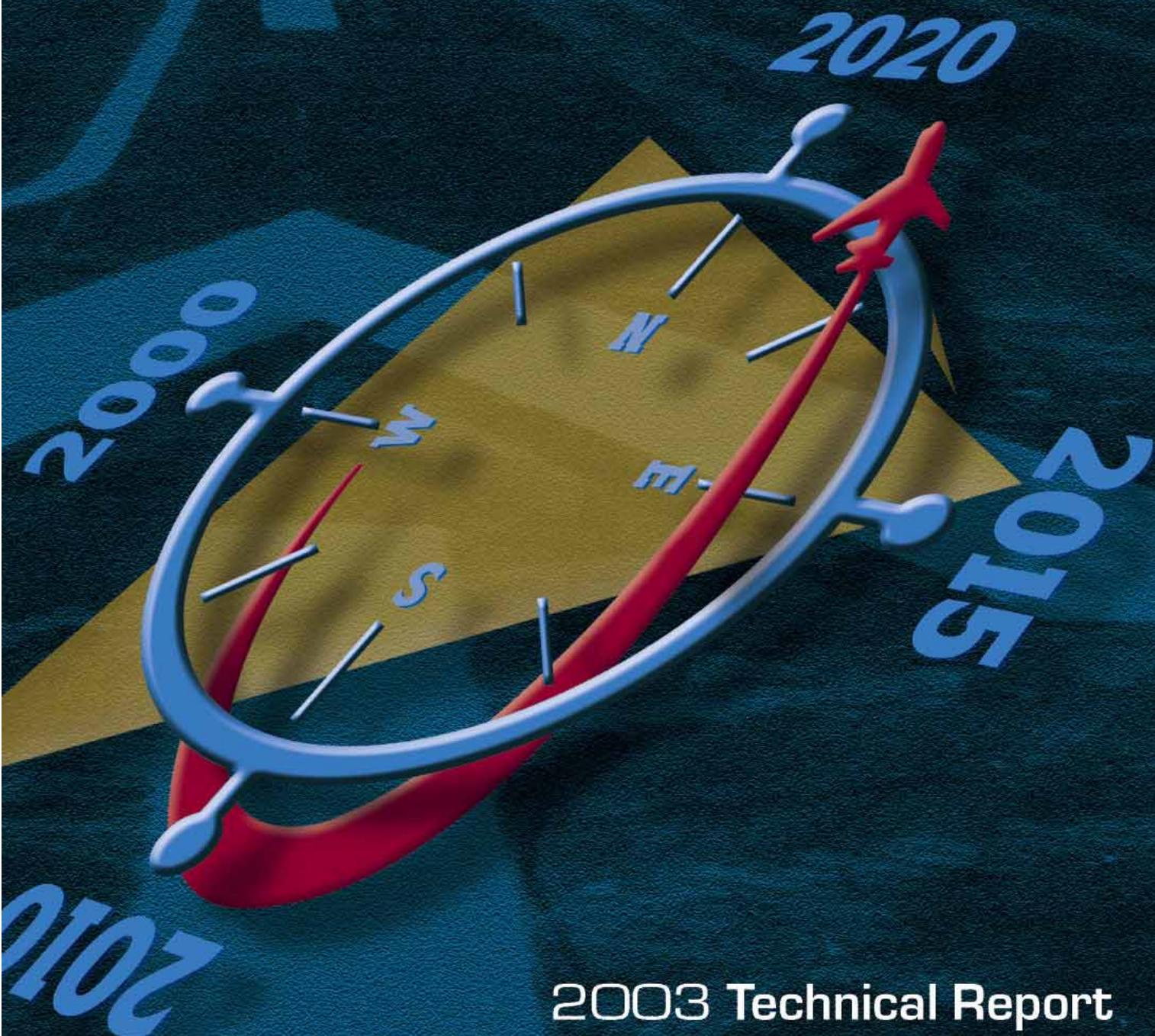


The **Virginia**

Air Transportation
System Plan Update



2003 Technical Report

In January 2000, the Virginia Department of Aviation initiated the Virginia Air Transportation System Plan (VATSP) Study Update. The Commonwealth of Virginia maintains one of the nation's most comprehensive and technologically advanced airport systems. The VATSP Update was performed to ensure that our State Airport System continues to effectively serve the needs of Virginia's residents and visitors, and provides the necessary infrastructure and technology to facilitate healthy economic development across the Commonwealth. This study provides the Department of Aviation with a blueprint to guide the future development of Virginia's airport system by identifying the type, location, timing and extent of airport development necessary to maintain an efficient, balanced, and integrated system of airports.

The goals and objectives of the VATSP Update are to:

- › · **Create a strategic management plan,**
- › · **Document historic activity at existing facilities,**
- › · **Create 5-, 10- and 20-year needs assessments for each airport based on individual airport forecasts, and**
- › · **Identify strengths and weaknesses of the existing system and recommend solutions which increase benefits to system users, enhance the contribution of the Airport System to Virginia's economy; and minimize adverse environmental impacts.**

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1. GOALS, OBJECTIVES AND PERFORMANCE MEASURES

The mission of the Virginia Department of Aviation is to “Progressively promote, develop and maintain a safe, technologically advanced, market driven air transportation system that provides the citizens of Virginia with convenient and efficient access to the expanding world community.”

The system goals, objectives and performance measures identified by the Department of Aviation establish a policy framework that has guided the development of various elements of this Virginia Air Transportation System Plan (VATSP) Update. The goals and objectives reflect airport system policy issues and priorities identified by the Department of Aviation in consultation with a Study Advisory Group (SAG) comprised of stakeholders from government and private industry that was involved throughout this system planning process.

The performance measures then serve to:

- › Establish benchmarks against which the current performance of the aviation system can be defined and future development needs assessed; and
- › Provide a basis for evaluating alternative strategies or projects to improve the performance of the aviation system.

GOAL 1: Maintain a safe and reliable airport system.

Objectives:

1. Ensure that airport facilities meet applicable federal or State design criteria and safety standards.
2. Protect FAA-mandated safety areas, runway protection zones, and other clear areas.
3. Provide meteorological facilities at all airports with a service role of “general aviation community” and higher to enhance the safety and reliability of operations under all weather conditions.
4. Provide instrument approach procedures through the use of ground based navigational facilities and/or global positioning satellites (GPS) to airports with a service role of “general aviation community” and higher, to improve reliability during adverse weather conditions.

Performance Measures:

- I. Percentage of runways with full safety areas and runway protection zones (RPZ's).
- II. Percentage of airports with a service role of “general aviation community” and higher with an Automated Weather Observation System III with present weather and thunderstorm information (AWOS III-P-T).
- III. Percentage of airports with a service role of “general aviation community” and higher that have a published straight-in approach and Runway End Identification Lighting (REIL).
- IV. Percentage of airports with a Vertical Guidance Visual Aid (VGVA) or similar system at both ends of primary runways.
- V. Percentage of system operations at airports at:
 - Commercial Service and Reliever airports with a precision approach (200-1/2).
 - General Aviation Regional airport with a non-precision approach (300-1).
 - General Aviation Community airports with a non-precision approach (400-1).

GOAL 2: Provide an efficient airport system capable of meeting existing and future demand and supporting statewide economic development.

Objectives:

- A. Preserve and enhance existing airport facilities and provide new or replacement airports as recommended by adopted system plan.
- B. Provide convenient access to the National Air Transportation System.

Performance Measures:

- I. Percentage of State population within 45 minutes of a commercial service airport.
- II. Percentage of State population within 30 minutes of a public use airport.
- III. Percentage of population served by an airport with at least a 5500 foot runway and approach minima of a 400 foot ceiling and 1 statute mile visibility (400-1).
- IV. Percentage of airports that meet the following criteria that also have a parallel taxiway:
 - 40,000 annual operations; or
 - 20,000 annual operations and landing minimums less than 1 statute-mile visibility and/or less than 400 feet decision height.

GOAL 3: Minimize non-compatible land use.

Objectives:

- A. Encourage local planning/zoning boards to consider airport needs and impacts when developing land use and zoning plans.

Performance Measures:

- I. Number of jurisdictions that have enacted height restrictive zoning according to Code of Virginia Sections 15.2-2294 and 5.1-25.1.

GOAL 4: Develop system in a fiscally responsible manner.

Objectives:

- A. Optimize benefit derived from capital improvement investments.

Performance Measures:

- I. Ratio of State and Federal capital grant dollars to the number of aircraft operations at those airports.

2. INVENTORY AND DATA COLLECTION

In order to develop a comprehensive and accurate database for analysis, the study team conducted on-site interviews with airport sponsors. The study team determined that individual site visits and interviews would provide the most comprehensive inventory data collection. To accomplish this, Virginia's 68 public use airports were divided into three groups. The study team visited 42 airports. The Department of Aviation staff conducted site visits at 12 airports. Remaining airports were contacted through telephone interviews.

INV – Exhibit 1





An airport inventory survey was designed to collect several types of information to be used in the study. Meetings were conducted with the study team and the Department of Aviation to determine which information would provide the best representation of the airport system in Virginia. Types of business users and types of aircraft operated were included on the survey in order to determine business usage. The needs of the airports were also highlighted with subjective questions for airport owners/sponsors, which approximated a mini SWOT (Strengths, Weaknesses, Threats and Opportunities) analysis. An adequacy assessment of facilities in terms of both size and condition was included to assist in the facilities requirements of the plan. A copy of the inventory survey form is included in Appendix A. Information requested included:

- › † Airport Planning Characteristics (Service Level, Airport Reference Code, Critical Aircraft)
- › † Current Airport Usage (Major Airport Uses, Business Users, Airport Industries)
- › † Aviation Services
- › † Airport Facilities (Airside, Landside)
- › † Current Based Aircraft

- › · Current Operations
- › · Airport Trends over Last 5 Years and Trends Anticipated over Next 5 Years
- › · Airport Strengths and Weaknesses
- › · Adequacy of Airport Facilities

Inventory data surveys were distributed to all airport sponsors in April 2000. The study team and the Department of Aviation staff then contacted sponsors to set up site visits. From May to July 2000, 54 airports were visited. Interviews were conducted with the airport manager and/or a representative of the local governing body. During the course of the interviews, pertinent information about the facility was identified and recorded on the inventory form. The study team reviewed each survey for completeness and consistency and made follow-up contacts and visits with sponsors in order to obtain missing data and to clarify any ambiguities in the responses. In addition, the study team visually reviewed facilities and specific conditions that were difficult to adequately depict on the form. Current airport master plans and other planning documents on file at the Department of Aviation were also referenced to ensure the accuracy of the data collected. Inventory forms were copied and sent to project team members for review and comment.

The inventory forms did require some explanation in order to extract the desired information. Many times the interviewer acted as a facilitator to help prompt the airport respondent to search other records or contact other personnel in order to answer the survey questions.

During the course of the 56 visits, the study team and the Department of Aviation observed that airport management/owners know the conditions of their facilities, could identify trends with respect to needed capacity improvements or physical plant conditions, and had strong interest in how the inventory information would be used.

During this period, the study team also collected historical based aircraft and operations data from Department of Aviation records. These records included FAA 5010 forms and the annual Virginia Based Aircraft Survey forms from the past 20 years. The records in some instances included conflicting information. When a conflict was encountered, a closer review was completed and an assumption made as to which source provided the most reliable information.

All of the data collected was entered into a database designed for the VATSP. Once entered, the information was further reviewed for inconsistencies and airport sponsors contacted for clarification. Both the FAA and the Department of Aviation reviewed the historical based aircraft and operations numbers and resolved any data discrepancies that existed.

Results from the inventory task are summarized as part of the Facilities Requirements section.

3. TREND ANALYSIS

Growth in aviation activity within Virginia, and changes in the composition of the aircraft fleet mix operating within the Commonwealth, have significant implications regarding the airport facilities that are necessary to effectively serve demand. Insights concerning likely future changes in the level and characteristics of both commercial and general aviation traffic can be gained by examination of historic trends at individual airports within Virginia, and for the Commonwealth's airport system as a whole. However, Virginia's aviation system does not operate in isolation, and changes that are occurring in the aviation industry on a nationwide global basis will ultimately impact development patterns within Virginia. The purpose of this Trend Analysis is to identify significant developments and trends that are occurring nationally that are likely to impact future growth patterns within Virginia.

The study team identified five major industry developments that have had or are likely to have an impact on future commercial or general aviation air traffic at Virginia airports. These trends are identified below:

1. US Airways is the dominant carrier at many of Virginia's commercial airports. Increased competition from full-fare carriers, along with the growing East Coast presence of low-fare specialist Southwest Airlines, have placed increasing pressure on US Airways' financial performance. Following the failed acquisition attempt by United Airlines and in the aftermath of September 11th terrorist attacks, many industry analysts consider US Airways a leading candidate for Chapter 11 bankruptcy. Given US Airways strong presence at many of the Virginia commercial airports, a potential bankruptcy—which could be followed by reorganization and a continuation of service—could lead to at least a short-term disruption in services.¹
2. The entry of Southwest Airlines at Norfolk in the fall of 2001, and the carrier's announced intention to initiate services at Richmond in the future, will bring low fare services to the Commonwealth that have been largely absent to this point. Historic air fare levels at Virginia airports have been quite high by national standards and the entry of Southwest Airlines will bring about a meaningful reduction in airline pricing at key Virginia airports. Improved air fares should produce significant levels of passenger traffic stimulation, and may also result in a re-distribution of passenger traffic between individual airports in the Commonwealth.
3. There is a fast growing presence of 30- to 70-seat regional jet (RJ) aircraft in the fleets of commercial airlines serving Virginia. The regional jet has permitted new nonstop services at many Virginia airports, and growing numbers of RJ's in the U.S. fleet should promote continued development of nonstop service in moderate density hub and point-to-point markets.

¹ US Airways filed for bankruptcy protection in August 2002. The carrier has continued to operate and is currently in the process of reorganization.

4. Growth in the general aviation industry resumed in the 1990's following passage of the General Aviation Revitalization Act (GARA) that provided product liability protection to aircraft manufacturers. Sustained economic growth in the U.S. economy coupled with the recent trend toward fractional aircraft ownership were important contributors to general aviation growth in Virginia and nationwide. The state of the economy, changes in fuel prices and continuing growth in fractional ownership programs will drive future growth in general aviation activity.
5. The terrorist attacks of September 11, 2001 represent the most important development shaping near-term aviation trends across the U.S. In the months following the attacks, commercial passenger traffic levels fell by over 20 percent nationwide, U.S. airlines implemented substantial capacity reductions, and the industry is experiencing massive financial losses. Commercial airports have incurred a sharp reduction in revenues, which combined with requirements for major security upgrades are placing a serious strain on airport financial resources. The possibility of subsequent terrorist incidents in either the commercial or general aviation sectors, and the ultimate speed of industry recovery will be key determinants regarding the long term impacts of these events.

In many cases, there are clear inter-relationships between the trends and industry developments identified above. For example, the terrorist attacks and resulting decline in passenger traffic and revenues placed increasing pressure on the financial position of US Airways. Similarly, the entry of Southwest Airlines at Norfolk and its potential future entry at Richmond represent continued expansion of low fare competition in US Airways core market area. The regional jet has been a key competitive weapon deployed by full fare airlines such as American and Delta to enter markets previously controlled by US Airways, and US Airways itself has identified the capability to acquire and operate increased numbers of RJ's as critical to its future survival.

The events of September 11th have the potential to promote increased reliance on general aviation, as businesses make greater use of corporate aircraft and fractional ownership as substitutes for commercial airline travel. Conversely, the possibility of terrorist attacks launched from general aviation facilities would have major consequences regarding security requirements at general aviation airports which, in turn, could have implications regarding the capability to operate and support the current broad and diverse network of GA airports across the Commonwealth.

Several of the trends described above are discussed in greater detail in the following sections of this chapter. These trends are relevant to the forecasts of general aviation and commercial airline activity developed in the course of the VATSP Update and described in subsequent chapters of this report. They are also explored to provide insight concerning some of the opportunities and risks that may face Virginia, its system of airports, and the traveling public in future years.

Impacts of the September 11th Terrorist Attacks

The tragic events of September 11, 2001 have had a profound impact on our nation and its citizens. In addition to personal tragedies, the impact to the economy and the disruption of our air transportation system have been significant. The U.S. airlines suffered a complete shutdown of services for three days as the Federal Aviation Administration (FAA) and other government agencies responded to the need for immediate increases in airport and airline security.

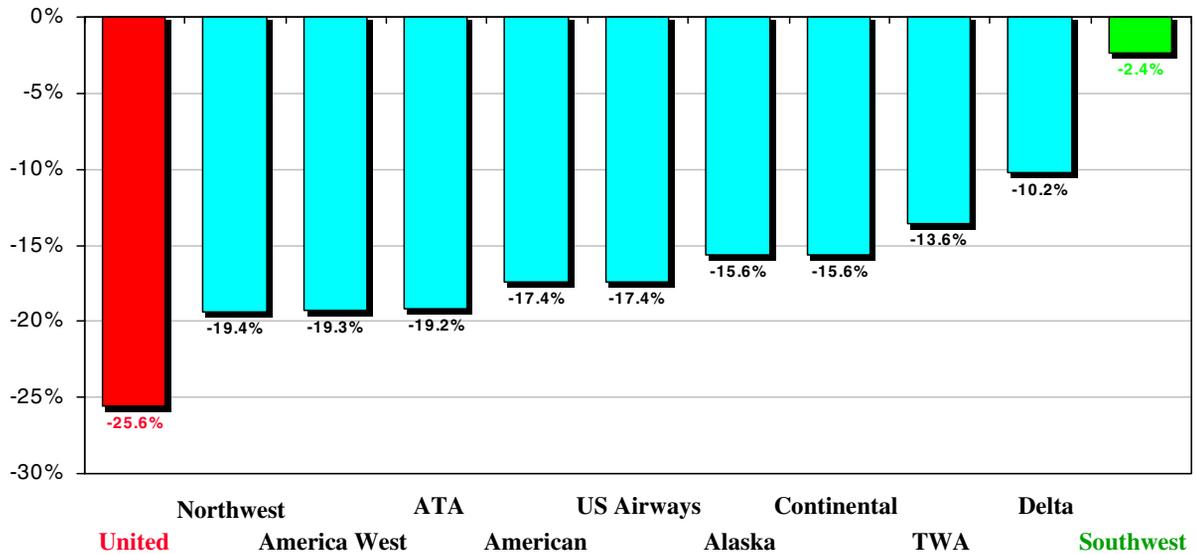
Immediately following the resumption of services, passenger traffic levels dropped significantly as travel plans were cancelled or postponed. For the full month of September 2001, U.S. airlines reported traffic declines ranging from 30 to 40 percent. While it is likely that depressed levels of airline service and passenger traffic will persist for some time, airline results in the months that have followed indicate that a gradual recovery is underway.

It is useful to recall that our air transportation system has dealt with serious disruptions in the past, due to events such as economic recessions and threats of terrorism caused by the Gulf War and the loss of Pan Am 103. In all previous cases, the U.S. air transportation industry has rebounded and long-term growth in air travel has resumed. In response to past terrorist incidents, this recovery has occurred within a single year. While the nature and impacts of the September 11th attacks are far more extensive than previous terrorist incidents, significant steps have been taken to respond. Security levels have been heightened at airports and onboard commercial aircraft. New federal aviation security legislation has been enacted, providing additional safeguards to the traveling public. And, in an unprecedented measure, the U.S. government authorized a \$15 billion recovery program to ensure the ongoing viability of our airlines and the national air transportation network.

Changes in U.S. Airline Services Following September 11

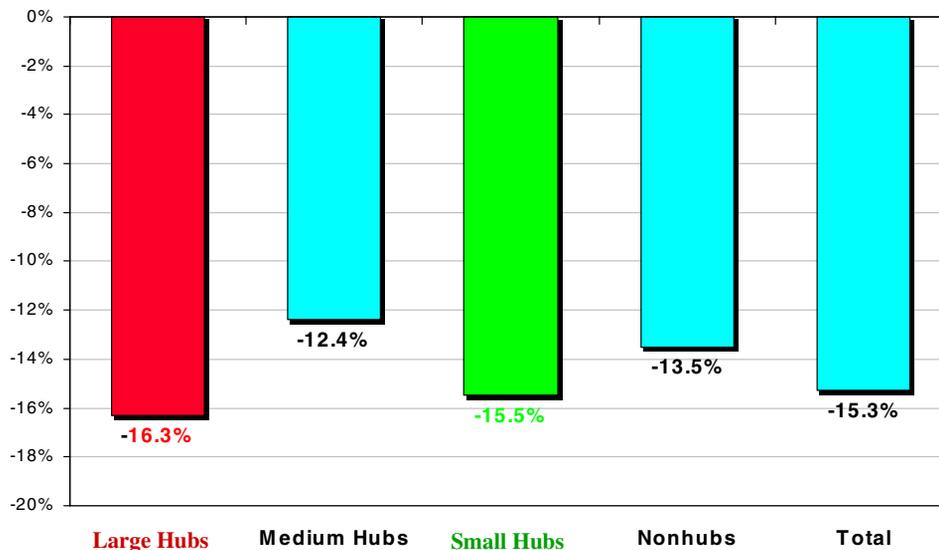
In response to depressed levels of passenger traffic, U.S. airlines have implemented capacity reductions across their route networks. Between September and November of 2001, the average U.S. carrier reduced seat capacity by 15 percent. This capacity reduction was accomplished by parking aircraft and reducing the daily utilization of aircraft remaining in service. Changes in airline seat capacity following September 11th are shown below in Exhibit 1. Among major U.S. carriers, United Airlines implemented the steepest decline in capacity, reducing scheduled seat departures by 25.6 percent. Virginia's leading carrier—US Airways—reduced capacity by 17 percent while Delta Air Lines dropped 10 percent of its daily seats. Southwest Airlines exhibited the smallest reduction in network capacity with only a 2.4 percent decline, and the carrier initiated new service to Norfolk as planned.

TA - Exhibit 1
Percent Change in Daily Scheduled Seats
Pre September 11th vs. November 2001



Airports of all sizes have been affected by these capacity reductions. As shown in Exhibit 2, airline seats have dropped by similar percentages at airports in all hub classifications, with Large, Medium, Small, and Non-Hub airports experiencing average capacity reductions of between 12 and 16 percent since September 11th.

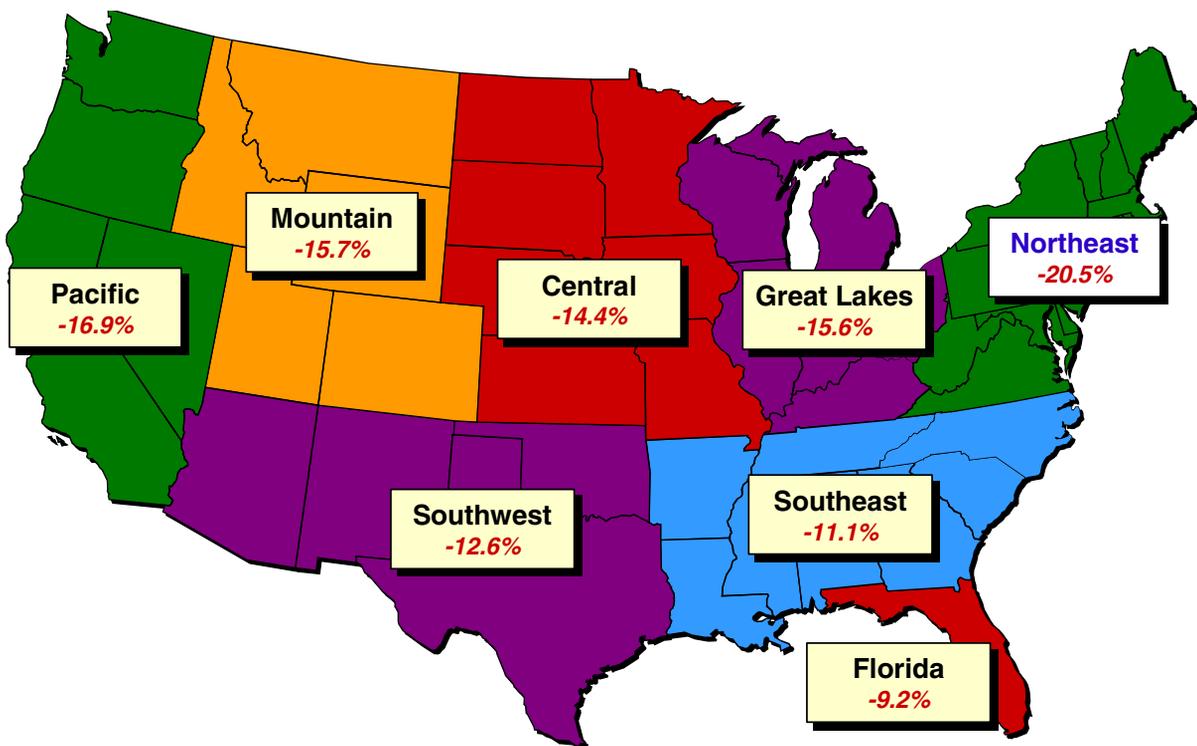
TA - Exhibit 1
Percent Change in Daily Scheduled Seats
Pre September 11th vs. November 2001



At individual airports, however, the impacts of September 11th have produced widely differing impacts. At Washington Reagan National Airport, airline seat capacity dropped by 51 percent between September and November, 2001 due to security-related restrictions on the number of flights that could be operated. Flights at Reagan National are being restored in phases, with the most recent increases (December 2001) bringing flight volume to 66 percent of pre-September 11 levels. Other major Northeast airports such as Boston Logan, Newark, and New York JFK each experienced seat capacity declines of between 25 and 30 percent between September and November, 2001.

Overall, the Northeast region (including Virginia) experienced the greatest reduction in airline service following the September 11 attacks, with a capacity reduction of 20.5 percent. Airports in Florida, the Southeast, and the Southwest regions experienced the smallest reductions in scheduled services, with capacity reductions ranging from 9 to 13 percent, respectively. Changes in airline seat capacity by U.S. region are displayed in Exhibit 3.

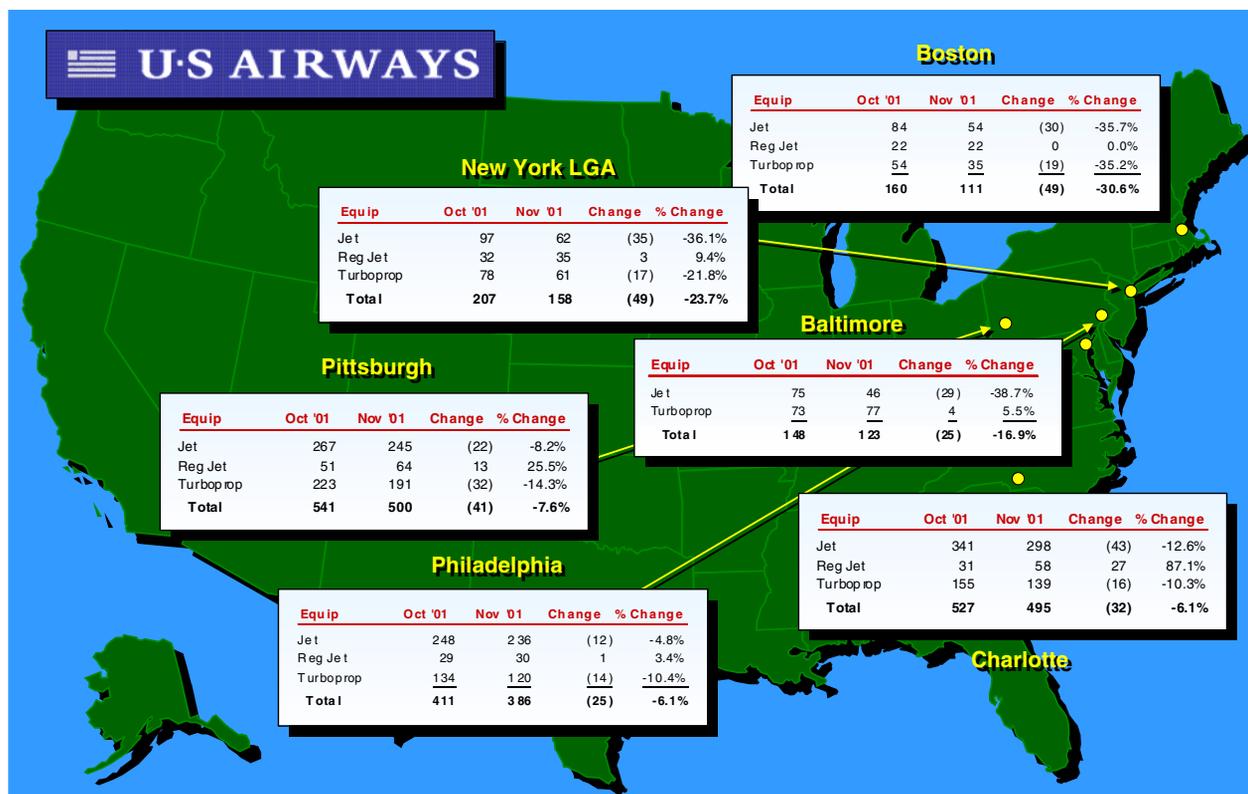
TA - Exhibit 3
Decline in Capacity After 9/11 by Region



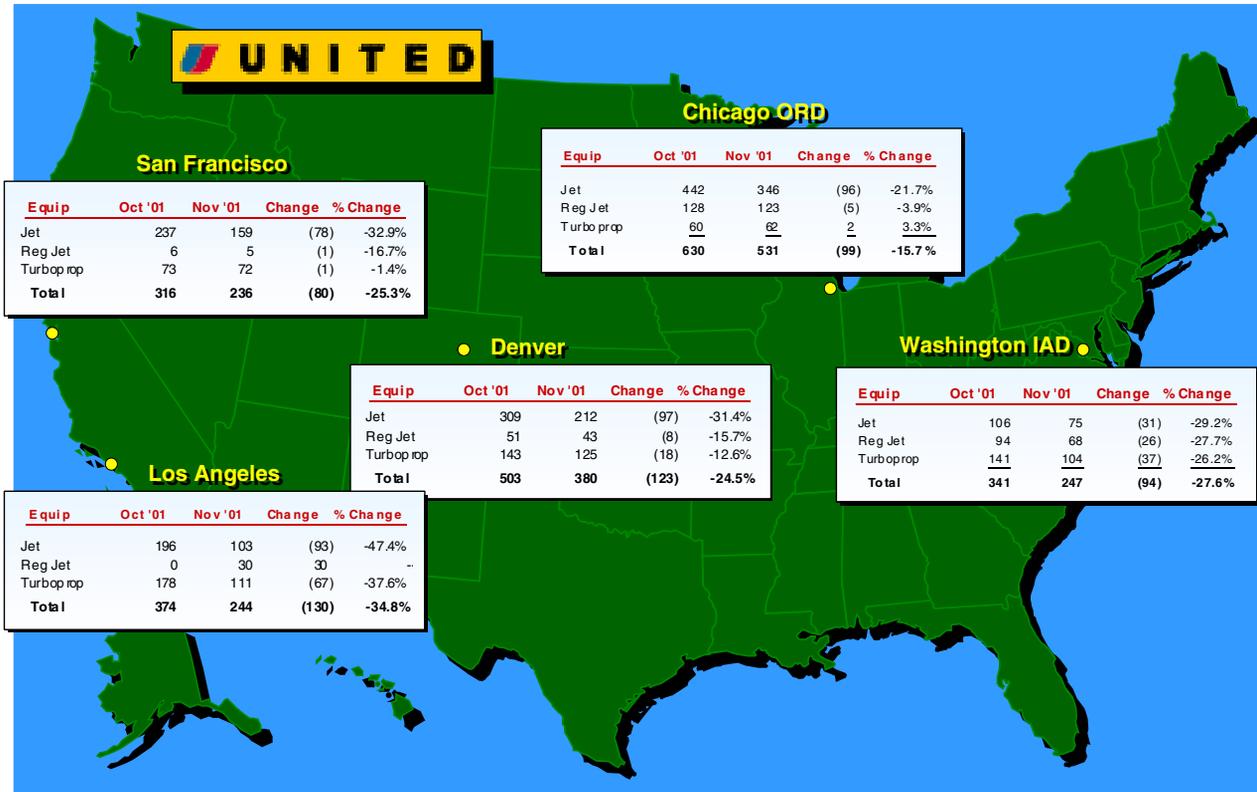
At connecting hub airports, the majority of capacity reductions have occurred in the early morning and late evening hours, as hub carriers have eliminated or downsized the first and last connecting banks of the operating day. At individual hub airports, schedule reductions have varied considerably with some hubs relatively unaffected by the events and aftermath of September 11 and other hubs experiencing significant

service reductions. Exhibits 4 through 6 highlight changes in hub schedules for Virginia’s three largest carriers—US Airways, United and Delta. Among the connecting hubs most significant to Virginia passengers, US Airways reduced its scheduled flights at both Charlotte and Philadelphia by 6 percent with Pittsburgh down 8 percent, Delta’s flight schedule at Atlanta was reduced by 8 percent (while flight volume at Cincinnati was slightly increased), and United reduced its departures at Washington Dulles by 27 percent and Chicago by 16 percent.

TA - Exhibit 4
Service Changes from
US Airways Hubs

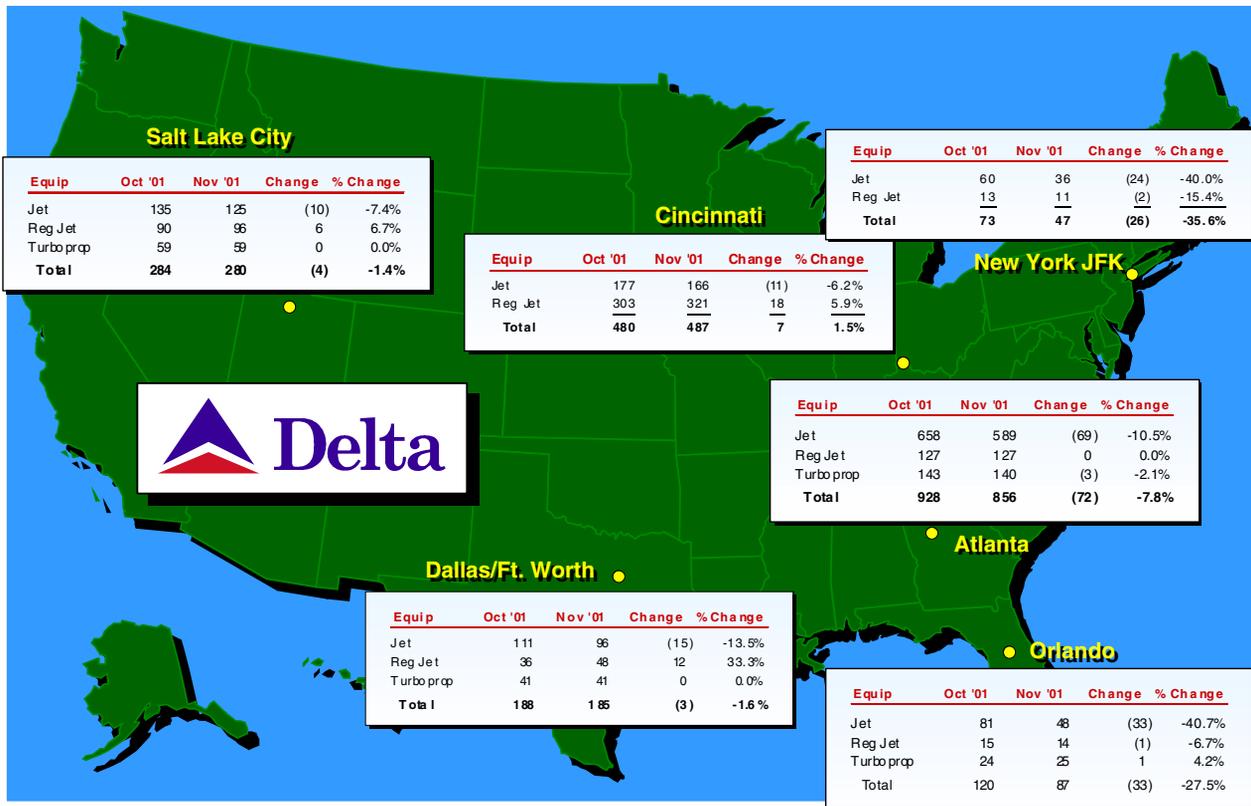


TA - Exhibit 5
 Service Changes from
 United Hubs



TA - Exhibit 6

Service Changes from Delta Hubs



Service Level Changes at Virginia Airports

Between September and November, 2001, scheduled airlines services at Virginia airports declined by 31 percent in terms of flight departures and 28 percent based on total seat capacity. The aggregate Virginia impacts are heavily weighted by the two metropolitan Washington airports—Reagan National and Dulles—which together accounted for approximately 80 percent of CY 2000 commercial airline traffic in the Commonwealth. Excluding the two Washington-area airports, the remaining seven Virginia commercial airports experienced a 16 percent reduction in scheduled airline departures (consistent with the U.S. average of 15.3 percent). Airline seat capacity at Virginia’s seven small- and non-hub airports dropped by 9.9 percent—less severe than the U.S. as a whole (down 15 percent).

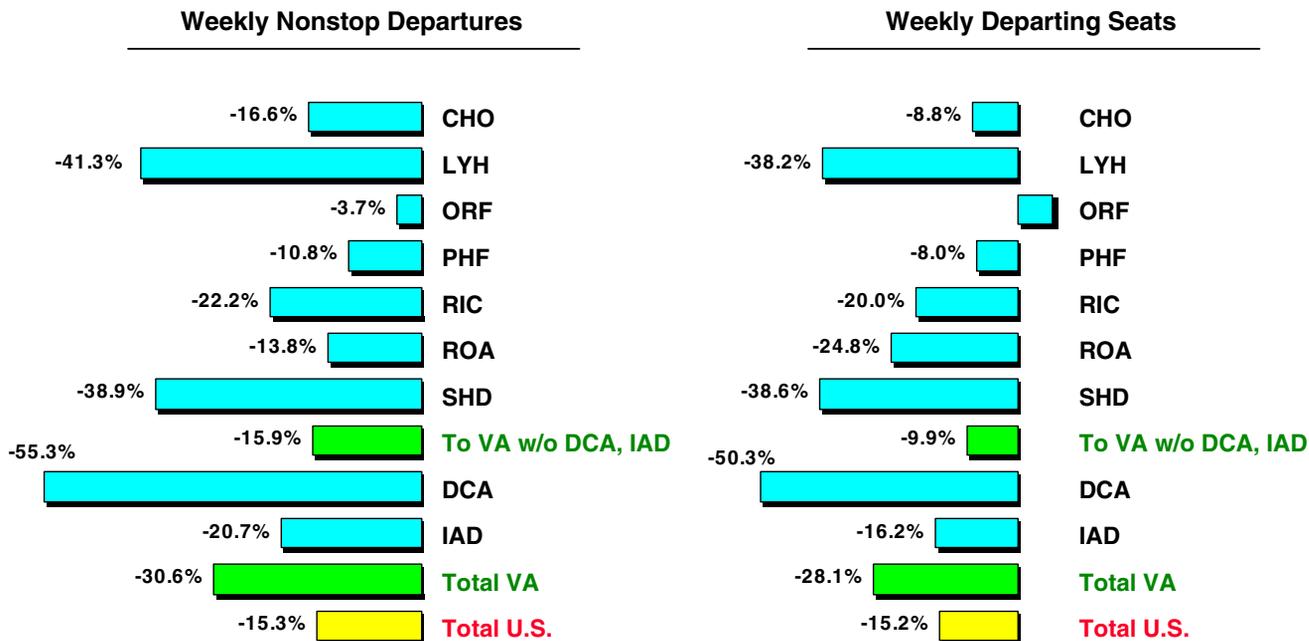
As shown in Exhibit 7, however, several of Virginia’s smallest airports have experienced serious reductions in airline service subsequent to the events of September 11th. Commercial airline services at Shenandoah Valley and Lynchburg declined by approximately 40 percent between September and November. At Shenandoah Valley, United and US Airways regional carriers reduced service to Dulles and Pittsburgh, respectively, causing daily departures to drop from 8 to 5. At Lynchburg, regional airlines

operating for US Airways and United implemented service reductions to Charlotte, Pittsburgh, and Washington Dulles, and total daily flights declined from 21 to 13 between September and November. Subsequently, United Express has completely withdrawn from the Lynchburg market.

TA - Exhibit 7

Post September 11th Schedule Reductions

Schedule Change September 2001 to November 2001



Airline capacity reductions at Richmond and Roanoke ranged from 20 to 25 percent following September 11, while Charlottesville and Newport News experienced smaller seat capacity declines of approximately 8 percent. At Norfolk, the entry of Southwest Airlines in October offset capacity reductions by other carriers, and led to a 3 percent overall gain in available seat capacity.

Impacts of September 11 on Future Growth in Air Travel Demand

TA - Exhibit 8

Factors Impacting Commercial Traffic Growth in the Aftermath of September 11th

Factor	Impact	Duration
Fear of Flying	Negative	Short-Term
Increased Security:		
Added Trip Time	Negative	Short to Mid-Term
Added Trip Cost	Negative	Long-Term
Airline Schedule Reductions	Negative	Mid-Term
Fare Discounting	Positive	Short-Term
Airline Financial Condition	Negative	Mid-Term
U.S. Economy	Negative	Short to Mid-Term

Looking forward, the events of September 11 and the subsequent declines in passenger demand and airline services will affect future growth in commercial aviation in a variety of ways. Exhibit 8 identifies six discrete factors arising from the terrorist events that will drive the future pace of industry recovery. These factors are as follow:

Fear of flying. The events of September 11 caused many passengers to defer or cancel travel plans. This reaction was responsible for the substantial reductions in passenger traffic that occurred subsequent to the terrorist attacks, and led to several of the secondary impacts listed below. Barring further terrorist events, it is expected that passenger confidence in the aviation system will be restored based on the significant and highly publicized increases in airport and airline security, and as passengers resume travel and gain comfort in the post-September 11 environment.

Increased Security. Improvements in air travel security are essential to prevent further air terrorist events, and to restore passenger confidence in the safety of airline travel. Enhanced security measures have or will be implemented in passenger screening, the handling of checked baggage and onboard commercial aircraft. While enhanced security is necessary to assure safety in air travel, increases in airport and airline security have the potential to increase the time and cost associated with airline trips, as passengers are subject to increased screening requirements and the costs of security enhancements are passed on to travelers. Increases in airline trip time and cost could

depress passenger demand, particularly on short-haul trips where added time and cost related to security would be most significant in terms of total trip time and costs. While the added cost of security is expected to represent a long-term by-product of the September 11th events, the added time related to increased screening of passengers (and checked baggage) should diminish as procedures and technologies are developed to maintain the efficiency and convenience of air travel. In the months following the September 11th attacks, there has already been a noticeable reduction in the additional time required to comply with increased security requirements and this trend should continue into the future.

Airline Schedule Reductions. Passenger demand is sensitive to the quantity and quality of available airline services, and the airline capacity reductions that have occurred in the aftermath of September 11th have had a depressing impact of passenger demand. Airlines are expected to gradually restore services as passenger demand rebounds to pre-September 11th levels. As a result, the service reductions that have been implemented should not represent a long-term deterrent to future growth in passenger demand.

Fare Discounting. Just as airlines reduced capacity following September 11th, air carriers have also implemented steep fare discounts in an effort to lure back passengers. While these fare reductions have represented the one positive factor in terms of post-September 11th air travel demand, the availability of fare discounts should diminish as the ongoing recovery in air travel demand re-aligns passenger traffic with airline seat capacity.

Airline Financial Conditions. The deep decline in passenger demand following the events of September 11 has had a serious impact on the financial performance of U.S. airlines. Major U.S. carriers lost \$2 billion during the 3rd Quarter of 2001, and losses for the 4th quarter were expected to be even greater. The declines in traffic and revenues resulting from September 11th have created a very realistic possibility that one or more major U.S. airlines could fail in the coming year.² In the past, major carriers have successfully re-structured and emerged from bankruptcy (Continental, America West) but others such as Eastern and Pan Am have shut down. In the event of a carrier failure, connecting hub airports in the carrier's route network can be vulnerable to significant reduction in services. Non-hubbing airports dominated by origin-destination passenger traffic generally see rapid replacement of services by other airlines, although small markets heavily dependent on a connecting hub in the failed carrier's network can experience a more lasting impact. Overall, the possibility of one or more airline failures would be expected to cause at least a short-term disruption in services at communities heavily reliant on the affected carriers.

² Both US Airways and United Airlines filed for bankruptcy protection in 2002. At the time of publication, both carriers are continuing to operate and each is attempting to reorganize and emerge from bankruptcy.

State of the U.S. Economy. Economic growth is a principle driver of the growth in air travel demand. The U.S. economy was already weak prior to September 11th and was subsequently declared to be in recession. The length of the recession and the rate of subsequent recovery will have a significant impact on future growth in both commercial and general aviation in Virginia.

The events of September 11th will bring lasting changes to commercial aviation in this country, particularly in the area of airline and airport security. The short-term effects of the terrorist attacks on commercial aviation have been dramatic, and have or will cause a series of secondary impacts on the U.S. airline industry, airports, and air travelers, as described above. Several of these secondary impacts have created immediate difficulties and near-term risks for Virginia airports and air travelers. It is expected, however, that passenger demand will recover and recent industry reports indicate that this recovery is already underway. An eventual recovery in passenger demand will dissipate many of these secondary impacts, allowing the industry to regain its financial health and enabling growth in the underlying demand for air travel to continue.

General aviation activity was restricted in the aftermath of September 11, particularly at airports in the proximity of Washington DC, New York City, and Boston. While most restrictions have been lifted, the Federal Aviation Administration has issued a series of security recommendations for GA airports. The possibility that acts of terrorism could originate from GA facilities—as highlighted by the recent incident involving a student pilot from Tampa FL—suggest that the current recommendations for GA airport security could become formal regulations.

While there is much uncertainty regarding future security requirements for general aviation airports and pilots, it is reasonable to anticipate that GA security standards will be significantly upgraded. Potential GA security measures are likely to include airport perimeter security, control of airfield access, and pre-flight screening of pilots, passengers, and aircraft.

Future security requirements could strain the financial resources of many public use GA airports. Depending on the availability and sources of funding, stringent GA airport security regulations could force states across the nation to concentrate their funding resources at a core system of public use GA airports. This risk has not been explicitly incorporated in the GA activity forecasts presented later in this report. However, the GA airport inventory, the review of airport roles, and the demographic coverage analysis performed in the course of this System Plan would provide the analytic foundation to support any future decision making process.

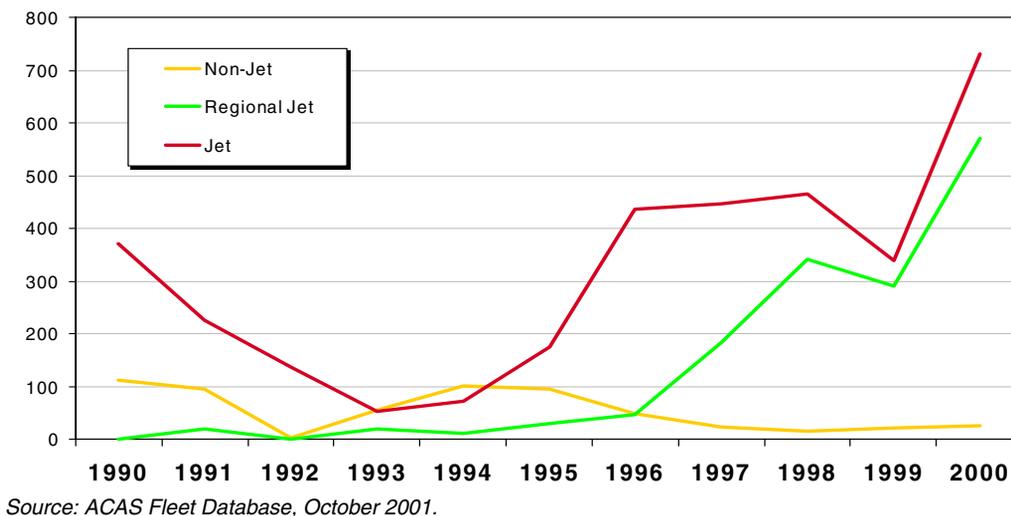
Growth in 30- to 70-Seat Regional Jet Aircraft

Regional jet (RJ) aircraft with 30 to 70 seats are rapidly entering the fleets of U.S. commercial air carriers and are providing services at a number of airports within the Commonwealth of Virginia. Since use of these aircraft has increased dramatically in recent years and since this growth is expected to continue, it is

important to understand how these aircraft are utilized and what roles they may play in the future development of Virginia’s aviation system.

Exhibit 9 presents the aircraft orders placed by North American passenger carriers over the past ten years. While regional jets played only small role in the early 1990’s when the 50-seat Canadair Regional Jet (CRJ) first entered service, these aircraft rose to prominence in the late 1990’s as new regional jet types such as the 37- to 50-seat Embraer Regional Jet (ERJ) and the 32-seat Fairchild-Dornier 328JET (FRJ) also entered production. Concurrent with the increase in RJs, orders for turboprop aircraft have declined, and in the year 2000, more than 20 regional jet orders were placed for every turboprop that was ordered.

TA - Exhibit 9
Aircraft Orders Placed by North American Passenger Carriers



US Airways, the dominant carrier at many of Virginia’s commercial airports, also currently provides the most RJ services through its regional affiliates Transtates, Chautauqua, and Mesa, which all fly ERJs.³ Delta is Virginia’s second leading RJ operator through its regional carriers Comair, AC Jet, and Atlantic Southeast, which fly CRJs and FRJs. American Eagle also flies a significant number of ERJs from airports within the Commonwealth.

³ November 2001 OAG Schedule for Virginia airports excluding IAD and DCA.

TA - Exhibit 10

RJ Routes Served from Virginia Airports (Ecluding IAD and DCA) – November 2001



Source: OAG Schedule Database, November 2001.

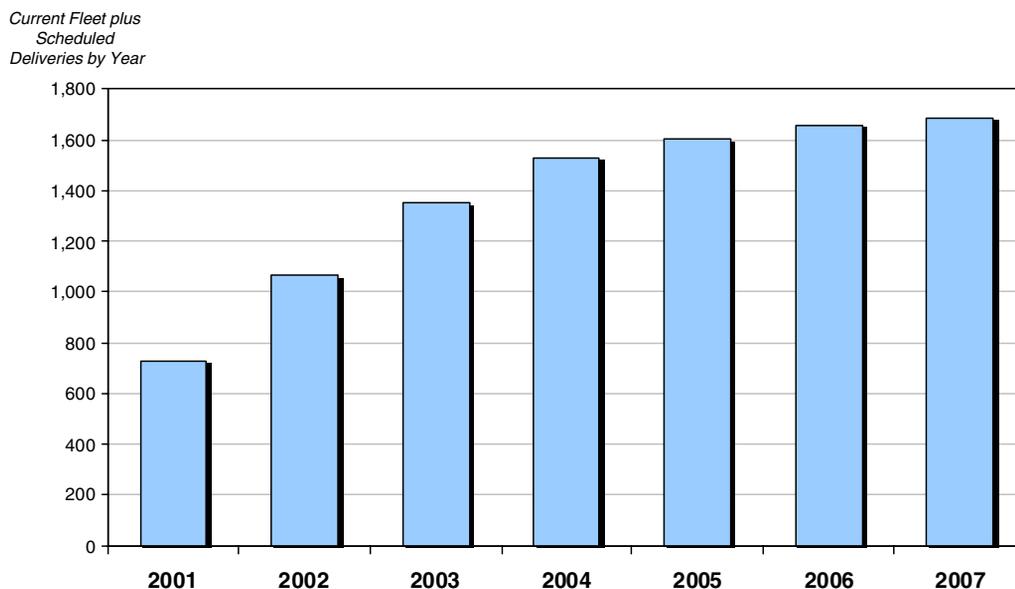
As shown in Exhibit 10, which presents the current RJ markets served from Virginia airports (excluding DCA and IAD), regional carriers are deploying RJs in a variety of roles:

- › To serve new nonstop markets: RJs extend the range for regional carriers to 1,000 miles and beyond (compared to the effective range of approximately 400 miles for turboprop services). They also permit nonstop services in low-volume markets incapable of supporting conventional narrowbody jets with 100 or more seats. For example, the Roanoke-Chicago service by United Express and the Norfolk-Toronto service by Air Canada represent new nonstop markets served from Virginia airports due to the availability of regional jets.
- › To replace turboprop services: Passengers often find jet service more attractive than turboprop service, and many regional carriers are consolidating their operations on jet aircraft. For example, Delta (Comair) replaced many of the Embraer Brasilias on its Charlottesville-Cincinnati route with CRJs. Similarly, Continental Express replaced Brasilias with ERJs on its Norfolk-Cleveland route.

- › To facilitate entry into competitive markets: Carriers are deploying regional jets to stage competitive entry into high volume markets dominated by other carriers. American Eagle is using ERJs to compete against US Airways narrowbody jets in the Norfolk-LaGuardia market.
- › To supplement or replace existing jet services: RJs are also being used to supplement or replace jet services in existing markets, allowing carriers to increase frequencies or better match capacity with demand. US Airways has added four daily ERJ departures to supplement its two daily narrowbody jets serving its Pittsburgh hub from Richmond.

Exhibit 11 presents the projected RJs in North American passenger service over the next six years. Due to the large numbers of firm orders and their scheduled delivery dates, the current size of the RJ fleet is projected to more than double in the near future.

TA - Exhibit 11
Projected RJs in North American Passenger Service



Source: ACAS Fleet Database, October 2001, Current Fleet plus Firm Orders.

This continued growth in regional jets may have a significant impact on the development of the Virginia airport system. The availability of these jets should allow commercial service to an expanded range of markets and destinations. RJ growth will allow thinner routes to support non-stop service and will provide additional hub feed. By allowing competitive entry into markets previous dominated by a single carrier, fares in some markets may decrease. At the same time, since regional jets cost more to operate than turboprops, fares could rise in new nonstop markets or in markets where turboprop services are replaced. Finally, growth in regional jets could impact facility requirements (such as runway length requirements), and should be considered in any planning analysis.

4. AIRPORT CLASSIFICATION

Classifications serve as a framework for describing the existing function of each airport in the system and as the reference for evaluating how system airports have changed their functions or are projected to change their functions as a result of accommodating forecast demand.

Virginia Airport Classifications

There are many ways that states discuss airport classifications. Some discussions are general in nature and identify functions without specifying design standards. On the other hand, some states identify detailed lists of facilities as goals for airports with a particular functional classification. Virginia's classification system identifies airport function, primary economic role, optimal Airport Reference Code (ARC), and to a lesser extent, funding category eligibility.

A series of discussions with the Department of Aviation and the Study Advisory Group were held to reassess the existing classification system. These meetings revealed that the classification system implemented as part of the 1990 VATSP Update continues to serve the needs and desires of the Commonwealth. Consequently, the existing classification system will continue to be used for the 2000 VATSP Update.

The descriptions provided below for each of the five classifications provide a broad definition of the airport roles and the type of facilities at each airport.

Commercial Service (CS). Commercial Service airports provide scheduled air carrier and/or commuter service to domestic and, in some cases, international destinations for surrounding communities. Established Commercial Service airports are included in this category. If a noncommercial service airport acquires scheduled passenger service, it would qualify as a Commercial Service airport upon reaching 10,000 annual enplanements. Commercial Service airports should be developed at a minimum according to the Federal Aviation Administration Airport Reference Code (ARC)-Category "C" design criteria. A precision instrument approach should be provided if technically and economically feasible. Such airports are eligible to receive Air Carrier entitlement, as well as, Air Carrier/Reliever discretionary funding from the Commonwealth Airport Fund.

Reliever (RL). General aviation airports in metro areas intended to reduce congestion at large commercial service airports by providing general aviation pilots with comparable landside and airside facilities. To accommodate the full range of general aviation aircraft, reliever airports should be developed to ARC-C design criteria when feasible. A precision instrument approach should be provided if technically and economically feasible. Such airports are eligible for Air Carrier/Reliever discretionary funding from the Commonwealth.

General Aviation Regional (GR). Service areas for Regional airports are often multi-jurisdictional due to geographic isolation or the relative scarcity of other airport services and facilities. Regional airports serve a large market area. They provide a full range of aviation facilities and services to the GA flying public, including jet fuel, instrument approaches, full service fixed based operations, corporate hangars and GA terminal facilities. These airports should be developed to ARC-C category design criteria when feasible. A precision instrument approach should be provided if technically and economically feasible and where justified by the level of operations. Regional airports are eligible for General Aviation discretionary funding by the Commonwealth.

General Aviation Community (GC). Provide general aviation facilities and services to business and recreational users. Community airports typically serve their respective communities or a smaller market area. The services provided by Community airports typically include aircraft rental, flight training and AvGas sales. Community airports should be developed to ARC-B category design criteria. A non-precision instrument approach should be considered if technically and economically feasible and where justified by the level of operations. Community airports are eligible for General Aviation discretionary funding by the Commonwealth.

Local Service (LO). Local service airports are generally low activity facilities and provide limited general aviation facilities to their respective communities. These airports typically have development constraints which preclude substantial expansion. Such constraints include airspace conflicts, environmental concerns, topography, competing aeronautical services, surrounding land use patterns and ownership status. When technically and economically feasible, Local Service airports should be developed to an ARC A or B category design criteria. These airports are not eligible for Commonwealth funding except for safety and preservation projects. Local service airports must meet minimum requirements for licensing in accordance with 5.1-7 of the Code of Virginia and 24 VAC 5-20-140 and may be in close proximity to larger airports in surrounding communities.

Composition of Virginia's Airport System

The Commonwealth has 68 existing public-use airports including the newly opened Stafford County Airport which is classified as a Reliever. The Commonwealth's classification of these airports is shown in **Table 1**. There are also two new facilities under development by the Department of Aviation and the FAA. Lee County and Tappahannock (estimated to be completed by 2005) will be General Aviation Community airports, and will replace existing Local Service airports.

AC- Table 1
Number of Airports by Classification Category

Classification	2001
Commercial Service	9
Reliever	8
General Aviation Regional	17
General Aviation Community	16
Local Service	17

5. GENERAL AVIATION FORECASTS

I. Overview

The VATSP Update serves as the strategic plan for the Commonwealth of Virginia's air transportation system, ensuring that the Commonwealth has a safe and reliable network of airports to efficiently serve the needs of both residents and visitors. One of the most important steps in creating this strategic plan is the development of reasonable estimates of future demand. These forecasts of based aircraft and operations determine the future facility requirements of the airports in the system and help the Virginia Department of Aviation assess the relative costs and benefits of potential improvements and investments.

This chapter describes the forecasts of general aviation (GA) activity developed for each of the Commonwealth's sixty-eight public-use airports and for the airports under development by the Department of Aviation and the Federal Aviation Administration (FAA). The sixty-eight public-use airports are divided into fifty-nine general aviation airports and nine air carrier airports. Airports under development include replacement airports (Lee County and Tappahannock) and new airports (Stafford). During the course of this study, two privately owned, public use airports were closed by owners (Whitman Strip and Kellam Field). In addition, Stafford County opened in 2001 and Lee County opened in 2002. Proposed airports that are specifically excluded from this VATSP Update (since there are no assurances that they will be licensed and operating during the forecast period) include Northern Neck, Rocky Mount – Franklin County, Grundy, and Lexington.

Forecasts of based aircraft and operations at each individual airport were developed for different categories of aircraft based on a range of historical data as well as projections of future activity such as the FAA Terminal Area Forecasts and master plans for the individual airports in the system. Projections of short-, intermediate-, and long-term activity were developed for the years 2005, 2015, and 2020, respectively. Preliminary forecasts were developed using a variety of methodologies, and then a preferred forecast was selected to represent the most reasonable estimate of future air transportation demand.

II. Based Aircraft

Based aircraft are an important indicator of the changes at an airport and drive many facility requirements. As shown in Table 1, the Commonwealth experienced slow growth in the number of based aircraft during the early 1990's; however, in more recent years that growth has increased. The fastest growth is concentrated in the northeast part of the state at airports such as Manassas, Culpeper, and Leesburg, as well as the southeastern part of the state at airports like Suffolk, Wakefield, and Petersburg.

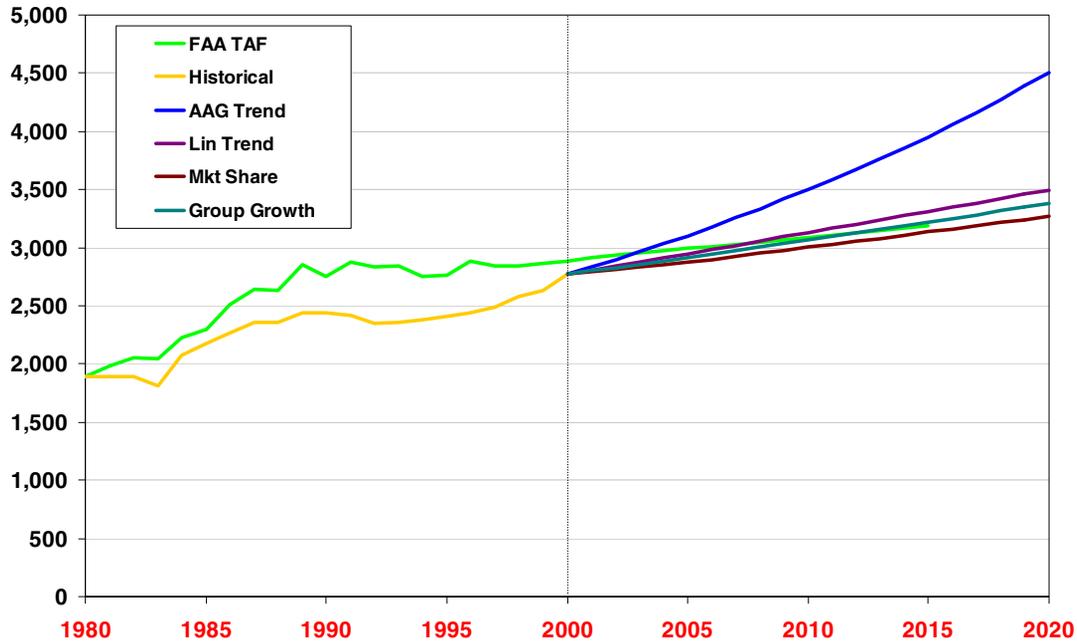
- › Market Share Forecast – The market share forecast builds off of the current share of Virginia’s total based aircraft at each individual airport by looking at the change in each individual airport’s market share over the past five years and the past ten years. The five-year and ten-year rates of change in individual airport market share were averaged and projected into the future at a declining rate. Once again, manual adjustments were made to temper the growth at airports that had substantial market share changes. This process resulted in a market share at each airport in each of the future forecast years, which was then applied to a forecast of total Virginia based aircraft growth.
- › Average Annual Growth Rate Trend Forecast – The methodology for this forecast was nearly identical to that of the linear trend forecast, but projections were made based on the average annual growth rate percentages rather than the growth in terms of based aircraft per year.
- › Group Growth Rate Forecast – For this forecast, airports were grouped into five categories based on growth trends in based aircraft, population, and income as well as consideration of sponsor expectations such as planned facility improvements. Forecast growth rates were assigned to each group resulting in an overall forecast for based aircraft in Virginia and a forecast at each individual airport.

Exhibit 1 presents the results of these four forecast methodologies graphically. Only the totals for VATSP airports with FAA Terminal Area Forecasts are presented here so that the forecasts can be directly compared with the FAA projections. The average annual growth rate forecast exhibited the fastest growth, while the market share forecast produced the slowest growth. The linear trend forecast was selected as the preferred methodology since it represents a reasonable mid-range forecast with long-term growth of 1.6 percent annually (2000-2020), consistent with growth over the past decade (1990 – 2000). When only the subset of airports with Terminal Area Forecasts are considered, the growth is 1.2 percent annually with the preferred methodology (2000 – 2015), slightly higher than the FAA TAF growth rate of 0.7 percent per year for the same period and the same subset of airports. The preferred forecast of based aircraft for all airports is presented in Table 1 of the Technical Appendix.

GAF - Exhibit 1

Comparison of Based Aircraft Forecast Methodologies

VATSP Airports with Terminal Area Forecasts



Preferred Forecast Methodology

Since the preferred forecast serves as an input to the operations forecasts, it is important to understand the detailed forecast methodology. This forecast methodology was applied to each of the Commonwealth's existing public-use airports, with adjustments made to account for the three airports currently under development.

First, the five- and ten-year growth rates in terms of based aircraft per year were compiled for each individual airport. These were averaged to determine the default long-term growth rate for each individual airport. For the Commonwealth as a whole, based aircraft increased by 47 based aircraft per year over the past 10 years (0.7 based aircraft per year per airport) and 66 based aircraft per year over the past five years (1.0 based aircraft per year per airport).

Next, it was assumed for planning purposes that each individual airport (except those being replaced) would retain, at a minimum, the level of based aircraft observed in 2000. To maintain consistency with the projected growth for the Commonwealth as a whole, growth at individual airports was also constrained to a maximum level. For airports with more than 100 based aircraft in 2000, the maximum growth rate was assumed to be 4 based aircraft per year; for those with fewer than 100 based aircraft, the maximum was 2 based aircraft per year.

The resulting growth rates were next examined for reasonableness and adjusted manually if necessary. For example, in cases where a decline between 1990 and 1995 resulted in a high “recovery” growth rate in the late 1990’s, the long-term growth was set to the ten-year historic growth rate rather than the average of the five- and ten-year rates. This adjustment procedure was utilized for airports such as Accomack County and Lynchburg Regional. Similar adjustments based on professional judgement were made in other cases where circumstances at an individual airport produced unreasonable forecasts of future activity.⁵

The replacement airport in Lee County is expected to open in 2005, and the new Tappahannock airport in 2007. The existing airports will be closed at the same time. The new airports were each assumed to gain some additional based aircraft within the first five years of operation due to the infrastructure improvements, with growth then continuing at the long-term rates developed in the individual forecasts for the new airports.

For the new Stafford airport, the planning level of 33 based aircraft was assumed to exist by the end of 2001, with growth to 39 based aircraft by 2005. It was also assumed that 75 percent of the initial aircraft at Stafford would come from Manassas and Shannon. Growth was assumed to continue at the rate of Manassas and Shannon alone (4.3 based aircraft per year), with one-third of future growth occurring at Stafford and growth at Manassas and Shannon declining proportionally.

Validation

The FAA Terminal Area Forecasts and various airport master plan forecasts were used to provide internal validation of the preferred based aircraft forecasts. These individual forecast comparisons are presented in Table 2 of the Technical Appendix. For those airports with FAA Terminal Area Forecasts, additional validation was performed by comparing various groups of airports as shown in Table 2.

⁵ Additional airports where the default growth rates were adjusted include Norfolk, Richmond, Roanoke, Shenandoah Valley, and Wakefield Municipal, as well as the new airports and those influenced by them.

GAF – Table 2

Comparison of VATSP and FAA Based Aircraft Forecasts

VATSP Airports with Terminal Area Forecasts

Airport Category	Historic			Forecast		Avg Annual Growth	
	1990	1995	2000	2005	2015	1990-2000	2000-2015
VA Airports							
VATSP	2,435	2,412	2,773	2,946	3,313	1.3%	1.2%
FAA TAF	2,752	2,760	2,889	2,991	3,191	0.5%	0.7%
GA Airports							
VATSP	1,785	1,781	2,028	2,161	2,449	1.3%	1.3%
FAA TAF	1,939	2,064	2,099	2,168	2,309	0.8%	0.6%
Air Carrier Airports							
VATSP	650	631	745	785	864	1.4%	1.0%
FAA TAF	813	696	790	823	882	-0.3%	0.7%
Northern Virginia Mini-System							
VATSP	504	474	554	590	643	1.0%	1.0%
FAA TAF	503	688	656	686	748	2.7%	0.9%
Southeast Virginia Mini-System							
VATSP	351	329	404	424	465	1.4%	0.9%
FAA TAF	461	404	409	422	447	-1.2%	0.6%

Source: FAA Terminal Area Forecasts, VATSP Update Database

Notes:

Includes only those airports with FAA Terminal Area Forecasts

Northern Virginia System includes Shannon, Manassas, Stafford, Warrenton Fauquier, and Culpeper.

Southeast Virginia System includes Hampton Roads, Suffolk, Chesapeake, and Norfolk

For those airports with Terminal Area Forecasts, the VATSP and FAA Terminal Area Forecasts were compared for all Virginia airports, for GA airports, for air carrier airports, and for two “mini-systems” of airports. The northern Virginia min-system includes Shannon, Manassas, Stafford, Warrenton Fauquier, and Culpeper. The southeast Virginia mini-system includes Hampton Roads, Suffolk, Chesapeake, and Norfolk. These two systems are compared to examine the VATSP forecasts from a more regional perspective.

For the Virginia air transportation system as a whole, the VATSP Update forecasts project slightly faster future growth than the Terminal Area Forecasts. Similar differences occur when GA and air carrier airports are considered separately and even when the two “mini-systems” of airports are analyzed.⁶ It should be noted that although the VATSP Update forecasts show more aggressive growth than the FAA Terminal Area Forecasts for VA airports, the forecasts are still fairly conservative. In all cases, the forecast growth rate is less than or equal to the historic growth rate, and while the VATSP forecasts show faster growth, they show fewer based aircraft than the FAA forecasts for some subsets of airports. These

⁶ The two “mini-systems” considered were the Hampton Roads-Suffolk-Chesapeake-Norfolk system and the Shannon-Manassas-Stafford system

small differences between the VATSP and FAA forecasts are further explained by the differences in the historic growth rates observed in the two datasets.⁷

While the number of based aircraft determines some facility requirements, the mix of aircraft types is also extremely important. Table 3 compares the historic growth in the national fleet by aircraft category with the growth at the VATSP airports. The table also shows the FAA projections for national growth and presents the assumptions used in the VATSP Update based aircraft fleet mix forecasts.

GAF – Table 3
Historic and Future Average Annual Growth Rates By Based Aircraft Type

Forecast and Period	Single Engine Piston	Multi Engine Piston	Multi Engine Turboprop	Multi Engine Jet	Heli-copter	Other	Total
FAA Aerospace Forecasts							
1990-2000	-0.8%	-1.5%	0.7%	5.2%	1.0%	12.1%	0.2%
2000-2011	0.7%	0.0%	1.2%	4.7%	1.4%	1.4%	0.9%
VATSP Update							
1990-2000	1.2%	0.9%	2.8%	10.2%	6.0%	6.3%	1.6%
2000-2005	1.0%	0.4%	2.0%	7.5%	3.7%	3.9%	1.6%
2005-2015	0.7%	0.0%	1.2%	4.7%	1.4%	1.4%	1.4%
2015-2020	0.7%	0.0%	1.2%	3.5%	1.4%	1.4%	1.2%

Source: FAA Aerospace Forecasts, VATSP Update Database

As expected given the overall differences in the national and VA growth rates, VA growth by based aircraft category has historically been faster than national growth. However, in both the Commonwealth and the nation, multi-engine jets represented one of the fastest growing aircraft categories between 1990 and 2000, while single- and multi-engine pistons represented the slowest growth. This pattern is expected to continue. The *FAA Aerospace Forecasts, FY2000 – 2011* show that the piston categories will continue to show the slowest growth in the nation, while the jets will grow the fastest. In order to capture the faster historic growth at the VATSP airports relative to the nation, as well as the projected national trends, three sets of growth rates were defined for the VATSP Update based aircraft fleet forecasts:

- › Between 2000 and 2005, each category of based aircraft was projected to grow at the average of the VATSP airport historic rate and the FAA projected rate for the nation.
- › From 2005 to 2015, growth in each category was projected to decline slightly to the FAA projected rate.

⁷ The FAA Terminal Area Forecasts use historic data reported to the FAA, while the VATSP database combines information from local, state and federal sources to create the most accurate representation possible.

- Between 2015 and 2020, the rapid growth in multi-engine jets was tempered further to reflect the fact that high growth rates typically decline over time. It should be noted, however, that jets remain the fastest-growing category, even with the tempered growth rate.

These growth rates were applied to the 2000 fleet mixes at each individual airport, and the resulting mix in each forecast year was then normalized to match the total based aircraft forecast for the airport as a whole. Manual adjustments were made for airports without jet or turboprop based aircraft that were expected to have such aircraft in the future.⁸ For the three new airports, the initial fleet mix was based upon existing fleet forecasts for each individual airport as well as historic fleet mix data for the airports they impact or replace. The resulting based aircraft fleet mix forecast is presented in Table 3 of the Technical Appendix.

Validation

For validation purposes, the fleet mix forecasts are compared with the FAA projections in Table 4. The historic fleet mixes are similar, but the national mix has more aircraft in the helicopter and other categories. More importantly, the future changes in fleet mix are similar. The share of piston aircraft in the Commonwealth is larger than the national share and declining more slowly, consistent with historic trends and future expectations. The share of jet aircraft in Virginia is slightly higher than the national average, and is growing faster than the national share. This is also consistent with historic and expected trends.

GAF – Table 4
Existing and Future Fleet Mix By Based Aircraft Type

Forecast and Period	Single Engine Piston	Multi Engine Piston	Multi Engine Turboprop	Multi Engine Jet	Heli-copter	Other	Total
FAA Aerospace Forecasts							
1990	77.5%	10.7%	2.9%	2.0%	3.4%	3.5%	100.0%
2000	70.2%	9.0%	3.0%	3.3%	3.7%	10.8%	100.0%
2010	68.7%	8.2%	3.1%	4.8%	3.9%	11.3%	100.0%
Avg Ann Chg: 1990-2010	-0.4%	-0.1%	0.0%	0.1%	0.0%	0.4%	0.0%
VATSP Update							
1990	80.9%	11.8%	2.7%	2.1%	0.7%	1.8%	100.0%
2000	77.0%	10.8%	3.6%	4.3%	1.3%	3.0%	100.0%
2005	76.0%	10.1%	3.7%	5.6%	1.4%	3.3%	100.0%
2015	75.6%	8.9%	3.8%	7.0%	1.3%	3.4%	100.0%
2020	75.5%	8.5%	3.8%	7.6%	1.3%	3.4%	100.0%
Avg Ann Chg: 1990-2020	-0.2%	-0.1%	0.0%	0.2%	0.0%	0.1%	0.0%

Source: FAA Aerospace Forecasts, VATSP Update Database

⁸ Chesapeake, Dinwiddie, Mecklenburg, New River Valley, Virginia Highlands, and Virginia Tech were all assumed to have some turboprop or jet based aircraft in the future.

III. Operations Forecasts

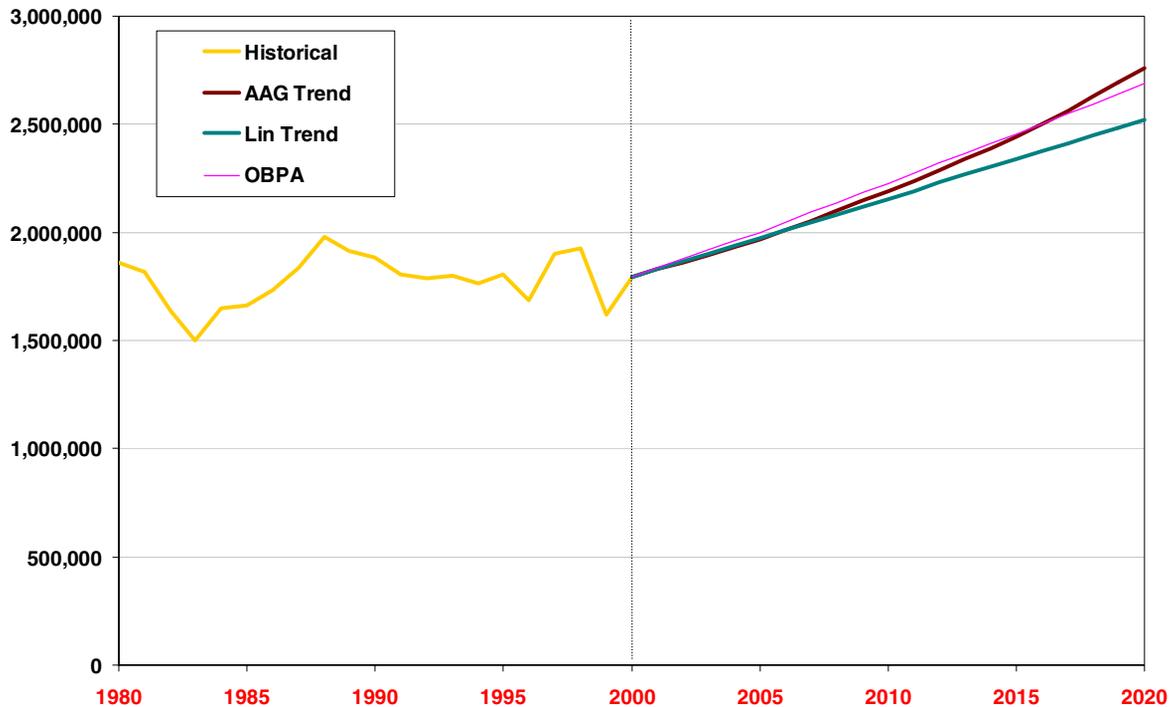
As with the based aircraft forecasts, different methodologies were tested to allow selection of a preferred operations forecast:

- › Linear Trend Forecast – Like the based aircraft linear trend forecast, five-year and ten-year growth rates in operations per year were averaged and projected forward. Limits and manual adjustments were used when growth rates appeared excessive. As with the based aircraft forecasts, it was assumed for planning purposes that each system airport would, at a minimum, maintain the level of operations reported for calendar year 2000.
- › Average Annual Growth Rate Trend Forecast – The methodology was similar to the linear trend, but projections were made based on the average annual growth rate percentages rather than the growth in terms of operations per year.
- › Operations per Based Aircraft Forecast – Civil Air Patrol (CAP) survey data and FAA tower counts for thirty-one Virginia airports were used to derive ratios of operations per based aircraft for various aircraft classes. These ratios were then used to project operations from the preferred based aircraft forecast.

Exhibit 2 compares the results of the preliminary operations forecasts. Although the various methodologies produced similar growth rates, examination of the forecast results led to the conclusion that the historic operation counts were simply not accurate enough for a reasonable trend analysis. While the most reliable data available has been compiled by the study team from airport master plans, Civil Air Patrol surveys, FAA, the Department of Aviation, and other available data sources, the historic trends in the operations counts suggest reporting inconsistencies.

The trend forecasts were therefore discarded and the operations per based aircraft (OPBA) forecast was selected as the preferred methodology. Several iterations were performed to test different aircraft groupings and methodologies, resulting in a formula for relating based aircraft to operations and different methodologies for applying that formula.

GAF - Exhibit 2
Comparison of Operations Forecast Methodologies
All VATSP Airports



Preferred Methodology

The 1990 VATSP developed a formula relating operations to based aircraft using tower counts and survey data from 1987:

$$Operations = 2,700 + 487 \times Based\ Aircraft$$

Using updated tower counts and CAP data from 1998, new ratios of operations per based aircraft were developed that considered the mix of based aircraft by type. These ratios are presented in Table 5.

GAF – Table 5

Estimated OPBA Compared with National GA Survey

Aircraft Type	Estimated Operations per Based Aircraft	GA and Air Taxi Survey (Operations per Active Aircraft)
Single Engine Piston	368	321
Multi Engine Piston	363	411
Multi Engine Turboprop or Turbojet	742	734
Other	598	578
Total	405	391

Sources:

FAA General Aviation and Air Taxi Activity Survey, July 2000.

FAA Tower Counts, 1998 CAP Survey

These OPBA ratios represent the median values for the thirty-one airports for which data was available (twenty-two non-towered airports with CAP data and nine towered airports with FAA tower counts). The ratios are slightly lower than the ratio reflected in the 1990 VATSP formula, but are reasonable when compared with the data from the *FAA General Aviation and Air Taxi Activity Survey*. As another reasonability check, FAA planning guidelines recommend GA OPBA ratios ranging from 250 for low activity airports up to 450 for high activity airports. The derived ratios from the CAP surveys and tower counts are generally consistent with these values.

The new ratios were used to develop operations forecasts directly from the preferred based aircraft forecasts. The OPBA ratios for individual aircraft classes were assumed to increase over time at a rate of 0.6% annually based upon national rates in the *FAA Aerospace Forecasts, FY2000 – 2011*. Three different methodologies were used to estimate operations from based aircraft. In the first, the median OPBA ratios in Exhibit 7 were used to directly calculate operations from the based aircraft forecasts for each airport without considering any historical operations data. In the second methodology, the individual OPBA ratios derived for those airports with CAP or tower count data were used to calculate operations rather than the average ratios used for the non-towered airports.

The third methodology was the same as the second, but the forecasts were re-scaled to match the 2000 base year operations in the VATSP Update Database.

After careful examination of the resulting forecasts, the preferred methodology was chosen. Due to the inconsistency of the historic operations data, the median values from Table 5 were used to generate

operations forecasts for all of the VATSP airports. For those airports with tower count data, the forecast growth was applied to the 2000 operations counts to maintain consistency with the historic data streams.⁹

There is one weakness associated with deriving the operations forecasts directly from the based aircraft. The methodology assumes the ratio of local to transient operations is relatively constant across airports and that the local fleet mix is similar to the transient mix. To account for this difference, 1998 CAP data was used to examine the fleet mix of transient operations.

Table 6 presents the mix of transient operations for the 22 airports included in the CAP survey. The airports are divided into those airports with runways less than 4,000 feet and those with runways greater than 4,000 feet, as it was assumed that this runway length indicated that airports were “jet capable”.

GAF – Table 6
Mix of Transient Aircraft

Airport	Transient % of Total	Transient Mix						
		S.E.	L.T.R.	T.T.P.	B.J.	Helic	Ultra	Unknown
Runway > 4000'	29%	71%	10%	7%	3%	7%	2%	0%
Runway < 4000'	31%	81%	7%	0%	0%	10%	2%	0%
Total	30%	73%	9%	6%	3%	7%	2%	0%

Source: 1998 CAP Survey

As shown in the table, approximately 30 percent of sampled operations were transient operations. For those airports with runways greater than 4,000 feet, turboprops and jets make up 10 percent of the transient operations. For airports with shorter runways, there are no turboprop or jet operations. Based on this analysis, the operations forecasts were adjusted. The original forecasts for each airport (determined by the based aircraft mix only) were reduced by thirty percent, and that thirty percent was replaced using the distribution of transient operations as appropriate for the airport’s runway length. For the two airports with a very high percentage of transient operations (Ingalls Field and Marks Municipal), the forecasts were adjusted so that the total operations were based on the airport’s reported numbers (rather than on the OPBA formula) and so that a larger proportion of the fleet mix was based on the assumed mix of transient operations. The resulting VATSP Update operations forecasts are presented in Table 4 of the Technical Appendix.

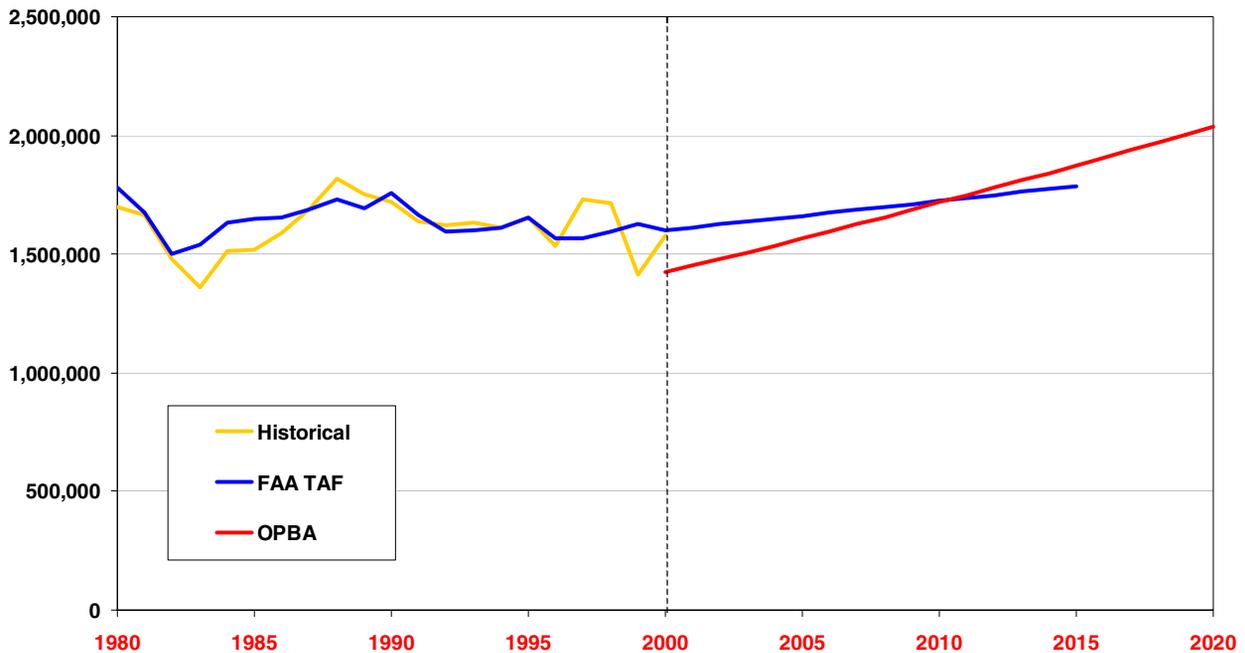
Validation

The FAA Terminal Area Forecasts and various airport master plan forecasts were used to provide internal validation of the operations forecasts. The individual forecast comparisons are presented in Table

⁹ For Shannon, the number of operations calculated using the median values from Exhibit 7 differed significantly from the CAP and other airport data. For this airport, the forecast growth was applied to the 2000 operations count to maintain consistency with the historic data stream.

5 of the Technical Appendix. For those airports with FAA Terminal Area Forecasts, additional validation was performed by comparing various groups of airports as shown in Exhibit 3 and Table 7.

GAF - Exhibit 3
Comparison of Operations Forecasts
VATSP Airports with Terminal Area Forecasts



As with the based aircraft forecasts, the VATSP Update operations forecasts show faster growth than the FAA Terminal Area Forecasts, and this faster growth is consistent across all airport groupings. Since the OPBA ratios are expected to grow slightly over time, it is reasonable to expect operations overall to grow faster than based aircraft, as is the case with the VATSP Update forecasts. Most of the differences in the forecasts are due to the differences in the historic data. Thus, while VATSP operations at GA airports are forecast to grow faster than FAA projections, the absolute number of operations is actually slightly lower than the FAA forecast.

GAF – Table 7

Comparison of VATSP and FAA Operations Forecasts

VATSP Airports with Terminal Area Forecasts

Airport Category	Historic			Forecast		Avg Annual Growth	
	1990	1995	2000	2005	2015	1990-2000	2000-2015
VA Airports							
VATSP	1,721,519	1,651,216	1,425,443	1,564,238	1,871,829	-1.9%	1.8%
FAA TAF	1,759,460	1,652,920	1,599,438	1,661,209	1,786,521	-0.9%	0.7%
GA Airports							
VATSP	1,047,440	1,015,999	778,095	867,441	1,068,802	-2.9%	2.1%
FAA TAF	1,086,517	1,016,087	973,255	1,008,692	1,078,234	-1.1%	0.7%
Air Carrier Airports							
VATSP	674,079	635,217	647,348	696,797	803,027	-0.4%	1.4%
FAA TAF	672,943	636,833	626,183	652,517	708,287	-0.7%	0.8%
Northern Virginia Mini-System							
VATSP	205,730	193,045	201,744	225,093	263,801	-0.2%	1.8%
FAA TAF	207,730	193,133	189,722	201,351	223,275	-0.9%	1.1%
Southeast Virginia Mini-System							
VATSP	222,798	240,236	163,159	177,322	206,601	-3.1%	1.6%
FAA TAF	263,904	234,726	180,037	181,192	183,503	-3.8%	0.1%

Source: FAA Terminal Area Forecasts, VATSP Update Database

Notes:

Includes only those airports with FAA Terminal Area Forecasts

Northern Virginia System includes Shannon, Manassas, Stafford, Warrenton Fauquier, and Culpeper.

Southeast Virginia System includes Hampton Roads, Suffolk, Chesapeake, and Norfolk

IV. Summary

In summary, the VATSP Update forecasts of general aviation based aircraft and operations considered historic data from the Department of Aviation, the FAA, airport master plans, and Civil Air Patrol surveys. A number of forecast methodologies were devised and tested, and a preferred methodology was selected that represented the most reasonable estimate of future activity. Based aircraft were estimated using a linear trend methodology, with adjustments made to account for individual airport characteristics and new airport construction. Since the validity of the historic operations data was somewhat questionable, an operations forecast methodology was devised to estimate future operations using the number and mix of based aircraft at each airport. This methodology took advantage of the most accurate information available while avoiding the pitfall of unreliable historic data.

The VATSP Update forecasts reflect growth in based aircraft and operations that is slightly faster than FAA projections. The VATSP Update forecasts represent a reasonable future scenario for planning purposes, and include a breakdown of based aircraft and operations by aircraft type that can be used to determine existing and future facility requirements for the Commonwealth's air transportation system.

TABLE 8
VATSP UPDATE BASED AIRCRAFT FORECAST

Airport Name	Historic Based Aircraft			Annual Growth Rates		BAC 2000	Future Growth Rates		Forecast Based Aircraft		
	1990	1995	2000	Based Aircraft per Year			Baseline Projection	Manual Adjustment	2005	2015	2020
				1990 - 2000	1995 - 2000						
General Aviation Airports											
Accomack County	14	16	25	1.1	1.8	25	1.5	1.1	31	42	47
Blackstone Municipal	5	7	7	0.2	0.0	7	0.1	0.1	8	9	9
Blue Ridge	62	64	56	(0.6)	(1.6)	56	0.0	0.0	56	56	56
Bridgewater Air Park	14	23	17	0.3	(1.2)	17	0.0	0.0	17	17	17
Brookneal-Campbell County	4	4	2	(0.2)	(0.4)	2	0.0	0.0	2	2	2
Chase City Municipal	2	5	5	0.3	0.0	5	0.2	0.2	6	7	8
Chesapeake Regional	62	64	70	0.8	1.2	70	1.0	1.0	75	85	90
Chesterfield County	106	109	112	0.6	0.6	112	0.6	0.6	130	136	139
Crewe Municipal	10	9	10	0.0	0.2	10	0.1	0.1	11	12	12
Culpeper County	20	90	111	9.1	4.2	111	4.0	4.0	131	171	191
Danville Regional	44	35	41	(0.3)	1.2	41	0.5	0.5	43	48	50
Dinwiddie County Airport	25	43	81	5.6	7.6	81	2.0	2.0	91	111	121
Emporia-Greenville Regional	7	8	3	(0.4)	(1.0)	3	0.0	0.0	3	3	3
Falwell	13	14	16	0.3	0.4	16	0.4	0.4	18	21	23
Farmville Regional	18	24	24	0.6	0.0	24	0.3	0.3	26	29	30
Franklin Municipal	7	13	12	0.5	(0.2)	12	0.2	0.2	13	14	15
Front Royal-Warren County	21	17	24	0.3	1.4	24	0.9	0.9	28	37	41
Gordonsville Municipal	6	11	15	0.9	0.8	15	0.9	0.9	19	28	32
Grundy Municipal	8	10	10	0.2	0.0	10	0.1	0.1	11	12	12
Hampton Roads	140	140	147	0.7	1.4	147	1.1	1.1	152	163	168
Hanover County Municipal	59	62	69	1.0	1.4	69	1.2	1.2	75	87	93
Hartwood Field	13	5	9	(0.4)	0.8	9	0.2	0.2	10	12	13
Hummel Field	26	27	29	0.3	0.4	29	0.4	0.3	31	34	35
Ingalls Field	2	3	6	0.4	0.6	6	0.5	0.5	9	14	16
Kellam Field	2	5	5	0.3	0.0	5	0.2	0.2	6	7	8
Lake Anna	3	2	1	(0.2)	(0.2)	1	0.0	0.0	1	1	1
Lawrenceville-Brunswick	3	4	5	0.2	0.2	5	0.2	0.2	6	8	9
Lee County	3	3	5	0.2	0.4	5	0.3	0.3	7	-	-
Lee County (Replacement)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.4	-	16	18
Leesburg Executive	182	183	211	2.9	5.6	211	4.0	4.0	231	271	291

Notes:

Growth rate constrained between 0 and 2 based aircraft per year for airports with less than 100 BAC in 2000

Growth rate constrained between 0 and 4 based aircraft per year for airports with more than 100 BAC in 2000.

☐ Boxed cells indicate manual adjustments due to new airports

TABLE 8
VATSP UPDATE BASED AIRCRAFT FORECAST

Airport Name	Historic Based Aircraft			Annual Growth Rates		BAC 2000	Future Growth Rates		Forecast Based Aircraft		
	1990	1995	2000	Based Aircraft per Year			Baseline Projection	Manual Adjustment	2005	2015	2020
				1990 - 2000	1995 - 2000						
Lonesome Pine	21	19	20	(0.1)	0.2	20	0.1	0.1	20	21	21
Louisa County	10	22	34	2.4	2.4	34	2.0	2.0	44	64	74
Lunenburg County	6	4	1	(0.5)	(0.6)	1	0.0	0.0	1	1	1
Luray Caverns	18	14	9	(0.9)	(1.0)	9	0.0	0.0	9	9	9
Manassas Regional	281	246	315	3.4	13.8	315	4.0	2.3	309	332	344
Marks Municipal	5	4	4	(0.1)	0.0	4	0.0	0.0	4	4	4
Mecklenburg-Brunswick Rgnl	9	9	14	0.5	1.0	14	0.8	0.8	18	25	29
Middle Peninsula Regional	16	23	30	1.4	1.4	30	1.4	1.4	37	51	58
Mountain Empire	37	30	26	(1.1)	(0.8)	26	0.0	0.0	26	26	26
New Kent County	51	34	38	(1.3)	0.8	38	0.0	0.0	38	38	38
New London	48	43	58	1.0	3.0	58	2.0	2.0	68	88	98
New Market	14	38	33	1.9	(1.0)	33	0.5	0.5	35	40	42
New River Valley	30	21	24	(0.6)	0.6	24	0.0	0.0	24	24	24
Orange County	26	21	22	(0.4)	0.2	22	0.0	0.0	22	22	22
Shannon	133	136	141	0.8	1.0	141	0.9	0.6	139	145	148
Smith Mountain Lake	9	16	13	0.4	(0.6)	13	0.0	0.0	13	13	13
Stafford (New)	N/A	N/A	N/A	N/A	N/A		N/A	1.4	39	53	60
Suffolk Municipal	40	47	80	4.0	6.6	80	2.0	2.0	90	110	120
Tangier Island	0	0	0	0.0	0.0	-	0.0	0.0	-	-	-
Tappahannock Municipal	12	10	14	0.2	0.8	14	0.5	0.5	17	-	-
Tappahannock (Replacement)	N/A	N/A	N/A	N/A	N/A		N/A	1.0	-	31	36
Tazewell County	13	12	10	(0.3)	(0.4)	10	0.0	0.0	10	10	10
Twin County	10	11	14	0.4	0.6	14	0.5	0.5	17	22	24
Virginia Highlands	60	57	55	(0.5)	(0.4)	55	0.0	0.0	55	55	55
Virginia Tech	29	30	33	0.4	0.6	33	0.5	0.5	36	41	43
Wakefield Municipal	14	10	28	1.4	3.6	28	2.0	1.4	35	49	56
Warrenton-Fauquier	90	92	98	0.8	1.2	98	1.0	1.0	103	113	118
Waynesboro	46	35	26	(2.0)	(1.8)	26	0.0	0.0	26	26	26
Whitman Strip	12	14	15	0.3	0.2	15	0.3	0.3	16	19	20
William M. Tuck	25	27	19	(0.6)	(1.6)	19	0.0	0.0	19	19	19
Williamsburg-Jamestown	47	47	56	0.9	1.8	56	1.4	1.4	63	76	83
Winchester Regional	62	69	79	1.7	2.0	79	1.9	1.9	88	107	116
Subtotal	2,055	2,141	2,437	38.2	59.2	2,446			2,663	3,082	3,287
Annual Growth Rate vs 2000	1.8%	2.7%	-						1.7%	1.6%	1.5%

Notes:

Growth rate constrained between 0 and 2 based aircraft per year for airports with less than 100 BAC in 2000

Growth rate constrained between 0 and 4 based aircraft per year for airports with more than 100 BAC in 2000.

Boxed cells indicate manual adjustments due to new airports

TABLE 8
VATSP UPDATE BASED AIRCRAFT FORECAST

Airport Name	Historic Based Aircraft			Annual Growth Rates		BAC 2000	Future Growth Rates		Forecast Based Aircraft			
	1990	1995	2000	Based Aircraft per Year			Baseline Projection	Manual Adjustment	2005	2015	2020	
				1990 - 2000	1995 - 2000							
Air Carrier Airports												
Charlottesville-Albemarle	60	55	93	3.3	7.6	93	2	2	103	123	133	
Lynchburg Regional	47	32	47	0.0	3.0	47	1.5	1.0	52	62	67	
Newport News-Williamsburg Intl	126	99	114	(1.2)	3.0	114	0.9	0.9	119	128	132	
Norfolk International	109	78	107	(0.2)	5.8	107	2.8	0.0	107	107	107	
Richmond International	75	92	108	3.3	3.2	108	3.3	1.0	113	123	128	
Roanoke Regional	101	113	117	1.6	0.8	117	1.2	1.6	125	141	149	
Ronald Reagan Washington Natl	37	23	20	(1.7)	(0.6)	20	0.0	0.0	20	20	20	
Shenandoah Valley Regional	46	80	87	4.1	1.4	87	2.0	1.4	94	108	115	
Washington Dulles Intl	49	59	52	0.3	(1.4)	52	0.0	0.0	52	52	52	
Subtotal	650	631	745	9.5	22.8	730			785	864	903	
Annual Growth Rate vs 2000	1.2%	3.0%	-						1.5%	1.1%	1.1%	
Total	2,705	2,772	3,182	47.7	82.0	3,176			3,448	3,946	4,190	
Annual Growth Rate vs 2000	1.6%	2.8%	-						1.7%	1.5%	1.4%	

Notes:

Growth rate constrained between 0 and 2 based aircraft per year for airports with less than 100 BAC in 2000

Growth rate constrained between 0 and 4 based aircraft per year for airports with more than 100 BAC in 2000.

Boxed cells indicate manual adjustments due to new airports

TABLE 9
VATSP UPDATE, FAA, AND MASTER PLAN FORECASTS

Airport Name	Historic Based Aircraft			VATSP Update Forecast			FAA Terminal Area Forecasts			Master Plan Forecasts			
	1990	1995	2000	2005	2015	2020	2000	2005	2015	2000	2005	2015	2020
General Aviation Airports													
Accomack County	14	16	25	31	42	47	14	14	14	25	26	29	30
Blackstone Municipal	5	7	7	8	9	9	12	12	12	9	10	14	16
Blue Ridge	62	64	56	56	56	56	62	67	77	73	77	83	86
Bridgewater Air Park	14	23	17	17	17	17	-	-	-	45	51	56	58
Brookneal-Campbell County	4	4	2	2	2	2	5	5	5	-	-	-	-
Chase City Municipal	2	5	5	6	7	8	5	5	5	-	-	-	-
Chesapeake Regional	62	64	70	75	85	90	68	68	68	70	77	95	104
Chesterfield County	106	109	112	130	136	139	111	111	111	129	139	157	166
Crewe Municipal	10	9	10	11	12	12	-	-	-	-	-	-	-
Culpeper County	20	90	111	131	171	191	-	-	-	57	70	96	109
Danville Regional	44	35	41	43	48	50	40	40	40	50	50	50	50
Dinwiddie County Airport	25	43	81	91	111	121	47	47	47	36	40	48	52
Emporia-Greenville Regional	7	8	3	3	3	3	6	6	6	12	14	20	23
Falwell	13	14	16	18	21	23	-	-	-	15	17	21	26
Farmville Regional	18	24	24	26	29	30	26	26	26	22	24	30	33
Franklin Municipal	7	13	12	13	14	15	13	13	13	-	-	-	-
Front Royal-Warren County	21	17	24	28	37	41	18	18	18	39	44	53	57
Gordonsville Municipal	6	11	15	19	28	32	-	-	-	-	-	-	-
Grundy Municipal	8	10	10	11	12	12	12	12	12	13	14	17	18
Hampton Roads	140	140	147	152	163	168	189	189	189	-	-	-	-
Hanover County Municipal	59	62	69	75	87	93	77	77	77	82	89	104	111
Hartwood Field	13	5	9	10	12	13	-	-	-	-	-	-	-
Hummel Field	26	27	29	31	34	35	-	-	-	-	-	-	-
Ingalls Field	2	3	6	9	14	16	6	6	6	-	-	-	-
Kellam Field	2	5	5	6	7	8	-	-	-	-	-	-	-
Lake Anna	3	2	1	1	1	1	-	-	-	-	-	-	-
Lawrenceville-Brunswick	3	4	5	6	8	9	-	-	-	5	5	7	8
Lee County	3	3	5	7	-	-	3	3	3	14	18	24	27
Lee County (Replacement)	-	-	-	-	16	18	-	-	-	-	-	-	-
Leesburg Executive	182	183	211	231	271	291	193	217	266	234	247	273	286

TABLE 9
VATSP UPDATE, FAA, AND MASTER PLAN FORECASTS

Airport Name	Historic Based Aircraft			VATSP Update Forecast			FAA Terminal Area Forecasts			Master Plan Forecasts			
	1990	1995	2000	2005	2015	2020	2000	2005	2015	2000	2005	2015	2020
Lonesome Pine	21	19	20	20	21	21	16	16	16	-	-	-	-
Louisa County	10	22	34	44	64	74	32	32	32	29	33	46	53
Lunenburg County	6	4	1	1	1	1	5	5	5	-	-	-	-
Luray Caverns	18	14	9	9	9	9	9	9	9	29	32	38	41
Manassas Regional	281	246	315	309	332	344	377	397	438	499	553	661	715
Marks Municipal	5	4	4	4	4	4	-	-	-	4	4	6	7
Mecklenburg-Brunswick Regional	9	9	14	18	25	29	10	10	10	15	17	22	25
Middle Peninsula Regional	16	23	30	37	51	58	23	23	23	-	-	-	-
Mountain Empire	37	30	26	26	26	26	27	27	27	45	52	68	76
New Kent County	51	34	38	38	38	38	43	43	43	50	63	79	86
New London	48	43	58	68	88	98	-	-	-	-	-	-	-
New Market	14	38	33	35	40	42	-	-	-	-	-	-	-
New River Valley	30	21	24	24	24	24	21	21	21	23	24	27	29
Orange County	26	21	22	22	22	22	22	22	22	29	35	41	43
Shannon	133	136	141	139	145	148	170	170	170	-	-	-	-
Smith Mountain Lake	9	16	13	13	13	13	-	-	-	-	-	-	-
Stafford (New)	-	-	-	39	53	60	-	-	-	-	-	-	-
Suffolk Municipal	40	47	80	90	110	120	50	55	65	-	-	-	-
Tangier Island	0	0	0	-	-	-	-	-	-	-	-	-	-
Tappahannock Municipal	12	10	14	17	-	-	-	-	-	16	17	20	22
Tappahannock (Replacement)	-	-	-	-	31	36	-	-	-	-	-	-	-
Tazewell County	13	12	10	10	10	10	13	13	13	14	17	21	22
Twin County	10	11	14	17	22	24	9	9	9	12	14	16	17
Virginia Highlands	60	57	55	55	55	55	55	55	55	68	75	93	103
Virginia Tech	29	30	33	36	41	43	28	28	28	-	-	-	-
Wakefield Municipal	14	10	28	35	49	56	-	-	-	-	-	-	-
Warrenton-Fauquier	90	92	98	103	113	118	109	119	140	116	128	152	164
Waynesboro	46	35	26	26	26	26	-	-	-	37	49	75	88
Whitman Strip	12	14	15	16	19	20	-	-	-	-	-	-	-
William M. Tuck	25	27	19	19	19	19	25	25	25	24	29	35	37
Williamsburg-Jamestown	47	47	56	63	76	83	52	52	52	50	54	60	62
Winchester Regional	62	69	79	88	107	116	96	101	111	109	122	147	159
Subtotal	2,055	2,141	2,437	2,663	3,082	3,287	2,099	2,168	2,309	2,096	2,333	2,782	3,009
Annual Growth Rate vs 2000	1.7%	2.6%	-	1.8%	1.6%	1.5%		0.6%	0.6%		2.2%	1.9%	1.8%

TABLE 9
VATSP UPDATE, FAA, AND MASTER PLAN FORECASTS

Airport Name	Historic Based Aircraft			VATSP Update Forecast			FAA Terminal Area Forecasts			Master Plan Forecasts			
	1990	1995	2000	2005	2015	2020	2000	2005	2015	2000	2005	2015	2020
Air Carrier Airports													
Charlottesville-Albemarle	60	55	93	103	123	133	61	65	74	70	77	92	99
Lynchburg Regional	47	32	47	52	62	67	42	46	52	44	49	59	64
Newport News-Williamsburg Intl	126	99	114	119	128	132	68	74	84	-	-	-	-
Norfolk International	109	78	107	107	107	107	102	110	125	-	-	-	-
Richmond International	75	92	108	113	123	128	251	262	281	122	122	122	122
Roanoke Regional	101	113	117	125	141	149	122	122	122	127	130	136	139
Ronald Reagan Washington Natl	37	23	20	20	20	20	24	24	24	-	-	-	-
Shenandoah Valley Regional	46	80	87	94	108	115	80	80	80	-	-	-	-
Washington Dulles Intl	49	59	52	52	52	52	40	40	40	-	-	-	-
Subtotal	650	631	745	785	864	903	790	823	882	363	378	409	424
Annual Growth Rate vs 2000	1.4%	3.4%	-	1.0%	1.0%	1.0%		0.8%	0.7%		0.8%	0.8%	0.8%
Total	2,705	2,772	3,182	3,448	3,946	4,190	2,889	2,991	3,191	2,459	2,711	3,190	3,433
Annual Growth Rate vs 2000	1.6%	2.8%	-	1.6%	1.4%	1.4%		0.7%	0.7%		2.0%	1.8%	1.7%

TABLE 10
BASED AIRCRAFT FLEET MIX

Airport Name	2000 Fleet Mix							2005 Projected Fleet Mix						
	SEP	MEP	MET	MEJ	HEL	OTH	TOT	SEP	MEP	MET	MEJ	HEL	OTH	TOT
General Aviation Airports														
Accomack County	22	2	0	0	0	1	25	27	2	0	0	0	1	31
Blackstone Municipal	5	0	0	0	0	2	7	5	0	0	0	0	2	8
Blue Ridge	47	5	1	1	2	0	56	47	5	1	1	2	0	56
Bridgewater Air Park	0	4	13	0	0	0	17	0	4	13	0	0	0	17
Brookneal-Campbell County	2	0	0	0	0	0	2	2	0	0	0	0	0	2
Chase City Municipal	5	0	0	0	0	0	5	6	0	0	0	0	0	6
Chesapeake Regional	56	9	2	0	0	3	70	59	9	2	1	0	4	75
Chesterfield County	88	13	4	5	2	0	112	100	14	5	8	3	0	130
Crewe Municipal	9	1	0	0	0	0	10	9	1	0	0	0	0	11
Culpeper County	102	4	0	1	1	3	111	119	5	0	2	1	4	131
Danville Regional	36	3	0	2	0	0	41	37	3	0	3	0	0	43
Dinwiddie County Airport	61	11	0	0	0	9	81	66	12	1	1	0	11	91
Emporia-Greenville Regional	2	1	0	0	0	0	3	2	1	0	0	0	0	3
Falwell	14	1	1	0	0	0	16	16	1	1	0	0	0	18
Farmville Regional	18	4	1	1	0	0	24	19	4	1	1	0	0	26
Franklin Municipal	9	3	0	0	0	0	12	10	3	0	0	0	0	13
Front Royal-Warren County	19	2	0	0	0	3	24	22	2	0	0	0	4	28
Gordonsville Municipal	14	1	0	0	0	0	15	18	1	0	0	0	0	19
Grundy Municipal	8	2	0	0	0	0	10	8	2	0	0	0	0	11
Hampton Roads	129	14	1	1	2	0	147	133	14	1	1	2	0	152
Hanover County Municipal	63	3	1	1	0	1	69	68	3	1	1	0	1	75
Hartwood Field	5	1	0	0	1	2	9	5	1	0	0	1	2	10
Hummel Field	27	1	0	0	1	0	29	28	1	0	0	1	0	31
Ingalls Field	4	1	0	1	0	0	6	5	1	0	2	0	0	9
Kellam Field	3	1	0	0	0	1	5	3	1	0	0	0	1	6
Lake Anna	1	0	0	0	0	0	1	1	0	0	0	0	0	1
Lawrenceville-Brunswick	5	0	0	0	0	0	5	6	0	0	0	0	0	6
Lee County	5	0	0	0	0	0	5	7	0	0	0	0	0	7
Lee County (Replacement)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leesburg Executive	179	18	8	5	1	0	211	194	19	9	7	1	0	231

TABLE 10
BASED AIRCRAFT FLEET MIX

Airport Name	2000 Fleet Mix							2005 Projected Fleet Mix						
	SEP	MEP	MET	MEJ	HEL	OTH	TOT	SEP	MEP	MET	MEJ	HEL	OTH	TOT
Lonesome Pine	12	4	0	1	1	2	20	12	4	0	1	1	2	20
Louisa County	29	3	1	1	0	0	34	37	4	1	2	0	0	44
Lunenburg County	1	0	0	0	0	0	1	1	0	0	0	0	0	1
Luray Caverns	9	0	0	0	0	0	9	9	0	0	0	0	0	9
Manassas Regional	247	31	14	14	5	4	315	235	31	13	20	6	5	309
Marks Municipal	4	0	0	0	0	0	4	4	0	0	0	0	0	4
Mecklenburg-Brunswick Rgnl	12	1	1	0	0	0	14	14	1	1	2	0	0	18
Middle Peninsula Regional	23	6	1	0	0	0	30	28	7	1	0	0	0	37
Mountain Empire	23	2	0	0	0	1	26	23	2	0	0	0	1	26
New Kent County	36	0	0	0	0	2	38	36	0	0	0	0	2	38
New London	55	1	0	0	0	2	58	64	1	0	0	0	3	68
New Market	28	2	0	0	0	3	33	30	2	0	0	0	4	35
New River Valley	21	3	0	0	0	0	24	19	3	1	1	0	0	24
Orange County	21	1	0	0	0	0	22	21	1	0	0	0	0	22
Shannon	125	14	0	0	0	2	141	123	14	0	0	0	2	139
Smith Mountain Lake	9	4	0	0	0	0	13	9	4	0	0	0	0	13
Stafford (New)	0	0	0	0	0	0	0	31	0	6	2	0	0	39
Suffolk Municipal	72	5	1	0	2	0	80	81	5	1	0	3	0	90
Tangier Island	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tappahannock Municipal	14	0	0	0	0	0	14	17	0	0	0	0	0	17
Tappahannock (Replacement)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tazewell County	5	1	1	0	0	3	10	5	1	1	0	0	3	10
Twin County	10	0	0	0	0	4	14	11	0	0	0	0	5	17
Virginia Highlands	40	5	0	0	3	7	55	37	5	1	1	3	8	55
Virginia Tech	24	3	2	0	1	3	33	24	3	2	1	1	4	36
Wakefield Municipal	26	1	0	0	0	1	28	32	1	0	0	0	1	35
Warrenton-Fauquier	81	11	0	0	0	6	98	85	11	0	0	0	7	103
Waynesboro	15	2	0	0	0	9	26	14	2	0	0	0	10	26
Whitman Strip	0	0	0	0	0	15	15	0	0	0	0	0	16	16
William M. Tuck	19	0	0	0	0	0	19	19	0	0	0	0	0	19
Williamsburg-Jamestown	50	5	0	0	1	0	56	56	5	0	0	1	0	63
Winchester Regional	66	11	1	1	0	0	79	74	12	1	2	0	0	88
Subtotal	2,015	221	54	35	23	89	2,437	2,174	229	66	61	27	105	2,663
	82.7%	9.1%	2.2%	1.4%	0.9%	3.7%	100.0%	81.6%	8.6%	2.5%	2.3%	1.0%	3.9%	100.0%

TABLE 10
BASED AIRCRAFT FLEET MIX

Airport Name	2000 Fleet Mix							2005 Projected Fleet Mix						
	SEP	MEP	MET	MEJ	HEL	OTH	TOT	SEP	MEP	MET	MEJ	HEL	OTH	TOT
<u>Air Carrier Airports</u>														
Charlottesville-Albemarle	62	13	5	7	1	5	93	66	14	6	10	1	6	103
Lynchburg Regional	37	6	3	1	0	0	47	41	6	3	1	0	0	52
Newport News-Williamsburg Intl	85	9	3	16	1	0	114	84	9	3	22	1	0	119
Norfolk International	54	15	23	12	3	0	107	51	14	23	16	3	0	107
Richmond International	33	24	12	30	8	1	108	31	22	12	38	9	1	113
Roanoke Regional	90	17	6	3	1	0	117	95	18	7	4	1	0	125
Ronald Reagan Washington Natl	5	4	3	6	2	0	20	4	3	3	7	2	0	20
Shenandoah Valley Regional	58	24	4	0	1	0	87	63	25	5	0	1	0	94
Washington Dulles Intl	12	11	0	28	1	0	52	10	9	0	32	1	0	52
Subtotal	436	123	59	103	18	6	745	446	120	61	131	20	7	785
	58.5%	16.5%	7.9%	13.8%	2.4%	0.8%	100.0%	56.8%	15.3%	7.8%	16.7%	2.5%	0.9%	100.0%
Total	2,451	344	113	138	41	95	3,182	2,619	349	127	192	47	112	3,448
	77.0%	10.8%	3.6%	4.3%	1.3%	3.0%	100.0%	76.0%	10.1%	3.7%	5.6%	1.4%	3.3%	100.0%

Notes:

Fleet mix assumed to change at average of Historic VA rate and rate of FAA active aircraft forecasts for first 5 years, at FAA rate for next ten years, and at FAA rate with jet growth tempered by 25% for the final 5 years.

TABLE 10
BASED AIRCRAFT FLEET MIX

Airport Name	2015 Projected Fleet Mix							2020 Projected Fleet Mix						
	SEP	MEP	MET	MEJ	HEL	OTH	TOT	SEP	MEP	MET	MEJ	HEL	OTH	TOT
General Aviation Airports														
Accomack County	36	3	0	0	0	2	42	41	3	0	0	0	2	47
Blackstone Municipal	6	0	0	0	0	3	9	6	0	0	0	0	3	9
Blue Ridge	46	4	1	2	2	0	56	46	4	1	2	2	0	56
Bridgewater Air Park	0	3	14	0	0	0	17	0	3	14	0	0	0	17
Brookneal-Campbell County	2	0	0	0	0	0	2	2	0	0	0	0	0	2
Chase City Municipal	7	0	0	0	0	0	7	8	0	0	0	0	0	8
Chesapeake Regional	66	10	3	2	0	4	85	70	10	3	3	0	5	90
Chesterfield County	103	14	5	12	3	0	136	104	13	5	14	3	0	139
Crewe Municipal	10	1	0	0	0	0	12	11	1	0	0	0	0	12
Culpeper County	155	6	0	3	2	6	171	173	6	0	4	2	6	191
Danville Regional	40	3	0	4	0	0	48	42	3	0	5	0	0	50
Dinwiddie County Airport	80	13	1	3	0	14	111	86	14	2	3	0	16	121
Emporia-Greenville Regional	2	1	0	0	0	0	3	2	1	0	0	0	0	3
Falwell	19	1	1	0	0	0	21	20	1	2	0	0	0	23
Farmville Regional	21	4	1	2	0	0	29	22	4	1	3	0	0	30
Franklin Municipal	11	3	0	0	0	0	14	12	3	0	0	0	0	15
Front Royal-Warren County	28	3	0	0	0	6	37	32	3	0	0	0	6	41
Gordonsville Municipal	26	2	0	0	0	0	28	30	2	0	0	0	0	32
Grundy Municipal	9	2	0	0	0	0	12	10	2	0	0	0	0	12
Hampton Roads	143	14	1	2	3	0	163	147	14	1	3	3	0	168
Hanover County Municipal	78	3	1	2	0	2	87	83	3	1	3	0	2	93
Hartwood Field	6	1	0	0	2	3	12	7	1	0	0	2	3	13
Hummel Field	31	1	0	0	1	0	34	32	1	0	0	2	0	35
Ingalls Field	8	2	0	4	0	0	14	9	2	0	5	0	0	16
Kellam Field	4	1	0	0	0	2	7	5	1	0	0	0	2	8
Lake Anna	1	0	0	0	0	0	1	1	0	0	0	0	0	1
Lawrenceville-Brunswick	8	0	0	0	0	0	8	9	0	0	0	0	0	9
Lee County	14	0	2	0	0	0	16	15	0	3	0	0	0	18
Lee County (Replacement)	14	0	2	0	0	0	16	15	0	3	0	0	0	18
Leesburg Executive	225	21	11	13	2	0	271	240	21	12	15	2	0	291

TABLE 10
BASED AIRCRAFT FLEET MIX

Airport Name	2015 Projected Fleet Mix							2020 Projected Fleet Mix						
	SEP	MEP	MET	MEJ	HEL	OTH	TOT	SEP	MEP	MET	MEJ	HEL	OTH	TOT
Lonesome Pine	12	4	0	2	1	2	21	12	3	0	2	1	2	21
Louisa County	53	5	2	4	0	0	64	61	6	2	5	0	0	74
Lunenburg County	1	0	0	0	0	0	1	1	0	0	0	0	0	1
Luray Caverns	9	0	0	0	0	0	9	9	0	0	0	0	0	9
Manassas Regional	246	30	14	30	7	5	332	251	30	15	35	7	6	344
Marks Municipal	4	0	0	0	0	0	4	4	0	0	0	0	0	4
Mecklenburg-Brunswick Rgnl	19	1	2	3	0	0	25	21	2	2	4	0	0	29
Middle Peninsula Regional	40	9	2	0	0	0	51	45	10	2	0	0	0	58
Mountain Empire	23	2	0	0	0	1	26	23	2	0	0	0	1	26
New Kent County	36	0	0	0	0	2	38	35	0	0	0	0	3	38
New London	83	1	0	0	0	4	88	92	1	0	0	0	4	98
New Market	33	2	0	0	0	4	40	35	2	0	0	0	5	42
New River Valley	19	2	1	2	0	0	24	19	2	1	2	0	0	24
Orange County	21	1	0	0	0	0	22	21	1	0	0	0	0	22
Shannon	129	14	0	0	0	3	145	132	13	0	0	0	3	148
Smith Mountain Lake	9	4	0	0	0	0	13	9	4	0	0	0	0	13
Stafford (New)	41	0	8	3	0	0	53	46	0	10	4	0	0	60
Suffolk Municipal	99	6	2	0	3	0	110	108	7	2	0	4	0	120
Tangier Island	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tappahannock Municipal	29	0	2	0	0	0	31	33	0	3	0	0	0	36
Tappahannock (Replacement)	29	0	2	0	0	0	31	33	0	3	0	0	0	36
Tazewell County	5	1	1	0	0	3	10	5	1	1	0	0	4	10
Twin County	14	0	0	0	0	7	22	16	0	0	0	0	8	24
Virginia Highlands	37	4	1	2	3	8	55	36	4	1	2	3	8	55
Virginia Tech	27	3	2	2	1	4	41	28	3	3	3	2	5	43
Wakefield Municipal	45	2	0	0	0	2	49	52	2	0	0	0	3	56
Warrenton-Fauquier	93	11	0	0	0	8	113	97	12	0	0	0	9	118
Waynesboro	14	2	0	0	0	10	26	14	2	0	0	0	11	26
Whitman Strip	0	0	0	0	0	19	19	0	0	0	0	0	20	20
William M. Tuck	19	0	0	0	0	0	19	19	0	0	0	0	0	19
Williamsburg-Jamestown	68	6	0	0	2	0	76	75	7	0	0	2	0	83
Winchester Regional	89	13	1	3	0	0	107	97	14	2	3	0	0	116
Subtotal	2,545	240	86	100	32	125	3,129	2,711	245	93	121	34	136	3,341
	81.3%	7.7%	2.8%	3.2%	1.0%	4.0%	100.0%	81.1%	7.3%	2.8%	3.6%	1.0%	4.1%	100.0%

**TABLE 10
BASED AIRCRAFT FLEET MIX**

Airport Name	2015 Projected Fleet Mix							2020 Projected Fleet Mix						
	SEP	MEP	MET	MEJ	HEL	OTH	TOT	SEP	MEP	MET	MEJ	HEL	OTH	TOT
<u>Air Carrier Airports</u>														
Charlottesville-Albemarle	76	14	7	17	1	8	123	80	15	7	21	2	8	133
Lynchburg Regional	48	7	4	3	0	0	62	52	7	5	3	0	0	67
Newport News-Williamsburg Intl	83	8	3	32	1	0	128	83	8	3	36	1	0	132
Norfolk International	48	12	23	21	3	0	107	46	11	22	24	3	0	107
Richmond International	29	19	12	53	9	1	123	28	18	12	60	9	1	128
Roanoke Regional	106	18	8	7	1	0	141	112	18	8	9	2	0	149
Ronald Reagan Washington Natl	4	3	3	9	2	0	20	4	2	2	10	2	0	20
Shenandoah Valley Regional	73	28	6	0	2	0	108	79	28	6	0	2	0	115
Washington Dulles Intl	8	7	0	37	1	0	52	7	6	0	38	1	0	52
Subtotal	475	116	64	179	20	9	864	491	114	67	201	21	9	903
	55.1%	13.4%	7.5%	20.7%	2.3%	1.0%	100.0%	54.4%	12.7%	7.4%	22.2%	2.3%	1.0%	100.0%
Total	3,020	356	151	280	52	134	3,993	3,202	359	160	322	55	146	4,244
	75.6%	8.9%	3.8%	7.0%	1.3%	3.4%	100.0%	75.5%	8.5%	3.8%	7.6%	1.3%	3.4%	100.0%

Notes:

Fleet mix assumed to change at average of Historic VA rate and rate of FAA active aircraft forecasts for first 5 years, at FAA rate for next ten years, and at FAA rate with jet growth tempered by 25% for the final 5 years.

TABLE 11
VATSP UPDATE OPERATIONS FORECAST

Airport Name	2000 Ops Forecast by Type - Preferred							2005 Ops Forecast by Type - Preferred						
	SEP	MEP	MET	MEJ	HEL	OTH	TOT	SEP	MEP	MET	MEJ	HEL	OTH	TOT
General Aviation Airports														
Accomack County	7,681	792	198	85	198	475	9,429	9,647	978	250	107	250	676	11,909
Blackstone Municipal	1,936	91	64	27	64	855	3,037	2,092	102	72	31	72	1,042	3,409
Blue Ridge	16,765	1,926	977	716	1,295	131	21,810	17,212	1,946	1,035	929	1,454	136	22,713
Bridgewater Air Park	2,697	1,251	6,753	-	333	67	11,100	2,805	1,231	7,090	-	346	69	11,541
Brookneal-Campbell County	695	15	-	-	22	4	737	717	16	-	-	23	5	760
Chase City Municipal	1,737	39	-	-	55	11	1,842	2,060	46	-	-	66	13	2,185
Chesapeake Regional	20,229	3,104	1,610	245	571	1,418	27,176	22,123	3,328	1,825	1,042	645	1,745	30,707
Chesterfield County	32,280	4,657	3,023	3,002	1,782	270	45,014	38,366	5,433	3,724	4,667	2,277	329	54,796
Crewe Municipal	3,215	332	-	-	110	22	3,679	3,488	353	-	-	120	24	3,985
Culpeper County	35,282	2,282	885	899	1,304	1,508	42,160	42,774	2,747	1,085	1,322	1,663	2,057	51,647
Danville Regional	12,656	1,238	333	1,181	333	95	15,836	13,673	1,322	368	1,678	368	105	17,513
Dinwiddie County Airport	22,513	3,753	669	287	669	3,956	31,846	25,602	4,173	1,409	1,132	801	5,048	38,165
Emporia-Greenville Regional	750	287	23	10	23	7	1,100	778	292	24	10	24	7	1,135
Falwell	5,132	386	519	-	188	38	6,263	5,871	434	625	-	216	43	7,189
Farmville Regional	6,680	1,304	720	606	201	57	9,568	7,289	1,392	815	863	224	64	10,647
Franklin Municipal	3,259	895	93	40	93	26	4,405	3,589	965	101	43	101	29	4,829
Front Royal-Warren County	7,212	709	-	-	286	1,312	9,519	8,686	837	-	-	350	1,797	11,669
Gordonsville Municipal	4,952	370	-	-	166	33	5,521	6,563	482	-	-	219	44	7,308
Grundy Municipal	2,956	586	-	-	110	22	3,674	3,213	623	-	-	119	24	3,979
Hampton Roads	45,040	5,220	1,680	1,017	1,998	332	55,287	48,087	5,477	1,828	1,290	2,266	356	59,304
Hanover County Municipal	21,864	1,554	1,073	757	554	577	26,379	24,430	1,721	1,234	1,058	625	715	29,784
Hartwood Field	2,261	338	-	-	538	861	3,998	2,544	369	-	-	664	1,083	4,660
Hummel Field	9,613	483	-	-	746	65	10,907	10,407	517	-	-	873	71	11,868
Ingalls Field	3,746	637	268	634	268	76	5,628	5,562	925	408	1,156	408	116	8,575
Kellam Field	1,214	316	43	19	43	431	2,066	1,424	361	52	22	52	573	2,485
Lake Anna	347	8	-	-	11	2	368	358	8	-	-	11	2	380
Lawrenceville-Brunswick	1,737	39	-	-	55	11	1,842	2,150	48	-	-	68	14	2,280
Lee County	1,737	39	-	-	55	11	1,842	2,329	52	-	-	74	15	2,470
Lee County (Replacement)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leesburg Executive	63,778	7,060	5,893	3,342	2,155	496	82,724	71,751	7,822	6,877	4,820	2,517	566	94,353

TABLE 11
VATSP UPDATE OPERATIONS FORECAST

Airport Name	2000 Ops Forecast by Type - Preferred							2005 Ops Forecast by Type - Preferred						
	SEP	MEP	MET	MEJ	HEL	OTH	TOT	SEP	MEP	MET	MEJ	HEL	OTH	TOT
Lonesome Pine	4,885	1,270	177	595	595	887	8,409	5,035	1,269	189	797	671	1,026	8,987
Louisa County	10,302	1,161	798	639	278	80	13,257	13,695	1,519	1,099	1,099	376	107	17,895
Lunenburg County	347	8	-	-	11	2	368	358	8	-	-	11	2	380
Luray Caverns	3,126	70	-	-	99	20	3,315	3,225	72	-	-	103	21	3,420
Manassas Regional	103,351	11,726	8,540	5,307	4,682	2,439	136,046	102,341	11,982	8,298	7,120	5,092	2,797	137,630
Marks Municipal	3,399	333	233	100	233	67	4,366	3,506	344	241	103	241	69	4,503
Mecklenburg-Brunswick Rgnl	4,271	420	635	50	116	33	5,526	5,345	529	815	914	164	47	7,814
Middle Peninsula Regional	8,358	1,868	759	103	239	68	11,395	10,665	2,334	1,003	131	305	87	14,525
Mountain Empire	8,018	803	206	88	206	477	9,797	8,254	813	213	91	213	556	10,141
New Kent County	12,796	304	-	-	434	923	14,457	13,140	315	-	-	449	1,077	14,980
New London	19,484	713	-	-	655	968	21,819	23,502	854	-	-	794	1,319	26,470
New Market	10,339	778	-	-	385	1,332	12,834	11,321	839	-	-	427	1,660	14,247
New River Valley	7,295	1,028	185	79	185	53	8,826	7,210	997	723	757	209	60	9,956
Orange County	7,383	424	-	-	243	49	8,099	7,623	431	-	-	251	50	8,355
Shannon	24,993	1,438	-	-	848	998	28,277	25,369	1,474	-	-	867	1,181	28,890
Smith Mountain Lake	3,480	1,118	-	-	143	29	4,769	3,609	1,134	-	-	148	30	4,920
Stafford (New)	-	-	-	-	-	-	-	12,117	534	3,644	1,009	373	107	17,784
Suffolk Municipal	25,015	2,180	1,155	272	1,472	182	30,277	28,994	2,491	1,373	317	1,848	211	35,234
Tangier Island	943	21	-	-	30	6	1,000	943	21	-	-	30	6	1,000
Tappahannock Municipal	4,863	108	-	-	155	31	5,157	5,913	132	-	-	188	38	6,270
Tappahannock (Replacement)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tazewell County	2,299	397	619	43	100	1,283	4,740	2,325	393	642	45	104	1,453	4,962
Twin County	3,872	182	128	55	128	1,710	6,074	4,602	225	158	68	158	2,291	7,501
Virginia Highlands	15,113	1,948	473	203	1,728	3,063	22,527	15,128	1,924	1,038	903	1,896	3,402	24,292
Virginia Tech	9,129	1,177	1,329	124	708	1,338	13,805	9,870	1,256	1,479	886	835	1,609	15,936
Wakefield Municipal	8,949	571	221	95	221	482	10,539	11,510	727	286	123	286	701	13,633
Warrenton-Fauquier	28,857	3,920	786	337	786	2,734	37,421	31,188	4,160	857	367	857	3,361	40,789
Waynesboro	6,694	753	-	-	349	3,834	11,630	6,763	743	-	-	366	4,332	12,204
Whitman Strip	2,178	188	-	-	269	6,328	8,963	2,434	210	-	-	301	7,072	10,017
William M. Tuck	6,390	210	147	63	147	42	6,999	6,592	217	152	65	152	43	7,220
Williamsburg-Jamestown	17,956	1,709	-	-	1,043	125	20,833	20,760	1,938	-	-	1,277	145	24,120
Winchester Regional	23,365	3,692	1,145	788	626	179	29,794	26,929	4,171	1,354	1,127	725	207	34,513
Subtotal	727,414	80,227	42,361	21,806	31,338	42,929	946,076	815,855	88,056	52,384	36,091	36,611	51,833	1,080,830
OPBA	361	363	784	623	1,363	482	388	375	384	789	589	1,335	494	406
Growth vs 2000														2.7%

TABLE 11
VATSP UPDATE OPERATIONS FORECAST

Airport Name	2000 Ops Forecast by Type - Preferred							2005 Ops Forecast by Type - Preferred						
	SEP	MEP	MET	MEJ	HEL	OTH	TOT	SEP	MEP	MET	MEJ	HEL	OTH	TOT
Air Carrier Airports														
Charlottesville-Albemarle	40,335	6,553	4,263	3,598	1,746	341	56,836	44,876	7,144	4,918	5,229	2,053	388	64,608
Lynchburg Regional	34,095	4,605	3,625	1,045	936	267	44,574	38,710	5,133	4,276	1,455	1,070	306	50,949
Newport News-Williamsburg Intl	143,334	14,666	8,928	20,346	5,528	1,164	193,966	148,283	15,024	9,576	27,769	6,064	1,248	207,964
Norfolk International	27,672	5,365	10,782	4,098	2,199	303	50,419	27,683	5,239	11,123	5,347	2,372	312	52,077
Richmond International	29,142	10,758	8,603	13,494	5,730	409	68,136	29,855	10,434	8,862	17,712	6,312	442	73,617
Roanoke Regional	51,060	7,700	4,715	1,792	1,913	406	67,585	55,915	8,270	5,354	2,437	2,184	448	74,607
Ronald Reagan Washington Natl	30,520	11,272	12,640	16,475	8,247	478	79,632	29,903	10,386	12,293	20,443	8,610	493	82,127
Shenandoah Valley Regional	14,823	2,660	819	171	441	114	19,027	16,562	2,912	939	191	499	127	21,230
Washington Dulles Intl	25,744	10,601	1,411	26,449	2,566	403	67,173	24,705	9,312	1,462	31,117	2,604	418	69,618
Subtotal	396,725	74,178	55,786	87,469	29,306	3,884	647,348	416,492	73,855	58,804	111,700	31,767	4,181	696,797
OPBA	910	603	946	849	1,628	647	869	934	617	962	853	1,617	578	888
Growth vs 2000														1.5%
Total	1,124,139	154,405	98,147	109,275	60,644	46,813	1,593,424	1,232,347	161,911	111,187	147,790	68,378	56,013	1,777,627
OPBA	459	449	869	792	1,479	493	501	470	464	872	769	1,453	499	516
Growth vs 2000														2.2%

TABLE 11
VATSP UPDATE OPERATIONS FORECAST

Airport Name	2015 Ops Forecast by Type - Preferred							2020 Ops Forecast by Type - Preferred						
	SEP	MEP	MET	MEJ	HEL	OTH	TOT	SEP	MEP	MET	MEJ	HEL	OTH	TOT
General Aviation Airports														
Accomack County	13,999	1,357	363	155	363	1,040	17,277	16,370	1,553	424	182	424	1,252	20,205
Blackstone Municipal	2,495	124	87	37	87	1,312	4,142	2,709	136	95	41	95	1,464	4,541
Blue Ridge	18,260	1,976	1,132	1,345	1,618	147	24,478	18,809	1,992	1,184	1,554	1,707	152	25,398
Bridgewater Air Park	3,019	1,217	7,740	-	373	75	12,423	3,131	1,211	8,079	-	387	77	12,885
Brookneal-Campbell County	763	17	-	-	24	5	809	787	18	-	-	25	5	834
Chase City Municipal	2,764	62	-	-	88	18	2,932	3,147	70	-	-	100	20	3,337
Chesapeake Regional	26,671	3,811	2,274	1,690	787	2,223	37,455	29,125	4,059	2,524	2,060	864	2,496	41,127
Chesterfield County	42,346	5,712	4,252	7,245	2,625	375	62,556	44,476	5,860	4,541	8,595	2,816	400	66,689
Crewe Municipal	4,086	391	-	-	139	28	4,644	4,408	411	-	-	150	30	4,999
Culpeper County	59,251	3,706	1,517	2,393	2,372	3,008	72,247	68,178	4,211	1,754	3,048	2,771	3,556	83,517
Danville Regional	15,885	1,483	444	2,753	444	127	21,135	17,074	1,567	485	3,346	485	139	23,096
Dinwiddie County Airport	33,177	5,133	1,874	1,946	1,052	6,926	50,108	37,272	5,622	2,133	2,430	1,190	8,006	56,654
Emporia-Greenville Regional	842	298	25	11	25	7	1,208	875	300	26	11	26	7	1,246
Falwell	7,491	529	837	-	276	55	9,188	8,370	578	958	-	308	62	10,275
Farmville Regional	8,631	1,556	999	1,438	272	78	12,974	9,355	1,640	1,101	1,761	299	85	14,241
Franklin Municipal	4,321	1,096	121	52	121	34	5,744	4,719	1,163	131	56	131	37	6,237
Front Royal-Warren County	12,011	1,100	-	-	487	2,639	16,237	13,813	1,235	-	-	562	3,127	18,736
Gordonsville Municipal	10,101	707	-	-	336	67	11,212	12,035	822	-	-	400	80	13,337
Grundy Municipal	3,781	691	-	-	139	28	4,638	4,088	725	-	-	150	30	4,993
Hampton Roads	54,799	5,952	2,121	1,878	2,668	407	67,826	58,402	6,198	2,281	2,200	2,892	434	72,408
Hanover County Municipal	30,050	2,057	1,563	1,758	780	924	37,132	33,083	2,234	1,745	2,165	864	1,043	41,133
Hartwood Field	3,230	443	-	-	884	1,449	6,006	3,598	480	-	-	1,009	1,656	6,743
Hummel Field	12,164	583	-	-	1,064	83	13,895	13,110	617	-	-	1,171	90	14,988
Ingalls Field	9,639	1,541	733	2,552	733	209	15,406	11,903	1,871	917	3,416	917	262	19,287
Kellam Field	1,914	458	71	30	71	817	3,361	2,180	507	81	35	81	959	3,842
Lake Anna	381	8	-	-	12	2	404	393	9	-	-	13	3	417
Lawrenceville-Brunswick	3,050	68	-	-	97	19	3,235	3,540	79	-	-	113	23	3,754
Lee County	5,701	155	1,244	-	221	44	7,365	6,606	180	1,475	-	257	51	8,569
Lee County (Replacement)	5,480	221	1,399	66	155	44	7,365	6,349	257	1,655	77	180	51	8,569
Leesburg Executive	89,204	9,321	8,855	8,290	3,220	718	119,608	98,626	10,096	9,964	10,316	3,609	800	133,412

TABLE 11
VATSP UPDATE OPERATIONS FORECAST

Airport Name	2015 Ops Forecast by Type - Preferred							2020 Ops Forecast by Type - Preferred						
	SEP	MEP	MET	MEJ	HEL	OTH	TOT	SEP	MEP	MET	MEJ	HEL	OTH	TOT
Lonesome Pine	5,451	1,288	212	1,207	759	1,160	10,076	5,672	1,299	224	1,414	807	1,233	10,649
Louisa County	21,086	2,241	1,750	2,361	592	169	28,200	25,091	2,613	2,119	3,169	712	203	33,907
Lunenburg County	381	8	-	-	12	2	404	393	9	-	-	13	3	417
Luray Caverns	3,432	76	-	-	109	22	3,639	3,540	79	-	-	113	23	3,754
Manassas Regional	114,825	12,863	9,629	11,055	5,934	3,287	157,594	121,515	13,324	10,363	13,167	6,399	3,560	168,328
Marks Municipal	3,731	366	256	110	256	73	4,792	3,848	378	264	113	264	76	4,943
Mecklenburg-Brunswick Rgnl	7,954	765	1,250	1,917	257	73	12,217	9,354	888	1,493	2,544	308	88	14,675
Middle Peninsula Regional	15,785	3,263	1,537	192	448	128	21,353	18,598	3,737	1,842	226	527	150	25,080
Mountain Empire	8,802	830	227	97	227	629	10,812	9,088	839	234	100	234	668	11,164
New Kent County	13,950	336	-	-	479	1,212	15,977	14,373	347	-	-	495	1,286	16,501
New London	32,343	1,148	-	-	1,095	1,922	36,509	37,140	1,304	-	-	1,259	2,271	41,975
New Market	13,573	961	-	-	515	2,113	17,163	14,786	1,024	-	-	562	2,372	18,744
New River Valley	7,623	1,004	791	1,123	228	65	10,835	7,841	1,009	828	1,305	237	68	11,288
Orange County	8,130	441	-	-	267	53	8,891	8,395	446	-	-	275	55	9,171
Shannon	28,328	1,579	-	-	968	1,394	32,268	29,910	1,634	-	-	1,022	1,514	34,079
Smith Mountain Lake	3,895	1,153	-	-	157	31	5,236	4,046	1,162	-	-	162	32	5,402
Stafford (New)	17,302	785	5,387	1,996	550	157	26,177	20,088	924	6,364	2,606	647	185	30,815
Suffolk Municipal	37,769	3,116	1,830	413	2,510	275	45,915	42,532	3,441	2,085	465	2,888	310	51,722
Tangier Island	943	21	-	-	30	6	1,000	943	21	-	-	30	6	1,000
Tappahannock Municipal	11,404	283	1,294	-	404	81	13,466	13,650	339	1,585	-	485	97	16,157
Tappahannock (Replacement)	11,000	404	1,577	121	283	81	13,466	13,166	485	1,925	145	339	97	16,157
Tazewell County	2,458	396	701	48	112	1,615	5,330	2,526	399	732	50	116	1,702	5,524
Twin County	6,310	314	220	94	220	3,318	10,477	7,225	363	254	109	254	3,904	12,110
Virginia Highlands	15,975	1,948	1,129	1,288	2,100	3,785	26,226	16,416	1,962	1,178	1,479	2,210	3,993	27,237
Virginia Tech	11,871	1,449	1,838	1,473	1,050	2,032	19,713	12,943	1,549	2,037	1,804	1,170	2,271	21,775
Wakefield Municipal	17,149	1,051	427	183	427	1,106	20,344	20,217	1,222	504	216	504	1,342	24,004
Warrenton-Fauquier	36,514	4,633	1,003	430	1,003	4,180	47,762	39,380	4,875	1,082	464	1,082	4,647	51,530
Waynesboro	7,142	747	-	-	393	4,818	13,101	7,338	750	-	-	407	5,078	13,573
Whitman Strip	2,989	258	-	-	369	8,683	12,299	3,288	284	-	-	406	9,554	13,532
William M. Tuck	7,014	230	161	69	161	46	7,683	7,236	238	166	71	166	48	7,925
Williamsburg-Jamestown	26,939	2,387	-	-	1,706	187	31,219	30,299	2,616	-	-	1,949	210	35,074
Winchester Regional	34,759	5,104	1,792	1,951	941	269	44,816	39,016	5,580	2,037	2,445	1,059	303	50,440
Subtotal	1,022,335	103,224	70,660	59,769	46,096	65,881	1,367,966	1,126,385	110,838	78,870	73,187	51,099	73,745	1,514,124
OPBA	402	430	821	595	1,447	525	437	416	453	845	605	1,491	541	453
Growth vs 2000							2.5%							2.4%

TABLE 11
VATSP UPDATE OPERATIONS FORECAST

Airport Name	2015 Ops Forecast by Type - Preferred							2020 Ops Forecast by Type - Preferred						
	SEP	MEP	MET	MEJ	HEL	OTH	TOT	SEP	MEP	MET	MEJ	HEL	OTH	TOT
Air Carrier Airports														
Charlottesville-Albemarle	55,311	8,354	6,271	9,058	2,631	493	82,118	60,857	8,961	7,018	11,257	2,949	550	91,591
Lynchburg Regional	48,848	6,165	5,597	2,429	1,361	389	64,787	54,318	6,692	6,339	3,001	1,518	434	72,302
Newport News-Williamsburg Intl	160,613	15,784	10,781	42,456	6,919	1,428	237,981	167,529	16,228	11,451	49,992	7,388	1,525	254,113
Norfolk International	28,258	5,057	11,612	7,624	2,522	332	55,405	28,629	4,990	11,907	8,686	2,606	343	57,162
Richmond International	32,331	10,211	9,470	25,860	6,894	512	85,279	33,806	10,202	9,869	29,882	7,256	549	91,564
Roanoke Regional	66,681	9,366	6,612	3,897	2,670	539	89,764	72,472	9,925	7,313	4,726	2,939	588	97,963
Ronald Reagan Washington Natl	29,798	9,296	11,888	27,079	8,514	523	87,097	29,974	8,917	11,836	29,923	8,564	539	89,753
Shenandoah Valley Regional	20,513	3,413	1,192	235	619	157	26,129	22,670	3,670	1,334	259	685	173	28,790
Washington Dulles Intl	24,069	7,822	1,564	37,984	2,580	447	74,467	24,085	7,364	1,616	40,820	2,602	462	76,949
Subtotal		75,469	64,987	156,621	34,711	4,818	803,027	494,341	76,948	68,683	178,546	36,510	5,161	860,188
OPBA		652	1,008	875	1,713	561	930	1,006	673	1,032	890	1,758	554	953
Growth vs 2000							1.4%							1.4%
Total	1,488,757	178,693	135,647	216,391	80,807	70,699	2,170,993	1,620,726	187,786	147,553	251,732	87,608	78,906	2,374,311
OPBA	493	502	901	774	1,550	527	544	506	523	923	782	1,592	542	560
Growth vs 2000							2.1%							2.0%

TABLE 12
OPERATIONS FORECAST COMPARISON

Airport Name	VATSP Update Forecast				FAA Terminal Area Forecasts			Master Plan Forecasts			
	2000	2005	2015	2020	2000	2005	2015	2000	2005	2015	2020
General Aviation Airports											
Accomack County	9,429	11,909	17,277	20,205	6,740	6,722	6,686	14,972	15,459	16,726	17,456
Blackstone Municipal	3,037	3,409	4,142	4,541	22,030	22,030	22,030	22,330	24,765	29,635	32,160
Blue Ridge	21,810	22,713	24,478	25,398	23,134	24,096	26,022	38,251	40,199	43,121	44,582
Bridgewater Air Park	11,100	11,541	12,423	12,885	-	-	-	21,920	27,860	31,640	33,440
Brookneal-Campbell County	737	760	809	834	4,800	4,800	4,800	-	-	-	-
Chase City Municipal	1,842	2,185	2,932	3,337	3,210	3,210	3,210	-	-	-	-
Chesapeake Regional	27,176	30,707	37,455	41,127	42,200	42,200	42,200	109,729	45,854	56,502	61,905
Chesterfield County	45,014	54,796	62,556	66,689	75,600	75,600	75,600	79,818	86,065	100,846	109,081
Crewe Municipal	3,679	3,985	4,644	4,999	-	-	-	-	-	-	-
Culpeper County	42,160	51,647	72,247	83,517	-	-	-	35,615	45,500	66,550	77,075
Danville Regional	15,836	17,513	21,135	23,096	30,425	30,425	30,425	44,250	46,000	49,500	51,250
Dinwiddie County Airport	31,846	38,165	50,108	56,654	16,200	16,200	16,200	20,232	22,277	26,173	28,121
Emporia-Greenville Regional	1,100	1,135	1,208	1,246	7,455	7,455	7,455	8,400	10,920	16,720	19,620
Falwell	6,263	7,189	9,188	10,275	-	-	-	10,228	11,011	12,831	13,821
Farmville Regional	9,568	10,647	12,974	14,241	7,125	7,125	7,125	11,800	13,920	18,520	20,820
Franklin Municipal	4,405	4,829	5,744	6,237	6,900	6,900	6,900	-	-	-	-
Front Royal-Warren County	9,519	11,669	16,237	18,736	8,300	8,300	8,300	26,013	29,015	35,018	38,019
Gordonsville Municipal	5,521	7,308	11,212	13,337	-	-	-	-	-	-	-
Grundy Municipal	3,674	3,979	4,638	4,993	4,360	4,360	4,360	6,120	6,700	8,150	8,900
Hampton Roads	55,287	59,304	67,826	72,408	76,305	76,305	76,305	-	-	-	-
Hanover County Municipal	26,379	29,784	37,132	41,133	59,650	59,650	59,650	64,010	70,860	83,910	90,360
Hartwood Field	3,998	4,660	6,006	6,743	-	-	-	-	-	-	-
Hummel Field	10,907	11,868	13,895	14,988	-	-	-	-	-	-	-
Ingalls Field	5,628	8,575	15,406	19,287	5,000	5,000	5,000	-	-	-	-
Kellam Field	2,066	2,485	3,361	3,842	-	-	-	-	-	-	-
Lake Anna	368	380	404	417	-	-	-	-	-	-	-
Lawrenceville-Brunswick	1,842	2,280	3,235	3,754	-	-	-	5,135	5,233	6,206	6,693
Lee County	1,842	2,470	7,365	8,569	3,010	3,010	3,010	7,570	8,544	12,884	15,676
Lee County (Replacement)	-	-	7,365	8,569	-	-	-	-	-	-	-
Leesburg Executive	82,724	94,353	119,608	133,412	100,503	115,060	144,172	96,780	102,230	113,130	118,580

TABLE 12
OPERATIONS FORECAST COMPARISON

Airport Name	VATSP Update Forecast				FAA Terminal Area Forecasts			Master Plan Forecasts			
	2000	2005	2015	2020	2000	2005	2015	2000	2005	2015	2020
Lonesome Pine	8,409	8,987	10,076	10,649	6,275	6,275	6,275	-	-	-	-
Louisa County	13,257	17,895	28,200	33,907	6,250	6,250	6,250	-	-	-	-
Lunenburg County	368	380	404	417	4,410	4,410	4,410	-	-	-	-
Luray Caverns	3,315	3,420	3,639	3,754	10,120	10,120	10,120	12,470	13,820	16,520	17,870
Manassas Regional	136,046	137,630	157,594	168,328	131,253	138,658	152,131	199,600	221,200	264,400	286,000
Marks Municipal	4,366	4,503	4,792	4,943	-	-	-	4,452	4,867	5,818	6,315
Mecklenburg-Brunswick Rgnl	5,526	7,814	12,217	14,675	1,000	1,000	1,000	11,836	13,415	16,534	18,093
Middle Peninsula Regional	11,395	14,525	21,353	25,080	7,780	7,780	7,780	-	-	-	-
Mountain Empire	9,797	10,141	10,812	11,164	15,875	15,875	15,875	-	-	-	-
New Kent County	14,457	14,980	15,977	16,501	18,350	18,350	18,350	24,560	30,720	38,270	41,920
New London	21,819	26,470	36,509	41,975	-	-	-	-	-	-	-
New Market	12,834	14,247	17,163	18,744	-	-	-	-	-	-	-
New River Valley	8,826	9,956	10,835	11,288	13,000	13,000	13,000	17,858	19,427	22,655	24,174
Orange County	8,099	8,355	8,891	9,171	20,010	20,010	20,010	14,140	17,020	19,750	21,000
Shannon	28,277	28,890	32,268	34,079	22,450	22,450	22,450	-	-	-	-
Smith Mountain Lake	4,769	4,920	5,236	5,402	-	-	-	-	-	-	-
Stafford (New)	-	17,784	26,177	30,815	-	-	-	-	-	-	-
Suffolk Municipal	30,277	35,234	45,915	51,722	10,886	12,041	14,352	-	-	-	-
Tangier Island	1,000	1,000	1,000	1,000	7,012	7,012	7,012	-	-	-	-
Tappahannock Municipal	5,157	6,270	13,466	16,157	-	-	-	10,654	11,174	12,830	13,804
Tappahannock (Replacement)	-	-	13,466	16,157	-	-	-	-	-	-	-
Tazewell County	4,740	4,962	5,330	5,524	6,000	6,000	6,000	6,920	8,500	10,060	10,760
Twin County	6,074	7,501	10,477	12,110	16,910	16,910	16,910	5,620	6,600	7,700	8,200
Virginia Highlands	22,527	24,292	26,226	27,237	15,000	15,000	15,000	18,229	20,078	24,579	26,985
Virginia Tech	13,805	15,936	19,713	21,775	35,267	37,762	42,753	-	-	-	-
Wakefield Municipal	10,539	13,633	20,344	24,004	-	-	-	-	-	-	-
Warrenton-Fauquier	37,421	40,789	47,762	51,530	36,019	40,243	48,694	53,367	67,183	95,017	108,934
Waynesboro	11,630	12,204	13,101	13,573	-	-	-	13,127	16,757	23,374	26,624
Whitman Strip	8,963	10,017	12,299	13,532	-	-	-	-	-	-	-
William M. Tuck	6,999	7,220	7,683	7,925	15,120	15,120	15,120	11,520	14,120	16,760	17,960
Williamsburg-Jamestown	20,833	24,120	31,219	35,074	17,960	17,960	17,960	26,955	29,098	32,074	33,156
Winchester Regional	29,794	34,513	44,816	50,440	53,361	58,018	67,332	81,600	91,125	109,875	119,250
Subtotal	946,076	1,080,830	1,367,966	1,514,124	973,255	1,008,692	1,078,234	1,136,081	1,197,515	1,444,278	1,568,606
Growth vs 2000		2.7%	2.5%	2.4%		0.7%	0.7%		1.1%	1.6%	1.6%

TABLE 12
OPERATIONS FORECAST COMPARISON

Airport Name	VATSP Update Forecast				FAA Terminal Area Forecasts			Master Plan Forecasts			
	2000	2005	2015	2020	2000	2005	2015	2000	2005	2015	2020
<u>Air Carrier Airports</u>											
Charlottesville-Albemarle	56,836	64,608	82,118	91,591	70,307	76,748	88,980	46,107	49,687	61,591	71,511
Lynchburg Regional	44,574	50,949	64,787	72,302	41,128	44,273	50,364	56,244	63,210	76,110	82,560
Newport News-Williamsburg Intl	193,966	207,964	237,981	254,113	185,646	196,992	222,633	-	-	-	-
Norfolk International	50,419	52,077	55,405	57,162	50,646	50,646	50,646	70,600	77,200	92,300	120,600
Richmond International	68,136	73,617	85,279	91,564	57,163	60,940	69,495	92,000	92,000	92,000	92,000
Roanoke Regional	67,585	74,607	89,764	97,963	65,528	65,528	65,528	-	-	-	-
Ronald Reagan Washington Natl	79,632	82,127	87,097	89,753	65,516	65,516	65,516	-	-	-	-
Shenandoah Valley Regional	19,027	21,230	26,129	28,790	19,027	19,027	19,027	-	-	-	-
Washington Dulles Intl	67,173	69,618	74,467	76,949	71,222	72,847	76,098	-	-	-	-
Subtotal	647,348	696,797	803,027	860,188	626,183	652,517	708,287	264,951	282,097	322,001	366,671
Growth vs 2000		1.5%	1.4%	1.4%		0.8%	0.8%		1.3%	1.3%	1.6%
Total	1,593,424	1,777,627	2,170,993	2,374,311	1,599,438	1,661,209	1,786,521	1,401,032	1,479,612	1,766,279	1,935,277
Growth vs 2000		2.2%	2.1%	2.0%		0.8%	0.7%		1.1%	1.6%	1.6%

6. COMMERCIAL AIRPORT FORECASTS

I. Overview

The VATSP Update will help the Commonwealth ensure that adequate facilities are in place to serve Virginia's aviation needs in the future. This forecast of airline activity projects the demand that will be placed upon Virginia's commercial aviation infrastructure over the planning period.

This chapter describes the development of activity forecasts for each of Virginia's nine airports that currently receive commercial service. Airports with some history of scheduled service but not served at the present, such as Danville, are not included in this analysis and it is assumed that they will receive no service over the forecast period.

Forecasts of commercial passenger enplanements were developed for each airport using data provided by individual airports, FAA historical data, and FAA nationwide activity projections. Preliminary forecasts were developed using alternative methodologies, with the most suitable then selected as the preferred forecast. Supplemental analysis beyond this preferred methodology was performed, especially where major changes in service implying changed assumptions about traffic growth are anticipated.

A derivative forecast of aircraft operations was then produced from the passenger enplanements projections. Enplanements per operation at each Virginia commercial service airport were forecast in view of historical trends at the airport, as well as nation-wide trends. Forecast enplanements were divided by enplanements per operation to yield a forecast of commercial aircraft operations.

II. Enplanements

This forecast considers passenger demand to be the major determinant of commercial aviation activity at Virginia airports. From passenger enplanements come derivative forecasts such as aircraft operations. Because it is the forecast driver, analytical emphasis is placed on forecasting future passenger enplanements.

CAF - Table 1

Historic Growth Rates Between 1990 and 2000 Virginia, Virginia non-DC Metro, and US Enplanements			
	<i>Virginia Enplanements</i>	<i>VA Non-DC Metro (Not DCA, IAD)</i>	<i>US Enplanements</i>
Year			
1990	15,931,355	3,012,516	495,399,518
1995	16,995,980	3,155,639	582,042,553
2000	21,577,626	3,730,621	706,106,262
Avg Ann Growth			
1990-1995	1.3%	0.9%	3.3%
1995-2000	4.9%	3.4%	3.9%
1990-2000	3.1%	2.2%	3.6%

Source: FAA Terminal Area Forecast

As shown in Table 1, passenger traffic grew more slowly over the past decade in Virginia than in the nation as a whole. Virginia’s total enplanement figures are dominated by enplanements at Reagan National and Dulles International airports, both of which serve the Washington DC metropolitan area. National’s underperformance weighed down the Virginia enplanement total before 1995, while extremely rapid growth at Dulles buoyed the Commonwealth’s total in the years since.

Excluding the Washington-area airports, other Virginia airports grew extremely slowly in the first half of the last decade, hurt by the recession of the early 1990’s. Traffic expanded at a more rapid pace in the latter half, though failing to reach the national average rate.

Preliminary Forecasts

Three different forecast methodologies were identified and each was applied to the individual Virginia airports. Of the three resulting forecasts, one was selected as the most appropriate and became the preferred commercial enplanement forecast for the VATSP.

Linear Regression

Regression analysis was used to determine the slope of the straight line that best fit historical enplanement data between 1985 and the present. According to this linear trend, enplanements are assumed to grow by a constant amount each year and follow the trend set in the past.

Logarithmic Regression

This methodology is similar to the linear trend analysis above. Instead of assuming a linear trend and growth by a constant number of enplanements each year, however, this method assumes that enplanements will increase by a constant annual percentage. Regression analysis was used to find the exponential trend that best fit the historical data, which was assumed to hold constant over the forecast period.

Relative Growth

The relative growth methodology casts enplanement growth at Virginia commercial service airports in the context of national enplanement growth. The rate of increase at each of the airports of the VATSP between 1985 and 2000 was compared to the expansion of enplanements nationwide over the same period, and the ratio of these growth rates calculated. These ratios were assumed to remain constant for the immediate future, and applied to the FAA's forecast of US enplanement growth to produce enplanement forecasts for each airport. Later in the forecast period, growth rates at the airports were gradually tapered back toward the FAA forecast national rate.

Preferred Forecast Methodology

The relative growth analysis described above was adopted as the basic methodology of the preferred forecast. Unlike the linear and logarithmic trend methods, the relative growth model is able to accommodate more than just historical trends at individual airports in formulating most-likely future scenarios. It is based on the FAA's national enplanement forecast, and thus reflects factors expected by the FAA to have an impact on air travel growth in the nation as a whole. Relative growth analysis subsumes the future macroeconomic, technological, and aviation system capacity assumptions in the FAA forecast.

In the first step of the basic methodology, the growth rate of each airport was compared with growth in national enplanements. In most cases, the period over which growth was measured was 1985 to the present, though growth since 1990 was used in instances where trends occurring between 1985 and 1990 were the result of dynamics considered to have little relevance for projecting future activity.

A ratio between the national and individual airports' rate of growth in enplanements was determined for each Virginia facility. For airports growing slower than the nation, the ratio was less than one. Airports growing faster than the rest of the nation had ratios greater than one.

The forecast of future traffic growth at Virginia airports was based on the FAA's national enplanements projections through 2015, obtained from its Terminal Area Forecast system. In the short-term, the ratios of growth between enplanements at Virginia airports and the national total were assumed to remain the same. The historical growth ratios were applied to the national forecast to yield growth rate forecasts for individual Virginia airports. For example, Charlottesville was found to have grown .96 times as fast as the nation in the historical period. In 2002, the FAA projects that national enplanements will increase by 4.3%. According to the basic relative growth methodology, Charlottesville will grow $4.3\% * .96 = 4.1\%$ in 2002 (though further adjustments to the forecast growth rate, described later, were subsequently made).

With time, it is assumed that growth rates diverging much above or below the national trend will track closer to the US average. Over the forecast period, the growth rates of Virginia airports have been tapered gradually toward the national forecast rate.

While the relative growth analysis was used to produce the basic forecasts for the airports, special conventions or additional analyses were adopted or performed for the airports below:

Reagan National (DCA) and Dulles International (IAD):

The VATSP forecast has adopted the forecast recently performed for Dulles in its Master Plan document. Enplanements at slot-controlled Reagan National Airport have fluctuated about a constant level over the historical period. As of this forecast's writing, it is uncertain whether National Airport will be permitted to resume serving the same level of traffic as before September 11, 2001. This forecast assumes that it will reach that level, at which enplanements will remain constant over the forecast period.

Norfolk International Airport (ORF):

Southwest Airlines began serving Norfolk in October of 2001 with twelve daily departures, though experience elsewhere suggests that its frequencies will grow rapidly. The initiation of Southwest service often has a transformative effect on an airport. The carrier's low fares and high frequency on short-haul routes attract many travelers who would otherwise drive to their destinations or use alternate airports. Due to its low cost structure, Southwest can also place a major market emphasis on transporting low-yielding discretionary travelers to leisure destinations such as Florida and Las Vegas. Airport traffic invariably grows rapidly in the years immediately following the entry of Southwest into a market.

To estimate how rapidly Norfolk will grow with the introduction of Southwest service, the experience of other airports that Southwest already serves was reviewed. The magnitude of Southwest's impact on an individual airport was found to depend on several factors. Among them were the absolute size of traffic flows before Southwest's arrival, the airport's proximity to other major airports, and initial fare levels.

Among airports of a size comparable to Norfolk, the effect of Southwest service on individual origin-and-destination markets within the carrier's route system was examined. The analysis demonstrated that in markets where the new Southwest service lowered fares, traffic jumped 125-150 percent between the year before and year after the commencement of service. In the following year, traffic grew 50-75 percent on the individual routes, then 12-25 percent, and then leveled off as the market matured.

These growth factors were applied to Norfolk origin-and-destination markets within Southwest's route system, on which fare benchmarking analysis indicated that Southwest's fares were likely to be lower than those currently offered. In aggregate terms, this analysis showed the airports' enplanements nearly doubling within five years, before leveling off and thereafter resuming a normal growth rate. Several examples were found of airports already served by Southwest and of comparable size to Norfolk (between half and double its traffic) where a similar growth pattern occurred, an external validation of the forecast methodology.

Passenger Traffic and the Inception of Southwest Service

	<u>Airport</u>	<u>Passenger Enplanements</u>		<u>Percent Increase</u>	
		<i>Year Prior</i>	<i>Five Years Later</i>		
CAF - Table 2	Memphis, TN	2,172,981	3,899,912	79.5%	
	Sacramento, CA	1,737,782	3,321,408	91.1%	
	Columbus, OH	1,578,673	3,239,160	105.2%	
	Reno, NV	1,411,912	2,526,136	78.9%	
	Burbank, CA	1,319,753	2,436,402	84.6%	
	Louisville, KY	918,284	1,698,118	84.9%	
	Boise, ID	752,046	1,332,837	77.2%	
	<i>SH&E Forecast:</i>				
	Norfolk, VA	1,516,361	2,812,276	85.4%	
	Richmond, VA	1,216,713	2,290,735	88.3%	

Source: FAA Terminal Area Forecast , SH&E Forecast

A leveling-off period follows the rapid growth. It represents the maturation of the market as Southwest stops expanding, holds capacity constant and allows growing demand to push up yields for a few years. This pattern has been observed at other Southwest airports, where fares are lower when the carrier first enters, and climb somewhat after the initial years of rapid expansion.

Following this brief level-off period, traffic is assumed to grow at the normal rate predicted by the basic relative growth methodology.

Richmond International Airport (RIC):

Southwest Airlines has declared its intention to serve Richmond in the future. A date for the launch of service or list of routes to be flown has not yet been fixed. This forecast assumes that Southwest will enter Richmond late in 2003.

While much is yet to be determined about Southwest service at Richmond, the forecast anticipates that in aggregate terms growth at Richmond will resemble growth at Norfolk. For the purposes of this forecast, the growth rates predicted for Norfolk in the years following the low-fare carrier's market entry have also been applied at Richmond, though commencing later with Southwest's projected market entry in 2003.

Newport News/Williamsburg (PHF):

When Southwest first enters into a new market, traffic at nearby facilities may decline as passengers are drawn away. However, there have also been many instances of airports where traffic and service appears to have been unaffected by Southwest's entry into a market nearby. The possibility was examined that Newport News would be adversely impacted by the entry of Southwest at Norfolk and Richmond, only twenty-three and fifty-two miles away respectively.

Certain factors suggest that Newport News' passenger traffic may not be diverted to Norfolk and Richmond. Fare benchmarking analysis shows that Newport News is already a deeply discounted airport, where fares are priced nearly twenty-five percent below level expected on routes of similar distance and density, due to the presence of low-fare carrier AirTran. Passengers originating in Newport News' natural catchment area and currently flying out of PHF are already paying low fares, so are unlikely to be diverted by low-fare service at ORF and RIC.

Secondly, the analysis shows that Newport News' most important origin-and-destination market by far is Atlanta, which Southwest does not serve. These Atlanta-bound passengers in particular will continue to fly from Newport News.

It is possible that PHF may lose traffic as passengers flying AirTran through Atlanta to connecting destinations such as Orlando and Jacksonville choose to fly Southwest, which offers direct flights. In addition, some passengers currently originating in Norfolk or Richmond's natural market areas but flying out of Newport News for its lower fares may stop driving there once low-fare service is available at ORF and RIC. The forecast aims to err on the side of caution in predicting traffic diversion from Newport News, however. In the forecast, Newport News' growth rate has been slowed somewhat during the years of Southwest expansion at Norfolk and Richmond.

Additional Forecast Adjustment

The events of September 11th and the drop in passenger traffic and downsizing by airlines necessitate a downward revision in passenger traffic forecasts. The incident lacks precedent, thus it is difficult to predict its medium and long-term effects. The forecast assumes that the full effect of the attack and its aftermath will cost the industry two years of growth. With this adjustment, the basic traffic levels initially forecast for 2001 become the 2003 forecast, 2002's projections are pushed back to 2004, and so forth.

As Tables 3 and 4 show the final result of the study team’s passenger enplanement forecast and predicted growth rates:

CAF - Table 3

Virginia Commercial Airport Enplanements

Airport Name	Historic Enplanements				SH&E Forecast		
	1985	1990	1995	2000	2005	2015	2020
Charlottesville	95,832	132,768	140,936	165,416	177,896	240,615	274,910
Washington National	7,261,209	7,806,515	7,692,554	7,875,373	7,875,373	7,875,373	7,875,373
Washington Dulles*	2,503,375	5,112,324	6,147,787	9,971,632	14,454,200	22,927,800	27,745,900
Lynchburg	67,089	91,575	91,975	81,010	84,001	105,110	119,094
Norfolk	1,626,844	1,345,173	1,337,509	1,516,361	2,812,276	3,362,508	3,823,698
New port New s	61,400	149,599	181,148	229,381	243,350	336,107	384,880
Richmond	766,744	937,054	1,068,023	1,351,925	1,957,635	2,679,171	3,062,572
Roanoke	308,493	345,088	327,845	365,503	382,758	489,099	555,414
Shenandoah	12,690	11,259	8,203	21,025	23,251	33,391	38,398
Total:	12,703,676	15,931,355	16,995,980	21,577,626	28,010,741	38,049,174	43,880,238

**SH&E adopted HNTB forecast*

Source: SH&E forecast except where noted

CAF - Table 4

Virginia Commercial Enplanements Growth

Airport Name	Average Annual Growth			SH&E Forecast		
	1985-1990	1990-1995	1995-2000	2000-2005	2005-2015	2015-2020
Charlottesville	6.7%	1.2%	3.3%	1.5%	3.1%	2.7%
Washington National	1.5%	-0.3%	0.5%	0.0%	0.0%	0.0%
Washington Dulles*	15.4%	3.8%	10.2%	7.7%	4.7%	3.9%
Lynchburg	6.4%	0.1%	-2.5%	0.7%	2.3%	2.5%
Norfolk	-3.7%	-0.1%	2.5%	13.1%	1.8%	2.6%
New port New s	19.5%	3.9%	4.8%	1.2%	3.3%	2.7%
Richmond	4.1%	2.7%	4.8%	7.7%	3.2%	2.7%
Roanoke	2.3%	-1.0%	2.2%	0.9%	2.5%	2.6%
Shenandoah	-2.4%	-6.1%	20.7%	2.0%	3.7%	2.8%
Total:	4.6%	1.3%	4.9%	5.4%	3.1%	2.9%

**SH&E adopted HNTB forecast*

Source: SH&E forecast except where noted

III. Commercial Aircraft Operations

The projection of commercial aircraft operations at Virginia airports represents a derivative forecast; it is based on forecast passenger enplanements as derived in the previous section. A forecast of average enplanements per aircraft operation was applied to projected enplanements to arrive at future aircraft operations.

The basic methodology used to project enplanements per operation was much like that used to forecast enplaning passengers. The difference between historical growth in enplanements per operation at individual airports and in the nation as a whole was evaluated. The resulting historical ratio between the airport and national growth rates was then applied to the FAA-forecast national increase in enplanements per operation in order to forecast growth in enplanements per operation at individual facilities.

As with passenger enplanements, growth rates in enplanements per operation at individual airports were tapered to the national rate over time. Annual forecast aircraft operations were then determined by dividing passenger enplanements by enplanements per operation. Operations forecasts were checked against the FAA's Terminal Area Forecasts. All forecasts were submitted to Commercial Airport operators for review.

Following are instances where analysis varied from this basic methodology:

Reagan National (DCA) and Dulles International (IAD):

The VATSP relied on Dulles' Master Plan document for operations figures. As with passenger enplanements, forecast operations were held constant at Reagan National Airport due to capacity limitations.

Norfolk International Airport (ORF) and Richmond International Airport (RIC):

Exceptional growth in passenger enplanements is projected at ORF and RIC, resulting from the launch of Southwest service. Southwest flies only Boeing 737 aircraft, a pillar of its low-cost operating strategy. These mainline jets will significantly raise the average aircraft size and thus enplanements per operation at those airports. The forecast compensated for this one-time rapid increase in aircraft size at Norfolk and Richmond by projecting probable changes in the fleet mix, and by review of average aircraft size at other Southwest-dominated facilities.

The following Tables, 5,6 and 7 present the study team’s forecast of commercial aircraft operations, predicted growth rates at Virginia airports and total airport operations:

CAF - Table 5

Virginia Commercial Aircraft Operations

Airport Name	Historic Operations				SH&E Forecast		
	1985	1990	1995	2000	2005	2015	2020
Charlottesville	20,356	16,803	19,828	22,103	24,298	31,030	34,077
Washington National	243,438	252,201	250,632	247,980	247,980	247,980	247,980
Washington Dulles*	88,709	178,635	251,365	389,314	524,770	700,840	797,800
Lynchburg	20,639	13,664	16,907	13,133	12,137	13,199	14,222
Norfolk	58,368	63,497	59,639	74,271	100,136	111,151	121,095
Newport News	10,953	26,841	22,208	21,047	17,662	20,958	22,789
Richmond	73,441	61,805	64,799	81,762	84,145	102,629	112,109
Roanoke	41,665	38,192	37,686	40,382	37,495	42,789	46,371
Shenandoah	1,500	4,167	2,553	1,619	1,599	2,000	2,188
Total:	559,069	655,805	725,617	891,611	1,050,223	1,272,578	1,398,631

**SH&E adopted HNTB forecast*

Source: SH&E forecast except where noted

CAF - Table 6

Virginia Commercial Operations Growth

Airport Name	Average Annual Growth			SH&E Forecast		
	1985-1990	1990-1995	1995-2000	2000-2005	2005-2015	2015-2020
Charlottesville	-3.8%	3.4%	2.2%	1.9%	2.5%	1.9%
Washington National	0.7%	-0.1%	-0.2%	0.0%	0.0%	0.0%
Washington Dulles*	15.0%	7.1%	9.1%	6.2%	2.9%	2.6%
Lynchburg	-7.9%	4.4%	-4.9%	-1.6%	0.8%	1.5%
Norfolk	1.7%	-1.2%	4.5%	6.2%	1.0%	1.7%
Newport News	19.6%	-3.7%	-1.1%	-3.4%	1.7%	1.7%
Richmond	-3.4%	1.0%	4.8%	0.6%	2.0%	1.8%
Roanoke	-1.7%	-0.3%	1.4%	-1.5%	1.3%	1.6%
Shenandoah	22.7%	-9.3%	-8.7%	-0.2%	2.3%	1.8%
Total:	3.2%	2.0%	4.2%	3.3%	1.9%	1.9%

**SH&E adopted HNTB forecast*

Source: SH&E forecast except where noted

CAF - Table 7

Total Operations at Virginia Commercial Airports

Airport Name	Ops Type	Historic Operations				SH&E Forecast		
		1985	1990	1995	2000	2005	2015	2020
Charlottesville	Commercial	20,356	16,803	19,828	22,103	24,298	31,030	34,077
	GA	39,789	42,962	72,594	56,898	66,056	85,981	96,815
	<i>Total</i>	<i>60,145</i>	<i>59,765</i>	<i>92,422</i>	<i>79,001</i>	<i>90,354</i>	<i>117,011</i>	<i>130,892</i>
Washington National	Commercial*	243,438	252,201	250,632	247,980	247,980	247,980	247,980
	GA	81,518	61,516	54,244	79,632	82,118	87,093	89,751
	<i>Total</i>	<i>324,956</i>	<i>313,717</i>	<i>304,876</i>	<i>327,612</i>	<i>330,098</i>	<i>335,073</i>	<i>337,731</i>
Washington Dulles	Commercial	88,709	178,635	251,365	389,314	524,770	700,840	797,800
	GA	115,972	63,562	56,773	67,173	69,607	74,458	76,941
	<i>Total</i>	<i>204,681</i>	<i>242,197</i>	<i>308,138</i>	<i>456,487</i>	<i>594,377</i>	<i>775,298</i>	<i>874,741</i>
Lynchburg	Commercial	20,639	13,664	16,907	13,133	12,137	13,199	14,222
	GA	56,980	58,391	41,689	44,574	50,942	64,779	72,292
	<i>Total</i>	<i>77,619</i>	<i>72,055</i>	<i>58,596</i>	<i>57,707</i>	<i>63,079</i>	<i>77,977</i>	<i>86,514</i>
Norfolk	Commercial	58,368	63,497	59,639	74,271	100,136	111,151	121,095
	GA	124,049	92,973	77,579	50,419	52,066	55,397	57,154
	<i>Total</i>	<i>182,417</i>	<i>156,470</i>	<i>137,218</i>	<i>124,690</i>	<i>152,202</i>	<i>166,548</i>	<i>178,249</i>
Newport News	Commercial	10,953	26,841	22,208	21,047	17,662	20,958	22,789
	GA	134,574	139,953	158,509	193,966	207,955	237,974	254,108
	<i>Total</i>	<i>145,527</i>	<i>166,794</i>	<i>180,717</i>	<i>215,013</i>	<i>225,617</i>	<i>258,933</i>	<i>276,897</i>
Richmond	Commercial	73,441	61,805	64,799	81,762	84,145	102,629	112,109
	GA	91,696	97,641	83,224	68,136	73,618	85,284	91,571
	<i>Total</i>	<i>165,137</i>	<i>159,446</i>	<i>148,023</i>	<i>149,898</i>	<i>157,764</i>	<i>187,913</i>	<i>203,679</i>
Roanoke	Commercial	41,665	38,192	37,686	40,382	37,495	42,789	46,371
	GA	105,582	90,775	76,401	67,585	74,597	89,752	97,950
	<i>Total</i>	<i>147,247</i>	<i>128,967</i>	<i>114,087</i>	<i>107,967</i>	<i>112,092</i>	<i>132,541</i>	<i>144,321</i>
Shenandoah	Commercial	1,500	4,167	2,553	1,619	1,599	2,000	2,188
	GA	22,450	26,306	14,204	19,027	21,221	26,119	28,780
	<i>Total</i>	<i>23,950</i>	<i>30,473</i>	<i>16,757</i>	<i>20,646</i>	<i>22,821</i>	<i>28,119</i>	<i>30,968</i>
VA Carrier Airports Total:		1,331,679	1,329,884	1,360,834	1,539,021	1,748,405	2,079,414	2,263,993

*SH&E adopted HNTB forecast

Source: SH&E forecast except where noted

7. FACILITY REQUIREMENTS

This chapter describes the system needs required to accommodate forecast demand through the 20-year planning period ending in year 2020. The facility needs for commercial service airports were coordinated with each airport sponsor to ensure consistency with their Master Plan, airport layout plan, and 6-year plan. The facility requirements for general aviation airports were calculated for this report and reviewed by each airport sponsor. Changes were made to reflect special circumstances, as appropriate.

System Needs Analysis

System requirements were developed by comparing estimated current and future requirements to existing facilities. Separate facility requirements were developed for horizon years 2000, 2005, and 2020. Analyses were performed for general aviation airports for following functional areas:

- › · Airport Capacity
- › · Primary Runway Length and Width
- › · Taxiway
- › · Aircraft Storage/Parking
- › · Apron Area
- › · Auto Parking
- › · Terminal Building
- › · NAVAIDS

Facility requirements were developed using standard planning parameters and relationships that are appropriate for macro-level analysis and system planning. Planning parameters for runway length and width, taxiway type, apron areas, T-hangar units, conventional hangar, and auto parking were based on FAA standards and other applicable guidelines. For general aviation terminal areas, space requirements were derived from the Virginia Department of Aviation terminal program data.

Circumstances at individual airports will differ from the standards used for this analysis and specific considerations may justify a level of facility development that could exceed or materially differ from the projections described in the enclosed sheets. The statewide projections will not eliminate or replace the need or validity of individual airport planning efforts, and those planning efforts will continue to have central importance in the Commonwealth's funding decisions in relation to specific projects.

Nevertheless, it is important from a system perspective that the forecasts of individual airport facility requirements provide a reasonable estimate of overall system facility and capital requirements for the near

and long-term horizons. Moreover, this chapter addresses facility requirements developed at a level appropriate for a state system plan, and represents a fiscally unconstrained condition.

Airport Capacity – Annual Service Volume

FAA Advisory Circular 150/5060-5, Airport Capacity and Delay, was used to estimate the ASV of each airport. Annual Service Volume (ASV) is an FAA capacity measure that provides a reasonable estimate of the capacity of an airport on an annual basis, and is useful for long-range planning. It accounts for differences in runway use, aircraft mix, weather conditions, etc., that would reasonably be encountered over a year's time. For the purpose of this analysis, a mix index of 0-20 was assumed for all GA airports. Consequently, the ASV for most GA airports is 230,000 operations. Manassas Regional is an exception due to their runway configuration which allows independent operations on more than one runway.

For planning purposes, industry practice suggest that at 60 percent of capacity, an airport should begin planning for capacity improvements. It is further recommended that at 80 percent of capacity, the improvements should be in place and operational.

The ASV can be exceeded, sometimes by significant amounts, with corresponding increases in delay. As the number of annual aircraft operations approach the ASV of an airport's airfield, average annual aircraft delays increase rapidly with relatively small increases in aircraft operations. As shown in Table 1, there is substantial surplus capacity at most Virginia airports throughout the planning period. However, notable exceptions include Newport News-Williamsburg International, Norfolk International and Richmond International airports.

Estimates of past capacity levels at Washington Dulles International Airport and Ronald Reagan Washington National Airport reflected hourly capacity, and were taken from the FAA's *Airport Capacity Benchmark Report 2001*.

Table 1

Annual Service Volume

Airport Name	Airport Identifier	Service Role	ASV	2005 Forecast Operations	2005 Capacity Level	2020 Forecast Operations	2020 Capacity Level
Charlottesville-Albemarle	CHO	CM	195,000	90,902	47%	128,468	66%
Lynchburg Regional	LYH	CM	200,000	63,488	32%	86,993	43%
Newport News-Williamsburg International	PHF	CM	219,000	226,521	103%	278,056	127%
Norfolk International	ORF	CM	190,000	152,213	80%	178,257	94%
Richmond International	RIC	CM	250,000	165,524	66%	214,391	86%
Roanoke Regional	ROA	CM	230,000	113,832	49%	146,473	64%
Ronald Reagan Washington National	DCA	CM	(1)	343,892	(1)	333,342	(1)
Shenandoah Valley Regional	SHD	CM	195,000	23,023	12%	31,244	16%
Washington Dulles International	IAD	CM	(1)	571,535	(1)	804,356	(1)
Chesapeake Regional	CPK	RL	230000	30,171	13%	39,963	17%
Chesterfield County	FCI	RL	230000	54,796	24%	66,689	29%
Hampton Roads	PVG	RL	230000	59,299	26%	72,399	31%
Hanover County Municipal	OPF	RL	230000	29,774	13%	41,116	18%
Leesburg Executive	JYO	RL	230000	94,325	41%	133,359	58%
Manassas Regional	HEF	RL	355000	137,604	39%	168,298	47%
Stafford Regional (New)	RMN	RL	230000	17,775	8%	30,798	13%
Warrenton-Fauquier	W66	RL	230000	40,759	18%	51,488	22%
Accomack County	MFV	GR	230000	11,903	5%	20,194	9%
Blue Ridge	MTV	GR	230000	22,709	10%	25,392	11%
Culpeper County	CJR	GR	230000	51,626	22%	83,479	36%
Danville Regional	DAN	GR	230000	17,506	8%	23,083	10%
Dinwiddie County Airport	PTB	GR	230000	37,191	16%	54,694	24%
Farmville Regional	FVX	GR	230000	10,642	5%	14,232	6%
Ingalls Field	HSP	GR	230000	3,925	2%	8,827	4%
Lonesome Pine	LNP	GR	230000	8,977	4%	10,636	5%
Mecklenburg-Brunswick Regional	AVC	GR	230000	7,251	3%	13,076	6%
Middle Peninsula Regional	W97	GR	230000	14,523	6%	25,077	11%
New River Valley	PSK	GR	230000	9,105	4%	9,995	4%
Shannon	EZF	GR	230000	53,294	23%	62,367	27%
Suffolk Municipal	SFQ	GR	230000	35,233	15%	51,720	22%
Tazewell County	6V3	GR	230000	4,953	2%	5,515	2%
Virginia Highlands	VJI	GR	230000	23,500	10%	26,061	11%
William M. Tuck	W78	GR	230000	7,220	3%	7,925	3%
Winchester Regional	OKV	GR	230000	34,507	15%	50,429	22%
Blackstone Municipal	BKT	GC	230000	3,402	1%	4,531	2%
Brookneal-Campbell County	0V4	GC	230000	760	0.3%	834	0.4%
Emporia-Greenville Regional	EMV	GC	230000	1,135	0.5%	1,246	1%
Franklin Municipal	FKN	GC	230000	4,829	2%	6,237	3%
Front Royal-Warren County	FRR	GC	230000	11,654	5%	18,710	8%
Lee County (New)		GC	230000	-	0%	8,091	4%
Louisa County	LKU	GC	230000	17,889	8%	33,892	15%
Luray Caverns	W45	GC	230000	3,420	1%	3,754	2%
Marks Municipal	W63	GC	230000	1,520	1%	1,668	1%
Mountain Empire	MKJ	GC	230000	10,136	4%	11,159	5%
New Kent County	W96	GC	230000	14,971	7%	16,489	7%
Orange County	OMH	GC	230000	8,355	4%	9,171	4%
Tangier Island	TGI	GC	230000	1,000	0.4%	1,000	0.4%
Tappahannock-Essex Co. (New)		GC	230000	-	0%	14,359	6%
Twin County	HLX	GC	230000	7,485	3%	12,084	5%

Table 1

Annual Service Volume

Airport Name	Airport Identifier	Service Role	ASV	2005 Forecast Operations	2005 Capacity Level	2020 Forecast Operations	2020 Capacity Level
Virginia Tech	BCB	GC	230000	15,464	7%	20,779	9%
Wakefield Municipal	AKQ	GC	230000	13,627	6%	23,993	10%
Williamsburg-Jamestown	JGG	GC	230000	24,120	10%	35,074	15%
Bridgewater Air Park	VBW	LO	230000	11,534	5%	12,877	6%
Chase City Municipal	CXE	LO	230000	2,185	1%	3,337	1%
Crewe Municipal	W81	LO	230000	3,985	2%	4,999	2%
Falwell	W24	LO	230000	7,188	3%	10,273	4%
Gordonsville Municipal	GVE	LO	230000	7,308	3%	13,337	6%
Grundy Municipal	GDY	LO	230000	3,979	2%	4,993	2%
Hartwood Field	8W8	LO	230000	4,653	2%	6,733	3%
Hummel Field	W75	LO	230000	15,881	7%	23,861	10%
Lake Anna	7W4	LO	230000	380	0.2%	417	0.2%
Lawrenceville-Brunswick	LVL	LO	230000	2,280	1%	3,754	2%
Lee County	PTG	LO	230000	2,470	1%	-	n/a
Lunenburg County	W31	LO	230000	380	0.2%	417	0.2%
New London	W90	LO	230000	26,458	12%	41,955	18%
New Market	8W2	LO	230000	14,232	6%	18,724	8%
Smith Mountain Lake	W91	LO	230000	4,920	2%	5,402	2%
Tappahannock Municipal	W79	LO	230000	6,270	3%	-	n/a
Waynesboro	W13	LO	230000	12,176	5%	13,542	6%

1) Washington Dulles International (IAD) and Ronald Reagan Washington National (DCA) Airports calculate hourly rather than annual capacity. The FAA's *Airport Capacity Benchmark Report 2001* reports the hourly capacity for DCA as 76-80 operations and the hourly capacity for IAD as 120-121 operations.

Source: HNTB Analysis

Primary Runway Length and Width

Although it is recognized that there is substantial value in multiple runways, for the purpose of this analysis, physical constraints were not considered, and only the primary runway was considered for the purpose of determining state airfield recommended improvements.

Minimum Runway length recommendations for each general aviation airport were derived by using the greater of:

- › Minimum runway length recommendations were calculated in accordance with FAA Advisory Circular 150/5300-13 Change 6, *Airport Design*. Minimum runway lengths are a function of airport elevation, and average high temperature, and are based on serving 95 percent of small airplanes with less than 10 passenger seats. Actual runway length requirements may exceed the minimums presented in this analysis. Elevation data was taken from the inventory survey and supplemented by Airport Layout Plan data, as necessary. Average high temperatures were calculated for each of the state's five climatic regions¹⁰ using data from The Virginia State Climatology Office.
- › Runway lengths to accommodate business jets were derived from the FAA Southern Region (ADO) policy (approved by the FAA Washington Airports District Office) which states that a minimum runway length of 5,500 feet should be considered for those airports with greater than 500 annual jet operations.¹¹
- › Existing runway dimensions.
- › Local Service airports are not eligible for state or federal funding; therefore, the runway length and width standards for Local Service airports reflect minimum Commonwealth standards.

Consequently, those airports with greater than 500 annual jet operations have a recommended minimum runway length of at least 5,500 feet, while airports with less than 500 annual jet operations have a recommended minimum runway length determined according the methodology in FAA Advisory Circular 150/5300-13 Change 6, *Airport Design*, or the existing runway length, if greater than that calculated using the FAA methodology.

Assuming that nominal deficiencies would not be remedied, Tables 2 and 3 reflect those runway length deficiencies greater than or equal to 500 feet. Only 2005 recommended improvements are shown because there are no runway improvements anticipated between 2005 and 2020. Any general aviation airports that are forecast to have greater than 500 jet operations during the 20-year planning period (or are forecast to require additional runway length), will require the additional runway by 2005.

¹⁰ Virginia's five climatic regions include Tidewater, Piedmont, Northern Virginia, Western Mountain, and Southwestern Mountain.

¹¹ Regional Guidance Letter RGL 00-1, *Standard Development for Business Jet Aircraft*, January 28,2000.

Table 2 also compares existing runway widths for each airport to the minimum standards in Advisory Circular 150/5300-13 Change 6, *Airport Design* for the purpose of determining state recommended improvements. Actual airport-specific runway width requirements may exceed the minimums presented in this analysis.

Table 2

Primary Runway Length - Commercial Service Airports

Airport Name	Service Role	Approach Category	Design Group	Primary Runway	Existing Primary Runway Length (ft)	2005 Master Plan Recommended Runway Length (ft)	2020 Master Plan Recommended Runway Length (ft)	2005 Runway Master Plan Recommended Extension (ft) (1)	2020 Runway Master Plan Recommended Extension (ft) (1)	Existing Primary Runway Width (ft)	Standard (ft)	Master Plan Recommended Improvements (ft)
Charlottesville-Albemarle	CM	C	III	3/21	6001	6001	6001	0	0	150	100	0
Lynchburg Regional	CM	C	III	4/22	5799	7000	7000	1200	1200	150	100	0
Newport News-Williamsburg International (2)	CM	D	III	7/25	8003	8003	10000	0	2000	150	100	0
Norfolk International	CM	D	V	5/23	9001	9001	9001	0	0	150	150	0
Richmond International (3)	CM	D	IV	16/34	9003	10300	10300	1300	1300	150	150	0
Roanoke Regional	CM	D	IV	6/24	6802	6802	6802	0	0	150	150	0
Ronald Reagan Washington National	CM	D	IV	1/19	6869	6869	6869	0	0	150	150	0
Shenandoah Valley Regional	CM	C	III	5/23	6002	6002	6002	0	0	150	100	0
Washington Dulles International (4)	CM	D	V	1R/19L	11501	11501	11501	0	0	150	150	0

- Notes:
- 1) Runway length deficiencies greater than 500 ft.
 - 2) To address capacity concerns, Newport News also projects a need to extend Runway 2/20 from 6,525 to 8,000 feet and build a new, parallel 6,000 foot Runway 7L/25R.
 - 3) To address capacity concerns, Richmond also projects a need to build a new, 8,000' x 150' parallel 16-34 Runway.
 - 4) To address capacity concerns, Washington Dulles International projects a need to build two additional runways during the planning period.

Source: HNTB Analysis of approved airport Master Plans

Taxiway

A full parallel taxiway was considered warranted at airports with at least one of the following:

- › 40,000 annual operations; or
- › 20,000 annual operations and landing minimums less than 1 statute-mile visibility and/or less than 400 feet decision height.

As shown in Table 4, the addition of full parallel taxiways should be considered at Accomack County, Newport News-Williamsburg, Shannon, and Suffolk Municipal.

Aircraft Hangar Storage

Demand for hangar space is directly related to the local climate and the type of based aircraft at each airport. Areas with severe weather conditions have a higher demand for hangar storage facilities. In addition, large investments in jet and turboprop aircraft also increase the demand for hangar storage. In Virginia, aircraft storage distribution also varies significantly by service role. Table 5 shows the aircraft storage distribution of each aircraft type by service role, as collected during the survey effort for the Inventory task of this study.

The demand for hangar space shifts when aircraft are moved from one airport to another. Aircraft owners often express interest, and pay a fee to be placed on a waiting list for hangar space at several airports. Consequently, emphasis was placed on overall system demand rather than airport specific demand. Nonetheless, the results of this analysis have been reviewed by the respective airport sponsors, and adjustments have been made where appropriate.

Small general aviation aircraft (less than 12,500 lbs.) can either be stored in a T-hangar or a conventional hangar. The decision of an airport sponsor regarding how to accommodate aircraft storage is generally a function of aircraft mix, physical space in the terminal area, and current construction costs.

Table 3

Primary Runway Length - GA Airports

Airport Name	Service Role	Approach Category	Design Group	Primary Runway	Existing Primary Runway Length (ft)	2005 Required Runway Length (ft)	2005 Runway Length Recommended Improvements (ft) (1, 2)	Existing Primary Runway Width (ft)	Standard (ft)	Runway Width Recommended Improvements (2)
Chesapeake Regional	RL	C	II	5/23	5500	5500		100	100	
Chesterfield County	RL	C	II	15/33	5501	5500		100	100	
Hampton Roads (3)	RL	B	II	10/28	4000	5500	1500	70	75	30
Hanover County Municipal (4)	RL	B	II	16/34	4650	5500	900	100	75	
Leesburg Executive	RL	C	II	17/35	5500	5500		100	100	
Manassas Regional (7)	RL	C	II	16L/34R	5700	6200	500	100	100	
Stafford Regional (New)	RL	C	II	15/33	5000	5500	500	100	100	
Warrenton-Fauquier	RL	B	II	14/32	4103	4103		60	75	15
Accomack County	GR	C	II	3/21	5000	5000		100	100	
Blue Ridge	GR	B	II	12/30	5001	5500	500	100	75	
Culpeper County (5)	GR	B	II	4/22	4002	5500	1500	75	75	25
Danville Regional	GR	C	II	2/20	6500	6500		150	100	
Dinwiddie County Airport	GR	B	II	5/23	5001	5500	500	100	75	
Farmville Regional	GR	B	II	3/21	4400	5500	1100	75	75	25
Ingalls Field	GR	B	II	7/25	5601	5601		100	75	
Lonesome Pine	GR	C	II	6/24	5402	5500		100	100	
Mecklenburg-Brunswick Regional	GR	B	II	1/19	5001	5500	500	75	75	25
Middle Peninsula Regional (8)	GR	B	II	9/27	3700	5300	1600	75	75	
New River Valley	GR	C	II	6/24	6201	6201		150	100	
Shannon	GR	B	I	6/24	2875	3100		100	60	
Suffolk Municipal	GR	C	II	4/22	5007	5007		100	100	
Tazewell County	GR	B	II	7/25	4300	4300		75	75	
Virginia Highlands	GR	B	II	6/24	4470	5500	1000	75	75	25
William M. Tuck	GR	B	II	1/19	4011	4011		75	75	
Winchester Regional	GR	C	II	14/32	5500	5500		100	100	
Blackstone Municipal	GC	C	II	4/22	4632	4632		150	100	
Brookneal-Campbell County	GC	B	II	7/25	3798	3798		60	75	15
Emporia-Greenville Regional	GC	B	II	15/33	5044	5044		100	75	
Franklin Municipal	GC	B	II	9/27	4977	4977		100	75	
Front Royal-Warren County	GC	B	I	9/27	3000	3200		75	60	
Lee County (New)	GC	B	II	6/24		5000	5000		75	75
Louisa County	GC	B	II	9/27	4301	5500	1200	100	75	
Luray Caverns	GC	B	II	4/22	3125	3300		75	75	

Table 3

Primary Runway Length - GA Airports

Airport Name	Service Role	Approach Category	Design Group	Primary Runway	Existing Primary Runway Length (ft)	2005 Required Runway Length (ft)	2005 Runway Length Recommended Improvements (ft) (1, 2)	Existing Primary Runway Width (ft)	Standard (ft)	Runway Width Recommended Improvements (2)
Marks Municipal	GC	B	II	4/22	4500	4500		50	75	25
Mountain Empire	GC	B	II	8/26	5250	5250		75	75	
New Kent County	GC	B	I	10/28	3600	3600		75	60	
Orange County	GC	B	I	7/25	3200	3200		75	60	
Tangier Island	GC	C	II	2/20	2950	3100		75	100	25
Tappahannock-Essex Co. (New)	GC	B	II	8/26		3200	3200		75	75
Twin County	GC	B	I	18/36	4204	4204		60	60	
Virginia Tech	GC	C	II	12/30	4550	5500	1000	100	100	
Wakefield Municipal	GC	B	II	2/20	4337	4337		75	75	
Williamsburg-Jamestown	GC	B	II	13/31	3204	3204		60	75	15
Bridgewater Air Park	LO	B	II	15/33	2745	2000		60	50	
Chase City Municipal	LO	B	I	18/36	3400	2000		50	50	
Crewe Municipal	LO	B	I	15/33	3300	2000		60	50	
Falwell	LO	A	I	10/28	2900	2000		50	50	
Gordonsville Municipal	LO	B	I	5/23	2300	2000		40	50	10
Grundy Municipal	LO	B	I	4/22	2258	2000		60	50	
Hartwood Field (6)	LO	A	I	17/35	2470	2000		50	50	
Hummel Field	LO	B	II	18/36	2145	2000		45	50	5
Lake Anna	LO	A	II	8/26	2560	2000		25	50	25
Lawrenceville-Brunswick	LO	B	I	18/36	3200	2000		50	50	
Lee County	LO	B	II	7/25	2262	2000		50	50	
Lunenburg County	LO	B	I	2/20	3000	2000		50	50	
New London	LO	B	I	16/34	3164	2000		40	50	10
New Market	LO	B	I	6/24	2920	2000		60	50	
Smith Mountain Lake	LO	B	I	5/23	3058	2000		50	50	
Tappahannock Municipal	LO	B	I	2/20	2785	2000		75	50	
Waynesboro	LO	B	I	6/24	2009	2000		50	50	

Notes:

- 1) Runway length deficiencies greater than 500 ft.
- 2) The runway length and width standards for Local Service airports reflect minimum Commonwealth standards.
- 3) Hampton Roads has requested funding for a 1300 foot runway extension for fiscal year 2003.
- 4) Hanover County has requested funding for a 750 foot runway extension for fiscal year 2001.
- 5) Culpeper County has requested funding for a 1000 foot runway extension for fiscal year 2002.
- 6) The Hartwood Field runway is turf.
- 7) The recommended minimum runway length for Manassas has been manually adjusted to reflect special circumstances .

Source: HNTB Analysis; FAA Advisory Circular 5300-13, Change 6, with review and input from DOAV and airport sponsors.

Table 4

Primary Taxiway Requirements

Airport Name	Service Role	ARC (Approach Category)	ARC (Design Group)	Existing Taxiway Type	2000 Operations	2005 Forecast Operations	2020 Forecast Operations	Instrument Approach Minima (1)	Parallel Taxiway Recommended
Charlottesville-Albemarle	CM	C	III	Full Parallel	78,939	90,902	128,468	312-1	
Lynchburg Regional	CM	C	III	Full Parallel	57,707	63,488	86,993	200-1/2	
Newport News-Williamsburg International	CM	D	III	75% Parallel	215,013	226,521	278,056	200-1/2	Yes
Norfolk International	CM	D	V	Full Parallel	124,690	152,213	178,257	200-3/8	
Richmond International	CM	D	IV	Full Parallel	149,898	165,524	214,391	200-1/2	
Roanoke Regional	CM	D	IV	Full Parallel	107,967	113,832	146,473	364-1	
Ronald Reagan Washington National	CM	D	IV	Full Parallel	327,612	343,892	333,342	200-3/8	
Shenandoah Valley Regional	CM	C	III	Full Parallel	20,646	23,023	31,244	200-1/2	
Washington Dulles International (3)	CM	D	V	Full Parallel	456,487	571,535	804,356	200-1/2	
Chesapeake Regional	RL	C	II	Full Parallel	27,176	30,171	39,963	360-3/4	
Chesterfield County	RL	C	II	Full Parallel	45,014	54,796	66,689	200-1/2	
Hampton Roads	RL	B	II	Full Parallel	55,287	59,299	72,399	380-1	
Hanover County Municipal	RL	B	II	Full Parallel	26,379	29,774	41,116	355-1	
Leesburg Executive	RL	C	II	Full Parallel	82,724	94,325	133,359	428-1	
Manassas Regional	RL	C	II	Full Parallel	136,046	137,604	168,298	250-3/4	
Stafford Regional (New)	RL	C	II	Full Parallel		17,775	30,798	n/a	
Warrenton-Fauquier	RL	B	II	Full Parallel	37,421	40,759	51,488	637-1	
Accomack County	GR	C	II	Stub	9,429	11,903	20,194	373-1	Yes
Blue Ridge	GR	B	II	Full Parallel	21,810	22,709	25,392	515-1	
Culpeper County	GR	B	II	Full Parallel	42,160	51,626	83,479	507-1	
Danville Regional	GR	C	II	Full Parallel	15,836	17,506	23,083	341-1/2	
Dinwiddie County Airport (2)	GR	B	II	Full Parallel	31,846	37,191	54,694	427-1	
Farmville Regional	GR	B	II	Stub	9,568	10,642	14,232	403-1	
Ingalls Field	GR	B	II	Full Parallel	2,579	3,925	8,827	315-1	
Lonesome Pine	GR	C	II	Partial Parallel	8,409	8,977	10,636	609-1	
Mecklenburg-Brunswick Regional	GR	B	II	Stub	5,526	7,251	13,076	318-1	
Middle Peninsula Regional	GR	B	II	Full Parallel	11,395	14,523	25,077	496-1	
New River Valley	GR	C	II	Partial Parallel	8,826	9,105	9,995	209-1	
Shannon	GR	B	I	None	52,329	53,294	62,367	495-1	Yes
Suffolk Municipal	GR	C	II	Partial Parallel	30,277	35,233	51,720	353-1	Yes
Tazewell County	GR	B	II	Stub	4,740	4,953	5,515	528-1	
Virginia Highlands	GR	B	II	Full Parallel	22,527	23,500	26,061	732-1	
William M. Tuck	GR	B	II	Full Parallel	6,999	7,220	7,925	530-1	
Winchester Regional	GR	C	II	Full Parallel	29,794	34,507	50,429	259-1	

Table 4

Primary Taxiway Requirements

Airport Name	Service Role	ARC (Approach Category)	ARC (Design Group)	Existing Taxiway Type	2000 Operations	2005 Forecast Operations	2020 Forecast Operations	Instrument Approach Minima (1)	Parallel Taxiway Recommended
Blackstone Municipal	GC	C	II	Stub	3,037	3,402	4,531	427-1	
Brookneal-Campbell County	GC	B	II	Stub	737	760	834	583-1	
Emporia-Greenville Regional	GC	B	II	Stub	1,100	1,135	1,246	299-1	
Franklin Municipal	GC	B	II	Partial Parallel	4,405	4,829	6,237	443-3/4	
Front Royal-Warren County	GC	B	I	Stub	9,519	11,654	18,710	n/a	
Lee County (New)	GC	B	II	Stub			8,091	n/a	
Louisa County	GC	B	II	Full Parallel	13,257	17,889	33,892	387-1	
Luray Caverns	GC	B	II	Stub	3,315	3,420	3,754	1358-1 1/4	
Marks Municipal	GC	B	II	Stub	1,474	1,520	1,668	417-1	
Mountain Empire	GC	B	II	Full Parallel	9,797	10,136	11,159	524-1	
New Kent County	GC	B	I	Full Parallel	14,457	14,971	16,489	577-1	
Orange County	GC	B	I	Stub	8,099	8,355	9,171	674-1	
Tangier Island	GC	C	II	Stub	1,000	1,000	1,000	713-1	
Tappahannock-Essex Co. (New)	GC	B	II	Stub			14,359	n/a	
Twin County	GC	B	I	Stub	6,074	7,485	12,084	367-1	
Virginia Tech	GC	C	II	Full Parallel	13,805	15,464	20,779	341-1	
Wakefield Municipal	GC	B	II	Stub	10,539	13,627	23,993	727-1	
Williamsburg-Jamestown	GC	B	II	Full Parallel	20,833	24,120	35,074	631-1	
Bridgewater Air Park	LO	B	II	Stub	11,100	11,534	12,877	1135-1 1/4	
Chase City Municipal	LO	B	I	Stub	1,842	2,185	3,337	694-1	
Crewe Municipal	LO	B	I	Partial Parallel	3,679	3,985	4,999	n/a	
Falwell	LO	A	I	Partial Parallel	6,263	7,188	10,273	n/a	
Gordonsville Municipal	LO	B	I	Stub	5,521	7,308	13,337	1038-1 1/4	
Grundy Municipal	LO	B	I	Stub	3,674	3,979	4,993	416-1	
Hartwood Field	LO	A	I	Turf	3,998	4,653	6,733	n/a	
Hummel Field	LO	B	II	Stub	13,486	15,881	23,861	490-1	
Lake Anna	LO	A	II	Stub	368	380	417	n/a	
Lawrenceville-Brunswick	LO	B	I	Stub	1,842	2,280	3,754	n/a	
Lee County	LO	B	II	Stub	1,842	2,470	-	n/a	
Lunenburg County	LO	B	I	Stub	368	380	417	n/a	
New London	LO	B	I	Full Parallel	21,819	26,458	41,955	n/a	
New Market	LO	B	I	Partial Parallel	12,834	14,232	18,724	n/a	
Smith Mountain Lake	LO	B	I	Partial Parallel	4,769	4,920	5,402	674-1	
Tappahannock Municipal	LO	B	I	Stub	5,157	6,270	-	n/a	
Waynesboro	LO	B	I	Full Parallel	11,630	12,176	13,542	n/a	

- 1) Instrument approach minima includes decision height or minimum descent altitude (as appropriate) and visibility minimums. Criteria do not reflect approaches that require special aircrew and aircraft certification.
- 2) Construction will begin on a new parallel taxiway in the fall of 2001.
- 3) IAD plans a new Taxiway F and Taxiway J extension by 2007.

Source: HNTB Analysis

Table 5

Aircraft Storage Distribution

Commercial Service			
		Conventional	
	T-Hangar	Hangar	Tie-down
Single-engine	56%	14%	30%
Multi-Engine	32%	66%	2%
Turboprop	6%	85%	9%
Jet	0%	100%	0%

Reliever			
		Conventional	
	T-Hangar	Hangar	Tie-down
Single-engine	78%	2%	20%
Multi-Engine	67%	27%	6%
Turboprop	0%	89%	11%
Jet	0%	100%	0%

General Aviation - Regional			
		Conventional	
	T-Hangar	Hangar	Tie-down
Single-engine	77%	11%	12%
Multi-Engine	45%	39%	16%
Turboprop	0%	100%	0%
Jet	0%	100%	0%

General Aviation - Community			
		Conventional	
	T-Hangar	Hangar	Tie-down
Single-engine	50%	19%	31%
Multi-Engine	42%	50%	8%
Turboprop	0%	83%	17%
Jet	0%	100%	0%

General Aviation - Local Service			
		Conventional	
	T-Hangar	Hangar	Tie-down
Single-engine	26%	44%	29%
Multi-Engine	25%	25%	50%
Turboprop	0%	47%	53%
Jet	0%	0%	0%

Source: HNTB Analysis

T-Hangar Requirements

T-hangars are individual aircraft storage hangars, similar to individual car garages; however, they are arranged adjacent to each other, alternating nose, tail, nose, etc., resulting in a “T” shaped storage space.

T-hangar requirements were derived from inventory survey results of existing facilities, using the forecast based aircraft and multiplying by the appropriate distribution assumptions given in Table 5. Assuming that nominal deficiencies would not be remedied, Table 6 summarizes T-hangar requirements greater than or equal to eight units. Minimum requirements shown are the greater of the calculated required facilities, or the existing facilities.

T-hangar requirements are a function of the mix of based aircraft. Consequently, the number of recommended T-hangars may vary over time as the mix of based aircraft changes. Though the total number of based aircraft may remain constant; the overall mix of aircraft types can change to reflect a different proportion of aircraft in a particular category (i.e. single-engine, multi-engine, turboprop, or jet). Also, as new airports open and others close in Virginia, the distribution of based aircraft shifts from one site to another. This redistribution will affect the need for T-hangars at each airport.

It is also important to note that due to the nature of the airports, Washington Dulles International Airport and Ronald Reagan Washington National Airport, do not use T-hangar storage facilities. Therefore, the T-hangar requirement for these airports was manually adjusted.

Conventional Hangar Requirement

Conventional hangars are usually rectangular with one large door and space for one or more aircraft. Conventional hangar requirements were derived from inventory survey results of existing facilities, forecast based aircraft and the distribution assumptions given in Table 5. For planning purposes, the following aircraft space requirements were used to determine total conventional hangar needs:

- › Single Engine Piston – 850 square feet
- › Multi Engine Piston – 1,200 square feet
- › Multi Engine Turboprop – 1,700 square feet
- › Multi Engine Jet – 2,900 square feet

Assuming that nominal deficiencies would not be remedied, Table 7 summarizes conventional hangar requirements greater than or equal to 3,000 square feet. Minimum requirements shown are the greater of the calculated required facilities, or the existing facilities.

Table 6

Unconstrained T-Hangar Requirements Forecast

Airport Name	Service Role	Approach Category	Design Group	Existing T-Hangars	2000	2005	2020	2000	2005	2020
					T-Hangars Needed	T-Hangars Needed	T-Hangars Needed	Recommended Additional T-Hangars (1)	Recommended Additional T-Hangars (1)	Recommended Additional T-Hangars (1)
Charlottesville-Albemarle	CM	C	III	36	49	52	60	13	16	24
Lynchburg Regional	CM	C	III	0	23	25	37	23	25	37
Newport News-Williamsburg International	CM	D	III	32	51	50	50	19	18	18
Norfolk International	CM	D	V	42	42	42	42			
Richmond International	CM	D	IV	0	32	30	28	32	30	28
Roanoke Regional	CM	D	IV	34	56	59	69	22	25	35
Ronald Reagan Washington National (2)	CM	D	IV	0						
Shenandoah Valley Regional	CM	C	III	57	60	69	79		12	22
Washington Dulles International (2)	CM	D	V	0						
Chesapeake Regional	RL	C	II	68	67	74	84			16
Chesterfield County	RL	C	II	90	90	100	120		10	30
Hampton Roads	RL	B	II	90	110	113	124	20	23	34
Hanover County Municipal	RL	B	II	48	51	55	67			19
Leesburg Executive	RL	C	II	88	151	164	201	63	76	113
Manassas Regional	RL	C	II	190	213	203	215	23	13	25
Stafford Regional (New)	RL	C	II	0		24	45		24	45
Warrenton-Fauquier	RL	B	II	79	79	79	83			
Accomack County	GR	C	II	18	18	22	33			15
Blue Ridge	GR	B	II	49	49	49	49			
Culpeper County	GR	B	II	105	105	116	167		11	62
Danville Regional	GR	C	II	30	30	40	50		10	20
Dinwiddie County Airport	GR	B	II	42	52	56	73	10	14	31
Farmville Regional	GR	B	II	0	16	16	19	16	16	19
Ingalls Field	GR	B	II	5	5	5	8			
Lonesome Pine	GR	C	II	6	11	11	11			
Mecklenburg-Brunswick Regional	GR	B	II	12	12	12	17			
Middle Peninsula Regional	GR	B	II	5	20	25	40	15	20	35
New River Valley	GR	C	II	10	18	16	15			
Shannon	GR	B	I	119	130	130	136	11	11	17
Suffolk Municipal	GR	C	II	62	69	77	98		15	36
Tazewell County	GR	B	II	8	8	8	9			
Virginia Highlands	GR	B	II	40	50	60	60	10	20	20
William M. Tuck	GR	B	II	16	16	16	16			
Winchester Regional	GR	C	II	52	56	62	81		10	29

Table 6

Unconstrained T-Hangar Requirements Forecast

Airport Name	Service Role	Approach Category	Design Group	Existing T-Hangars	2000	2005	2020	2000	2005	2020
					T-Hangars Needed	T-Hangars Needed	T-Hangars Needed	Recommended Additional T-Hangars (1)	Recommended Additional T-Hangars (1)	Recommended Additional T-Hangars (1)
Blackstone Municipal	GC	C	II	10	10	10	10			
Brookneal-Campbell County	GC	B	II	0	1	1	1			
Emporia-Greenville Regional	GC	B	II	6	6	6	6			
Franklin Municipal	GC	B	II	22	22	22	22			
Front Royal-Warren County	GC	B	I	10	10	12	17			
Lee County (New)	GC	B	II	0			8			
Louisa County	GC	B	II	20	16	20	33			13
Luray Caverns	GC	B	II	0	5	5	5			
Marks Municipal	GC	B	II	0	2	2	2			
Mountain Empire	GC	B	II	0	12	12	12	12	12	12
New Kent County	GC	B	I	29	29	29	29			
Orange County	GC	B	I	10	11	11	11			
Tangier Island	GC	C	II	0						
Tappahannock-Essex Co. (New)	GC	B	II	0	8	8	17	8		17
Twin County	GC	B	I	6	12	12	12			
Virginia Tech	GC	C	II	9	16	19	29		10	20
Wakefield Municipal	GC	B	II	7	13	17	27		10	20
Williamsburg-Jamestown	GC	B	II	19	27	30	40	8	11	21

1) Assuming nominal deficiencies would not be remedied, this table reflects T-hangar deficiencies of eight or greater.

2) Ronald Reagan Washington National and Dulles International airports were manually adjusted. These airports do not use or require T-hangars.

Source: HNTB Analysis

Table 7

Unconstrained Conventional Hangar Requirements Forecast

Airport Name	Service Role	Existing Conventional Hangar Space (sf)	2000	2005	2020	2000	2005	2020
			Conventional Hangar Space Needed (sf)	Conventional Hangar Space Needed (sf)	Conventional Hangar Space Needed (sf)	Additional Space Recommended (1)	Additional Space Recommended (1)	Additional Space Recommended (1)
Charlottesville-Albemarle	CM	63,500	79,900	87,800	128,800	16,400	24,300	65,300
Lynchburg Regional	CM	52,500	63,400	68,900	85,900	10,900	16,400	33,400
Newport News-Williamsburg International	CM	43,400	67,600	86,600	128,800	24,200	43,200	85,400
Norfolk International	CM	79,060	86,100	99,700	119,800	7,040	20,640	40,740
Richmond International	CM	135,030	150,300	161,800	220,200	15,270	26,770	85,170
Roanoke Regional	CM	102,100	102,100	96,200	101,200			
Ronald Reagan Washington National	CM	490,422	490,422	490,422	490,422			
Shenandoah Valley Regional	CM	26,000	32,900	35,700	43,000	6,900	9,700	17,000
Washington Dulles International	CM	0	0	0	1,306,800			1,306,800
Chesapeake Regional	RL	23,000	27,400	33,200	35,300	4,400	10,200	12,300
Chesterfield County	RL	60,660	62,125	77,425	94,725		16,765	34,065
Hampton Roads	RL	41,040	41,040	41,040	41,040			
Hanover County Municipal	RL		6,700	8,100	13,500	6,700	8,100	13,500
Leesburg Executive	RL	32,240	38,200	44,400	78,700	5,960	12,160	46,460
Manassas Regional	RL	138,000	138,000	147,700	182,600		9,700	44,600
Stafford Regional (New)	RL	0		14,300	26,800		14,300	26,800
Warrenton-Fauquier	RL	2,100	5,000	5,100	5,500			3,400
Accomack County	GR		3,400	3,600	5,400	3,400	3,600	5,400
Blue Ridge	GR	17,300	21,900	17,100	19,400	4,600		
Culpeper County	GR	28,125	28,125	28,125	39,300			11,175
Danville Regional	GR	37,869	37,869	37,869	43,369			5,500
Dinwiddie County Airport	GR	34,351	41,428	44,128	58,828	7,077	9,777	24,477
Farmville Regional	GR	6,240	8,100	9,700	14,300		3,460	8,060
Ingalls Field	GR	13,400	13,400	13,400	16,600			3,200
Lonesome Pine	GR	17,700	17,700	17,700	17,700			
Mecklenburg-Brunswick Regional	GR	6,400	6,400	8,400	18,000			11,600
Middle Peninsula Regional	GR	4,800	6,600	8,200	12,900		3,400	8,100
New River Valley	GR	8,000	8,000	8,200	10,400			
Shannon	GR	16,600	19,100	19,000	19,900			3,300
Suffolk Municipal	GR	32,400	32,400	36,200	49,400		3,800	17,000
Tazewell County	GR	2,805	4,000	4,100	4,200			
Virginia Highlands	GR	49,300	80,300	100,300	100,300	31,000	51,000	51,000
William M. Tuck	GR		1,800	1,800	1,800			
Winchester Regional	GR	72,000	72,000	72,000	72,000			

Table 7

Unconstrained Conventional Hangar Requirements Forecast

Airport Name	Service Role	Existing Conventional Hangar Space (sf)	2000	2005	2020	2000	2005	2020
			Conventional Hangar Space Needed (sf)	Conventional Hangar Space Needed (sf)	Conventional Hangar Space Needed (sf)	Additional Space Recommended (1)	Additional Space Recommended (1)	Additional Space Recommended (1)
Blackstone Municipal	GC		800	800	1,000			
Brookneal-Campbell County	GC	27,000	27,000	27,000	27,000			
Emporia-Greenville Regional	GC	2,600	2,600	2,600	2,600			
Franklin Municipal	GC	25,300	25,300	25,300	25,300			
Front Royal-Warren County	GC	4,000	4,800	5,600	7,900			3,900
Lee County (New)	GC				6,400			6,400
Louisa County	GC	11,200	12,500	17,300	34,000		6,100	22,800
Luray Caverns	GC		1,500	1,500	1,500			
Marks Municipal	GC	7,200	7,200	7,200	7,200			
Mountain Empire	GC	18,000	18,000	18,000	18,000			
New Kent County	GC	9,300	9,300	9,300	9,300			
Orange County	GC	100	4,000	4,000	3,900	3,900	3,900	3,800
Tangier Island	GC							
Tappahannock-Essex Co. (New)	GC				9,200			9,200
Twin County	GC	8,000	8,000	8,000	8,000			
Virginia Tech	GC	7,800	10,300	12,800	18,200		5,000	10,400
Wakefield Municipal	GC	4,000	5,400	6,000	9,400			5,400
Williamsburg-Jamestown	GC	22,000	22,000	22,000	26,400			4,400

1) Assuming nominal deficiencies would not be remedied, this table reflects conventional hangar deficiencies of 3,000 square feet or greater.

Source: HNTB Analysis

Apron Area

Apron areas were calculated for paved tie-down areas for based and transient aircraft. Assuming that nominal deficiencies would not be remedied, Table 8 summarizes apron requirements greater than or equal to 7,500 square yards. Minimum requirements shown are the greater of the calculated required facilities, or the existing facilities.

Transient Aircraft Apron

Apron area requirements for transient aircraft parking were derived by multiplying the forecast busy day itinerant operations by the appropriate aircraft space requirements. The following assumptions were used:

- › Total operations by aircraft type were taken from the GA Forecasts presented as part of this document. Daily operations were derived by dividing the number of annual operations by 365. It was assumed that a busy day was 10 percent more active than an average day.
- › The number of transient operations was assumed to be a factor of runway length. Per 1998 Civil Air Patrol survey data¹², airports with primary runways greater than 4,000 feet were assumed to have 29 percent transient operations; airports with primary runways less than 4,000 feet were assumed to have 31 percent transient operations.
- › The majority of transient aircraft will arrive and depart on the same day; thus, it is assumed that the actual number of aircraft utilizing the parking apron is one-half (50 percent) of the transient operations on the average day of the peak month.
- › 50 percent of transient aircraft will be on the apron at any given time.
- › Aircraft space requirements reflect square yardage that includes circulation area for ingress and egress of aircraft. Required areas were calculated for each category of aircraft (SEP, MEP, MET, MEJ). Circulation area was then added based on Design Group II taxiway centerline to fixed or moveable object separation standards. In addition, a separation of 10 feet between SEP and MEP aircraft, and 20 feet between MET/MEJ aircraft was assumed. The apron space assumed for each aircraft type is as follows:
 - Single Engine Piston – 870 square yards
 - Multi Engine Piston – 960 square yards
 - Multi Engine Turboprop – 1,730 square yards
 - Multi Engine Jet – 2,540 square yards

¹² *The 1998 Virginia Department of Aviation On-Site Air Activity Survey*, Virginia Department of Aviation, 1998.

Based Aircraft Apron

Apron area requirements for based aircraft parking were derived by multiplying forecast based aircraft by the appropriate parking distribution assumptions in Table 4, and the appropriate aircraft space requirements. Apron space requirements for each type of aircraft were assumed to be the same as those calculated for transient aircraft.

Table 8

Unconstrained Apron Area Requirements Forecast

Airport Name	Service Role	Existing Apron Area (sy)	2000	2005	2020	2000	2005
			Total Apron Area Needed (sy)	Total Apron Area Needed (sy)	Total Apron Area Needed (sy)	Additional Apron Recommended (1)	Additional Apron Recommended (1)
Charlottesville-Albemarle (AC Apron)	CM	33,225	33,225	33,225	43,225		
Charlottesville-Albemarle (GA Apron)	CM	27,750	30,100	33,500	44,900		
Lynchburg Regional (AC Apron)	CM	16,000	16,000	16,000	16,000		
Lynchburg Regional (GA Apron)	CM	16,700	20,000	22,600	31,000		
Newport News-Williamsburg International (AC Apron)	CM	59,000	112,000	112,000	138,100	53,000	53,000
Newport News-Williamsburg International (GA Apron)	CM	86,000	86,000	87,100	107,200		
Norfolk International (AC Apron)	CM						
Norfolk International (GA Apron)	CM	95,400	95,400	95,400	95,400		
Richmond International (AC Apron)	CM	185,000	185,000	185,000	185,000		
Richmond International (GA Apron)	CM	58,175	58,175	58,175	58,175		
Roanoke Regional (AC Apron)	CM	62,500	62,500	62,500	62,500		
Roanoke Regional (GA Apron)	CM	27,500	39,500	42,700	53,300	12,000	15,200
Ronald Reagan Washington National (AC Apron)	CM	902,065	902,065	902,065	902,065		
Ronald Reagan Washington National (GA Apron)	CM	397,414	397,414	397,414	436,414		
Shenandoah Valley Regional (AC Apron)	CM	9,700	9,700	16,000	16,000		
Shenandoah Valley Regional (GA Apron)	CM	34,000	34,000	34,000	34,000		
Washington Dulles International (AC Apron)	CM	4,151,993	4,151,993	4,312,193	7,453,593		160,200
Washington Dulles International (GA Apron)	CM	918,875	918,875	918,875	918,875		
Chesapeake Regional	RL	28,650	28,650	28,650	28,650		
Chesterfield County	RL	46,000	46,000	46,000	46,000		
Hampton Roads	RL	5,733	35,900	37,200	42,700	30,200	31,500
Hanover County Municipal	RL	3,389	17,200	18,600	24,000	13,800	15,200
Leesburg Executive	RL	72,500	83,500	88,000	106,700	11,000	15,500
Manassas Regional	RL	15,933	76,700	75,200	86,400	60,800	59,300
Stafford Regional (New)	RL	115,180	-	115,180	115,180		
Warrenton-Fauquier	RL	6,000	21,800	23,000	27,200	15,800	17,000
Accomack County	GR	10,360	10,360	10,360	11,500		
Blue Ridge	GR	3,300	10,000	10,200	10,800		
Culpeper County	GR	20,000	29,300	33,100	45,200	9,300	13,100
Danville Regional	GR	36,965	36,965	59,965	59,965		23,000
Dinwiddie County Airport	GR	24,000	24,000	24,000	24,000		
Farmville Regional	GR	14,000	14,000	14,000	14,000		
Ingalls Field	GR	25,000	25,000	25,000	25,000		
Lonesome Pine	GR	6,005	6,005	6,005	6,005		

Table 8

Unconstrained Apron Area Requirements Forecast

Airport Name	Service Role	Existing Apron Area (sy)	2000	2005	2020	2000	2005
			Total Apron Area Needed (sy)	Total Apron Area Needed (sy)	Total Apron Area Needed (sy)	Additional Apron Recommended (1)	Additional Apron Recommended (1)
Mecklenburg-Brunswick Regional	GR	1,000	2,600	3,600	6,400		
Middle Peninsula Regional	GR	1,527	5,800	7,300	11,800		
New River Valley	GR	13,889	13,889	13,889	13,889		
Shannon	GR	12,400	25,400	25,300	27,900	13,000	12,900
Suffolk Municipal	GR	22,322	22,322	22,322	22,322		
Tazewell County	GR	11,000	11,000	11,000	11,000		
Virginia Highlands	GR	24,000	34,000	41,000	41,000	10,000	17,000
William M. Tuck	GR	3,333	6,300	6,400	6,500		
Winchester Regional	GR	23,750	23,750	23,750	23,750		
Blackstone Municipal	GC	3,365	3,365	3,365	3,365		
Brookneal-Campbell County	GC	8,944	8,944	8,944	8,944		
Emporia-Greenville Regional	GC	42,300	42,300	42,300	42,300		
Franklin Municipal	GC	7,500	7,500	7,500	7,500		
Front Royal-Warren County	GC	3,590	6,900	8,100	11,900		
Lee County (New)	GC	-	-	-	7,800		
Louisa County	GC	17,500	17,500	17,500	17,500		
Luray Caverns	GC	1,250	4,600	4,600	4,700		
Marks Municipal	GC	2,000	2,000	2,000	2,100		
Mountain Empire	GC	642	8,200	8,200	8,400	7,600	7,600
New Kent County	GC	8,000	12,400	12,400	12,600		
Orange County	GC	4,700	7,300	7,400	7,600		
Tangier Island	GC	22,881	22,881	22,881	22,881		
Tappahannock-Essex Co. (New)	GC	-	-	-	13,400		
Twin County	GC	4,444	4,444	8,444	9,900		
Virginia Tech	GC	16,970	16,970	16,970	16,970		
Wakefield Municipal	GC	1,058	9,000	11,300	18,500	7,900	10,200
Williamsburg-Jamestown	GC	16,400	22,900	25,100	32,300		8,700

1) Assuming nominal deficiencies would not be remedied, this table reflects apron deficiencies of 7,500 square yards or greater.

Source: HNTB Analysis

Auto Parking

Auto parking requirements were estimated by assuming a need for 1 parking space per airport or tenant employee and 1.5 auto parking spaces per based aircraft departure on an average day in the peak month. The results were then reviewed and revised with the assistance of each airport sponsor. The methodology used was a macro-level analysis and should not replace more detailed Master Planning done for individual airports. Assuming that nominal deficiencies would not be remedied, Table 9 summarizes auto parking requirements greater than or equal to 20 spaces. Minimum requirements shown are the greater of the calculated required facilities, or the existing facilities.

GA Terminal Buildings

The terminal building requirements for general aviation airports were derived from the Virginia Department of Aviation terminal program. However, this program calculates only the State funding eligible portion of the terminal, which is approximately 70 percent of an average terminal building. Therefore, Table 10 has been adjusted to represent the total terminal space needed, or 1.3 times the requirement determined by the Department of Aviation terminal program. Minimum requirements shown are the greater of the calculated required facilities, or the existing facilities.

NAVAIDS

Table 11 outlines the recommended Navaid guidelines for each category of airport in the Commonwealth. Recommended navigation and landing aids include instrument approach capability, runway lighting, communication, vertical guidance visual aids, runway end identifier lights, and weather reporting. Tables 12-16 summarize the requirements for each type of navigation or landing aid. Minimum requirements shown are the greater of the calculated required facilities, or the existing facilities.

Instrument Approach Capability

The recommended guideline for the primary runway at Commercial Service and Reliever airports is precision approach capability. When possible, the primary runway at GA Regional airports should have non-precision approach capability with a recommended minima of (300-1), and the primary runway at GA Community airports should have non-precision approach capability with a recommended minima of (400-1). These are recommended guidelines only, and it is recognized that these minimum are not always attainable. Actual airport-specific recommendations and project justification will vary with factors including airport demand, high corporate use, and cost-benefit of the improvement.

As shown in Table 12, there are no instrument approach capability improvements recommended for Commercial Service airports, however six of the current eight Reliever airports have only a non-precision approach, and one GA Community airport has only a visual approach. In addition, although each of the GA Regional and most of the GA Community airports have a non-precision approach, many of these airports do not meet the recommended approach minima. Consequently, recognizing that approach minima

are determined by a variety of factors, and are not always attainable, only the approach type was considered when determining recommended improvements.

Runway Lighting

High Intensity Runway Lights (HIRL) are recommended for the primary runway at Commercial Service and Reliever airports. Medium Intensity Runway Lights (MIRL) are recommended for the primary runway at GA Regional and GA Community airports.

As shown in Table 13, there are no improvements recommended for Commercial Service airports, however improvements are recommended for five Reliever airports, one GA Regional airport, and four GA Community airports.

GCO/RTR/RCO

A Remote Communication Outlet (RCO) is recommended for Commercial Service airports. A Ground Communication Outlet (GCO) or Remote Transmitter/Receiver (RTR) is recommended for Reliever, and GA Regional airports.

An RCO is an unstaffed, remotely controlled air to ground communications facility providing communications capability to extend the service range of FSS facilities.

A GCO is a lower cost alternative to an RCO, which allows pilots at uncontrolled airports to contact ATC or FSS via VHF to a telephone connection to obtain an instrument clearance or close a flight plan. They may also get an updated weather briefing prior to takeoff. A GCO is an unstaffed, remotely controlled ground to ground communications facility that is a combination of a radio transceiver and an automated telephone dialer. GCO's must only be utilized by aircraft on the ground, as they serve an extremely limited area, and airborne aircraft may activate multiple GCO's simultaneously.

An RTR provides radio communication services between air traffic controllers at terminal facilities and aircraft pilots. It is an unstaffed, remotely controlled air to ground communications facility, remotely controlled and providing communications capability to extend the service range of ATC facilities.

As shown in Table 14, improvements are recommended for only two Commonwealth airports.

Vertical Guidance Visual Aid

A Vertical Guidance Visual Aid (VGVA) is recommended for both ends of primary runways. A Precision Approach Path Indicator (PAPI) is recommended for all but Local Service airports, which may be served by a single unit State-approved system. Table 15 summarizes the VGVA recommended improvements.

Runway End Identification Lights (REIL)

Runway End Identification Lights (REIL) are recommended for all straight-in approaches, where no approach lighting system exists. Table 16 summarizes the REIL recommended improvements.

Weather Reporting

For Commercial Service, Reliever, and GA Regional airports, the recommended guidelines regarding short-term and long-term weather reporting are shown below.

2005	2020
ASOS or AWOS III-P-T	ASOS or AWOS IV

An Automated Surface Observing System (ASOS) is an automated observing system that provides weather observations including temperature, dew point, wind, altimeter setting, visibility, sky condition, and precipitation.

An Automated Weather Observing System (AWOS) is a suite of sensors, which measure, collect and

AWOS III: Wind Speed, Wind Gust, Wind Direction, Variable Wind Direction, Temperature, Dew Point, Altimeter Setting, Density Altitude, Visibility, Variable Visibility, Sky Condition, Cloud Height and Type.

AWOS III-P-T: Same as AWOS III, plus Present Weather and Lightning Detection

AWOS IV: Same as AWOS III-P-T, plus Runway Surface Sensors.

The basic difference between these two automated weather systems is that the ASOS is a product of a National Weather Service (NWS), Department of Defense (DoD) and Federal Aviation Administration (FAA) joint venture, and is comprised of a generally standard suite of weather sensors. AWOS is a suite of weather sensors of many different configurations that were either procured by the FAA or purchased by individuals, groups, airports, etc. that are required to meet FAA standards to be able to report weather parameters.

Table 17 summarizes weather reporting recommended improvements.

Table 9

Unconstrained GA Auto Parking Requirements Forecast

Airport Name	Service Role	Existing Auto Parking Spaces	2000	2005	2020	2,000	2005	2020
			Required Parking Spaces	Required Parking Spaces	Required Parking Spaces	Additional Parking Space Recommended (1)	Additional Parking Space Recommended (1)	Additional Parking Space Recommended (1)
Charlottesville-Albemarle (AC Auto Parking)	CM	893	893	1,163	1,473		270	580
Charlottesville-Albemarle (GA Auto Parking)	CM	100	130	144	194	30	44	94
Lynchburg Regional (AC Auto Parking)	CM	539	539	599	813		60	274
Lynchburg Regional (GA Auto Parking)	CM	105	107	119	158			53
Newport News-Williamsburg International (AC Auto Parking)	CM	1,181	1,533	1,533	1,971	352	352	790
Newport News-Williamsburg International (GA Auto Parking)	CM	766	766	860	1,093		94	327
Norfolk International (AC Auto Parking)	CM	5237	5237	8,337	11,337		3,100	6100
Norfolk International (GA Auto Parking)	CM	171	171	171	200			29
Richmond International (AC Auto Parking)	CM	6,019	6,019	7,919	9,919		1,900	3900
Richmond International (GA Auto Parking)	CM	340	340	340	430			90
Roanoke Regional (AC Auto Parking)	CM	1,440	1,440	1,600	1,975		160	535
Roanoke Regional (GA Auto Parking)	CM	150	200	212	255	50	62	105
Ronald Reagan Washington National (AC Auto Parking)	CM	2700	2700	2,700	2,700			
Ronald Reagan Washington National (GA Auto Parking)	CM	35	35	35	35			
Shenandoah Valley Regional (AC Auto Parking)	CM	340	550	550	550	210	210	210
Shenandoah Valley Regional (GA Auto Parking)	CM	350	350	350	350			
Washington Dulles International (AC Auto Parking)	CM	6038	6038	9,538	10,538		3,500	4500
Washington Dulles International (GA Auto Parking)	CM	225	225	225	225			
Chesapeake Regional	RL	51	70	85	105		34	54
Chesterfield County	RL	267	267	331	398		64	131
Hampton Roads	RL	55	104	111	135	49	56	80
Hanover County Municipal	RL	75	75	75	81			
Leesburg Executive	RL	186	207	229	301	21	43	115
Manassas Regional	RL	110	256	259	315	146	149	205
Stafford Regional (New)	RL	61		61	61			
Warrenton-Fauquier	RL	30	74	80	100	44	50	70
Accomack County	GR	30	36	51	66		21	36
Blue Ridge	GR	25	45	47	52	20	22	27
Culpeper County	GR	30	83	100	159	53	70	129
Danville Regional	GR	140	140	155	204			64
Dinwiddie County Airport (2)	GR	0	96	96	106	96	96	106
Farmville Regional	GR	25	25	25	31			
Ingalls Field	GR	73	73	73	73			
Lonesome Pine	GR	60	60	60	60			

Table 9

Unconstrained GA Auto Parking Requirements Forecast

Airport Name	Service Role	Existing Auto Parking Spaces	2000	2005	2020	2,000	2005	2020
			Required Parking Spaces	Required Parking Spaces	Required Parking Spaces	Additional Parking Space Recommended (1)	Additional Parking Space Recommended (1)	Additional Parking Space Recommended (1)
Mecklenburg-Brunswick Regional	GR	30	30	30	30			
Middle Peninsula Regional (2)	GR	0	30	30	50	30	30	50
New River Valley	GR	50	50	50	50			
Shannon	GR	60	99	100	117	39	40	57
Suffolk Municipal	GR	50	61	70	100			50
Tazewell County	GR	10	14	14	15			
Virginia Highlands	GR	41	47	48	53			
William M. Tuck	GR	75	75	75	75			
Winchester Regional	GR	90	90	90	90			
Blackstone Municipal	GC	6	8	8	10			
Brookneal-Campbell County	GC	0	3	3	3			
Emporia-Greenville Regional	GC	30	30	30	30			
Franklin Municipal	GC	48	48	48	48			
Front Royal-Warren County	GC	15	19	23	36			21
Lee County (New)	GC	0	30	30	30	30	30	30
Louisa County	GC	10	26	35	64		25	54
Luray Caverns	GC	15	28	28	29			
Marks Municipal	GC	10	10	10	10			
Mountain Empire	GC	10	20	21	23			
New Kent County	GC	35	35	35	35			
Orange County	GC	20	20	20	20			
Tangier Island	GC	1	1	1	1			
Tappahannock-Essex Co. (New)	GC	0	14	14	28			28
Twin County	GC	25	25	25	25			
Virginia Tech	GC	62	62	62	62			
Wakefield Municipal	GC	12	21	26	45			33
Williamsburg-Jamestown	GC	76	76	88	128			52

1) Assuming nominal deficiencies would not be remedied, this table reflects auto parking deficiencies of 20 or more spaces.

2) Existing parking is not paved. Requirements reflect a need for additional paved parking.

Source: HNTB Analysis

Table 10

Unconstrained Terminal Requirements Forecast

Airport Name	Service Role	Existing GA Terminal (sf)	2000	2005	2020	2000	2005	2020
			GA Terminal Required Area (sf)	GA Terminal Required Area (sf)	GA Terminal Required Area (sf)	Additional Terminal Area Recommended (1)	Additional Terminal Area Recommended (1)	Additional Terminal Area Recommended (1)
Charlottesville-Albemarle (AC Term)	CM	60,000	60,000	60,000	60,000		-	-
Charlottesville-Albemarle (GA Term)	CM	3,800	7,300	7,500	8,100	3,500	3,700	4,300
Lynchburg Regional (AC Term)	CM	38,000	38,000	38,000	38,000			
Lynchburg Regional (GA Term)	CM	4,500	6,700	7,200	7,700	2,200	2,700	3,200
Newport News-Williamsburg International (AC Term)	CM	114,860	137,000	137,000	201,300	22,140	22,140	86,440
Newport News-Williamsburg International (GA Term)	CM	25,000	25,000	25,000	25,000			
Norfolk International (AC Term)	CM	396,596	396,596	609,596	657,596		213,000	261,000
Norfolk International (GA Term)	CM	54,000	54,000	54,000	61,200			7,200
Richmond International (AC Term)	CM	293,706	293,706	547,947	547,947		254,241	254,241
Richmond International (GA Term)	CM	30,680	30,680	30,680	30,680			
Roanoke Regional (AC Term)	CM	96,000	96,000	96,000	96,000			
Roanoke Regional (GA Term)	CM	3,750	7,500	7,700	8,300	3,750	3,950	4,550
Ronald Reagan Washington National (AC Term) (5)	CM	1,159,490	1,159,490	1,159,490	1,159,490			
Ronald Reagan Washington National (GA Term)	CM	74,062	74,062	74,062	153,235			79,173
Shenandoah Valley Regional (AC Term)	CM	8,300	16,000	16,000	16,000	7,700	7,700	7,700
Shenandoah Valley Regional (GA Term)	CM	7,300	7,300	7,300	7,300			
Washington Dulles International (AC Term)	CM	1,917,000	1,917,000	2,103,560	4,262,980		186,560	2,345,980
Washington Dulles International (GA Term)	CM	1,320,831	1,320,831	1,320,831	1,320,831			
Chesapeake Regional	RL	2,920	5,800	6,000	6,500	2,880	3,080	3,580
Chesterfield County (2)	RL	8,400	8,400	8,400	8,400			
Hampton Roads	RL	5,577	7,300	7,400	7,700	1,723	1,823	2,123
Hanover County Municipal	RL	2,600	5,700	5,900	6,500	3,100	3,300	3,900
Leesburg Executive	RL	3,800	7,900	8,200	9,100	4,100	4,400	5,300
Manassas Regional	RL	18,500	18,500	18,500	18,500			
Stafford Regional (New)	RL	-	2,400	4,800	6,000	2,400	4,800	6,000
Warrenton-Fauquier	RL	4,800	6,300	6,500	7,200	1,500	1,700	2,400
Accomack County	GR	4,000	4,000	4,000	5,100			
Blue Ridge	GR	3,600	5,300	5,400	5,700	1,700	1,800	2,100
Culpeper County	GR	2,000	6,600	7,200	7,900	4,600	5,200	5,900
Danville Regional	GR	12,100	12,100	12,100	12,100			
Dinwiddie County Airport (3)	GR	6,600	6,600	6,600	7,300			
Farmville Regional	GR	1,800	3,300	3,600	4,300	1,500	1,800	2,500
Ingalls Field	GR	6,000	6,000	6,000	6,000			
Lonesome Pine	GR	4,000	4,000	4,000	4,000			

Table 10

Unconstrained Terminal Requirements Forecast

Airport Name	Service Role	Existing GA Terminal (sf)	2000	2005	2020	2000	2005	2020
			GA Terminal Required Area (sf)	GA Terminal Required Area (sf)	GA Terminal Required Area (sf)	Additional Terminal Area Recommended (1)	Additional Terminal Area Recommended (1)	Additional Terminal Area Recommended (1)
Mecklenburg-Brunswick Regional	GR	3,000	3,000	3,000	4,400			1,400
Middle Peninsula Regional	GR	2,000	3,700	4,300	5,600	1,700	2,300	3,600
New River Valley	GR	4,500	4,500	4,500	4,500			
Shannon	GR	5,640	7,200	7,200	7,400	1,560	1,560	1,760
Suffolk Municipal	GR	3,500	5,900	6,200	7,200	2,400	2,700	3,700
Tazewell County	GR	3,600	3,600	3,600	3,600			
Virginia Highlands	GR	9,000	9,000	9,000	9,000			
William M. Tuck (4)	GR	-	2,800	2,900	3,000	2,800	2,900	3,000
Winchester Regional	GR	9,000	9,000	9,000	9,000			
Blackstone Municipal	GC	1,200	2,400	2,400	2,400	1,200	1,200	1,200
Brookneal-Campbell County	GC	-	2,400	2,400	2,400	2,400	2,400	2,400
Emporia-Greensville Regional	GC	2,700	2,700	2,700	2,700			
Franklin Municipal	GC	3,800	3,800	3,800	3,800			
Front Royal-Warren County	GC	1,800	3,300	3,800	4,900	1,500	2,000	3,100
Lee County (New)	GC	-	-	2,400	3,100		2,400	3,100
Louisa County	GC	1,000	4,100	4,800	6,100	3,100	3,800	5,100
Luray Caverns	GC	1,000	2,400	2,400	2,400	1,400	1,400	1,400
Marks Municipal	GC	-	2,400	2,400	2,400	2,400	2,400	2,400
Mountain Empire	GC	2,000	3,400	3,500	3,700	1,400	1,500	1,700
New Kent County	GC	1,920	4,300	4,400	4,700	2,380	2,480	2,780
Orange County	GC	200	3,000	3,100	3,300	2,800	2,900	3,100
Tangier Island	GC	575	2,400	2,400	2,400	1,825	1,825	1,825
Twin County	GC	700	2,600	2,900	3,800	1,900	2,200	3,100
Virginia Tech	GC	6,890	6,890	6,890	6,890			
Wakefield Municipal	GC	2,880	3,500	4,200	5,600		1,320	2,720
Williamsburg-Jamestown	GC	7,327	5,200	5,600	6,200			
Tappahannock-Essex Co. (New)	GC	-	-	2,400	6,200		2,400	6,200

- 1) Assuming nominal deficiencies would not be remedied, this table reflects terminal deficiencies of 1200 square feet or greater.
- 2) A new 8,400 sf terminal building is under construction. Completion is expected late 2002.
- 3) Construction will begin on a new 6,600 sf terminal building in the fall of 2001.
- 4) The William Tuck terminal was destroyed by fire March 2001.
- 5) An expansion of Terminal A is planned during the 20-year planning horizon.

Source: HNTB Analysis

Table 11

Guidelines for Navigation and Landing Aids

Commercial Service (CM)

Precision Approach (200-1/2)
High Intensity Runway Lights
REILS (1) at all straight-in approaches
AWOS III p/t (2) /ASOS (short-term)
AWOS IV/ASOS (20-year)
GCO/RTR (if airport does not have a control tower)
Vertical Guidance Visual Aid (PAPI) on all runway ends

Reliever (RL)

Precision Approach (200-1/2)
High Intensity Runway Lights
REILS (1) at all straight-in approaches
AWOS III p/t (2) /ASOS (short-term)
AWOS IV/ASOS (20-year)
GCO/RTR
Vertical Guidance Visual Aid (PAPI) on all runway ends

General Aviation Regional (GR)

Non Precision Approach (300-1)
Medium Intensity Runway Lights
REILS (1) at all straight-in approaches
AWOS III p/t (2) /ASOS (short-term)
AWOS IV/ASOS (20-year)
GCO/RTR
Vertical Guidance Visual Aid (PAPI) on all runway ends

General Aviation Community (GC)

Non Precision Approach (400-1)
Medium Intensity Runway Lights
REILS (1) at all straight-in approaches
Vertical Guidance Visual Aid (PAPI) on all runway ends

Local Service (LO)

Visual Approach
Vertical Guidance Visual Aid (State System) on all runway ends

Notes:

1) REILS are runway end identification lights.

2) An AWOS III-P-T is an AWOS III with present weather and lightning detection.
Please refer to the Weather Reporting section of the chapter for additional detail.

Source: DOAV and HNTB Analysis

Table 12

Precision Approach Capability Requirements

	Service Role	Approach Category	Design Group	Primary Runway	Existing Instrument Approach Capability (1)	Existing Instrument Approach Minima (1)	Desired Instrument Approach Capability (Type, Minimums)	Improvements Recommended
Charlottesville-Albemarle	CM	C	III	3/21	Precision	312-1	Precision	No
Lynchburg Regional	CM	C	III	4/22	Precision	200-1/2	Precision	No
Newport News-Williamsburg International	CM	D	III	7/25	Precision	200-1/2	Precision	No
Norfolk International	CM	D	V	5/23	Precision	200-3/8	Precision	No
Richmond International	CM	D	IV	16/34	Precision	200-1/2	Precision	No
Roanoke Regional	CM	D	IV	6/24	Precision	364-1	Precision	No
Ronald Reagan Washington National	CM	D	IV	1/19	Precision	200-3/8	Precision	No
Shenandoah Valley Regional	CM	C	III	5/23	Precision	200-1/2	Precision	No
Washington Dulles International	CM	D	V	1R/19L	Precision	200-1/2	Precision	No
Chesapeake Regional (2)	RL	C	II	5/23	Non-Precision	360-3/4	Precision	ILS
Chesterfield County	RL	C	II	15/33	Precision	200-1/2	Precision	No
Hampton Roads	RL	B	II	10/28	Non-Precision	380-1	Precision	ILS
Hanover County Municipal	RL	B	II	16/34	Non-Precision	355-1	Precision	ILS
Leesburg Executive	RL	C	II	17/35	Non-Precision	428-1	Precision	ILS
Manassas Regional	RL	C	II	16L/34R	Precision	250-3/4	Precision	No
Stafford Regional (New)	RL	C	II	15/33	Visual		Precision	ILS
Warrenton-Fauquier	RL	B	II	14/32	Non-Precision	637-1	Precision	ILS
Acomack County	GR	C	II	3/21	Non-Precision	373-1	Non-Precision (300-1)	Localizer
Blue Ridge	GR	B	II	12/30	Non-Precision	515-1	Non-Precision (300-1)	No
Culpeper County	GR	B	II	4/22	Non-Precision	507-1	Non-Precision (300-1)	Loc/NDB
Danville Regional	GR	C	II	2/20	Precision	341-1/2	Non-Precision (300-1)	No
Dinwiddie County Airport	GR	B	II	5/23	Non-Precision	427-1	Non-Precision (300-1)	No
Farmville Regional	GR	B	II	3/21	Non-Precision	403-1	Non-Precision (300-1)	Localizer
Ingalls Field	GR	B	II	7/25	Precision	315-1	Non-Precision (300-1)	No
Lonesome Pine	GR	C	II	6/24	Non-Precision	609-1	Non-Precision (300-1)	No
Mecklenburg-Brunswick Regional	GR	B	II	1/19	Non-Precision	318-1	Non-Precision (300-1)	No
Middle Peninsula Regional	GR	B	II	9/27	Non-Precision	496-1	Non-Precision (300-1)	Loc/NDB
New River Valley	GR	C	II	6/24	Precision	209-1	Non-Precision (300-1)	No
Shannon	GR	B	I	6/24	Non-Precision	495-1	Non-Precision (300-1)	Localizer
Suffolk Municipal	GR	C	II	4/22	Non-Precision	353-1	Non-Precision (300-1)	No
Tazewell County	GR	B	II	7/25	Non-Precision	528-1	Non-Precision (300-1)	No
Virginia Highlands	GR	B	II	6/24	Non-Precision	732-1	Non-Precision (300-1)	No
William M. Tuck	GR	B	II	1/19	Non-Precision	530-1	Non-Precision (300-1)	Loc/NDB
Winchester Regional	GR	C	II	14/32	Precision	259-1	Non-Precision (300-1)	No
Blackstone Municipal	GC	C	II	4/22	Non-Precision	427-1	Non-Precision (400-1)	No
Brookneal-Campbell County	GC	B	II	7/25	Non-Precision	583-1	Non-Precision (400-1)	No
Emporia-Greenville Regional	GC	B	II	15/33	Non-Precision	299-1	Non-Precision (400-1)	No

Table 12

Precision Approach Capability Requirements

	Service Role	Approach Category	Design Group	Primary Runway	Existing Instrument Approach Capability (1)	Existing Instrument Approach Minima (1)	Desired Instrument Approach Capability (Type, Minimums)	Improvements Recommended
Franklin Municipal	GC	B	II	9/27	Non-Precision	443-3/4	Non-Precision (400-1)	No
Front Royal-Warren County	GC	B	I	9/27	Visual		Non-Precision (400-1)	Yes
Lee County (New)	GC	B	II	6/24	None		Non-Precision (400-1)	No
Louisa County	GC	B	II	9/27	Non-Precision	387-1	Non-Precision (400-1)	No
Luray Caverns	GC	B	II	4/22	Non-Precision	1358-1 1/4	Non-Precision (400-1)	No
Marks Municipal	GC	B	II	4/22	Non-Precision	417-1	Non-Precision (400-1)	No
Mountain Empire	GC	B	II	8/26	Non-Precision	524-1	Non-Precision (400-1)	No
New Kent County	GC	B	I	10/28	Non-Precision	577-1	Non-Precision (400-1)	No
Orange County	GC	B	I	7/25	Non-Precision	674-1	Non-Precision (400-1)	No
Tangier Island	GC	C	II	2/20	Non-Precision	713-1	Non-Precision (400-1)	No
Tappahannock-Essex Co. (New)	GC	B	II	8/26	None		Non-Precision (400-1)	No
Twin County	GC	B	I	18/36	Non-Precision	367-1	Non-Precision (400-1)	No
Virginia Tech	GC	C	II	12/30	Non-Precision	341-1	Non-Precision (400-1)	No
Wakefield Municipal	GC	B	II	2/20	Non-Precision	727-1	Non-Precision (400-1)	No
Williamsburg-Jamestown	GC	B	II	13/31	Non-Precision	631-1	Non-Precision (400-1)	No
Bridgewater Air Park	LO	B	II	15/33	Non-Precision	1135-1 1/4	Visual	No
Chase City Municipal	LO	B	I	18/36	Non-Precision	694-1	Visual	No
Crewe Municipal	LO	B	I	15/33	Visual		Visual	No
Falwell	LO	A	I	10/28	Visual		Visual	No
Gordonsville Municipal	LO	B	I	5/23	Non-Precision	1038-1 1/4	Visual	No
Grundy Municipal	LO	B	I	4/22	Non-Precision	416-1	Visual	No
Hartwood Field	LO	A	I	17/35	Visual		Visual	No
Hummel Field	LO	B	II	18/36	Non-Precision	490-1	Visual	No
Lake Anna	LO	A	II	8/26	Visual		Visual	No
Lawrenceville-Brunswick	LO	B	I	18/36	Visual		Visual	No
Lee County	LO	B	II	7/25	Visual		Visual	No
Lunenburg County	LO	B	I	2/20	Visual		Visual	No
New London	LO	B	I	16/34	Visual		Visual	No
New Market	LO	B	I	6/24	Visual		Visual	No
Smith Mountain Lake	LO	B	I	5/23	Non-Precision	674-1	Visual	No
Tappahannock Municipal	LO	B	I	2/20	Visual		Visual	No
Waynesboro	LO	B	I	6/24	Visual		Visual	No

1) Approach data current as of 08/2001. Instrument approach minima includes decision height or minimum descent altitude (as appropriate) and visibility minimums. Criteria do not reflect approaches that require special aircrew and aircraft certification.

2) ILS/MALSR to be commissioned Spring 2002.

Source: HNTB Analysis

Table 13

Runway Lighting Requirements

Airport Name	Service Role	Primary Runway	Existing Runway Lights	Guideline for Runway Lights (1)	Improvements Recommended
Charlottesville-Albemarle	CM	3/21	HIRL	HIRL	No
Lynchburg Regional	CM	4/22	HIRL	HIRL	No
Newport News-Williamsburg International	CM	7/25	HIRL	HIRL	No
Norfolk International	CM	5/23	HIRL	HIRL	No
Richmond International	CM	16/34	HIRL	HIRL	No
Roanoke Regional	CM	6/24	HIRL	HIRL	No
Ronald Reagan Washington National	CM	1/19	HIRL	HIRL	No
Shenandoah Valley Regional	CM	5/23	HIRL	HIRL	No
Washington Dulles International	CM	1R/19L	HIRL	HIRL	No
Chesapeake Regional	RL	5/23	MIRL	HIRL	Yes
Chesterfield County	RL	15/33	HIRL	HIRL	No
Hampton Roads	RL	10/28	MIRL	HIRL	Yes
Hanover County Municipal	RL	16/34	MIRL	HIRL	Yes
Leesburg Executive	RL	17/35	MIRL	HIRL	Yes
Manassas Regional	RL	16L/34R	HIRL	HIRL	No
Stafford Regional (New)	RL	15/33	HIRL	HIRL	No
Warrenton-Fauquier	RL	14/32	MIRL	HIRL	Yes
Accomack County	GR	3/21	MIRL	MIRL	No
Blue Ridge	GR	12/30	MIRL	MIRL	No
Culpeper County	GR	4/22	MIRL	MIRL	No
Danville Regional	GR	2/20	HIRL	MIRL	No
Dinwiddie County Airport	GR	5/23	MIRL	MIRL	No
Farmville Regional	GR	3/21	MIRL	MIRL	No
Ingalls Field	GR	7/25	HIRL	MIRL	No
Lonesome Pine	GR	6/24	HIRL	MIRL	No
Mecklenburg-Brunswick Regional	GR	1/19	MIRL	MIRL	No
Middle Peninsula Regional	GR	9/27	MIRL	MIRL	No
New River Valley	GR	6/24	HIRL	MIRL	No
Shannon	GR	6/24	MIRL	MIRL	No
Suffolk Municipal	GR	4/22	HIRL	MIRL	No
Tazewell County	GR	7/25	MIRL	MIRL	No
Virginia Highlands	GR	6/24	MIRL	MIRL	No
William M. Tuck	GR	1/19	LIRL	MIRL	Yes
Winchester Regional	GR	14/32	MIRL	MIRL	No
Blackstone Municipal	GC	4/22	None	MIRL	Yes
Brookneal-Campbell County	GC	7/25	None	MIRL	Yes
Emporia-Greenville Regional	GC	15/33	MIRL	MIRL	No
Franklin Municipal	GC	9/27	MIRL	MIRL	No
Front Royal-Warren County	GC	9/27	MIRL	MIRL	No

Table 13

Runway Lighting Requirements

Airport Name	Service Role	Primary Runway	Existing Runway Lights	Guideline for Runway Lights (1)	Improvements Recommended
Lee County (New)	GC		None	MIRL	Yes
Louisa County	GC	9/27	MIRL	MIRL	No
Luray Caverns	GC	4/22	MIRL	MIRL	No
Marks Municipal	GC	4/22	MIRL	MIRL	No
Mountain Empire	GC	8/26	MIRL	MIRL	No
New Kent County	GC	10/28	MIRL	MIRL	No
Orange County	GC	7/25	MIRL	MIRL	No
Tangier Island	GC	2/20	None	MIRL	Yes
Tappahannock-Essex Co. (New)	GC		None	MIRL	Yes
Twin County	GC	18/36	MIRL	MIRL	No
Virginia Tech	GC	12/30	MIRL	MIRL	No
Wakefield Municipal	GC	2/20	None	MIRL	Yes
Williamsburg-Jamestown	GC	13/31	MIRL	MIRL	No

1) High Intensity Runway Lights (HIRL) are recommended for Commercial Service and Reliever airports. Medium Intensity Runway Lights (MIRL) are recommended for GA Regional and GA Community airports.

Source: HNTB Analysis

Table 14

RTR/GCO/RCO

Airport Name	Service Role	Existing GCO	Existing RTR	Existing RCO	GCO/RTR/RCO
					Improvement Recommended(1)
Charlottesville-Albemarle	CM			RCO	No
Lynchburg Regional	CM			RCO	No
Newport News-Williamsburg International	CM			RCO	No
Norfolk International	CM			RCO	No
Richmond International	CM			RCO	No
Roanoke Regional	CM			RCO	No
Ronald Reagan Washington National	CM			RCO	No
Shenandoah Valley Regional	CM				Yes
Washington Dulles International	CM			RCO	No
Chesapeake Regional	RL	GCO	RTR		No
Chesterfield County	RL		RTR		No
Hampton Roads	RL	GCO			No
Hanover County Municipal	RL		RTR		No
Leesburg Executive	RL	GCO	RTR		No
Manassas Regional	RL		RTR		No
Stafford Regional (New)	RL				Yes
Warrenton-Fauquier	RL	GCO			No
Accomack County	GR	GCO			No
Blue Ridge	GR		RTR		No
Culpeper County	GR	GCO			No
Danville Regional	GR			RCO	No
Dinwiddie County Airport	GR	GCO			No
Farmville Regional	GR	GCO			No
Ingalls Field	GR				Yes
Lonesome Pine	GR				No
Mecklenburg-Brunswick Regional	GR	GCO			No
Middle Peninsula Regional	GR			RCO	No
New River Valley	GR		RTR	RCO	No
Shannon	GR	GCO			No
Suffolk Municipal	GR	GCO			No
Tazewell County	GR	GCO			No
Virginia Highlands	GR			RCO	No
William M. Tuck	GR			RCO	No
Winchester Regional	GR		RTR		No
Blackstone Municipal	GC				No
Brookneal-Campbell County	GC				No
Emporia-Greenville Regional	GC				No
Franklin Municipal	GC	GCO			No
Front Royal-Warren County	GC				No

Table 14

RTR/GCO/RCO

Airport Name	Service Role	Existing GCO	Existing RTR	Existing RCO	GCO/RTR/RCO Improvement Recommended(1)
Lee County (New)	GC				No
Louisa County	GC				No
Luray Caverns	GC				No
Marks Municipal	GC				No
Mountain Empire	GC				No
New Kent County	GC	GCO			No
Orange County	GC	GCO			No
Tangier Island	GC			RCO	No
Tappahannock-Essex Co. (New)	GC				No
Twin County	GC	GCO			No
Virginia Tech	GC		RTR		No
Wakefield Municipal	GC			RCO	No
Williamsburg-Jamestown	GC	GCO			No

1) Ground Communication Outlets (GCO) or Remote Transmit Receive (RTR) are recommended for Commercial Service airports only if the airport is not served by an air traffic control tower. A GCO or RTR is also recommended at Reliever, and GA Regional airports.

Source: HNTB Analysis

Table 15

Vertical Guidance Visual Aids

Airport Name	Service Role	Primary Runway	Existing VGVA RW End 1	Existing VGVA RW End 2	VGVA Improvement Recommended (1)
Charlottesville-Albemarle	CM	3/21	None	VASI	Yes
Lynchburg Regional	CM	4/22	PAPI(P4L)	VASI(V4L)	Yes
Newport News-Williamsburg International	CM	7/25	None	VASI	Yes
Norfolk International	CM	5/23	PAPI(P4L)	PAPI(P4L)	No
Richmond International	CM	16/34	VASI(V4L)	None	Yes
Roanoke Regional	CM	6/24	VASI(V4L)	None	Yes
Ronald Reagan Washington National	CM	1/19	None	VASI(V12)	Yes
Shenandoah Valley Regional	CM	5/23	PAPI(P4L)	PAPI(P4L)	No
Washington Dulles International	CM	1R/19L	None	None	Yes
Chesapeake Regional	RL	5/23	PAPI	PAPI	No
Chesterfield County	RL	15/33	PAPI(P4L)	PAPI(P4L)	No
Hampton Roads	RL	10/28	APAP(PNIL)	APAP(PNIR)	Yes
Hanover County Municipal	RL	16/34	APAP(PNIL)	None	Yes
Leesburg Executive	RL	17/35	PAPI(P4L)	PAPI(P4R)	No
Manassas Regional	RL	16L/34R	PAPI(P4L)	PAPI(P4L)	No
Stafford Regional (New)	RL	15/33	PAPI	PAPI	No
Warrenton-Fauquier	RL	14/32	APAP(PNIL)	APAP(PNIL)	Yes
Accomack County	GR	3/21	PAPI	PAPI	No
Blue Ridge	GR	12/30	PAPI	PAPI	No
Culpeper County	GR	4/22	APAP(PNIR)	APAP(PNIL)	Yes
Danville Regional	GR	2/20	PAPI	PAPI	No
Dinwiddie County Airport (2)	GR	5/23	PAPI	PAPI	No
Farmville Regional	GR	3/21	PAPI(P2L)	PAPI(P2L)	No
Ingalls Field	GR	7/25	PAPI	PAPI	No
Lonesome Pine	GR	6/24	PAPI(P2L)	PAPI(P2R)	No
Mecklenburg-Brunswick Regional	GR	1/19	PAPI(P2L)	PAPI(P2L)	No
Middle Peninsula Regional	GR	9/27	None	None	Yes
New River Valley	GR	6/24	None	None	Yes
Shannon	GR	6/24	APAP(PNIL)	APAP(PNIL)	Yes
Suffolk Municipal	GR	4/22	PAPI(P4L)	PAPI(P4L)	No
Tazewell County	GR	7/25	None	PAPI(P2L)	Yes
Virginia Highlands	GR	6/24	None	None	Yes
William M. Tuck	GR	1/19	APAP(PNIL)	None	Yes
Winchester Regional	GR	14/32	PAPI (P2L)	PAPI (P2L)	No
Blackstone Municipal	GC	4/22	None	None	Yes
Brookneal-Campbell County	GC	7/25	None	None	Yes
Emporia-Greenville Regional	GC	15/33	PAPI	PAPI	No
Franklin Municipal	GC	9/27	APAP(PNIL)	VASI	Yes

Table 15

Vertical Guidance Visual Aids

Airport Name	Service Role	Primary Runway	Existing VGVA		VGVA
			RW End 1	RW End 2	Improvement Recommended (1)
Front Royal-Warren County	GC	9/27	None	None	Yes
Lee County (New)	GC	6/24	None	None	Yes
Louisa County	GC	9/27	PAPI(2L)	PAPI(2L)	No
Luray Caverns	GC	4/22	APAP(PNIL)	APAP(PNIL)	Yes
Marks Municipal	GC	4/22	None	None	Yes
Mountain Empire	GC	8/26	PAPI(P2L)	PAPI(P2L)	No
New Kent County	GC	10/28	PAPI(P2L)	PAPI(P2L)	No
Orange County	GC	7/25	PAPI(P2L)	PAPI(P2L)	No
Tangier Island	GC	2/20	None	None	Yes
Tappahannock-Essex Co. (New)	GC	8/26	None	None	Yes
Twin County	GC	18/36	APAP(PNIL)	APAP(PNIL)	Yes
Virginia Tech	GC	12/30	PVASI (PSIL)	PVASI (PSIL)	Yes
Wakefield Municipal	GC	2/20	APAP(PNIL)	APAP(PNIL)	Yes
Williamsburg-Jamestown	GC	13/31	APAP(PNIL)	APAP(PNIL)	Yes
Bridgewater Air Park	LO	15/33	Non-FAA VASI	Non-FAA VASI	No
Chase City Municipal	LO	18/36	None	None	Yes
Crewe Municipal	LO	15/33	APAP(PNIL)	APAP(PNIL)	No
Falwell	LO	10/28	n/a	VASI(P1)	No
Gordonsville Municipal	LO	5/23	APAP(PNIR)	APAP(PNIR)	No
Grundy Municipal	LO	4/22	APAP(PNIL)	APAP(PNIL)	No
Hartwood Field	LO	17/35	None	None	Yes
Hummel Field	LO	18/36	APAP(PNIR)	APAP(PNIL)	No
Lake Anna	LO	8/26	None	None	Yes
Lawrenceville-Brunswick	LO	18/36	APAP(PNIL)	APAP(PNIL)	No
Lee County	LO	7/25	APAP(PNIL)	APAP(PNIL)	No
Lunenburg County	LO	2/20	APAP(PNIL)	APAP(PNIL)	No
New London	LO	16/34	None	None	Yes
New Market	LO	6/24	None	None	Yes
Smith Mountain Lake	LO	5/23	None	None	Yes
Tappahannock Municipal	LO	2/20	APAP(PNIR)	APAP(PNIL)	No
Waynesboro	LO	6/24	None	None	Yes

1) A Vertical Guidance Visual Aid (VGVA) is recommended for all primary runway ends. A Precision Approach Path Indicator (PAPI) is recommended for all but Local Service airports, which may be served by a minimal State system.

2) PAPI's will be installed in the fall of 2001 as part of an overlay of the primary runway. The runway currently has a VASI (V2L) unit on each runway end.

Source: HNTB Analysis

Table 16

Runway End Identification Lights

Airport Name	Service Role	Primary Runway	Existing REIL RW End 1 (1)	Existing REIL RW End 2 (1)	Improvement Recommended
Charlottesville-Albemarle	CM	3/21	MALSR	REIL	No
Lynchburg Regional	CM	4/22	MALSR	REIL	No
Newport News-Williamsburg International	CM	7/25	MALSR	REIL	No
Norfolk International	CM	5/23	MALSR	MALSF/ REIL	No
Richmond International	CM	16/34	MALSR	ALSF2	No
Roanoke Regional	CM	6/24	MALSR	REIL	No
Ronald Reagan Washington National	CM	1/19	ALSF2	MALSF/ REIL	No
Shenandoah Valley Regional	CM	5/23	MALSR	REIL	No
Washington Dulles International	CM	1R/19L	ALSF2	MALSR	No
Chesapeake Regional	RL	5/23	ODALS	REIL	No
Chesterfield County	RL	15/33	REIL	MALSR	No
Hampton Roads	RL	10/28			Runway 10/28
Hanover County Municipal	RL	16/34	REIL	REIL	No
Leesburg Executive	RL	17/35	ODALS	REIL	No
Manassas Regional	RL	16L/34R	MALSR	REIL	No
Stafford Regional (New)	RL	15/33	REIL	REIL	No
Warrenton-Fauquier	RL	14/32			Runway 14
Accomack County	GR	3/21	REIL	REIL	No
Blue Ridge	GR	12/30	REIL	ODALS	No
Culpeper County	GR	4/22			Runway 22
Danville Regional	GR	2/20	MALSR	REIL	No
Dinwiddie County Airport	GR	5/23	ODALS	REIL	No
Farmville Regional	GR	3/21			Runway 3/21
Ingalls Field	GR	7/25		REIL	Runway 7
Lonesome Pine	GR	6/24	REIL	ODALS (NS)	No
Mecklenburg-Brunswick Regional	GR	1/19	REIL	REIL	No
Middle Peninsula Regional	GR	9/27			No
New River Valley (3)	GR	6/24	MALSR		Runway 24
Shannon	GR	6/24			Runway 24
Suffolk Municipal	GR	4/22	REIL	REIL	No
Tazewell County	GR	7/25	REIL	REIL	No
Virginia Highlands	GR	6/24			Runway 24
William M. Tuck	GR	1/19	REIL		No
Winchester Regional	GR	14/32	REIL	MALSR	No
Blackstone Municipal	GC	4/22			Runway 4/22
Brookneal-Campbell County	GC	7/25			No
Emporia-Greenville Regional	GC	15/33	REIL	REIL	No
Franklin Municipal	GC	9/27		ODALS	Runway 9

Table 16

Runway End Identification Lights

Airport Name	Service Role	Primary Runway	Existing REIL RW End 1 (1)	Existing REIL RW End 2 (1)	Improvement Recommended
Front Royal-Warren County	GC	9/27			No
Lee County (New)	GC	06/24	None	None	No
Louisa County	GC	9/27	REIL	REIL	No
Luray Caverns	GC	4/22			Runway 22
Marks Municipal	GC	4/22			Runway 4
Mountain Empire	GC	8/26	REIL	REIL	No
New Kent County	GC	10/28	REIL	REIL	No
Orange County	GC	7/25	REIL	REIL	No
Tangier Island	GC	2/20			Runway 2
Tappahannock-Essex Co. (New)	GC	8/26	None	None	No
Twin County	GC	18/36			Runway 18/36
Virginia Tech	GC	12/30	ODALS	REIL	No
Wakefield Municipal	GC	2/20			Runway 20
Williamsburg-Jamestown	GC	13/31	REIL	REIL	No

- 1) Runway end identification lights (REIL) are recommended for all straight-in approaches where no approach lighting system exists. Outlined cells reflect runways with a straight-in approach.
 2) REIL will be installed at New River Valley in the Summer of 2002.

Source: HNTB Analysis

Table 17

AWOS/ASOS Requirements

Airport Name	Service Role	Existing Weather Reporting	Weather Reporting Improvement Recommended (5 year) (1)	Weather Reporting Improvement Recommended (20 year) (1)
Charlottesville-Albemarle	CM	ASOS	No	No
Lynchburg Regional	CM	ASOS	No	No
Newport News-Williamsburg International	CM	ASOS	No	No
Norfolk International	CM	ASOS	No	No
Richmond International	CM	ASOS	No	No
Roanoke Regional	CM	ASOS	No	No
Ronald Reagan Washington National	CM	ASOS	No	No
Shenandoah Valley Regional	CM	AWOS-3 P-T	No	Yes
Washington Dulles International	CM	ASOS	No	No
Chesapeake Regional	RL	AWOS-3	Yes	Yes
Chesterfield County	RL	AWOS-3	Yes	Yes
Hampton Roads	RL	AWOS-3	Yes	Yes
Hanover County Municipal	RL	ASOS	No	No
Leesburg Executive	RL	AWOS-3	Yes	Yes
Manassas Regional	RL	AWOS-3	Yes	Yes
Stafford Regional (New)	RL	AWOS-3	Yes	Yes
Warrenton-Fauquier	RL	None	Yes	Yes
Accomack County	GR	AWOS-3	Yes	Yes
Blue Ridge	GR	AWOS-3	Yes	Yes
Culpeper County	GR	AWOS-3	Yes	Yes
Danville Regional	GR	ASOS	No	No
Dinwiddie County Airport	GR	AWOS-3	Yes	Yes
Farmville Regional	GR	AWOS-3	Yes	Yes
Ingalls Field	GR	AWOS-3	Yes	Yes
Lonesome Pine	GR	AWOS-3	Yes	Yes
Mecklenburg-Brunswick Regional	GR	AWOS-3	Yes	Yes
Middle Peninsula Regional	GR	None	Yes	Yes
New River Valley	GR	AWOS-3	Yes	Yes
Shannon	GR	AWOS-3	Yes	Yes
Suffolk Municipal	GR	AWOS-3	Yes	Yes
Tazewell County	GR	AWOS-3	Yes	Yes
Virginia Highlands	GR	AWOS-3	Yes	Yes
William M. Tuck	GR	None	Yes	Yes
Winchester Regional	GR	AWOS-3	Yes	Yes

Table 17

AWOS/ASOS Requirements

Airport Name	Service Role	Existing Weather Reporting	Weather Reporting Improvement Recommended (5 year) (1)	Weather Reporting Improvement Recommended (20 year) (1)
Blackstone Municipal	GC	None	n/a	n/a
Brookneal-Campbell County	GC	None	n/a	n/a
Emporia-Greenville Regional	GC	AWOS-3	n/a	n/a
Franklin Municipal	GC	AWOS-3	n/a	n/a
Front Royal-Warren County	GC	None	n/a	n/a
Lee County (New)	GC	None	n/a	n/a
Louisa County	GC	AWOS-3	n/a	n/a
Luray Caverns	GC	None	n/a	n/a
Marks Municipal	GC	None	n/a	n/a
Mountain Empire	GC	AWOS-3	n/a	n/a
New Kent County	GC	None	n/a	n/a
Orange County	GC	AWOS-3	n/a	n/a
Tangier Island	GC	None	n/a	n/a
Tappahannock-Essex Co. (New)	GC	None	n/a	n/a
Twin County	GC	AWOS-3	n/a	n/a
Virginia Tech	GC	AWOS-3	n/a	n/a
Wakefield Municipal	GC	ASOS	n/a	n/a
Williamsburg-Jamestown	GC	AWOS-3	n/a	n/a

1) For Commercial Service, Reliever, and GA Regional airports, AWOS-3 p/t or ASOS is recommended by 2005. AWOS-4 or ASOS is recommended by 2020.

Source: HNTB Analysis

8. ALTERNATIVES

This chapter describes the system alternatives reviewed and evaluated for the 20-year planning period ending in year 2020.

Corporate Jet Accessible Alternatives

As illustrated in Exhibit 1, Virginia has an extensive, mature aviation system, with greater than 97 percent of the 2000 Virginia population within 30 minutes of a GA airport *or* 45 minutes of a Commercial Service Airport¹³. Given such substantial service area coverage, it was decided to primarily focus the alternatives analysis on the ability of corporate aviation to use the Virginia airport system. To establish the most appropriate criteria by which to judge a corporate jet accessible airport, three alternatives were presented to the Study Advisory Group (SAG) for review.

A variety of factors were considered, including runway length and NAVAIDS, amenities such as weather reporting equipment, and the availability of services such as Jet-A fuel. However, preliminary analysis confirmed a direct correlation between runway length/approach type, and the other factors. Accordingly, further analysis focused on runway length and approach type. In addition, all service area contours were changed to 30 minutes, to reflect the GA nature of corporate aviation, even at Commercial Service airports.

Criteria I - Airports with 5,500 feet of runway length and a precision approach.

This criteria included 15 airports with 75.6 percent of the 2000 Virginia population within 30 minutes of an Criteria I Corporate Jet Accessible airport (see Exhibit 2). Assuming the improvements recommended in the System Requirements chapter were implemented, this alternative would eventually include 20 airports, with 81.4 percent of the Virginia population within 30 minutes of a Criteria I airport (see Exhibit 3).

Criteria II - Airports with 5,500 feet of runway length and a non-precision approach.

This criteria included 17 airports, with 76.0 percent of the 2000 Virginia population within 30-minutes of an Criteria II Corporate Jet Accessible airport (see Exhibit 4). Assuming the improvements recommended in the System Requirements chapter were implemented, this alternative would eventually include 29 airports, with 87.5 percent of the Virginia population within 30-minutes of an Criteria II airport (see Exhibit 5).

Criteria III - Airports with 5,000 feet of runway length and a non-precision approach.

This criteria included 27 airports with 85.3 percent of the 2000 Virginia population within 30 minutes of an Criteria III Corporate Jet Accessible airport (see Exhibit 6). Assuming the improvements recommended in the System Requirements chapter were implemented, this alternative would eventually include 35 airports, with 90.0 percent of the Virginia population within 30 minutes of an Criteria III Corporate Jet Accessible airport (see Exhibit 7).

¹³ The methodology for this analysis is provided in Appendix B.

Recommended Corporate Jet Accessible Criteria

Input from the SAG and the National Business Aircraft Association (NBAA) suggested that although some smaller corporate aircraft can operate on a much smaller runway, 5,500 feet of runway length is needed for most corporate jet use, especially when considering a variety of weather conditions. It was also determined that the type of approach was less important than the available approach minima. The approach minima agreed upon included a 400 foot ceiling and 1 statute mile visibility (400-1).

Exhibit 8 shows the 16 airports and 75.7 percent of the Virginia population within 30 minutes of a corporate jet accessible airport. Exhibit 9 shows the 23 airports and 83.3 percent of the population within 30 minutes of a corporate jet accessible airport that could be expected assuming the recommended improvements in the System Requirements chapter were implemented.

The Commonwealth currently has adequate service coverage of corporate jet accessible airports, and the coverage will increase as improvements are implemented. Nonetheless, service gaps remain, especially in southwest Virginia where terrain often makes improvements cost prohibitive. For better geographic coverage, additional improvements should be considered at the airports shown in Table 1. These improvements are recommended solely on the basis of geography, existing facilities, and a preliminary analysis of the feasibility of the improvements. It is important to note that these improvements may not be technically or financially feasible, and their justification will require further detailed analysis.

Table 1

Potential Additional Corporate Jet Accessible Airports

Airport	Existing Runway Length	Recommended Runway Length (1)	Existing Approach Minima	Improvements Needed for Corporate Jet Airport
Culpepper	4002	5500	507-1	Reduce approach minima to 400-1
Blue Ridge	5000	5500	515-1	Reduce approach minima to 400-1
Mt. Empire	5250	5250	524-1	Expand runway to 5,500 ft and reduce approach minima to 400-1
VA Highlands	4470	5500	732-1	Reduce approach minima to 400-1
Lee County	0	5000	0	Expand runway to 5,500 ft and reduce approach minima to 400-1

Note 1: Runway length calculations from facility requirements chapter.

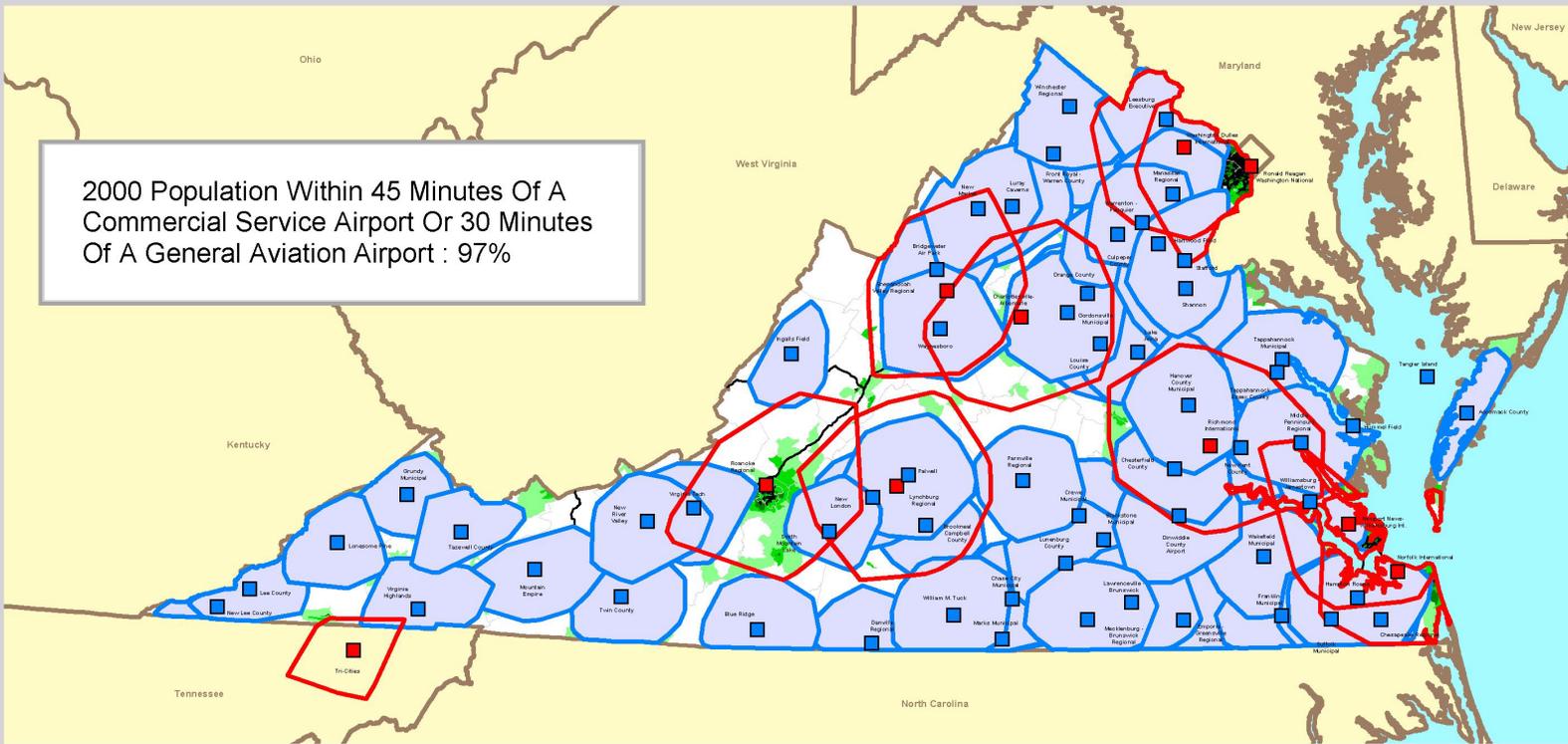
Source: HNTB Analysis



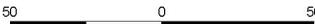
VIRGINIA AIR TRANSPORTATION SYSTEM PLAN

AIRPORT SERVICE AREAS

Alt - Exhibit 1



2000 Population Within 45 Minutes Of A Commercial Service Airport Or 30 Minutes Of A General Aviation Airport : 97%

	45 Minute Commercial Service Travel Time		Commercial Service Airport	2000 Population Per Square Mile  0 - 50  51 - 150  151 - 1,500  1,501 - 3,000  3,001 - 64,000
	30 Minute General Aviation Travel Time		General Aviation Airport	
				



Source: HNTB Analysis



VIRGINIA AIR TRANSPORTATION SYSTEM PLAN

CRITERIA 1 - CORPORATE JET AIRPORTS - EXISTING CONDITIONS

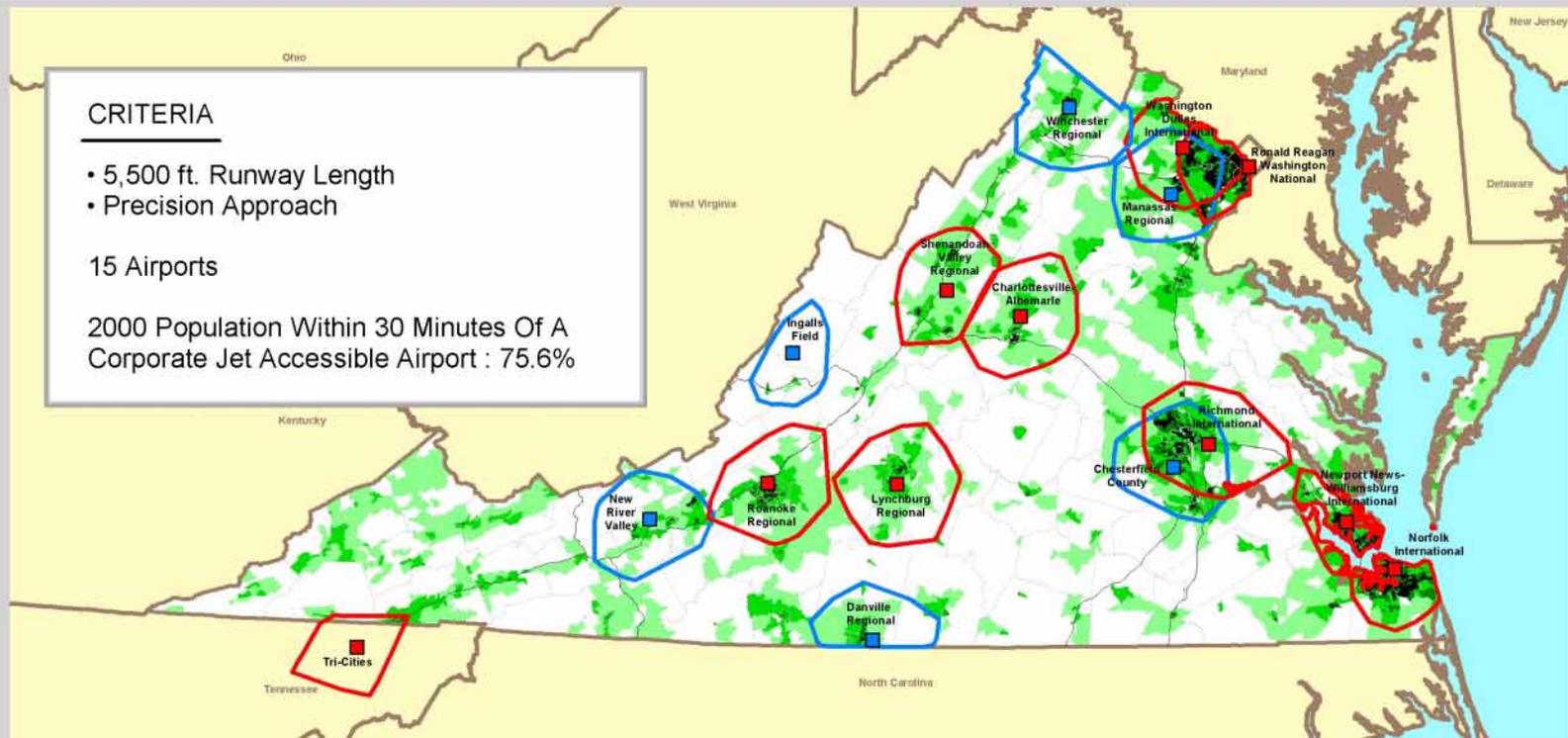
Alt - Exhibit 2

CRITERIA

- 5,500 ft. Runway Length
- Precision Approach

15 Airports

2000 Population Within 30 Minutes Of A Corporate Jet Accessible Airport : 75.6%



- 30 Minute Commercial Service Travel Time
- 30 Minute General Aviation Travel Time

- Corporate Jet Accessible - Commercial Service Airport
- Corporate Jet Accessible - General Aviation Airport

- 2000 Population Per Square Mile
- 0 - 50
 - 51 - 150
 - 151 - 1,500
 - 1,501 - 3,000
 - 3,001 - 64,000

50 0 50 Miles



Source: HNTB Analysis



VIRGINIA AIR TRANSPORTATION SYSTEM PLAN

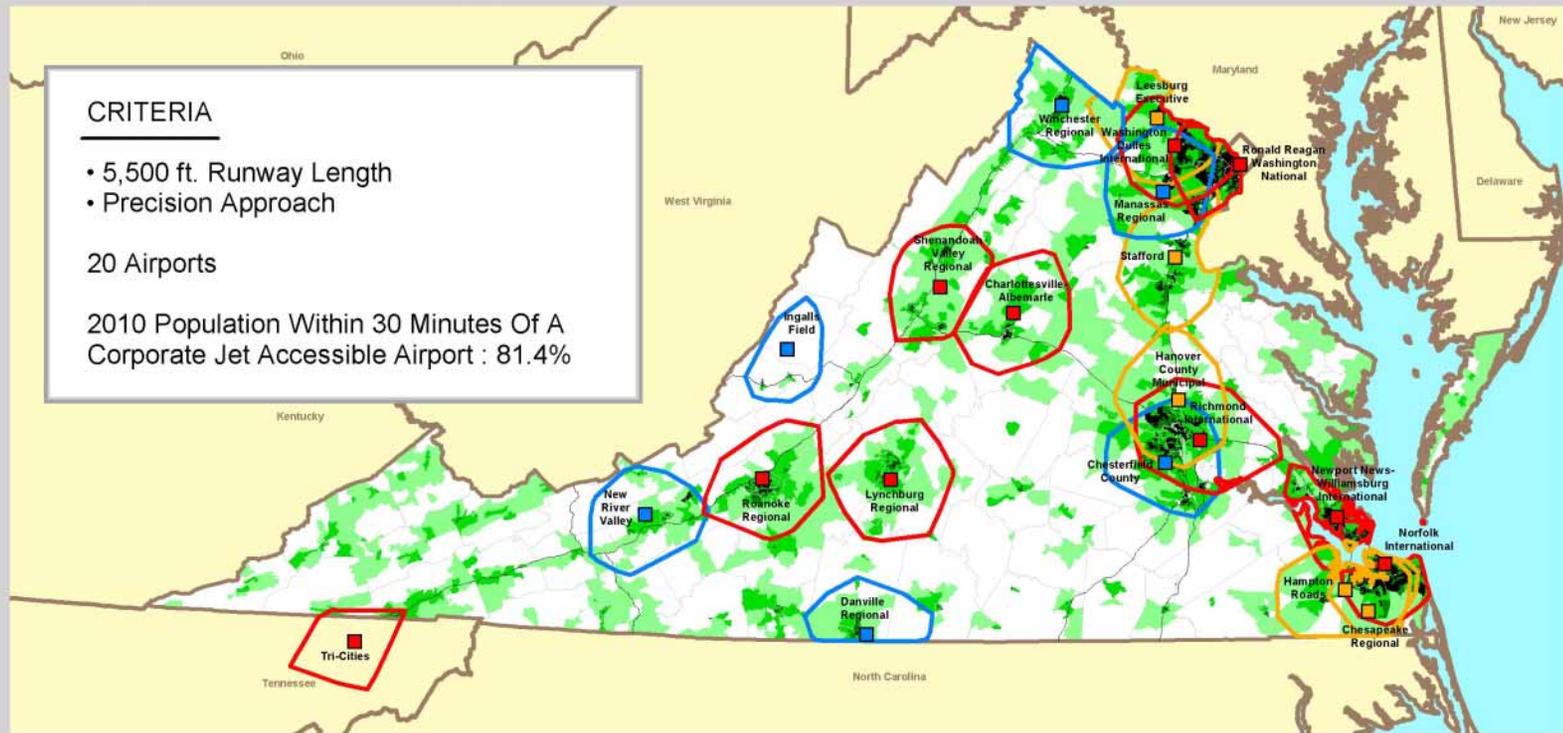
CRITERIA 1 - CORPORATE JET AIRPORTS - WITH RECOMMENDED IMPROVEMENTS Alt - Exhibit 3

CRITERIA

- 5,500 ft. Runway Length
- Precision Approach

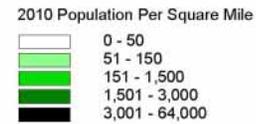
20 Airports

2010 Population Within 30 Minutes Of A Corporate Jet Accessible Airport : 81.4%



- ▭ 30 Minute Commercial Service Travel Time
- ▭ 30 Minute General Aviation Travel Time
- ▭ 30 Minute General Aviation Travel Time (With Recommended Improvements)

- ▣ Corporate Jet Accessible - Commercial Service Airport
- ▣ Corporate Jet Accessible - General Aviation Airport
- ▣ Corporate Jet Accessible - General Aviation Airport (With Recommended Improvements)



50 0 50 Miles



Source: HNTB Analysis



VIRGINIA AIR TRANSPORTATION SYSTEM PLAN

CRITERIA 2 - CORPORATE JET AIRPORTS - EXISTING CONDITIONS

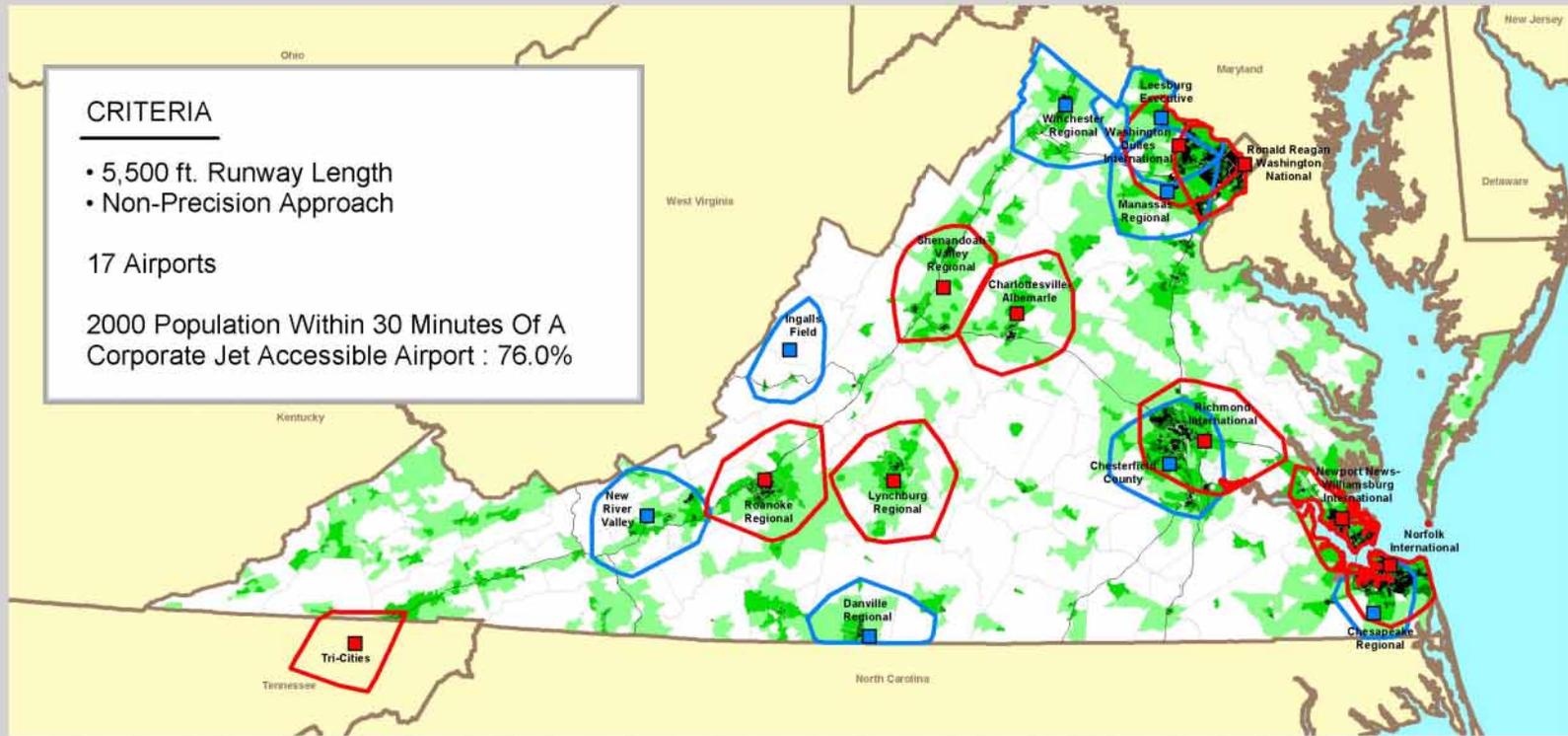
Alt - Exhibit 4

CRITERIA

- 5,500 ft. Runway Length
- Non-Precision Approach

17 Airports

2000 Population Within 30 Minutes Of A Corporate Jet Accessible Airport : 76.0%



 30 Minute Commercial Service Travel Time
 30 Minute General Aviation Travel Time

■ Corporate Jet Accessible - Commercial Service Airport
■ Corporate Jet Accessible - General Aviation Airport

2000 Population Per Square Mile

	0 - 50
	51 - 150
	151 - 1,500
	1,501 - 3,000
	3,001 - 64,000



Source: HNTB Analysis



VIRGINIA AIR TRANSPORTATION SYSTEM PLAN

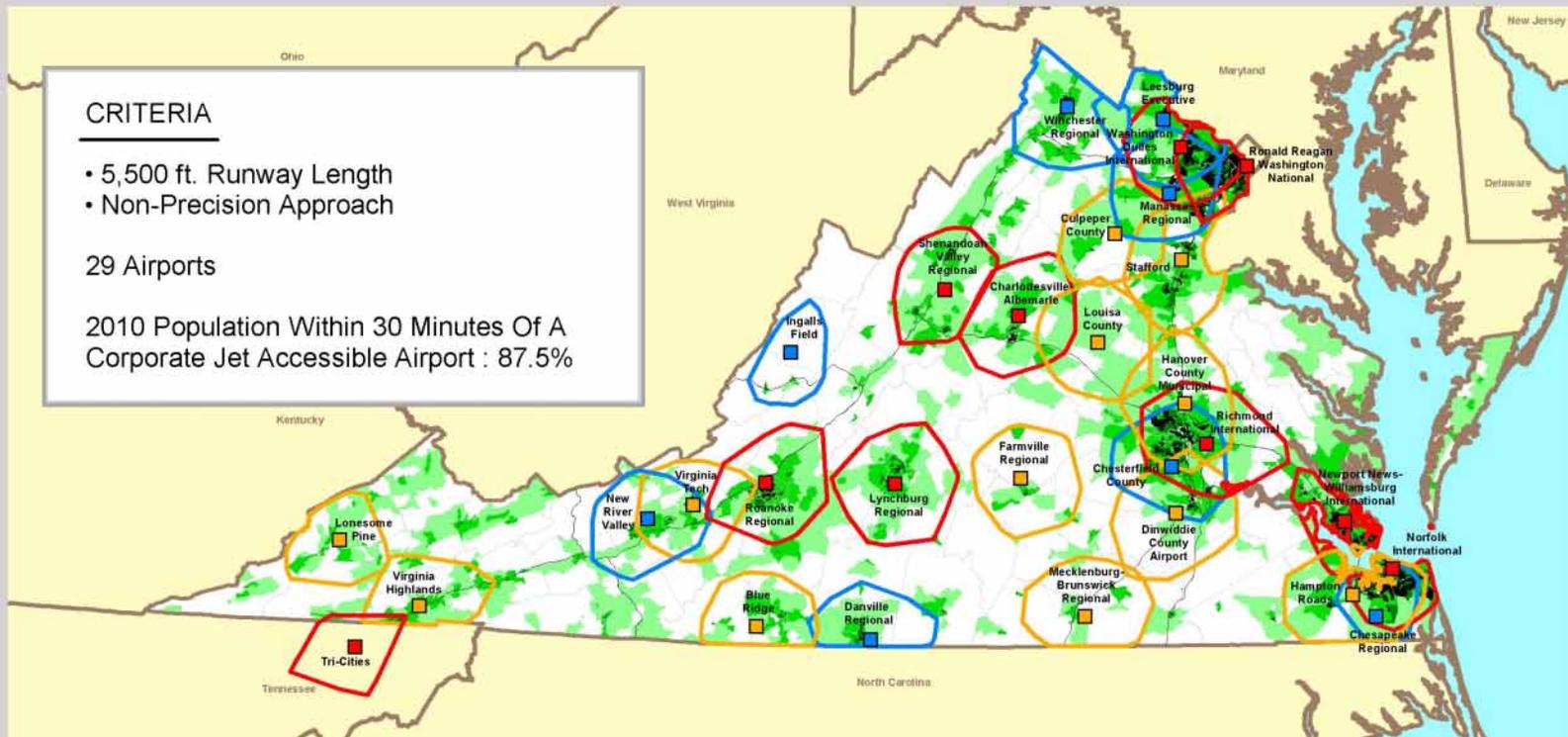
CRITERIA 2 - CORPORATE JET AIRPORTS - WITH RECOMMENDED IMPROVEMENTS Alt - Exhibit 5

CRITERIA

- 5,500 ft. Runway Length
- Non-Precision Approach

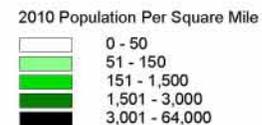
29 Airports

2010 Population Within 30 Minutes Of A Corporate Jet Accessible Airport : 87.5%



- 30 Minute Commercial Service Travel Time
- 30 Minute General Aviation Travel Time
- 30 Minute General Aviation Travel Time (With Recommended Improvements)

- Corporate Jet Accessible - Commercial Service Airport
- Corporate Jet Accessible - General Aviation Airport
- Corporate Jet Accessible - General Aviation Airport (With Recommended Improvements)



Source: HNTB Analysis



VIRGINIA AIR TRANSPORTATION SYSTEM PLAN

CRITERIA 3 - CORPORATE JET AIRPORTS - EXISTING CONDITIONS

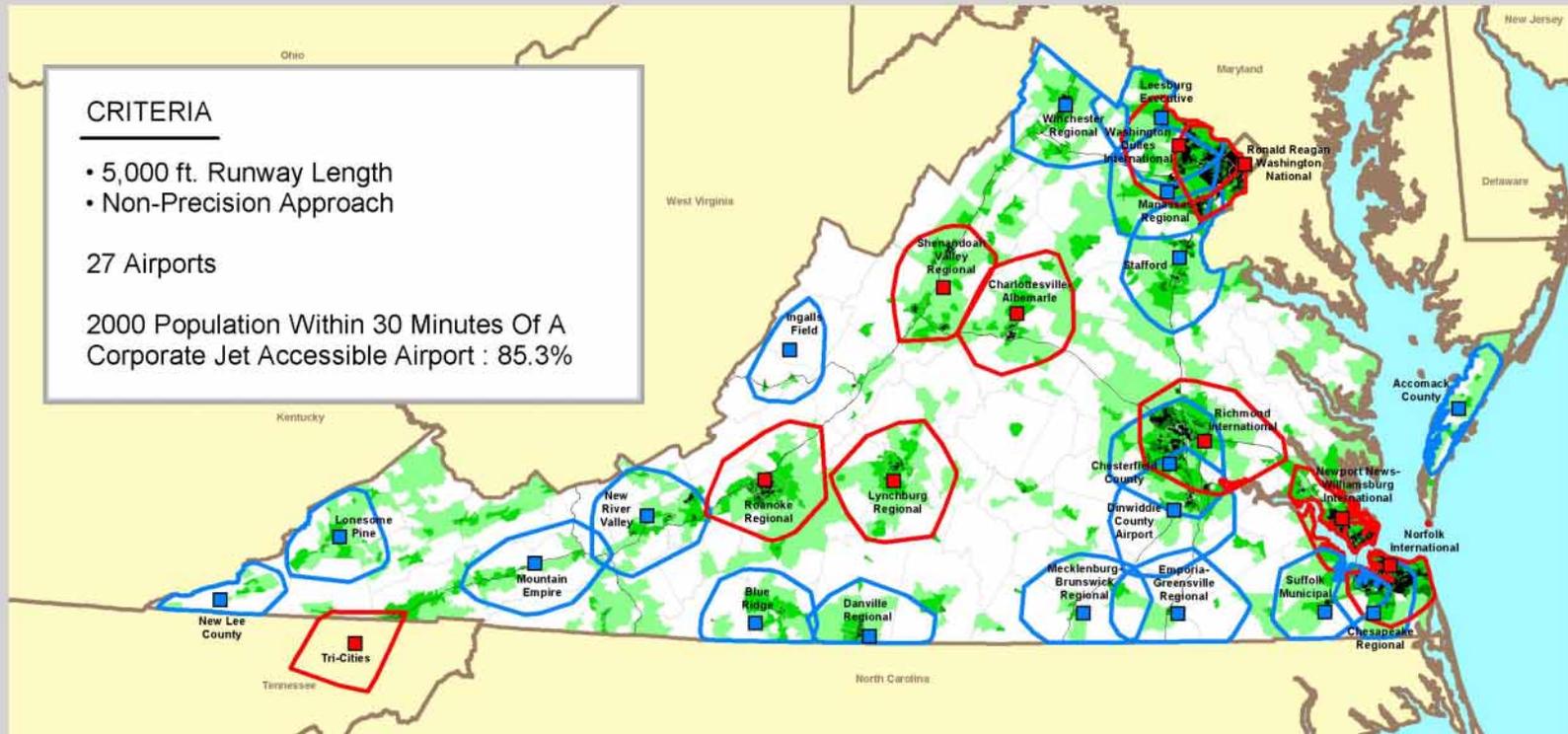
Alt - Exhibit 6

CRITERIA

- 5,000 ft. Runway Length
- Non-Precision Approach

27 Airports

2000 Population Within 30 Minutes Of A Corporate Jet Accessible Airport : 85.3%



- 30 Minute Commercial Service Travel Time
- 30 Minute General Aviation Travel Time

- Corporate Jet Accessible - Commercial Service Airport
- Corporate Jet Accessible - General Aviation Airport

2000 Population Per Square Mile

- 0 - 50
- 51 - 150
- 151 - 1,500
- 1,501 - 3,000
- 3,001 - 64,000

50 0 50 Miles



Source: HNTB Analysis



VIRGINIA AIR TRANSPORTATION SYSTEM PLAN

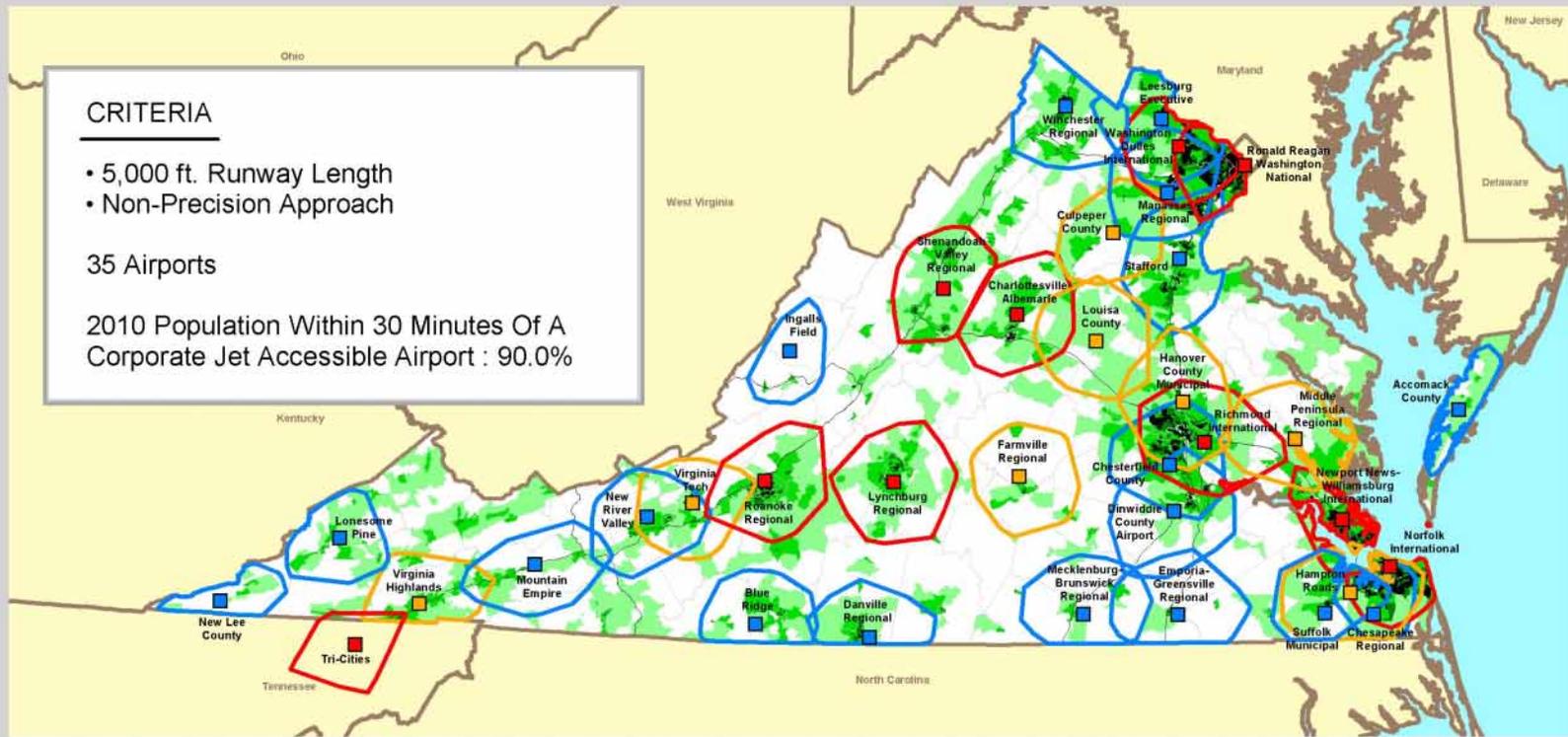
CRITERIA 3 - CORPORATE JET AIRPORTS - WITH RECOMMENDED IMPROVEMENTS Alt - Exhibit 7

CRITERIA

- 5,000 ft. Runway Length
- Non-Precision Approach

35 Airports

2010 Population Within 30 Minutes Of A Corporate Jet Accessible Airport : 90.0%



- 30 Minute Commercial Service Travel Time
- 30 Minute General Aviation Travel Time
- 30 Minute General Aviation Travel Time (With Recommended Improvements)

- Corporate Jet Accessible - Commercial Service Airport
- Corporate Jet Accessible - General Aviation Airport
- Corporate Jet Accessible - General Aviation Airport (With Recommended Improvements)

- 2010 Population Per Square Mile
- 0 - 50
 - 51 - 150
 - 151 - 1,500
 - 1,501 - 3,000
 - 3,001 - 64,000

50 0 50 Miles



Source: HNTB Analysis



VIRGINIA AIR TRANSPORTATION SYSTEM PLAN

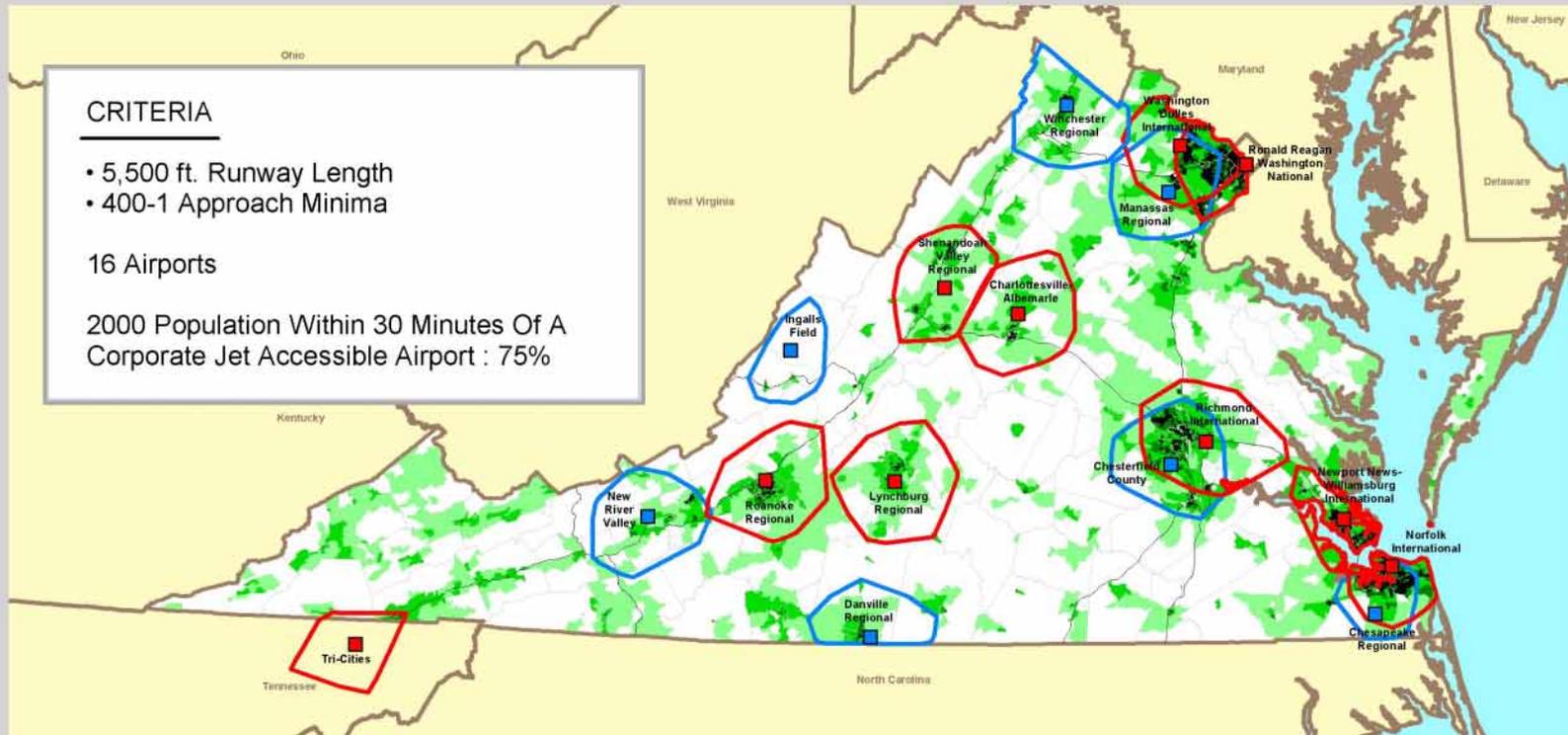
RECOMMENDED CRITERIA - CORPORATE JET AIRPORTS - EXISTING CONDITIONS Alt - Exhibit 8

CRITERIA

- 5,500 ft. Runway Length
- 400-1 Approach Minima

16 Airports

2000 Population Within 30 Minutes Of A Corporate Jet Accessible Airport : 75%



- 30 Minute Commercial Service Travel Time
- 30 Minute General Aviation Travel Time

- Corporate Jet Accessible - Commercial Service Airport
- Corporate Jet Accessible - General Aviation Airport

2000 Population Per Square Mile

- 0 - 50
- 51 - 150
- 151 - 1,500
- 1,501 - 3,000
- 3,001 - 64,000

50 0 50 Miles



Source: HNTB Analysis



VIRGINIA AIR TRANSPORTATION SYSTEM PLAN

RECOMMENDED CRITERIA - CORPORATE JET AIRPORTS
WITH RECOMMENDED IMPROVEMENTS

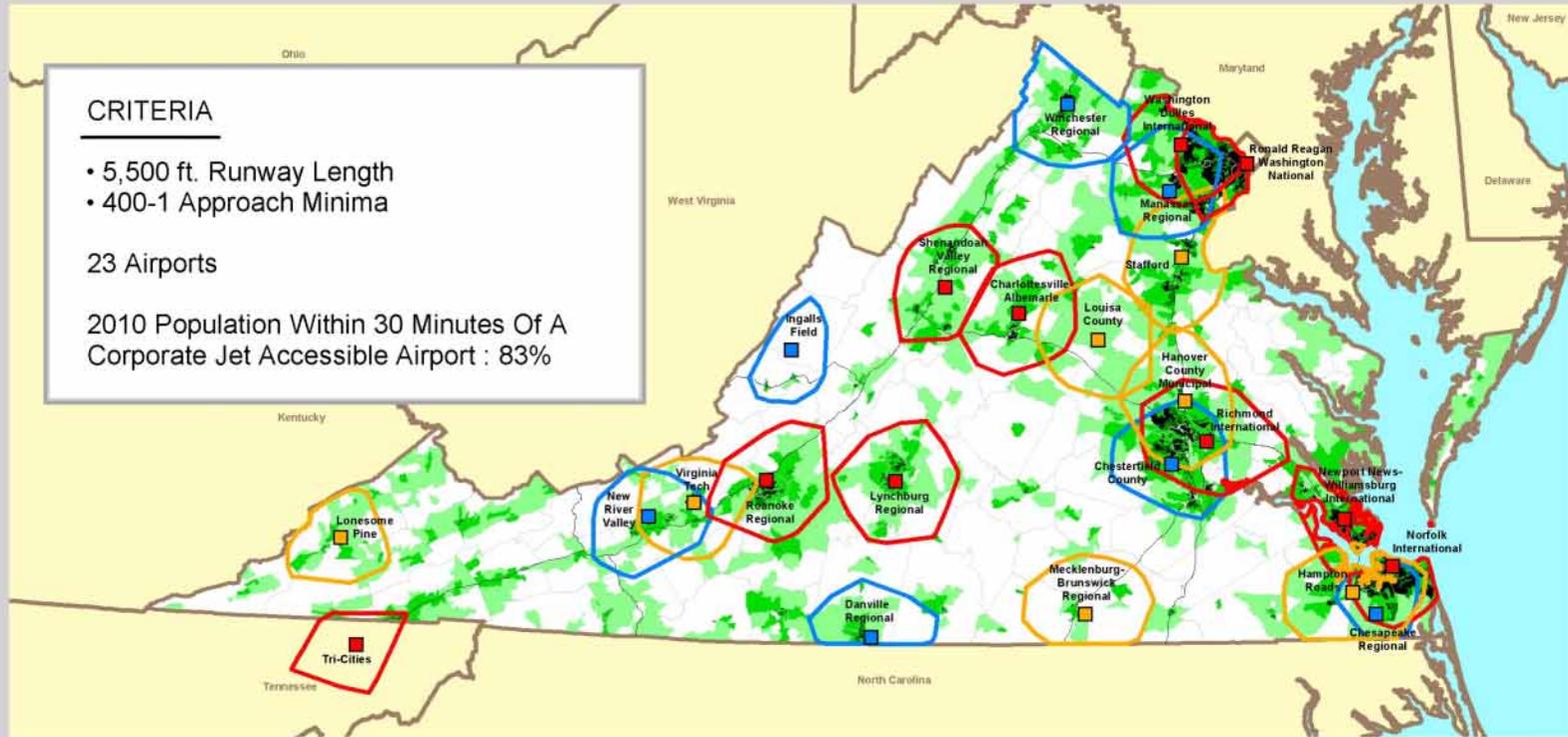
Alt - Exhibit 9

CRITERIA

- 5,500 ft. Runway Length
- 400-1 Approach Minima

23 Airports

2010 Population Within 30 Minutes Of A Corporate Jet Accessible Airport : 83%



- 30 Minute Commercial Service Travel Time
- 30 Minute General Aviation Travel Time
- 30 Minute General Aviation Travel Time (With Recommended Improvements)

- Corporate Jet Accessible - Commercial Service Airport
- Corporate Jet Accessible - General Aviation Airport
- Corporate Jet Accessible - General Aviation Airport (With Recommended Improvements)

- 2010 Population Per Square Mile
- 0 - 50
 - 51 - 150
 - 151 - 1,500
 - 1,501 - 3,000
 - 3,001 - 64,000

50 0 50 Miles



Source: HNTB Analysis

System Alternatives

Alternative 1 – Existing System (Status Quo)

The existing airport system has 67 airports as follows:

› Commercial Service	9
› Reliever	8
› GA Regional	17
› GA Community	17
› GA Local Service	17

As shown in Table 2, and illustrated previously in Exhibit 1, over 97 percent of the 2000 population of Virginia is currently within 30 minutes of a GA airport or 45 minutes of a Commercial Service airport.

Table 2

Population Served

Service Area	2000 Percentage Served	2010 Percentage Served
Within 45-minutes of a Commercial Service Airport	77.57	78.24
Within 30-minutes of a General Aviation Airport	79.99	80.60
Within 45-minutes of a Commercial Service Airport or 30-minutes of a General Aviation Airport	97.18	97.32

Source: HNTB Analysis

Alternative 2 – Expanded System

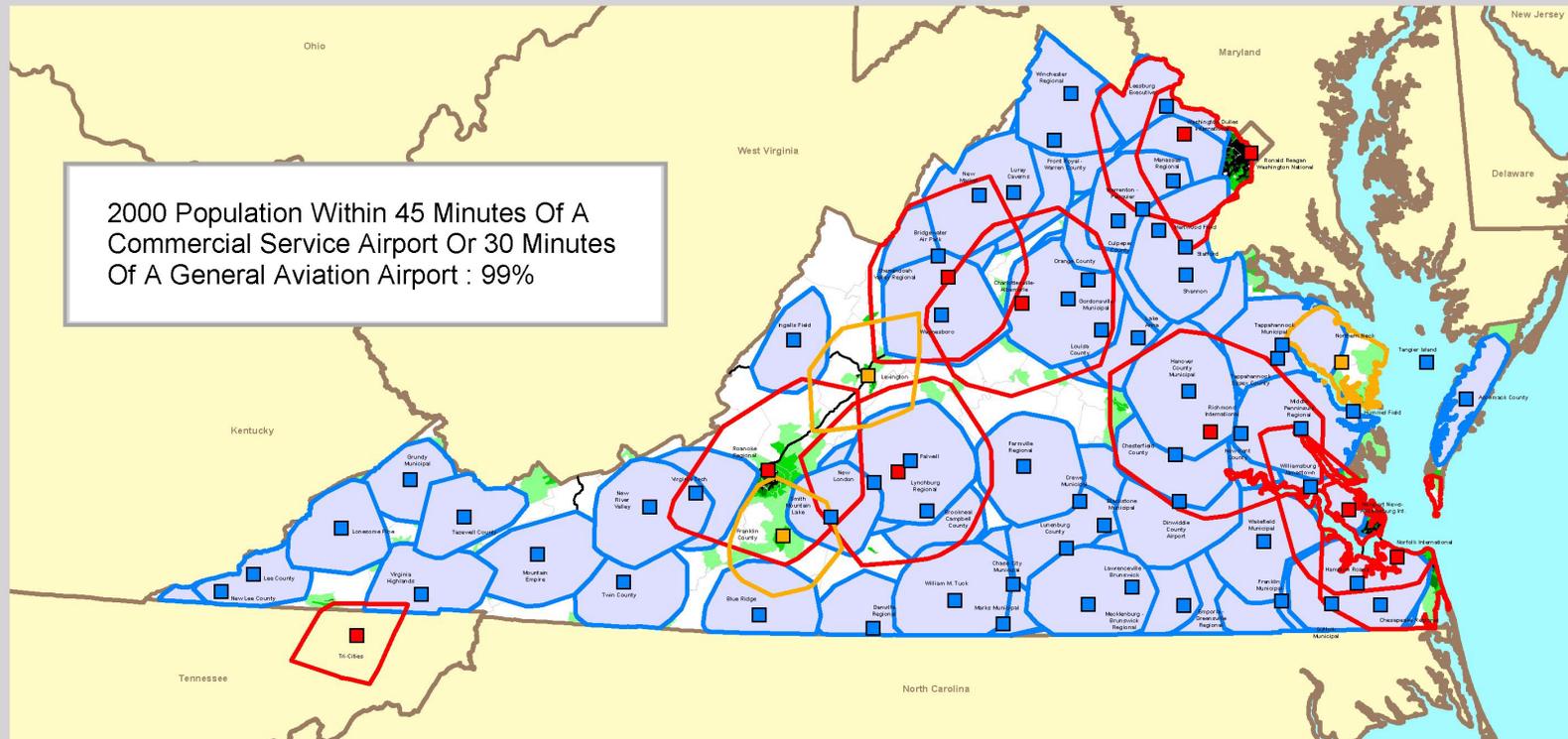
As shown in Exhibit 10, Alternative 2 includes three new GA community airports; one in Franklin County, one in Lexington County, and one in Northern Neck.. The addition of these airports would close populated service area coverage gaps, and, as shown in Table 3, bring over 99 percent of the 2010 population of Virginia within 30 minutes of a GA airport or 45 minutes of a Commercial Service airport. However, it should be noted that although there is an obvious service gap in the Lexington area, a new airport is not welcomed by the community, and has been voted down by referendum. (Also, there are on-going planning studies underway for a new airport in Northern Neck.)



VIRGINIA AIR TRANSPORTATION SYSTEM PLAN

ALTERNATIVE 2 - EXPANDED SYSTEM

Alt - Exhibit 10



	45 Minute Commercial Service Travel Time		Commercial Service Airport	2000 Population Per Square Mile 0 - 50 51 - 150 151 - 1,500 1,501 - 3,000 3,001 - 64,000
	30 Minute General Aviation Travel Time		General Aviation Airport	
	30 Minute Proposed General Aviation Travel Time		Proposed General Aviation Airport	

Source: HNTB Analysis

Table 3

Recommended New Airports

Location	Additional Population Served	Additional Percentage of 2010 Population Served
Franklin County	124,900	1.63
Lexington	40,600	0.53
Northern Neck	19,100	0.24

Source: HNTB Analysis

Alternative 3 – Condensed System

There are several airports that serve significantly redundant service areas. These include:

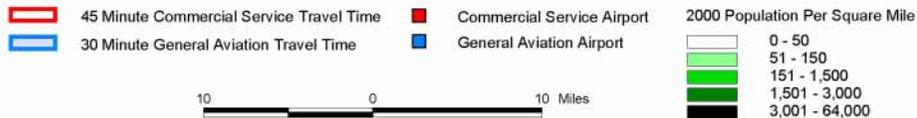
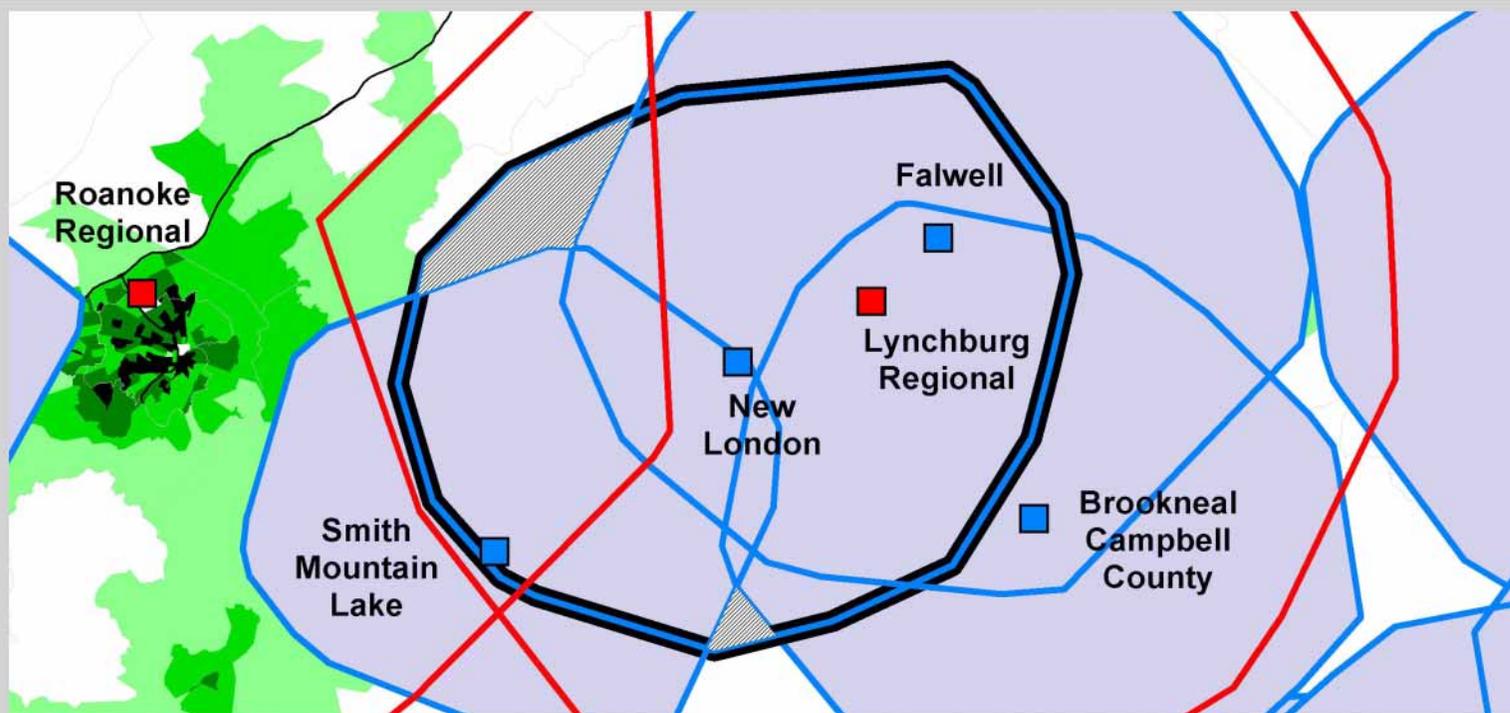
- § **New London** – As shown in Exhibit 11, New London Airport shares its service area with Smith Mountain Lake, Falwell, and Brookneal Campbell County. It only exclusively serves the small area in the far northwest corner of its service area.
- § **Lake Anna** - As shown in Exhibit 12, Lake Anna shares its service area with Stafford Regional, Hanover County Municipal, Shannon, Louisa County, Orange County, and Gordonsville Municipal airports. It only serves exclusively a very small triangle near the center of its service area.
- § **Lunenburg County** - As shown in Exhibit 13, Lunenburg County shares its service area with Farmville Regional, Mecklenburg Brunswick Regional, Lawrenceville-Brunswick, Marks Municipal, Chase City Municipal, Blackstone Municipal, and Crewe Municipal airports. Its exclusive service area is an extremely small parcel at the north-northwest boundary of its service area.
- § **New Market** - As shown in Exhibit 14, New Market shares its service area with Front Royal-Warren County, Luray Caverns, and Bridgewater Air Park. It does exclusively serve a sparsely populated area near its north-northwest service area border.
- § **Hartwood** - As shown in Exhibit 15, Hartwood shares its service area with Warrenton-Fauquier, Culpeper County, Stafford Regional, Shannon, Orange County, and Manassas Regional airports. It has no exclusive service area.



VIRGINIA AIR TRANSPORTATION SYSTEM PLAN

ALTERNATIVE 3 - CONDENSED SYSTEM - NEW LONDON AIRPORT

Alt - Exhibit 11

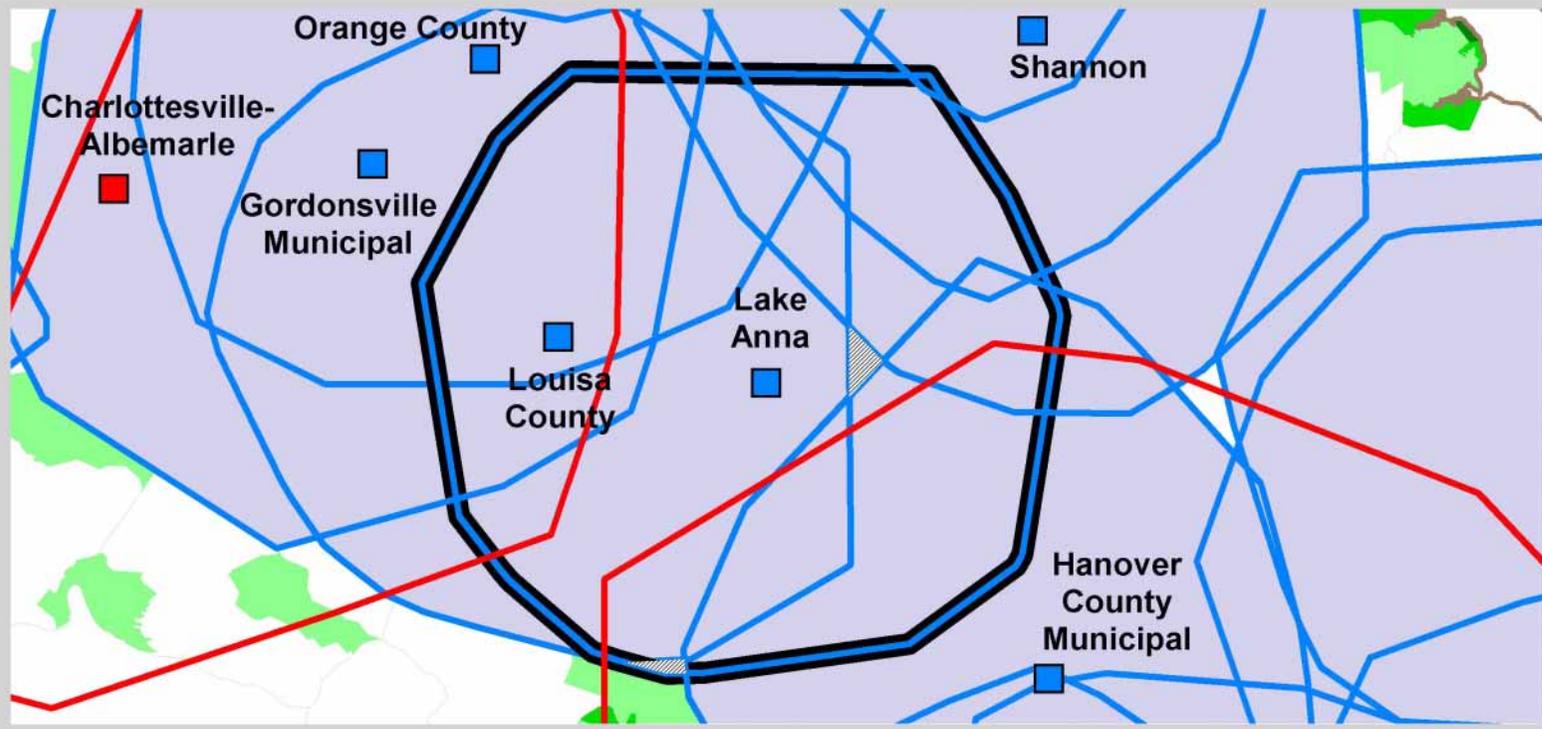




VIRGINIA AIR TRANSPORTATION SYSTEM PLAN

ALTERNATIVE 3 - CONDENSED SYSTEM - LAKE ANNA AIRPORT

Alt - Exhibit 12



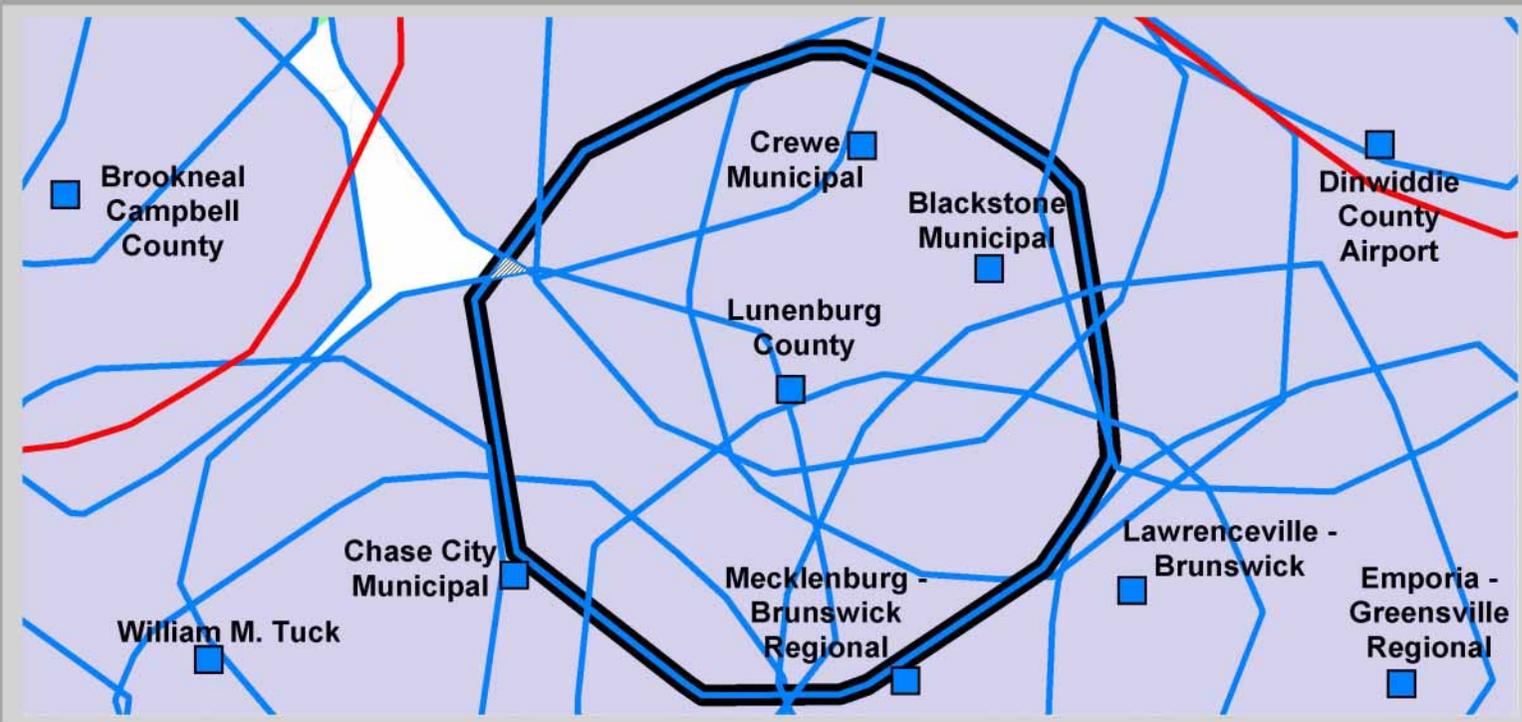
	45 Minute Commercial Service Travel Time		Commercial Service Airport	2000 Population Per Square Mile  0 - 50  51 - 150  151 - 1,500  1,501 - 3,000  3,001 - 64,000
	30 Minute General Aviation Travel Time		General Aviation Airport	
				
				
Source: HNTB Analysis				



VIRGINIA AIR TRANSPORTATION SYSTEM PLAN

ALTERNATIVE 3 - CONDENSED SYSTEM - LUNENBURG COUNTY AIRPORT

Alt - Exhibit 13



— 45 Minute Commercial Service Travel Time
— 30 Minute General Aviation Travel Time

■ Commercial Service Airport
■ General Aviation Airport

2000 Population Per Square Mile

	0 - 50
	51 - 150
	151 - 1,500
	1,501 - 3,000
	3,001 - 64,000



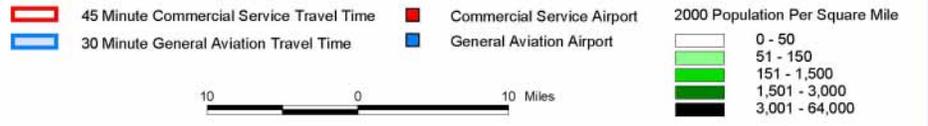
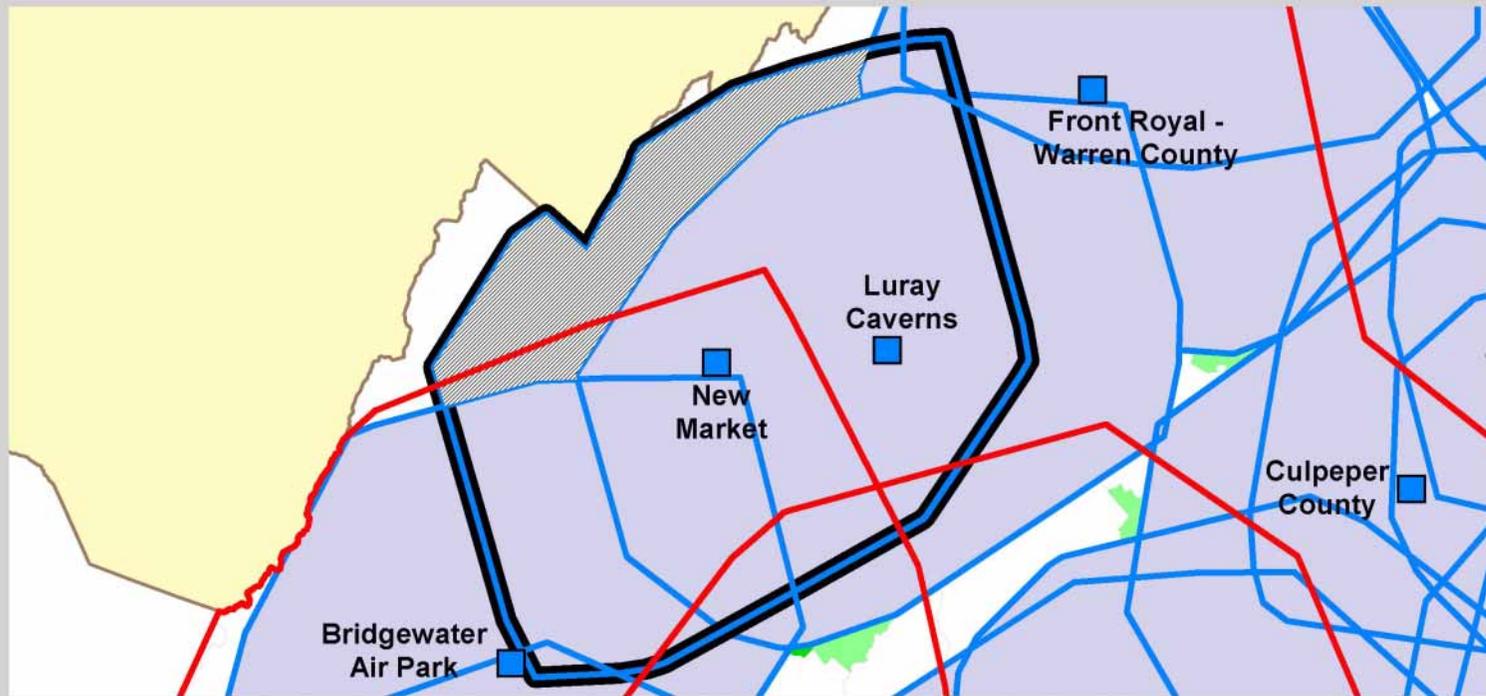
Source: HNTB Analysis



VIRGINIA AIR TRANSPORTATION SYSTEM PLAN

ALTERNATIVE 3 - CONDENSED SYSTEM - NEW MARKET AIRPORT

Alt - Exhibit 14

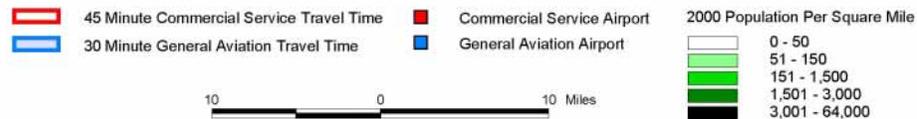
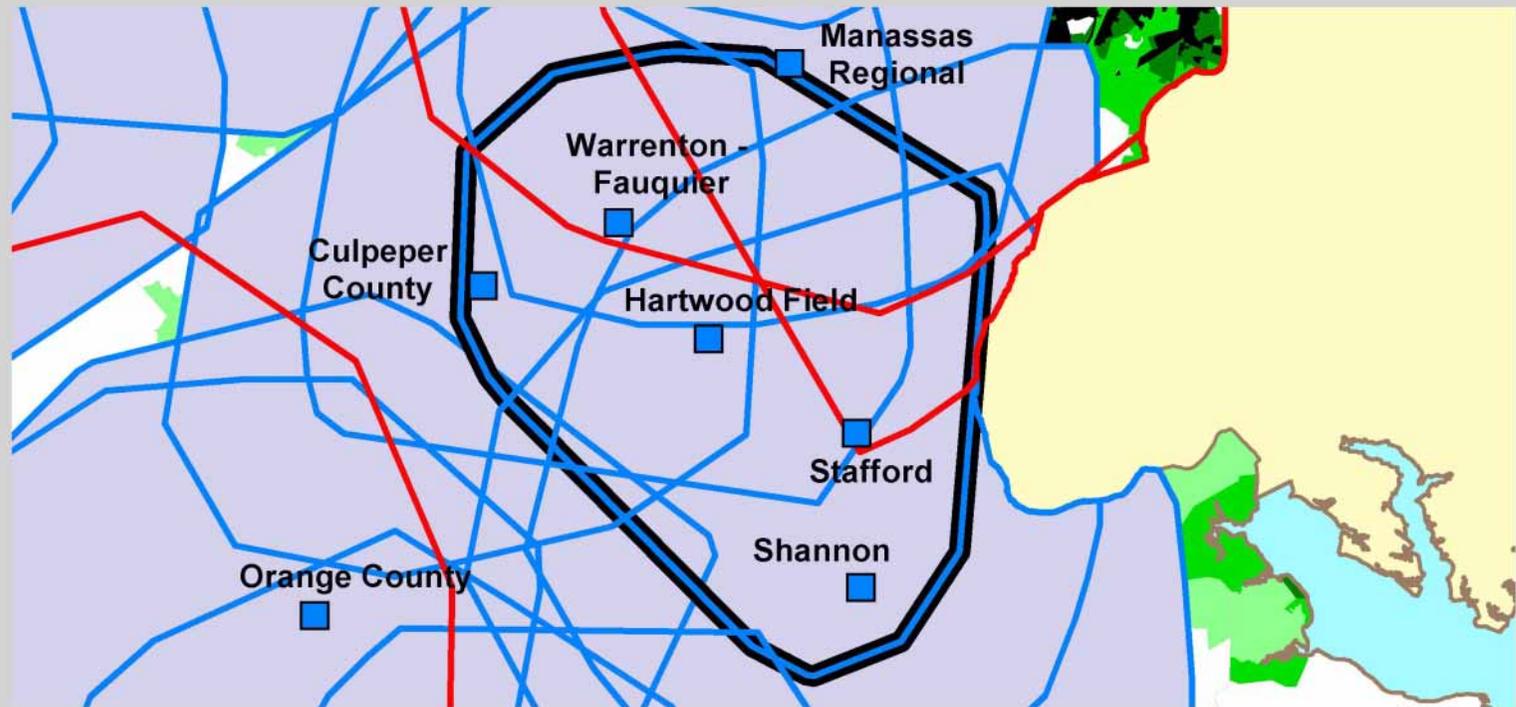




VIRGINIA AIR TRANSPORTATION SYSTEM PLAN

ALTERNATIVE 3 - CONDENSED SYSTEM - HARTWOOD FIELD

Alt - Exhibit 15



Source: HNTB Analysis

9. RECOMMENDED SYSTEM

Recommended System

The Recommended System provides for the development of existing facilities and enhances the ability of certain airports to meet the forecast increases in aviation demand. In addition, the Recommended System provides for the addition of three new, and one replacement airport.

Recommended Projects

The Recommended System includes projects that address the specific needs of each airport based on its current and forecast traffic. Due to adjustments following the Department of Aviation and airport review, the recommended projects vary somewhat from those detailed in the Facility Requirements Chapter. The adjusted projects include the following:

- › • New Runways – 4 at existing airports and 6 at new or replacement airports
- › • Runway Extensions – 18 airports
- › • Runway Widening – 10 airports
- › • Parallel Taxiways – 4 airports
- › • T-hangars – 31 airports
- › • Conventional Hangars – 33 airports
- › • Apron Area – 22 airports
- › • Auto Parking – 29 airports
- › • Terminal Improvements – 37 airports
- › • NAVAIDS
- › • Instrument Landing System (ILS) – 5 airports
- › • Localizer or Localizer/NDB – 6 airports
- › • Runway Lighting – 23 airports
- › • Ground Communications Outlets – 3 airports
- › • Vertical Guidance Visual Aids (VGVA) – 32 airports
- › • Runway End Identification Lights (REIL) – 14 airports
- › • Weather Reporting – 26 airports

In addition to the demand-based projects, improvements are recommended if justifiable and economically practical as follows to close service gaps in Corporate Jet Accessible airports:

- › Runway extensions to 5,500 feet – Mt. Empire and the new Lee County airport.
- › Reductions in approach minima to 400-1 – Culpeper, Blue Ridge, Mt. Empire, Virginia Highlands, and the new Lee County airport.

New Airports

In addition to the new Lee County and Tappahannock airports already in process, two additional new airports are recommended to close or reduce large service area gaps; a new GA Regional airport in Rocky Mount/Franklin County, and a new GA Community airport in Rockbridge County/Lexington. Each of these airports was recommended in the 1990 VATSP plan, and have been retained as recommendations in this plan. A feasibility study is currently underway for Rocky Mount/Franklin County, however in Rockbridge County/Lexington a new airport is not locally supported, and has been voted down by referendum. Nonetheless, there is still a large unserved population in the area.

In addition, there are on-going planning studies underway for a new airport in Northern Neck. It is expected that by 2020, sufficient demand will exist to justify the development of a Community Service airport.

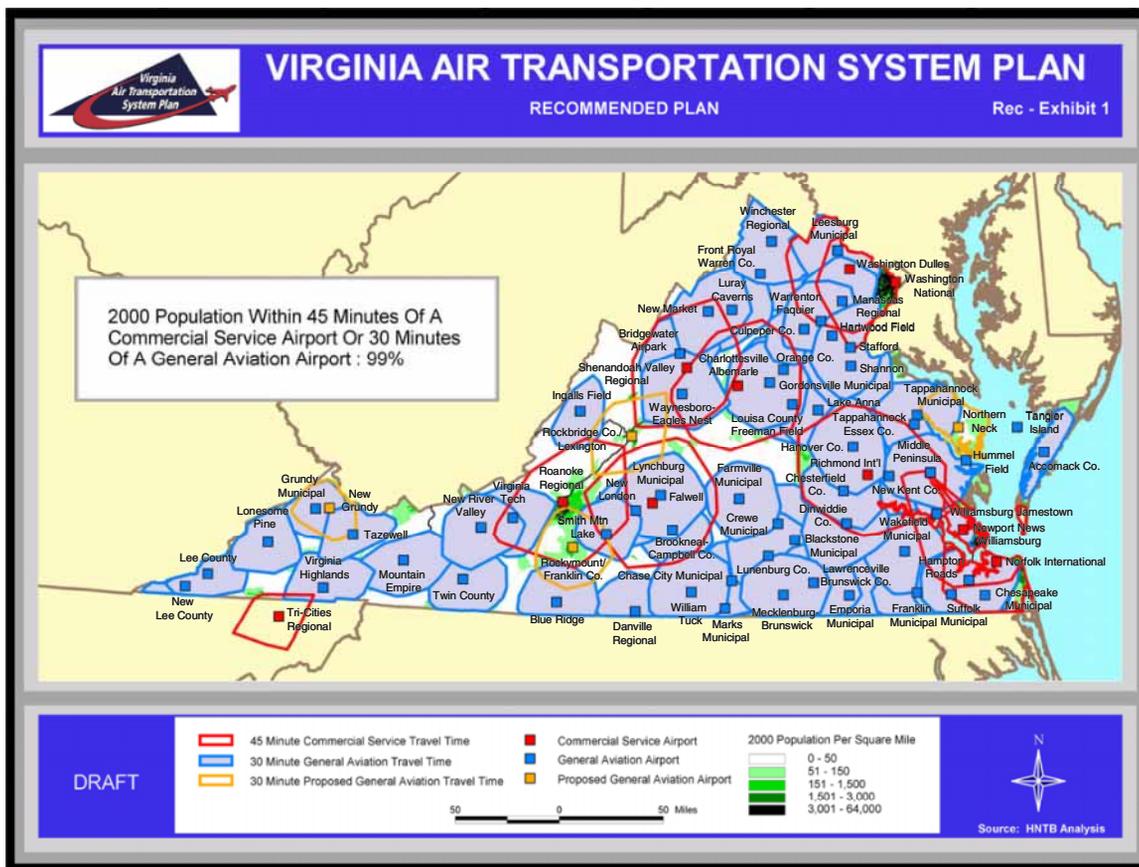
Replacement Airports

A replacement airport is recommended for the existing Grundy airport to address on-going safety issues and development constraints. A replacement airport will also provide corporate access to the community, improving their economic development potential. Exhibit 1 depicts the existing airport system with the recommended new and replacement airports.

Redundant Airports

There are five airports with substantially overlapping, or redundant service areas in the current system – New London, Lake Anna, Lunenburg County, New Market, and Hartwood. However, they are all Local Service airports, and consequently do not divert state or federal funds from higher priority projects. Therefore, their inclusion in the system has a minimal financial impact to the system.

Further, the Commonwealth airport system lost seven airports that were closed or changed to private use, and thus deleted from the VATSP between 1990 and 2002 (Sky Bryce Airport, Glascock Airport, Gloucester Airport, Hilltop Airport, Richlands Airport, Kellam Field, Whitman Strip). The loss of additional airports serves no fiscal purpose, and could further a potentially damaging trend. Therefore, removal of any additional airports is not in the interest of the aviation system and is not recommended.



Role Changes

During the course of the study, airport sponsors were provided the opportunity to request and justify a role change. Airports requesting role changes included Mountain Empire, Emporia-Greensville, New Market, Crewe, and Bridgewater. Based on the analysis and documentation presented, the roles of Emporia-Greensville and Mountain Empire were changed to General Aviation Regional. The other airports retained their current role designations.

The existing role for each airport was evaluated using criteria detailed in Table 1. As shown in Table 2, and Exhibit 2, immediate role changes are recommended for Shannon, Emporia-Greensville Regional, Louisa County and Mountain Empire airports. In addition, past role changes were proposed for Luray Caverns and the new Tappahannock-Essex County airport. These past proposed role changes were dependent on events such as facility expansion, acquisition of additional airport services, and increases in aeronautical demand.

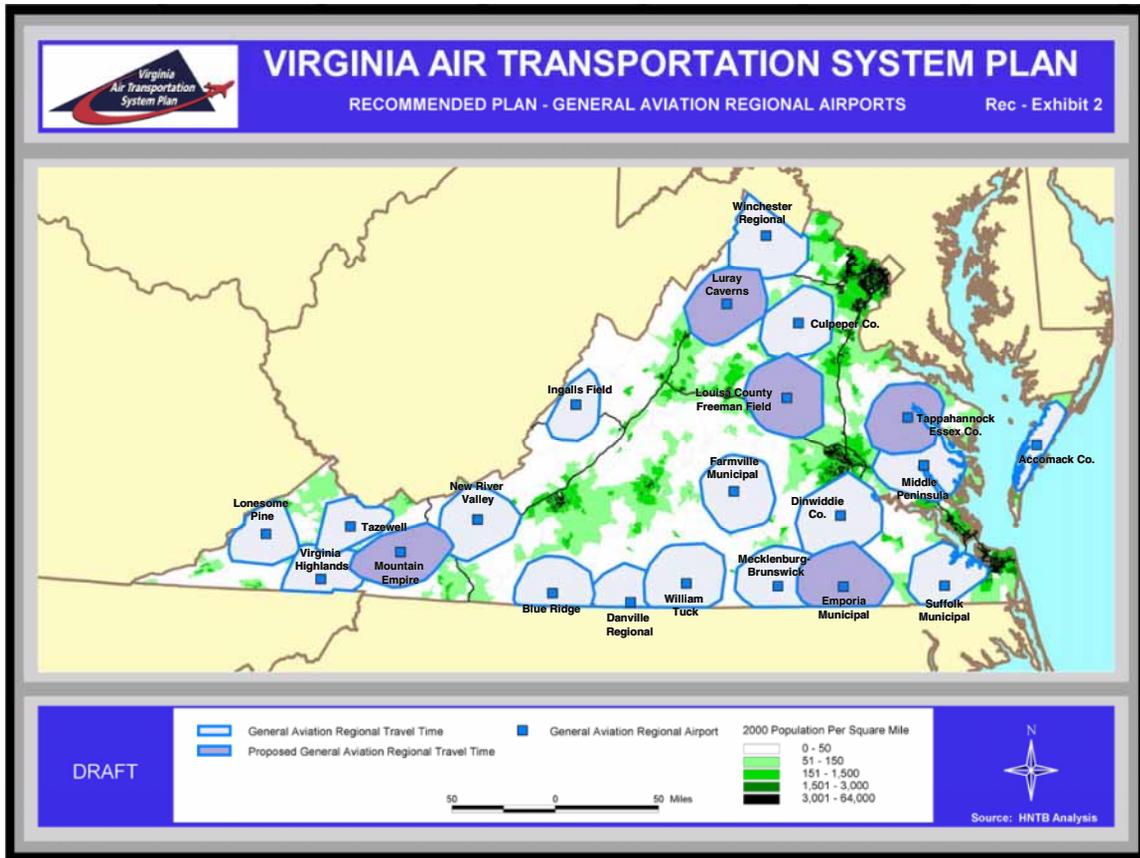
Table 1

	Commercial Service (CS)	Reliever (RL)	GA – Regional (GR)	GA – Community (GC)	Local Service (LO)
Service Role	Provide scheduled commuter and/or air carrier service to surrounding communities.	Provide alternative GA facilities to reduce congestion at commercial service airports.	Provide a full range of aviation facilities and services to business and recreational users in a broad market area. Service areas are often multijurisdictional due to geographic isolation or the relative scarcity of other airport services and facilities.	Provide GA facilities and services to business and recreational users. Community airports typically serve a limited market area.	Provide limited facilities to their respective communities. Substantial expansion is typically precluded by development constraints such as airspace conflicts, environmental concerns, topography, competing services, surrounding land use patterns and ownership status.
Funding Eligibility	Entitlement as well as air carrier/reliever discretionary funding	Air carrier/reliever discretionary funding	GA discretionary funding	GA discretionary funding	GA discretionary funding – safety and preservation projects only
Market Area	Metropolitan area	Metropolitan area, Relieves CS Airport	Regional market area serving multiple jurisdictions, isolated from other GR airports, convenient access	Community market area, access to a separate GR, RL or CS airport	Local market area
Activity Level and Mix	Provides scheduled airline service	25,000 annual operations, 50 based A/C with jets, 500 annual jet operations	10,000 annual operations, 25 Based A/C with jets, 100 jet operations	5,000 annual operations, 10 based A/C, 50 jet operations	Low activity levels
Recommended Facility Attributes	5,500 x 150 runway, parallel taxiway, precision approach	5,500 x 100 runway, parallel taxiway, precision approach	5,500 x 100 runway, non-precision approach (300-1)	3,100 x 75 runway, non-precision approach (400-1)	3,000 x 50 runway, visual approach
Available Services	Jet fuel and AvGas, major maintenance, hangars, passenger terminal, rentals, training, charters	Jet fuel and AvGas, major maintenance, hangars and GA terminal, rentals, training, charters	Jet fuel and AvGas, minor maintenance, hangars and GA terminal, rentals, training, charters	AvGas sales, rentals, training, charters	Limited services
Development/Constraints	No significant constraints	No significant constraints	No significant constraints	No significant constraints	Environmental, airspace, or topographic constraints/ownership status

Recommended Role Changes

Airport Name	Airport Identifier	Current Service Role	Recommended Current Service Role	Proposed Future Service role
Shannon	EZF	GR	GC	
Emporia-Greenville Regional	EMV	GC	GR	
Louisa County	LKU	GC	GR	
Mountain Empire	MKJ	GC	GR	
Luray Caverns	W45	GC		GR
Tappahannock-Essex Co. (New)	tbd	GC		GR

Source: HNTB Analysis



The complete list of current airport roles is detailed in Table 3 and depicted in Exhibit 3.

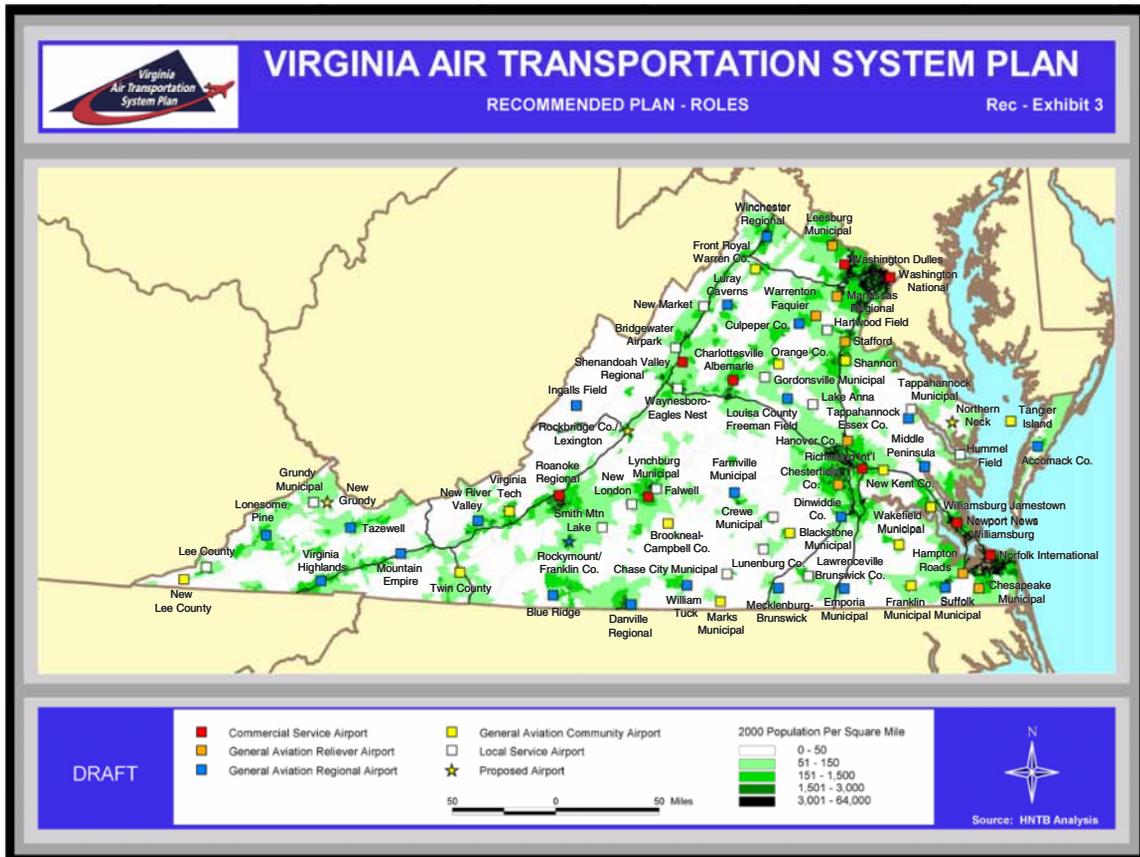


Table 3

Virginia Air Transportation System Plan

Recommended Service Roles

Airport Name	Airport Identifier	Current Service Role	Recommended Service Role	Airport Name	Airport Identifier	Current Service Role	Recommended Service Role
Charlottesville-Albemarle	CHO	CM	CM	Blackstone Municipal	BKT	GC	GC
Lynchburg Regional	LYH	CM	CM	Brookneal-Campbell County	0V4	GC	GC
Newport News-Williamsburg International	PHF	CM	CM	Franklin Municipal	FKN	GC	GC
Norfolk International	ORF	CM	CM	Front Royal-Warren County	FRR	GC	GC
Richmond International	RIC	CM	CM	Lee County (New)		GC	GC
Roanoke Regional	ROA	CM	CM	Marks Municipal	W63	GC	GC
Ronald Reagan Washington National	DCA	CM	CM	New Kent County	W96	GC	GC
Shenandoah Valley Regional	SHD	CM	CM	Orange County	OMH	GC	GC
Washington Dulles International	IAD	CM	CM	Shannon	EZF	GR	GC
Chesapeake Regional	CPK	RL	RL	Tangier Island	TGI	GC	GC
Chesterfield County	FCI	RL	RL	Twin County	HLX	GC	GC
Hampton Roads	PVG	RL	RL	Virginia Tech	BCB	GC	GC
Hanover County Municipal	OFF	RL	RL	Wakefield Municipal	AKQ	GC	GC
Leesburg Executive	JYO	RL	RL	Williamsburg-Jamestown	JGG	GC	GC
Manassas Regional	HEF	RL	RL	Bridgewater Air Park	VBW	LO	LO
Stafford Regional	RMN	RL	RL	Chase City Municipal	CXE	LO	LO
Warrenton-Fauquier	W66	RL	RL	Crewe Municipal	W81	LO	LO
Accomack County	MFV	GR	GR	Falwell	W24	LO	LO
Blue Ridge	MTV	GR	GR	Gordonsville Municipal	GVE	LO	LO
Culpeper County	CJR	GR	GR	Grundy Municipal	GDY	LO	LO
Danville Regional	DAN	GR	GR	Hartwood Field	8W8	LO	LO
Dinwiddie County Airport	PTB	GR	GR	Hummel Field	W75	LO	LO
Farmville Regional	FVX	GR	GR	Lake Anna	7W4	LO	LO
Ingalls Field	HSP	GR	GR	Lawrenceville-Brunswick	LVL	LO	LO
Lonesome Pine	LNP	GR	GR	Lunenburg County	W31	LO	LO
Mecklenburg-Brunswick Regional	AVC	GR	GR	New London	W90	LO	LO
Middle Peninsula Regional	W97	GR	GR	New Market	8W2	LO	LO
New River Valley	PSK	GR	GR	Smith Mountain Lake	W91	LO	LO
Emporia-Greenville Regional	EMV	GC	GR	Waynesboro	W13	LO	LO
Louisa County	LKU	GC	GR				
Luray Caverns	W45	GC	GR	Source: HNTB Analysis			
Mountain Empire	MKJ	GC	GR				
Suffolk Municipal	SFQ	GR	GR				
Tappahannock-Essex Co. (New)		GC	GR				
Tazewell County	6V3	GR	GR				
Virginia Highlands	VJI	GR	GR				
William M. Tuck	W78	GR	GR				
Winchester Regional	OKV	GR	GR				

Beyond 2020

The Commonwealth of Virginia and a number of regional public and private partners launched the Eastern Virginia Airport System Study (EVASS) in 1992 to identify a system of airports that would best meet eastern Virginia's air transportation needs beyond the year 2020. EVASS findings provide guidance for enhancing the efficiency and competitiveness of air transportation in the region and for contributing to the economic vitality of southeastern Virginia and the entire Commonwealth.

The conclusion of EVASS was that a two-airport system, consisting of Richmond International Airport and a new airport in the Hampton Roads region of southeastern Virginia, is the best long-term strategy for maintaining the region's economic competitiveness and providing citizens with efficient and convenient air service. The new airport would provide the opportunity for improved air service in terms of increased daily departures and direct destinations, including international flights. The commercial air service provided by Newport News-Williamsburg International Airport and Norfolk International Airport would be consolidated at the new airport, located in the vicinity of Isle of Wight County on a "greenfield" site. Based on market demand, the existing airports would be used by other aviation users.

Newport News-Williamsburg International and Norfolk International Airports are located in highly congested areas. Although both airports have adequate capacity to handle their existing and future aviation demand, major expansion of both airports would be required to provide improved international flight capabilities. Such expansion would face several hurdles, including ground access, environmental constraints, and incompatible land use encroachment. Although some of these issues could apply to a new airport, a greenfield site would be designed to minimize such adverse impacts, resulting in a carefully planned, well-developed international airport serving the region. A greenfield site would allow for "maximum build-out" of a facility well into the future, while incorporating new technologies and providing the flexibility to allow for market changes, which are inevitable in the aviation industry. A single, globally reaching airport would act as a regional consolidation point for long-haul domestic and international markets. Consolidation of the regional market would have a direct, positive impact on commercial service and on business and job growth.

The existing airports have served their communities well in the 20th century. However, airfield limitations, residential encroachment, urban sprawl, major road congestion, and the overall geographic location of these two airports point toward constructing a new airport to serve the region's demands throughout the 21st century.

10. IMPLEMENTATION PLAN

The Implementation Plan was developed to provide a comprehensive cost estimate and proposed schedule of the capital improvements in the Recommended Plan.

Funding Sources

The principal funding sources to finance airport capital improvement projects are: (1) federal grants-in-aid, (2) commonwealth grants-in-aid, and (3) local revenue sources. Projected funds for the implementation plan are presented as federal, State and local sources.

Federal Funding

The Federal funding program includes the Airport Improvement Program (AIP). The Airport Improvement Program (AIP) was created by the Airport and Airway Improvement Act of 1982 with the objective of providing financial assistance in the development of a nationwide system of public use airports adequate to meet the projected growth of civil aviation. AIP funds are allocated to airports as entitlement and discretionary funds. Federal entitlement funds are awarded based on activity (enplanements or cargo) at respective airports. Discretionary funds are awarded based on needs as determined by priorities of the FAA.

Due to the demand for capital funding, a project priority ranking system is used to evaluate projects on the basis of consistent criteria. The FAA national priority system was developed for the allocation of discretionary funds and is designed to facilitate routine prioritization for the bulk of projects while allowing exceptions to handle special projects and those hard to classify. Projects are favored which best carry out the purpose of the authorizing Act with emphasis on those that improve safety and assure the integrity of the system.¹⁴

The FAA's National Priority System uses four factors to calculate the priority rating number. Those factors include the airport code, purpose, component and type. The Airport code is used to identify the role and size of the airport. The purpose identifies the objective of the proposed project, such as safety, capacity, reconstruction or environment. The component identifies the physical area intended for development, such as runways, aprons or terminals. The type identifies the actual work to be done, such as extensions, or resurfacing.

Commonwealth Funding

The Commonwealth awards state entitlement and discretionary funds through its 6-Year Airport Capital Improvement Program (ACIP). Similar to AIP, entitlement funds are allocated to airport sponsors with

¹⁴ FAA, Airport Improvement Program (AIP) Handbook, October 24, 1989.

scheduled air carrier service, while any air carrier, reliever or general aviation airport sponsor is eligible for discretionary funds.

The Commonwealth's Project Priority Evaluation is based on project type, facility usage, sponsor responsibility and bonus points. Project type is comparable to the FAA's project purpose in identifying the objective of the project. Facility Usage accounts for activity at the airport and airport classification. Sponsor responsibility recognizes sponsors that address height zoning, maintenance and safety standards issues. Bonus points are awarded for federal funding availability, economic development potential, attracting commercial service and special project considerations such as mandated projects, PFC funding or completed design.

Local Funding

Local sources of funds for Commercial Service airports may include airport revenues, bonds, or passenger facility charges (PFC). Airport revenues include fees received from terminal rents, landing fees, ramp charges, concession fees, T-hangar rentals, fuel sales, ground leases or other fees imposed by the airport sponsor. Bonds represent debt financing in which the repayment is supported through airport revenues of the airport sponsor or governing municipality. Passenger Facility Charges (PFC) represent a fee imposed on each passenger boarding a commercial flight at an eligible airport. PFC funds are dedicated to support federally approved capital improvement projects.

In addition, the Virginia Resource Authority makes market rate loans available to airport sponsors. Traditionally, these loans are used for projects that are not eligible for federal or state funding.

Allocation of Costs

This analysis does not address the probability of a project actually receiving funding. Rather, the allocation of costs between federal, state and local funds was determined entirely by the respective funding eligibility of each project.

Projects eligible for federal and state funding include improvements to runways, taxiways, and aprons; environmental assessments, master plans, and airport layout studies, land acquisition, terminal buildings, visual aids, and lighting. Following the events of September 11, a major focus has also been on security. Eligible projects usually preserve or improve safety, security or capacity of the airport and aviation system. Eligible projects also include those that mitigate noise or other environmental impacts due to the airport, and in some cases include projects which provide opportunity to enhance competition at the airport. Conversely, projects that are revenue producing or proprietary in nature for the exclusive use of management or tenants are not eligible for federal or state grants. Some ineligible projects include restaurants, concession facilities, hangars, and airline leased spaces. Though federal and state funding are similar, overall differences remain and must be addressed on an individual project basis.

The federal and state governments have established eligibility criteria for airports and capital projects to receive funding. Public agencies operating airports must typically assure that the facility will be open for public use, have an approved airport layout plan, and meet several other administrative and regulatory requirements of the government agencies.

Unit Costs

Unit costs were derived from existing project cost estimates and the recent historical experience of the consultant team and the Department of Aviation. Unit costs for Ronald Reagan Washington National and Dulles International airports were provided by the Metropolitan Washington Airports Authority (MWAA) and represent the short-term needs of only those 13 capital categories considered for this plan. The actual 20-year needs for the MWAA airports is expected to be much higher, however per Title 58.1 of the Code of Virginia, the fiduciary responsibility of the Commonwealth to MWAA is limited to a maximum amount of two million dollars per year. All costs are presented in constant 2002 dollars.

Implementation Plan

The Implementation Plan identifies a total of \$2.78 billion of capital needs during the 20-year planning period ending in 2020. Of this total, \$1.89 billion reflects the 20-year needs of Ronald Reagan Washington National and Dulles International airports. This unconstrained analysis addresses capital needs only and does not consider potential funding levels. Consequently, it is vital to note that the 20-year state share of \$187.4 million represents the minimum state contribution if, and only if, all federally eligible projects received federal funding. In reality, many eligible projects will not be federally funded, but due to their importance to the state, may become state projects. Therefore the 20-year state contribution may realistically be much higher than \$187.4 million shown in the analysis.

The role of federal and state grants are key to the realization of the system plan. The FAA agrees to pay ninety percent (90%) of eligible project costs when it awards grants.¹⁵ The Commonwealth of Virginia awards grants at eighty percent (80%) of the non-federal share, with the local airport sponsor to pay the balance of twenty percent (20%) of the non-federal share, or two percent of the eligible project costs. In the absence of federal grants, in most instances the Department of Aviation awards state grants at eighty percent (80%) of eligible project cost, while the local sponsor must cover the remaining twenty percent (20%). State funded terminal improvements are funded at 100 percent of non revenue producing space, up to 90 percent of the total project cost. Projects ineligible for federal or state grants must be funded entirely with local funds.

Near-term capital requirements for projects recommended by 2005 total \$681 million, with a State share of \$60 million. Long-term capital requirements covering the period from 2006 to 2020 will require total funding of \$2.1 billion with \$127 million provided by the Commonwealth.

¹⁵ Ninety percent applies to small hub, reliever and GA airports. Large or medium hub airports are awarded grants at 75% of eligible project costs. AIP-eligible terminal improvements are awarded at 75 percent for all airports.

The state shares of near- and long-term system capital requirements average approximately \$9.4 million annually, significantly below the annual funding level provided by the Commonwealth for airport projects over the past five years. However, the federal share of system capital requirements is \$451 million through 2005, and nearly \$1.5 billion between 2006 and 2020. Based on historic levels of federal funding provided for airport development in Virginia, there is expected to be a significant short-fall of available federal dollars.

This is not unusual as the Commonwealth frequently absorbs a portion of the unmet federal funding for high priority projects. In fact, the priority system used by the Department of Aviation on an annual basis to direct project funding and the six-year plan that is applied to identify near-term system development priorities are both designed to determine where funds will be assigned in the face of overall capital constraints.

Although the Commonwealth may provide a portion of the unmet federal shares for high priority airport projects, there is still expected to be a shortfall in the total funding available for airport system development. This shortfall is quite typical and the Department of Aviation has historically dealt with funding constraints by phasing projects and extending the timeframe during which recommended projects are funded and completed. It is expected that similar strategies will be employed over the planning horizon to reconcile the available funding with the Commonwealth's airport development requirements.

In addition to the capital needs of the Commonwealth, obsolescence costs of existing improvements were determined for runway pavement and terminal buildings. Runway pavements were assumed to be overlaid each ten years. Terminal buildings were assumed to receive a major rehabilitation at 25 years, and to have a functional life of 50 years.

Table 1 provides detailed unconstrained costs by airport. Table 2 provides unconstrained costs by project type. Table 3 is a summary table of costs by airport, and Table 4 provides a summary by service role.

Maintenance Program and Facilities and Equipment Funding

The Department of Aviation also provides funding to support maintenance, and facilities and equipment programs at Commonwealth airports. The maintenance program is designed to provide grants for nonrecurring maintenance and to assist airport sponsors in implementing preventative maintenance that extends the useful life of facilities. The facilities and equipment program funds the installation of electronic communication, navigation and information systems to enhance reliability and safety.

Table 1
VIRGINIA AIR TRANSPORTATION SYSTEM PLAN
Unconstrained Implementation Plan - Costs By Airport
(2002 Dollars)

Airport	Project Type	Identifier	Service Role	Unit \$	Unit	2005 Quantity	2020 Quantity	2005 Total \$	2020 Total \$	2000-2005			2006-2020			20 Year Total
										Federal	State	Local	Federal	State	Local	
<i>Charlottesville-Albemarle</i>																
		CHO	CM													
	T-Hangars			\$ 25,000	Each	16	8	\$ 400,000	\$ 200,000	\$ -	\$ 20,000	\$ 380,000	\$ -	\$ 10,000	\$ 190,000	
	Conventional Hangars			\$ 30	sf	24,300	41,000	\$ 1,215,000	\$ 2,050,000	\$ -	\$ 60,800	\$ 1,154,200	\$ -	\$ 102,500	\$ 1,947,500	
	Apron Area			\$ 125	sy	-	27,200	\$ -	\$ 3,400,000	\$ -	\$ -	\$ -	\$ 3,060,000	\$ 272,000	\$ 68,000	
	Auto Parking			\$ 1,250	Each	314	360	\$ 392,600	\$ 449,600	\$ -	\$ -	\$ 392,600	\$ -	\$ -	\$ 449,600	
	Terminal Building									\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
	GA			\$ 175	sf	3,700	600	\$ 647,500	\$ 105,000	\$ -	\$ 453,250	\$ 194,250	\$ -	\$ 73,500	\$ 31,500	
	VGVA			\$ 35,000	Each	-	2	\$ -	\$ 70,000	\$ -	\$ -	\$ -	\$ 70,000	\$ -	\$ -	
	Master Plan			\$ 400,000	Each	1	-	\$ 400,000	\$ -	\$ 360,000	\$ 32,000	\$ 8,000	\$ -	\$ -	\$ -	
Total								\$ 3,055,100	\$ 6,274,600	\$ 360,000	\$ 566,050	\$ 2,129,050	\$ 3,130,000	\$ 453,000	\$ 2,686,000	\$ 9,329,700
<i>Lynchburg Regional</i>																
		LYH	CM													
	Runway Length			\$ 175	sy	20,000	-	\$ 3,500,000	\$ -	\$ 3,150,000	\$ 280,000	\$ 70,000	\$ -	\$ -	\$ -	
	Environmental Assessment			\$ 150,000	Each	1	-	\$ 150,000	\$ -	\$ 135,000	\$ 12,000	\$ 3,000	\$ -	\$ -	\$ -	
	T-Hangars			\$ 25,000	Each	25	12	\$ 625,000	\$ 300,000	\$ -	\$ 31,250	\$ 593,750	\$ -	\$ 15,000	\$ 285,000	
	Conventional Hangars			\$ 30	sf	16,400	17,000	\$ 820,000	\$ 850,000	\$ -	\$ 41,000	\$ 779,000	\$ -	\$ 42,500	\$ 807,500	
	Apron Area			\$ 125	sy	-	14,300	\$ -	\$ 1,787,500	\$ -	\$ -	\$ -	\$ 1,603,750	\$ 143,000	\$ 35,750	
	Auto Parking			\$ 1,250	Each	60	267	\$ 75,000	\$ 333,750	\$ -	\$ -	\$ 75,000	\$ -	\$ -	\$ 333,750	
	Terminal Building									\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
	GA			\$ 175	sf	2,700	500	\$ 472,500	\$ 87,500	\$ -	\$ 330,750	\$ 141,750	\$ -	\$ 61,250	\$ 26,250	
	Runway Lighting (for runway extension)			\$ 4,500	Each	12	-	\$ 54,000	\$ -	\$ 48,600	\$ 4,320	\$ 1,080	\$ -	\$ -	\$ -	
	VGVA			\$ 35,000	Each	-	1	\$ -	\$ 35,000	\$ -	\$ -	\$ -	\$ 35,000	\$ -	\$ -	
	Master Plan			\$ 400,000	Each	1	-	\$ 400,000	\$ -	\$ 360,000	\$ 32,000	\$ 8,000	\$ -	\$ -	\$ -	
Total								\$ 6,096,500	\$ 3,393,750	\$ 3,693,600	\$ 731,220	\$ 1,671,280	\$ 1,643,750	\$ 261,750	\$ 1,482,250	\$ 9,496,250
Note: Runway length includes lighting																
<i>Newport News Williamsburg International</i>																
		PHF	CM													
	Runway Length			Note 1	sy	-	33,333	\$ -	\$ 58,866,600	\$ -	\$ -	\$ -	\$ 48,479,940	\$ 4,309,328	\$ 1,077,332	
	Environmental Assessment			\$ 150,000	Each	-	1	\$ -	\$ 150,000	\$ -	\$ -	\$ -	\$ 135,000	\$ 12,000	\$ 3,000	
	T-Hangars			\$ 25,000	Each	18	-	\$ 450,000	\$ -	\$ -	\$ 22,500	\$ 427,500	\$ -	\$ -	\$ -	
	Conventional Hangars			\$ 30	sf	43,200	42,200	\$ 2,160,000	\$ 2,110,000	\$ -	\$ 108,000	\$ 2,052,000	\$ -	\$ 105,500	\$ 2,004,500	
	Apron Area			\$ 125	sy	53,000	47,300	\$ 6,625,000	\$ 5,912,500	\$ 5,962,500	\$ 530,000	\$ 132,500	\$ 5,321,250	\$ 473,000	\$ 118,250	
	Auto Parking			\$ 1,250	Each	446	671	\$ 557,500	\$ 838,750	\$ -	\$ -	\$ 557,500	\$ -	\$ -	\$ 838,750	
	Terminal Building									\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
	Air Canteen			\$ 250	sf	22,140	64,300	\$ 5,535,000	\$ 16,075,000	\$ 4,151,250	\$ 1,107,000	\$ 276,750	\$ 12,056,250	\$ 3,215,000	\$ 803,750	
	Runway Lighting (for runway extension)			\$ 4,500	Each	-	20	\$ -	\$ 90,000	\$ -	\$ -	\$ -	\$ 81,000	\$ 7,200	\$ 1,800	
	VGVA			\$ 35,000	Each	-	2	\$ -	\$ 70,000	\$ -	\$ -	\$ -	\$ 70,000	\$ -	\$ -	
	Master Plan (Note 2)			\$ 450,000	Each	1	-	\$ 450,000	\$ -	\$ 405,000	\$ 36,000	\$ 9,000	\$ -	\$ -	\$ -	
Total								\$ 15,777,500	\$ 79,112,850	\$ 10,518,750	\$ 1,893,500	\$ 3,455,250	\$ 66,143,440	\$ 8,122,028	\$ 4,847,382	\$ 94,896,350
Note 1 - To address capacity concerns, Newport News projects a need to extend Runway 220 from 6,525 to 8,000 feet and build a new, parallel 6,000 foot Runway 7L/2SR. The cost estimate is updated from their 1997 Master Plan and includes all project costs including land acquisition and associated taxways.																
Note 2 - Cost estimate from 2002 6-year plan.																
<i>Norfolk International</i>																
		ORF	CM													
	New Runway			\$ 175	sy	Note 1	Note 1	\$ 16,500,000	\$ 40,000,000	\$ 14,850,000	\$ 1,320,000	\$ 330,000	\$ 54,000,000	\$ 4,800,000	\$ 1,200,000	
	Environmental Assessment			\$ 150,000	Each	-	1	\$ -	\$ 150,000	\$ -	\$ -	\$ -	\$ 135,000	\$ 12,000	\$ 3,000	
	Conventional Hangars			\$ 30	sf	20,640	20,100	\$ 1,032,000	\$ 1,005,000	\$ -	\$ 51,600	\$ 980,400	\$ -	\$ 30,250	\$ 954,750	
	Auto Parking			\$ 18,000	Each	3,100	3,029	\$ 55,800,000	\$ 54,522,000	\$ -	\$ -	\$ 55,800,000	\$ -	\$ -	\$ 54,522,000	
	Terminal Building									\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
	Air Canteen			\$ 250	sf	213,000	48,000	\$ 53,250,000	\$ 12,000,000	\$ 39,937,500	\$ 10,650,000	\$ 2,662,500	\$ 9,000,000	\$ 2,400,000	\$ 600,000	
	GA			\$ 175	sf	-	7,200	\$ -	\$ 1,260,000	\$ -	\$ -	\$ -	\$ 882,000	\$ 378,000	\$ -	
	Master Plan (Note 2)			\$ 1,000,000	Each	1	-	\$ 1,000,000	\$ -	\$ 900,000	\$ 80,000	\$ 20,000	\$ -	\$ -	\$ -	

Airport	Project Type	Identifier	Service Role	Unit \$	Unit	2005 Quantity	2020 Quantity	2006-2005			2006-2020			20 Year Total			
								2005 Total \$	2020 Total \$	Federal	State	Local	Federal		State	Local	
Total								\$ 127,582,000	\$ 128,937,000	\$ 55,687,500	\$ 12,101,600	\$ 59,792,900	\$ 63,135,000	\$ 8,144,250	\$ 57,657,750	\$ 256,519,000	
Note 1 - To address capacity concerns, Norfolk projects a need for a new parallel Runway 6SR/23L.																	
The cost estimate is updated from the 2002 6-year plan and includes all project costs including land acquisition.																	
Note 2 - Cost estimate from 2002 6-year plan																	
Richmond International																	
			RIC	CM													
Runway Length					\$ 175	sy	21,667	133,333	\$ 3,791,700	\$ 23,333,300	\$ 3,412,700	\$ 308,336	\$ 75,834	\$ 20,999,970	\$ 1,866,664	\$ 466,666	
Environmental Assessment					\$ 150,000	Each	1	1	\$ 150,000	\$ 150,000	\$ 135,000	\$ 12,000	\$ 3,000	\$ 135,000	\$ 12,000	\$ 3,000	
T-Hangars					\$ 25,000	Each	30	-	\$ 750,000	\$ -	\$ -	\$ -	\$ 750,000	\$ -	\$ -	\$ -	
Conventional Hangars					\$ 50	sf	26,770	58,400	\$ 1,338,500	\$ 2,920,000	\$ -	\$ 66,925	\$ 1,271,575	\$ -	\$ 146,000	\$ 2,774,000	
Auto Parking					\$ 1,250	Each	1,900	2,090	\$ 2,375,000	\$ 2,612,500	\$ -	\$ -	\$ 2,375,000	\$ -	\$ -	\$ 2,612,500	
Terminal Building									\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Air Cane					\$ 250	sf	254,241	-	\$ 63,560,250	\$ -	\$ 47,670,188	\$ 12,712,050	\$ 3,178,013	\$ -	\$ -	\$ -	
Runway Lighting (for runway extension)					\$ 4,500	Each	14	-	\$ 63,000	\$ -	\$ 56,700	\$ 5,040	\$ 1,260	\$ -	\$ -	\$ -	
VGVA					\$ 35,000	Each	-	2	\$ -	\$ 70,000	\$ -	\$ -	\$ -	\$ 70,000	\$ -	\$ -	
Master Plan					\$ 400,000	Each	-	1	\$ -	\$ 400,000	\$ -	\$ -	\$ -	\$ 360,000	\$ 32,000	\$ 8,000	
Total								\$ 72,028,450	\$ 29,485,800	\$ 51,274,418	\$ 13,099,351	\$ 7,654,682	\$ 21,564,970	\$ 2,056,664	\$ 5,864,166	\$ 101,514,250	
Roanoke Regional																	
			ROA	CM													
T-Hangars					\$ 25,000	Each	25	10	\$ 625,000	\$ 250,000	\$ -	\$ 31,250	\$ 593,750	\$ -	\$ 12,500	\$ 237,500	
Apron Area					\$ 125	sy	15,200	10,600	\$ 1,900,000	\$ 1,325,000	\$ 1,710,000	\$ 152,000	\$ 38,000	\$ 1,192,500	\$ 106,000	\$ 26,500	
Auto Parking					\$ 1,250	Each	222	418	\$ 277,500	\$ 522,500	\$ -	\$ -	\$ 277,500	\$ -	\$ -	\$ 522,500	
Terminal Building									\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
GA					\$ 175	sf	-	4,550	\$ -	\$ 796,250	\$ -	\$ -	\$ -	\$ -	\$ 597,375	\$ 238,875	
VGVA					\$ 35,000	Each	-	2	\$ -	\$ 70,000	\$ -	\$ -	\$ -	\$ 70,000	\$ -	\$ -	
Master Plan (Note 1)					\$ 500,000	Each	1	-	\$ 500,000	\$ -	\$ 430,000	\$ 40,000	\$ 10,000	\$ -	\$ -	\$ -	
Total								\$ 3,302,500	\$ 2,963,750	\$ 2,160,000	\$ 223,250	\$ 919,250	\$ 1,262,500	\$ 675,875	\$ 1,025,375	\$ 6,266,250	
Note 1 - Cost estimate from 2002 6-year plan.																	
Ronald Reagan Washington National																	
			DCA	CM													
Apron Area					\$ 125	sy	-	39,000	\$ -	\$ 4,875,000	\$ -	\$ -	\$ -	\$ 3,656,250	\$ -	\$ 1,218,750	
Terminal Building									\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
GA					\$ 175	sf	-	79,200	\$ -	\$ 13,860,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13,860,000	
VGVA					\$ 35,000	Each	-	2	\$ -	\$ 70,000	\$ -	\$ -	\$ -	\$ 70,000	\$ -	\$ -	
Master Plan (Note 2)					\$ 1,000,000	Each	1	-	\$ 1,000,000	\$ -	\$ 900,000	\$ -	\$ 100,000	\$ -	\$ -	\$ -	
Total								\$ 1,000,000	\$ 18,805,000	\$ 900,000	\$ -	\$ 100,000	\$ 3,726,250	\$ -	\$ 15,078,750	\$ 19,805,000	
1) Cost estimates were provided by the Metropolitan Washington Airports Authority and include all project costs.																	
2) Washington National does not currently maintain a traditional Master Plan. This estimate is included as an estimate of the minimum funding that would be required if a Master Plan were prepared.																	
Shenandoah Valley Regional																	
			SHD	CM													
T-Hangars					\$ 25,000	Each	12	10	\$ 300,000	\$ 250,000	\$ -	\$ 15,000	\$ 285,000	\$ -	\$ 12,500	\$ 237,500	
Conventional Hangars					\$ 50	sf	9,700	7,900	\$ 485,000	\$ 365,000	\$ -	\$ 24,250	\$ 460,750	\$ -	\$ 18,250	\$ 346,750	
Auto Parking					\$ 1,250	Each	210	-	\$ 262,500	\$ -	\$ -	\$ -	\$ 262,500	\$ -	\$ -	\$ -	
Terminal Building									\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Air Cane					\$ 250	sf	7,700	-	\$ 1,925,000	\$ -	\$ 1,443,750	\$ 385,000	\$ 96,250	\$ -	\$ -	\$ -	
Communication					\$ 8,000	Each	-	1	\$ -	\$ 8,000	\$ -	\$ -	\$ -	\$ -	\$ 6,400	\$ 1,600	
Wx Reporting									\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
AWOS-3-F to AWOS-4 or ASOS					\$ 100,000	Each	-	1	\$ -	\$ 100,000	\$ -	\$ -	\$ -	\$ 90,000	\$ 8,000	\$ 2,000	
Master Plan					\$ 400,000	Each	-	1	\$ -	\$ 400,000	\$ -	\$ -	\$ -	\$ 360,000	\$ 32,000	\$ 8,000	
Total								\$ 2,972,500	\$ 1,123,000	\$ 1,443,750	\$ 424,250	\$ 1,104,500	\$ 450,000	\$ 77,150	\$ 595,250	\$ 4,095,500	
Washington Dulles International																	
			IAD	CM													
Runway Length					Note 1	sy	776,111	792,778	\$ 216,800,000	\$ 250,000,000	\$ 162,600,000	\$ -	\$ 54,200,000	\$ 187,300,000	\$ -	\$ 62,500,000	
Environmental Assessment					\$ 150,000	Each	1	1	\$ 150,000	\$ 150,000	\$ 135,000	\$ -	\$ 15,000	\$ 135,000	\$ -	\$ 15,000	
Taxiway					Note 1	sy	261,278	-	\$ 38,300,000	\$ -	\$ 38,875,000	\$ -	\$ 9,625,000	\$ -	\$ -	\$ -	
Conventional Hangars					Note 1	sf	-	1,306,800	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 22,938,000	
Apron Area					Note 1	sy	180,200	3,141,400	\$ 5,900,000	\$ 132,867,000	\$ 4,425,000	\$ -	\$ 1,475,000	\$ 99,650,250	\$ -	\$ 33,216,750	
Auto Parking					Note 1	Each	3,500	1,000	\$ 11,000,000	\$ 3,605,000	\$ -	\$ -	\$ 11,000,000	\$ -	\$ -	\$ 3,605,000	
Terminal Building									\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	

Airport	Project Type	Identifier	Service Role	Unit \$	Unit	2005 Quantity	2020 Quantity	2009-2015				2016-2020			20 Year Total	
								2005 Total \$	2020 Total \$	Federal	State	Local	Federal	State		Local
Alt Case				Now 1	sf	186,560	2,159,420	\$ 1,250,000	\$ 1,188,800,000	\$ 957,500	\$ -	\$ 312,500	\$ 891,600,000	\$ -	\$ 297,200,000	\$ -
VGVA				\$ 35,000	Each	-	2	\$ -	\$ 70,000	\$ -	\$ -	\$ -	\$ 70,000	\$ -	\$ -	\$ -
Master Plan (Nota 2)				\$ 1,000,000	Each	1	-	\$ 1,000,000	\$ -	\$ 900,000	\$ -	\$ 100,000	\$ -	\$ -	\$ -	\$ -
Total								\$ 274,600,000	\$ 1,258,430,000	\$ 197,457,500	\$ -	\$ 76,727,500	\$ 1,178,955,250	\$ -	\$ 419,474,750	\$ 1,873,030,000
1) Cost estimates were provided by the Metropolitan Washington Airports Authority and include all project costs.																
2) Washington Dulles does not currently maintain a traditional Master Plan. This estimate is included as an estimate of the minimum funding that would be required if a Master Plan were prepared.																
Subtotal - CM								\$ 506,414,350	\$ 1,868,525,750	\$ 333,910,518	\$ 34,949,321	\$ 147,554,712	\$ 1,340,611,160	\$ 49,795,717	\$ 474,718,873	\$ 2,374,540,300
Subtotal - CM (w/o MWAA)								\$ 236,814,350	\$ 251,290,750	\$ 125,136,918	\$ 28,949,321	\$ 76,227,212	\$ 157,329,660	\$ 19,795,717	\$ 74,165,273	\$ 483,193,300
Note: The State portion of the Commercial Service Subtotal reflects \$2 million per year, which is the maximum annual liability responsibility of the Commonwealth to the MWAA airports per Title 58.1 of the Code of Virginia.																
<i>Chesapeake Regional</i>																
		CPE	RL	\$ 25,000	Each	-	16	\$ -	\$ 400,000	\$ -	\$ -	\$ -	\$ -	\$ 20,000	\$ 380,000	\$ -
T-Hangers				\$ 50	sf	10,200	2,100	\$ 510,000	\$ 105,000	\$ -	\$ 25,500	\$ 484,500	\$ -	\$ 5,230	\$ 99,750	\$ -
Conventional Hangars				\$ 1,250	Each	34	20	\$ 42,500	\$ 25,000	\$ -	\$ 34,000	\$ 8,500	\$ -	\$ 20,000	\$ 5,000	\$ -
Auto Parking				\$ 175	sf	3,580	-	\$ 626,500	\$ -	\$ 438,530	\$ 187,950	\$ -	\$ -	\$ -	\$ -	\$ -
Terminal Building				\$ 4,500	Each	77	-	\$ 346,500	\$ -	\$ 311,830	\$ 27,720	\$ 6,950	\$ -	\$ -	\$ -	\$ -
Runway Lighting (MIRL to HIRL)								\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Wa Reporting								\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
AWOS 3 to AWOS 3 P.T				\$ 40,000	Each	1	-	\$ 40,000	\$ -	\$ 36,000	\$ 3,200	\$ 800	\$ -	\$ -	\$ -	\$ -
AWOS 3 P.T to AWOS 4 or ADO2				\$ 100,000	Each	-	1	\$ -	\$ 100,000	\$ -	\$ -	\$ -	\$ 90,000	\$ 8,000	\$ 2,000	
Master Plan				\$ 200,000	Each	-	1	\$ -	\$ 200,000	\$ -	\$ -	\$ -	\$ 180,000	\$ 16,000	\$ 4,000	
Total								\$ 1,565,500	\$ 820,000	\$ 347,850	\$ 528,970	\$ 688,680	\$ 270,000	\$ 69,250	\$ 490,750	\$ 2,393,500
<i>Chesterfield County</i>																
		RCI	RL	\$ 25,000	Each	10	20	\$ 250,000	\$ 500,000	\$ -	\$ 12,500	\$ 237,500	\$ -	\$ 25,000	\$ 475,000	\$ -
T-Hangers				\$ 50	sf	16,800	17,300	\$ 840,000	\$ 865,000	\$ -	\$ 42,000	\$ 798,000	\$ -	\$ 48,230	\$ 821,750	\$ -
Conventional Hangars				\$ 1,250	Each	64	67	\$ 79,566	\$ 83,642	\$ 71,961	\$ 6,396	\$ 1,999	\$ 75,278	\$ 6,691	\$ 1,673	\$ -
Auto Parking								\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Wa Reporting								\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
AWOS 3 to AWOS 3 P.T				\$ 40,000	Each	1	-	\$ 40,000	\$ -	\$ 36,000	\$ 3,200	\$ 800	\$ -	\$ -	\$ -	\$ -
AWOS 3 P.T to AWOS 4 or ADO2				\$ 100,000	Each	-	1	\$ -	\$ 100,000	\$ -	\$ -	\$ -	\$ 100,000	\$ -	\$ -	
Master Plan				\$ 200,000	Each	-	1	\$ -	\$ 200,000	\$ -	\$ -	\$ -	\$ 180,000	\$ 16,000	\$ 4,000	
Total								\$ 1,209,956	\$ 1,748,642	\$ 107,961	\$ 64,096	\$ 1,037,899	\$ 385,278	\$ 90,941	\$ 1,262,423	\$ 2,058,596
<i>Hampton Roads</i>																
		PVG	RL	\$ 110	sy	61,111	-	\$ 7,500,000	\$ -	\$ 6,750,000	\$ 600,000	\$ 150,000	\$ -	\$ -	\$ -	\$ -
Replacement Runway 10-28				\$ 25,000	Each	23	11	\$ 575,000	\$ 268,000	\$ -	\$ 28,730	\$ 546,250	\$ -	\$ 13,400	\$ 254,600	\$ -
T-Hangers				\$ 70	sy	31,500	37,000	\$ 2,205,000	\$ 2,590,000	\$ 1,984,500	\$ 176,400	\$ 44,100	\$ 2,381,000	\$ 207,200	\$ 51,800	\$ -
Apron Area				\$ 1,250	Each	56	23	\$ 70,000	\$ 28,750	\$ 63,000	\$ 5,600	\$ 1,400	\$ 25,875	\$ 2,300	\$ 575	\$ -
Auto Parking				\$ 175	sf	7,700	-	\$ -	\$ 1,347,500	\$ -	\$ -	\$ -	\$ -	\$ 943,230	\$ 404,250	\$ -
Terminal Building (new)								\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Navais								\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Glendale				\$ 175,000	Each	-	1	\$ -	\$ 175,000	\$ -	\$ -	\$ -	\$ 157,500	\$ 14,000	\$ 3,500	
Lehans				\$ 175,000	Each	-	1	\$ -	\$ 175,000	\$ -	\$ -	\$ -	\$ 157,500	\$ 14,000	\$ 3,500	
MALR				\$ 325,000	Each	-	1	\$ -	\$ 325,000	\$ -	\$ -	\$ -	\$ 292,500	\$ 26,000	\$ 6,500	
DMZ				\$ 80,000	Each	-	1	\$ -	\$ 80,000	\$ -	\$ -	\$ -	\$ 72,000	\$ 6,400	\$ 1,600	
Runway Lighting (MIRL to HIRL)				\$ 4,500	Each	-	62	\$ -	\$ 279,000	\$ -	\$ -	\$ -	\$ 251,100	\$ 22,330	\$ 5,580	
VGVA				\$ 35,000	Each	2	-	\$ 70,000	\$ -	\$ 63,000	\$ 5,600	\$ 1,400	\$ -	\$ -	\$ -	
REIL				\$ 35,000	Each	2	-	\$ 70,000	\$ -	\$ 63,000	\$ 5,600	\$ 1,400	\$ -	\$ -	\$ -	
Wa Reporting								\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
AWOS 3 to AWOS 3 P.T				\$ 40,000	Each	1	-	\$ 40,000	\$ -	\$ 36,000	\$ 3,200	\$ 800	\$ -	\$ -	\$ -	
AWOS 3 P.T to AWOS 4 or ADO2				\$ 100,000	Each	-	1	\$ -	\$ 100,000	\$ -	\$ -	\$ -	\$ 100,000	\$ -	\$ -	
Master Plan				\$ 200,000	Each	1	-	\$ 200,000	\$ -	\$ 180,000	\$ 16,000	\$ 4,000	\$ -	\$ -	\$ -	
Total								\$ 10,730,000	\$ 5,248,250	\$ 9,139,500	\$ 841,150	\$ 749,350	\$ 3,387,475	\$ 1,248,870	\$ 731,995	\$ 16,098,250
<i>Hanover County Municipal</i>																
		OPP	RL	\$ 25,000	Each	-	19	\$ -	\$ 475,000	\$ -	\$ -	\$ -	\$ -	\$ 23,730	\$ 451,250	\$ -
T-Hangers				\$ 50	sf	8,100	5,400	\$ 405,000	\$ 270,000	\$ -	\$ 20,250	\$ 384,750	\$ -	\$ 13,500	\$ 256,500	\$ -
Conventional Hangars				\$ 70	sy	15,200	20,600	\$ 1,064,000	\$ 1,442,000	\$ 957,600	\$ 85,120	\$ 21,280	\$ 1,297,800	\$ 115,360	\$ 28,840	\$ -
Apron Area				\$ 175	sf	3,900	-	\$ 682,500	\$ -	\$ -	\$ 477,750	\$ 204,750	\$ -	\$ -	\$ -	\$ -
Terminal Building								\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Navais								\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Glendale				\$ 175,000	Each	1	-	\$ -	\$ 175,000	\$ -	\$ -	\$ -	\$ 157,500	\$ 14,000	\$ 3,500	
MALR				\$ 325,000	Each	1	-	\$ -	\$ 325,000	\$ -	\$ -	\$ -	\$ 292,500	\$ 26,000	\$ 6,500	

Airport	Project Type	Identifier	Service Role	Unit \$	Unit	2005 Quantity	2020 Quantity	2000-2005			2006-2020			20 Year Total	
								2005 Total \$	2020 Total \$	Federal	State	Local	Federal		State
	Runway Lighting (MIRL to HIRL)			\$ 4,500	Each	-	69	\$ -	\$ 310,300	\$ -	\$ -	\$ -	\$ 279,450	\$ 24,840	\$ 6,210
	VCVA			\$ 35,000	Each	-	2	\$ -	\$ 70,000	\$ -	\$ -	\$ -	\$ 65,000	\$ 5,600	\$ 1,400
	Master Plan			\$ 200,000	Each	1	-	\$ 200,000	\$ -	\$ 180,000	\$ 16,000	\$ 4,000	\$ -	\$ -	\$ -
Total								\$ 2,351,500	\$ 3,067,500	\$ 1,137,000	\$ 599,120	\$ 614,760	\$ 2,096,250	\$ 223,050	\$ 754,200
Total								\$ 8,202,348	\$ 6,179,975	\$ 4,828,640	\$ 1,204,347	\$ 2,797,351	\$ 3,177,362	\$ 414,911	\$ 2,587,702
	Leeburg Executive		JYO	RL											
	T-Hangars			\$ 25,000	Each	76	37	\$ 1,888,348	\$ 934,573	\$ -	\$ 94,417	\$ 1,798,981	\$ -	\$ 46,729	\$ 887,844
	Land acquisition			\$ 4,000,000	Each	1	-	\$ 4,000,000	\$ -	\$ 3,600,000	\$ 320,000	\$ 80,000	\$ -	\$ -	\$ -
	Conventional Hangars			\$ 50	sf	12,160	34,300	\$ 608,000	\$ 1,715,000	\$ -	\$ 30,400	\$ 577,600	\$ -	\$ 85,750	\$ 1,620,250
	Apron Area			\$ 70	sy	15,300	34,200	\$ 1,085,000	\$ 2,394,000	\$ 976,500	\$ 86,800	\$ 21,700	\$ 2,154,600	\$ 191,520	\$ 47,880
	Auto Parking			\$ 1,250	Each	48	72	\$ 58,499	\$ 89,903	\$ 48,149	\$ 4,280	\$ 1,070	\$ 80,912	\$ 7,192	\$ 1,798
	Terminal Building			\$ 175	sf	5,300	-	\$ 927,300	\$ -	\$ -	\$ 649,230	\$ 278,250	\$ -	\$ -	\$ -
	Navais			\$ -	Each	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	Obstacle			\$ 175,000	Each	1	1	\$ -	\$ 175,000	\$ -	\$ -	\$ -	\$ 157,500	\$ 14,000	\$ 3,300
	MALR			\$ 325,000	Each	1	1	\$ -	\$ 325,000	\$ -	\$ -	\$ -	\$ 292,500	\$ 26,000	\$ 6,300
	Runway Lighting (MIRL to HIRL)			\$ 4,500	Each	-	77	\$ -	\$ 346,300	\$ -	\$ -	\$ -	\$ 311,850	\$ 27,720	\$ 6,990
	Wa Reporting			\$ -	Each	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	AWOS-3-R-1-AWOS-3-R-T			\$ 40,000	Each	1	-	\$ 40,000	\$ -	\$ 36,000	\$ 3,200	\$ 800	\$ -	\$ -	\$ -
	AWOS-3-R-1-AWOS-4-AWOS			\$ 200,000	Each	-	1	\$ -	\$ 200,000	\$ -	\$ -	\$ -	\$ 180,000	\$ 16,000	\$ 4,000
	Master Plan			\$ 200,000	Each	1	-	\$ 200,000	\$ -	\$ 180,000	\$ 16,000	\$ 4,000	\$ -	\$ -	\$ -
Total								\$ 8,202,348	\$ 6,179,975	\$ 4,828,640	\$ 1,204,347	\$ 2,797,351	\$ 3,177,362	\$ 414,911	\$ 2,587,702
	Monroe Regional		HEF	RL											
	Runway Length			\$ 110	sy	5,556	-	\$ 611,111	\$ -	\$ 530,000	\$ 48,889	\$ 12,222	\$ -	\$ -	\$ -
	Environmental Assessment			\$ 150,000	Each	1	-	\$ 150,000	\$ -	\$ 135,000	\$ 12,000	\$ 3,000	\$ -	\$ -	\$ -
	T-Hangars			\$ 25,000	Each	15	12	\$ 384,273	\$ 298,069	\$ -	\$ 16,714	\$ 317,559	\$ -	\$ 14,698	\$ 279,271
	Conventional Hangars			\$ 50	sf	9,700	34,900	\$ 485,000	\$ 1,745,000	\$ -	\$ 24,230	\$ 460,750	\$ -	\$ 87,250	\$ 1,657,730
	Apron Area			\$ 70	sy	39,300	70,500	\$ 4,151,000	\$ 4,935,000	\$ 3,735,000	\$ 332,080	\$ 83,020	\$ 4,441,300	\$ 394,800	\$ 98,700
	Auto Parking			\$ 1,250	Each	149	57	\$ 185,680	\$ 70,894	\$ 167,112	\$ 14,854	\$ 3,714	\$ 65,624	\$ 5,655	\$ 1,414
	Runway Lighting (for runway extension)			\$ 4,500	Each	6	-	\$ 27,000	\$ -	\$ 24,500	\$ 2,160	\$ 540	\$ -	\$ -	\$ -
	Wa Reporting			\$ -	Each	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	AWOS-3-R-1-AWOS-3-R-T			\$ 40,000	Each	1	-	\$ 40,000	\$ -	\$ 36,000	\$ 3,200	\$ 800	\$ -	\$ -	\$ -
	AWOS-3-R-1-AWOS-4-AWOS			\$ 200,000	Each	-	1	\$ -	\$ 200,000	\$ -	\$ -	\$ -	\$ 200,000	\$ -	\$ -
	Master Plan			\$ 200,000	Each	1	-	\$ 200,000	\$ -	\$ 180,000	\$ 16,000	\$ 4,000	\$ -	\$ -	\$ -
Total								\$ 6,484,064	\$ 7,244,663	\$ 4,828,312	\$ 470,147	\$ 885,605	\$ 4,705,124	\$ 502,404	\$ 2,037,138
	Stafford Regional (New)		RMN	RL											
	Runway Length			\$ 110	sy	5,556	-	\$ 611,111	\$ -	\$ 530,000	\$ 48,889	\$ 12,222	\$ -	\$ -	\$ -
	Environmental Assessment			\$ 150,000	Each	1	-	\$ 150,000	\$ -	\$ 135,000	\$ 12,000	\$ 3,000	\$ -	\$ -	\$ -
	T-Hangars			\$ 25,000	Each	24	21	\$ 607,800	\$ 517,170	\$ -	\$ 30,392	\$ 577,499	\$ -	\$ 25,858	\$ 491,311
	Conventional Hangars			\$ 50	sf	14,300	12,500	\$ 715,000	\$ 625,000	\$ -	\$ 35,730	\$ 679,250	\$ -	\$ 31,250	\$ 598,730
	Terminal Building			\$ 175	sf	4,800	1,200	\$ 840,000	\$ 210,000	\$ -	\$ 588,000	\$ 252,000	\$ -	\$ 147,000	\$ 63,000
	Navais			\$ -	Each	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	MALR			\$ 325,000	Each	-	1	\$ -	\$ 325,000	\$ -	\$ -	\$ -	\$ 292,500	\$ 26,000	\$ 6,300
	Runway Lighting (for runway extension)			\$ 4,500	Each	6	-	\$ 27,000	\$ -	\$ 24,500	\$ 2,160	\$ 540	\$ -	\$ -	\$ -
	Master Plan			\$ 200,000	Each	1	-	\$ 200,000	\$ -	\$ 180,000	\$ 16,000	\$ 4,000	\$ -	\$ -	\$ -
Total								\$ 3,150,941	\$ 1,677,170	\$ 889,500	\$ 733,190	\$ 1,528,451	\$ 262,500	\$ 336,108	\$ 1,154,561
	Warrenton-Ferguson		W66	RL											
	Runway (new/Inhab 14-32)			\$ 220	sy	35,893	-	\$ 7,883,333	\$ -	\$ 7,095,000	\$ 630,667	\$ 157,667	\$ -	\$ -	\$ -
	Environmental Assessment			\$ 150,000	Each	1	-	\$ 150,000	\$ -	\$ 135,000	\$ 12,000	\$ 3,000	\$ -	\$ -	\$ -
	Conventional Hangars			\$ 50	sf	-	3,400	\$ -	\$ 170,000	\$ -	\$ -	\$ -	\$ -	\$ 8,500	\$ 161,500
	Apron Area			\$ 70	sy	17,000	21,200	\$ 1,190,000	\$ 1,484,000	\$ 1,071,000	\$ 95,200	\$ 28,800	\$ 1,385,600	\$ 118,720	\$ 29,680
	Auto Parking			\$ 1,250	Each	30	20	\$ 62,625	\$ 24,712	\$ 56,368	\$ 5,010	\$ 1,253	\$ 22,341	\$ 1,977	\$ 494
	Terminal Building (new)			\$ 175	sf	-	7,200	\$ -	\$ 1,260,000	\$ -	\$ -	\$ -	\$ 882,000	\$ -	\$ 378,000
	Navais			\$ -	Each	-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	Obstacle			\$ 175,000	Each	1	1	\$ -	\$ 175,000	\$ -	\$ -	\$ -	\$ 157,500	\$ 14,000	\$ 3,300
	Landmark			\$ 175,000	Each	1	1	\$ -	\$ 175,000	\$ 157,500	\$ 14,000	\$ 3,300	\$ -	\$ -	\$ -
	MALR			\$ 325,000	Each	1	1	\$ -	\$ 325,000	\$ -	\$ -	\$ -	\$ 292,500	\$ 26,000	\$ 6,300
	MALR			\$ 80,000	Each	1	1	\$ -	\$ 80,000	\$ -	\$ -	\$ -	\$ 72,000	\$ 6,400	\$ 1,600
	MALR			\$ 20,000	Each	1	1	\$ 20,000	\$ -	\$ 18,000	\$ 1,600	\$ 400	\$ -	\$ -	\$ -

Airport	Project Type	Identifier	Service Role	Unit \$	Unit	2005 Quantity	2020 Quantity	2006-2005			2006-2020			20 Year Total		
								2005 Total \$	2020 Total \$	Federal	State	Local	Federal		State	Local
	Runway Lighting (MIRL to HRL)			\$ 4,500	Each	63	-	\$ 283,635	\$ -	\$ 255,272	\$ 22,691	\$ 5,673	\$ -	\$ -	\$ -	
	VGVA			\$ 35,000	Each	-	2	\$ -	\$ 70,000	\$ -	\$ -	\$ -	\$ 63,000	\$ 5,600	\$ 1,400	
	REIL			\$ 35,000	Each	-	1	\$ -	\$ 35,000	\$ -	\$ -	\$ -	\$ 31,500	\$ 2,800	\$ 700	
	Wx Reporting			\$ 125,000	Each	1	-	\$ 125,000	\$ -	\$ 112,500	\$ 10,000	\$ 2,500	\$ -	\$ -	\$ -	
	AWOC 3 to AWOC 3.1.T			\$ 100,000	Each	-	1	\$ -	\$ 100,000	\$ -	\$ -	\$ -	\$ 90,000	\$ 8,000	\$ 2,000	
	AWOC 3.1.T to AWOC 4 or AWOC			\$ 200,000	Each	-	-	\$ 200,000	\$ -	\$ 180,000	\$ 16,000	\$ 4,000	\$ -	\$ -	\$ -	
	Master Plan			\$ 200,000	Each	1	-	\$ 200,000	\$ -	\$ 200,000	\$ -	\$ -	\$ -	\$ -	\$ -	
Total								\$ 10,689,584	\$ 3723,712	\$ 9,808,634	\$ 897,167	\$ 201,792	\$ 2,064,341	\$ 1,073,997	\$ 585,374	\$ 13,813,306
Subtotal - RI								\$ 44,063,903	\$ 29,639,912	\$ 30,371,807	\$ 5,246,189	\$ 6,463,906	\$ 16,342,330	\$ 3,853,532	\$ 9,644,050	\$ 73,923,815
Accomack County		MPV	GR													
	Taxiway			\$ 110	sy	30,556	-	\$ 3,361,111	\$ -	\$ 3,025,000	\$ 268,889	\$ 67,222	\$ -	\$ -	\$ -	
	Environmental Assessment			\$ 150,000	Each	1	-	\$ 150,000	\$ -	\$ 135,000	\$ 12,000	\$ 3,000	\$ -	\$ -	\$ -	
	T-Hangars			\$ 25,000	Each	-	15	\$ -	\$ 375,000	\$ -	\$ -	\$ -	\$ -	\$ 18,175	\$ 364,330	
	Conventional Hangars			\$ 45	sf	3,600	1,800	\$ 162,000	\$ 81,000	\$ -	\$ 8,100	\$ 153,000	\$ -	\$ 4,050	\$ 76,950	
	Auto Parking			\$ 1,250	Each	21	15	\$ 26,164	\$ 19,096	\$ 23,548	\$ 2,099	\$ 523	\$ 17,187	\$ 1,528	\$ 382	
	Wx Reporting			\$ 40,000	Each	1	-	\$ 40,000	\$ -	\$ 36,000	\$ 3,200	\$ 800	\$ -	\$ -	\$ -	
	AWOC 3 to AWOC 3.1.T			\$ 100,000	Each	-	1	\$ -	\$ 100,000	\$ -	\$ -	\$ -	\$ 100,000	\$ -	\$ -	
	AWOC 3.1.T to AWOC 4 or AWOC			\$ 100,000	Each	-	-	\$ 100,000	\$ -	\$ 90,000	\$ 8,000	\$ 2,000	\$ -	\$ -	\$ -	
	Master Plan			\$ 100,000	Each	1	-	\$ 100,000	\$ -	\$ 100,000	\$ -	\$ -	\$ -	\$ -	\$ -	
Total								\$ 3,839,275	\$ 583,291	\$ 3,309,548	\$ 392,282	\$ 227,446	\$ 117,187	\$ 247,52	\$ 441,652	\$ 4,422,866
Blue Ridge		MTV	GR													
	Runway Length			\$ 110	sy	5,556	-	\$ 611,111	\$ -	\$ 530,000	\$ 48,890	\$ 12,222	\$ -	\$ -	\$ -	
	Environmental Assessment			\$ 150,000	Each	1	-	\$ 150,000	\$ -	\$ 135,000	\$ 12,000	\$ 3,000	\$ -	\$ -	\$ -	
	Auto Parking			\$ 1,250	Each	22	5	\$ 27,303	\$ 6,178	\$ 24,578	\$ 2,184	\$ 546	\$ 5,561	\$ 494	\$ 124	
	Terminal Building			\$ 175	sf	2,100	-	\$ 306,750	\$ -	\$ -	\$ 257,250	\$ 110,250	\$ -	\$ -	\$ -	
	Runway Lighting (for runway extension)			\$ 4,500	Each	6	-	\$ 27,000	\$ -	\$ 24,300	\$ 2,160	\$ 540	\$ -	\$ -	\$ -	
	Wx Reporting			\$ 40,000	Each	1	-	\$ 40,000	\$ -	\$ 36,000	\$ 3,200	\$ 800	\$ -	\$ -	\$ -	
	AWOC 3 to AWOC 3.1.T			\$ 100,000	Each	-	1	\$ -	\$ 100,000	\$ -	\$ -	\$ -	\$ 90,000	\$ 8,000	\$ 2,000	
	AWOC 3.1.T to AWOC 4 or AWOC			\$ 100,000	Each	-	-	\$ 100,000	\$ -	\$ 90,000	\$ 8,000	\$ 2,000	\$ -	\$ -	\$ -	
	Master Plan			\$ 100,000	Each	1	-	\$ 100,000	\$ -	\$ 100,000	\$ -	\$ -	\$ -	\$ -	\$ -	
Total								\$ 1,322,915	\$ 106,178	\$ 839,873	\$ 333,683	\$ 129,386	\$ 95,561	\$ 8,494	\$ 2,124	\$ 1,429,693
Culpeper County		CJR	GR													
	Runway Length			\$ 110	sy	12,500	-	\$ 1,375,000	\$ -	\$ 1,237,500	\$ 110,000	\$ 27,500	\$ -	\$ -	\$ -	
	Runway Width			\$ 110	sy	15,278	-	\$ 1,680,556	\$ -	\$ 1,512,500	\$ 134,444	\$ 38,611	\$ -	\$ -	\$ -	
	Environmental Assessment			\$ 150,000	Each	1	-	\$ 150,000	\$ -	\$ 135,000	\$ 12,000	\$ 3,000	\$ -	\$ -	\$ -	
	T-Hangars			\$ 25,000	Each	11	51	\$ 267,983	\$ 1,285,671	\$ -	\$ 13,999	\$ 254,584	\$ -	\$ 64,184	\$ 1,219,488	
	Conventional Hangars			\$ 30	sf	-	11,175	\$ -	\$ 558,750	\$ -	\$ -	\$ -	\$ -	\$ 27,938	\$ 530,813	
	Apron Area			\$ 30	sy	25,200	-	\$ 655,000	\$ 1,260,000	\$ 589,500	\$ 52,400	\$ 13,100	\$ 1,134,000	\$ 100,800	\$ 25,300	
	Auto Parking			\$ 1,250	Each	70	59	\$ 87,656	\$ 73,363	\$ 78,890	\$ 7,012	\$ 1,753	\$ 66,027	\$ 5,869	\$ 1,467	
	Terminal Building (new)			\$ 175	sf	-	7,900	\$ -	\$ 1,382,300	\$ -	\$ -	\$ -	\$ -	\$ 967,730	\$ 414,730	
	Navais			\$ 175,000	Each	1	-	\$ 175,000	\$ -	\$ 157,500	\$ 14,000	\$ 3,500	\$ -	\$ -	\$ -	
	NB			\$ 20,000	Each	1	-	\$ 20,000	\$ -	\$ 18,000	\$ 1,600	\$ 400	\$ -	\$ -	\$ -	
	Runway Lighting (for runway extension)			\$ 4,500	Each	16	-	\$ 72,000	\$ -	\$ 64,800	\$ 5,760	\$ 1,440	\$ -	\$ -	\$ -	
	VGVA			\$ 35,000	Each	2	-	\$ 70,000	\$ -	\$ 63,000	\$ 5,600	\$ 1,400	\$ -	\$ -	\$ -	
	REIL			\$ 35,000	Each	1	-	\$ 35,000	\$ -	\$ 31,500	\$ 2,800	\$ 700	\$ -	\$ -	\$ -	
	Wx Reporting			\$ 40,000	Each	1	-	\$ 40,000	\$ -	\$ 36,000	\$ 3,200	\$ 800	\$ -	\$ -	\$ -	
	AWOC 3 to AWOC 3.1.T			\$ 100,000	Each	-	1	\$ -	\$ 100,000	\$ -	\$ -	\$ -	\$ 90,000	\$ 8,000	\$ 2,000	
	AWOC 3.1.T to AWOC 4 or AWOC			\$ 100,000	Each	-	-	\$ 100,000	\$ -	\$ 90,000	\$ 8,000	\$ 2,000	\$ -	\$ -	\$ -	
	Master Plan			\$ 100,000	Each	1	-	\$ 100,000	\$ -	\$ 100,000	\$ -	\$ -	\$ -	\$ -	\$ -	
Total								\$ 4,728,194	\$ 4,638,283	\$ 4,014,190	\$ 379,216	\$ 345,788	\$ 1,290,027	\$ 1,174,540	\$ 2,193,718	\$ 9,266,679
Danville Regional		DAN	GR													
	T-Hangars			\$ 25,000	Each	10	10	\$ 250,000	\$ 250,000	\$ -	\$ 12,500	\$ 287,500	\$ -	\$ 12,500	\$ 287,500	
	Conventional Hangars			\$ 30	sf	-	5,500	\$ -	\$ 275,000	\$ -	\$ -	\$ -	\$ -	\$ 13,750	\$ 261,250	
	Apron Area			\$ 30	sy	-	29,000	\$ -	\$ 1,150,000	\$ -	\$ -	\$ -	\$ 1,085,000	\$ 92,000	\$ 23,000	
	Auto Parking			\$ 1,250	Each	-	64	\$ -	\$ 80,000	\$ -	\$ -	\$ -	\$ 72,000	\$ 6,400	\$ 1,600	
	Master Plan			\$ 100,000	Each	1	-	\$ 100,000	\$ -	\$ 90,000	\$ 8,000	\$ 2,000	\$ -	\$ -	\$ -	

Airport	Project Type	Identifier	Service Role	Unit \$	Unit	2005 Quantity	2020 Quantity	2005 Total \$		2006-2005			2006-2020			20 Year Total
								2005 Total \$	2020 Total \$	Federal	State	Local	Federal	State	Local	
Total								\$ 366,000	\$ 1,755,000	\$ 90,000	\$ 20,500	\$ 239,500	\$ 1,107,000	\$ 124,650	\$ 523,350	\$ 2,105,000
<i>Durham County Airport</i>		PFB	GR													
Runway Length				\$ 110	sy	5,556	-	\$ 611,111	\$ -	\$ 530,000	\$ 48,889	\$ 12,222	\$ -	\$ -	\$ -	\$ -
Environmental Assessment				\$ 150,000	Each	1	-	\$ 150,000	\$ -	\$ 150,000	\$ 12,000	\$ 3,000	\$ -	\$ -	\$ -	\$ -
T-Hangars				\$ 25,000	Each	14	17	\$ 348,358	\$ 422,369	\$ -	\$ 17,418	\$ 330,940	\$ -	\$ 21,118	\$ 401,250	
Conventional Hangars				\$ 50	sf	9,777	14,700	\$ 488,850	\$ 735,000	\$ -	\$ 24,443	\$ 464,408	\$ -	\$ 36,750	\$ 698,250	
Auto Parking				\$ 1,250	Each	106	-	\$ 152,221	\$ -	\$ 118,999	\$ 10,578	\$ 2,644	\$ -	\$ -	\$ -	
Runway Lighting (for runway extension)				\$ 4,500	Each	6	-	\$ 27,000	\$ -	\$ 24,300	\$ 2,100	\$ 540	\$ -	\$ -	\$ -	
Wx Reporting								\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
AWQ-3 to AWQ-3 P.T				\$ 40,000	Each	1	-	\$ 40,000	\$ -	\$ 36,000	\$ 3,300	\$ 800	\$ -	\$ -	\$ -	
AWQ-3 P.T to AWQ-3 or ADOS				\$ 100,000	Each	-	1	\$ -	\$ 100,000	\$ -	\$ -	\$ -	\$ 90,000	\$ 8,000	\$ 2,000	
Master Plan				\$ 100,000	Each	-	1	\$ -	\$ 100,000	\$ -	\$ -	\$ -	\$ 90,000	\$ 8,000	\$ 2,000	
Total								\$ 1,797,540	\$ 1,387,369	\$ 864,299	\$ 118,687	\$ 814,554	\$ 180,000	\$ 73,868	\$ 1,103,500	\$ 3,154,909
<i>Farmville Regional</i>		FVX	GR													
Runway Length				\$ 110	sy	9,167	-	\$ 1,008,333	\$ -	\$ 907,500	\$ 80,667	\$ 20,167	\$ -	\$ -	\$ -	
Runway Width				\$ 110	sy	15,278	-	\$ 1,680,556	\$ -	\$ 1,512,500	\$ 134,444	\$ 33,611	\$ -	\$ -	\$ -	
Environmental Assessment				\$ 150,000	Each	1	-	\$ 150,000	\$ -	\$ 150,000	\$ 12,000	\$ 3,000	\$ -	\$ -	\$ -	
T-Hangars				\$ 25,000	Each	19	-	\$ 464,733	\$ -	\$ -	\$ 23,237	\$ 441,496	\$ -	\$ -	\$ -	
Land Acquisition				\$ 167,000	Each	1	-	\$ 167,000	\$ -	\$ 130,300	\$ 13,360	\$ 3,340	\$ -	\$ -	\$ -	
Conventional Hangars				\$ 50	sf	3,460	4,600	\$ 173,000	\$ 230,000	\$ -	\$ 8,650	\$ 164,350	\$ -	\$ 11,500	\$ 218,500	
Terminal Building				\$ 175	sf	-	2,500	\$ -	\$ 437,500	\$ -	\$ -	\$ -	\$ -	\$ 306,250	\$ 131,250	
Navaid								\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Lodges				\$ 175,000	Each	-	1	\$ -	\$ 175,000	\$ -	\$ -	\$ -	\$ 157,500	\$ 14,000	\$ 3,500	
Runway Lighting (for runway extension)				\$ 4,500	Each	12	-	\$ 54,000	\$ -	\$ 48,600	\$ 4,320	\$ 1,080	\$ -	\$ -	\$ -	
REIL				\$ 35,000	Each	-	2	\$ -	\$ 70,000	\$ -	\$ -	\$ -	\$ 63,000	\$ 5,600	\$ 1,400	
Wx Reporting								\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
AWQ-3 to AWQ-3 P.T				\$ 40,000	Each	1	-	\$ 40,000	\$ -	\$ 36,000	\$ 3,300	\$ 800	\$ -	\$ -	\$ -	
AWQ-3 P.T to AWQ-3 or ADOS				\$ 100,000	Each	-	1	\$ -	\$ 100,000	\$ -	\$ -	\$ -	\$ 90,000	\$ 8,000	\$ 2,000	
Master Plan				\$ 100,000	Each	-	1	\$ -	\$ 100,000	\$ -	\$ -	\$ -	\$ 90,000	\$ 8,000	\$ 2,000	
Total								\$ 3,837,621	\$ 1,012,500	\$ 2,879,900	\$ 287,878	\$ 609,844	\$ 310,500	\$ 345,350	\$ 356,650	\$ 4,850,121
<i>Ingalls Field</i>		HSP	GR													
Conventional Hangars				\$ 50	sf	-	3,200	\$ -	\$ 160,000	\$ -	\$ -	\$ -	\$ -	\$ 8,000	\$ 152,000	
Communication				\$ 8,000	Each	-	1	\$ -	\$ 8,000	\$ -	\$ -	\$ -	\$ 7,200	\$ 640	\$ 160	
REIL				\$ 35,000	Each	1	-	\$ 35,000	\$ -	\$ 31,500	\$ 2,800	\$ 700	\$ -	\$ -	\$ -	
Wx Reporting								\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
AWQ-3 to AWQ-3 P.T				\$ 40,000	Each	1	-	\$ 40,000	\$ -	\$ 36,000	\$ 3,300	\$ 800	\$ -	\$ -	\$ -	
AWQ-3 P.T to AWQ-3 or ADOS				\$ 100,000	Each	-	1	\$ -	\$ 100,000	\$ -	\$ -	\$ -	\$ 90,000	\$ 8,000	\$ 2,000	
Master Plan				\$ 100,000	Each	-	1	\$ -	\$ 100,000	\$ -	\$ -	\$ -	\$ 90,000	\$ 8,000	\$ 2,000	
Total								\$ 175,000	\$ 268,000	\$ 187,500	\$ 14,000	\$ 3,500	\$ 97,200	\$ 16,640	\$ 154,160	\$ 443,000
<i>Loneoak Pine</i>		LNP	GR													
Taxiway (Partial Parallel)				\$ 1,581,400	Each	1	-	\$ 1,581,400	\$ -	\$ 1,428,260	\$ 136,512	\$ 31,628	\$ -	\$ -	\$ -	
Environmental Assessment				\$ 150,000	Each	1	-	\$ 150,000	\$ -	\$ 135,000	\$ 12,000	\$ 3,000	\$ -	\$ -	\$ -	
Navaid								\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Obstacle				\$ 1,000,000	Each	1	-	\$ 1,000,000	\$ -	\$ 1,000,000	\$ -	\$ -	\$ -	\$ -	\$ -	
MALSR				\$ 325,000	Each	1	-	\$ 325,000	\$ -	\$ 292,500	\$ 26,000	\$ 6,500	\$ -	\$ -	\$ -	
Wx Reporting								\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
AWQ-3 to AWQ-3 P.T				\$ 40,000	Each	1	-	\$ 40,000	\$ -	\$ 36,000	\$ 3,300	\$ 800	\$ -	\$ -	\$ -	
AWQ-3 P.T to AWQ-3 or ADOS				\$ 100,000	Each	-	1	\$ -	\$ 100,000	\$ -	\$ -	\$ -	\$ 90,000	\$ 8,000	\$ 2,000	
Master Plan				\$ 100,000	Each	-	1	\$ -	\$ 100,000	\$ -	\$ -	\$ -	\$ 90,000	\$ 8,000	\$ 2,000	
Total								\$ 3,096,400	\$ 290,000	\$ 2,886,760	\$ 167,712	\$ 41,928	\$ 180,000	\$ 16,000	\$ 4,000	\$ 3,206,400
<i>Mechlenburg-Emerick Regional</i>		AVC	GR													
Runway Length				\$ 110	sy	-	4,167	\$ -	\$ 458,333	\$ -	\$ -	\$ -	\$ 41,200	\$ 36,667	\$ 9,167	
Runway Width				\$ 110	sy	-	15,278	\$ -	\$ 1,680,556	\$ -	\$ -	\$ -	\$ 1,512,500	\$ 134,444	\$ 33,611	
Environmental Assessment				\$ 150,000	Each	-	1	\$ -	\$ 150,000	\$ -	\$ -	\$ -	\$ 135,000	\$ 12,000	\$ 3,000	
Conventional Hangars				\$ 50	sf	-	11,600	\$ -	\$ 580,000	\$ -	\$ -	\$ -	\$ -	\$ 20,000	\$ 551,000	

Airport	Project Type	Identifier	Service Role	Unit \$	Unit	2005 Quantity	2020 Quantity	2000-2005			2006-2020			20 Year Total	
								2005 Total \$	2020 Total \$	Federal	State	Local	Federal		State
	Terminal Building			\$ 175	sf	-	1,400	\$ -	\$ 245,000	\$ -	\$ -	\$ -	\$ -	\$ 171,500	\$ 75,500
	Runway Lighting (for runway extension)			\$ 4,500	Each	-	6	\$ -	\$ 27,000	\$ -	\$ -	\$ -	\$ 24,300	\$ 2,100	\$ 540
	Wx Reporting			\$ -		-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	AWQ2-3 to AWQ2-3 P-T			\$ 40,000	Each	1	-	\$ 40,000	\$ -	\$ 36,000	\$ 3,200	\$ 800	\$ -	\$ -	\$ -
	AWQ2-3 P-T to AWQ24 or AWQ2			\$ 100,000	Each	-	1	\$ -	\$ 100,000	\$ -	\$ -	\$ -	\$ 90,000	\$ 8,000	\$ 2,000
	Master Plan			\$ 180,000	Each	-	1	\$ -	\$ 180,000	\$ -	\$ -	\$ -	\$ 162,000	\$ 14,400	\$ 3,600
Total								\$ 40,000	\$ 3,420,889	\$ 36,000	\$ 3,200	\$ 800	\$ 2,336,300	\$ 406,171	\$ 676,418
3,460,889															
Middle Peninsula Regional		W97	GR												
	Runway Length			\$ 110	sy	-	13,333	\$ -	\$ 1,466,667	\$ -	\$ -	\$ -	\$ 1,320,000	\$ 117,333	\$ 29,333
	Environmental Assessment			\$ 150,000	Each	-	1	\$ -	\$ 150,000	\$ -	\$ -	\$ -	\$ 135,000	\$ 12,000	\$ 3,000
	T-Hangars			\$ 25,000	Each	-	35	\$ -	\$ 866,184	\$ -	\$ -	\$ -	\$ -	\$ 49,509	\$ 822,875
	Conventional Hangars			\$ 30	sf	3,400	4,700	\$ 170,000	\$ 285,000	\$ -	\$ 8,300	\$ 161,500	\$ -	\$ 11,730	\$ 228,250
	Apron Area			\$ 30	sy	-	10,300	\$ -	\$ 315,000	\$ -	\$ -	\$ -	\$ 463,500	\$ 41,200	\$ 10,300
	Auto Parking			\$ 1,250	Each	30	30	\$ 37,500	\$ 24,880	\$ 38,750	\$ 3,000	\$ 750	\$ 21,392	\$ 1,990	\$ 498
	Terminal Building			\$ 175	sf	2,300	1,300	\$ 402,500	\$ 227,500	\$ -	\$ 281,750	\$ 120,750	\$ -	\$ 159,250	\$ 68,250
	Navaid			\$ -		-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	Locator			\$ 175,000	Each	-	1	\$ -	\$ 175,000	\$ -	\$ -	\$ -	\$ 157,500	\$ 14,000	\$ 3,500
	ND			\$ 20,000	Each	-	1	\$ -	\$ 20,000	\$ -	\$ -	\$ -	\$ 18,000	\$ 1,600	\$ 400
	Runway Lighting (for runway extension)			\$ 4,500	Each	-	16	\$ -	\$ 72,000	\$ -	\$ -	\$ -	\$ 64,800	\$ 5,760	\$ 1,440
	VGVA			\$ 35,000	Each	-	2	\$ -	\$ 70,000	\$ -	\$ -	\$ -	\$ 63,000	\$ 5,600	\$ 1,400
	Wx Reporting			\$ -		-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	AWQ2-3 P-T			\$ 40,000	Each	1	-	\$ 40,000	\$ -	\$ -	\$ 32,000	\$ 8,000	\$ -	\$ -	\$ -
	AWQ2-3 P-T to AWQ24 or AWQ2			\$ 100,000	Each	-	1	\$ -	\$ 100,000	\$ -	\$ -	\$ -	\$ 90,000	\$ 8,000	\$ 2,000
	Master Plan			\$ 100,000	Each	-	1	\$ -	\$ 100,000	\$ -	\$ -	\$ 2,000	\$ -	\$ -	\$ -
Total								\$ 750,000	\$ 3,922,250	\$ 123,750	\$ 333,250	\$ 293,000	\$ 2,334,192	\$ 421,793	\$ 1,166,245
4,671,250															
New River Valley		PSK	GR												
	Wx Reporting			\$ -		-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	AWQ2-3 to AWQ2-3 P-T			\$ 40,000	Each	1	-	\$ 40,000	\$ -	\$ 36,000	\$ 3,200	\$ 800	\$ -	\$ -	\$ -
	AWQ2-3 P-T to AWQ24 or AWQ2			\$ 100,000	Each	-	1	\$ -	\$ 100,000	\$ -	\$ -	\$ -	\$ 90,000	\$ 8,000	\$ 2,000
	Master Plan			\$ 100,000	Each	-	1	\$ -	\$ 100,000	\$ -	\$ -	\$ -	\$ 90,000	\$ 8,000	\$ 2,000
Total								\$ 40,000	\$ 200,000	\$ 36,000	\$ 3,200	\$ 800	\$ 180,000	\$ 16,000	\$ 4,000
240,000															
Shannon		EZF	GR												
	Taxiway			\$ 110	sy	15,500	-	\$ 1,705,000	\$ -	\$ -	\$ 1,364,000	\$ 341,000	\$ -	\$ -	\$ -
	Environmental Assessment			\$ 150,000	Each	1	-	\$ 150,000	\$ -	\$ -	\$ 120,000	\$ 30,000	\$ -	\$ -	\$ -
	T-Hangars			\$ 25,000	Each	11	6	\$ 268,745	\$ 153,633	\$ -	\$ 13,437	\$ 255,308	\$ -	\$ 7,682	\$ 145,952
	Conventional Hangars			\$ 30	sf	-	3,300	\$ -	\$ 165,000	\$ -	\$ -	\$ -	\$ -	\$ 8,250	\$ 156,750
	Apron Area			\$ 30	sy	12,900	15,500	\$ 645,000	\$ 775,000	\$ -	\$ 516,000	\$ 129,000	\$ -	\$ 620,000	\$ 155,000
	Auto Parking			\$ 1,250	Each	-	57	\$ -	\$ 70,846	\$ -	\$ -	\$ -	\$ -	\$ 56,677	\$ 14,169
	Terminal Building			\$ 175	sf	-	1,760	\$ -	\$ 308,000	\$ -	\$ -	\$ -	\$ -	\$ 277,200	\$ 30,800
	VGVA			\$ 35,000	Each	-	2	\$ -	\$ 70,000	\$ -	\$ -	\$ -	\$ -	\$ 56,000	\$ 14,000
	REIL			\$ 35,000	Each	-	1	\$ -	\$ 35,000	\$ -	\$ -	\$ -	\$ -	\$ 28,000	\$ 7,000
	Wx Reporting			\$ -		-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	AWQ2-3 to AWQ2-3 P-T			\$ 40,000	Each	1	-	\$ 40,000	\$ -	\$ -	\$ 32,000	\$ 8,000	\$ -	\$ -	\$ -
	AWQ2-3 P-T to AWQ24 or AWQ2			\$ 100,000	Each	-	1	\$ -	\$ 100,000	\$ -	\$ -	\$ -	\$ -	\$ 80,000	\$ 20,000
	Master Plan			\$ 100,000	Each	-	1	\$ -	\$ 100,000	\$ -	\$ -	\$ 2,000	\$ -	\$ -	\$ -
Total								\$ 2,908,745	\$ 1,677,480	\$ 90,000	\$ 2,053,437	\$ 765,208	\$ -	\$ 1,133,809	\$ 545,671
4,586,224															
Stafford Municipal		SFQ	GR												
	Taxiway			\$ 110	sy	30,600	-	\$ 3,366,000	\$ -	\$ 3,020,400	\$ 269,280	\$ 67,320	\$ -	\$ -	\$ -
	Environmental Assessment			\$ 150,000	Each	1	-	\$ 150,000	\$ -	\$ 135,000	\$ 12,000	\$ 3,000	\$ -	\$ -	\$ -
	T-Hangars			\$ 25,000	Each	15	22	\$ 375,000	\$ 550,000	\$ -	\$ 18,730	\$ 356,250	\$ -	\$ 27,500	\$ 522,500
	Conventional Hangars			\$ 30	sf	-	3,800	\$ 190,000	\$ 660,000	\$ -	\$ 9,500	\$ 180,500	\$ -	\$ 33,000	\$ 627,000
	Apron Area			\$ 30	sy	-	30	\$ -	\$ 62,500	\$ -	\$ -	\$ -	\$ 56,250	\$ 5,000	\$ 1,250
	Auto Parking			\$ 1,250	Each	-	30	\$ -	\$ 62,500	\$ -	\$ -	\$ -	\$ -	\$ 453,250	\$ 194,250
	Terminal Building			\$ 175	sf	-	3,700	\$ -	\$ 647,500	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	Wx Reporting			\$ -		-	-	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	AWQ2-3 to AWQ2-3 P-T			\$ 40,000	Each	1	-	\$ 40,000	\$ -	\$ 36,000	\$ 3,200	\$ 800	\$ -	\$ -	\$ -
	AWQ2-3 P-T to AWQ24 or AWQ2			\$ 100,000	Each	-	1	\$ -	\$ 100,000	\$ -	\$ -	\$ -	\$ 90,000	\$ 8,000	\$ 2,000
	Master Plan			\$ 100,000	Each	-	1	\$ -	\$ 100,000	\$ -	\$ -	\$ 2,000	\$ -	\$ -	\$ -

Airport	Project Type	Identifier	Service Role	Unit\$	Unit	2005 Quantity	2020 Quantity	2006-2005			2006-2020			20 Year Total			
								2005 Total \$	2020 Total\$	Federal	State	Local	Federal		State	Local	
Total								\$ 4,221,000	\$ 2,020,000	\$ 3,290,400	\$ 320,730	\$ 609,870	\$ 146,250	\$ 526,750	\$ 1,347,000	\$ 6,241,000	
<i>Tazewell County</i>		6V5	GR														
								\$ 175,000		\$ 175,000	\$ 14,000	\$ 3,300					
								\$ 20,000		\$ 20,000	\$ 1,600	\$ 400					
								\$ 35,000	\$ 35,000				\$ 31,500	\$ 2,800	\$ 700		
								\$ 40,000		\$ 36,000	\$ 3,300	\$ 800					
								\$ 100,000					\$ 90,000	\$ 8,000	\$ 2,000		
								\$ 100,000	\$ 100,000				\$ 90,000	\$ 8,000	\$ 2,000		
Total								\$ 235,000	\$ 235,000	\$ 211,500	\$ 18,800	\$ 4,700	\$ 211,500	\$ 18,800	\$ 4,700	\$ 470,000	
<i>Virginia Highlands</i>		VII	GR														
							8,333	\$ -	\$ 916,667	\$ -	\$ -	\$ -	\$ 825,000	\$ 73,333	\$ 18,333		
							15,278	\$ -	\$ 1,680,556	\$ -	\$ -	\$ -	\$ 1,512,500	\$ 134,444	\$ 33,611		
								\$ 150,000	\$ 150,000	\$ -	\$ -	\$ -	\$ 135,000	\$ 12,000	\$ 3,000		
								\$ 1,300,000	\$ 1,300,000	\$ -	\$ -	\$ -	\$ 1,170,000	\$ 104,000	\$ 26,000		
							20	\$ 25,000	\$ -	\$ 25,000	\$ 475,000	\$ -	\$ -	\$ -	\$ -		
							51,000	\$ 30	\$ 2,550,000	\$ -	\$ 127,500	\$ 2,422,500	\$ -	\$ -	\$ -		
							17,000	\$ 50	\$ 850,000	\$ 830,000	\$ 765,000	\$ 68,000	\$ 17,000	\$ 765,000	\$ 68,000	\$ 17,000	
							10	\$ 4,500	\$ 45,000	\$ -	\$ -	\$ -	\$ 40,500	\$ 3,600	\$ 900		
							1	\$ 35,000	\$ -	\$ 31,500	\$ 2,800	\$ 700	\$ -	\$ -	\$ -		
							1	\$ 35,000	\$ 35,000	\$ -	\$ -	\$ -	\$ 31,500	\$ 2,800	\$ 700		
							1	\$ 40,000	\$ -	\$ 36,000	\$ 3,300	\$ 800	\$ -	\$ -	\$ -		
							1	\$ 100,000	\$ 100,000	\$ -	\$ -	\$ -	\$ 90,000	\$ 8,000	\$ 2,000		
							1	\$ 100,000	\$ 100,000	\$ -	\$ -	\$ -	\$ 90,000	\$ 8,000	\$ 2,000		
Total								\$ 3,975,000	\$ 5,177,223	\$ 832,500	\$ 226,500	\$ 2,916,000	\$ 4,659,500	\$ 414,178	\$ 103,544	\$ 9,152,322	
<i>William M. Dick</i>		W78	GR														
							2,900	\$ 175	\$ 507,500	\$ 17,500	\$ 355,250	\$ 152,250	\$ -	\$ 12,250	\$ 5,250		
							1	\$ 175,000	\$ 175,000	\$ -	\$ -	\$ -	\$ 157,500	\$ 14,000	\$ 3,500		
							1	\$ 20,000	\$ 20,000	\$ -	\$ -	\$ -	\$ 18,000	\$ 1,600	\$ 400		
							62	\$ 4,500	\$ 279,495	\$ -	\$ -	\$ -	\$ 251,546	\$ 22,340	\$ 5,590		
							2	\$ 35,000	\$ 70,000	\$ 69,000	\$ 5,600	\$ 1,400	\$ -	\$ -	\$ -		
							1	\$ 125,000	\$ -	\$ 112,500	\$ 10,000	\$ 2,500	\$ -	\$ -	\$ -		
							1	\$ 100,000	\$ 100,000	\$ -	\$ -	\$ -	\$ 90,000	\$ 8,000	\$ 2,000		
							1	\$ 100,000	\$ -	\$ 90,000	\$ 8,000	\$ 2,000	\$ -	\$ -	\$ -		
Total								\$ 802,500	\$ 891,995	\$ 265,500	\$ 378,850	\$ 138,150	\$ 517,046	\$ 58,210	\$ 16,740	\$ 1,394,095	
<i>Winchester Regional</i>		OKV	GR														
							19	\$ 25,143	\$ 471,948	\$ -	\$ 12,807	\$ 239,585	\$ -	\$ 23,597	\$ 448,351		
							1	\$ 40,000	\$ -	\$ 36,000	\$ 3,300	\$ 800	\$ -	\$ -	\$ -		
							1	\$ 100,000	\$ 100,000	\$ -	\$ -	\$ -	\$ 90,000	\$ 8,000	\$ 2,000		
							1	\$ 100,000	\$ -	\$ 90,000	\$ 8,000	\$ 2,000	\$ -	\$ -	\$ -		
Total								\$ 392,143	\$ 571,948	\$ 126,000	\$ 25,807	\$ 242,335	\$ 90,000	\$ 31,597	\$ 450,351	\$ 964,091	
<i>Rocky Mount/Franklin County (New)</i>			GR														
							11,000,000	\$ -	\$ 5,000,000	\$ 9,900,000	\$ 880,000	\$ 220,000	\$ 4,500,000	\$ 400,000	\$ 100,000	\$ 16,000,000	
Subtotal - GR								\$ 43,511,333	\$ 32,757,686	\$ 29,973,720	\$ 5,856,732	\$ 7,680,881	\$ 18,252,261	\$ 5,213,603	\$ 9,191,822	\$ 76,269,020	
<i>Blackstone Municipal</i>		BKT	OC														
							1,200	\$ 175	\$ 210,000	\$ -	\$ -	\$ -	\$ -	\$ 147,000	\$ 63,000		
							2	\$ 35,000	\$ 70,000	\$ -	\$ -	\$ -	\$ 63,000	\$ 5,600	\$ 1,400		
							2	\$ 35,000	\$ 70,000	\$ -	\$ -	\$ -	\$ 63,000	\$ 5,600	\$ 1,400		
							1	\$ 100,000	\$ -	\$ 90,000	\$ 8,000	\$ 2,000	\$ -	\$ -	\$ -		

Airport	Project Type	Identifier	Service Role	Unit \$	Unit	2005 Quantity	2020 Quantity	2005-2005			2006-2020			20 Year Total		
								2005 Total \$	2020 Total \$	Federal	State	Local	Federal		State	Local
Total								\$ 100,000	\$ 350,000	\$ 90,000	\$ 8,000	\$ 2,000	\$ 126,000	\$ 158,200	\$ 65,800	\$ 450,000
<i>Brookwood-Campbell County</i>		OVA	OC													
Runway Width				\$ 75	sy	-	6,330	\$ -	\$ 474,750	\$ -	\$ -	\$ -	\$ 427,275	\$ 37,980	\$ 9,495	
Environmental Assessment				\$ 150,000	Each	-	1	\$ -	\$ 150,000	\$ -	\$ -	\$ -	\$ 135,000	\$ 12,000	\$ 3,000	
Terminal Building				\$ 175	sf	-	2,400	\$ -	\$ 420,000	\$ -	\$ -	\$ -	\$ -	\$ 294,000	\$ 126,000	
VGVA				\$ 35,000	Each	-	2	\$ -	\$ 70,000	\$ -	\$ -	\$ -	\$ 63,000	\$ 5,600	\$ 1,400	
Master Plan				\$ 100,000	Each	-	1	\$ 100,000	\$ -	\$ 90,000	\$ 8,000	\$ 2,000	\$ -	\$ -	\$ -	
Total								\$ 100,000	\$ 1,114,750	\$ 90,000	\$ 8,000	\$ 2,000	\$ 625,275	\$ 349,580	\$ 139,895	\$ 1,214,750
<i>Emporia-Greenville Regional</i>		EMV	OC													
Partial Parallel Taxiway				\$ 75	sy	5,200	-	\$ 390,000	\$ -	\$ 351,000	\$ 31,200	\$ 7,800	\$ -	\$ -	\$ -	
Environmental Assessment				\$ 150,000	Each	1	-	\$ 150,000	\$ -	\$ 135,000	\$ 12,000	\$ 3,000	\$ -	\$ -	\$ -	
Master Plan				\$ 100,000	Each	1	-	\$ 100,000	\$ -	\$ 90,000	\$ 8,000	\$ 2,000	\$ -	\$ -	\$ -	
Total								\$ 640,000	\$ -	\$ 576,000	\$ 51,200	\$ 12,800	\$ -	\$ -	\$ -	\$ 640,000
<i>Franklin Municipal</i>		FEN	OC													
VGVA				\$ 35,000	Each	-	2	\$ -	\$ 70,000	\$ -	\$ -	\$ -	\$ 63,000	\$ 5,600	\$ 1,400	
REIL				\$ 35,000	Each	-	1	\$ -	\$ 35,000	\$ -	\$ -	\$ -	\$ 31,200	\$ 2,800	\$ 700	
Master Plan				\$ 100,000	Each	-	1	\$ 100,000	\$ -	\$ -	\$ -	\$ -	\$ 90,000	\$ 8,000	\$ 2,000	
Total								\$ -	\$ 205,000	\$ -	\$ -	\$ -	\$ 184,500	\$ 16,400	\$ 4,100	\$ 205,000
<i>Front Royal-Warren County</i>		FRR	OC													
Conventional Hangars				\$ 30	sf	3,900	-	\$ 195,000	\$ -	\$ -	\$ 9,750	\$ 185,250	\$ -	\$ -	\$ -	
Apron Area				\$ 30	sy	-	8,300	\$ -	\$ 415,000	\$ -	\$ -	\$ -	\$ 373,500	\$ 33,200	\$ 8,300	
Auto Parking				\$ 1,250	Each	-	21	\$ -	\$ 26,250	\$ -	\$ -	\$ -	\$ 23,066	\$ 2,050	\$ 513	
Terminal Building				\$ 175	sf	-	3,100	\$ -	\$ 542,500	\$ -	\$ -	\$ -	\$ -	\$ 379,750	\$ 162,750	
VGVA				\$ 35,000	Each	-	2	\$ -	\$ 70,000	\$ -	\$ -	\$ -	\$ 63,000	\$ 5,600	\$ 1,400	
Master Plan				\$ 100,000	Each	-	1	\$ 100,000	\$ -	\$ 90,000	\$ 8,000	\$ 2,000	\$ -	\$ -	\$ -	
Total								\$ 295,000	\$ 1,053,125	\$ 90,000	\$ 17,750	\$ 187,250	\$ 459,566	\$ 429,600	\$ 172,963	\$ 1,348,125
<i>Lee County (New)</i>			OC													
Runway				\$ 75	sy	41,667	-	\$ 3,125,000	\$ -	\$ 2,812,500	\$ 250,000	\$ 62,500	\$ -	\$ -	\$ -	
Taxiway (for T-Hangars) (note 1)				\$ 75	sy	4,667	-	\$ 350,000	\$ -	\$ -	\$ 280,000	\$ 70,000	\$ -	\$ -	\$ -	
T-Hangars				\$ 25,000	Each	10	-	\$ 250,000	\$ -	\$ -	\$ -	\$ 250,000	\$ -	\$ -	\$ -	
Environmental Assessment				\$ 150,000	Each	1	-	\$ 150,000	\$ -	\$ 135,000	\$ 12,000	\$ 3,000	\$ -	\$ -	\$ -	
Conventional Hangars				\$ 30	sf	6,400	-	\$ 320,000	\$ -	\$ -	\$ 16,000	\$ 304,000	\$ -	\$ -	\$ -	
Apron Area				\$ 30	sy	-	7,800	\$ -	\$ 390,000	\$ -	\$ -	\$ -	\$ 351,000	\$ 31,200	\$ 7,800	
Auto Parking				\$ 1,250	Each	30	-	\$ 37,500	\$ -	\$ 38,750	\$ 3,000	\$ 750	\$ -	\$ -	\$ -	
Terminal Building				\$ 175	sf	3,100	-	\$ 542,500	\$ -	\$ -	\$ 379,750	\$ 162,750	\$ -	\$ -	\$ -	
Runway Lighting (MIRL and MITLS)				\$ 4,500	Each	-	72	\$ -	\$ 490,000	\$ -	\$ -	\$ -	\$ 441,000	\$ 39,200	\$ 9,800	
VGVA				\$ 35,000	Each	-	2	\$ -	\$ 70,000	\$ -	\$ -	\$ -	\$ 63,000	\$ 5,600	\$ 1,400	
Wx Reporting				\$ 125,000	Each	1	-	\$ 125,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Neato AWC 337				\$ 125,000	Each	1	-	\$ 125,000	\$ -	\$ 112,500	\$ 10,000	\$ 2,500	\$ -	\$ -	\$ -	
Master Plan				\$ 100,000	Each	1	-	\$ 100,000	\$ -	\$ 90,000	\$ 8,000	\$ 2,000	\$ -	\$ -	\$ -	
Fuel Farm (note 1)				\$ 300,000	Each	1	-	\$ 300,000	\$ -	\$ -	\$ 198,000	\$ 102,000	\$ -	\$ -	\$ -	
Perimeter Fencing (note 1)				\$ 35,000	Each	1	-	\$ 35,000	\$ -	\$ 298,800	\$ 25,500	\$ 6,540	\$ -	\$ -	\$ -	
Total								\$ 5,632,000	\$ 950,000	\$ 3,482,550	\$ 1,183,310	\$ 966,140	\$ 855,000	\$ 76,000	\$ 19,000	\$ 6,582,000
Note 1 - Cost estimate for this item is from the 2002 6-Year Plan.																
<i>Lexicon County</i>		LKU	OC													
Runway Length				\$ 75	sy	-	13,333	\$ -	\$ 1,000,000	\$ -	\$ -	\$ -	\$ 900,000	\$ 80,000	\$ 20,000	
Environmental Assessment				\$ 150,000	Each	-	1	\$ -	\$ 150,000	\$ -	\$ -	\$ -	\$ 135,000	\$ 12,000	\$ 3,000	
T-Hangars				\$ 25,000	Each	-	15	\$ -	\$ 375,000	\$ -	\$ -	\$ -	\$ -	\$ 259,198	\$ 64,798	
Conventional Hangars				\$ 30	sf	6,100	16,700	\$ 305,000	\$ 835,000	\$ -	\$ 244,000	\$ 61,000	\$ -	\$ 668,000	\$ 167,000	
Auto Parking				\$ 1,250	Each	54	-	\$ 68,000	\$ -	\$ 61,254	\$ 5,445	\$ 1,361	\$ -	\$ -	\$ -	
Terminal Building				\$ 175	sf	3,800	1,500	\$ 665,000	\$ 227,500	\$ -	\$ 465,500	\$ 199,500	\$ -	\$ 159,250	\$ 68,250	
Runway Lighting (for runway extension)				\$ 4,500	Each	-	12	\$ -	\$ 54,000	\$ -	\$ -	\$ -	\$ 48,600	\$ 4,320	\$ 1,080	
Master Plan				\$ 100,000	Each	-	1	\$ 100,000	\$ -	\$ 90,000	\$ 8,000	\$ 2,000	\$ -	\$ -	\$ -	

Airport	Project Type	Identifier	Service Role	Unit \$	Unit	2005 Quantity	2020 Quantity	2000-2005			2006-2020			20 Year Total		
								2005 Total \$	2020 Total \$	Federal	State	Local	Federal		State	Local
Total								\$ 1,138,000	\$ 2,590,401	\$ 151,254	\$ 722,945	\$ 263,861	\$ 1,083,600	\$ 1,182,763	\$ 324,128	\$ 3,728,551
<i>Laroy Cove</i>		W45	GC													
	Runway Extension (3000 ft) (Note 1)			\$ 1	Each	-	3,150,000	\$ -	\$ 3,150,000	\$ -	\$ -	\$ -	\$ 2,835,000	\$ 252,000	\$ 63,000	
	Taxiway (note 1)			\$ 75	sy	-	-	\$ 1,000,000	\$ -	\$ 900,000	\$ 80,000	\$ 20,000	\$ -	\$ -	\$ -	
	T-Hangars			\$ 25,000	Each	-	12	\$ -	\$ 300,000	\$ -	\$ -	\$ -	\$ -	\$ 15,000	\$ 285,000	
	Conventional Hangars			\$ 30	sf	-	9,000	\$ -	\$ 450,000	\$ -	\$ -	\$ -	\$ -	\$ 22,500	\$ 427,500	
	Apron Area (note 1)			\$ 30	sy	20,000	-	\$ 1,000,000	\$ -	\$ 900,000	\$ 80,000	\$ 20,000	\$ -	\$ -	\$ -	
	Auto Parking (Note 1)			\$ 1,250	Each	-	30	\$ -	\$ 62,500	\$ -	\$ -	\$ -	\$ 56,250	\$ 5,000	\$ 1,230	
	Terminal Building (Note 1)			\$ 175	sf	1,400	2,500	\$ 345,000	\$ 437,500	\$ -	\$ 171,500	\$ 79,500	\$ -	\$ 306,250	\$ 131,250	
	VGVA			\$ 35,000	Each	-	2	\$ -	\$ 70,000	\$ -	\$ -	\$ -	\$ 63,000	\$ 5,600	\$ 1,400	
	REIL			\$ 35,000	Each	-	1	\$ -	\$ 35,000	\$ -	\$ -	\$ -	\$ 31,500	\$ 2,800	\$ 700	
	Master Plan			\$ 100,000	Each	1	-	\$ 100,000	\$ -	\$ 90,000	\$ 8,000	\$ 2,000	\$ -	\$ -	\$ -	
Total								\$ 2,345,000	\$ 4,595,000	\$ 1,290,000	\$ 339,500	\$ 115,500	\$ 2,983,750	\$ 609,150	\$ 910,100	\$ 6,850,000
Note 1: Cost estimate provided by DOAV.																
<i>Macle Municipal</i>		W63	GC													
	Runway Width			\$ 75	sy	12,200	-	\$ 987,500	\$ -	\$ -	\$ 750,000	\$ 187,500	\$ -	\$ -	\$ -	
	Environmental Assessment			\$ 150,000	Each	1	-	\$ 150,000	\$ -	\$ 135,000	\$ 12,000	\$ 3,000	\$ -	\$ -	\$ -	
	Land Acquisition			\$ 500,000	Each	1	-	\$ 500,000	\$ -	\$ 430,000	\$ 40,000	\$ 10,000	\$ -	\$ -	\$ -	
	Terminal Building			\$ 175	sf	2,400	-	\$ 420,000	\$ -	\$ -	\$ 294,000	\$ 126,000	\$ -	\$ -	\$ -	
	VGVA			\$ 35,000	Each	-	2	\$ -	\$ 70,000	\$ -	\$ -	\$ -	\$ -	\$ 56,000	\$ 14,000	
	REIL			\$ 35,000	Each	-	1	\$ -	\$ 35,000	\$ -	\$ -	\$ -	\$ -	\$ 28,000	\$ 7,000	
	Master Plan			\$ 100,000	Each	1	-	\$ 100,000	\$ -	\$ 90,000	\$ 8,000	\$ 2,000	\$ -	\$ -	\$ -	
Total								\$ 2,107,500	\$ 105,000	\$ 675,000	\$ 1,104,000	\$ 328,500	\$ -	\$ 84,000	\$ 21,000	\$ 2,212,500
<i>Mountain Empire</i>		MEJ	GC													
	T-Hangars			\$ 25,000	Each	12	-	\$ 307,159	\$ -	\$ -	\$ 15,358	\$ 291,801	\$ -	\$ -	\$ -	
	Apron Area			\$ 30	sy	7,600	7,800	\$ 380,000	\$ 390,000	\$ 342,000	\$ 30,400	\$ 7,600	\$ 351,000	\$ 31,200	\$ 7,800	
	Terminal Building (new)			\$ 175	sf	-	3,700	\$ -	\$ 647,500	\$ -	\$ -	\$ -	\$ -	\$ 453,250	\$ 194,250	
	Wx Reporting			\$ 100,000	Each	1	-	\$ 100,000	\$ -	\$ 90,000	\$ 8,000	\$ 2,000	\$ -	\$ -	\$ -	
	Master Plan			\$ 100,000	Each	1	-	\$ 100,000	\$ -	\$ 90,000	\$ 8,000	\$ 2,000	\$ -	\$ -	\$ -	
Total								\$ 887,159	\$ 1,037,500	\$ 522,000	\$ 61,758	\$ 303,401	\$ 351,000	\$ 484,450	\$ 202,050	\$ 1,924,659
<i>New Kent County</i>		W96	GC													
	Terminal Building			\$ 175	sf	-	4,700	\$ -	\$ 822,500	\$ -	\$ -	\$ -	\$ -	\$ 375,750	\$ 246,750	
	Master Plan			\$ 100,000	Each	-	1	\$ -	\$ 100,000	\$ -	\$ -	\$ -	\$ 90,000	\$ 8,000	\$ 2,000	
Total								\$ -	\$ 922,500	\$ -	\$ -	\$ -	\$ 90,000	\$ 83,750	\$ 248,750	\$ 922,500
<i>Orange County</i>		OMH	GC													
	Conventional Hangars			\$ 30	sf	3,900	-	\$ 195,000	\$ -	\$ -	\$ 9,750	\$ 185,250	\$ -	\$ -	\$ -	
	Terminal Building			\$ 175	sf	3,100	-	\$ 342,500	\$ -	\$ -	\$ 399,750	\$ 162,750	\$ -	\$ -	\$ -	
	Master Plan			\$ 100,000	Each	1	-	\$ 100,000	\$ -	\$ 90,000	\$ 8,000	\$ 2,000	\$ -	\$ -	\$ -	
Total								\$ 637,500	\$ -	\$ 90,000	\$ 397,500	\$ 350,000	\$ -	\$ -	\$ -	\$ 637,500
<i>Tangier Island</i>		TOI	GC													
	Runway Width			\$ 75	sy	8,611	-	\$ 645,833	\$ -	\$ 581,250	\$ 51,667	\$ 12,917	\$ -	\$ -	\$ -	
	Environmental Assessment			\$ 125,000	Each	1	-	\$ 125,000	\$ -	\$ 112,500	\$ 10,000	\$ 2,500	\$ -	\$ -	\$ -	
	Terminal Building			\$ 175	sf	1,825	-	\$ 319,375	\$ -	\$ -	\$ 228,563	\$ 95,813	\$ -	\$ -	\$ -	
	Runway Lighting (MIRL)			\$ 4,500	Each	-	52	\$ -	\$ 231,750	\$ -	\$ -	\$ -	\$ 208,575	\$ 18,540	\$ 4,635	
	VGVA			\$ 35,000	Each	-	2	\$ -	\$ 70,000	\$ -	\$ -	\$ -	\$ 63,000	\$ 5,600	\$ 1,400	
	REIL			\$ 35,000	Each	-	1	\$ -	\$ 35,000	\$ -	\$ -	\$ -	\$ 31,500	\$ 2,800	\$ 700	
	Master Plan			\$ 100,000	Each	1	-	\$ 100,000	\$ -	\$ 90,000	\$ 8,000	\$ 2,000	\$ -	\$ -	\$ -	
Total								\$ 1,190,208	\$ 336,750	\$ 783,750	\$ 293,229	\$ 113,229	\$ 303,075	\$ 26,940	\$ 67,35	\$ 1,526,958
<i>Tappahannock/Emanx Co. (New)</i>			GC													
	Runway			\$ 75	sy	26,667	-	\$ 2,000,000	\$ -	\$ 1,800,000	\$ 160,000	\$ 40,000	\$ -	\$ -	\$ -	

Airport	Project Type	Identifier	Service Rate	Unit \$	Unit	2005 Quantity	2020 Quantity	2005 Total \$	2020 Total \$	2000-2005			2006-2020			20 Year Total
										Federal	State	Local	Federal	State	Local	
	Environmental Assessment			\$ 150,000	Each	1	-	\$ 150,000	\$ -	\$ 135,000	\$ 12,000	\$ 3,000	\$ -	\$ -	\$ -	\$ -
	T-Hangers (Note 1)			\$ 25,000	Each	10	10	\$ 515,000	\$ 515,000	\$ -	\$ 190,000	\$ 925,000	\$ -	\$ 188,000	\$ 927,000	\$ -
	Conventional Hangars			\$ 50	sf	5,000	4,200	\$ 250,000	\$ 210,000	\$ -	\$ 12,500	\$ 237,500	\$ -	\$ 10,500	\$ 199,500	\$ -
	Apron Area			\$ 50	sf	-	13,400	\$ -	\$ 670,000	\$ -	\$ -	\$ -	\$ 603,000	\$ -	\$ 53,600	\$ 13,400
	Auto Parking			\$ 1,250	Each	20	20	\$ 25,000	\$ 25,000	\$ -	\$ 20,000	\$ 5,000	\$ -	\$ 20,000	\$ 5,000	\$ -
	Terminal Building			\$ 175	sf	2,400	3,800	\$ 420,000	\$ 665,000	\$ -	\$ 204,000	\$ 126,000	\$ -	\$ 465,500	\$ 199,500	\$ -
	Navade							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	Leases			\$ 250,000	Each	1	-	\$ 250,000	\$ -	\$ -	\$ 230,000	\$ -	\$ -	\$ -	\$ -	\$ -
	Runway Lighting (MIRL)			\$ 4,500	Each	-	54	\$ -	\$ 243,000	\$ -	\$ -	\$ -	\$ 218,700	\$ 19,440	\$ 4,860	\$ -
	Communication			\$ 8,000	Each	1	-	\$ 8,000	\$ -	\$ -	\$ 8,000	\$ -	\$ -	\$ -	\$ -	\$ -
	VGVA			\$ 35,000	Each	2	-	\$ 70,000	\$ -	\$ 63,000	\$ 5,600	\$ 1,400	\$ -	\$ -	\$ -	\$ -
	REIL			\$ 35,000	Each	1	-	\$ 35,000	\$ -	\$ 31,500	\$ 2,800	\$ 700	\$ -	\$ -	\$ -	\$ -
	Wa Reporting							\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
	New to AWD 33-F			\$ 125,000	Each	1	-	\$ 125,000	\$ -	\$ 112,500	\$ 10,000	\$ 2,500	\$ -	\$ -	\$ -	\$ -
	AWD 33-F to WSD 44 ASOS			\$ 100,000	Each	-	1	\$ -	\$ 100,000	\$ -	\$ -	\$ -	\$ 90,000	\$ 8,000	\$ 2,000	\$ -
	Access Road (Note 1)			\$ 2,200,000	Each	1	-	\$ 2,200,000	\$ -	\$ 1,980,000	\$ 176,000	\$ 44,000	\$ -	\$ -	\$ -	\$ -
	Emmons Road (Notes 1 and 2)			\$ 600,000	Each	1	-	\$ 600,000	\$ -	\$ -	\$ -	\$ 600,000	\$ -	\$ -	\$ -	\$ -
	Land Acquisition (Note 1)			\$ 333,880	Each	1	-	\$ 333,880	\$ -	\$ 300,492	\$ 26,710	\$ 6,678	\$ -	\$ -	\$ -	\$ -
	Design (AIP Eligible - runway, taxiway, apron, etc) (Note 1)			\$ 300,000	Each	1	-	\$ 300,000	\$ -	\$ 430,000	\$ 40,000	\$ 10,000	\$ -	\$ -	\$ -	\$ -
	Design (Non-AIP Eligible - roadway, parking, fuel farm, etc)			\$ 90,000	Each	1	-	\$ 90,000	\$ -	\$ -	\$ 72,000	\$ 18,000	\$ -	\$ -	\$ -	\$ -
	Cultural Resources Study			\$ 130,000	Each	1	-	\$ 130,000	\$ -	\$ 117,900	\$ 10,480	\$ 2,620	\$ -	\$ -	\$ -	\$ -
	Master Plan			\$ 100,000	Each	-	1	\$ -	\$ 100,000	\$ -	\$ -	\$ -	\$ 90,000	\$ 8,000	\$ 2,000	\$ -
Total								\$ 7,792,880	\$ 2,228,000	\$ 4,990,292	\$ 1,290,690	\$ 1,422,368	\$ 1,001,700	\$ 773,040	\$ 753,260	\$ 10,230,880
Note 1: Cost estimate from 2001 6-year Plan.																
Note 2: \$450k from VDOT Airport Access Road Fund.																
Twin County		HLX	OC													
	Terminal Building			\$ 175	sf	3,100	-	\$ 542,500	\$ -	\$ -	\$ 379,750	\$ 162,750	\$ -	\$ -	\$ -	\$ -
	Master Plan			\$ 100,000	Each	-	1	\$ -	\$ 100,000	\$ -	\$ -	\$ -	\$ 90,000	\$ 8,000	\$ 2,000	
Total								\$ 542,500	\$ 100,000	\$ -	\$ 379,750	\$ 162,750	\$ 90,000	\$ 8,000	\$ 2,000	\$ 642,500
Virginia Tech		BCB	OC													
	Runway Length			\$ 75	sf	11,111	-	\$ 833,333	\$ -	\$ 730,000	\$ 66,667	\$ 16,667	\$ -	\$ -	\$ -	\$ -
	Environmental Assessment			\$ 150,000	Each	1	-	\$ 150,000	\$ -	\$ 135,000	\$ 12,000	\$ 3,000	\$ -	\$ -	\$ -	\$ -
	T-Hangers			\$ 25,000	Each	10	10	\$ 250,000	\$ 230,000	\$ -	\$ 12,500	\$ 237,500	\$ -	\$ 12,500	\$ 237,500	\$ -
	Conventional Hangars			\$ 50	sf	5,000	5,400	\$ 250,000	\$ 270,000	\$ -	\$ 12,500	\$ 237,500	\$ -	\$ 13,500	\$ 256,500	\$ -
	Runway Lighting (for runway extension)			\$ 4,500	Each	12	-	\$ 54,000	\$ -	\$ 48,600	\$ 4,320	\$ 1,080	\$ -	\$ -	\$ -	\$ -
	VGVA			\$ 35,000	Each	-	2	\$ -	\$ 70,000	\$ -	\$ -	\$ -	\$ 63,000	\$ 5,600	\$ 1,400	
	REIL			\$ 35,000	Each	-	1	\$ -	\$ 100,000	\$ -	\$ -	\$ -	\$ 90,000	\$ 8,000	\$ 2,000	
Total								\$ 1,537,333	\$ 690,000	\$ 933,600	\$ 107,987	\$ 495,747	\$ 153,000	\$ 39,600	\$ 497,400	\$ 2,227,333
Wakefield Municipal		AKQ	OC													
	T-Hangers			\$ 25,000	Each	10	10	\$ 242,533	\$ 248,041	\$ -	\$ 121,28	\$ 230,425	\$ -	\$ 12,402	\$ 235,639	\$ -
	Conventional Hangars			\$ 50	sf	-	5,400	\$ -	\$ 270,000	\$ -	\$ -	\$ -	\$ -	\$ 13,500	\$ 256,500	\$ -
	Apron Area			\$ 50	sf	10,200	17,400	\$ 510,000	\$ 870,000	\$ -	\$ 408,000	\$ 102,000	\$ -	\$ 696,000	\$ 174,000	\$ -
	Auto Parking			\$ 1,250	Each	-	33	\$ -	\$ 41,250	\$ -	\$ -	\$ -	\$ -	\$ 32,965	\$ 8,241	\$ -
	Terminal Building			\$ 175	sf	-	2,720	\$ -	\$ 476,000	\$ -	\$ -	\$ -	\$ -	\$ 333,200	\$ 142,800	\$ -
	VGVA			\$ 35,000	Each	-	2	\$ -	\$ 70,000	\$ -	\$ -	\$ -	\$ -	\$ 56,000	\$ 14,000	\$ -
	REIL			\$ 35,000	Each	-	1	\$ -	\$ 35,000	\$ -	\$ -	\$ -	\$ -	\$ 28,000	\$ 7,000	\$ -
	Master Plan			\$ 100,000	Each	-	1	\$ 100,000	\$ -	\$ 90,000	\$ 8,000	\$ 2,000	\$ -	\$ -	\$ -	\$ -
Total								\$ 852,533	\$ 2,010,344	\$ 90,000	\$ 428,128	\$ 334,425	\$ -	\$ 1,172,065	\$ 838,179	\$ 2,262,797
Williamburg-Jamestown		IOG	OC													
	Runway Width			\$ 75	sf	-	5,340	\$ -	\$ 400,500	\$ -	\$ -	\$ -	\$ -	\$ 320,400	\$ 80,100	\$ -
	Environmental Assessment			\$ 150,000	Each	-	1	\$ -	\$ 130,000	\$ -	\$ -	\$ -	\$ 135,000	\$ 12,000	\$ 3,000	\$ -
	T-Hangers			\$ 25,000	Each	11	10	\$ 282,816	\$ 243,421	\$ -	\$ 14,141	\$ 268,675	\$ -	\$ 12,171	\$ 231,230	\$ -
	Conventional Hangars			\$ 50	sf	-	4,400	\$ -	\$ 220,000	\$ -	\$ -	\$ -	\$ -	\$ 11,000	\$ 209,000	\$ -
	Apron Area			\$ 50	sf	8,700	15,900	\$ 435,000	\$ 795,000	\$ -	\$ 348,000	\$ 87,000	\$ -	\$ 636,000	\$ 159,000	\$ -
	Auto Parking			\$ 1,250	Each	-	52	\$ -	\$ 65,000	\$ -	\$ -	\$ -	\$ -	\$ 52,000	\$ 13,000	\$ -
	VGVA			\$ 35,000	Each	-	2	\$ -	\$ 70,000	\$ -	\$ -	\$ -	\$ -	\$ 56,000	\$ 14,000	\$ -
	REIL			\$ 100,000	Each	-	1	\$ -	\$ 100,000	\$ -	\$ 90,000	\$ 8,000	\$ 2,000	\$ -	\$ -	\$ -

Airport	Project Type	Identifier	Service Role	Unit \$	Unit	2005 Quantity	2020 Quantity	2000-2005			2006-2020			20 Year Total		
								2005 Total \$	2020 Total \$	Federal	State	Local	Federal		State	Local
Total								\$ 817,816	\$ 1,943,921	\$ 90,000	\$ 370,341	\$ 307,075	\$ 135,000	\$ 1,059,271	\$ 709,250	\$ 2,761,737
Rockbridge County/Lexington			GC	\$ -	Each	11,000,000	5,000,000	\$ 11,000,000	\$ 5,000,000	\$ 9,900,000	\$ 880,000	\$ 220,000	\$ 4,500,000	\$ 400,000	\$ 100,000	\$ 16,000,000
Northern Neck			GC	\$ -	Each	8,000,000	5,000,000	\$ 8,000,000	\$ 5,000,000	\$ 7,200,000	\$ 640,000	\$ 160,000	\$ 4,500,000	\$ 400,000	\$ 100,000	\$ 13,000,000
Grundy (Replacement)			GC	\$ -	Each	\$30,000,000	\$10,000,000	\$ 30,000,000	\$ 10,000,000	\$ 27,000,000	\$ 2,400,000	\$ 600,000	\$ 9,000,000	\$ 800,000	\$ 200,000	\$ 40,000,000
Subtotal - GC								\$ 75,725,510	\$ 40,442,286	\$ 38,644,546	\$ 10,683,287	\$ 6,307,077	\$ 26,443,466	\$ 2,684,109	\$ 5,314,711	\$ 116,167,795
Bridgewater Air Park			VBW	LO	\$ 30,000	Each	1	\$ 30,000	\$ -	\$ -	\$ 24,000	\$ 6,000	\$ -	\$ -	\$ -	\$ -
Total								\$ 30,000	\$ -	\$ -	\$ 24,000	\$ 6,000	\$ -	\$ -	\$ -	\$ 30,000
Chase City Municipal			CXE	LO	\$ 35,000	Each	-	\$ -	\$ 70,000	\$ -	\$ -	\$ -	\$ 63,000	\$ 5,000	\$ 1,400	\$ -
Total								\$ 30,000	\$ -	\$ -	\$ 24,000	\$ 6,000	\$ -	\$ -	\$ -	\$ -
Creve Municipal			W81	LO	\$ 30,000	Each	1	\$ 30,000	\$ -	\$ -	\$ 24,000	\$ 6,000	\$ -	\$ -	\$ -	\$ -
Total								\$ 30,000	\$ -	\$ -	\$ 24,000	\$ 6,000	\$ -	\$ -	\$ -	\$ 30,000
Esbell			W24	LO	\$ 30,000	Each	-	\$ -	\$ 30,000	\$ -	\$ -	\$ -	\$ -	\$ 24,000	\$ 6,000	\$ -
Total								\$ -	\$ 30,000	\$ -	\$ -	\$ -	\$ -	\$ 24,000	\$ 6,000	\$ 30,000
Gordonville Municipal			OVE	LO	\$ 75	sy	2,222	\$ 166,667	\$ -	\$ -	\$ 133,333	\$ 33,333	\$ -	\$ -	\$ -	\$ -
Total								\$ 150,000	\$ -	\$ 135,000	\$ 12,000	\$ 3,000	\$ -	\$ -	\$ -	\$ -
Grandy Municipal			GDY	LO	\$ 30,000	Each	-	\$ -	\$ 30,000	\$ -	\$ -	\$ -	\$ -	\$ 24,000	\$ 6,000	\$ -
Total								\$ -	\$ 30,000	\$ -	\$ -	\$ -	\$ -	\$ 24,000	\$ 6,000	\$ 30,000
Hartwood Field			8W8	LO	\$ 30,000	Each	1	\$ 30,000	\$ -	\$ -	\$ 24,000	\$ 6,000	\$ -	\$ -	\$ -	\$ -
Total								\$ 30,000	\$ -	\$ -	\$ 24,000	\$ 6,000	\$ -	\$ -	\$ -	\$ 30,000
Hummel Field			W75	LO	\$ 30,000	Each	1	\$ 30,000	\$ -	\$ -	\$ 24,000	\$ 6,000	\$ -	\$ -	\$ -	\$ -
Total								\$ 30,000	\$ -	\$ -	\$ 24,000	\$ 6,000	\$ -	\$ -	\$ -	\$ 30,000
Lake Anna			7W4	LO	\$ 75	sy	5,556	\$ 416,667	\$ -	\$ -	\$ 333,333	\$ 83,333	\$ -	\$ -	\$ -	\$ -
Total								\$ 150,000	\$ -	\$ 135,000	\$ 12,000	\$ 3,000	\$ -	\$ -	\$ -	\$ -
Lawrenceville-Brownsville			LVL	LO	\$ 175	sf	1,200	\$ 210,000	\$ -	\$ -	\$ 147,000	\$ 63,000	\$ -	\$ -	\$ -	\$ -
Total								\$ 30,000	\$ -	\$ -	\$ 24,000	\$ 6,000	\$ -	\$ -	\$ -	\$ 30,000
Total								\$ 240,000	\$ -	\$ -	\$ 171,000	\$ 69,000	\$ -	\$ -	\$ -	\$ 240,000

Airport	Project Type	Identifier	Service Role	Unit \$	Unit	2005 Quantity	2020 Quantity	2000-2005			2006-2020			20 Year Total		
								2005 Total \$	2020 Total \$	Federal	State	Local	Federal		State	Local
Lee County (To be closed 2003)																
Total		PTJ	LO					\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
Lanenburg County																
ALP Update		W31	LO	\$ 30,000	Each	1	-	\$ 30,000	\$ -	\$ -	\$ 24,000	\$ 6,000	\$ -	\$ -		
Total								\$ 30,000	\$ -	\$ -	\$ 24,000	\$ 6,000	\$ -	\$ 30,000		
New London																
ALP Update		W50	LO	\$ 30,000	Each	1	-	\$ 30,000	\$ -	\$ -	\$ 24,000	\$ 6,000	\$ -	\$ -		
Total								\$ 30,000	\$ -	\$ -	\$ 24,000	\$ 6,000	\$ -	\$ 30,000		
New Market																
VGVA		8W2	LO	\$ 35,000	Each	-	2	\$ -	\$ 70,000	\$ -	\$ -	\$ -	\$ -	\$ 56,000	\$ 14,000	
ALP Update				\$ 30,000	Each	1	-	\$ 30,000	\$ -	\$ -	\$ 24,000	\$ 6,000	\$ -	\$ -		
Total								\$ 30,000	\$ 70,000	\$ -	\$ 24,000	\$ 6,000	\$ -	\$ 56,000	\$ 14,000	
Smith Mountain Lake																
VGVA		W91	LO	\$ 35,000	Each	-	2	\$ -	\$ 70,000	\$ -	\$ -	\$ -	\$ -	\$ 56,000	\$ 14,000	
ALP Update				\$ 30,000	Each	1	-	\$ 30,000	\$ -	\$ -	\$ 24,000	\$ 6,000	\$ -	\$ -		
Total								\$ 30,000	\$ 70,000	\$ -	\$ 24,000	\$ 6,000	\$ -	\$ 56,000	\$ 14,000	
Tappahannock Municipal (To be closed 2006)																
Total		W79	LO					\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		
Waynesboro																
VGVA		W13	LO	\$ 35,000	Each	-	2	\$ -	\$ 70,000	\$ -	\$ -	\$ -	\$ -	\$ 56,000	\$ 14,000	
ALP Update				\$ 30,000	Each	-	1	\$ -	\$ 30,000	\$ -	\$ -	\$ -	\$ -	\$ 24,000	\$ 6,000	
Total								\$ -	\$ 100,000	\$ -	\$ -	\$ -	\$ -	\$ 80,000	\$ 20,000	
Subtotal - LO								\$ 1,453,333	\$ 370,000	\$ 270,000	\$ 925,667	\$ 257,667	\$ 63,000	\$ 245,600	\$ 61,400	\$ 1,823,333
ALL	Runway Rehabilitation			\$ 24	sy		3,339,874	\$ -	\$ 80,156,970	\$ -	\$ -	\$ -	\$ 19,838,850	\$ 48,254,496	\$ 12,063,624	\$ 80,156,970
	Terminal Rehabilitation							\$ 9,128,102	\$ 46,140,510	\$ 6,544,778	\$ 2,196,893	\$ 486,492	\$ 32,723,888	\$ 10,984,164	\$ 2,452,458	\$ 55,368,612
	System Planning			\$ 1,000,000	Each	-	1	\$ 1,000,000	\$ 4,000,000	\$ 900,000	\$ 100,000	\$ -	\$ 3,000,000	\$ 400,000	\$ -	\$ 5,000,000
Subtotal - CM								\$ 306,414,550	\$ 1,268,225,750	\$ 323,910,518	\$ 34,949,321	\$ 147,254,712	\$ 1,340,011,160	\$ 49,795,717	\$ 478,718,373	
Subtotal - CM (without MWA)								\$ 230,814,550	\$ 251,209,750	\$ 125,138,018	\$ 28,949,321	\$ 76,727,212	\$ 157,329,660	\$ 19,795,717	\$ 74,165,373	
Subtotal - RL								\$ 44,883,903	\$ 29,839,912	\$ 30,271,807	\$ 5,248,189	\$ 8,463,908	\$ 16,342,330	\$ 3,853,532	\$ 9,644,050	
Subtotal - GR								\$ 43,811,333	\$ 32,757,686	\$ 29,973,720	\$ 5,856,732	\$ 7,680,881	\$ 18,352,261	\$ 5,213,603	\$ 9,191,822	
Subtotal - GC								\$ 75,725,510	\$ 40,442,286	\$ 58,644,546	\$ 16,683,287	\$ 6,297,677	\$ 26,443,466	\$ 8,684,109	\$ 5,514,711	
Subtotal - LO								\$ 1,453,333	\$ 370,000	\$ 270,000	\$ 925,667	\$ 257,667	\$ 63,000	\$ 245,600	\$ 61,400	
PROGRAM TOTAL								\$ 681,416,731	\$ 2,102,230,114	\$ 459,615,268	\$ 59,960,629	\$ 170,841,335	\$ 1,437,274,956	\$ 127,431,220	\$ 517,426,938	\$ 2,783,649,845
PROGRAM TOTAL (without MWA)								\$ 405,816,731	\$ 484,998,114	\$ 251,842,868	\$ 53,960,629	\$ 100,013,835	\$ 274,693,456	\$ 97,431,220	\$ 112,873,438	\$ 890,814,845

Note: The costs for runway pavements generally include design, excavation, pavement and subbase, drainage, edge lights, relocation of threshold lights, relocation of approach lighting system, and clearing and grubbing of the extended runway safety area. Unless specifically noted, the costs do not include land acquisition, roadway realignment, environmental remediation/mitigation, demolition of existing buildings, extension of parallel taxiway to the new runway end, or any other site specific concerns.

Note: The costs for taxiway pavements generally include design, excavation, pavement, drainage, marking, signage, and lighting.

Note: Funding for T-Hangars and Conventional Hangars reflect State funds at 5% of project costs for site prep.

Note: The costs for apron includes design, pavement, subbase, excavation, drainage collection system based on sump inlets (i.e. trench drains are not proposed), and aircraft guidance edge lighting along one edge of the pavement. Not included in the costs are any terminal/hangar foundations, utility services, or floodlighting.

Note: The costs for Navaid, runway lighting, and weather reporting equipment include the all equipment and installation.

Note: The costs for edge lighting includes minimal upgrades to the lighting system such as electrical vault modifications, new signs, modification to the lighting control system, and minimal sized ductbanks.

Note: The cost for auto parking includes design, paving, lighting, circulation areas, marking and drainage.

Note: The cost for airfield pavement rehabilitation assumes that each runway will be overlaid during the planning period.

Note: The cost for terminal replacement assumes that all terminals will receive a major rehabilitation at year 20 in their economic life cycle.

Note: Unit costs were updated per DOAV comments.

Note: Cost estimates for new airports were provided by DOAV, and are based on previous new airport construction costs taking into consideration airport location, land costs, site prep, and construction costs.

Italic - Represents airports listed in the National Plan of Integrated Airport Systems (NPIAS)

Table 2

VIRGINIA AIR TRANSPORTATION SYSTEM PLAN

Unconstrained Implementation Plan - Costs By Project Type
(2002 Dollars)

Project Type	Service Eols	2005 Total (\$)	2020 Total (\$)	2006-2005			2006-2020			20 Year Total
				Federal	State	Local	Federal	State	Local	
Runway Length	CM	\$ 240,591,700	\$ 387,195,900	\$ 184,012,530	\$ 1,903,336	\$ 54,675,834	\$ 310,975,910	\$ 10,975,992	\$ 65,343,998	
Runway Width	CM	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Taxiway	CM	\$ 38,500,000	\$ -	\$ 28,875,000	\$ -	\$ 9,625,000	\$ -	\$ -	\$ -	
T-Hangars	CM	\$ 3,150,000	\$ 1,000,000	\$ -	\$ 120,000	\$ 3,030,000	\$ -	\$ 30,000	\$ 950,000	
Conventional Hangars	CM	\$ 7,050,300	\$ 32,238,000	\$ -	\$ 352,575	\$ 6,697,925	\$ -	\$ 465,000	\$ 31,773,000	
Apron Area	CM	\$ 14,425,000	\$ 130,167,000	\$ 12,097,500	\$ 682,000	\$ 1,645,500	\$ 114,489,000	\$ 994,000	\$ 34,684,000	
Auto Parking	CM	\$ 70,740,100	\$ 62,884,100	\$ -	\$ -	\$ 70,740,100	\$ -	\$ -	\$ 62,884,100	
Terminal Building	CM	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Air Carrier	CM	\$ 125,520,250	\$ 1,216,875,000	\$ 94,140,188	\$ 24,854,050	\$ 6,526,013	\$ 91,265,620	\$ 5,615,000	\$ 298,603,750	
GA	CM	\$ 1,120,000	\$ 16,108,750	\$ -	\$ 784,000	\$ 386,000	\$ -	\$ 1,574,125	\$ 14,584,625	
Nav aids	CM	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Glide slope	CM	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Localizer	CM	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
MALS	CM	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
MALSR	CM	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
DME	CM	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Runway Lighting	CM	\$ 117,000	\$ 90,000	\$ 105,300	\$ 9,360	\$ 2,340	\$ 81,000	\$ 7,200	\$ 1,800	
Communications	CM	\$ -	\$ 8,000	\$ -	\$ -	\$ -	\$ -	\$ 6,400	\$ 1,600	
PAPI	CM	\$ -	\$ 455,000	\$ -	\$ -	\$ -	\$ 455,000	\$ -	\$ -	
REIL	CM	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Master Plan	CM	\$ 4,750,000	\$ 800,000	\$ 4,275,000	\$ 220,000	\$ 25,000	\$ 720,000	\$ 64,000	\$ 16,000	
Environmental Assessment	CM	\$ 450,000	\$ 600,000	\$ 405,000	\$ 24,000	\$ 21,000	\$ 540,000	\$ 36,000	\$ 24,000	
Wx Reporting	CM	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
A WOS-3 to A WOS-3 P-T	CM	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
None to A WOS-3 P-T	CM	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
A WOS-3 P-T to A WOS-4 or A308	CM	\$ -	\$ 100,000	\$ -	\$ -	\$ -	\$ 90,000	\$ 8,000	\$ 2,000	
		\$ 506,414,350	\$ 1,868,525,350	\$ 323,910,518	\$ 34,949,321	\$ 147,354,712	\$ 1,340,011,160	\$ 49,795,717	\$ 478,718,873	

Note: The State portion of the Commercial Service Subtotal reflects \$2 million per year, which is the maximum annual fiduciary responsibility of the Commonwealth to the MWAA airports per Title 58.1 of the Code of Virginia.

Runway Length	RL	\$ 8,722,222	\$ -	\$ 7,830,000	\$ 697,778	\$ 174,444	\$ -	\$ -	\$ -
Runway Width	RL	\$ 7,883,333	\$ -	\$ 7,095,000	\$ 630,667	\$ 157,667	\$ -	\$ -	\$ -
Taxiway	RL	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
T-Hangars	RL	\$ 3,655,451	\$ 3,388,711	\$ -	\$ 182,773	\$ 3,472,679	\$ -	\$ 169,456	\$ 3,219,276
Conventional Hangars	RL	\$ 3,563,000	\$ 5,495,000	\$ -	\$ 178,150	\$ 3,384,850	\$ -	\$ 274,750	\$ 5,230,250
Apron Area	RL	\$ 9,695,000	\$ 12,845,000	\$ 8,725,500	\$ 775,600	\$ 193,900	\$ 11,560,500	\$ 1,027,600	\$ 266,900
Auto Parking	RL	\$ 494,261	\$ 322,700	\$ 406,585	\$ 70,141	\$ 17,535	\$ 267,930	\$ 43,816	\$ 10,954
Terminal Building	RL	\$ 3,076,300	\$ 2,817,300	\$ -	\$ 2,153,550	\$ 922,930	\$ -	\$ 1,972,250	\$ 845,250
Nav aids	RL	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Glide slope	RL	\$ -	\$ 700,000	\$ -	\$ -	\$ -	\$ 630,000	\$ 56,000	\$ 14,000
Localizer	RL	\$ 175,000	\$ 175,000	\$ 157,500	\$ 14,000	\$ 3,500	\$ 157,500	\$ 14,000	\$ 3,500
MALS	RL	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
MALSR	RL	\$ -	\$ 1,625,000	\$ -	\$ -	\$ -	\$ 1,462,500	\$ 130,000	\$ 32,500
DME	RL	\$ -	\$ 160,000	\$ -	\$ -	\$ -	\$ 144,000	\$ 12,800	\$ 3,200
Runway Lighting	RL	\$ 420,500	\$ 98,000	\$ 978,430	\$ 33,640	\$ 8,410	\$ 842,400	\$ 74,880	\$ 18,720
Communications	RL	\$ 283,835	\$ -	\$ 255,272	\$ 22,691	\$ 5,673	\$ -	\$ -	\$ -
VCHA	RL	\$ 70,000	\$ 70,000	\$ 63,000	\$ 5,600	\$ 1,400	\$ 63,000	\$ 5,600	\$ 1,400
REIL	RL	\$ 70,000	\$ 70,000	\$ 63,000	\$ 5,600	\$ 1,400	\$ 63,000	\$ 5,600	\$ 1,400
Master Plan	RL	\$ 1,200,000	\$ 400,000	\$ 1,080,000	\$ 96,000	\$ 24,000	\$ 360,000	\$ 32,000	\$ 8,000
Environmental Assessment	RL	\$ 450,000	\$ -	\$ 405,000	\$ 36,000	\$ 9,000	\$ -	\$ -	\$ -
Land Acquisition	RL	\$ 4,000,000	\$ -	\$ 3,600,000	\$ 320,000	\$ 80,000	\$ -	\$ -	\$ -
Wx Reporting	RL	\$ -	\$ 35,000	\$ -	\$ -	\$ -	\$ 31,500	\$ 2,800	\$ 700
A WOS-3 to A WOS-3 P-T	RL	\$ 200,000	\$ -	\$ 180,000	\$ 16,000	\$ 4,000	\$ -	\$ -	\$ -
None to A WOS-3 P-T	RL	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
A WOS-3 P-T to A WOS-4 or A308	RL	\$ 125,000	\$ 800,000	\$ 112,500	\$ 10,000	\$ 2,500	\$ 760,000	\$ 32,000	\$ 8,000
		\$ 44,083,303	\$ 29,839,912	\$ 30,371,807	\$ 5243,189	\$ 8,463,908	\$ 16,342,330	\$ 3,835,332	\$ 9,444,050
Runway Length	GR	\$ 3,605,556	\$ 2,841,667	\$ 3,245,000	\$ 288,444	\$ 72,111	\$ 2,557,500	\$ 227,333	\$ 56,833
Runway Width	GR	\$ 3,361,111	\$ 3,361,111	\$ 3,025,000	\$ 268,889	\$ 67,222	\$ 3,025,000	\$ 268,889	\$ 67,222
Taxiway	GR	\$ 10,013,511	\$ -	\$ 7,477,660	\$ 2028,681	\$ 507,170	\$ -	\$ -	\$ -
T-Hangars	GR	\$ 2,726,961	\$ 4,381,300	\$ -	\$ 136,348	\$ 2,590,613	\$ -	\$ 219,065	\$ 4,162,285
Conventional Hangars	GR	\$ 3,733,850	\$ 3,679,750	\$ -	\$ 186,693	\$ 3,547,158	\$ -	\$ 183,988	\$ 3,495,763
Apron Area	GR	\$ 2,150,000	\$ 4,550,000	\$ 1,354,500	\$ 636,400	\$ 159,100	\$ 3,397,500	\$ 922,000	\$ 280,500
Auto Parking	GR	\$ 310,845	\$ 336,864	\$ 279,760	\$ 24,868	\$ 6,217	\$ 289,416	\$ 77,958	\$ 19,490
Terminal Building	GR	\$ 1,277,300	\$ 3,365,300	\$ -	\$ 894,250	\$ 383,250	\$ -	\$ 2,347,450	\$ 918,050
Nav aids	GR	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Glide slope	GR	\$ 1,000,000	\$ -	\$ 1,000,000	\$ -	\$ -	\$ -	\$ -	\$ -

Table 2

VIRGINIA AIR TRANSPORTATION SYSTEM PLAN

Unconstrained Implementation Plan - Costs By Project Type
(2002 Dollars)

Project Type	Service Role	2005 Total (\$)	2010 Total (\$)	2000-2005			2006-2020			20 Year Total
				Federal	State	Local	Federal	State	Local	
Localizer	GR	\$ 320,000	\$ 325,000	\$ 315,000	\$ 38,000	\$ 7,000	\$ 472,500	\$ 42,000	\$ 10,300	
MALS	GR	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
MALSR	GR	\$ 325,000	\$ -	\$ 292,500	\$ 26,000	\$ 6,500	\$ -	\$ -	\$ -	
DME	GR	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Runway Lighting	GR	\$ 148,000	\$ 112,000	\$ 138,200	\$ 11,840	\$ 2,960	\$ 100,800	\$ 8,960	\$ 2,240	
Communication	GR	\$ 72,000	\$ 359,495	\$ 64,800	\$ 5,760	\$ 1,440	\$ 323,546	\$ 28,760	\$ 7,150	
VOVA	GR	\$ 35,000	\$ 70,000	\$ 31,500	\$ 2,800	\$ 700	\$ -	\$ -	\$ 56,000	\$ 14,000
REIL	GR	\$ 175,000	\$ 245,000	\$ 157,500	\$ 14,000	\$ 3,500	\$ 189,000	\$ 44,800	\$ 11,200	
Master Plan	GR	\$ 1,100,000	\$ 680,000	\$ 990,000	\$ 88,000	\$ 22,000	\$ 61,200	\$ 54,400	\$ 13,600	
Environmental Assessment	GR	\$ 1,200,000	\$ 450,000	\$ 945,000	\$ 204,000	\$ 51,000	\$ 405,000	\$ 36,000	\$ 9,000	
Land Acquisition	GR	\$ 167,000	\$ 1,300,000	\$ 130,300	\$ 13,360	\$ 3,340	\$ 1,170,000	\$ 104,000	\$ 26,000	
Wx Reporting	GR	\$ 35,000	\$ -	\$ 31,500	\$ 2,800	\$ 700	\$ -	\$ -	\$ -	
AWOS-3 to AWOS-3 P-T	GR	\$ 480,000	\$ -	\$ 396,000	\$ 67,200	\$ 16,800	\$ -	\$ -	\$ -	
None to AWOS-3 P-T	GR	\$ 80,000	\$ -	\$ 72,000	\$ 6,400	\$ 1,600	\$ -	\$ -	\$ -	
AWOS-3 P-T to AWOS-4 or ASOS	GR	\$ 165,000	\$ 1,400,000	\$ 112,500	\$ 42,000	\$ 10,500	\$ 1,360,000	\$ 192,000	\$ 48,000	
New Airport	GR	\$ 11,000,000	\$ 5,000,000	\$ 9,900,000	\$ 880,000	\$ 220,000	\$ 4,300,000	\$ 400,000	\$ 100,000	
		\$ 45,511,333	\$ 32,757,684	\$ 29,973,720	\$ 3,856,732	\$ 7,680,881	\$ 18,352,241	\$ 5,213,603	\$ 9,191,822	
				\$ -	\$ -	\$ -				
Runway Length	OC	\$ 5,958,333	\$ 4,150,000	\$ 5,362,500	\$ 476,667	\$ 119,167	\$ 3,735,000	\$ 332,000	\$ 83,000	
Runway Width	OC	\$ 1,583,333	\$ 875,250	\$ 581,250	\$ 801,667	\$ 300,417	\$ 427,275	\$ 358,380	\$ 89,595	
Taxiway	OC	\$ 1,740,000	\$ -	\$ 1,251,000	\$ 391,200	\$ 97,800	\$ -	\$ -	\$ -	
T-Hangar	OC	\$ 1,847,528	\$ 1,880,453	\$ -	\$ 244,126	\$ 1,603,402	\$ -	\$ 499,266	\$ 1,381,187	
Conventional Hangar	OC	\$ 1,515,000	\$ 2,255,000	\$ -	\$ 304,500	\$ 1,210,500	\$ -	\$ 790,000	\$ 1,516,000	
Apron Area	OC	\$ 2,325,000	\$ 3,780,000	\$ 1,242,000	\$ 866,400	\$ 216,600	\$ 1,678,500	\$ 1,481,200	\$ 370,300	
Auto Parking	OC	\$ 130,560	\$ 29,333	\$ 95,004	\$ 28,445	\$ 7,111	\$ 79,316	\$ 112,013	\$ 28,003	
Terminal Building	OC	\$ 3,696,875	\$ 4,448,300	\$ -	\$ 2,587,813	\$ 1,109,063	\$ -	\$ 3,113,950	\$ 1,334,550	
Navaid	OC	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Localizer	OC	\$ 250,000	\$ -	\$ -	\$ 230,000	\$ -	\$ -	\$ -	\$ -	
Runway Lighting	OC	\$ 34,000	\$ 1,018,750	\$ 48,600	\$ 4,330	\$ 1,080	\$ 916,875	\$ 81,500	\$ 20,375	
Communication	OC	\$ 8,000	\$ -	\$ -	\$ 8,000	\$ -	\$ -	\$ -	\$ -	
VOVA	OC	\$ 70,000	\$ 700,000	\$ 69,000	\$ 5,600	\$ 1,400	\$ 441,000	\$ 207,200	\$ 51,800	
REIL	OC	\$ 35,000	\$ 315,000	\$ 31,500	\$ 2,800	\$ 700	\$ 220,500	\$ 75,600	\$ 18,900	
Master Plan	OC	\$ 1,300,000	\$ 500,000	\$ 1,170,000	\$ 104,000	\$ 26,000	\$ 450,000	\$ 40,000	\$ 10,000	
Environmental Assessment	OC	\$ 875,000	\$ 450,000	\$ 787,500	\$ 70,000	\$ 17,500	\$ 405,000	\$ 36,000	\$ 9,000	
Land Acquisition	OC	\$ 853,480	\$ -	\$ 730,492	\$ 66,710	\$ 16,678	\$ -	\$ -	\$ -	
Other	OC	\$ 4,153,000	\$ -	\$ 2,846,700	\$ 529,040	\$ 783,260	\$ -	\$ -	\$ -	
Wx Reporting	OC	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
None to AWOS-3 P-T	OC	\$ 250,000	\$ -	\$ 225,000	\$ 20,000	\$ 5,000	\$ -	\$ -	\$ -	
AWOS-3 P-T to AWOS-4 or ASOS	OC	\$ 100,000	\$ 100,000	\$ 90,000	\$ 8,000	\$ 2,000	\$ 90,000	\$ 8,000	\$ 2,000	
New Airports	OC	\$ 49,000,000	\$ 20,000,000	\$ 44,100,000	\$ 3,920,000	\$ 980,000	\$ 18,000,000	\$ 1,600,000	\$ 400,000	
		\$ 75,725,510	\$ 40,442,284	\$ 58,644,546	\$ 10,683,287	\$ 6,397,677	\$ 26,443,466	\$ 8,684,109	\$ 5,314,711	
Runway Length	LO	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Runway Width	LO	\$ 583,333	\$ -	\$ -	\$ 466,667	\$ 116,667	\$ -	\$ -	\$ -	
ALP Update	LO	\$ 360,000	\$ 90,000	\$ -	\$ 288,000	\$ 72,000	\$ -	\$ 72,000	\$ 18,000	
Environmental Assessment	LO	\$ 300,000	\$ -	\$ 270,000	\$ 24,000	\$ 6,000	\$ -	\$ -	\$ -	
Terminal Building	LO	\$ 210,000	\$ -	\$ 147,000	\$ 147,000	\$ 63,000	\$ -	\$ -	\$ -	
VOVA	LO	\$ -	\$ 280,000	\$ -	\$ -	\$ -	\$ 63,000	\$ 178,600	\$ 43,400	
		\$ 1,453,333	\$ 370,000	\$ 270,000	\$ 925,667	\$ 257,667	\$ 63,000	\$ 245,600	\$ 61,400	
ALL	Runway Rehabilitation	\$ -	\$ 80,156,970	\$ -	\$ -	\$ -	\$ 19,898,830	\$ 48,254,496	\$ 12,063,624	
	Terminal Rehabilitation	\$ 9,228,102	\$ 46,140,510	\$ 6,544,778	\$ 2,196,833	\$ 486,492	\$ 3,273,888	\$ 10,994,164	\$ 2,432,458	
	System Planning	\$ 1,000,000	\$ 4,000,000	\$ 900,000	\$ 100,000	\$ -	\$ 3,000,000	\$ 400,000	\$ -	
		\$ 81,416,731	\$ 2,102,233,114	\$ 450,615,268	\$ 59,960,029	\$ 170,841,335	\$ 1,457,374,956	\$ 127,431,220	\$ 517,426,368	\$ 2,783,649,843
		\$ 405,816,731	\$ 484,998,114	\$ 251,842,868	\$ 53,960,029	\$ 100,013,835	\$ 274,693,456	\$ 97,431,220	\$ 112,873,458	\$ 890,814,845

Table 3

VIRGINIA AIR TRANSPORTATION SYSTEM PLAN
Summary Costs By Airport - Unconstrained Implementation Plan
(2002 Dollars)

Airport	2005 Total \$	2020 Total \$	2000-2005			2006-2020			Total
			Federal	State	Local	Federal	State	Local	
<i>Charlottesville-Abe marie</i>	\$ 3,055,100	\$ 6,274,600	\$ 360,000	\$ 566,050	\$ 2,129,050	\$ 3,130,000	\$ 458,000	\$ 2,686,600	\$ 9,329,700
<i>Lynchburg Regional</i>	\$ 6,096,500	\$ 3,393,750	\$ 3,693,600	\$ 731,320	\$ 1,671,580	\$ 1,643,750	\$ 261,750	\$ 1,488,250	\$ 9,490,250
<i>Newport News-Williamsburg International</i>	\$ 15,777,500	\$ 79,112,850	\$ 10,518,750	\$ 1,803,500	\$ 3,455,250	\$ 66,143,440	\$ 8,122,028	\$ 4,847,382	\$ 94,890,350
<i>Norfolk International</i>	\$ 127,582,000	\$ 128,937,000	\$ 35,687,500	\$ 12,101,600	\$ 59,792,900	\$ 63,135,000	\$ 8,144,250	\$ 57,657,750	\$ 256,519,000
<i>Richmond International</i>	\$ 72,028,450	\$ 29,485,800	\$ 51,274,418	\$ 13,099,351	\$ 7,654,682	\$ 21,564,970	\$ 2,056,664	\$ 5,864,166	\$ 101,514,250
<i>Roanoke Regional</i>	\$ 3,302,500	\$ 2,963,750	\$ 2,160,000	\$ 223,250	\$ 919,250	\$ 1,262,500	\$ 675,875	\$ 1,025,375	\$ 6,266,250
<i>Ronald Reagan Washington National</i>	\$ 1,000,000	\$ 18,805,000	\$ 900,000	\$ -	\$ 100,000	\$ 3,726,250	\$ -	\$ 15,078,750	\$ 19,805,000
<i>Shenandoah Valley Regional</i>	\$ 2,972,500	\$ 1,123,000	\$ 1,443,750	\$ 424,250	\$ 1,104,500	\$ 450,000	\$ 77,150	\$ 595,850	\$ 4,095,500
<i>Washington Dulles International</i>	\$ 274,600,000	\$ 1,598,430,000	\$ 197,872,500	\$ -	\$ 76,727,500	\$ 1,178,955,250	\$ -	\$ 419,474,750	\$ 1,873,030,000
<i>Chesapeake Regional</i>	\$ 1,565,500	\$ 830,000	\$ 347,850	\$ 528,970	\$ 688,680	\$ 270,000	\$ 69,250	\$ 490,750	\$ 2,395,500
<i>Chesterfield County</i>	\$ 1,209,956	\$ 1,748,642	\$ 107,961	\$ 64,096	\$ 1,037,899	\$ 355,278	\$ 90,941	\$ 1,302,423	\$ 2,958,598
<i>Hampton Roads</i>	\$ 10,730,000	\$ 5,368,250	\$ 9,139,500	\$ 841,150	\$ 749,350	\$ 3,387,475	\$ 1,248,870	\$ 731,905	\$ 16,098,250
<i>Hanover County Municipal</i>	\$ 2,351,500	\$ 3,067,500	\$ 1,137,600	\$ 599,120	\$ 614,780	\$ 2,090,250	\$ 223,050	\$ 754,200	\$ 5,419,000
<i>Leesburg Executive</i>	\$ 8,802,348	\$ 6,179,975	\$ 4,840,649	\$ 1,204,347	\$ 2,757,351	\$ 3,177,362	\$ 414,911	\$ 2,587,702	\$ 14,982,323
<i>Manassas Regional</i>	\$ 6,184,064	\$ 7,244,663	\$ 4,828,312	\$ 470,147	\$ 885,605	\$ 4,705,124	\$ 502,404	\$ 2,037,135	\$ 13,428,727
<i>Stafford Regional (New)</i>	\$ 3,150,941	\$ 1,677,170	\$ 889,300	\$ 733,190	\$ 1,528,451	\$ 292,500	\$ 230,108	\$ 1,154,561	\$ 4,828,111
<i>Warrenton-Fauquier</i>	\$ 10,089,594	\$ 3,723,712	\$ 9,080,634	\$ 807,167	\$ 201,792	\$ 2,064,341	\$ 1,073,997	\$ 585,374	\$ 13,813,306
<i>Accomack County</i>	\$ 3,839,275	\$ 583,591	\$ 3,309,548	\$ 302,282	\$ 227,446	\$ 117,187	\$ 24,752	\$ 441,652	\$ 4,422,866
<i>Blue Ridge</i>	\$ 1,322,915	\$ 106,178	\$ 859,873	\$ 333,683	\$ 129,358	\$ 95,561	\$ 8,494	\$ 2,124	\$ 1,429,093
<i>Culpeper County</i>	\$ 4,728,194	\$ 4,658,285	\$ 4,014,190	\$ 370,216	\$ 343,788	\$ 1,290,027	\$ 1,174,540	\$ 2,193,718	\$ 9,386,479
<i>Danville Regional</i>	\$ 350,000	\$ 1,755,000	\$ 90,000	\$ 20,500	\$ 239,500	\$ 1,107,000	\$ 124,650	\$ 523,350	\$ 2,105,000
<i>Dinwiddie County Airport</i>	\$ 1,797,540	\$ 1,357,369	\$ 864,299	\$ 118,687	\$ 814,554	\$ 180,000	\$ 73,868	\$ 1,103,500	\$ 3,154,909
<i>Farmville Regional</i>	\$ 3,837,621	\$ 1,012,500	\$ 2,879,900	\$ 287,878	\$ 669,844	\$ 310,500	\$ 345,350	\$ 356,650	\$ 4,850,121
<i>Ingalls Field</i>	\$ 175,000	\$ 268,000	\$ 157,500	\$ 14,000	\$ 3,500	\$ 97,200	\$ 16,640	\$ 154,160	\$ 443,000
<i>Lonesome Pine</i>	\$ 3,096,400	\$ 200,000	\$ 2,886,760	\$ 167,712	\$ 41,928	\$ 180,000	\$ 16,000	\$ 4,000	\$ 3,296,400
<i>Mecklenburg-Brunswick Regional</i>	\$ 40,000	\$ 3,420,889	\$ 36,000	\$ 3,200	\$ 800	\$ 2,336,300	\$ 408,171	\$ 676,418	\$ 3,460,889
<i>Middle Peninsula Regional</i>	\$ 750,000	\$ 3,922,230	\$ 123,750	\$ 333,250	\$ 293,000	\$ 2,334,192	\$ 421,793	\$ 1,166,245	\$ 4,672,230
<i>New River Valley</i>	\$ 40,000	\$ 200,000	\$ 36,000	\$ 3,200	\$ 800	\$ 180,000	\$ 16,000	\$ 4,000	\$ 240,000
<i>Shannon</i>	\$ 2,908,745	\$ 1,677,480	\$ 90,000	\$ 2,053,437	\$ 765,308	\$ -	\$ 1,133,809	\$ 543,671	\$ 4,586,224
<i>Sigfock Municipal</i>	\$ 4,221,000	\$ 2,020,000	\$ 3,290,400	\$ 320,730	\$ 609,870	\$ 146,250	\$ 526,750	\$ 1,347,000	\$ 6,241,000
<i>Tazewell County</i>	\$ 235,000	\$ 235,000	\$ 211,500	\$ 18,800	\$ 4,700	\$ 211,500	\$ 18,800	\$ 4,700	\$ 470,000
<i>Virginia Highlands</i>	\$ 3,975,000	\$ 5,177,222	\$ 832,500	\$ 226,500	\$ 2,916,000	\$ 4,659,500	\$ 414,178	\$ 103,544	\$ 9,152,222
<i>William M. Tuck</i>	\$ 802,500	\$ 591,995	\$ 265,500	\$ 378,850	\$ 158,150	\$ 517,046	\$ 38,210	\$ 16,740	\$ 1,394,495
<i>Winchester Regional</i>	\$ 392,143	\$ 571,948	\$ 126,000	\$ 23,807	\$ 242,335	\$ 90,000	\$ 31,597	\$ 450,351	\$ 964,091
<i>Rocky Mount/Franklin County (New)</i>	\$ 11,000,000	\$ 5,000,000	\$ 9,900,000	\$ 880,000	\$ 220,000	\$ 4,500,000	\$ 400,000	\$ 100,000	\$ 16,000,000
<i>Blackstone Municipal</i>	\$ 100,000	\$ 350,000	\$ 90,000	\$ 8,000	\$ 2,000	\$ 126,000	\$ 158,200	\$ 65,800	\$ 450,000
<i>Brookneal-Campbell County</i>	\$ 100,000	\$ 1,114,750	\$ 90,000	\$ 8,000	\$ 2,000	\$ 625,275	\$ 349,580	\$ 139,895	\$ 1,214,750
<i>Emporia-Greenville Regional</i>	\$ 640,000	\$ -	\$ 576,000	\$ -51,200	\$ 12,800	\$ -	\$ -	\$ -	\$ 640,000
<i>Franklin Municipal</i>	\$ -	\$ 205,000	\$ -	\$ -	\$ -	\$ 184,500	\$ 16,400	\$ 4,100	\$ 205,000

Airport	2005 Total \$	2020 Total \$	2000-2005			2006-2020			Total
			Federal	State	Local	Federal	State	Local	
<i>Front Royal-Warren County</i>	\$ 295,000	\$ 1,053,129	\$ 90,000	\$ 17,750	\$ 187,250	\$ 459,566	\$ 420,600	\$ 172,963	\$ 1,348,129
<i>Lee County (New)</i>	\$ 5,632,000	\$ 950,000	\$ 3,482,550	\$ 1,183,310	\$ 966,140	\$ 855,000	\$ 76,000	\$ 19,000	\$ 6,582,000
<i>Louisa County</i>	\$ 1,138,060	\$ 2,590,491	\$ 151,254	\$ 722,945	\$ 263,861	\$ 1,083,600	\$ 1,182,763	\$ 324,128	\$ 3,728,551
<i>Luray Caverns</i>	\$ 2,345,000	\$ 4,505,000	\$ 1,890,000	\$ 339,500	\$ 115,500	\$ 2,985,750	\$ 609,150	\$ 910,100	\$ 6,850,000
<i>Marks Municipal</i>	\$ 2,107,500	\$ 105,000	\$ 675,000	\$ 1,104,000	\$ 328,500	\$ -	\$ 84,000	\$ 21,000	\$ 2,212,500
<i>Mountain Empire</i>	\$ 887,159	\$ 1,037,500	\$ 522,000	\$ 61,758	\$ 303,401	\$ 351,000	\$ 484,450	\$ 202,050	\$ 1,924,659
<i>New Kent County</i>	\$ -	\$ 922,500	\$ -	\$ -	\$ -	\$ 90,000	\$ 583,750	\$ 248,750	\$ 922,500
<i>Orange County</i>	\$ 837,500	\$ -	\$ 90,000	\$ 397,500	\$ 350,000	\$ -	\$ -	\$ -	\$ 837,500
<i>Tangier Island</i>	\$ 1,190,208	\$ 336,750	\$ 783,750	\$ 293,229	\$ 113,229	\$ 303,075	\$ 26,940	\$ 6,735	\$ 1,526,958
<i>Tappahannock-Essex Co. (New)</i>	\$ 7,702,880	\$ 2,528,000	\$ 4,990,392	\$ 1,290,090	\$ 1,422,398	\$ 1,001,700	\$ 773,040	\$ 753,260	\$ 10,230,880
<i>Twin County</i>	\$ 542,500	\$ 100,000	\$ -	\$ 379,750	\$ 162,750	\$ 90,000	\$ 8,000	\$ 2,000	\$ 642,500
<i>Virginia Tech</i>	\$ 1,537,333	\$ 690,000	\$ 933,600	\$ 107,987	\$ 495,747	\$ 153,000	\$ 39,600	\$ 497,400	\$ 2,227,333
<i>Wakefield Municipal</i>	\$ 852,553	\$ 2,010,244	\$ 90,000	\$ 428,128	\$ 334,425	\$ -	\$ 1,172,065	\$ 838,179	\$ 2,862,797
<i>Williamsburg-Jamestown</i>	\$ 817,816	\$ 1,943,921	\$ 90,000	\$ 370,141	\$ 357,675	\$ 135,000	\$ 1,099,571	\$ 709,350	\$ 2,761,737
<i>Rockbridge County/Lexington</i>	\$ 11,000,000	\$ 5,000,000	\$ 9,900,000	\$ 880,000	\$ 220,000	\$ 4,500,000	\$ 400,000	\$ 100,000	\$ 16,000,000
<i>Northern Neck</i>	\$ 8,000,000	\$ 5,000,000	\$ 7,200,000	\$ 640,000	\$ 160,000	\$ 4,500,000	\$ 400,000	\$ 100,000	\$ 13,000,000
<i>Grundy (Replacement)</i>	\$ 30,000,000	\$ 10,000,000	\$ 27,000,000	\$ 2,400,000	\$ 600,000	\$ 9,000,000	\$ 800,000	\$ 200,000	\$ 40,000,000
<i>Bridgewater Air Park</i>	\$ 30,000	\$ -	\$ -	\$ 24,000	\$ 6,000	\$ -	\$ -	\$ -	\$ 30,000
<i>Chase City Municipal</i>	\$ 30,000	\$ 70,000	\$ -	\$ 24,000	\$ 6,000	\$ 63,000	\$ 5,600	\$ 1,400	\$ 100,000
<i>Crewe Municipal</i>	\$ 30,000	\$ -	\$ -	\$ 24,000	\$ 6,000	\$ -	\$ -	\$ -	\$ 30,000
<i>Falwell</i>	\$ -	\$ 30,000	\$ -	\$ -	\$ -	\$ -	\$ 24,000	\$ 6,000	\$ 30,000
<i>Gordonsville Municipal</i>	\$ 346,667	\$ -	\$ 135,000	\$ 169,333	\$ 42,333	\$ -	\$ -	\$ -	\$ 346,667
<i>Grundy Municipal</i>	\$ -	\$ 30,000	\$ -	\$ -	\$ -	\$ -	\$ 24,000	\$ 6,000	\$ 30,000
<i>Hartwood Field</i>	\$ 30,000	\$ -	\$ -	\$ 24,000	\$ 6,000	\$ -	\$ -	\$ -	\$ 30,000
<i>Hummel Field</i>	\$ 30,000	\$ -	\$ -	\$ 24,000	\$ 6,000	\$ -	\$ -	\$ -	\$ 30,000
<i>Lake Anna</i>	\$ 596,667	\$ -	\$ 135,000	\$ 369,333	\$ 92,333	\$ -	\$ -	\$ -	\$ 596,667
<i>Lawrenceville-Brunswick</i>	\$ 240,000	\$ -	\$ -	\$ 171,000	\$ 69,000	\$ -	\$ -	\$ -	\$ 240,000
<i>Lee County (To be closed 2003)</i>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<i>Lunenburg County</i>	\$ 30,000	\$ -	\$ -	\$ 24,000	\$ 6,000	\$ -	\$ -	\$ -	\$ 30,000
<i>New London</i>	\$ 30,000	\$ -	\$ -	\$ 24,000	\$ 6,000	\$ -	\$ -	\$ -	\$ 30,000
<i>New Market</i>	\$ 30,000	\$ 70,000	\$ -	\$ 24,000	\$ 6,000	\$ -	\$ 56,000	\$ 14,000	\$ 100,000
<i>Smith Mountain Lake</i>	\$ 30,000	\$ 70,000	\$ -	\$ 24,000	\$ 6,000	\$ -	\$ 56,000	\$ 14,000	\$ 100,000
<i>Tappahannock Municipal (To be closed 2006)</i>	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<i>Waynesboro</i>	\$ -	\$ 100,000	\$ -	\$ -	\$ -	\$ -	\$ 80,000	\$ 20,000	\$ 100,000
Runway Rehabilitation	\$ -	\$ 80,156,970	\$ -	\$ -	\$ -	\$ 19,838,850	\$ 48,254,496	\$ 12,063,624	\$ 80,156,970
Terminal Rehabilitation	\$ 9,228,102	\$ 46,140,510	\$ 6,544,778	\$ 2,196,833	\$ 486,492	\$ 32,723,888	\$ 10,984,164	\$ 2,452,458	\$ 55,368,612
System Planning	\$ 1,000,000	\$ 4,000,000	\$ 900,000	\$ 100,000	\$ -	\$ 3,600,000	\$ 400,000	\$ -	\$ 5,000,000
PROGRAM TOTAL	\$ 681,416,731	\$ 2,102,233,114	\$ 450,615,368	\$ 59,960,029	\$ 170,841,335	\$ 1,457,374,956	\$ 127,431,220	\$ 517,426,938	\$ 2,783,649,845
PROGRAM TOTAL (without MWAA)	\$ 405,816,731	\$ 484,998,114	\$ 251,842,868	\$ 53,960,029	\$ 100,013,835	\$ 274,693,456	\$ 97,431,220	\$ 112,873,438	\$ 890,814,845

Note: The State portion of the Commercial Service Subtotal reflects \$2 million per year, which is the maximum annual fiduciary responsibility of the Commonwealth to the MWAA airports per Title 38.1 of the Code of Virginia.

Table 4

VIRGINIA AIR TRANSPORTATION SYSTEM PLAN

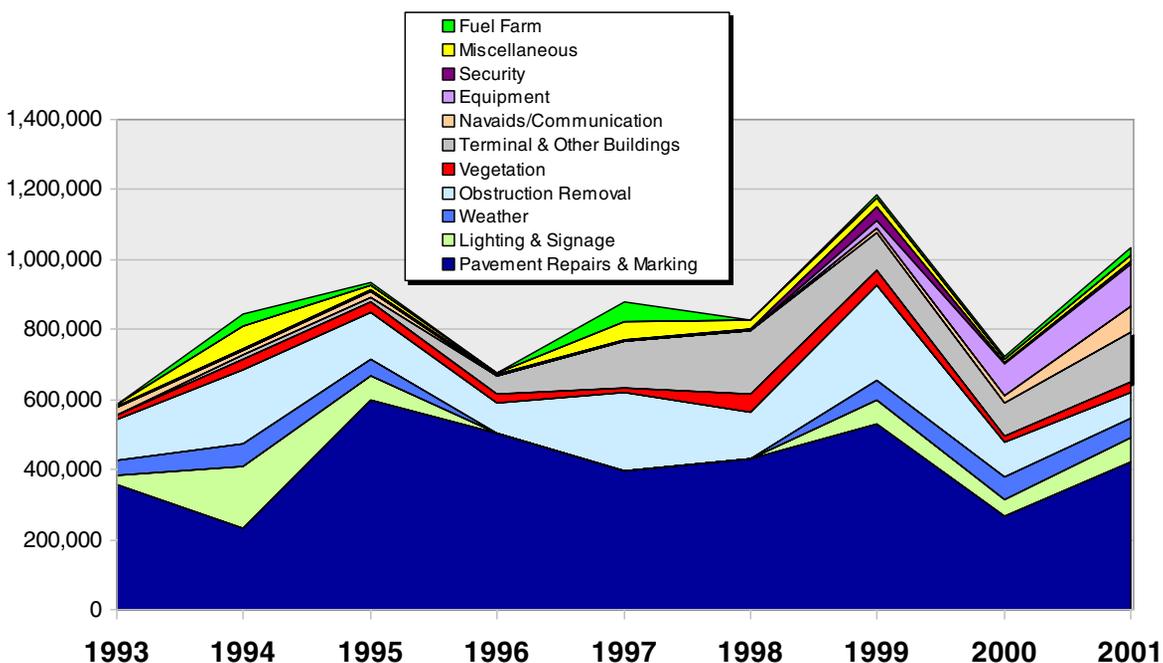
Summary by Service Role and Funding Source
(2002 Dollars)

	2005 Total (\$)	2020 Total (\$)	2000-2005			2006-2020			Total
			Federal	State	Local	Federal	State	Local	
CM	\$ 506,414,550	\$ 1,868,525,750	\$ 323,910,518	\$ 34,949,321	\$ 147,554,712	\$ 1,340,011,160	\$ 49,795,717	\$ 478,718,873	\$ 2,374,940,300
RL	\$ 44,083,903	\$ 29,839,912	\$ 30,371,807	\$ 5,248,189	\$ 8,463,908	\$ 16,342,330	\$ 3,853,532	\$ 9,644,050	\$ 73,923,815
GR	\$ 43,511,333	\$ 32,757,686	\$ 29,973,720	\$ 5,856,732	\$ 7,680,881	\$ 18,352,261	\$ 5,213,603	\$ 9,191,822	\$ 76,269,020
GC	\$ 75,725,510	\$ 40,442,286	\$ 58,644,546	\$ 10,683,287	\$ 6,397,677	\$ 26,443,466	\$ 8,684,109	\$ 5,314,711	\$ 116,167,795
LO	\$ 1,453,333	\$ 370,000	\$ 270,000	\$ 925,667	\$ 257,667	\$ 63,000	\$ 245,600	\$ 61,400	\$ 1,823,333
Runway Rehabilitation	\$ -	\$ 80,156,970	\$ -	\$ -	\$ -	\$ 19,838,850	\$ 48,254,496	\$ 12,063,624	\$ 80,156,970
Terminal Rehabilitation	\$ 9,228,102	\$ 46,140,510	\$ 6,544,778	\$ 2,196,833	\$ 486,492	\$ 32,723,888	\$ 10,984,164	\$ 2,432,458	\$ 55,368,612
System Planning	\$ 1,000,000	\$ 4,000,000	\$ 900,000	\$ 100,000	\$ -	\$ 3,600,000	\$ 400,000	\$ -	\$ 5,000,000
PROGRAM TOTAL	\$ 681,416,731	\$ 2,102,233,114	\$ 450,615,368	\$ 59,960,029	\$ 170,841,335	\$ 1,457,374,956	\$ 127,431,220	\$ 517,426,938	\$ 2,783,649,845
PROGRAM TOTAL (without MWAA)	\$ 405,816,731	\$ 484,998,114	\$ 251,842,868	\$ 53,960,029	\$ 100,013,835	\$ 274,693,456	\$ 97,431,220	\$ 112,873,438	\$ 890,814,845

Historical funding expenditures, as detailed in the Department of Aviation Maintenance Program Funding Status Reports, were categorized in an effort to group them by the general purpose for which they were spent. For example, all expenditures for crack sealing, joint repairs, and seal coating were categorized as "Pavement" maintenance. No differentiation was made with regard to the type or location of the pavement being repaired. Similarly, radio equipment, rotating beacons, and all lighting related to navigational equipment (i.e. PAPIs) were categorized as "Nav aids/Communication".

Program Funding Status Reports for FY 1993 through FY 2002 were used to sum expenditure categories for each fiscal year. Once categorized and summed, the expenditures were graphed in order to display spending trends over the last decade. Figure 1 depicts the results of this analysis.

**Figure 1
Maintenance and F&E Expenditures, 1993-2002**

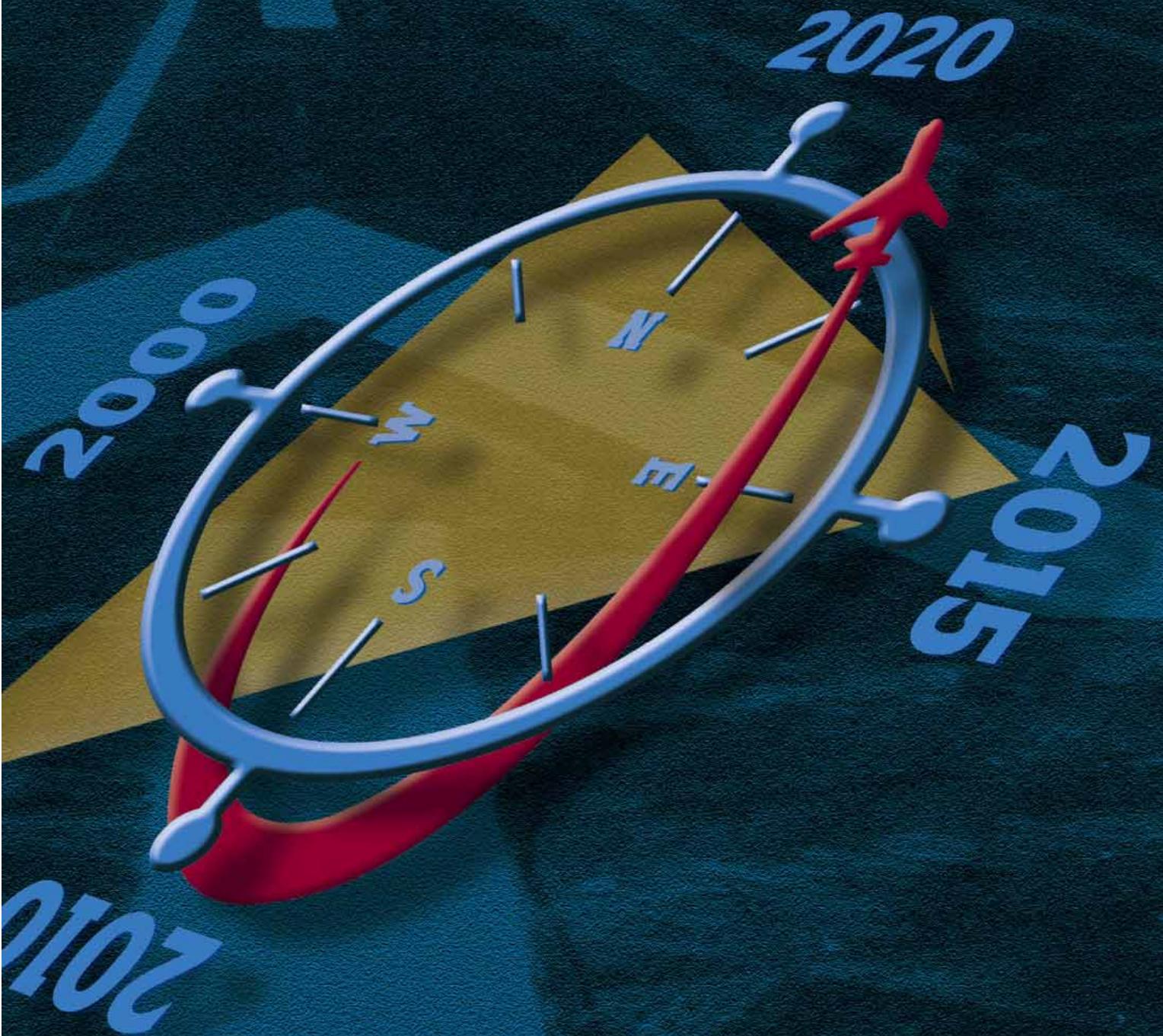


Estimation of Annual Pavement Maintenance Funding Needs

The largest expense of the Maintenance Program is pavement maintenance. Therefore, the annual cost to maintain pavement (runways, taxiways, and aprons) was estimated. The expected service life of pavement was assumed to be 20 years, which represents the approximate amount of time for which pavement can be expected to meet the requirements for which it was intended in a cost effective manner. Pavement ceases to be cost effective when it reaches the point at which it would be cheaper to replace than to maintain. The cost to maintain pavement over its expected service life was divided by the number of years in the life cycle to determine that the annual amount of needed pavement maintenance is more than \$900,000, as detailed in Table 5. This is for pavement maintenance only. Runway rehabilitation costs are capital expenditures and

are included in Tables 1 through 4. Given that the average historical expenditures for the last nine years was \$416,000, ranging from a low of \$235,000 in 1994 to a high of \$599,000 in 1995, there is a substantial gap between historical expenditures and actual need.

APPENDIX A:
INVENTORY SURVEY





VIRGINIA STATE SYSTEM PLAN AIRPORT INVENTORY DATA REQUEST

1. GENERAL INFORMATION

Airport Name: _____ Date of Survey: _____
Airport Identifier: _____ Associated City: _____
Airport Location: _____ miles _____ of _____, County of _____
Airport Latitude: _____ Airport Longitude: _____
Airport Elevation: _____ ft msl Total Airport Acreage: _____
Airport Owner: _____ Publicly Owned Privately Owned
Owner Address: _____ Owner Phone: _____
Airport Manager: _____ Manager Phone: _____
Manager Address: _____

2. AIRPORT CHARACTERISTICS

a. NPIAS Classification:

- Service Level: PR – Commercial Service – Primary
 CM – Commercial Service – Other
 CR – Reliever Airport with Commercial Service
 RL – Reliever Airport
 GA – General Aviation Airport

b. Control Tower: None FAA Tower Contract Tower

Hours of Operation, if applicable _____

c. Airport has: Rotating Beacon Segmented Circle Lighted Wind Cone
 Weather Reporting (type _____)

d. Airport Reference Code: _____ Date/Source: _____

e. Critical Aircraft: _____ Date/Source: _____

g. Other Airports within 25 Miles: _____

3. CURRENT AIRPORT USEAGE

a. The Airport is used for the following purposes:

- | | |
|--------------------------------------------------------------------------------|-----------------------------------------------------------------------|
| <input type="checkbox"/> Recreational Flying | <input type="checkbox"/> Police or Law Enforcement Flights |
| <input type="checkbox"/> Corporate/Business Flights | <input type="checkbox"/> Emergency Medical (air ambulance, etc.) |
| <input type="checkbox"/> Flight Training | <input type="checkbox"/> Gateway for VIP/High Profile Visitors |
| <input type="checkbox"/> Prisoner Transport | <input type="checkbox"/> Search and Rescue |
| <input type="checkbox"/> Traffic or News Reporting | <input type="checkbox"/> Aerial Photography/Surveying |
| <input type="checkbox"/> Aviation Museum | <input type="checkbox"/> Real Estate Tours |
| <input type="checkbox"/> Forest Fire Fighting | <input type="checkbox"/> Aerial Inspections (pipeline, electric, etc) |
| <input type="checkbox"/> Agricultural Spraying | <input type="checkbox"/> Staging Area for Community Events |
| <input type="checkbox"/> Environmental Patrols | <input type="checkbox"/> Aerial Advertising/Banner Towing |
| <input type="checkbox"/> Civil Air Patrol | <input type="checkbox"/> Shipping of Just-In-Time or Perishable Goods |
| <input type="checkbox"/> Location for Community Facilities | <input type="checkbox"/> Skydiving |
| <input type="checkbox"/> Other _____
(fire department, Humane Society, etc) | |

b. The Airport has an Industrial Park: Yes No (continue to question "c")

The Airport Industrial Park is: On-Airport Off-Airport

Total Acres: _____ Total Acres Developed: _____

Tenants or Types of Businesses: _____

Airport Usage by Industrial Park Tenants: _____

c. Major Airport Users and Off-Airport Dependent Businesses:

<u>Airport User/Dependent Business</u>	<u>Aircraft Based at Airport?</u>	<u>Type of Aircraft</u>
_____	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
_____	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
_____	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
_____	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
_____	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____
_____	<input type="checkbox"/> Yes <input type="checkbox"/> No	_____

d. Estimate percentage of airport operations:

Business: _____ Leisure: _____ Flight Training: _____

4. AVIATION SERVICES PROVIDED AT THE AIRPORT:

- | | | |
|---------------------------------------------------|---------------------------------------------------------|------------------------------------------------|
| <input type="checkbox"/> Scheduled Air Carrier | <input type="checkbox"/> Scheduled Commuter Air Service | <input type="checkbox"/> Air Taxi |
| <input type="checkbox"/> U.S. Customs/Immigration | <input type="checkbox"/> General Aviation Facilities | <input type="checkbox"/> Hangar Rental |
| <input type="checkbox"/> Tie Downs | <input type="checkbox"/> Aircraft Rental | <input type="checkbox"/> Aircraft Sales |
| <input type="checkbox"/> Flight Instruction | <input type="checkbox"/> Jet Fuel Sales | <input type="checkbox"/> Avgas Sales |
| <input type="checkbox"/> Aircraft Repair-Major | <input type="checkbox"/> Avionics Sales/Repair | <input type="checkbox"/> Public Telephone |
| <input type="checkbox"/> Aircraft Repair-Minor | <input type="checkbox"/> Vending | <input type="checkbox"/> Car Rental |
| <input type="checkbox"/> Restaurant | <input type="checkbox"/> Taxis | <input type="checkbox"/> Public Transportation |
| <input type="checkbox"/> Skydiving | <input type="checkbox"/> Courtesy Vehicle | <input type="checkbox"/> _____ |

5. AIRSIDE FACILITIES:

Electronic and Visual Landing Aid Acronyms for use in next section :

- Full ILS (instrument landing system)
 - LOC (localizer)
 - GS (glide slope)
 - OM (outer marker)
 - MM (middle marker)
 - ALS (approach light system):
 - ALSF-I – App. Light System with Sequenced Flashing Lights in an ILS CAT-I configuration
 - ALSF-II – App. Light System with Sequenced Flashing Lights in an ILS CAT-II configuration
 - SSALF – Simplified Short Approach Light System with Sequenced Flashing Lights
 - SSALR – Simplified Short Approach Light System with Runway Alignment Indicator Lights
 - MALSF – Medium Intensity Approach Light System with Sequenced Flashing Lights
 - MALSR – Medium Intensity Approach Light System with Runway Alignment Indicator Lights
 - LDIN – Sequenced Flashing Lead-In Lights
 - ODALS – Omni-directional Approach Lighting System
 - RAIL – Runway Alignment Indicator Lights (sequenced flashing lights which are installed only in combination with other light systems)
- DME (distance measuring equipment)
- NDB (non-directional beacon)
- PAPI (precision approach path indicator)
- PLASI (pulse light approach slope indicator)
- VADI (visual approach descent indicator)
- REIL (runway end identifier lights)
- VASI (visual approach slope indicator)
- VOR (very high frequency omni-directional range station)
- _____
- _____

a. Number of Runways: _____

Runway 1:

- a. Runway Designation: _____ Length (ft) _____ Width (ft) _____
- b. Surface Type: Concrete Asphalt Other _____
- c. Surface Treatment: Grooved Other _____
- d. Runway Shoulder Paved Unpaved None
- e. Runway Lights: HIRL (high intensity) MIRL (medium intensity) LIRL (low intensity)
- CL (centerline lights) PL (pilot controlled) Non-standard
- f. Runway Weight Bearing Capacity: _____ Pavement Condition Index: _____

g. Electronic and Visual Landing Aids by Runway End (see list). Please note when PC (pilot controlled) or NS (non-standard):

Runway End _____ Aids _____
Instrument Approach(es) Available: _____
Runway End _____ Aids _____
Instrument Approach(es) Available: _____

h. Runway Meets Runway Safety Area Standards: Dimensional: Yes No Gradient: Yes No

Runway 2:

a. Runway Designation: _____ Length (ft) _____ Width (ft) _____

b. Surface Type: Concrete Asphalt Other _____

c. Surface Treatment: Grooved Other _____

d. Runway Shoulder Paved Unpaved None

e. Runway Lights: HIRL (high intensity) MIRL (medium intensity) LIRL (low intensity)
 CL (centerline lights) PL (pilot controlled) Non-standard

f. Runway Weight Bearing Capacity: _____ Pavement Condition Index: _____

g. Electronic and Visual Landing Aids by Runway End (see list). Please note when PC (pilot controlled) or NS (non-standard):

Runway End _____ Aids _____
Instrument Approach(es) Available: _____
Runway End _____ Aids _____
Instrument Approach(es) Available: _____

h. Runway Meets Runway Safety Area Standards: Dimensional: Yes No Gradient: Yes No

Runway 3:

a. Runway Designation: _____ Length (ft) _____ Width (ft) _____

b. Surface Type: Concrete Asphalt Other _____

c. Surface Treatment: Grooved Other _____

d. Runway Shoulder Paved Unpaved None

e. Runway Lights: HIRL (high intensity) MIRL (medium intensity) LIRL (low intensity)
 CL (centerline lights) PL (pilot controlled) Non-standard

f. Runway Weight Bearing Capacity: _____ Pavement Condition Index: _____

g. Electronic and Visual Landing Aids by Runway End (see list). Please note when PC (pilot controlled) or NS (non-standard):

Runway End _____ Aids _____
Instrument Approach(es) Available: _____
Runway End _____ Aids _____
Instrument Approach(es) Available: _____

h. Runway Meets Runway Safety Area Standards: Dimensional: Yes No Gradient: Yes No

Runway 4:

a. Runway Designation: _____ Length (ft) _____ Width (ft) _____

b. Surface Type: Concrete Asphalt Other _____

- c. Surface Treatment: Grooved Other _____
- d. Runway Shoulder Paved Unpaved None
- e. Runway Lights: HIRL (high intensity) MIRL (medium intensity) LIRL (low intensity)
 CL (centerline lights) PL (pilot controlled) Non-standard
- f. Runway Weight Bearing Capacity: _____ Pavement Condition Index: _____
- g. Electronic and Visual Landing Aids by Runway End (see list). Please note when PC (pilot controlled) or NS (non-standard):
 Runway End _____ Aids _____
 Instrument Approach(es) Available: _____
 Runway End _____ Aids _____
 Instrument Approach(es) Available: _____
- h. Runway Meets Runway Safety Area Standards: Dimensional: Yes No Gradient: Yes No

6. LANDSIDE FACILITIES

- a. Air Carrier Terminal(s) - Total Area: _____ sq ft
 When Built: _____
 Date of Last Major Renovation: _____
 Number of Loading Positions: _____
 Number of Loading Bridges: _____
- b. General Aviation Terminal(s) - Total Area: _____ sq ft
 When Built: _____
 Date of Last Major Renovation: _____
- c. Administration Building: _____ sq ft
 When Built: _____
 Date of Last Major Renovation: _____
- d. Air Cargo Facilities:
 Office: _____ sq ft
 When Built: _____
 Date of Last Major Renovation: _____
 Warehouse: _____ sq ft
 Apron: _____ sq yds
 Other: _____
- e. Hangars:

T-Hangars	
Number of Spaces	sq ft

Conventional Hangars (sq ft per Hangar)	
Hangar	sq ft

Is there a waiting list for hangar space? _____
 If so, number of aircraft on the list _____
 Number of aircraft owners on the wait list that would pay market price for new hangar space _____

- f. Apron Area: _____ sq yds

Number of Tie-downs for Transient Aircraft: _____ paved _____ unpaved

Number of Tie-downs for Based Aircraft: _____ paved _____ unpaved

Is there a waiting list for Tie-downs? _____

If so, how many aircraft are on the list? _____

g. Number of FBO's at Airport: _____

	<u>FBO Name</u>
FBO 1	_____
FBO 2	_____
FBO 3	_____
FBO 4	_____

h. Fuel Storage Capacity (gallons): _____ Avgas _____ JetA

i. Auto Parking:

	<u>Number of Spaces</u>
Terminal	_____
GA	_____
Employee	_____
Total	_____

7. BASED AIRCRAFT

Current Based Aircraft

	<u>T-Hangar</u>	<u>Conventional</u>	<u>Tie-down</u>	<u>Total</u>
Single Engine Piston	_____	_____	_____	_____
Multi-Engine Piston	_____	_____	_____	_____
Turbo-Prop	_____	_____	_____	_____
Jet	_____	_____	_____	_____
Civil Helicopter	_____	_____	_____	_____
Military – Fixed Wing	_____	_____	_____	_____
Military – Helicopter	_____	_____	_____	_____
Other (gliders, experimental)	_____	_____	_____	_____

8. CURRENT OPERATIONAL DATA

Definitions: **Operation:** an aircraft takeoff or a landing

a. Busiest Month for Airport: _____

b. Typical Peak Hour Operations in Busiest Month: _____

9. AIRPORT TRENDS

a. Over the last five years, please describe the general trends experienced in the following categories:

	<u>Significant Increase</u>	<u>Increase</u>	<u>About the Same</u>	<u>Decrease</u>	<u>Significant Decrease</u>
Level of Commercial Passenger Activity	_____	_____	_____	_____	_____
Level of Cargo Activity	_____	_____	_____	_____	_____
Level of GA Business/Corporate Activity	_____	_____	_____	_____	_____

Level of GA Training/Student Activity _____
 Level of GA Recreational Activity _____

b. Over the next five years, changes are anticipated in the following categories:

	Significant Increase	Increase	About the Same	Decrease	Significant Decrease
Level of Commercial Passenger Activity	_____	_____	_____	_____	_____
Level of Cargo Activity	_____	_____	_____	_____	_____
Level of GA Business/Corporate Activity	_____	_____	_____	_____	_____
Level of GA Training/Student Activity	_____	_____	_____	_____	_____
Level of GA Recreational Activity	_____	_____	_____	_____	_____

10. AIRPORT PLANNING

a. Constraints to Future Airport Expansion (zoning, environmental concerns, local laws, ordinances, etc.):

b. Current Airport Improvements Underway: _____

c. Future Airport Improvements Planned/Priority Projects: _____

d. Airport Master Plan: Approved _____ (date) Underway _____ (status)

e. Airport Layout Plan: Approved _____ (date) Underway _____ (status)

f. Strengths of Airport in terms of its current and future status within Virginia's system of airports: _____

g. Weaknesses that limit Airport's present and future development: _____

h. Opportunities that could enhance the role played by the Airport: _____

i. Threats that could jeopardize the Airport's ability to effectively fulfill its mission: _____

j. Industry trends that might impact the Airport's future development: _____

11. AIRPORT ADEQUACY

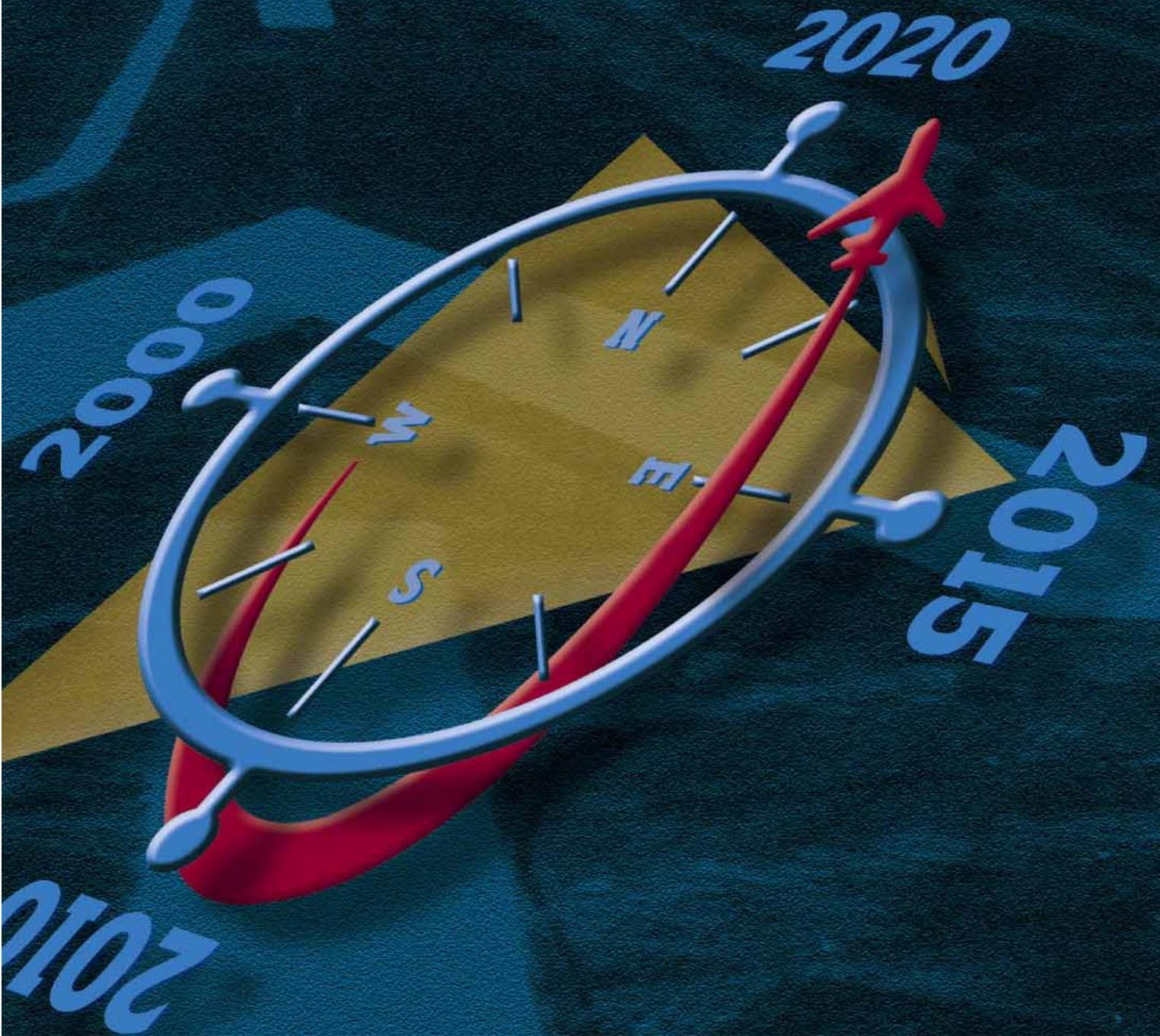
a. Note the Adequacy of the Following. (Please Note "N/A" as appropriate)

	Totally Adequate	Reasonably Adequate	Neutral	Somewhat Inadequate	Totally Inadequate
Runway Length					
Runway Width					
Airfield Pavement Condition					
Runway Instrumentation					
Taxiway Layout					
Taxiway Width					
Taxiway Pavement Condition					
Airfield Lighting					
Airfield Signage					
Airfield Capacity					
Aircraft Parking/Storage Capacity					
Auto Parking					
Taxi Service					
Rental Car Service					
Availability of Courtesy Car					
Surface Access					
Integration of Multi-Modal Transportation Modes					
Terminal/FBO Size					
Terminal/FBO Condition					
Aviation Fuel Storage Capacity					
Airspace Interactions with Other Airports					
Approach Surfaces					

b. Specific issues or explanation for the items listed as "Somewhat Inadequate" or "Totally Inadequate":

c. Name and position of person providing data: _____

APPENDIX B:
POPULATION ANALYSIS
METHODOLOGY



POPULATION ANALYSIS METHODOLOGY

The population analysis component of the VATSP was completed in May 2001. The analysis calculated affected population for three drive time intervals. The intervals were:

- › 45 minutes from a commercial service airport.
- › 30 minutes from a general aviation airport
- › 45 minutes from a commercial airport OR 30 minutes from a general aviation airport

Phase 1 – Data Acquisition.

Drive Time Contours – Street network files for the Commonwealth of Virginia were obtained from Environmental Systems Research Institute (ESRI) U.S. Street Database Files. Each road segment was assigned a speed limit based on size and road type. Utilizing this information, a time per road segment calculator was created. The files were then processed through ESRI’s Network Analyst and subsequent polygons were created that displayed driving distances based on time. Polygons were created for the three drive time intervals defined above.

Population Data – Year 2000 and 2010 population data was collected for the Commonwealth of Virginia at the Census Block Group Level. The provider of the demographic data, Applied Geographic Solutions, has been used in previous HNTB Corp. population analysis studies including the Potomac TRACON EIS and the Roanoke Airport Noise Exposure Map.

Geographic Data – Census Block geography files for the Commonwealth of Virginia were obtained from ESRI Data and Maps. These files provide comprehensive statewide polygons with an underlying table structure similar to the Applied Geographic Solutions (AGS) Block Group projections. The similarity in the two file structures allows for relationships to be created and for the demographic data to be attached to the geographic files as attributes.

Phase 2 – Analysis

The population analysis component of the VATSP was conducted in a step process. This process allows for streamlining and consistency between the three drive time intervals.

The steps were:

- › Calculation of population per acre at block group level to create a population multiplier.
- › Clipping drive time contours into block groups and subsequent calculation of acreage for each clipped Block Group.
- › Multiplying clipped Block Group acreage by population multiplier to derive total affected population. Subsequent division of total affected population into total state population to derive percentage of state population within the drive time interval.

The step process is defined below. The analysis was completed using ESRI's ArcView software.

Step 1 – Calculation of population per acre.

The Applied Geographic Solutions 2000 Census Block Group projections are joined to ESRI's Block Group geography. Total acreage is then calculated for each Block Group record. The Block Group total population for each record is then divided into the Block Group acreage for each record to derive a population per acre multiplier for each Block Group.

Shape	Areakay	Z000pop	Pop_per_ac	Orig_acres
Polygon	510019901001	354	0.162	2179.234
Polygon	510019901002	381	0.234	1631.475
Polygon	510019901003	673	1.792	375.605
Polygon	510019901004	732	0.306	2394.027
Polygon	510019901004	732	0.306	2394.027
Polygon	510019901004	732	0.306	2394.027
Polygon	510019901005	443	0.025	17415.129
Polygon	510019901005	443	0.025	17415.129
Polygon	510019901006	1100	0.123	8934.368
Polygon	510019902001	2093	0.077	27180.378
Polygon	510019902001	2093	0.077	27180.378
Polygon	510019902001	2093	0.077	27180.378
Polygon	510019902002	970	0.087	11121.510
Polygon	510019902003	2031	0.062	32830.113
Polygon	510019902003	2031	0.062	32830.113
Polygon	510019902003	2031	0.062	32830.113
Polygon	510019902003	2031	0.062	32830.113
Polygon	510019902003	2031	0.062	32830.113
Polygon	510019903001	845	0.092	9170.120
Polygon	510019903002	923	0.040	23053.423
Polygon	510019904001	1001	0.108	9310.421
Polygon	510019904001	1001	0.108	9310.421

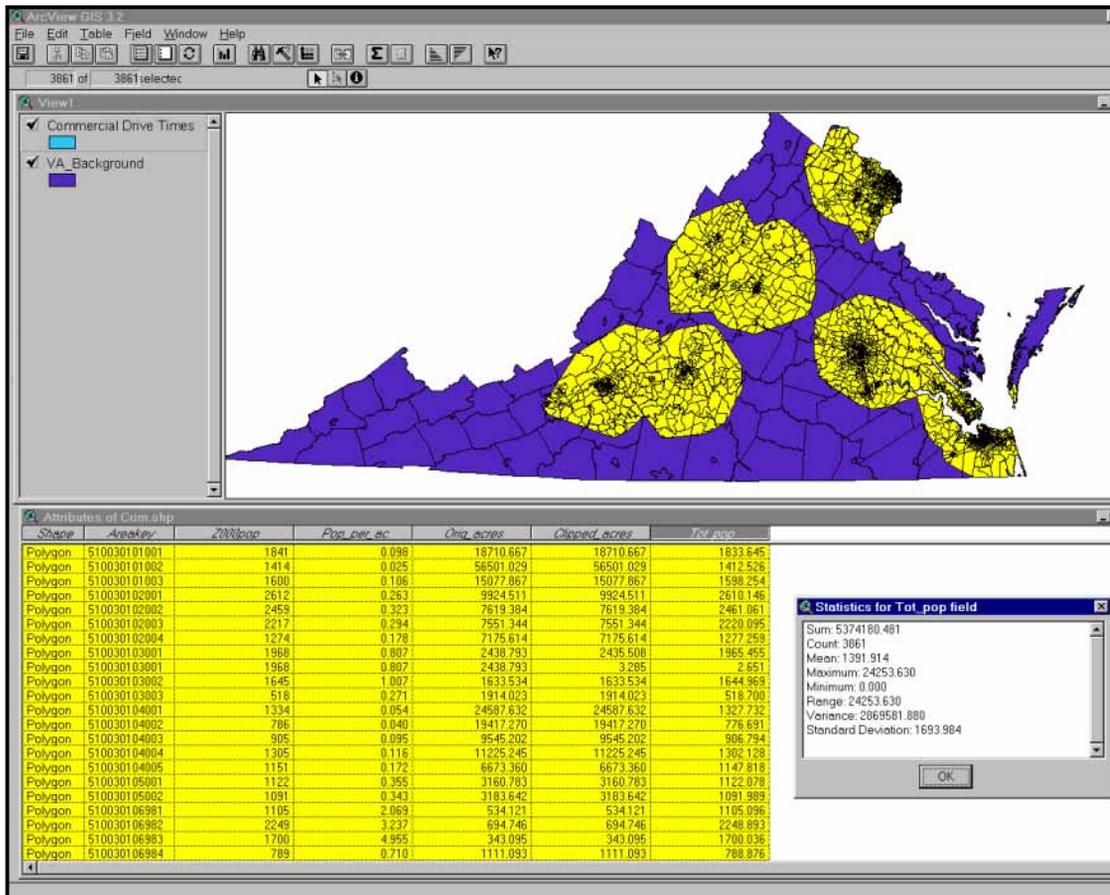
Shape	Areakay	Z000pop	Pop_per_ac	Orig_acres	Clipped_acres
Polygon	510030101001	1841	0.098	18710.667	18710.667
Polygon	510030101002	1414	0.025	56501.029	56501.029
Polygon	510030101003	1600	0.106	15077.867	15077.867
Polygon	510030102001	2612	0.263	9924.511	9924.511
Polygon	510030102002	2459	0.323	7619.384	7619.384
Polygon	510030102003	2217	0.294	7551.344	7551.344
Polygon	510030102004	1274	0.178	7175.614	7175.614
Polygon	510030103001	1968	0.807	2438.793	2438.793
Polygon	510030103001	1968	0.807	2438.793	2438.793
Polygon	510030103002	1645	1.007	1633.534	1633.534
Polygon	510030103003	518	0.271	1914.023	1914.023
Polygon	510030104001	1334	0.054	24587.632	24587.632
Polygon	510030104002	786	0.040	19417.270	19417.270
Polygon	510030104003	905	0.095	9545.202	9545.202
Polygon	510030104004	1305	0.116	11225.245	11225.245
Polygon	510030104005	1151	0.172	6673.360	6673.360
Polygon	510030105001	1122	0.355	3160.783	3160.783
Polygon	510030105002	1091	0.343	3183.642	3183.642
Polygon	510030106981	1105	2.069	534.121	534.121
Polygon	510030106982	2249	3.237	694.746	694.746
Polygon	510030106983	1700	4.955	343.095	343.095
Polygon	510030106984	789	0.710	1111.093	1111.093
Polygon	510030106985	827	2.819	293.377	293.377
Polygon	510030107001	1723	7.454	231.136	231.136
Polygon	510030107002	2747	11.064	248.282	248.282
Polygon	510030107003	3125	11.558	270.385	270.385
Polygon	510030108001	638	0.472	1352.230	1352.230

Step 2 – Clipping Drive Time Contours into Block Groups.

The drive time contours are clipped into the Census Block files and a resultant clipped Block Groups file is created. Acreage is recalculated for the clipped block groups.

Step 3 – Multiplying clipped Block Group acreage by the population multiplier.

The acreage for the clipped block groups is multiplied by the population per acre multiplier. A subsequent resultant affected population total is derived. The analysis for commercial airport drive times is shown below.



Phase 3 – Results

The results of the three drive time intervals are shown below. 2000 and 2010 are the study years for the analysis.

2000 Population Analysis

Virginia Total 2000 Population = 6,928,327

Virginia Total 2000 Population within 45 minutes of a commercial airport = 5,374,180 or 77.57%

Virginia Total 2000 Population within 30 minutes of a general aviation airport = 5,541,939 or 79.99%

Virginia Total 2000 Population within 45 minutes of a commercial airport or 30 minutes of a general aviation airport = 6,732,945 or 97.18%

2010 Population Analysis

Virginia Total 2010 Population = 7,659,065

Virginia Total 2010 Population within 45 minutes of a commercial airport = 5,992,471 or 78.24%

Virginia Total 2010 Population within 30 minutes of a general aviation airport = 6,173,063 or 79.99%

Virginia Total 2010 Population within 45 minutes of a commercial airport or 30 minutes of a general aviation airport = 7,453,580 or 97.18%



Study performed by:

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