECT	DETERMINED/COMPLETED
2019	-	AEA	-	755	-	NRA	CONSTRUCT TAXIWAY: CONVERT RUNWAY 7-25 (CSPP SUBMISSION)	08/29/2019
2019	-	AEA	-	1023	-	NRA	RUNWAY 34 ALS ABOVE GROUND STORAGE TANK	11/01/2019
2019	-	AEA	-	1389	-	NRA	DOMINION ENERGY AIRCRAFT HANGAR	01/03/2020
2019	-	AEA	-	1429	-	NRA	RAISE ASR-9 ANTENNA	12/31/2019
2019	-	AEA	-	2481	-	NRA	DECOMMISSION RUNWAY 7-25	01/21/2020

AIRSPACE APPROVAL (OFF-AIRPORT*)

ASN							DESCRIPTION/PROJECT	DETERMINED/COMPLETED
2020	-	AEA	-	2275	-	OE	CONSTRUCTION OF LIGHT POLES FOR ATHLETIC FIELDS AND TENNIS COURTS	03/23/2020
2020	-	AEA	-	2260	-	OE	CONSTRUCTION OF A NEW TWO-STORY HIGH SCHOOL BUILDING	04/06/2020
2020	-	AEA	-	2082	-	OE	CONSTRUCTION OF A NEW HIGHLAND SPRINGS HIGH SCHOOL	03/23/2020

* FAA OEAAA CASES WITHIN 2 NAUTICAL MILE (NM) RADIUS OF RIC (2019-2020)

TAXIWAY DATA

TAXIWAY		AIRPLANE DESIGN GROUP		TAXIWAY DESIGN GROUP		PAVEMENT WIDTH		TAXIWAY SAFETY AREA[1]		TAXIWAY OBJECT FREE AREA[1]		TAXIWAY EDGE SAFETY MARGIN		TAXIWAY LIGHTING	
		EXISTING	FUTURE	EXISTING	FUTURE	EXISTING	FUTURE	EXISTING	FUTURE	EXISTING	FUTURE	EXISTING	FUTURE	EXISTING	FUTURE
A	'ALPHA'	IV	IV	5	5	75'	75'	171	171	259	259	15	15	MITL	MITL
B	'BRAVO'	IV	IV	5	5	150'	150'	171	171	259	259	15	15	MITL	MITL
C	'CHARLIE'	IV	IV	5	5	75'	75'	171	171	259	259	15	15	MITL	MITL
E	'ECHO'	IV	IV	5	5	75'	75'	171	171	259	259	15	15	MITL	MITL
F	'FOXTROT'	IV	IV	5	5	90'	90'	171	171	259	259	15	15	MITL	MITL
G	'GOLF'	IV	IV	5	5	90'	90'	171	171	259	259	15	15	MITL	MITL
H	'HOTEL'	IV	IV	5	5	75'	75'	171	171	259	259	15	15	MITL	MITL
J	'JULIET'	IV	IV	4	4	50'	50'	171	171	259	259	10	10	MITL	MITL
K	'KILO'	IV	IV	5	5	75'	75'	171	171	259	259	15	15	MITL	MITL
L	'LIMA'	IV	IV	5	5	75'	75'	171	171	259	259	15	15	MITL	MITL
M	'MIKE'	IV	IV	5	5	75'	75'	171	171	259	259	15	15	MITL	MITL
N	'NOVEMBER'	IV	IV	5	5	75'	75'	171	171	259	259	15	15	MITL	MITL
R	'ROMEO'	IV	IV	4	4	50'	50'	171	171	259	259	10	10	MITL	MITL
T	'TANGO'	IV	IV	5	5	90'	90'	171	171	259	259	15	15	MITL	MITL
U	'UNIFORM'	IV	IV	5	5	75'	75'	171	171	259	259	15	15	MITL	MITL
U1	'UNIFORM-1'	IV	IV	5	5	75'	75'	171	171	259	259	15	15	MITL	MITL
V	'VICTOR'	IV	IV	4	4	50'	50'	171	171	259	259	10	10	MITL	MITL

[1] TOTAL WIDTH OF AREA. TSA/TOFA IS CENTERED ON TAXIWAY CENTERLINE.

TAXIWAY SEPARATION

TAXIWAY		TAXIWAY CENTERLINE				TAXILANE CENTERLINE				WINGTIP CLEARANCE			
		PARALLEL TAXIWAY/TAXILANE		FIXED OR MOVABLE OBJECT		PARALLEL TAXILANE		FIXED OR MOVABLE OBJECT		TAXIWAY CLEARANCE		TAXILANE CLEARANCE	
		EXISTING	FUTURE	EXISTING	FUTURE	EXISTING	FUTURE	EXISTING	FUTURE	EXISTING	FUTURE	EXISTING	FUTURE
A	'ALPHA'	215	215	129.5	129.5	198	198	112.5	112.5	44	44	27	27
B	'BRAVO'	215	215	129.5	129.5	198	198	112.5	112.5	44	44	27	27
C	'CHARLIE'	215	215	129.5	129.5	198	198	112.5	112.5	44	44	27	27
E	'ECHO'	215	215	129.5	129.5	198	198	112.5	112.5	44	44	27	27
F	'FOXTROT'	215	215	129.5	129.5	198	198	112.5	112.5	44	44	27	27
G	'GOLF'	215	215	129.5	129.5	198	198	112.5	112.5	44	44	27	27
H	'HOTEL'	215	215	129.5	129.5	198	198	112.5	112.5	44	44	27	27
J	'JULIET'	215	215	129.5	129.5	198	198	112.5	112.5	44	44	27	27
K	'KILO'	215	215	129.5	129.5	198	198	112.5	112.5	44	44	27	27
L	'LIMA'	215	215	129.5	129.5	198	198	112.5	112.5	44	44	27	27
M	'MIKE'	215	215	129.5	129.5	198	198	112.5	112.5	44	44	27	27
N	'NOVEMBER'	215	215	129.5	129.5	198	198	112.5	112.5	44	44	27	27
R	'ROMEO'	215	215	129.5	129.5	198	198	112.5	112.5	44	44	27	27
T	'TANGO'	215	215	129.5	129.5	198	198	112.5	112.5	44	44	27	27
U	'UNIFORM'	215	215	129.5	129.5	198	198	112.5	112.5	44	44	27	27
U1	'UNIFORM-1'	215	215	129.5	129.5	198	198	112.5	112.5	44	44	27	27
V	'VICTOR'	215	215	129.5	129.5	198	198	112.5	112.5	44	44	27	27

TAXIWAY SAFETY AREA (TSA) OBSTRUCTIONS

EXISTING					FUTURE				
TAXIWAY	OBJECT TYPE	FIXED/MOVABLE	FROM CENTERLINE	DISPOSITION	TAXIWAY	OBJECT TYPE	FIXED/MOVABLE	FROM CENTERLINE	DISPOSITION
-	-							-	-
-	-	NO OBSTRUCTIONS TO TAXIWAY SAFETY AREA (TSA)						-	-
-	-							-	-

TAXIWAY OBJECT FREE AREA (TOFA) OBSTRUCTIONS

EXISTING					FUTURE				
TAXIWAY	OBJECT TYPE	FIXED/MOVABLE	FROM CENTERLINE	DISPOSITION	TAXIWAY	OBJECT TYPE	FIXED/MOVABLE	FROM CENTERLINE	DISPOSITION
-	-							-	-
-	-	NO OBSTRUCTIONS TO TAXIWAY OBJECT FREE AREA (TOFA)						-	-
-	-							-	-

RUNWAY PROTECTION ZONE (RPZ) OBSTRUCTIONS

RUNWAY	EXISTING			FUTURE		
	OBJECT NUMBER (TYPE)	PENETRATION	DISPOSITION	OBJECT NUMBER (TYPE)	PENETRATION	DISPOSITION
16/34						
16R/34L	NO OBSTRUCTIONS TO RUNWAY PROTECTION ZONE (RPZ)					
02/20						

MODIFICATION OF STANDARDS

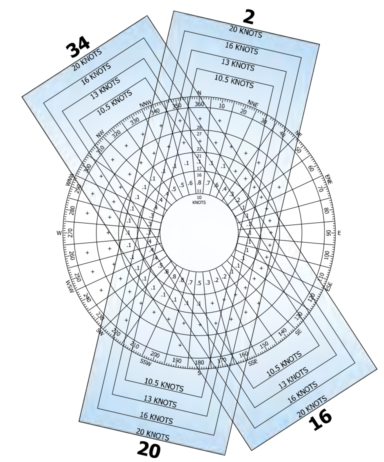
NUMBER	FAA STANDARD		MODIFICATION REQUESTED	
	AC/STANDARD	DESCRIPTION	DESCRIPTION	APPROVED
1	AC 150/5300-13	RUNWAYS WITH APPROACH LIGHTING SYSTEMS MUST CLEAR 50:1 SLOPE IN INNER APPROACH OFZ	RUNWAY 2: RAILROAD IN INNER APPROACH OFZ RESULTING IN 4' PENETRATION TO 50:1 SLOPE.	-
-	-	-	-	-

OBSTRUCTION DATA

OBSTRUCTION DATA SOURCE
AERIAL IMAGERY CONDUCTED BY QUANTUM SPATIAL AND DATED XX/XX/2020 USING NORTH AMERICAN DATUM OF 1983/2011 (NAD 83(2011)), IN THE VIRGINIA STATE PLANE COORDINATE SYSTEM

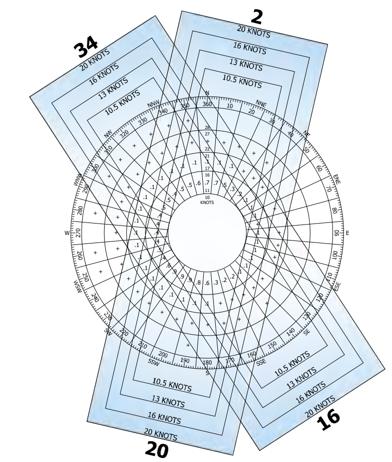
AIRPORT WINDROSE

STATION		PERIOD	SOURCE
NAME	NUMBER		
RICHMOND INTERNATIONAL AIRPORT (RIC)	UNITED STATES AIR FORCE (USAF) STATION: 724010 WEATHER BUREAU ARMY NAVY (WBAN) STATION: 13740	2010-2019	NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA) INTEGRATED SURFACE DATABASE (ISD)



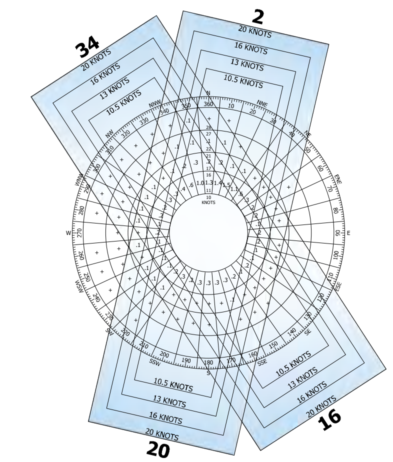
WIND COVERAGE - ALL WEATHER

RUNWAY	CROSSWIND COMPONENT			
	10.5 KNOTS	13 KNOTS	16 KNOTS	20 KNOTS
16	53.67%	55.41%	56.82%	57.19%
34	54.62%	56.44%	57.76%	58.10%
16/34	**92.85%**	**96.41%**	**99.12%**	**99.82%**
2	52.89%	54.05%	55.00%	55.35%
20	57.59%	58.71%	59.59%	59.85%
2/20	**95.09%**	**97.36%**	**99.17%**	**99.79%**
COMBINED	**97.97%**	**99.22%**	**99.80%**	**99.97%**



WIND COVERAGE - IFR CONDITIONS

RUNWAY	CROSSWIND COMPONENT			
	10.5 KNOTS	13 KNOTS	16 KNOTS	20 KNOTS
16	46.18%	47.05%	47.74%	47.98%
34	59.70%	62.24%	63.88%	64.37%
16/34	**93.23%**	**96.64%**	**98.95%**	**99.68%**
2	66.21%	67.33%	68.10%	68.38%
20	42.39%	43.05%	43.60%	43.86%
2/20	**96.01%**	**97.78%**	**99.09%**	**99.63%**
COMBINED	**98.32%**	**99.24%**	**99.71%**	**99.91%**



WIND COVERAGE - IFR CONDITIONS

RUNWAY	CROSSWIND COMPONENT			
	10.5 KNOTS	13 KNOTS	16 KNOTS	20 KNOTS
16	54.73%	56.65%	58.20%	58.58%
34	53.80%	55.52%	56.79%	57.11%
16/34	**92.72%**	**96.35%**	**99.15%**	**99.85%**
2	50.53%	51.72%	52.74%	53.11%
20	60.08%	61.29%	62.23%	62.50%
2/20	**94.84%**	**97.23%**	**99.17%**	**99.81%**
COMBINED	**97.89%**	**99.21%**	**99.81%**	**99.98%**

RUNWAY DATA

ITEM		RUNWAY 16-34				RUNWAY 16R-34L				RUNWAY 2-20			
		EXISTING		FUTURE		EXISTING		FUTURE		EXISTING		FUTURE	
		RUNWAY 16	RUNWAY 34	RUNWAY 16	RUNWAY 34	RUNWAY 16R	RUNWAY 34L	RUNWAY 16R	RUNWAY 34L	RUNWAY 2	RUNWAY 20	RUNWAY 2	RUNWAY 20
RUNWAY DIMENSIONS	LENGTH	9,003'		10,703'		-		9,000'		6,607'		6,607'	
	WIDTH	150'		150'		-		150'		150'		150'	
DISPLACED THRESHOLD		N/A	N/A	N/A	N/A	-	-	N/A	N/A	N/A	N/A	N/A	N/A
AIRPORT REFERENCE CODE		D-IV		D-IV		-		D-IV		D-IV		D-IV	
RUNWAY DESIGN CODE (RDC)		D/IV/2400		D/IV/2400		-		D/IV/2400		D/IV/2400		D/IV/2400	
APPROACH/DEPARTURE REFERENCE CODE	APRC	D/IV/2400		D/IV/2400		-		D/IV/2400		D/IV/2400		D/IV/2400	
	DPRC	D/VI		D/VI		-		D/VI		D/IV / D/V		D/IV / D/V	
% WIND COVERAGE (All WX / VFR / IFR)	10.5 KNOT CROSSWIND	92.85% / 92.72% / 93.23%		92.85% / 92.72% / 93.23%		-		92.85% / 92.72% / 93.23%		95.09% / 94.84% / 96.01%		95.09% / 94.84% / 96.01%	
	13 KNOT CROSSWIND	96.41% / 96.35% / 96.64%		96.41% / 96.35% / 96.64%		-		96.41% / 96.35% / 96.64%		97.36% / 97.23% / 97.78%		97.36% / 97.23% / 97.78%	
	16 KNOTCROSSWIND	99.12% / 99.15% / 98.95%		99.12% / 99.15% / 98.95%		-		99.12% / 99.15% / 98.95%		99.17% / 99.17% / 99.09%		99.17% / 99.17% / 99.09%	
	20 KNOTCROSSWIND	99.82% / 99.85% / 99.68%		99.82% / 99.85% / 99.68%		-		99.82% / 99.85% / 99.68%		99.79% / 99.81% / 99.63%		99.79% / 99.81% / 99.63%	
MAXIMUM ELEVATION ABOVE MSL		167.0'		TBD		-		TBD		165.2'		165.2'	
PAVEMENT TYPE		ASPHALT		ASPHALT		-		ASPHALT		ASPHALT		ASPHALT	
PAVEMENT TREATMENT		GROOVED		GROOVED		-		GROOVED		GROOVED		GROOVED	
PAVEMENT DESIGN STRENGTH (POUNDS)	SINGLE WHEEL	125,000		TBD		-		TBD		125,000		125,000	
	DOUBLE WHEEL	200,000		TBD		-		TBD		200,000		200,000	
	DOUBLE TANDEM	340,000		TBD		-		TBD		340,000		340,000	
RUNWAY CLASSIFICATION NUMBER (PCN)		92/F/B/W/T		TBD		-		TBD		70/F/C/W/T		70/F/C/W/T	
EFFECTIVE RUNWAY GRADIENT		0.1%		TBD		-		TBD		0.2%		0.2%	
OBSTRUCTION CLEARANCE SLOPE		34:1	34:1	34:1	34:1	-	-	34:1	34:1	20:1	20:1	20:1	20:1
FAR PART 77 APPROACH SLOPE		50:1	50:1	50:1	50:1	-	-	50:1	50:1	50:1	50:1	50:1	50:1
FAR PART 77 APPROACH CATEGORY		PIR	PIR	PIR	PIR	-	-	PIR	PIR	PIR	C	PIR	C
RUNWAY APPROACH CATEGORY		D	D	D	D	-	-	D	D	D	D	D	D
RUNWAY DEPARTURE SURFACE		40:1	40:1	40:1	40:1	-	-	40:1	40:1	40:1	40:1	40:1	40:1
APPROACH VISBILITY MINIMUMS		1/2 MILE	1/2 MILE	1/2 MILE	1/2 MILE	-	-	1/2 MILE	1/2 MILE	3/4 MILE	7/8 MILE	3/4 MILE	7/8 MILE
RUNWAY MARKING		PRECISION	PRECISION	PRECISION	PRECISION	-	-	PRECISION	PRECISION	PRECISION	PRECISION	PRECISION	PRECISION
RUNWAY LIGHTING		HIRL		HIRL		-		HIRL		HIRL		HIRL	
THRESHOLD SITING SURFACE (TSS) SLOPE		34:1	34:1	34:1	34:1	-	-	34:1	34:1	20:1	20:1	20:1	20:1
THRESHOLD SITING SURFACE (TSS) PENETRATIONS		NONE	NONE	NONE	NONE	-	-	NONE	NONE	NONE	NONE	NONE	NONE
TYPE OF AERONAUTICAL SURVEY REQUIRED		VGS	VGS	VGS	VGS	-	-	VGS	VGS	VGS (PA & APV) NVGS	VGS (PA & APV) NVGS	VGS (PA & APV) NVGS	VGS (PA & APV) NVGS
NAVAIDS - VISUAL APPROACH		PAPI (4L), MALSR	PAPI (4L), ALSF2	TBD	TBD	-	-	TBD	TBD	PAPI (4L), MALSR	PAPI (4L), REILS	PAPI (4L), MALSR	PAPI (4L), REILS
NAVAIDS - INSTRUMENT APPROACH		ILS, RNAV (RNP), RNAV (GPS), VOR	ILS, RNAV (RNP), RNAV (GPS), VOR	ILS, RNAV (RNP), RNAV (GPS), VOR	ILS, RNAV (RNP), RNAV (GPS), VOR	-	-	ILS, RNAV (RNP), RNAV (GPS), VOR	ILS, RNAV (RNP), RNAV (GPS), VOR	ILS, RNAV (RNP), RNAV (GPS), VOR	RNAV (RNP), RNAV (GPS), VOR	ILS, RNAV (RNP), RNAV (GPS), VOR	RNAV (RNP), RNAV (GPS), VOR
RUNWAY SAFETY AREA (RSA)	BEYOND END	1,000'	1,000'	1,000'	1,000'	-	-	1,000'	1,000'	1,000'	1,000'	1,000'	1,000'
	PRIOR TO END	600'	600'	600'	600'	-	-	600'	600'	600'	600'	600'	600'
	WIDTH	500'	500'	500'	500'	-	-	500'	500'	500'	500'	500'	500'
RUNWAY OBJECT FREE AREA (ROFA)	BEYOND END	1,000'	1,000'	1,000'	1,000'	-	-	1,000'	1,000'	1,000'	1,000'	1,000'	1,000'
	PRIOR TO END	600'	600'	600'	600'	-	-	600'	600'	600'	600'	600'	600'
	WIDTH	800'	800'	800'	800'	-	-	800'	800'	800'	800'	800'	800'
RUNWAY OBSTACLE FREE ZONE (ROFZ)	BEYOND END	200'	200'	200'	200'	-	-	200'	200'	200'	200'	200'	200'
	WIDTH	400'	400'	400'	400'	-	-	400'	400'	400'	400'	400'	400'
APPROACH RUNWAY PROTECTION ZONE (RPZ)	LENGTH	2,500'	2,500'	2,500'	2,500'	-	-	2,500'	2,500'	1,700'	1,700'	1,700'	1,700'
	INNER WIDTH	1,000'	1,000'	1,000'	1,000'	-	-	1,000'	1,000'	1,000'	1,000'	1,000'	1,000'
	OUTER WIDTH	1,750'	1,750'	1,750'	1,750'	-	-	1,750'	1,750'	1,510'	1,510'	1,510'	1,510'
DEPARTURE RUNWAY PROTECTION ZONE (RPZ)	LENGTH	1,700'	1,700'	1,700'	1,700'	-	-	1,700'	1,700'	1,700'	1,700'	1,700'	1,700'
	INNER WIDTH	500'	500'	500'	500'	-	-	500'	500'	500'	500'	500'	500'
	OUTER WIDTH	1,010'	1,010'	1,010'	1,010'	-	-	1,010'	1,010'	1,010'	1,010'	1,010'	1,010'
PRECISION OBJECT FREE ZONE (POFZ)	LENGTH	200'	200'	200'	200'	-	-	200'	200'	N/A	N/A	N/A	N/A
	WIDTH	800'	800'	800'	800'	-	-	800'	800'	N/A	N/A	N/A	N/A
DECLARED DISTANCES	TORA	9,003'	9,003'	9,003'	9,003'	-	-	9,000'	9,000'	6,607'	6,607'	6,607'	6,607'
	TODA	9,003'	9,003'	9,003'	9,003'	-	-	9,000'	9,000'	6,607'	6,607'	6,607'	6,607'
	ASDA	9,003'	9,003'	9,003'	9,003'	-	-	9,000'	9,000'	6,607'	6,607'	6,607'	6,607'
	LDA	9,003'	9,003'	9,003'	9,003'	-	-	9,000'	9,000'	6,607'	6,607'	6,607'	6,607'

AIRPORT DATA TABLE

ITEM		EXISTING	FUTURE
AIRPORT REFERENCE CODE		D-IV	D-IV
CRITICAL AIRCRAFT		BOEING 767-300	BOEING 767-300
NATIONAL PLAN OF INTEGRATED AIRPORT SYSTEMS (NPIAS)	CATEGORY	COMMERCIAL SERVICE - PRIMARY	COMMERCIAL SERVICE - PRIMARY
	HUB	SMALL	SMALL
VIRGINIA DOAV AIRPORT CLASSIFICATION		COMMERCIAL SERVICE	COMMERCIAL SERVICE
AIRPORT OWNER/SPONSOR		CAPITAL REGION AIRPORT COMMISSION	CAPITAL REGION AIRPORT COMMISSION
AIRPORT PROPERTY (ACRES)		2,750	2,750
ARFF INDEX		C	C
AIRPORT ELEVATION (FEET)		167.5'	167.5'
MEAN TEMPERATURE OF THE HOTTEST MONTH		80.26° F (JULY 2019)	80.26° F (JULY 2019)
AIRPORT REFERENCE POINT	LATITUDE	37° 30' 18.62" N	37° 30' 20.64" N
	LONGITUDE	77° 19' 10.83" W	77° 19' 09.05" W
NAVIGATIONAL AIDS - VISUAL		PAPI (4L), MALSR, ALSF2, REILS	PAPI (4L), MALSR, ALSF2, REILS
NAVIGATIONAL AIDS - INSTRUMENT		ILS, LOC/GS, RNAV (RNP), RNAV (GPS), VORTAC	ILS, LOC/GS, RNAV (RNP), RNAV (GPS), VORTAC
MISCELLANOUS FACILITIES		HIRL, MITL, LIGHTED WINDCONE, ASOS, BEACON (CG/SS-SR)	HIRL, MITL, LIGHTED WINDCONE, ASOS, BEACON (CG/SS-SR)
MAGNETIC DECLINATION	VARIATION	10° 20' W ± 0° 22'	10° 20' W ± 0° 22'
	DATE	September 22, 2020	September 22, 2020
	SOURCE	NOAA NCEI	NOAA NCEI

RUNWAY END DATA

RUNWAY 16	EXISTING					FUTURE				
	LATITUDE / LONGITUDE			ELEVATION	TDZ ELEVATION	LATITUDE / LONGITUDE			ELEVATION	TDZ ELEVATION
EDGE OF PAVEMENT	37	30	59.89	166.9	167.0	37	31	4.05	165.0	167.0
	77	19	24.88			77	19	28.21		
DISPLACED THRESHOLD	N/A			N/A	N/A	N/A			N/A	N/A

RUNWAY 34	EXISTING					FUTURE				
	LATITUDE / LONGITUDE			ELEVATION	TDZ ELEVATION	LATITUDE / LONGITUDE			ELEVATION	TDZ ELEVATION
EDGE OF PAVEMENT	37	29	44.85	160.5	160.6	37	29	34.85	170.2	170.2
	77	18	24.78			77	18	16.77		
DISPLACED THRESHOLD	N/A			N/A	N/A	N/A			N/A	N/A

RUNWAY 16R	EXISTING					FUTURE				
	LATITUDE / LONGITUDE			ELEVATION	TDZ ELEVATION	LATITUDE / LONGITUDE			ELEVATION	TDZ ELEVATION
EDGE OF PAVEMENT	N/A			N/A	N/A	37	30	54.37	167.0	167.1
						77	19	38.12		
DISPLACED THRESHOLD	N/A			N/A	N/A	N/A			N/A	N/A

RUNWAY 34L	EXISTING					FUTURE				
	LATITUDE / LONGITUDE			ELEVATION	TDZ ELEVATION	LATITUDE / LONGITUDE			ELEVATION	TDZ ELEVATION
EDGE OF PAVEMENT	N/A			N/A	N/A	37	29	39.35	173.3	173.3
						77	18	38.04		
DISPLACED THRESHOLD	N/A			N/A	N/A	N/A			N/A	N/A

RUNWAY 2	EXISTING					FUTURE				
	LATITUDE / LONGITUDE			ELEVATION	TDZ ELEVATION	LATITUDE / LONGITUDE			ELEVATION	TDZ ELEVATION
EDGE OF PAVEMENT	37	29	55.94	158.6	161.5	37	29	55.94	158.6	161.5
	77	19	46.77			77	19	46.77		
DISPLACED THRESHOLD	N/A			N/A	N/A	N/A			N/A	N/A

RUNWAY 20	EXISTING					FUTURE				
	LATITUDE / LONGITUDE			ELEVATION	TDZ ELEVATION	LATITUDE / LONGITUDE			ELEVATION	TDZ ELEVATION
EDGE OF PAVEMENT	37	30	59.47	165.3	167.1	37	30	59.47	165.3	167.1
	77	19	27.68			77	19	27.68		
DISPLACED THRESHOLD	N/A			N/A	N/A	N/A			N/A	N/A

PACS & SACS MONUMENTATION

DESIGNATION	TYPE	IDENTIFIER (PID)	LONGITUDE				LONGITUDE				ELEVATION
RIC A	PACS	AE2426	37°	30'	37.11"	N	77°	19'	23.82"	W	53.10'
RIC ARP 2	PACS	AA9298	37°	30'	16.22"	N	77°	19'	09.51"	W	47.16'
AP STA C2 RIC	SACS	GV6176	37°	31'	01.63"	N	77°	19'	23.70"	W	55.26'
AP STA D2 RIC	SACS	GV6175	37°	29'	44.88"	N	77°	18'	22.23"	W	47.90'

THRESHOLD SITING SURFACE (TSS) OBSTRUCTIONS

RUNWAY	EXISTING			FUTURE		
	OBJECT NUMBER (TYPE)	PENETRATION	DISPOSITION	OBJECT NUMBER (TYPE)	PENETRATION	DISPOSITION
16/34						
16R/34L	NO OBSTRUCTIONS TO THRESHOLD SITING SURFACE (TSS)					
02/20						

OBJECT FREE AREA (OFZ) OBSTRUCTIONS

RUNWAY	EXISTING			FUTURE		
	OBJECT NUMBER (TYPE)	PENETRATION	DISPOSITION	OBJECT NUMBER (TYPE)	PENETRATION	DISPOSITION
16/34						
16R/34L	NO OBSTRUCTIONS TO OBJECT FREE AREA (OFZ)					
02/20						

NOTES	
1	UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE IN FEET
2	APPROACH VISBILITY MINIMUMS ARE BASED UPON THE LATEST APPROACH PROCEDURE CHARTS PUBLISHED ON THE U.S. TERMINAL PROCEDURE PUBLICATIONS WEBSITE
3	AIRPORT LAYOUT PLAN (ALP) DRAWING SET WAS PREPARED IN ACCORDANCE WITH FAA ADVISORY CIRCULAR 150/5070-6 AND 150/5300-13
4	AERIAL IMAGERY DESIGNED TO CONFORM TO THE NATIONAL MAP ACCURACY STANDARDS (NMAS) FOR IMAGES WITH A 0.25' GROUND SAMPLE DISTANCE (GSD)

REVISION	BY	DATE
ALP Revision No. 1	K&G GG/DP	08/07/2012
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ALP Revision No. 4	K&G GG/DP	02/07/2020
ALP Revision No. 5	K&G GG/DP	07/07/2022

RICHMOND INTERNATIONAL AIRPORT

AIRPORT DATA SHEET

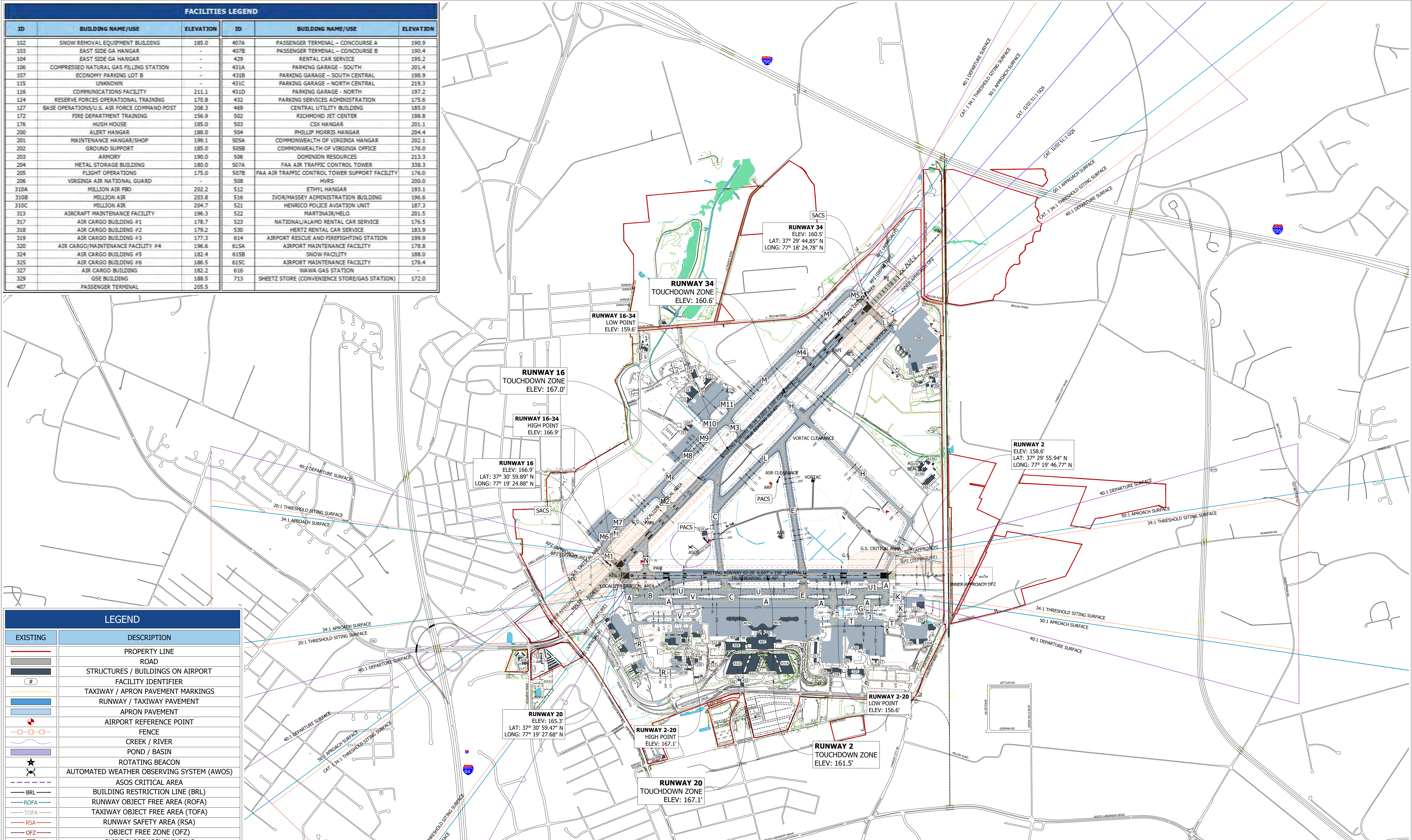
RICHMOND INTERNATIONAL AIRPORT

KUTCHINS & GROH, LLC
K-G@KUTCHINS-GROH.COM
WWW.KUTCHINS-GROH.COM

DRAWN BY DP/K&G
REVIEWED BY GG/K&G
ISSUE DATE 07-2022

FACILITIES LEGEND

ID	BUILDING NAME/USE	ELEVATION	ID	BUILDING NAME/USE	ELEVATION
102	SNOW REMOVAL EQUIPMENT BUILDING	185.0	407A	PASSENGER TERMINAL – CONCOURSE A	190.9
103	EAST SIDE GA HANGAR	-	407B	PASSENGER TERMINAL – CONCOURSE B	190.4
104	EAST SIDE GA HANGAR	-	429	RENTAL CAR SERVICE	195.2
106	COMPRESSED NATURAL GAS FILLING STATION	-	431A	PARKING GARAGE - SOUTH	201.4
107	ECONOMY PARKING LOT B	-	431B	PARKING GARAGE – SOUTH CENTRAL	198.9
115	UNKNOWN	-	431C	PARKING GARAGE – NORTH CENTRAL	219.3
116	COMMUNICATIONS FACILITY	211.1	431D	PARKING GARAGE - NORTH	197.2
124	RESERVE FORCES OPERATIONAL TRAINING	170.8	432	PARKING SERVICES ADMINISTRATION	175.6
127	BASE OPERATIONS/U.S. AIR FORCE COMMAND POST	208.3	469	CENTRAL UTILITY BUILDING	185.0
172	FIRE DEPARTMENT TRAINING	156.9	502	RICHMOND JET CENTER	198.8
176	HUSH HOUSE	185.0	503	CSX HANGAR	201.1
200	ALERT HANGAR	188.0	504	PHILLIP MORRIS HANGAR	204.4
201	MAINTENANCE HANGAR/SHOP	199.1	505A	COMMONWEALTH OF VIRGINIA HANGAR	202.1
202	GROUND SUPPORT	185.0	505B	COMMONWEALTH OF VIRGINIA OFFICE	176.0
203	ARMORY	190.0	506	DOMINION RESOURCES	213.3
204	METAL STORAGE BUILDING	180.0	507A	FAA AIR TRAFFIC CONTROL TOWER	338.3
205	FLIGHT OPERATIONS	175.0	507B	FAA AIR TRAFFIC CONTROL TOWER SUPPORT FACILITY	176.0
206	VIRGINIA AIR NATIONAL GUARD	-	508	HVRS	200.0
310A	MILLION AIR FBO	202.2	512	ETHYL HANGAR	193.1
310B	MILLION AIR	203.8	516	IVOR/MASSEY ADMINISTRATION BUILDING	196.6
310C	MILLION AIR	204.7	521	HENRICO POLICE AVIATION UNIT	187.3
313	AIRCRAFT MAINTENANCE FACILITY	196.3	522	MARTINAIR/HELO	201.5
317	AIR CARGO BUILDING #1	178.7	523	NATIONAL/ALAMO RENTAL CAR SERVICE	176.5
318	AIR CARGO BUILDING #2	179.2	530	HERTZ RENTAL CAR SERVICE	183.9
319	AIR CARGO BUILDING #3	177.3	614	AIRPORT RESCUE AND FIREFIGHTING STATION	199.9
320	AIR CARGO/MAINTENANCE FACILITY #4	196.6	615A	AIRPORT MAINTENANCE FACILITY	178.8
324	AIR CARGO BUILDING #5	182.4	615B	SNOW FACILITY	188.0
325	AIR CARGO BUILDING #6	186.5	615C	AIRPORT MAINTENANCE FACILITY	176.4
327	AIR CARGO BUILDING	182.2	616	WAWA GAS STATION	-
329	GSE BUILDING	188.5	713	SHEETZ STORE (CONVENIENCE STORE/GAS STATION)	172.0
407	PASSENGER TERMINAL	205.5			



LEGEND

EXISTING	DESCRIPTION
	PROPERTY LINE
	ROAD
	STRUCTURES / BUILDINGS ON AIRPORT
#	FACILITY IDENTIFIER
	TAXIWAY / APRON PAVEMENT MARKINGS
	RUNWAY / TAXIWAY PAVEMENT
	APRON PAVEMENT
	AIRPORT REFERENCE POINT
	FENCE
	CREEK / RIVER
	POND / BASIN
★	ROTATING BEACON
	AUTOMATED WEATHER OBSERVING SYSTEM (AWOS)
	ASOS CRITICAL AREA
BRL	BUILDING RESTRICTION LINE (BRL)
ROFA	RUNWAY OBJECT FREE AREA (ROFA)
TOFA	TAXIWAY OBJECT FREE AREA (TOFA)
RSA	RUNWAY SAFETY AREA (RSA)
OFZ	OBJECT FREE ZONE (OFZ)
	GLIDE SLOPE (GS) BUILDING
	GLIDE SLOPE CRITICAL AREA
	LOCALIZER (LOC)
	LOCALIZER CRITICAL AREA
	PRECISION APPROACH PATH INDICATOR (PAPI)
	WINDSOCK
	RUNWAY GUARD LIGHTS (RGL)
	RUNWAY END IDENTIFIER LIGHTS (REIL)
■	EXISTING SURVEY MONUMENT

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NORTH ARROW

MAGNETIC DECLINATION
10° 20' W ± 0° 22' (09/2020)

GRAPHIC SCALE

1000 0 500 1000 2000

GRAPHIC SCALE IN FEET
1" = 1000'

REVISION	BY	DATE
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RICHMOND INTERNATIONAL AIRPORT

EXISTING AIRPORT LAYOUT DRAWING

RICHMOND INTERNATIONAL AIRPORT

KUTCHINS & GROH, LLC
K-G@KUTCHINS-GROH.COM
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DRAWN BY DP/K&G
REVIEWED BY GG/K&G
ISSUE DATE 07-2022
SHEET 3 OF 7

FUTURE PROJECTS / DEVELOPMENT

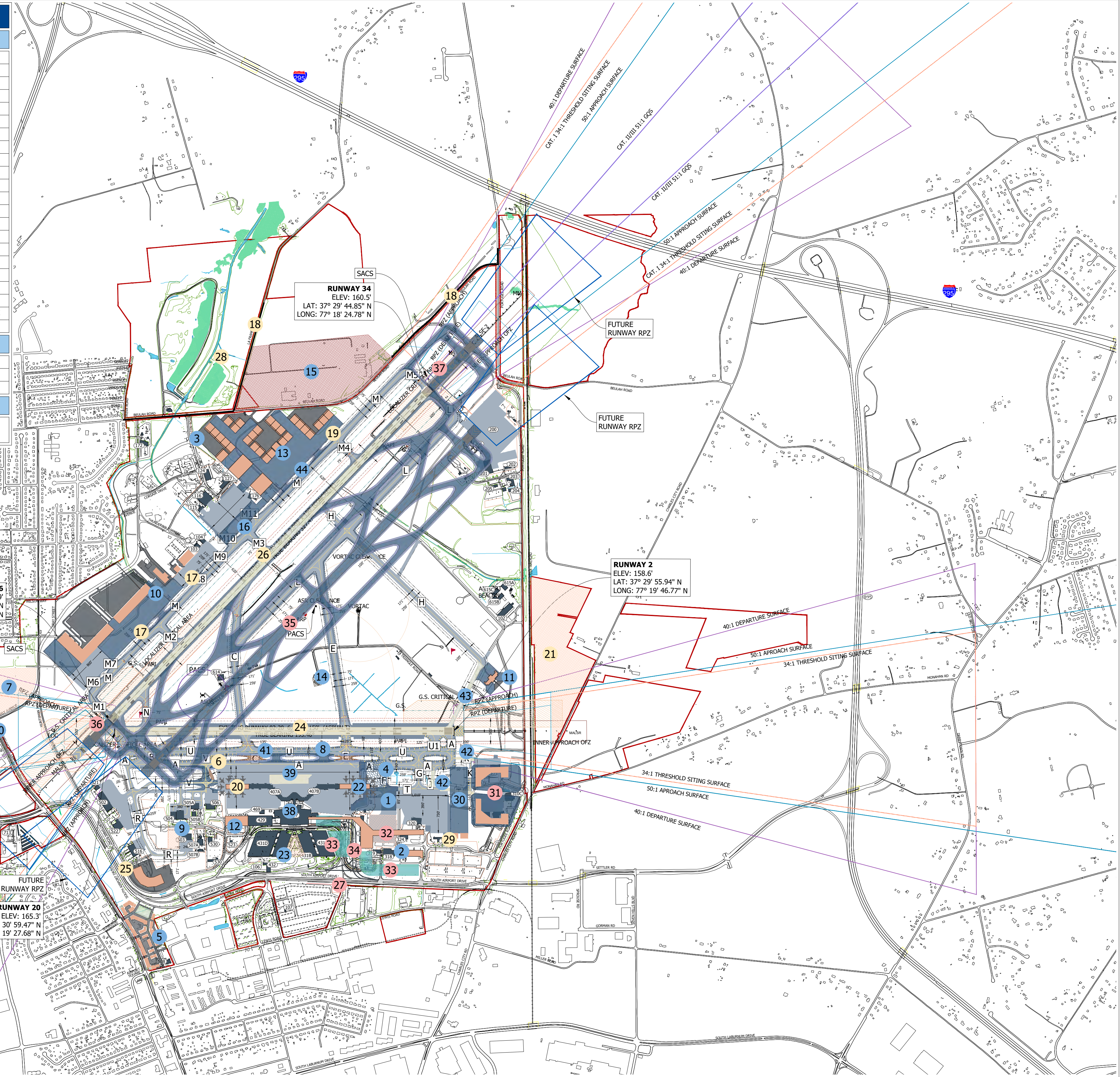
ID	PROJECT DESCRIPTION / TITLE	PHASE	ID	PROJECT DESCRIPTION / TITLE	PHASE
1	CONCOURSE 'B' APRON EXPANSION/DE-ICING FACILITY	2021-2025	23	URBAN AIR MOBILITY DEVELOPMENT	2021-2025
2	THIRD PARTY CARGO OPERATOR	2026-2030	24	RUNWAY 2-20 REHABILITATION	2026-2030
3	FUTURE GA DEVELOPMENT - SOUTH (PHASE I)	2021-2025	25	CONRAC RELOCATION - LONG TERM	2026-2030
4	DEICING AND DIVERSION PAD	2021-2025	26	RUNWAY 16-34 REHABILITATION	2026-2030
5	WILLIAMSBURG ROAD DEVELOPMENT	2021-2025	27	REGIONAL RAIL CONNECTION	2031-2040
6	TAXIWAY 'V' RECONFIGURATION	2021-2025	28	BEULAH ROAD DEVELOPMENT	2026-2030
7	RENTAL CAR STAGING/3RD PARTY DEVELOPMENT	2021-2025	29	RELOCATED BELLY CARGO AND GSE	2026-2030
8	TAXIWAY 'E' RECONFIGURATION	2021-2025	30	FUTURE CARGO EXPANSION - SOUTH APRON	2021-2025
9	FUTURE ENTERPRISE RENTAL CAR FACILITY	2021-2025	31	FUTURE AIRPORT SUPPORT	2031-2040
10	EAST SIDE STREAM MITIGATION	2021-2025	32	FUTURE TERMINAL EXPANSION	2031-2040
11	RELOCATED ARFF	2021-2025	33	FUTURE REMOTE PARKING GARAGE	2031-2040
12	CONRAC EXPANSION - SHORT TERM	2021-2025	34	FUTURE ACCESS ROAD	2031-2040
13	EAST SIDE GA TERMINAL AND HANGAR FACILITIES	2021-2025	35	FUTURE RUNWAY 16R-34L	2031-2040
14	RELOCATE ASR (LOCATION TBD)	2021-2025	36	FUTURE RUNWAY 16 EXTENSION	2031-2040
15	FUTURE ARMY NATIONAL GUARD RELOCATION	2021-2025	37	FUTURE RUNWAY 34 EXTENSION	2031-2040
16	EAST APRON 4 RECONSTRUCTION EXPANSION	2021-2025	38	FEDERAL INSPECTION SERVICE RENOVATION	2021-2025
17	EAST APRON 3 EXPANSION AND HANGAR FACILITIES	2026-2030	39	MID-CONCOURSE APRON RECONSTRUCTION	2021-2025
18	CLOSE BEULAH ROAD/IMPROVE LAFRANCE ROAD	2026-2030	40	WILLIAMSBURG ROAD ROUNDABOUT	2021-2025
19	FUTURE FBO DEVELOPMENT - SOUTHEAST	2021-2025	41	TAXIWAYS 'C' AND 'A' RECONFIGURATION	2021-2025
20	CONCOURSE 'A' EXPANSION	2026-2030	42	TAXIWAYS 'J', 'K', AND 'T' RECONSTRUCTION	2021-2025
21	CHARLES CITY ROAD DEVELOPMENT	2026-2030	43	TAXIWAY 'H' RECONSTRUCTION	2021-2025
22	CONCOURSE 'B' EXPANSION	2026-2030	44	EAST SIDE APRON 5 CONSTRUCTION	2021-2025

PROJECT PHASING LEGEND

- # NEAR-TERM PLANNING HORIZON (2022-2025)
- # INTERMEDIATE-TERM PLANNING HORIZON (2026-2030)
- # BEYOND PLANNING HORIZON (2031-2040)

NOTES

1/ PURSUANT TO FAA'S CONDITIONAL APPROVAL OF ALP REVISION NO. 4, DATED FEBRUARY 7, 2020, INCOMPATIBLE LAND USES WITHIN THE FUTURE RPZ AS A RESULT OF THE PROPOSED RUNWAY EXTENSION TO RUNWAY 16/34 TO THE NORTH, MUST BE REMOVED PRIOR TO CONSTRUCTION.



LEGEND

EXISTING	FUTURE	DESCRIPTION
		PROPERTY LINE
		ROAD/PARKING
		STRUCTURES / BUILDINGS ON AIRPORT
#		FACILITY IDENTIFIER
	#	FUTURE PROJECT ID
		TAXIWAY / APRON PAVEMENT MARKINGS
		RUNWAY / TAXIWAY PAVEMENT
		RUNWAY / TAXIWAY SHOULDER PAVEMENT
		RUNWAY / TAXIWAY PAVEMENT (TO BE REMOVED)
		APRON PAVEMENT
		AIRPORT REFERENCE POINT
		FENCE
		CREEK / RIVER
		POND / BASIN
		ROTATING BEACON
		AUTOMATED WEATHER OBSERVING SYSTEM (AWOS)
		ASOS CRITICAL AREA
BRL	BRL	BUILDING RESTRICTION LINE (BRL)
	FUT ROFA	RUNWAY OBJECT FREE AREA (ROFA)
		TAXIWAY OBJECT FREE AREA (TOFA)
	FUT RSA	RUNWAY SAFETY AREA (RSA)
	FUT OFZ	OBJECT FREE ZONE (OFZ)
		GLIDE SLOPE (GS) BUILDING
		GLIDE SLOPE CRITICAL AREA
		LOCALIZER (LOC)
		LOCALIZER CRITICAL AREA
		PRECISION APPROACH PATH INDICATOR (PAPI)
		WINDSOCK
		RUNWAY GUARD LIGHTS (RGL)
		RUNWAY END IDENTIFIER LIGHTS (REIL)
		EXISTING SURVEY MONUMENT
		RUNWAY / TAXIWAY REHABILITATION
		AIRSIDE DEVELOPMENT
		LANDSIDE DEVELOPMENT
		PARKING GARAGE
		RUNWAY / TAXIWAY REHABILITATION

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NORTH ARROW

MAGNETIC DECLINATION
10° 20' W ± 0° 22' (09/2020)

GRAPHIC SCALE

1000 0 500 1000 2000

GRAPHIC SCALE IN FEET
1" = 1000'

REVISION	BY	DATE
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ALP Revision No. 4	K&G GG/DP	02/07/2020
ALP Revision No. 5	K&G GG/DP	07/07/2022

RICHMOND INTERNATIONAL AIRPORT

FUTURE AIRPORT LAYOUT DRAWING

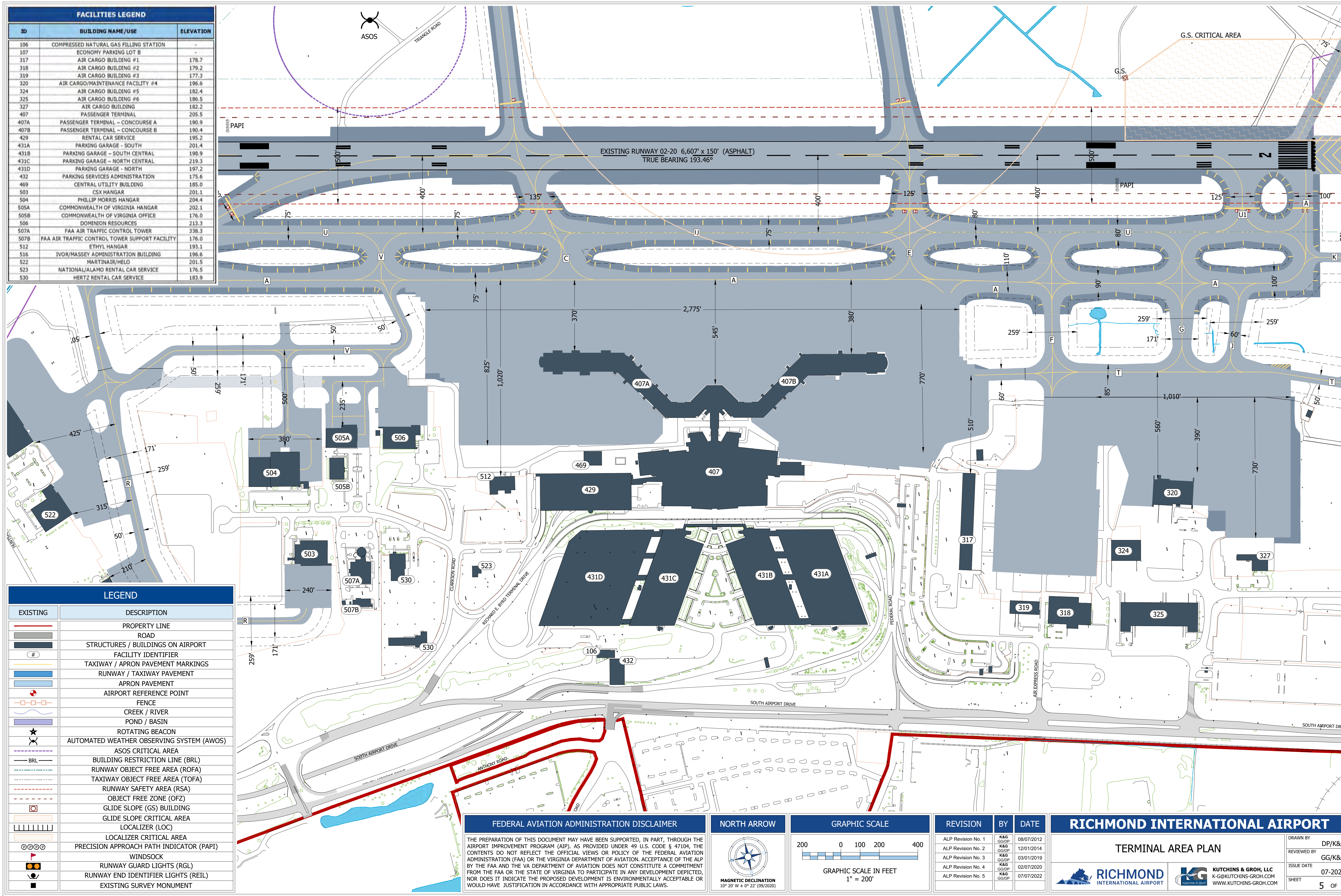
RICHMOND INTERNATIONAL AIRPORT

KUTCHINS & GROH, LLC
K-G@KUTCHINS-GROH.COM
WWW.KUTCHINS-GROH.COM

DRAWN BY DP/K&G
REVIEWED BY GG/K&G
ISSUE DATE 07-2022
SHEET 4 OF 7

FACILITIES LEGEND

ID	BUILDING NAME/USE	ELEVATION
106	COMPRESSED NATURAL GAS FILLING STATION	-
107	ECONOMY PARKING LOT B	-
317	AIR CARGO BUILDING #1	178.7
318	AIR CARGO BUILDING #2	179.2
319	AIR CARGO BUILDING #3	177.3
320	AIR CARGO/MAINTENANCE FACILITY #4	196.6
324	AIR CARGO BUILDING #5	182.4
325	AIR CARGO BUILDING #6	186.5
327	AIR CARGO BUILDING	182.2
407	PASSENGER TERMINAL	205.5
407A	PASSENGER TERMINAL – CONCOURSE A	190.9
407B	PASSENGER TERMINAL – CONCOURSE B	190.4
429	RENTAL CAR SERVICE	195.2
431A	PARKING GARAGE - SOUTH	201.4
431B	PARKING GARAGE – SOUTH CENTRAL	198.9
431C	PARKING GARAGE – NORTH CENTRAL	219.3
431D	PARKING GARAGE - NORTH	197.2
432	PARKING SERVICES ADMINISTRATION	175.6
469	CENTRAL UTILITY BUILDING	185.0
503	CSX HANGAR	201.1
504	PHILLIP MORRIS HANGAR	204.4
505A	COMMONWEALTH OF VIRGINIA HANGAR	202.1
505B	COMMONWEALTH OF VIRGINIA OFFICE	176.0
506	DOMINION RESOURCES	213.3
507A	FAA AIR TRAFFIC CONTROL TOWER	338.3
507B	FAA AIR TRAFFIC CONTROL TOWER SUPPORT FACILITY	176.0
512	ETHYL HANGAR	193.1
516	IVOR/MASSEY ADMINISTRATION BUILDING	196.6
522	MARTINAIR/HELO	201.5
523	NATIONAL/ALAMO RENTAL CAR SERVICE	176.5
530	HERTZ RENTAL CAR SERVICE	183.9



LEGEND

EXISTING	DESCRIPTION
	PROPERTY LINE
	ROAD
	STRUCTURES / BUILDINGS ON AIRPORT
#	FACILITY IDENTIFIER
	TAXIWAY / APRON PAVEMENT MARKINGS
	RUNWAY / TAXIWAY PAVEMENT
	APRON PAVEMENT
	AIRPORT REFERENCE POINT
	FENCE
	CREEK / RIVER
	POND / BASIN
	ROTATING BEACON
	AUTOMATED WEATHER OBSERVING SYSTEM (AWOS)
	ASOS CRITICAL AREA
BRL	BUILDING RESTRICTION LINE (BRL)
	RUNWAY OBJECT FREE AREA (ROFA)
	TAXIWAY OBJECT FREE AREA (TOFA)
	RUNWAY SAFETY AREA (RSA)
	OBJECT FREE ZONE (OFZ)
	GLIDE SLOPE (GS) BUILDING
	GLIDE SLOPE CRITICAL AREA
	LOCALIZER (LOC)
	LOCALIZER CRITICAL AREA
	PRECISION APPROACH PATH INDICATOR (PAPI)
	WINDSOCK
	RUNWAY GUARD LIGHTS (RGL)
	RUNWAY END IDENTIFIER LIGHTS (REIL)
	EXISTING SURVEY MONUMENT

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NORTH ARROW

MAGNETIC DECLINATION
10° 20' W ± 0° 22' (09/2020)

GRAPHIC SCALE

200 0 100 200 400

GRAPHIC SCALE IN FEET
1" = 200'

REVISION	BY	DATE
ALP Revision No. 1	K&G GG/DP	08/07/2012
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RICHMOND INTERNATIONAL AIRPORT

TERMINAL AREA PLAN

RICHMOND INTERNATIONAL AIRPORT

KUTCHINS & GROH, LLC
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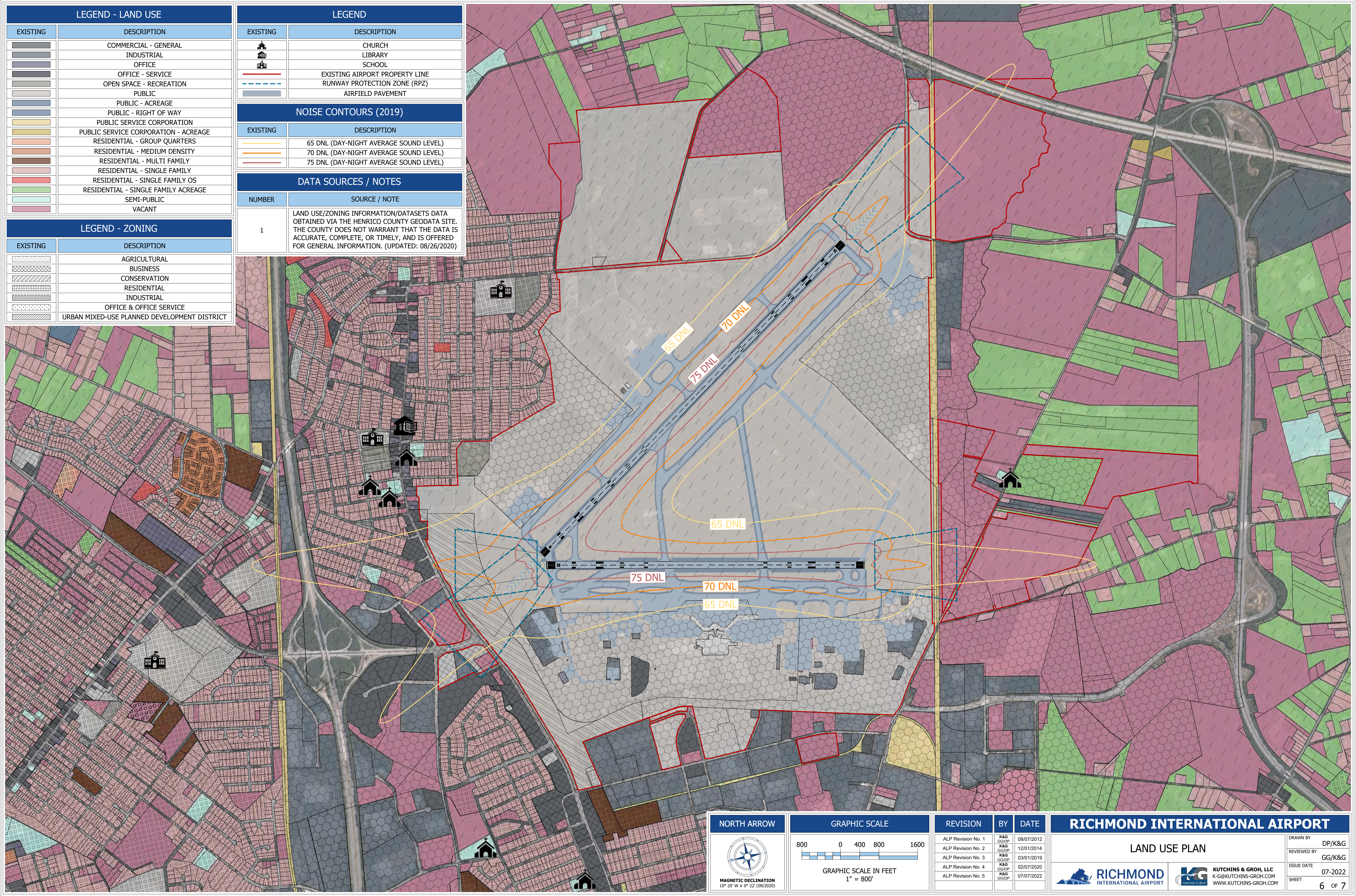
WWW.KUTCHINS-GROH.COM

DRAWN BY	DP/K&G
REVIEWED BY	GG/K&G
ISSUE DATE	07-2022
SHEET	5 OF 7



LEGEND - LAND USE

EXISTING	DESCRIPTION
	COMMERCIAL - GENERAL
	INDUSTRIAL
	OFFICE
	OFFICE - SERVICE
	OPEN SPACE - RECREATION
	PUBLIC
	PUBLIC - ACREAGE
	PUBLIC - RIGHT OF WAY
	PUBLIC SERVICE CORPORATION
	PUBLIC SERVICE CORPORATION - ACREAGE
	RESIDENTIAL - GROUP QUARTERS
	RESIDENTIAL - MEDIUM DENSITY
	RESIDENTIAL - MULTI FAMILY
	RESIDENTIAL - SINGLE FAMILY
	RESIDENTIAL - SINGLE FAMILY OS
	RESIDENTIAL - SINGLE FAMILY ACREAGE
	SEMI-PUBLIC
	VACANT

LEGEND - ZONING

EXISTING	DESCRIPTION
	AGRICULTURAL
	BUSINESS
	CONSERVATION
	RESIDENTIAL
	INDUSTRIAL
	OFFICE & OFFICE SERVICE
	URBAN MIXED-USE PLANNED DEVELOPMENT DISTRICT

LEGEND

EXISTING	DESCRIPTION
	CHURCH
	LIBRARY
	SCHOOL
	EXISTING AIRPORT PROPERTY LINE
	RUNWAY PROTECTION ZONE (RPZ)
	AIRFIELD PAVEMENT

NOISE CONTOURS (2019)

EXISTING	DESCRIPTION
	65 DNL (DAY-NIGHT AVERAGE SOUND LEVEL)
	70 DNL (DAY-NIGHT AVERAGE SOUND LEVEL)
	75 DNL (DAY-NIGHT AVERAGE SOUND LEVEL)

DATA SOURCES / NOTES

NUMBER	SOURCE / NOTE
1	LAND USE/ZONING INFORMATION/DATASETS DATA OBTAINED VIA THE HENRICO COUNTY GEODATA SITE. THE COUNTY DOES NOT WARRANT THAT THE DATA IS ACCURATE, COMPLETE, OR TIMELY, AND IS OFFERED FOR GENERAL INFORMATION. (UPDATED: 08/26/2020)

NORTH ARROW

MAGNETIC DECLINATION
10° 20' W ± 0° 22' (09/2020)

GRAPHIC SCALE

800 0 400 800 1600

GRAPHIC SCALE IN FEET
1" = 800'

REVISION	BY	DATE
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RICHMOND INTERNATIONAL AIRPORT

LAND USE PLAN

RICHMOND INTERNATIONAL AIRPORT

KUTCHINS & GROH, LLC
K-G@KUTCHINS-GROH.COM
WWW.KUTCHINS-GROH.COM

DRAWN BY DP/K&G
REVIEWED BY GG/K&G
ISSUE DATE 07-2022
SHEET 6 OF 7

EXISTING AIRPORT PROPERTY

PARCEL NUMBER	HENRICO COUNTY PARCEL NUMBER	OWNER	DATE ACQUIRED	TYPE HELD	PURPOSE	ACREAGE	FAA PROJECT NUMBER
1	821-704-7436	CRAC	7/1/1976	FEE	ESTABLISH AIRPORT	88.415	ADAP-16
2	824-712-5473	CRAC	7/1/1976	FEE	ESTABLISH AIRPORT	2,298.890	-
3	822-716-2325	CRAC	1/1/1981	FEE	EXPAND AIRPORT	9.383	ADAP-15
4	822-715-1942	CRAC	3/1/1981	FEE	EXPAND AIRPORT	2.500	ADAP-15
5	820-711-0520	CRAC	10/1/1993	FEE	EXPAND AIRPORT	7.450	-
6	832-707-0784	CRAC	7/1/1994	FEE	EXPAND AIRPORT	53.880	-
7	822-715-8368	CRAC	7/14/1997	FEE	EXPAND AIRPORT	0.900	ADAP-16
8	821-704-0680	CRAC	4/6/1998	FEE	EXPAND AIRPORT	0.770	-
9	821-704-0658	CRAC	4/7/1998	FEE	EXPAND AIRPORT	2.020	-
10	823-704-4391	CRAC	6/11/1998	FEE	EXPAND AIRPORT	30.456	-
11	824-705-4307	CRAC	8/10/1998	FEE	EXPAND AIRPORT	13.010	-
12	821-704-0829	CRAC	1/7/1999	FEE	EXPAND AIRPORT	2.080	-
13	823-701-1959	CRAC	3/5/1999	FEE	EXPAND AIRPORT	47.000	-
14	818-709-9610	CRAC	4/28/2000	FEE	EXPAND AIRPORT	9.000	-
15	819-712-4614	CRAC	5/3/2000	FEE	EXPAND AIRPORT	12.000	-
16	829-703-8623	CRAC	7/11/2000	FEE	EXPAND AIRPORT	144.000	-
17	822-716-3874	CRAC	9/1/2000	FEE	EXPAND AIRPORT	5.730	-
18	820-705-9887	CRAC	10/14/2003	FEE	EXPAND AIRPORT	0.810	-
19	831-711-8253	CRAC	2/4/2004	FEE	EXPAND AIRPORT	16.300	-
20	821-705-0884	CRAC	2/23/2005	FEE	EXPAND AIRPORT	0.121	-
21	819-710-8950	CRAC	2/28/2007	FEE	EXPAND AIRPORT	7.587	-
22	819-711-4906	CRAC	2/28/2007	FEE	EXPAND AIRPORT	9.641	-
23	822-715-2089.001	CRAC	1/1/1981	FEE	EXPAND AIRPORT	2.922	ADAP-15
24	819-713-3876.001	CRAC	7/1/1976	FEE	ESTABLISH AIRPORT	1.680	-
25	823-716-0911	CRAC	11/1/1981	FEE	EXPAND AIRPORT	12.130	ADAP-16
26	847-677-0879	CRAC	7/1/1976	FEE	EXPAND AIRPORT	0.002	-
27	820-711-3399	CRAC	12/12/2007	FEE	EXPAND AIRPORT	1.630	-
28	822-703-4057	CRAC	4/25/2008	FEE	EXPAND AIRPORT	13.790	-
					TOTAL ACREAGE	2,794.017	

AVIGATION EASEMENTS

PARCEL NUMBER	TRACT NUMBER	GRANTOR	DATE	DEED BOOK/ PAGE NUMBER	APPROXIMATE AREA (ACRES)	DESCRIPTION	AQCISITION METHOD	EASEMENT TYPE	FAA PROJECT NUMBER
100	12412-017	JOHN M BOHR, ET UX	11/15/1982	1862/1516	1.300	EAST OF MONAHAN RD.	-	RWY 2 50:1	ADAP-16
101	12411-018	LEROY OWENS, ET UX	30270	1862/1510	14.810	SOUTH OF CHARLES & CITY RD.	-	RWY 2 50:1	ADAP-16
102	7083-019	RALPH J. CROSS, ET AL	30146	1855/987	0.900	NE RTE. 60 & AIRPORT DR.	-	RWY 16 50:1	ADAP-16
103	9771-020	F. ELMORE BUTLER	29788	1836/348	5.600	NW AIRPORT DR. & SERVICE RD.	-	RWY 16 50:1	ADAP-16
104	6640-001-002	E.M. WRENN, ET AL	23649	1250/373	12.610	WEST OF LEWIS ROAD	FEE	UNKNOWN	-
105	*31938-029-00A	MECHANICSVILLE CONCRET	36088	2924/2431	1.640	SOUTH OF PORTUGEE ROAD	-	RWY 34 50:1	AIP-35
106	*31938-029-00B	MECHANICSVILLE CONCRET	36088	2924/2431	0.950	SOUTH OF PORTUGEE ROAD	-	RWY 34 50:1	AIP-35
107	*31939-030	KATIE WOODSON OWENS	36277	4/6/1998	63.479	SOUTH OF PORTUGEE ROAD	-	RWY 34 50:1	AIP-35

AVIGATION EASEMENTS

PARCEL NUMBER	TRACT NUMBER	GRANTOR	DATE	DEED BOOK/ PAGE NUMBER	APPROXIMATE AREA (ACRES)	DESCRIPTION	AQCISITION METHOD	EASEMENT TYPE	FAA PROJECT NUMBER
N/A	N/A	COMM. OF VIRGINIA	1/8/1964	1230/145	2.520	PORTION OF U.S. RT 60	DEED	UNKNOWN	N/A
N/A	N/A	COMM. OF VIRGINIA	3/3/1981	1826/1156	2.490	PORTION OF U.S. RT 60	DEED	UNKNOWN	N/A
N/A	N/A	COMM. OF VIRGINIA	3/3/1981	1826/1156	0.130	PORTION OF U.S. RT 60	DEED	UNKNOWN	N/A
N/A	N/A	COMM. OF VIRGINIA	3/3/1981	1826/1156	1.020	PORTION OF AIRPORT DR.	DEED	UNKNOWN	N/A
N/A	N/A	COUNTY OF HENRICO VA.	10/1/1981	1841/976	1.900	PORTION OF CHAS. CTY RD.	DEED	UNKNOWN	N/A
N/A	N/A	COUNTY OF HENRICO VA.	10/1/1981	1841/976	0.750	PORTION OF WILSON WAY	DEED	UNKNOWN	N/A
N/A	N/A	COUNTY OF HENRICO VA.	10/1/1981	1841/976	0.950	PORTION OF TREVA RD.	DEED	UNKNOWN	N/A
N/A	N/A	COUNTY OF HENRICO VA.	10/1/1981	1841/976	0.413	PORTION OF LAFRANCE RD.	DEED	UNKNOWN	N/A
N/A	N/A	COUNTY OF HENRICO VA.	10/1/1981	1841/976	0.385	PORTION OF BEULAH RD.	DEED	UNKNOWN	N/A
N/A	N/A	COUNTY OF HENRICO VA.	10/1/1981	1841/976	5.438	PORTION OF BEULAH RD.	DEED	UNKNOWN	N/A
N/A	N/A	COUNTY OF HENRICO VA.	10/1/1981	1841/976	0.325	PORTION OF LEWIS RD.	DEED	UNKNOWN	N/A
N/A	N/A	COUNTY OF HENRICO VA.	10/1/1981	1841/976	0.735	PORTION OF BEULAH RD.	DEED	UNKNOWN	N/A
N/A	N/A	COUNTY OF HENRICO VA.	10/1/1981	1841/976	0.058	PORTION OF LAFRANCE RD.	DEED	UNKNOWN	N/A
N/A	N/A	COUNTY OF HENRICO VA.	10/1/1981	1841/976	4.650	PORTION OF PORTUGEE RD.	DEED	UNKNOWN	N/A
N/A	N/A	COUNTY OF HENRICO VA.	10/1/1981	1841/976	5.430	PORTION OF BEULAH RD.	DEED	UNKNOWN	N/A
N/A	N/A	COUNTY OF HENRICO VA.	10/1/1981	1841/976	0.030	PORTION OF CHAS. CTY RD.	DEED	UNKNOWN	N/A
N/A	N/A	COUNTY OF HENRICO VA.	10/1/1981	1841/976	0.980	PORTION OF CHAS. CTY RD.	DEED	UNKNOWN	N/A

SOURCE / NOTES

NUMBER	SOURCE / NOTE
1	SOURCE: 2000 RICHMOND INTERNATIONAL AIRPORT EXHIBIT "A" AND FAA APPROVED ALP (AIRPORT PROPERTY MAP)
2	THE 2000 RICHMOND INTERNATIONAL AIRPORT EXHIBIT "A" MAP PREPARED BY AUSTIN BROCKENBROUGH IS CONSIDERED THE OFFICIAL PROPERTY DOCUMENT AND CONTAINS ADDITIONAL DETAIL REGARDING INDIVIDUAL PARCEL ACQUISITION. THIS DOCUMENT ALSO CONTAINS UTILITY EASEMENT DATA.
3	THE CRAC OWNS 277.992 ACRES OF LAND IN NEW KENT COUNTY FOR WETLAND MITIGATION. SEE 2000 RICHMOND INTERNATIONAL AIRPORT EXHIBIT "A", SUPPLEMENT "B" - NON-DEDICATED AIRPORT PROPERTY FOR DETAILED INFORMATION.

LEGEND

EXISTING	DESCRIPTION
	EXISTING AIRPORT PROPERTY LINE
	EXISTING AIRPORT PROPERTY
	RUNWAY PROTECTION ZONE (RPZ)
	EXISTING AIRFIELD PAVEMENT

NORTH ARROW

MAGNETIC DECLINATION
10° 20' W ± 0° 22' (09/2020)

GRAPHIC SCALE

800 0 400 800 1600

GRAPHIC SCALE IN FEET
1" = 800'

REVISION	BY	DATE
ALP Revision No. 1	K&G GG/DP	08/07/2012
ALP Revision No. 2	K&G GG/DP	12/01/2014
ALP Revision No. 3	K&G GG/DP	03/01/2019
ALP Revision No. 4	K&G GG/DP	02/07/2020
ALP Revision No. 5	K&G GG/DP	07/07/2022

RICHMOND INTERNATIONAL AIRPORT

AIRPORT PROPERTY MAP

RICHMOND INTERNATIONAL AIRPORT

KUTCHINS & GROH, LLC
K-G@KUTCHINS-GROH.COM
WWW.KUTCHINS-GROH.COM

DRAWN BY DP/K&G
REVIEWED BY GG/K&G
ISSUE DATE 07-2022
SHEET 7 OF 7

Richmond International Airport

Master Plan Revision

Appendix H

ALP Narrative

Kutchins & Groh

RICHMOND INTERNATIONAL AIRPORT

U. S. Department
of Transportation

Federal Aviation
Administration

WASHINGTON AIRPORTS DISTRICT OFFICE
13873 Park Center Road, Suite 490 S
Herndon, VA. 20171
Telephone: (703) 487-3978
Fax: (703) 487-3982

July 8, 2022

Mr. Perry J. Miller, AAE
President and CEO
Capital Region Airport Commission
Richmond International Airport
1 Richmond E. Bryd Terminal Drive
Richmond, VA 23250-2400

Re: ALP Revision No. 5
Richmond International Airport
Richmond, Virginia

Dear Mr. Miller:

Our office is in receipt of the proposed Airport Layout Plan (ALP) Revision No. 5 to the ALP for the Richmond International Airport in Richmond Virginia. The changes to the ALP include depicting the following projects:

As-Built Projects/Future Project Updates
Airside Development/Improvements
Taxiway 'V' Reconfiguration
Taxiway 'C' and 'H' Rehabilitation
Runway 2-20 Rehabilitation
Runway 16-34 Rehabilitation
Relocate ASR (Location TBD)
Taxiway 'E' Reconfiguration
Taxiway 'U' Rehabilitation
Future GA Development - Southeast
East Side Development
Relocated ARFF (Updated Location)
East Apron 3 Expansion and Hangar Facilities
Third-Party Cargo Operator
East Side GA Terminal and Hangar Facilities
Future GA Development - South
Future Cargo Expansion - South Apron
Future Army National Guard Relocation
East Apron 4 Reconstruction Expansion
East Side Stream Mitigation
Mid-Concourse Apron Reconstruction
East Side Apron 5 Development
Landside Development/Improvements
Williamsburg Road Development
Urban Air Mobility Development
CONRAC Relocation – Long Term

Rental Car Staging Area / 3rd Party Development
Future Access Road
Future Enterprise Rental Car Facility
Close Beulah Road / Improve Lafrance Road

These changes are noted in revision block 5 on the ALP dated July 7, 2022. ALP Revision No. 5 is being considered a pen and ink revision to the current ALP and is hereby conditionally approved.

The contents of the ALP revision do not necessarily reflect the official views or policies of the FAA. Approval of the ALP by the FAA does not in any way constitute a commitment on the part of the United States to participate in any development depicted therein. No additional modifications to FAA design standards are noted on the revised ALP.

All proposed development identified on the ALP requires environmental review and shall not be undertaken without prior written environmental approval by the FAA. Approval of the ALP interim revision does not relieve any sponsor responsibilities for ensuring compatible use of land adjacent to or in the vicinity of the airport.

Approval of an ALP showing future non-aeronautical use does not constitute FAA approval. A separate FAA approval is required at the time the land is to be used for non-aeronautical purpose.

This determination does not relieve the sponsor of any compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local governing body.

You are reminded of your continuing responsibility to keep your ALP current at all times. Each revision must be submitted to this office for review and approval prior to the start of construction. Your ALP should be reviewed at regular intervals and updated as necessary.

FAA's approval of this ALP represents acceptance of the general location of future facilities depicted. During the preliminary design phase, the airport owner is required to resubmit for approval the final locations, heights, and exterior finishes of structures. FAA's concerns are obstructions, impact on electronic aids, which could adversely affect the safety, efficiency or utility of the airport.

If you should have any questions in regards to this letter, please do not hesitate to contact me at (703) 487-3978.

Sincerely,

Jeffrey W. Breeden, AICP
Washington Airports District Office

cc: John Rutledge, CRAC
Scott Denny, DOAV
George Groh, K & G
Darren Persick, K & G
Guillermo Felix, AEA-620

U. S. Department
of Transportation

Federal Aviation
Administration

WASHINGTON AIRPORTS DISTRICT OFFICE
13873 Park Center Road, Suite 490 S
Herndon, VA. 20171
Telephone: (703) 487-3978
Fax: (703) 487-3982

January 26, 2022

John B. Rutledge, P.E
Chief Operating Officer
Capital Region Airport Commission
Richmond International Airport
1 Richmond E. Bryd Terminal Drive
Richmond, VA 23250-2400

Re: **Airport Layout Plan Revision No. 5**
Richmond International Airport
Richmond, Virginia

Dear Mr. Rutledge:

Our office has received and reviewed a draft copy of Airport Layout Plan Revision No. 5 and narrative report for the Richmond International Airport that was received electronically on December 17, 2021. Please find attached our comments on the attached sheet(s). Please also incorporate any comments received from the Virginia Department of Aviation. We would like to request a written response to each of our comments for our files

If you have any questions or require additional information, please feel free to contact me at (703) 487-3978.

Sincerely,

JEFFREY W BREEDEN Digitally signed by JEFFREY W BREEDEN Date: 2022.01.26 19:36:04 -05'00'

Jeffrey W. Breeden, AICP
Airport Planner
Washington Airports District Office

Enclosure

cc: Scott Denny, DOAV
George Groh, K & G
Darren Persick, K & G

Draft ALP Revision No. 5
Richmond International Airport
January 26, 2022

Please incorporate any comments submitted by the Virginia Department of Aviation

The ALP revision narrative should be updated to make it clear what changes to the ALP were made to reflect "as-built" conditions and what changes were made to reflect new future development. The ALP narrative may need some revisions.

<u>Concourse "A" expansion.</u>
It appears that the Concourse "A" expansion reflects revisions to incorporate "as built" conditions and as well as future gates for a total of 6. It appears that the future 6 gates were shown on the previous ALP revision. Please confirm. One concern we have is the line of sight from the ATCT for future expansion of Concourse "A" to the north. I understand this issue came up during the previous Concourse "A" expansion. Has the planning team evaluated line of sight of the Concourse "A" expansion and the ATCT?

<u>National Guard Taxiway</u>
The National Guard Taxiway - the taxiway providing access to the new National Guard site is shown on the draft ALP but not noted on the ALP revision narrative. This brings up two points. Are there any other development items that aren't captured within the ALP narrative report? The second point is the National Guard taxiway will need additional analysis and compliance review. It is suggested that this item be deleted from the draft ALP until that review is complete and we can process this at a later date.

<u>Development Along Taxiway H</u>
There is new development noted as buildings 12 and 16. This is new development that was not shown on the previous ALP. Generally, an ALP revision reflects moving previously approved development to different locations or depicting a slightly different configuration. Since this is new and hasn't been vetted thru a traditional master planning process, we would suggest deleting this effort and evaluating it during the upcoming master planning effort.

Richmond International Airport

ALP Update Narrative Report

Revision Number 5 – April 2022

Executive Summary

The Richmond International Airport (RIC) is owned and operated by the Capitol Region Airport Commission (CRAC). This governmental body consists of a fourteen member board of directors appointed by four Richmond area jurisdictions. The Commission elects a Chairman on an annual basis from among its membership. Since its opening as a commercial facility in 1927, RIC has provided the commercial, general aviation and military facilities for the Richmond Area.

Richmond International Airport is located approximately ten miles east of the Central Business District of the City of Richmond. Its main entrance is off of U.S. Highway 60, termed Williamsburg Road. Physically, RIC occupies 2,580 acres, has three active runways, has an extensive taxiway and airfield system, and serves the aviation needs of the surrounding communities.

In 2020, the Capital Regional Airport Commission began the process of revising their current FAA approved Airport Master Plan for the Richmond International Airport to address changes occurring within the aviation industry as well as changes happening within the current airport environment. These include the mergers of multiple air carriers and the reduction of frequency of flights. More important than these events is the completion of several major projects, including the construction of Taxiway 'M', construction of a new south ramp for Concourse B, expansion of Concourse A, and the addition of 6 gates and associated holdrooms, multiple development projects on the east side of the airfield, conversion of Runway 7-25 to Taxiway 'H', expansion of both Security Checkpoints, addition of cargo aprons, and Baggage Screening improvements.

Since the Airport must keep the ALP document current by depicting the location of existing and planned future airport infrastructure, an update to the Airport Layout Plan (ALP) was also completed as part of the Master Plan Revision, which included an update to the Existing and Future Airport Layout Drawings, the Terminal Area Drawing, the Land Use Drawing, and the Airport Property Map.

This document details the changes to the ALP since the 2010 ALP was adopted by the FAA, which includes the previously FAA approved Revision No. 1, completed in 2012; Revision No. 2, completed in 2017; Revision No. 3, completed in 2019; and Revision No. 4, completed in 2020. Airport Layout Plans are required by the FAA as an element in assisting the administration of the Airport Improvement Programs grants for funding eligible Capital Improvement Programs (CIP) and are typically updated every five to ten years to incorporate recent construction, reflect new documentation requirements, and illustrate future projects anticipated to occur over the next 20 years. This ALP was prepared in accordance with the applicable elements specified in FAA Advisory Circulars (AC) 150/5070-6A, Airport Master Plans, and AC 150/5300-13, Airport Design.

Existing Conditions – Existing Airport Layout Drawing

The Richmond International Airport is classified as a primary airport in the National Transportation System. The FAA uses an additional classification referred to as the Airport Reference Code (ARC) to define the typical size of aircraft that the airport can accommodate. The ARC is defined by wingspan and approach speed of the critical aircraft using the facility. The current design aircraft for RIC is the Boeing 767-300, which establishes the airport's ARC as D-IV. The Airport's existing layout satisfies safety standards for a D-IV and will allow the Airport to continue to adequately serve the community, while meeting FAA safety and design standards. This ALP effort did not analyze any proposed change in the ARC.

RIC has two active runways. The nomenclature used for these runways is defined by compass headings; they are referred to as 2-20 and 16-34. ATCT personnel consider Runway 16-34 the primary runway due to its Category III Instrument Landing System; however, operations are generally split between Runways 2-20 and 16-34.

The runway system and developed aviation uses on the airport are served by a system of taxiways that provides access between the airfield and other aviation facilities. Taxiways link the independent airport elements and provide for controlled movement to and from the runways, terminal/cargo areas, general aviation facilities and aircraft parking areas. From a design standpoint, it is desirable to maintain a smooth flow on the taxiway system with a minimum number of points requiring changes in an aircraft's taxing speed (e.g., runway and taxiway crossings).

The primary Taxiways at RIC are 'A', 'C', 'E', 'H', 'L', 'M', and 'U'. Each of these taxiways serves a specific purpose that facilitates the safe and efficient flow of aircraft in and around the airfield. The remainder of the airfield's taxiway system is made up of secondary taxiways that aid in the flow of aircraft in and around the airfield. All of the secondary taxiways are equipped with MITL and can accommodate all aircraft utilizing RIC.

Since the 2010 ALP was completed and adopted by the FAA in 2010, the ALP has been updated and was subsequently approved in 2012 (ALP Revision No. 1), 2017 (ALP Revision No. 2), 2019 (ALP Revision No. 3), and 2020 (ALP Revision No. 4). ALP Revisions 1 through 4 included the following projects:

<u>ALP Revision No. 1 – 2012</u>

- Perimeter Security Road
- Taxiway 'M' Relocation and Re-alignment
- Taxiway 'N'

<u>ALP Revision No. 2 – 2017</u>

- Relocation of Airport Rotating Beacon
- Snow Removal Equipment Building
- East Side General Aviation Expansion
- Charles City Road Right-of-Way Dedication
- Runway 7/25 Threshold Removal and Re-striping
- Compressed Natural Gas Filing Station
- Fire Training Road
- East Side Hangar Buildings 1 and 2
- Economy Parking Lot 'B' Expansion
- Replacement of Runway 2/20 VASI and PAPI
- East Side Clearing and Demolition
- Relocation of Runway 20 REILS
- Re-alignment of North Fence Line
- East Side Access Road and Utilities
- Concourse 'A' Apron Expansion
- Updated Airport Property Line

ALP Revision No. 3 – 2019

- Construction of 800 MHz Radio Tower
- TNC Staging/South Cell Phone Lot
- Rental Car Garage Infill
- Security Checkpoints Expansion
- ARFF Training Pad at Airport Maintenance Facilities
- Airport Maintenance Facilities Maintenance Equipment/Storage Building and Salt/Sand Storage Dome
- Enterprise Rental Car Service Facility

ALP Revision No. 4 – 2020

- Sheetz Store (Convenience Store/Gas Station)

Following the completion of ALP Revision No. 4, the Airport initiated an additional update to the 2010 Airport Layout Plan, in conjunction with a revision to the previously approved Airport Master Plan. These changes, referred to as “ALP Revision No. 5” and outlined below, are reflected on this updated ALP, in addition to the previously approved ALP Revisions 1, 2, 3, and 4.

ALP Revision No. 5 – 2022 (Current Update)

1. Update Existing Building List

   Since the previous update to the ALP, inconsistencies in the existing building were discovered. To accurately depict what is currently within Airport property, the existing building list was updated to match existing conditions.

2. East Side General Aviation/Cargo Apron 1

   This project includes the construction of an approximately 400’ x 800’ concrete aircraft apron and associated lighting, pavement marking and other associated items on the east side of the Airport at the approach end of Runway 16 and adjacent to Taxiway ‘M’.

3. Concourse A Expansion

   This project includes the expansion of the existing Concourse A and consisted of a two story 60,000 square foot addition to the existing concourse. This extension created additional overnight aircraft parking positions, allowing for future airline growth, and adds six gates, bringing the airport’s total gate count to 28.

4. Removal of Enterprise Rental Car Facility Maintenance/Wash Building (Building #711) and Enterprise Rental Car Fuel Station Canopy (Building #712)

   Buildings 711 and 712 were removed from the Existing ALP, as they are no longer located on Airport property. The existing building list has also been updated accordingly.

5. Runway 7-25 Conversion to Taxiway (Taxiway 'H')

   As outlined on the approved ALP, this project includes the conversion of Runway 7-25 to a taxiway. The converted taxiway features a seventy-five (75) foot wide full-strength pavement with thirty (30) foot shoulders. The overall length is approximately 4,450 feet and is designated as Taxiway 'H' on the Existing ALP. As a result of the conversion, all associated airport data tables, and existing wind roses on the ALP Airport Data Tables, were updated to depict existing conditions.

In addition to the changes described above, airspace studies were submitted to the FAA's Obstruction Evaluation/Airport Airspace Analysis (OE/AAA) office for approval since the previously approved ALP and can be found below. As stated in 14 Code of Federal Regulations (CFR) Part 77.9, any person/organization who intends to sponsor any of the following construction or alterations must notify the Administrator of the FAA:

- Any construction or alteration exceeding 200-feet above ground level
- Any construction or alteration:
  - Within 20,000-feet of a public use or military airport which exceeds a 100:1 surface from any point on the runway of each airport with its longest runway more than 3,200-feet
  - Within 10,000-feet of a public use or military airport which exceeds a 50:1 surface from any point on the runway of each airport with its longest runway no more than 3,200-feet
  - Within 5,000-feet of a public use heliport which exceeds a 25:1 surface
- Any highway, railroad or other traverse way whose prescribed adjusted height would exceed the above noted standards
- When requested by the FAA
- Any construction or alteration located on a public use airport or heliport regardless of height or location.

2009 Cases

ASN	Description
2009-AEA-837-NRA	Airport Master Plan Update for RIC
2009-AEA-339-NRA	North Parking Garage - Temporary Crane
2009-AEA-174-NRA	North Parking Garage - Temporary Crane
2009-AEA-340-NRA	FBO Hangar and Apron Expansion
2009-AEA-153-NRA	FBO Hangar and Apron Expansion
2009-AEA-916-NRA	FBO Hangar and Apron Expansion
2009-AEA-864-NRA	Hangar Expansion (Resubmission) - Temporary Crane
2009-AEA-694-NRA	Hangar Expansion - Temporary Crane

2010 Cases

ASN	Description
2010-AEA-959-NRA	Rehabilitate Taxiways H, F, R, & C
2010-AEA-861-NRA	Rehabilitate Airfield Electrical System
2010-AEA-525-NRA	Construct East Side General Aviation Apron

2011 Cases

ASN	Description
2011-AEA-371-NRA	Rehabilitate Taxiways H, F, R, & C
2011-AEA-654-NRA	Rehabilitate Airfield Electrical System
2011-AEA-190-NRA	Construct East Side General Aviation Apron
2011-AEA-193-NRA	Airfield Lighting Rehabilitation - Temporary Crane
2011-AEA-194-NRA	Airfield Lighting Rehabilitation - Temporary Crane
2011-AEA-191-NRA	Airfield Lighting Rehabilitation - Temporary Crane
2011-AEA-50-NRA	Runway 2-20 Safety Area Grading
2011-AEA-192-NRA	Airfield Lighting Rehabilitation - Temporary Crane
2011-AEA-195-NRA	Airfield Lighting Rehabilitation - Temporary Crane
2011-AEA-837-NRA	Solar Panel Installation - Million Air Hangar Facility
2011-AEA-945-NRA	Installation of HF Vertical Antenna

2012 Cases

ASN	Description
2012-AEA-839-NRA	Runway 16-34 Rehabilitation - Construction Safety and Phasing Plans
2012-AEA-993-NRA	Not Found
2012-AEA-279-NRA	Below Grade Concrete Vaults Installation - Temporary Crane
2012-AEA-1043-NRA	Re-Glaze Concourse A and B Atrium Skylight - Temporary Crane
2012-AEA-1036-NRA	Above Ground Glycol Storage Tank Replacement - Temporary Crane
2012-AEA-462-NRA	Below Grade Glycol Storage Tank Replacement - Temporary Crane

2013 Cases

ASN	Description
2013-AEA-1219-NRA	Revision to the RIC ALP to change the location of Runway 25 threshold
2013-AEA-13-NRA	Construct Perimeter Security Road - Construction Equipment
2013-AEA-489-NRA	Antenna Replacement for the RTR Facility - Tower 4
2013-AEA-486-NRA	Antenna Replacement for the RTR Facility - Tower 1
2013-AEA-502-NRA	Antenna Replacement for the RTR Facility - Temporary Crane
2013-AEA-488-NRA	Antenna Replacement for the RTR Facility - Tower 3
2013-AEA-487-NRA	Antenna Replacement for the RTR Facility - Tower 2
2013-AEA-1427-NRA	Construct Perimeter Security Road
2013-AEA-1384-NRA	Wind Equipment Pole Replacement/Relocation
2013-AEA-1421-NRA	Construct Perimeter Security Road
2013-AEA-980-NRA	Not Found
2013-AEA-982-NRA	Not Found
2013-AEA-1428-NRA	Construct Snow Removal Equipment Building
2013-AEA-981-NRA	Airport Rotating Beacon Relocation
2013-AEA-1431-NRA	Construct Snow Removal Equipment Building
2013-AEA-1426-NRA	Construct Perimeter Security Road
2013-AEA-1429-NRA	Construct Snow Removal Equipment Building
2013-AEA-1430-NRA	Construct Snow Removal Equipment Building
2013-AEA-708-NRA	Runway 20 REIL Installation - Identifier Unit Assembly (IUA) #2
2013-AEA-1433-NRA	Relocate AASF Communication Antennas
2013-AEA-1425-NRA	Construct Perimeter Security Road

2013 Cases (Continued)

ASN	Description
2013-AEA-709-NRA	Runway 20 REIL Installation - Identifier Unit Assembly (IUA) #1
2013-AEA-1434-NRA	Relocate AASF Communication Antennas
2013-AEA-707-NRA	Not Found
2013-AEA-750-NRA	Runway 20 REIL Installation - Power and Control Unit (Revised Location)
2013-AEA-1422-NRA	Construct Perimeter Security Road
2013-AEA-1423-NRA	Construct Perimeter Security Road
2013-AEA-1424-NRA	Construct Perimeter Security Road
2013-AEA-942-NRA	Emergency Radio Communications Tower

2014 Cases

ASN	Description
2014-AEA-1219-NRA	Revision to the RIC ALP to change the location of Runway 25 threshold
2014-AEA-13-NRA	Construct Perimeter Security Road – Construction Equipment

2015 Cases

ASN	Description
2015-AEA-951-NRA	Temporary Security Fence Installation
2015-AEA-950-NRA	Temporary Security Fence Installation
2015-AEA-949-NRA	Temporary Security Fence Installation
2015-AEA-948-NRA	Temporary Security Fence Installation
2015-AEA-947-NRA	Temporary Security Fence Installation
2015-AEA-946-NRA	Temporary Security Fence Installation
2015-AEA-945-NRA	Temporary Security Fence Installation
2015-AEA-944-NRA	Temporary Security Fence Installation
2015-AEA-943-NRA	Material Hopper/Silo Installation (Relocated Site)
2015-AEA-594-NRA	Material Hopper/Silo Installation - Temporary Crane
2015-AEA-557-NRA	Material Hopper/Silo Installation
2015-AEA-312-NRA	Virginia Aviation Museum SR71 Move - Temporary Crane
2015-AEA-298-NRA	Runway 16 PAPI Installation (Temporary Equipment)
2015-AEA-288-NRA	Runway 16 PAPI Installation (Temporary Equipment)
2015-AEA-287-NRA	Runway 16 PAPI Installation (Temporary Equipment)
2015-AEA-286-NRA	Runway 34 PAPI Installation (Temporary Equipment)
2015-AEA-285-NRA	Runway 34 PAPI Installation (Temporary Equipment)
2015-AEA-284-NRA	Runway 34 PAPI Installation (Temporary Equipment)
2015-AEA-244-NRA	Runway 25 Downwind VASI Units Demolition (Equipment)
2015-AEA-243-NRA	Runway 25 Upwind VASI Units Demolition (Equipment)
2015-AEA-242-NRA	Runway 16 PAPI Installation (Temporary Equipment)
2015-AEA-240-NRA	Runway 34 PAPI Installation (Temporary Equipment)
2015-AEA-236-NRA	Runway 34 PAPI Installation - LHA #4
2015-AEA-235-NRA	Runway 34 PAPI Installation - LHA #3
2015-AEA-234-NRA	Runway 34 PAPI Installation - LHA #2
2015-AEA-233-NRA	Runway 34 PAPI Installation - LHA #1
2015-AEA-226-NRA	Runway 16 PAPI Installation - LHA #4
2015-AEA-225-NRA	Runway 16 PAPI Installation - LHA #3

2015 Cases (Continued)

ASN	Description
2015-AEA-234-NRA	Runway 34 PAPI Installation - LHA #2
2015-AEA-233-NRA	Runway 34 PAPI Installation - LHA #1
2015-AEA-226-NRA	Runway 16 PAPI Installation - LHA #4
2015-AEA-225-NRA	Runway 16 PAPI Installation - LHA #3
2015-AEA-224-NRA	Runway 16 PAPI Installation - LHA #2
2015-AEA-223-NRA	Runway 16 PAPI Installation - LHA #1
2015-AEA-67-NRA	Snow Removal Equipment Building Construction - Temporary Crane
2015-AEA-66-NRA	Snow Removal Equipment Building Construction - Temporary Crane
2015-AEA-65-NRA	Snow Removal Equipment Building Construction - Temporary Crane
2015-AEA-64-NRA	Snow Removal Equipment Building Construction - Temporary Crane
2015-AEA-27-NRA	Hangar Air Conditioning Roof Top Unit Replacement - Temporary Crane

2016 Cases

ASN	Description
2016-AEA-665-NRA	Rehabilitate Taxiways E & L
2016-AEA-664-NRA	Rehabilitate Taxiways E & L (North) - Construction Equipment
2016-AEA-663-NRA	Rehabilitate Taxiways E & L (North) - Construction Equipment
2016-AEA-662-NRA	Rehabilitate Taxiways E & L (North)
2016-AEA-660-NRA	Temporary Portable Hot Mix Asphalt Plant

2017 Cases

ASN	Description
2017-AEA-2512-NRA	Rehabilitate Taxiway L (South) - Construction Equipment
2017-AEA-2511-NRA	Rehabilitate Taxiway L (South) - Construction Equipment
2017-AEA-2510-NRA	Rehabilitate Taxiway L (South) - Construction Equipment
2017-AEA-1586-NRA	Construct North Parking Garage Vertical Expansion
2017-AEA-1585-NRA	Construct North Parking Garage Vertical Expansion
2017-AEA-1584-NRA	Construct North Parking Garage Vertical Expansion
2017-AEA-1583-NRA	North Parking Garage Vertical Expansion
2017-AEA-1140-NRA	Air National Guard - Well Development Project (Drilling Rigs)
2017-AEA-1139-NRA	Air National Guard - Well Development Project (Drilling Rigs)
2017-AEA-1138-NRA	Air National Guard - Well Development Project (Drilling Rigs)
2017-AEA-1137-NRA	Air National Guard - Well Development Project (Drilling Rigs)
2017-AEA-1136-NRA	Air National Guard - Well Development Project (Drilling Rigs)
2017-AEA-1135-NRA	Air National Guard - Well Development Project (Drilling Rigs)
2017-AEA-1134-NRA	Air National Guard - Well Development Project (Drilling Rigs)
2017-AEA-1133-NRA	Air National Guard - Well Development Project (Drilling Rigs)
2017-AEA-1132-NRA	Air National Guard - Well Development Project (Drilling Rigs)
2017-AEA-1131-NRA	Air National Guard - Well Development Project (Drilling Rigs)
2017-AEA-1130-NRA	Air National Guard - Well Development Project (Drilling Rigs)
2017-AEA-1129-NRA	Air National Guard - Well Development Project (Drilling Rigs)
2017-AEA-1128-NRA	Air National Guard - Well Development Project (Drilling Rigs)
2017-AEA-1127-NRA	Air National Guard - Well Development Project (Drilling Rigs)

2017 Cases (Continued)

ASN	Description
2017-AEA-1126-NRA	Air National Guard - Well Development Project (Drilling Rigs)
2017-AEA-1125-NRA	Air National Guard - Well Development Project (Drilling Rigs)
2017-AEA-1124-NRA	Air National Guard - Well Development Project (Drilling Rigs)
2017-AEA-1123-NRA	Air National Guard - Well Development Project (Drilling Rigs)
2017-AEA-1122-NRA	Air National Guard - Well Development Project (Drilling Rigs)
2017-AEA-1121-NRA	Air National Guard - Well Development Project (Drilling Rigs)
2017-AEA-1120-NRA	Air National Guard - Well Development Project (Drilling Rigs)
2017-AEA-1119-NRA	Air National Guard - Well Development Project (Drilling Rigs)
2017-AEA-1118-NRA	Air National Guard - Well Development Project (Drilling Rigs)
2017-AEA-1117-NRA	Air National Guard - Well Development Project (Drilling Rigs)
2017-AEA-1116-NRA	Air National Guard - Well Development Project (Drilling Rigs)
2017-AEA-993-NRA	Runway 2 Glide Slope Shelter Replacement - Temporary Crane
2017-AEA-994-NRA	Runway 2 Glide Slope Shelter - Replacement
2017-AEA-962-NRA	Rehabilitate Taxiway L (South)
2017-AEA-725-NRA	Rehabilitate Taxiway L (South) - Contractor Staging Area
2017-AEA-724-NRA	Rehabilitate Taxiway E & L
2017-AEA-723-NRA	Rehabilitate Taxiways E & L (North) - Construction Equipment

2018 Cases

ASN	Description
2018-AEA-5-NRA	Rehabilitate Taxiway L (South) - Construction Equipment (Haul Road)
2018-AEA-6-NRA	Rehabilitate Taxiway L (South) - Construction Equipment (Haul Road)
2018-AEA-22-NRA	VOR/TACR - Antenna and Mounting Ring Removal - Temporary Crane/Lift
2018-AEA-674-NRA	FedEx Propane Tank Removal (Temporary Crane)
2018-AEA-967-NRA	Construct East Side Cargo Ramp 1 (Concrete Batch Plant)
2018-AEA-968-NRA	Construct East Side Cargo Ramp 1 (Concrete Batch Plant)
2018-AEA-969-NRA	Construct East Side Cargo Ramp 1 (Concrete Batch Plant)
2018-AEA-970-NRA	Construct East Side Cargo Ramp 1 (Concrete Batch Plant)
2018-AEA-1324-NRA	Raise ASR Antenna
2018-AEA-1360-NRA	Install Cooler Tower Cells (Temporary Crane)
2018-AEA-1361-NRA	Install Cooler Tower Cells (Temporary Crane)
2018-AEA-1362-NRA	Install Cooler Tower Cells (Temporary Crane)
2018-AEA-1363-NRA	Install Cooler Tower Cells (Temporary Crane)
2018-AEA-1375-NRA	Rental Car Service Facility Development (Various Buildings)
2018-AEA-1376-NRA	Rental Car Service Facility Development (Various Buildings)
2018-AEA-1377-NRA	Rental Car Service Facility Development (Various Buildings)
2018-AEA-1378-NRA	Rental Car Service Facility Development (Various Buildings)
2018-AEA-1379-NRA	Rental Car Service Facility Development (Various Buildings)
2018-AEA-1380-NRA	Rental Car Service Facility Development (Various Buildings)
2018-AEA-1381-NRA	Rental Car Service Facility Development (Various Buildings)
2018-AEA-1382-NRA	Rental Car Service Facility Development (Various Buildings)
2018-AEA-1383-NRA	Rental Car Service Facility Development (Various Buildings)
2018-AEA-1384-NRA	Rental Car Service Facility Development (Various Buildings)
2018-AEA-1385-NRA	Rental Car Service Facility Development (Various Buildings)

2018 Cases (Continued)

ASN	Description
2018-AEA-1386-NRA	Rental Car Service Facility Development (Various Buildings)
2018-AEA-2592-NRA	Terminal Expansion - Concourse A Building Construction

2019 Cases

ASN	Description
2019-AEA-755-NRA	Construct Taxiway – Convert Runway 7-25 (CSPP Submission)
2019-AEA-1023-NRA	Runway 34 ALS Above Ground Storage Tank
2019-AEA-1389-NRA	Dominion Energy Aircraft Hangar
2019-AEA-1429-NRA	Raise ASR-9 Antenna
2019-AEA-2481-NRA	Decommission Runway 7-25

2020 Cases

ASN	Description
2020-AEA-1471-NRA	Rehabilitate Taxiway U South

2021 Cases

ASN	Description
2021-AEA-535-NRA	10' x 16' x 8' Shelter to Replace Existing 8' x 12' x 8' Shelter at EZD LOC

Recommended Development – Future Airport Layout Drawing

The Future Airport Layout Drawing (ALD), also known as the Preferred Development Plan, shows the proposed airport configuration and recommended facilities designed to develop the Airport. It graphically depicts all of the elements of the existing ALD and also includes proposed future development.

The future ALD depicts infrastructure such as future airfield pavement, clearances over future facilities, future safety surfaces, critical areas, and future dimensions. Other items shown on the future ALD include future terminal development, future support facilities, future building identification, and relocation information. Finally, future access facilities, easements, and the future property line work are found on this drawing.

As previously stated, a revision of the Airport Master Plan was conducted, which included an update to the previously approved Existing and Future ALP (ALP Revision No. 4, 2020). Like the Existing ALD, the Future ALD was updated, but to reflect changes in future development at the Airport as opposed to existing conditions. The Future ALP, developed as part of the Master Plan revision process consisted of an analysis of the existing airfield demand/capacity and facility requirements of the Airport and assessed the adequacy of facilities based on future demand, as projected in the Aviation Demand Forecasts section of the Master Plan Revision. The culmination of the Airport Master Planning Process resulted in the Recommended Development Plan (RDP), which served as the base for the Future ALP while outlining the Airport's vision for the future and recommendations for its development.

A list of updates made to the Future ALD can be found below and descriptions of the projects added to the most recent update of the ALP can be found in the previous section. Additionally, all projects that have been completed since the 2010 ALP and have been depicted on the updated Existing ALD, have been removed from the Future ALD.

ALP Revision No. 1 – 2012

- No updates were made to the Future ALD

ALP Revision No. 2 – 2014

- Reconfiguration of the East Side Development (Project 26)
- Additional FBI Hangar and Apron South of Existing Office Complex

ALP Revision No. 3 – 2019

- Vehicle Car Wash at Airport Maintenance Facilities (Project 30)
- East Side GA Apron Expansion/GA4 Apron (Project 26)
- Demolition of Ethyl Hangar (Project 18)
- Compressed Natural Gas (CNG) Station at Airport Maintenance Facilities (Project 25)

ALP Revision No. 4 – 2020

- No updates were made to the Future ALD

ALP Revision No. 5 – 2022

- Airside Development/Improvements
  - Taxiway 'V' Reconfiguration
  - Taxiway 'C' and 'H' Rehabilitation
  - Runway 2-20 Rehabilitation
  - Runway 16-34 Rehabilitation
  - Relocate ASR (Location TBD)
  - Taxiway 'E' Reconfiguration
  - Taxiway 'U' Rehabilitation
  - Future GA Development - Southeast
  - East Side Development
  - Relocated ARFF (Updated Location)
  - East Apron 3 Expansion and Hangar Facilities
  - Third Party Cargo Operator
  - East Side GA Terminal and Hangar Facilities
  - Future GA Development - South
  - Future Cargo Expansion - South Apron
  - Future Army National Guard Relocation
  - East Apron 4 Reconstruction Expansion
  - East Side Stream Mitigation
  - Mid-Concourse Apron Reconstruction
  - East Side Apron 5 Development
- Landside Development/Improvements
  - Williamsburg Road Development
  - Urban Air Mobility Development
  - CONRAC Relocation – Long Term

- Rental Car Staging Area / 3rd Party Development
- Future Access Road
- Future Enterprise Rental Car Facility
- Close Beulah Road / Improve Lafrance Road

Terminal Area Drawing

The Terminal area Drawing consists of a scaled drawing, depicting close-in features of the major terminal area(s) as consistent with the ALP drawing. This drawing is useful in planning related to and management of the passenger terminal complex, maintenance and cargo facilities, general aviation fixed based operators (FBO) facilities, commercial and industrial areas, and other facilities within the Airport boundary as it depicts detailed references to buildings, apron/ramp areas and auto access features, including geometric dimensional areas, safety setbacks and separation standards.

Key facilities shown on the Terminal Area Plan drawing include, but are not limited to:

- Terminal Building Footprint and Major Components
- Apron Configuration and Aircraft Parking Positions
- Aircraft Taxiways and Taxilanes
- Terminal Curb front, Auto Parking Lot Area(s); Access Roadways
- Aircraft Hangars (Existing, Future, Relocated)
- Fueling Facilities
- Fencing & Security Access Points
- Airport Storage/Maintenance Facilities
- Commercial-Related Terminal Area Space
- Reserved Terminal Area Space

As part of this update, the Terminal Area Drawing was updated to depict the existing conditions, as outlined on the Existing ALP. All updates to this drawing are consistent with those depicted on the Existing ALP.

Land Use Drawing

The Land Use Drawing depicts existing and recommended use of all land within the ultimate Airport property line (on-airport) and in the vicinity of the Airport (off-airport to at least the 65 DNL noise contour). The objective of this drawing is to coordinate uses of the airport property in a manner compatible with the functional design of the airport facility. When development is proposed, it should be directed to the appropriate land use area depicted on this plan.

As part of this update, the land use and zoning map was updated to include the most recent Henrico County datasets. Additionally, as part of the Master Plan Revision, a noise analysis of existing conditions was conducted using the latest version of the Integrated Noise Model (INM) and were plotted to include the DNL 60, 65, and 70 contours. Following the analysis, the updated noise contours were added to the Land Use Plan.

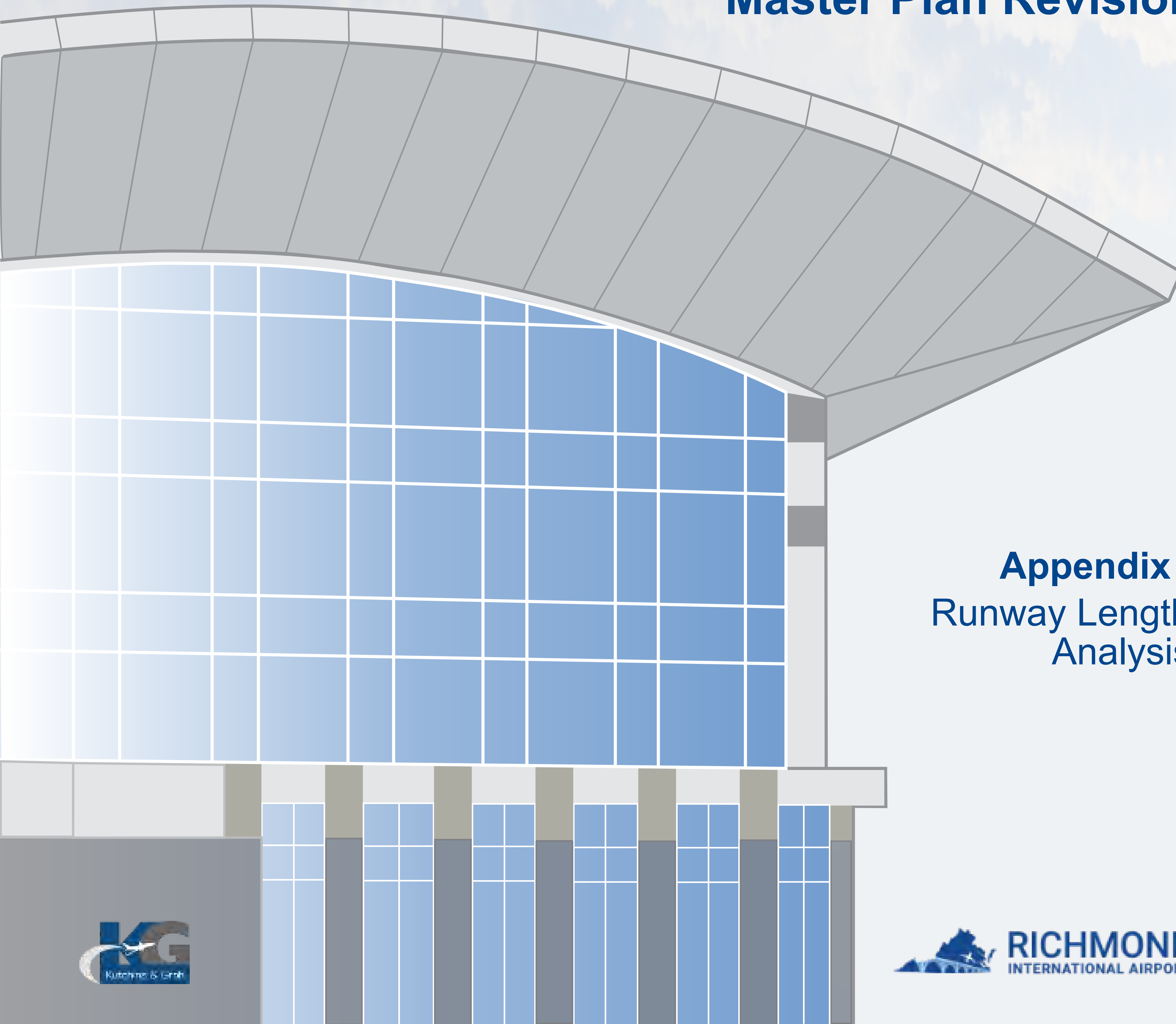
Airport Property Map

The Airport Property Map depicts the property interests held or to be acquired in all lands to be developed or used in connection with the airport, as consistent with the Airport Layout Drawing. This drawing documents past Airport land acquisition, including fee-simple and easement tracts, and summarizes how theses tracts have been acquired (i.e., federal funds, surplus property, local funds, etc.). A drawing table lists an inventory of all Airport property parcels by number, including owner, type of ownership, acreage, federal/state grant project number, and date of acquisition.

No changes to the existing Airport boundary were made as part of this update. The Airport Property Map was only updated to include the most recent aerial imagery.

Richmond International Airport

Master Plan Revision



Appendix I

Runway Length Analysis

To: John Rutledge, Director, Planning and Engineering
Richmond International Airport

From: Kutchins & Groh

Date: May 1, 2020

Re: Richmond International Airport Runway Length Analysis

Memorandum

This memorandum presents the assumptions used for and the results of runway length analyses prepared for Richmond International Airport's Runway 16/34. The purpose of the analysis was to review and validate runway length requirements for incorporation into the Airport Master Plan Update and to evaluate the potential for possible leasing of airport-owned property in the vicinity of a proposed runway extension. The results of this runway length analysis will be used to determine the timing associated with proposed future extensions.

RUNWAY LENGTH ANALYSIS

The methodology, assumptions, input data, and results of the runway length analysis are discussed in the following sections.

Methodology

As specified in FAA planning criteria, the recommended length for a primary runway must be determined by considering either the family of aircraft having similar performance characteristics or a specific aircraft requiring the longest runway. In either case, the choice should be based on aircraft that are anticipated to use the runway on a regular basis, which is defined by the FAA as at least 250 departures per year.

The required runway length as calculated using the methodology described in FAA AC 150/5325-4A is a function of the maximum operating temperature and elevation of the airport as well as the specific aircraft takeoff weight.

Input Data and Assumptions For the initial calculations, the following input data and assumptions were used for the runway length analysis:

- The aircraft weight was assumed to be the maximum allowable gross takeoff weight for the specific aircraft type and model
- The temperature at takeoff was assumed to be the average maximum daily temperature in August in Richmond (90 degrees Fahrenheit)
- The runway elevation was assumed to be 167 feet at the Runway 16 end, and 160.6 feet at the Runway 34 end.

- The windspeed was assumed to be zero and the optimal flap settings were assumed

The aircraft types analyzed included:

- Airbus A300-622R
- Airbus A319-100
- Airbus A320-200
- Airbus A321-100
- Boeing 737-400
- Boeing 737-500
- Boeing 737-700
- Boeing 737-800
- Boeing 737-800MAX
- Boeing 737-900
- Boeing 757-200
- Boeing 757-300
- Boeing 767-200
- Boeing 767-300
- Bombardier CRJ 700
- Bombardier CRJ 900
- Cessna Citation X
- Embraer ERJ-170
- Embraer ERJ-175
- Embraer ERJ-190

The aircraft selected were based on a review of the aircraft types currently operating at the Airport and the aircraft types identified as potential future operators. Although not all of the aircraft currently operating at the Airport and not all of the aircraft that could be expected to operate at the airport are listed, the list is representative of the overall aircraft fleet for the purposes of the runway length analysis.

The analysis showed that some aircraft currently operating at RIC require longer distances at Maximum Take Off Weight (MTOW) than is available on Runway 16/34 now. That is understandable considering the destinations those aircraft currently serve do not require the aircraft's full fuel capacity and thus a lower weight for takeoff. **Exhibit 1: Existing Aircraft Operating at Richmond International Airport** depicts the aircraft evaluated that currently operate at Richmond International Airport.

Exhibit 1: Existing Aircraft Operating at Richmond International Airport

Aircraft						Takeoff Distance (Feet)	
Manufacturer	Make/Model	Engine Type	ATCT Weight Class	Range (NM)	Fuel Capacity	MTOW, SL, & ISA	Adjusted for RIC
Airbus	A300-622R	Jet	Large Jet	2,900	10,685	7,900	9,319
Airbus	A319-100	Jet	Large Jet	3,750	7,980	7,400	8,734
Airbus	A320-200	Jet	Large Jet	3,300	7,190	6,860	8,101
Airbus	A321-100	Jet	Large Jet	3,200	7,930	8,400	9,905
Beechcraft	Beechjet 400	Jet	Medium Commuter	1,180	733	3,802	4,518
Boeing	DC-9-15	Jet	Large Jet			7,200	8,499
Boeing	DC-9-32	Jet	Large Jet			8,100	9,554
Boeing	737-400	Jet	Large Jet	2,060	5,311	8,333	9,827
Boeing	737-500	Jet	Large Jet	2,375	5,311	6,004	7,098
Boeing	737-700	Jet	Large Jet	2,935	7,837	8,500	10,022
Boeing	737-800	Jet	Large Jet	2,935	6,875	7,598	8,966
Boeing	737-800MAX	Jet	Large Jet	3,550	6,820	8,300	9,788
Boeing	737-900	Jet	Large Jet	2,950	7,837	9,800	11,545
Boeing	757-200	Jet	Large Jet	3,915	11,489	6,800	8,031
Boeing	767-200	Jet	Large Jet	3,900	16,700	6,300	7,445
Boeing	767-300	Jet	Large Jet	3,900	16,700	9,200	10,842
Bombardier	Challenger 300	Jet	Medium Commuter	3,276	2,112	4,950	5,863
Bombardier	Challenger 604	Jet	Medium Commuter	4,000	2,000	5,699	6,741
Bombardier	Challenger 800	Jet	Medium Commuter	3,235	9,251	6,295	7,439
Bombardier	Learjet 25	Jet	Medium Commuter	1,767	715	3,200	3,813
Bombardier	Learjet 31A	Jet	Medium Commuter	1,447	695	3,490	4,153
Bombardier	Learjet 35A	Jet	Medium Commuter	2,056	925	4,972	5,889
Bombardier	Learjet 40	Jet	Small	1,707	802	4,285	5,084
Bombardier	Learjet 45	Jet	Small	2,001	905	4,350	5,160
Bombardier	Learjet 45XR	Jet	Small	1,968	905	5,060	5,992

Exhibit 1: Existing Aircraft Operating at Richmond International Airport (cont.)

Aircraft						Takeoff Distance (Feet)	
Manufacturer	**Make/Model**	**Engine Type**	**ATCT Weight Class**	**Range (NM)**	**Fuel Capacity**	**MTOW, SL, & ISA**	**Adjusted for RIC**
Bombardier	Learjet 55	Jet	Medium Commuter	2,492	1,052	4,540	5,383
Bombardier	Learjet 60	Jet	Medium Commuter	2,381	1,181	5,450	6,449
Bombardier	CRJ 100	Jet	Large Commuter	2,250	2,135	5,800	6,859
Bombardier	CRJ 700	Jet	Large Commuter	1,378	2,903	5,130	6,074
Bombardier	CRJ 900	Jet	Large Commuter	1,553	1,959	5,820	6,883
Cessna	Citation Mustang	Jet	Medium Commuter	1,200	385	3,120	3,719
Cessna	Citation CJ1	Jet	Medium Commuter	1,550	3,296	3,280	3,907
Cessna	Citation CJ2	Jet	Medium Commuter	1,781	3,930	3,420	4,071
Cessna	Citation CJ3	Jet	Small	2,040	4,710	3,450	4,106
Cessna	Citation II/Bravo	Jet	Medium Commuter	1,865	771	3,600	4,282
Cessna	Citation III	Jet	Medium Commuter	1,520	741	5,030	5,957
Cessna	Citation Encore	Jet	Small	1,736	805	3,490	4,153
Cessna	Citation Excel	Jet	Medium Commuter	1,839	1,006	3,590	4,270
Cessna	Citation Sovereign	Jet	Medium Commuter	3,010	1,675	3,694	4,392
Cessna	Citation Citation X	Jet	Medium Commuter	3,250	1,990	5,200	6,156
Dassault Aviation	Falcon 10	Jet	Medium Commuter	2,209	3,340	4,615	5,471
Dassault Aviation	Falcon 20C	Jet	Medium Commuter	1,285	1,237	3,800	4,516
Dassault Aviation	Falcon 20D	Jet	Medium Commuter	2,080	1,400	6,400	7,562
Dassault Aviation	Falcon 20F	Jet	Medium Commuter	2,475	1,357	4,600	5,453
Dassault Aviation	Falcon 50EX	Jet	Medium Commuter	3,075	3,084	4,890	5,793
Dassault Aviation	Falcon 2000	Jet	Medium Commuter	3,250	1,456	5,440	6,437

Exhibit 1: Existing Aircraft Operating at Richmond International Airport (cont.)

Aircraft						Takeoff Distance (Feet)	
Manufacturer	**Make/Model**	**Engine Type**	**ATCT Weight Class**	**Range (NM)**	**Fuel Capacity**	**MTOW, SL, & ISA**	**Adjusted for RIC**
Dassault Aviation	Falcon 2000DX	Jet	Medium Commuter	3,250	1,215	5,760	6,812
Dassault Aviation	Falcon 900C	Jet	Medium Commuter	4,080	2,860	4,935	5,846
Dassault Aviation	Falcon 900EX	Jet	Medium Commuter	4,500	2,314	5,215	6,174
Dassault Aviation	Falcon 7X	Jet	Medium Commuter	6,846	3,194	5,200	6,156
Embraer	ERJ-135	Jet	Large Commuter	1,300	1,690	5,774	6,829
Embraer	ERJ-140	Jet	Large Commuter	1,250	1,690	6,070	7,175
Embraer	ERJ-145	Jet	Large Commuter	1,550	1,690	7,448	8,790
Embraer	ERJ-170	Jet	Large Commuter	2,150	2,058	5,394	6,383
Embraer	ERJ-175	Jet	Large Commuter	2,200	2,058	7,362	8,689
Embraer	ERJ-190	Jet	Large Commuter	2,450	2,859	7,194	8,492
Gulfstream	G100	Jet	-	3,394	1,300	5,395	6,385
Gulfstream	G150	Jet	Medium Commuter	3,394	1,300	5,830	6,894
Gulfstream	G200	Jet	Medium Commuter	3,400	1,500	6,083	7,191
Gulfstream	G300	Jet	Medium Commuter	3,820	3,985	5,100	6,039
Gulfstream	G400	Jet	Medium Commuter	4,220	2,928	5,450	6,449
Gulfstream	G450	Jet	Medium Commuter	4,350	4,403	5,600	6,625
Gulfstream	G500	Jet	Medium Commuter	5,000	4,306	5,200	6,156
Gulfstream	G500	Jet	Medium Commuter	5,000	4,306	5,910	6,988

Denotes calculated length greater than 9,003 ft available on Runway 16/34

Exhibit 2: Future Potential Aircraft Operating at Richmond International Airport

Aircraft						Takeoff Distance (Feet)	
Manufacturer	**Make/Model**	**Engine Type**	**ATCT Weight Class**	**Range (NM)**	**Fuel Capacity**	**MTOW, SL, & ISA**	**Adjusted for RIC**
Airbus	A300-622R	Jet	Large Jet	2,900	10,685	7,900	9,319
Airbus	A319-100	Jet	Large Jet	3,750	7,980	7,400	8,734
Airbus	A320-200	Jet	Large Jet	3,300	7,190	6,860	8,101
Airbus	A321-100	Jet	Large Jet	3,200	7,930	8,400	9,905
Boeing	737-400	Jet	Large Jet	2,060	5,311	8,333	9,827
Boeing	737-500	Jet	Large Jet	2,375	5,311	6,004	7,098
Boeing	737-700	Jet	Large Jet	2,935	7,837	5,500	6,508
Boeing	737-800	Jet	Large Jet	2,935	6,875	7,598	8,966
Boeing	737-800MAX	Jet	Large Jet	3,550	6,820	8,300	9,788
Boeing	737-900	Jet	Large Jet	2,950	7,837	9,800	11,545
Boeing	757-200	Jet	Large Jet	3,915	11,489	6,800	8,031
Boeing	767-200	Jet	Large Jet	3,900	16,700	6,300	7,445
Boeing	767-300	Jet	Large Jet	3,900	16,700	9,200	10,842
Bombardier	Challenger 300	Jet	Medium Commuter	3,276	2,112	4,950	5,863
Bombardier	CRJ 700	Jet	Large Commuter	1,434	2,903	5,130	6,074
Bombardier	CRJ 900	Jet	Large Commuter	1,553	1,959	5,820	6,883
Cessna	Citation X	Jet	Medium Commuter	3,250	1,990	5,200	6,156
Embraer	ERJ-170	Jet	Large Commuter	2,150	2,058	5,394	6,246
Embraer	ERJ-175	Jet	Large Commuter	2,200	2,058	7,362	8,525
Embraer	ERJ-190	Jet	Large Commuter	2,450	2,859	7,194	8,331

Denotes calculated length greater than 9,003 ft available on Runway 16/34

When evaluating future aircraft operations, depicted in **Exhibit 2: Future Potential Aircraft Operating at Richmond International Airport**, some aircraft required more runway than available at MTOW. For this reason, the Consultant Team expanded the analysis for Runway 16/34 to evaluate runway length for destinations which are currently being pursued by the airport. This analysis utilized *Boeing Airplane Characteristics for Airport Planning* for aircraft which are within the fleet of current or prospective operators most likely to be utilized for specific destinations. This analysis looked at the specific pressure altitude calculated for RIC to determine if prospective destinations could be reached by aircraft most likely to be utilized for these routes. **Exhibit 3: Potential Destinations** details the Airport Destinations analyzed and the associated Great Circle Distance for each.

Exhibit 3: Potential Destinations

Airport Destination	Great Circle Distance
SFO	2440
LAX	2300
SEA	2350
DUB	3400

This analysis determined that all potential west coast destinations could be met by current carriers with aircraft within their existing fleet. However, a potential European destination would require the airline utilizing Boeing 757-300 to put a passenger limitation in place to reduce weight in order to utilize the existing runway length.

Exhibit 4: Future Potential Aircraft Operating at Richmond International Airport for Specific Destinations

Aircraft															
Manufacturer	Make/Model	Engine Type	ATCT Weight Class	Model	Range (NM)	Usable Fuel (lbs)	OEW	PAX Number	Payload	OEW + Payload	Brake Release Gross Weight	MTOW	Takeoff Length	Temp Adj (58 + 25 F) 83	Temp Adj (58 + 27 F) 85
Boeing	737-800	Jet	Large Jet	CFM56-7B	2,440	46,063	91,300	184	40,480	131,780	173,000	174,200	5,300	--	8,250
Boeing	757-200	Jet	Large Jet	RB211-535C	3,400	75,550	132,280	186	40,920	173,200	240,000	240,000	4,600	8,000	--
Boeing	757-200	Jet	Large Jet	RB211-535E4B	3,400	75,550	136,940	186	40,920	177,860	240,000	255,000	6,000	6,000	--
Boeing	757-300	Jet	Large Jet	RBR211-535E4, 4B	3,400	79,980	142,350	243	53,460	195,810	270,000	270,000	9,200	9,900	--

Denotes calculated length greater than 9,003 ft available on Runway 16/34

- Assumes Dry Runway

- Utilizing Boeing Airplane Characteristics for Airport Planning for 737-800, 757-200 (two models), and 757-300

CONCLUSIONS

The results of the runway length analyses for Richmond International Airport can be summarized as follows:

- This analysis determined that all potential west coast destinations could be met by current carriers with aircraft within their existing fleet.

- A potential European destination would require the airline utilizing Boeing 757-300 to put a minor passenger limitation in place to reduce weight in order to utilize the existing runway length.

- It is not anticipated that a European destination is likely to occur in coming years considering the COVID-19 impact on the Aviation industry. Should an airline choose to begin European service, the social distancing which will likely be integrated into airline standard operating procedures will not make a passenger limitation an issue for RIC operations.

- It is not anticipated that Runway 16/34 will require an extension within the 20-year horizon.

These results confirm that the existing runway length is sufficient for existing operations and potential future aircraft operations. In concert with the forecasting effort associated with the RIC Master Plan Update, it is not anticipated that Runway 16/34 will require an extension within the 20-year horizon.

Should the airport choose to lease property within the area of a proposed runway extension, best management practices suggest that a clause should be added to the lease to allow the airport to terminate the lease should a runway extension become required.