MVY AIRPORT MARTHA'S VINEYARD

MASTER PLAN UPDATE

Photo Source: Martha's Vineyard Airport

September 2016

Prepared By

JACOBS

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Foreword

The Martha's Vineyard Airport Master Plan Update is prepared with financial assistance from the Federal Aviation Administration, the Massachusetts Department of Transportation, and Martha's Vineyard Airport. It is prepared in compliance with appropriate federal, state, and local requirements and guidelines.

The Martha's Vineyard Airport Master Plan Update is prepared by Jacobs Engineering, with assistance from: KM Chng Environmental (noise analysis), Welch Surveyors, GZA Geo-Environmental (wildlife and habitat inventory), Nitsch Engineering (ground survey), PAL (Public Archeology Laboratory), and Sanborn Aerial Mapping.

The information, recommendations, views, and opinions expressed in the Martha's Vineyard Airport Master Plan Update are those of Jacobs Engineering, and do not represent or reflect the views, opinions, or recommendations of the Federal Aviation Administration, the Massachusetts Department of Transportation, or Martha's Vineyard Airport.

The Martha's Vineyard Airport Master Plan Update does not commit or obligate the Federal Aviation Administration, the Massachusetts Department of Transportation, or Martha's Vineyard Airport to implement or undertake any recommendation, improvements, or projects presented in the plan.

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Chapter 1 - Airfield Inventory

This chapter presents a detailed inventory of existing facilities, aircraft operations data, demographic, environmental and other data pertinent to the development of a comprehensive airport master plan. This chapter serves as the foundation upon which subsequent chapters are built.

1.1 Existing Documents and Reports

Maximum use was made of existing plans, data and studies that were prepared for the Martha's Vineyard Airport (MVY). In addition, relevant studies prepared by the Martha's Vineyard Commission (MVC), FAA and MassDOT, as well as other sources were reviewed in developing this chapter. A brief overview of the pertinent plans and studies is included below:

- Martha's Vineyard Airport Master Plan, 2001

  The 2001 Airport Master Plan was prepared by Hoyle, Tanner & Associates. It projected aviation activity between the years 2000 and 2020, and anticipated that air carrier passenger enplanements would increase by 36% to 143,794, that total aircraft operations would grow by 37% to 115,104, and based aircraft would increase from 134 to 166, an increase of 24%. The Master Plan recommended a number of airfield improvements, including construction of additional hangars and parking aprons, an extension of Runway 15-33 to 4,400' in length, construction of additional parallel taxiways to Runway 6-24 and 15-33, as well as expansion of the terminal building.

- Martha's Vineyard Commission, Island Plan 2010-11

  The Island Plan provides a comprehensive look at a variety of issues including housing, development, employment, the environment and sensitive resources, transportation, land use and zoning, energy, and the arts. The Island Plan identifies issues in each category, as well as goals to address each issue. As noted by MVC: "The Island Plan outlines a vision for the future of Martha's Vineyard and includes 207 strategies for getting there."

- Martha's Vineyard Commission, Regional Transportation Plan (RTP), 2011

  As noted in the Plan: "The Martha's Vineyard Regional Transportation Plan (RTP) is updated every four years as required by federal statute. The RTP outlines Martha's Vineyard's transportation issues, and offers proposals to improve the transportation system." Specifically regarding Martha's Vineyard Airport, the latest Plan identified trends, objectives, and proposed projects and actions, summarized below:

  <u>Objectives</u>

  1. Improve the safety, efficiency, and reliability of the airport facility as a transportation resource for the community.

  2. Improve the airport facilities in response to present needs and growing demand, with a priority on increasing ramp areas and hangars for airplane parking, and on ensuring adequate facilities to

accommodate aviation activity.

Proposed Projects and Actions – 2011 Martha's Vineyard Commission Regional Transportation Plan
Short-Term Projects (through 2014)

1. GPS Approach to Runway 15/33;
2. Construct new ARFF (Aircraft Rescue and Firefighting) and SRE (Snow Removal Equipment) facilities;
3. Airfield maintenance and snow removal equipment acquisition and replacement;
4. Reconstruct taxiways and construct additional parking aprons to ensure modern design standards, and continued eligibility for funding;
5. Acquire/relocate existing hangars to provide increased apron space adjacent to terminal complex;
6. Reconstruct Runway 6/24 to meet Runway Safety Area standards and Taxiway A to meet wing tip clearance standards as required by the Federal Aviation Administration.

Long-term projects (2014-2025)

1. Construct General Aviation Terminal facilities, including vehicle parking areas and access roads;
2. Construct airline and connector roads to reduce vehicle traffic at the intersection of Edgartown – West Tisbury Road and Barnes Road, and complete the inter-airport roadway system associated with the development of the airport business park and the terminal areas;
3. Construct infrastructure improvements adequate to meet current and future fire protection needs as relates to water supply and pressure for fire protection systems;
4. Air safety improvements;
5. Re-construct or add taxiways as appropriate;
6. Construct sewage treatment plant improvements;
7. Construct access roads, parking areas and utilities;
8. Extend secondary runway and install runway safety areas;
9. Expand existing airline terminal building.

Other Actions

1. Enhance year round air service to hub airports;
2. Identify performance measures to improve the operating performance of air transportation facilities;
3. Coordinate the capacities of the air carriers with the capacities of the region's roads and public surface transportation services;
4. Monitor operating policies at "hub" airports that affect Island air carriers;
5. Monitor the operation of the Martha's Vineyard Airport Terminal.

- Martha's Vineyard Commission, Unified Planning Work Program (UPWP) for Transportation Planning Activities, FFY 2012

As noted in the UPWP: "The Martha's Vineyard Commission (MVC) is a Regional Planning Agency (RPA) in the Commonwealth of Massachusetts. The FFY 2012 Unified Planning Work Program (UPWP) describes the transportation planning tasks and activities, which are to be conducted in the region during the coming year. The Unified Planning Work Program is a federally required certification document, which must be prepared and endorsed annually by the Martha's Vineyard MPO, prior to the start of the planning program."

"The Martha's Vineyard Commission has the responsibility of preparing the Unified Planning Work Program. The UPWP was prepared in consideration of the following national planning priorities set forth in the Safe, Accountable, Flexible, Efficient, Transportation Equity Act: A Legacy for Users (SAFETEA-LU) and Congressional continuing resolutions:

1. Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency;
2. Increase the safety of the transportation system for motorized and non-motorized users;
3. Increase the security of the transportation system for motorized and non-motorized users;
4. Increase the accessibility and mobility of people and for freight;
5. Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and economic development patterns;
6. Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight;
7. Promote efficient system management and operation, and;
8. Emphasize the preservation of the existing transportation system."

The UPWP incorporates four elements: management and support of the planning process; data collection and analysis activities; transportation studies; and other transportation technical activities (inter-regional transportation coordination, special tasks, and access to jobs). The focus of the UPWP is on ground transportation. Trip generation to Martha's Vineyard Airport by both aviation and non-aviation users impacts the local road network. Therefore, activity trends at the Airport relate to the UPWP in relation to ground trip generation.

- Martha's Vineyard Automobile Traffic Counts (1990-2005)

As noted by the Martha's Vineyard Commission (MVC), "there are 177 miles of public, paved roads on the Vineyard, none more than two lanes wide. There are no traffic lights or parking meters on the Island. Traffic can be quite congested in Down-Island towns during the summer." The MVC oversees the Island-wide traffic counting program. Traffic counts have been taken at more than 700 locations between 1991 and 2005. The counts were taken primarily in the summer months, and measure average daily traffic (ADT) at specific locations. Traffic volumes mirror the Island's strong summer seasonal peak, with a large volume of visitors bringing cars over on the ferry. A variety of transportation modes serve the Airport from private automobiles to taxicabs, limousines, buses (operated by the Martha's Vineyard Transit Authority), bicycles, and even pedestrian traffic.

- Transportation Improvement Program (TIP), FFY 2012-2015

As noted by the Martha's Vineyard Commission (MVC), "The transportation improvement program (TIP) is a planning and prioritizing document. Generally, the TIP is the region's short-term outlook for road, transit, and multimodal projects that coincides with current funding targets, regional plans, and local interests. The TIP must identify priorities and available funds. Priority projects must include all federally funded projects to be funded under Title 23 and the Federal Transit Act. Other regionally significant projects must be listed, and not just for informational purposes. Regionally significant projects usually affect air quality." The Plan focuses on ground transportation and does not include any projects at Martha's Vineyard Airport. However, the Airport supports the Plan's priorities of improving transportation safety, reducing congestion and air pollution, improving transportation infrastructure, and promoting alternate modes of ground transportation.

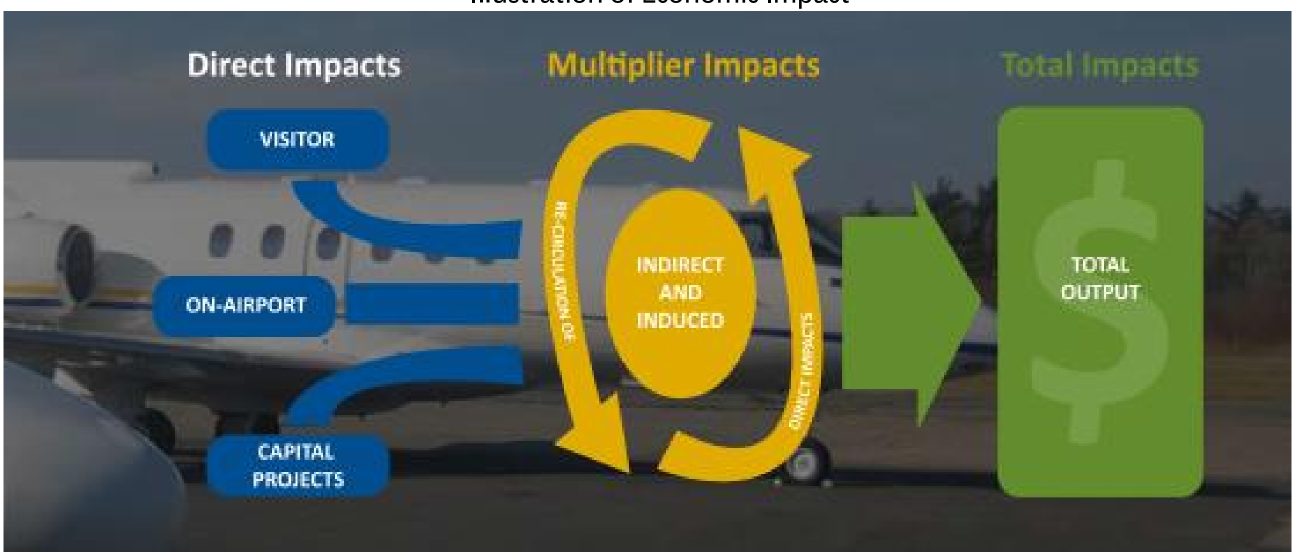
- FAA Terminal Area Forecast (TAF)

The FAA updates their TAF every year, which projects traffic levels for a 30 year period. The FAA projects demand broken down by various categories including: passenger enplanements, air and commuter aircraft operations, general aviation and military aircraft operations, and based aircraft. The FAA anticipates growth in most categories of activity at MVY through 2040, as discussed in more detail in Chapter 3.

- Economic Impacts of Massachusetts Airports, Massachusetts Aeronautics Commission,

Prepared by Wilbur Smith Associates in 2011. The report analyzed the direct impacts coupled with multiplier impacts to determine the total impact of each public use airport in the Commonwealth, as illustrated below:

Illustration of Economic Impact



Source: Massachusetts Statewide Airport Economic Impact Study Executive Summary, Wilbur Smith Assoc. 2011

The report analyzed the economic impact that Martha's Vineyard has on Dukes County including the visitors that travel via the airport. The study calculated that the airport had a total effect of generating more than $94 million annually in total output, more than $30 million in payroll and wages, and over 1,000 jobs.

- Massachusetts Statewide Airport System Plan, MassDOT

The 2010 Statewide Airport System Plan by Wilbur Smith was prepared "in order to provide an analysis of the statewide airport system that will produce an extensive assessment of the condition of the current system, as well as a plan for meeting its current and future needs."

1.2 Aviation Activity

This section presents the myriad of aviation activity found at MVY. The airport hosts a number of based aircraft, general aviation, government and commercial service operations. The airport strives to meet the appropriate FAA design standards for the typical operations at MVY now and into the future as discussed in the following sections.

1.2.1 Introduction

Aviation activity at airports is measured primarily in terms of aircraft operations[1], as well as by passenger enplanements (boardings). Martha's Vineyard Airport accommodates a broad range of aviation activity and airport users, from scheduled airline service to on-demand charters and air taxi, general aviation and corporate activity, military, government, and Coast Guard units, as well as special/ irregular operations that include presidential and other VIP visitors.

The level of aviation activity of each of these uses has fluctuated over time, in part because each activity responds to different market forces (demand drivers). Each type of activity also puts different demands on airport facilities and requires different airport services and FAA design standards to be met. Finally, each type of activity has a different impact on the airport's financial situation in terms of revenue generation and costs.

There are a number of factors that make Martha's Vineyard unique relative to most other airports in the U.S.:

- As an island off the coast of Massachusetts, Martha's Vineyard is only accessible by airplane or boat. As a result, air travel competes against just one other mode of transportation- i.e. boats, primarily in the form of scheduled ferry service (see Appendix 1), and to a lesser extent private boats. By comparison, airports on the mainland compete against multiple modes of transportation including automobiles, buses, and trains, as well as other airports.

- The largest air passenger market is only 60 nm away from Martha's Vineyard Airport, which is Boston, followed by White Plains, NY. Hyannis, MA (Barnstable Municipal Airport, 22nm away) is also a large market for Martha's Vineyard's air passengers. A large percentage of passengers do not start or finish their trips at those locations, but drive to/from those cities (airports).

- The economy on the Island is extremely seasonal and is driven by summer tourism. According to the Chamber of Commerce, the Vineyard is home to 15,000 year-round residents, which during the summer months increases to 125,000 (more than an eight-fold increase). The Regional Transportation Plan notes that "In 2010, about 57% of the Vineyard's 17,188 homes were seasonally occupied. The Vineyard's seasonal housing occupancy rate at 57% is second to Nantucket's at 64% of the 14 counties in Massachusetts." According to the Martha's Vineyard Commission: "The cornerstone of the Island's economy is providing services to seasonal residents and visitors. The service, retail trade, construction, and finance, insurance and real estate sectors—mainly seasonal industries—account for 54% of Island jobs." Aviation activity mirrors that very strong seasonal pattern. As discussed in more detail below, peak season aircraft operations from June through August generate approximately 50% of total annual operations at MVY.

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[1] FAA defines an aircraft operation as one takeoff or one landing. A takeoff and a landing are counted as two operations.

- The Commission further notes: "The driving force of the Island's economic base is visitors, especially second homeowners who purchase goods and services during their stay. Consumer spending can vary widely among sub-groups: year-round resident, seasonal resident, vacationer, transient (staying for less than a week), or day-tripper." Seasonal visitors are also the largest group of aircraft and airport users (that includes airlines, general aviation, and VIPs), and airport users fall within the same broad categories/sub-groups defined by the Commission. Among the summer visitors/airport users have been U.S. presidents and other VIPs, which have a direct impact on airport and regional airspace operations (discussed below).

- Among Island visitors are also workers (contractors, vendors, suppliers, government officials, professional services, etc.) who live on the mainland and travel to the Island to do business, often on a day-to-day basis.

- Island residents visit the mainland. However, socio-economic data indicates that year-round Island residents are not the primary users of air travel at Martha's Vineyard Airport. The Martha's Vineyard Regional Transportation Plan 2011 Update noted:

    - The Vineyard's year-round population has a somewhat lower average income than the Commonwealth as a whole.

    - The median household income of year-round Dukes County households was (in 2000) $57,076 which is only 89% of the state-wide figure of $64,057. This compares with the highest household income of $79,548 in Norfolk County and the lowest of $44,061 in Berkshire County.

    - According to the 2008 Economic Profile for Martha's Vineyard Study, the average wages of year-round residents was 27% below the state's average, while according to a 2008 Cost of Living Study by the MVC, the overall cost of living on the Vineyard is about 70% higher than the national average and 26% higher than Boston.

The unique factors of being an island with very strong seasonal traffic directly impacts the type and level of aviation activity at Martha's Vineyard Airport, as well as the airport's facility needs. Historic and current aviation activity at Martha's Vineyard Airport is examined in this chapter in terms of:

1. Aircraft Operations
2. Airline Activity: Passenger Enplanements and Operations
3. General Aviation/Corporate Aircraft Operations
4. Special (Irregular) Operations

There is one other public use airport on the Island, Katama Airpark. Located in Edgartown, Katama Airpark has three turf runways, 4 based aircraft, and approx. 7,000 aircraft operations per year. Given its location, size, and service level, Katama Airpark does not compete with Martha's Vineyard Airport for traffic with the exception of some light single-engine piston aircraft.

1.2.2 Aircraft Operations

Aircraft operations (takeoffs and landings) at MVY are counted by air traffic controllers, and the data is compiled and published on FAA's Air Traffic Activity Data System (ATADS).

The control tower at MVY is open during certain hours that coincide with the majority of aircraft operations, and the hours of operation are adjusted seasonally to coincide with changes in peak and off-peak traffic (shown below in Table 1.1).

Table 1.1
Martha's Vineyard Air Traffic Control Tower – Hours of Operation

May 15 – Oct. 31	1100Z-0300Z (7am – 11pm local time)
Nov. 1 – May 14	1200Z – 2200Z (7am – 5pm local time)

Source: FAA Airport/Facilities Data, 2014. Z = Zulu, i.e. coordinated universal time (UTC), also Greenwich Mean time (GMT)

It is estimated by controllers and airport management that the number of aircraft operations that occur when the control tower is closed total no more than 5% of the counted operations. The number of aircraft operations at MVY declined by just over 23% between 1990 and 2013 (Chart 1.1 and Table 1.2 on the following page).

Chart 1.1 Aircraft Operations – Martha's Vineyard Airport
Source: FAA ATADS

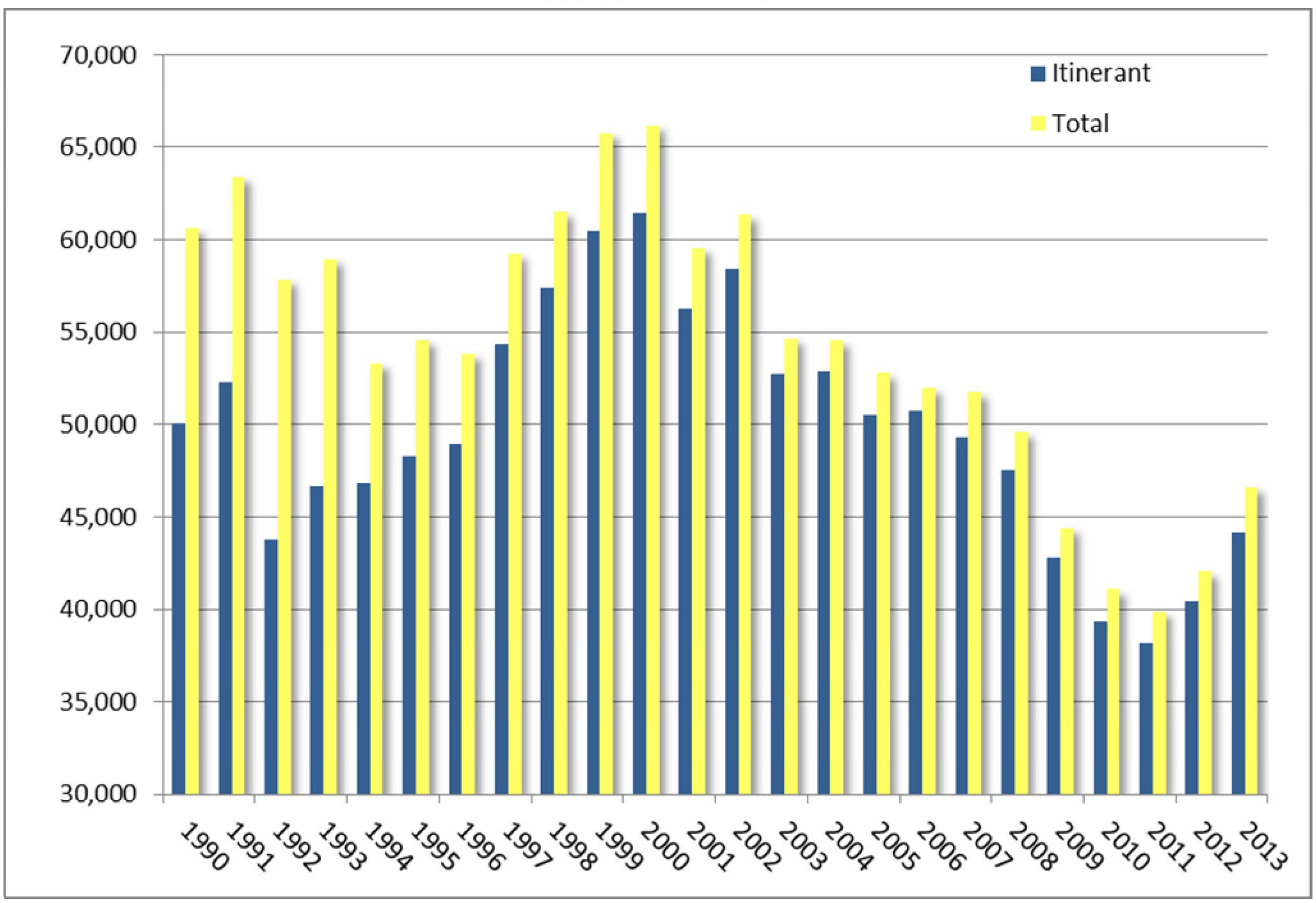


Table1.2*
Martha's Vineyard Airport
Aircraft Operations: 1990-2011
Source: FAA Air Traffic Activity Data System (ATADS)

	Itinerant					Local			
C.Y.	Air Carrier	Air Taxi	General Aviation	Military	Total Itinerant	Civil	Military	Total Local	Total Operations
1990	0	17,795	31,944	321	50,060	10,200	348	10,548	60,608
1991	3	17,122	34,863	294	52,282	10,472	623	11,095	63,377
1992	2	14,131	29,393	201	43,727	13,479	612	14,091	57,818
1993	4	17,839	28,469	292	46,604	11,834	492	12,326	58,930
1994	8	18,624	28,013	149	46,794	5,972	526	6,498	53,292
1995	2	20,831	27,255	140	48,228	6,002	326	6,328	54,556
1996	4	21,881	26,901	131	48,917	4,630	276	4,906	53,823
1997	6	24,231	29,907	155	54,299	4,661	260	4,921	59,220
1998	0	26,063	31,191	120	57,374	3,923	178	4,101	61,475
1999	4	28,004	32,298	152	60,458	4,994	292	5,286	65,744
2000	0	30,267	31,077	101	61,445	4,421	288	4,709	66,154
2001	24	26,589	29,474	170	56,257	2,990	283	3,273	59,530
2002	0	28,040	30,261	106	58,407	2,659	262	2,921	61,328
2003	2	26,734	25,838	142	52,716	1,778	153	1,931	54,647
2004	0	24,117	28,541	167	52,825	1,598	104	1,702	54,527
2005	9	23,822	26,492	155	50,478	2,152	115	2,267	52,745
2006	1	22,550	28,030	119	50,700	1,187	92	1,279	51,979
2007	61	22,727	26,366	160	49,314	2,218	197	2,415	51,729
2008	13	23,498	23,775	204	47,490	1,947	155	2,102	49,592
2009	63	22,473	20,000	271	42,807	1,396	170	1,566	44,373
2010	2	19,876	19,126	289	39,293	1,610	153	1,763	41,056
2011	525	18,224	19,136	239	38,124	1,617	119	1,736	39,860
2012	640	19,108	20,350	352	40,450	1,254	304	1,558	42,008
2013	963	21,395	21,460	269	44,087	2,199	297	2,496	46,583
					% Change				
1990-2013	963.0%	20.2%	-32.8%	-16.2%	--11.9%	-78.4%	-14.7%	-76.3%	-23.1%
2000-2013	963.0%	-29.3%	-30.9%	166.3%	-28.2%	-50.3%	3.1%	-47.0%	-29.6%
2010-2013	99.8%	7.6%	12.2%	-6.9%	12.2%	36.6%	94.1%	41.6%	13.5%

*FAA Definitions:

Air Carrier is an aircraft with seating capacity of more than 60 seats or a maximum payload capacity of more than 18,000 pounds carrying passengers or cargo for hire or compensation. This includes US and foreign flagged carriers.

Air Taxi is an aircraft designed to have a maximum seating capacity of 60 seats or less or a maximum payload capacity of 18,000 pounds or less carrying passengers or cargo for hire or compensation.

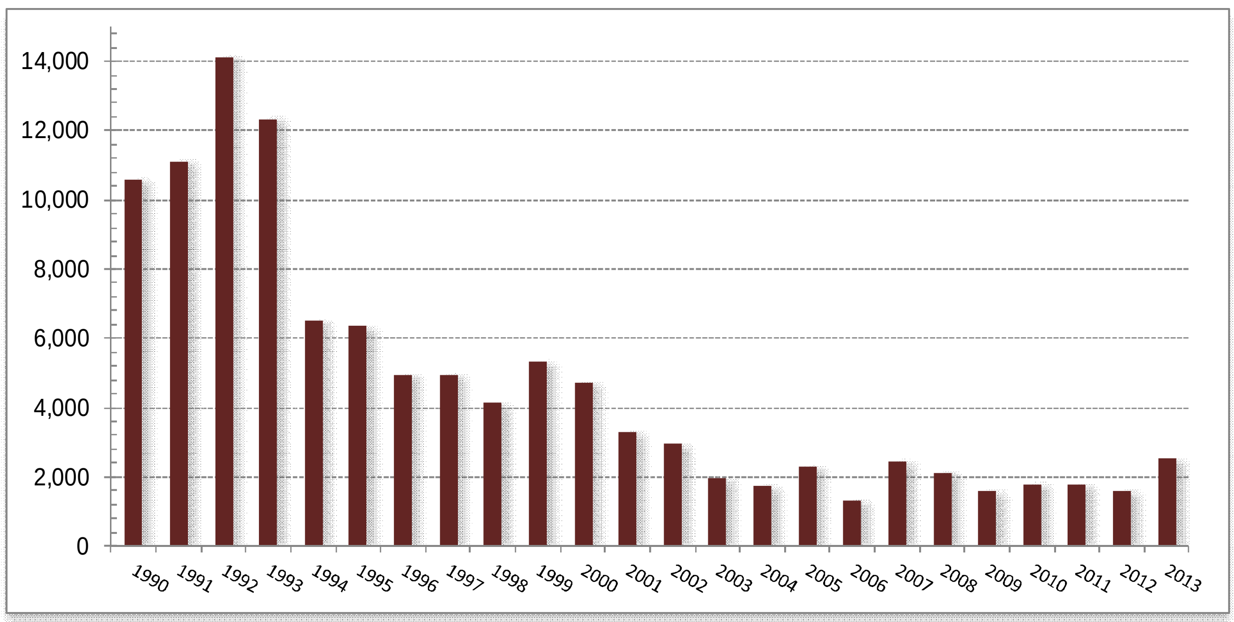
Local Operations are those operations performed by aircraft that remain in the local traffic pattern, execute simulated instrument approaches or low passes at the airport, and the operations to or from the airport and a designated practice area within a 20mile radius of the tower.

Itinerant Operations are operations performed by an aircraft that lands at an airport, arriving from outside the airport area, or departs an airport and leaves the airport area.

General Aviation (GA) Operations are takeoffs and landings of all civil aircraft except those classified as air carriers or air taxis.

General aviation activity experienced the greatest decline over that 21 year period, particularly local (i.e. training) activity (Chart 1.2). A number of factors contributed to the decline, including the rising cost of airplane ownership and operation. The airport has however seen an increase in local operations since the low point in 2006. Each segment of aviation activity at MVY is examined in more detail below.

Chart 1.2 Local Aircraft Operations – Martha's Vineyard Airport



Source: FAA ATADS

1.2.3 Peak Season Aircraft Operations

As noted previously, aviation activity at MVY accurately mirrors the Island's strong seasonal economy. Peak season aviation activity typically occurs in three months; June, July, and August. Between 2000 and 2013, activity in those three months represented 47.7% of total annual aircraft operations (Table 1.3), which is one of strongest seasonal peaks of any airport in the U.S.

Table 1.3
Martha's Vineyard Airport
Aircraft Operations
Source: FAA ATADS

CY	Total Annual Ops	Total Peak Season Ops*	Peak Season % of Total Ops
2000	66,154	29,779	45.0%
2001	59,530	27,046	45.4%
2002	61,328	29,418	48.0%
2003	54,647	26,273	48.1%
2004	54,527	25,556	46.9%
2005	52,745	24,918	47.2%
2006	51,979	25,071	48.2%
2007	51,729	25,037	48.4%
2008	49,592	25,063	50.5%
2009	44,373	21,212	47.8%
2010	41,056	20,113	49.0%
2011	39,860	19,359	48.6%
2012	42,008	20,683	49.2%
2013	46,583	21,414	46.0%
Average			
2000-2013	51,151	24,353	47.7%

** Peak season = June, July, August*

Passenger data from the Steamship Authority, which provides year-round ferry service between Woods Hole and Vineyard Haven, shows similar strong summer peak characteristics: ferry passengers carried June through August 2013 represented 42.3% of total annual passengers.

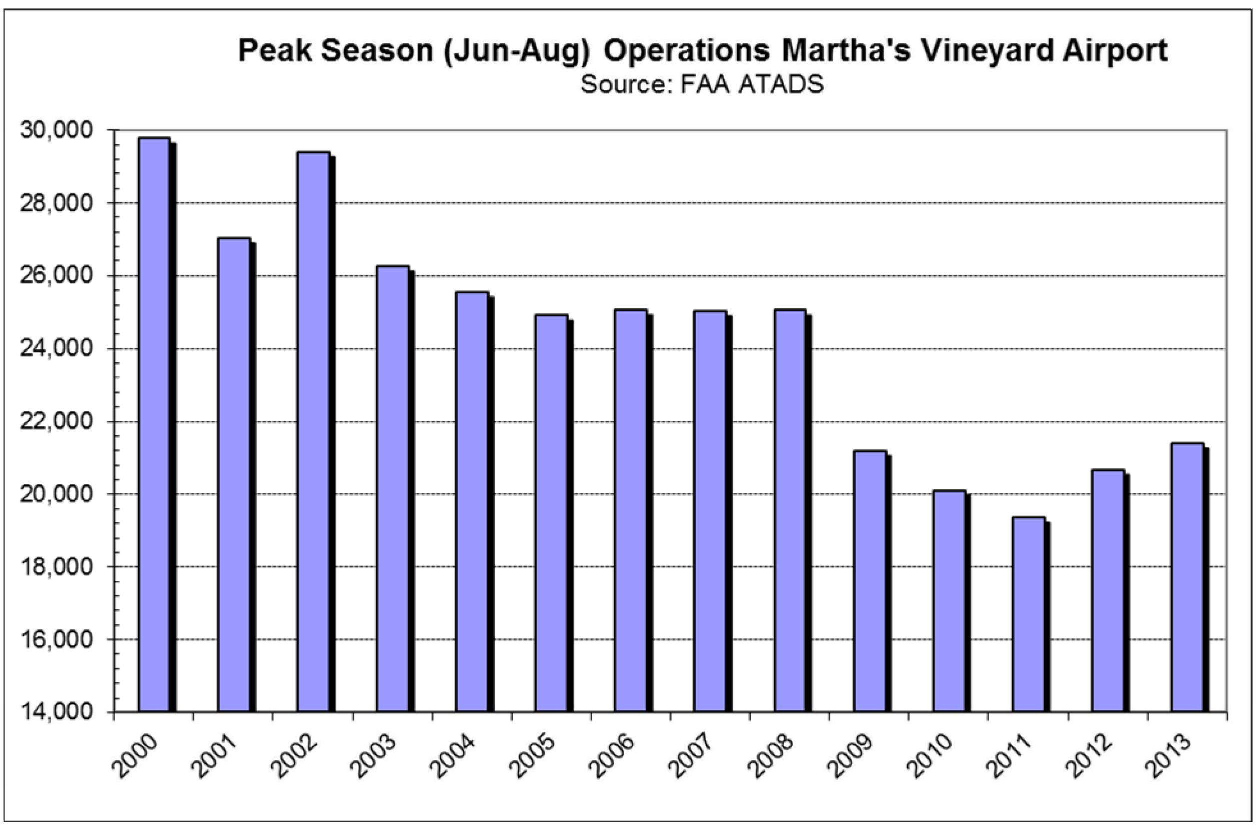
Similar to the trend in annual aircraft operations noted above, the number of peak season operations have also been declining steadily (Table 1.4 and Chart 1.3), although they have maintained the same percentage of total annual operations. The number of peak season operations declined by 28% between 2000 and 2013, although they recently experienced an increase of 2.3% between 2012 and 2013.

The overall decline in peak season aircraft operations is due to a combination of factors, including two economic recessions, the rising cost of air travel (both airline and general aviation), and competition from ferry services. By comparison, Steamship Authority ferry passenger traffic fluctuated within a narrow range between 2000 and 2013, particularly between 2003 and 2011, and did not experience the same decline as aircraft operations (Appendix 1).

Table 1.4
Martha's Vineyard Airport
Peak Season Aircraft Operations by Category (June – August)
Source: FAA Air Traffic Activity Data System (ATADS)

	Itinerant					Local			Total
CY	Air Carrier	Air Taxi	General Aviation	Military	Total Itinerant	Civil	Military	Total Local	Peak Season
2000	0	13,801	14,459	65	28,325	1,340	114	1,454	29,779
2001	18	12,371	13,911	66	26,366	628	52	680	27,046
2002	0	13,805	14,767	34	28,606	750	62	812	29,418
2003	2	13,887	11,984	61	25,934	312	27	339	26,273
2004	0	11,834	13,395	24	25,253	293	10	303	25,556
2005	2	12,299	12,130	35	24,466	436	16	452	24,918
2006	1	12,089	12,721	35	24,846	221	4	225	25,071
2007	24	12,146	12,168	76	24,414	546	77	623	25,037
2008	0	12,690	11,666	82	24,438	594	31	625	25,063
2009	0	11,702	8,826	175	20,703	455	54	509	21,212
2010	2	10,559	8,740	156	19,457	616	40	656	20,113
2011	462	9,106	9,126	132	18,826	512	21	533	19,359
2012	529	9,760	9,848	135	20,272	313	98	411	20,683
2013	799	10,588	9,448	105	20,940	392	82	474	21,414

Chart 1.3



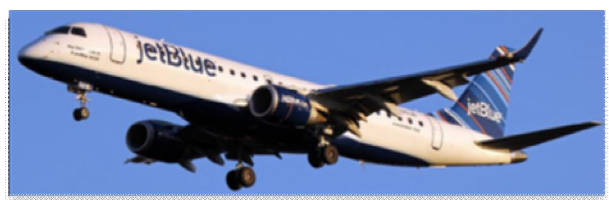
1.2.4 Airline Activity

Martha's Vineyard Airport is served by four scheduled passenger airlines:

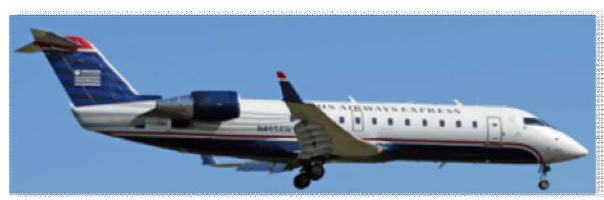
Cape Air – is owned by Hyannis Air Inc., which also owns Nantucket Airlines. Both carriers operate piston-engine Cessna 402 (B-I Type) aircraft with 9 passenger seats (photo). They operate under FAR Part 135 as certificated commuter carriers. From Martha's Vineyard, Cape Air provides year-round non-stop service to Boston Logan International, White Plains - Westchester County, New Bedford Regional, Barnstable Boardman-Polando Field, and Nantucket Memorial airports. Cape Air also provides seasonal service to Providence T.F. Green and Provincetown Municipal Airport. Cape Air has an interline agreement with JetBlue and operates from their gates in Terminal C at Boston Logan Airport, as well as at San Juan, PR. According to the U.S. Bureau of Transportation Statistics (BTS), Cape Air enplaned approximately 30,700 passengers at Martha's Vineyard Airport, which was approximately 62% of all scheduled passenger enplanements[2] (Chart 1.4, pg. 15). In addition to their Northeast hub, Cape Air is also based in San Juan, PR as well as Micronesia (Guam, Saipan).

Delta - service is provided by Pinnacle Airlines under contract to Delta, operating 50-seat Canadair CRJ-200 regional jets as Delta Connection. Pinnacle operates non-stop to JFK International Airport, NY, with seasonal service (May-September). According to BTS, Pinnacle enplaned approximately 3,500 passengers, or 7% of all scheduled passenger enplanements at MVY (Chart 1.4).

JetBlue – provides non-stop seasonal service (May-September) to JFK International Airport, NY, with 100-seat E190 regional jets (photo). JFK is the primary connecting hub for JetBlue. JetBlue enplaned approximately 13,690 passengers at Martha's Vineyard, or 14.2% of all passenger enplanements (Table 1.8 and Chart 1.4 on the following page). Because Cape Air is a code share partner with JetBlue, some of Cape Air's passengers connect with JetBlue at Logan Airport, effectively increasing JetBlue's market share at Martha's Vineyard.



American Airlines - service is provided by Air Wisconsin under contract as American Eagle, operating 50-seat Canadair CRJ-200 regional jets (photo). They provide seasonal service (June-September) to Ronald Reagan Washington National Airport, DC. Air Wisconsin (American Airlines) enplaned approximately 14,180 passenger enplanements at Martha's Vineyard Airport, or 14.7% of all scheduled passenger enplanements.



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2 An enplanement, as stated by the Federal Aviation Administration (FAA), is a paying ticketed passenger on a regularly scheduled flight departing from an airport.

Table 1.8
Martha's Vineyard Airport - Airline Market Share
Source: U.S. Bureau of Transportation Statistics (BTS), 2012

Airline	Total Passengers	Share
Cape Air	6,1430	63.5%
JetBlue	13,690	14.2%
Mesaba* (US Airways Express)	7,990	8.3%
Pinnacle (Delta Connection)	7,100	7.3%
Wisconsin (US Airways Express)	6,190	6.4%
Other	270	0.3%
Total	96,670	100.0%

*Mesaba absorbed by Pinnacle in Jan. 2012. Total passengers = enplaned + deplaned

Due to its seasonal economy the large majority of visitors to the Island, whether by air or ferry, are pleasure (discretionary) vs. business travelers. The number of passenger enplanements at Martha's Vineyard Airport declined between 2000 and 2008, but have been increasing between 2009-2013 (Table 1.9 and Chart 1.5 on the following page). On the relatively short-haul routes between Martha's Vineyard and Hyannis, New Bedford, and Nantucket, scheduled ferry service is the primary mode of competition due to lower fares (Table 1.10 pg. 16). However, there is no direct ferry service between Boston or Providence and Martha's Vineyard. Table 1.11 on pg. 16 provides a breakdown of passenger traffic to/from Martha's Vineyard by mode of transportation.

Chart 1.4

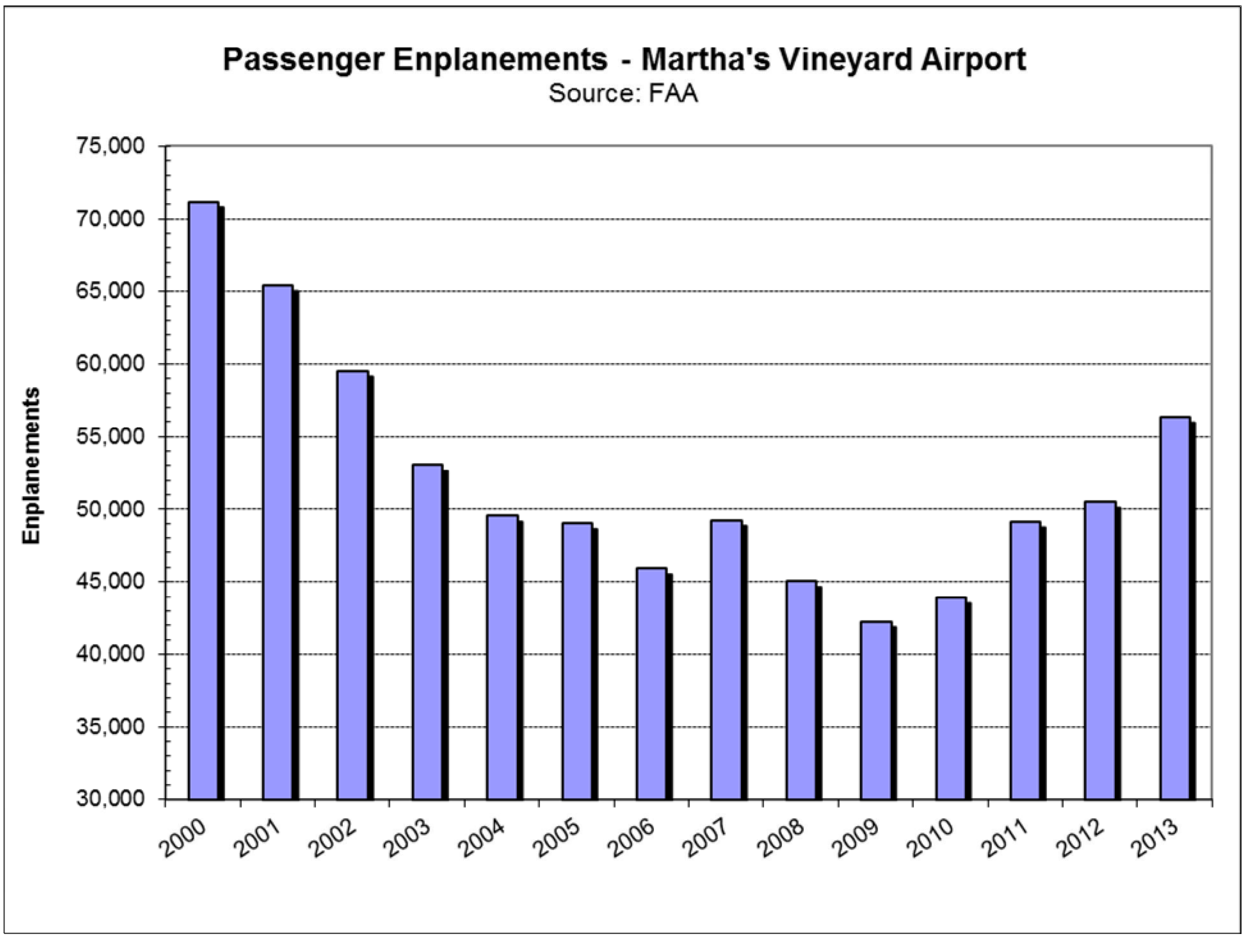


Table 1.9
Martha's Vineyard Airport – Passenger Enplanements
Source: FAA ACAIS

C.Y.	Passenger Enplanements
2000	71,150
2001	65,374
2002	59,500
2003	53,011
2004	49,480
2005	48,977
2006	45,881
2007	49,205
2008	45,002
2009	42,248
2010	43,904
2011	49,095
2012	50,484
2013	56,313

	% Change
2000-2005	-31.2%
2006-2013	22.7%
2010-2013	28.3%
2000-2013	-20.9%

Chart 1.5

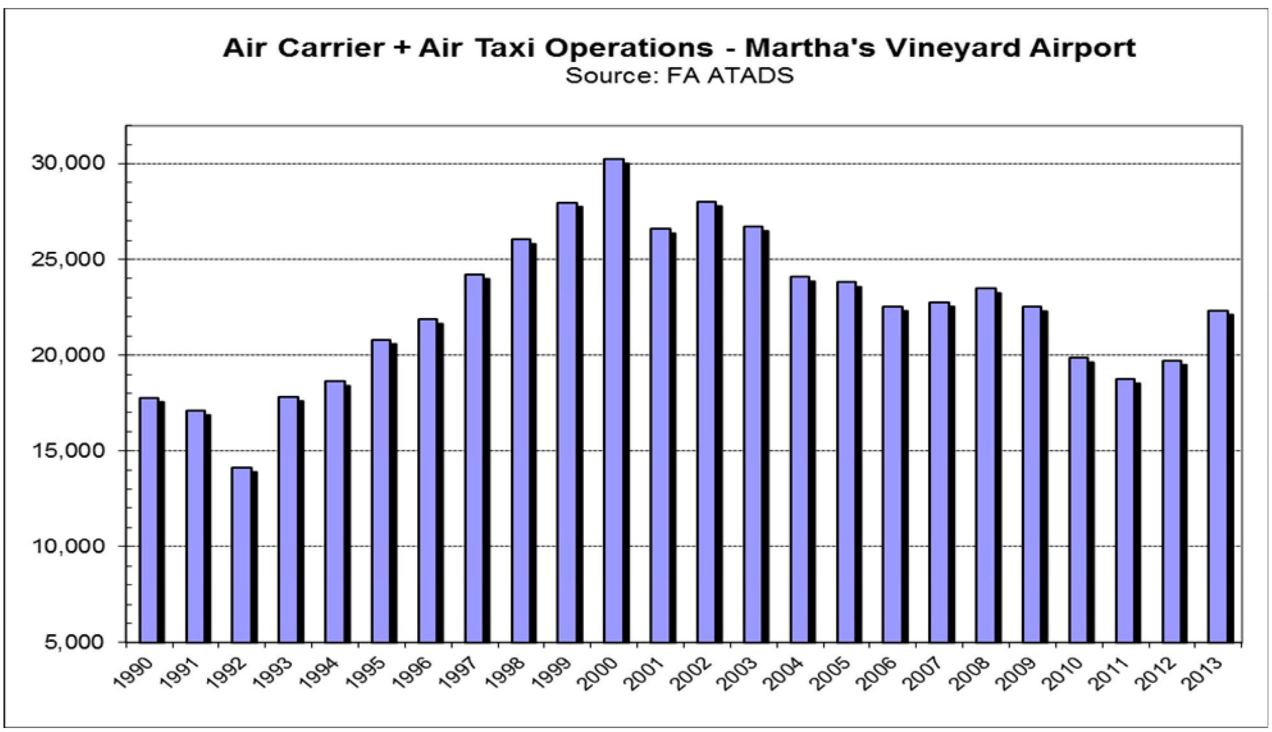


Table 1.10
Ferry and Air Service to Martha's Vineyard

	Fare (R.T.)	Trip Time (mins.)
Ferry (SSA Woods Hole-Vineyard Haven)	$16.00	45
Air (Cape Air HYA-MVY)	$95.00	18
Difference	$79	27

Sources: Steamship Authority and Cape Air. Fares are shown for single adult roundtrip unrestricted. Trip times in minutes, one way, scheduled.

Table 1.11
Martha's Vineyard - Passenger Traffic By Mode

	Ferry	Air	Total	% by Air
1990	1,957,546	238,896	2,196,442	10.9%
1995	2,382,102	297,082	2,679,184	11.1%
2000	2,573,026	344,156	2,917,182	11.8%
2005	2,365,920	259,294	2,625,214	9.9%
2010	2,393,185	191,654	2,584,839	7.4%
2011	2,189,530			
2012	2,244,441			
2013	2,263,708			

Note: Air passenger enplanements were doubled to represent outbound and inbound traffic similar to ferry passenger data. *Air passengers include both scheduled airline and general aviation*.

Percent Change

Period	Ferry	Air
1990-1995	21.7%	24.4%
1995-2000	8.0%	15.8%
2000-2005	-8.0%	-24.7%
2005-2010	1.2%	-26.1%
1990-2010	22.3%	-19.8%
2000-2010	-7.0%	-44.3%

One factor in terms of fluctuating air passenger traffic, particularly in relation to the competition from ferry service, has been increased airport passenger security screening since 9/11[3]. Shortly after 9/11 Congress created the Department of Homeland Security (DHS), and within DHS the Transportation Security Administration (TSA), which assumed responsibility for all airport security requirements.

Partly in response to congressional mandates the TSA implemented passenger security procedures that have resulted in extensive delays at airports across the U.S., as well as raised concerns about invasion of personal privacy. By contrast, other public transportation modes such as ferries, trains, and buses, as well as personal

[3] Source: Blalock, Garrick, et al. *The Impact of Post 9/11 Airport Security Measures on the Demand for Air Travel*, Cornell University School of Applied Economics and Management, Feb. 2005. "Our results indicate that baggage screening reduced originating passenger volume from all airports by five percent, and reduced originating passenger volume at the nation's fifty busiest airports by eight percent. In addition, we observe larger declines in passengers flying shorter trips, for which passengers are more likely to substitute driving for flying following the implementation of the new security procedures. Furthermore, we find that contemporaneous price changes cannot explain our results. These results suggest that regulatory efforts to enhance airport security, in response to the terrorist attacks of 9/11, had the unintended consequence of reducing the convenience of air travel, which in turn caused a decline in the demand for air travel."

vehicles, are not subject to similar screening procedures. That has resulted in a dramatic shift over short-haul routes (i.e. less than 500 miles) from airlines to other modes. That has had an impact on the split of passengers using ferry vs. air service to Martha's Vineyard and Nantucket.

One of the clearest examples has been the significant decline of what was formerly one of the largest origin and destination (O&D) airline passenger markets in the U.S. – the Northeast Shuttle. Starting in 1961, the shuttle had been operated by numerous airlines including Eastern, Pan Am, Delta, US Air, and Trump, among others, that offered high frequency flights between Boston, New York, and Washington DC. Since 9/11, however, a majority of air passengers in the Northeast Corridor have shifted to trains (Amtrak), buses, and private automobiles, in large part to avoid the delays and inconvenience of airport security. Post 9/11 airport security procedures have also greatly boosted corporate aircraft utilization, which is not subject to the same screening requirements, as well as benefitted ferry service to Martha's Vineyard and Nantucket.

According to the U.S. Bureau of Transportation Statistics (BTS), the top two air service markets from Martha's Vineyard Airport are Boston and New York. Hyannis (Barnstable Airport) is also a large market from Martha's Vineyard. Air passengers begin and end trips at those off-Island locations, as well as connect with other flights at Boston Logan and JFK International Airport, particularly passengers on Cape Air connecting with JetBlue at Logan Airport. In addition, some air passengers from MVY connect with various international carriers at both Logan and JFK Airports.

The non-stop destinations served from Martha's Vineyard Airport are shown in Table 1.12.

Table 1.12
Martha's Vineyard Airport - Non-Stop Destinations

• Boston Logan International (BOS)	Cape Air and JetBlue
• JFK International, NY (JFK)	Delta Connection & JetBlue
• White Plains-Westchester County Airport, NY (HPN)	Cape Air
• New Bedford Regional Airport, MA (EWB)	Cape Air
• Washington Reagan National (DCA)	American Airlines
• Barnstable Boardman-Polando Field, MA (HYA)	Cape Air
• Nantucket Memorial Airport, MA (ACK)	Cape Air
• Providence T.F. Green Airport, RI (PVD)	Cape Air
• Provincetown Municipal Airport, MA (PVC)	Cape Air

Passengers enplaning and deplaning at those airports fall within several categories: they begin and end their trip at those locations (i.e. origin and destination passengers); they drive to those locations from somewhere else; or they connect with another airline. Extensive surveys would need to be conducted to identify the true origin and destination of the air passengers using Martha's Vineyard Airport, but data from other visitor surveys indicate that most travelers begin and/or end their trip in the Northeast U.S.

Boston-Logan, JFK International, and Reagan National Airports are connecting hubs for Cape Air, JetBlue, Delta, and American Airlines respectively, and serve both O&D and connecting passengers to/ from Martha's Vineyard. Cape Air has an extensive route network throughout the Northeast (Figure 1.1 page 18). Boston Logan Airport serves as a de facto hub, although Cape Air specializes in point-to-point, origin and destination, high-frequency service throughout the Northeast. That route structure and service pattern is heavily dependent on operating relatively small, cost effective aircraft (Cessna 402). It is one of the few airlines in the world to use Cessna 402s. If Cape Air were to change its fleet, particularly to larger turbine powered aircraft, it is likely that its operating costs would increase and its route network and service patterns would change. Cape Air has given no indication that it will change its fleet in the near term, although factors such as the high cost of 100LL avgas, decreased availability of leaded avgas, or rising aircraft maintenance costs might prompt a fleet change. As noted previously, passenger and freight traffic to/from the Island is carried by two modes: water (primarily scheduled ferry) and air. The majority of the freight traffic is carried by ferry, due to the lower cost and relatively short trip time by ferry. Bypassing airport security and screening is another factor in ferry utilization.

Figure 1.1

1.2.5 Air Carrier Aircraft Operations

Air carrier (airline) aircraft operations (takeoffs and landings) are categorized and counted by FAA Air Traffic Controllers as either 'Air Carrier' or 'Air Taxi' based on the following FAA definitions:

- Air Carrier (AC): An aircraft with seating capacity of more than 60 seats or a maximum payload capacity of more than 18,000 pounds carrying passengers or cargo for hire or compensation. This includes JetBlue's E190, and as well as larger aircraft.

- Air Taxi (AT): An aircraft designed to have a maximum seating capacity of 60 seats or less, or a maximum payload capacity of 18,000 pounds or less, carrying passengers or cargo for hire or compensation. All of the 50-seat regional jets and Cape Air's Cessna 402s are classified by FAA as Air Taxi. In addition, some operators of corporate jets and turboprops fly under FAR Part 135 air taxi regulations and have a separate air taxi call sign, and are counted by ATC as air taxi. However, they operate the same type of aircraft and park on the same ramp as other GA (non-air taxi) aircraft (that operate under FAR Part 91). As a result, ATC traffic data combine both air carrier (regional jets and Cape Air) with certain GA passengers and aircraft operations.

Table 1.13
Martha's Vineyard Airport -
Total Air Carrier & Air Taxi Aircraft Operations

C.Y.	Air Carrier	Air Taxi	Total
1990	0	17,795	17,795
1991	3	17,122	17,125
1992	2	14,131	14,133
1993	4	17,839	17,843
1994	8	18,624	18,632
1995	2	20,831	20,833
1996	4	21,881	21,885
1997	6	24,231	24,237
1998	0	26,063	26,063
1999	4	28,004	28,008
2000	0	30,267	30,267
2001	24	26,589	26,613
2002	0	28,040	28,040
2003	2	26,734	26,736
2004	0	24,117	24,117
2005	9	23,822	23,831
2006	1	22,550	22,551
2007	61	22,727	22,788
2008	13	23,498	23,511
2009	63	22,473	22,536
2010	2	19,876	19,878
2011	525	18,224	18,749
2012	640	19,108	19,748
2013	963	21,395	22,358
% Change			
1990-2013	525.0%	20.2%	25.6%
2000-2013	525.0%	-29.3%	-26.1%
2010-2013	525.0%	7.6%	12.5%

Source: FAA ATADS

Almost all airline operations at Martha's Vineyard were counted by FAA ATC as 'air taxi' operations (Table 1.13). Air taxi also includes corporate jets and even some piston-engine aircraft operating under a FAR Part 135 certificate and with a specific call sign. The air taxi operations data does not distinguish between aircraft type.

While JetBlue's E190 operations were counted by ATC as 'air carrier', they represent a small percent of the total air carrier activity. The fluctuation in air carrier and air taxi aircraft operations between 1990 and 2013 is clearly illustrated in Table 1.13 and Chart 1.5 pg. 15).

Between 1990 and 2013 year-round Island population and employment increased steadily, so the fluctuations in air passengers were driven largely by seasonal visitor demand, the level of scheduled service provided (i.e. destinations served and frequency of service offered), as well as competition from ferry service. The increase in airline operations between 1993 and 2000 coincided with a period of strong overall economic growth both nationally and statewide, which stimulated both business and leisure travel demand.

Table 1.14
Martha's Vineyard Airport –
Peak Season (Jun-Aug) Air Carrier & Air Taxi Operations

Year	Air Carrier	Air Taxi	AC + AT Total	Peak Season % Annual
2000	0	13,801	13,801	45.0%
2001	18	12,371	12,389	45.4%
2002	0	13,805	13,805	48.0%
2003	2	13,887	13,889	48.1%
2004	0	11,834	11,834	46.9%
2005	2	12,299	12,301	47.2%
2006	1	12,089	12,090	48.2%
2007	24	12,146	12,170	48.4%
2008	0	12,690	12,690	50.5%
2009	0	11,702	11,702	47.8%
2010	2	10,559	10,561	49.0%
2011	462	9,106	9,568	48.6%
2012	529	9,760	10,289	49.2%
2013	799	10,588	11,387	46.0%

Period	Percent Change		
2000-2013	799.0%	-23.3%	-17.5%
2000-2005	200.0%	-10.9%	-10.9%
2006-2013	799.0%	-12.4%	-5.8%
2011-2013	72.9%	16.3%	19.0%

Note: relatively large percentage changes in air carrier operations generated by relatively small value changes.

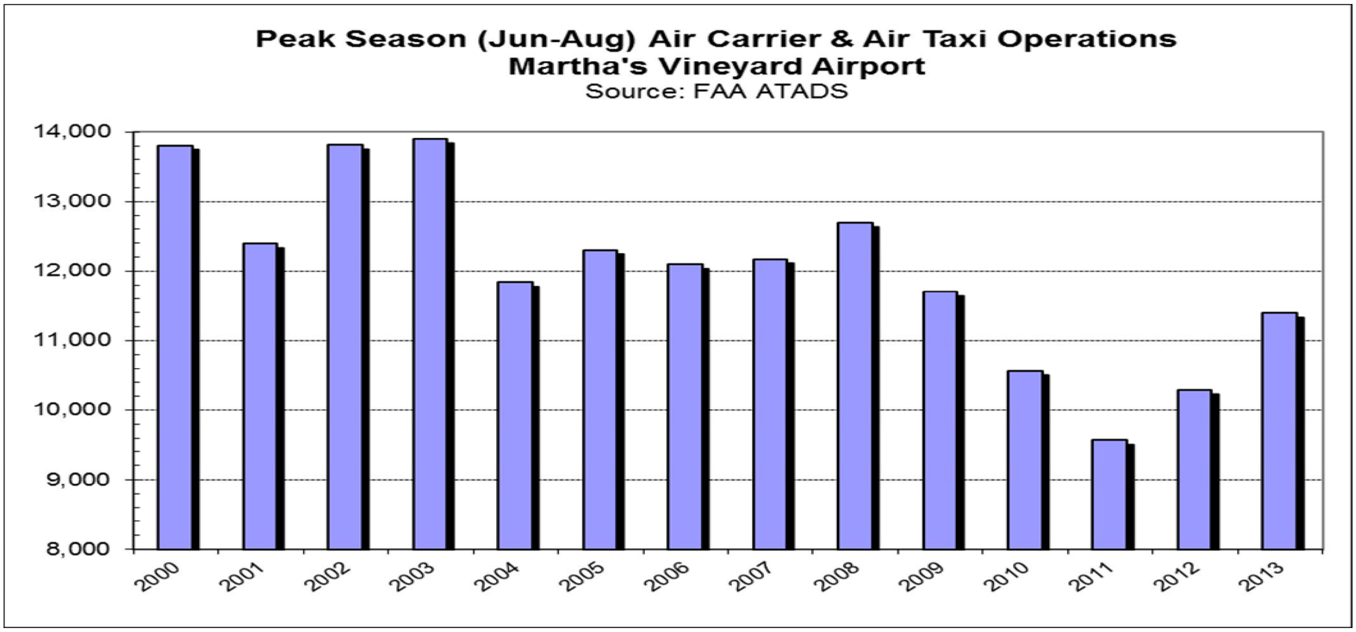
The decline in operations since 2001 coincides with national travel trends that resulted from the impact of the 9/11 attacks, as well as two economic recessions, particularly the latest one beginning in 2008 and ending 2010/2011.

Between 2000 and 2013, the number of passenger enplanements fluctuated more than air carrier and air taxi aircraft operations, in part because Cape Air continued to offer high-frequency service with their 9 passenger Cessna 402 aircraft throughout the period, even as enplanements fluctuated. Regional jet service, however, fluctuated over that period in terms of type of equipment, destinations served, and frequency of service.

The ratio of peak season (June-August) airline operations have remained near 50% of total annual airline operations since 2003 (Table 1.14), even though the actual number of peak season operations have declined over that period (Chart 1.6). By comparison, passengers on the Steamship Authority ferry service between Woods Hole and Vineyard Haven increased by approximately 3% between 2003 and 2013.

Peak season operations have increased by 19.0% from CY 2011 to 2013, which may be due to the improving economy as well as additional regional jet service by JetBlue.

Chart 1.6



1.2.6 General Aviation (GA) Aircraft Operations and Based Aircraft

General aviation encompasses a very broad spectrum of activity. It is defined as all aircraft activity other than airline or military. The National Business Aircraft Association (NBAA), which represents owners and operators of business and corporate aircraft, noted:

Business Aviation in Massachusetts provides the following economic benefits to the Bay State:

- General aviation in Massachusetts provides nearly 10,000 jobs in the state.
- General aviation contributes $641 per capita in annual economic contribution for a total of $4 billion.
- There are 39 general aviation airports and 6 commercial airports serving 12,458 pilots and 4,300 general aviation aircraft.
- Massachusetts is home to 22 charter flight companies, 58 repair stations, and 12 flight schools

In the early 1990s GA activity generated approximately 70% of total operations at MVY. Between 1990 and 2013 GA operations declined by approximately 44% (Tables 1.15, 1.16 and Chart 1.7). The share of GA operations has been holding steady at approximately 50% of total operations over the last decade.

Local operations (i.e. those conducted within the vicinity of the airport – primarily training touch and go operations) have declined by almost 68% since 1990. There is no flight school based at MVY, however, pilots training at flight schools elsewhere occasionally fly to MVY for practice. During peak season periods, particularly on weekends with good weather when traffic is heavy, conducting training operations such as touch and goes and practice instrument approaches, is challenging for pilots and air traffic controllers.

The number of based aircraft (mostly single-engine piston – Table 1.17), by contrast, increased until 2008 (Chart 1.8), and has since fluctuated within a fairly narrow range.

Table 1.15
Martha's Vineyard Airport –
General Aviation Aircraft Operations

C.Y.	Itinerant	Local	Total	GA as % of Total Ops
1990	31,944	10,200	42,144	69.5%
1991	34,863	10,472	45,335	71.5%
1992	29,393	13,479	42,872	74.1%
1993	28,469	11,834	40,303	68.4%
1994	28,013	5,972	33,985	63.8%
1995	27,255	6,002	33,257	61.0%
1996	26,901	4,630	31,531	58.6%
1997	29,907	4,661	34,568	58.4%
1998	31,191	3,923	35,114	57.1%
1999	32,298	4,994	37,292	56.7%
2000	31,077	4,421	35,498	53.7%
2001	29,474	2,990	32,464	54.5%
2002	30,261	2,659	32,920	53.7%
2003	25,838	1,778	27,616	50.5%
2004	28,541	1,598	30,139	55.3%
2005	26,492	2,152	28,644	54.3%
2006	28,030	1,187	29,217	56.2%
2007	26,366	2,218	28,584	55.3%
2008	23,775	1,947	25,722	51.9%
2009	20,000	1,396	21,396	48.2%
2010	19,126	1,610	20,736	50.5%
2011	19,136	1,617	20,753	52.1%
2012	20,350	1,254	21,604	51.4%
2013	21,460	2,199	23,659	50.7%

Source: FAA Air Traffic Activity Data System (ATADS)

Chart 1.7

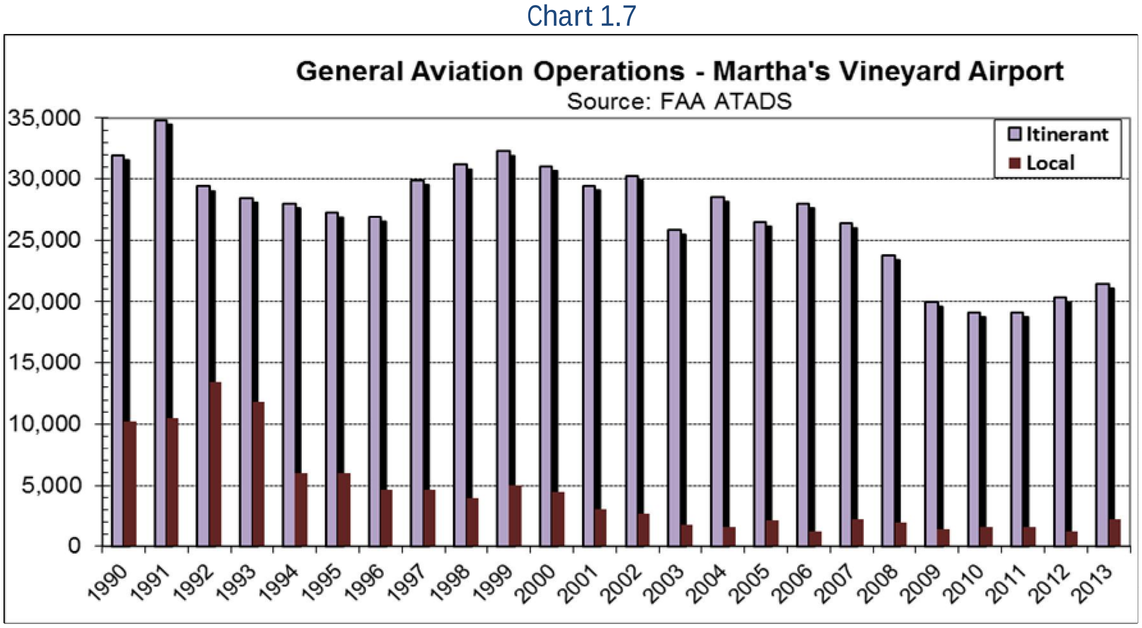
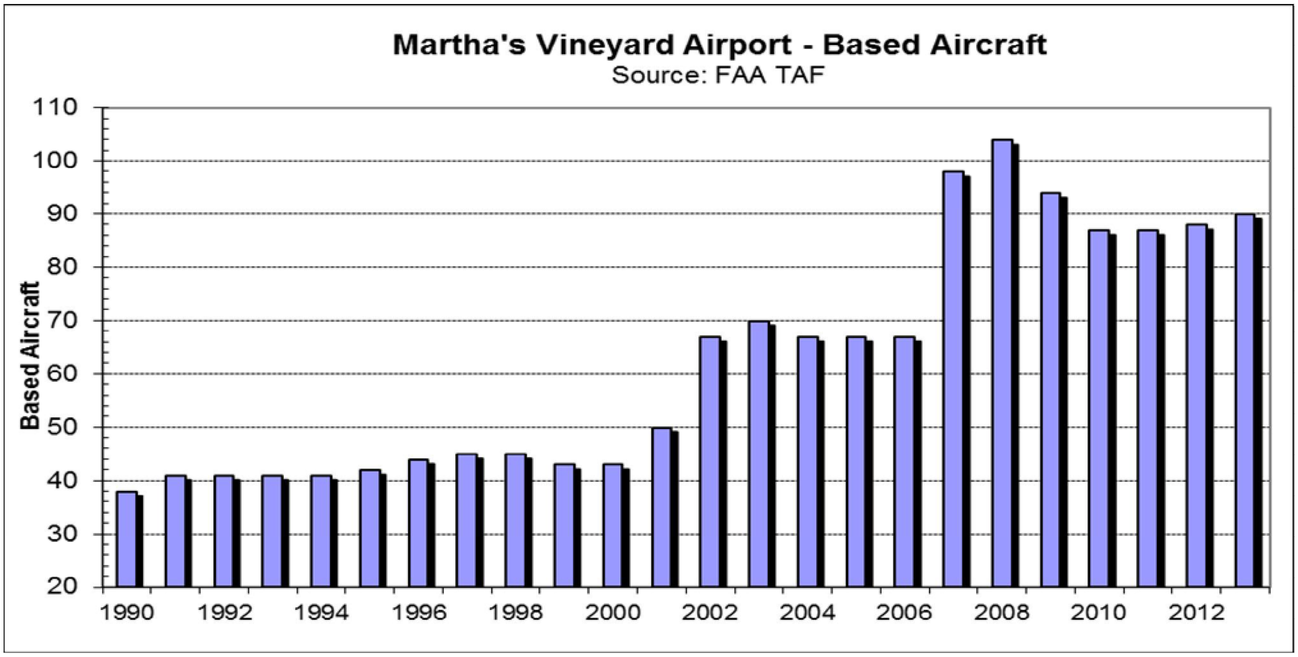


Table 1.17
Martha's Vineyard Airport – Based Aircraft 2012

Single Engine:	62
Multi Engine:	15
Jet:	0
TOTAL FIXED WING:	77
Helicopters:	1
Military:	0

Source: FAA Airport Master Record, Form 5010

Chart 1.8



1.2.7 Regional General Aviation Operations

By definition GA encompasses a very wide variety of aviation users, aircraft types, and missions, and they each respond to different market drivers. For example:

- Individual (vs. corporate or government) GA aircraft owners are relatively price sensitive, particularly when their primary mission is personal/recreational flying. Individual owners and pilots typically decrease their flying activity faster in response to rising prices than corporate or government operators;

- GA flight training activity fluctuates with changes in cost, as well as due to factors such as airline and military pilot hiring trends. Airline and military pilot recruiting has declined since the beginning of the recession in 2008. GA flight students are also price sensitive, and training activity fluctuates with the cost of rental aircraft and instruction. There is no flight school located on Martha's Vineyard Airport.

- Corporate aircraft are owned and operated by companies primarily for business purposes. FAA makes a distinction between corporate and business aviation; corporate aircraft are flown by professional pilots, while business aircraft are owner flown. Corporate aircraft are predominantly turbine powered – turboprops and jets, while business aircraft are primarily piston engine, with some turboprops (such as the Piper Meridian and TBM-700/850) and jets (Cessna CitationJet and Mustang, Eclipse, etc). Corporate aviation activity levels closely correlate with the performance of the stock market and corporate profits, which has relatively little impact on individual and government-owned airplanes;

- Government aircraft are owned and operated by a variety of federal, state, and local agencies, and are used primarily for public safety and security missions. For example, the Massachusetts State Police Air Wing operates five Eurocopter AS-355N Twinstars, which are twin-engine, multipurpose helicopters, for a variety of law enforcement and public safety missions. Their helicopters are based at Lawrence, Plymouth, and Westover Airports, and they operate at every airport in the Commonwealth including Martha's Vineyard. Government aircraft activity is directly affected by federal, state, and local budgets, which have little direct impact on corporate or individual aircraft operators;

- Public service/medical evacuation aircraft, such as Boston MedFlight, serve specific public safety missions, and are typically operated by hospitals or other non-profit medical organizations. Boston MedFlight is one of the largest non-profit medevac operators in New England, and operates two helicopters and a Cessna Citation, which are based at Plymouth, Hanscom and Lawrence Airports. Their aircraft operate at all of the airports in the Commonwealth including Martha's Vineyard. Their activity relies on financial support from the medical institutions that use their services, as well as insurance companies. Because Martha's Vineyard is an island, patients are more reliant on helicopter medevac to Boston than other communities in Massachusetts.

Individual airports have little or no control over those market drivers of GA activity, except for landing, tiedown, and storage fees, and to a certain extent fuel prices. Although Martha's Vineyard Airport sells both avgas and Jet A, the Airport has no control over the wholesale price of fuel, only the retail price, which needs to cover both the wholesale price as well as overhead costs. But local factors such as the restaurant in the terminal building, as well as convenient bus and taxi service to points around the Island, serve to attract a variety of GA users.

GA activity has also declined throughout Massachusetts, the six New England states, and the U.S. as a whole over that time period. Trends in GA operations at towered airports in both FAA's New England and Eastern Regions have shown steady declines (Table 1.18). Also, similar to trends at Martha's Vineyard Airport, local (i.e. training) operations decreased faster than itinerant operations.

A number of factors are attributed to the overall decline in GA activity regionally and nationally:

- Rising cost of GA aircraft ownership and operation: over the past 20 years the cost of new GA aircraft and parts have risen faster than the overall rate of inflation, as well as faster than the rate of income growth among the majority of households. In addition, the price of aviation gasoline (100LL avgas), as well as Jet A, has also outpaced the overall rate of inflation.

- The average age of GA aircraft is more than 40 years old. Such aircraft require increased maintenance, which increases operating costs, particularly as parts become scarcer.

- The airlines and military have reduced new pilot hires since the mid-2000s, and the experience and training requirements for airline pilots has increased. Fewer professional pilot opportunities results in fewer student starts, particularly among 20-30 year olds.

- The average age of GA pilots is almost 60, and the number of new student and private pilots has been declining steadily for more than a decade.

- Increased security regulations and procedures (such as temporary flight restrictions – TFRs), many instituted since 9/11, increase the complexity of operating GA aircraft.

Table 1.18
General Aviation Activity at Towered Airports – FAA Regions
Percent Change Between 2000-2011

	FAA New England Region (ANE)			FAA Eastern Region (AEA)			Both FAA Regions Combined		
Period	Local	Itin.	Total	Local	Itin.	Total	Local	Itin.	Total
2000-2005	-12.3%	-5.8%	-9.5%	-20.0%	-18.4%	-19.4%	-18.0%	-14.7%	-16.7%
2005-2010	-17.9%	-27.2%	-22.0%	-24.7%	-21.1%	-23.3%	-22.8%	-23.1%	-22.9%
2010-2011	-5.3%	1.1%	-2.7%	-4.8%	-2.2%	-3.8%	-5.0%	-1.2%	-3.4%
2000-2011	-31.8%	-30.7%	-31.3%	-42.6%	-37.1%	-40.5%	-39.8%	-35.2%	-37.9%

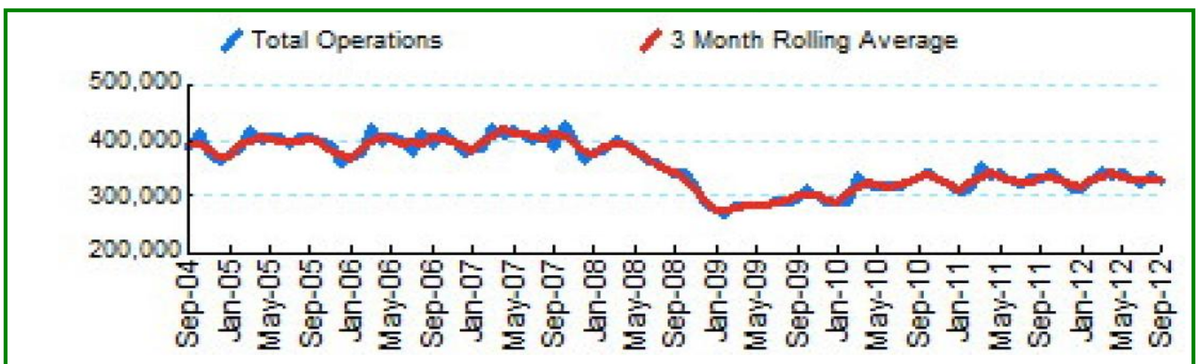
Source: FAA ATADS. Itin. = itinerant. FAA New England Region includes MA, RI, CT, NH, VT, ME. FAA Eastern Region includes NY, NJ, PA, DE, MD, DC, VA, W.VA. Data from towered airports only.

1.2.8 Corporate Aircraft Activity

Corporate flight activity (specifically corporate jets) was the fastest growing segment of the GA industry in terms of the value of new aircraft sold, fuel purchased, and flight hours from 2002 until 2008, at the outset of the latest recession. Combined with the public scrutiny of corporate aircraft activity (particularly the Congressional hearings on the auto industry bailouts in 2008), the recession caused a significant drop in all measures of corporate flight activity (new & used aircraft sales, fuel sales, hours flown, operations, etc.). That decline directly impacted fixed base operators (FBOs) and airports across the country in terms of revenue from the sale of Jet A fuel, as well as landing, parking, and hangar fees.

Nationally, business jet activity has rebounded since 2010, but has not yet returned to the levels generated pre-2008 (see Chart 1.9, Total Business Jet Operations). Similar trends have been experienced at Martha's Vineyard Airport (Table 1.19 and Chart 1.9).

Chart 1.9
Business Jet Operations – U.S. Total



Source: ETMSC
Note: Operations refer to arrivals and departures.

Business jet operations at MVY experienced similar trends that were seen nationally. While business jet activity has stabilized or increased since 2010, fuel sales have not rebounded to the same extent since more aircraft are 'tankering' fuel and not buying locally.

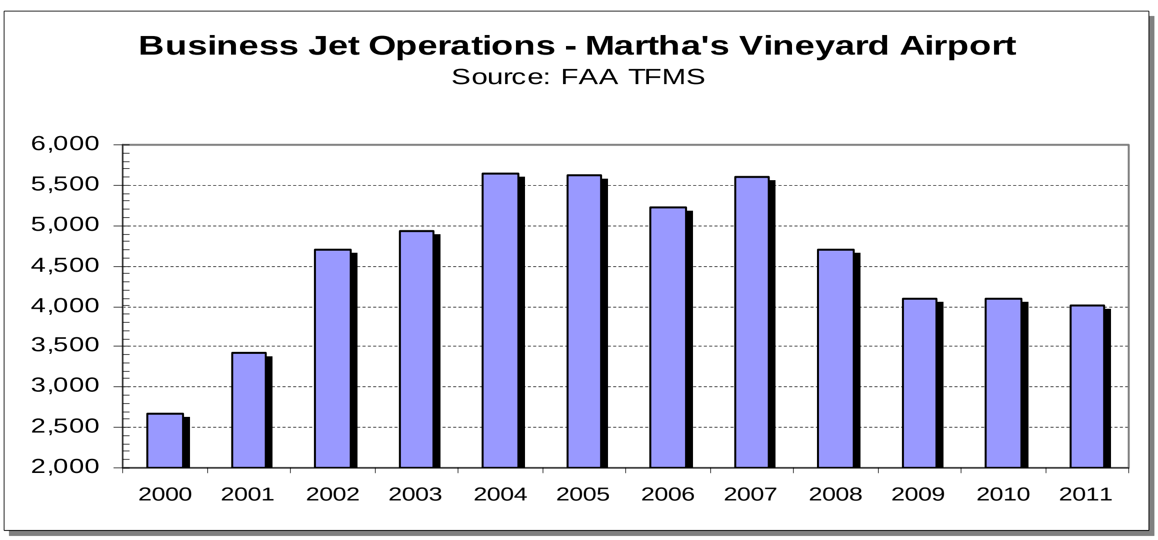
Business jet activity is closely tied to certain economic indicators, including the stock market performance and corporate profits, both of which have been rising since 2010/2011. Like Nantucket, most business jets operated at MVY are by second home owners and Island visitors, as opposed to business-related trips.

Table 1.19
Martha's Vineyard Airport - Business Jet Operations

Date	Departures	Arrivals	Total Operations
2000	1,327	1,351	2,678
2001	1,701	1,723	3,424
2002	2,324	2,377	4,701
2003	2,458	2,471	4,929
2004	2,810	2,830	5,640
2005	2,796	2,817	5,613
2006	2,587	2,637	5,224
2007	2,769	2,836	5,605
2008	2,337	2,365	4,702
2009	2,031	2,067	4,098
2010	2,042	2,061	4,103
2011	1,983	2,025	4,008
2012	2,111	2,129	4,240
2013	2,233	2,240	4,473

Source: FAA Traffic Flow Management System (TFMS)

Chart 1.10



Corporate Jets at Martha's Vineyard Airport

Source: Martha's Vineyard Airport

1.2.9 General Aviation Passenger Traffic

The Martha's Vineyard *Regional Transportation Plan – 2011 Update* estimated the number of passenger enplanements on general aviation (GA) aircraft (Table 1.12). There were between 70% to 100% more GA passengers than commercial (air carrier) enplanements. Although the average number of passenger enplanements per departure on a GA aircraft is significantly less than on a typical air carrier aircraft, the higher number of GA aircraft departures accounts for the difference.

The fact that the large majority of general aviation aircraft operations at MVY are transient vs. local (training) indicate that there is a higher average number of GA passenger enplanements per departure compared to other airports with a higher volume of training activity. At MVY the average number of enplanements (includes pilot & passengers) ranges between two to four per departure.

There is no single source of GA passenger enplanement data compiled by the FAA or the Airport – it is estimated based on the average number of enplanements per GA aircraft departure. The National Business Aircraft Association (NBAA) estimates that the average number of enplanements on corporate jets is 3 to 4 passengers, even though many corporate aircraft have seating capacities of 8 to 16 passengers. Coinciding with overall GA operations, the number of GA passenger and pilot enplanements has also been decreasing steadily since 2000.

Table 1.20
Martha's Vineyard Airport -
Passengers Departing by Air

Date	General Aviation	Commercial	Total
1970	-	-	33,550
1975	-	-	45,305
1980	-	-	58,540
1985	-	-	105,194
1990	-	-	119,448
1995	94,087	54,454	148,541
2000	100,125	71,953	172,078
2005	80,670	48,977	129,647
2006	82,104	45,381	127,485
2007	80,745	45,924	126,669
2008	72,766	40,892	113,658
2009	66,865	34,730	101,595
2010	59,087	36,740	95,827

Source: Martha's Vineyard Regional Transportation Plan – 2011 Update

1.2.10 Irregular Aircraft Operations (IROPS)

Irregular Aircraft Operations (IROPS) encompass a wide variety of unanticipated aircraft diversions, from mechanical difficulties, ill passengers or crew, to passenger rage, terrorist threats, and VIP visits. MVY has accommodated a variety of irregular operations (IROPS), from presidential and other VIP visits, to serving as a staging area for search and rescue operations, as well as diversions due to aircraft and passenger/pilot emergencies.

Figure 1.2
Presidential Helicopters & Support Aircraft at Martha's Vineyard Airport

Source: Martha's Vineyard Airport

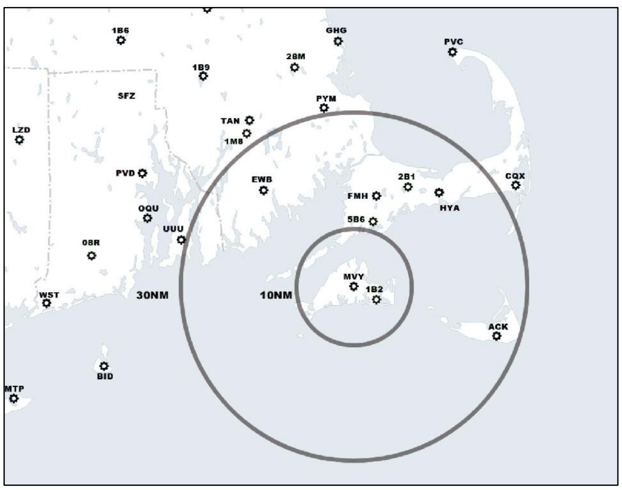
Although by their very nature IROPS are difficult to anticipate, VIP visits are typically announced/ planned in advance. However, one unique aspect about VIP activity at MVY is that they often last for a week or more, vs. the more typical relatively short VIP visits of one day or less. Both Presidents Clinton and Obama have vacationed on the Vineyard for one to two weeks. Their visits include a large number of support aircraft such as the Boeing C-17 transport (shown above), in addition to presidential aircraft and helicopters (Figure 1.2).

While many support aircraft fly into and station at MVY, Air Force One typically flies into Cape Cod CGAS (formerly Otis AFB), which is 17nm from MVY. VIP visits require significant airport support services, and also occupy a large portion of the airfield.

In addition to the extensive ramp area required for VIP helicopter and aircraft parking, designated "hot launch areas" are also required. Security prohibits the movement of other aircraft or personnel in the vicinity of VIP aircraft when they are transporting VIPs.

In addition, FAA imposes temporary flight restrictions (TFR) in the airspace surrounding MVY, effectively preventing most other aircraft from flying into, out of, or in the vicinity of the airport while the VIPs are on the Island (the TFR imposed for President Obama's visit in August 2011 is shown below and at right).

Figure 1.3
Temporary Flight Restriction (TFR) Area – August, 2011



A TFR will be in place over Martha's Vineyard from August 18th until August 27th. The actual times for activation of the TFR have not been determined so the FAA recommends that all aircraft operators check NOTAMs frequently for possible changes and updates to this TFR prior to operations within this region. The restrictions are designed to provide a safe and secure environment, but also ensure fair and equitable access to all airspace users, to the greatest extent possible. The restrictions will allow commercial flight operations to continue and are designed to minimize the impact on private pilots. The TFR reference point is located at 412335N/0703652W or the MVY VOR/DME from the surface up to but not including 18,000 MSL and will consist of a 30NM outer ring and a 10NM inner core.

Pursuant to Title 14, Section 91.141 of the Code of Federal Regulations, aircraft flight operations are prohibited except as specified below and/or unless authorized by ATC in consultation with the Air Traffic Security Coordinator (ATSC) via the Domestic Events Network (DEN).

A. All aircraft operations within the 10NMR area(s) listed above, known as the inner core(s), are prohibited except for:

1. Approved law enforcement, MEDEVAC/Air ambulance and military aircraft directly supporting the United States Secret Service (USSS) and the Office of the President of the United States.
2. Regularly scheduled commercial passenger and all-cargo carriers operating under one of the following TSA-approved standard security programs/procedures: Aircraft Operator Standard Security Program (AOSSP), Full All-Cargo Aircraft Operator Standard Security Program (FACAOSSP), and Twelve Five Standard Security Program (TFSSP) All Cargo and are arriving into and/or departing from 14 CFR Part 139 airports.
3. All other aircraft not operating under TSA-approved standard security programs listed above and arriving KMVY must be security screened at a designated gateway airport. Aircraft departing KMVY must be security screened at KMVY. Aircraft must register with the TSA for gateway access at least 24 hours prior to the planned flight. Operators are advised to register as soon as possible to avoid any potential delays.
4. All emergency/life saving flights (medical/law enforcement/firefighting) operations must coordinate with ATC prior to their departure at 508-968-7126 to avoid potential delays. This number will become active two hours prior to the activation of the TFR.
5. Other aircraft operations deemed appropriate by the United States Secret Service (USSS) and coordinated with the ATSC may be permitted.

B. All aircraft operations within the 10NMR to 30NMR area(s) listed above, know as the outer core(s), are prohibited except for:

1. Aircraft entering or exiting the outer ring must remain in two-way radio communications with ATC at all times. Aircraft must be on an active IFR or VFR flight plan with a discrete beacon code assigned by ATC. Aircraft must be squawking the discrete code at all times while in the TFR. Operations are limited to aircraft arriving or departing local airports, ATC may authorize transit operations with USSS

1.3 FAA Design Standards

As an airport that receives federal funding, MVY is required to meet FAA airport design standards to the extent practicable. The design standards that apply to facilities at MVY are based upon the most demanding airplane (or grouping of aircraft) that use the airport on a regular basis. Regular basis is defined as conducting 500 or more operations per year. This aircraft, or grouping of aircraft, is referred to as the critical design aircraft. Once the critical design aircraft has been identified, it can be used to select the appropriate Airplane Design Group (ADG), Runway Design Code (RDC), Taxiway Design Group (TDG) and the Airport Reference Code (ARC) which dictate safety clearances and other design standards. The critical design aircraft, ADG, RDC, TDG, and ARC are discussed in detail below.

1.3.1 Critical Design Aircraft

As noted above, the critical design aircraft is defined as the aircraft or grouping of aircraft that conduct a minimum of 500 operations per year at the airport. In August, 2012, Jacobs completed an on-site survey of aircraft operations at MVY. That period was selected because it captured peak-season traffic flows during a typical summer weekend. The weather during the survey period was visual flight rules (VFR). Jacobs personnel were situated in the control tower and all aircraft arrivals and departures were tracked including date and time of arrival and departure, aircraft type, and registration (N) number.

As shown in Table 1.21, almost 92% of aircraft operations were conducted by single and multi-engine piston airplanes (such as Cessna 172 and 182, Beech Bonanza, Piper Arrow and Lance, Beech Baron, Cessna 402), as well as small turboprops (such as the Beech King Air 200 and Pilatus PC-12). Jets such as the Cessna Citation II, Falcon 2000, G-IV and CRJ-200 made up the remainder of operations.

Table 1.21
Martha's Vineyard Airport –
Aircraft Operations by Type
Source: On-site survey conducted by Jacobs personnel
Aug. 24-27, 2012 (Weekend Survey)

ADG	Representative Aircraft	Operations	Percent
A-I	C-172, BE-36, PA-28, PA-46	265	31.6%
B-I	C-402, BE-100, PA-32, TBM-700	357	42.6%
B-II	BE-200, CE-560, CE-650, FA-50, FA-2000, PC-12	147	17.5%
C-I	LR-60, HS-125-700	6	0.7%
C-II	CRJ-200, CE-X, G-IV, CL-600	50	6.0%
C-III	E190	7	0.8%
D-I	LR-40	6	0.7%
Total		838	100.0%

ADG = Airplane Design Group (FAA classification based on wingspan, and tail height)

The high-frequency of scheduled operations by Cape Air with their Cessna 402 aircraft impacted the fleet mix. Annualizing the results of the survey indicates that several types of large corporate and regional jets generate sufficient activity to use as a composite grouping of aircraft for use as the critical design aircraft (Table 1.22 and Table 1.24). Therefore, the E-190 is used as the overall design aircraft for the airport.

The critical design aircraft are separated by runway as shown in Table 1-23.

Table 1.22
Martha's Vineyard Airport –
Estimated Annualized Operations by Airplane Design Group (ADG)

ADG	Representative Aircraft	Annual Operations	Percent
A-I	C-172, BE-36, PA-28, PA-46	12,596	31.6%
B-I	C-402, BE-100, PA-32, TBM-700	16,980	42.6%
B-II	BE-200, CE-560, CE-650, FA-50, FA-2000, PC-12	6,976	17.5%
C-I	LR-60, HS-125-700	279	0.7%
C-II	CRJ-200, CE-X, G-IV, CL-600	2,431	6.0%
C-III	E190, G-V	319	0.8%
D-I	LR-40	279	0.7%
Total		39,860	100.0%

Critical design aircraft = Embraer E-190
Note: Annual operations by ADG estimated based on survey conducted by Jacobs in August 2012
ADG = Airplane Design Group (FAA classification based on wingspan, and tail height)

Table 1.23
Runway Usage by Typical Aircraft

Runway 6-24	Runway 15-33
E190	Cessna 172
CRJ-200	Cessna 402
GV	Cessna Citation CJ2
	Pilatus PC-12

In addition to the onsite analysis prepared in 2012, Flight Aware data between September 2013-October 2014 confirmed that the prominent group of aircraft that utilize the airport is a class C-III Aircraft with a total of 670 operations. The following table summarizes the dominant aircraft that make up the C-III ADG determination.

Table 1.24
C-III Aircraft- September 2013-Oct 2014

Aircraft	Operations
E190	333
Cessna Citation X	182
GV	100
Gulfstream Global Express	33
Gulfstream Global Express 5000	16
Gulfstream G650	6

The critical design aircraft for MVY is based on the E190.

1.3.2 Runway Design Code (RDC)

For airport planning purposes, the FAA classifies aircraft based on wingspan and tail height. These classifications are dubbed Airplane Design Group (ADG) and Aircraft Approach Category (AAC) and are defined as shown in Tables 1.25 and 1.26, which, when combined determine the appropriate Runway Design Code (RDC).

Table 1.25
Airplane Design Group

Group #	Tail Height (ft)	Wingspan (ft)
I	<20	<49
II	20- <30	49 - <79
III	30 -<45	79 - <118
IV	45 - <60	118 - <171
V	60 - <66	171 - <214
I	66 - <80	214 - <262

Table 1.26
Aircraft Approach Categories

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

Source: FAA AC 150/5300-13A

The RDC for both Runway 6-24 and Runway 15-33 are based on a grouping of the most demanding aircraft to typically use each runway. For Runway 6-24 this equates to a RDC of C-III and for Runway 15-33, an RDC of B-II.

The RDC for Runway 6-24 is C-III and Runway 15-33 is B-II.

1.3.3 Airport Reference Code (ARC)

The Airport Reference Code (ARC) is a designation that signifies the airport's most demanding Runway Design Code. Each runway at MVY is designated with its own specific RDC. Runway 6-24 is C-III and Runway 15-33 is B-II based on unique characteristics, serving different operational needs and aircraft.

MVY is currently planned to C-III standards, as it signifies the airport's highest Runway Design Code.

1.3.4 Safety Areas

Airport safety areas are designed to protect arriving/departing aircraft and persons/property on the ground in the event an aircraft exits the runway unexpectedly. The safety areas are one element under the FAA's design criteria and are based on the design aircraft and type of approach for the particular runway. The following definitions provided by the FAA describe the various safety areas at MVY. The dimensions for each are provided in Table 1.27 on page 34.

Runway Safety Area (RSA) – is defined as an area surrounding the runway that is prepared or suitable for reducing the risk or damage to aircraft in the event of an overshoot, undershoot, or excursion from the runway. This area is designed to support the weight of emergency vehicles and equipment.

MVY currently meets the design standards for full Runway Safety Areas.

Runway Object Free Area (OFA) - a two-dimensional area surrounding the runway which must be clear of parked aircraft and objects other than those whose location is fixed by function. There is a fence and a roadway within the ROFA near the approach ends of Runway 6-24 on each end.

Options will be explored in subsequent chapters within this master plan to mitigate the objects located within the Runway 6-24 OFA.

Runway Protection Zone (RPZ) - an area on the ground used to enhance the protection of people and property near the runway approach. The FAA encourages airports to obtain control over the land within the RPZ either through ownership or avigation easements. MVY does not control all of the land within the RPZ's on Runway 6-24, and 33. Table 1.27 depicts the airports land ownership within each RPZ.

Table 1.27
Airport Land Within RPZ

Runway	Standard RPZ Area (acres)	Airport Owned (acres)	Difference (acres)
6	48.97	12.83	(36.14)
24	78.91	22.63	(56.28)
15	13.77	4.59	(9.18)
33	13.77	13.77	0

The airport should seek to acquire avigation easements over the land within each RPZ that it does not presently control to ensure compatible land use is maintained.

Runway Obstacle Free Zone (OFZ) - a defined volume of air-space centered above the runway which supports the transition between ground and airborne operations. The OFZ is required to be clear of obstacles for the protection of aircraft arriving or departing from the runway and for missed approaches. MVY serves large aircraft (aircraft weighing greater than 12,500lbs) and has a precision approach with an approach light system to Runway 24. Therefore the Inner-approach OFZ and the Precision Obstacle Free Zone (POFZ) criteria apply on Runway 24. Each of these surfaces is clear from obstacles at MVY.

The following sections describe the physical facilities at MVY.

1.4 Airport Facilities

Martha's Vineyard Airport encompasses 688 acres, and is comprised of a variety of facilities. The airport's facilities can be broadly categorized as airside and landside:

- Airside Facilities
  - Runways: 6-24 and 15-33, including safety areas
  - Taxiways
  - Aircraft parking aprons (transient parking)
  - Aircraft tiedown aprons (based aircraft)
  - Hangars
  - Navigation Aids (navaids)
- Landside Facilities
  - Terminal Building
  - Air Traffic Control Tower

- o Access Road
- o Automobile Parking
- o Industrial Park (buildings, access road, utilities)

Jacobs completed an on-site survey of the airport buildings in March 2013 (see Appendix 2 for the completed survey forms). As noted previously, airport management has completed a number of improvements to the airfield facilities since 2001 (listed below), in addition to performing routine, on-going airfield maintenance.

1. Shifted Runway 6-24 more than 300 feet to the northeast to construct FAA standard safety areas. Four FAA NAVAIDs were relocated as a result of the runway shift, including the glide slope antenna and equipment shelter, REILs, PAPIs, and approach lights;
2. Reconstructed Taxiway C (approximately 300' x 50');
3. Reconstructed the Terminal and Southwest aprons (approximately 1,850' x 260');
4. Reconstructed Taxiway A (approximately 2,600' x 50'); shifted T/W A 40' to south to meet FAA separation criteria of 400' from RW 6-24;
5. Replaced edge lighting system for Taxiway A and apron;
6. Installed new high mast lighting for apron;
7. Installed new tie-downs on general aviation ramp;
8. Installed pavement markings;
9. Installed raised electrical outlets for tie-downs;
10. Installed new duct bank (for future use) under reconstructed apron; and
11. An LPV instrument approach feasibility study for MVY. The study was prepared by Jacobs under contract to MassDOT.

The existing facilities are in good to excellent condition, which is consistent with FAA Sponsor Assurance #19, Operation and Maintenance: "The airport and all facilities which are necessary to serve the aeronautical users of the airport, other than facilities owned or controlled by the United States, shall be operated at all times in a safe and serviceable condition and in accordance with the minimum standards as may be required or prescribed by applicable Federal, state and local agencies for maintenance and operation. It (i.e. the Sponsor) will suitably operate and maintain the airport and all facilities thereon or connected therewith, with due regard to climatic and flood conditions."

1.4.1 Airside Facilities

This section provides an overview of the runways, taxiways, aircraft parking aprons, and aeronautical navigational aids at MVY. These facilities are commonly referred to as "airside" facilities.

1.4.1.1 Runways

Two runways are available for use at MVY. The runway characteristics are shown below in Table 1.28. The majority of aircraft operations occur on Runway 6-24 because it is the longest runway (5,504'), has a precision instrument landing system (ILS) approach, and is better aligned with the prevailing wind in the summer months when peak period operations occur. Runway 15-33 is the crosswind runway which extends in a northwest-southeast direction and is 3,328' long. Runway 15-33 provides pilots with non-precision instrument approach capability through an Area Navigation (RNAV/GPS) approach with LPV (Localizer Performance with Vertical Guidance) landing minima. Each of these approaches has circling minimums associated with them as well.

Each runway has a specific Runway Design Code (RDC) designation based on the most demanding grouping of aircraft that commonly use the runway. The RDC provides the information needed to determine the applicable

FAA airport design standards. As noted in Section 1.3.2, the RDC for Runway 6/24 is C-III and the RDC for Runway 15-33 is B-II.

The first 300' of pavement of Runway 24 was constructed in 2010 as part of the Runway 6-24 shift to achieve full Runway Safety Areas and is rated as "excellent" on the 2012 Pavement Inventory Plan. The remainder of the pavement on Runway 6-24 was last constructed in 1993 and is rated "good". Runway 15-33 is similar in that the majority of the pavement was constructed in 1992 and is in "good to fair" condition. An extension to Runway 33 that was completed in 2010 is rated as "excellent".

Access to the airport's runways is obtained through the use of an extensive taxiway system, which is described in Section 1.4.1.2.

Table 1.28 Runway Characteristics				
	Runways			
	6	24	15	33
Runway Design Code	C-III		B-II	
Length	5,504'		3,328'	
Width	100'		75'	
Pavement Condition	Good		Good	
Approach Aids*				
ILS	No	LOC/DME	No	No
PAPI	Yes	No	No	No
REILS	Yes	Yes	No	Yes
MALSR	No	Yes	No	No
Marking	Precision		Non-precision	
Lighting	High Intensity Edge Lighting		Medium Intensity Edge Lighting	
Touchdown Point	Yes, no lights		Yes, no lights	
Gross Weight Limitations	SW: 32,000 lb DW:45,000 lb		SW: 30,000lb	
AWOS/ASOS	ASOS			
RSA Dimensions Width	500'		150'	
RSA Dimensions Length Beyond RW End	1,000'		300'	
ROFA Dimensions Width	800'		500'	
ROFA Dimensions Length Beyond RW End	1,000'		300'	
RPZ Dimensions Inner Width	1,000'	1,000'	500'	
RPZ Dimensions Outer Width	1,510'	1,750'	700'	
RPZ Dimensions Length	1,700'	2,500'	1000'	

The length of Runway 15-33 should be further evaluated for its ability to accommodate all aircraft within RDG B-II.

1.4.1.2 Taxiways

The function of an airport's taxiways is to provide access from the terminal or aircraft parking areas to the runway system. The FAA standards for taxiways are formed around a classification of airplanes based on the outer to outer main gear width as well as the cockpit to main gear distance. This classification is referred to as the Taxiway Design Group (TDG). All taxiways at MVY are 50' wide with the exception of Taxiway 'E' which is only 35' wide. The largest aircraft that are expected to operate on Taxiway 'E' all fall within ADG II. The TDG for Taxiway 'E' is TDG-IA which is based on the main gear width of a Beechcraft King Air 100 which is representative of the grouping of aircraft currently using Taxiway 'E'. The TDG for all other taxiways is TDG-2 based on the E190.

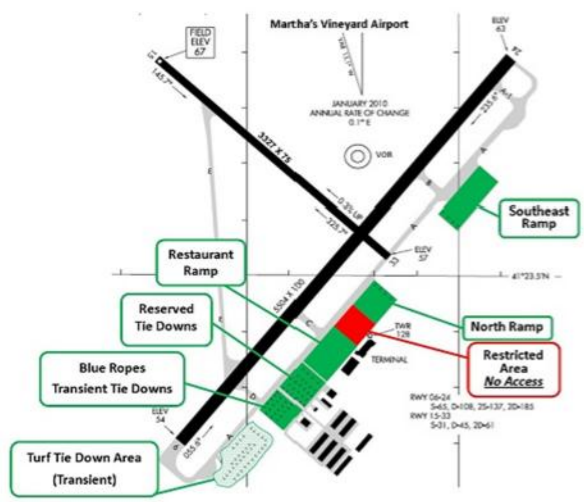
The taxiways at MVY meet the separation criteria for ADG III for runway to parallel taxiway separation of 400-feet (Runway 6-24 to parallel Taxiway 'A'), taxiway to fixed or movable objects of 65.5-feet, and Taxiway Object Free Area of 131-feet.

Runway 6-24 is served by a full parallel taxiway, Taxiway 'A'. Taxiway 'A' has 4 stub connector taxiways that afford access from the terminal area and aircraft parking aprons to Runway 6-24 at various points along the length of the runway. The positioning of the stub taxiways greatly reduces runway occupancy time. The taxiway and associated stub taxiways are all lit with Medium Intensity Taxiway Lights. Taxiway 'E' provides the only access to Runway 15, intersecting the runway approximately 700' from the end. An aircraft departing from Runway 15 must back-taxi approximately 700' from the intersection of Taxiway 'E' prior to reaching the departure end of runway. This creates a less than optimal situation for runway occupancy as well as runway safety.

Reconfiguring Taxiway 'E' should be further evaluated to obtain optimal runway access from the terminal area.

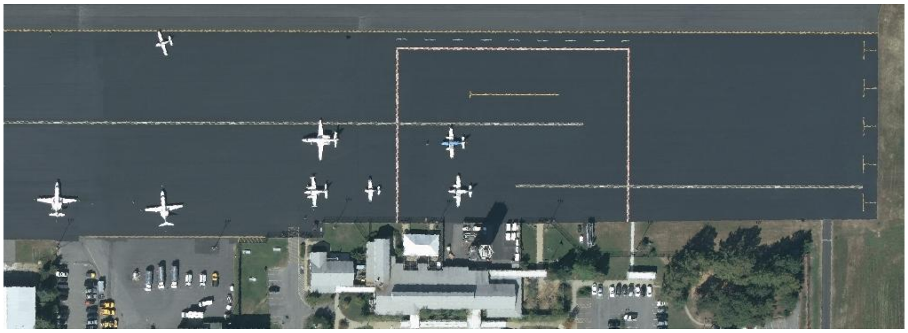
1.4.1.3 Aircraft Parking Aprons

There are four paved aprons designated for transient aircraft: the Southeast, North, Restaurant, and Transient ramps (see figures below). The transient aprons can accommodate large corporate aircraft up to Gulfstream G-550, Canadair Global Jet, regional jets such as the CRJ-200 and E190, as well as occasional larger aircraft (DC-9, C-17, BBJ/B-737-700). There are 72 marked aircraft tie-down spots.



The turf tie-down area, located southwest of Taxiway 'D' has 28 spots for transient aircraft. The aircraft that make use of these spots are typically ADG A/B-I in size. The transient (blue rope) tie-down ramp, northeast of Taxiway 'D', can accommodate 22 aircraft. The Southeast ramp (not shown), adjacent to Taxiway 'B' can accommodate a mix of GA aircraft and is not specifically marked.

The ramp in front of the terminal is divided into three sections: Restaurant Ramp, Terminal Ramp and North Ramp. The Restaurant ramp is not marked. The Terminal Ramp is delineated by a surface painted line marking the area as a Secure Identification Display Area (SIDA) where access is controlled. This area is used by the air carriers offering scheduled service to airports where passengers must undergo screening by the TSA (Transportation Security Administration). The area is sized to accommodate two EMB/CRJ size aircraft and several Cessna 402 aircraft.



The adjacent ramp to the northeast is considered the North Ramp. This ramp primarily accommodates the non-screened Cape Air flights and other general aviation aircraft that do not require TSA screening.

Airport management and the members of master plan Aviation working group have stated that the SIDA ramp needs to be expanded as well as additional aircraft parking options considered for non-screened general aviation aircraft.

1.4.1.4 NAVAIDs

There are several navigational aids (NAVAIDs) that assist pilots in navigating to and from MVY which are described below. Cape Approach/Departure Control provides separation from aircraft operating within the region for instrument approaches and departures as well as VFR flight following.

- Localizer (Runway 24), which provides horizontal guidance to pilots, is located 794' from the approach end of Runway 6. The localizer is associated with the ILS precision approach to Runway 24 and allows pilots to descend as low as 200' AGL (Above Ground Level) 263'MSL above the runway under poor weather conditions.
- Glide slope (Runway 24) provides vertical guidance to pilots using the ILS precision approach to Runway 24.
- Medium Intensity Approach Light System with runway alignment indicator lights (MALSR) provides visual guidance to Runway 24.
- PAPI (Precision Approach Path Indicator) provides a visual glide path for a 3 degree descent to Runway 6. The PAPI for Runway 6 is constructed of 4 lights and is mounted on the right side of Runway 6.
- A windsock on the airfield assists pilots in determining the wind direction and general wind speed at the airport.
- Airport beacon, located on top of the Air Traffic Control tower. At night and in poor weather conditions, the airport beacon is used to provide a visual aid to pilots to find the airport. The airport beacon at MVY uses alternating green and white flashing lenses which identifies it as a civilian airport.

- Runway 6-24 and Runway 33 are equipped with white high-intensity strobe Runway End Identifier Lights (REILs) located on either side of the approach end of each runway to assist the pilot in identifying the runway end.

1.4.2 Landside Facilities

The landside facilities at MVY consist of those structures and support elements that are not directly associated with the aircraft movement areas (airside). Examples of landside facilities include structures adjoining the airfield such as the terminal building, access roads, and automobile parking areas, airport perimeter fencing, utilities, aviation fuel farm, and aircraft hangars. The existing landside facilities are described in the following section.

1.4.2.1 Airport Terminal Building

The airport terminal building was built in 1998 and accommodates space for the airline ticketing area, airline offices, baggage and passenger screening, baggage claim, lobby, rental car counters, restaurant and restrooms. It is connected to the General Aviation building which houses the airport administration and operations offices, conference room, pilot lounge and fixed based operator area.

The main terminal building is under severe spatial constraints due to increased passenger activity and the associated TSA screening requirements since 2001. There is currently not enough waiting area during peak periods for arriving passengers who need to check in as the que often extends from the ticketing counter to the front of the building. In addition and perhaps more problematic, is the lack of space available for both passengers and their baggage when going through security screening. The terminal hold room and the baggage screening area are severely undersized to accommodate period demand.

The airport erects a temporary tent structure during the summer months from June through August to act as a waiting area for passengers that have gone through security screening. The passenger experience when traveling through MVY during peak periods is diminished due to the lack of cooling and ventilation as well as lack of adequate restroom facilities in the temporary tent once on the secure side of the terminal.

The terminal building configuration needs to be further analyzed to better accommodate the three months of seasonal peak period activity in terms of passenger waiting area and security screening.

1.4.2.2 Aircraft Storage Hangars

There are seven T-hangar buildings for based aircraft, with a total of 74 individual storage units. There are also four conventional hangars which are owned by the airport. Approximately 70% of the hangars are currently occupied. Building assessments of the hangars were conducted by Jacobs in March 2013 (Appendix 2). All of the buildings are in fair to good condition.

The airport has adequate aircraft hangar storage.

1.4.2.3 Airport Fuel Farm

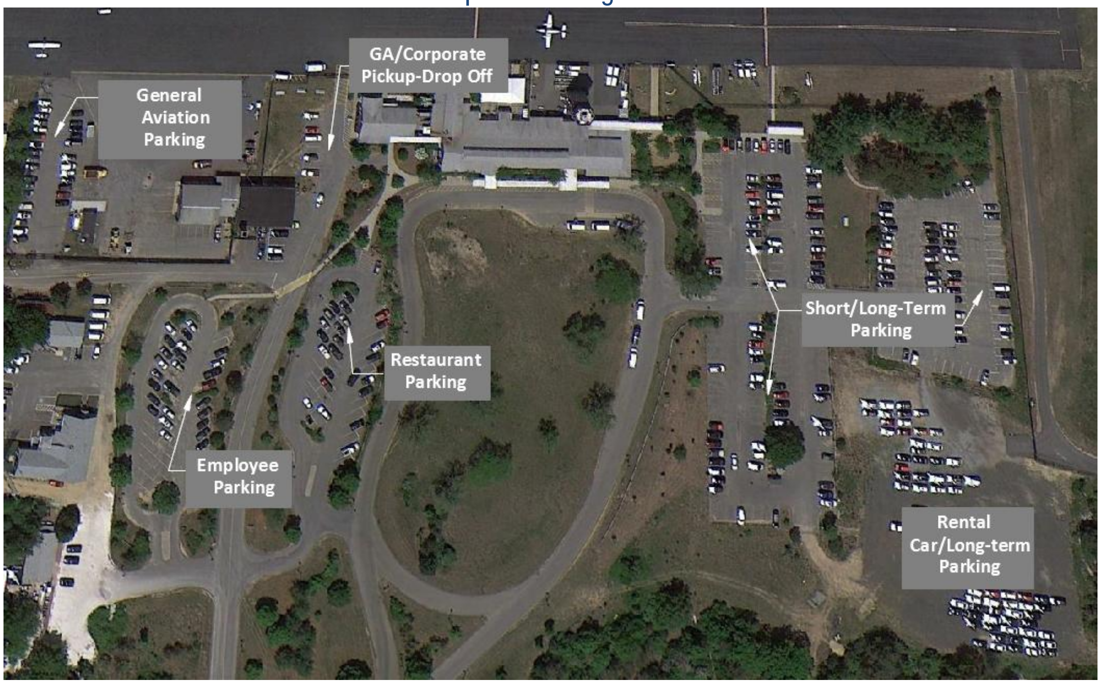
The airport fuel farm is comprised of a fenced in an area containing a small building which houses the fuel monitoring and reporting equipment as well as (3) 20,000 gallon aviation fuel storage tanks. Of the three fuel storage tanks, one tank contains 20,000 gallons of 100LL AVGAS while the other two tanks contain 20,000 gallons each of Jet A fuel.

The airport has adequate aircraft fuel storage capabilities.

1.4.2.4 Automobile Parking

The airport is served by several automobile parking lots (see Figure 1.4). The lots are referred to as Short/Long-term (226 spots), Rental Car/Long-term Parking (approximately 90 spots), Restaurant (39 spots), GA/Corporate (9 spots) and Employee Parking (5 spots). The airport charges $10 per calendar day ($50/week) for short and long-term parking. The airport utilizes an honor system with regard to collecting the parking fees. An envelope is left on the windshield of each vehicle and the envelope can then be deposited with payment in the collection box at the parking lot exit, mailed in, or paid in person in the General Aviation Terminal Building. The airport encourages travelers to use public transportation to and from the airport such as the Vineyard Regional Transit Authority's bus service or local taxi service.

Figure 1.4
Airport Parking Lots



1.5 Airspace

The FAA is responsible for managing the national airspace system and providing for the safe approach and departure for aircraft operating at MVY. The FAA utilizes an air traffic control tower (ATC) as well as protected airspace surfaces to try to ensure the safe and efficient flow of air traffic to and from the airport.

When the ATC tower at MVY is in operation, the airspace within a 4 nautical mile radius of the airport is classified as Class D airspace. Class D is controlled airspace, and it extends from the surface up to 2,600' above mean sea level (MSL). As noted previously, the ATC tower is not open continuously. Its hours of operation coincide with aircraft activity, and change seasonally. Even though Katama Airpark is situated just outside the edge of the Class D airspace, a number of aircraft that fly into Katama coordinate with Martha's Vineyard control tower.

When the control tower is closed, the airspace becomes Class G (i.e. uncontrolled), and ATC permission to operate in the area is only required if the local weather conditions are less than 3 statute miles visibility and/or the ceiling (cloud height) is less than 1,000' above the airport..

In an effort to reduce the risk of an aircraft collision with tall vegetation and/or manmade objects, the FAA requires airports to maintain a variety of protected airspace surfaces free and clear of obstructions. These protected surfaces extend outward and upward from the sides and ends of each runway end at various slopes. The surfaces are referred to as FAR Part 77 and TERPS and are in place to protect the visual and instrument approaches and departures at the airport. The airport is required to maintain the airspace surfaces described in CFR 14 FAR Part 77 whereas penetrations to the TERPS surfaces will have a negative impact to the existing as well as any future instrument approach procedures at MVY.

MVY has been proactive in ensuring that these surfaces are maintained to the best extent practicable. The current airport master record cites a clear 50:1 approach to Runway 24 and trees 14-feet above, 350-feet to the right, and 700-feet from the Runway 6 end. Tree obstructions are also noted to each end of Runway 15/33.

Planimetric mapping from a 2009 survey will be combined with new planimetric mapping obtained in October 2012 to determine the extent, if any, of obstructions to the FAR Part 77 protected airspace surfaces at MVY.

1.6 Drainage System Survey

Relevant storm water drainage system data was compiled for the airfield and landside parcels from existing plans, data and GZA's SPCC/Drainage Master Plan, 2012. Recently completed engineering as-builts were also collated and reviewed to determine potential gaps in drainage system data and to identify those portions of the drainage system which require additional survey. Figure 1-5 on the following page shows the airport's existing drainage system.

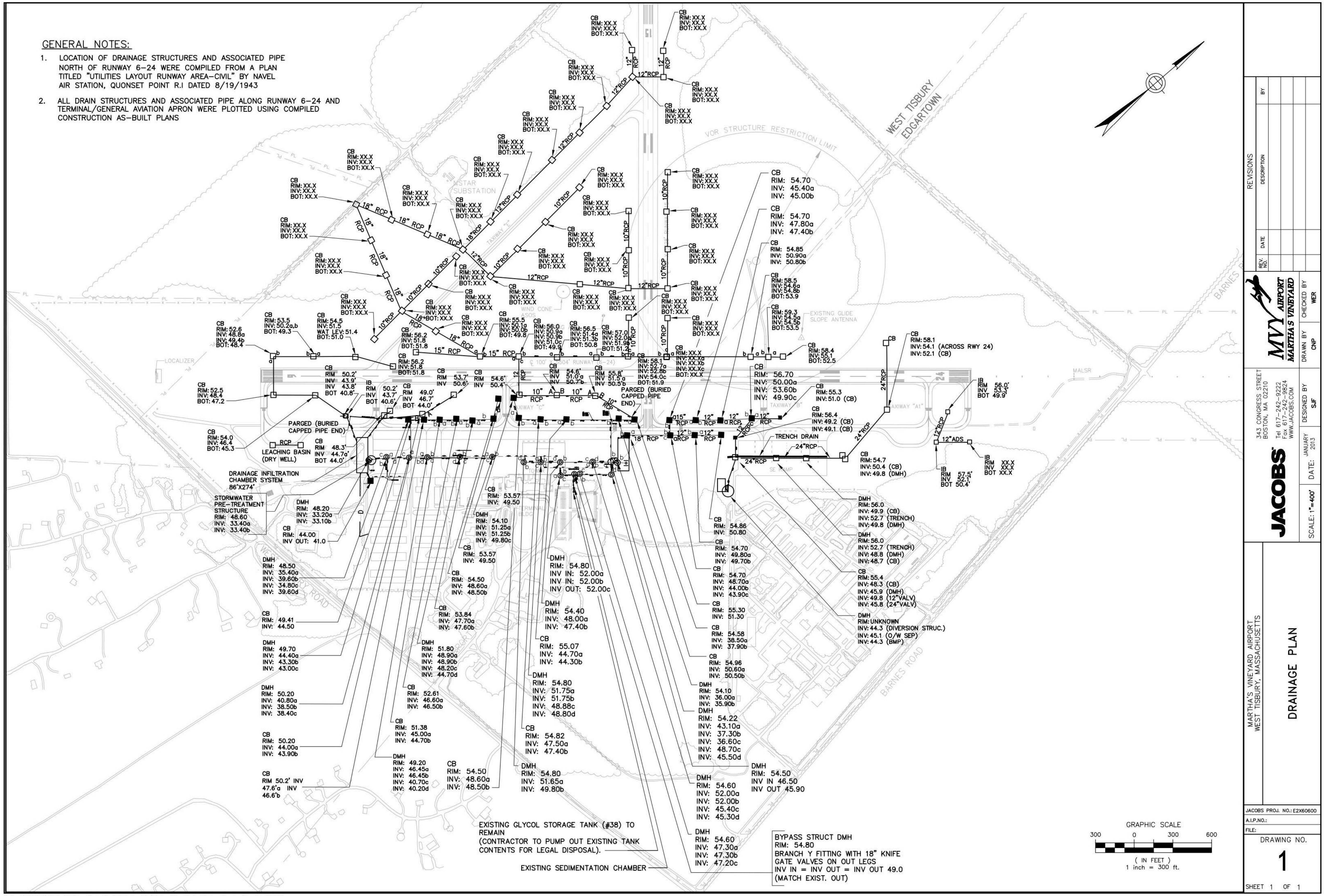
One of the most important aspects in assuring the life span of pavement sections is to provide positive drainage. Between 2009 and 2011 two major airfield improvement projects were completed. "Runway 6-24 Safety Area Improvements" and "Realign and Reconstruct Taxiway A-C/ Reconstruct Terminal and Southwest Apron". During the Runway 6-24 Safety Area Improvement project, the existing infield drain system was improved by either removing failing structures or constructing new structures.

While reconstructing and realigning Taxiway A from Runway 6 to Taxiway D, a new infiltration basin was added to the existing system and a discharge line was constructed across the new Taxiway A alignment to a detention pond. It was also observed after a couple of heavy rain storms that a re-graded area was not discharging water properly and beginning to flood a portion of the Runway 6 Holding Apron. This problem was corrected by setting two leaching basins (Dry wells) and connecting pipe between the two.

Airport representatives continued to monitor this area and found that storm water was draining properly and no longer flooding. While constructing a 303' extension to Runway 24, Taxiway A was also extended and a new infield area between the old alignment (Renamed Taxiway A1) and the new alignment (Ultimate Taxiway A) was formed, a new catch basin was set to drain pavement and infield storm water, this section was observed after numerous rain storms, the new drain system could not handle the flow and continuously had standing water and attracted wild life. This area was corrected by connecting a drain line to the existing drain structure on the other side of Taxiway A and terminating it in a newly constructed leaching basin. Again, Airport representatives continued to monitor the area and found that the additional pipe and structure adequately handled the water flow.

During the realignment and reconstruction of Taxiway A-C and the Terminal Apron, a new infield drainage system was constructed to accommodate the realigned and re-graded Taxiway sections. The reconstructed Terminal Apron and General Aviation Apron also had a new drainage system constructed consisting of a new main trunk line and associated drain structures, trench drains and two 330,000 gallon underground infiltration chambers on either end of the Apron. For more extensive information on storm water drainage, please refer to the Martha's Vineyard Airport Storm Water Pollution Prevention Plan (Appendix 3).

Figure 1.5 MVY Drainage Plan

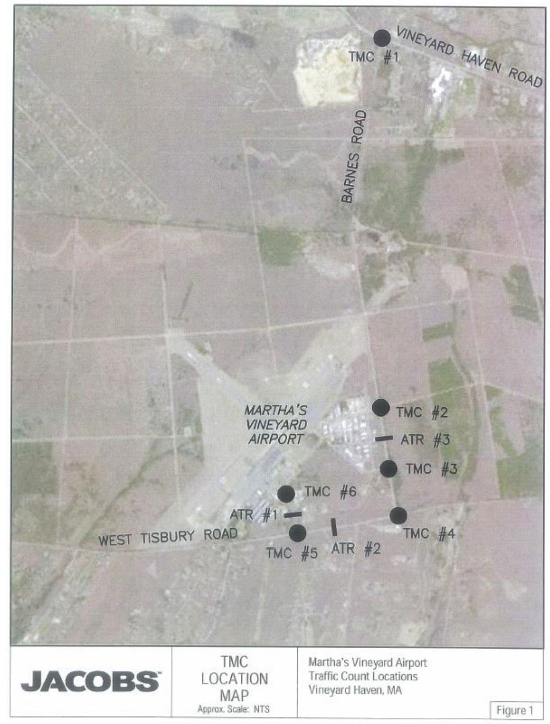


1.7 Automobile Access and Auto Traffic Impacts

A Traffic Impact and Analysis Study (TIAS) was prepared to determine the automobile traffic conditions at six locations in the Towns of West Tisbury, Edgartown and Oak Bluffs, Massachusetts, both under current and future conditions. The six locations are listed below, and shown graphically in Figure 1.6.

1. Barnes Road at Edgartown-Vineyard Haven Road
2. Barnes Road at North Business Park
3. Barnes Road at South Business Park
4. Barnes Road at Edgartown-West Tisbury Road
5. Edgartown-West Tisbury Road at Airport Road
6. Martha's Vineyard Airport main entrance

Figure 1.6



The first five locations are intersections that airport related traffic use to access the airport to and from dense areas such as Edgartown, Oak Bluffs and Vineyard Haven. The sixth location is the main entrance to the airport, which has several access points and approaches, which split direction into several roadways to serve drop-off, short-term parking lot and long term parking lot users. This location captures all user trips.

Two specific types of vehicle counts were conducted, including a manual turning movement count (TMC) and three automatic traffic recorder (ATR) count locations. The ATR counts provide longer data collection periods which complement the TMCs within the study, which collects the amount and direction of traffic along a segment of roadway. These locations include:

1. Airport Drive, north of West Tisbury Road
2. West Tisbury Drive, west of Coffins Field Road
3. Barnes Road, south of North Business Park

The first two locations provide the volume and direction of airport traffic. The third location helps to establish amounts of traffic between the two Business Park driveways at MVY.

1.7.1 Base Traffic Counts

For this analysis, each of the individual intersections peak hour traffic volume was used to present a worst case, conservative scenario. Base traffic volume conditions were established by conducting manual turning movement counts on August 16th and 18th. Peak period TMC were collected during weekday morning peak period (7:00 AM to 9:00 AM), weekday midday (11:00 AM to 1:00PM) and weekday evening peak period (4:00 PM to 6:00 PM). TMC was also conducted on Saturday during the same morning (7:00 AM to 9:00 AM), midday (11:00 AM to 1:00 PM) and evening (4:00 PM to 6:00 PM) times. The existing peak hour volumes are shown in Figures 2 through 6 in Appendix 4.

1.7.2 Existing Conditions Analysis

Level of Service (LOS) is a term used to denote different operating conditions that occur under various traffic volume loads. It is a qualitative measure of the effect of a number of factors including geometrics, speed, travel delay, freedom to maneuver, and safety. The LOS is divided into a range of six letter grades, ranging from A to F, with A being the best and F the worst. LOS E or F is generally considered inadequate traffic operations in suburban and urban areas. The full criteria used for the traffic analysis results determination can be found in Section D1 of Appendix 4.

The results of the traffic analysis are summarized below.

Area 1: Barnes Road at Edgartown-Vineyard Haven Road

The study reveals that this intersection suffers the most significant operating constraints out of the study areas. Compared to historical time frames, this intersection has grown 0.8% per year during weekday midday period and 1.5% annually during Saturday midday peak periods. The analysis states that "the growth rates are generally consistent with the growth rates experienced from the cape and the islands region of Massachusetts over this time period. Based on a review of the historical analysis, it appears that the delays at this intersection have been observed for an extended period."

During the week (M-F) the critical (eastbound) approach of the unsignalized intersection of Barnes Road at Edgartown-Vineyard Haven road operates at a Level of Service (LOS) F during the weekday morning, midday and evening peak hours, resulting in queues ranging from 168 feet to 331feet during these time periods. Saturday peak morning period, the road operates at LOS C, and at LOS F during the midday and evening peak hours.

Area 2: Barnes Road at North Business Park

The analysis reveals that both of the Business Park driveways operate at acceptable levels during the peak periods, with evidence by improved operating conditions (mostly at North Business Park) where the business park is more active during weekdays, which is predicted by the land use the roadways serve.

During the week, the critical (eastbound) approach of the unsignalized intersection of Barnes Road at North Business Park operates at a LOS C during the weekday morning and evening peak hours, and LOS D during the weekday midday peak hour resulting in queues ranging from 63 feet to 69 feet.

On Saturday, the critical (eastbound) approach of the unsignalized intersection of Barnes Road at North Business Park operates at a LOS B during the Saturday morning and evening peak hours and at LOS C during the Saturday midday peak hour, resulting in queues ranging from 8 feet to 32 feet.

Area 3: Barnes Road at South Business Park

During the week, the critical (eastbound) of the unsignalized intersection of Barnes Road at North Business Park operates at LOS B during the weekday morning, midday and evening peak hours, with queues ranging from 10 feet to 14 feet.

On Saturday, the critical (eastbound) approach of the unsignalized intersection of Barnes Road at North Business Park operates at a LOS B during the morning, midday and evening peak hours, with queues ranging from 4 feet to 12 feet.

Area 4: Barnes Road at Edgartown-West Tisbury Road

During the week, the critical (southbound) approach of the unsignalized intersection of Barnes Road at Edgartown-West Tisbury Road operates at a LOS F during the weekday morning, midday and evening peak hours with queues ranging from 377 feet to 890 feet.

On Saturday, the critical (southbound) approach of the unsignalized intersection of Barnes Road at Edgartown-West Tisbury Road operates at a LOS B during the morning peak hour, and a LOS F during midday and evening peak hours, with queues ranging from 46 feet to 735 feet.

It is noted in this report that the methodologies used do not account for the dynamic nature of motorist to adapt to roadway conditions, (such as motorists may use a shorter gap than those required for safe operations) which may result in the fact that the excessive delays during the weekday peak periods may not accurately reflect existing field conditions.

Area 5: Edgartown-West Tisbury Road at Airport Road

During the weekday, the critical (southbound) approach of the unsignalized intersection of Barnes Road at Edgartown-West Tisbury road operates at LOS C during the weekday morning peak hour, LOS F during the weekday midday peak hour and LOS E during the weekday evening hour, resulting in queues that range from 38 feet to 199 feet.

On Saturday, the critical (southbound) approach of the unsignalized intersection of Barnes Road at Edgartown-West Tisbury road operates at LOS B, during the morning peak hour, LOS F during midday peak hour and LOS C during evening peak hour, with queues ranging from 21 feet to 179 feet.

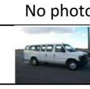
Area 6: Martha's Vineyard Airport main entrance

The results reveal that delays within the driveways MVY driveway network are not significant, as the critical (eastbound) approach operates at LOS A every peak hour, with maximum queues of 5 feet.

1.8 Airport Vehicle Inventory

The airport operates a number of pieces of equipment that are necessary to operate and maintain the airport in a safe and efficient manner. The airport is responsible for ensuring that the equipment is in good operating condition, and replaced when necessary. A listing of airport vehicles is provided in Table 1.29 below.

Table 1.29
Airport Vehicle Inventory

Model Year	Description	Make	Model	Airport Nickname	FY Purchased	Photo
2012	Dump Truck	Ford	F550	New Ops 2	2012	No photo
2011	Pickup Truck	Ford	F350	Big White Truck	2011	No photo
2011	Hybrid SUV	Ford	Escape Hybrid	Deb's Car	2011	No photo
2011	Pickup Truck	Ford	F350	Mango Tango	2010	
2011	Dump Truck (TW)	Freightliner	M2112V	Ops 4	2010	
2011	Dump Truck (TW)	Freightliner	M2112V	Ops 5	2010	
2011	Boarding Stairs	KCI	BAR3033FB	AIRSTAIRS	2011	No photo
2011	Snow Blower Truck	Kodiak	BR700D	Ops 7	2012	
2011	Snow Blower Truck	Kodiak	PP475S	Ops 6	2012	
2011	Plow	henke	for kodiak	Plow for Kodiak	2012	
2011	Plow	henke	for kodiak	Other plow	2012	No photo
2011	Plow	henke	for kodiak	ice scraper plow	2012	
2011	Sweeper		for kodiak	sweeper for Kodiak	2012	No photo
2011	Blower	Blower for Kodiak	for kodiak	blower	2012	No photo
2010	RTV Utility Vehicle	Kubota	RTV1140CP	Kubota 2	2010	
2010	RTV Utility Vehicle	Kubota	RTV1140CP	Kubota 3	2010	
2010	RTV Sander	Torwell	GM-1200P	RTV Sander	2010	No photo
2009	Van	Ford	E35SUP (ECOWAG)	VAN	2009	
2009	Trailer	Load Carhaul	-	New Trailer	2009	No photo
2009	RTV Utility Vehicle	Kubota	RTV1140CP	Kubota 1	2009	
2009	Mower	Toro	Z580D/72467	ZERO TURN 1	2009	
2009	Mower	Toro	Z580D/72467	ZERO TURN 2	2009	
2009	Jet Rueler	International Jet Refueler (5000 gallons)	International Model	CHILMARK	LEASE	
2009	Jet Rueler	International Jet Refueler (5000 gallons)	International Model	WASQUE	LEASE	
2008	Bobcat	Bobcat	S300	BOBCAT	2009	No photo
2008	GPU	Ground Power Unit by Hobart	JETEX5D	NEW GPU	2009	
2008	Tug	Lektro Aircraft Tug	AP8850SDA	TUG	2009	

Model Year	Description	Make	Model	Airport Nickname	FY Purchased	Photo
2008	Bobcat Attachment	Bobcat Brush Cutter Attachment	72" Brushcat Forestry Cutter	Bobcat Brush Cutter	2009	No photo
2008	Bobcat Attachment	Bobcat Bucket Attachment	74" Combination Bucket	Bobcat Bucket	2009	No photo
2008	Bobcat Attachment	Bobcat Mower Attachment	72" Rotary Cutter	Bobcat Mower	2009	No photo
2008	Bobcat Attachment	Bobcat Snow Pusher Attachment	94" Snow Pusher	Bobcat Snow Pusher	2009	
2007	Tractor	New Holland	T6050	NEW HOLLAND	2009	
2006	Utility Truck	Ford	F450	OPS 1	-	
2006	SUV	Ford	Expedition	ARFF MOBILE	-	
2006	Utility Truck	Ford	F450	WWTF TRUCK	-	
2006	Refueler Truck	Isuzu AvG Refueler (750 gallons)	Airport AvG Refueler	WEST CHOP	LEASE	
2005	Refueler Truck	International Jet Refueler (5000 gallons)	International Model	MENEMSHA	LEASE	
2004	De-Icer	De-Icer Vehicle	-	DEICER	2005	
2004	Refueler Truck	Isuzu AvG Refueler (750 gallons)	Airport AvG Refueler	AMITY	LEASE	
2003	Van	Ford	E35SUP (CUTVAN)	BUS	-	
2002	Trailer	Bray Utility Trailer	-	Old Trailer	-	No photo
2002	Fire Truck	E-One Titan Fire Truck	-	942	-	
2002	Fire Truck	KME Fire Truck	-	941	-	
2002	Tractor	Hurliman	H488	HURLIMAN	2002	
2002	GPU	Ground Power Unit by Hobart	60KJVA/60CU24P5	OLD GPU	2002	
2000	Dump Truck	Sterling	L8500	OPS 3	-	No photo
1999	Utility Truck	Ford	-	Old Ops 2	-	
1980	Loader	Clark Michigan	-	LOADER	-	

1.9 Airfield Pavement

MVY maintains approximately 2,650,000sq.ft.of pavement between runways, taxiways, and aircraft parking aprons. Jacobs prepared a pavement inventory plan in 2012 which provides a color coded depiction of airfield pavement based on the condition of various pavement sections (Figure 1.7 on the following page). The plan notes year of paving completion, AIP project number, pavement rating and proposed time of rehabilitation. The majority of the pavement at MVY is in excellent condition with several large paving projects having been recently completed as shown on Figure 1.7.

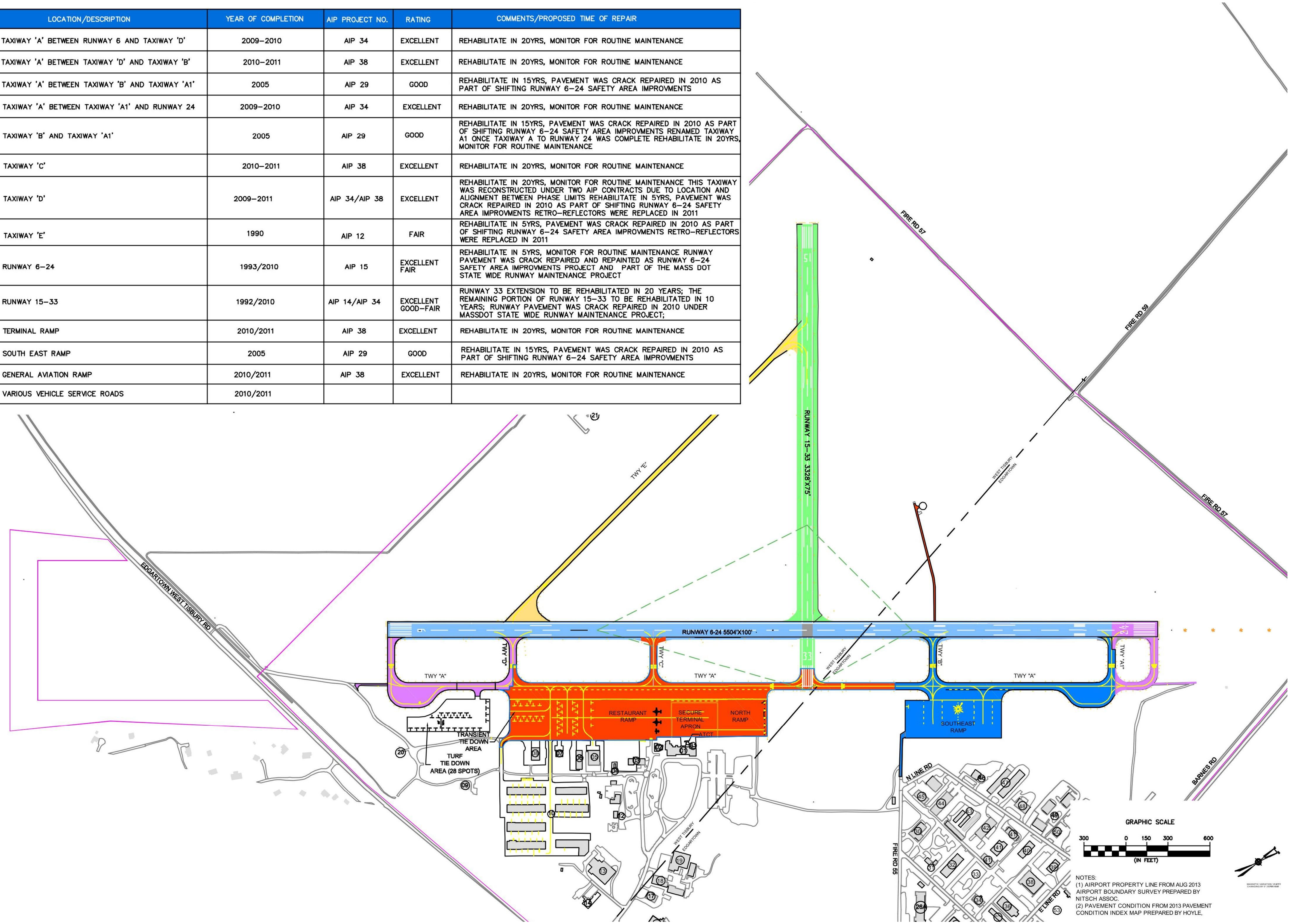
There are two areas of airfield pavement that will need rehab within the next 5 years. The first area encompasses Taxiway E. Taxiway E was last paved in 1980 and has exceeded the 20-year FAA design life. The taxiway was crack repaired in 2010 as part of the Runway 6-24 safety area improvements and is in need of rehabilitation. However, options for realigning Taxiway E are to be explored within this master plan in which case the existing pavement would be removed.

The second area to be considered for rehab is Runway 6-24 from Taxiway A to A1. This pavement was completed in 1993 and last crack repaired in 2010 as part of the Runway 6-24 safety area project.

This project should receive a higher priority over the Taxiway E rehab.

Figure 1.7
Pavement Inventory Plan

ITEM	LOCATION/DESCRIPTION	YEAR OF COMPLETION	AIP PROJECT NO.	RATING	COMMENTS/PROPOSED TIME OF REPAIR
	TAXIWAY 'A' BETWEEN RUNWAY 6 AND TAXIWAY 'D'	2009–2010	AIP 34	EXCELLENT	REHABILITATE IN 20YRS, MONITOR FOR ROUTINE MAINTENANCE
	TAXIWAY 'A' BETWEEN TAXIWAY 'D' AND TAXIWAY 'B'	2010–2011	AIP 38	EXCELLENT	REHABILITATE IN 20YRS, MONITOR FOR ROUTINE MAINTENANCE
	TAXIWAY 'A' BETWEEN TAXIWAY 'B' AND TAXIWAY 'A1'	2005	AIP 29	GOOD	REHABILITATE IN 15YRS, PAVEMENT WAS CRACK REPAIRED IN 2010 AS PART OF SHIFTING RUNWAY 6–24 SAFETY AREA IMPROVMENTS
	TAXIWAY 'A' BETWEEN TAXIWAY 'A1' AND RUNWAY 24	2009–2010	AIP 34	EXCELLENT	REHABILITATE IN 20YRS, MONITOR FOR ROUTINE MAINTENANCE
	TAXIWAY 'B' AND TAXIWAY 'A1'	2005	AIP 29	GOOD	REHABILITATE IN 15YRS, PAVEMENT WAS CRACK REPAIRED IN 2010 AS PART OF SHIFTING RUNWAY 6–24 SAFETY AREA IMPROVMENTS RENAMED TAXIWAY A1 ONCE TAXIWAY A TO RUNWAY 24 WAS COMPLETE REHABILITATE IN 20YRS, MONITOR FOR ROUTINE MAINTENANCE
	TAXIWAY 'C'	2010–2011	AIP 38	EXCELLENT	REHABILITATE IN 20YRS, MONITOR FOR ROUTINE MAINTENANCE
	TAXIWAY 'D'	2009–2011	AIP 34/AIP 38	EXCELLENT	REHABILITATE IN 20YRS, MONITOR FOR ROUTINE MAINTENANCE THIS TAXIWAY WAS RECONSTRUCTED UNDER TWO AIP CONTRACTS DUE TO LOCATION AND ALIGNMENT BETWEEN PHASE LIMITS REHABILITATE IN 5YRS, PAVEMENT WAS CRACK REPAIRED IN 2010 AS PART OF SHIFTING RUNWAY 6–24 SAFETY AREA IMPROVMENTS RETRO–REFLECTORS WERE REPLACED IN 2011
	TAXIWAY 'E'	1990	AIP 12	FAIR	REHABILITATE IN 5YRS, PAVEMENT WAS CRACK REPAIRED IN 2010 AS PART OF SHIFTING RUNWAY 6–24 SAFETY AREA IMPROVMENTS RETRO–REFLECTORS WERE REPLACED IN 2011
	RUNWAY 6–24	1993/2010	AIP 15	EXCELLENT FAIR	REHABILITATE IN 5YRS, MONITOR FOR ROUTINE MAINTENANCE RUNWAY PAVEMENT WAS CRACK REPAIRED AND REPAINTED AS RUNWAY 6–24 SAFETY AREA IMPROVMENTS PROJECT AND PART OF THE MASS DOT STATE WIDE RUNWAY MAINTENANCE PROJECT
	RUNWAY 15–33	1992/2010	AIP 14/AIP 34	EXCELLENT GOOD–FAIR	RUNWAY 33 EXTENSION TO BE REHABILITATED IN 20 YEARS; THE REMAINING PORTION OF RUNWAY 15–33 TO BE REHABILITATED IN 10 YEARS; RUNWAY PAVEMENT WAS CRACK REPAIRED IN 2010 UNDER MASSDOT STATE WIDE RUNWAY MAINTENANCE PROJECT;
	TERMINAL RAMP	2010/2011	AIP 38	EXCELLENT	REHABILITATE IN 20YRS, MONITOR FOR ROUTINE MAINTENANCE
	SOUTH EAST RAMP	2005	AIP 29	GOOD	REHABILITATE IN 15YRS, PAVEMENT WAS CRACK REPAIRED IN 2010 AS PART OF SHIFTING RUNWAY 6–24 SAFETY AREA IMPROVMENTS
	GENERAL AVIATION RAMP	2010/2011	AIP 38	EXCELLENT	REHABILITATE IN 20YRS, MONITOR FOR ROUTINE MAINTENANCE
	VARIOUS VEHICLE SERVICE ROADS	2010/2011			



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Chapter 2 - Existing Environmental Conditions

2.1 Introduction

This section describes the existing environmental conditions at MVY. Several special studies were prepared to supplement the general environmental overview normally associated with an airport master plan. These studies include:

- Noise Monitoring Study prepared by KM Chng;
- Automobile Traffic Movement Study prepared by Jacobs;
- Rare Species Habitat Survey prepared by GZA GeoEnvironmental;
- Archaeological Survey prepared by PAL.

A summary of the findings within each of these studies is included below. A copy of each of the studies mentioned above is included as an appendix within this master plan. In addition to the studies noted above, this section also identifies any known environmental conditions associated within each category of the National Environmental Policy Act (NEPA).

2.2 National Environmental Policy Act (NEPA) Categories

Airports are required under federal law (FAA Orders 5050.4B and 1050.1E) to evaluate the impact of proposed airport improvements on the environment. These FAA Orders define 18 different impact categories which must be addressed depending on the type of project proposed at the airport. The sections below identify any known impacts to each of the NEPA categories.

2.2.1 Air Quality

Through the requirements of the Clean Air Act [42 USC Sections 7409, 7410, and 7502-7514], the United States Environmental Protection Agency sets health standards for air quality in the United States. Data from ambient monitoring stations are used to ensure compliance with these standards and develop attainment plans for areas where the standards are not met. Regions of the US are designated as attaining these standards or not attaining these standards for six different pollutants, including ozone (O_3) carbon monoxide (CO), Nitrogen dioxide (NO_2), sulfur dioxide (SO_2) lead (Pb) and particulate matter of differing sizes (PM-10 and PM 2.5). The 2010 Report on Air Quality in New England indicates that Massachusetts is in nonattainment for Ozone for the 1 hour ozone standard.

FAA Order 5050.4A [Section 47(e)(5)(c)] determines airport activity thresholds that trigger air quality analysis for airport actions. For a General Aviation airport, if the proposed airport action would occur at an airport having a total of 180,000 general aviation and air taxi annual operations, an air quality analysis is required. Martha's Vineyard Airport does not exceed 180,000 total operations in a year and is therefore below the threshold for air quality analysis.

2.2.2 Coastal Resources

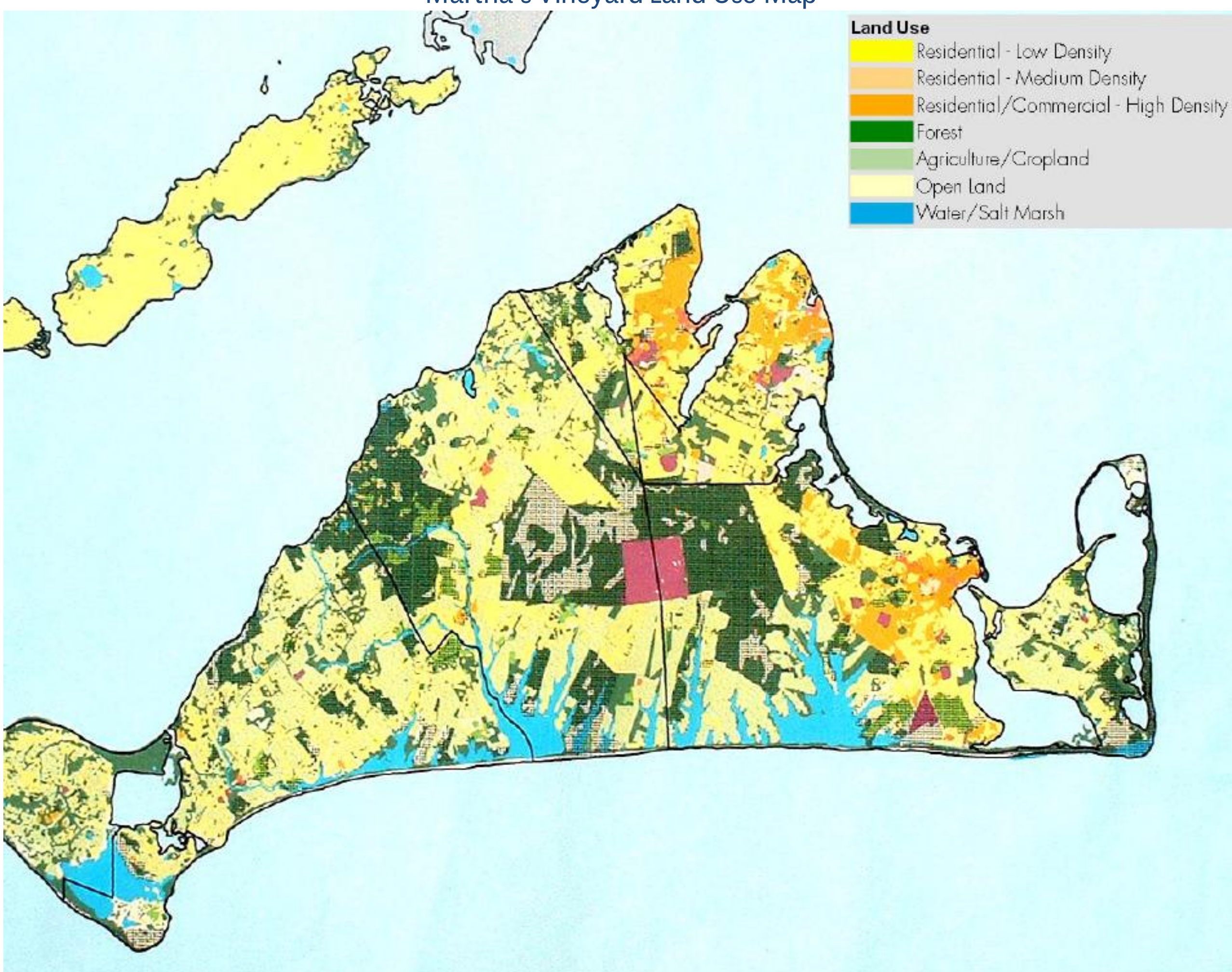
The entire island of Martha's Vineyard is located within the designated coastal zone for Massachusetts. This Master Plan was distributed to the Massachusetts Office of Coastal Zone Resources to ensure consistency with state standards and the Massachusetts coastal zone management plan. Due to its centralized location on the island, it is not anticipated that any of the Master Plan elements will be inconsistent with state standards nor will the projects have any effect on the Coastal Zone.

2.2.3 Compatible Land Uses and Zoning

The airport was originally constructed during World War II. Following the war, the land and aviation facilities were leased to the county for use as a public airport. In August 1959, the federal government, under the Federal Surplus Property Act of 1944, as amended, transferred all of its interests in the airport to the county for use as a public airport.

Within the airport property, there is an airport business park, airport water and waste water treatment facilities. The Airport business park accommodates many commercial and industrial land uses that are not compatible with the residential nature of other areas on the island. These uses – including propane tank distribution and storage, self-storage facilities, warehousing/distribution/trucking centers, among others – serve vital island needs in a setting well removed from the village centers and most residential neighborhoods. In return, the use of airport land for commercial purposes provides a source of revenue enabling it to develop financial stability and self-sufficiency. This revenue stream helps allow the airport to be financially independent of the county.

Figure 2.1
Martha's Vineyard Land Use Map



Source: Martha's Vineyard Transportation Plan (2011)

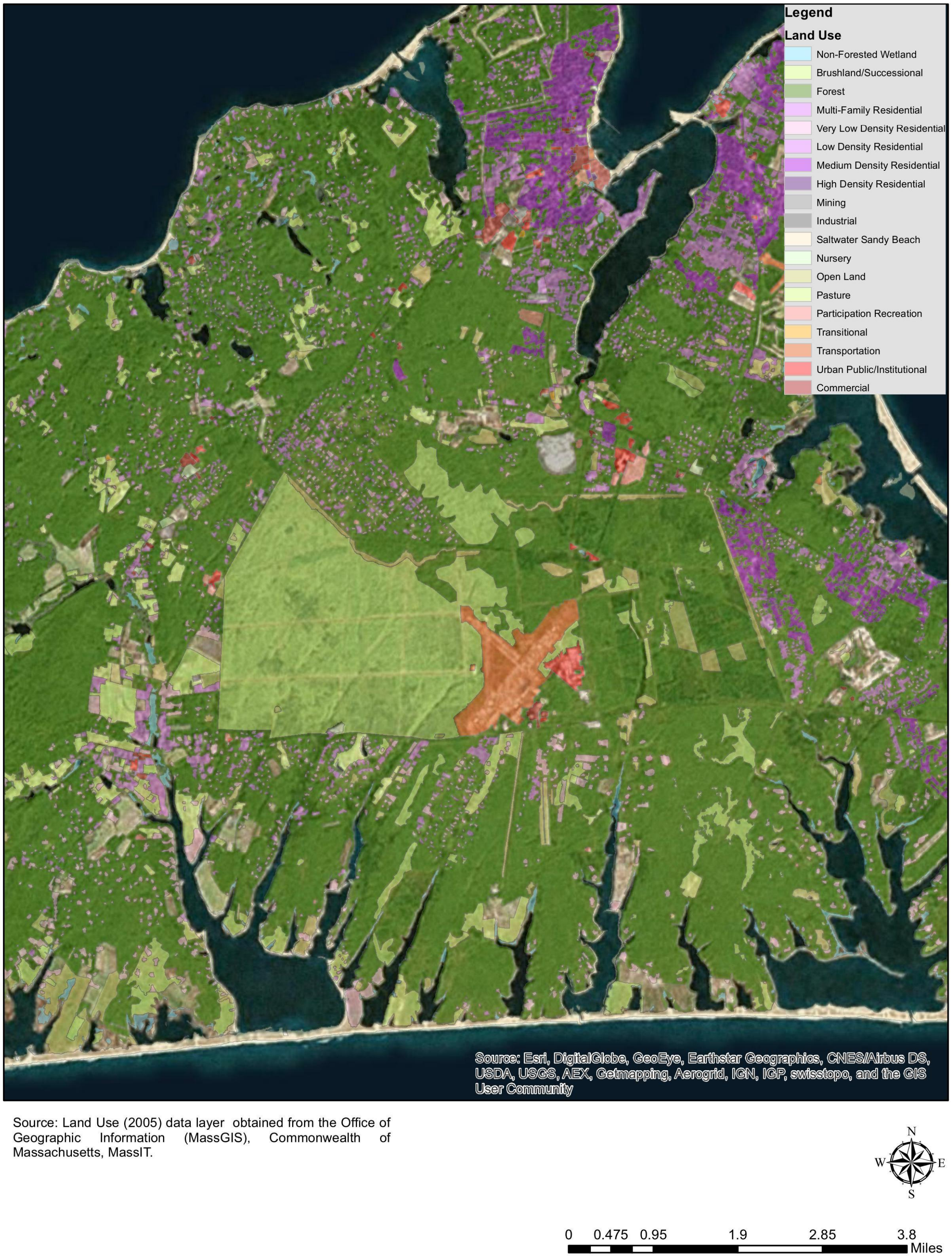
The permitted uses of land adjacent to an airport can have a significant effect on the type of aeronautical activity seen at the airport. High density residential areas, landfills, and libraries all tend to be incompatible with most types of aviation activity. Also, vegetative and man-made objects with extensive vertical development can have substantial adverse impacts on airport aeronautical activity if they are found to penetrate any of the protected airspace surfaces described previously.

According to the Martha's Vineyard Transportation Plan (2011), "33% of the land of the Vineyard is developed or is unbuildable (e.g. wetlands), 36% is protected open space, and 31% is "available" either for development or protection." Approximately within 1 mile radius of the airport, the majority of the land use to the north/northeast portion of the airport is primarily forested land. To the west/south west, the land uses vary, with a majority of land use ranging from residential, forest, and industrial use. A land use map depicting the land uses surrounding the airport is provided on the following page in Figure 2.2. Definitions of each type of land use are provided in Table 2.1, below.

Table 2.1
Land Use Definitions

Land Use Code	Land Use Description	Detailed Definition
2	Pasture	Fields and associated facilities (barns and other outbuildings) used for animal grazing and for the growing of grasses for hay.
3	Forest	Areas where tree canopy covers at least 50% of the land. Both coniferous and deciduous forests belong to this class.
4	Non-Forested Wetland	DEP Wetlands (1:12,000) WETCODEs 4, 7, 8, 12, 23, 18, 20, and 21.
5	Mining	Includes sand and gravel pits, mines and quarries. The boundaries extend to the edges of the site's activities, including on-site machinery, parking lots, roads and buildings.
6	Open Land	Vacant land, idle agriculture, rock outcrops, and barren areas. Vacant land is not maintained for any evident purpose and it does not support large plant growth.
7	Participation Recreation	Facilities used by the public for active recreation. Includes ball fields, tennis courts, basketball courts, athletic tracks, ski areas, playgrounds, and bike paths plus associated parking lots. Primary and secondary school recreational facilities are in this category, but university stadiums and arenas are considered Spectator Recreation. Recreation facilities not open to the public such as those belonging to private residences are mostly labeled with the associated residential land use class not participation recreation. However, some private facilities may also be mapped.
10	Multi-Family Residential	Duplexes (usually with two front doors, two entrance pathways, and sometimes two driveways), apartment buildings, condominium complexes, including buildings and maintained lawns. Note: This category was difficult to assess via photo interpretation, particularly in highly urban areas.
11	High Density Residential	Housing on smaller than 1/4 acre lots. See notes below for details on Residential interpretation.
12	Medium Density Residential	Housing on 1/4 - 1/2 acre lots. See notes below for details on Residential interpretation.
13	Low Density Residential	Housing on 1/2 - 1 acre lots. See notes below for details on Residential interpretation.
16	Industrial	Light and heavy industry, including buildings, equipment and parking areas.
17	Transitional	Open areas in the process of being developed from one land use to another (if the future land use is at all uncertain). Formerly identified as "Urban Open".
18	Transportation	Airports (including landing strips, hangars, parking areas and related facilities), railroads and rail stations, and divided highways (related facilities would include rest areas, highway maintenance areas, storage areas, and on/off ramps). Also includes docks, warehouses, and related land-based storage facilities, and terminal freight and storage facilities. Roads and bridges less than 200 feet in width that are the center of two differing land use classes will have the land use classes meet at the center line of the road (i.e., these roads/bridges themselves will not be separated into this class).
25	Saltwater Sandy Beach	DEP Wetlands (1:12,000) WETCODEs 1, 2, 3, 6, 10, 13, 17 and 19
31	Urban Public/Institutional	Lands comprising schools, churches, colleges, hospitals, museums, prisons, town halls or court houses, police and fire stations, including parking lots, dormitories, and university housing. Also may include public open green spaces like town commons.
36	Nursery	Greenhouses and associated buildings as well as any surrounding maintained lawn. Christmas tree (small conifer) farms are also classified as Nurseries.
38	Very Low Density Residential	Housing on > 1 acre lots and very remote, rural housing. See notes below for details on Residential interpretation.
40	Brushland/ Successional	Predominantly (> 25%) shrub cover, and some immature trees not large or dense enough to be classified as forest. It also includes areas that are more permanently shrubby, such as heath areas, wild blueberries or mountain laurel.

Figure 2.2 Land Use Map Surrounding MVY



Source: Land Use (2005) data layer obtained from the Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, MassIT.

2.2.4 Section 4(f) Parcels

Section 4(f) of the Department of Transportation Act of 1966 provides protection to parklands, historic sites, and other special resources from impacts from transportation projects. This statute requires that "the Secretary of Transportation may approve a transportation program or project requiring the use of publicly owned land of a park, recreation area, wildlife or waterfowl refuge, or public and private historical sites only if 1) there is no feasible and prudent alternative to using that land and 2) the program or project includes all possible planning to minimize harm…." Although the Airport is surrounded by state forest, it does not contain any 4(f) protected uses within the airport property.

2.2.5 Socioeconomic Conditions

The local economy on Martha's Vineyard is predominantly based on seasonal visitors. Less than half of the homes on the island are occupied on a year round basis (Island plan 2010). The airport plays a key role in promoting the ease of travel that is a critical base to this type of economy. Locally the airport contributes significantly to the economy of the island.

The 2011 Statewide Airport Economic Impact Study prepared by MassDOT indicates that MVY provides 1,003 jobs on the island and contributes $94,663,000 to the local economy.

2.2.6 Demographic and Housing Characteristics in the Airport Vicinity

The population of Dukes County totaled 16,353 based on the 2010 US Census Data. This is a 9% increase from the population of 14,987 in the year 2000. In the same timeframe, Massachusetts population grew by 3%. Demographic information for the state and Dukes County is presented below in Table 2.2.

Table 2.2
Demographic Data

Characteristic	Massachusetts	Dukes County
Total Population	6,587,536	16,353
Median age	39.3	44
Total housing units	2818940	17385
Home ownership rate	63.6%	81.7%
Population over 65	14%	16%
Median owner occupied housing Value	$343,500	$679,000
Population under 18	21.3%	19%
Median household income	$65,981	$69,760

Source: American Community Survey 2007-2011

2.2.7 Environmental Justice Populations

Environmental Justice issues arise when environmental impacts disproportionately affect low income or minority populations. Federal Executive Order 12898, issued in 1994, and the associated guidance document prepared by the Council on Environmental Quality in 1997 states the requirements of federal agencies in ensuring the principles of environmental justice are adhered to.

The federal policy focuses on minority and low-income populations. The 2010 Census Data (Table 2.3) was reviewed and indicates that there are three areas on Martha's Vineyard with recognized environmental justice communities. Two are in Oak Bluffs and one in Gay Head/Aquinnah. None of the communities are located in the vicinity of the airport.

Table 2.3

Characteristic	Massachusetts	Dukes County
Median household Income	$65,981	$69,760
Persons below poverty level	10.2%	10.7%
Black	7.8%	3.5%
American Indian and Alaskan Native	0.5%	1.2%
White	84%	91%

2.2.8 Farmlands

There are no farmlands on the airport property or within the vicinity of the airport.

2.2.9 Fish, Wildlife and Plants (Endangered Species)

Due to its geographic location and vegetation management actions, MVY is home to several sandplain grassland plant species of concern. Sandplain grasslands and scrublands have become a rare habitat in the northeast due to forest succession and encroaching development. The sandy soils at the airport, combined with the vegetation management of areas to remain free of obstructions such as trees and shrubs, result in conditions at the airport that support grassland vegetative species. In addition, the airport and its surrounding forest are host to habitat for several species invertebrates and birds that are considered rare in the state. Surveys for rare vegetation have been conducted at the airport since 1989.

2.2.10 Federally listed Species of Concern

The Duke's county listings for endangered species, published by the United States Fish and Wildlife Service, includes three federally protected species that are found in habitats with coastal dunes. Coastal dune habitats are not found at the MVY airport. In addition, the listing for Dukes County includes sandplain gerardia (Endangered), specifically located in West Tisbury. This species was not found on the airport property during any field studies conducted in 2010, 2011 and 2012.

2.2.11 State listed Species of Concern

Endangered Species studies for state listed species of concern are ongoing at the airport in accordance with the Conservation Management Permit (004-039 DFW) issued in 2004. Various sandplain grassland plant species are found at the airport, several of which are listed by the state of Massachusetts as threatened, rare or endangered. In 2001, the airport instituted a sandplain grassland vegetation management plan. In 2004, as part of the proposed airport improvements covered by the Capital Improvement Plan (CIP), the airport applied for a Conservation Management Permit for impacts to listed habitat.

A habitat management plan was developed as part of this permitting process, and was put in place at the airport. The results of rare species monitoring at the airport are reported to Natural Heritage on a regular basis in compliance with all previous permits. The airport manager has committed to maintaining this unique ecosystem by continuing to manage the property in accordance with the Habitat Management Plan. Table 2.4 (below) provides a listing of the presences or lack of State Listed Species at MVY.

Table 2.4 Summary of presence or absence of State Listed Species in targeted Areas
Martha's Vineyard Airport 2012

Common Name	*Scientific Name*	State Status*	On NHESP List	Observed in 2012
		Moths		
Coastal Heath Cutworm	*Abagrotis nefascia*	SC	Y	N
Barrens Daggernoth	*Acronicta albarufa*	T	Y	Y
Gerhard's Underwing Moth	*Catocala herodias gerhardii*	SC	Y	Y
Waxed Sallow	*Chaetaglaea cerata*	SC	N	Y
Melsheimer's Sack Bearer	*Cicinnus melsheimeri*	T	Y	Y
Unexpected Cycnia	*Cycnia inopinatus*	T	N	Y
Sandplain Euchlaena	*Euchlaena madusaria*	SC	Y	Y
Slender Clearwing Sphinx	*Hemaris gracilis*	SC	Y	N
Barrens Buckmoth	*Hemileuca maia*	SC	Y	Y
Sandplain Heterocampa	*Heterocampa varia*	T	Y	Y
Pine Barrens Lycia	*Lycia ypsilon*	T	Y	Y
Barrens Metarranthis	*Metarranthis apiciaria*	E	Y	N
Coastal Swamp Metarranthis	*Metarranthis pilosaria*	SC	Y	Y
Imperial Moth	*Eacles imperialis*	T	Y	Y
Pink Sallow	*Psectaglaea carnosa*	SC	Y	Y
Southern Ptichodis	*Ptichodis bistrigata*	T	N	Y
Pine Barrens Speranza	*Speranza exonerata*	SC	Y	Y
Faded Gray Geometer	*Stenoporpia polygrammaria*	T	Y	Y
Pine Barrens Zale	*Zale lunifera*	SC	Y	N
		Beetle		
Purple Tiger Beetle	*Cicindela purpurea*	SC	Y	Y
		Birds		
Grasshopper Sparrow	*Ammodramus savannarum*	T	Y	Y
Eastern Whip-poor-will	*Caprimulgus vociferus*	SC	Y	Y
Northern Harrier	*Circus cyaneus*	T	Y	N
		Plants		
Purple Needlegrass	*Aristida purpurescens*	T	Y	N
Sandplain Flax	*Linum intercursum*	SC	Y	Y
Lion's Foot	*Nabalus serpentarius*	E	Y	N
Papillose Nut-Sedge	*Scleria pauciflora*	E	Y	Y
Sandplain Blue-Eyed Grass	*Sisyrinchium fuscatum*	SC	Y	Y
*SC = Special Concern; T = Threatened; E = Endangered				

Figure 2.3 Rare Plant Findings

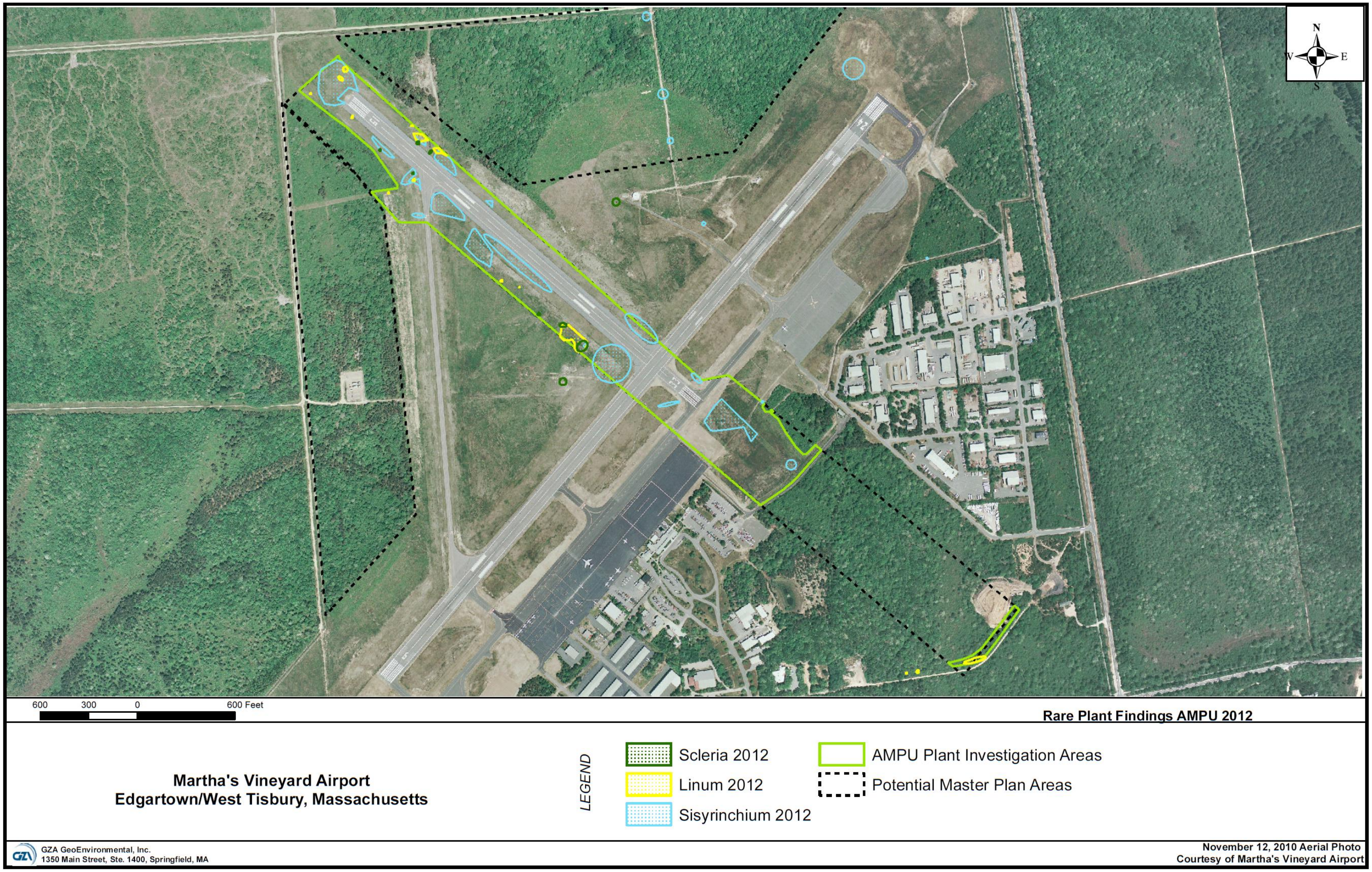
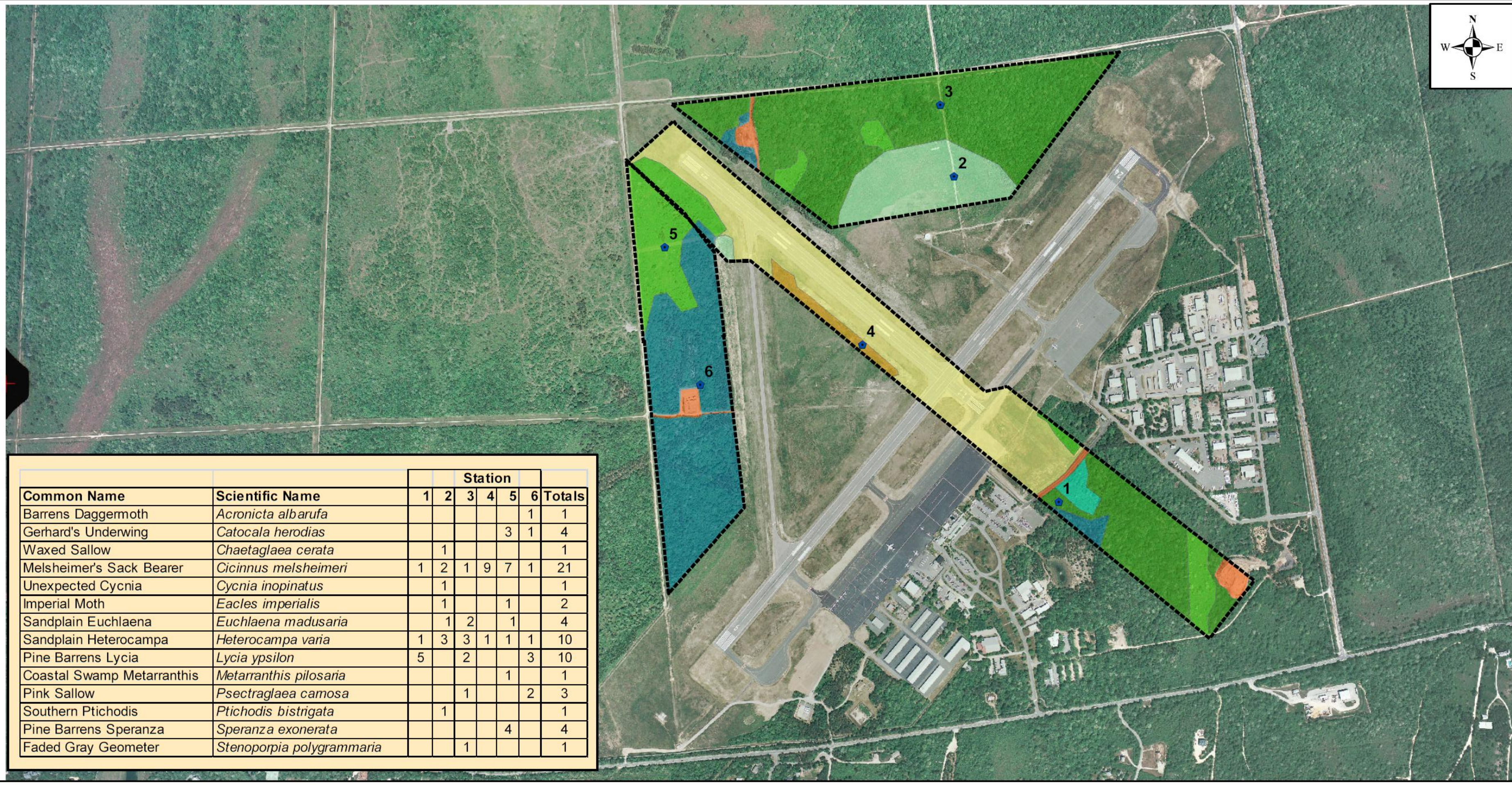


Figure 2.4 Barrens Buckmoth Survey

Figure 2.5 Blacklight Trap Survey



		Station						
Common Name	**Scientific Name**	**1**	**2**	**3**	**4**	**5**	**6**	**Totals**
Barrens Daggermoth	*Acronicta albarufa*						1	1
Gerhard's Underwing	*Catocala herodias*					3	1	4
Waxed Sallow	*Chaetaglaea cerata*		1					1
Melsheimer's Sack Bearer	*Cicinnus melsheimeri*	1	2	1	9	7	1	21
Unexpected Cycnia	*Cycnia inopinatus*		1					1
Imperial Moth	*Eacles imperialis*		1			1		2
Sandplain Euchlaena	*Euchlaena madusaria*		1	2		1		4
Sandplain Heterocampa	*Heterocampa varia*	1	3	3	1	1	1	10
Pine Barrens Lycia	*Lycia ypsilon*	5		2			3	10
Coastal Swamp Metarranthis	*Metarranthis pilosaria*					1		1
Pink Sallow	*Psectraglaea carnosa*			1			2	3
Southern Ptichodis	*Ptichodis bistrigata*		1					1
Pine Barrens Speranza	*Speranza exonerata*					4		4
Faded Gray Geometer	*Stenoporpia polygrammaria*			1				1

800 400 0 800 1,600 Feet

BLACKLIGHT TRAP SURVEY

Martha's Vineyard Airport
Rare Species Monitoring Report, 2012
Edgartown/West Tisbury, Massachusetts

LEGEND
Blacklight Stations
Potential Master Plan Areas

Natural Communities
Grassland (GL)
Grassland/Sandplain Heathland
Scrub Oak Shrubland (SO)
SO/OW
mowed SO/OW
Oak Woodland (OW)
Pitch Pine/Oak Woodland (PP/OW)
Disturbed

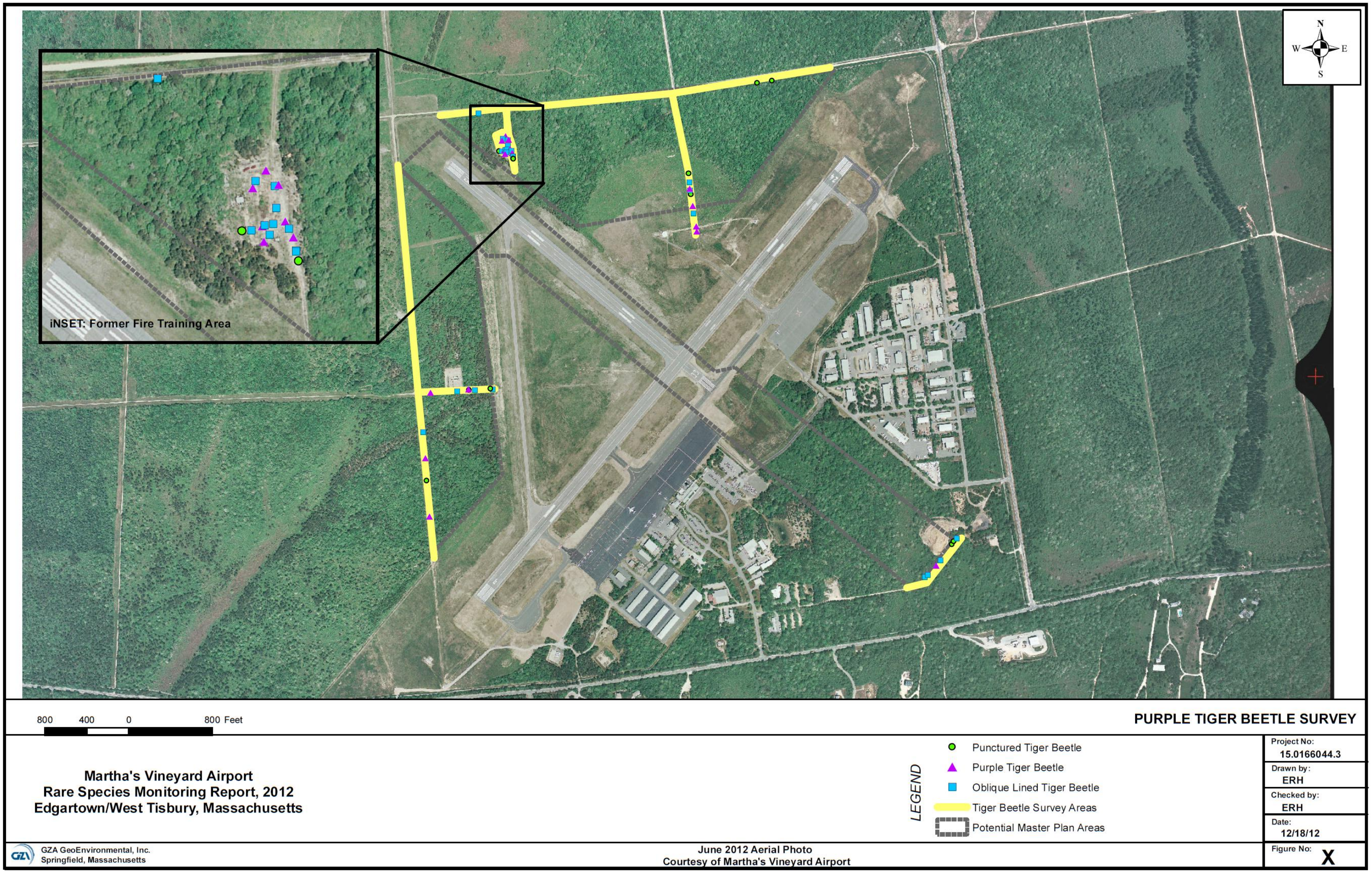
Project No: 15.0166044.3
Drawn by: ERH
Checked by: ERH
Date: 12/18/12
Figure No: X

GZA GeoEnvironmental, Inc.
Springfield, Massachusetts

June 2012 Aerial Photo
Courtesy of Martha's Vineyard Airport

Figure 2.6 Grasshopper Sparrow Observations

Figure 2.8 Purple Tiger Beetle Survey



An amendment to the 2004 permit was issued in order to implement projects to comply with new safety regulations from FAA, including the shift of runway 6/24, safety area improvements and limited vegetation clearance to comply with airspace safety requirements.

The Conservation Management Permit and the Habitat Management Plan required botanical surveys, transplants of potentially affected plants, construction monitoring, revegetation of buckmoth habitat areas, and monitoring of invasive species throughout the airport. Of the 688 acres at the airport 280 are under long term management for habitat.

Additional endangered species surveys were conducted to investigate areas that may be impacted by operational and safety improvements associated with this master plan. Surveys for grassland plant species, three species of bird, several moth species and one beetle were conducted throughout 2012. Individual species were located in several locations throughout the airport. The results of those surveys are included in Appendix 5 – Rare Species Habitat Survey report.

2.2.12 Floodplains

There are no mapped floodplains at or within the vicinity of the airport boundaries.

2.2.13 Hazardous Materials/Pollution Prevention/Solid Waste

A database search was conducted to determine the presence of any known contaminants within the project area. There are no superfund sites located in Dukes County. The majority of releases reported in the airport vicinity were two hour releases – requiring notification of DEP within 2 hours of the release incident. The airport has undertaken all measures for remediation in response to past releases of OHM within the airport boundaries in accordance with the Massachusetts Contingency Plan – MCP (310 CMR 40.000). Due to the location of the airport in proximity to the sole source aquifer, the most stringent standards for cleanup, relating to human exposure, are followed.

An inventory of hazardous material stored at the airport was conducted as part of the Spill Control and Prevention Plan updates (Appendix 3). Inspections of airport and tenant facilities are conducted on a regular basis to ensure compliance with Massachusetts Hazardous Waste Regulations (310 CMR 30.000).

The Airport SWPP details best management practices for the storage of hazardous material. No hazardous materials are stored where they may be exposed to rainwater.

Aircraft fuel storage is conducted in accordance with state regulations (310 CMR 30.000) and FAA circular 150/5230-4B. Airport staff are trained in proper handling, storage and refueling procedures.

2.2.14 Historic and Archaeological Resources

Section 106 of the National Historic Preservation Act of 1966 requires Federal agencies to consider the effects of their projects on properties that are listed in, or are eligible for listing in, the National Register of Historic Places. The lead Federal agency for a project must determine whether any property located within the project's Area of Potential Effect (APE) is listed in, or may be eligible for listing in, the National Register. The APE for archaeological resources is defined as locations where the proposed project may alter or disturb surface and/or subsurface soils that contain, or have the potential to contain, archaeological sites. The review process is administered at the Federal level by the President's Advisory Council on Historic Preservation and at the state level by the State Historic Preservation Officer.

Results of the review of the Massachusetts Historical files indicate that there are no recorded archaeological sites or historic properties within the project area or its immediate vicinity. The pre-contact (Native American) archaeological sensitivity of the project area is defined primarily by the identification of archeological sites in similar environmental settings and the presence of sandy, well drained soils. Several Native American sites have been identified in nearby sections of Edgartown and West Tisbury in similar environmental settings.

Therefore, the airport conducted a site walkover to determine the sensitivity of the project area. The survey was conducted by a qualified archaeologist from Public Archeology Laboratory (PAL) on November 5, 2012 (Appendix 9) and included Randy Jardin, Aquinnah Tribal Preservation Officer of the Wampanoag Tribe of Gay Head/Aquinnah. The walkover confirmed that large areas of the airport property have low archaeological integrity.

Two areas of moderate archaeological sensitivity were identified within the project area during the walkover. The future development of the project area will require review and/or permitting under MEPA and NEPA and Section 106 of the Historic Preservation Act. State agency review will require consultation with the state historic preservation officer (SHPO). If archaeological investigations are required by the SHPO, the proposed areas of moderate sensitivity would likely be scoped for intensive survey.

2.2.15 Sustainability

There are numerous benefits to implementing sustainable practices at airports including, lower energy consumption, lower waste production, reduced noise and emissions, and better public relations. These can lead to cost savings for airports in both the short and long term. The first step in any sustainability assessment is the inventory of existing conditions at the airport as it operates today. Many of the criteria used to evaluate sustainability are included as part of the overall master planning process for airports, including noise evaluations, and forecasts of growth.

Measuring the existing conditions and using suitability criteria as a core principal in planning will help drive the project development process as part of this Master Plan. Energy Audits can be conducted to determine overall energy use at the airport and can help to develop protocols and methods to reduce energy consumption.

Energy use at the airport can be categorized in two groups:

- Stationary sources such as the buildings and airside lighting facilities
- Moveable sources such as aircraft and vehicles associated with the airport (Firefighting, shuttles etc.)

More than 99% of the energy used on Martha's Vineyard is generated off island (source: Island Plan 2010), making energy costs on the island among the most expensive in the country. Opportunities for on-island production of energy, with a focus on renewable energy, have come to the forefront in island planning. To this end, the airport has been participating in a pilot study of wind generation for over 2 years. A vertical axis wind turbine prototype was installed at the airport in 2010. According to Eastern Wind Power, the machine is capable of generating 45 MWh per year and is currently grid connected at the airport. Because it is vertical and fairly compact, this system has a small footprint allowing several to be spaced in close proximity.

MVY is also reviewing installation of a solar farm on airport property. This development will be done in coordination with FAA to ensure efficient use of the property with no negative impact on aviation.

2.2.16 Aircraft Noise

As a vacation destination, maintenance of peace and quiet enjoyment of property on the Island is of high importance to the community. In 2003 the Martha's Vineyard Airport (MVY) Commission initiated a "Noise Analysis / Mitigation Program" as a proactive initiative to address noise concerns related to aircraft operations at the airport, and to ensure that the airport continued to operate as a "good neighbor" to the community. The airport, in coordination with the FAA, prepared a noise abatement study that modeled existing and future noise levels at the airport through the year 2015.

The result of that study was the development of noise abatement procedures aimed at reducing noise impacts to residents on the Island. It should be noted that the FAA has the sole authority to regulate airspace and air traffic control procedures. As a result, the MVY noise abatement program is voluntary, and the airport encourages pilots to utilize the noise abatement flight procedures for incoming and outgoing aircraft of all sizes. The Airport also recommends that pilots follow noise abatement departure and arrival procedures developed by the National Business Aircraft Association (NBAA) for corporate aircraft (see Appendix 6).

Separate noise abatement procedures were developed for large airplanes (those that weigh more than 12,500 lbs.), and small airplanes (those that weigh less than 12,500 lbs.). The noise abatement procedures for the airport are shown on Figures 2.9 – 2.11 on pages 63-65. When the control tower is in operation, the controllers determine the optimum flight tracks based on a variety of factors including which runway is in use, wind direction and speed, volume of traffic, weather conditions, etc.

Additional noise monitoring was accomplished in August 2012 as part of this Master Plan. The purpose of this noise monitoring was to obtain noise measurements over a peak summertime weekend to compare with the noise measurements that were obtained in 1999. A comparison of these noise measurements (1999 vs. 2012) was used to determine how the noise levels from Airport aircraft operations have changed over that period of time.

Table 2-5
Comparison of Measured DNL Levels 2012 vs. 1999

Measurement Location	Measured DNL Noise Levels 2012	1999
Bluebird Way	50-57 dBA	59-61 dBA
Hopps Farm Road	43-60 dBA	55-59 dBA
Oyster Pond Road	43-60dBA	53 dBA
Ryan's Way	53-56 dBA	58-63 dBA

Source: 2012 Noise Measurement report prepared by KM Chng Environmental Inc.

As can be seen from Table 2-5 above, the average noise levels in the vicinity of the airport have decreased over the last decade. This is in part due to adherence to the published noise abatement procedures, fewer aircraft operations as well as advances in engine technology.

There continues to be significant complaints about aircraft noise to the Southwest of the airport. Airport

Management has formed a working group of neighbors, air carrier personnel, and FAA Air Traffic to work on reducing negative noise impacts.

Appendix 7 contains the full noise report prepared by KM Chng Environmental Inc.

Figure 2.9 Noise Abatement Procedures for Aircraft Greater than 12,500 lbs.

Figure 2.10 Noise Abatement Procedures for Small Aircraft (less than 12,500 lbs.)

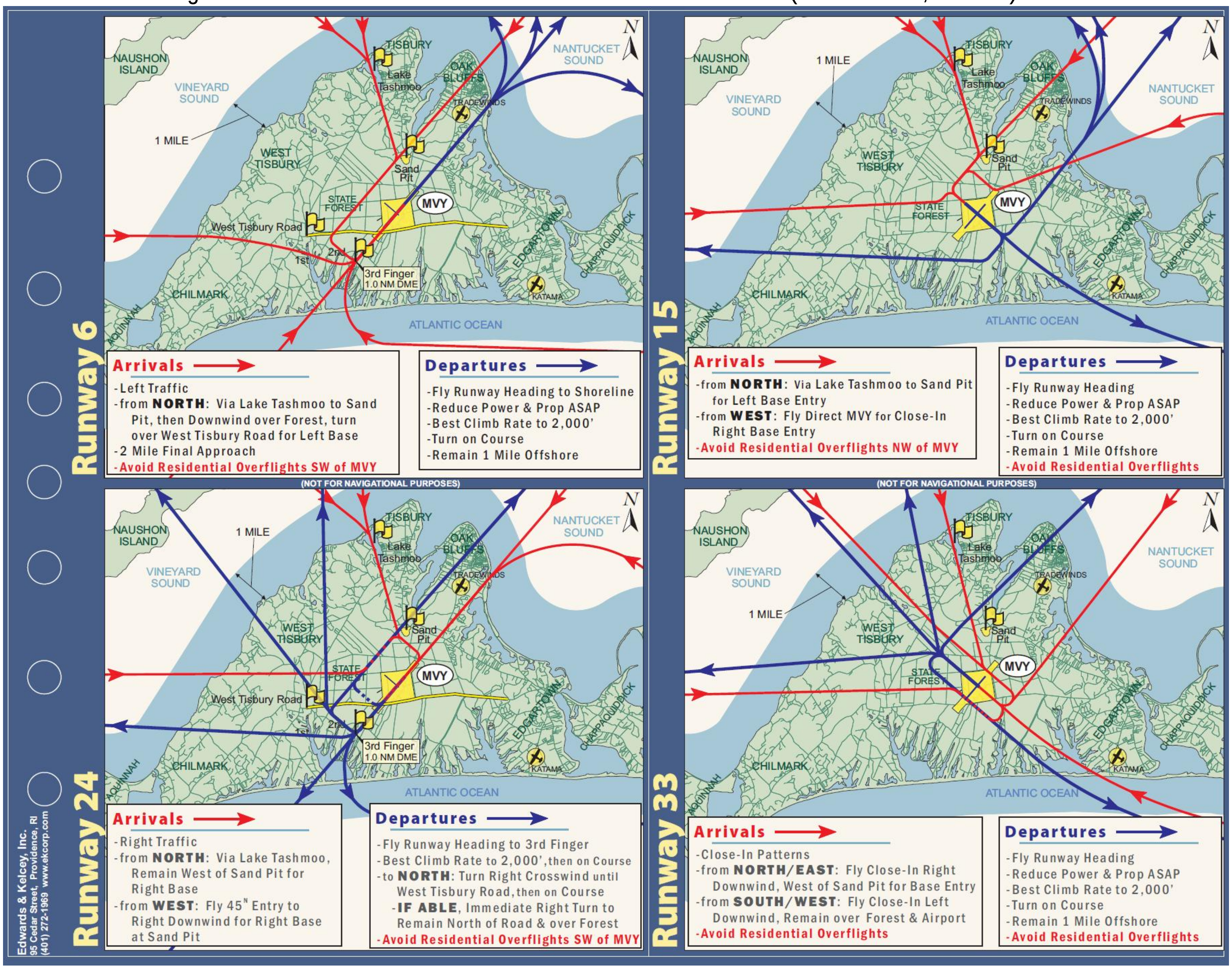
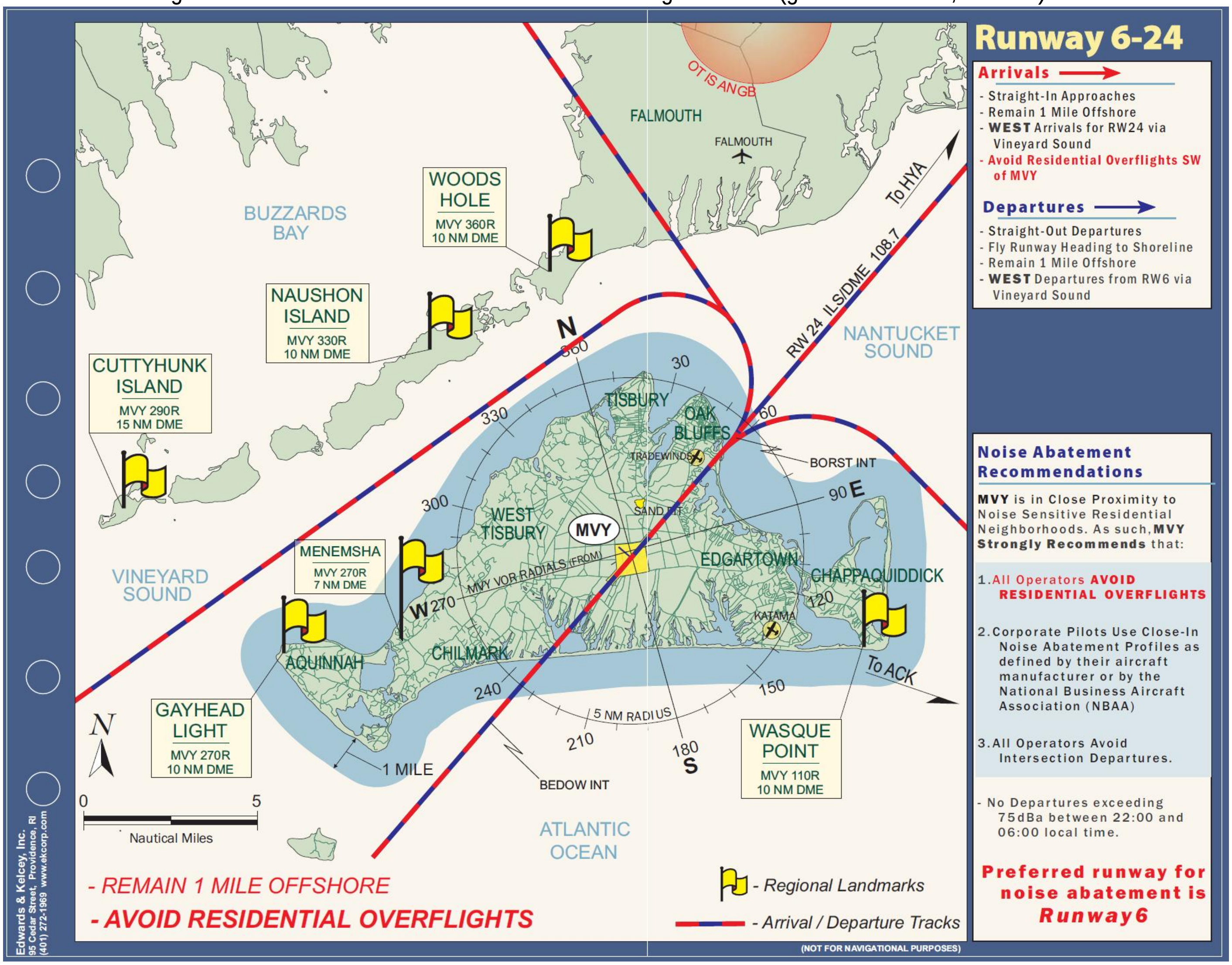


Figure 2.11 Noise Abatement Procedures for Large Aircraft (greater than 12,500 lbs.)



2.2.17 Water Quality

The Clean Water Act provides the authority to establish water quality standards, control discharges, develop waste treatment management plans and practices, prevent or minimize the loss of wetland, and regulate other issues concerning water quality. Any project proposed as part of this master plan that would impound, divert, drain, control, or otherwise modify the waters of any stream or other body of water must meet the requirements of the Fish and Wildlife Coordination Act. Additionally, any project that proposes a point-source discharge into waters of the U.S. would require a National Pollutant Discharge Elimination System (NPDES) permit under the Clean Water Act.

2.2.18 Groundwater

The entire island, including the airport property, is underlain by a designated sole source aquifer. EPA designated the aquifer in 1988 as the only source of drinking water on the island, with no reasonable alternative. The design of all airport projects must take into account the groundwater protection requirements of this designation and ensure that all protections are in place to comply with state and local groundwater regulations.

2.2.19 Wastewater

MVY provides drinking water and sewage services to its airport facilities and tenants. This water distribution system is classified as a Non-Transient Non-Community Water System (NTNC) because it doesn't serve year round residential housing, however the airport does have at least 15 service connections and serve at least 25 people, 60 or more days each year.

In addition, this water system is classified as a consecutive water distribution system because all water comes through the Oak Bluffs Water District. Oak Bluffs Water District and the Edgartown Water Department maintain an interconnection for backup emergency use which helps to stabilize the Airport's water supply. The airport water passes through a master meter that the Oak Bluffs Water District invoices the airport for.

The water distribution system is operated and maintained by the Martha's Vineyard Airport Water Department. The water distribution system follows Barnes Road starting at Deer Run Housing Development. The distribution system enters the business park along North Road entrance, supplies the Business Park and continues on to the airport terminal ending at the airport wastewater treatment plant.

The airport maintains the distribution system by performing fire flow testing, hydrant maintenance, flushing the water mains, monthly bacterial testing, Cross-Connection Backflow Prevention Testing and inspections, Sanitary Surveys, Leak Detection and Water Audits, assist with water meter installation, monthly water meter readings and invoicing for water use. The airport water department also files an annual statistical report with the MA DEP Drinking Water Program which can be viewed at: http://www.mvyairport.com.

Martha's Vineyard Airport uses State Certified Laboratories to perform water testing per DEP sampling requirements. State certified labs perform all of the airport's water and wastewater tests.

The Martha's Vineyard Wastewater Treatment Facility has been in operation since the early 1940's. It was built to serve the Naval Air Station that was created during the war. The WWTF is located on approximately five acres of fenced in land located in West Tisbury on the southwest corner of the airport.

The WWTF originally consisted of a settling tank. The settling tank water flowed to a dosing tank before being discharged underground. Due to concerns about the islands sole source aquifer, the WWTF was upgraded to a small advanced facility. The WWTF upgrade was finished and online in June of 1992. The new facility consists of a process, utility, office and storage rooms along with a laboratory and restroom. The process room contains a single four stage aerobic Rotating Biological Contactor (with space for a second RBC), dual anoxic RBCs, two secondary clarifiers and dual sand filters followed by ultraviolet disinfection before discharge to the new surface rapid infiltration beds.

Outside the facility, the following units have been added: a coarse bar rack, a primary settling tank (or clarifier), flow equalization tank with two pumps, a sludge holding tank and the original dosing tank that discharges to the original discharge beds that can be used if needed. Excess sludge is removed from the holding tank by tanker and brought off-island for further treatment. The facility is connected through a series of sewer pipes ranging in size from four inch to twelve inch gravity as well as a four inch force main from the business park pump station. There are approximately two miles of main sewer lines.

2.2.20 Wetlands

Field surveys conducted over the course of 2011 and 2012 confirmed that there are no jurisdictional wetlands on the airport property.

2.2.21 Wild and Scenic Rivers

There are no designated Wild and Scenic Rivers on or in the vicinity of the airport.

The following chapter presents the forecasts of aviation demand for MVY.

Chapter 3 – Forecasts of Aviation Demand

3.1 Introduction

Aviation forecasts are prepared to aid in planning the timing of airport capital improvements in anticipation of future demand. Existing and future aviation activity can have a direct impact on a number of factors, including:

- Airport facilities
- Airport services
- Airport revenue and expenses
- Airport role and appropriate design standards
- Environmental conditions
- Ground transportation

There have been a number of forecasts of aviation activity prepared previously for Martha's Vineyard Airport, which are reviewed and summarized below. In addition, the FAA prepares forecasts of aviation activity on a national level based on broad economic, demographic, and industry trends, which are also reviewed and summarized below.

3.2 Forecast Periods

The aviation forecasts for this Master Plan Update extend to the year 2040 and are divided into three planning periods that coincide with the FAA Terminal Area Forecast (TAF), discussed in more detail below:

Table 3.1

MVY AMP - Forecast Periods	
Short Term:	2013-2020
Medium Term:	2021-2030
Long Term:	2031-2040

Note: Forecast periods coincide with FAA TAF

One characteristic common to all forecasts is that their accuracy, and hence their statistical level of confidence, are directly correlated with time. As forecasts look further into the future their level of accuracy (and level of confidence) decreases. The correlation with time is due to a number of factors, including the increasing chance (or likelihood) that unforeseen events will occur.

The Government Accountability Office (GAO) noted in 2012 that: "Forecasting is inherently uncertain, and, as one forecasting expert noted, luck can be a factor in accurate forecasting. Specifically, if forecasts for model components err, even slightly, in the same direction, the aggregate error can be considerable. However, if forecasts for model components err in opposite directions, even forecasts that are wildly inaccurate for individual components can be accurate in the aggregate."

That is particularly relevant to aviation forecasting where a number of external factors, such as fluctuations in fuel prices and/or availability of certain types of fuel, changes in the airline industry, airport and airspace security regulations, the performance of the economy, etc., each have an impact on demand for aviation services.

Those factors are increasingly difficult to predict with accuracy as forecasts proceed into the future. As a result the short and intermediate term forecasts have a relatively higher level of confidence than long term forecasts, which are considered an outlook and subject to change. All forecasts should be reviewed and compared against actual activity, and updated regularly based on current events. The factors that may affect demand specific to each type of activity at Martha's Vineyard Airport are discussed below followed by the aviation forecasts.

3.3 Factors Affecting Future Aviation Activity at Martha's Vineyard Airport

As noted previously, aviation activity at Martha's Vineyard Airport encompasses a wide variety of users, missions, and types of aircraft, each of which respond to different market drivers that are discussed below.

Air carrier and commuter passenger enplanements at MVY peaked in 1999 at almost 74,000, and declined steadily until 2010 when they reached approximately 45,000. Passenger enplanements increased in 2011 to approximately 49,000, in part due to JetBlue's service to JFK. Continued seasonal jet service to hubs such as JFK, Reagan National, and possible resumption of jet service to LaGuardia Airport, along with the high frequency short-haul service to Boston Logan, Hyannis, New Bedford, and Nantucket, should stimulate future growth in passenger enplanements at MVY. The FAA's latest Terminal Area Forecast (TAF) predicts that air carrier and commuter passenger enplanements will increase by 13% by 2040 to 56,000 total enplanements, compared to 49,500 enplanements in 2012.

3.3.1 Factors Affecting Air carrier and air taxi activity

MVY is served by four scheduled passenger airlines (Cape Air, American Airlines, JetBlue, and Delta). MVY is an origin and destination (vs. a connecting hub) market. It is also primarily comprised of discretionary/ pleasure travelers (visitors) vs. business travelers. Non-stop markets served from MVY are short-haul (i.e. less than 500 miles) and include connecting hub airports (Boston Logan, JFK International, and Reagan National), as well as regional O&D airports; Barnstable, New Bedford, Nantucket, and Providence. The passenger airline industry is presently undergoing significant changes, some or all of which could affect future service levels at MVY. As discussed below some changes could enhance airline service at MVY, while other changes could have a negative impact on passenger traffic.

Industry consolidation: a number of major airline mergers and acquisitions have occurred in the last seven years: US Airways (served MVY) and America West merged in 2005; Delta (serves MVY) acquired Northwest; United acquired Continental; and Southwest acquired AirTran (which serves Boston and Providence). In February 2013 it was announced that US Airways would acquire American Airlines. The two airlines have since merged, and carry the American Airlines brand name. Since the merger, there was speculation about American Airlines offering additional service to and from MVY to other locations nationally; since the merge, there has not been any additional direct flights offered from the airline.

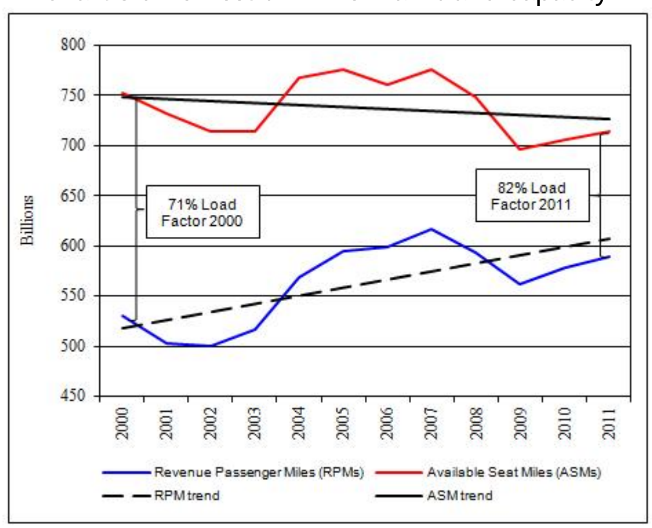
Rising fuel prices and ticket prices: airlines have been raising ticket prices and increasing fuel surcharges in response to rising fuel prices, which impacts demand, particularly by leisure travelers. It is anticipated that both fuel and ticket prices will continue to rise in the foreseeable future, although short-term fluctuations in fuel prices will likely occur. Rising ticket prices will likely impact leisure travelers more than business travelers which could impact traffic at MVY more than other markets, and also make competitive modes of transportation to the Island, particularly scheduled ferry service, more attractive.

Ancillary revenue/fees: airlines generated more than $20 billion in ancillary revenue in 2011 from charges on checked baggage, in-flight meals/entertainment, preferred seating and boarding, and other services[4], all of which are above and beyond the stated ticket prices. In fact some airlines, such as Spirit, generated more revenue from ancillary fees than from ticket sales. Three of the airlines serving MVY charge ancillary fees. While profitable for airlines, ancillary fees have generated strong negative passenger reaction and impacted passenger levels, but airlines are expected to continue charging ancillary fees. Southwest is one of the few carriers that have not adopted ancillary fees to date, but has recently indicated it might do so in the future (AirTran, the airline that Southwest acquired, continues to charge ancillary fees). Increasing fees will result in more passengers shifting trips to alternate modes of transportation, such as ferry service.

Elimination of 50 passenger regional jets: both mainline and regional carriers have been rapidly retiring their 50-passenger CRJ-200 and ERJ-145 jets, in part because they are less economical to operate due to rising fuel prices as well as higher maintenance and crew costs. In particular, Delta Air Lines has announced they are retiring their 50-seat RJs to be replaced with larger jets (Boeing 717s from AirTran and new CRJ-900s), and American Eagle is also replacing their existing RJ fleet. This change points to increased focus on hub-oriented service (such as Boston, New York, etc.) vs. point-to-point O&D service. Use of larger aircraft could also indicate a potential reduction of the total number scheduled flights. JetBlue currently provides seasonal service between MVY and JFK with 100 seat Embraer E190 regional jets, which is the largest aircraft in scheduled service at MVY. Increased hub oriented by larger jets could stimulate passenger traffic at MVY, but it would be strictly seasonal. Off-peak season service would continue to require smaller aircraft.

Cape Air is unique in that it operates 9 passenger Cessna 402 aircraft, and generates the majority of scheduled operations at MVY. Cape Air has not indicated that it will change aircraft (i.e. operate larger aircraft) in the near future, but the increasing age and flight time on their 402s, as well as uncertainty about the cost and availability of 100LL avgas, may prompt Cape Air to look at fleet replacement. The likeliest replacement aircraft given Cape Air's existing short-haul/high frequency network would be the Cessna Caravan (10 seat single-engine turboprop), or equivalent. It has also indicated an interest in a new twin-engine piston aircraft to be developed by Tecnam, an Italian company, however it is uncertain if and when that new aircraft will be certified and manufactured. The cost to acquire and operate any new aircraft is extremely high, and operating an aircraft with more than 9 passenger seats would require Cape Air to operate under FAR Part 121 vs. FAR Part 135 under which they currently operate.

Chart 3.9 Domestic Airline Traffic and Capacity



Source: Bureau of Transportation Statistics

The change in federal aviation regulation and operating certificates would be expensive for Cape Air. If Cape Air were to incur those higher costs the financial viability of their current route network, fare structure, and service levels would need to be reevaluated.

Reduced service to some airports and fewer short-haul flights: according to the U.S. DOT Office of Inspector General (OIG): "Although the industry's recent actions have restored profitability, some actions have also reduced travel opportunities for passengers. For example, the availability of short-haul flights for passengers has been

[4] The president of Ryanair (a low fare carrier based in Ireland), Michael O'Leary, recently proposed putting pay machines on lavatory doors in aircraft. The idea is 'on hold for the foreseeable future'.

greatly impacted. In June 2012, the number of scheduled domestic passenger flights of less than 250 miles was 24 percent lower than it was in June 2007. In addition, the number of flights in the 250–499 mile range declined by 16 percent. Combined, flights in these two 12 distance brackets represent a reduction of 3,000 flights per day or three-quarters of all flight reductions experienced between June 2007 and June 2012. Passengers in small communities and in short-haul markets can anticipate further cuts in scheduled air service as a result of the reduction of the number of 50-seat aircraft in the regional airline fleet."

Capacity controls: since the beginning of the recession in 2007, mainline carriers have reduced seating capacity throughout their system, which has enabled them to increase load factors and revenue per seat mile (see graph). That trend has resulted in system-wide load factors (ratio of passenger enplanements to available seats) growing higher. But limiting capacity has also resulted in fewer flights and less convenience for passengers, particularly after cancellations due to weather or other factors. It is anticipated that airlines will continue strong capacity control resulting in 3% fewer total seats and departures in 2012 compared to 2011. And as new aircraft come on-line they will replace (not add to) existing older aircraft. United recently announced a reduction in its fleet size with early retirement of older aircraft.

Low cost vs. legacy carriers: the distinction between low cost carriers (Southwest, JetBlue, Frontier, etc.) and so-called legacy carriers (American, Delta, United, etc.) is rapidly changing. A number of low cost carriers are experiencing rising operating costs (labor, fuel, aircraft maintenance, etc.), while some legacy carriers have achieved greater cost efficiencies from their larger network and consolidations (noted above). As a result, some legacy carriers (such as Delta) are now extremely price competitive with low cost carriers. Southwest recently acquired AirTran and is a longtime leader among low cost carriers, but they have drastically shifted their business model and are now focused on the business travel market at large-hub (so-called 'fortress hub') airports including Atlanta, San Francisco, Denver, Philadelphia, LaGuardia, Washington Reagan, Pittsburgh, and Boston-Logan. It is anticipated that the strong distinctions between low cost and legacy carriers will continue to diminish in the future, which may offer additional opportunities for O&D airports such as MVY. Southwest is competing directly against JetBlue in a number of markets, including Boston and New York, which might stimulate additional JetBlue service to O&D markets like MVY in order to increase regional market share. Given their new business model, it is unlikely that Southwest will serve MVY in the foreseeable future.

Air Taxi and Commuter Activity: the definition of air taxi and commuter operations encompasses a very wide variety of aircraft types, and also ranges from scheduled service provided by Cape Air to on-demand charter services provided by corporate jets (up to and including aircraft such as the B-737, B-757, Gulfstream G-550, and Airbus A-319), turboprops (such as the Pilatus PC-12, Socata TBM-850, and King Air 200 and 350), and piston-engine aircraft (Beech Bonanza and Baron, the Piper Navajo, Seneca, and Aztec, and Cessna 206, 310, etc.) All air taxi and commuter operators have an operating certificate issued by FAA and an economic operating certificate issued by the U.S. DOT. Air carriers operate under one of a number of Federal Aviation Regulations (e.g. Part 121, 125, 129, 133, and 135). Cape Air operates under FAR Part 135, similar to many on-demand air taxi operators, because the Cessna 402 has 9 passenger seats. If Cape Air operated a larger airplane with 10 or more passenger seats they would need to operate under FAR Part 121, which is a more restrictive and costly regulation. Because non-commercial private operators (operating under FAR Part 91) also fly similar turbine and piston powered aircraft, it is difficult for FAA and airport operators to accurately track all air taxi and commuter aircraft operations and passenger enplanements.

MVY, along with Hyannis and Nantucket, are popular destinations for corporate/GA air taxi/charter operators, particularly in the summer season, and many corporate and air taxi passengers are second home owners on the Island. The corporate jet/ turboprop air taxi market tends to fluctuate with overall corporate aviation activity, i.e. in response to factors such as the performance of the stock market and corporate profits (i.e. the Island's economy has little or no impact on that particular traffic). Nationally, corporate and air taxi activity declined significantly in response to the recession of 2008-2010, in part due to the sudden and steep decline in the stock market and corporate profits, and has since partially rebounded. Passengers on Cape Air, by contrast, are more price sensitive than air taxi passengers and are more likely to use ferry service as an alternative mode.

The FAA's Terminal Area Forecast predicts that air taxi aircraft operations at MVY will increase by 13% between 2012 and 2040 to 22,000 takeoff and landings (from 19,400 operations in 2012), which is reasonable given historic patterns of air taxi activity at MVY. As noted previously, it is anticipated that Cape Air will continue to operate Cessna 402 aircraft and maintain their current service levels (i.e. high frequency short-haul) for the foreseeable future, although issues such as rising aircraft maintenance costs and availability of 100LL fuel may force Cape Air to replace their 402s with turbine powered aircraft such as the Cessna Caravan.

Based on the various trends in the airline markets described above, as well as recent volatility in the economy, the TAF is a reasonable projection of air carrier and commuter passenger activity at MVY. A number of unforeseen events could have a significant impact on future passenger activity at MVY, such as a sudden rise in fuel prices, reduction or loss of all scheduled jet service, or a significant increase in passenger security procedures, however, there is no indication that any of those events will occur in the foreseeable future.

3.3.2 Factors Affecting General Aviation

A variety of factors impact GA activity at a particular airport, including based aircraft. Of the various factors discussed below, only airport rates and charges and the availability of hangars and tiedowns are directly controlled by the airport itself – the other factors are typically outside of any particular airport's control.

Rising aircraft ownership and operating costs, including new and used aircraft prices, parts, fuel prices, insurance, maintenance, etc. For more than 20 years aircraft ownership and operating costs have increased faster than the overall rate of inflation, particularly the price of new aircraft and fuel. For example, a popular personal and training airplane - a new Cessna 172 (single piston engine, four seats, fixed landing gear) – costs more than $300,000 (or $75,000 per seat). Those increased costs have directly impacted the number of new aircraft sales nationally. As a result airplane owners have kept existing airplanes vs. trading in for new, and the average age of a general aviation airplane is almost 40 years old, which results in higher maintenance and operating costs.

Availability of fuel: avgas, or 100LL, is used in piston engine aircraft (including the Cessna 402 flown by Cape Air), and it is the only fuel sold in the U.S. with lead additive. The U.S. EPA and various environmental groups have been studying avgas, and some groups have called for its discontinuation. In addition, compared to jet and auto fuel, only a very small quantity of avgas is sold, and it is one of the most expensive processed fuels produced by oil companies. A variety of industry groups, aviation companies, and the FAA have been studying alternatives to avgas, but have not found any that are 'drop-in' ready. A discontinuation of avgas, or even a decline in its availability before a 'drop-in ready' fuel is found, would potentially ground a large part of the GA piston engine fleet.

State sales and use taxes: until 2001 the state of Massachusetts imposed sales tax on aircraft and parts sold and/or based in the state. Other New England states, such as NH, did not charge sales or use tax on aircraft, and a number of owners and operators in the Bay State moved their aircraft to adjoining states to avoid Massachusetts state taxes. The Massachusetts *Sales Tax Exemption on Aircraft Parts and Maintenance* was passed in 2001 and has been renewed by the state legislature, but only for a limited period. The repeal of the aircraft sales tax directly benefitted in-state aircraft service companies and fixed base operators. If the repeal were allowed to lapse in the future, the reinstitution of a sales tax would decrease GA activity throughout the Commonwealth. The economic recession of 2008-2010 put severe pressure on state budgets across the country resulting in significant budget and staffing cuts, and as result states have been looking for new revenues including eliminating tax exemptions.

Airport rates and charges: GA aircraft owners are relatively price sensitive and will base their aircraft at airports with competitive (i.e. lower) prices for tiedowns, hangars, and fuel, if the airports are located within a convenient driving distance (typically less than 1 hour drive time) from home or office. However, MVY is the only airport on the Island with paved runways, published instrument approaches and lights for night operations, so it does not have similar competition for based aircraft as many airports on the mainland.

Availability of hangars and tiedowns: both the availability and the cost of hangars and aircraft tiedowns will affect the number of based aircraft, and also operations. Historically, all of the hangars at MVY have been occupied and based aircraft tiedowns were mostly occupied, although the availability of hangars and tiedowns has increased recently. The number of based aircraft at Martha's Vineyard Airport typically increases in the summer months. Given its location and market base, GA aircraft owners/users at MVY are somewhat less price sensitive than other GA aircraft operators. FAA's Terminal Area Forecast predicts that based aircraft at MVY will increase by 36% by 2040, from 77 to 118 total based airplanes.

Local and regional economy: although factors such as rates of employment, per capita income, and disposable personal income typically have a bearing on aviation activity at a given airport, the majority of MVY airport users are visitors, not Island residents. As a consequence, the New England regional economy has more of an impact on overall aviation activity at MVY than changes in employment or per capita income of Island residents. For example, the recent recession (2008-2010) greatly impacted corporate aviation activity regionally, nationally, and world-wide, which also had an impact on corporate traffic at MVY. But the Island's economy did not directly impact corporate aviation activity. The economic recession also prompted travelers to visit locations closer to home, which benefitted summer destinations such as MVY, however, many travelers were also more price sensitive and used lower cost transportation modes (such as the ferry vs. air service), and also visited for shorter periods. As noted above, factors such as the performance of the stock market and corporate profits have a more direct impact on corporate aircraft and air taxi activity (often used by second home owners) at MVY.

Pilot career opportunities: one factor in stimulating GA flying, and training in particular (discussed below) are career opportunities for professional pilots. Due to the recent recession, airlines and corporations had significantly reduced their fleets and furloughed flight crews, some of which have since been hired back. However, pilot hiring by regional and mainline carriers has not rebounded significantly, and the public perception of airline careers has become more negative due to numerous bankruptcies, mergers, and downsizing. In addition, Congress recently passed legislation requiring the FAA to substantially increase the minimum time and experience requirements for new copilots to be hired by air carriers. At the same time the military has been reducing the number of slots for new pilots, in part because fewer graded military pilots are leaving the service (in part because of fewer airline jobs), but also because all of the branches of the military are focused on increasing their fleets of unmanned aerial vehicles (UAV). As a result, the number of personnel being trained as UAV pilots is greater than for manned aircraft, and that trend is anticipated to continue. The combination of reduced airline, corporate, and military pilot opportunities decreases the level of interest in GA as a career path.

Local/flight training activity: although there is no flight school based at MVY, the airport is used by student pilots based at other airports on the mainland. However, a number of factors have combined to significantly decrease the overall level of flight training statewide and regionally: the cost of flight training has risen faster than the rate of inflation; airlines and military are recruiting fewer pilots (discussed above); government subsidies for flight training in the form of the GI Bill and student loans have decreased; and security procedures (including the use of

As noted in the Washington Times, Jan. 30, 2103: "Flight training schools have taken a tip from the FAA's estimates that 10,000-plus commercial drones will be operational in the United States in the next few years, and bolstered their course selection. Even community colleges now offer training on remote piloting, NBC reports."

Temporary Flight Restrictions – TFR), makes operation of GA aircraft less attractive. Also, GA flight schools are making much greater use of computer and simulator based training in an effort to reduce costs and increase safety. FAA recently adopted new regulations and procedures for light sport pilots and light sport aircraft (LSA), which has stimulated training activity at certain airports. However, the cost of LSAs were not as low as anticipated/hoped, and combined with restrictions on their use have limited demand for that type of GA activity. Finally, civilian interest in piloting Unmanned Aerial Vehicles (UAV) is growing rapidly, and colleges are offering more programs for UAV operators.

The FAA's Terminal Area Forecast predicts that total GA operations will decrease by 1.4% between 2012 and 2040, with itinerant operations declining by 1.8% (from 20,500 operations in 2012 to 20,100 operations in 2040, a drop of only 975 operations). Local (training) operations were forecasted to increase by 4.6% over the same period, but it only increases from 1,273 annual operations to 1,132 operations, an increase of just 59 operations. The difference in overall GA activity from 2012 to 2040 is not statistically significant, and essentially represents a flat forecast. In 1990 GA operations represented 70% of total aircraft operations, and by 2011 GA's share had declined to 50% of total activity. FAA predicts that the share of GA operations will decline to 48% of total activity by 2040.

As noted above with future air carrier activity, a number of external events could significantly impact GA activity at MVY, including a sharp rise in avgas and/or Jet A fuel prices, a shortage of avgas, rapidly increasing cost of new aircraft and parts, or new security regulations or restrictions aimed at GA. However, none of those events are currently anticipated to occur in the foreseeable future, and based on historical trends the FAA's Terminal Area Forecast of GA activity is reasonable.

3.3.3 Irregular Operations (IROPs)

By their very nature and definition, IROPs are irregular and unpredictable. MVY has served as a staging area for search and rescue operations, as well as aircraft diversions due to mechanical problems, ill passengers and crew, and deteriorating weather. Those types of diversions will continue to occur, and the frequency of such occurrences will be tied to factors such as overall aviation activity in the region, etc. Aircraft overflying the Cape and Islands have a variety of airports to divert too based on the type and extent of their emergency, and airport facilities and services needed. VIP visits are anticipated to continue, although they are not possible to predict with any accuracy. As noted previously, MVY has hosted a number of weeklong visits by U.S. presidents, which had an enormous impact on airport and airspace operations. Whether presidents will return to the Island for future weeklong visits is difficult to predict, but it is anticipated that other VIPs will visit in the future. The Airport has operating and contingency plans in place to accommodate IROPs, including VIP visits.

Military Activity

In 2013 there were fewer than 600 total military aircraft operations at MVY, which represented less than 1% of total activity at the airport. FAA predicts that military aircraft operations will remain flat throughout the forecast period, and given possible upcoming Defense Department budget cuts, along with the military's increased focus on the use of unmanned aerial vehicles (UAV), FAA's forecast appears to be reasonable.

3.4 Projections

Projections of based aircraft and aircraft operations are presented below based on growth rates as determined by accepted aviation forecasting methodologies. Based aircraft are defined as the total number of active general aviation aircraft that are either hangared or tied-down at an airport. There were 77 based aircraft at MVY in 2014. MVY had approximately 47,000 aircraft operations in 2013. An aircraft operation is defined as either a takeoff or a landing. Activity levels were derived from a site visit/survey by Jacobs personnel, ATC tower records and discussions with airport management.

The projections for MVY are based on growth rates derived from:

- FAA's Terminal Area Forecast (TAF)
- 2010 Massachusetts State Airport System Plan
- 2001 Airport Master Plan
- FAA's National Aerospace Forecast

The forecast scenarios are presented below.

3.4.1 FAA Terminal Area Forecast (TAF)

The Federal Aviation Administration (FAA) develops and publishes terminal area forecasts for each airport in its National Plan of Integrated Airport Systems (NPIAS), including Martha's Vineyard Airport. The FAA's Terminal Area Forecast (TAF) is published annually, and covers a period of approximately 30 years.

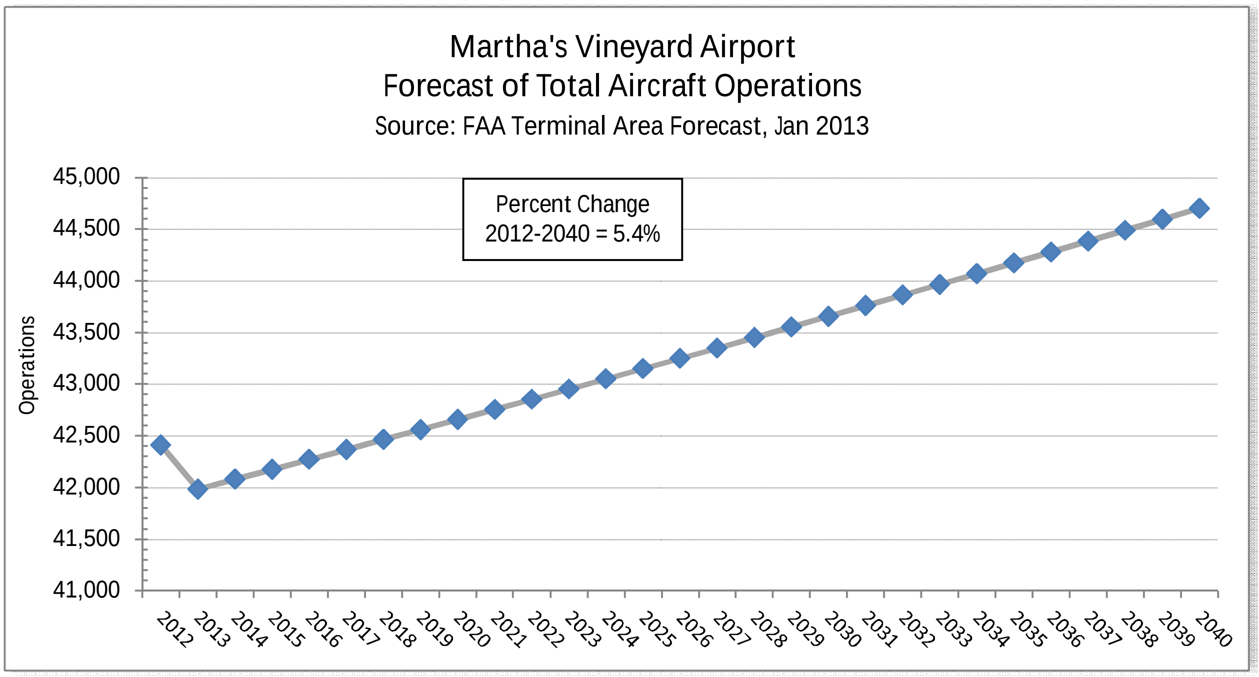
The most recent TAF published for Martha's Vineyard Airport was issued in January 2013 and covered the period from 2012 to 2040. It forecasted air carrier, air taxi, general aviation, and military aircraft operations, as well as passenger enplanements. It also forecasts local and itinerant aircraft operations. As discussed below, the FAA's TAF is considered reasonable given all of the variables and historical trends at MVY, and it represents the forecasts for this Master Plan.

The FAA anticipates that total aircraft operations at Martha's Vineyard Airport will increase by 5.4% between 2012 and 2040 (from 39,000 to 41,200 takeoffs and landings), which represents an annual average growth rate (AAGR) of less than ½ % throughout the forecast period. Although that is a relatively low growth rate it represents a change in the direction of activity. Between 2000 and 2011 aircraft operations declined by almost 40%, which was discussed in Chapter 1 of this master plan.

Although the FAA did not identify the specific factors that will cause the change in direction at MVY, rapidly improving regional and national economic performance has stimulated additional travel demand, and the rising stock market and corporate profits has further stimulated corporate aviation activity. New airline service to JFK International Airport has recently increased passenger traffic, and FAA anticipates that growth in both air carrier and corporate activity will continue throughout the forecast period.

As previously discussed, there are external factors that could negatively impact certain segments of aviation activity at Martha's Vineyard Airport, although it does not presently appear that those factors are imminent.

Chart 3.1



Starting in 2013, the FAA's TAF anticipates a reverse of recent trends in activity at the airport. It is important to note that total aircraft operations comprise both airline and general aviation activity, which are subject to different market forces, as discussed below.

Air taxi and commuter aircraft operations are projected to increase by almost 14% between 2012 and 2040, in response to anticipated growth of passenger enplanements. The growth in passenger activity is reasonable if the economy continues to grow at a reasonable pace without deep recessions similar to the one experienced between 2008 and 2011, or sudden increases in fuel prices. In addition, the cost differential between airline and ferry ticket prices, will need to fluctuate within range that does not represent a sharp increase in air vs. ferry service.

Although based aircraft and general aviation (GA) operations are projected to increase relatively little through 2040, it is still a change compared to the downward trends experienced between 2000 and 2011. Continued growth in the regional economy will stimulate transient GA activity, while local (i.e. training) GA operations will remain essentially flat (although FAA's TAF projected that local operations will increase by almost 30% by 2040, the actual number of additional local operations is only 670 - or approx. 1.5% of total operations, so the rate of increase is negligible).

Table 3.2

FAA TERMINAL AREA FORECAST - Martha's Vineyard Airport (MVY)

Forecast Issued January 2013

	Pass. Enplanements			AIRCRAFT OPERATIONS Itinerant Operations					Local Operations				
Fiscal Year	**Air Carrier**	**Commuter**	**Total**	**Air Carrier**	**Air Taxi & Commuter**	**GA**	**Military**	**Total**	**Civil**	**Military**	**Total**	**Total Ops**	**Based Aircraft**
2012	7,121	42,746	49,867	630	19,420	20,493	327	40,870	1,273	269	1,542	42,412	88
2013	7,121	42,959	50,080	630	19,507	20,095	327	40,559	1,157	269	1,426	41,985	90
2014	7,121	43,175	50,296	630	19,595	20,096	327	40,648	1,163	269	1,432	42,080	91
2015	7,121	43,391	50,512	630	19,683	20,097	327	40,737	1,169	269	1,438	42,175	91
2016	7,121	43,608	50,729	630	19,772	20,098	327	40,827	1,175	269	1,444	42,271	93
2017	7,121	43,827	50,948	630	19,861	20,099	327	40,917	1,181	269	1,450	42,367	94
2018	7,121	44,046	51,167	630	19,951	20,100	327	41,008	1,187	269	1,456	42,464	95
2019	7,121	44,267	51,388	630	20,041	20,101	327	41,099	1,193	269	1,462	42,561	96
2020	7,121	44,488	51,609	630	20,131	20,102	327	41,190	1,199	269	1,468	42,658	97
2021	7,121	44,710	51,831	630	20,222	20,103	327	41,282	1,205	269	1,474	42,756	98
2022	7,121	44,933	52,054	630	20,312	20,104	327	41,373	1,211	269	1,480	42,853	99
2023	7,121	45,157	52,278	630	20,404	20,105	327	41,466	1,217	269	1,486	42,952	101
2024	7,121	45,382	52,503	630	20,496	20,106	327	41,559	1,223	269	1,492	43,051	102
2025	7,121	45,608	52,729	630	20,588	20,107	327	41,652	1,229	269	1,498	43,150	103
2026	7,121	45,836	52,957	630	20,680	20,108	327	41,745	1,235	269	1,504	43,249	104
2027	7,121	46,065	53,186	630	20,772	20,109	327	41,838	1,241	269	1,510	43,348	105
2028	7,121	46,297	53,418	630	20,866	20,110	327	41,933	1,248	269	1,517	43,450	106
2029	7,121	46,530	53,651	630	20,961	20,111	327	42,029	1,255	269	1,524	43,553	107
2030	7,121	46,764	53,885	630	21,056	20,112	327	42,125	1,262	269	1,531	43,656	108
2031	7,121	47,000	54,121	630	21,151	20,113	327	42,221	1,269	269	1,538	43,759	109
2032	7,121	47,237	54,358	630	21,246	20,114	327	42,317	1,276	269	1,545	43,862	110
2033	7,121	47,475	54,596	630	21,341	20,115	327	42,413	1,283	269	1,552	43,965	111
2034	7,121	47,714	54,835	630	21,437	20,116	327	42,510	1,290	269	1,559	44,069	112
2035	7,121	47,955	55,076	630	21,533	20,117	327	42,607	1,297	269	1,566	44,173	113
2036	7,121	48,197	55,318	630	21,630	20,118	327	42,705	1,304	269	1,573	44,278	114
2037	7,121	48,439	55,560	630	21,727	20,119	327	42,803	1,311	269	1,580	44,383	115
2038	7,121	48,682	55,803	630	21,825	20,120	327	42,902	1,318	269	1,587	44,489	116
2039	7,121	48,927	56,048	630	21,923	20,121	327	43,001	1,325	269	1,594	44,595	117
2040	7,121	49,173	56,294	630	22,022	20,122	327	43,101	1,332	269	1,601	44,702	118
2012-2020	0.0%	4.1%	3.5%	0.0%	3.7%	-1.9%	0.0%	0.8%	-5.8%	0.0%	-4.8%	0.6%	10.2%
2021-2040	0.0%	10.0%	8.6%	0.0%	8.9%	0.1%	0.0%	4.4%	10.5%	0.0%	8.6%	4.6%	20.4%
2012-2040	0.0%	15.0%	12.9%	0.0%	13.4%	-1.8%	0.0%	5.5%	4.6%	0.0%	3.8%	5.4%	34.1%

Chart 3.2

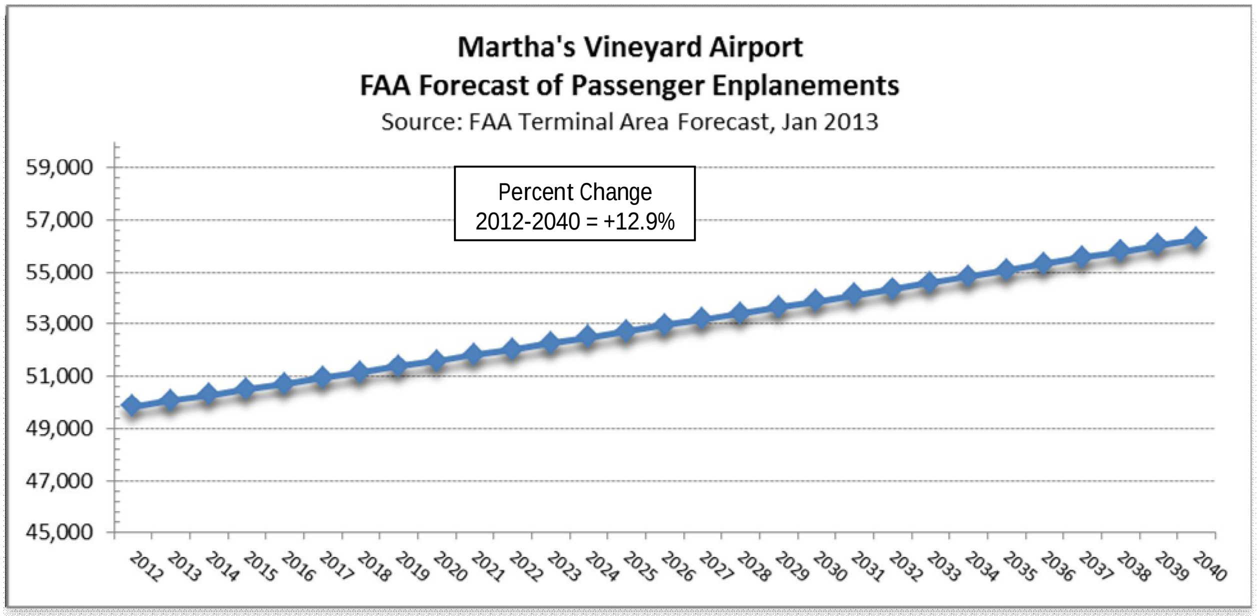


Chart 3.3

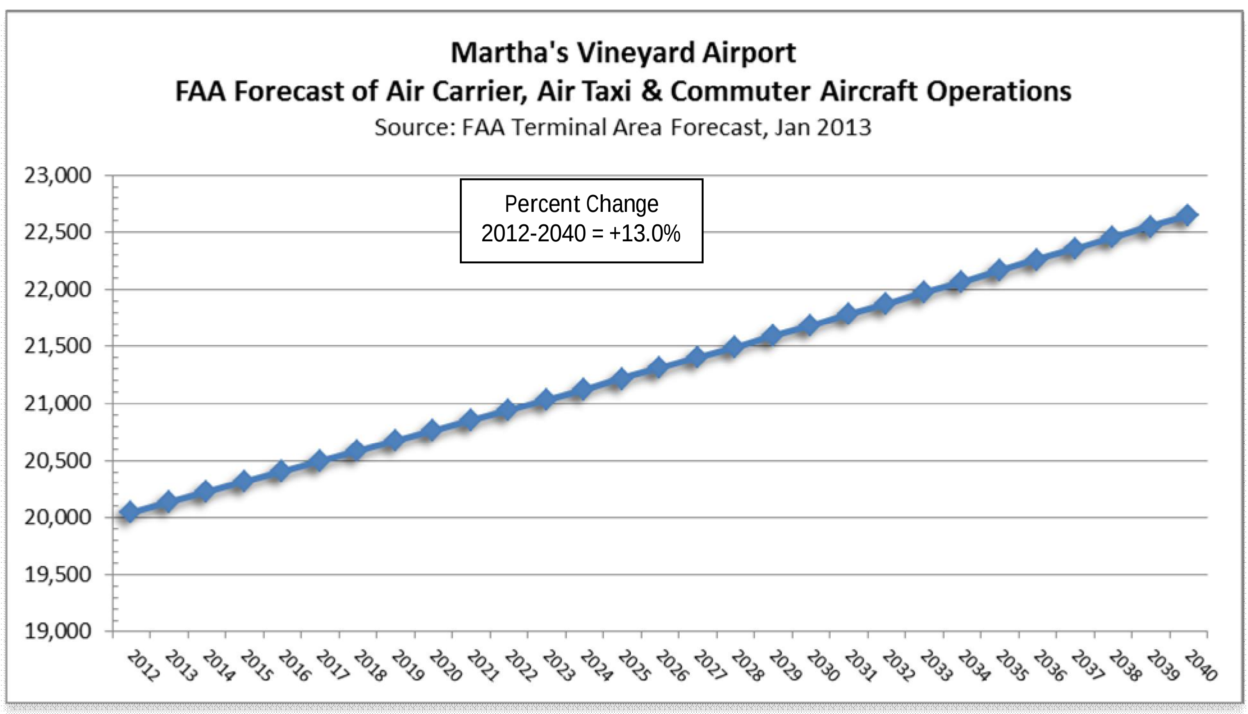


Chart 3.4

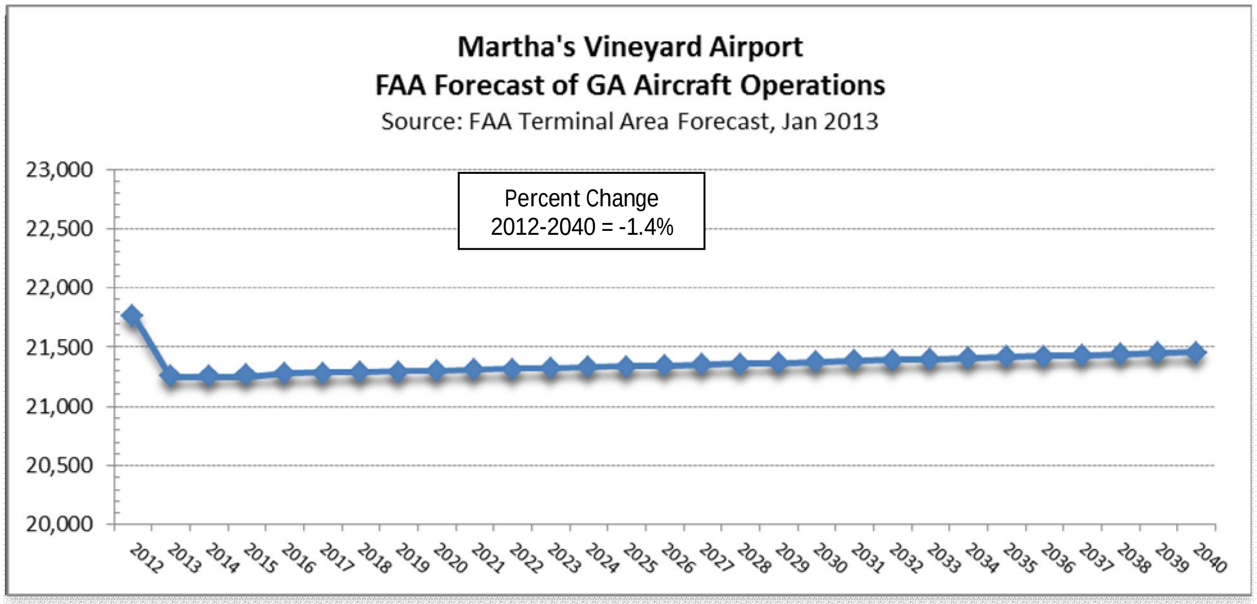
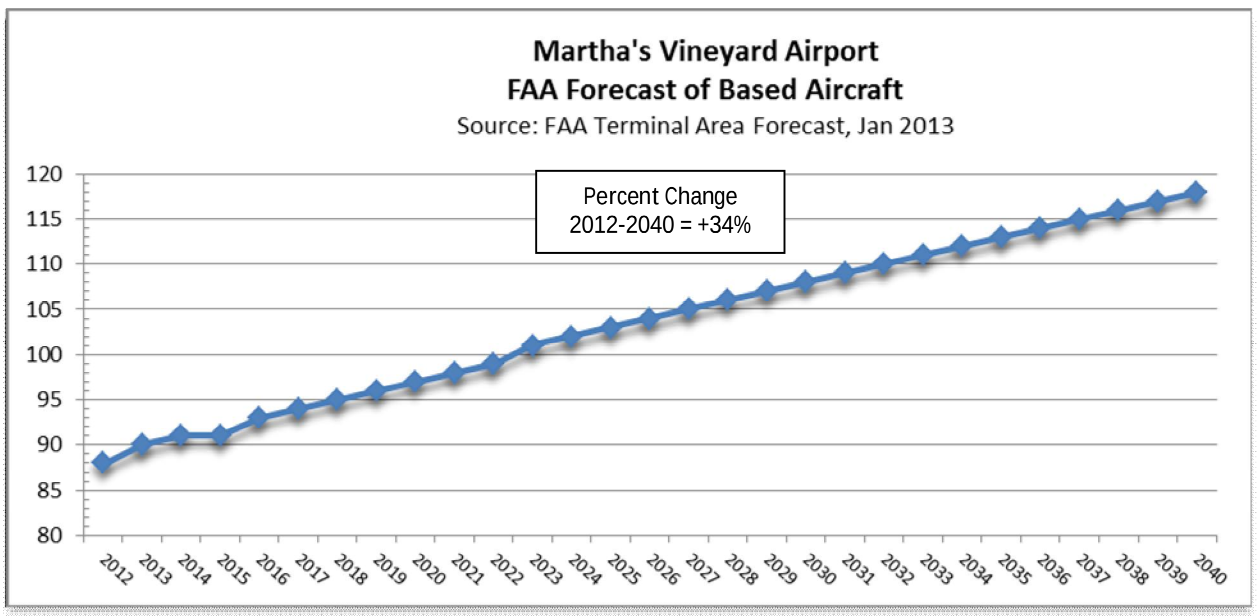


Chart 3.5



3.4.2 Massachusetts State Airport System Plan (2010)

The most recent Massachusetts State Airport Plan was completed in 2010. The System Plan included a number of elements such as inventory, forecasts, airport role, and facility requirements for each of the public-use airports in the Commonwealth, including Martha's Vineyard and Katama Airpark. Located in Edgartown, Katama Airpark has turf runways, 4 based aircraft, and approx. 7,000 aircraft operations per year. Given its location, size, and service level, Katama Airpark does not compete with Martha's Vineyard Airport for traffic with the exception of some single-engine piston aircraft.

The forecast of aircraft operations at MVY presented in the System Plan extend through 2030 (Tables 3.2 & 3.3), and overall are higher than FAA's TAF, both in terms of the starting activity level as well as the rate of growth.

In C.Y. 2011, 39,860 total operations were counted by the control tower personnel, compared to 50,980 operations estimated in the State System Plan. The System Plan did not present airport-specific factors that determined the forecasted rate of growth at Martha's Vineyard, nor did it project GA, airline, and military activity separately.

Table 3.2

Martha's Vineyard Airport
Mass DOT System Plan –
Forecast of Aircraft Operations

Percent Change	
2011-2020	16.1%
2021-2030	8.4%
2011-2030	27.0%

Source: MassDOT System Plan

Chart 3.6

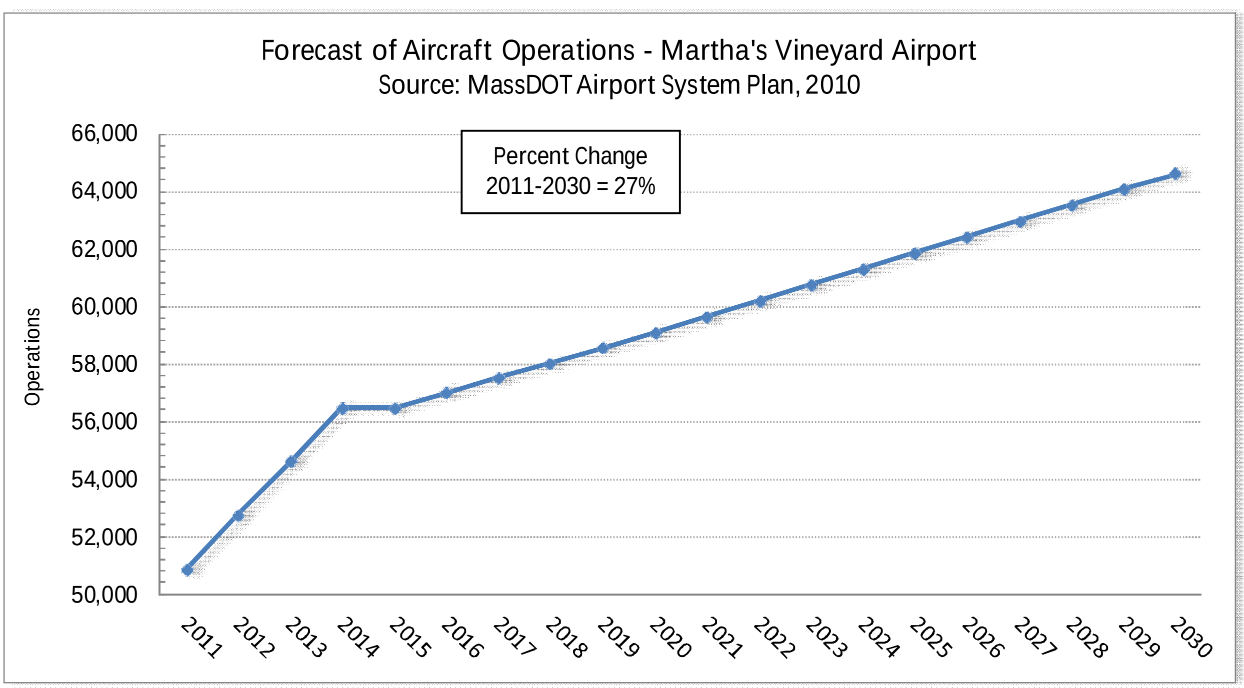


Table 3.3
Martha's Vineyard Airport
MassDOT System Plan –
GA Airport Enplanements Forecast

Based Aircraft Forecast					
Airport City	*Airport Name*	*2009*	*2015*	*2020*	*2030*
Vineyard Haven	Martha's Vineyard	94	99	104	113

Annual Aircraft Operations Forecast					
Airport City	*Airport Name*	*2008[5]*	*2015*	*2020*	*2030*
Vineyard Haven	Martha's Vineyard	45,291	56,507	59,096	64,635

GA Airport Enplanement Forecast					
Airport City	*Airport Name*	*2008[4]*	*2015*	*2020*	*2030*
Hyannis	Barnstable Municipal-Boardman Polando Field	191,837	215,863	234,846	277,967
Nantucket	Nantucket Memorial Airport	257,755	272,540	283,618	307,142
New Bedford	New Bedford Regional Airport	13,990	14,850	16,801	21,508
*Provincetown	Provincetown Municipal Airport	11,468	12,042	12,469	13,370
Springfield/Chicopee	Westover Air Reserve Base/Metropolitan	15,437	1,336	1,336	1,336
Vineyard Haven	Martha's Vineyard	40,892	44,189	45,306	47,622
Westfield/Springfield	Barns Municipal Airport	301	387	387	387
*Worcester	Worcester Regional Airport	685	107,686	114,262	270,800
	System Totals:	532,365	668,894	739,025	940,132

3.4.3 Airport Master Plan (2001)

The 2001 Martha's Vineyard Airport Master Plan (AMP) developed forecasts of aviation activity for the period between 2005 and 2020. The 2001 AMP projected that activity would increase from 83,952 operations in 2005 to 115,104 operations by 2020, an increase of 37%. Two factors explain the substantial difference between the AMP forecasts and those presented by FAA and MassDOT: a) the AMP started in a different time period with a higher number of operations than either FAA or MassDOT; and b) the AMP projected a significantly higher rate of growth than FAA or MassDOT. As noted previously, actual operations at Martha's Vineyard Airport declined by almost 40% between 2000 and 2011.

Part of the explanation for the higher number of operations and the higher growth rates is that the 2001 Master Plan forecasts were prepared in the early part of the decade when overall aviation activity was much stronger, particularly before the 9/11 attacks in 2001. It also pre-dated the decline in aviation traffic experienced throughout the Commonwealth and the U.S. between 2000 and 2011. As a result, the forecasts of aviation activity in the 2001 Master Plan have little to no relationship to recent or existing activity levels at Martha's Vineyard Airport, or to future aviation activity trends.

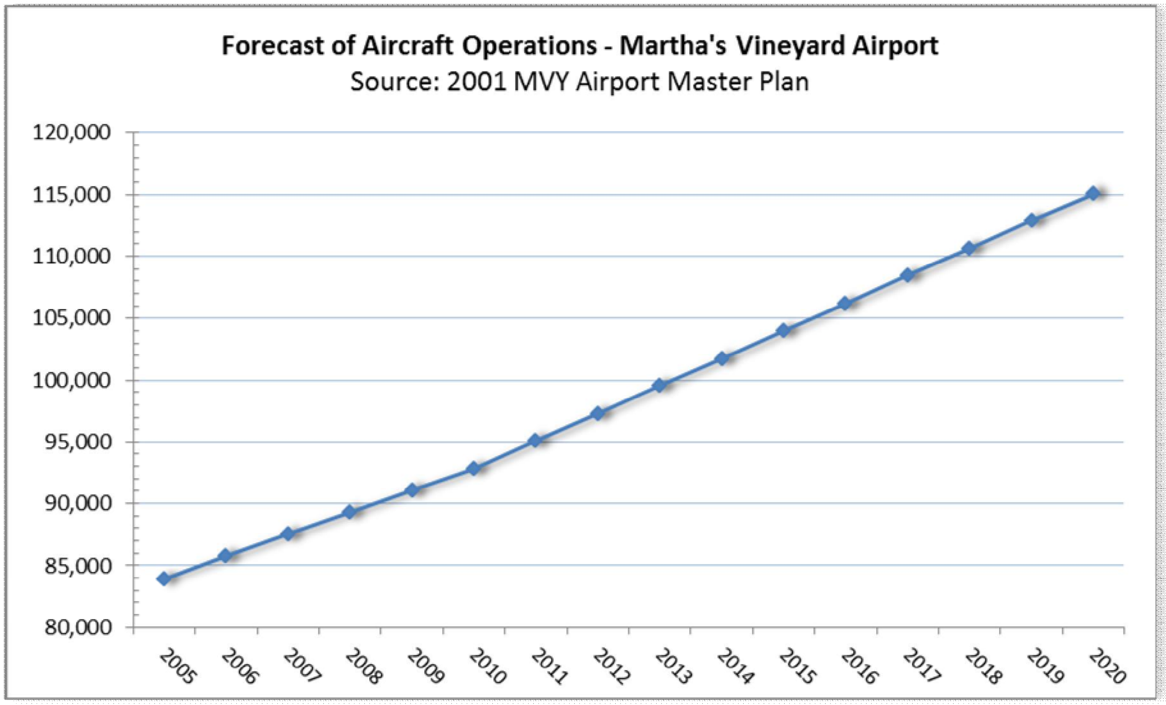
Source: 2010 Massachusetts Statewide Airport Statewide Airport System Plan; FAA TAF; Airport Master Plans and The Louis Berger Group Calculations (See Appendix B)
[5] 2008 is the last full year operations data was available for all airports
*Airport master plan forecasted growth rate utilized.

Table 3.4

Martha's Vineyard Airport 2001 Airport Master Plan - Aircraft Operations Percent Change	
2005-2010	10.6%
2011-2020	21.1%
2005-2020	37.1%

Source: 2001 MVY Airport Master Plan

Chart 3.7



3.4.4 FAA National Aerospace Forecasts FY 2012-2032

The FAA publishes annual forecasts of aviation activity for the U.S. based on industry trends and economic projections. The forecasts are broken down by mainline carrier (domestic and international), regional carrier, and general aviation activity. The latest forecast period covers 2012-2032. National trends are useful to examine to determine if local growth rates are consistent with those trends, or if there are significant differences to identify what factors account for the differences. In general, FAA's TAF for MVY is consistent with their national aviation activity projections.

Domestic mainline air carrier passenger enplanements nationally are projected to increase by a total of 58.7% over the 20-year period, from 487 million in 2012 to 773 million enplanements by 2032. Available domestic seat miles (ASM – a measure of system capacity) are projected to increase by 65% over the same period, and system-wide load factors are also anticipated to increase from 84% in 2012 to almost 86% by 2032. By comparison, in the year 2000 system-wide domestic load factors averaged 71%. The increase in load factors is due to both rising number of passenger enplanements and limited capacity growth (i.e. available seats).

Regional carriers (domestic) passenger enplanements nationally are projected to increase by almost 67% over the 20-year period, from 2012 to 2032. Domestic revenue passenger miles (RPM), which accounts for trip lengths and enplanements, is projected to increase 100% by 2032, which indicates that the average trip length will increase at an even faster pace than passenger enplanements. Those trends are consistent with airlines' recent moves to replace their 35 and 50 passenger aircraft (such as the Canadair CRJ-200 and ERJ-145) with larger regional aircraft such as the CRJ-900, E190, etc. JetBlue presently serves MVY with E190 aircraft, while Delta and American Airlines serve MVY with CRJ-200 aircraft.

Active general aviation aircraft are projected to increase at an average annual rate of 0.5 percent over the forecast period which was applied to the based aircraft forecast. Within the general aviation group, the FAA projects the total active single-engine piston aircraft fleet to decline at 0.4 percent annually from 2013 through 2034, while the multi-engine piston fleet is expected to decline at 0.5 percent a year. The turbine jet fleet is expected to expand at a growth rate 3.0 percent.

In terms of hours flown, or operations, general aviation activity is forecast to grow at 1.4 percent annually. Within this, the hours flown by turbine aircraft are forecast to increase 3.2 percent annually, while hours flown by piston-powered aircraft are expected to decline by 0.4 percent.

Total activity at FAA Air Traffic Control towers is expected to grow at 1.0 percent annually over the forecast period of 2014-2034.

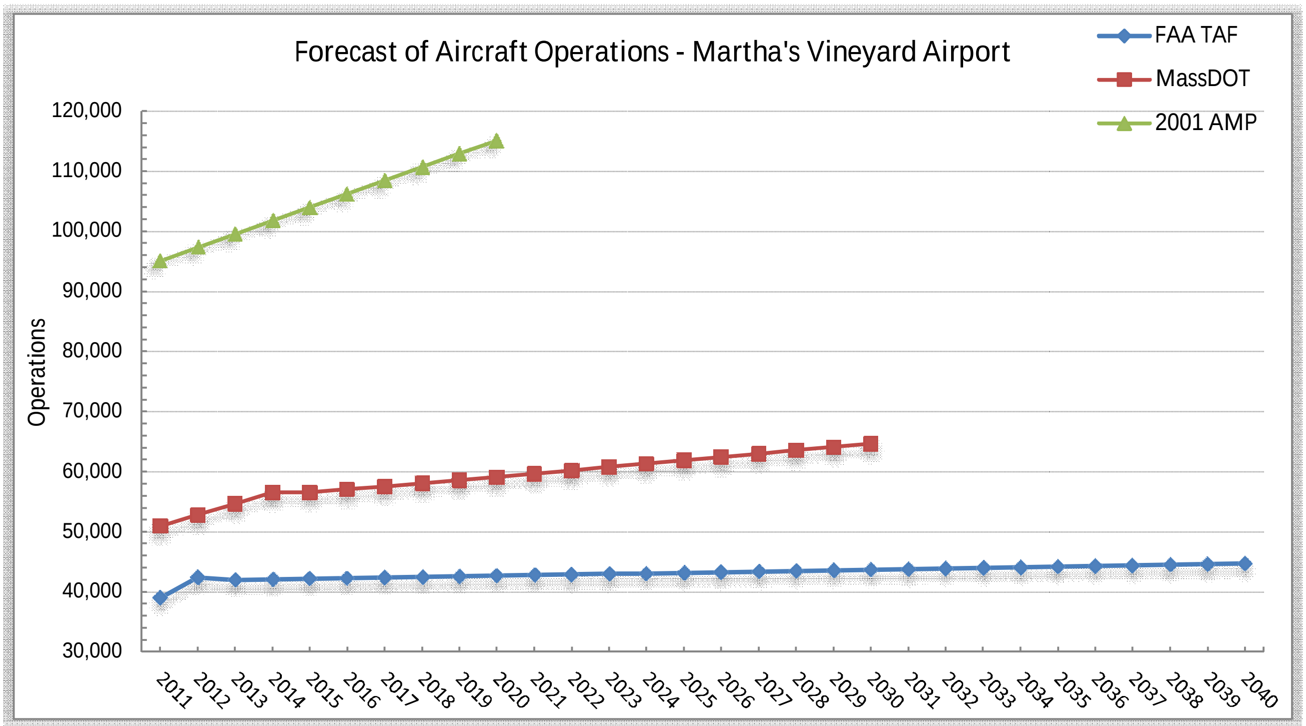
3.5 Summary of MVY Aviation Activity Forecasts

The three aviation forecasts for Martha's Vineyard Airport (FAA TAF, MassDOT System Plan, and 2001 Airport Master Plan) are summarized below. The FAA's Terminal Area Forecast appears to be the most reasonable of the three.

Table 3-5 Summary of Aviation Forecasts – Annual Operations

	2014	2019	2024	2034	CAGR (%)
FAA TAF	42,080	42,561	43,051	44,069	.23
2010 State Aviation System Plan	56,505	58,579	61,312	67,981	1.27
2001 Airport Master Plan	101,747	112,877	125,237	154,167	2.10

Chart 3.8



3.6 Preferred Forecast

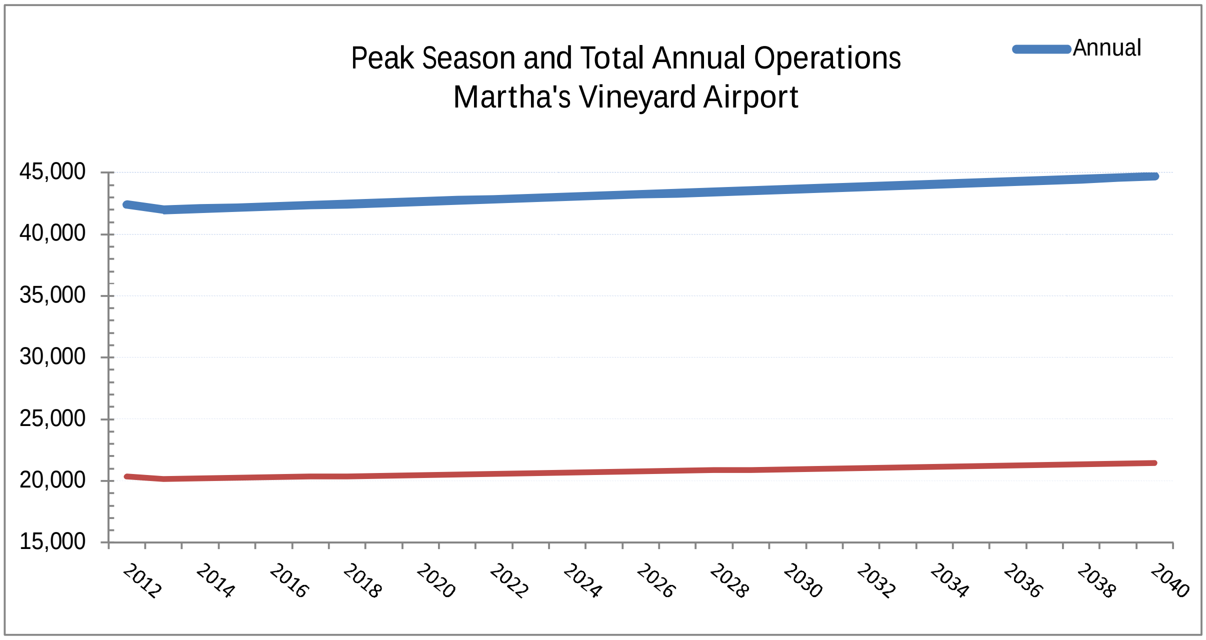
As noted previously, based on historic trends and current socio-economic conditions, FAA's Terminal Area Forecast (TAF) is reasonable. FAA's TAF did not identify peak period traffic, which was analyzed in this study, and is presented below.

Table 3-6 – Preferred Forecasts				
	Year			
	2014	2019	2024	2034
Based Aircraft	77	96	102	112
Jet	0	0	0	0
Multi-engine piston	15	19	20	22
Single-engine piston	62	77	82	90
Annual Operations	42,080	42,561	43,051	44,069
Local	1,432	1,462	1,492	1,559
Itinerant	40,648	41,099	41,559	42,510

Peak Season Operations: As noted previously, MVY experiences one of the strongest peak season levels of any airport in the country. Peak season typically occurs in three months: June, July, and August. Between 2000 and 2012, peak season operations averaged 47.7% of total annual operations.

Even as traffic levels varied over that period, the ratio of peak season to total annual operations has fluctuated within a narrow range. As a result, it was projected that peak season operations would remain at approximately 48% of total annual operations, as shown below.

Chart 3.10



Peak month, average day, and peak hour operations are based on peak season activity, and are shown in Table 3.5 on the following page.

Table 3.5

Peak Period Aircraft Operations Martha's Vineyard Airport				
CY	Peak Season	Peak Month	Avg. Day	Peak Hour
2012	20,358	6,786	219	33
2013	20,153	6,718	217	33
2014	20,198	6,733	217	33
2015	20,244	6,748	218	33
2016	20,290	6,763	218	33
2017	20,336	6,779	219	33
2018	20,383	6,794	219	33
2019	20,429	6,810	220	33
2020	20,476	6,825	220	33
2021	20,523	6,841	221	33
2022	20,569	6,856	221	33
2023	20,617	6,872	222	33
2024	20,664	6,888	222	33
2025	20,712	6,904	223	33
2026	20,760	6,920	223	33
2027	20,807	6,936	224	34
2028	20,856	6,952	224	34
2029	20,905	6,968	225	34
2030	20,955	6,985	225	34
2031	21,004	7,001	226	34
2032	21,054	7,018	226	34
2033	21,103	7,034	227	34
2034	21,153	7,051	227	34
2035	21,203	7,068	228	34
2036	21,253	7,084	229	34
2037	21,304	7,101	229	34
2038	21,355	7,118	230	34
2039	21,406	7,135	230	35
2040	21,457	7,152	231	35

The following chapter identifies those infrastructure improvements that will be required to meet anticipated future demand based on the preferred aviation forecasts as well as addressing any FAA airport design standard deficiencies.

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Chapter 4– Facility Requirements

4.1 Introduction

This chapter examines the current infrastructure at MVY in terms of:

1. Correcting airport design standard deficiencies;
2. Developing facilities to meet existing and forecast levels of demand;
3. Achieving the goals and objectives identified by the MVY Airport Commission, Airport management and the working groups assembled for this master plan.

The facilities are analyzed in regard to accommodating the design aircraft and the FAA's airport design standards as contained in FAA Advisory Circular 150/5300-13A as described below.

4.2 Critical Design Aircraft/ Airport Design Standards

The FAA's airport design standards are based on the critical design aircraft that use the airport, specifically in relation to its wingspan and approach speed. Jacobs obtained operations data from a flight tracking firm (FlightAware) for the period October 1, 2013 through October 29, 2014. FlightAware provided operational counts of those aircraft operating to/from MVY for aircraft that had filed an FAA flight plan. The operations data provided by FlightAware included: date, type of aircraft, origin, destination and count. The data was sorted and summarized to determine aircraft activity levels, specifically the largest aircraft or type of aircraft conducting at least 500 operations per year at the airport. From Oct. 2013 – Oct 2014, 670 operations by ARC C-III aircraft were recorded (see table at right).

The current critical design aircraft at MVY is a composite of the regional and corporate jets noted to have operated at MVY from Oct. 2013 to Oct. 2014. Therefore the design aircraft will continue to be Airplane Design Group (ADG) C-III (Table 4.1 on the following page). ADG C-III aircraft include large jets such as the Embraer 190, Gulfstream G-550, Boeing 737 and Airbus A320 (Figure 4-1). ADG C-III includes aircraft with wingspans of at least 79' to less than 118', and approach speeds from 121 kts. to less than 141 kts.

MVY Operations by ARC C-III Aircraft	
Aircraft	Operations
Cessna Citation X	182
ERJ-190	333
Bombardier Global 5000	16
Bombardier Global Express	33
Gulfstream V	100
Gulfstream 650	6
Total	670

Figure 4-1 Airplane Design Groups

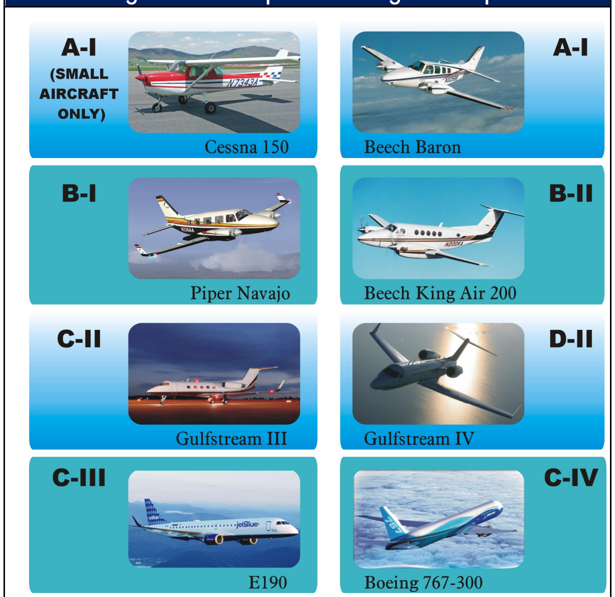

Table 4.1
Runway 6-24 Design Standards
(Highlighted in yellow)

Aircraft Approach Category (AAC) and Airplane Design Group (ADG):
(select from pull-down menu at right)

C – III

MVY

ITEM	DIM[1]	Visibility Minimums: Visual	Not Lower than 1 mile	Not Lower than 3/4 mile	Lower than 3/4 mile
Runway Design					
Runway Length	A	*Refer to paragraphs 302 and 304*			
Runway Width [12]	B	150 ft	150 ft	150 ft	150 ft
Shoulder Width [12]		25 ft	25 ft	25 ft	25 ft
Blast Pad Width [12]		200 ft	200 ft	200 ft	200 ft
Blast Pad Length		200 ft	200 ft	200 ft	200 ft
Crosswind Component		16 knots	16 knots	16 knots	16 knots
Runway Protection					
Runway Safety Area (RSA)					
Length beyond departure end [9, 10]	R	1000 ft	1000 ft	1000 ft	1000 ft
Length prior to threshold [11]	P	600 ft	600 ft	600 ft	600 ft
Width	C	500 ft	500 ft	500 ft	500 ft
Runway Object Free Area (ROFA)					
Length beyond runway end	R	1000 ft	1000 ft	1000 ft	1000 ft
Length prior to threshold [11]	P	600 ft	600 ft	600 ft	600 ft
Width	Q	800 ft	800 ft	800 ft	800 ft
Runway Obstacle Free Zone (ROFZ)					
Length		*Refer to paragraph 308*			
Width		*Refer to paragraph 308*			
Precision Obstacle Free Zone (POFZ)					
Length		N/A	N/A	N/A	200 ft
Width		N/A	N/A	N/A	800 ft
Approach Runway Protection Zone (RPZ)					
Length	L	1700 ft	1700 ft	1700 ft	2500 ft
Inner Width	U	500 ft	500 ft	1000 ft	1000 ft
Outer Width	V	1010 ft	1010 ft	1510 ft	1750 ft
Acres		29.465	29.465	48.978	78.914
Departure Runway Protection Zone (RPZ)					
Length	L	1700 ft	1700 ft	1700 ft	1700 ft
Inner Width	U	500 ft	500 ft	500 ft	500 ft
Outer Width	V	1010 ft	1010 ft	1010 ft	1010 ft
Acres		29.465	29.465	29.465	29.465
Runway Separation					
Runway centerline to:					
Parallel runway centerline	H	*Refer to paragraph 316*			
Holding position [8]		250 ft	250 ft	250 ft	250 ft
Parallel Taxiway/Taxilane centerline [2]	D	400 ft	400 ft	400 ft	400 ft
Aircraft parking area	G	500 ft	500 ft	500 ft	500 ft
Helicopter touchdown pad		Refer to AC 150/5390-2			

Notes:

- Appendix 7 contains non-interactive tables for all RDCs.
- Values in the table are rounded to the nearest foot. 1 foot = 0.305 meters.

Source: FAA Advisory Circular 150/5300-13A-Change 1, Airport Design

Table 4.2
<u>Runway 15-33 Design Standards</u>
(Highlighted in yellow)

Aircraft Approach Category (AAC) and Airplane Design Group (ADG):
(select from pull-down menu at right)

B – II

MVY

ITEM	DIM[1]	Visibility Minimums: Visual	Not Lower than 1 mile	Not Lower than 3/4 mile	Lower than 3/4 mile
Runway Design					
Runway Length	A	*Refer to paragraphs 302 and 304*			
Runway Width	B	75 ft	75 ft	75 ft	100 ft
Shoulder Width		10 ft	10 ft	10 ft	10 ft
Blast Pad Width		95 ft	95 ft	95 ft	120 ft
Blast Pad Length		150 ft	150 ft	150 ft	150 ft
Crosswind Component		13 knots	13 knots	13 knots	13 knots
Runway Protection					
Runway Safety Area (RSA)					
Length beyond departure end [9, 10]	R	300 ft	300 ft	300 ft	600 ft
Length prior to threshold	P	300 ft	300 ft	300 ft	600 ft
Width	C	150 ft	150 ft	150 ft	300 ft
Runway Object Free Area (ROFA)					
Length beyond runway end	R	300 ft	300 ft	300 ft	600 ft
Length prior to threshold	P	300 ft	300 ft	300 ft	600 ft
Width	Q	500 ft	500 ft	500 ft	800 ft
Runway Obstacle Free Zone (ROFZ)					
Length		*Refer to paragraph 308*			
Width		*Refer to paragraph 308*			
Precision Obstacle Free Zone (POFZ)					
Length		N/A	N/A	N/A	200 ft
Width		N/A	N/A	N/A	800 ft
Approach Runway Protection Zone (RPZ)					
Length	L	1000 ft	1000 ft	1700 ft	2500 ft
Inner Width	U	500 ft	500 ft	1000 ft	1000 ft
Outer Width	V	700 ft	700 ft	1510 ft	1750 ft
Acres		13.770	13.770	48.978	78.914
Departure Runway Protection Zone (RPZ)					
Length	L	1000 ft	1000 ft	1000 ft	1000 ft
Inner Width	U	500 ft	500 ft	500 ft	500 ft
Outer Width	V	700 ft	700 ft	700 ft	700 ft
Acres		13.770	13.770	13.770	13.770
Runway Separation					
Runway centerline to:					
Parallel runway centerline	H	*Refer to paragraph 316*			
Holding position		200 ft	200 ft	200 ft	250 ft
Parallel Taxiway/Taxilane centerline [2, 4]	D	240 ft	240 ft	240 ft	300 ft
Aircraft parking area	G	250 ft	250 ft	250 ft	400 ft
Helicopter touchdown pad			Refer to	AC 150/5390-2	

Source: FAA Advisory Circular 150/5300-13A, Change 1, Airport Design

Airport design standards for ADG C-III also accommodate smaller aircraft (in ADG A-I and B-I, B-II, CII) such as the Raytheon Beech King Air series (King Air C-90 & B-200) and Premier I Jet; Piper Navajo and Aztec; the Cessna Citation series (CE-600); Falcon 50, 900, and 2000; as well as the Cessna 402 operated by Cape Air and Island Air, and Cessna C-310, C-150/172/ 182/206, all of which operate at MVY.

RDC KEY
C = Approach Speed (121 <141 kts.)
II = wingspan (79' <118')
2400 = lowest vis. minimum (in feet)

As noted in FAA's latest edition of AC 150/5300-13A, Change 1, *Airport Design*, the Runway Design Code (RDC) is a combination of approach speed, wingspan and tail height, and lowest runway visibility minimums. The Runway Design Code (RDC) for Runway 6-24 is C-III-2400. Due to its shorter length and the fact that jets rarely use Runway 15-33, the RDC for Runway 15-33 is B-II-4000, which can accommodate

RDC KEY
B = Approach Speed (91<121 kts.)
II = wingspan (49' <79')
4000 = lowest vis. minimum (in feet)

aircraft such as the King Air 200, Rockwell Turbine Commander 1000, Piper Cheyenne III, as well as all piston-engine aircraft.

4.3 Runway Length Requirements

MVY has two runways: Runway 6-24 is 5,504' x 100', and Runway 15-33 is 3,328' x 75'. Based on the analysis presented below, current runway length imposes some operational constraints in terms of useful load carried, particularly on jets, for Runway 15-33. Runway 6-24 is the primary use runway because it is the longest; prevailing winds are from the southwest in the summer (i.e. during peak season); and there is a precision instrument landing system (ILS) approach to Runway 24. An estimated 85% of all operations are conducted on Runway 6-24.

Runway 15-33 is used primarily by piston engine and turboprop aircraft when the winds are from the northwest or southeast, particularly after frontal passage. However, the length of 15-33 (3,328') precludes most jets from using it on a regular basis, even when the winds favor 33 for departure. Unless crosswinds clearly exceed their design limits, jets will typically depart on the longest runway available (6-24). The 2002 Master Plan estimated that approx. 15%-20% of all GA operations were conducted on Runway 15-33. In terms of air carrier operations, Cape Air's C-402s will use 15-33 when the winds favor it, but all turbine-powered air carrier aircraft (such as the CRJ-200 and E190) use 6-24.

The current length and width of Runway 6-24 and 15-33 meet current FAA Design standards for their particular RDC. However, there are a number of factors that affect runway length requirements for turbine aircraft, particularly jets:

- Pilots are required to calculate balanced field length (BFL) before each takeoff - i.e. specific runway length requirements. BFL is based on the runway required to accelerate to a predetermined speed (designated by FAA as V_1) and either stop on the remaining runway in case of an emergency, or else safely continue the takeoff with one engine inoperative (OEI). The BFL varies based on a number of factors including aircraft weight, runway gradient, outside air temperature/pressure/humidity, density altitude[6], flap setting, wind direction and speed, condition of the runway (wet, dry), use of air conditioning or not, etc. As a result, the BFL is different for every takeoff

- The large majority of jet and turboprop departures are conducted at less than maximum takeoff weight. Variables in terms of weight carried include fuel, passengers, and baggage or cargo, known as useful load. Pilots of jet aircraft routinely limit takeoff weight by reducing useful load in order to safely takeoff at a specific airport or runway. As noted in Chapter 2, regional jets fly between MVY and BOS (61 nm), JFK (150 nm), and Washington Reagan National Airport (DCA – 332 nm). The maximum range of the CRJ-200 is approx. 1,229 to 1,585 nm, depending on the size of fuel tanks in the particular aircraft (source: Canadair). The E190 operated by Jet Blue has a non-stop range of approx. 2,400 nm (source: Embraer). As a result, regional jets depart MVY with significantly less than maximum fuel, which reduces takeoff weight as well as takeoff runway distance (i.e. BFL), and also reduces operating costs because the airplane is carrying less weight and therefore burns less fuel.

At maximum takeoff weight, sea level, 59°F., the CRJ-200 requires 5,800' for takeoff (BFL), and the E190 at maximum takeoff weight requires a runway length of 6,745'. However, regional jets take off at well below maximum weight when leaving MVY due to reduced fuel requirements, which gives operators more flexibility in terms of how much payload (i.e. passengers and baggage) can be carried. As a result, the length of Runway 6-24 imposes few operational constraints in terms of payload for the present destinations served by MVY carriers.

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[6] MVY is 68' above mean sea level, and the mean maximum temperature in summer is 78^0 F

In terms of takeoff performance regional jets could depart from Runway 15-33, however airlines typically require a minimum of 5,000' for takeoff by regional jets. There are some airports with slightly shorter runways, such as Key West, FL whose Runway 9-27 is 4,800' long, as well as internationally; Santos Dumont Airport in Rio de Janeiro, Brazil has 4,300' long runway with scheduled jet service, as well as London City Airport, UK, which has a 4,948' runway. But those are exceptions to the rule.

While it is possible for regional jets to take off from runways less than 5,000', the weight penalty (either passengers/fuel) for most is significant and many carriers are not willing to accept that penalty because it directly impacts their revenue potential. Although the relatively short stage lengths served from MVY reduces fuel requirements and therefore takeoff weight, turbine aircraft would be very weight limited in terms of the amount payload carried when departing from Runway 15-33 (3,328' long).

Corporate jets have similar operating characteristics as regional jets in terms of normally departing at reduced weight. For example, the average stage (trip) length flown by corporate jets ranges from 300nm for Citations and turboprops, up to 756 nm for large jets such as the Boeing BBJ, Airbus ACJ-A318, Global 5000, and Falcon 7X [7], which is a fraction of their maximum range. For example, a number of corporate jets have maximum ranges of 5,000nm. In addition, corporate jets typically carry an average of 4 passengers, which is less than their maximum seating capacity. As a result corporate jets typically takeoff at well below their maximum weight, which means that many mid-size and large corporate jets can depart from runways less than 4,000' long, including 15-33 at MVY. A recent pilot report and user survey about the Falcon 2000LX (specifications shown in Figure 4.2), a mid-size corporate jet that flies into MVY, noted that operators typically carry four passengers and that:

> *"Most U.S. operators report average mission lengths of 1.5 to 2.0 hr. The average mission length for the whole fleet is 1.7 hr. according to Dassault Falcon Jet statistics. On such missions, they can use runways as short as 3,500 ft. On such trips they climb directly to FL 390 to FL 410 and cruise at 0.80 indicated Mach." – Business & Commercial Aviation*

Figure 4.2

Falcon 2000LX

- 2 Turbofan engines
- Max weight = 42,200 lbs.
- Max pass. seats = 19
- Max range = 4,000 nm

The impact on decreasing takeoff runway length by reducing weight is also illustrated in Figure 4.3 below. The chart is for the Gulfstream G-280, a new mid-size corporate jet built by Gulfstream (max. weight 39,600 lbs., 10 passengers, and maximum range of approx. 3,600 nm).

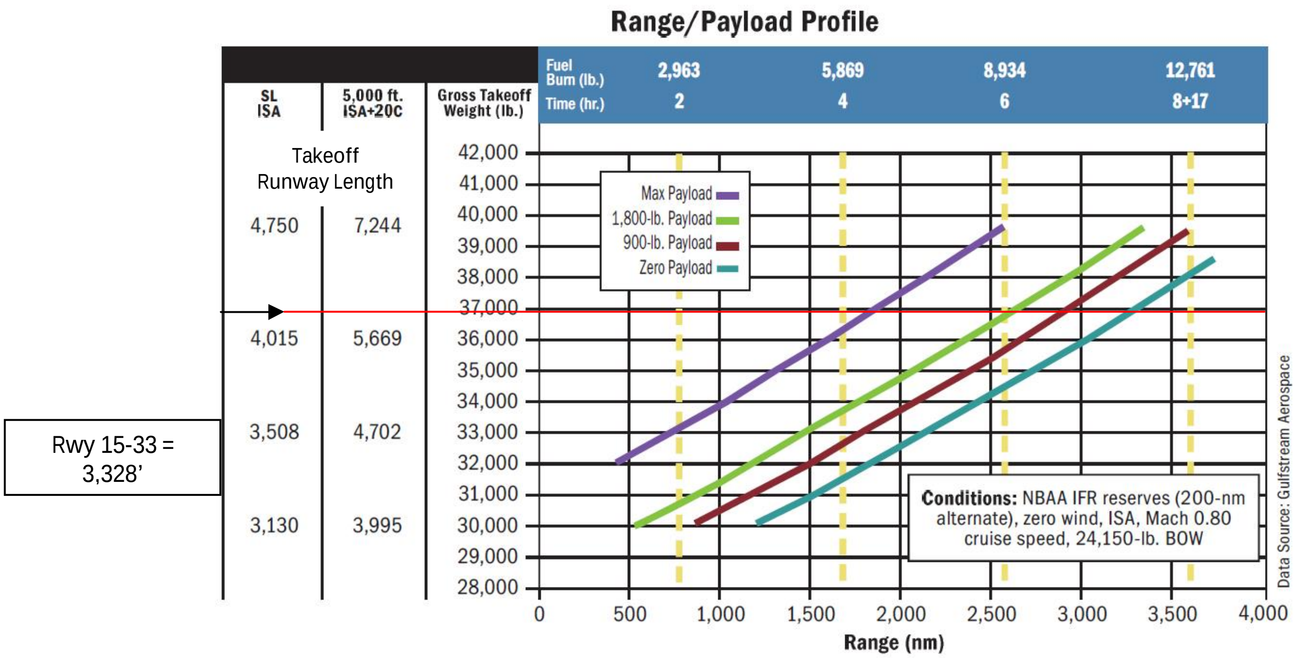
Gulfstream G-280

The range/payload profile chart below illustrates that as the payload (horizontal color lines represent passengers and baggage) is reduced, the takeoff runway length requirement is reduced as well, from a maximum runway length of 4,800' at maximum weight, down to 3,130' takeoff distance at 30,000 lbs. (sea level in standard temperature). Departing from a 3,328' runway at sea level (i.e. Runway 15-33), the G-280 can fly non-stop for 1,100 nm with a 900 lb. payload. However, jets would only use Runway 15-33 when the crosswind components on 6-24 exceed their limits, which for corporate jets can be as high as 25 kts. That means corporate jets can use 6-24 the large majority of time, particularly in the summer months. And it also highlights that existing runway lengths at MVY do not

[7] Source: Business and Commercial Aviation, *Operations and Planning Guide*, 2012

significantly constrain jet operations, except when winds favor Runway 15-33, where it is often not long enough to accommodate most jets without weight penalties.

Figure 4-3
Gulfstream G-280



Aircraft used for compensation or hire must operate with an appropriate certificate issued by FAA under a specific federal aviation regulation (FAR), such as FAR Part 135, 121, 125. Those aircraft also must have FAA-approved operations specifications (ops specs) on board the aircraft.

The ops specs serve as the aircraft flight manual (AFM), and specify runway length requirements in addition to all other operating procedures. The ops specs are developed by each operator and approved by FAA. Therefore, ops specs for similar aircraft may be somewhat different for each operator, depending on their particular operating procedures or requirements, and their minimum performance requirements may also be somewhat different than listed by the aircraft manufacturer.

Performance requirements such as takeoff and landing distance, for example, cannot be less than the minimum specified by the aircraft manufacturer, but in some cases the ops specs may stipulate additional safety margins that may increase takeoff and landing distance requirements.

As a result, in order to accommodate a variety of operators and types of aircraft, runway length requirements typically fall within a range, as noted in FAA's advisory circular 150/5325-4B, *Runway Length Requirements for Airport Design.* Based on FAA guidance, in order to accommodate 100% of the corporate jet fleet at 60% load, MVY would need a 5,000' runway (Table 4.4).

Table 4.4 below presents recommended runway lengths using a compilation of calculations from Figures 2-1, 2-2, 3-1, and 3-2 in FAA *AC 150/5325-4B, Runway Length Requirements*.

Table 4.4 MVY Runway Length Analysis	
Airport Input Data:	
Airport Elevation	67 ft. (MSL)
Mean daily temperature of the hottest month	78° (July)
Maximum difference in runway centerline elevation	10 ft.
Runway 6-24 Length and Width	
Runway Length Recommended for Airport Design	
Small airplanes with less than 10 passenger seats	
95 percent of these small airplanes	2,950'
100 percent of these small airplanes	3,500'
Small airplanes with 10 or more passenger seats	3,950'
Large airplanes with MTOW 60,000lbs or less	
75% of these large airplanes at 60% useful load	4,600'
75% of these large airplanes at 90% useful load	6,000'
100% of these large airplanes at 60% useful load	5,000'
100% of these large airplanes at 90% useful load	7,400'

The FAA Runway Length Analysis indicates that at 5,500 feet, Runway 6-24 currently accommodates 100% of large airplanes weighing less than 60,000 pounds at 60% useful load.

At 5,500', Runway 6-24 allows a number of regional and corporate jets to takeoff at greater than 60% useful load, which means they can depart with more fuel and/or passengers and baggage than on a 5,000' runway.

A large number of corporate aircraft were analyzed in terms of their actual takeoff performance requirements see Figure 4.4 on the following page. Twenty eight different models of corporate jets can takeoff on Runway 6-24 at maximum gross weight (see Table 1 in Appendix 5-A), and even more aircraft can takeoff at reduced weight (see Table 2 in Appendix 5-A).

The 2002 Master Plan noted that Runway 6-24 has 97.2% all weather wind coverage for 16 knot crosswinds. That means that regional and corporate jets may exceed their crosswind component on 6-24 less than 3% of the time within a given year. FAA latest Airport Design advisory circular, AC 150/5300-13A, notes that the maximum allowable crosswind for ARC C-III aircraft is 16 kts. However, a number of jet aircraft have higher crosswind components.

The prevailing winds in the summer during peak traffic periods at MVY are from the southwest, so the percent of time that 16 kt. crosswinds are exceeded on 6-24 in the summer is less than 3%. For jets with max crosswind components of 20 to 25 kts., the winds favor 6-24 almost 99% of the time in the summer. That means that the demand to use Runway 15-33 in the summer, particularly by jets, is relatively low.

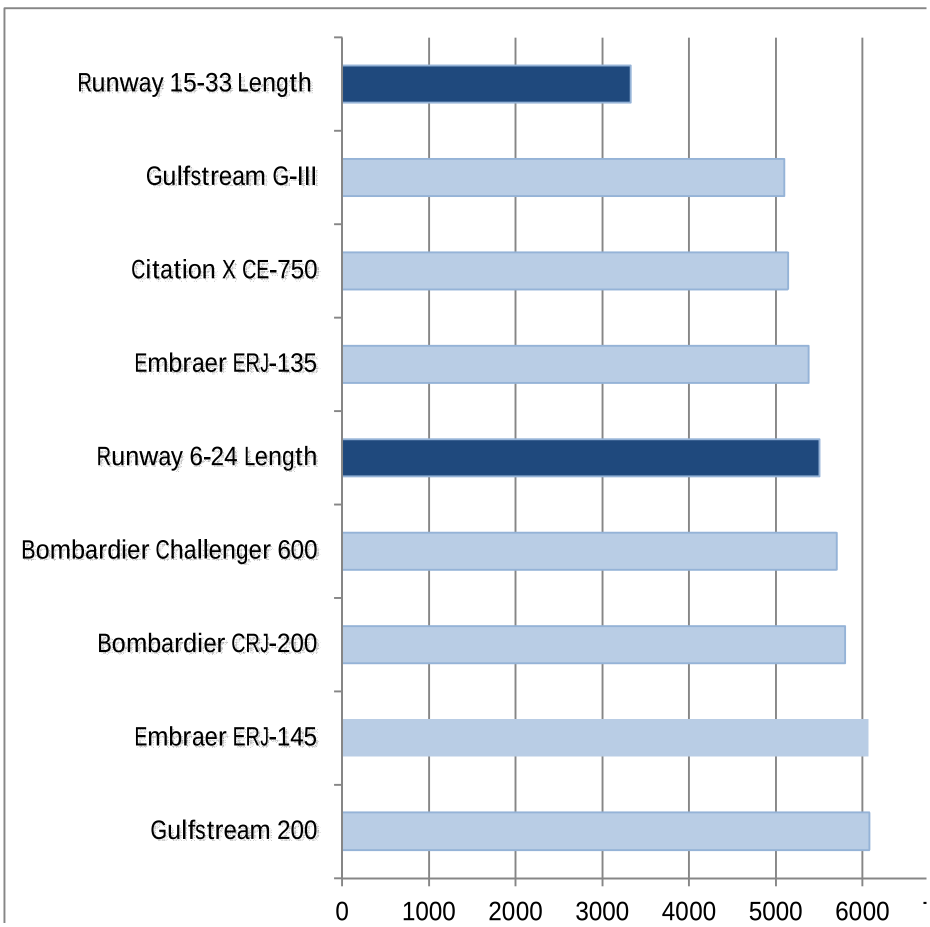
In addition, seven different models of corporate jets can depart on Runway 15-33 at its current length at maximum takeoff weight (see Table 1 in Appendix 5-A), and twenty one different models of corporate jets (including the new Gulfstream G-280) can depart on existing Runway 15-33 at reduced takeoff weight (see Table 2 in Appendix 5-A).

Almost all turboprops (most at reduced takeoff weight) and most piston engine aircraft at maximum weight can depart from Runway 15-33 at its current length, particularly with headwinds of 10 kts. or greater.

Regional Jets, regardless of their MTOW (maximum take-off weight), are assigned to the 60,000 pound or more weight category. Although a number of RJs have a MTOW less than 60,000 pounds, the exception acknowledges the long range capability of the RJs and the necessity to offer these operators the flexibility to interchange RJ models according to passenger demand without suffering operating weight restrictions. When the MTOW of listed aircraft is over 60,000 pounds, the recommended runway length is determined according to the individual aircraft. Therefore, given that the majority of the aircraft identified in the table below are RJs, the recommended runway length for MVY is determined according to individual aircraft utilizing associated aircraft manufacturer data and APM (airport planning manuals).

The recommended runway lengths shown in Figure 4.4 are established based on typical take off performance at sea level, standard temperature (59°), and MTOW. The calculations should not be used as a substitute of aircraft manufacturer specifications.

Figure 4.4
Aircraft Fleet Runway Take Off Length Requirements [8] [9] [10]



[8] Aircraft fleet estimated based on survey conducted by Jacobs in August 2012
[9] Aviation Research Group Inc: http://compair.aviationreasearch.com/index.aspx?action=aircraft_comparison
[10] Airplane Manufacturer Websites

The analysis indicates that 100% of typical regional jets that fly out of MVY are unable to utilize RW 15-33 without a large weight penalty.

Additionally, a large number of corporate aircraft were analyzed in terms of their actual takeoff performance requirements. Twenty eight different models of corporate jets can takeoff on Runway 6-24 at maximum gross weight (see Table 1 in Appendix 8), and even more aircraft can takeoff at reduced weight (see Table 2 in Appendix 8).

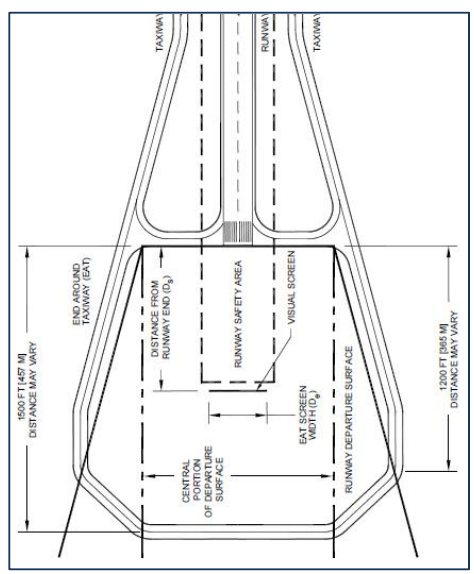
Almost all turboprops (most at reduced takeoff weight) and most piston engine aircraft at maximum weight can depart from Runway 15-33 at its current length, particularly with headwinds of 10 kts. or greater.
As a result, there is little operational benefit or need to extending RW 6-24, however an extension to RW 15-33 to 5,000ft would enable regional jets to depart when the winds are favored, particularly during the winter. It is recommended that the benefits of an extension to Runway 15-33 be considered.

4.4 Taxiways

Taxiways serve as the designated connectors between runways and terminal area facilities. The number, location, and configuration of taxiways have a significant impact on airport traffic flows, operational capacity, as well as safety. Eliminating runway incursions is one of the highest priorities of the FAA, and a major element of that program is improving taxiway systems at airports, as well as marking and lighting. The current version of FAA advisory circular 150/5300-13A, *Airport Design,* incorporated a number of changes from the previous standards, including the main gear width of the critical design aircraft as well as the distance between the cockpit and main gear to determine appropriate taxiway widths, and also new criteria for taxiway intersection design. The taxiway design group (TDG) for all taxiways is TDG-2, with the exception of Taxiway 'E' which falls under TDG-1A.

Runway 6-24 has a full parallel taxiway ('A'). Taxiway A to Runway 6-24 centerline to centerline distance is 400', which meets FAA design standard[11]. Taxiway A is 50' wide, which also meets FAA's taxiway design group (TDG) 2 standards (that includes ADG C-III aircraft). There are 7 exits off of Runway 6-24 to Taxiway A, including Runway 15-33. That number of exit taxiways is optimal in terms of minimizing runway occupancy time by arriving aircraft and therefore maximizing operational capacity. As a result there is no need for additional taxiways to serve 6-24, as was recommended in the 2002 Master Plan. All of the exit (stub) taxiways intersect with Runway 6-24 and Taxiway A at right angles, which meet FAA standards.

Figure 4.5



Access to Runway 15-33 is via Taxiways E and A. The Runway 33 threshold is served by Taxiway A, which also connects 24 and 6. The FAA has developed standards for end around taxiways (EAT), which are taxiways that are situated around and outside of runway safety areas (see Figure 4.5.) (Source: FAA AC *Airport Design*). EATs can prevent taxiing aircraft from crossing runway thresholds, as currently is the case when an aircraft taxi's between Runway 24 and the terminal area at MVY. However, the FAA acknowledges that EATs "may introduce certain risks", and a new EAT to avoid the 33 threshold would require a significant amount of new pavement, and also increase aircraft taxi times as well as emissions. The existing Taxiway A alignment has not resulted in runway incursions on Runway 33, and therefore *does not justify the construction of an EAT*.

[11] Source: FAA AC 150/5300-13A, *Airport Design*, Chp. 3, para. 318, Table 3-7, ADG C-III visibility lower than ¾ but not lower than ½ mile

The departure end of Runway 15 is served only by Taxiway E, resulting in a back taxi of 700 ft., which is not operationally efficient for runway capacity as well as safety. Additionally, better access to the departure end of Runway 15 is recommended.

Taxiway E intersects Runway 15-33 approximately 700' south the 15 threshold, at a 45° angle between Runway 15-33 and 6-24 (see Figure 4.6). Taxiway D is a stub on the south side of Runway 6-24, opposite Taxiway E, that connects 6-24 with Taxiway A. Taxiway E is 35' wide, which meets FAA's TDG 2 standard.

Figure 4.6
Taxiway 'E'

A new full parallel taxiway to Runway 15-33, situated to the southwest of the runway should be considered given the current configuration and age of pavement of Taxiway E. A new Taxiway E should meet TDG 2 and ADG B-II separation standards. A new parallel taxiway would replace existing Taxiway E, and Taxiway D could be closed as well, thereby reducing pavement maintenance costs.

There should also be a new stub taxiway between 15-33 and a new parallel Taxiway E, situated approximately 1,800' – 2,000' north of the Runway 33 threshold. This would allow aircraft landing on 33 to exit the runway before rolling to the end, and thereby minimize runway occupancy time.

A new parallel taxiway should be constructed within the 2016-2018 timeframe because Taxiway E pavement is currently 23 years old, so maintenance costs of the existing taxiway pavement will continue to rise in the near term.

4.5 Safety Area Deficiencies

MVY staff and the FAA work collaboratively to ensure that the standards for the various airport safety areas are met to the extent practicable. Airport safety areas include the Runway Protection Zone (RPZ), Runway Object Free Area (ROFA), Runway Obstacle Free Zone (ROFZ), and Runway Safety Areas (RSA). There are noted deficiencies in the RPZ's and ROFA's and this section addresses those deficiencies. The RSA's for each runway meet design standards. If a change in runway length or orientation were to occur, the associated safety areas would need to be reconsidered.

4.5.1 Runway Protection Zone (RPZ)

As noted in Chapter 1.3.4, the Runway Protection Zone (RPZ) is an area on the ground used to enhance the protection of people and property near the runway approach. In accordance with AC 150/5300-13A, RPZs should be maintained clear of residences and places of public assembly, including churches, schools, hospitals, office buildings, shopping centers and other uses with similar concentrations of persons. In order to ensure that the RPZ's are kept clear of incompatible objects and activities, it is recommended that the land within the RPZ be owned by the airport or protected through an avigation easement. Table 4.5 provides a comparison of RPZ design standards to existing conditions. Figures 4.7 and 4.8 on the next page illustrate the existing RPZs at MVY, as red trapezoids.

Table 4.5 Runway Protection Zone Design Standards

Runway	RDC	Standard (Inner W x Outer W x Length) & Acres	Existing (Inner W x Outer W x Length) & Acres (Airport Owned)	Discrepancy
6	C-III	1,000'x1,510'x1,700' 48.97 Acres	1,000'x1,510'x1,700' 46.67 Acres	2.3 Acres
24	C-III	1,000'1,750'x2,500' 78.91 Acres	1,000'1,750'x2,500' 22.63 Acres	56.28 Acres
15	B-II	500'x700'x1,000' 13.77 Acres	500'x700'x1,000' 4.59 Acres	9.18 Acres
33	B-II	500'x700'x1,000' 13.77 Acres	500'x700'x1,000' 13.77 Acres	Meets Standard

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

Figure 4.7
Martha's Vineyard Airport –Runway 6-24 RPZ's

Figures 4.7 and 4.8 depict the RPZ's (shown as green trapezoids off each runway end) and the airport property line (depicted as a magenta line). The airport *does not* control approximately 2.3 acres within the Runway 6 RPZ and *does not* control approximately 56 acres within the Runway 24 RPZ. However, with the exception of a very small

portion of the Runway 6 RPZ, the land within the RPZ's is owned by the Commonwealth of Massachusetts and is listed as state forest.

Figure 4.8

yard

There are approximately 9 acres of state forest located off airport property within the Runway 15 RPZ. All of the land within the Runway 33 RPZ is controlled by the airport.

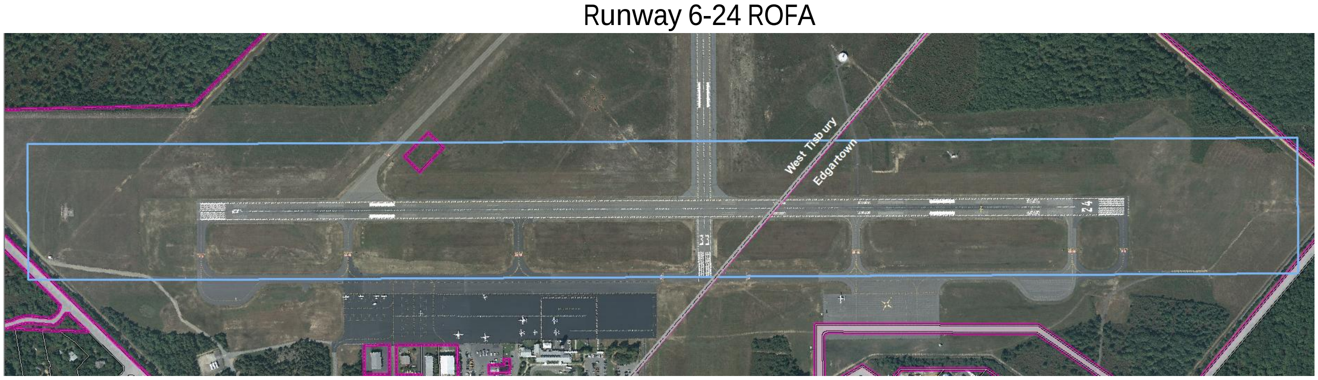
With the exception of approximately 1-acre of land within the Runway 6 RPZ, all of the land within the RPZ's that is outside of airport property is within a state forest. It is recommended that the airport obtain avigation easements over this property.

4.5.2 Runway Object Free Area (ROFA)

Runway Object Free Areas (ROFA) are two-dimensional areas surrounding runways which must be clear of parked aircraft and objects greater than 3" in height, unless frangible, and required for air navigation, or aircraft ground maneuvering purposes.

Currently there is a fence and a roadway within the ROFA to the approach ends of Runway 6-24 (shown in blue on Figure 4.9). The ROFA for Runway 15-33 is free of obstacles.

Figure 4.9
Runway 6-24 ROFA

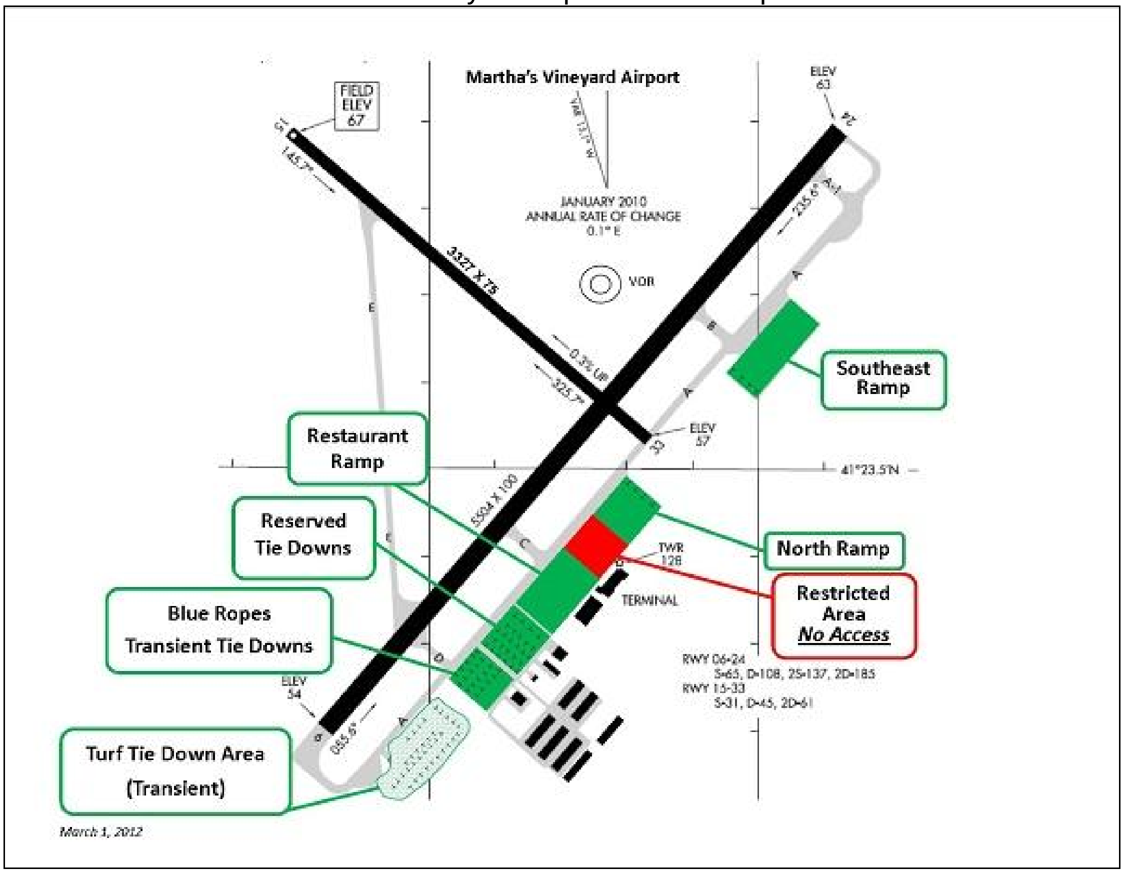


Options need to be considered to address the fence and roadway within the Runway 6-24 ROFA.

4.6 Aircraft Parking Aprons

The aircraft parking aprons were analyzed for the ability to meet existing and forecast levels of aircraft parking demand. There are multiple aircraft parking aprons at MVY (see Figure 4.10 and Table 4.6). The aprons serve both based and transient aircraft.

Figure 4.10
Martha's Vineyard Airport – Aircraft Aprons



Source: Martha's Vineyard Airport

Table 4.6 Martha's Vineyard Airport – Aircraft Aprons			
Apron	Type	Size (s.f.)	No. A/C Parking Positions [1]
Southeast Ramp	Transient	187,000	25
North Ramp	Transient	94,600	5
Restaurant Ramp	Transient	139,800	Unmarked
Restricted/Air Carrier	Transient	89,000	4
Reserved Tiedowns	Based	97,200	26
Transient Tiedowns (Blue Ropes)	Transient	63,800	22
Turf Tiedowns	Transient	110,000	28
Total		781,400	110
[1.] Actual parking capacity dependent on type of aircraft			

Transient (also known as itinerant) aircraft are parked primarily on paved aprons. Turf parking is available for overflow situations, and can be used by single-engine and light twin piston airplanes. However, paved parking aprons are preferred by all transient pilots. Larger multi-engine and turbine aircraft will not use turf aprons because of the risk of damage to their aircraft from loose material, ruts, etc. Additionally, transient pilots and passengers prefer close access to the terminal facilities and ground transportation when arriving and departing, particularly if they have baggage. The airport provides carts to transport pilots, passengers, and bags between the GA terminal and their aircraft.

Based on the very strong peak seasonal activity at MVY, the north, southeast, and blue rope ramps are used to accommodate transient aircraft, particularly those that will park for a day or more. The short term parking (i.e. typically several hours, but less than a day) is accommodated on the so-called 'restaurant ramp' in front of the GA terminal. Also, transient corporate turbine aircraft are typically parked on the restaurant ramp in the summer, and piston-engine aircraft are parked on the blue rope transient ramp, as well as the southeast ramp, depending on the amount of corporate aircraft at the airport.

Corporate aircraft are typically parked close to the GA terminal because they buy significantly more fuel than piston-engine aircraft. They also pay higher landing and parking fees, therefore generating significantly more revenue for the airport than piston engine aircraft.

The 'restricted area' is the secure air carrier ramp (also known as the Security Identification Display Area – SIDA). This apron usually accommodates an E190, CRJ-200 and several Cape Air Cessna 402 aircraft. At times, the aircraft parking capacity of this apron is exceeded especially during peak periods or weather delays. Discussions with airport staff and members of the master plan working group revealed that during the peak period or, if a weather delay or ground stop occurs, the SIDA apron in front of the terminal building becomes congested.

Irregular special operations aircraft, such as VIPs, can be parked in a variety of locations depending on the nature of the operation and number of aircraft involved. When Presidents Clinton and Obama vacationed on the Island, for example, they arrived with multiple military aircraft, some of which were stationed at the Coast Guard Air Station Cape Cod /Otis Military Reserve Base.

The FAA Terminal Area Forecast (TAF) projects that based aircraft at MVY will increase from 88 in 2012 to 118 by 2040, an increase of 34% over 28 years. There are 26 aircraft tiedowns (i.e. outdoor parking on aprons) and 72 T-hangars available for based aircraft, for a total capacity of 98 aircraft. Assuming that based aircraft demand grows as projected, an additional 20 spaces will be needed – a mix of tiedowns and hangars depending on the specific type of aircraft. Owners of multi-engine and turbine airplanes prefer hangar storage, while typically 50% - 60% of piston engine aircraft owners opt for paved tiedowns. To accommodate the additional 20 based aircraft by 2040, 10 additional paved tiedowns should be considered.

Additional tiedowns should only be provided if there is clearly demonstrated demand for the additional space. If future demand is uncertain, constructing additional tiedowns on speculation could create excess (unused) capacity. The facilities will require on-going maintenance but not generate revenue, and may drive down revenue from existing storage areas.

MVY staff have indicated the need to expand the Secure Terminal Apron/Secure Identification Display Area to accommodate additional secure flights and screened passengers as a result of increased growth of commercial air carrier service.

4.7 Aircraft Storage Hangars

There are seven T-hangar buildings that accommodate 72 aircraft (individual storage units) at MVY. In addition, there are also two conventional (multi-plane) hangars; one is 5,400 s.f. (Stanley hangar), and the other is 8,000 s.f. (Duchess hangar).

The two conventional hangars (Stanley and Duchess) can accommodate up to 6 aircraft (depending on specific type), but the hangar owners determine how many (or how few) aircraft will be stored in each hangar.

Conventional (multi-plane) storage hangars are the most efficient in terms of land use and revenue generation, and such hangars are typically managed and maintained by an FBO, as opposed to an individual owner (like T-hangars). Conventional hangars can be constructed by private parties or the airport. If demand is sufficient, the airport can realize more long-term revenue by constructing and owning the conventional hangar, however that requires a sizeable capital investment plus operating and maintenance (O&M) costs. A private developer can assume the cost of constructing the hangar and either sell it to the airport, or own and operate the hangar and collect the revenue from based tenants. It is recommended that leases with owners of privately developed facilities situated on-airport have a reversion clause that specifies that the facility revert to airport ownership at the end of a designated period (between 20 – 30 years after the facility is constructed).

The 2001 Master Plan recommended constructing additional parking aprons and hangars in the northeast quadrant of the airport. Those facility requirements were based on the levels of traffic experienced in the 1990s and early 2000, as well the forecasts of demand prepared in that time frame. Since that time demand has not grown as anticipated, and as a result the need for the aprons and hangars to the extent identified in the 2001 Master Plan is not warranted. There may however be enough demand for as many as 10 additional aircraft storage hangars based on the growth rate in the preferred FAA TAF.

Additional hangars should only be constructed if there is clearly demonstrated demand for the additional space. If future demand is uncertain, constructing additional hangars on speculation could create excess (unused) capacity. The facilities will require on-going maintenance but not generate revenue, and may drive down revenue from existing storage areas.

4.8 Terminal Area Facility Needs

The terminal building at Martha's Vineyard Airport (picture above) opened in 2000. The terminal complex is comprised of the airline terminal building, the general aviation (GA) terminal building, the air traffic control tower, auto parking lot, and access road. The main terminal building is single story and approximately 9,800s.f. in size. It includes airline ticket counters and queuing area, airline offices, baggage claim area (manual – no automated belts), restrooms, restaurant, TSA security screening area and offices. Capacity issues have led to the overuse of the existing facility which creates overcrowding or an exceedance of the original design's intended capacity. At MVY, the Terminal Building and SIDA Ramp can frequently exceed design capacity during peak summer weekends.

4.8.1 Level of Service Analysis

A broad Level of Service Analysis (LOS) was conducted using the FAA Airport Cooperative Research Program (ACRP) Terminal Planning Spreadsheet Model. LOS calculations compare the passenger demand in each functional area (ticketing, baggage, airline office space, holdrooms, concessions, circulation, TSA, restrooms, and maintenance areas), during the peak hour to the capacity metrics outlined in this report. The following factors were used to model the MVY LOS:

- 90% load factor was applied to each aircraft operation and used as an integer number of passengers in the model, based on aircraft equipment currently in use.
- The terminal program was based upon "peak month, peak day, peak hour". A gated schedule was not available from MVY. In order to accurately determine the peak passenger load during a peak day, a schedule was created using information gathered by the airport. The schedule was created based on current available information from all commercial airlines that serve MVY during the peak season for both unscreened and TSA screened flights.
- For predicting future spatial needs the FAA Terminal Area Forecast for annual enplanements was used to predict a percentage yearly increase. This increase was then applied to the peak hour passenger load. It is important to understand that due to air carrier operations that the peak hour passenger load may not increase as described but rather the air carriers changing to larger equipment or adding additional flights.
- The "FAA Terminal Area Forecast" served as the basis for enplanements. Commercial operations were used as the basis for terminal programming for MVY. Annual demand forecasts were analyzed to

interpolate the number of Peak Hour Originating Passengers (PHOP), Peak Hour Terminating Passengers (PHTP), Annual Enplanements (ANNEP), and Peak Hour Passengers (PHP).

- TSA equipment throughput capacity was determined based on industry standards. Weather delays and ground holds are known to occur sporadically at MVY, however for the purposes of this study and forecasting these were not factored into the sizing of the individual program functions.
- Cape Air operates both TSA screened flights and unscreened flights. Two peak originating passenger counts were created based on schedules available from Cape Air. These separate numbers are key in correctly sizing the program elements.
- Secure holdroom, TSA security, and baggage screening are the only elements sized solely for TSA screened passengers. All other program elements combine both unscreened and screened passengers.

Design Hour Determination

The peak hour was determined by combining published Cape Air flight schedules and reported JetBlue, Delta, and US Air flights. These flight schedules only include commercial aircraft and passengers that will pass through TSA security. Cape Air additionally operates nine unscreened flights per day. This study analyzes both TSA screened passengers and un-screened passengers for program elements utilized by both types of passengers.
During the busy period (late June through early September):

- Cape Air operates approximately 30 flights on a peak day (approx. 9 pax per flight)
- JetBlue operate 2 flights per day using the E190 (100 pax per flight)
- Delta operates three flights per day using a 50 seat CRJ-200.
- US Air operates three flights per day using a 50 seat CRJ-200.

The analysis determined that the peak departing hour was from 3:20pm until 4:20pm, with a total of 236 departing screened passengers, during this same time period there are 9 unscreened passengers. Arriving passengers will peak at 2:50pm with a total of 177 arriving screened passengers and 14 unscreened passengers. Since MVY is unique in that the departing holdroom and arrival holdroom are separated and these passengers will not mix, the analysis of the individual program spaces reflects this unique arrangement.

During the departure peak hour it was determined that there are 5 departing flights, one E190 (100 passenger) flight, two ERJ-135 (50 passenger) flights, and two C-402 (9 passenger) flights. The arrival peak hour includes 5 arriving screened flights, one E190 (100 passenger), one ERJ-135 (50 passenger) and three C-402 (9 passenger) flights and 1 unscreened C-402 (9 passenger) flight.

The PHOP, PHTP, and PHP were derived by analyzing the total number of passengers that would arrive and depart on these flights during the peak hours, with the given 90% load factor.

The air carrier (screened) passengers are analyzed separately from the unscreened passengers. As the unscreened passengers will not occupy a secure holdroom, the secure side areas have been sized for screened passengers only.

Figure 4.11
Design Day Departing Screened Passengers (PHOP – Screened) Rolling 60-minute periods

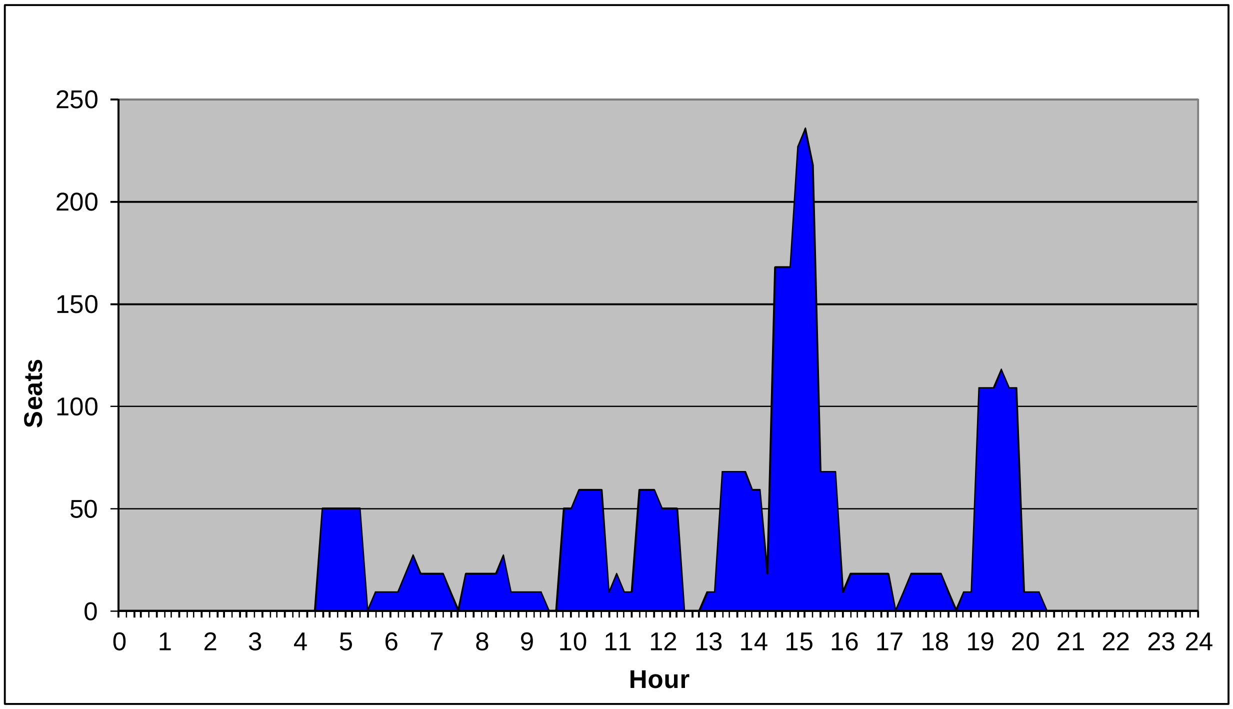


Figure 4.12
Design Day Arriving Screened Passengers (PHTP – Screened) Rolling 60-minute periods

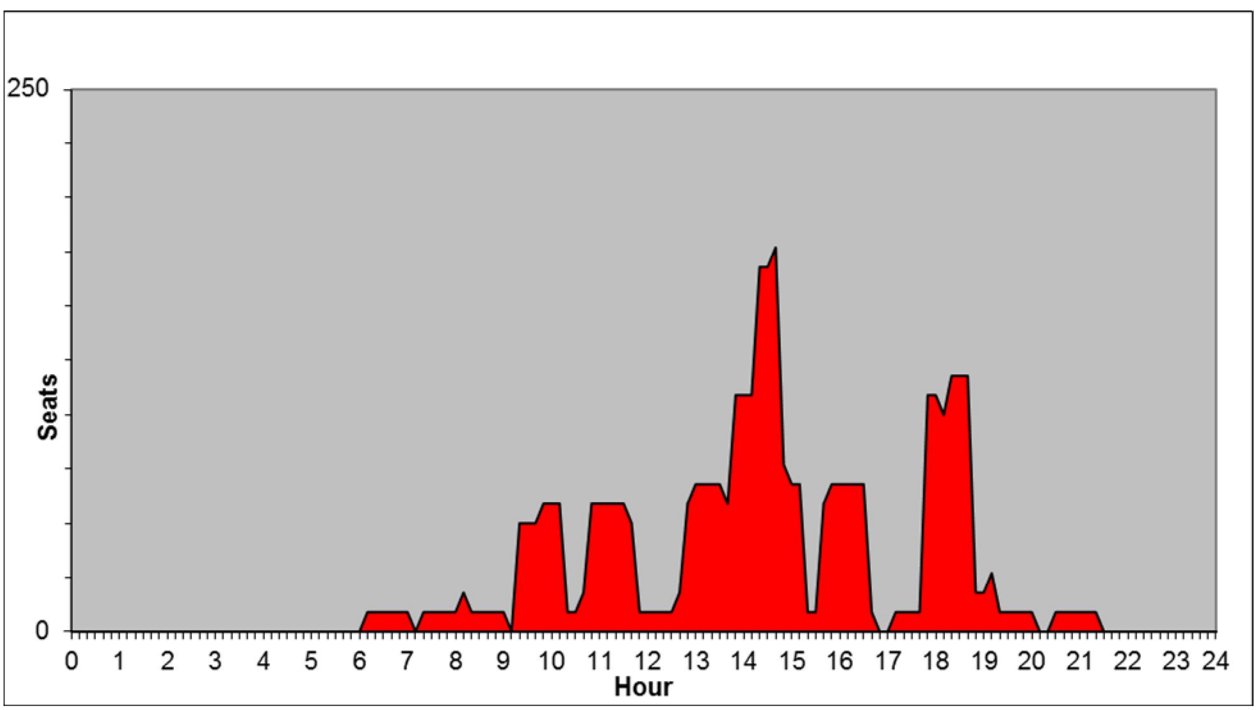


Figure 4.13
Design Day Departing Unscreened Passengers (PHOP – Unscreened)

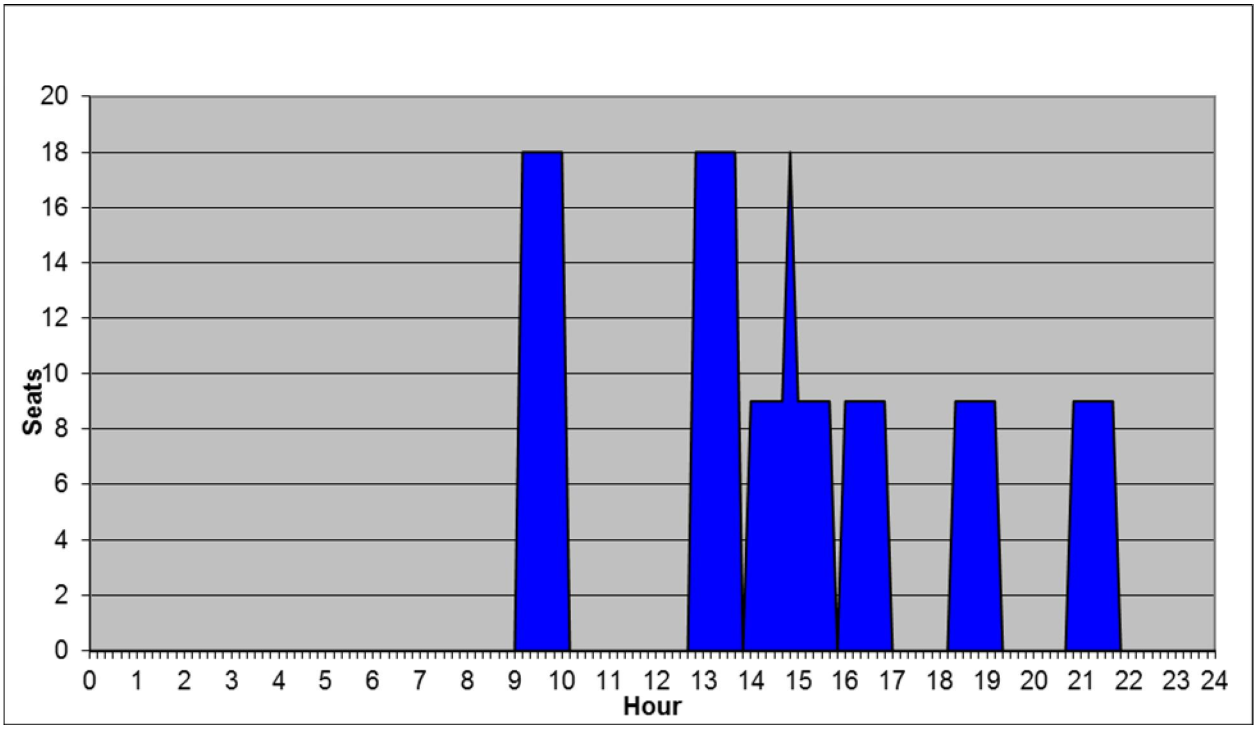
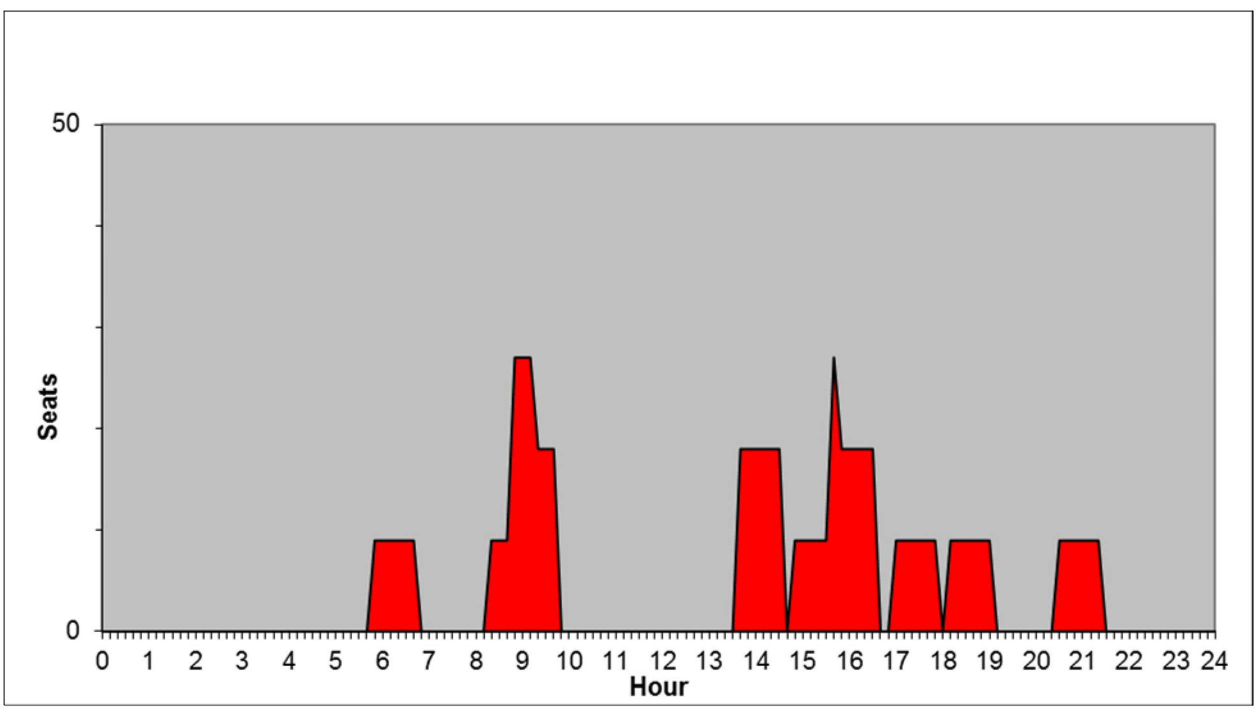


Figure 4.14
Design Day Arriving Unscreened Passengers (PHTP – Unscreened)



Ticketing

Currently MVY has 12 ticket counter positions. Industry trends indicate that 50% of the passengers will arrive during the peak 30 minute period for check-in and 60 minutes prior to departure, and we have assumed that 70% of those passengers will use the ticketing counters. The remaining 30% will use self-service kiosks and print their tickets at home. Applying the ACRP model of spatial needs, the current ticketing desk area is in-adequate for MVY during a peak hour/peak day scenario due to inadequate ticket counter queuing.

Table 4.7 presents the analysis for spatial requirements for the passenger ticketing area.

Table 4.7 – Passenger Ticketing Spatial Requirements

			Required Square-Footage per Forecast Year				
Type of Occupancy	Existing SF	Conceptual Planning Factor	2014	2018	2020	2025	2030
		PHOP[1]-Total	246.05	250.28	252.43	257.85	263.44
		PHTP[2]-Screened	227.98	231.89	233.89	238.91	244.09
Ticketing							
Ticket Counter Queuing Area	620	(3.15 SF)(PHOP Total)(70%)	543	552	557	569	581
Ticker Counter Length (LF)	66	(0.3 LF)(PHOP Total)(70%)	51.7	52.6	53.0	54.1	55.3
Ticketing Kiosks	3		3	3	3	3	3
Ticket counter Queuing	740	(6 SF)(PHOP Total)(70%)	1,033	1,051	1,060	1,083	1,106

[1]PHOP (Peak Hour Originating Passengers)
[2]PHTP (Peak Hour Terminating Passengers)

Based on the ACRP model, the current ticketing area is undersized for ticket counter queuing.

Airline Office Space

Presently each air carrier has designated office space, which is smaller than industry standards dictate. The current arrangement does not have adequate space to accommodate future expansion. Table 4.8 depicts the space anticipated to accommodate the forecast of demand.

Table 4.8 – Airline Office Spatial Requirements

			Required Square-Footage per Forecast Year				
Type of Occupancy	Existing SF	Conceptual Planning Factor	2014	2018	2020	2025	2030
		PHOP[1]-Total	246.05	250.28	252.43	257.85	263.44
Airline Office Space	403	(3.25 SF)(PHOP Total)	800	813	820	838	856

[1]PHOP (Peak Hour Originating Passengers)

The current airline office space is approximately half of the industry standard.

Security

Using the ACRP model, the current peak hour needs are not met with a single operating security lane. However, a more accurate approach for an airport the size of MVY is to consider security screening in 3 parts, TSA security queuing, TSA security screening, and TSA reconciliation area. Queuing and reconciliation area is determined based on Peak Hour Originating Passengers (PHOP-Screened), whereas the screening area is determined by a flat number based on size of machine in use. Currently MVY does not use a full body back scatter scanner in their screening process.

Additional square-footage will be required should TSA decide to add this equipment.

Table 4.9 illustrates the recommended needs for screening. Square footages in red indicate a deficiency.

Table 4.9 – Security Screening Spatial Requirements							
			Required Square-Footage per Forecast Year				
Type of Occupancy	Existing SF	Conceptual Planning Factor	2014	2018	2020	2025	2030
		PHOP[1]-Screened	227.98	231.89	233.89	238.91	244.09
TSA Security Screening (Depart Wait)	908	(1,200 SF)(2 lanes)	2,400	2,400	2,400	2,400	2,400
TSA Security Queuing (Depart Lobby	610	(2 SF)(PHOP Screened)	474	482	486	497	508
TSA Offices (2 security offices)	403	(4.34 SF) (PHOP-Screened)	1,029	1,046	1,055	1,078	1,101
TSA Reconciliation Area	0	(2 SF) (PHOP-Screened)	474	482	486	497	508
[1]PHOP (Peak Hour Originating Passengers)							

Circulation

Simplified, airport passenger circulation is easiest viewed as a passenger's and/or visitor's direct flow from point A to point B. This is best accomplished with well signed and obstruction free circulation routes to primary terminal functions. The primary circulation at MVY is shared among various functions: ticketing, security, restaurant, restrooms and baggage claim. This shared nature is accentuated during high volume peak days, where the circulation can become bogged down by overflow and crisscross circulation patterns from any of the above listed functional spaces. A good airport terminal circulation limits the distances that passengers must carry bags from the curbside to the baggage check-in area as well as limiting the travel distance from bag claim to landside transportation. Concessions and restrooms should be located adjoining primary circulation routes. Table 4.10 shows the general circulation and restrooms requirements for the terminal building at MVY. Figure 4.15 depicts the current circulation route.

Table 4.10 – General Circulation and Restroom Spatial Requirements							
			Required Square-Footage per Forecast Year				
Type of Occupancy	Existing SF	Conceptual Planning Factor	2014	2018	2020	2025	2030
		ANNEP[1]	50,296	51,167	51,609	52,729	53,885
		PHOP[2] Total	246.05	250.28	252.43	257.85	263.44
		PHTP[3] Screened	227.98	231.89	233.89	238.91	244.09
		PHP[4] Total	488.09	496.47	500.74	511.49	522.58
		PHOP Screened	237.02	241.08	243.16	248.38	253.77
Circulation – General	300	(0.018 SF)(ANNEP)	905	921	929	949	970
Circulation – Ticketing	1,450	(4.6 SF)(PHOP Total)	1,132	1,151	1,161	1,186	1,212
Circulation – Baggage Claim	521	(7 SF) (PHTP Screened)	1,596	1,623	1,637	1,672	1,709
Circulation (Secure)	0	(0.015 SF) (ANNEP)	754	768	774	791	808

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Restrooms (Non-Secure)	991	(2 SF)(PHP Total)	976	993	1,001	1,023	1,045
Restrooms (Secure)	0	(2 SF)(PHOP Screened)	474	482	486	497	508

[1]ANNEP (Annual Enplanements)
[2]PHOP (Peak Hour Originating Passengers)
[3]PHTP (Peak Hour Terminating Passengers)
[4]PHP (Peak Hour Passengers)

Figure 4.15
General Circulation Area- 2,661 SF (green shading)

Holdroom

Holdroom capacity analysis in the ACRP model considers the number of seats on the design aircraft. For the purpose of this study, and due to the likelihood of multiple planes being parked during a peak hour, the largest plane that services MVY was chosen. The largest plane currently in service at MVY is an E190 aircraft at 100 seats, at an assumed 90% load factor. IATA/ACRP standard estimates that 80% of the Holdroom passengers will sit and 20% will remain standing. In order to yield an LOS of C, the seated passengers require 15 square-feet and standing passengers will occupy 10 square-feet.

Seated and standing square-footage for a 100 passenger plane at 90% load will require 1,260 SF. This number does not currently take into consideration space for podiums, boarding corridor width, or passenger amenities.

The assumptions made here are shown in Table 4.11. Once all items are considered in the ACRP model the estimated size required for the holdroom equals 1,600 square-feet.

There is currently only a small designated secure holdroom at MVY, and typically passengers only clear TSA security directly before their flight departure time, and will occupy the ticketing lobby in lieu of a secure holdroom area. On a typical peak day in August, MVY can expect to have a peak departing passenger load of 236 passengers occupying the holdroom/ticketing lobby during the peak hour, this passenger load requires 2,844 SF, while the current secure hold room is 686 SF in size. During weather delays or FAA Ground Stops, this overcrowded condition can reportedly increase.

Unlike the IATA/ACRP model, this analysis considers the peak hour originating passengers which are more indicative of the expected number of passengers that will occupy the arrival holdroom and departure holdrooms. The PHOP-screened was derived from the ACRP peak hour model, which analyzed the number of scheduled seats during the peak hour. This analysis used the same breakout of seated versus standing passengers and required square footages as the ACRP model. The analysis results are presented in Table 4.12. Again, existing and forecast spatial deficiencies are indicated in red.

Table 4.11
Passenger Holding Room Assumptions

SINGLE HOLDROOM APPROACH	INPUTS	OUTPUTS
# of Seats on Design Aircraft	100	
Load Factor	90%	
# of Design Passengers		**90**
Percent Seated	80%	
Percent Standing		**20%**
Seated Passenger Space Requirement (sq. ft.)	15	
Standing Passenger Space Requirement (sq. ft.)	10	
Seated & Standing area (sq. ft.)		**1,260**
Allowance for Amenities (Increase)	5%	
High Utilization Factor (Increase)	20%	
Holdroom Sharing Factor (Decrease)	5%	
Adjusted Seated and Standing Area (sq. ft.)		**1,510**
Podium Width/Position (ft)	4.0	
Depth of Podium to back wall (ft)	8	
Podium Queue Depth (ft)	5	
Area per Podium Position (sq. ft.)		**52**
Number of Podium Positions	1	
Total Podium and Queue Area (sq. ft.)		**52**
Boarding/ Egress Corridor Width (ft)	8	
Depth of Holdroom (ft)	8	
Boarding/ Egress Corridor per Bridge (sq. ft.)		**64**
Number of Bridges/ Doors	1	
Boarding Corridor Area (sq. ft.)		**64**
Total Holdroom Area (sq. ft.)		**1,600**

Table 4.12 – Holdroom Spatial Requirements							
			Required Square-Footage per Forecast Year				
Type of Occupancy	Existing SF	Conceptual Planning Factor	2014	2018	2020	2025	2030
		PHOP[1] Unscreened	9.04	9.19	9.27	9.47	9.68
		PHOP Screened	237.02	241.08	243.16	248.38	253.77
Holdrooms (Secure)	686						
Space for Sitting Passengers		(15 SF)(PHOP Screened)	2,844	2,893	2,918	2,981	3,045
Space for Standing Passengers		(10 SF)(PHOP Screened)	474	482	486	497	508
Subtotal	686		3,318	3,375	3,404	3,477	3,553
Holdrooms (Non-Secure)	N/A						
Space for Sitting Passengers		(15 SF)(PHOP Unscreened)	108	110	111	114	116
Space for Standing Passengers		(10 SF)(PHOP Unscreened)	72	74	74	76	77
Subtotal	0		180.8	183.9	185.5	189.4	193.5
[1]PHOP (Peak Hour Originating Passengers)							

The overcrowding due to lack of holdroom space is an issue should be further studied to verify and resolve this condition. A long term solution would include adding designated secure holdroom space, including ancillary services (concessions, restrooms, and building services). Adding this space would alleviate the current crowding that occurs during the peak summer season, and reduce the demand on the restrooms and circulation space in the non-secure areas.

Holdroom space analysis/recommendations are discussed in Chapter 5.

Concessions

The ACRP model does not include the spatial needs for concessions in its study factors.

Therefore, industry standard conceptual planning factors were applied to arrive at forecast estimates for Concession space. The analysis shown in Table 4.13 indicates that there is sufficient concession space within the non-secure terminal area.

Table 4.13 – Airport Concession Spatial Requirements							
			Required Square-Footage per Forecast Year				
Type of Occupancy	Existing SF	Conceptual Planning Factor	2014	2018	2020	2025	2030
		ANNEP[1]	50,296	51,167	51,609	52,729	53,885
Concessions Food/Beverage (Restaurant + Kitchen)	1,586	(0.0055 SF)(ANNEP)	277	281	284	290	296
Concessions (News/Gifts) (Gift Shop)	170	(0.0023 SF)(ANNEP)	116	118	119	121	124
Concessions Storage (Restaurant)	327	(0.0005 SF)(ANNEP)	25	26	26	26	27
[1]ANNEP (Annual Enplanements)							

All concession space is currently located on the non-secure side of the airport, with no concession space on the secure side. Future planning should provide more concession space on the secure side.

Rental Car Counter Area

The ACRP model does not include rental car counter area in its factors.

Therefore, this study applied industry standard conceptual planning factors to arrive at forecast estimates. Square footages in red indicate a deficiency.

Table 4.14 – Rental Car Spatial Requirements							
			Required Square-Footage per Forecast Year				
Type of Occupancy	Existing SF	Conceptual Planning Factor	2014	2018	2020	2025	2030
		ANNEP[1]	50,296	51,167	51,609	52,729	53,885
Rental Car							
Rental Car Counter Area	214	(0.0025 SF)(ANNEP)	126	128	129	132	135
Rental Car Counter Length (lf)	26	(0.0005 SF)(ANNEP)	25	26	26	26	27
Rental Car Offices (4)	397	(0.008 SF)(ANNEP)	402	409	413	422	431
[1]ANNEP (Annual Enplanements)							

Outbound Baggage + Screening

The ACRP model considers the PHOP-screened for the analysis of the outbound baggage and screening.

This study applied the ACRP factors and assumptions in this analysis as follows:

- 60% of passengers will check luggage
- 0.9 bags per passenger – this number skews towards the higher end of the estimate based on the fact MVY is a leisure destination.
- Level 1 and 2 EDS (explosives detection system) screening rate is assumed to be 120 bags per hour.
- Level 3 ETD (explosives trace detection) screening rate is assumed to be 24 pages per hour per screener.
- ACRP indicates that Level 1 area per EDS is 800 SF per unit.
- ACRP indicates that Level 2 area per EDS is 40 SF per unit.

Industry trends indicate the spatial needs are double the current space.

Table 4.15 – Outbound Baggage Screening Spatial Requirements							
			Required Square-Footage per Forecast Year				
Type of Occupancy	Existing SF	Conceptual Planning Factor	2014	2018	2020	2025	2030
		PHOP[1] Total	246.05	250.28	252.43	257.85	263.44
Outbound Baggage	800	(7 SF)(PHOP Total)	1,722	1,752	1,767	1,805	1,844
[1]PHOP (Peak Hour Originating Passengers)							

The ACRP model indicates that 1,740 SF is currently needed for outgoing baggage screening.

DESIGN HOUR BAG LOAD			INPUTS	OUTPUTS	
Design Hour Passengers Checking In	*User Input*	218	218	linked to Check-In / Ticketing	
% of Passengers Checking Bags			60%		
Average # of Bags per Passenger			0.9		
Total # of Bags to process in Peak Hour				**118**	
10 minute Baggage flow rate				**20**	
TSA Surge Factor (based on a 10 minute baggage flow rate)			*Applied*	**1.45**	
Equivalent Baggage Surge Rate (bags/hour)				**171**	
% of Total bags that are over-odd/sized bags & too large for EDS			5%		
# of over-odd/sized bags requiring ETD inspections				**9**	
Total # of Bags to process through Level 1 EDS Units				**162**	
EDS/ETD EQUIPMENT REQUIREMENTS					
Level 1 EDS Screening - Process Rate(bags/hour)			120		
# of Level 1 EDS Units required				**2**	
% of Scanned Bags requiring Level 2 Screening (**Alarm Rate**)			25%		
# of bags requiring Level 2 OSR				**41**	
Level 2 OSR rate (bags/hour per operator)			120		
# of Level 2 OSR Stations required(1 operator/station)				**1**	
% of Resolved OSR Bag Reviews (**Clear Rate**)			80%		
Total # of Bags needing Level 3 Screening in Peak Hour				**17**	
Level 3 ETD Screening - Process Rate(bags/hour/screener)			24	TSA suggests 24 bags/hr/screener	
# of Level 3 ETD Units required (2 screeners/unit)				**1**	
BAGGAGE SCREENING SPACE REQUIREMENTS					
Level 1 Area per EDS Screening Unit (sq. ft.)			800	~ 800 sq. ft per Unit	
# of Required EDS Units			2		
Level 2 Area per OSR Station (sq. ft.)			40	~ 40 sq. ft per Unit	
# of OSR Stations required			1		
Area per ETD Screening Unit (sq. ft.)			100	~ 100 sq. ft per Unit	
# of required ETD Units			1		
Total Area requirements for Baggage Screening (sq. ft.)				**1,740**	

Restrooms

There are 2 sets of men's and women's restrooms, one set for the arrival lobby, and another set of in the ticketing/departure lobby. Access to these restrooms is open to the public.

Currently there are no secure side restrooms; access to the restrooms is the same for screened and non-screened passengers. The restaurant's patrons use the airport's restrooms and in some cases, when the patrons exit the restaurant they will need to cut through the line for TSA screening. This is less than ideal, and creates confusion and stress for some outgoing passengers.

Industry trends indicate that 50% of the passengers will arrive during the peak 30 minute period for check-in and 60 minutes prior to departure, and we have assumed that 80% of those passengers will use the restrooms. Those passengers are then evenly spread out over the peak hour study period. A Level of Service (LOS) classification is given to restroom facilities based on the time required (in seconds) to find an available fixture. The different LOS definitions are:

- LOS A - No wait time with 10% extra fixtures beyond the maximum PAX load. Passenger can enter the restroom and find a fixture to use without needing to search for an available fixture.
- LOS B - No wait time, where the PAX load equals the number of fixtures available. Passenger can enter the restroom and find an available fixture; may require extra time to

find an available fixture.

- LOS C - Fixture count is reduced by 10% providing a potential wait time of 0-30 seconds. Passenger will enter the restroom and potentially wait for an available fixture.
- LOS D - Fixture count is reduced by 20% providing a potential wait time of 30-90 seconds. Passenger will enter the restroom and have a mild wait for an available fixture.
- LOS F - Fixture count is reduced by 30% providing a potential wait time in excess of 90 seconds. Passenger will enter the restroom and have an excessive wait for an available fixture.

The data provided in Table 4.16 demonstrates that the current restroom facilities at MVY do not provide an acceptable level of service during peak times. The average passenger will have an excessive wait.

Table 4.16 – Restroom Spatial Requirements

Restroom Fixture LOS[1]	Description	Current Fixture Count	Current PAX Load per minute	Current PAX Load per hour	PAX Load in 15 minute study	LOS A	LOS B	LOS C	LOS D	LOS F
						Fixture Count Needed				
	Departing Lobby		1.63	98	24.5					
F	Men's	5				13.5	12.3	11.0	9.8	8.6
F	Women's	4				13.5	12.3	11.0	9.8	8.6
	Arrivals Lobby		1.61	96.4	24.1					
F	Men's	3				27	11	10	9	8
F	Women's	3				12	11	10	9	8

[1]Level of Service (LOS)

4.9 Automobile Parking Demand / Capacity

Public parking lots should be designed such that finding an empty stall during the peak periods is not too difficult for the traveling public and ensuring a positive customer experience. Therefore, when developing parking requirements the future demand is increased 10% to provide "circulation spaces" to reduce the amount of time required to search for an empty parking stall. This parking forecast assumes that the maximum desired occupancy parking is 90 percent capacity.

Circulation spaces are a necessity and are factored into future facility requirements to provide good circulation while searching for a space, and take into account lost spaces due to incorrectly parked vehicles, minor construction, snow loss, etc. A circulation, or effective supply, cushion allows a parking configuration to operate with maximum efficiency and allows passengers to find parking easily without having to circulate through the parking lot to locate the last few spaces available.

Historical parking data available from Martha's Vineyard Airport (MVY) was reviewed and analyzed for 2013 and 2014 to determine peak month and peak day of the peak month demand. The highest occupancy of the passenger parking lot occurred during the summer with peak months of activity identified as August 2013 and July 2014.

For purposes of this planning analysis, it is assumed that the percentage of departing passengers who currently choose to use public parking at MVY will remain the same in the future. Additionally, projections of demand are based on current utilization. Monthly demand of August was 46% full with peak day of the peak month demand reaching peaks of 88 and 102 filled parking spaces for 2013 and 2014 respectively – see Table 4.17

Historical Auto Parking Demand Analysis

Table 4.17
Historical Auto Parking Demand Analysis

	2013			2014		
	Monthly Demand	Monthly Utilization	Peak Month / Peak Day Spaces Filled	Monthly Demand	Monthly Utilization	Peak Month / Peak Day Spaces Filled
January	1,107	30%	57	297	8%	24
February	871	26%	51	382	11%	25
March	N/A	N/A	N/A	297	8%	24
April	795	22%	48	442	12%	22
May	N/A	N/A	N/A	630	17%	42
June	1,341	37%	72	1,353	38%	65
July	1,545	42%	75	1,583	43%	102
August	1,644	46%	88	1,719	46%	80
September	1,250	35%	58	1,202	33%	80
October	N/A	N/A	N/A	N/A	N/A	N/A
November	N/A	N/A	N/A	N/A	N/A	N/A
December	557	15%	25	N/A	N/A	N/A
*N/A data was not available for these months						

The approved aviation forecast identified long term annual enplanement growth of 8.6% through 2040. When applying the 8.6% annual growth rate to historical peak day of the peak month occupancy of the parking spaces, the future peak daily vehicle occupancy is projected to reach 116 by the year 2020 and 139 by the year 2040, as shown Table 4.18.

Table 4.18
Future Auto Parking Demand Analysis

Year	Enplanements		Growth Rate	Existing Parking Inventory	Vehicle Spaces Needed	Percentage of Spaces Filled
2014	Enplanements	49,867	-	226	102	45%
2020	Projected Enplanements	51,609	3.5%	226	116	51%
2040	Projected Enplanements	56,294	8.6%	226	139	61%

Each airport must take the necessary steps to plan for and reserve adequate space that ultimately may be needed for vehicle parking capacity expansion. Actual construction of parking facilities should only occur as demand materializes and should be sized according to the actual needs at the time construction projects are implemented.

The maximum desired occupancy of parking facilities is 90% of capacity. Peak day of the peak month parking demand for MVY is projected to reach 116 parking spaces by year 2020 and 139 spaces by year 2040. This projected demand represents parking space occupancy of 51% and 61% for 2020 and 2040 respectively.

The existing parking capacity of 226 spaces will be sufficient to meet near term and long term parking demand.

Table 4.19 Facility Requirements Summary	
	Requirement
Runways	
6-24	Length and width are adequate.
15-33	Consider extension to accommodate 60% of current fleet. Current width is adequate.
Taxiways	
	Consider full length parallel to Runway 15-33; Consider alternatives for Taxiway 'E'.
Airport Safety Areas	
Runway Safety Areas	Adequate
Runway Object Free Area	Consider options for moving/removing fence and roadways within the Runway 6-24 ROFA.
Runway Object Free Zone	Adequate
Runway Protection Zone	RPZ's for Runways 6, 24 and 15 extend outside the airport boundary. Avigation easements and or land acquisition should be further evaluated.
Aircraft Parking Aprons	
	Consider options for expanding SIDA apron to accommodate additional/peak period demand air carrier service.
	Additional apron space should only be provided if demonstrated demand exists. However, there is no additional GA demand at this time.
Aircraft Storage Hangars	
	Additional hangars should only be provided if demonstrated demand exists. However, there is no additional GA demand at this time.
Terminal Building	
Ticketing	Area is undersized. Explore options for expansion.
Airline Office Space	Area is undersized. Industry standard is double current size.
Security	TSA offices, screening areas, reconciliation area, hold room and queuing are all undersized for peak period operations.
Circulation	Overall terminal circulation is poor as primary circulation is shared among various functions. Efforts should be made to eliminate crisscross patterns in accessing various terminal functions.
Holdroom	Additional provisions for holdroom space need to be considered.
Concessions	Future planning should provide for secure-side concessions.
Rental Car Area	Adequate
Outbound Baggage & Screening	The current queuing area, reconciliation area, hold room, baggage makeup area and screening area are severely inadequate. The current terminal configuration has outgrown its functional design.
Restrooms	The number of restroom facilities and fixtures are severely inadequate.
Automobile Parking	
Automobile Parking Lot	Adequate

The next chapter provides various alternatives to address the facility deficiencies identified in Table 4.19 above.

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Chapter 5 – Alternatives Analysis

5.1 Introduction

This chapter presents various alternatives which have been derived from the facility needs in Chapter 4. The intent of the alternatives developed as a part of this master plan are to:

(1) Correct or mitigate airport design standard deficiencies (ROFA and RPZ standards compliance);

(2) Develop facilities to meet existing and forecast levels of demand (Terminal building and aircraft parking);

(3) Achieve the goals and objectives identified by the Martha's Vineyard Airport Commission (Sustainability).

5.2 Correct or mitigate airport design standard deficiencies

At the outset of this master plan, an inventory was taken of existing conditions at MVY. Within that inventory, the ability of the current airport infrastructure to meet Federal and State airport design standards was assessed. It should be noted once again that as MVY receives federal grant assistance, it is obligated to meet the federal airport design standards contained in FAA Advisory Circular (AC) 150/5300-13A.

During the inventory process it was noted that MVY does not currently meet the design criteria for:

- Clear Runway Object Free Area (ROFA) on Runway 6 and 24;
- Airport control of land within each Runway Protection Zone (RPZ);
- Clear FAR Part 77 surfaces (there are vegetative penetrations to each of the FAR Part 77 surfaces);

Each airport design deficiency is discussed below along with alternative concepts to mitigate the deficiency.

5.2.1 Runway Object Free Area

The ROFA (Runway Object Free Area) clearing standard outlined in FAA AC 150/5300-13A requires clearing the ROFA of above-ground objects protruding above the nearest point of the RSA (Runway Safety Area) unless the object is used for air navigation or aircraft ground maneuvering purposes. There are currently portions of a fence and roadways within the Runway 6-24 ROFA as shown below in Figure 5.1.

Figure 5.1
Runway 6-24 ROFA

Relocate Roadways and Fence

In order to achieve fully compliant Runway Object Free Area's (ROFA's), approximately 1,100 lf of Edgartown /West Tisbury Road would need to be relocated outside of the Runway 06 ROFA. Approximately 400 lf of an 8' high perimeter fence would also need to be removed and 550 lf of fence installed outside of the ROFA. Approximately 500 lf of Barnes Road and 830lf of Fire Road 57 need to be relocated outside of the Runway 24 ROFA. Additionally, 600lf of chain link fence need to be removed and 850 lf of fence installed outside of the ROFA.

The estimated cost associated with the Runway 06 ROFA is $800,000. The estimated cost associated with the Runway 24 ROFA is $885,000. *Total estimated project cost to provide fully compliant ROFA's is approximately $1.7M.*

It would be highly impracticable to relocate Edgartown/West Tisbury Road which is captured within a small portion of the ROFA for the length prior to the Runway 6 threshold or to relocate Barnes Road, which is captured within the Runway 24 ROFA as shown in Figures 5.2 and 5.3.

Figure 5.2
Runway 6 ROFA

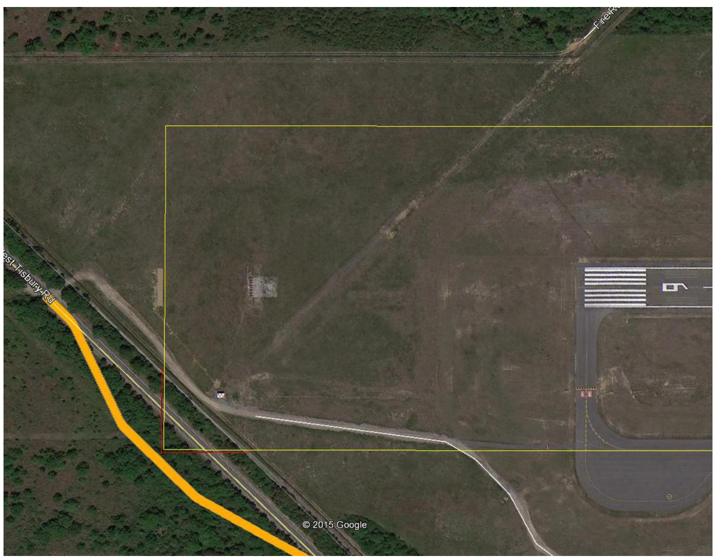
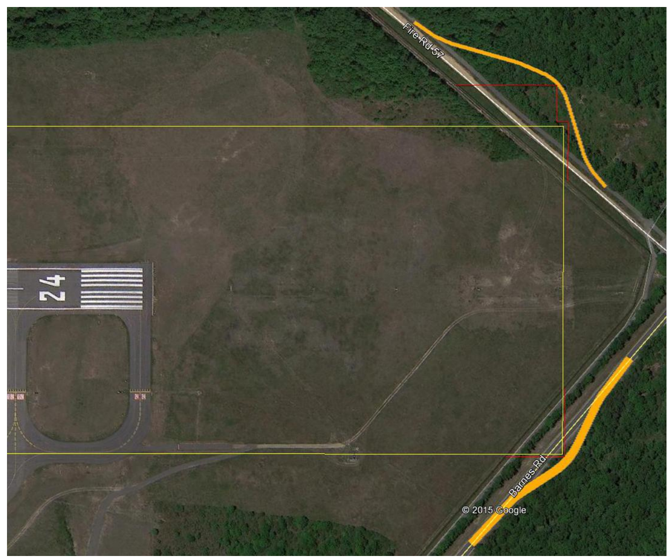


Figure 5.3
Runway 24 ROFA



Obtain Full ROFA Using Declared Distance

The use of declared distances is an FAA approved mitigation measure to resolve object penetrations to the ROFA. Use of declared distances would in effect, reduce the runway length available for takeoff and landing. A declared distance analysis shows that the runway length declared useable on Runway 06 would be reduced by 145' (from 5,504'to 5,359') and Runway 24 would be reduced by 211' (from 5,504' to 5,293') as shown in Figures 5.4 and 5.5.

A reduction in runway length would be detrimental to the air carrier and corporate jet operations that occur throughout the year, but primarily in the peak season months as these aircraft may have to take reduction in payload (either passengers or fuel). For the E190 operated by JetBlue (the largest air carrier operated aircraft), the weight penalty on a dry, level runway at sea level would be approximately 4,000lbs. Using the standard 220 lbs./passenger, 18 passengers would need to be cut from the maximum capacity of 106 if the weight penalty was taken in passengers. Discussions with the airport indicate that JetBlue flights departing from MVY are operating at capacity during peak season.

Figure 5.4
Runway 06 Declared Distance

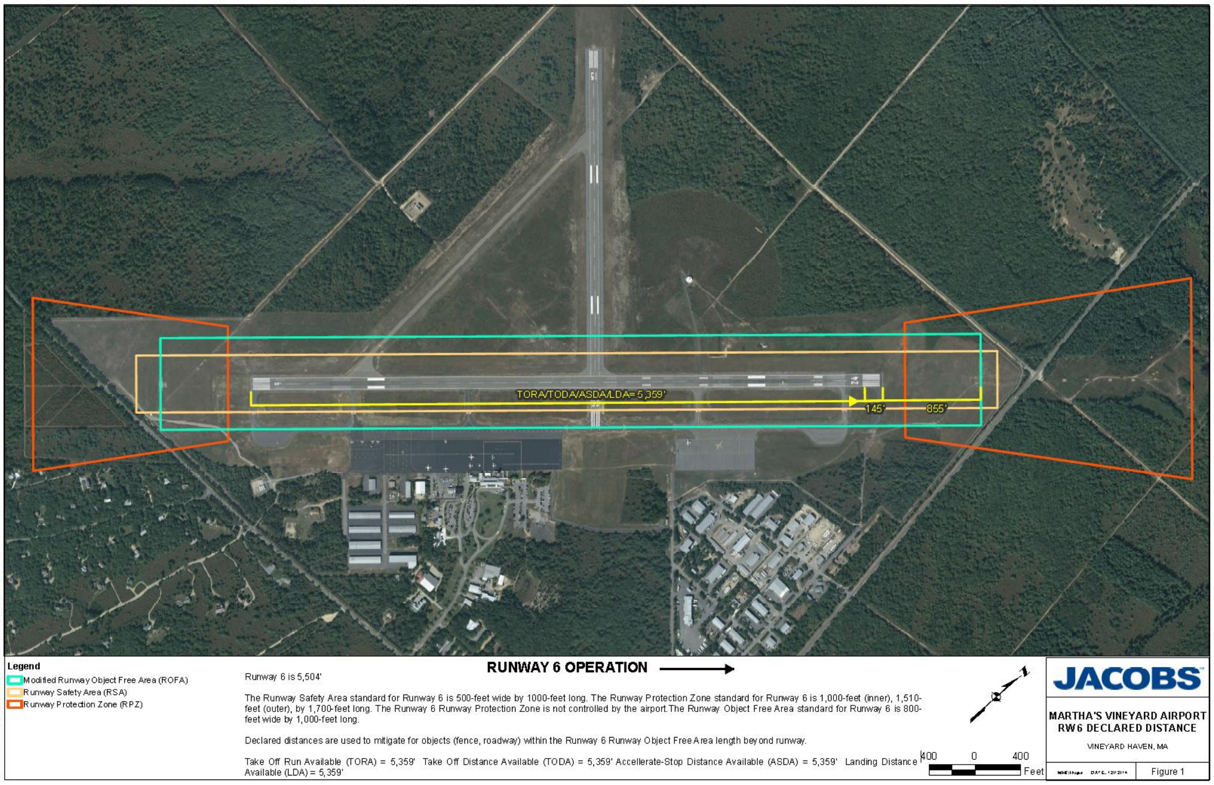
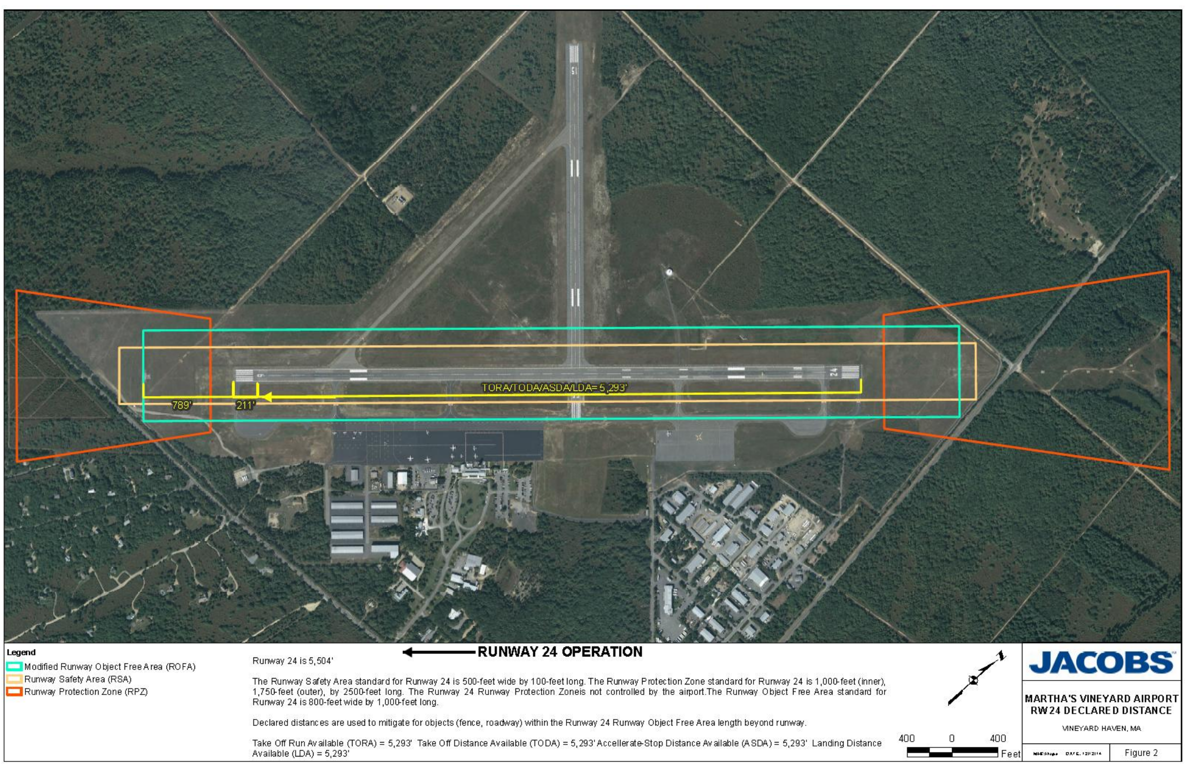


Figure 5.5
Runway 24 Declared Distance

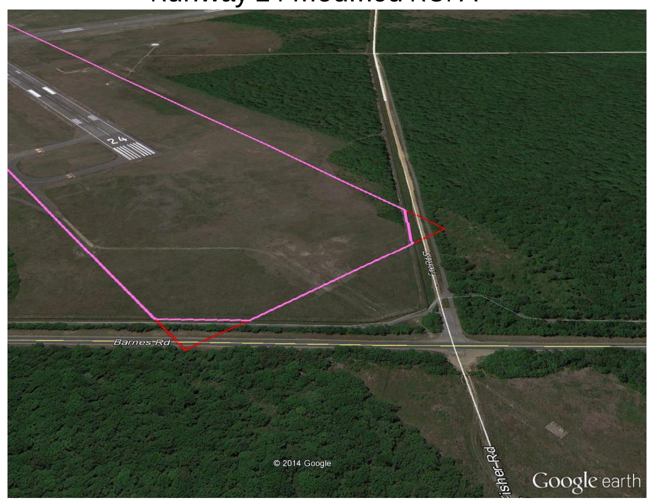


Modify ROFA

An equivalent level of safety can be achieved with the current configuration of the Runway 6-24 ROFA. The portions of the roadway and fence within the ROFA are at the extreme corners of the ROFA and are away from the runway centerline. The airport should request a modification of standard to modifying the corners of the ROFA to conform to the fence line as shown in Figures 5.6 and 5.7 below. This alternative would provide a cost effective and efficient solution to the non-standard ROFA – in total there are 332 feet of roadway and 404 feet of fence line (a total area of 19,971 square feet) penetrating the standard ROFA. A search of the NTSB database was conducted and it was determined there is not a history of aircraft veering into these areas. As noted above, declared distances adversely impact existing operations.

Figure 5.6
Runway 6 Modified ROFA

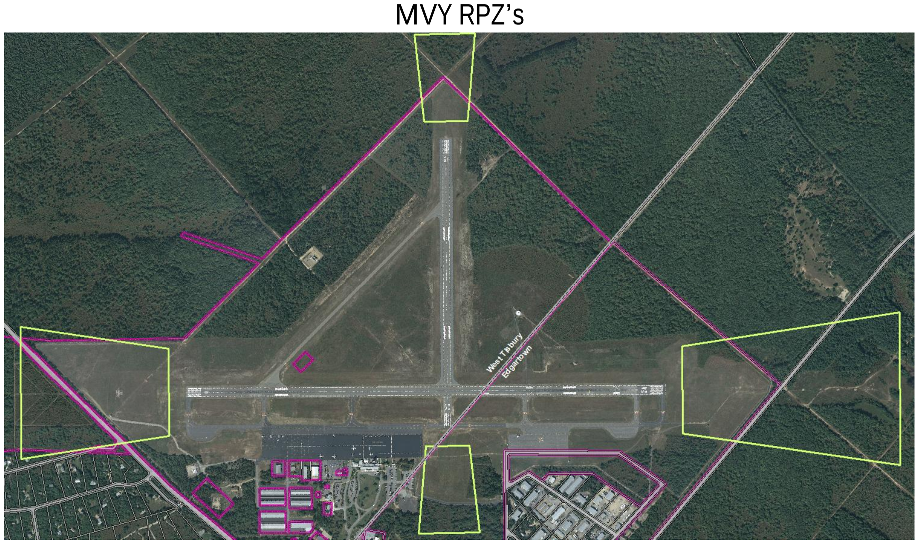
Figure 5.7
Runway 24 Modified ROFA



5.2.2 Runway Protection Zone

The Runway Protection Zone (RPZ) is defined as a trapezoidal area at ground level prior to the threshold or beyond the runway end whose function is to enhance the safety and protect persons and property on the ground. All of the RPZ's extend beyond airport property (see Figure 5.8 below). As noted earlier, the RPZ's for Runways 6-24 and 15 extend off airport property where they overlie state forest land.

Figure 5.8
MVY RPZ's

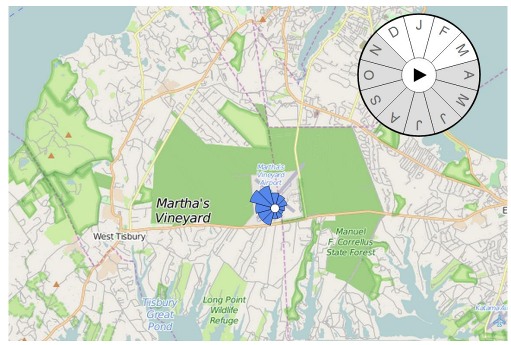


5.3 Alternatives for Extending Runway 33

Discussions with airport staff and the master plan working group revealed the need to look at extending Runway 33 by at least 1,000'. The basis for the extension is to better accommodate operations by the existing fleet mix. In addition, the prevailing wind during the winter months is predominately from the northwest, favoring operations from Runway 33.

Prevailing wind data was gathered from www.windhistory.com (Figure 5.9 at right), a website that collects historical wind data from NOAA (National Oceanic and Atmospheric Administration) archives and presents it in an interactive and graphically oriented manner. The site generates a wind rose based on user input. The source of the data from the site is from the MVY weather reporting station Meteorological Terminal Aviation Routine Weather Report (METAR) data collected from 2006 to 2010. The data is parsed and average winds are calculated for each weather station. For this analysis, the months December through March were selected to analyze the prevailing wind in the winter months. Figure 5.10 below shows the wind rose that was generated for this period. It confirms the prevailing winds from December through March which occurs from the northwest, favoring Runway 33.

Figure 5.9
Prevailing Wind Data for MVY
December - March



Source: Wind History

Figure 5.10
Prevailing Winds at MVY (Dec-March)

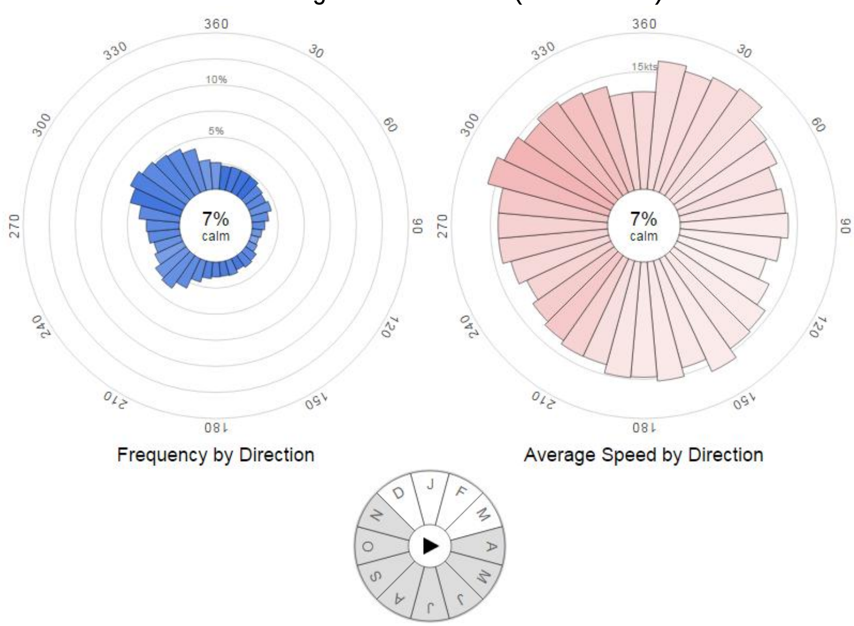


Table 5.1 below presents the FAA's suggested runway lengths for small airplanes with less than 10 passenger seats (i.e. Cape Air Cessna 402's) and large airplanes with a Maximum Takeoff Weight of 60,000lbs or less (i.e. JetBlue's E190). With the current runway length of Runway 15-33, 95% of small aircraft can be accommodated. With a 1,000' extension, 100% of small airplanes could be accommodated. If the runway were to be extended to its maximum practicable length of 5,191', 100% of large airplanes at 60% load factor could be accommodated.

Table 5.1 MVY Runway Length Analysis				
Airport Input Data:				
Airport Elevation	67 ft. (MSL)			
Mean daily temperature of the hottest month	78° (July)			
Maximum difference in runway centerline elevation	10 ft.			
Runway 15-33 Length and Width	3,328' x 75'			
Runway Length Recommended for Airport Design	Recommended Runway Length	Current (3,328')	1,000' extension (4,328')	1,843' extension (5,191')
Small airplanes with less than 10 passenger seats				
95 percent of these small airplanes	2,950'	X	X	X
100 percent of these small airplanes	3,500'		X	X
Small airplanes with 10 or more passenger seats	3,950'		X	X
Large airplanes with MTOW 60,000lbs or less				
75% of these large airplanes at 60% useful load	4,600'			X
75% of these large airplanes at 90% useful load	6,000'			
100% of these large airplanes at 60% useful load	5,000'			X
100% of these large airplanes at 90% useful load	7,400'			

Two alternatives are presented for extending Runway 33.

<u>1,000' extension to Runway 33 (from 3,348' to 4,348') – Figure 5.11</u>
This option provides a 1,000' extension to Runway 33 with an associated parallel taxiway. The existing REILs would need to be relocated with the extension. A stub connector taxiway is located 2,500 from the Runway 33 threshold to accommodate 84% of small airplanes (weighing less than 12,500lbs) on a wet runway and 99% of small airplanes on a dry runway. The estimated cost for this alternative is approximately $3M. This alternative is illustrated on the following page.

<u>Maximum practicable length - 1,843' extension on Runway 33 from 3,348' to 5,191' – Figure 5.12</u>
The maximum length the runway could be extended while keeping the safety areas and Runway Protection Zone within airport property is 1,843'. This option would reduce the area available for non-aviation related use such as an island grocery store or other commercial development. The runway extension would accommodate 100% of large airplanes at 60% useful load. A stub connector taxiway would be located 3,000' from the Runway 33 threshold to accommodate 96% of small airplanes on a wet runway and 100% of small airplanes on a dry runway. The estimated cost for this alternative is approximately $7M. This option is illustrated on the following page.

Figure 5.11
Runway Extension Alternative 1 – 1,000' extension

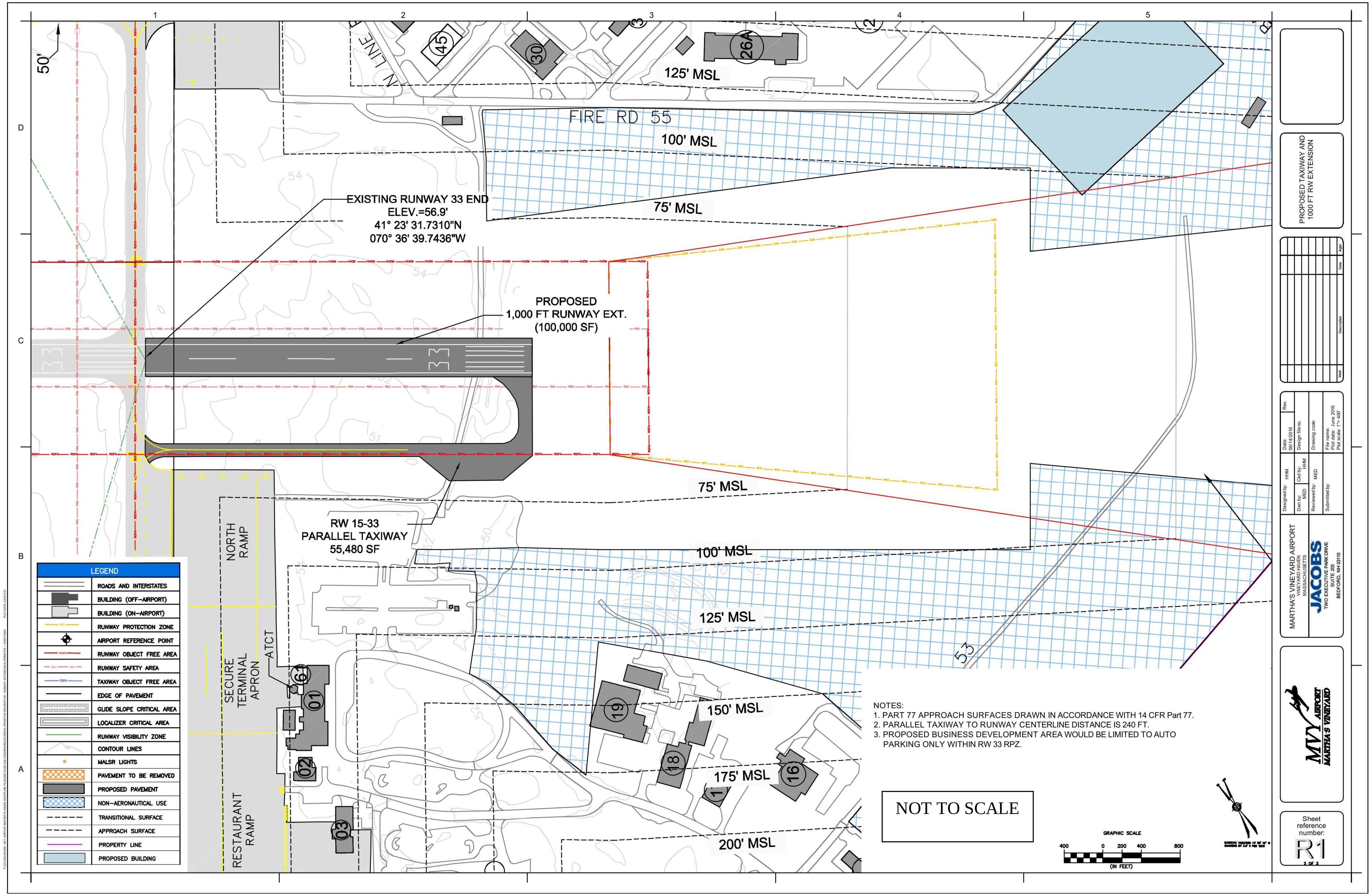
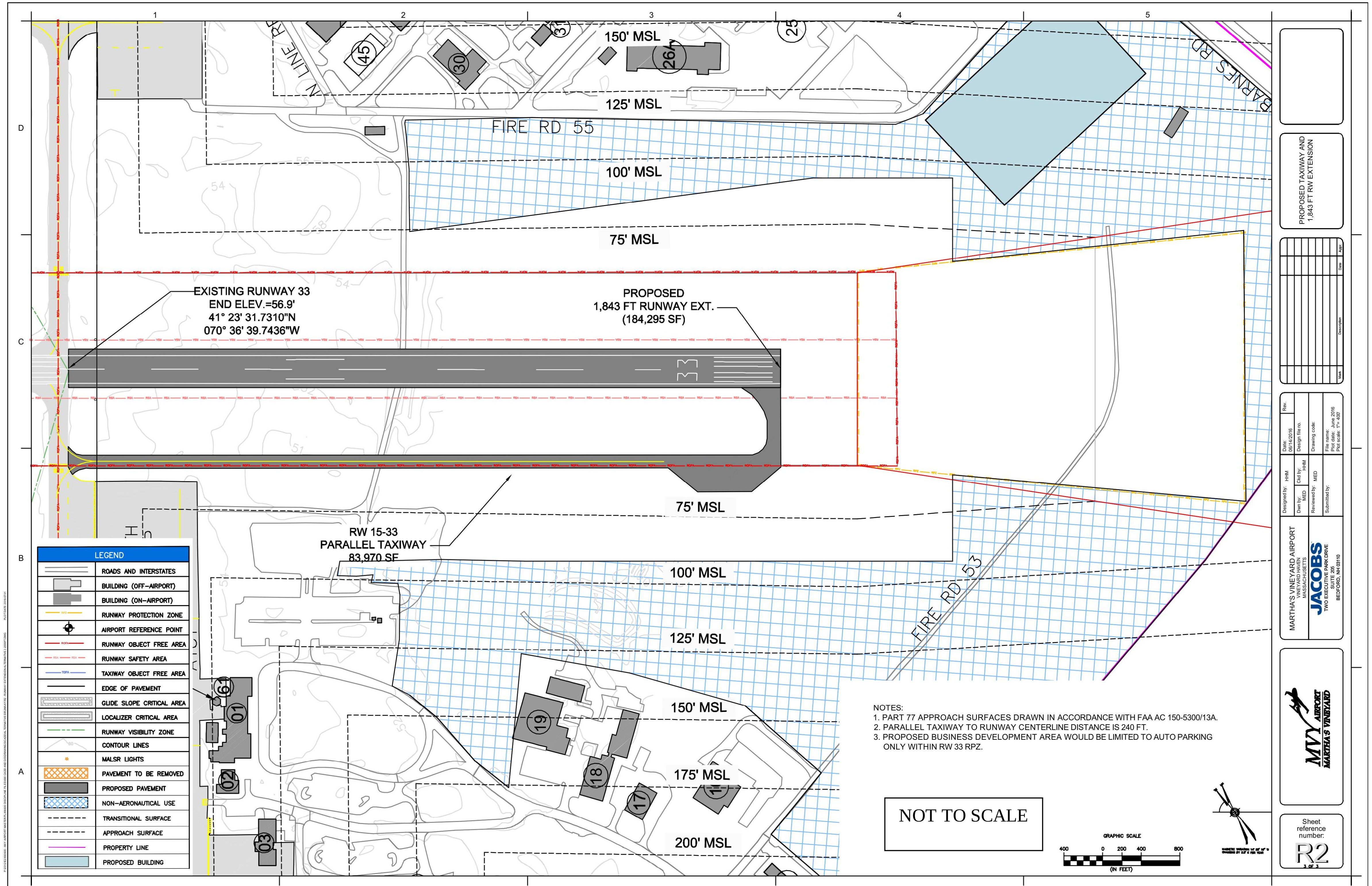


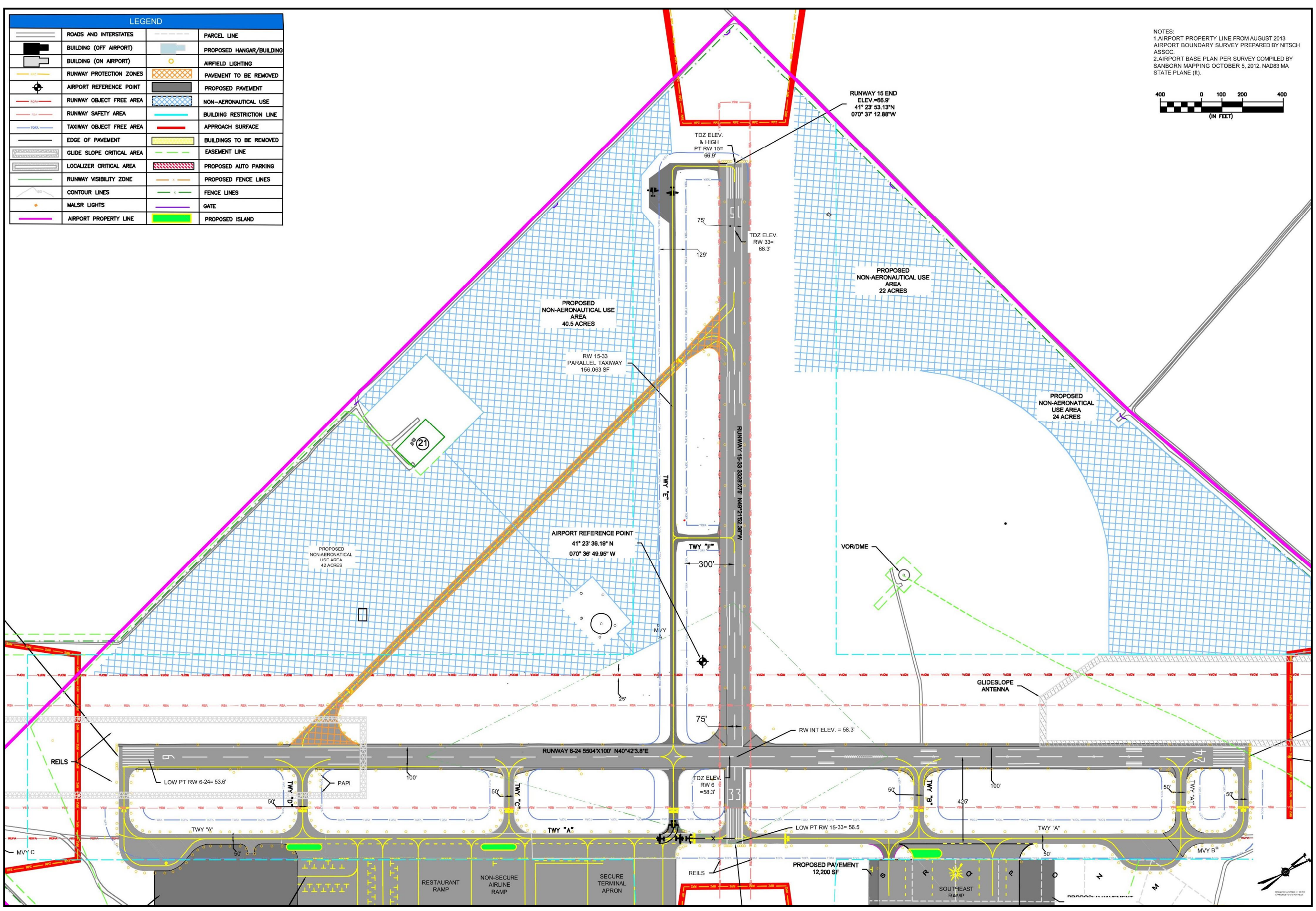
Figure 5.12
Runway Extension Alternative 2 - 1,843' extension



5.4 Taxiway Alternatives

The pavement on Taxiway 'E' was completed in 1990, requires constant maintenance and is in need of repair. The configuration of Taxiway 'E' does not offer the most efficient route to/from Runway 15-33 to/from the terminal area. The circuitous route also leads to increased aircraft emissions and fuel burn due to the nature of the long distance required to taxi from the terminal area to Runway 15 and vice versa. The layout shown in Figure 5.13 provides a full length parallel taxiway with the taxiway centerline offset 300' from the Runway 15-33 centerline per FAA design standards for Airplane Design Group B-II. The configuration shown allows additional area for development of sustainable initiatives such as solar panels or wind turbines. Per FAA design criteria, the right angle taxiway connection provides better visibility to pilots at runway/taxiway intersections and conforms to the current FAA design standard. The full parallel taxiway provides a more direct taxi route to the terminal area for aircraft. The hold short line between the terminal area and Runway 33 is currently 250 feet from the Runway 33 centerline, and the FAA standard is 200 feet. In this alternative, the hold short line should be moved 50 feet closer to the Runway 33 centerline from its current location to ensure other aircraft will be able to taxi to/from Taxiway E to/from the terminal area while an airplane is waiting on the hold line. Figure 5.13 depicts the preferred alternative.

Figure 5.13
Preferred Taxiway E Reconfiguration



5.4.1 Taxiway Criteria and Layout

The taxiway design standards described in Chapter 4 of AC 150/5300-13A are provided to enable safe and efficient taxing by airplanes while minimizing excess pavement. Taxiways are constructed based on the Taxiway Design Group (TDG), which relates to the dimensions of the design aircraft landing gear. Specifically, the cockpit to main gear (CMG) and main gear width (MGW) are the dimensions that directly relate to an aircraft's ability to safely maneuver taxiways at an airport. The current taxiway at MVY is not the most efficient route to Runway 15-33 from the terminal area and vice versa. Using a design aircraft of a Pilatus PC-12, the proposed Taxiway E for MVY was designed to standard.

In addition to the TDG, the AC provides guidelines to keep in mind to reduce the probability of runway incursions. The recommendations listed that will be discussed later in this chapter include designing turns to be 90 degrees wherever possible and creating intersections that provide the best visibility for pilots.

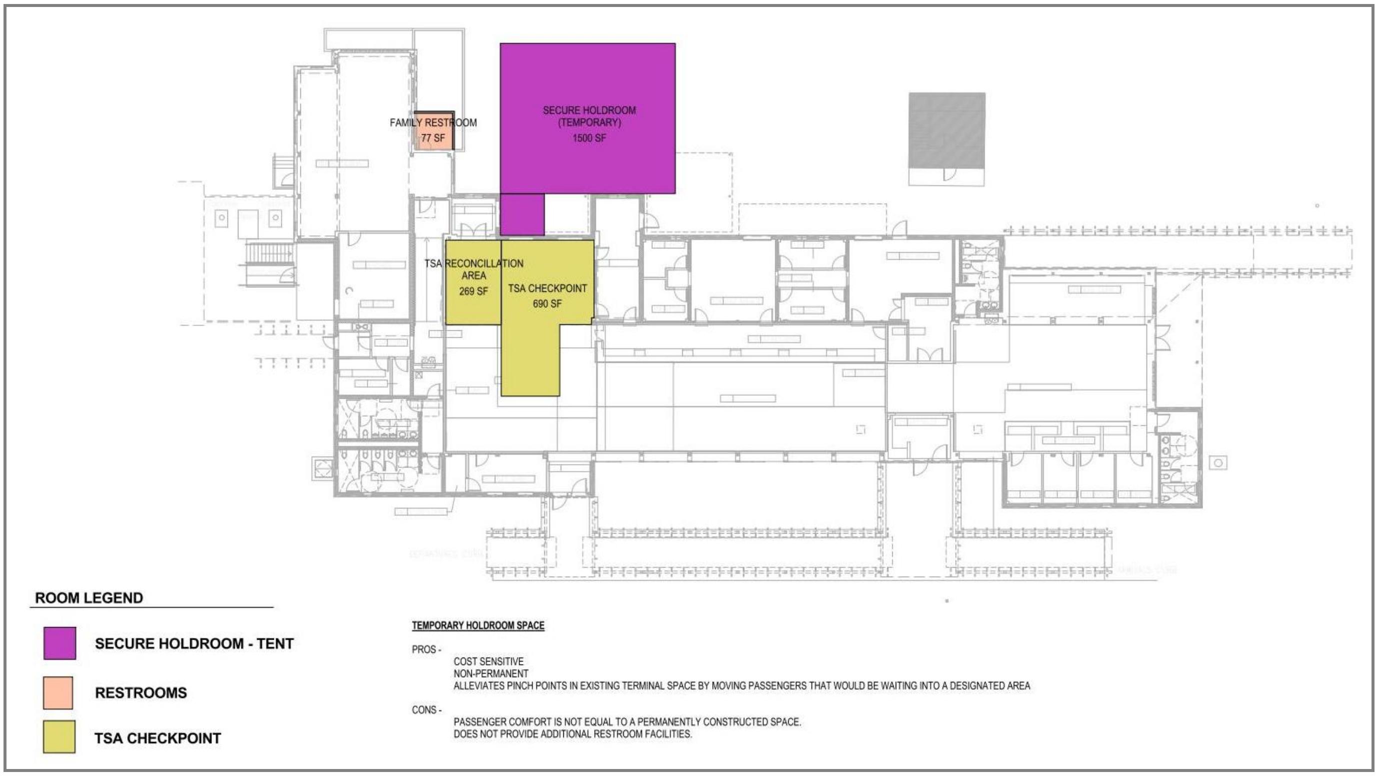
5.5 Terminal Building Renovation Alternatives

A significant emphasis was placed on providing viable alternatives to resolve and/or alleviate the seasonal congestion within the existing airport terminal space. Several options were explored and are discussed below. A major consideration when developing the options was to be mindful of not overbuilding to accommodate the peak season traffic as large portions of added space would be underutilized in the off-season. Therefore, to avoid overbuilding based on peak season terminal usage, the options below do not fully accommodate the spatial requirements that were calculated for each space in Chapter 4 of this master plan.

5.5.1 Temporary Tent Structure with Renovation – Option 1

This alternative expands on the current solution to seasonal congestion (of providing a temporary tent) by adding a family restroom, dedicated TSA reconciliation area and reconfiguring the TSA screening area. By adding a restroom off of the restaurant ramp, a better flow of pedestrian traffic is achieved as restaurant patrons are not mixing with departure traffic to use the nearest restroom facility. A reconciliation area would be provided for screened passengers to retrieve items before entering the secure holdroom prior to boarding. The secure holdroom would continue to be in the form of a temporary tent. The cost associated with the option includes rental of a 1,500-sf tent for 3 months. The tent could be purchased for approximately $20,500. This option does not address the HVAC, secure side restroom or concession issues and may still lead to passenger complaints during the summer peak period. The estimated cost of this alternative is $100,244.

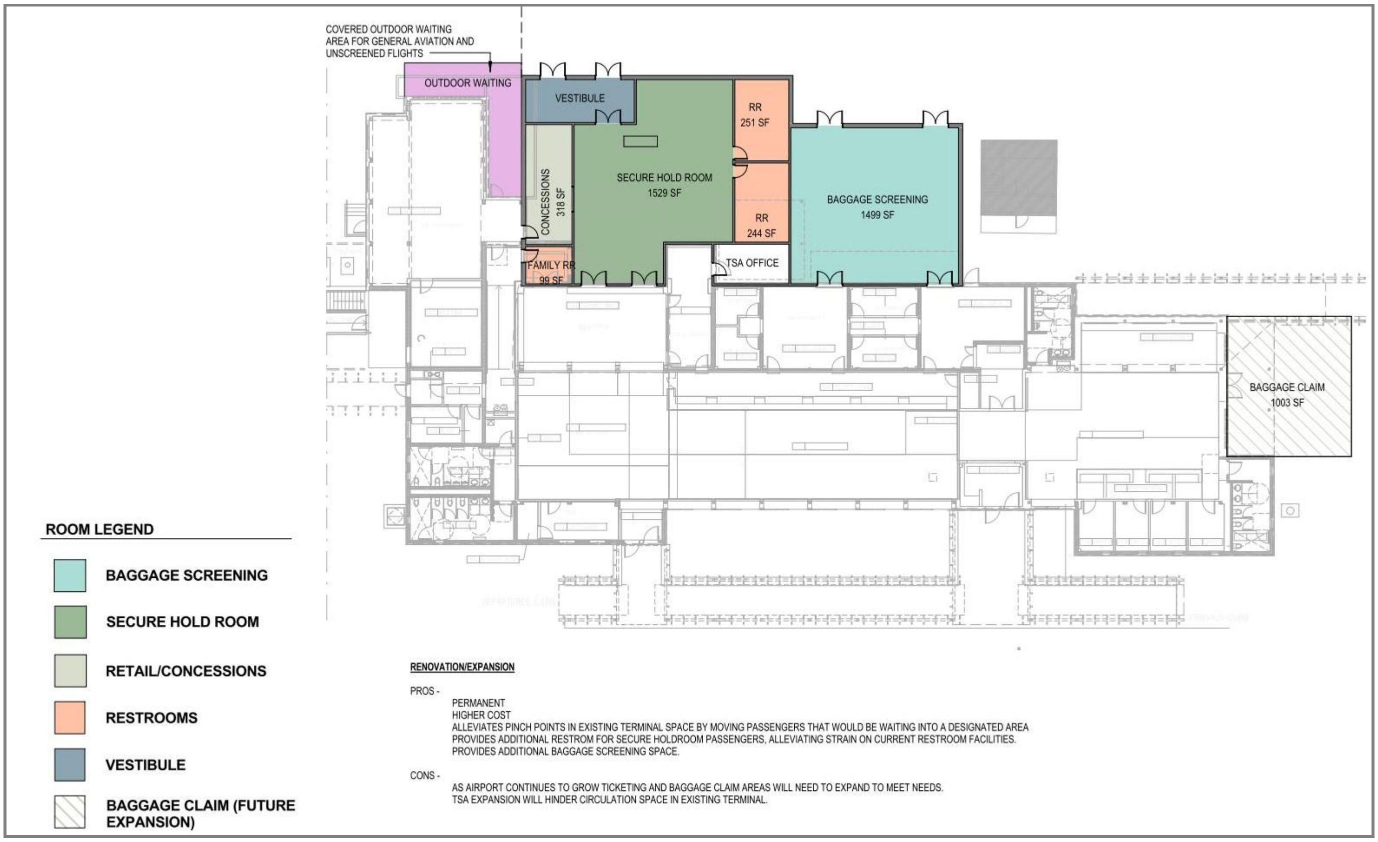
Figure 5.14
Temporary Tent Structure with Renovation



5.5.2 Terminal Expansion and Renovation – Option 2

This option provides a new secure hold room with restrooms and an expanded baggage screening area. In addition, a new secure-side concession area would be constructed. A covered outdoor waiting area would be provided for those passengers departing on non-secure flights. A third restroom near the restaurant is provided. The addition of the third restroom close to the restaurant would help reduce the mixing of pedestrian traffic in the vicinity of the ticketing and screening area. This option would cost approximately $1.8M.

Figure 5.15
Option 2



5.5.3 Terminal Expansion and Renovation – Option 3

This option would provide the airport with a long-term option to address the overcrowding that is currently experienced with the existing terminal configuration. This is also the most expensive option. In this option, the existing airport admin/operations space as well as the pilot lounge, would be gutted and turned into a baggage claim area to provide better circulation for arriving passengers during peak season. The portion of the terminal building currently occupied by the restaurant would become a secure holdroom with the capacity to handle peak season traffic by JetBlue's E190's (106 seats) and CRJ 200 aircraft (86 seats). The admin/operations/pilot lounge would be relocated into new construction with two different options presented for a new location (see Figures 5.16 and Figure 5.17) based on terminal apron configuration. The estimated cost for this option is approximately $7.7M.

Figure 5.16
Option 3A

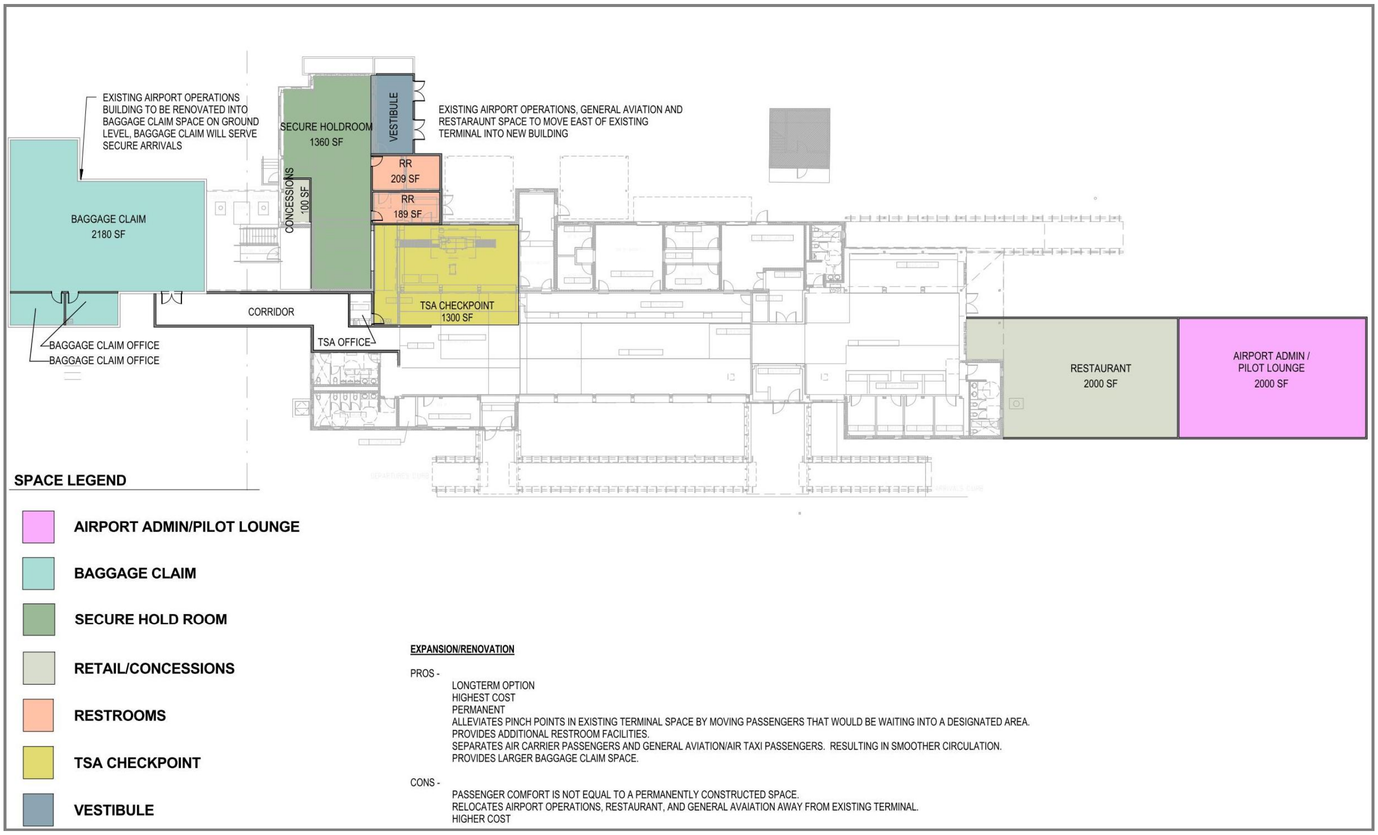
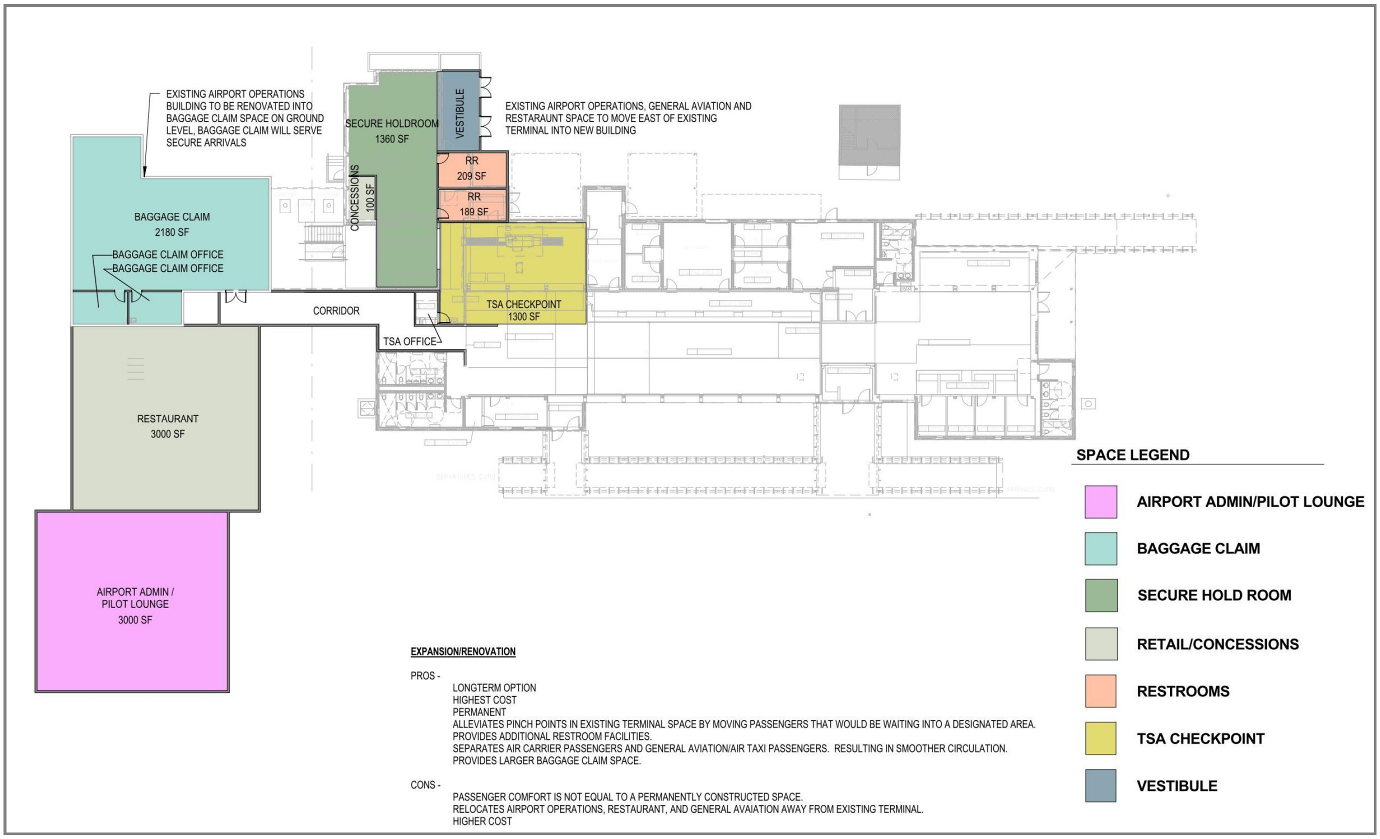


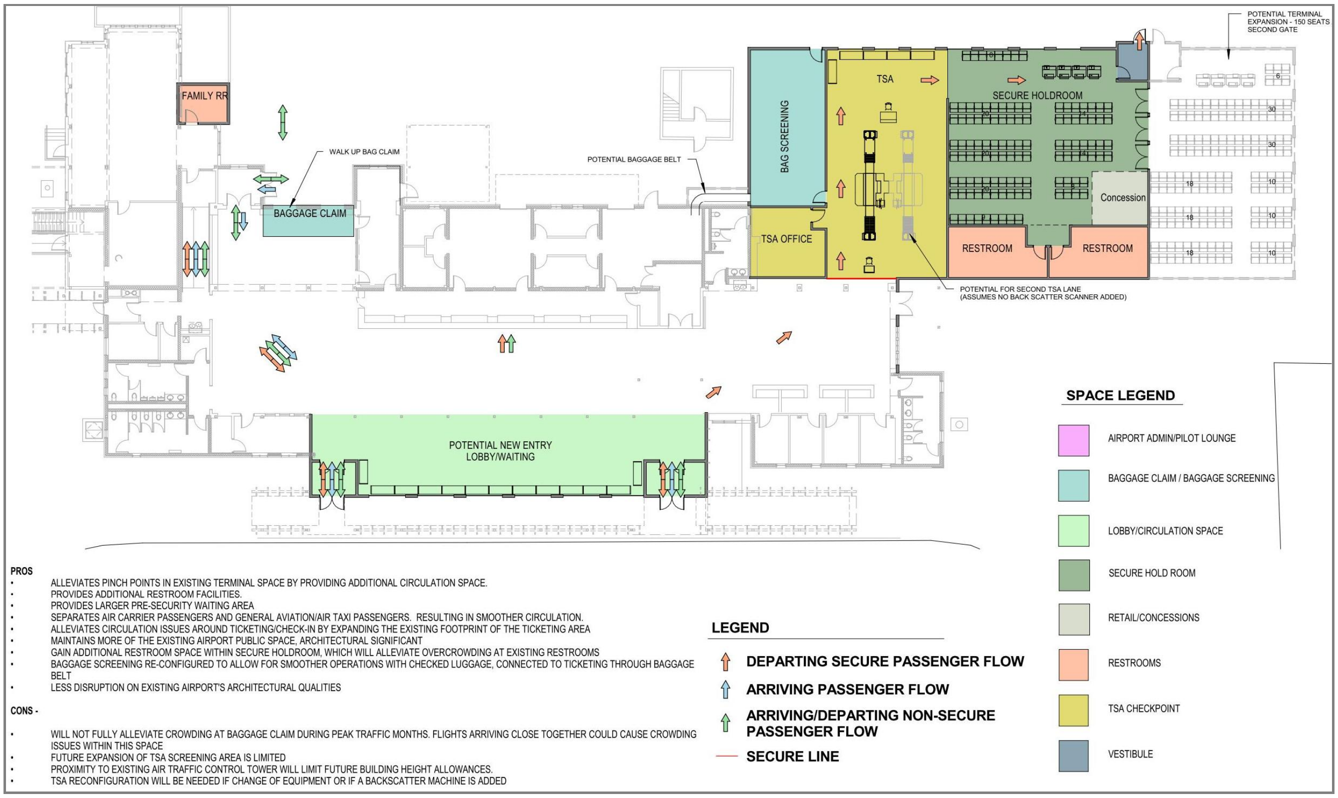
Figure 5.17
Option 3B



5.5.4 Terminal Expansion and Renovation - Option 4

This option minimizes disruption to the existing terminal facilities while providing for an improved terminal flow and increased passenger screening/holdroom space. The rock garden area between the walkway and the terminal face could be enclosed for additional space in the main lobby area. Additional space could also be added adjacent to the proposed addition to increase the passenger hold room capacity. The majority of existing terminal facilities could remain in place such as the airport restaurant, restrooms, ticketing counters and rental car counters while the additional space is built. This option is shown below in Figure 5.18 – Option 4. The estimated cost for this option is approximately $3.4M.

Figure 5.18
Option 4



5.6 Non-aviation Related Use/Sustainability

MVY management, along with the members of the master plan working group, expressed a commitment to sustainable economic growth and environmental stewardship with regard to future airport development. At the outset of the master plan process several members of the working group indicated that MVY offers strong potential for solar and wind power generation. In addition, there is a large area of undeveloped land to the south of Runway 33 and north of the intersection of West Tisbury Road/Barnes Road. The following sections describe several options for developing the areas that have been identified on the airport as compatible for non-aviation related use.

The FAA promotes several sustainability programs/initiatives that align with sustainability's "Triple Bottom Line" which involve; the reduction of environmental impacts, maintaining high and stable levels of economic growth/economic benefits, and social progress. Some examples of the FAA's sustainability initiative/programs include: The Voluntary Airport Low Emissions Program (VALE) (started in 2005); Environmental Management Systems (Advisory Circular issued in 2007); Geothermal and Solar Projects; Solar Guidance; and the Sustainable Master Plan Pilot Program. These programs and guidance allow for airports such as MVY to utilize decision making tools in order to identify ways to:

1.) Reduce energy consumption;
2.) Reduce Environmental impacts;
3.) Realize economic benefits;
4.) Become a better neighbor.

Using the FAA's Sustainable Master Plan Pilot Program as a template, ten sustainability categories have been identified for potential implementation at MVY. Goals, targets and initiatives are then assigned to each category. The categories are:

- Buildings and Facilities
- Air Quality Enhancement
- Energy Conservation and Renewable Energy
- Solid Waste Reduction & Recycling
- Surface Transportation Management
- Water Quality Protection and Water Conservation
- Noise Abatement
- Land Use On – and Off-Site
- Socioeconomic Benefits
- Design and Construction

Categories are discussed below.

5.6.1 Solar

There are approximately 129 acres available on airport property that have been identified as potential use for photovoltaic solar panel or wind turbine development. There are many reasons that the airport should commit to renewable energy resources, including solar panel development as a revenue generator and sustainable resource. This will allow the airport to capitalize on solar resources which will reduce energy expenses which directly affect MVY's operating costs, as well as the airport having the ability to capitalize on renewable energy resources. Airport interest in solar energy is growing rapidly, according to the FAA's Solar Guide, with are over 15 airports around the county which are utilizing solar facilities. "The decrease in prices of solar panels has made it a practical consideration for airports, allowing solar energy to present itself as an opportunity for FAA and airports to produce on-site electricity and to reduce long-term electricity use and energy costs."[12]

The airport's commitment to environmental stewardship is imperative, and investing in solar energy allows for many benefits including cleaner air, fewer greenhouse gases and small business development, energy independence, and financial sustainability. Examples of local airports that have invested in solar energy include, Barnstable Municipal Airport, Hyannis, MA; Laurence G Hanscom Field Airport, Bedford, MA; Manchester-Boston Regional Airport, Manchester, NH; Boston-Logan International Airport, Boston, MA; and Burlington International Airport, Burlington, VT; with Nantucket Memorial Airport, Nantucket, MA, currently evaluating options for solar development.

While the vast availability of open acreage at MVY would encourage ground mounted solar installation, there are airports that are optimizing roof mounted solar panels such as Manchester-Regional Airport and Burlington International Airport. Roof-mounting is common because it generally receives unobstructed sun exposure, and the roof itself tends to provide a ready-made support structure for a solar installation, which generally minimizes installation costs for smaller projects, whereas ground-mounted projects provide better pricing for larger projects (See Fig. 6.1). Ideally, MVY would have ground-mounted solar panels installed, where the ground is generally flat

[12/13] FAA Guidance on Airport Solar Technology, 2012; Technical Guidance for Evaluating Selected Solar Technologies on Airports with unobstructed southerly views. Ground-mounted systems require long-term stable soil and panel mountings of steel poles and beams to provide stability. [13]

Figure 5.19
Solar Panels at Barnstable Municipal Airport

The FAA Solar guide explains that the reason airports (being high energy consumption land use) are good locations for solar installation since the electricity can be generated and consumed on site. MVY has a high on-site electricity demand, due to the year-round accessibility, seasonal popularity, and expansion of the business park.

In May 2014, Barnstable Municipal Airport released a press release[14] announcing the construction of their 18.8 acre solar photovoltaic farm, making it the largest Cape and Island's solar panel array, with approximately 24,700 modules. The panels generate enough energy to provide approximately 1,077 average sized homes annually. This equals approximately 8,100 annual megawatt hours of electricity to provide energy to the airport, the Barnstable Fire District and "ultimately, ratepayers in the Town of Barnstable and in other jurisdictions that belong to the Cape and Vineyard Electric Cooperative (CVEC)", in which the revenue generated from the solar panels will be distributed to the airport and the Town of Barnstable in equal amounts. In another press release issued by CVEC, it was stated that this renewable energy resource will "offset 15,584 metric tons of carbon dioxide emissions annually, which is the equivalent of taking 3,056 automobiles off the road every year."

At the end of December 2014, Indianapolis International Airport completed its second phase of solar panel installation making it the world's largest solar farm. The farm encompasses 76,000 photovoltaic solar panels spanning over 150 acres. The newly installed solar panels are unique because they have the ability to move and track the sun as it moves across the sky. The entire solar farm generates enough energy to power more than 1,410 average American homes for a year. This equals to approximately 31 million annual megawatt hours of electricity to provide energy to the airport. The airport has been reported as saying "The solar farm not only enhances our environmentally friendly and energy-efficient terminal campus, but also played a huge role in our recent recognition of being named one of America's greenest airports."[15]

FAA approvals and an FAA glint and glare review would be required, as well as MESA habitat mitigation program.

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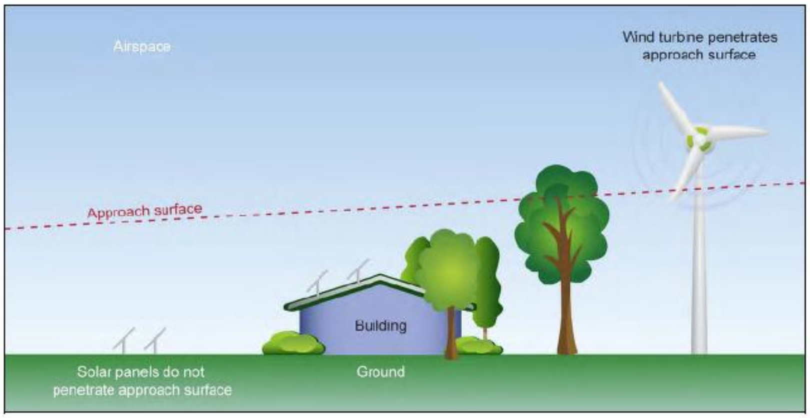
[14] http://www.capecod.com/newscenter/large-solar-field-construction-hyannis-airport/
[15] Indystar; *World's Largest Solar Farm Complete at Indianapolis Airport*, December 28, 2014

5.6.3 Wind

As noted earlier, there are approximately 27 acres available on MVY airport property that have been identified as potential use for alternative energy sources such as wind turbines. As mentioned in the previous section (5.6.2) there are many reasons the airport should commit to renewable energy resources, such as wind turbine development as a revenue generator and sustainable resource, allowing the airport to commit to environmental stewardship.



Chapter 6 – Airport Layout Plan

A complete Airport Layout Plan (ALP) drawing set was produced in full conformance with FAA AC 150/5070-6B, *Airport Master Plans*, including Change 1. A total of 13 drawings constitute the full ALP set. The ALP set drawings were printed at 24"x36" size, and also attached below.

The ALP drawings were prepared in AutoCAD Map (version 2010) and Geographic Information System (GIS), as well as other software to incorporate and graphically display data from various sources. For example, GIS files from the State of Massachusetts were incorporated into various drawings in the ALP set.

6.1 Airport Layout Plan Drawings

A brief description of the ALP drawings is presented below:

Title Sheet (Drawing No. 1) – The title sheet includes the airport location maps, an index of drawings in the ALP set, as well as signature blocks.

Airport Data Sheet (Drawing No. 2) – This sheet depicts diagrams for an All Weather Wind Rose, IFR Wind Rose and an ILS Wind Rose. The Obstruction Data Tables are also included and lists the type of obstruction, elevation, airspace surface and the penetration amount for each obstruction.

Existing Airport Layout Plan (Drawing No. 3) – This drawing was produced at a scale of 1" = 300', and was developed based on aerial mapping acquired October 5, 2012 by the Sanborn Mapping Company.

Proposed Airport Layout Plan (Drawing No. 4) – The Proposed ALP drawing depicts the existing *and future* airport facilities. The drawing was produced at a scale of 1" = 300' and graphically identifies the proposed airport facilities, the proposed Solar Area and the proposed Wind Farm Area. It also includes pertinent imaginary surfaces such as the Runway Protection Zones (RPZ) and Runway Safety Areas (RSA), as well as airport and runway data tables.

Terminal Area Plan (Drawing No. 5) – This drawing is at a scale of 1" = 100' and presents a detailed layout of the future terminal facility area.

Airspace Plan (Drawing No. 6) – This drawing depicts the imaginary surfaces defined in FAR Part 77. It also graphically shows penetrations to the imaginary surfaces and their location in relation to the Martha's Vineyard Airport. A number of sources of data were compiled to prepare this drawing, including aerial mapping from Sanborn Mapping Company collected on October 5, 2012, ground surveys from Nitcsh Engineering in September 2013, FAA's digital obstacle file (DOF), and U.S.G.S. topographic maps. FAA's DOF is a database of man-made objects that were identified on FAA Form 7460-1, *Notice of Proposed Construction or Alternation,* specifically those objects that were actually constructed as reported to FAA.

Exhibit A: Airport Properties Map (Drawing No. 7) – This drawing depicts the airport property lines along with adjacent roads and the business park parcel. The drawing was produced at a scale of 1" = 400'. An airport boundary survey was prepared by Nitcsh Engineering in September 2013.

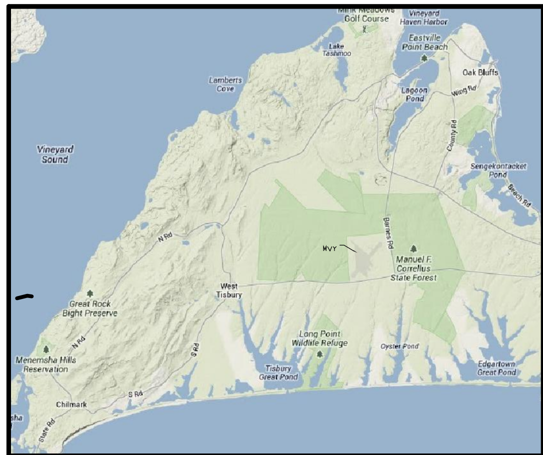
Runway 06 Plan and Profile (Drawing No. 8) – This sheet graphically depicts approach surface penetrations for Runway 06, from a plan and profile view. The depictions are both at a horizontal scale of 1" = 100'. The profile view has a vertical scale of 1" = 10'. The obstruction data was compiled from aerial mapping acquired October 5, 2012 by the Sanborn Mapping Company and the airport property line details by Nitcsh Engineering in September 2013.

Runway 24 Plan and Profile (Drawing No. 9) - This sheet graphically depicts approach surface penetrations for Runway 24, from a plan and profile view. The depictions are both at a horizontal scale of 1” = 100’. The profile view has a vertical scale of 1” = 10’. The obstruction data was compiled from aerial mapping acquired October 5, 2012 by the Sanborn Mapping Company and the airport property line details by Nitcsh Engineering in September 2013.

Runway 15 Plan and Profile (Drawing No. 10) – This sheet graphically depicts approach surface penetrations for Runway 15, from a plan and profile view. The depictions are both at a horizontal scale of 1” = 100’. The profile view has a vertical scale of 1” = 10’. The obstruction data was compiled from aerial mapping acquired October 5, 2012 by the Sanborn Mapping Company and the airport property line details by Nitcsh Engineering in September 2013.

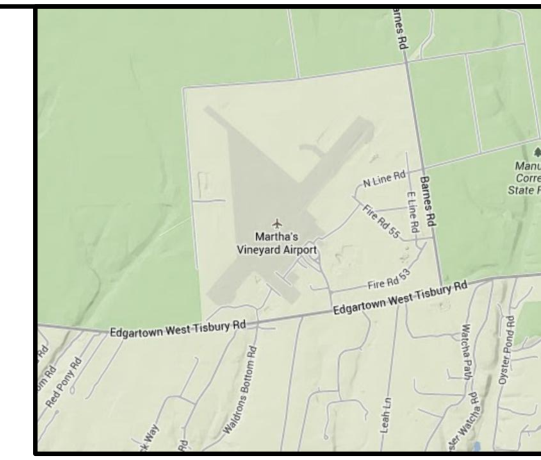
Runway 33 Plan and Profile (Drawing No. 11) - This sheet graphically depicts approach surface penetrations for Runway 33, from a plan and profile view. The depictions are both at a horizontal scale of 1” = 100’. The profile view has a vertical scale of 1” = 10’. The obstruction data was compiled from aerial mapping acquired October 5, 2012 by the Sanborn Mapping Company and the airport property line details by Nitcsh Engineering in September 2013.

The ALP drawings are included in 11”x 17” format on the following pages.



VICINITY MAP

MARTHA'S VINEYARD AIRPORT
WEST TISBURY, MASSACHUSETTS



LOCATION MAP

AIRPORT LAYOUT PLAN UPDATE

AIP No. 3-25-0031-40-2012

INDEX TO DRAWINGS

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
NEW ENGLAND REGIONAL HEADQUARTERS
AIRPORTS DIVISION – ANE 600

APPROVED: ______________________

DATE: ______________________

APPROVAL SUBJECT TO COMMENTS AND RECOMMENDATIONS LETTER

____
CHAIRMAN, MVY AIRPORT COMMISSION

DATE: ______________________

____
DIRECTOR,
MASS. DOT BUREAU OF TRANSPORTATION

DATE: ______________________

CERTIFICATION

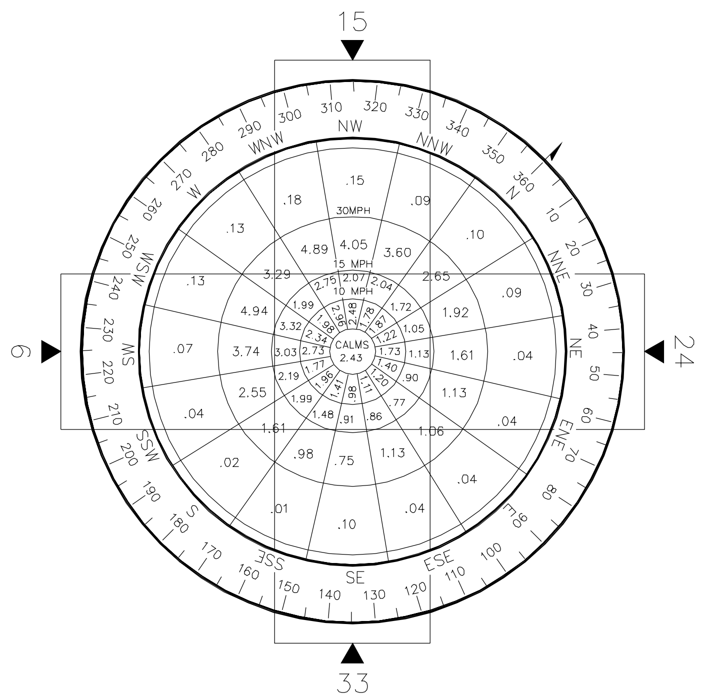
CERTIFIES THAT ALL AIRPORT ELEMENTS SHOWN ON THIS ALP ARE IN ACCORDANCE WITH CRITERIA CONTAINED IN THE CURRENT EDITION OF THE FAA ADVISORY CIRCULAR 150/5300-13, CHANGE 8, EXCEPT AS NOTED IN THE ABOVE TABLE ENTITLED " NON CONFORMING CONDITIONS".

(NAME OF SPONSOR) ______ NAME ______ DATE ______

PREPARED IN ACCORDANCE WITH FAA ADVISORY CIRCULARS:
150/5300-13A AIRPORT DESIGN CHANGE 1, SEPTEMBER, 2012
150/5070-6B AIRPORT MASTER PLANS CHANGE 1, MAY 1, 2007

June 2016

WIND ROSES

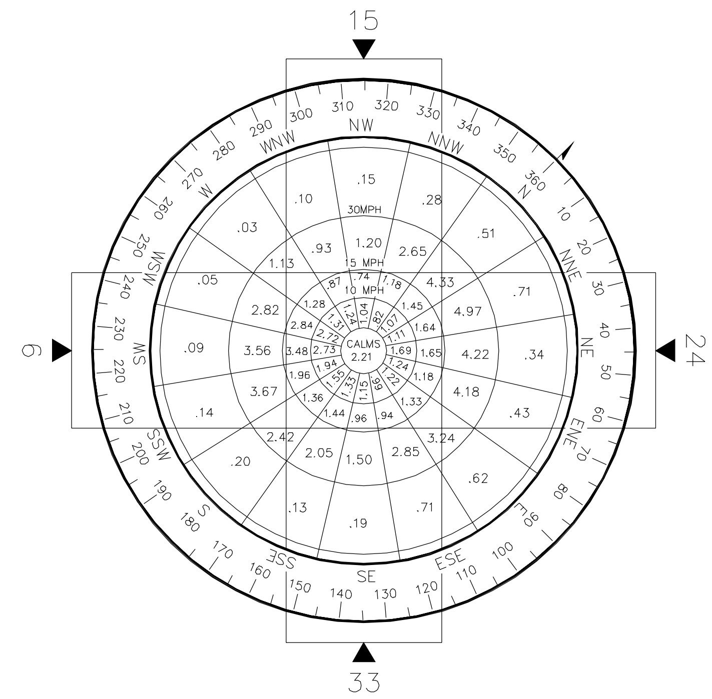


VFR

SOURCE: NATIONAL CLIMATIC CENTER
PERIOD: 1954–1964

ALLOWABLE CROSS WIND COMPONENT	15 MPH	12 MPH
RUNWAY 6–24	79.33	71.13
RUNWAY 15–33	78.88	70.55
RUNWAY 12–30	79.51	71.11
ALL RUNWAYS	97.33	87.05

CEILING / VISIBILITY GREATER THAN 1000 FT. AND 3 MILES



IFR

SOURCE: NATIONAL CLIMATIC CENTER
PERIOD: 1954–1964

ALLOWABLE CROSS WIND COMPONENT	15 MPH	12 MPH
RUNWAY 6–24	79.22	70.70
RUNWAY 15–33	66.71	55.84
RUNWAY 6–24 + 15–33	91.84	84.32

CEILING / VISIBILITY GREATER THAN 200 FT. AND 1/2 MILE AND LESS THAN 1000 FT. WITH GREATER THAT 1/2 MILE OR GREATER THAN 1000 FT. WITH LESS THAN 3 MILES

OBSTRUCTION DATA TABLES

POINT #	DESCRIPTION	ELEVATION (FT AMSL)	AIRSPACE SURFACE	PENETRATION AMOUNT	DISPOSITION
1	TREE	89.0	TRANSITIONAL	9.5	REMOVE
2	TREE	98.1	TRANSITIONAL	24.5	REMOVE
3	TREE	97.3	TRANSITIONAL	16.4	REMOVE
4	TREE	87.5	TRANSITIONAL	16.7	REMOVE
5	TREE	95.4	TRANSITIONAL	23.6	REMOVE
6	TREE	94.0	TRANSITIONAL	16.0	REMOVE
7	TREE	83.2	TRANSITIONAL	15.2	REMOVE
8	TREE	86.4	TRANSITIONAL	19.4	REMOVE
9	TREE	84.2	TRANSITIONAL	18.6	REMOVE
10	TREE	79.9	TRANSITIONAL	2.1	REMOVE
11	TREE	89.2	TRANSITIONAL	4.6	REMOVE
12	TREE	92.0	TRANSITIONAL	22.1	REMOVE
13	TREE	92.9	TRANSITIONAL	24.8	REMOVE
14	TREE	97.2	TRANSITIONAL	26.9	REMOVE
15	TREE	92.3	TRANSITIONAL	21.8	REMOVE
16	TREE	86.1	TRANSITIONAL	17.4	REMOVE
17	TREE	86.7	TRANSITIONAL	17.6	REMOVE
18	TREE	93.4	TRANSITIONAL	7.4	REMOVE
19	TREE	91.7	TRANSITIONAL	11.6	REMOVE
20	TREE	94.4	TRANSITIONAL	9.2	REMOVE
21	TREE	88.4	TRANSITIONAL	0.9	REMOVE
22	TREE	105.2	TRANSITIONAL	5.8	REMOVE
23	TREE	94.3	TRANSITIONAL	0.8	REMOVE
24	TREE	90.8	TRANSITIONAL	2.2	REMOVE
25	TREE	100.3	TRANSITIONAL	11.2	REMOVE
26	TREE	100.7	TRANSITIONAL	12.2	REMOVE
27	TREE	100.6	TRANSITIONAL	0.3	REMOVE
28	TREE	97.3	TRANSITIONAL	8.9	REMOVE
29	TREE	88.5	TRANSITIONAL	12.7	REMOVE
30	TREE	92.3	TRANSITIONAL	15.7	REMOVE
31	TREE	89.0	TRANSITIONAL	2.0	REMOVE
32	TREE	95.2	TRANSITIONAL	2.6	REMOVE
33	TREE	92.4	TRANSITIONAL	5.6	REMOVE
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35	TREE	91.8	TRANSITIONAL	6.0	REMOVE
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38	TREE	92.0	TRANSITIONAL	2.6	REMOVE
39	TREE	88.9	TRANSITIONAL	1.7	REMOVE
40	TREE	94.6	TRANSITIONAL	5.7	REMOVE
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42	TREE	84.8	TRANSITIONAL	0.3	REMOVE
43	TREE	90.5	TRANSITIONAL	2.6	REMOVE
44	TREE	87.5	TRANSITIONAL	12.2	REMOVE
45	TREE	89.5	TRANSITIONAL	4.5	REMOVE
46	TREE	96.0	TRANSITIONAL	21.8	REMOVE
47	TREE	90.8	TRANSITIONAL	18.6	REMOVE
48	TREE	78.7	TRANSITIONAL	1.0	REMOVE
49	TREE	92.8	TRANSITIONAL	0.8	REMOVE
50	TREE	88.5	TRANSITIONAL	8.8	REMOVE
51	TREE	92.3	TRANSITIONAL	13.5	REMOVE
52	TREE	84.2	TRANSITIONAL	7.4	REMOVE
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54	TREE	97.2	TRANSITIONAL	9.7	REMOVE
55	TREE	90.6	TRANSITIONAL	2.0	REMOVE
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60	TREE	85.7	TRANSITIONAL	8.1	REMOVE
61	TREE	81.6	TRANSITIONAL	3.2	REMOVE
62	TREE	90.8	TRANSITIONAL	3.0	REMOVE
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77	TREE	83.6	TRANSITIONAL	7.7	REMOVE
78	TREE	105.7	TRANSITIONAL	20.9	REMOVE
79	TREE	92.6	TRANSITIONAL	15.5	REMOVE
80	TREE	77.9	TRANSITIONAL	6.7	REMOVE
81	TREE	78.1	TRANSITIONAL	12.4	REMOVE
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85	NAVAID	54.5	PRIMARY	0.4	FIXED BY FUNCTION
86	NAVAID	54.6	PRIMARY	0.6	FIXED BY FUNCTION
87	NAVAID	61.1	PRIMARY	2.9	FIXED BY FUNCTION
88	NAVAID	67.7	PRIMARY	6.9	FIXED BY FUNCTION
89	NAVAID	62.9	PRIMARY	1.0	FIXED BY FUNCTION
90	NAVAID	60.3	PRIMARY	1.3	FIXED BY FUNCTION
91	NAVAID	60.1	PRIMARY	0.3	FIXED BY FUNCTION
92	NAVAID	61.9	PRIMARY	1.8	FIXED BY FUNCTION
93	NAVAID	64.0	PRIMARY	3.7	FIXED BY FUNCTION
94	NAVAID	60.4	PRIMARY	3.7	FIXED BY FUNCTION
95	NAVAID	59.7	PRIMARY	2.8	FIXED BY FUNCTION
96	NAVAID	59.5	PRIMARY	2.5	FIXED BY FUNCTION
97	NAVAID	61.1	PRIMARY	3.9	FIXED BY FUNCTION
98	NAVAID	61.2	PRIMARY	2.7	FIXED BY FUNCTION
99	NAVAID	61.9	PRIMARY	3.7	FIXED BY FUNCTION
100	NAVAID	62.9	PRIMARY	3.1	FIXED BY FUNCTION
101	NAVAID	61.8	PRIMARY	2.8	FIXED BY FUNCTION
102	NAVAID	61.3	PRIMARY	2.6	FIXED BY FUNCTION
103	NAVAID	60.2	PRIMARY	1.5	FIXED BY FUNCTION
104	NAVAID	62.7	PRIMARY	4.6	FIXED BY FUNCTION
105	NAVAID	62.8	PRIMARY	4.1	FIXED BY FUNCTION
106	NAVAID	59.4	PRIMARY	0.6	FIXED BY FUNCTION
107	NAVAID	59.7	PRIMARY	0.7	FIXED BY FUNCTION
108	NAVAID	57.7	PRIMARY	1.9	FIXED BY FUNCTION
109	NAVAID	59.4	PRIMARY	3.6	FIXED BY FUNCTION
110	NAVAID	59.4	PRIMARY	3.6	FIXED BY FUNCTION
111	NAVAID	58.7	PRIMARY	3.0	FIXED BY FUNCTION
112	NAVAID	58.2	PRIMARY	4.4	FIXED BY FUNCTION
113	NAVAID	57.7	PRIMARY	2.2	FIXED BY FUNCTION

DATA SHEET

Mark | Description | Date | Appr.

Rev.
Date: 03/21/2016
Design file no.
Drawing code:
File name:
Plot date: March 2016
Plot scale: N/A

Designed by: HHM
Dwn by: TMP
Ckd by: MED
Reviewed by: SJF
Submitted by:

MARTHA'S VINEYARD AIRPORT
VINEYARD HAVEN
MASSACHUSETTS

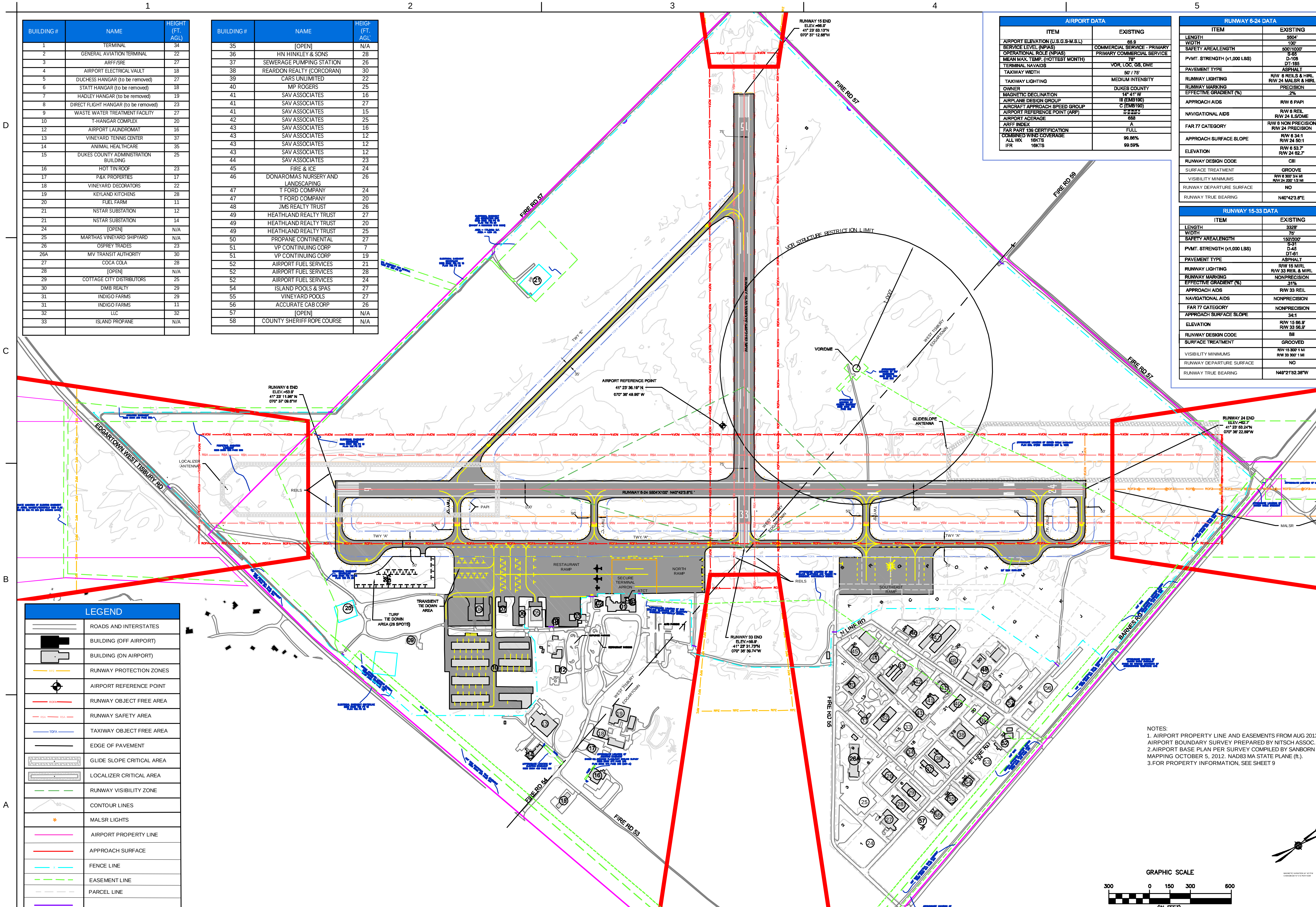
JACOBS
TWO EXECUTIVE PARK DRIVE
SUITE 205
BEDFORD, NH 03110

MVY AIRPORT MARTHA'S VINEYARD

Sheet reference number:
02

BUILDING #	NAME	HEIGHT (FT. AGL)
1	TERMINAL	34
2	GENERAL AVIATION TERMINAL	22
3	ARFF/SRE	27
4	AIRPORT ELECTRICAL VAULT	18
5	DUCHESS HANGAR (to be removed)	27
6	STATT HANGAR (to be removed)	18
7	HADLEY HANGAR (to be removed)	19
8	DIRECT FLIGHT HANGAR (to be removed)	23
9	WASTE WATER TREATMENT FACILITY	27
10	T-HANGAR COMPLEX	20
12	AIRPORT LAUNDROMAT	16
13	VINEYARD TENNIS CENTER	37
14	ANIMAL HEALTHCARE	35
15	DUKES COUNTY ADMINISTRATION BUILDING	25
16	HOT TIN ROOF	23
17	P&K PROPERTIES	17
18	VINEYARD DECORATORS	22
19	KEYLAND KITCHENS	28
20	FUEL FARM	11
21	NSTAR SUBSTATION	12
21	NSTAR SUBSTATION	14
24	[OPEN]	N/A
25	MARTHAS VINEYARD SHIPYARD	N/A
26	OSPREY TRADES	23
26A	MV TRANSIT AUTHORITY	30
27	COCA COLA	28
28	[OPEN]	N/A
29	COTTAGE CITY DISTRIBUTORS	25
30	DMB REALTY	29
31	INDIGO FARMS	29
31	INDIGO FARMS	11
32	LLC	32
33	ISLAND PROPANE	N/A

BUILDING #	NAME	HEIGH (FT. AGL)
35	[OPEN]	N/A
36	HN HINKLEY & SONS	28
37	SEWERAGE PUMPING STATION	26
38	REARDON REALTY (CORCORAN)	30
39	CARS UNLIMITED	22
40	MP ROGERS	25
41	SAV ASSOCIATES	16
41	SAV ASSOCIATES	27
41	SAV ASSOCIATES	15
42	SAV ASSOCIATES	25
43	SAV ASSOCIATES	16
43	SAV ASSOCIATES	12
43	SAV ASSOCIATES	12
43	SAV ASSOCIATES	12
44	SAV ASSOCIATES	23
45	FIRE & ICE	24
46	DONAROMAS NURSERY AND LANDSCAPING	26
47	T FORD COMPANY	24
47	T FORD COMPANY	20
48	JMS REALTY TRUST	26
49	HEATHLAND REALTY TRUST	27
49	HEATHLAND REALTY TRUST	20
49	HEATHLAND REALTY TRUST	25
50	PROPANE CONTINENTAL	27
51	VP CONTINUING CORP	7
51	VP CONTINUING CORP	19
52	AIRPORT FUEL SERVICES	21
52	AIRPORT FUEL SERVICES	28
52	AIRPORT FUEL SERVICES	24
54	ISLAND POOLS & SPAS	27
55	VINEYARD POOLS	27
56	ACCURATE CAB CORP	26
57	[OPEN]	N/A
58	COUNTY SHERIFF ROPE COURSE	N/A



LEGEND

	ROADS AND INTERSTATES
	BUILDING (OFF AIRPORT)
	BUILDING (ON AIRPORT)
	RUNWAY PROTECTION ZONES
	AIRPORT REFERENCE POINT
	RUNWAY OBJECT FREE AREA
	RUNWAY SAFETY AREA
	TAXIWAY OBJECT FREE AREA
	EDGE OF PAVEMENT
	GLIDE SLOPE CRITICAL AREA
	LOCALIZER CRITICAL AREA
	RUNWAY VISIBILITY ZONE
	CONTOUR LINES
	MALSR LIGHTS
	AIRPORT PROPERTY LINE
	APPROACH SURFACE
	FENCE LINE
	EASEMENT LINE
	PARCEL LINE

AIRPORT DATA	
ITEM	EXISTING
AIRPORT ELEVATION (U.S.G.S-M.S.L)	66.9
SERVICE LEVEL (NPIAS)	COMMERCIAL SERVICE - PRIMARY
OPERATIONAL ROLE (NPIAS)	PRIMARY COMMERCIAL SERVICE
MEAN MAX. TEMP. (HOTTEST MONTH)	78°
TERMINAL NAVAIDS	VOR, LOC, GS, DME
TAXIWAY WIDTH	50' / 75'
TAXIWAY LIGHTING	MEDIUM INTENSITY
OWNER	DUKES COUNTY
MAGNETIC DECLINATION	14° 41' W
AIRPLANE DESIGN GROUP	III (EMB190)
AIRCRAFT APPROACH SPEED GROUP	C (EMB190)
AIRPORT REFERENCE POINT (ARP)	41° 23' 36.19" N 70° 36' 49.96" W
AIRPORT ACERAGE	688
ARFF INDEX	A
FAR PART 139 CERTIFICATION	FULL
COMBINED WIND COVERAGE ALL WX 16KTS IFR 16KTS	99.86% 99.59%

RUNWAY 6-24 DATA	
ITEM	EXISTING
LENGTH	5504'
WIDTH	100'
SAFETY AREA/LENGTH	500'/1000'
PVMT. STRENGTH (x1,000 LBS)	S-65 D-108 DT-185
PAVEMENT TYPE	ASPHALT
RUNWAY LIGHTING	R/W 6 REILS & HIRL R/W 24 MALSR & HIRL
RUNWAY MARKING	PRECISION
EFFECTIVE GRADIENT (%)	.2%
APPROACH AIDS	R/W 6 PAPI
NAVIGATIONAL AIDS	R/W 6 REIL R/W 24 ILS/DME
FAR 77 CATEGORY	R/W 6 NON PRECISION R/W 24 PRECISION
APPROACH SURFACE SLOPE	R/W 6 34:1 R/W 24 50:1
ELEVATION	R/W 6 53.7' R/W 24 62.7'
RUNWAY DESIGN CODE	CIII
SURFACE TREATMENT	GROOVE
VISIBILITY MINIMUMS	R/W 6 300' 3/4 MI R/W 24 200' 1/2 MI
RUNWAY DEPARTURE SURFACE	NO
RUNWAY TRUE BEARING	N40°42'3.8"E

RUNWAY 15-33 DATA	
ITEM	EXISTING
LENGTH	3328'
WIDTH	75'
SAFETY AREA/LENGTH	150'/300'
PVMT. STRENGTH (x1,000 LBS)	S-31 D-45 DT-61
PAVEMENT TYPE	ASPHALT
RUNWAY LIGHTING	R/W 15 MIRL R/W 33 REIL & MIRL
RUNWAY MARKING	NONPRECISION
EFFECTIVE GRADIENT (%)	.31%
APPROACH AIDS	R/W 33 REIL
NAVIGATIONAL AIDS	NONPRECISION
FAR 77 CATEGORY	NONPRECISION
APPROACH SURFACE SLOPE	34:1
ELEVATION	R/W 15 66.9' R/W 33 56.9'
RUNWAY DESIGN CODE	BII
SURFACE TREATMENT	GROOVED
VISIBILITY MINIMUMS	R/W 15 300' 1 MI R/W 33 300' 1 MI
RUNWAY DEPARTURE SURFACE	NO
RUNWAY TRUE BEARING	N49°21'52.38"W

NOTES:
1. AIRPORT PROPERTY LINE AND EASEMENTS FROM AUG 2013 AIRPORT BOUNDARY SURVEY PREPARED BY NITSCH ASSOC.
2. AIRPORT BASE PLAN PER SURVEY COMPILED BY SANBORN MAPPING OCTOBER 5, 2012. NAD83 MA STATE PLANE (ft.).
3. FOR PROPERTY INFORMATION, SEE SHEET 9

GRAPHIC SCALE
300 0 150 300 600
(IN FEET)

EXISTING AIRPORT LAYOUT PLAN

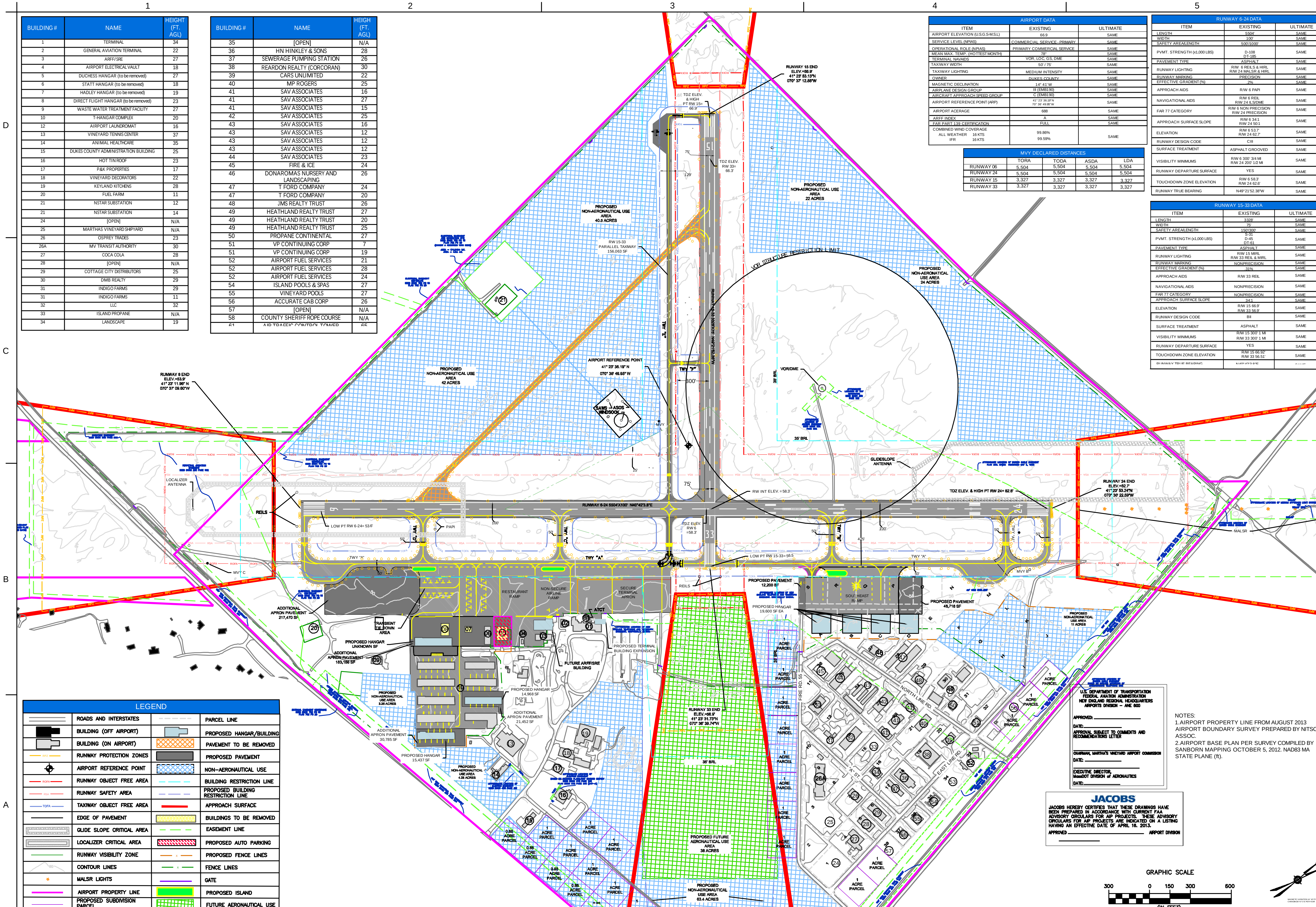
Date: 03/21/2016
Designed by: HHM
Dwn by: KLH
Ckd by: HHM
Reviewed by: SJF
Plot date: March 2016
Plot scale: 1"= 300'

MARTHA'S VINEYARD AIRPORT
VINEYARD HAVEN
MASSACHUSETTS

JACOBS
TWO EXECUTIVE PARK DRIVE
SUITE 205
BEDFORD, NH 03110

MVY AIRPORT MARTHA'S VINEYARD

Sheet reference number:
03



BUILDING #	NAME	HEIGHT (FT. AGL)
1	TERMINAL	34
2	GENERAL AVIATION TERMINAL	22
3	ARFF/SRE	27
4	AIRPORT ELECTRICAL VAULT	18
5	DUCHESS HANGAR (to be removed)	27
6	STATT HANGAR (to be removed)	18
7	HADLEY HANGAR (to be removed)	19
8	DIRECT FLIGHT HANGAR (to be removed)	23
9	WASTE WATER TREATMENT FACILITY	27
10	T-HANGAR COMPLEX	20
12	AIRPORT LAUNDROMAT	16
13	VINEYARD TENNIS CENTER	37
14	ANIMAL HEALTHCARE	35
15	DUKES COUNTY ADMINISTRATION BUILDING	25
16	HOT TIN ROOF	23
17	P&K PROPERTIES	17
18	VINEYARD DECORATORS	22
19	KEYLAND KITCHENS	28
20	FUEL FARM	11
21	NSTAR SUBSTATION	12
21	NSTAR SUBSTATION	14
24	[OPEN]	N/A
25	MARTHAS VINEYARD SHIPYARD	N/A
26	OSPREY TRADES	23
26A	MV TRANSIT AUTHORITY	30
27	COCA COLA	28
28	[OPEN]	N/A
29	COTTAGE CITY DISTRIBUTORS	25
30	DMB REALTY	29
31	INDIGO FARMS	29
31	INDIGO FARMS	11
32	LLC	32
33	ISLAND PROPANE	N/A
34	LANDSCAPE	19

BUILDING #	NAME	HEIGH (FT. AGL)
35	[OPEN]	N/A
36	HN HINKLEY & SONS	28
37	SEWERAGE PUMPING STATION	26
38	REARDON REALTY (CORCORAN)	30
39	CARS UNLIMITED	22
40	MP ROGERS	25
41	SAV ASSOCIATES	16
41	SAV ASSOCIATES	27
41	SAV ASSOCIATES	15
42	SAV ASSOCIATES	25
43	SAV ASSOCIATES	16
43	SAV ASSOCIATES	12
43	SAV ASSOCIATES	12
43	SAV ASSOCIATES	12
44	SAV ASSOCIATES	23
45	FIRE & ICE	24
46	DONAROMAS NURSERY AND LANDSCAPING	26
47	T FORD COMPANY	24
47	T FORD COMPANY	20
48	JMS REALTY TRUST	26
49	HEATHLAND REALTY TRUST	27
49	HEATHLAND REALTY TRUST	20
49	HEATHLAND REALTY TRUST	25
50	PROPANE CONTINENTAL	27
51	VP CONTINUING CORP	7
51	VP CONTINUING CORP	19
52	AIRPORT FUEL SERVICES	21
52	AIRPORT FUEL SERVICES	28
52	AIRPORT FUEL SERVICES	24
54	ISLAND POOLS & SPAS	27
55	VINEYARD POOLS	27
56	ACCURATE CAB CORP	26
57	[OPEN]	N/A
58	COUNTY SHERIFF ROPE COURSE	N/A
61	AIR TRAFFIC CONTROL TOWER	65

AIRPORT DATA

ITEM	EXISTING	ULTIMATE
AIRPORT ELEVATION (U.S.G.S-M.S.L)	66.9	SAME
SERVICE LEVEL (NPIAS)	COMMERCIAL SERVICE - PRIMARY	SAME
OPERATIONAL ROLE (NPIAS)	PRIMARY COMMERCIAL SERVICE	SAME
MEAN MAX. TEMP. (HOTTEST MONTH)	78°	SAME
TERMINAL NAVAIDS	VOR, LOC, GS, DME	SAME
TAXIWAY WIDTH	50' / 75'	SAME
TAXIWAY LIGHTING	MEDIUM INTENSITY	SAME
OWNER	DUKES COUNTY	SAME
MAGNETIC DECLINATION	14° 41' W	SAME
AIRPLANE DESIGN GROUP	III (EMB190)	SAME
AIRCRAFT APPROACH SPEED GROUP	C (EMB190)	SAME
AIRPORT REFERENCE POINT (ARP)	41° 23' 36.19"N 70° 36' 49.95"W	SAME
AIRPORT ACERAGE	688	SAME
ARFF INDEX	A	SAME
FAR PART 139 CERTIFICATION	FULL	SAME
COMBINED WIND COVERAGE ALL WEATHER 16 KTS IFR 16 KTS	99.86% 99.59%	SAME

MVY DECLARED DISTANCES

	TORA	TODA	ASDA	LDA
RUNWAY 06	5,504	5,504	5,504	5,504
RUNWAY 24	5,504	5,504	5,504	5,504
RUNWAY 15	3,327	3,327	3,327	3,327
RUNWAY 33	3,327	3,327	3,327	3,327

RUNWAY 6-24 DATA

ITEM	EXISTING	ULTIMATE
LENGTH	5504'	SAME
WIDTH	100'	SAME
SAFETY AREA/LENGTH	500'/1000'	SAME
PVMT. STRENGTH (x1,000 LBS)	D-108 DT-185	SAME
PAVEMENT TYPE	ASPHALT	SAME
RUNWAY LIGHTING	R/W 6 REILS & HIRL R/W 24 MALSR & HIRL	SAME
RUNWAY MARKING	PRECISION	SAME
EFFECTIVE GRADIENT (%)	.2%	SAME
APPROACH AIDS	R/W 6 PAPI	SAME
NAVIGATIONAL AIDS	R/W 6 REIL R/W 24 ILS/DME	SAME
FAR 77 CATEGORY	R/W 6 NON PRECISION R/W 24 PRECISION	SAME
APPROACH SURFACE SLOPE	R/W 6 34:1 R/W 24 50:1	SAME
ELEVATION	R/W 6 53.7' R/W 24 62.7'	SAME
RUNWAY DESIGN CODE	CIII	SAME
SURFACE TREATMENT	ASPHALT GROOVED	SAME
VISIBILITY MINIMUMS	R/W 6 300' 3/4 MI R/W 24 200' 1/2 MI	SAME
RUNWAY DEPARTURE SURFACE	YES	SAME
TOUCHDOWN ZONE ELEVATION	R/W 6 58.3' R/W 24 62.6'	SAME
RUNWAY TRUE BEARING	N49°21'52.38"W	SAME

RUNWAY 15-33 DATA

ITEM	EXISTING	ULTIMATE
LENGTH	3328'	SAME
WIDTH	75'	SAME
SAFETY AREA/LENGTH	150'/300'	SAME
PVMT. STRENGTH (x1,000 LBS)	S-31 D-45 DT-61	SAME
PAVEMENT TYPE	ASPHALT	SAME
RUNWAY LIGHTING	R/W 15 MIRL R/W 33 REIL & MIRL	SAME
RUNWAY MARKING	NONPRECISION	SAME
EFFECTIVE GRADIENT (%)	.31%	SAME
APPROACH AIDS	R/W 33 REIL	SAME
NAVIGATIONAL AIDS	NONPRECISION	SAME
FAR 77 CATEGORY	NONPRECISION	SAME
APPROACH SURFACE SLOPE	34:1	SAME
ELEVATION	R/W 15 66.9' R/W 33 56.9'	SAME
RUNWAY DESIGN CODE	BII	SAME
SURFACE TREATMENT	ASPHALT	SAME
VISIBILITY MINIMUMS	R/W 15 300' 1 MI R/W 33 300' 1 MI	SAME
RUNWAY DEPARTURE SURFACE	YES	SAME
TOUCHDOWN ZONE ELEVATION	R/W 15 66.92' R/W 33 56.51'	SAME
RUNWAY TRUE BEARING	[illegible]	[illegible]

LEGEND

	ROADS AND INTERSTATES		PARCEL LINE
	BUILDING (OFF AIRPORT)		PROPOSED HANGAR/BUILDING
	BUILDING (ON AIRPORT)		PAVEMENT TO BE REMOVED
RPZ	RUNWAY PROTECTION ZONES		PROPOSED PAVEMENT
	AIRPORT REFERENCE POINT		NON-AERONAUTICAL USE
ROFA	RUNWAY OBJECT FREE AREA		BUILDING RESTRICTION LINE
RSA	RUNWAY SAFETY AREA		PROPOSED BUILDING RESTRICTION LINE
TOFA	TAXIWAY OBJECT FREE AREA		APPROACH SURFACE
	EDGE OF PAVEMENT		BUILDINGS TO BE REMOVED
	GLIDE SLOPE CRITICAL AREA		EASEMENT LINE
	LOCALIZER CRITICAL AREA		PROPOSED AUTO PARKING
	RUNWAY VISIBILITY ZONE	x	PROPOSED FENCE LINES
60	CONTOUR LINES	x	FENCE LINES
	MALSR LIGHTS		GATE
	AIRPORT PROPERTY LINE		PROPOSED ISLAND
	PROPOSED SUBDIVISION PARCEL		FUTURE AERONAUTICAL USE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
NEW ENGLAND REGIONAL HEADQUARTERS
AIRPORTS DIVISION – ANE 600

APPROVED: ____________

DATE: ____________

APPROVAL SUBJECT TO COMMENTS AND RECOMMENDATIONS LETTER

____
CHAIRMAN, MARTHA'S VINEYARD AIRPORT COMMISSION

DATE: ____________

____
EXECUTIVE DIRECTOR, MassDOT DIVISION of AERONAUTICS

DATE: ____________

NOTES:
1. AIRPORT PROPERTY LINE FROM AUGUST 2013 AIRPORT BOUNDARY SURVEY PREPARED BY NITSCH ASSOC.
2. AIRPORT BASE PLAN PER SURVEY COMPILED BY SANBORN MAPPING OCTOBER 5, 2012. NAD83 MA STATE PLANE (ft).

JACOBS

JACOBS HEREBY CERTIFIES THAT THESE DRAWINGS HAVE BEEN PREPARED IN ACCORDANCE WITH CURRENT FAA ADVISORY CIRCULARS FOR AIP PROJECTS. THESE ADVISORY CIRCULARS FOR AIP PROJECTS ARE INDICATED ON A LISTING HAVING AN EFFECTIVE DATE OF APRIL 16, 2013.

APPROVED ____________ AIRPORT DIVISION

GRAPHIC SCALE
300 0 150 300 600
(IN FEET)

MAGNETIC VARIATION 14° 42' 0" W CHANGING BY 0° 3' E PER YEAR

ULTIMATE AIRPORT LAYOUT PLAN

Mark	Description	Date	Appr.

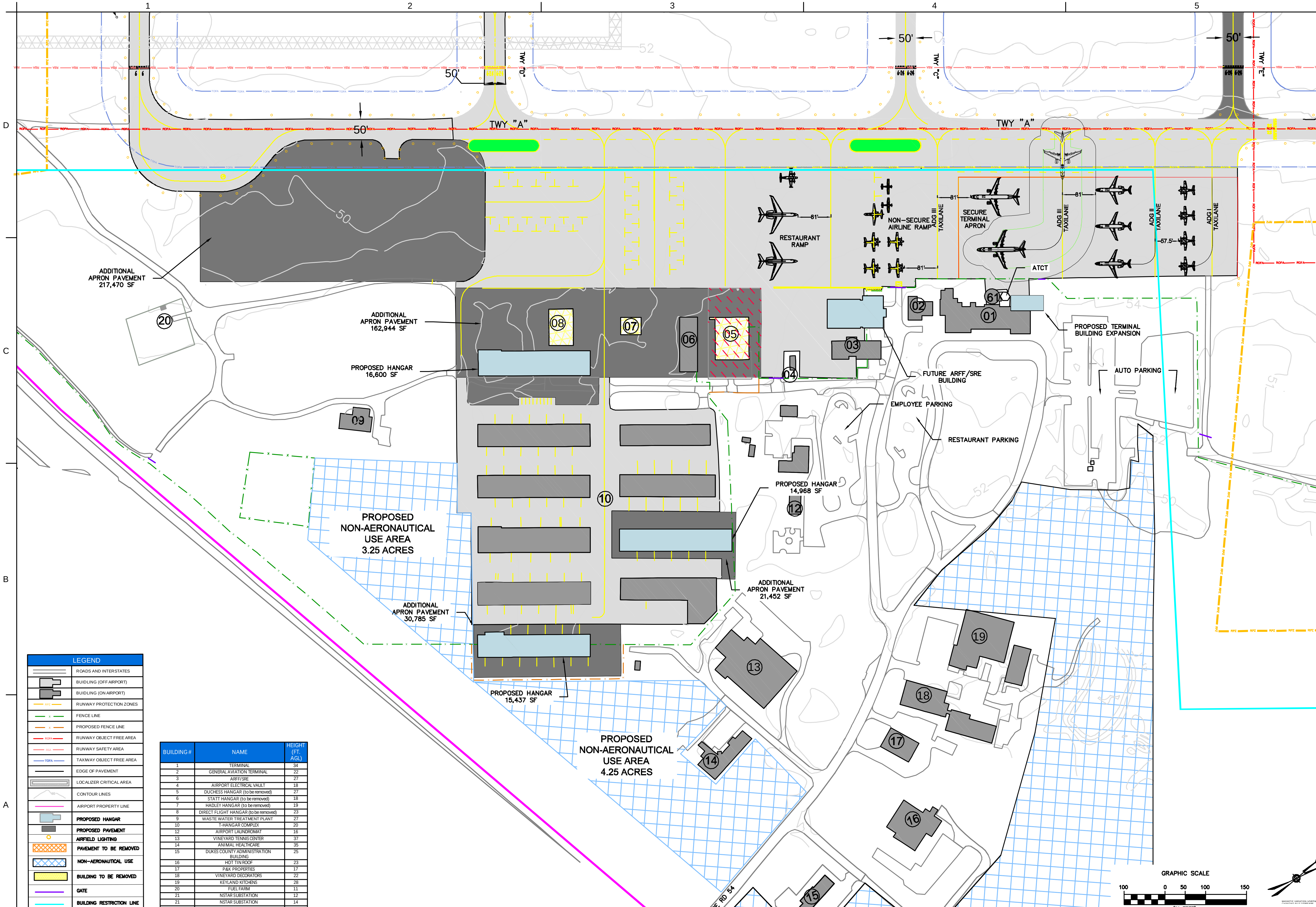
MARTHA'S VINEYARD AIRPORT
VINEYARD HAVEN
MASSACHUSETTS

JACOBS
TWO EXECUTIVE PARK DRIVE
SUITE 205
BEDFORD, NH 03110

Designed by: HHM
Dwn by: MED
Ckd by: HHM
Reviewed by: HHM
Submitted by:
Date: 07/05/2016
Rev.
Design file no.
Drawing code:
File name:
Plot date: July 2016
Plot scale: 1"= 300'

MVY AIRPORT MARTHA'S VINEYARD

Sheet reference number:
04
04 OF 11



BUILDING #	NAME	HEIGHT (FT. AGL)
1	TERMINAL	34
2	GENERAL AVIATION TERMINAL	22
3	ARFF/SRE	27
4	AIRPORT ELECTRICAL VAULT	18
5	DUCHESS HANGAR (to be removed)	27
6	STATT HANGAR (to be removed)	18
7	HADLEY HANGAR (to be removed)	19
8	DIRECT FLIGHT HANGAR (to be removed)	23
9	WASTE WATER TREATMENT PLANT	27
10	T-HANGAR COMPLEX	20
12	AIRPORT LAUNDROMAT	16
13	VINEYARD TENNIS CENTER	37
14	ANIMAL HEALTHCARE	35
15	DUKES COUNTY ADMINISTRATION BUILDING	25
16	HOT TIN ROOF	23
17	P&K PROPERTIES	17
18	VINEYARD DECORATORS	22
19	KEYLAND KITCHENS	28
20	FUEL FARM	11
21	NSTAR SUBSTATION	12
21	NSTAR SUBSTATION	14

TERMINAL AREA DRAWING

MARTHA'S VINEYARD AIRPORT
VINEYARD HAVEN
MASSACHUSETTS

JACOBS
TWO EXECUTIVE PARK DRIVE
SUITE 205
BEDFORD, NH 03110

Designed by: HHM
Dwn by: TMP
Ckd by: MED
Reviewed by: SJF
Submitted by:
Date: 03/21/2016
Rev.
Design file no.
Drawing code:
File name:
Plot date: March 2016
Plot scale: 1"= 100'

Mark | Description | Date | Appr.

MVY AIRPORT MARTHA'S VINEYARD

Sheet reference number:
05
05 OF 11

IMAGINARY SURFACES PART 77

PART 77 CLASSIFICATION	RUNWAY 06	RUNWAY 24	RUNWAY 15	RUNWAY 33
APPROACH VISIBILITY MINS.	300'-3/4MI	200'-1/2MI	300'-1MI	300'-1MI
PRIMARY SURFACES WIDTH / LENGTH	500' 200' BEYOND RUNWAY END	1000' 200' BEYOND RUNWAY END	500' 200' BEYOND RUNWAY END	500' 200' BEYOND RUNWAY END
APPROACH SURFACES SLOPE / INNER WIDTH / OUTER WIDTH / LENGTH / DISTANCE FROM THRESHOLD	34:1 / 500' / 3,500' / 10,000' / 200'	50:1/40:1 / 1,000' / 16,000' / 10,000'/40,000' / 200'	34:1 / 500' / 3,500' / 10,000' / 200'	34:1 / 500' / 3,500' / 10,000' / 200'
RUNWAY END ELEVATIONS (FT. MSL)	53.9'	63'	67'	57'

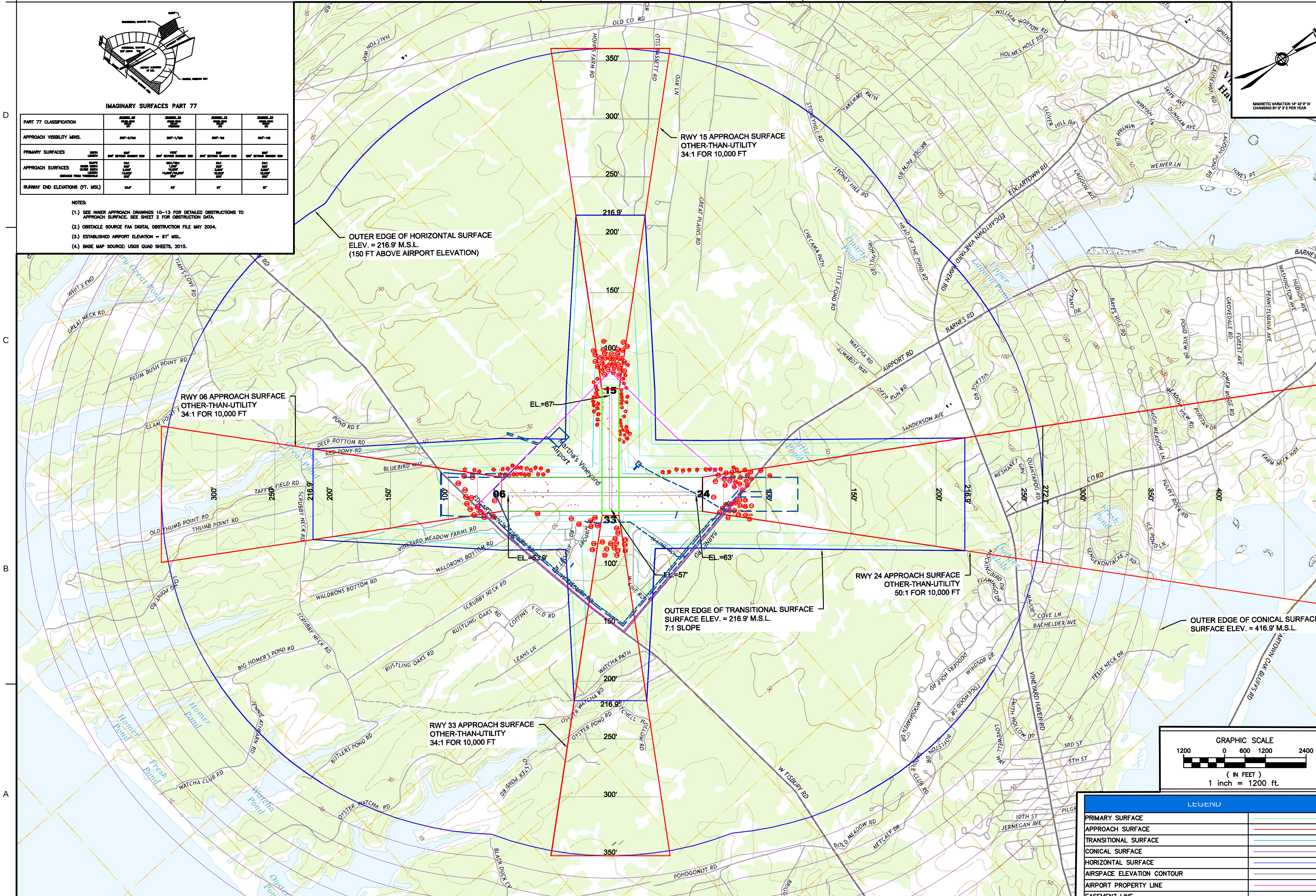
NOTES:

(1.) SEE INNER APPROACH DRAWINGS 10–13 FOR DETAILED OBSTRUCTIONS TO APPROACH SURFACE. SEE SHEET 2 FOR OBSTRUCTION DATA.

(2.) OBSTACLE SOURCE FAA DIGITAL OBSTRUCTION FILE MAY 2004.

(3.) ESTABLISHED AIRPORT ELEVATION = 67' MSL.

(4.) BASE MAP SOURCE: USGS QUAD SHEETS, 2015.



GRAPHIC SCALE

1200 0 600 1200 2400

(IN FEET)

1 inch = 1200 ft.

LEGEND	
PRIMARY SURFACE	
APPROACH SURFACE	
TRANSITIONAL SURFACE	
CONICAL SURFACE	
HORIZONTAL SURFACE	
AIRSPACE ELEVATION CONTOUR	
AIRPORT PROPERTY LINE	
EASEMENT LINE	

AIRSPACE PLAN

Mark	Description	Date	Appr.

Rev.

Date: 03/21/2016

Design file no.

Drawing code:

File name:

Plot date: March 2016

Plot scale: 1"= 1200'

Designed by: HHM

Dwn by: MED

Ckd by: TMP

Reviewed by: SJF

Submitted by:

MARTHA'S VINEYARD AIRPORT

VINEYARD HAVEN

MASSACHUSETTS

JACOBS

TWO EXECUTIVE PARK DRIVE

SUITE 205

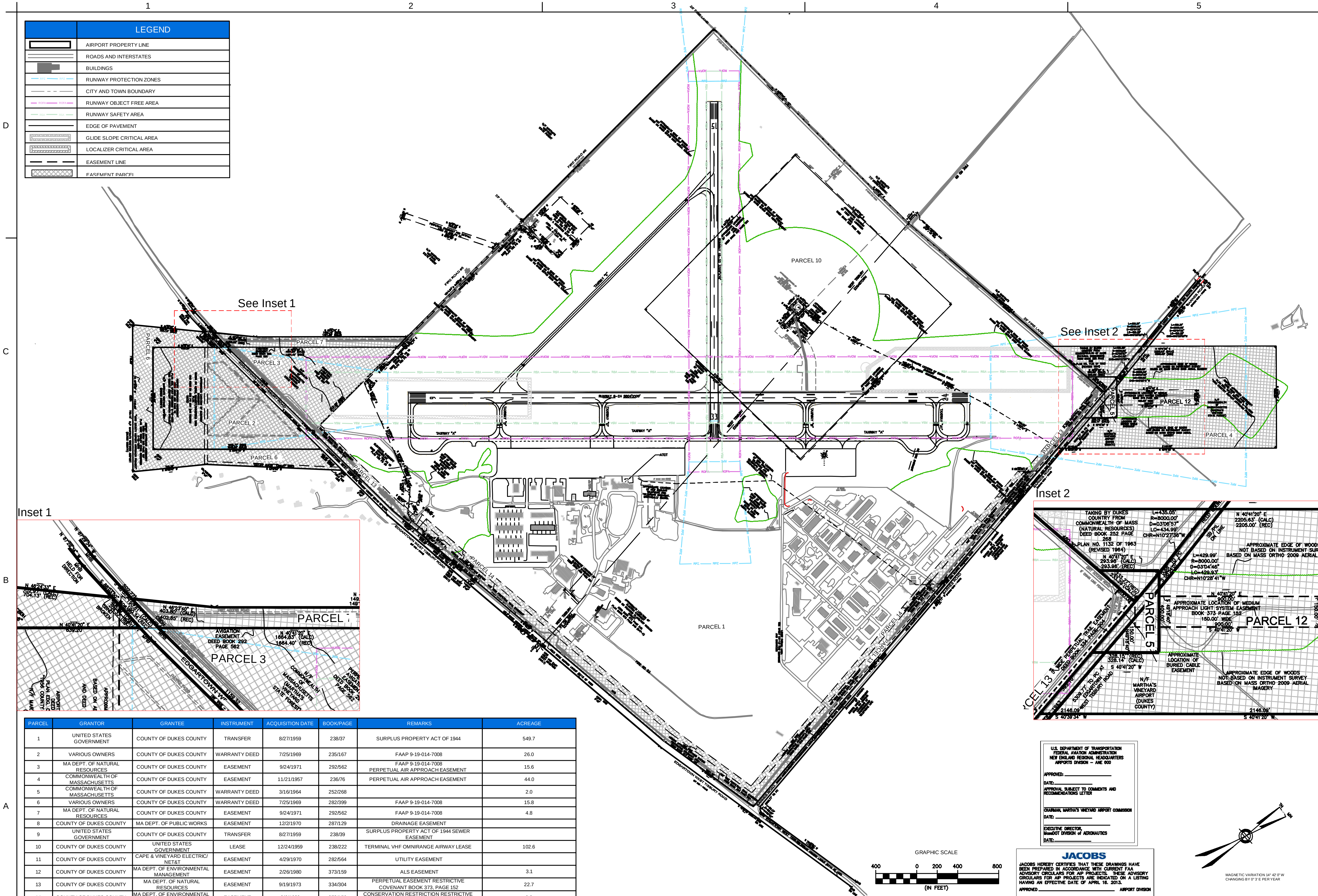
BEDFORD, NH 03110

MVY AIRPORT MARTHA'S VINEYARD

Sheet reference number:

06

06 OF 11



LEGEND

	AIRPORT PROPERTY LINE
	ROADS AND INTERSTATES
	BUILDINGS
	RUNWAY PROTECTION ZONES
	CITY AND TOWN BOUNDARY
	RUNWAY OBJECT FREE AREA
	RUNWAY SAFETY AREA
	EDGE OF PAVEMENT
	GLIDE SLOPE CRITICAL AREA
	LOCALIZER CRITICAL AREA
	EASEMENT LINE
	EASEMENT PARCEL

PARCEL	GRANTOR	GRANTEE	INSTRUMENT	ACQUISITION DATE	BOOK/PAGE	REMARKS	ACREAGE
1	UNITED STATES GOVERNMENT	COUNTY OF DUKES COUNTY	TRANSFER	8/27/1959	238/37	SURPLUS PROPERTY ACT OF 1944	549.7
2	VARIOUS OWNERS	COUNTY OF DUKES COUNTY	WARRANTY DEED	7/25/1969	235/167	FAAP 9-19-014-7008	26.0
3	MA DEPT. OF NATURAL RESOURCES	COUNTY OF DUKES COUNTY	EASEMENT	9/24/1971	292/562	FAAP 9-19-014-7008 PERPETUAL AIR APPROACH EASEMENT	15.6
4	COMMONWEALTH OF MASSACHUSETTS	COUNTY OF DUKES COUNTY	EASEMENT	11/21/1957	236/76	PERPETUAL AIR APPROACH EASEMENT	44.0
5	COMMONWEALTH OF MASSACHUSETTS	COUNTY OF DUKES COUNTY	WARRANTY DEED	3/16/1964	252/268		2.0
6	VARIOUS OWNERS	COUNTY OF DUKES COUNTY	WARRANTY DEED	7/25/1969	282/399	FAAP 9-19-014-7008	15.8
7	MA DEPT. OF NATURAL RESOURCES	COUNTY OF DUKES COUNTY	EASEMENT	9/24/1971	292/562	FAAP 9-19-014-7008	4.8
8	COUNTY OF DUKES COUNTY	MA DEPT. OF PUBLIC WORKS	EASEMENT	12/2/1970	287/129	DRAINAGE EASEMENT	
9	UNITED STATES GOVERNMENT	COUNTY OF DUKES COUNTY	TRANSFER	8/27/1959	238/39	SURPLUS PROPERTY ACT OF 1944 SEWER EASEMENT	
10	COUNTY OF DUKES COUNTY	UNITED STATES GOVERNMENT	LEASE	12/24/1959	238/222	TERMINAL VHF OMNIRANGE AIRWAY LEASE	102.6
11	COUNTY OF DUKES COUNTY	CAPE & VINEYARD ELECTRIC/ NET&T	EASEMENT	4/29/1970	282/564	UTILITY EASEMENT	
12	COUNTY OF DUKES COUNTY	MA DEPT. OF ENVIRONMENTAL MANAGEMENT	EASEMENT	2/26/1980	373/159	ALS EASEMENT	3.1
13	COUNTY OF DUKES COUNTY	MA DEPT. OF NATURAL RESOURCES	EASEMENT	9/19/1973	334/304	PERPETUAL EASEMENT RESTRICTIVE COVENANT BOOK 373, PAGE 152	22.7
14	COUNTY OF DUKES COUNTY	MA DEPT. OF ENVIRONMENTAL MANAGEMENT	EASEMENT	2/6/1980	373/156	CONSERVATION RESTRICTION RESTRICTIVE COVENANT BOOK 373, PAGE 152	9.2

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
NEW ENGLAND REGIONAL HEADQUARTERS
AIRPORTS DIVISION – ANE 600

APPROVED: ____________

DATE: ____________

APPROVAL SUBJECT TO COMMENTS AND RECOMMENDATIONS LETTER

____
CHAIRMAN, MARTHA'S VINEYARD AIRPORT COMMISSION

DATE: ____________

____
EXECUTIVE DIRECTOR,
MassDOT DIVISION of AERONAUTICS

DATE: ____________

JACOBS

JACOBS HEREBY CERTIFIES THAT THESE DRAWINGS HAVE BEEN PREPARED IN ACCORDANCE WITH CURRENT FAA ADVISORY CIRCULARS FOR AIP PROJECTS. THESE ADVISORY CIRCULARS FOR AIP PROJECTS ARE INDICATED ON A LISTING HAVING AN EFFECTIVE DATE OF APRIL 16, 2013.

APPROVED ____________ AIRPORT DIVISION

EXHIBIT A
AIRPORT PROPERTIES MAP

Mark	Description	Date	Appr.

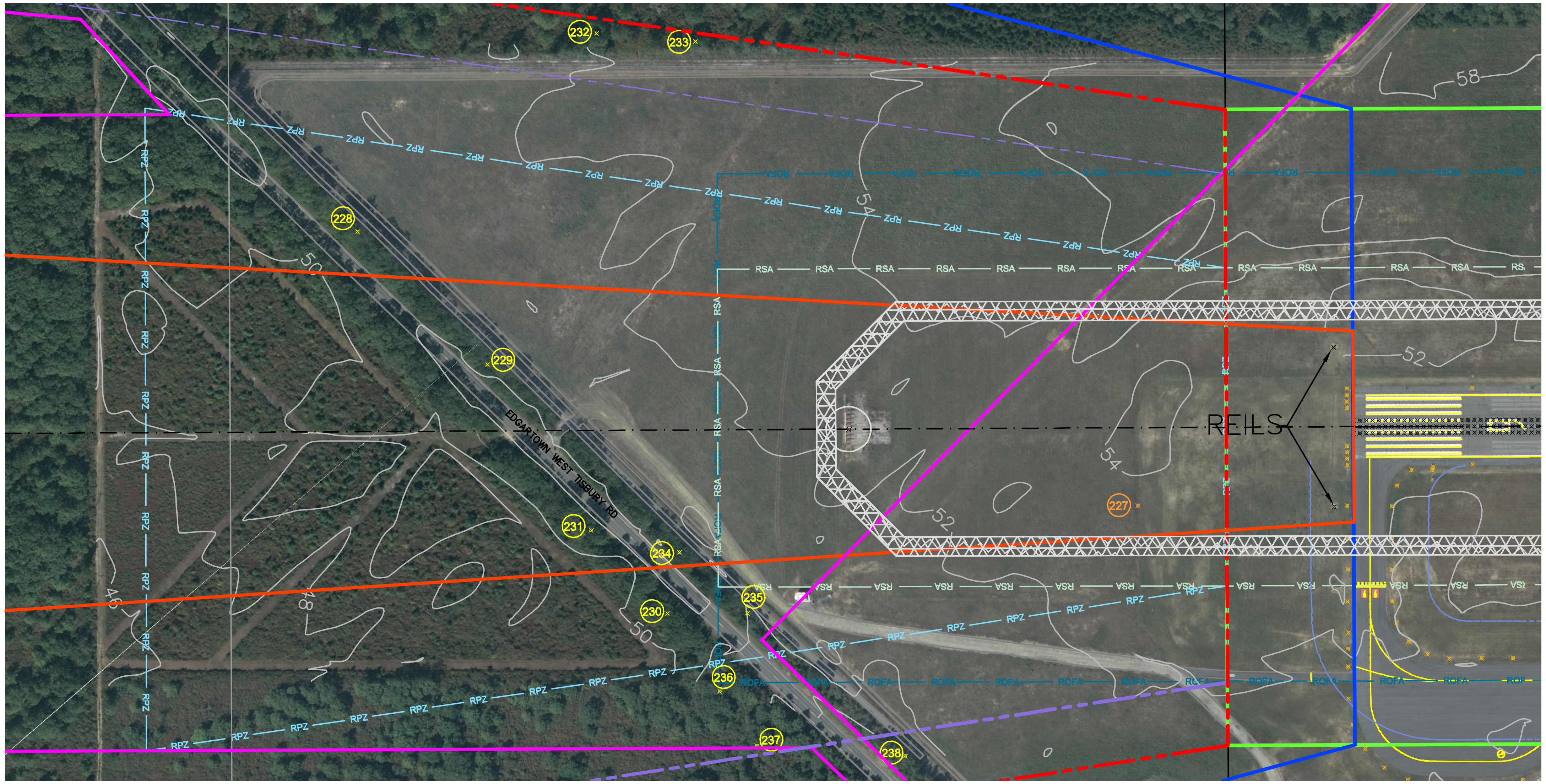
Rev.
Date: 07/11/2016
Designed by: HHM
Dwn by: MED
Ckd by: TMP
Design file no.
Reviewed by: SJF
Drawing code:
Submitted by:
File name:
Plot date: July 2016
Plot scale: 1"= 400'

MARTHA'S VINEYARD AIRPORT
VINEYARD HAVEN
MASSACHUSETTS

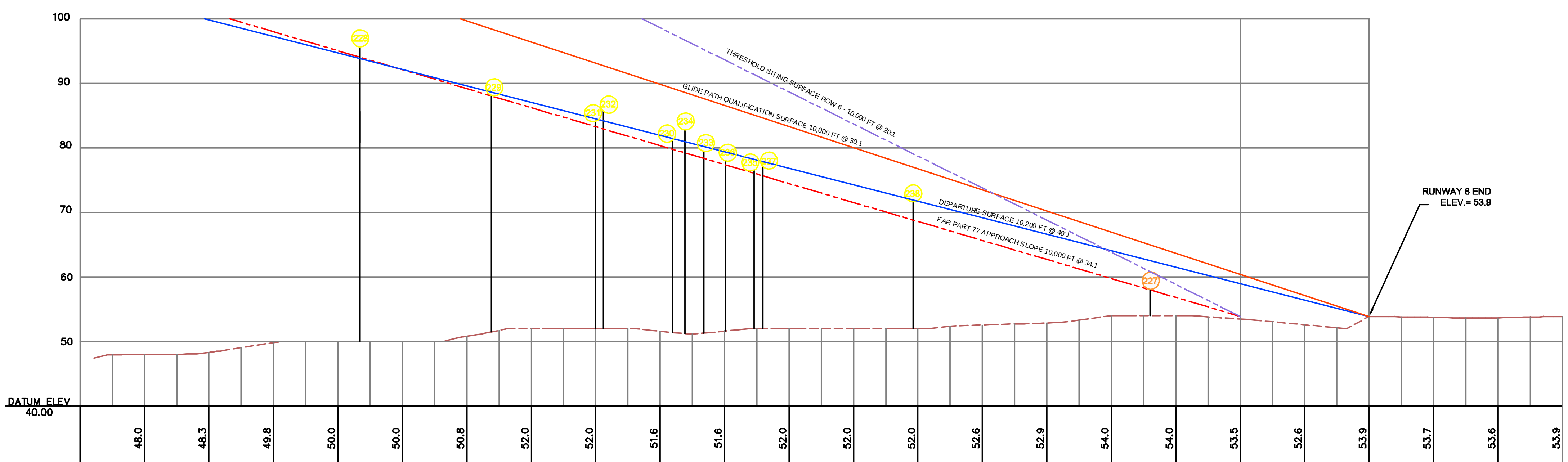
JACOBS
TWO EXECUTIVE PARK DRIVE
SUITE 205
BEDFORD, NH 03110

MVY AIRPORT MARTHA'S VINEYARD

Sheet reference number:
07
07 OF 11



PLAN VIEW RUNWAY06
HORIZONTAL SCALE 1"=100'



EDGARTOWN W. TISBURY RD.

PROFILE VIEW RUNWAY 06
HORIZONTAL SCALE 1"=100'
VERTICAL SCALE 1"=10'

NOTES:
1. OBSTRUCTION DATA COMPILED FROM AERIAL MAPPING ACQUIRED OCTOBER 5, 2012 BY THE SANBORN MAPPING COMPANY.
2. SEE OBSTRUCTION DATA TABLE ON SHEET 2 FOR OBSTRUCTION INFORMATION.
3. AIRPORT PROPERTY LINE BY NITCSH ENGINEERING IN SEPTEMBER 2013.
4. SURFACE DIMENSIONS AND SLOPES BASED ON RNAV (GPS) RW 6 INSTRUMENT APPROACH PROCEDURE LPV MINIMUMS (300-3/4) CURRENT AS OF AUG 2013.

SOURCES:
1. FAA ADVISORY CIRCULAR I50/5300-13A, AIRPORT DESIGN STANDARDS, TABLES: 3-2, 3-4, 3-5.
2. 14 CFR PART 77 OBJECTS AFFECTING NAVIGABLE AIRSPACE, OTHER THAN UTILITY RUNWAY, NON-PRECISION ≥ 3/4 MI VISIBILITY.

LEGEND	
	APPROACH SURFACE
	PRIMARY SURFACE
	OBSTRUCTION- TREE
	OBSTRUCTION- NAVAID
RPZ	RUNWAY PROTECTION ZONE
	AIRPORT PROPERTY LINE
	THRESHOLD SITING SURFACE
	DEPARTURE SURFACE
	GLIDE PATH QUALIFICATION SURFACE (GQS)
	LOCALIZER CRITICAL AREA
ROFA	RUNWAY OBJECT FREE AREA
RSA	RUNWAY SAFETY AREA
54	GROUND CONTOURS

OBSTRUCTION DATA TABLE

POINT #	DESCRIPTION	ELEVATION (FT AMSL)	AIRSPACE SURFACE	PENETRATION AMOUNT	DISPOSITION
227	NAVAID	58.1	APPROACH	0.1	FIXED BY FUNCTION
228	TREE	95.7	APPROACH	1.6	REMOVE
229	TREE	88.1	APPROACH	0.0	REMOVE
230	TREE	81.2	APPROACH	1.3	REMOVE
231	TREE	84.2	APPROACH	0.9	REMOVE
232	TREE	85.7	APPROACH	2.7	REMOVE
233	TREE	79.4	APPROACH	1.0	REMOVE
234	TREE	82.8	APPROACH	3.5	REMOVE
235	TREE	76.5	APPROACH	0.5	REMOVE
236	TREE	78.0	APPROACH	0.6	REMOVE
237	TREE	77.1	APPROACH	1.4	REMOVE
238	TREE	72.1	APPROACH	3.2	REMOVE

100 0 50 100 200
(IN FEET)
SCALE 1" = 100' HORIZONTAL
1" = 10' VERTICAL

RUNWAY 06
PLAN AND PROFILE

Mark | Description | Date | Appr.

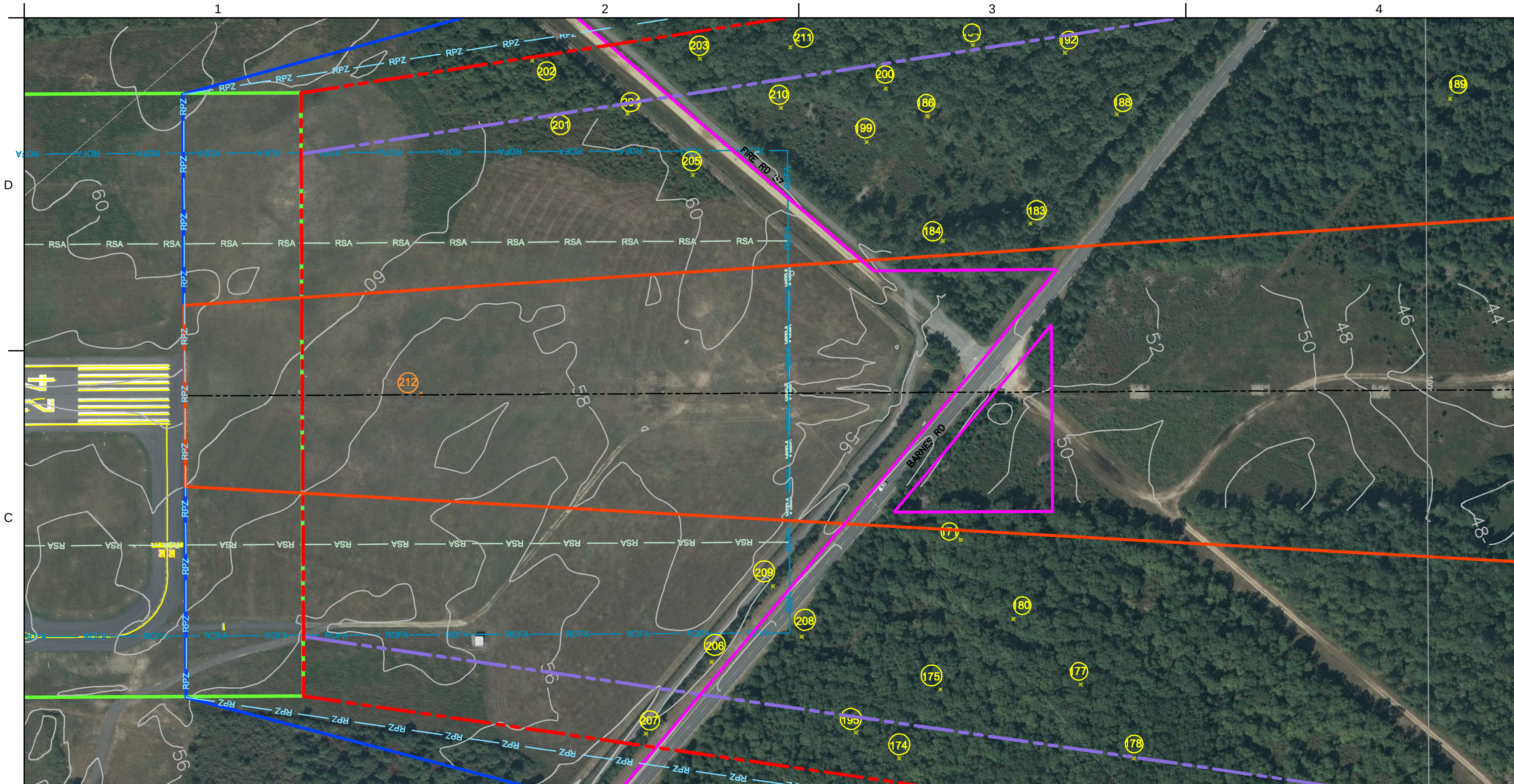
Designed by: HHM
Dwn by: TMP
Ckd by: MED
Reviewed by: SJF
Submitted by:
Date: 03/21/2016
Rev.
Design file no.
Drawing code:
File name:
Plot date: March 2016
Plot scale: 1"= 100'

MARTHA'S VINEYARD AIRPORT
VINEYARD HAVEN
MASSACHUSETTS

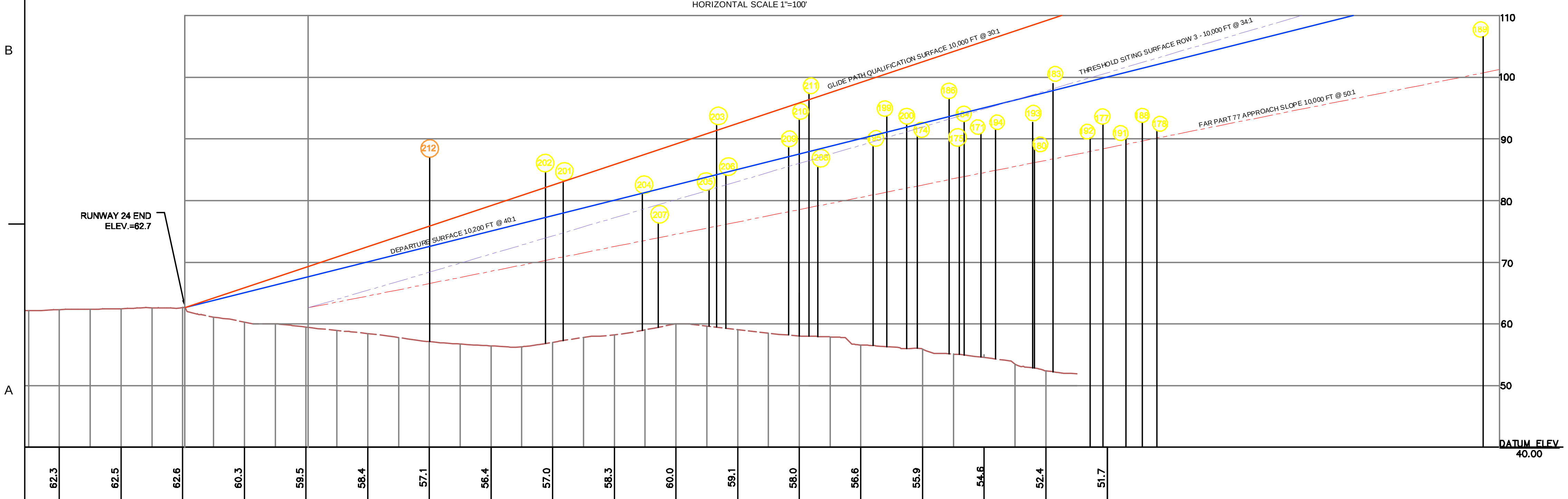
JACOBS
TWO EXECUTIVE PARK DRIVE
SUITE 205
BEDFORD, NH 03110

MVY AIRPORT MARTHA'S VINEYARD

Sheet reference number:
08
08 OF 11



PLAN VIEW RUNWAY 24
HORIZONTAL SCALE 1"=100'



PROFILE VIEW RUNWAY 24
HORIZONTAL SCALE 1"=100'
VERTICAL SCALE 1"=10'

MAGNETIC VARIATION 14° 42' 0" W
CHANGING BY 0° 3' E PER YEAR

NOTES:

1. OBSTRUCTION DATA COMPILED FROM AERIAL MAPPING ACQUIRED OCTOBER 5, 2012 BY THE SANBORN MAPPING COMPANY.
2. SEE OBSTRUCTION DATA TABLE ON SHEET 2 FOR OBSTRUCTION INFORMATION.
3. AIRPORT PROPERTY LINE SURVEYED BY NITSCH ENGINEERING IN AUGUST 2013.
4. SURFACE DIMENSIONS AND SLOPES BASED ON RUNWAY 24 INSTRUMENT APPROACH PROCEDURE ILS MINIMUMS (200-1/2) CURRENT AS OF AUG 2013.

SURFACES DRAWN IN ACCORDANCE WITH:

1. FAA ADVISORY CIRCULAR I50/5300-13A, AIRPORT DESIGN STANDARDS, TABLES: 3-2, 3-4, 3-5.
2. 14 CFR PART 77 OBJECTS AFFECTING NAVIGABLE AIRSPACE, OTHER THAN UTILITY RUNWAY, PRECISION, VISIBILITY = 1/2 MI.

LEGEND	
	APPROACH SURFACE
	PRIMARY SURFACE
	OBSTRUCTION- TREE
	OBSTRUCTION- NAVAID
RPZ	RUNWAY PROTECTION ZONE
	AIRPORT PROPERTY LINE
	THRESHOLD SITING SURFACE
	DEPARTURE SURFACE
	GLIDE PATH QUALIFICATION SURFACE (GQS)
RSA	RUNWAY SAFETY AREA
ROFA	RUNWAY OBJECT FREE AREA
54	GROUND CONTOURS

POINT #	DESCRIPTION	ELEVATION (FT AMSL)	AIRSPACE SURFACE	PENETRATION AMOUNT	DISPOSITION
171	TREE	90.9	APPROACH	8.3	REMOVE
172	TREE	89.0	APPROACH	2.8	REMOVE
173	TREE	90.3	APPROACH	1.5	REMOVE
174	TREE	90.5	APPROACH	8.0	REMOVE
175	TREE	88.9	APPROACH	6.1	REMOVE
176	TREE	89.0	APPROACH	2.6	REMOVE
177	TREE	92.4	APPROACH	3.9	REMOVE
178	TREE	91.3	APPROACH	1.1	REMOVE
179	TREE	89.6	APPROACH	0.4	REMOVE
180	TREE	88.3	APPROACH	2.1	REMOVE
181	TREE	84.7	APPROACH	0.9	REMOVE
182	TREE	86.7	APPROACH	4.4	REMOVE
183	TREE	95.0	APPROACH	8.1	REMOVE
184	TREE	92.8	APPROACH	8.9	REMOVE
185	TREE	88.6	APPROACH	4.7	REMOVE
186	TREE	96.6	APPROACH	13.1	REMOVE
187	TREE	98.9	APPROACH	12.1	REMOVE
188	TREE	92.7	APPROACH	3.0	REMOVE
189	TREE	106.6	APPROACH	5.7	REMOVE
190	TREE	98.8	APPROACH	3.1	REMOVE
191	TREE	90.0	APPROACH	0.6	REMOVE
192	TREE	90.2	APPROACH	2.1	REMOVE
193	TREE	92.6	APPROACH	6.4	REMOVE
194	TREE	91.5	APPROACH	6.5	REMOVE
195	TREE	88.6	APPROACH	7.6	REMOVE
196	TREE	88.7	APPROACH	7.6	REMOVE
197	TREE	84.8	APPROACH	3.7	REMOVE
198	TREE	89.6	APPROACH	7.7	REMOVE
199	TREE	93.7	APPROACH	12.2	REMOVE
200	TREE	92.4	APPROACH	10.3	REMOVE
201	TREE	83.3	APPROACH	12.4	REMOVE
202	TREE	84.8	APPROACH	14.3	REMOVE
203	TREE	92.3	APPROACH	16.4	REMOVE
204	TREE	81.2	APPROACH	7.6	REMOVE
205	TREE	81.7	APPROACH	6.1	REMOVE
206	TREE	84.1	APPROACH	7.8	REMOVE
207	TREE	76.3	APPROACH	2.3	REMOVE
208	TREE	85.5	APPROACH	6.3	REMOVE
209	TREE	78.7	APPROACH	0.5	REMOVE
210	TREE	93.2	APPROACH	14.5	REMOVE
211	TREE	97.4	APPROACH	18.5	REMOVE
212	NAVAID	66.9	APPROACH	0.3	FIXED BY FUNCTION

100 0 50 100 200
(IN FEET)

SCALE 1" = 100' HORIZONTAL
1" = 10' VERTICAL

RUNWAY 24
PLAN AND PROFILE

Mark	Description	Date	Appr.

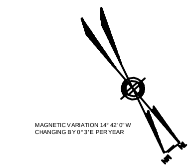
MARTHA'S VINEYARD AIRPORT
VINEYARD HAVEN
MASSACHUSETTS

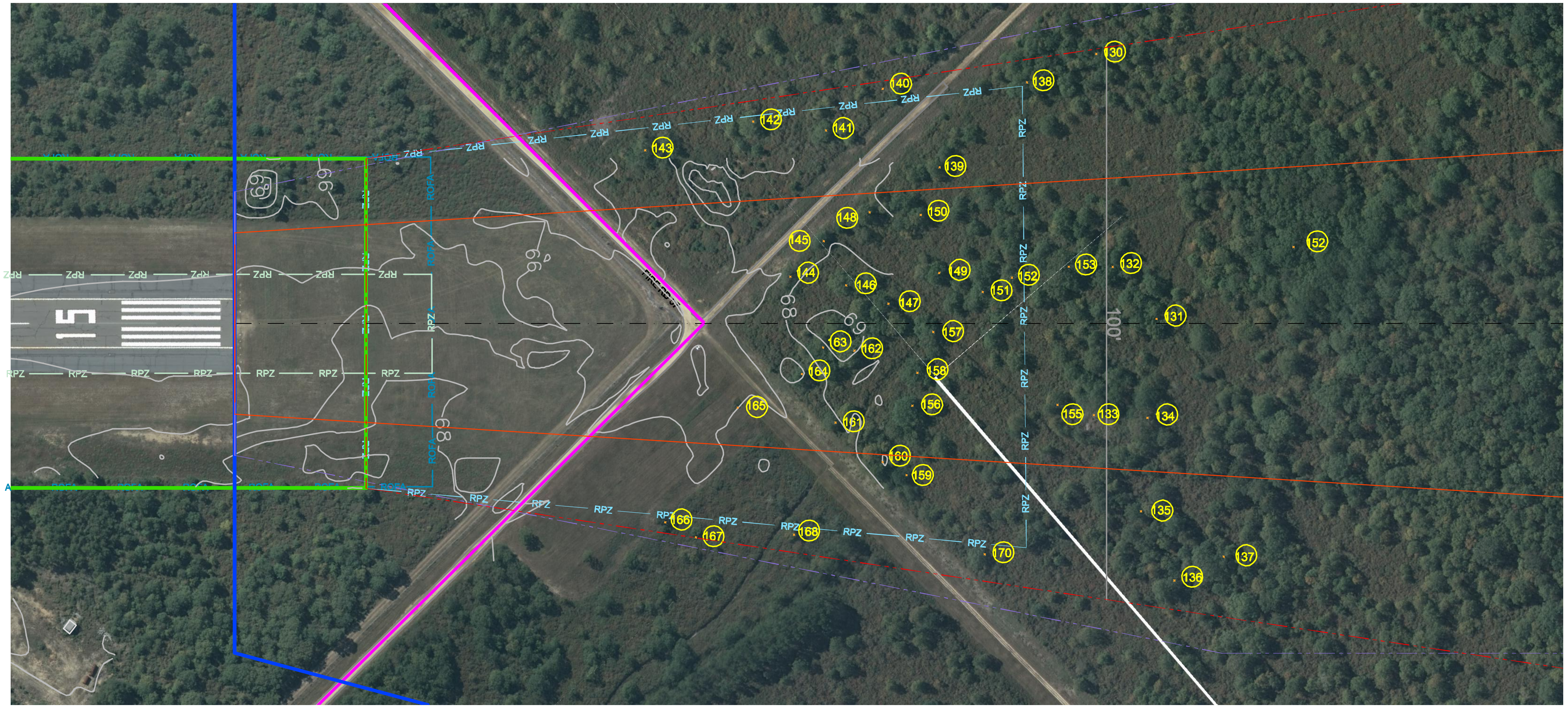
JACOBS
TWO EXECUTIVE PARK DRIVE
SUITE 205
BEDFORD, NH 03110

Designed by: HHM
Dwn by: MED
Ckd by: TMP
Reviewed by: SJF
Submitted by:
Date: 03/21/2016
Rev.
Design file no.
Drawing code:
File name:
Plot date: March 2016
Plot scale: 1"= 100'

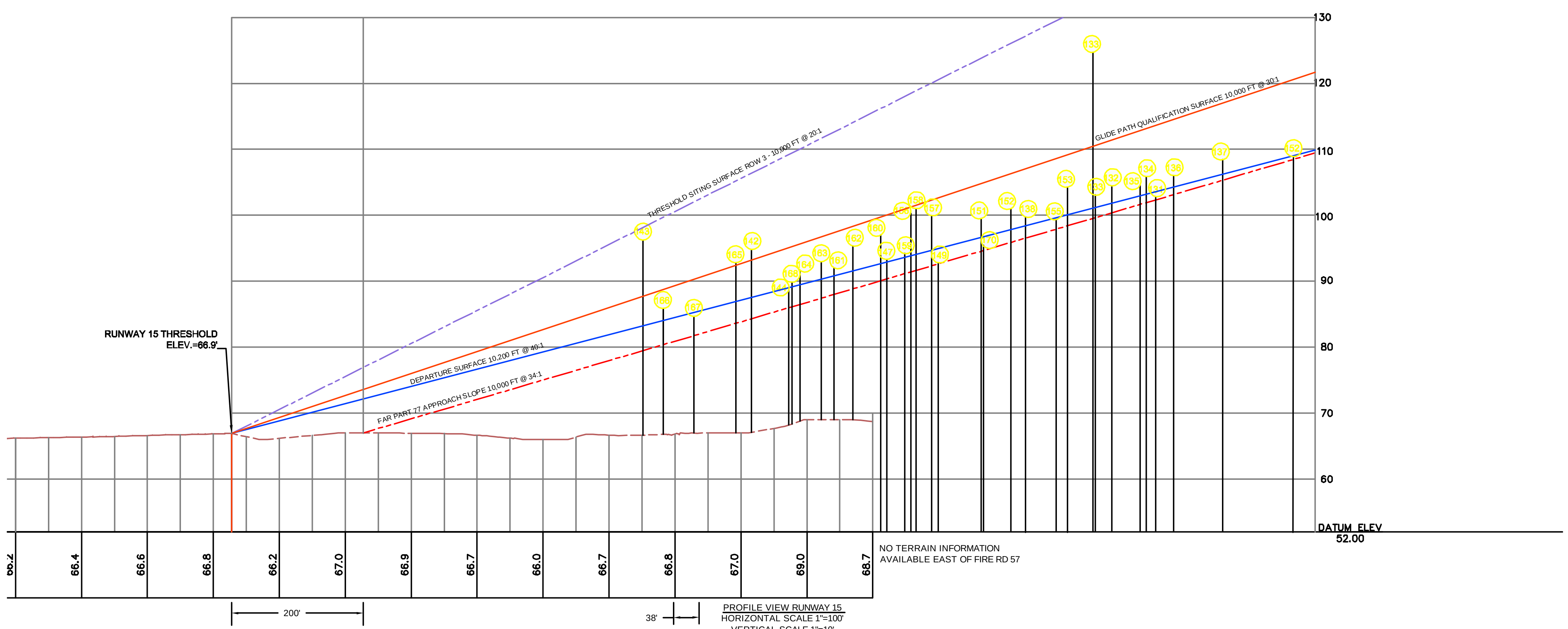
MVY AIRPORT MARTHA'S VINEYARD

Sheet reference number:
09
09 OF 11





PLAN VIEW RUNWAY 15
HORIZONTAL SCALE 1"=100'



PROFILE VIEW RUNWAY 15
HORIZONTAL SCALE 1"=100'
VERTICAL SCALE 1"=10'

NOTES:

1. OBSTRUCTION DATA COMPILED FROM AERIAL MAPPING ACQUIRED OCTOBER 5, 2012 BY THE SANBORN MAPPING COMPANY.
2. SEE OBSTRUCTION DATA TABLE ON SHEET 2 FOR OBSTRUCTION INFORMATION.
3. AIRPORT PROPERTY LINE SURVEYED BY NITSCH ENGINEERING IN AUGUST 2013.
4. SURFACE DIMENSIONS AND SLOPES BASED ON RUNWAY 15 INSTRUMENT APPROACH PROCEDURE LPV (GPS) MINIMUMS (300-1) CURRENT AS OF AUG 2013.

SURFACES DRAWN IN ACCORDANCE WITH:

1. FAA ADVISORY CIRCULAR I50/5300-13A, AIRPORT DESIGN STANDARDS, TABLES: 3-2, 3-4, 3-5.
2. 14 CFR PART 77 OBJECTS AFFECTING NAVIGABLE AIRSPACE, OTHER THAN UTILITY RUNWAY, NON-PRECISION, VISIBILITY = 1MI.

LEGEND	
	APPROACH SURFACE
	PRIMARY SURFACE
	OBSTRUCTION- TREE
54	GROUND CONTOURS
RPZ	RUNWAY PROTECTION ZONE
	AIRPORT PROPERTY LINE
	THRESHOLD SITING SURFACE
	DEPARTURE SURFACE
	GLIDE PATH QUALIFICATION SURFACE (GQS)
RSA	RUNWAY SAFETY AREA
ROFA	RUNWAY OBJECT FREE AREA

OBSTRUCTION DATA TABLE

POINT #	DESCRIPTION	ELEVATION (FT AMSL)	AIRSPACE SURFACE	PENETRATION AMOUNT	DISPOSITION
131	TREE	102.8	APPROACH	0.6	REMOVE
132	TREE	104.5	APPROACH	4.2	REMOVE
133	TREE	112.7	APPROACH	13.3	REMOVE
134	TREE	105.8	APPROACH	4.0	REMOVE
135	TREE	104.6	APPROACH	3.1	REMOVE
136	TREE	106.0	APPROACH	3.0	REMOVE
137	TREE	108.4	APPROACH	3.2	REMOVE
138	TREE	99.7	APPROACH	3.2	REMOVE
139	TREE	92.8	APPROACH	0.3	REMOVE
140	TREE	96.6	APPROACH	6.6	REMOVE
141	TREE	94.0	APPROACH	6.6	REMOVE
142	TREE	94.8	APPROACH	10.6	REMOVE
143	TREE	96.3	APPROACH	16.9	REMOVE
144	TREE	88.6	APPROACH	2.8	REMOVE
145	TREE	90.4	APPROACH	3.1	REMOVE
146	TREE	92.8	APPROACH	4.5	REMOVE
147	TREE	93.4	APPROACH	3.1	REMOVE
148	TREE	96.2	APPROACH	6.7	REMOVE
149	TREE	97.2	APPROACH	4.7	REMOVE
150	TREE	95.5	APPROACH	3.8	REMOVE
151	TREE	99.5	APPROACH	5.0	REMOVE
152	TREE	101.0	APPROACH	5.2	REMOVE
153	TREE	104.3	APPROACH	5.9	REMOVE
154	TREE	108.8	APPROACH	0.4	REMOVE
155	TREE	99.3	APPROACH	1.5	REMOVE
156	TREE	100.3	APPROACH	9.0	REMOVE
157	TREE	99.9	APPROACH	7.7	REMOVE
158	TREE	101.0	APPROACH	9.4	REMOVE
159	TREE	94.2	APPROACH	3.2	REMOVE
160	TREE	97.0	APPROACH	7.0	REMOVE
161	TREE	92.0	APPROACH	4.2	REMOVE
162	TREE	95.3	APPROACH	6.6	REMOVE
163	TREE	93.0	APPROACH	5.7	REMOVE
164	TREE	91.6	APPROACH	5.2	REMOVE
165	TREE	92.8	APPROACH	9.3	REMOVE
166	TREE	85.9	APPROACH	5.6	REMOVE
167	TREE	84.7	APPROACH	3.0	REMOVE
168	TREE	89.8	APPROACH	3.8	REMOVE
169	TREE	92.6	APPROACH	4.1	REMOVE
170	TREE	95.4	APPROACH	0.9	REMOVE

100 0 50 100 200
(IN FEET)

SCALE 1" = 100' HORIZONTAL
1" = 10' VERTICAL

RUNWAY 15
PLAN AND PROFILE

Mark | Description | Date | Appr.

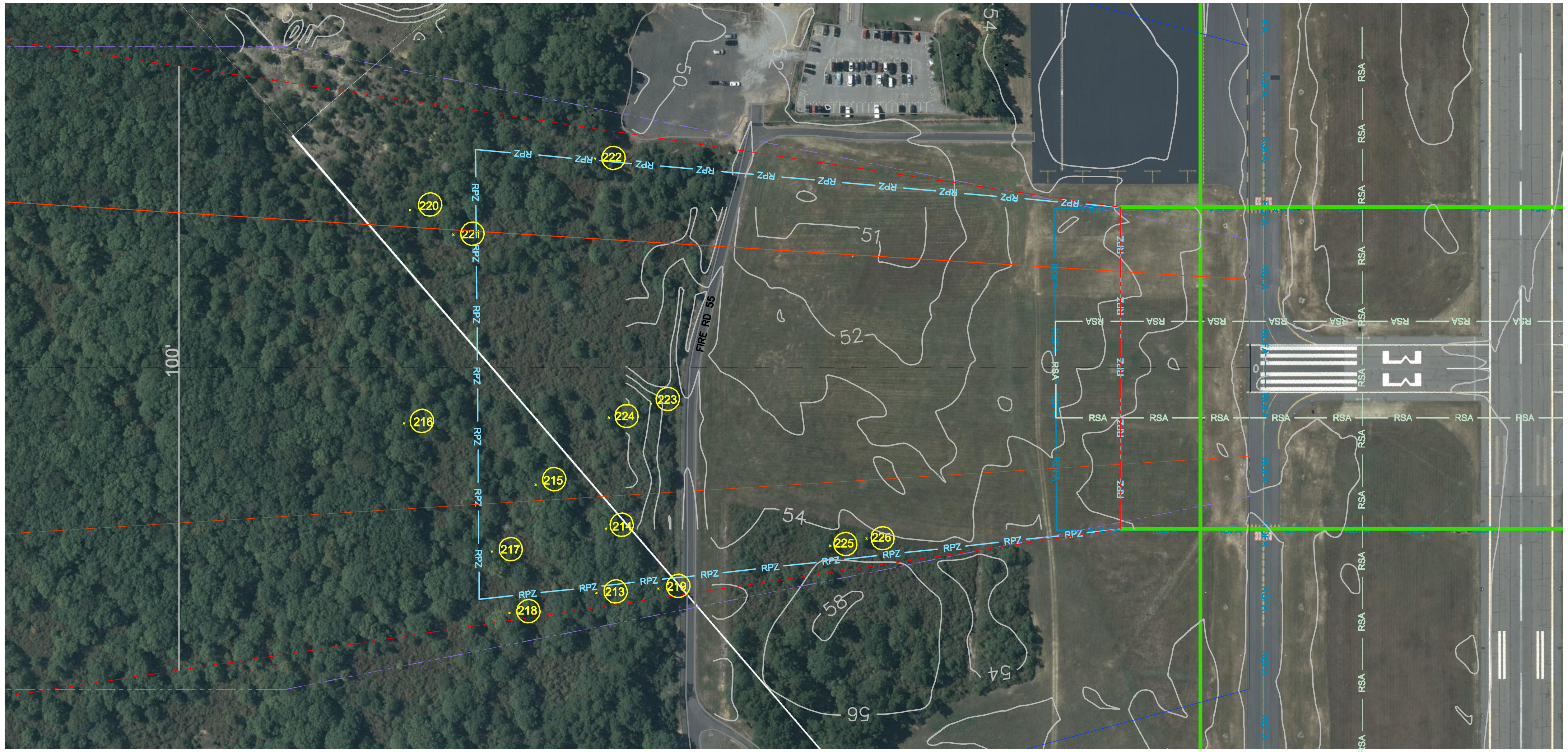
Rev.
Date: 03/21/2016
Design file no.
Drawing code:
File name:
Plot date: March 2016
Plot scale: 1"= 100'
Designed by: HHM
Dwn by: MED
Ckd by: TMP
Reviewed by: SJF
Submitted by:

MARTHA'S VINEYARD AIRPORT
VINEYARD HAVEN
MASSACHUSETTS

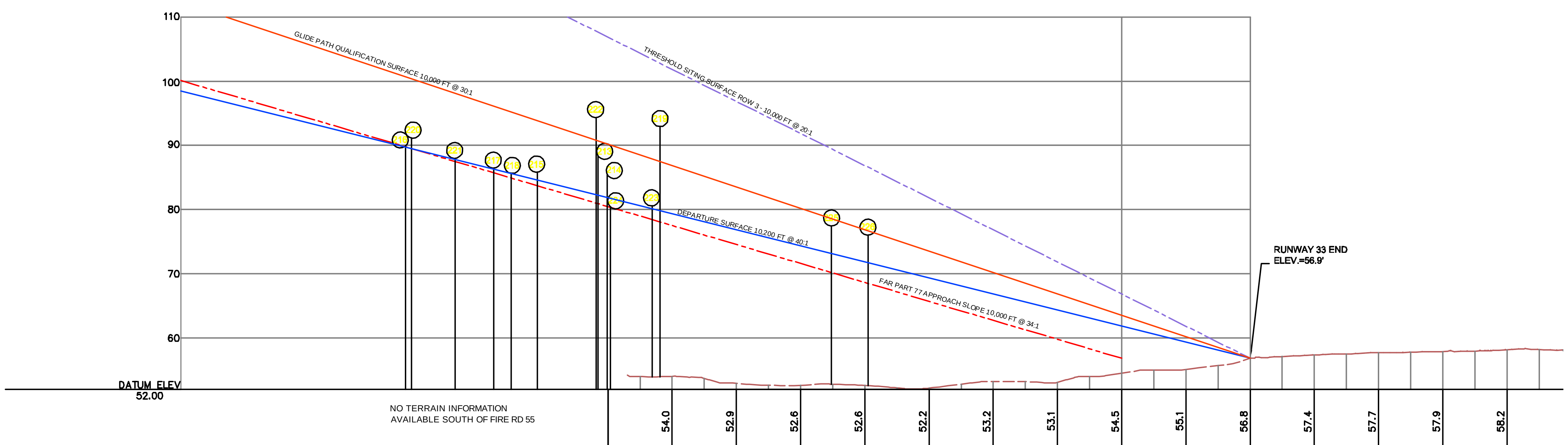
JACOBS
TWO EXECUTIVE PARK DRIVE
SUITE 205
BEDFORD, NH 03110

MVY AIRPORT MARTHA'S VINEYARD

Sheet reference number:
10
10 OF 11



PLAN VIEW RUNWAY 33
HORIZONTAL SCALE 1"=100'



PROFILE VIEW RUNWAY 33
HORIZONTAL SCALE 1"=100'
VERTICAL SCALE 1"=10'

MAGNETIC VARIATION 14° 42'0" W
CHANGING BY 0° 3' E PER YEAR

NOTES:
1. OBSTRUCTION DATA COMPILED FROM AERIAL MAPPING ACQUIRED OCTOBER 5, 2012 BY THE SANBORN MAPPING COMPANY.
2. SEE OBSTRUCTION DATA TABLE ON SHEET 2 FOR OBSTRUCTION INFORMATION.
3. AIRPORT PROPERTY LINE SURVEYED BY NITSCH ENGINEERING IN AUGUST 2013.
4. SURFACE DIMENSIONS AND SLOPES BASED ON RNAV (GPS) RW 33 INSTRUMENT APPROACH PROCEDURE LPV MINIMUMS (300-1) CURRENT AS OF AUG 2013.

AIRSPACE SURFACES DRAWN IN ACCORDANCE WITH:
1. FAA ADVISORY CIRCULAR I50/5300-13A, AIRPORT DESIGN STANDARDS, TABLES: 3-2, 3-4, 3-5.
2. 14 CFR PART 77 OBJECTS AFFECTING NAVIGABLE AIRSPACE, OTHER THAN UTILITY RUNWAY, NON-PRECISION ≥ 3/4 MI VISIBILITY.

LEGEND	
	APPROACH SURFACE
	PRIMARY SURFACE
25	OBSTRUCTION- TREE
54	GROUND CONTOURS
RPZ	RUNWAY PROTECTION ZONE
	THRESHOLD SITING SURFACE
	DEPARTURE SURFACE
	GLIDE PATH QUALIFICATION SURFACE (GQS)
RSA	RUNWAY SAFETY AREA
ROFA	RUNWAY OBJECT FREE AREA

OBSTRUCTION DATA TABLE

POINT #	DESCRIPTION	ELEVATION (FT AMSL)	AIRSPACE SURFACE	PENETRATION AMOUNT	DISPOSITION
213	TREE	88.4	APPROACH	7.5	REMOVE
214	TREE	85.5	APPROACH	5.0	REMOVE
215	TREE	85.8	APPROACH	2.2	REMOVE
216	TREE	89.9	APPROACH	0.2	REMOVE
217	TREE	86.5	APPROACH	0.8	REMOVE
218	TREE	85.7	APPROACH	0.8	REMOVE
219	TREE	93.0	APPROACH	14.9	REMOVE
220	TREE	91.2	APPROACH	1.7	REMOVE
221	TREE	88.0	APPROACH	0.5	REMOVE
222	TREE	94.3	APPROACH	13.3	REMOVE
223	TREE	80.6	APPROACH	2.2	REMOVE
224	TREE	80.4	APPROACH	0.1	REMOVE
225	TREE	77.5	APPROACH	7.3	REMOVE
226	TREE	76.0	APPROACH	7.5	REMOVE

100 0 50 100 200
(IN FEET)
SCALE 1" = 100' HORIZONTAL
1" = 10' VERTICAL

RUNWAY 33
PLAN AND PROFILE

Mark | Date | Description | Appr.

Designed by: HHM
Dwn by: TMP
Ckd by: MED
Reviewed by: SJF
Submitted by:
Date: 03/21/2016
Rev.
Design file no.
Drawing code:
File name:
Plot date: March 2016
Plot scale: 1"= 100'

MARTHA'S VINEYARD AIRPORT
VINEYARD HAVEN
MASSACHUSETTS

JACOBS
TWO EXECUTIVE PARK DRIVE
SUITE 205
BEDFORD, NH 03110

MVY AIRPORT MARTHA'S VINEYARD

Sheet reference number:
11
11 OF 11

Chapter 7 – Capital Improvement Plan

The FAA requires airport sponsors to prepare and regularly update a Capital Improvement Program (CIP). A CIP is a flexible and dynamic document that outlines aviation facility needs in a safe, efficient and cost-effective manner while being regularly reviewed and adjusted to meet changing conditions, costs, finances and priorities. CIPs identify specific projects, the FAA fiscal year in which they are scheduled to be completed, the cost estimate, and funding sources. Generally, CIPs are prepared for a five year period and updated annually. The following table illustrates the cost associated with the current projects being evaluated.

Martha's Vineyard Airport- Five Year FAA CIP and beyond								
			FAA Eligible					
Project	Priority	Fiscal Year	Yes	No	FAA Entitlement	MASS DOT	Airport Sponser	Total Cost
Paint Apron Islands	1	2017	X		$ 144,000.00	$ 8,000.00	$ 8,000.00	$ 160,000.00
Remove RWY 15/33 Shoulder Pavement and Replace With Grass	2	2017	X		$ 540,000.00	$ 30,000.00	$ 30,000.00	$ 600,000.00
Crack Seal/Crack Repair RWY 06/24	3	2017	X		$ 324,000.00	$ 18,000.00	$ 18,000.00	$ 360,000.00
Move Taxiway E Centerline to Meet Standard	4	2017	X		$ 11,700.00	$ 650.00	$ 650.00	$ 13,000.00
Environmental Assessment	5	2017	X		$ 315,000.00	$ 17,500.00	$ 17,500.00	$ 350,000.00
Replace ARFF Truck (1)	6	2018	X		$ 828,000.00	$ 46,000.00	$ 46,000.00	$ 920,000.00
Reconstruction of Runway 06/24 and 15/33	7	2018	X		$ 6,615,000.00	$367,500.00	$ 367,500.00	$ 7,350,000.00
Replace ARFF Truck (1)	8	2019	X		$ 828,000.00	$ 46,000.00	$ 46,000.00	$ 920,000.00
Concrete Fuel Farm Pad	9	2019	X		$ 130,500.00	$ 7,250.00	$ 7,250.00	$ 145,000.00
Paving the Transient Turf Tie Down Area	10	2020	X		$ 1,260,000.00	$ 70,000.00	$ 70,000.00	$ 1,400,000.00
New Apron (addition to the Southeast Ramp)	11	2021	X		$ 315,000.00	$ 17,500.00	$ 17,500.00	$ 350,000.00
Terminal Expansion & Renovation	12	2022	X		$ 3,060,000.00	$170,000.00	$ 170,000.00	$ 3,400,000.00
Remove TWY "E"	13	2023	X		$ 505,800.00	$ 28,100.00	$ 28,100.00	$ 562,000.00
New TWY "E" Construction	14	2023	X		$ 2,250,000.00	$125,000.00	$ 125,000.00	$ 2,500,000.00
Move Hold Short Lines for Runway 33 to Meet Standard	15	2023	X		$ 4,950.00	$ 275.00	$ 275.00	$ 5,500.00
Southwest Ramp Expansion	16	2024	X		$ 1,080,000.00	$ 60,000.00	$ 60,000.00	$ 1,200,000.00

The projects are described in more detail below:

Paint Apron Islands

In order to enhance situational awareness, the FAA has deemed that direct access from a ramp/terminal to a runway is not recommended. At MVY, both the Non-Secure Airline Ramp and the Southeast Ramp are currently constructed so that pilots can taxi directly from the ramp onto Runway 06-24. To mitigate the risk of runway incursions, the FAA suggests adding non-taxi areas called Islands that require pilots to stop and change direction before taxing onto a runway. The preferred method is to have the center of the island be a grass area that portrays a clear no taxi area for pilots. Painting the island green with appropriate signage is another acceptable option that can be considered, and is suggested in these instances to minimize disruption to airport ops while providing a cost effective solution.

Total Estimated Cost (Painting): $160,000.00

Remove RWY 15/33 Shoulder Pavement and Replace with Grass

The shoulders of RWY 15/33 at MVY have exceeded their life expectancy and oxidized to the point of cracking at multiple locations resulting in a Part 139 inspection action item. The runway edge markings have multiple layers of paint which is flaking off as well. The combination of pavement cracking and paint peeling presents an increased risk for Foreign Object Debris (FOD) damage to aircraft and/or equipment operating at MVY. The paving or repair of the RWY 15/33 shoulders would not be eligible for Airport Improvement Plan (AIP) funding as the runway width exceeds the current design criteria for an ADG-II category runway; it is suggested the existing shoulders be removed and replaced with grass.

Total Estimated Cost (Shoulder Removal and Replaced with Grass): $600,000.00

Crack Seal/Crack Repair RWY 06/24

The paved shoulders on RWY 06/24 have exceeded their expected life and are in need of repair due to excessive cracking. The multiple layers of runway edge markings are also peeling and are in need of remarking. The crack sealing, repair and marking of the runway shoulders and runway edge markings would be AIP eligible and imperative to reducing the risk of FOD.

Total Estimated Cost: $600,000.00

Taxiway "E" Centerline

In order to meet the FAA's taxiway centerline guidelines, the current Taxiway "E" centerline would need to be moved approximately 2 inches from its current location. Making sure the taxiway centerline is centered precisely within the taxiway will aid in maintaining separation standards per FAA guidance.

Total Estimated Cost: $13,000.00

Replace ARFF Trucks

As an FAR Part 139 (air carrier) airport, MVY is required to have and maintain ARFF (Aircraft Rescue and Firefighting) apparatuses. MVY is categorized as an ARFF Index A airport, meaning there are less than 5 average daily departures of air carrier aircraft that are less than 90 feet in length. MVY's current ARFF trucks are 14 years old and will soon be in need of replacement. They are nearing their expected life expectancy of 15 years and should be considered for replacement within the next 5 years. Each truck, properly equipped is approximately $920,000.00.

Total Estimated Cost (Assumes Two Trucks): $1,840,000.00

Environmental Assessment

The purpose of an environmental assessment is to examine potential environmental effects of proposed actions. This planning project would be completed for the removal and new construction of Taxiway "E", the terminal building, and apron paving projects. The project would identify any proposed environmental impacts as a result of proposed projects, analyze alternatives, and/or mitigation and identify the appropriate permits.

Total Estimated Cost: $350,000.00

Reconstruction of Runway 06/24 and 15/33

The FAA life expectancy for airport pavement is 20 years. The pavement for the majority of Runway 15/33 was paved in 1992 and Runway 06/24 was paved in 1993, both of which exceed design life. MVY is regularly and frequently conducting crack sealing and repairs to the asphalt on each runway; as the pavement ages, FOD from loose asphalt is becoming a safety issue that needs to be considered. This project proposes a mill and overlay of the existing pavement. New markings and grooving are included in the estimate.

Total Estimated Cost: $7,350,000.00

Concrete Fuel Farm Pad

Fuel farms are extremely important to an airport's revenue. MVY's fuel farms are currently surrounded by hard pack gravel which is difficult to plow and maintain, and increases the risk of FOD. A concrete pad would allow for easier maintenance and reduce the potential for FOD.

Total Estimated Cost: $145,000.00

Removal of TWY "E" and Construction of the New TWY "E"

MVY's current taxiway configuration does not provide the most efficient taxi route for aircraft to get to/from RWY 15. The first step to maximize airfield efficiency would be to remove the existing pavement associated with Taxiway E, and reconstruct the taxiway parallel to Runway 15/33 with exit stub taxiways placed at appropriate distances. The proposed taxiway design will also maximize land available for non-aeronautical use such as solar energy, wind turbine, or further business development.

Total Estimated Cost (127,302 SF): $3,038,000.00

Move RWY 33 Hold Short Lines

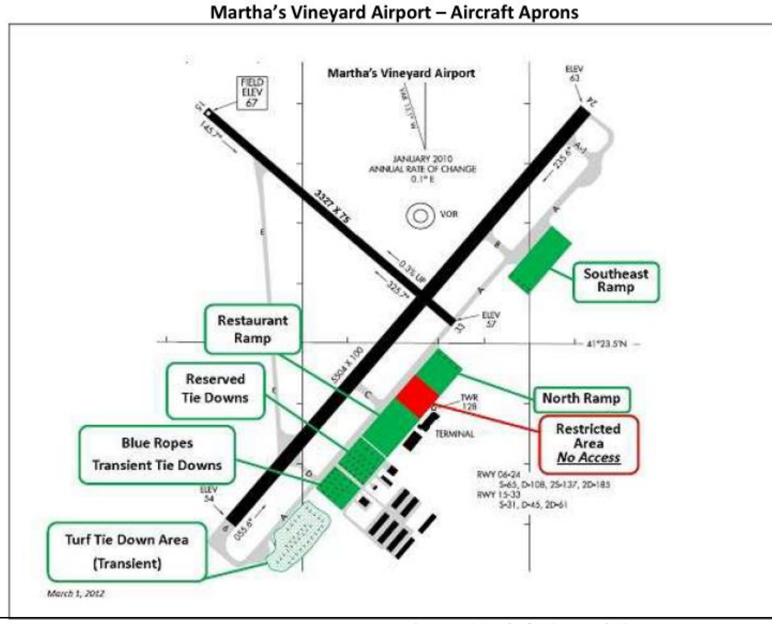
The RWY 33 hold short lines are currently placed further away from the Runway 33 centerline than standard. By moving the hold short lines closer to the Runway 33 centerline, it will minimize the potential as a choke point for aircraft queuing for departure on Runway 33.

Total Estimated Cost: $5,500.00

New Apron

There are multiple aircraft parking aprons at MVY that serve both based and transient aircraft, as shown in the diagram on the right.

Martha's Vineyard Airport – Aircraft Aprons



Source: Martha's Vineyard Airport

The MVY staff has indicated the need to expand the Secure Terminal Apron/Secure Identification Display Area to accommodate additional secure flights and screened passengers as a result of increased growth of commercial air carrier service. Expanding that apron will take away parking spaces for both based and transient aircraft, resulting in the need for more paved apron space.

1. New Apron (addition to the Southeast Ramp) | 58,918 SF -
   If demand dictates the need for the hangars along the Southeast Ramp, that apron will need to be expanded in order to have adequate room to move aircraft in and out of the hangars while maintaining tie down space for overflow aircraft.

   Total Estimated Cost: $350,000.00

2. Paving the Transient Turf Tie Down Area | 217,470 SF -
   If demand warrants, this area can be paved for additional transient parking.

   Total Estimated Cost: $1,400,000.00

3. Southwest Ramp Expansion | 183,186 SF -
   The area southeast of the Transient Tie Down Area is currently paved intermittently. By paving the entire area, more room will be allotted for aircraft to taxi to/from the hangars. Further Southeast from that location, there are areas available for additional hangars to be built. By paving these areas, it will provide further expansion capabilities.

   Total Estimated Cost: $1,200,000.00

Terminal Expansion & Renovation

The main terminal building at MVY is a single story building that currently includes airline ticket counters and queuing area, airline offices, baggage claim area (manual-no automated belts), restrooms, restaurant, gift shop, TSA security screening area and offices. Capacity issues have led to overuse of the existing facility during peak summer weekends and can frequently exceed design capacity during that timeframe. Option 4 (shown in Figure 5.18 of the Master Plan) is the preferred alternative since it minimizes disruption to the existing terminal facilities while providing for an improved terminal flow and increased passenger screening/hold room space. This option also allows room for additional growth if demand dictates by adding a secure hold room, secure side restrooms, a concession area, and larger passenger and bag screening areas.

Total Estimated Cost: $3,400,000.00

APPENDICIES

APPENDIX 1 –

FERRY PASSENER TRAFFIC AND SERVICE

WOODS HOLE, MARTHA'S VINEYARD AND NANTUCKET STEAMSHIP AUTHORITY

PASSENGERS CARRIED/ MARTHA'S VINEYARD AND NANTUCKET

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
							MAINLAND TO THE VINEYARD AND RETURN						
2000	90,231	91,509	111,342	148,648	211,807	260,111	344,644	350,757	245,325	216,968	128,759	109,080	2,309,181
2001	91,644	93,747	97,835	148,982	213,663	268,320	383,161	392,868	246,303	200,438	139,583	120,215	2,396,759
2002	94,612	94,325	117,266	150,204	212,646	270,960	375,644	399,057	244,873	196,935	128,119	116,645	2,401,286
2003	94,229	83,219	105,907	141,742	201,129	260,955	353,536	377,498	227,086	199,439	130,306	108,581	2,283,627
2004	91,803	92,119	98,494	141,803	198,169	237,374	318,603	333,107	225,848	193,922	123,336	109,591	2,164,169
2005	81,111	85,296	98,302	134,286	176,908	232,213	324,344	331,788	222,295	175,881	127,015	108,598	2,098,037
2006	93,039	83,903	102,048	138,211	177,334	217,349	321,898	329,628	220,866	181,355	124,847	114,650	2,105,128
2007	92,887	85,010	100,944	128,742	184,257	230,354	324,077	345,864	229,981	188,252	122,469	110,323	2,143,160
2008	94,827	92,252	108,335	138,774	187,431	236,596	328,409	360,582	209,167	187,347	122,567	107,898	2,174,185
2009	90,016	86,043	95,967	139,497	189,174	227,093	335,454	366,924	241,007	179,159	121,112	108,121	2,179,567
2010	94,902	85,310	100,500	140,454	197,682	234,477	346,581	371,649	229,360	184,664	121,100	107,121	2,213,800
2011	89,395	84,483	99,539	133,653	189,391	234,178	355,666	339,810	237,745	184,527	126,407	114,736	2,189,530
2012	95,911	92,166	106,823	146,027	197,040	245,135	348,917	364,410	233,673				1,830,102
							MAINLAND TO NANTUCKET AND RETURN						
2000	15,285	14,625	18,114	26,917	46,578	69,865	98,693	105,754	72,513	56,743	28,488	24,985	578,560
2001	14,089	13,137	14,352	27,436	51,465	73,486	104,505	112,387	72,533	55,144	35,461	30,030	604,025
2002	17,142	14,498	18,817	35,927	51,082	73,436	99,935	117,412	67,941	47,602	26,628	30,093	600,513
2003	14,638	13,321	19,102	30,576	49,347	67,442	96,835	108,107	60,810	50,497	27,511	20,504	558,690
2004	10,957	10,426	14,909	30,063	47,034	56,970	90,203	96,423	62,091	43,000	24,910	22,004	508,990
2005	10,847	11,587	16,292	26,926	40,438	62,380	95,373	101,263	57,997	38,538	25,569	24,588	511,798
2006	12,165	10,781	13,906	26,688	43,629	60,268	92,555	103,042	61,044	40,054	25,451	25,854	515,437
2007	11,731	10,730	14,106	28,432	47,345	68,125	97,147	108,411	65,540	47,162	27,155	23,322	549,206
2008	11,031	11,520	12,968	25,071	44,157	61,249	94,096	111,860	53,087	43,576	26,471	22,760	517,846
2009	10,682	10,678	11,734	25,760	45,999	56,485	97,595	109,895	61,185	37,254	24,303	22,041	513,611
2010	11,377	10,432	12,208	23,683	45,645	58,553	99,924	108,302	59,921	42,908	24,774	24,620	522,347
2011	10,724	10,686	12,094	23,546	47,633	58,764	103,780	101,687	61,091	40,378	24,796	27,338	522,517
2012	10,677	10,760	13,156	24,175	51,131	64,540	103,360	115,532	65,596				458,927
							TOTALS						
2000	105,516	106,134	129,456	175,565	258,385	329,976	443,337	456,511	317,838	273,711	157,247	134,065	2,887,741
2001	105,733	106,884	112,187	176,418	265,128	341,806	487,666	505,255	318,836	255,582	175,044	150,245	3,000,784
2002	111,754	108,823	136,083	186,131	263,728	344,396	475,579	516,469	312,814	244,537	154,747	146,738	3,001,799
2003	108,867	96,540	125,009	172,318	250,476	328,397	450,371	485,605	287,896	249,936	157,817	129,085	2,842,317
2004	102,760	102,545	113,403	171,866	245,203	294,344	408,806	429,530	287,939	236,922	148,246	131,595	2,673,159
2005	91,958	96,883	114,594	161,212	217,346	294,593	419,717	433,051	280,292	214,419	152,584	133,186	2,609,835
2006	105,204	94,684	115,954	164,899	220,963	277,617	414,453	432,670	281,910	221,409	150,298	140,504	2,620,565
2007	104,618	95,740	115,050	157,174	231,602	298,479	421,224	454,275	295,521	235,414	149,624	133,645	2,692,366
2008	105,858	103,772	121,303	163,845	231,588	297,845	422,505	472,442	262,254	230,923	149,038	130,658	2,692,031
2009	100,698	96,721	107,701	165,257	235,173	283,578	433,049	476,819	302,192	216,413	145,415	130,162	2,693,178
2010	106,279	95,742	112,708	164,137	243,327	293,030	446,505	479,951	289,281	227,572	145,874	131,741	2,736,147
2011	100,119	95,169	111,633	157,199	237,024	292,942	459,446	441,497	298,836	224,905	151,203	142,074	2,712,047
2012	106,588	102,926	119,979	170,202	248,171	309,675	452,277	479,942	299,269				2,289,029

WOODS HOLE, MARTHA'S VINEYARD AND NANTUCKET STEAMSHIP AUTHORITY

AUTOMOBILES CARRIED/MARTHA'S VINEYARD AND NANTUCKET

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
						MAINLAND TO THE VINEYARD AND RETURN							
2000	22,638	23,990	28,578	32,718	35,481	39,936	46,073	46,186	38,606	37,313	29,772	28,225	409,516
2001	23,064	22,682	24,787	31,294	34,954	40,357	46,390	49,932	42,766	37,944	32,250	31,033	417,453
2002	23,162	23,056	27,751	31,467	35,394	42,680	46,522	50,393	41,750	34,735	29,539	29,575	416,024
2003	22,979	20,691	26,189	31,026	36,809	42,827	47,493	50,739	40,521	36,010	29,837	27,702	412,823
2004	20,958	21,041	22,853	28,930	33,040	39,206	46,187	48,917	40,334	35,500	28,374	25,920	391,260
2005	18,812	19,110	22,497	28,624	32,129	38,725	48,541	49,000	40,199	32,844	26,620	26,204	385,305
2006	20,170	18,139	22,709	26,822	31,574	38,431	47,951	48,610	39,735	32,228	27,260	26,298	379,927
2007	19,751	18,097	22,067	25,881	32,483	39,529	48,478	50,775	40,217	32,442	26,870	25,340	381,930
2008	19,651	19,209	23,305	27,215	32,829	40,108	48,659	52,676	36,909	32,096	26,269	24,262	383,188
2009	17,441	17,294	19,433	25,403	31,669	38,039	48,423	52,957	38,950	30,643	24,838	23,614	368,704
2010	18,519	17,179	20,286	25,998	32,194	38,584	49,643	52,535	38,332	31,395	25,516	23,487	373,668
2011	17,865	16,875	21,034	25,521	32,093	38,609	50,786	49,442	39,974	32,302	26,396	24,718	375,615
2012	18,851	18,601	22,309	27,843	33,188	40,381	49,885	52,672	40,162				303,892
						MAINLAND TO NANTUCKET AND RETURN							
2000	3,954	3,920	4,810	5,550	7,115	8,928	10,911	11,061	8,801	7,350	5,544	4,950	82,894
2001	3,904	3,589	3,974	5,458	6,749	8,974	10,279	11,201	8,831	6,980	5,961	5,871	81,771
2002	4,058	3,797	4,401	5,761	6,798	9,306	10,283	11,988	8,810	6,375	5,158	6,034	82,769
2003	3,564	3,377	4,165	5,719	7,030	8,915	10,441	12,264	8,295	6,712	5,308	5,373	81,163
2004	2,736	2,746	3,317	4,770	6,002	8,201	9,961	10,574	7,749	5,655	4,406	4,518	70,635
2005	2,602	2,658	3,227	4,475	5,501	7,975	10,248	10,895	7,948	5,317	4,933	4,573	70,352
2006	2,862	2,488	3,226	4,349	5,617	7,675	10,036	11,520	7,660	5,230	4,761	4,551	69,975
2007	2,863	2,504	3,323	4,234	5,735	8,222	10,175	11,939	7,621	5,481	4,573	4,157	70,827
2008	2,760	2,793	3,163	4,091	5,575	7,899	9,920	12,443	6,549	5,280	4,087	4,072	68,632
2009	2,486	2,443	2,714	3,666	5,101	6,979	9,590	12,014	6,860	4,518	4,079	3,888	64,338
2010	2,636	2,464	2,565	3,664	5,087	6,973	10,265	12,078	6,810	4,739	3,884	3,682	64,847
2011	2,449	2,356	2,554	3,435	4,809	7,068	10,584	11,661	6,889	4,605	3,911	3,785	64,106
2012	2,370	2,261	2,759	3,727	4,959	7,378	10,172	11,866	6,665				52,157
						TOTALS							
2000	26,592	27,910	33,388	38,268	42,596	48,864	56,984	57,247	47,407	44,663	35,316	33,175	492,410
2001	26,968	26,271	28,761	36,752	41,703	49,331	56,669	61,133	51,597	44,924	38,211	36,904	499,224
2002	27,220	26,853	32,152	37,228	42,192	51,986	56,805	62,381	50,560	41,110	34,697	35,609	498,793
2003	26,543	24,068	30,354	36,745	43,839	51,742	57,934	63,003	48,816	42,722	35,145	33,075	493,986
2004	23,694	23,787	26,170	33,700	39,042	47,407	56,148	59,491	48,083	41,155	32,780	30,438	461,895
2005	21,414	21,768	25,724	33,099	37,630	46,700	58,789	59,895	48,147	38,161	33,553	30,777	455,657
2006	23,032	20,627	25,935	31,171	37,191	46,106	57,987	60,130	47,395	37,458	32,021	30,849	449,902
2007	22,614	20,601	25,390	30,115	38,218	47,751	58,653	62,714	47,838	37,923	31,443	29,497	452,757
2008	22,411	22,002	26,468	31,306	38,404	48,007	58,579	65,119	43,458	37,376	30,356	28,334	451,820
2009	19,927	19,737	22,147	29,069	36,770	45,018	58,013	64,971	45,810	35,161	28,917	27,502	433,042
2010	21,155	19,643	22,851	29,662	37,281	45,557	59,908	64,613	45,142	36,134	29,400	27,169	438,515
2011	20,314	19,231	23,588	28,956	36,902	45,677	61,370	61,103	46,863	36,907	30,307	28,503	439,721
2012	21,221	20,862	25,068	31,570	38,147	47,759	60,057	64,538	46,827				356,049

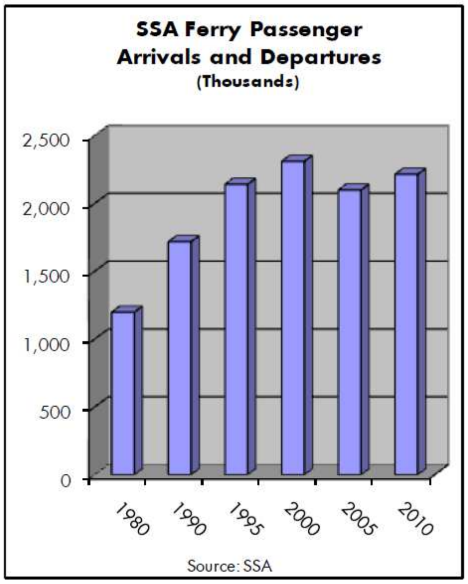


Figure 18: SSA Traffic 2000-2010 Source: SSA

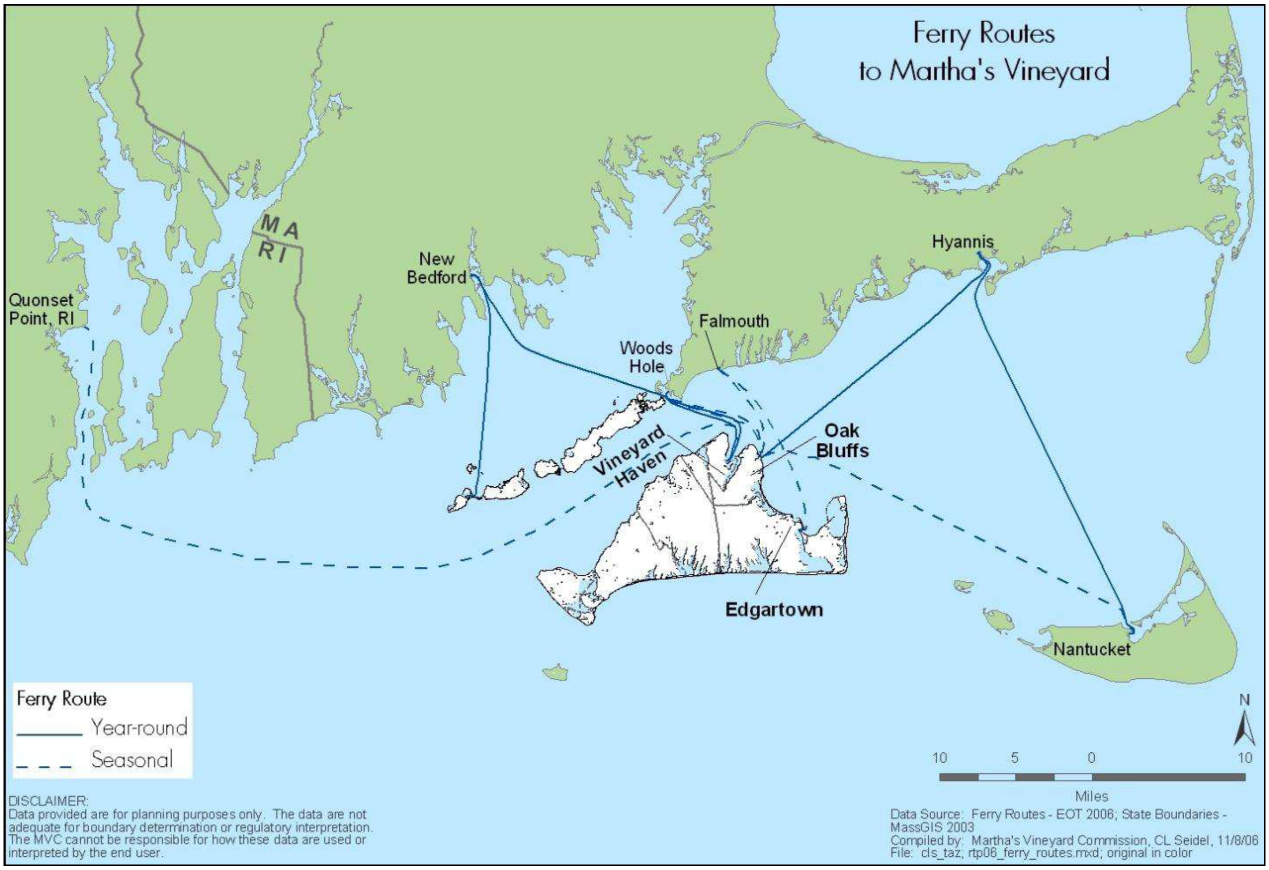
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Annual Growth
Passengers Carried	2,309,181	2,396,759	2,401,286	2,283,627	2,164,169	2,098,037	2,105,128	2,143,160	2,174,185	2,179,567	2,213,800	-0.42%
Automobiles Carried	409,516	417,453	416,024	412,823	391,260	385,305	379,927	381,930	383,188	368,704	373,668	-0.91%
Trucks Carried	72,542	73,271	72,451	70,546	87,166	97,595	103,939	98,257	98,393	115,600	116,461	4.85%
Total Vehicles	482,058	490,724	488,475	483,369	478,426	482,900	483,866	480,187	481,581	484,304	490,129	0.17%
Change in Passengers	0.30%	3.80%	0.20%	-4.90%	-5.20%	-3.10%	0.30%	1.80%	1.40%	0.20%	1.60%	
Change in Vehicles	0.80%	1.80%	-0.50%	-1.00%	-1.00%	0.90%	0.20%	-0.80%	0.30%	0.60%	1.20%	

Source: Martha's Vineyard Regional Transportation Plan – 2011 Update

Figure 19: Passenger Arrivals & Departures by Ferry

	SSA	Private Ferries	Total
1960	233,828	N.A.	233,828
1965	442,853	N.A.	442,853
1970	736,067	N.A.	736,067
1975	989,761	N.A.	989,761
1980	1,197,852	219,209	1,417,061
1985	1,347,467	227,706	1,575,173
1990	1,717,238	240,308	1,957,546
1995	2,139,599	242,503	2,382,102
2000	2,309,181	263,845	2,573,026
2005	2,098,037	267,883	2,365,920
2010	2,213,800	179,385	2,393,185

Excludes the Island Queen and the Rhode Island Fast Ferry. Source: SSA



Source: Martha's Vineyard Regional Transportation Plan – 2011 Update

Ferry Lines & Service to Martha's Vineyard:

Island Queen: Island Commuter Corporation operates the *Island Queen* between Oak Bluffs and Falmouth, with a capacity of 594 passengers. During their operating season of mid-June to mid-September, the *Island Queen* operates seven daily round trips, with additional sailings on the weekends. Limited service is provided in May and October. (Statistics are not public because Island Commuter Corp. was licensed before this became a requirement.)

Hy-Line: Hy-Line Cruises operates between Hyannis and Oak Bluffs, with a schedule that varies from season to season. In peak season, the 450-passenger M/V *Brant Point* makes four round trips. Since 2005 Hy-Line has operated a year-round fast ferry service aboard the 140-passenger M/V *Lady Martha* between Oak Bluffs and Hyannis.

SeaStreak Martha's Vineyard: Formerly New England Fast Ferry, this seasonal fast ferry service operates between Vineyard Haven and New Bedford (and seasonal service to Oak Bluffs) aboard the M/V *SeaStreak* with a capacity of 150 passengers. This service replaced the *Schamonchi,* which had been operated seasonally for several years by the Steamship Authority.

Martha's Vineyard Fast Ferry: This seasonal, high-speed service aboard a 400-passenger catamaran between Quonset Point, Rhode Island and Oak Bluffs started in 2003.

Pied Piper: Falmouth - Edgartown Ferry & Charter Service operates this 120-passenger seasonal ferry service between Falmouth and Edgartown.

Cruise Ships: There have been up to 30,000 annual visitors brought to the Vineyard by cruise ships operated by major companies, such as Norwegian and Royal Caribbean. These large vessels anchor off Oak Bluffs and tenders ferry passengers to the Oak Bluffs Harbor. Smaller cruise ships berth at Vineyard Haven Harbor and annual bring up to 1,000 passengers.

On-Island Ferries: In addition to the ferries providing access to the Island, there are also two ferries that serve movement on the Vineyard. The 3-car *On-Time* ferries provide the only vehicular access to the Island of Chappaquiddick (other than sporadic four-wheel drive access along the beach), operating year-round from the Edgartown Harbor. A seasonal bike ferry allows cyclists to travel from the village of Menemsha to Lobsterville Road in Aquinnah.

Source: Martha's Vineyard Regional Transportation Plan – 2011 Update

Island Queen-Ferry to Martha's Vineyard
Visiting Martha's Vineyard - sail on the Island Queen from Falmouth, Cape Cod and you'll experience Martha's Vineyard within 35 minutes of departure. Convenient parking just 200 yards from our dock. Enjoy our enclosed lounge, outside deck and snack bar. Sailing daily from May to October. Group discounts available.
Address: 75 Falmouth Heights Rd, Falmouth, MA **Tel:** 508.548.4800 **Email:** info@islandqueen.com

Falmouth Edgartown Ferry Service
Falmouth Edgartown Ferry "The Pied Piper" is the only scheduled vessel from Falmouth to Edgartown and is operational from Memorial Day through Labor Day. The 50 minute trip brings visitors to the municipal wharf next to the Chappy Ferry in Edgartown's waterfront. Valet parking service is available at the Falmouth dock. Buy tickets online, charters available.
Address: 278 Scranton Avenue, Falmouth, MA **Tel:** 508.548.9400 **Email:** falmouthferry@verizon.net

SeaStreak Martha's Vineyard
For 1-hour luxury high speed ferry service to Martha's Vineyard, cruise with Seastreak from New Bedford. Skip Cape traffic. Daily service from May through October. Kids 12 and under (accompanied by an adult) ride free. Check seastreak.com for details. 1.800.BOATRIDE (800.262.8743)
Address: State Pier, Vineyard Haven, Oak Bluffs., MA **Tel:** 866.MVFERRY 866.683.3779
Email: info@seastreakmv.com

SeaStreak NYC
Memorial Day to Labor Day. Direct ferry service to Martha's Vineyard from NYC Travel in style on one of SeaStreak's 400 passenger vessels, the largest, fastest, most luxurious catamarans in the New York Harbor! SeaStreak vessels offer 3 spacious decks, a full service cash bar, food concessions and flat screen TV's with movie showings. No traffic, No stress! Vessels are available for charters on Saturdays.
Address: 1 Seaview Avenue, Oak Bluffs, MA **Tel:** 1-800-262-8743 **Email:** heather.vacca@seastreak.com

The Steamship Authority
Woods Hole, MA to Vineyard Haven and Oak Bluffs, Year-round, Passengers & Cars, 45 minute trip. The Steamship Authority provides the only year-round passenger and vehicle ferry service to the island of Martha's Vineyard. On Martha's Vineyard call: 508.693.9130
Address: Railroad Avenue, Woods Hole, MA **Tel:** 508.477.8600

Hy-Line Cruises
KIDS RIDE FREE on Traditional Ferry Service from Hyannis to Oak Bluffs in 95 minutes, May through October. High-Speed ferry service from Hyannis to Oak Bluffs in 50 minutes, May through October. Inter-Island service from Oak Bluffs to Nantucket, June through September. Passenger-only.
Address: 12 Circuit Avenue Extension, Oak Bluffs, MA **Tel:** 800-492-8082 **Email:** betsy@hylinecruises.com

Vineyard Fast Ferry (Rhode Island)
May thru October...We operate the largest, most luxurious fast ferry to Martha's Vineyard. Our departure location from Quonset Point, Rhode Island is the most convenient and time saving way to travel to Martha's Vineyard – we will save you hours in travel time each way! The closest Martha's Vineyard ferry to CT, NY, NJ & Western MA. Also Providence Airport & Amtrak Shuttle Service, dockside parking & advance reservations.
Address: 1347 Roger Williams Way, North Kingstown, RI **Tel:** (401) 295-4040
Email: info@vineyardfastferry.com

Chappaquiddick Ferry
Edgartown to Chappaquiddick, Year-round,
Passengers & Cars, 5 minute trip.
See their website for seasonal schedules and updates: http://chappyferry.com/marthasvineyard/
Address: Dock Street, Edgartown, MA **Tel:** 508.627.9427

Patriot Party Boats
MV Water Shuttle between Falmouth-Oak Bluffs. Late night water taxi.
Address: Oak Bluffs Harbor, Oak Bluffs, MA **Tel:** 1-800-734-0088

APPENDIX 2 –

EXISTING BUILDING ASSESSMENTS

Prepared by Jacobs

MVY Master Plan Update Building Assessment	Building Name: ARFF/SRE Date of Observation: March 15, 2013

GENERAL INFORMATION

Two-story building on the edge of the airfield holding both ARFF and SRE operations.

Property Number/ID:

Current Use: ARFF/SRE operations

Year Built: 1970's

Cost:

Approximate Dimension:

Approximate Area:

Number of floors: 2

Location (Northing, Easting):

General Condition of the Building: Fair to Poor

ARCHITECTURAL FEATURES

Building Exterior: Wood shingle/siding

Windows description*: Presumed wood

Doors description*:

Roof type, condition:

Roof date of install*:

Roof insulation*:

Foundation insulation*:

Wall insulation*:

Building Interior:

Figure 1: Key Plan of ARFF/SRE Building

Figure 2: Airside View of ARFF/SRE Building

Figure 3: Landside View of ARFF/SRE Building

Structure: Unobserved but presumed wood

Basement:

Dates of any modifications*:

ELECTRICAL FEATURES

Type of lights:

Note: hooked up to the airfield lighting meter with no separate submeter for the building

HVAC FEATURES

Fuel source: Oil

Age of HVAC system:

Type of HVAC system: Steam heat

Is duct work insulated and air sealed?:

Are pipes insulated?

Do system or components have Energy Star ratings?

ENERGY USAGE

Energy used in 2012:

ADA COMPLIANCE

Does building meet ADA? Not public use

If not, deficiencies: N/A

ONGOING ISSUES

Are there any ongoing or recurrent building maintenance issues or problems?

Figure 4: Landside View of ARFF/SRE Building

Figure 5: Landside View of ARFF/SRE Building

GENERAL INFORMATION

Hangar owned by third party leased on land owned by the airport.

Property Number/ID:

Current Use: Hangar

Year Built: 1970's

Cost: Unknown

Approximate Dimension:

Approximate Area:

Number of floors: 1

Location (Northing, Easting):

General Condition of the Building: Good to Fair (from exterior only)

ARCHITECTURAL FEATURES

Building Exterior: Metal panel

Windows description*: N/A

Doors description*: Unknown

Roof type, condition: Assumed metal, condition unobserved

Roof date of install*: Unknown

Roof insulation*: Unknown

Foundation insulation*: Unknown

Wall insulation*: Unknown

Building Interior: Not observed

Figure 1: Key Plan Duchess Hangar

Figure 2: Front View of Duchess Hangar

Structure: Assumed steel

Basement: N/A

Dates of any modifications*:

ELECTRICAL FEATURES

Type of lights: Unobserved

HVAC FEATURES

Fuel source: Unknown

Age of HVAC system: Unknown

Type of HVAC system: Unknown

Is duct work insulated and air sealed?: Unknown

Are pipes insulated? Unknown

Do system or components have Energy Star ratings? Unknown, likely not.

ENERGY USAGE

Energy used in 2012: Data not available

ADA COMPLIANCE

Does building meet ADA? Not public use

If not, deficiencies: N/A

ONGOING ISSUES

Are there any ongoing or recurrent building maintenance issues or problems? None known.

MVY Master Plan Update Building Assessment	Building Name: Fuel Farm Date of Observation: March 15, 2013

GENERAL INFORMATION

The Fuel Farm building is a small shed-like structure across from the storage tanks.

Property Number/ID:

Current Use:

Year Built:

Cost:

Approximate Dimension:

Approximate Area:

Number of floors: 1

Location (Northing, Easting):

General Condition of the Building: Fair to Good

ARCHITECTURAL FEATURES

Building Exterior: Wood or vinyl siding; exact type could not be observed

Windows description*: Believed to be wood

Doors description*: Wood

Roof type, condition: Asphalt shingle, expected to be good

Roof date of install*:

Roof insulation*:

Foundation insulation*:

Wall insulation*:

Building Interior: Not observed

Figure 1: Key Plan Fuel Farm

Figure 2: View of Fuel Farm Structure

Structure: Not observed, believed to be wood

Basement: None

Dates of any modifications*:

ELECTRICAL FEATURES

Type of lights: Not observed

HVAC FEATURES

Fuel source:

Age of HVAC system:

Type of HVAC system:

Is duct work insulated and air sealed?:

Are pipes insulated?

Do system or components have Energy Star ratings?

ENERGY USAGE

Energy used in 2012:

ADA COMPLIANCE

Does building meet ADA? Not a public use building

If not, deficiencies: N/A

ONGOING ISSUES

Are there any ongoing or recurrent building maintenance issues or problems?

GENERAL INFORMATION

Single unit hangar situated just off the apron

Property Number/ID:

Current Use: Equipment storage

Year Built:

Cost:

Approximate Dimension:

Approximate Area:

Number of floors: 1

Location (Northing, Easting):

General Condition of the Building: Fair

ARCHITECTURAL FEATURES

Building Exterior: Metal

Windows description*: N/A

Doors description*: Metal hangar door

Roof type, condition: Metal, unable to observe

Roof date of install*:Original to building

Roof insulation*:

Foundation insulation*:

Wall insulation*:

Building Interior:

Structure: Steel

Figure 1: Key Plan of Hadley Hangar

Figure 2: Front View of Hadley Hangar

Figure 3: Front/Side View of Hadley Hangar

Basement: None

Dates of any modifications*:

ELECTRICAL FEATURES

Type of lights:

HVAC FEATURES

Fuel source:

Age of HVAC system:

Type of HVAC system:

Is duct work insulated and air sealed?:

Are pipes insulated?

Do system or components have Energy Star ratings?

ENERGY USAGE

Energy used in 2012:

ADA COMPLIANCE

Does building meet ADA? Not public use

If not, deficiencies: N/A

ONGOING ISSUES

Are there any ongoing or recurrent building maintenance issues or problems?

Figure 4: Rear/Side View of Hadley Hangar

GENERAL INFORMATION

Hangar owned by third party on land owned by the airport with 100% occupancy.

Property Number/ID:

Current Use: Hangar

Year Built:

Cost:

Approximate Dimension:

Approximate Area:

Number of floors: 1

Location (Northing, Easting):

General Condition of the Building: Good to Fair (from exterior only)

ARCHITECTURAL FEATURES

Building Exterior: Metal panel

Windows description*: Metal

Doors description*: Metal

Roof type, condition: Metal, condition unobserved

Roof date of install*: Original to building

Roof insulation*:

Foundation insulation*:

Wall insulation*:

Building Interior: Not observed

Figure 1: Key Plan for Hangar A

Figure 2: Overall view, Hangar A

Figure 3: Overall view, Hangar A

Structure: Assumed steel

Basement: N/A

Dates of any modifications*:

ELECTRICAL FEATURES

Type of lights: Unobserved

HVAC FEATURES

Fuel source:

Age of HVAC system:

Type of HVAC system:

Is duct work insulated and air sealed?:

Are pipes insulated?

Do system or components have Energy Star ratings?

ENERGY USAGE

Energy used in 2012: Data not available

ADA COMPLIANCE

Does building meet ADA? Not public use

If not, deficiencies: N/A

ONGOING ISSUES

Are there any ongoing or recurrent building maintenance issues or problems?

GENERAL INFORMATION

Hangar owned by third party on land owned by the airport with 100% occupancy.

Property Number/ID:

Current Use: Hangar

Year Built:

Cost:

Approximate Dimension:

Approximate Area:

Number of floors: 2

Location (Northing, Easting):

General Condition of the Building: Good to Fair (from exterior only)

ARCHITECTURAL FEATURES

Building Exterior: Metal panel

Windows description*: Metal

Doors description*: Metal

Roof type, condition: Metal, condition unobserved

Roof date of install*: Original to building

Roof insulation*:

Foundation insulation*:

Wall insulation*:

Building Interior: Not observed

Figure 1: Key Plan of Hangar B

Figure 2: Side View of Hangar B

Figure 3: Rear View of Hangar B

Structure: Assumed steel

Basement: N/A

Dates of any modifications*:

ELECTRICAL FEATURES

Type of lights: Unobserved

HVAC FEATURES

Fuel source:

Age of HVAC system:

Type of HVAC system:

Is duct work insulated and air sealed?:

Are pipes insulated?

Do system or components have Energy Star ratings?

ENERGY USAGE

Energy used in 2012: Data not available

ADA COMPLIANCE

Does building meet ADA? Not public use

If not, deficiencies: N/A

ONGOING ISSUES

Are there any ongoing or recurrent building maintenance issues or problems?

MVY Master Plan Update Building Assessment	Building Name: Hangar C Date of Observation: March 15, 2013

GENERAL INFORMATION

Hangar owned by third party on land owned by the airport with 100% occupancy.

Property Number/ID:

Current Use: Hangar

Year Built:

Cost:

Approximate Dimension:

Approximate Area:

Number of floors: 1

Location (Northing, Easting):

General Condition of the Building: Good to Fair (from exterior only)

ARCHITECTURAL FEATURES

Building Exterior: Metal panel

Windows description*: Metal

Doors description*: Metal

Roof type, condition: Metal, condition unobserved

Roof date of install*: Original to building

Roof insulation*:

Foundation insulation*:

Wall insulation*:

Building Interior: Not observed

Figure 1: Key Plan of Hangar C

Figure 2: Front View of Hangar C

Figure 3: Side View of Hangar C

Structure: Assumed steel

Basement: N/A

Dates of any modifications*:

ELECTRICAL FEATURES

Type of lights: Unobserved

HVAC FEATURES

Fuel source:

Age of HVAC system:

Type of HVAC system:

Is duct work insulated and air sealed?:

Are pipes insulated?

Do system or components have Energy Star ratings?

ENERGY USAGE

Energy used in 2012: Data not available

ADA COMPLIANCE

Does building meet ADA? Not public use

If not, deficiencies: N/A

ONGOING ISSUES

Are there any ongoing or recurrent building maintenance issues or problems?

Figure 4: Side View of Hangar C

GENERAL INFORMATION

Hangar owned by third party on land owned by the airport with 100% occupancy.

Property Number/ID:

Current Use: Hangar

Year Built:

Cost:

Approximate Dimension:

Approximate Area:

Number of floors: 2

Location (Northing, Easting):

General Condition of the Building: Good to Fair (from exterior only)

ARCHITECTURAL FEATURES

Building Exterior: Metal panel

Windows description*: Metal

Doors description*: Metal

Roof type, condition: Metal, condition unobserved

Roof date of install*: Original to building

Roof insulation*:

Foundation insulation*:

Wall insulation*:

Building Interior: Not observed

Figure 1: Key Plan of Hangar D

Figure 2: Front/Side View of Hangar D

Figure 3: Front/Side View of Hangar D

Structure: Assumed steel

Basement: N/A

Dates of any modifications*:

ELECTRICAL FEATURES

Type of lights: Unobserved

HVAC FEATURES

Fuel source: Propane

Age of HVAC system:

Type of HVAC system:

Is duct work insulated and air sealed?:

Are pipes insulated?

Do system or components have Energy Star ratings?

ENERGY USAGE

Energy used in 2012: Data not available

ADA COMPLIANCE

Does building meet ADA? Not public use

If not, deficiencies: N/A

ONGOING ISSUES

Are there any ongoing or recurrent building maintenance issues or problems?

GENERAL INFORMATION

Hangar owned by third party on land owned by the airport with roughly 50% occupancy.

Property Number/ID:

Current Use: Hangar

Year Built:

Cost:

Approximate Dimension:

Approximate Area:

Number of floors: 1

Location (Northing, Easting):

General Condition of the Building: Fair (from exterior only)

ARCHITECTURAL FEATURES

Building Exterior: Metal panel

Windows description*: Metal

Doors description*: Metal

Roof type, condition: Metal, condition unobserved

Roof date of install*: Original to building

Roof insulation*:

Foundation insulation*:

Wall insulation*:

Building Interior: Not observed

Figure 1: Key Plan of Hangar E

Figure 2: Rear/Side View of Hangar E

Figure 3: Rear View of Hangar E

Structure: Assumed steel

Basement: N/A

Dates of any modifications*:

ELECTRICAL FEATURES

Type of lights: Unobserved

HVAC FEATURES

Fuel source:

Age of HVAC system:

Type of HVAC system:

Is duct work insulated and air sealed?:

Are pipes insulated?

Do system or components have Energy Star ratings?

ENERGY USAGE

Energy used in 2012: Data not available

ADA COMPLIANCE

Does building meet ADA? Not public use

If not, deficiencies: N/A

ONGOING ISSUES

Are there any ongoing or recurrent building maintenance issues or problems?

GENERAL INFORMATION

Hangar owned by third party on land owned by the airport with roughly 20% occupancy.

Property Number/ID:

Current Use: Hangar

Year Built:

Cost:

Approximate Dimension:

Approximate Area:

Number of floors: 1

Location (Northing, Easting):

General Condition of the Building: Fair (from exterior only)

ARCHITECTURAL FEATURES

Building Exterior: Metal panel

Windows description*: Metal

Doors description*: Metal

Roof type, condition: Metal, condition unobserved

Roof date of install*: Original to building

Roof insulation*:

Foundation insulation*:

Wall insulation*:

Building Interior: Not observed

Figure 1: Key Plan of Hangar F

Figure 2: Front View of Hangar F

Structure: Assumed steel

Basement: N/A

Dates of any modifications*:

ELECTRICAL FEATURES

Type of lights: Unobserved

HVAC FEATURES

Fuel source: Propane

Age of HVAC system:

Type of HVAC system:

Is duct work insulated and air sealed?:

Are pipes insulated?

Do system or components have Energy Star ratings?

ENERGY USAGE

Energy used in 2012: Data not available

ADA COMPLIANCE

Does building meet ADA? Not public use

If not, deficiencies: N/A

ONGOING ISSUES

Are there any ongoing or recurrent building maintenance issues or problems?

GENERAL INFORMATION

Hangar owned by third party on land owned by the airport with 100% occupancy.

Property Number/ID:

Current Use: Hangar

Year Built:

Cost:

Approximate Dimension:

Approximate Area:

Number of floors: 1

Location (Northing, Easting):

General Condition of the Building: Good (from exterior only)

ARCHITECTURAL FEATURES

Building Exterior: Metal panel

Windows description*: Metal

Doors description*: Metal

Roof type, condition: Metal, condition unobserved

Roof date of install*: Original to building

Roof insulation*:

Foundation insulation*:

Wall insulation*:

Building Interior: Not observed

Figure 1: Key Plan of Hangar H

Figure 2: Front View of Hangar H

Figure 3: Side View of Hangar H

Structure: Assumed steel

Basement: N/A

Dates of any modifications*:

ELECTRICAL FEATURES

Type of lights: Unobserved

HVAC FEATURES

Fuel source: Propane

Age of HVAC system:

Type of HVAC system:

Is duct work insulated and air sealed?:

Are pipes insulated?

Do system or components have Energy Star ratings?

ENERGY USAGE

Energy used in 2012: Data not available

ADA COMPLIANCE

Does building meet ADA? Not public use

If not, deficiencies: N/A

ONGOING ISSUES

Are there any ongoing or recurrent building maintenance issues or problems?

Figure 4: Rear View of Hangar H

GENERAL INFORMATION

Three bay hangar owned by the airport.

Property Number/ID:

Current Use: Airplane hangar

Year Built: 1984

Cost:

Approximate Dimension:

Approximate Area:

Number of floors: 1

Location (Northing, Easting):

General Condition of the Building: Good

ARCHITECTURAL FEATURES

Building Exterior: Metal panel

Windows description*: N/A

Doors description*: Metal

Roof type, condition: Metal

Roof date of install*: Original to building

Roof insulation*:

Foundation insulation*:

Wall insulation*:

Building Interior: Not observed

Structure: Assumed steel

Figure 1: Key Plan for Stott Hangar

Figure 2: Side/Front View of Stott Hangar

Figure 3: Front View Stott Hangar

Basement: N/A

Dates of any modifications*:

ELECTRICAL FEATURES

Type of lights:

HVAC FEATURES

Fuel source:

Age of HVAC system: N/A

Type of HVAC system:

Is duct work insulated and air sealed?:

Are pipes insulated?

Do system or components have Energy Star ratings?

ENERGY USAGE

Energy used in 2012:

ADA COMPLIANCE

Does building meet ADA? Not public use

If not, deficiencies: N/A

ONGOING ISSUES

Are there any ongoing or recurrent building maintenance issues or problems?

Figure 4: Side View Stott Hangar

GENERAL INFORMATION

Hangar owned by the airport and leased in its entirety to one owner.

Property Number/ID:

Current Use: Airplane hangar

Year Built: 1983

Cost:

Approximate Dimension:

Approximate Area:

Number of floors:

Location (Northing, Easting):

General Condition of the Building:

ARCHITECTURAL FEATURES

Building Exterior: Metal panel

Windows description*: Assumed metal

Doors description*: Assumed metal

Roof type, condition: Metal, condition unobserved

Roof date of install*: Original to building

Roof insulation*:

Foundation insulation*:

Wall insulation*:

Building Interior: Unobserved

Figure 1: Key Plan for Ted Stanley Hangar

Figure 2: Front/Side View of Ted Stanley Hangar

Structure: Assumed steel

Basement: N/A

Dates of any modifications*:

ELECTRICAL FEATURES

Type of lights:

Note: No electricity use is paid for by the airport; the lessee is responsible for that usage and cost.

HVAC FEATURES

Fuel source:

Age of HVAC system:

Type of HVAC system:

Is duct work insulated and air sealed?:

Are pipes insulated?

Do system or components have Energy Star ratings?

ENERGY USAGE

Energy used in 2012:

ADA COMPLIANCE

Does building meet ADA? Not public use

If not, deficiencies: N/A

ONGOING ISSUES

Are there any ongoing or recurrent building maintenance issues or problems?

GENERAL INFORMATION

The main Terminal building and the General Aviation building buildings combine to make the overall Terminal. It contains airport management offices, a conference room, the ops center, pilot's lounge and kitchen, airline counters, rental car counters, restaurant, and baggage claim.

Property Number/ID:

Current Use: Passenger terminal

Year Built:

Cost:

Approximate Dimension:

Approximate Area:

Number of floors: 1

Location (Northing, Easting):

General Condition of the Building: Good

ARCHITECTURAL FEATURES

Building Exterior: Wood shingles

Windows description*: Wood, double pane

Doors description*: Metal

Roof type, condition: Asphalt shingle, good

Roof date of install*:

Roof insulation*:

Foundation insulation*:

Figure 1: Key Plan for Terminal

Figure 2: Front View of Terminal

Figure 3: Side View of Terminal

Wall insulation*:

Building Interior:

Structure: Wood framed roof, unobserved for rest of structure

Basement: Unobserved

Dates of any modifications*:

ELECTRICAL FEATURES

Type of lights: Fluorescent

Note: The ATCT is also on the electrical meter for the Terminal building. It is not sub-metered.

HVAC FEATURES

Fuel source: Oil

Age of HVAC system:

Type of HVAC system:

Is duct work insulated and air sealed?:

Are pipes insulated?

Do system or components have Energy Star ratings?

ENERGY USAGE

Energy used in 2012:

ADA COMPLIANCE

Does building meet ADA? No obvious deficiencies

If not, deficiencies: N/A

ONGOING ISSUES

Are there any ongoing or recurrent building

Figure 4: Airside View of Terminal

Figure 5: Interior View of Terminal

Figure 6: Interior View of Terminal

GENERAL INFORMATION

Wastewater treatment plant

Property Number/ID:

Current Use: Wastewater Treatment Plant

Year Built:

Cost:

Approximate Dimension:

Approximate Area:

Number of floors: 1.5

Location (Northing, Easting):

General Condition of the Building: Good

ARCHITECTURAL FEATURES

Building Exterior: CMU

Windows description*: Believed to be metal

Doors description*: Metal

Roof type, condition: Asphalt shingle, fair

Roof date of install*: Original to building

Roof insulation*:

Foundation insulation*:

Wall insulation*:

Building Interior: CMU and vinyl tile and concrete

Structure: CMU, CIP Concrete

Figure 1: Key Plan for WWTP

Figure 2: Front View WWTP

Figure 3: Side View WWTP

Basement: None

Dates of any modifications*:

ELECTRICAL FEATURES

Type of lights:

HVAC FEATURES

Fuel source: Propane

Age of HVAC system: Original to building

Type of HVAC system:

Is duct work insulated and air sealed?: None observed

Are pipes insulated?

Do system or components have Energy Star ratings?

ENERGY USAGE

Energy used in 2012:

ADA COMPLIANCE

Does building meet ADA? Not public use

If not, deficiencies: N/A

ONGOING ISSUES

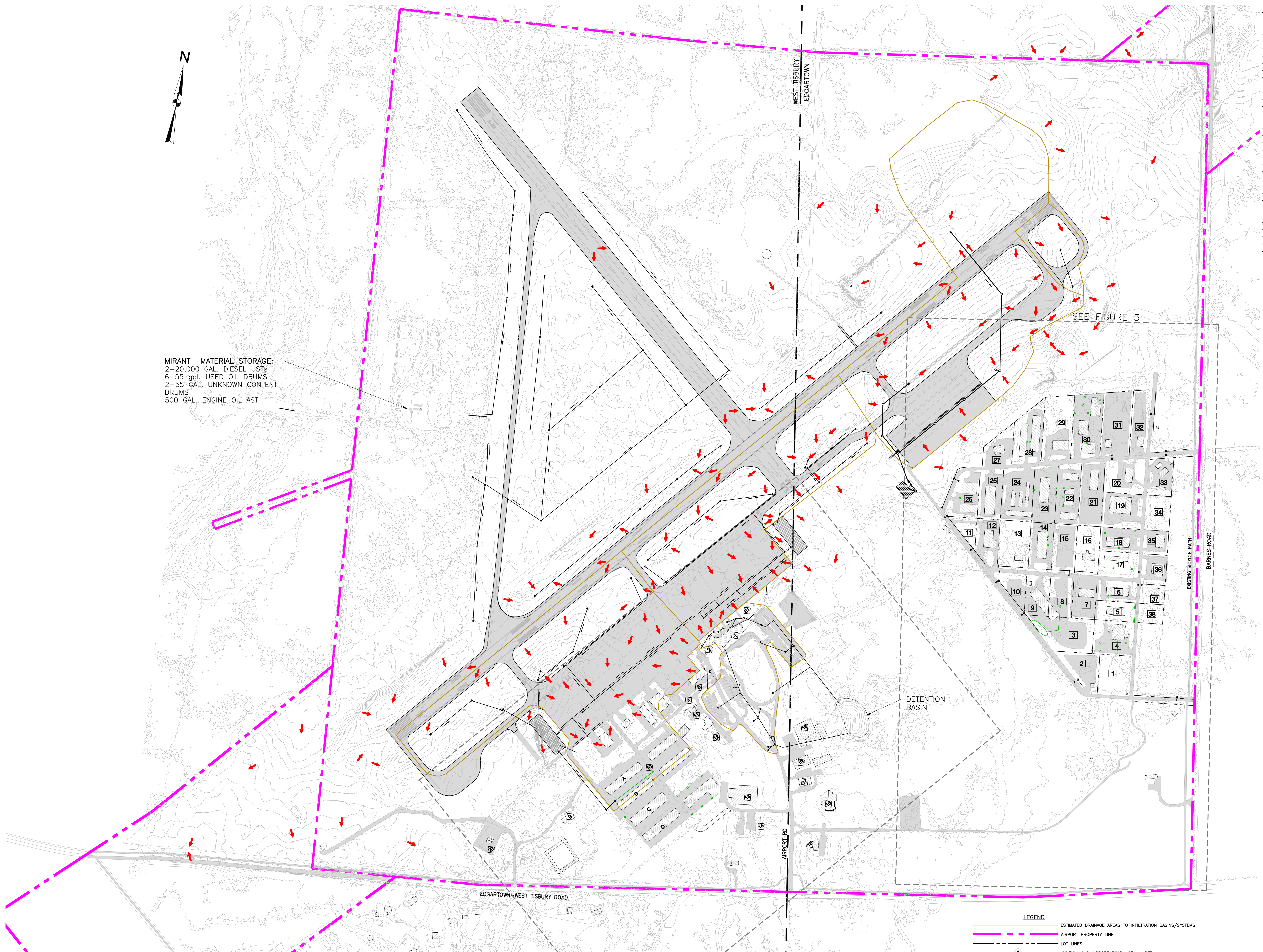
Are there any ongoing or recurrent building maintenance issues or problems?

Figure 4: Equipment WWTP

APPENDIX 3 –

STORM WATER POLLUTION PREVENTION PLAN

Prepared by Jacobs



ALP #	Descriptor
1	Terminal, Parking, Apron
	Airport maintained areas
	Rental Cars - Budget, Avis
	Cape Air
	Plane View
2	GA Terminal
3	ARFF Building
4	Electrical Vault
9	Wastewater Treatment Facility
10	T-Hangars
11	Dukes County Comm. Ctr./Comm. Corrections Ctr.
12	Airport Laundromat
13	Vineyard Tennis Center
14	Animal Healthcare Associates
	Animal Healthcare Associates
	The Computer Lab
	Rising Tide
15	Dukes County Administration Building
16	True North LLC (Flatbread)
17	P & K Properties
	Steamship Authority
	Island Dentistry
18	Vineyard Decorators
19	Keyland Kitchens
20	Fuel Farm
21	Mirant Canal Substation
59	C&W Power Equipt
60	Substation
61	Air Traffic Control Tower
	Duchess Hangar
	Direct Flight Hangar
	Airport Hangar
	Hadley Hangar

ABP Lot #	Tenant/*Subtenant*
2	Martha's Vineyard Shipyard
3, 8, 9, 10	Martha's Vineyard Transit Authority
4	Coca Cola Enterprises
5	Bruno's Rolloff (Big Foot LLC)
6	Cottage City Dist. LLC
	Claghorn
	Truly Scrumptious
	Big Sky, Inc.
7	Osprey Trades
	William Mueller Plumbing/Heating
	Willetts Electric
	Baumhofer Builders
	Medeiros Excavation
11, 12	DMB Realty Trust
	Granite Stores
	MV Construction
	Brennan and Co.
13	Indigo Farm
14	MV Lot 14, LLC
	Cape Building Systems
	Mass. Highway Dept.
	Michael Carroll
	The Kitchen Porch
	Barnes Moving
	Paul Bettencourt, Licensed Electrician
15	Island Propane
16	Landscope, Inc.
17	MV Lot 17, LLC (Comcast)
18	HN Hinckleys and Sons Lumber
19	Reardon Realty (Supply New England)
20	Jay & Dee Realty Trust (Cars Unlimited)
21	R2 Enterprises (Vineyard Oil/Vineyard Propane)
22, 23, 24, 25	SAV Associates
	Cape Cod Express
	Fed Ex
	Frito Lay
	Pepsi Beverages Co.
	Parker Carpets
	Self-Storage
26	*Fire and Ice*
	Island Water Source, Inc.
	John Jones, Inc.
	FAA
	Laurence Lynch Corp., Inc.
	Richard Lee
	Nickerson Lumber Co. dba Mid Cape Home Centers
	Kenneth Edwards
	Conover Restorations Inc.
	Chappaquiddick Woodworking
	Foam Insulation Technology
27	Donaroma's Nursery
28	Airport Mini Storage of MV
29	JMS Realty Trust
	Vineyard Bottled Waters
	Squibnocket Ltd./Bill Smith's Clambakes
	Pam's Provisions and Annie Foley Catering
30	Healthland Realty Trust
	Island Distributors
	Protec M.V.
	Cape Island Glass
	Chilmark Springwater
	Associate Roofing, Inc.
	Tiasquam Enterprises
	Island Tobacco Inc./Ultimate Transport
	GD Reynolds Woodworking
	Davies Landscaping and Tree Service
31	Vineyard Propane
32	VPI Continuing Corp. (Amerigas)
33	Airport Fuel Service Inc.
35	Vine Inc.
	Rosbeck Builders
	Island Pool and Spa
	Martha's Vineyard Tile Co.
36	Vineyard Pool and Spa, Inc.
	Vineyard Pool and Spa, Inc.
	Schwab Electric
37	Cazeault & Sons Inc.
	Cazeault & Sons Inc.
	Thorton Charter Co.

SOURCES:

1. SWPPP/SPCC PLANS PREPARED BY BAYSTATE ENVIRONMENTAL CONSULTANTS, INC. (BEC), 2002.
2. BASE PLANS AND APRON DRAINAGE PLANS PROVIDED BY JACOBS ENGINEERING, 2011 & 2012.
3. DRAINAGE PLANS PROVIDED BY HOYLE TANNER & ASSOCIATES, INC. (2005).

NO.	ISSUE/DESCRIPTION	BY	DATE

MARTHA'S VINEYARD AIRPORT
71 AIRPORT ROAD
WEST TISBURY, MA 02568

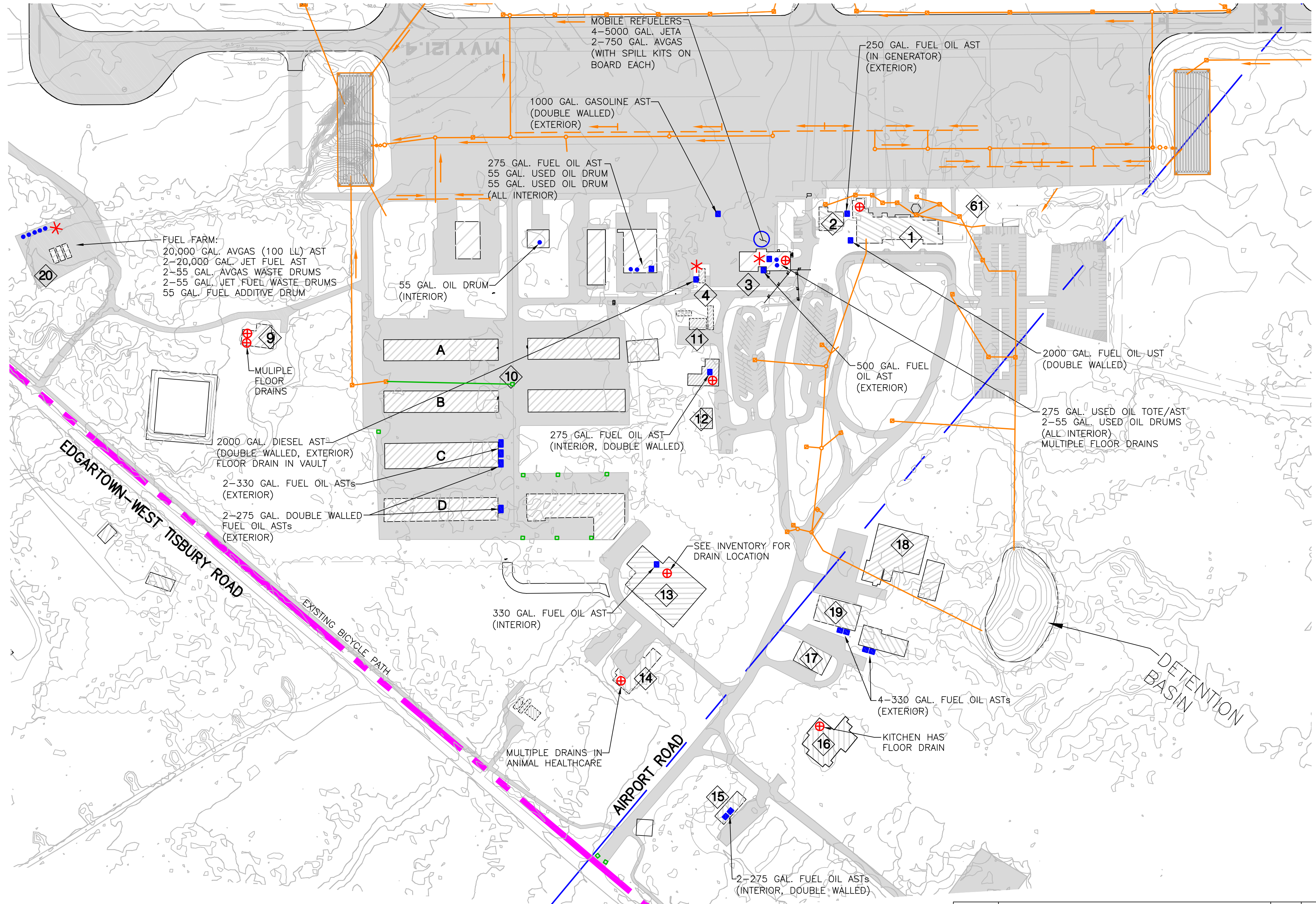
SWPPP/SPCC
OVERALL SITE MAP

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
MARTHA'S VINEYARD AIRPORT
71 AIRPORT ROAD
WEST TISBURY, MA 02568

PROJ MGR: JRB	REVIEWED BY: TEJ	CHECKED BY: TEJ	FIGURE
DESIGNED BY: JRB	DRAWN BY: EDM	SCALE: 1"=300'	1
DATE: JANUARY 2013	PROJECT NO. 15.0166198.00	REVISION NO.	SHEET NO. 1 OF 3

ALP #	Descriptor
1	Terminal, Parking, Apron
	Airport maintained areas
	Rental Cars - Budget, Avis
	Cape Air
	Plane View
2	GA Terminal
3	ARFF Building
4	Electrical Vault
9	Wastewater Treatment Facility
10	T-Hangars
11	Dukes County Comm. Ctr./Comm. Corrections Ctr.
12	Airport Laundromat
13	Vineyard Tennis Center
14	Animal Healthcare Associates
	Animal Healthcare Associates
	The Computer Lab
	Rising Tide
15	Dukes County Administration Building
16	True North LLC (Flatbread)
17	P & K Properties
	Steamship Authority
	Island Dentistry
18	Vineyard Decorators
19	Keyland Kitchens
20	Fuel Farm
21	Mirant Canal Substation
59	C&W Power Equipt.
60	Substation
61	Air Traffic Control Tower
	Duchess Hangar
	Direct Flight Hangar
	Airport Hangar
	Hadley Hangar



LEGEND

- AIRPORT PROPERTY LINE
- LOT LINES
- AVIATION AND AIRPORT ROAD LOT NUMBER
- EXISTING CONTOUR
- EXISTING BUILDING
- ABOVEGROUND & UNDERGROUND STORAGE TANKS (ASTs, USTs)
- DRUMS
- DUMPSTERS/TRASH RECEPTACLES
- FLOOR DRAINS (APPROX.) (NON-RESTROOM ONLY)
- SPILL KITS
- DRAINAGE STRUCTURES
- ESTIMATED DRAINAGE STRUCTURES
- STORMWATER FLOW (PIPED SYSTEMS)
- SWALE

NOTES:

1. OIL MATERIALS IN 55 GAL.+ SIZE CONTAINERS SHOWN ON PLANS. SMALLER QUANTITIES AND OTHER TYPES OF MATERIAL STORAGE INDICATED ON SPREADSHEETS/INVENTORIES WITH SWPPP/SPCC PLANS DUE TO LARGE DIVERSITY/COMPLEXITY OF MATERIALS STORED.

2. PRIVATE DRAINAGE ON INDIVIDUAL LOTS SHOWN ONLY AS OBSERVED AND ESTIMATED. ALL DRAIN STRUCTURES INFILTRATE, NO PIPED OUTFALLS.

N

GRAPHIC SCALE

0 150 300 600

1"=300'

NO.	ISSUE/DESCRIPTION	BY	DATE

MARTHA'S VINEYARD AIRPORT
71 AIRPORT ROAD
WEST TISBURY, MA 02568

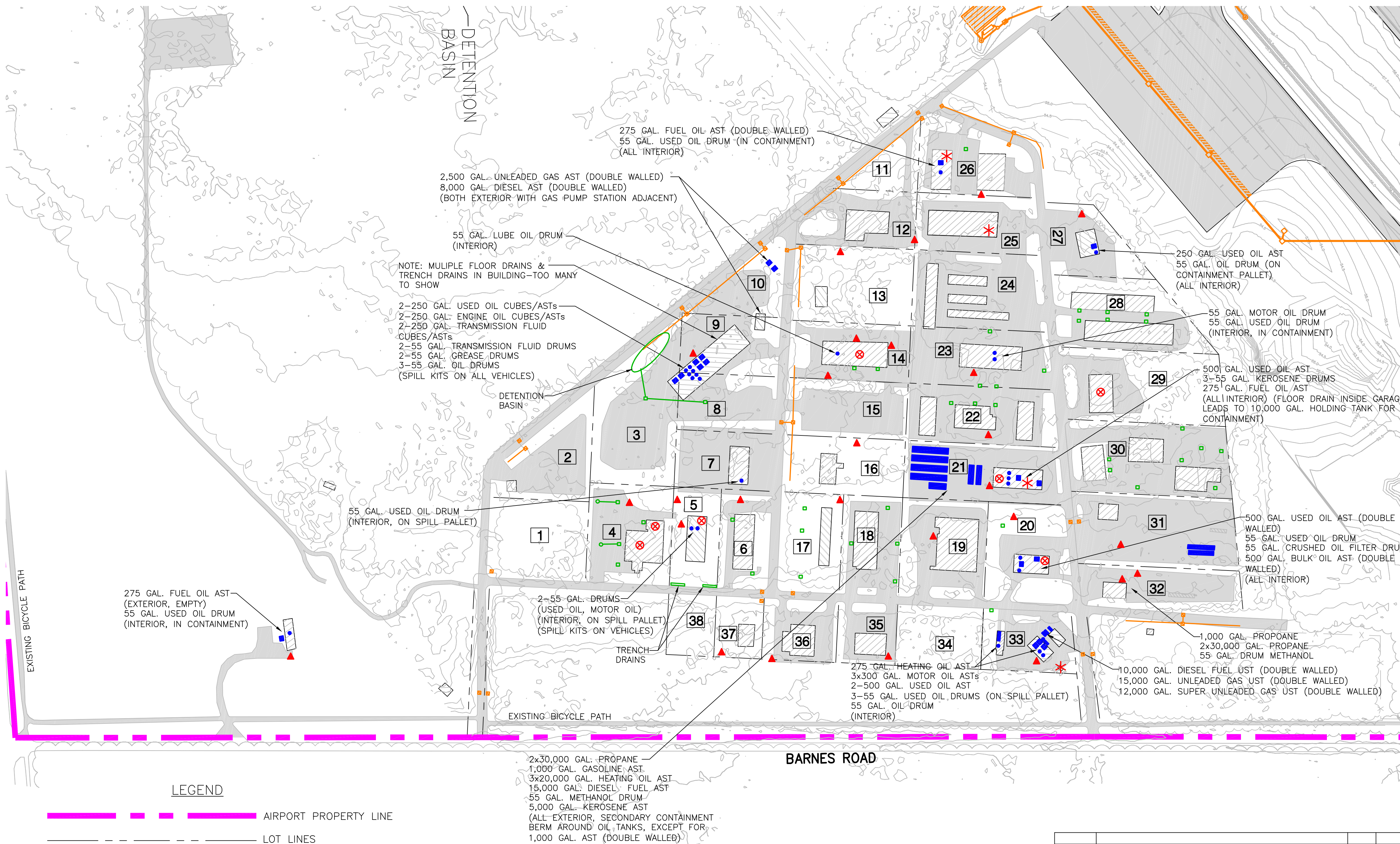
SWPPP/SPCC
AVIATION/AIRPORT ROAD OPERATIONS

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
MARTHA'S VINEYARD AIRPORT
71 AIRPORT ROAD
WEST TISBURY, MA 02568

PROJ MGR: JRB	REVIEWED BY: TEJ	CHECKED BY: TEJ	FIGURE
DESIGNED BY: JRB	DRAWN BY: EDM	SCALE: 1"=300'	2
DATE: JANUARY 2013	PROJECT NO. 15.0166198.00	REVISION NO.	SHEET NO. 2 OF 3

ABP Lot #	Tenant/*Subtenant*
2	Martha's Vineyard Shipyard
3, 8, 9, 10	Martha's Vineyard Transit Authority
4	Coca Cola Enterprises
5	Bruno's Rolloff (Big Foot LLC)
6	Cottage City Dist. LLC
	Claghorn
	Truly Scrumptious
	Big Sky, Inc.
7	Osprey Trades
	William Mueller Plumbing/Heating
	Willetts Electric
	Baumhofer Builders
	Medeiros Excavation
11, 12	DMB Realty Trust
	Granite Stores
	MV Construction
	Brennan and Co.
13	Indigo Farm
14	MV Lot 14, LLC
	Cape Building Systems
	Mass. Highway Dept.
	Michael Carroll
	The Kitchen Porch
	Barnes Moving
	Paul Bettencourt, Licensed Electrician
15	Island Propane
16	Landscope, Inc.
17	MV Lot 17, LLC (Comcast)
18	HN Hinckleys and Sons Lumber
19	Reardon Realty (Supply New England)
20	Jay & Dee Realty Trust (Cars Unlimited)
21	R2 Enterprises (Vineyard Oil/Vineyard Propane)
22, 23, 24, 25	SAV Associates
	Cape Cod Express
	Fed Ex
	Frito Lay
	Pepsi Beverages Co.
	Parker Carpets
	Self-Storage
26	*Fire and Ice*
	Island Water Source, Inc.
	John Jones, Inc.
	FAA
	Laurence Lynch Corp., Inc.
	Richard Lee
	Nickerson Lumber Co. dba Mid Cape Home Centers
	Kenneth Edwards
	Conover Restorations Inc.
	Chappaquiddick Woodworking
	Foam Insulation Technology
27	Donaroma's Nursery
28	Airport Mini Storage of MV
29	JMS Realty Trust
	Vineyard Bottled Waters
	Squibnocket Ltd./Bill Smith's Clambakes
	Pam's Provisions and Annie Foley Catering
30	Healthland Realty Trust
	Island Distributors
	Protec M.V.
	Cape Island Glass
	Chilmark Springwater
	Associate Roofing, Inc.
	Tiasquam Enterprises
	Island Tobacco Inc./Ultimate Transport
	GD Reynolds Woodworking
	Davies Landscaping and Tree Service
31	Vineyard Propane
32	VPI Continuing Corp. (Amerigas)
33	Airport Fuel Service Inc.
35	Vine Inc.
	Rosbeck Builders
	Island Pool and Spa
	Martha's Vineyard Tile Co.
36	Vineyard Pool and Spa, Inc.
	Vineyard Pool and Spa, Inc.
	Schwab Electric
37	Cazeault & Sons Inc.
	Cazeault & Sons Inc.
	Thorton Charter Co.



LEGEND

- AIRPORT PROPERTY LINE
- LOT LINES
- AIRPORT BUSINESS PARK (ABP) LOT NUMBER
- EXISTING CONTOUR
- EXISTING BUILDING
- ABOVEGROUND & UNDERGROUND STORAGE TANKS (ASTs, USTs)
- DRUMS
- DUMPSTERS/TRASH RECEPTACLES
- FLOOR DRAINS (APPROX.) (NON–RESTROOM ONLY)
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MARTHA'S VINEYARD AIRPORT
71 AIRPORT ROAD
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PROJ MGR: JRB	REVIEWED BY: TEJ	CHECKED BY: TEJ	FIGURE
DESIGNED BY: JRB	DRAWN BY: EDM	SCALE: 1"=300'	3
DATE: JANUARY 2013	PROJECT NO. 15.0166198.00	REVISION NO.	SHEET NO. 3 OF 3

APPENDIX 4 –

TRAFFIC MEASUREMENTS

Prepared by Jacobs

Martha's Vineyard Airport

Traffic Impact and Analysis Study

West Tisbury, Massachusetts

Prepared For:

MVY AIRPORT
MARTHA'S VINEYARD

Prepared By:

JACOBS

October 2012

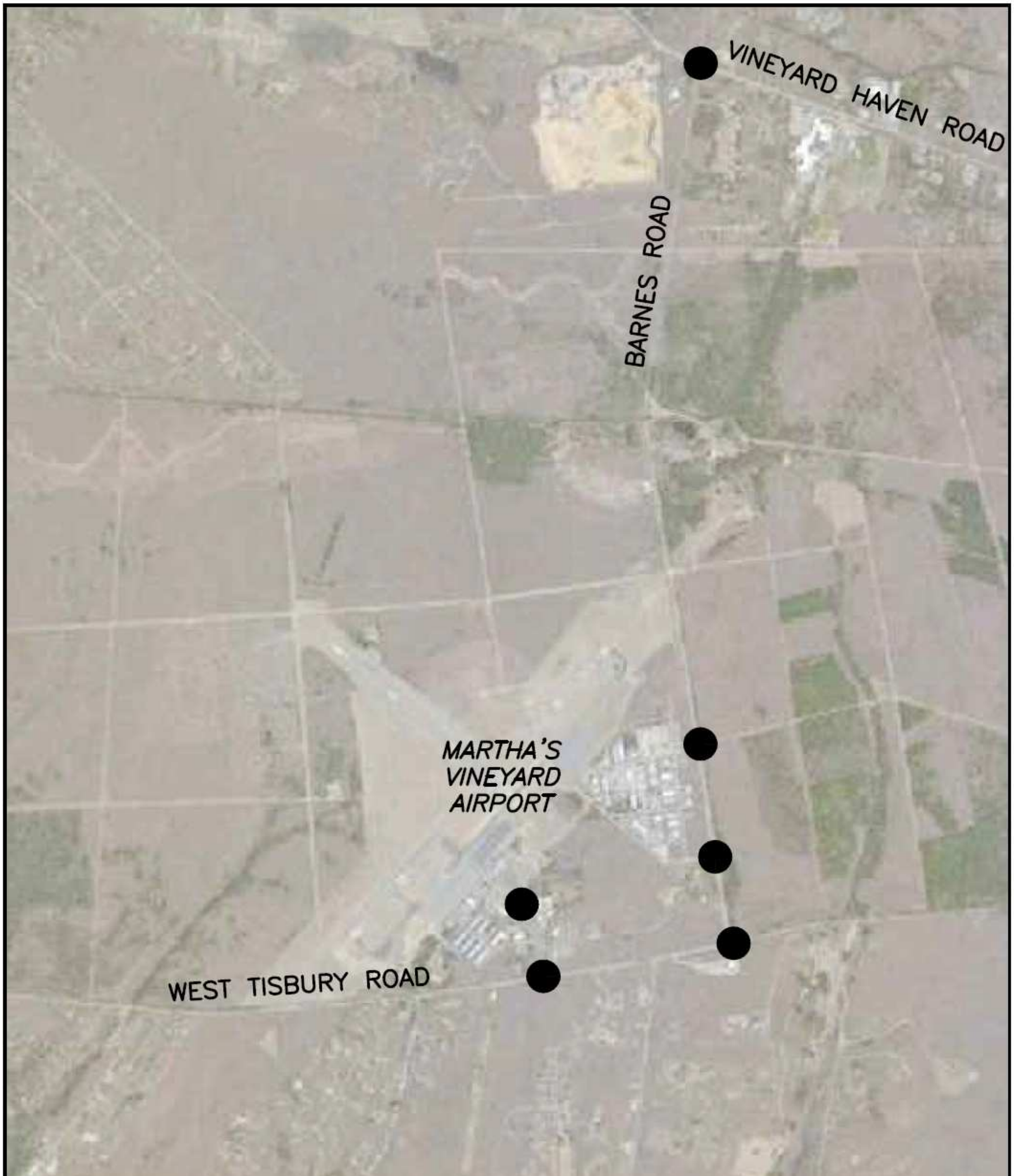
TABLE OF CONTENTS

INTRODUCTION

This Traffic Impact and Analysis Study (TIAS) has been prepared to determine the operating conditions at six locations in the Towns of West Tisbury, Edgartown and Oak Bluffs, Massachusetts (see Figure 1), both under current and future projected conditions. The six intersections included in the study area are:

1. Barnes Road at Edgartown-Vineyard Haven Road
2. Barnes Road at North Business Park
3. Barnes Road at South Business Park
4. Barnes Road at Edgartown-West Tisbury Road
5. Edgartown-West Tisbury Road at Airport Road
6. Martha's Vineyard Airport main entrance

This report will be based on two time periods, one during the peak tourist season and another during the off-peak winter months. At this time this draft TIAS represents the results of traffic conditions during the tourist period.



JACOBS	TMC LOCATION MAP Approx. Scale: NTS	Martha's Vineyard Airport Traffic Count Locations Vineyard Haven, MA	Figure 1

A. EXISTING CONDITIONS

A1. STUDY AREA

A1.1 Study Area Roadways

This section describes the major ground transportation facilities supporting the study area.

Barnes Road

Within the study area Barnes Road is a town-owned two-lane roadway that runs north-south between Edgartown and Oak Bluffs. Barnes Road has a posted speed limit of 45 mph. The roadway is approximately 20-feet wide with no marked shoulders provided and on-street parking prohibited. Land use along the roadway is mostly conservation/reservation land with some commercial use on the southern portion and residential use near the northern terminus. Pedestrian sidewalks are not present along Barnes Road within the project area. An approximately 8-foot wide cycle track is located approximately 30-feet west of the roadway.

Edgartown-West Tisbury Road

Within the study area Edgartown-West Tisbury Road is a state-owned two-lane roadway that runs east-west between Edgartown and West Tisbury. Edgartown-West Tisbury Road has a posted speed limit of 45 mph. The roadway is approximately 24-feet wide with 2-foot wide marked shoulders provided and on-street parking prohibited. Land use along the roadway is a mix of conservation/reservation land residential and commercial development. Pedestrian sidewalks are not present along Edgartown-West Tisbury Road within the project area. An approximately 9-foot wide cycle track is located approximately 30-feet north of the roadway.

A1.2 Study Area Intersections

The study area is comprised of four key intersections. These intersections are described below.

Barnes Road at Edgartown-Vineyard Haven Road

Edgartown-Vineyard Haven Road, an east-west two-lane roadway, connects with Barnes Road to form an unsignalized four legged intersection. The Barnes Road north and southbound approaches provide one general purpose travel lane under STOP-sign and flasher control, with a raised splitter island located at the intersection. The Edgartown-Vineyard Haven Road east and westbound approaches provide one general purpose travel lane under STOP-sign and flasher control. Sidewalks are not provided at the intersection, although cycle tracks are provided along the south side of Edgartown-Vineyard Haven Road and the west side of Barnes Road, south of the intersection. The general area land-use is a mix of residential and commercial.

Barnes Road at North Business Park

North Business Park intersects Barnes Road from the west to form an unsignalized three-legged "T" intersection. The Barnes Road north and southbound approaches provide one general purpose travel lane. The North Business Park eastbound approach provides one general purpose travel lane under STOP-sign control. Sidewalks are not provided at the intersection, although a cycle track is provided along the west side of Barnes Road. The general land-use is a mix of conservation/reservation land and commercial developments.

Barnes Road at South Business Park

South Business Park intersects Barnes Road from the west to form an unsignalized three-legged "T" intersection. The Barnes Road north and southbound approaches provide one general purpose travel lane. The South Business Park eastbound approach provides one general purpose travel lane under STOP-sign control. Sidewalks are not provided at the intersection, although a cycle track is provided along the west side of Barnes Road. The general land-use is a mix of conservation/reservation land and commercial developments.

Barnes Road at Edgartown-West Tisbury Road

Barnes Road intersects West Tisbury Road from the north to form an unsignalized three-legged "T" intersection. The Barnes Road southbound approach provides one general purpose travel lane under STOP-sign control. The Edgartown-West Tisbury Road east and westbound approaches provide one general purpose travel lane under STOP-sign control. Sidewalks are not provided at the intersection, although cycle tracks are provided along the west side of Barnes Road and the north side of Edgartown-West Tisbury Road. The general land-use is a mix of conservation/reservation land and commercial developments.

Edgartown-West Tisbury Road at Airport Road

Airport Road intersects Edgartown-West Tisbury Road from the north to form an unsignalized three-legged "T" intersection. The Edgartown-West Tisbury Road east and westbound approaches provide one general purpose travel lane. The Airport Road southbound approach provides one general purpose travel lane under STOP-sign control. Sidewalks are not provided at the intersection, although a cycle track is provided along the north side of Edgartown-West Tisbury Road. The general land-use is a mix of conservation/reservation land and commercial developments.

Martha's Vineyard Airport Main Entrance

The Martha's Vineyard Airport short-term parking lot driveway intersects the long-term/rental parking lot driveway and Airport Road from the west to form an unsignalized three-legged "T" intersection. The Airport Road northbound approach provides one general purpose travel lane. The Martha's Vineyard Airport long-term/rental parking lot driveway southbound approach provides one general purpose travel lane. The Martha's Vineyard Airport short-term parking lot driveway eastbound approach provides one general purpose travel lane under STOP-sign control. North of the intersection the Martha's Vineyard Airport long-term rental parking lot driveway splits to form a ring road, which serves as a drop-off/pick-up area, and provides access to the long-term and rental parking lots. Sidewalks are not provided at these intersections. The general land-use is a mix of commercial developments and the Martha's Vineyard Airport.

A2. ***MULTIMODAL TRANSPORTATION***

A2.1 Transit

VTA

The Martha's Vineyard Regional Transit Authority (VTA) operates several bus routes within the study area. VTA bus route 1 travels along Edgartown-Vineyard Haven Road and connects Edgartown and Vineyard Haven. This route passes through the study area intersection of Edgartown-Vineyard Haven Road at Barnes Road. VTA bus route 6 serves the airport and travels between Edgartown and West Tisbury along Edgartown-West Tisbury Road. VTA bus routes 7 and 9 also serve the airport, terminating there and travelling to various points in Oak Bluffs. Routes 6, 7 and 9 travel through all of the study area intersections; excluding route 6, which does not travel through Edgartown-Vineyard Haven Road at Barnes Road.

A2.2 Pedestrians & Bicycles

Existing accommodations for pedestrians within the study area are limited. Formal sidewalks are not provided along any of the study area roadways. Additionally, marked crosswalks are not provided at any of the study area intersections. There is a marked crosswalk traversing the south leg of the Barnes Road at Edgartown-Vineyard Haven Road intersection, however this is provided for cycle track usage. Lastly, the relatively high speeds (posted at 45 mph) coupled with the lack of pedestrian accommodations discourage pedestrian activities along the study area roadways.

Bicycle accommodations are extensively provided on Martha's Vineyard, with sidepath cycle tracks provided parallel to many key roadways on the island. Within the study area, these sidepaths are located along Edgartown-West Tisbury Road, Barnes Road and Edgartown-Vineyard Haven Road. Generally speaking the sidepaths have about 30-feet of horizontal separation and are approximately 8-feet wide.

B. TRAFFIC VOLUMES

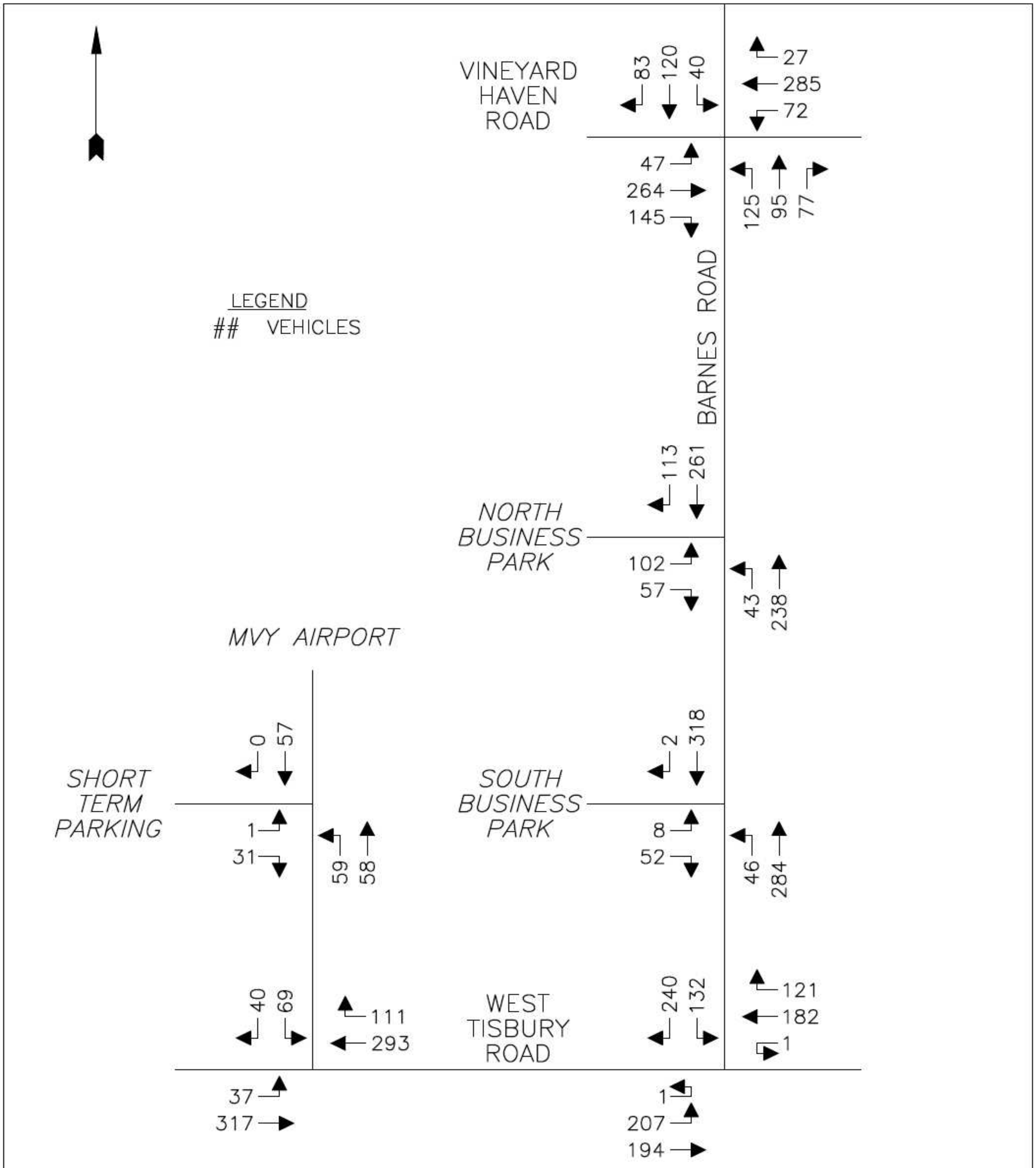
B1. EXISTING TRAFFIC COUNTS

In order to establish base traffic-volume conditions within the study area, manual turning movement counts were conducted on August 16th and August 18th, 2012 by Precision Data Industries, Inc. Peak period turning movement counts were performed during weekday morning peak period (7:00 AM to 9:00 AM), weekday midday (11:00 AM to 1:00 PM) and weekday evening peak period (4:00 PM to 6:00 PM). Turning movement counts were also conducted on Saturday as well during the same morning (7:00 AM to 9:00 AM), midday (11:00 AM to 1:00 PM) and evening (4:00 PM to 6:00 PM) times.

For this analysis, each of the individual intersections peak hours was used to present a worst case, conservative scenario. These existing peak hour volumes are shown in the network on Figures 2 through 6 for the peak periods listed above. The manual turning movement count sheets are provided in the appendix.

B2. SEASONAL ADJUSTMENT

Since the purpose of this report is to compare operations between both the peak tourist summer season and the off-peak winter season no adjustments were made to the August traffic counts. This methodology will be carried over to the full report, when the winter counts will not be adjusted upwards to develop an average month condition.



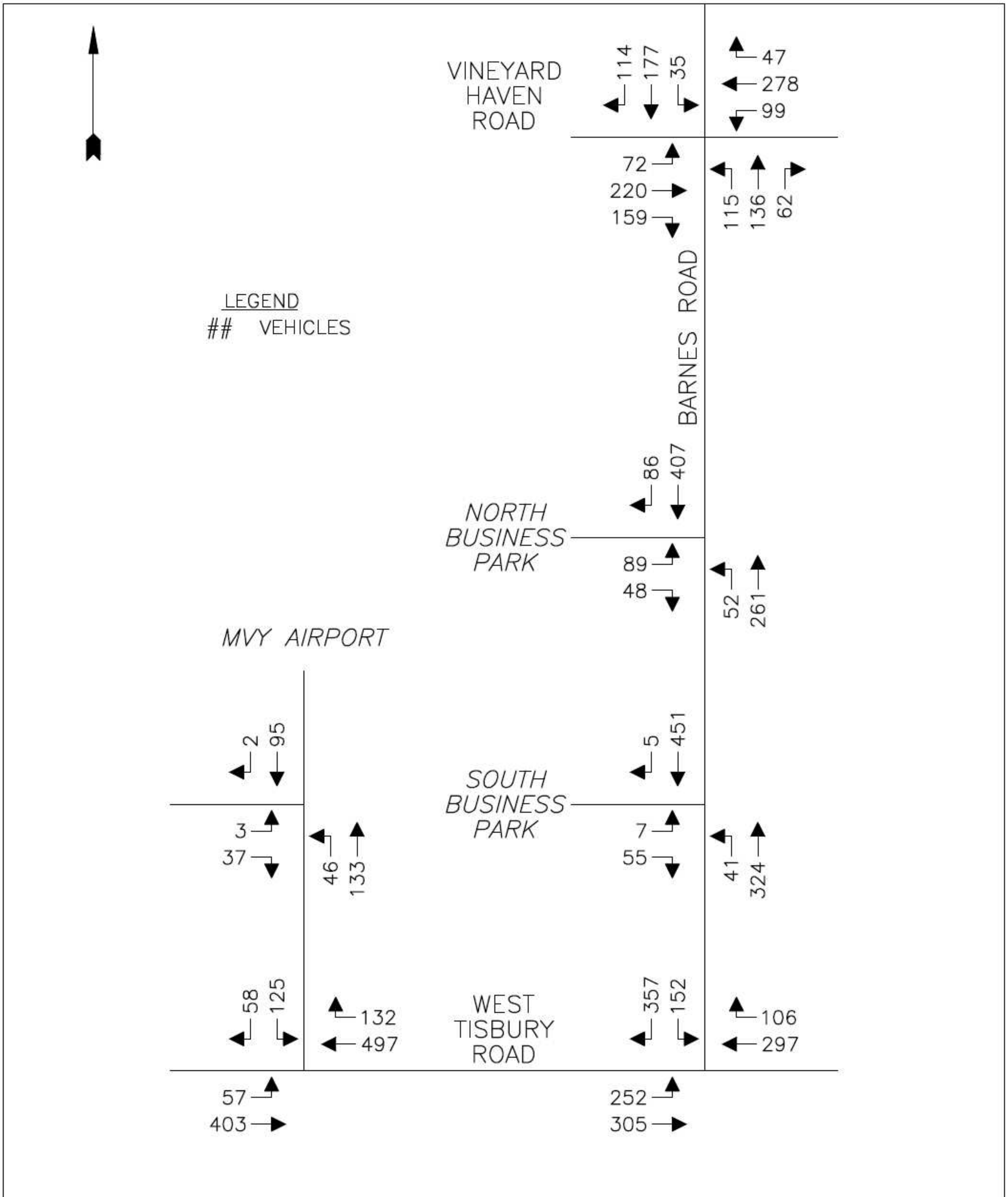
JACOBS

2012 EXISTING WEEKDAY MORNING PEAK HOUR VOLUMES

Approx. Scale: NTS

Martha's Vineyard Airport
Master Plan Update
Vineyard Haven, MA

Figure 2



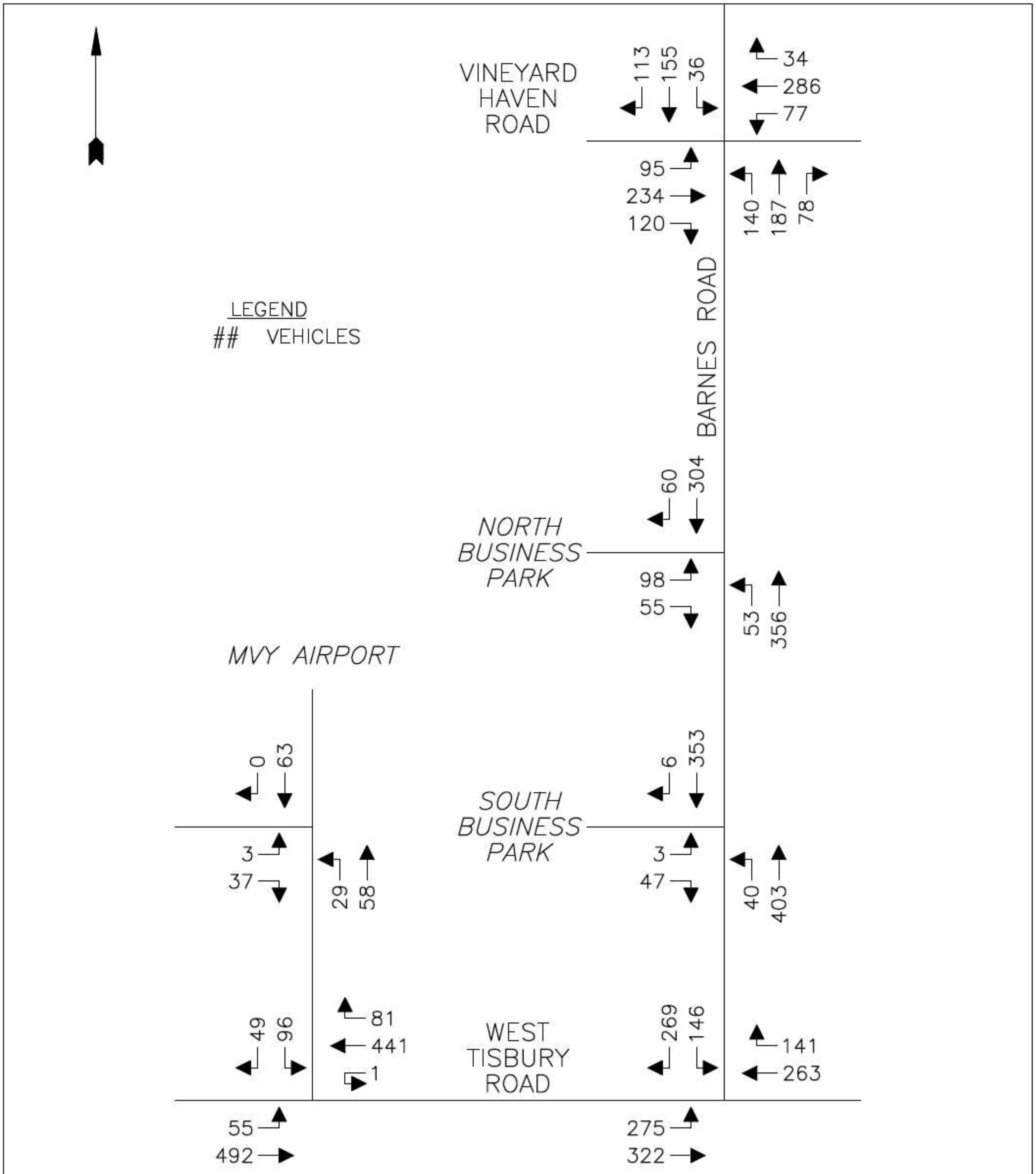
JACOBS

2012 EXISTING WEEKDAY MIDDAY PEAK HOUR VOLUMES

Approx. Scale: NTS

Martha's Vineyard Airport
Master Plan Update
Vineyard Haven, MA

Figure 3



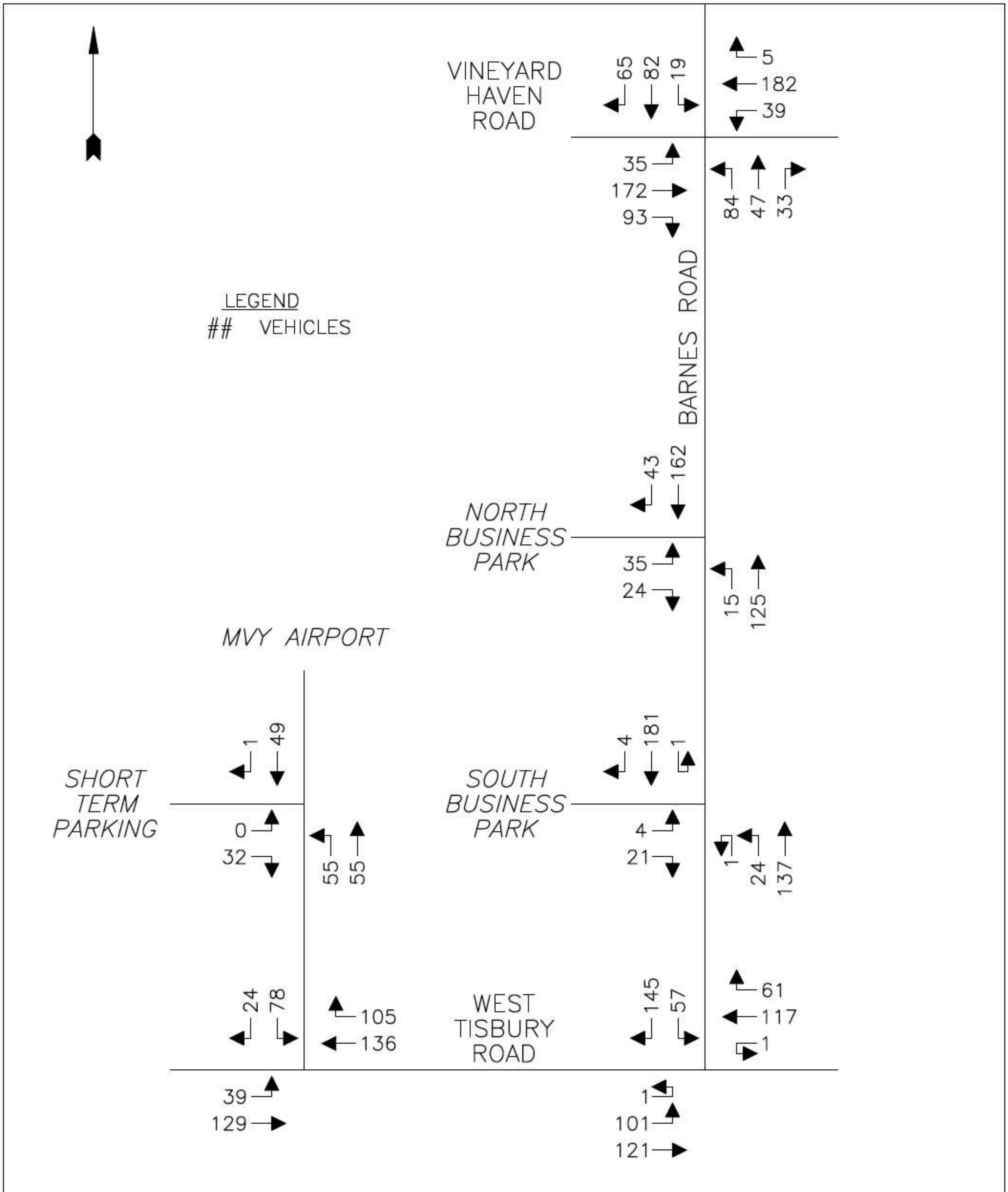
JACOBS

2012 EXISTING WEEKDAY EVENING PEAK HOUR VOLUMES

Approx. Scale: NTS

Martha's Vineyard Airport
Master Plan Update
Vineyard Haven, MA

Figure 4



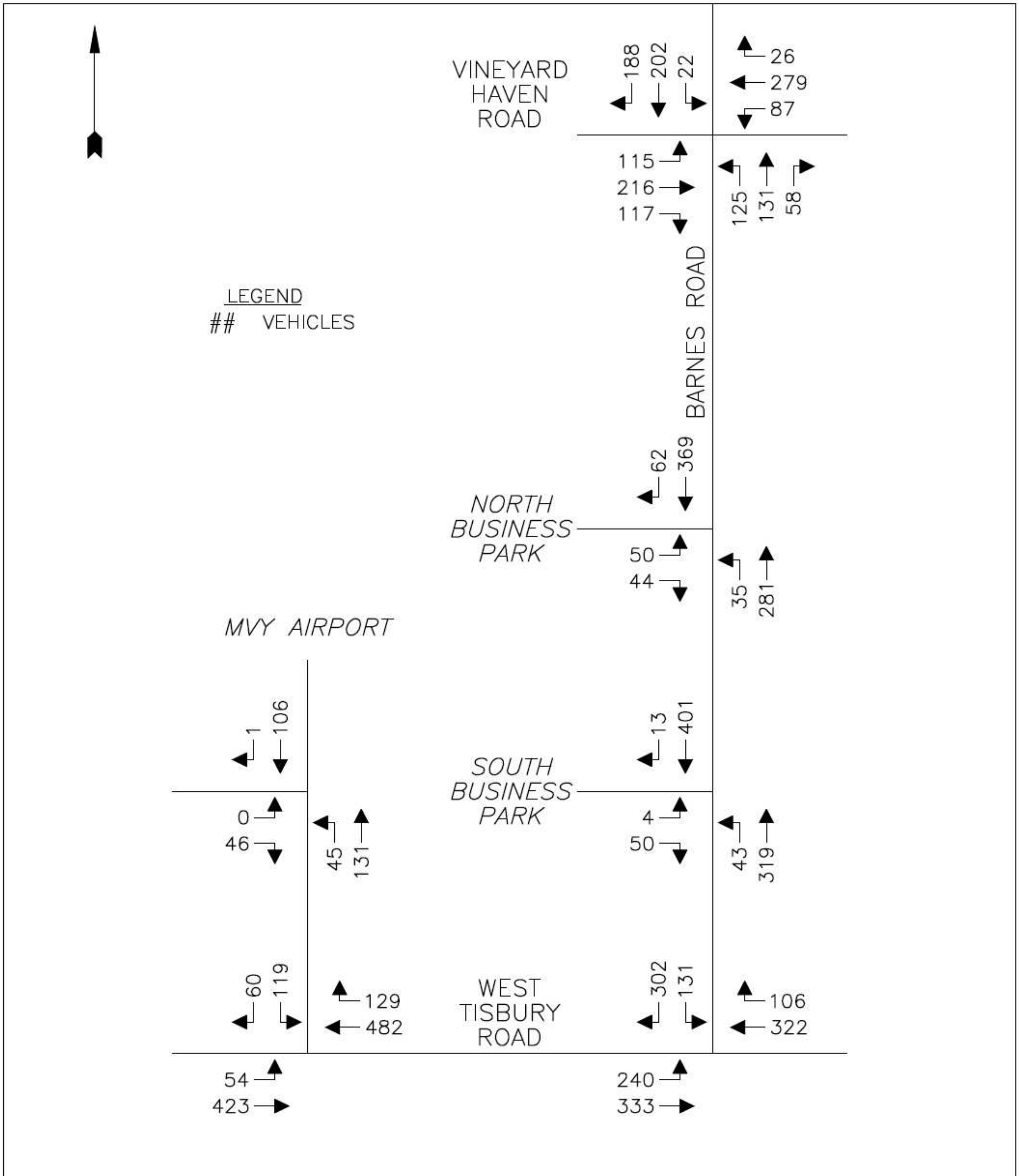
JACOBS

2012 EXISTING SATURDAY MORNING PEAK HOUR VOLUMES

Approx. Scale: NTS

Martha's Vineyard Airport
Master Plan Update
Vineyard Haven, MA

Figure 5

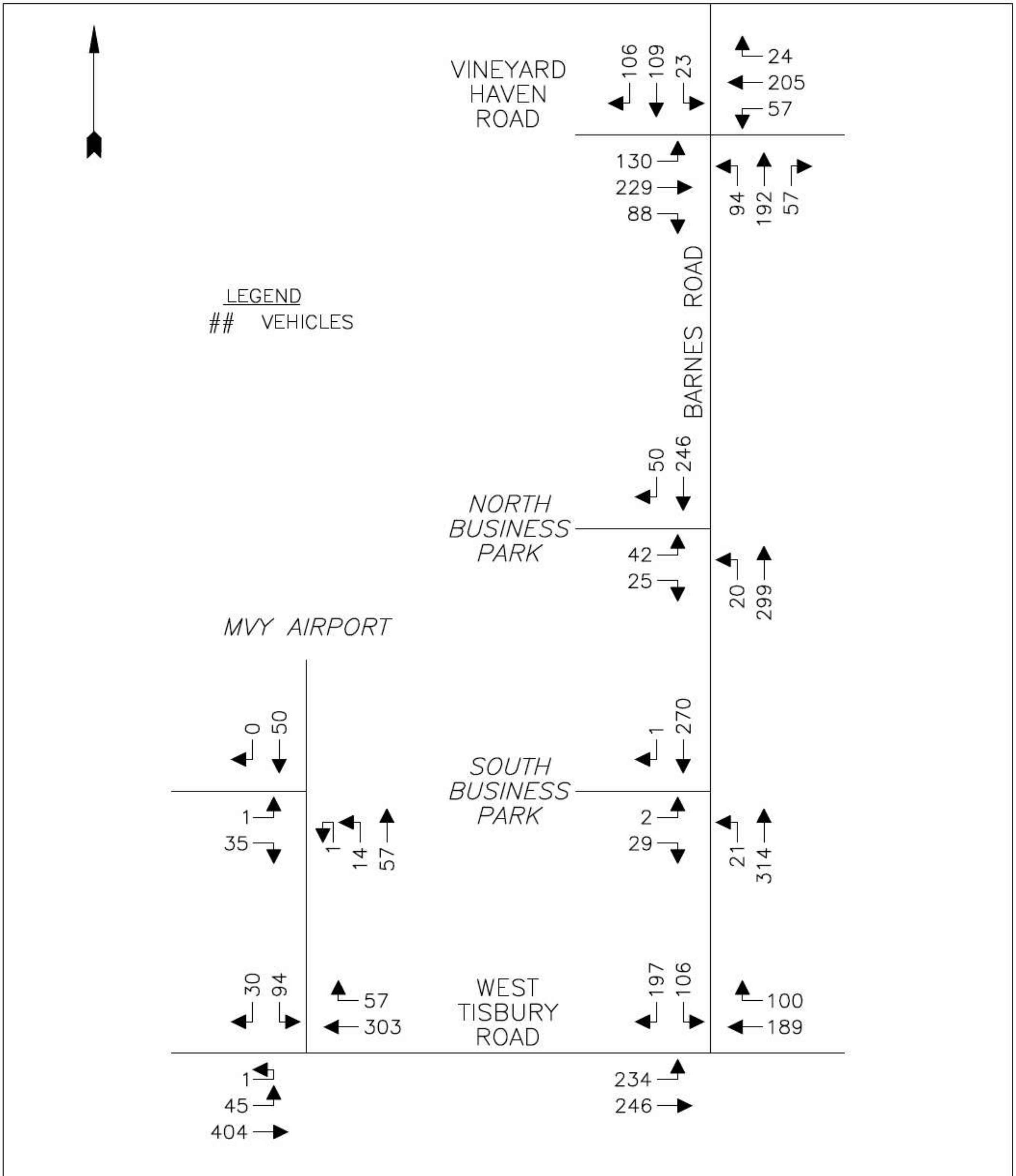


2012 EXISTING SATURDAY MIDDAY PEAK HOUR VOLUMES

Approx. Scale: NTS

Martha's Vineyard Airport
Master Plan Update
Vineyard Haven, MA

Figure 6



JACOBS™

2012 EXISTING SATURDAY EVENING PEAK HOUR VOLUMES

Approx. Scale: NTS

Martha's Vineyard Airport
Master Plan Update
Vineyard Haven, MA

Figure 7

C. SAFETY ANALYSIS

C1. Crashes

Crash data for the study area intersections were obtained from Massachusetts Highway Department (MassHighway) for the most recently available calendar years of 2007 through 2009. A summary of the crash data is tabulated in Table 1. The study area intersections did not suffer a significant amount of crashes. Five total crashes had occurred at the study area intersections over the three year period. The intersection of Barnes Road at Edgartown-West Tisbury Road had the highest number of crashes with 2 occurring during the three-year study period. Both of these accidents resulted in personal injuries, one accident was a cross-movement angle type accident (which occurred under wet roadway conditions) and the other was a sideswipe.

Table 1
Motor Vehicle Crash Data

Location	Number of Accidents		Avg. Crash Rate	Severity			Type			Percent During	
	Total	Avg. per Year		PD/U[a]	PI[b]	F[c]	CM[d]	RE[e]	SS[f]	Peak Periods	Wet/Icy Conditions
Barnes Road at Edgartown-Vineyard Haven Road	1	0.33	0.05	1	0	0	0	1	0	0%	0%
Barnes Road at North Business Park	1	0.33	0.09	1	0	0	0	1	0	0%	0%
Barnes Road at South Business Park	0	0.00	0.00	0	0	0	0	0	0	0%	0%
Barnes Road at Edgartown-West Tisbury Road	2	0.67	0.12	0	2	0	1	0	1	0%	50%
Edgartown-West Tisbury Road at Airport Road	1	0.33	0.07	0	1	0	1	0	0	100%	0%
Martha's Vineyard Airport main entrance	0	0.00	0.00	0	0	0	0	0	0	0%	0%
TOTAL	**5**	**1.67**	--	**2**	**3**	**0**	**2**	**2**	**1**	**20%**	**20%**

[a]Propery Damage/Unknown
[b]Personal Injury
[c]Fatality
[d]Cross Movement
[e]Rear-End
[f]Sideswipe
*Exceeds Statewide Average Crash Rate.

D. OPERATIONAL ANALYSIS

D1. Traffic Analysis Criteria

The Highway Capacity Manual (HCM) from the Federal Highway Administration (FHWA) provides guidance and analysis methodologies that are used to calculate measure performance levels for freeway sections, ramp junctions, weave sections and intersections (signalized and unsignalized).

Level of Service (LOS) is a term used to denote different operating conditions that occur under various traffic volume loads. It is a qualitative measure of the effect of a number of factors including geometrics, speed, travel delay, freedom to maneuver, and safety. The LOS is divided into a range of six letter grades, ranging from A to F, with A being the best and F the worst. LOS E or F is generally considered inadequate traffic operations in suburban and urban areas.

The MassDOT Highway Design Manual indicates a minimum overall LOS D. MassDOT strives for the best LOS possible wherever possible, and indicates overall LOS D can be acceptable for urban areas, in accordance with AASHTO guidelines. The minimum LOS for the area is supported by the guidance found in the *National Highway Institute (NHI) Fundamentals of Planning, Design and Approval of Interchange Improvements to the Interstate System, Publication No. FHWA-NHI-10-038.*

The physical segmenting of analysis performed in this study was identified in accordance with *FHWA's Interstate System Access Informational Guide, August 2010*, *FHWA's Traffic Analysis Toolbox*, and MassDOT's guidelines.

Intersection performance measures can be calculated in the form of volume to capacity (v/c) ratio, average vehicular delay, 95th percentile queue lengths, and level-of-service (LOS). *Synchro 7.0 was the software used to execute the intersection analysis. Synchro 7.0*, a software program from Trafficware, uses the methodologies and thresholds contained within the HCM. This is the preferred/recommended software of MassDOT. Traffic volume represents the travel demand observed and capacity represents the amount of traffic the intersection can accommodate under prevailing conditions. Volume to capacity ratio that approaches or exceeds 1.0 indicates traffic congestion or poor operating conditions.

For unsignalized intersections, the analysis assumes that the traffic on the mainline is not affected by traffic on the side street. The LOS for each movement is calculated by determining the length of gaps that are available in the conflicting traffic stream. Based upon the length of the gaps between vehicles, the capacity of the movement can be calculated. The demand of the movement is then compared to the capacity and utilized to determine the average control delay for the movement. For unsignalized intersections, an overall intersection LOS is not determined. It is generally reported in terms of delay for left-turns on the mainline and all side street movements. The delay ranges for unsignalized intersections are summarized on Table 2.

Table 2: Intersection LOS Thresholds

LOS	Unsignalized Control Delay (sec/veh)
A	0-10
B	>10-15
C	>15-25
D	>25-35
E	>35-50
F	>50

Source: 2000 Highway Capacity Manual

D2. Existing Conditions Analysis

The results of the analysis are summarized on Tables 3 through 8 and described below:

Barnes Road at Edgartown-Vineyard Haven Road

During the weekday, the critical approach (the Edgartown-Vineyard Haven Road eastbound approach) of the unsignalized intersection of Barnes Road at Edgartown-Vineyard Haven Road operates at a level of service (LOS) of F during the weekday morning, midday and evening peak hours. The queues along this approach range from 168 to 331-feet during these periods. The volume to capacity (V/C) ratios all exceed 1.00 during these periods.

On Saturday, the critical approach (the Edgartown-Vineyard Haven Road eastbound approach) of the unsignalized intersection of Barnes Road at Edgartown-Vineyard Haven Road operates at a LOS C during the Saturday morning peak hour and at LOS F during the Saturday midday and evening peak hours. The queues along this approach range from 147 to 188-feet during these periods. The V/C ratio is 0.57 during the Saturday morning peak period; although it is over 1.00 during the Saturday midday and evening peak periods.

This intersection suffers the most significant operating constraints out of the study area intersections. A review of comparable historical time frames (weekday midday from August 2000 and Saturday midday from 1996) revealed that the intersection has sustained annual growth rates of 0.8% per year during the weekday midday peak period and 1.5% per year during the Saturday midday peak period. These growth rates are generally consistent with the growth rates experienced from the cape and the islands region of Massachusetts over this time period. Based on a review of the historical analysis, it appears that the delays at this intersection have been observed for an extended period.

Table 3
Existing Weekday Morning Traffic Operating Conditions
Peak Hour Level of Service Analysis

Intersection/ Approach/ Movement	v/c Ratio[1]	Delay[2]	LOS[3]	95th Queue[4]
Barnes Road at Edgartown-Vineyard Haven Road				
Vineyard Haven Road EB LTR	1.30	180.0	F	168
Vineyard Haven Road WB LTR	1.15	124.3	F	185
Barnes Road NB LTR	1.01	80.0	F	139
Barnes Road SB LTR	0.90	55.8	F	137
Barnes Road at North Business Park				
North Business Park EB LR	0.50	22.2	C	69
Barnes Road NB LT	0.05	1.7	A	4
Barnes Road SB TR	0.25	0.0	A	0
Barnes Road at South Business Park				
South Business Park EB LR	0.16	12.8	B	14
Barnes Road NB LT	0.05	1.6	A	4
Barnes Road SB TR	0.23	0.0	A	0
Barnes Road at Edgartown-West Tisbury Road				
West Tisbury Road EB LT	0.20	5.5	A	19
West Tisbury Road WB TR	0.20	0.0	A	0
Barnes Road SB LR	1.08	101.0	F	377
Edgartown-West Tisbury Road at Airport Road				
West Tisbury Road EB LT	0.04	1.3	A	3
West Tisbury Road WB TR	0.32	0.0	A	0
Airport Road SB LR	0.35	20.4	C	38
Martha's Vineyard Airport main driveway				
Short Term Parking Lot EB LR	0.04	8.9	A	3
Airport Main Driveway NB LT	0.05	4.0	A	4
Airport Main Driveway SB TR	0.05	0.0	A	0

[1]Volume-to-Capacity Ratio.
[2]Average vehicle delay in seconds.
[3]Level-of-Service grade.
[4]Queue length in feet.
EB = Eastbound, WB = Westbound, NB = Northbound, SB = Southbound.
LTR = Shared Left-Through-Right movement, LT = Shared Left-Through movement, LR = Shared Left-Right movement, TR = Shared Through-Right movement.

Table 4
Existing Weekday Midday Traffic Operating Conditions
Peak Hour Level of Service Analysis

Intersection/ Approach/ Movement	v/c Ratio[1]	Delay[2]	LOS[3]	95th Queue[4]
Barnes Road at Vineyard Haven Road				
Vineyard Haven Road EB LTR	1.24	154.4	F	256
Vineyard Haven Road WB LTR	1.13	115.7	F	197
Barnes Road NB LTR	0.91	57.3	F	165
Barnes Road SB LTR	0.93	59.9	F	112
Barnes Road at North Business Park				
North Business Park EB LR	0.49	25.3	D	65
Barnes Road NB LT	0.05	2.0	A	4
Barnes Road SB TR	0.32	0.0	A	0
Barnes Road at South Business Park				
South Business Park EB LR	0.15	13.6	B	13
Barnes Road NB LT	0.04	1.4	A	3
Barnes Road SB TR	0.29	0.0	A	0
Barnes Road at West Tisbury Road				
West Tisbury Road EB LT	0.25	5.7	A	24
West Tisbury Road WB TR	0.25	0.0	A	0
Barnes Road SB LR	1.76	381.7	F	890
West Tisbury Road at Airport Road				
West Tisbury Road EB LT	0.07	2.0	A	6
West Tisbury Road WB TR	0.41	0.0	A	0
Airport Road SB LR	0.93	86.9	F	199
Martha's Vineyard Airport main driveway				
Short Term Parking Lot EB LR	0.06	9.4	A	4
Airport Main Driveway NB LT	0.04	2.2	A	3
Airport Main Driveway SB TR	0.08	0.0	A	0

[1]Volume-to-Capacity Ratio.
[2]Average vehicle delay in seconds.
[3]Level-of-Service grade.
[4]Queue length in feet.
EB = Eastbound, WB = Westbound, NB = Northbound, SB = Southbound.
LTR = Shared Left-Through-Right movement, LT = Shared Left-Through movement, LR = Shared Left-Right movement, TR = Shared Through-Right movement.

Table 5
Existing Weekday Evening Traffic Operating Conditions
Peak Hour Level of Service Analysis

Intersection/ Approach/ Movement	v/c Ratio[1]	Delay[2]	LOS[3]	95th Queue[4]
Barnes Road at Vineyard Haven Road				
Vineyard Haven Road EB LTR	1.23	151.7	F	331
Vineyard Haven Road WB LTR	1.10	105.4	F	107
Barnes Road NB LTR	1.10	107.4	F	165
Barnes Road SB LTR	0.90	56.0	F	210
Barnes Road at North Business Park				
North Business Park EB LR	0.48	22.8	C	63
Barnes Road NB LT	0.05	1.5	A	4
Barnes Road SB TR	0.24	0.0	A	0
Barnes Road at South Business Park				
South Business Park EB LR	0.12	12.0	B	10
Barnes Road NB LT	0.04	1.2	A	3
Barnes Road SB TR	0.24	0.0	A	0
Barnes Road at West Tisbury Road				
West Tisbury Road EB LT	0.25	5.9	A	25
West Tisbury Road WB TR	0.26	0.0	A	0
Barnes Road SB LR	1.53	288.2	F	646
West Tisbury Road at Airport Road				
West Tisbury Road EB LT	0.06	1.5	A	5
West Tisbury Road WB TR	0.33	0.0	A	0
Airport Road SB LR	0.64	40.5	E	98
Martha's Vineyard Airport main driveway				
Short Term Parking Lot EB LR	0.06	9.0	A	5
Airport Main Driveway NB LT	0.02	2.6	A	2
Airport Main Driveway SB TR	0.05	0.0	A	0

[1]Volume-to-Capacity Ratio.
[2]Average vehicle delay in seconds.
[3]Level-of-Service grade.
[4]Queue length in feet.
EB = Eastbound, WB = Westbound, NB = Northbound, SB = Southbound.
LTR = Shared Left-Through-Right movement, LT = Shared Left-Through movement, LR = Shared Left-Right movement, TR = Shared Through-Right movement.

Table 6
Existing Saturday Morning Traffic Operating Conditions
Peak Hour Level of Service Analysis

Intersection/ Approach/ Movement	v/c Ratio[1]	Delay[2]	LOS[3]	95th Queue[4]
Barnes Road at Vineyard Haven Road				
Vineyard Haven Road EB LTR	0.59	17.3	C	147
Vineyard Haven Road WB LTR	0.54	16.3	C	69
Barnes Road NB LTR	0.37	13.6	B	107
Barnes Road SB LTR	0.44	14.1	B	105
Barnes Road at North Business Park				
North Business Park EB LR	0.10	11.4	B	8
Barnes Road NB LT	0.01	0.9	A	1
Barnes Road SB TR	0.15	0.0	A	0
Barnes Road at South Business Park				
South Business Park EB LR	0.06	10.8	B	4
Barnes Road NB LT	0.02	1.4	A	2
Barnes Road SB TR	0.14	0.0	A	0
Barnes Road at West Tisbury Road				
West Tisbury Road EB LT	0.09	4.0	A	7
West Tisbury Road WB TR	0.13	0.0	A	0
Barnes Road SB LR	0.39	13.7	B	46
West Tisbury Road at Airport Road				
West Tisbury Road EB LT	0.03	2.1	A	3
West Tisbury Road WB TR	0.18	0.0	A	0
Airport Road SB LR	0.22	13.1	B	21
Martha's Vineyard Airport main driveway				
Short Term Parking Lot EB LR	0.04	8.8	A	3
Airport Main Driveway NB LT	0.05	3.9	A	4
Airport Main Driveway SB TR	0.04	0.0	A	0

[1]Volume-to-Capacity Ratio.
[2]Average vehicle delay in seconds.
[3]Level-of-Service grade.
[4]Queue length in feet.
EB = Eastbound, WB = Westbound, NB = Northbound, SB = Southbound.
LTR = Shared Left-Through-Right movement, LT = Shared Left-Through movement, LR = Shared Left-Right movement, TR = Shared Through-Right movement.

Table 7
Existing Saturday Midday Traffic Operating Conditions
Peak Hour Level of Service Analysis

Intersection/ Approach/ Movement	v/c Ratio[1]	Delay[2]	LOS[3]	95th Queue[4]
Barnes Road at Vineyard Haven Road				
Vineyard Haven Road EB LTR	1.22	148.5	F	187
Vineyard Haven Road WB LTR	1.04	87.9	F	105
Barnes Road NB LTR	0.89	54.4	F	161
Barnes Road SB LTR	1.10	105.1	F	117
Barnes Road at North Business Park				
North Business Park EB LR	0.30	17.6	C	32
Barnes Road NB LT	0.04	1.3	A	3
Barnes Road SB TR	0.28	0.0	A	0
Barnes Road at South Business Park				
South Business Park EB LR	0.14	12.5	B	12
Barnes Road NB LT	0.05	1.4	A	4
Barnes Road SB TR	0.27	0.0	A	0
Barnes Road at West Tisbury Road				
West Tisbury Road EB LT	0.24	5.6	A	23
West Tisbury Road WB TR	0.29	0.0	A	0
Barnes Road SB LR	1.63	329.4	F	735
West Tisbury Road at Airport Road				
West Tisbury Road EB LT	0.07	1.8	A	5
West Tisbury Road WB TR	0.39	0.0	A	0
Airport Road SB LR	0.87	71.3	F	179
Martha's Vineyard Airport main driveway				
Short Term Parking Lot EB LR	0.06	9.1	A	4
Airport Main Driveway NB LT	0.04	2.2	A	3
Airport Main Driveway SB TR	0.07	0.0	A	0

[1]Volume-to-Capacity Ratio.
[2]Average vehicle delay in seconds.
[3]Level-of-Service grade.
[4]Queue length in feet.
EB = Eastbound, WB = Westbound, NB = Northbound, SB = Southbound.
LTR = Shared Left-Through-Right movement, LT = Shared Left-Through movement, LR = Shared Left-Right movement, TR = Shared Through-Right movement.

Table 8
Existing Saturday Evening Traffic Operating Conditions
Peak Hour Level of Service Analysis

Intersection/ Approach/ Movement	v/c Ratio[1]	Delay[2]	LOS[3]	95th Queue[4]
Barnes Road at Vineyard Haven Road				
Vineyard Haven Road EB LTR	1.18	130.5	F	188
Vineyard Haven Road WB LTR	0.85	44.4	E	91
Barnes Road NB LTR	0.98	67.0	F	194
Barnes Road SB LTR	0.67	28.2	D	83
Barnes Road at North Business Park				
North Business Park EB LR	0.18	14.0	B	16
Barnes Road NB LT	0.02	0.7	A	1
Barnes Road SB TR	0.20	0.0	A	0
Barnes Road at South Business Park				
South Business Park EB LR	0.07	10.7	B	6
Barnes Road NB LT	0.02	0.7	A	1
Barnes Road SB TR	0.18	0.0	A	0
Barnes Road at West Tisbury Road				
West Tisbury Road EB LT	0.23	5.6	A	22
West Tisbury Road WB TR	0.22	0.0	A	0
Barnes Road SB LR	1.01	85.4	F	289
West Tisbury Road at Airport Road				
West Tisbury Road EB LT	0.04	1.2	A	3
West Tisbury Road WB TR	0.22	0.0	A	0
Airport Road SB LR	0.48	24.7	C	63
Martha's Vineyard Airport main driveway				
Short Term Parking Lot EB LR	0.06	8.8	A	4
Airport Main Driveway NB LT	0.01	1.5	A	1
Airport Main Driveway SB TR	0.04	0.0	A	0

[1]Volume-to-Capacity Ratio.
[2]Average vehicle delay in seconds.
[3]Level-of-Service grade.
[4]Queue length in feet.
EB = Eastbound, WB = Westbound, NB = Northbound, SB = Southbound.
LTR = Shared Left-Through-Right movement, LT = Shared Left-Through movement, LR = Shared Left-Right movement, TR = Shared Through-Right movement.

Barnes Road at North Business Park

During the weekday, the critical approach (the North Business Park eastbound approach) of the unsignalized intersection of Barnes Road at North Business Park operates at a LOS C during the weekday morning and evening peak hours, and a LOS D during the weekday midday peak hour. The queues along this approach range from 63 to 69-feet during these periods. The V/C ratios never exceed 0.50 during these periods.

On Saturday, the critical approach (the North Business Park eastbound approach) of the unsignalized intersection of Barnes Road at North Business Park operates at a LOS B during the Saturday morning and evening peak hours and at LOS C during the Saturday midday peak hour. The queues along this approach range from 8 to 32-feet during these periods. The V/C ratios never exceed 0.30 during these periods.

Barnes Road at South Business Park

During the weekday, the critical approach (the South Business Park eastbound approach) of the unsignalized intersection of Barnes Road at North Business Park operates at a LOS B during the weekday morning, midday and evening peak hours. The queues along this approach range from 10 to 14-feet during these periods. The V/C ratios never exceed 0.16 during these periods.

On Saturday, the critical approach (the South Business Park eastbound approach) of the unsignalized intersection of Barnes Road at North Business Park operates at a LOS B during the Saturday morning, midday and evening peak hours. The queues along this approach range from 4 to 12-feet during these periods. The V/C ratios never exceed 0.14 during these periods.

Both of the Business Park driveways operate at acceptable levels during the peak periods. As evidenced by the improvement in operating conditions (especially at North Business Park) the business park is used more actively during the weekdays, which is anticipated based on the land use the roadways serve.

Barnes Road at Edgartown-West Tisbury Road

During the weekday, the critical approach (the Barnes Road southbound approach) of the unsignalized intersection of Barnes Road at Edgartown-West Tisbury Road operates at a LOS F during the weekday morning, midday and evening peak hours. The queues along this approach range from 377 to 890-feet during these periods. The V/C ratios all exceed 1.00 during these periods, with a maximum ratio of 1.76 during the weekday midday peak hour.

On Saturday, the critical approach (the Barnes Road southbound approach) of the unsignalized intersection of Barnes Road at Edgartown-West Tisbury Road operates at a LOS B during the Saturday morning peak hour and a LOS F during the Saturday midday and evening peak hours. The queues along this approach range from 46 to 735-feet during these periods. The V/C ratio is 0.39 during the Saturday morning peak period; although it is over 1.00 during the Saturday midday and evening peak periods.

It is important to note that the excessive delays at during the weekday peak periods may not accurately reflect existing field conditions. The methodologies applied do not recognize the dynamic nature of motorists to adapt to roadway conditions. Motorists, when faced with a significant delay at an unsignalized intersection may accept a shorter gap than required for safe operation.

Edgartown-West Tisbury Road at Airport Road

During the weekday, the critical approach (the Airport Road southbound approach) of the unsignalized intersection of Barnes Road at Edgartown-West Tisbury Road operates at a LOS C during the weekday morning peak hour, LOS F during the weekday midday peak hour and LOS E during the weekday evening peak hour. The queues along this approach range from 38 to 199-feet during these periods. The V/C ratios do not exceed 1.00 during these periods.

On Saturday, the critical approach (the Airport Road southbound approach) of the unsignalized intersection of Barnes Road at Edgartown-West Tisbury Road operates at a LOS B during the Saturday morning peak hour, a LOS F during the Saturday midday peak hour and at LOS C during the Saturday evening peak hour. The queues along this approach range from 21 to 179-feet during these periods. The V/C ratio is 0.22 during the Saturday morning peak period, 0.87 during the Saturday midday peak period and 0.48 during the Saturday evening peak period.

Martha's Vineyard Airport main driveway

Delays within the Martha's Vineyard Airport driveway network are not significant, with the critical approach (the short-term driveway eastbound approach) operating at a LOS A during every peak hour, and a V/C ratio under 0.06 and a maximum queue length of 5-feet.

D3. Previous Study Results

In September 2001 MS Transportation Systems, Inc. conducted a Comprehensive Traffic Study/Functional Design Report on the intersection of Barnes Road at Edgartown-Vineyard Haven Road. The results of this analysis are comparable to the current results. At the time of that report, the intersection operated differently, with free operation provided along both Edgartown-Vineyard Haven Road approaches. Under that operating condition the intersection still provided a LOS F along the critical approach (Barnes Road northbound approach) during the weekday midday and afternoon summer season peak hours.

APPENDIX 5 –

RARE SPECIES HABITAT SURVEY

Prepared by GZA GeoEnvironmental

MARTHA'S VINEYARD AIRPORT
COMPREHENSIVE RARE SPECIES FINDINGS REPORT, 2012
LOCATION: 71 AIRPORT ROAD
VINEYARD HAVEN, MA 02568

FEBRUARY 2012

Prepared for:
The Martha's Vineyard Airport Commission
71 Airport Road
Vineyard Haven, MA 02568

And

Jacobs Engineering Group Inc.

Prepared by:

GZA GeoEnvironmental, Inc.
1350 Main Street, Suite 1400
Springfield, MA 01103
413-726-2100

Prepared in compliance with
Conservation Permit 004-039.DFW
for the Massachusetts Natural Heritage
and Endangered Species Program

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7.0 Conclusions

Sandplain grassland and shrubland environments, such as those found on MVY property, are considered a rare ecological community in the northeastern United States. This rarity stems primarily from a decrease in pasturelands, development, lack of fire and natural ecological processes such as forest succession, which results in the replacement of early and mid successional sandplain grassland communities with mature woodland communities. Martha's Vineyard Airport is a somewhat isolated open habitat located within the confines of the surrounding Manuel F. Correllus State Forest. MVY currently supports a large sandplain grassland community primarily due to maintenance mowing activities conducted by Airport Operations personnel over the course of the last 60+ years. The future presence of this rare ecosystem type within the MVY footprint continues to be highly dependent upon maintenance activities by airport personnel. The Airport Manager for MVY has committed to preserving this unique ecosystem by continuing to maintain the property according to the MVY Habitat Management Plan - July 2005 (with the 2009 updated management map). This plan was developed to include maintenance of safe Airport operations while fostering habitat for rare sandplain grassland plants, and the grasshopper sparrow, and to include a shrubland mitigation area for the barrens buckmoth with pathways for the purple tiger beetle. These mitigation areas were established in 2005 and have successfully begun to foster new rare plant and invertebrate populations.

In support of the Habitat Management Plan and in compliance with conservation permits, several tasks and investigations occurred at MVY in 2012. These investigations included observation of rare plants that were transplanted in 2010, and grassland surveys of revegetating work areas. Observation revealed the transplantation is successful with new areas of rare plants growing by the transplant plots. Revegetation is continuing with some areas reaching their restoration goals. Other areas of revegetation are still in progress and the airport has taken steps to help these areas reach their goals of 60 percent native vegetative cover. Additional observation of the areas in progress will occur in 2013. Table 13 summarizes the findings and observed mitigation area compliance and status at MVY. In the course of this field work, new observations of sandplain blue-eyed grass (SC) was made, some of which were located within restoration areas.

Table 13: Overview of Investigations and Permit Compliance at MVY in 2012

Special Condition No.	Compliance Task	Rare Species Observations
Sandplain Grassland		
18, 19	Observation of grassland revegetation areas	2012 observations show that grassland restoration is progressing and some areas showed new sandplain blue-eyed grass individuals. Some areas are revegetating slowly and additional seeding and other methods were taken to remedy this situation. Further observation of areas that have not reached 60% native cover is planned for 2013.
21	Observation of rare plants transplanted in 2010 (mitigation for Projects 1,15)	- RW 6 Transplants - Papillose nut sedge, sandplain flax, and sandplain blue-eyed grass that were transplanted out of the limits of work from RW 6 project area were observed in 2011 and 2012. The papillose nut sedge, and sandplain blue-eyed grass appeared close to the numbers observed in 2010. The sandplain flax, a long lived annual, was not observed in 2012. It is uncertain if this species had completed its life cycle. Generally, the transplants appear to have generally been successful, and with the neighboring 2009 transplants, these three species have been established in this vicinity. Additional observation for sandplain flax may occur in 2013 to see if this species will grow from seed produced in previous years. - TW A Transplants - Purple needlegrass and sandplain blue-eyed grass within the TW A Phase 3 project were transplanted from that work area to an area of sparse grassland east of TW E. These transplants were observed in 2011 and 2012, and both species appeared to have increased in number since the original transplant. They both produced seed in their new location and may continue to spread into the surrounding open areas in the future. The transplant appears to have been successful, and no future observation is needed.
Invasive Species Tasks		
15, 16	Invasive species investigations and observations during all tasks	Weeding of spotted knapweed was conducted in the transplant and restoration areas. Japanese knotweed was targeted for removal by the airport in several landscaped areas and in the location along the fuel farm road.

In addition to the CMP observation activities, several new investigations were conducted in many previously un-surveyed areas for the proposed AMPU. These investigations included surveys of grassland, heathland, oak shrubland and woodland habitats at the airport, and state listed species were observed during most of these surveys (Table 14). During these surveys, several new populations of sandplain flax, papillose nut sedge and sandplain blue-eyed grass were observed or previously observed populations were more defined. Additionally, a grasshopper sparrow was observed using the grassland habitat at the airport. This species has been observed as occasionally present in low numbers in previous years. Invertebrate investigations documented the presence of several rare species. Surveys showed that purple tiger beetles continue to occur at the airport in open pathway habitats and barrens buckmoth continue to use the scrub oak habitats. Blacklight surveys were conducted for the first time at the airport and revealed the presence of many listed species that were previously known to occur in the Manuel Correlus State Forest. Additionally, two open community species were observed that are not known to occur in the State Forest. Should some of these natural communities have proposed work under the AMPU, permitting is likely to be required, either through an amendment or a new permit.

Table 14: Summary of State Listed Species Observed in AMPU Areas at MVY in 2012

Common Name	*Scientific Name*	State Status	On NHESP List	Observed in 2012	Habitat*
		Moths			
Coastal Heath Cutworm	*Abagrotis nefascia*	SC	Y	N	SO, OW shadbush/ currant
Barrens Daggermoth	*Acronicta albarufa*	T	Y	Y	SO
Gerhard's Underwing Moth	*Catocala herodias gerhardii*	SC	Y	Y	SO
Waxed Sallow	*Chaetaglaea cerata*	SC	N	Y	SH
Melsheimer's Sack Bearer	*Cicinnus melsheimeri*	T	Y	Y	SO
Unexpected Cycnia	*Cycnia inopinatus*	T	N	Y	GL, SH
Sandplain Euchlaena	*Euchlaena madusaria*	SC	Y	Y	SH
Slender Clearwing Sphinx	*Hemaris gracilis*	SC	Y	N	SH
Barrens Buckmoth	*Hemileuca maia*	SC	Y	Y	SO
Sandplain Heterocampa	*Heterocampa varia*	T	Y	Y	SO
Pine Barrens Lycia	*Lycia ypsilon*	T	Y	Y	OW, SO
Barrens Metarranthis	*Metarranthis apiciaria*	E	Y	N	SO
Coastal Swamp Metarranthis	*Metarranthis pilosaria*	SC	Y	Y	SH, SO
Imperial Moth	*Eacles imperialis*	T	Y	Y	PP
Pink Sallow	*Psectaglaea carnosa*	SC	Y	Y	SH, OW w/heath understory
Southern Ptichodis	*Ptichodis bistrigata*	T	N	Y	GL, SH
Pine Barrens Speranza	*Speranza exonerata*	SC	Y	Y	SO

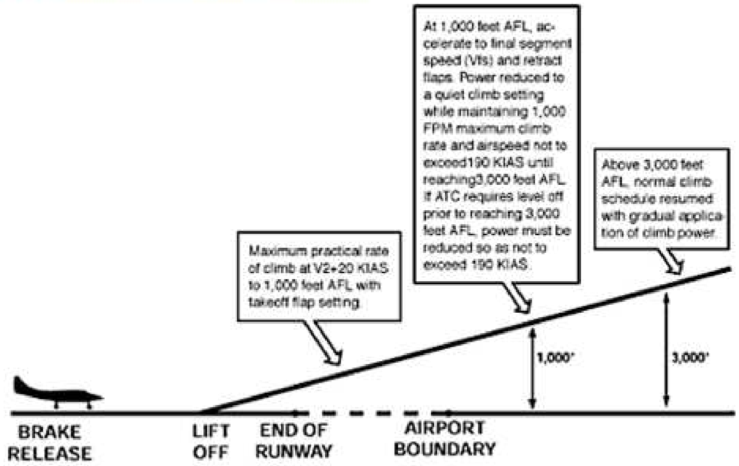
Common Name	*Scientific Name*	State Status	On NHESP List	Observed in 2012	Habitat*
Moths (cont.)					
Faded Gray Geometer	*Stenoporpia polygrammaria*	T	Y	Y	SO, OW
Pine Barrens Zale	*Zale lunifera*	SC	Y	N	SO. PP. OW
Beetles					
Purple Tiger Beetle	*Cicindela purpurea*	SC	Y	Y	Pathway
Birds					
Grasshopper Sparrow	*Ammodramus savannarum*	T	Y	Y	GL
Eastern Whip-poor-will	*Caprimulgus vociferus*	SC	Y	Y	PP/OW
Northern Harrier	*Circus cyaneus*	T	Y	N	GL
Plants					
Purple Needlegrass	*Aristida purpurescens*	T	Y	N	GL
Sandplain Flax	*Linum intercursum*	SC	Y	Y	GL
Lion's Foot	*Nabalus serpentarius*	E	Y	N	GL
Papillose Nut-Sedge	*Scleria pauciflora*	E	Y	Y	GL
Sandplain Blue-Eyed Grass	*Sisyrinchium fuscatum*	SC	Y	Y	GL
* GL=Grassland, SH= Sandplain Heathland, SO=Scrub Oak Shrubland, OW= Oak Woodland, PP/OW = Pitch Pine/Oak Woodland					

Based on the new rare species observations, Airport maintenance and the use of the HMP appears to be benefitting rare species at the airport. The establishment and management of mitigation areas continues to benefit the rare plant, invertebrate and animal communities at MVY. Continued utilization of the Habitat Management Plan and adherence to the conditions of the permit (existing and amended) will allow for long-term maintenance and observations of the rare communities at MVY in the future.

APPENDIX 6 –

NBAA RECOMMENDED NOISE ABATEMENT PROCEDURES

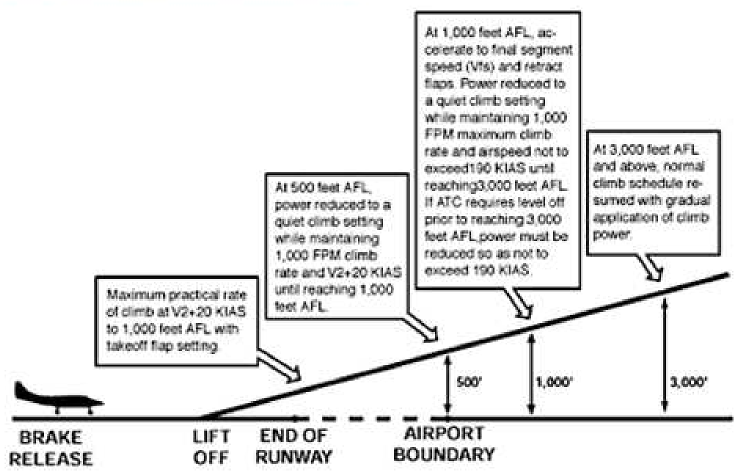
NBAA Standard Departure Procedure



1. Climb at maximum practical rate at V2+20 Knots indicated airspeed (KIAS) to 1,000 feet above ground level (AGL) with takeoff flap setting.
2. At 1,000 feet AGL, accelerate to final segment speed (Vfs) and retract flaps. Reduce to a quiet climb power setting while maintaining 1,000 FPM maximum climb rate and airspeed not to exceed 190 KIAS until reaching 3,000 feet AGL. If ATC requires level off prior to reaching 3,000 feet AGL, power must be reduced so as not to exceed 190 KIAS until at or above 3,000 feet AGL. (See note below)
3. At 3,000 feet AGL and above, resume normal climb schedule with gradual application of climb power.
4. Observe all airspeed limitations and ATC instructions.

NOTE: It is recognized that aircraft performance will differ with aircraft type and takeoff conditions; therefore, the business aircraft operator must have the latitude to determine whether takeoff thrust should be reduced prior to, during, or after flap retraction.

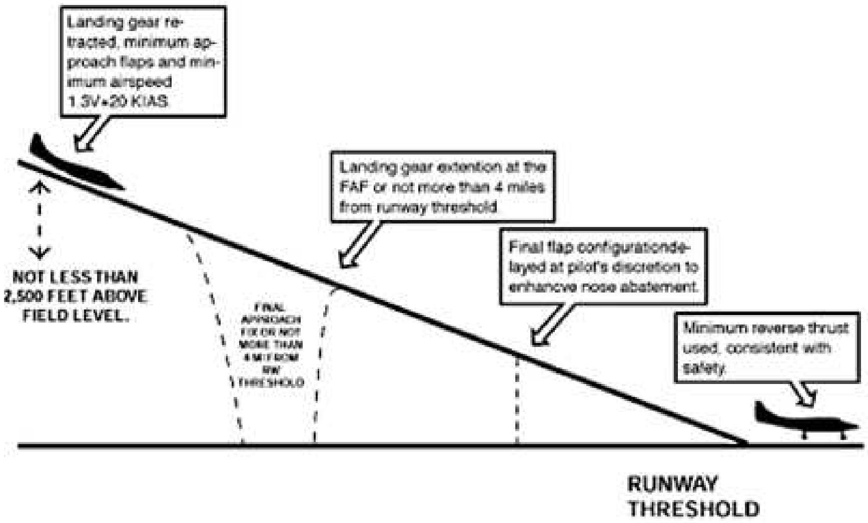
NBAA Close-In Departure Procedure



1. Climb at maximum practical rate at V2+20 KIAS to 500 feet AGL with takeoff flap setting.
2. At 500 feet AGL, reduce to a quiet climb power setting while maintaining 1,000 FPM maximum climb rate and V2+20 KIAS until reaching 1,000 feet AGL.
3. At 1,000 feet AGL, accelerate to final segment speed (Vfs) and retract flaps. Maintain quiet climb power, 1,000 FPM climb rate and airspeed not to exceed 190 KIAS until reaching 3,000 feet AGL. If ATC requires level off prior to reaching 3,000 feet AGL, power must be reduced so as not to exceed 190 KIAS. (See note below)
4. At 3,000 feet AGL and above, resume normal climb schedule with gradual application of climb power.
5. Observe all airspeed limitations and ATC instructions.

NOTE: It is recognized that aircraft performance will differ with aircraft type and takeoff conditions; therefore, the business aircraft operator must have the latitude to determine whether takeoff thrust should be reduced prior to, during, or after flap retraction. Also, aircraft in excess of 75,000 lbs. GTOW operating under FAR, Part 121, Part 125, or Part 135 may not be permitted to comply with this procedure.

NBAA Approach and Landing Procedure VFR & IFR



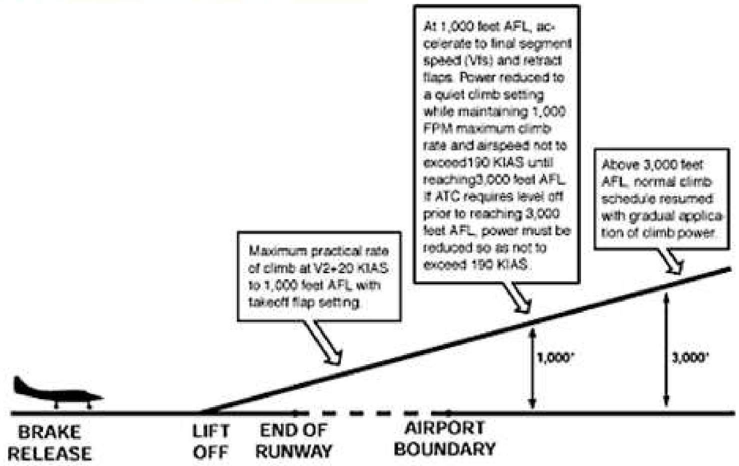
1. Inbound flight path should not require more than a 20 degree bank angle to follow noise abatement track.
2. Observe all airspeed limitations and ATC instructions.
3. Initial inbound altitude for noise abatement areas will be a descending path from 2,500 feet AGL or higher. Maintain minimum airspeed (1 .3Vs+20 KIAS) with gear retracted and minimum approach flap setting.
4. At the final approach fix (FAF) or not more than 4 miles from runway threshold, extend landing gear. Final landing flap configuration should be delayed at pilot's discretion to enhance noise abatement.
5. During landing, use minimum reverse thrust consistent with safety for runway conditions and available length.

Summary

This publication has been designed to illustrate the need for and the availability of noise abatement procedures for turbojet business aircraft. It is not intended to describe all the various types of noise abatement policies followed by airport and aircraft operators, nor does it pretend to describe the "best" or "only" way to handle the problem of airport noise. However, it is an attempt to develop a generic approach for noise abatement procedures as a partial solution for the airport noise problem. Therefore, the following three points are stressed:

1. Noise abatement policies must be cooperatively developed and understood by aircraft and airport operators, engine and aircraft manufacturers and the local communities if such programs are to be effective.
2. At the time decisions are made to purchase and operate business jet aircraft, the aircraft operators will surely review what is available that would best satisfy their individual needs, but they must also thoroughly review aircraft types for performance characteristics in terms of noise generated and the impact on community noise levels. Many such aircraft have the ability to be flown within reduced noise specifications and business jet aircraft operators are strongly urged to utilize the procedures and techniques that permit them to do so.
3. A system of flight procedures is only one part of a complete noise abatement program. The NBAA's recommended flight procedures can be implemented immediately, and can result in a major reduction in the noise generated by turbojet business aircraft. However, there may be a tendency to use them beyond reasonable expectations as a means of effectively resolving the entire noise reduction issue. This tendency can be self-defeating, particularly if the general public is misled as to the effectiveness of flight procedures as the sole permanent solution to the overall noise problem. Therefore, aircraft operators must continually demonstrate to the general public that there is a genuine concern toward reducing aircraft noise and that the application of NBAA's noise abatement program will serve as a partial aid in this effort by standardizing flight procedures and by providing adequate safety margins.

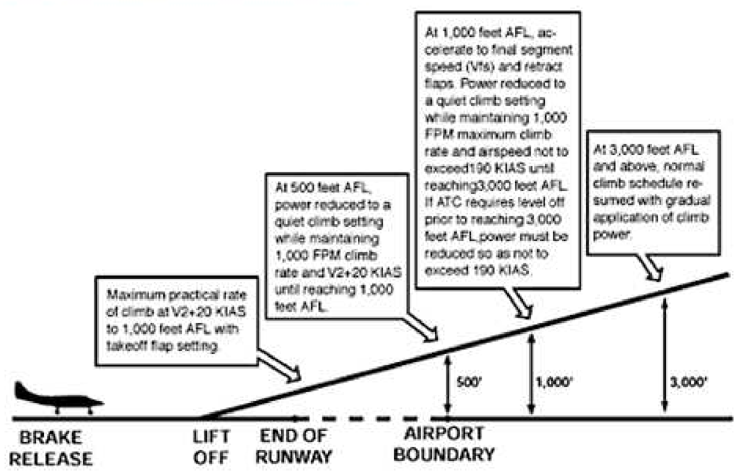
NBAA Standard Departure Procedure



1. Climb at maximum practical rate at V2+20 Knots indicated airspeed (KIAS) to 1,000 feet above ground level (AGL) with takeoff flap setting.
2. At 1,000 feet AGL, accelerate to final segment speed (Vfs) and retract flaps. Reduce to a quiet climb power setting while maintaining 1,000 FPM maximum climb rate and airspeed not to exceed 190 KIAS until reaching 3,000 feet AGL. If ATC requires level off prior to reaching 3,000 feet AGL, power must be reduced so as not to exceed 190 KIAS until at or above 3,000 feet AGL. (See note below)
3. At 3,000 feet AGL and above, resume normal climb schedule with gradual application of climb power.
4. Observe all airspeed limitations and ATC instructions.

NOTE: It is recognized that aircraft performance will differ with aircraft type and takeoff conditions; therefore, the business aircraft operator must have the latitude to determine whether takeoff thrust should be reduced prior to, during, or after flap retraction.

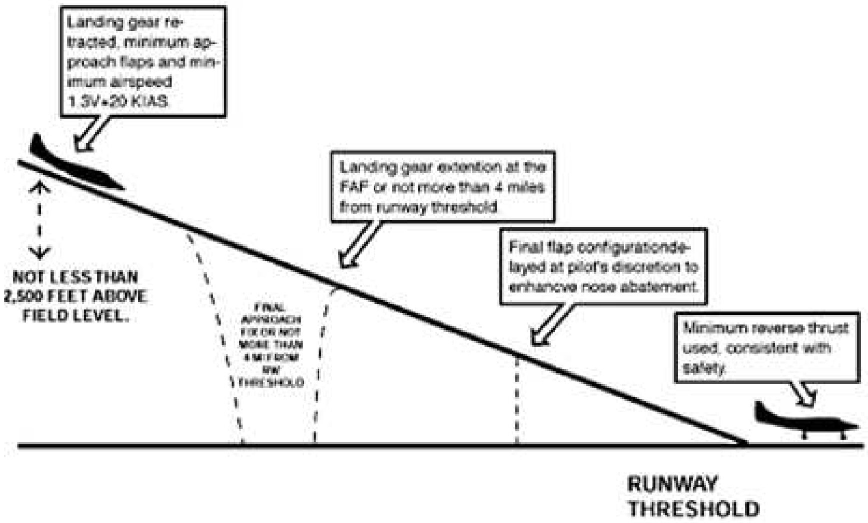
NBAA Close-In Departure Procedure



1. Climb at maximum practical rate at V2+20 KIAS to 500 feet AGL with takeoff flap setting.
2. At 500 feet AGL, reduce to a quiet climb power setting while maintaining 1,000 FPM maximum climb rate and V2+20 KIAS until reaching 1,000 feet AGL.
3. At 1,000 feet AGL, accelerate to final segment speed (Vfs) and retract flaps. Maintain quiet climb power, 1,000 FPM climb rate and airspeed not to exceed 190 KIAS until reaching 3,000 feet AGL. If ATC requires level off prior to reaching 3,000 feet AGL, power must be reduced so as not to exceed 190 KIAS. (See note below)
4. At 3,000 feet AGL and above, resume normal climb schedule with gradual application of climb power.
5. Observe all airspeed limitations and ATC instructions.

NOTE: It is recognized that aircraft performance will differ with aircraft type and takeoff conditions; therefore, the business aircraft operator must have the latitude to determine whether takeoff thrust should be reduced prior to, during, or after flap retraction. Also, aircraft in excess of 75,000 lbs. GTOW operating under FAR, Part 121, Part 125, or Part 135 may not be permitted to comply with this procedure.

NBAA Approach and Landing Procedure VFR & IFR



1. Inbound flight path should not require more than a 20 degree bank angle to follow noise abatement track.
2. Observe all airspeed limitations and ATC instructions.
3. Initial inbound altitude for noise abatement areas will be a descending path from 2,500 feet AGL or higher. Maintain minimum airspeed (1 .3Vs+20 KIAS) with gear retracted and minimum approach flap setting.
4. At the final approach fix (FAF) or not more than 4 miles from runway threshold, extend landing gear. Final landing flap configuration should be delayed at pilot's discretion to enhance noise abatement.
5. During landing, use minimum reverse thrust consistent with safety for runway conditions and available length.

Summary

This publication has been designed to illustrate the need for and the availability of noise abatement procedures for turbojet business aircraft. It is not intended to describe all the various types of noise abatement policies followed by airport and aircraft operators, nor does it pretend to describe the "best" or "only" way to handle the problem of airport noise. However, it is an attempt to develop a generic approach for noise abatement procedures as a partial solution for the airport noise problem. Therefore, the following three points are stressed:

1. Noise abatement policies must be cooperatively developed and understood by aircraft and airport operators, engine and aircraft manufacturers and the local communities if such programs are to be effective.
2. At the time decisions are made to purchase and operate business jet aircraft, the aircraft operators will surely review what is available that would best satisfy their individual needs, but they must also thoroughly review aircraft types for performance characteristics in terms of noise generated and the impact on community noise levels. Many such aircraft have the ability to be flown within reduced noise specifications and business jet aircraft operators are strongly urged to utilize the procedures and techniques that permit them to do so.
3. A system of flight procedures is only one part of a complete noise abatement program. The NBAA's recommended flight procedures can be implemented immediately, and can result in a major reduction in the noise generated by turbojet business aircraft. However, there may be a tendency to use them beyond reasonable expectations as a means of effectively resolving the entire noise reduction issue. This tendency can be self-defeating, particularly if the general public is misled as to the effectiveness of flight procedures as the sole permanent solution to the overall noise problem. Therefore, aircraft operators must continually demonstrate to the general public that there is a genuine concern toward reducing aircraft noise and that the application of NBAA's noise abatement program will serve as a partial aid in this effort by standardizing flight procedures and by providing adequate safety margins.

APPENDIX 7 –

NOISE MONITORING

Prepared by KM Chng

Martha's Vineyard Airport

- Noise Measurements

Prepared by:
KM Chng Environmental Inc.
Woburn, MA 01801

Introduction

KM Chng Environmental Inc. (KM Chng) obtained noise measurements at Martha's Vineyard Airport over a peak summertime weekend to compare with the noise measurements that were obtained by KM Chng in 1999. A comparison of these noise measurements (1999 vs. 2012) was used to determine how the noise levels from Airport aircraft operations have changed over that period of time.

Noise measurements were obtained at the same four measurement locations used during the 1999 noise study plus two additional monitoring sites (see below). The six noise measurement locations are shown in Figure 1.

- Residence on Bluebird Way (W. Tisbury)
- Residence at 17 Hopps Farm Road (W. Tisbury)
- Residence at 58 Oyster Pond Road (Edgartown)
- Residence on Ryan's Way (Oak Bluffs)
- ADD: Residence at 12 Pond Lane, West Tisbury (Deep Bottom)
- ADD: Terminal Building airside at baggage claim area

Noise measurements were obtained over a five-day period from Thursday, August 23rd through Monday August 27th. (Note that the 1999 noise measurements were obtained over the Labor Day weekend.) Noise measurements at all six locations were obtained concurrently over the five-day period.

As in 1999, the noise measurements consisted of hourly Leq and L90 noise levels as well as the 24-hour DNL noise level. The hourly Leq(h) represents the level of constant noise with the same acoustic energy as the fluctuating noise levels measured during the one hour period. The DNL level is the average noise level over a 24-hour period with a 10-decibel penalty added to the nighttime hours (10 PM to 7 AM) to account for people's increased sensitivity to noise during the nighttime hours. The L90 noise level is the level exceeded 90 percent of the time and is representative of the ambient background noise level without the effects of intermittent noise sources such as aircraft flyovers and local street traffic. Noise measurements were obtained using six Rion model NL-32 Sound Level Meters that meet or exceed ANSI Standards for Type I precision and accuracy. The sound level meters were calibrated both before and after the noise measurement program to maintain the accuracy of the collected data.

Figure 1: Martha's Vineyard Airport and Noise Measurement Locations

Noise Measurement Results

The results of the noise measurement program at Martha's Vineyard Airport are summarized in Table 1 for each of the noise measurement locations.

The measurement location on Bluebird Way is approximately 4,000 feet from the end of the main Runway 6/24. The measured DNL noise levels at this location ranged from 49.7 dBA to 57.3 dBA. The daytime hourly Leq levels ranged from 50 to 60 dBA, and the nighttime hourly Leq levels ranged from 28 to 42 dBA. The L90 ambient background levels ranged from 28 to 41 dBA. The maximum (Lmax) noise level measured at this location during GA jet takeoff operations ranged from 80 to 85 dBA.

The measurement location on Hopps Farm Road is approximately 9,500 feet from the end of the crosswind Runway 15/33. The measured DNL noise levels at this location ranged from 43.0 to 60.3 dBA. The daytime hourly Leq levels ranged from 40 to 53 dBA, and the nighttime hourly Leq levels ranged from 22 to 40 dBA. The L90 ambient background levels ranged from 19 to 39 dBA. The maximum (Lmax) noise level measured at this location during aircraft takeoff operations ranged from 69 to 83 dBA.

The measurement location on Oyster Pond Road is approximately 8,800 feet from the end of the crosswind Runway 15/33. The measured DNL noise levels at this location ranged from 43.1 to 59.7 dBA. The daytime hourly Leq levels ranged from 40 to 65 dBA, and the nighttime hourly Leq levels ranged from 28 to 47 dBA. The L90 ambient background levels ranged from 27 to 45 dBA. The maximum (Lmax) noise level measured at this location during aircraft takeoff operations ranged from 67 to 81 dBA.

The measurement location on Ryan's Way is approximately 7,500 feet from the end of the main Runway 6/24. The measured DNL noise levels at this location ranged from 52.8 to 56.1 dBA. The daytime hourly Leq levels ranged from 50 to 60 dBA, and the nighttime hourly Leq levels ranged from 40 to 45 dBA. The L90 ambient background levels ranged from 30 to 45 dBA. The maximum (Lmax) noise level measured at this location during GA jet takeoff operations ranged from 80 to 86 dBA.

The measurement location on Pond Lane is approximately 5,000 feet from the end of the main Runway 6/24. The measured DNL noise levels at this location ranged from 47.8 to 56.4 dBA. The daytime hourly Leq levels ranged from 40 to 62 dBA, and the nighttime hourly Leq levels ranged from 27 to 40 dBA. The L90 ambient background levels ranged from 23 to 45 dBA. The maximum (Lmax) noise level measured at this location during GA jet takeoff operations ranged from 79 to 85 dBA.

The measurement location at Martha's Vineyard Airport is at the airside baggage area near the terminal building. This location is adjacent to the apron and aircraft taxi area and was selected to be representative of the noise levels at the airport. Noise measurements at this location were obtained for only two days. When a problem developed with the sound level meter at Bluebird Way, this noise meter was moved to the Bluebird Way location. The measured DNL noise levels at this location ranged from

65.4 to 66.1 dBA. The daytime hourly Leq levels ranged from 55 to 72 dBA, and the nighttime hourly Leq levels ranged from 39 to 45 dBA. The L90 ambient background levels ranged from 38 to 67 dBA.

The DNL noise levels measured at the five residential locations around Martha's Vineyard Airport are well below the Federal Aviation Administration (FAA) residential noise impact level of 65 dBA. Since the GA jet aircraft and other larger aircraft use the main 5,500-foot Runway 6/24, the DNL noise level at Bluebird Way, Ryan's Way and Pond Lane are generally higher than the DNL noise levels measured at Hopps Farm Road and Oyster Pond Road that are located along the shorter 3,300-foot crosswind runway 15/33 used by the smaller GA piston engine aircraft. Day to day variations in the measured DNL noise levels at any one location are due to differences in the number of daily aircraft operations, aircraft mix, and wind and weather conditions that determine runway use for takeoffs and landings.

Comparison of 2012 and 1999 Measured DNL Noise Levels

Table 2 shows a comparison of the measured DNL noise levels obtained in 2012 with the 1999 measured levels. The noise measurement locations are in the same general area if not at the same exact residential location. The results indicate that in general, the measured DNL noise levels in 1999 were higher than the levels measured in 2012. These differences could be due to several factors:

- The 1999 noise measurements were obtained over the Labor Day Holiday weekend when the level of aircraft activity at the airport could have been significantly higher than during the August 24^{th} weekend in 2012.

- The aircraft fleet mix could have been significantly different, with more of the noisier Stage 2 GA jet aircraft operating at the airport in 1999 replaced by quieter Stage 3 GA jet aircraft in 2012.

- Noise abatement measures implemented at the airport since 1999.

The results of the 1999 noise measurements at Martha's Vineyard Airport are shown in Appendix A.

Table 1: Summary of Measured DNL Noise Levels at Martha's Vineyard Airport (August 23-27, 2012)

Noise Measurement Locations	Distance from Runway	Runway End	Measured DNL Levels (in dBA)				
			Day 1	Day 2	Day 3	Day 4	Day 5
Bluebird Way	4,000 feet	06	50.7	49.7	51.7	54.6	57.3
Hopps Farm Road	9,500 feet	15	43.2	44.5	43.0	55.8	60.3
Oyster Pond Road	8,800 feet	33	48.7	46.1	44.3	43.1	59.7
Ryan's Way	7,500 feet	24	51.7	50.4	47.8	48.9	56.4
Pond Lane	5,000 feet	06	53.3	54.5	56.1	52.8	53.7
Airport Airside Baggage Area		NA	66.1	65.4	----	----	----

Table 2: Comparison of Measured DNL Levels 2012 vs. 1999

Measurement Location	Measured DNL Noise Levels	
	2012	1999
Bluebird Way	50 – 57 dBA	59 – 61 dBA
Hopps Farm Road	43 – 60 dBA	55 – 59 dBA
Oyster Pond Road	43 – 60 dBA	53 dBA
Ryan's Way	53 – 56 dBA	58 – 63 dBA

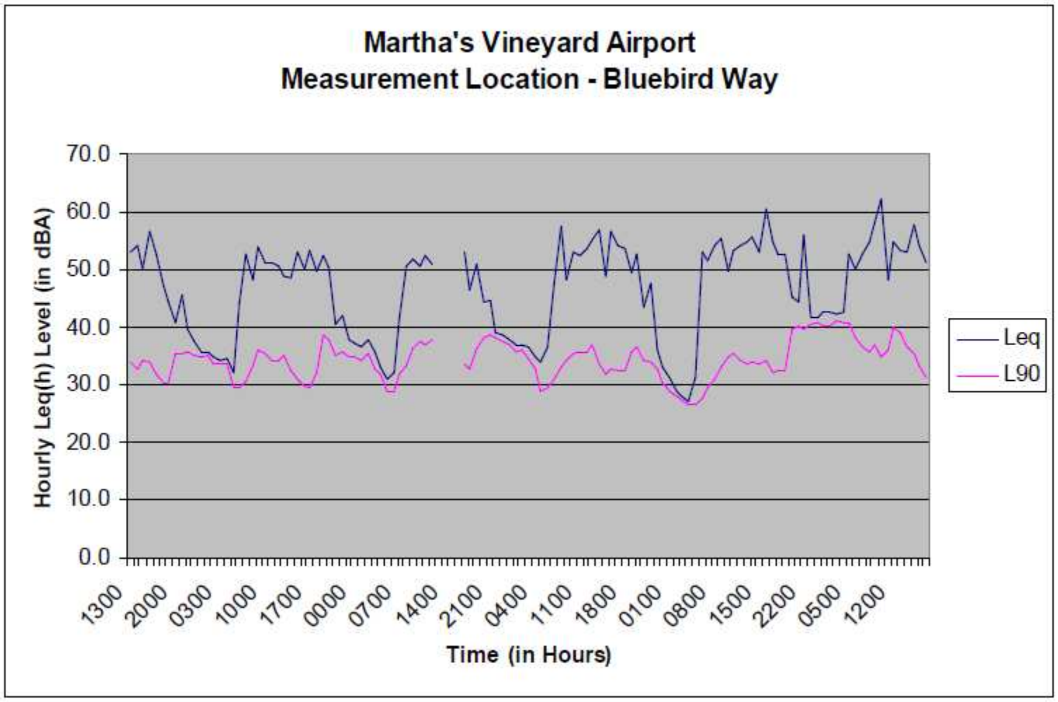


Figure 2: Measurement Location – Bluebird Way

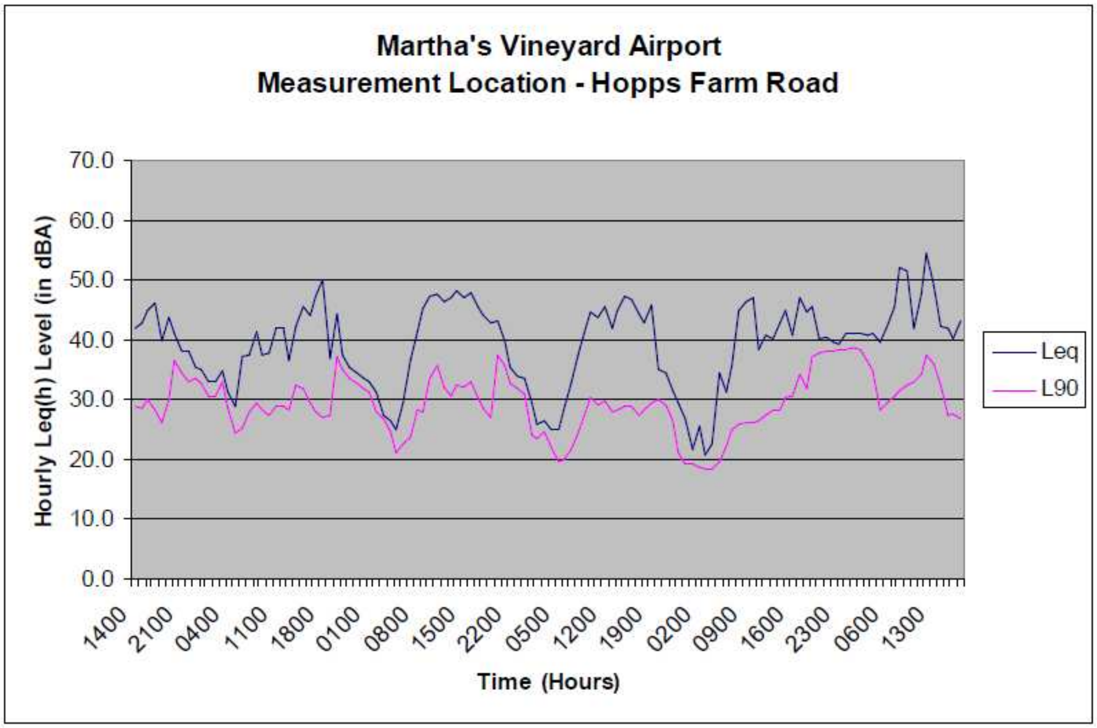


Figure 3: Measurement Location – Hopps Farm Road

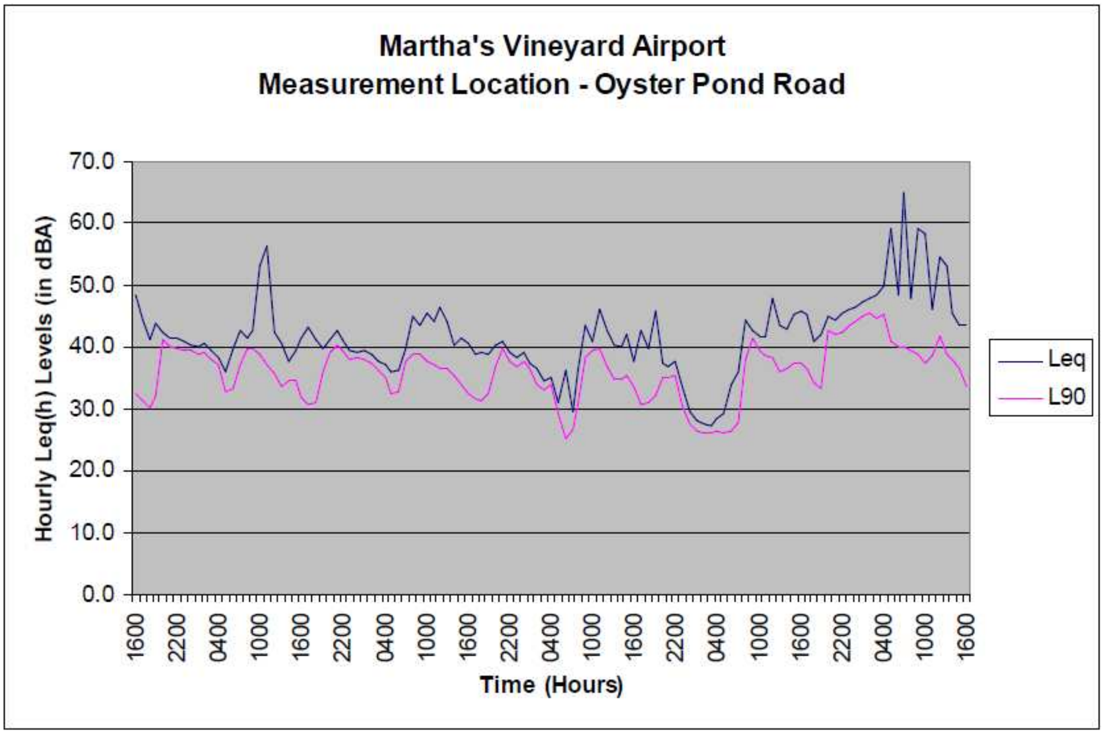


Figure 4: Measurement Location – Oyster Pond Road

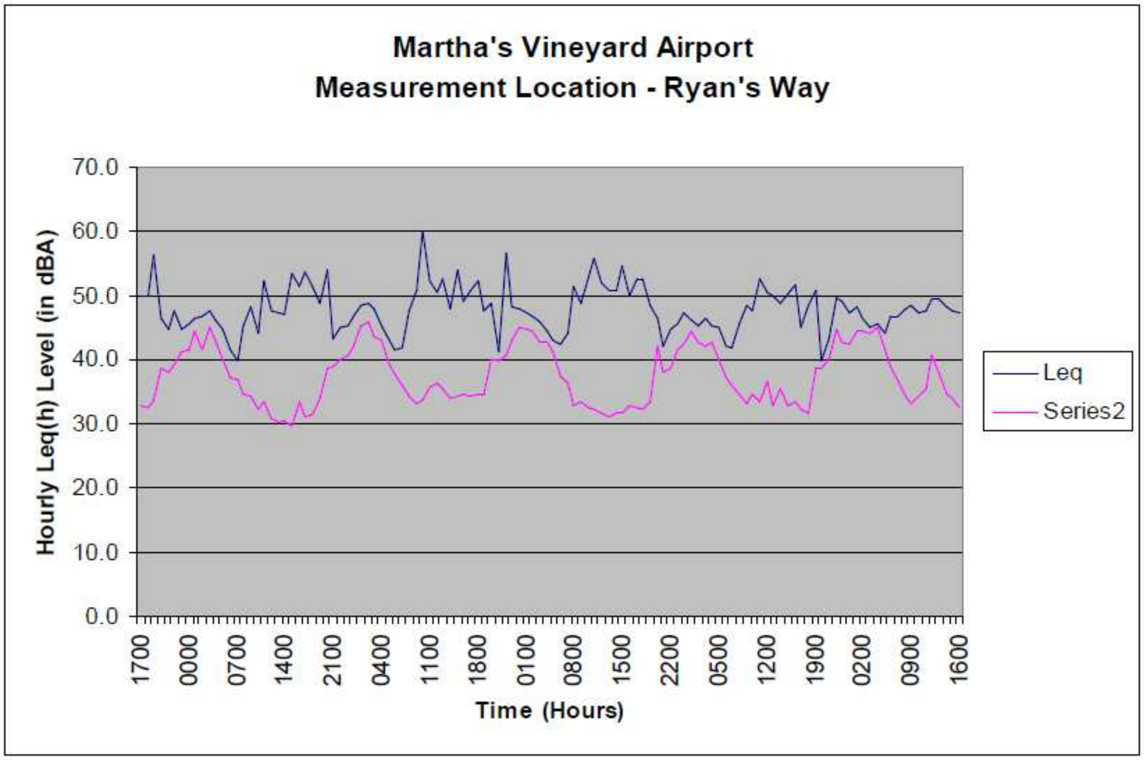


Figure 5: Measurement Location – Ryan's Way

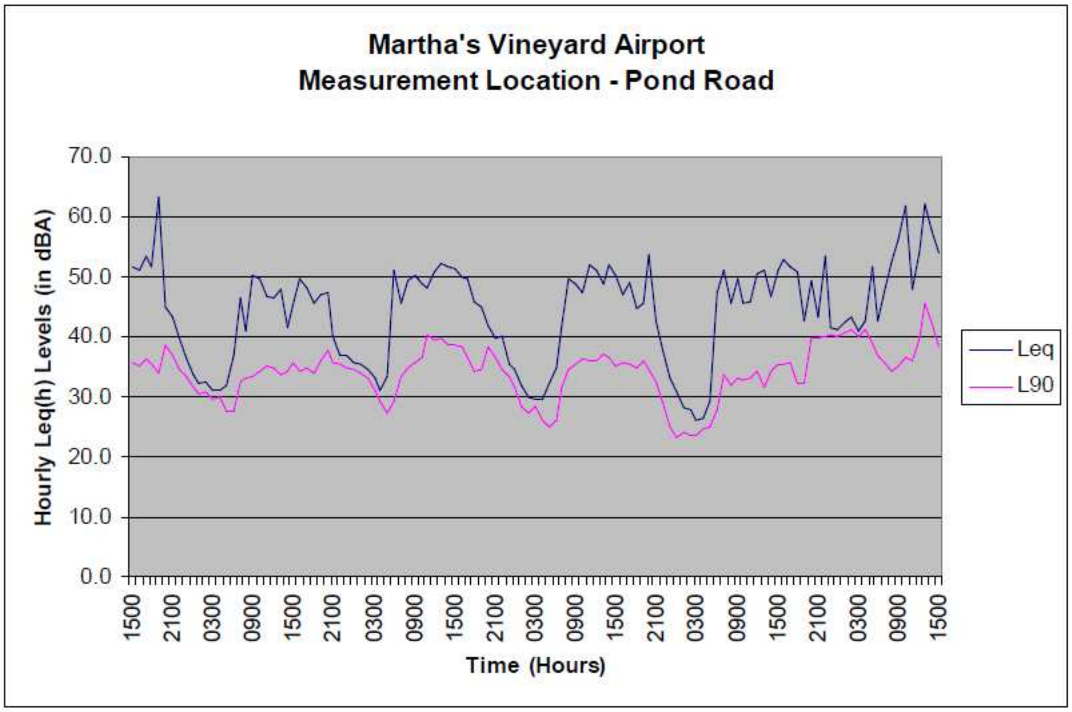


Figure 6: Measurement Location – Pond Road

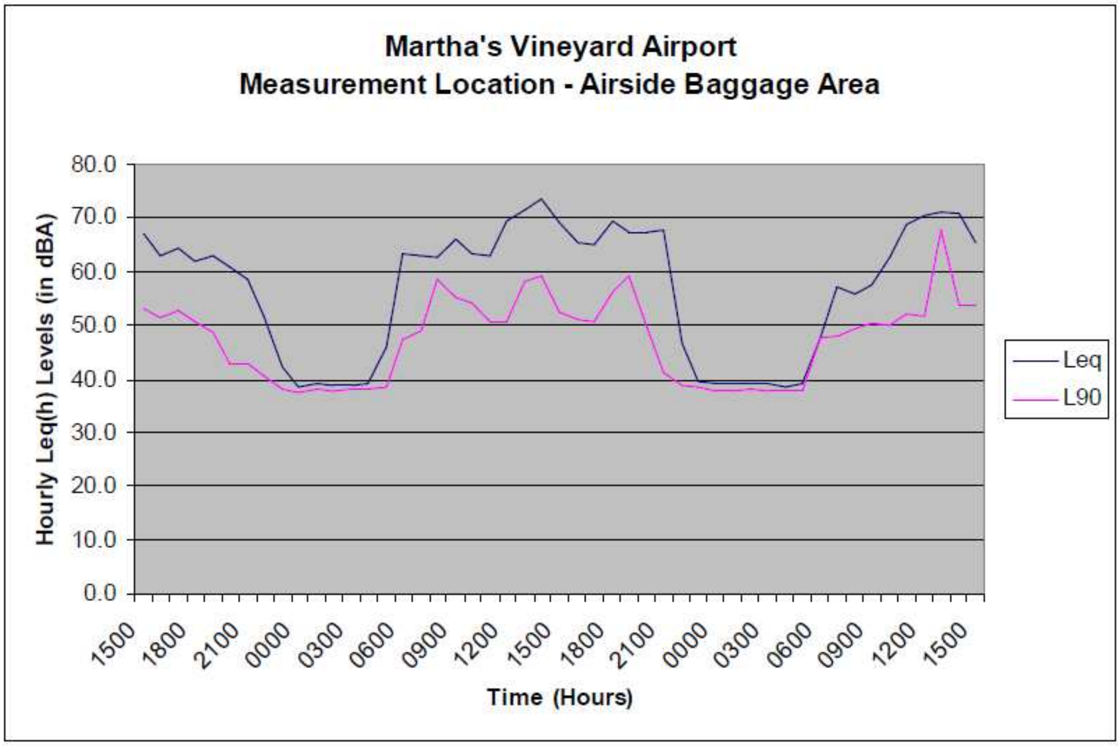


Figure 7: Measurement Location – Airside Baggage Area

Appendix A

1999 Noise Measurements

Table 1

Summary of the Noise Monitoring Program Conducted September 3-6, 1999
at Representative Receptor Locations Surrounding Martha's Vineyard Airport

Receptor		Distance to Runways		24-Hr[1]	Avg. Hr[2]	BKGD[3]	Maximum[4]
No.	Description	Dist (ft)	R/W End	DNL	Leq	L90	Lmax
1	Res., Bluebird Way (W. Tisbury)	2,500	06	59-61	45-70	36-53	52-98
2	Res., 17 Hopps Farm Rd (W. Tisbury)	9,000	15	55-59	40-59	26-55	50-80
3	Res., 58 Oyster Pond Rd (Edgartown)	8,000	33	53	46-51	38-50	35-65
4	Res., Ryan's Way (Oak Bluffs)	7,500	24	58-63	49-64	37-56	52-100

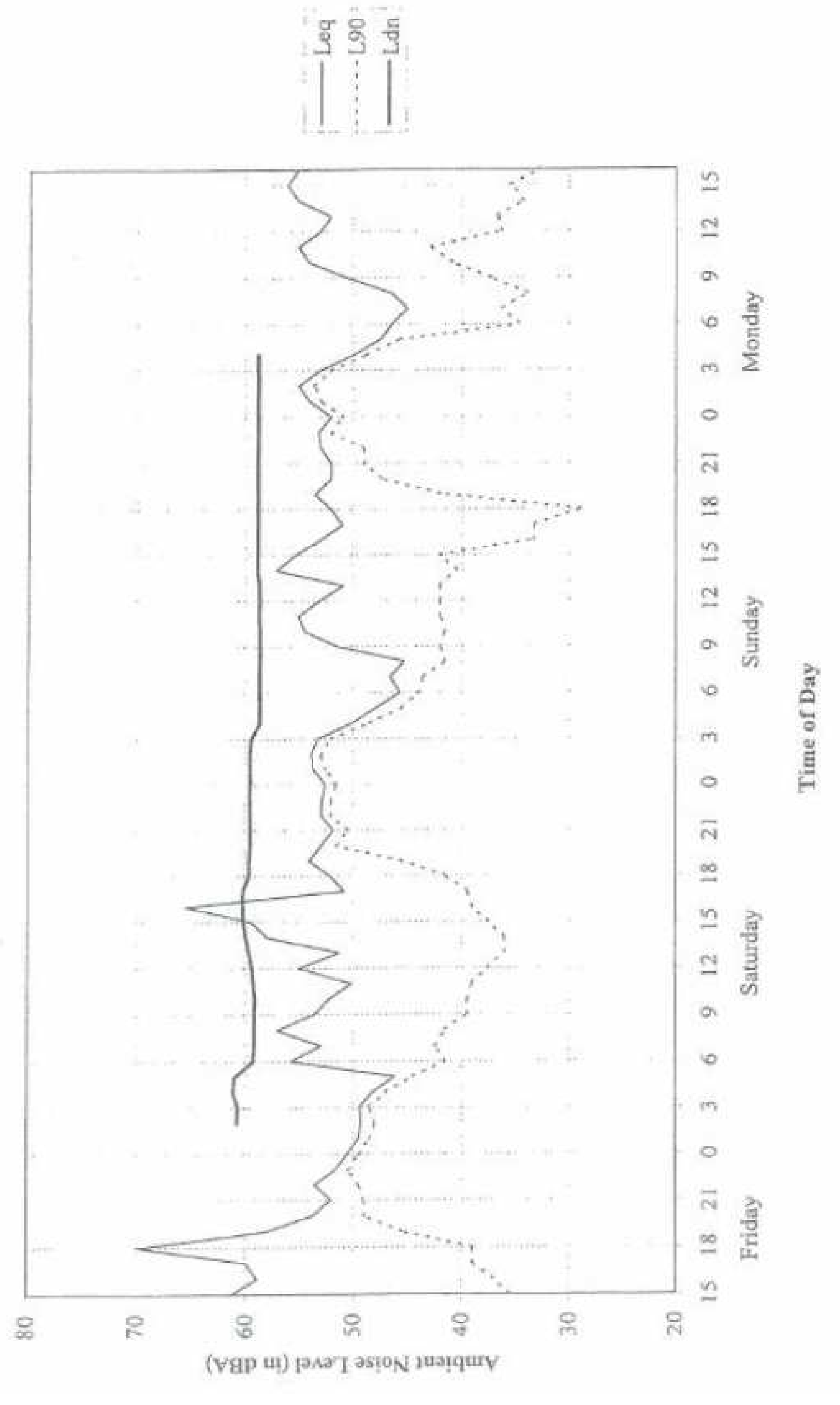


Figure 2: Measured Noise Levels at Site 1 (a residence on Bluebird Way, W. Tisbury) from September 3 to 6, 1999

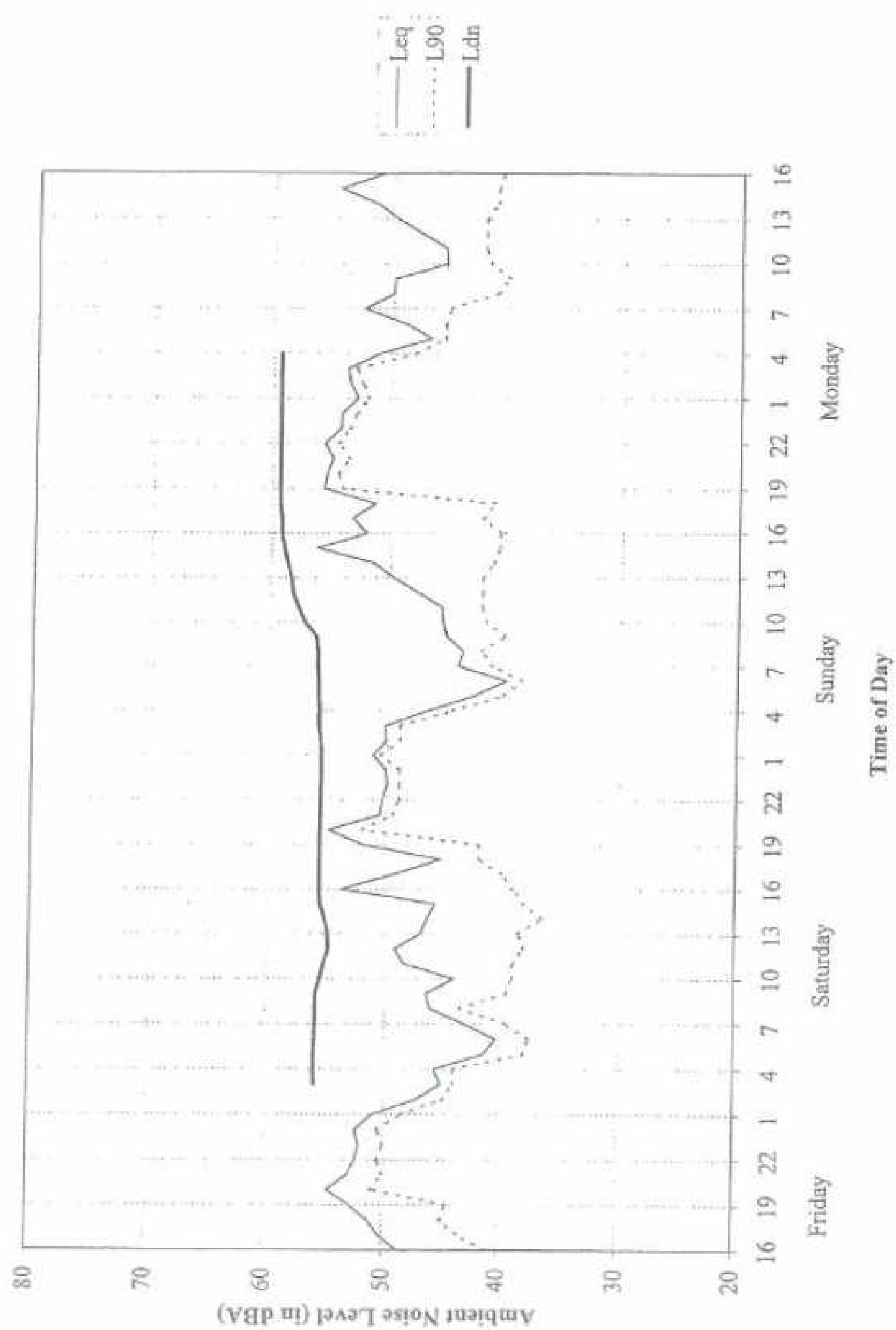


Figure 3: Measured Noise Levels at Site 2 (a Residence at 17 Hopps Farm Rd., W. Tisbury) from September 3 to 6, 1999

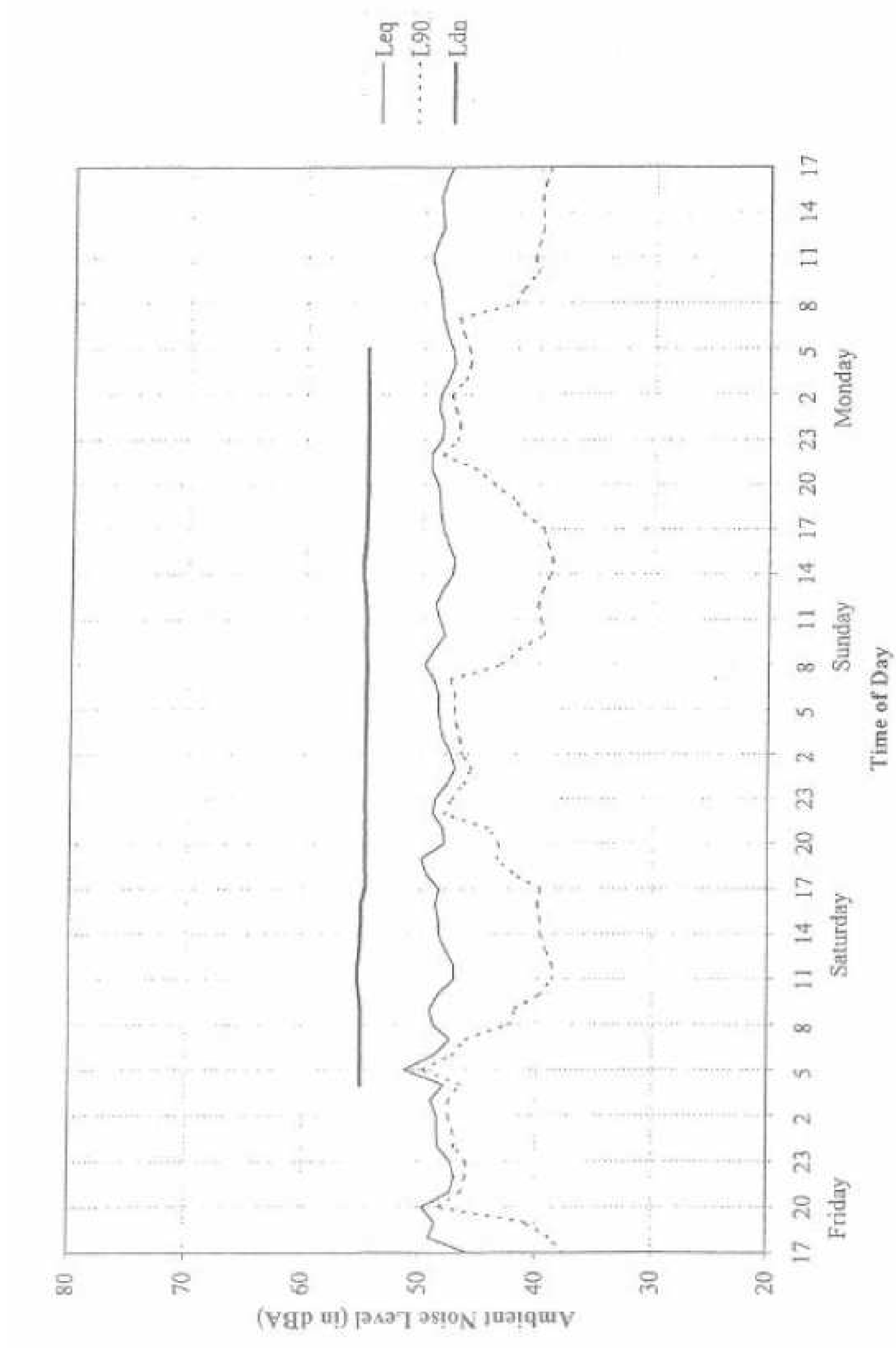


Figure 4: Measured Noise Levels at Site 3 (a Residence at 58 Oyster Pond Rd.) from September 3 to 6, 1999

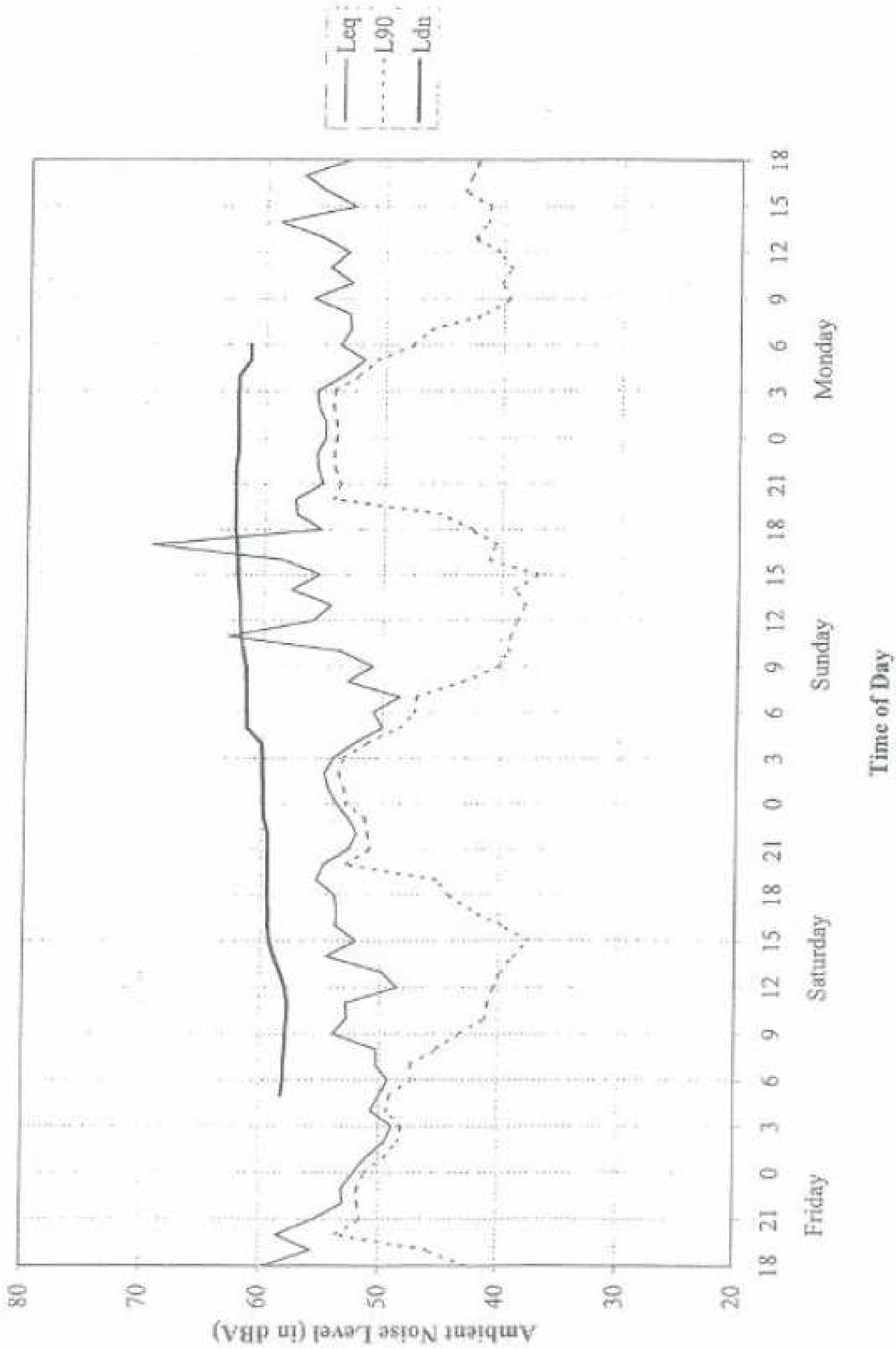


Figure 5: Measured Noise Levels at Site 5 (a Residence on Ryan's Way, Oak Bluffs) from September 3 to 6, 1999

APPENDIX 8 –

CORPORATE AIRCRAFT RUNWAY LENGTH REQUIREMENTS

Source:
Business & Commercial Aviation Magazine
Purchase Planning Handbook

Table 1

BALANCED FIELD LENGTH (BFL) TAKEOFF DISTANCE AT MAX. TAKEOFF WEIGHT

Corporate Jet	Runway Length Required [1]	Number Registered [2]
Diamond D-Jet	2,500’	0*
Eclipse EA-500	2,342’	264
Cessna Mustang CE-510	3,110’	85
Embraer Phenom 100	3,400’	0*
Cessna Citation CJ1	3,250’	413
Beechcraft Premier 1A	3,792’	49
Cessna Citation CJ2	3,360’	217
Grob Spn G180	3,000’	0*
Sino Swearingen SJ-30	3,939’	6
Hawker 400XP	3,906’	62
Embraer Phenom 300	3,700’	0*
Cessna Citation CJ3	3,180’	206
Cessna Citation Encore	3,520’	603
Cessna Citation CJ4	3,300’	3
Cessna Citation XLS	3,560’	436
Cessna Citation Sovereign	3,640’	170
Learjet 40XR	4,680’	0
Learjet 45XR	5,040’	314
Hawker 750	4,696’	25
Hawker 850XP	5,032’	16
Gulfstream G-150	5,012’	0*
Hawker 900XP	4,965’	59
Challenger 300	4,810’	142
Gulfstream G-350	5,050’	8
Falcon 900DX	4,890’	117
Bombardier Global 5000	5,000’	32
Total Registered	-	3,195

1. Takeoff distance at sea level, standard atmosphere (ISA), Max. T.O. Weight. (MTOW), balanced field length (BFL). All aircraft landing distance less than 4,000’.
2. Source: FAA Registration Database, August 2008
* FAA Certification new or pending.

Table 2

BALANCED FIELD LENGTH TAKEOFF DISTANCE AT REDUCED TAKEOFF WEIGHT

(1,000 nm Mission, IFR Reserves, 4 Pass.+ Bags + Crew)

Corporate Jet	**Runway Length Required** [1]	**Number Registered** [2]
Diamond D-Jet	NA	0*
Eclipse EA-500	2,342’	264
Cessna Mustang CE-510	3,120’	85
Embraer Phenom 100	NA	0*
Cessna Citation CJ1	3,088’	413
Beechcraft Premier 1A	3,642’	49
Cessna Citation CJ2	2,958’	217
Grob Spn G180	2,480’	0*
Sino Swearingen SJ-30	2,950’	6
Hawker 400XP	3,589’	62
Embraer Phenom 300	NA	0*
Cessna Citation CJ3	2,754’	206
Cessna Citation Encore	3,063’	603
Cessna Citation CJ4	2,820’	3
Cessna Citation XLS	3,021’	436
Cessna Citation Sovereign	3,093’	170
Learjet 40XR	3,767’	0
Learjet 45XR	3,882’	314
Hawker 750	3,966’	25
Learjet 60XR	3,690’ (600 nm range)	242
Hawker 850XP	3,974’	16
Gulfstream G-150	3,950’	0*
Hawker 900XP	3,915’	59
Embraer Legacy 135LR	3,773’	177
Cessna Citation X	3,672’	238
Hawker 4000	3,027’	29
Challenger 300	3,472’	142
Gulfstream G-200	3,965’	2
Gulfstream G-280	3,350’	0*
Embraer Legacy 600	3,563’	43
Falcon 2000DX/EX/LX	3,367’	243
Challenger 605	3,458’	195
Challenger 850	3,751’(600 nm range)	616
Gulfstream G-350	3,296’	8
Falcon 900DX	2,795’	117
Gulfstream G-450	3,299’	112
Global Challenger 890 CS	3,820’	114
Falcon 900EX	2,796’	99
Global Challenger 5000	2,692’	32
Gulfstream G-500	3,413’	7
Falcon 7X	2,750’	5
Boeing BBJ/BBJ-2	3,635’	98
Gulfstream G-550	3,436’	121
Global Express XRS	2,756’	126
Boeing BBJ IGW	3,590’	13

Falcon 900DX	2,795'	117
Total Registered	-	5,824

1 Takeoff distance at sea level, standard atmosphere (ISA), Reduced Takeoff Weight., balanced field length (BFL). All aircraft landing distance less than 4,000'.
2 Source: FAA Registration Database, August 2008
* FAA Certification new or pending.

Table 1
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Hawker 750	4,696’	25
Hawker 850XP	5,032’	16
Gulfstream G-150	5,012’	0*
Hawker 900XP	4,965’	59
Challenger 300	4,810’	142
Gulfstream G-350	5,050’	8
Falcon 900DX	4,890’	117
Bombardier Global 5000	5,000’	32
Total Registered	-	3,195

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2. Source: FAA Registration Database, August 2008
* FAA Certification new or pending.

Table 2
BALANCED FIELD LENGTH TAKEOFF DISTANCE AT REDUCED TAKEOFF WEIGHT
(1,000 nm Mission, IFR Reserves, 4 Pass.+ Bags + Crew)

Corporate Jet	Runway Length Required [1]	Number Registered [2]
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Cessna Citation CJ1	3,088’	413
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Hawker 4000	3,027’	29
Challenger 300	3,472’	142
Gulfstream G-200	3,965’	2
Gulfstream G-280	3,350’	0*
Embraer Legacy 600	3,563’	43
Falcon 2000DX/EX/LX	3,367’	243
Challenger 605	3,458’	195
Challenger 850	3,751’(600 nm range)	616
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Falcon 900DX	2,795’	117
Gulfstream G-450	3,299’	112
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Falcon 900EX	2,796’	99
Global Challenger 5000	2,692’	32
Gulfstream G-500	3,413’	7
Falcon 7X	2,750’	5
Boeing BBJ/BBJ-2	3,635’	98
Gulfstream G-550	3,436’	121

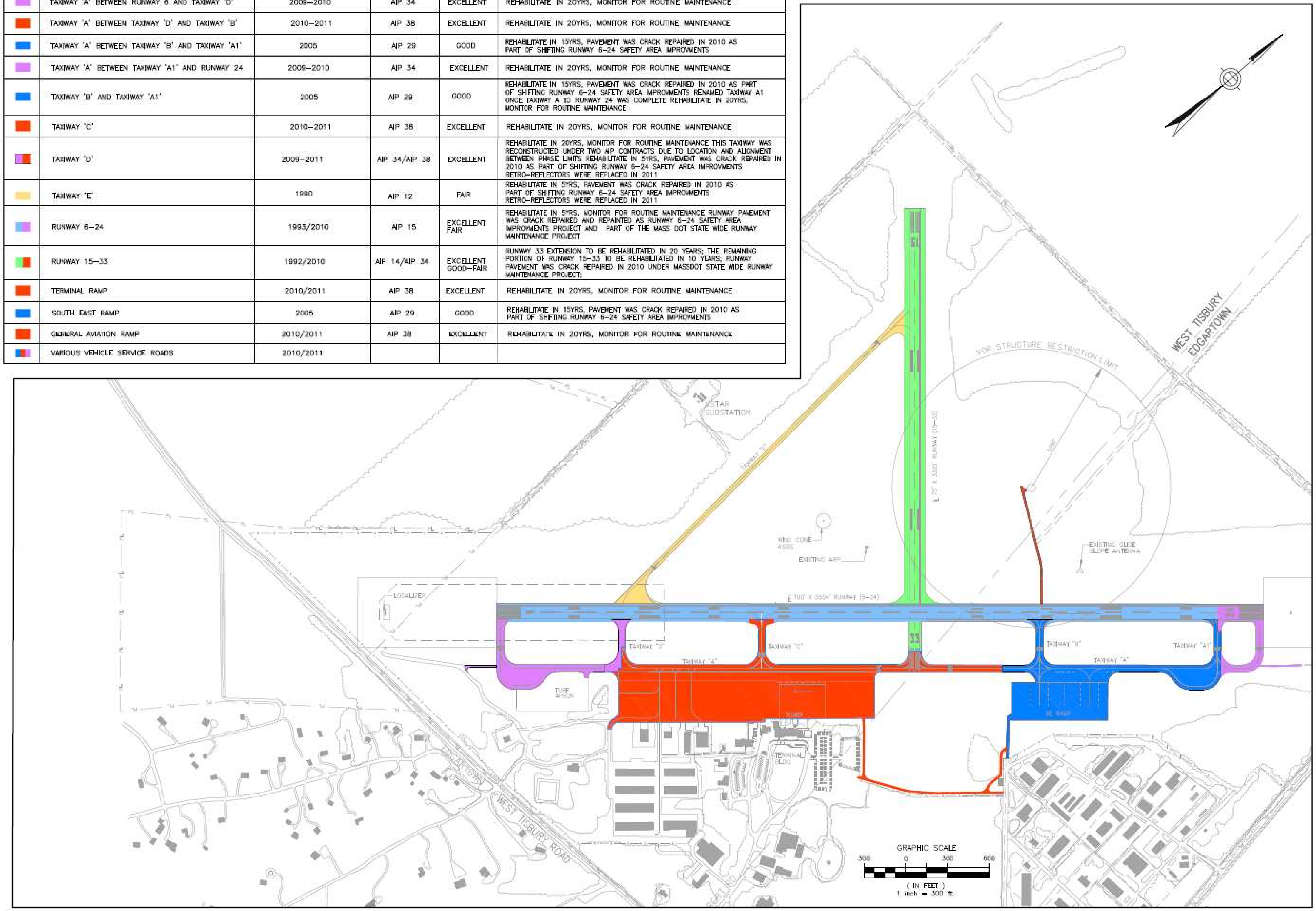
Global Express XRS	2,756’	126
Boeing BBJ IGW	3,590’	13
Falcon 900DX	2,795’	117
Total Registered	-	5,824

1 Takeoff distance at sea level, standard atmosphere (ISA), Reduced Takeoff Weight., balanced field length (BFL). All aircraft landing distance less than 4,000’.
2 Source: FAA Registration Database, August 2008
* FAA Certification new or pending.

APPENDIX 9 –

PAVEMENT INVENTORY PLAN

ITEM	LOCATION/DESCRIPTION	YEAR OF COMPLETION	AIP PROJECT NO.	RATING	COMMENTS/PROPOSED TIME OF REPAIR
	TAXIWAY 'A' BETWEEN RUNWAY 6 AND TAXIWAY 'D'	2009–2010	AIP 34	EXCELLENT	REHABILITATE IN 20YRS, MONITOR FOR ROUTINE MAINTENANCE
	TAXIWAY 'A' BETWEEN TAXIWAY 'D' AND TAXIWAY 'B'	2010–2011	AIP 38	EXCELLENT	REHABILITATE IN 20YRS, MONITOR FOR ROUTINE MAINTENANCE
	TAXIWAY 'A' BETWEEN TAXIWAY 'B' AND TAXIWAY 'A1'	2005	AIP 29	GOOD	REHABILITATE IN 15YRS, PAVEMENT WAS CRACK REPAIRED IN 2010 AS PART OF SHIFTING RUNWAY 6–24 SAFETY AREA IMPROVMENTS
	TAXIWAY 'A' BETWEEN TAXIWAY 'A1' AND RUNWAY 24	2009–2010	AIP 34	EXCELLENT	REHABILITATE IN 20YRS, MONITOR FOR ROUTINE MAINTENANCE
	TAXIWAY 'B' AND TAXIWAY 'A1'	2005	AIP 29	GOOD	REHABILITATE IN 15YRS, PAVEMENT WAS CRACK REPAIRED IN 2010 AS PART OF SHIFTING RUNWAY 6–24 SAFETY AREA IMPROVMENTS RENAMED TAXIWAY A1 ONCE TAXIWAY A TO RUNWAY 24 WAS COMPLETE REHABILITATE IN 20YRS, MONITOR FOR ROUTINE MAINTENANCE
	TAXIWAY 'C'	2010–2011	AIP 38	EXCELLENT	REHABILITATE IN 20YRS, MONITOR FOR ROUTINE MAINTENANCE
	TAXIWAY 'D'	2009–2011	AIP 34/AIP 38	EXCELLENT	REHABILITATE IN 20YRS, MONITOR FOR ROUTINE MAINTENANCE THIS TAXIWAY WAS RECONSTRUCTED UNDER TWO AIP CONTRACTS DUE TO LOCATION AND ALIGNMENT BETWEEN PHASE LIMITS REHABILITATE IN 5YRS, PAVEMENT WAS CRACK REPAIRED IN 2010 AS PART OF SHIFTING RUNWAY 6–24 SAFETY AREA IMPROVMENTS RETRO–REFLECTORS WERE REPLACED IN 2011
	TAXIWAY 'E'	1990	AIP 12	FAIR	REHABILITATE IN 5YRS, PAVEMENT WAS CRACK REPAIRED IN 2010 AS PART OF SHIFTING RUNWAY 6–24 SAFETY AREA IMPROVMENTS RETRO–REFLECTORS WERE REPLACED IN 2011
	RUNWAY 6–24	1993/2010	AIP 15	EXCELLENT FAIR	REHABILITATE IN 5YRS, MONITOR FOR ROUTINE MAINTENANCE RUNWAY PAVEMENT WAS CRACK REPAIRED AND REPAINTED AS RUNWAY 6–24 SAFETY AREA IMPROVMENTS PROJECT AND PART OF THE MASS DOT STATE WIDE RUNWAY MAINTENANCE PROJECT
	RUNWAY 15–33	1992/2010	AIP 14/AIP 34	EXCELLENT GOOD–FAIR	RUNWAY 33 EXTENSION TO BE REHABILITATED IN 20 YEARS; THE REMAINING PORTION OF RUNWAY 15–33 TO BE REHABILITATED IN 10 YEARS; RUNWAY PAVEMENT WAS CRACK REPAIRED IN 2010 UNDER MASSDOT STATE WIDE RUNWAY MAINTENANCE PROJECT;
	TERMINAL RAMP	2010/2011	AIP 38	EXCELLENT	REHABILITATE IN 20YRS, MONITOR FOR ROUTINE MAINTENANCE
	SOUTH EAST RAMP	2005	AIP 29	GOOD	REHABILITATE IN 15YRS, PAVEMENT WAS CRACK REPAIRED IN 2010 AS PART OF SHIFTING RUNWAY 6–24 SAFETY AREA IMPROVMENTS
	GENERAL AVIATION RAMP	2010/2011	AIP 38	EXCELLENT	REHABILITATE IN 20YRS, MONITOR FOR ROUTINE MAINTENANCE
	VARIOUS VEHICLE SERVICE ROADS	2010/2011			



REVISIONS

REV. NO.	DATE	DESCRIPTION	BY

MVY AIRPORT MARTHA'S VINEYARD

JACOBS
343 CONGRESS STREET
BOSTON, MA 02210
Tel 617-242-9222
Fax 617-242-9824
WWW.JACOBS.COM

SCALE: 1"=400' | DATE: DECEMBER 2012 | DESIGNED BY SJF | DRAWN BY SNA | CHECKED BY WER

MARTHA'S VINEYARD AIRPORT
WEST TISBURY, MASSACHUSETTS

PAVEMENT INVENTORY PLAN

JACOBS PROJ. NO.: E2X60500
A.I.P. NO.:
FILE:
DRAWING NO.
1
SHEET 1 OF 1

APPENDIX 10 –

INSTRUMENT APPROACH PROCEDURES

VINEYARD HAVEN, MASSACHUSETTS AL-694 (FAA) 14205

LOC/DME I-MVY 108.7 Chan 24	APP CRS 236°	Rwy ldg 5504 THRE 63 Apt Elev 67

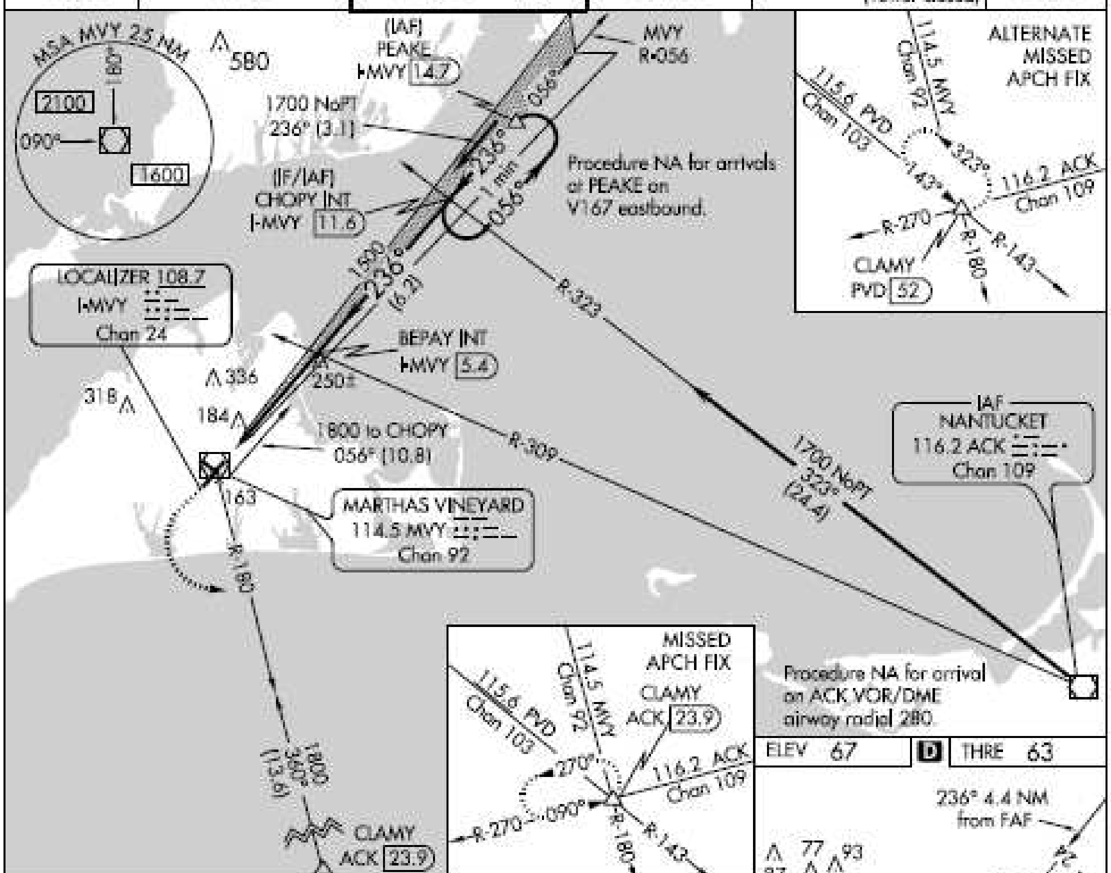
ILS or LOC RWY 24
MARTHA'S VINEYARD (MVY)

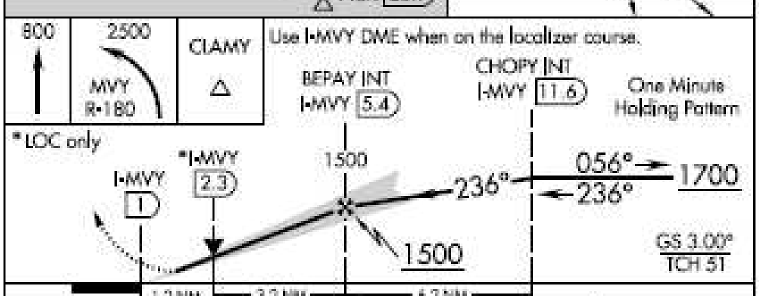
Visibility reduction by helicopters NA. VDP NA with Hyannis altimeter setting. When local altimeter setting not received, use Hyannis altimeter setting and increase all DA 54 feet and all MDA 60 feet; increase S-LOC Cats C and D visibility to RVR 5000. For inoperative MALSR when using Hyannis altimeter setting, increase S-LOC Cats C and D visibility to 1⅝ mile.
**RVR 1800 authorized with use of FD or AP or HUD to DA.

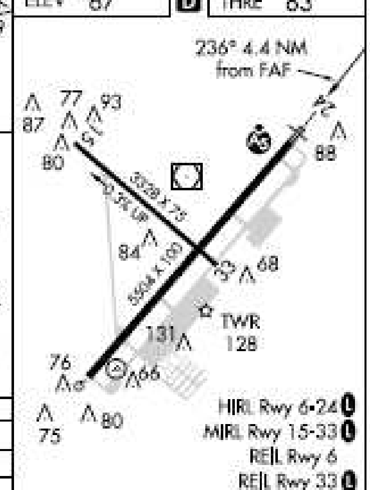
MALSR

MISSED APPROACH: Climb to 800 then climbing left turn to 2500 on MVY VOR/DME R-180 to CLAMY INT/ACK 23.9 DME and hold.

ATIS	CAPE APP CON *	VINEYARD TOWER *	GND CON	CLNC DEL	UNICOM
126.25	119.7	121.4 (CTAF)	124.35	124.35 119.7 (Tower closed)	122.95







CATEGORY	A	B	C	D
S-ILS 24	** 263/24 200 (200-½)			
S-LOC 24	500/24 437 (500-½)		500/40 437 (500-¾)	
CIRCLING	500-1 433 (500-1)	520-1 453 (500-1)	540-1½ 473 (500-1½)	620-2 553 (600-2)

FAF to MAP 4.4 NM

Knots	60	90	120	150	180
Min:Sec	4:24	2:56	2:12	1:46	1:28

VINEYARD HAVEN, MASSACHUSETTS
Amdt 3 13JAN11
41°24'N-70°37'W
MARTHA'S VINEYARD (MVY)
ILS or LOC RWY 24

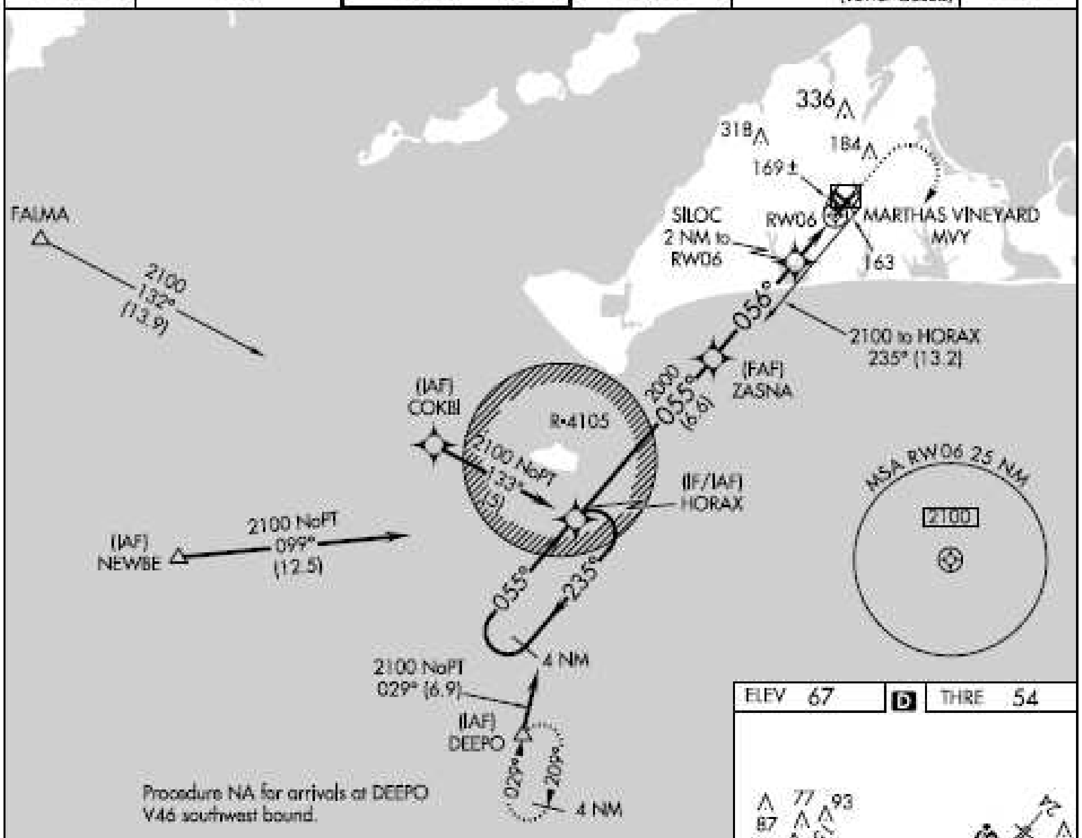
WAAS CH 42601 W06A	APP CRS 056°	Rwy ldg 5504 THRE 54 Apt Elev 67

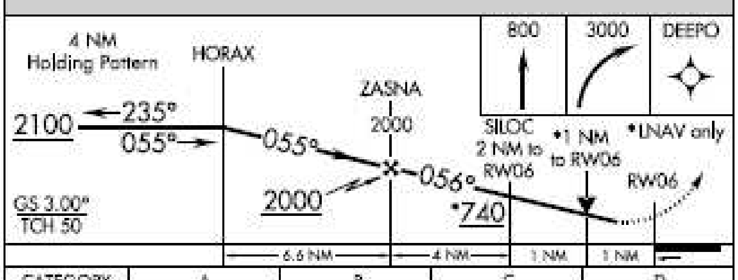
RNAV (GPS) RWY 6
MARTHA'S VINEYARD (MVY)

DME/DME RNP-0.3 NA. Visibility reduction by helicopters NA. VDP and Baro-VNAV NA when using Hyannis altimeter setting. For uncompensated Baro-VNAV systems, LNAV/VNAV NA below -15°C (5°F) or above 43°C (109°F). When local altimeter setting not received, use Hyannis altimeter setting and increase all DA 54 feet and all MDA 60 feet; increase LPV all Cats visibility ¼ mile, LNAV-VNAV all Cats visibility ⅛ mile, and LNAV Cats C and D visibility ¼ mile.

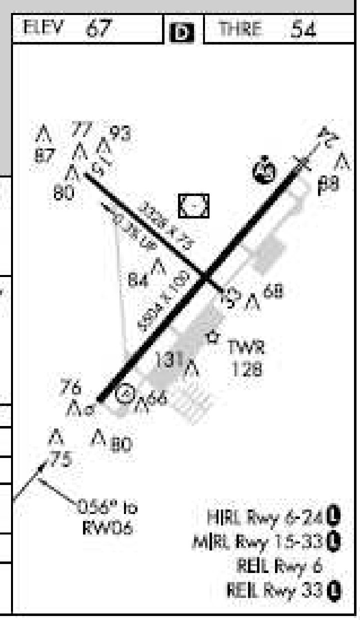
MISSED APPROACH: Climb to 800 then climbing right turn to 3000 direct DEEPO and hold.

ATIS	CAPE APP CON *	VINEYARD TOWER *	GND CON	CLNC DEL	UNICOM
126.25	119.7	121.4 (CTAF)	124.35	124.35 119.7 (Tower closed)	122.95





CATEGORY	A	B	C	D
LPV DA	304-¾ 250 (300-¾)			
LNAV/VNAV DA	350-1 296 (300-1)			
LNAV MDA	420-1 366 (400-1)			
CIRCLING	500-1 433 (500-1)	520-1 453 (500-1)	540-1½ 473 (500-1½)	620-2 553 (600-2)



VINEYARD HAVEN, MASSACHUSETTS — AL-694 (FAA) — 14205

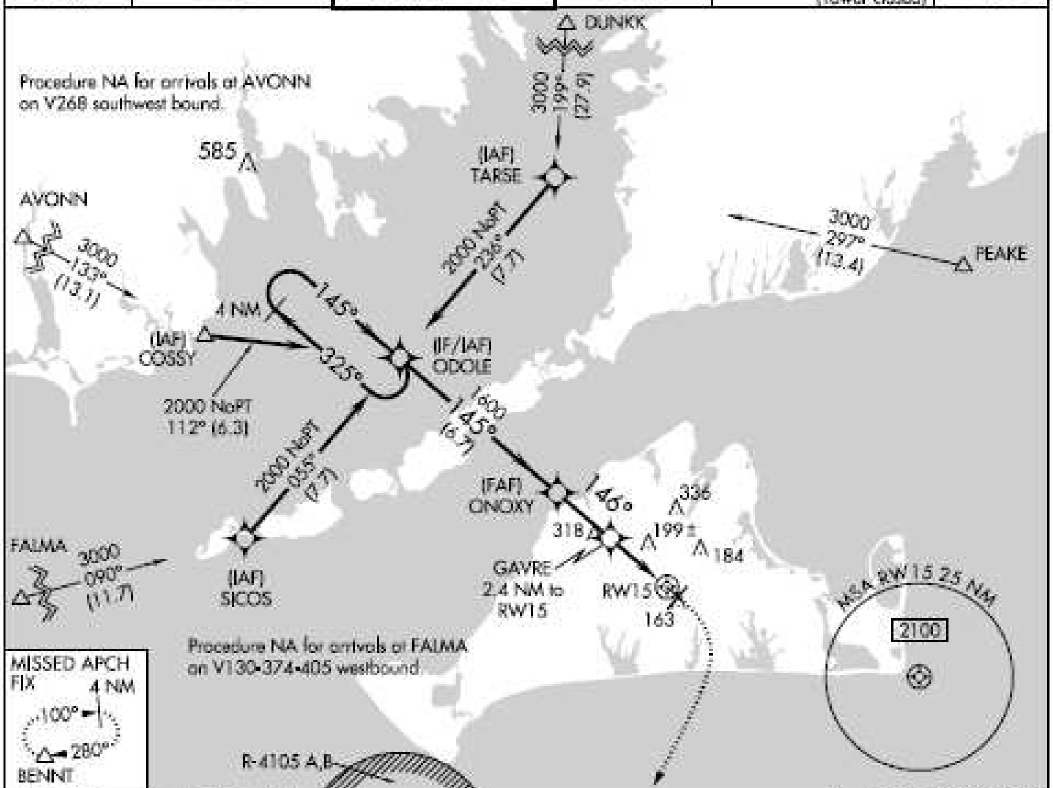
WAAS CH 93829 W15A	APP CRS 146°	Rwy ldg 3327 / THRE 67 / Apt Elev 67

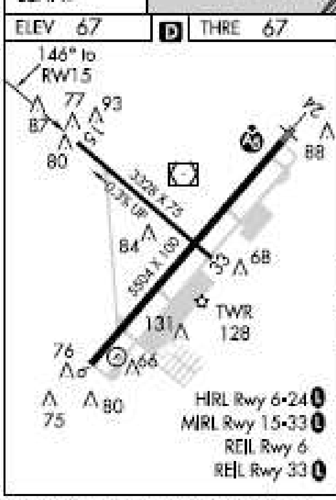
RNAV (GPS) RWY 15
MARTHA'S VINEYARD (MVY)

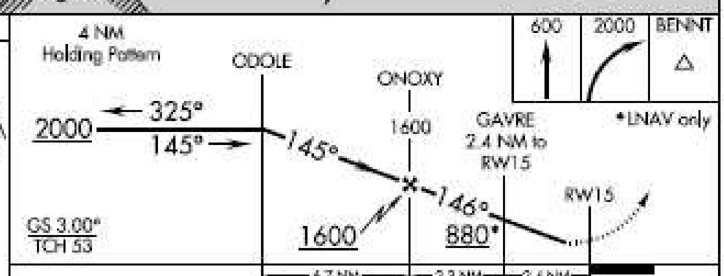
Baro-VNAV NA when using Hyannis altimeter setting. For uncompensated Baro-VNAV systems, LNAV/VNAV NA below -15°C (5°F) or above 54°C (130°F). When local altimeter setting not received, use Hyannis altimeter setting and increase all DA 54 feet and all MDA 60 feet; increase LNAV Cat C and D visibility and Circling Cat C and D visibility ¼ mile. DME/DME RNP-0.3 NA. Helicopter visibility reduction below 1 SM NA. Rwy 15 Straight-in and Circling minimums NA at night.

MISSED APPROACH: Climb to 600 then climbing right turn to 2000 direct BENNT and hold.

ATIS	CAPE APP CON *	VINEYARD TOWER *	GND CON	CLNC DEL	UNICOM
126.25	119.7	121.4 (CTAF)	124.35	124.35 119.7 (Tower closed)	122.95







CATEGORY	A	B	C	D
LPV DA	317-1 250 (300-1)			
LNAV/VNAV DA	317-1 250 (300-1)			
LNAV MDA	460-1 393 (400-1)		460-1⅛ 393 (400-1⅛)	
CIRCLING	500-1 433 (500-1)	540-1 473 (500-1)	700-1¾ 633 (700-1¾)	780-2½ 713 (800-2½)

VINEYARD HAVEN, MASSACHUSETTS
Orig-A 19SEP13

41°24'N-70°37'W

MARTHA'S VINEYARD (MVY)
RNAV (GPS) RWY 15

RNAV (GPS) RWY 24
MARTHA'S VINEYARD (MVY)

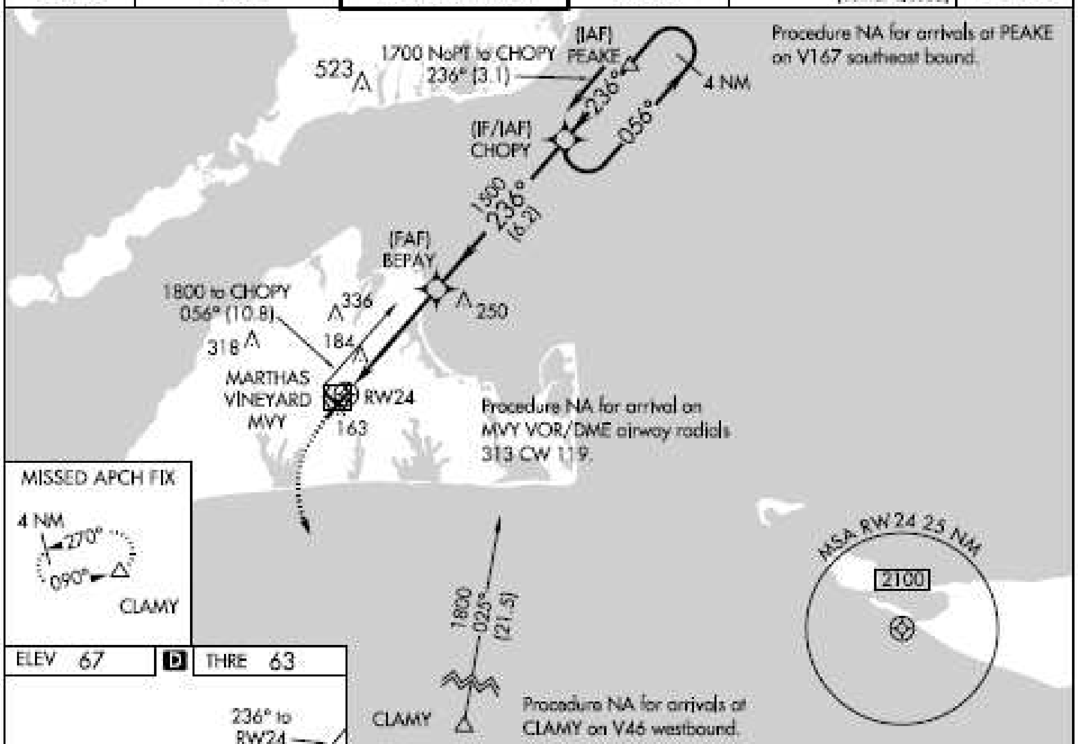
WAAS	APP CRS		
CH 48804 W24A	236°	Rwy ldg 5504 THRE 63 Apt Elev 67	

For uncompensated Baro-VNAV systems, LNAV/VNAV NA below -14°C (7°F) or above 54°C (130°F). DME/DME RNP-0.3 NA. When local altimeter setting not received, use Hyannis altimeter setting and increase all DA 54 feet and all MDA 60 feet; increase LNAV/VNAV all Cats visibility to RVR 5200; increase LNAV Cats C/D visibility to RVR 5000; increase Circling visibility Cats C to 2 miles and D to 2 ½ mile. For inoperative MALSR, increase LNAV/VNAV all Cats visibility to 1⅜ mile. For inoperative MALSR using Hyannis altimeter setting, increase LPV all Cats visibility to RVR 4000, LNAV/VNAV all Cats visibility to 1⅝ mile and increase LNAV Cats C/D visibility to 1⅛ mile. VDP and Baro-VNAV NA when using Hyannis altimeter setting. Circling to Rwy 15 NA at night.

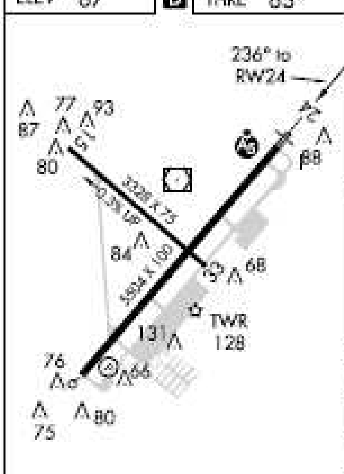
MALSR

MISSED APPROACH: Climb to 500 then climbing left turn to 2500 direct CLAMY and hold.

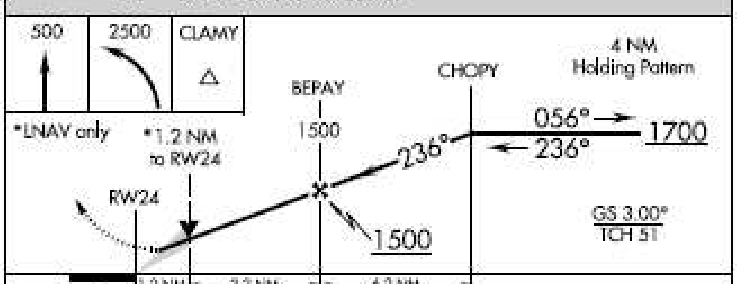
ATIS	CAPE APP CON *	VINEYARD TOWER *	GND CON	CLNC DEL	UNICOM
126.25	119.7	121.4 (CTAF)	124.35	124.35 119.7 (Tower closed)	122.95



ELEV 67 THRE 63



HIRL Rwy 6-24
MIRL Rwy 15-33
REIL Rwy 6
REIL Rwy 33



CATEGORY	A	B	C	D
LPV DA	263/24 200 (200-½)			
LNAV/VNAV DA	480/47 417 (500-1)			
LNAV MDA	500/24 437 (500-½)		500/40 437 (500-¾)	
CIRCLING	500-1 433 (500-1)	540-1 473 (500-1)	700-1¾ 633 (700-1¾)	780-2¼ 713 (800-2¼)

WAAS CH 56629 W33A	APP CRS 326°	Rwy ldg 3327 THRE 57 Apt Elev 67

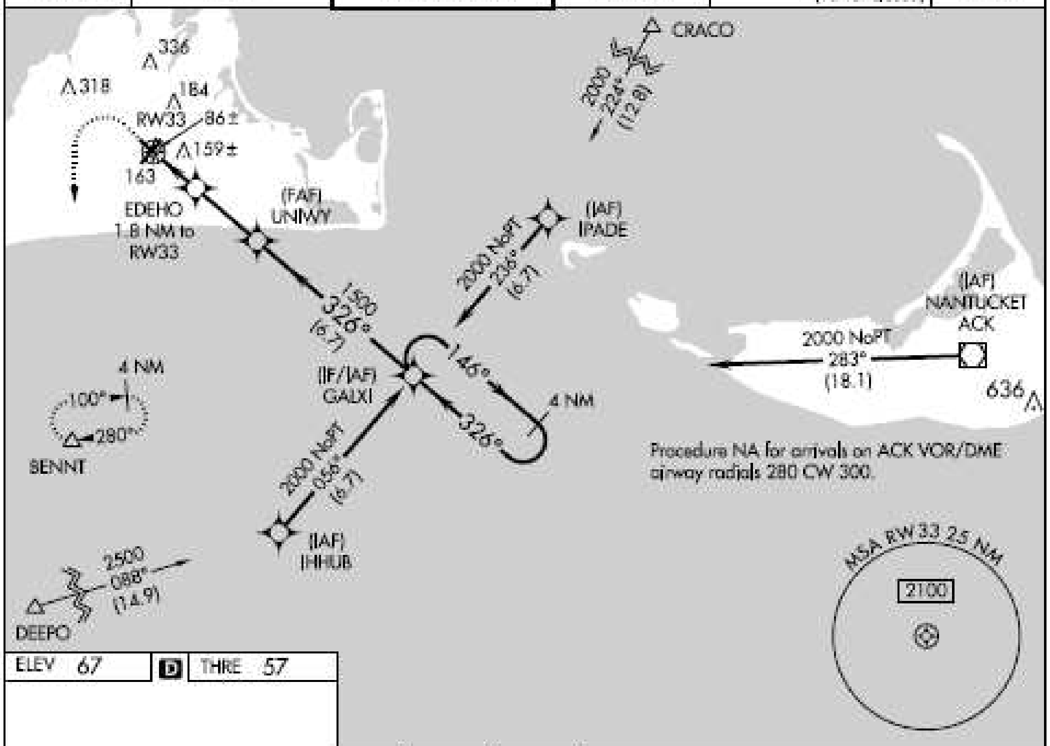
RNAV (GPS) RWY 33

MARTHA'S VINEYARD (MVY)

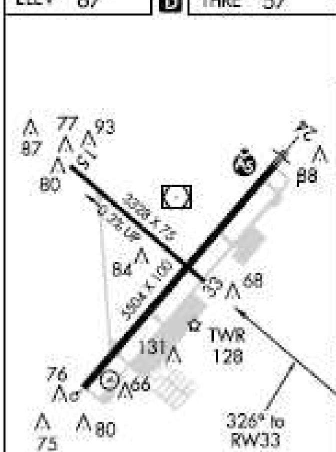
Circling to Rwy 15 NA at night. Baro-VNAV NA when using Hyannis altimeter setting. For uncompensated Baro-VNAV systems, LNAV/VNAV NA below -15°C (5°F) or above 43°C (109°F). DME/DME RNP-0.3 NA. Visibility reduction by helicopters NA. When local altimeter setting not received, use Hyannis altimeter setting and increase all DA 54 feet and all MDA 60 feet; increase LNAV/VNAV all Cats visibility to ½ and LNAV Cat C and D ¼ mile. Straight-in/Circling Rwy 33 procedure NA at night.

MISSED APPROACH: Climb to 1400 then climbing left turn to 2000 direct BENNT and hold.

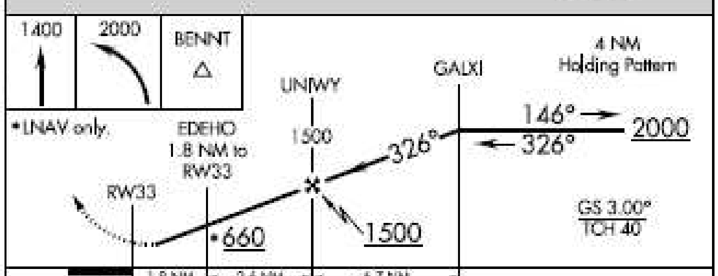
ATIS	CAPE APP CON *	VINEYARD TOWER *	GND CON	CLNC DEL	UNICOM
126.25	119.7	121.4 (CTAF)	124.35	124.35 119.7 (Tower closed)	122.95



ELEV 67 | D | THRE 57



HIRL Rwy 6-24
MIRL Rwy 15-33
REIL Rwy 6
REIL Rwy 33



CATEGORY	A	B	C	D
LPV DA	307-1 250 (300-1)			
LNAV/VNAV DA	330-1 273 (300-1)			
LNAV MDA	420-1 363 (400-1)			
CIRCLING	500-1 433 (500-1)	520-1 453 (500-1)	540-1½ 473 (500-1½)	620-2 553 (600-2)

VINEYARD HAVEN, MASSACHUSETTS AL-694 (FAA) 14205

VOR/DME MVY 114.5 Chan 92	APP CRS 050°	Rwy ldg 5504 THRE 54 Apt Elev 67

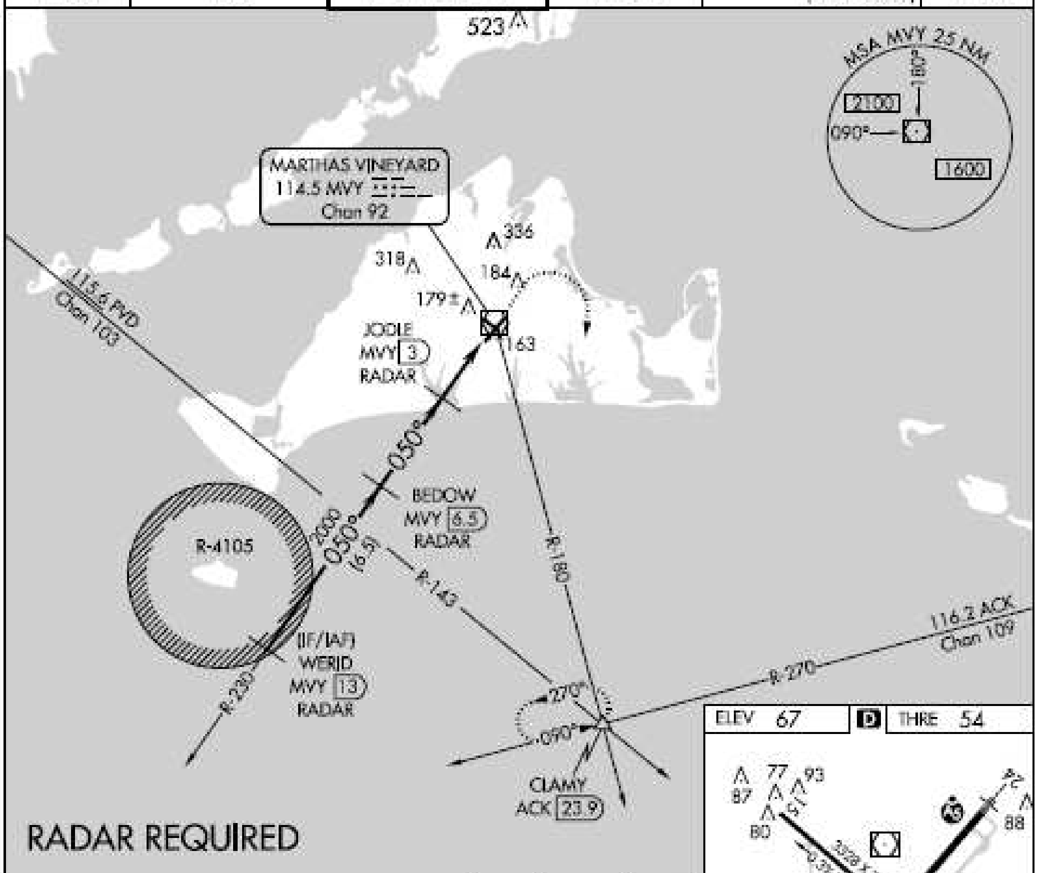
VOR RWY 6

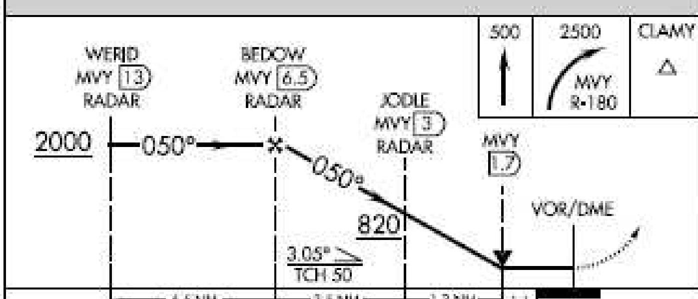
MARTHA'S VINEYARD (MVY)

DME or Radar required. Visibility reduction by helicopters NA. VDP NA with Hyannis altimeter setting. When local altimeter setting not received, use Hyannis altimeter setting and increase all MDA 60 feet; increase S-6 Cats C and D visibility ¼ mile.

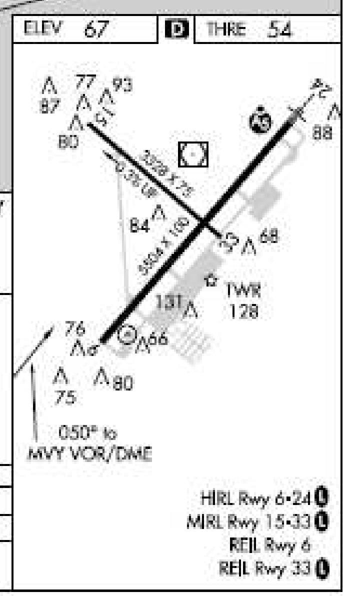
MISSED APPROACH: Climb to 500 then climbing right turn to 2500 via MVY VOR/DME R-180 to CLAMY INT/ACK 23.9 DME and hold.

ATIS	CAPE APP CON *	VINEYARD TOWER *	GND CON	CLNC DEL	UNICOM
126.25	119.7	121.4 (CTAF)	124.35	124.35 119.7 (Tower closed)	122.95





CATEGORY	A	B	C	D
S-6	440-1	386 (400-1)	440-1⅛	386 (400-1⅛)
CIRCLING	500-1 433 (500-1)	520-1 453 (500-1)	540-1½ 473 (500-1½)	620-2 553 (600-2)



VINEYARD HAVEN, MASSACHUSETTS
Amdt 2 13JAN11

41°24'N-70°37'W

MARTHA'S VINEYARD (MVY)
VOR RWY 6

VINEYARD HAVEN, MASSACHUSETTS AL-694 (FAA) 14205

VOR RWY 24

MARTHA'S VINEYARD (MVY)

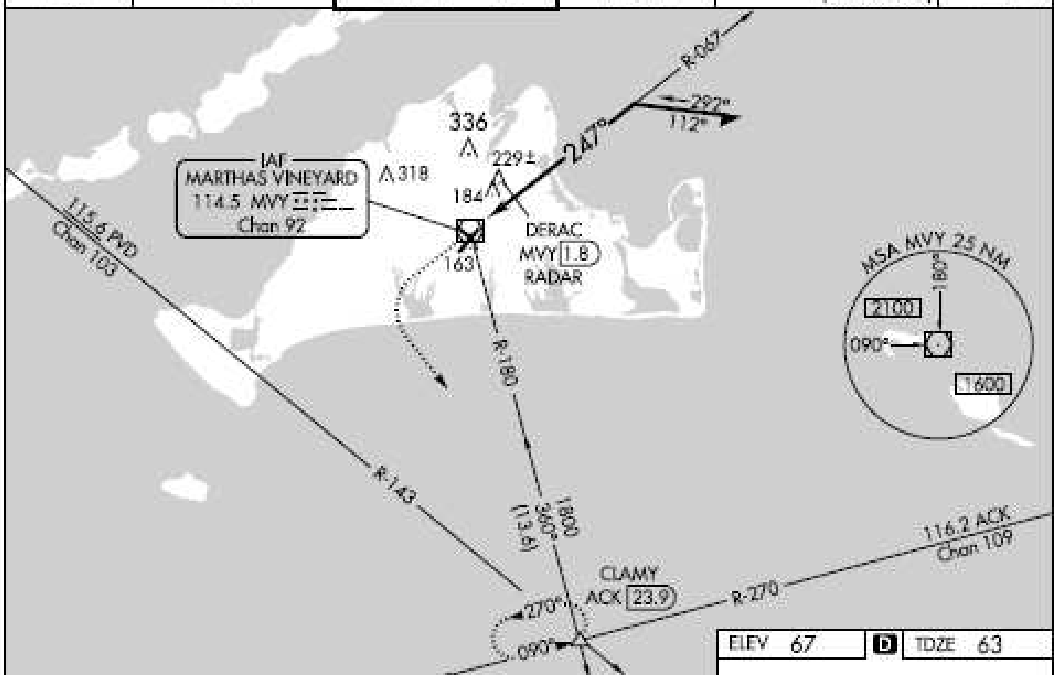
VOR/DME MVY 114.5 Chan 92	APP CRS 247°	Rwy ldg 5504 TDZE 63 Apt Elev 67

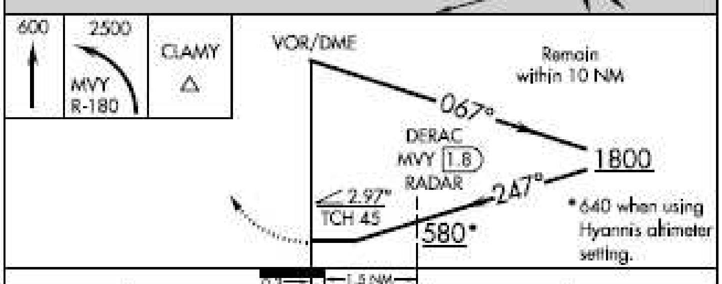
Visibility reduction by helicopters NA. When local altimeter setting not received, use Hyannis altimeter setting and increase all MDA 60 feet; increase S-24 Cats C and D visibility ¼ mile, increase DERAC fix minimums S-24 Cat C and D visibility to RVR 5000. For inoperative MALSR, increase S-24 Cats A and B visibility to RVR 5000, Cats C and D visibility to 1⅜ mile; increase DERAC fix minimums S-24 Cats A and B to RVR 5000, Cats C and D to RVR 6000. For inoperative MALSR using Hyannis altimeter setting, increase S-24 Cats A and B to RVR 5000, Cats C and D to 1⅝ mile; increase DERAC fix minimums S-24 Cats A and B visibility to RVR 5000, Cats C and D to 1⅜ mile.

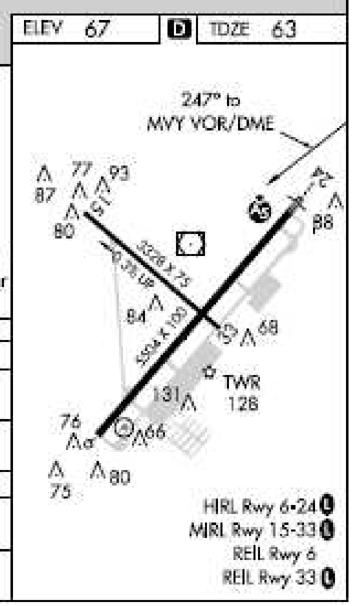
MALSR

MISSED APPROACH: Climb to 600 then climbing left turn to 2500 via MVY VOR/DME R-180 to CLAMY INT/ACK 23.9 DME and hold.

ATIS	CAPE APP CON *	VINEYARD TOWER *	GND CON	CLNC DEL	UNICOM
126.25	119.7	121.4 (CTAF)	124.35	124.35 119.7 (Tower closed)	122.95







CATEGORY	A	B	C	D
S-24	580/40 517 (600-½)		580/55 517 (600-1¼)	
CIRCLING	580-1 513 (600-1)		580-1½ 513 (600-1½)	620-2 553 (600-2)
DERAC FIX MINIMUMS				
S-24	480/40 417 (500-½)			
CIRCLING	500-1 433 (500-1)	520-1 453 (500-1)	540-1½ 473 (500-1½)	620-2 553 (600-2)

VINEYARD HAVEN, MASSACHUSETTS

Amdt 2 13JAN11

41°24'N-70°37'W

MARTHA'S VINEYARD (MVY)

VOR RWY 24