4. Forecasts

4.1. INTRODUCTION

The purpose of aviation forecasting is to outline future growth of significant areas of activity over a 20-year period at the Barnstable Municipal Airport (HYA or the Airport). The Federal Aviation Administration (FAA) requires that all airport planning efforts be based upon an approved forecast methodology as the resulting analysis assists in determining the facility requirements for meeting future demand.

The key elements of this chapter include:

- Airport Catchment/Service Areas
- Forecast Influencing Factors
- Socioeconomic Data
- Commercial Passenger Enplanements
- Aircraft Operations
- Based Aircraft
- Itinerant General Aviation Passengers
- Annual Instrument Operations
- Forecast Summary
- Existing and Future Design Aircraft

Key metrics of the aviation forecasts and their focus at HYA include the following:

Annual Commercial Passenger Enplanements: The number of people boarding commercial aircraft at HYA each year, which is used to identify the need for future passenger terminal area space, parking facilities, and airport access. In the dynamic commercial aviation industry, forecasting passenger enplanements requires a broad view of trends and influencing factors as opposed to looking at past relationships through regression analysis. These growth-influencing factors range from socioeconomic patterns to air service analyses.

Aircraft Operations: The number of takeoffs and landings at HYA each year, which is used to determine the necessary capacity of the airfield and aircraft operating areas. A takeoff and landing are each counted individually as one operation.

Based Aircraft by Type: The number and type of general aviation (GA) and Cape Air aircraft maintained at the airport on a permanent basis (including remain overnight (RON)), which is used to identify the space requirements of future facilities.

General Aviation Passengers: The estimated number of non-pilots utilizing GA facilities.

Annual Instrument Approaches: The estimated number of traffic counts that fly under Instrument Flight Rules (IFR) and are captured by FAA enroute computers.

At the time of this forecast effort (Spring 2020), there is a great deal of short-term uncertainty and volatility in demand due to the impacts of the global Covid-19/Coronavirus crisis. The initial sharp reduction in demand and following economic ramifications may result in much lower demand in all aviation segments, especially those related to commercial aviation in the immediate short-term. Though the full impacts remain to be seen, the situation is currently being viewed as more of a temporary shock/interruption to the market as opposed to a shift in demand. The cardinal years of 5, 10, and 20 are still considered prudent for long-range planning purposes as the broader market is expected to ultimately emerge the same as it was prior to these events.

4.2. AIRPORT CATCHMENT/SERVICE AREAS

4.2.1. Commercial Service Catchment Area

Presently, nearly all of Cape Cod uses other off-Cape airports for their commercial service needs as a function of where those services are currently offered. These are primarily Boston's Logan and Providence's TF Green Airports. For the sake of this master plan, the HYA potential commercial service market area is defined as all of Cape Cod and towns that straddle the Cape Cod Canal. Towns that would normally be considered within a reasonable 60-minute drive of Hyannis that were off-cape, such as Plymouth, were excluded from the service area as those communities are ultimately closer to other commercial service options in Boston and Providence. This market area was used for a detailed analysis involving passenger booking data which, is discussed in the enplanements section. **Figure 4-1** displays the passenger service area for HYA.

During the peak season, traffic across the Cape Cod Canal can be time-prohibitive for people from Plymouth County. However, a year-round, low-cost service should include Plymouth County in the catchment area.

4.2.2. General Aviation Service Areas

GA also plays a key role at HYA. For purposes of GA, the area from which tenants/users are most likely to be located is referred to as a service area. For HYA, there are two types of GA service areas: GA jet service and light GA service areas. When determining service areas, Martha's Vineyard and Nantucket (the Islands) were excluded.

GA jet service and light GA service areas are shown in **Figure 4-2** and **Figure 4-3**, respectively. The GA jet service area is defined as airports having at least one 5,000-foot paved runway at a public use GA airport. Within Barnstable County and south of the Cape Cod Canal, HYA is the only public use airport with at least one 5,000-foot paved runway to provide jet service. The Island Airports were excluded from this service area since most GA operations would fly directly to the Islands if that is their final destination.

Figure 4-1: Commercial Service - Service Area

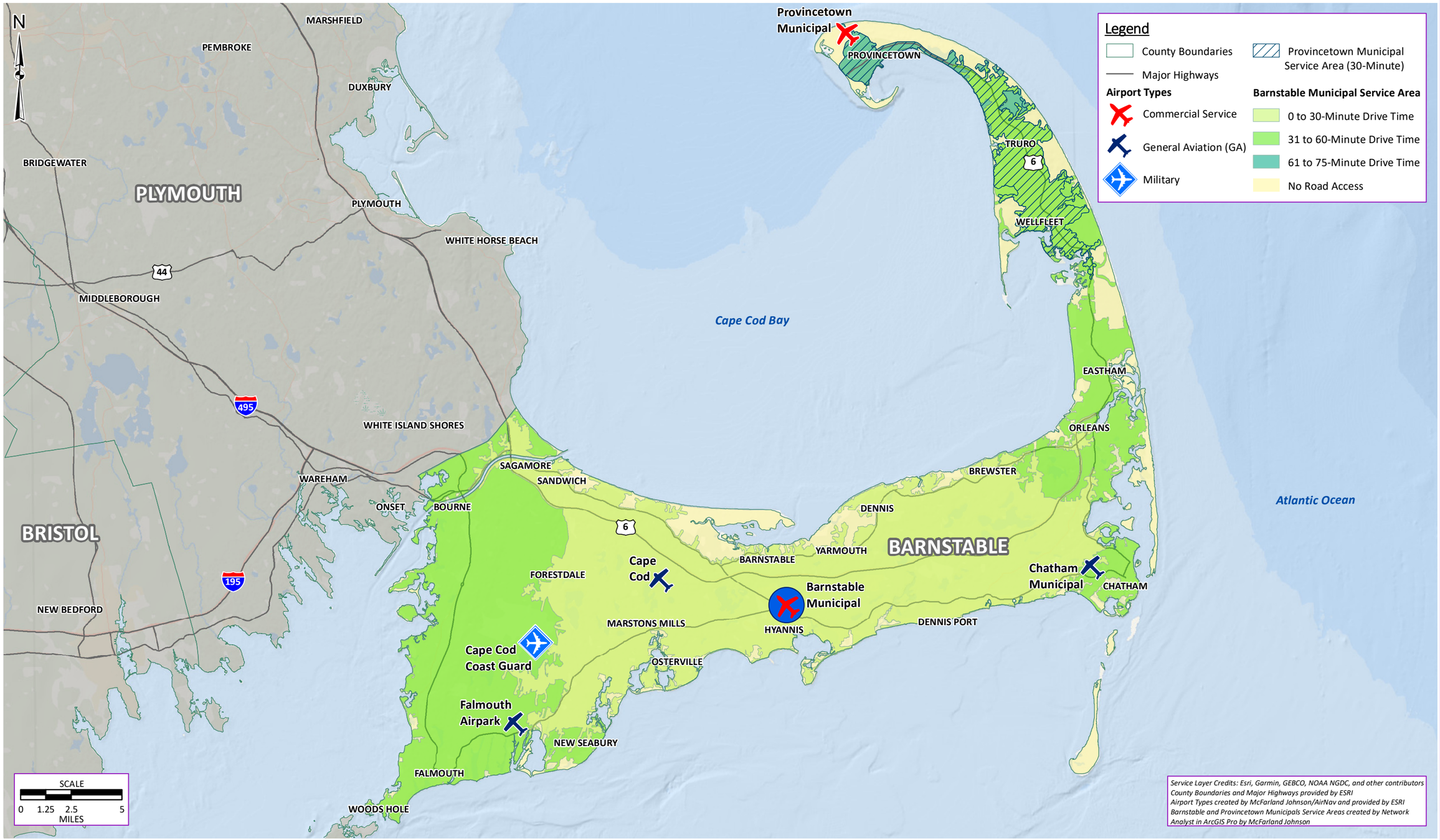

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Figure 4-2: GA Jet - Service Area

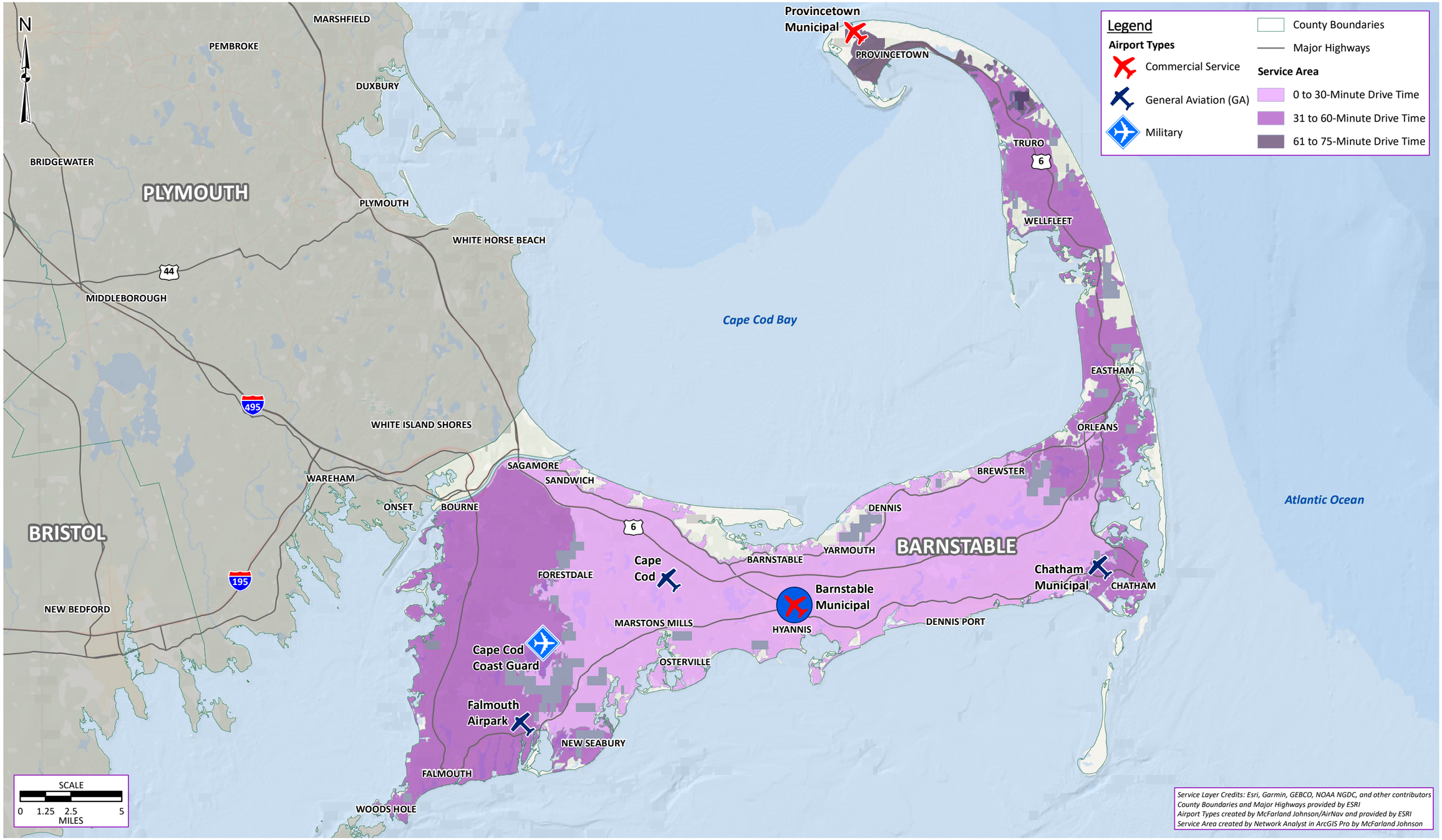

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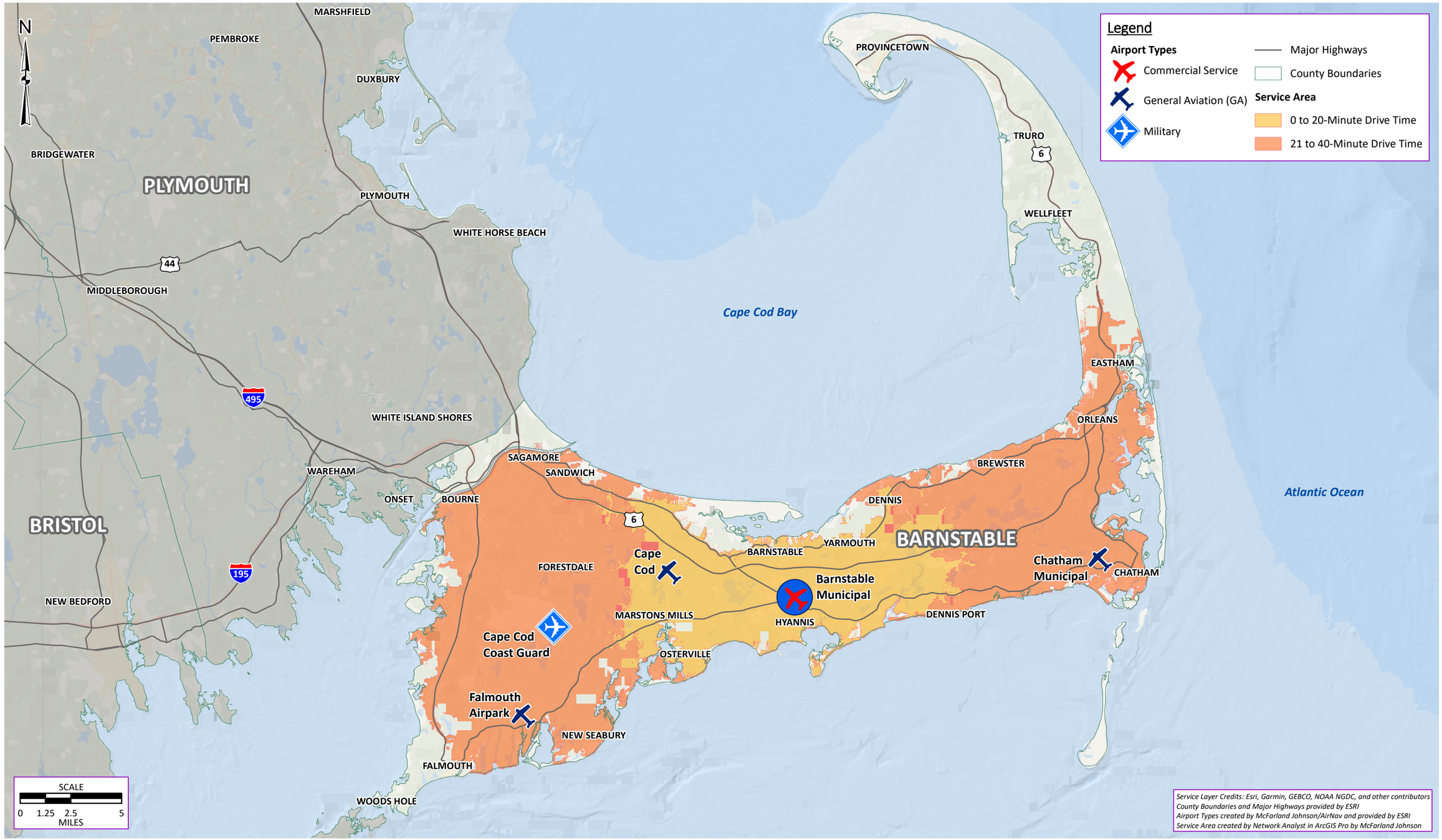
Figure 4-3: Light GA - Service Area



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The light GA service area was defined as public use GA airports within a 40-minute drive and south of the Cape Cod Canal. There are four public use GA airports within the light GA service area. These airports are: HYA, Cape Cod Airfield (2B1), Falmouth Airpark (5B6), and Chatham Municipal Airport (CQX). Of these airports, only 2B1 is located within a 20-minute drive time. However, 2B1 does not have a paved runway.

4.3. FORECAST INFLUENCING FACTORS

Airline and Hub Consolidation – In the early to mid-2000's, there were close to a dozen major network airlines such as Air Tran, America West, Continental, Northwest, TWA, and US Airways all of whom have since merged or have been acquired by other airlines. These actions have also limited hub choice as airlines closed hubs such as Pittsburgh (US Airways), Cincinnati (Delta), Cleveland (Continental), and Memphis (Northwest). While consolidation among the major network carriers (American, Delta, Southwest, and United) is unlikely, some consolidation cannot be ruled out for the next size-tier of airlines such as Alaska, Frontier, JetBlue, or Spirit. Despite how the airlines sell the merger to regulatory agencies in the approval process, mergers and acquisitions typically result in reduced options and higher fares for the consumer in the long run. For airports this can result in a surplus of facilities such as ticket counters, baggage offices, and sometimes even gates.

Low Cost Airline Growth – Low cost and less than daily service has been introduced at dozens of small-hub and non-hub airports throughout the U.S. The number of airports with low fare service had increased steadily over time with nearly every airport small-hub and larger boasting some type of low-fare service, with an increasing number of non-hub airports joining that list. This service is often seasonal and less-than daily allowing airlines to better match service levels to the limited demand of these small markets.

Aircraft Up-Gauging – Industry wide, and especially at small and medium sized airports, regional jets and turboprops with 50 seats or less are being consolidated into larger regional aircraft. In most cases, these larger aircraft come at the expense of frequency. This is further emphasized by the fact that there are no aircraft being produced or in development for the more than 9 to 66 seat segments aside from the ATR-42, which only has one operator in the U.S. (Silver Airways). The last 50-seat regional jet was delivered to a U.S. regional in 2005, meaning they will likely all be retired within the 20-year planning horizon.

This trend was included as a highlight in the FAA's Aerospace Forecast for 2019-2039, which notes "US carrier system capacity measure in available seat miles is forecast to grow in line with the increases in demand. The number of seats per aircraft is getting bigger, especially in the regional jet market, where we expect the number of 50 seat regional jets to fall to just a handful by 2030, replaced by 70-90 seat aircraft."

Pilot Supply – In recent years, the industry has begun to see impacts associated with a reduced number of pilots entering the aviation industry. Reduced pay, with the onset of regional jet flying in the 2000's, and regulatory changes requiring 1,500 hours for first officers, have added to an already increasingly expensive training process. These are compounding factors that will likely increase the severity of this issue in the coming years. Some industry groups also predict a similar shortage in qualified aircraft mechanics. Limited pilot supply is a contributing factor to the recent aircraft up-gauging trend. The pilot shortage is not unique to HYA. However, Cape Air acts as an

entry level position for new pilots. With Cape Air being based at the Airport, this situation could present additional business opportunities for HYA.

NextGen – For the past 10 years, the FAA has been incrementally implementing new technology with the broader goal of modernizing the nation's air traffic control system. Some of the key objectives involve improving the safety and efficiency of airspace in and around high-volume airport regions such as Atlanta, New York, and Washington. These improvements may not have a noticeable impact on airport's operational efficiency; however, it may reduce delays to hub airports and provide the opportunity for additional schedule frequencies resulting in an improved passenger experience.

Fuel Prices – Over the past 10 years, the aviation industry has demonstrated its sensitivity to fuel prices and their impact on operational cost and ultimately aviation demand. On average, fuel represents approximately one-third of the cost of commercial aviation activity. Thus, during spikes in fuel prices like in 2008, the impacts to both supply and demand are tremendous. Advancements in fuel technology will help reduce industry sensitivity to fuel although it will likely continue to be a key influencer for activity for some time.

Electric Aircraft - To counter the high cost and uncertainty associated with fuel, several aircraft manufacturers have begun investing in the development of all-electric aircraft. The prospects that are furthest along in the development phase are predominantly those 9-seats and smaller. Cape Air is hoping to be a pioneer by having ordered aircraft for their fleet. There are significant regulatory hurdles to overcome before these aircraft can enter revenue service or even be utilized privately on a wide scale; however, this could potentially have notable implications on demand. Key considerations associated with the development of electric aircraft include the provision of the necessary facilities for charging and the loss of fuel sales, flowage fees and tax revenue that funds airport infrastructure.

Aircraft Technology – Over the past 20 years there have been significant advances and innovations to aviation and aircraft technology. With global positioning system (GPS) technology, unmanned aerial systems (UAS), and single pilot operations for complex aircraft systems, the next 20 years will likely yield numerous additional advances in technology that could impact various airline business models. Monitoring and maintaining an awareness of technology enhancements and potential applications will help ensure the Airport is always well-positioned to respond to a changing industry.

4.4. SOCIOECONOMIC DATA

To understand the socioeconomic atmosphere surrounding the Airport, data was collected and placed in multiple tables below. These tables provide a comparison between the United States, the Commonwealth of Massachusetts, Dukes County, Nantucket County, Barnstable County, and surrounding towns that comprise the local area.

The total percent change in population from 2000 to 2018, shows that the Barnstable vicinity, with the exception of Dukes and Nantucket Counties, has experienced a steady decline in population, while the U.S. and the Commonwealth of Massachusetts have seen increases in population. Barnstable County, the Town of Barnstable, the Town of Yarmouth, and the Town of Falmouth

have seen declines in population. Dukes and Nantucket Counties as well as the Town of Sandwich show population increases in the past 18 years. These numbers are shown in **Table 4-1**.

Table 4-1: Population Change 2000-2018

Area	2000 Population	2010 Population	2018 Population (Estimate)	Total % Population Change (2000-2018)
United States	281,421,906	308,745,538	327,167,434	+16.26%
Commonwealth of Massachusetts	6,349,097	6,547,629	6,902,149	+8.71%
Dukes County	14,836	16,155	17,313	+16.70%
Dukes County Seasonal Increase[1]	N/A	N/A	200,000	N/A
Nantucket County	9,210	10,069	11,101	+20.53%
Nantucket County Seasonal Increase[2]	N/A	N/A	60,000	N/A
Barnstable County	222,230	215,888	213,413	-3.97%
Barnstable County Seasonal Increase[3]	N/A	N/A	430,000	N/A
Town of Barnstable	47,821	45,193	44,460	-5.5%
Town of Yarmouth	24,807	23,793	23,459*	-5.43%
Town of Sandwich	20,136	20,675	20,416*	+1.39%
Town of Falmouth	32,660	31,531	31,254*	-4.30%

Notes: * 2017 Data Utilized; N/A – not available

Sources: U.S. Census Bureau, American Fact Finder 2019; [1]https://www.mvy.com/island-information.html; retrieved November 14, 2019; [2]https://www.nantucket-ma.gov/31/Community; retrieved November 14, 2019; [3]https://www.jackconway.com/blog/whats-it-like-to-live-year-round-on-cape-cod/, retrieved April 16, 2020.

As the gateway to the Cape Cod Islands, HYA is also influenced by the summertime population growth experienced on the Cape, Nantucket, and Martha's Vineyard. The year-round population of Cape Cod is 213,413[1], while Nantucket[2] and Martha's Vineyard[3] year-round populations are 10,000 and nearly 17,000 residents, respectively. During the summer months, July and August in particular, the population of the Cape more than doubles[4] while Nantucket balloons to between 50,000 and 60,000 residents and the population of Martha's Vineyard grows to as much as 200,000 residents.

[1] Estimated 2018 census data, U.S. Census Bureau, American Fact Finder, 2019.

[2] https://www.nantucket-ma.gov/31/Community; retrieved November 14, 2019.

[3] https://www.mvy.com/island-information.html; retrieved November 14, 2019.

[4] https://www.jackconway.com/blog/whats-it-like-to-live-year-round-on-cape-cod/, retrieved April 16, 2020.

The area surrounding Barnstable is rather homogenous. Nationally, there is a higher percentage of all minority populations than in Barnstable or surrounding towns. National, state, and local demographics are shown in Table 4-2.

Table 4-2: Racial and Ethnic Characteristics (2017 Data)

Area	White	Black or African American	Asian	Two or More Races	Hispanic/Latino
United States	61.5%	12.3%	5.3%	2.2%	17.6%
Commonwealth of Massachusetts	72.9%	6.7%	6.2%	2.1%	11.2%
Dukes County	88.5%	3.9%	0.4%	4.6%	3.5%
Nantucket County	87.7%	7.0%	1.0%	4.5%	3.5%
Barnstable County	90.2%	2.7%	1.5%	1.7%	2.7%
Town of Barnstable	87.7%	4.4%	0.6%	1.6%	4.2%
Town of Yarmouth	92.1%	1.9%	2.1%	1.8%	1.7%
Town of Sandwich	95.0%	0.0%	1.3%	0.5%	2.8%
Town of Falmouth	88.4%	3.5%	3.1%	2.9%	2.1%

Source: U.S. Census Bureau, American Fact Finder 2019.

Most municipalities that surround the Airport are below the state and national unemployment, as shown in Table 4-3. Barnstable County has a lower unemployment rate than the state, as do the Towns of Barnstable, Sandwich, and Falmouth. The Town of Yarmouth is the only town in the area with a slightly higher than national unemployment rate. Dukes and Barnstable Counties, along with the Towns of Barnstable and Yarmouth all have median household incomes lower than the state, but higher than the nation. Nantucket County as well as the Towns of Sandwich and Falmouth boast median household incomes significantly higher than both the state and the nation.

According to the 2017 American Community Survey provided by the U.S. Census American Fact Finder, Barnstable County's major industries are educational services, health care, and social services (25.1%); retail trade (13.3%); and professional, scientific, management, and administrative and waste management services (12.3%). The top ten employers in the county include healthcare providers, hospitals and emergency centers, Woods Hole Oceanographic Institution, Air National Guard, and manufacturing (Massachusetts Executive Office of Labor and Workforce Development)[5].

Table 4-3: Employment and Income

Area	Unemployment Rate	Percent in Labor Force	Median Household Income
United States	4.1%	63.4%	$57,652
Commonwealth of Massachusetts	4.0%	67.3%	$74,167
Dukes County	N/A	62.1	$71,224
Nantucket County	N/A	73.7	$105,171

[5] http://lmi2.detma.org/lmi/Top_employer_list.asp?gstfips=25&areatype=04&gCountyCode=000001

Area	Unemployment Rate	Percent in Labor Force	Median Household Income
Barnstable County	3.3%	59.9%	$68,048
Town of Barnstable	3.3%	62.9%	$66,864
Town of Yarmouth	4.3%	60.1%	$62,954
Town of Sandwich	3.3%	67.4%	$88,870
Town of Falmouth	3.5%	58.3%	$95,472

Source: U.S. Census Bureau, American Fact Finder, 2019.

The Barnstable Municipal Airport is heavily influenced by the tourism industry for both Cape Cod and the Cape Cod Islands. In 2017, direct tourism spending during peak season was $1.1 billion. This includes supporting over 10,300 jobs within the travel industry. The effects of the influx of tourism to Barnstable County shows drastically in the hospitality industry with hotel occupancy and nightly rates jumping considerable during peak season. During the peak season, from June to August, hotel average occupancy rates from 2015 to 2019 were 75 percent and cost an average of $242 per night. Barnstable County also experiences increased activity during the shoulder season: May, September, and October. The five-year averages of these months were a 60 percent occupancy rate and an average cost of $156 per night. During off season months, hotel occupancy rates drop to an average of 36 percent and rates drop to an average nightly rate of $111[6].

4.5. COMMERCIAL PASSENGER ENPLANEMENTS

Passenger enplanements are a key measure in the forecasting efforts for commercial service airports. The enplanements forecast focuses on the total annual enplanements as well as the peak hour characteristics of busier traffic periods. The results of these forecasts are particularly useful in the assessment of the passenger terminal building and associated facilities such as auto parking lots. Beyond that, the types and quantities of growth extend beyond the terminal area itself to impact elements such as roadways and transportation networks, helping to ensure that they are adequately sized for future demand.

4.5.1. Historical Activity

The historical data for passenger enplanements presented in **Table 4-4** and **Figure 4-4** depicts a decline in passenger growth over the past ten years. The majority of these enplanements were lost with the introduction of the high-speed ferry service, which started service in the mid 2000's coupled by the affects post-September 11, 2001 and the loss of Island Airlines. Key market disruptions that can be evidenced in the table below include the Great Recession (2008-2009) and Island Air bankruptcy (2015-2016).

Table 4-4: Historical Passenger Enplanements

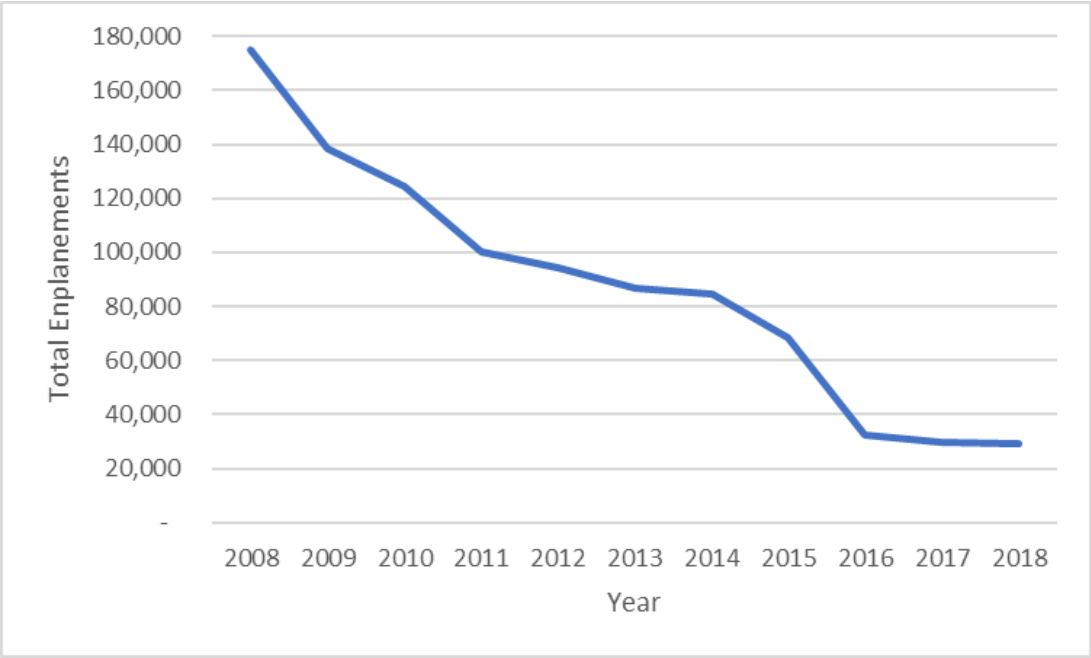
Year	Total Enplanements
2008	175,198
2009	138,451

[6] https://www.capecodchamber.org/members/membership/statistics/; retrieved April 30, 2020.

Year	Total Enplanements
2010	124,164
2011	100,450
2012	94,466
2013	86,745
2014	84,764
2015	68,519
2016	32,397
2017	29,719
2018	29,457

Source: Barnstable Municipal Airport, 2019.

Figure 4-4: Historical Passenger Enplanements



Source: Barnstable Municipal Airport, 2019.

4.5.2. Passenger Market Analysis

Not all passenger enplanements are created equal. Those passengers utilizing the national air transportation network have different demand characteristics than those flying to and from the Islands. Passenger booking data was analyzed for the 40-mile radius surrounding Hyannis to better quantify the passenger market potential for the Airport. The market was further refined to encompass of all of Cape Cod and the towns that straddle the Cape Cod Canal. This service area was previously displayed in Figure 4-1.

The passenger booking data is separated by originating (outbound, local traffic) and arriving (inbound, from other areas). For originating traffic, the data uses the billing zip code of the credit card used to purchase the ticket and matched it with the originating leg of the journey. The quarterly breakdown of the originating Hyannis passenger market is shown in Table 4-5.

Table 4-5: HYA Passenger Market

Airport/Quarter	Q1	Q2	Q3	Q4	Total	% Share
HYA	16	249	1,025	15	1,305	0.6%
BOS	41,937	45,233	40,973	44,330	172,474	82.8%
PVD	5,701	5,676	4,427	4,825	20,629	9.9%
MVY	25	225	1,331	114	1,696	0.8%
EWR/JFK/LGA	1,209	1,292	1,621	1,173	5,295	2.5%
Others	1,762	1,763	1,762	1,601	6,878	3.3%
Totals	50,651	54,439	51,139	52,058	208,277	100%

Source: Airline Data Inc., 2019.

Key takeaways from this data include:

- The originating Cape Cod-based air travel demand is consistent year-round; meaning Cape Cod residents conduct business and travel just as much in the off season as they do in the summertime.
- Boston captures the majority (82%) of the Cape-Cod passenger demand. Providence is the next closest at approximately 10%.
- Martha's Vineyard captures Cape Cod-based traffic during the summer months when their air service peaks. This traffic likely originated in the Falmouth/Woods Hole area.

For inbound traffic, the data uses billing zip code of the credit card used to purchase the ticket but uses the terminating point followed by credit card transactions to determine where the user ultimately traveled to. The quarterly breakdown of the terminating Hyannis passenger market is shown in Table 4-6.

Table 4-6: Terminating Hyannis Passenger Market (Excluding Cape Air)

Airport/Quarter	Q1	Q2	Q3	Q4	Total	% Share
HYA	N/A	1,080	3,490	57	4,626	2.1%
BOS	28,373	48,779	55,783	45,762	178,698	80.7%
PVD	2,090	3,645	4,480	3,557	13,772	6.2%
MVY	22	1,705	8,290	212	10,228	4.6%
EWR/JFK/LGA	1,585	1,535	1,124	1,886	6,131	2.8%
Others	855	1,818	3,588	1,660	7,922	3.6%
Totals	**32,925**	**58,562**	**76,755**	**53,134**	**221,376**	**100%**

Source: Airline Data Inc., 2019.

Key takeaways from this data include:

- As expected, there is a significant peak in the summer months with demand double that of the winter months.
- The overall size of the inbound market is not significantly larger than the Cape-originating passenger demand indicating that the summer tourism demand is largely a drive-market.

- As with the originating passenger demand, Martha's Vineyard captures Cape Cod-based traffic during the summer months when their air service peaks. This traffic likely originated in the Falmouth/Woods Hole area.

Overall, the current market retention is approximately 1.3%, indicating that there is an opportunity to attract air service to meet the local Cape-Cod based demand. The 5,931 passengers attributed to the HYA market equates to approximately 2,965 enplanements. For smaller airports in competitive regions (i.e. with multiple passenger options) high levels of market leakage can be expected. Even airports like Providence, with multiple airlines and over two dozen non-stop destinations, likely leaks over 25% of its market to Boston. Table 4-7 displays enplanement levels with incremental market recapture increasing 1% annually, 2% annually, and an average of the two. This table also adds in the Island flying that is not included in the passenger booking data to represent an "upper bound" of theoretical passenger enplanements.

Table 4-7: Market Recapture

Year	Market Recapture Low (+1%/y)	Market Recapture High (+2%/y)	Blend	Other Traffic (Islands/Air Taxi)	"Upper Bound"
2020	2,965	2,965	2,965	23,225	26,190
2025	13,926	24,839	19,383	22,365	41,747
2030	24,839	46,666	35,753	21,294	73,416
2040	46,666	90,318	68,492	21,065	89,557

Source: McFarland Johnson, 2019.

4.5.3. Forecast Methodology and Industry Factors

Network - Network enplanements represent the summer seasonal service provided by JetBlue. This service has operated for six years with relatively stable passenger numbers. Passengers numbers have varied slightly due to runway projects at JFK airport and also the timing of Labor Day (end of season). The regional airline growth rate of 1.6% from the FAA National Aerospace forecast was applied to this passenger segment.

Secure - Secure enplanements represent the Cape Air passenger flights bound for Boston Logan or New York's JFK Airport via Nantucket, whose passengers and baggage are screened as they are entering the sterile passenger environment. While still operated via 9-seat piston aircraft, the passengers are accessing the national air transportation network in a similar manner to that of a regional airline. Therefore, the regional airline growth rate of 1.6% from the FAA National Aerospace Forecast was also applied to this passenger segment.

The combination of network and secure passengers represents the numbers to be used for terminal facility planning for the sterile hold room and secure passenger and baggage screening.

Non-Secure – Non-Secure enplanements reflect those associated with the Cape and Islands traffic, as well as the summertime flights to Westchester County Airport in White Plains, NY. The passenger traffic from Hyannis to both Martha's Vineyard and Nantucket has been on the decline for over 20 years as the costs of air travel have increased and high-speed ferries have been

introduced. This market segment is expected to continue to decline; however, there will always be a need for commercial air travel for time sensitive passengers doing day-trips for work (contractors, doctors, lawyers, etc.) in addition to the fact that the boats have a greater difficulty operating during inclement weather than aircraft. The baseline forecast applies a negative 2% growth rate to this passenger segment. Significant changes in this market dynamics such as the introduction of electric aircraft or autonomous aircraft that change the cost paradigm would merit an update to this forecast element.

Table 4-8 displays the previous calculations comprised of these elements compared to the FAA TAF. Given the relative consistency between the baseline forecast and the 2020 FAA TAF, particularly in the near term, the TAF was chosen as the baseline forecast for the purpose of the HYA Master Plan.

Table 4-8: Baseline Enplanement Forecast

Year	Secure	Non-Secure	Total	TAF (Selected Forecast)
2020	9,271	16,919	26,190	**26,104**
2025	10,037	15,293	25,330	**27,121**
2030	10,866	13,824	24,690	**28,193**
2040	12,735	11,295	24,030	**30,484**

Sources: Terminal Area Forecast, 2020 and McFarland Johnson, 2019.

4.5.4. Derivative Forecast Scenarios

The following sections outline additional derivative forecasts scenarios that have been developed to address potential market conditions that are reasonably foreseeable but not able to be specifically quantified based on service announcements or contracts. These forecast scenarios will be additive or subtractive to the selected baseline forecast and will be used for facility planning only.

New Seasonal Operator - This scenario entails the introduction of service by a regional operator using a 76-seat regional jet during the 90-day peak summer period. It includes incremental growth in load factors over time and an additional weekend flight starting in years 5 and 10, providing a total of up to 114 departures per year.

New Regional Airline - This scenario entails the introduction of service by a regional operator using a 76-seat regional jet providing year-round service with an average service level of twice-daily flights. It includes incremental growth in load factors over time and an additional weekend flight starting in year 10, providing a total of up to 730 departures per year.

New Low Cost/Ultra Low-Cost Airline - This scenario considers the introduction of a new low-cost or ultra-low-cost airline with twice-weekly flights for approximately 6 months of the year (either summer peak for inbound or winter/spring for Florida markets). It includes the addition of two weekly frequencies each year as service grows to year-round levels.

Market Interruption – While the projected growth and future for HYA is stable, there is a potential for a temporary market interruption due to factors unrelated to the local HYA passenger market. Examples of a market interruption include airline network changes (loss of service or bankruptcy)

or a 9/11-like national event. This scenario includes a 10 percent drop in passenger demand/traffic with a 5-year recovery period (two percent annually).

The enumerative value of this impact (10%) would be directly related to the respective year in which the effect would take place.

Table 4-9 compares the derivative scenarios and displays the change relative to the baseline forecast. With every scenario applied in year one, the forecast would remain consistent with what was previously described as the market recapture "upper bound". The scenario maximum assumes that a new summer seasonal service, new year-round regional service, and new ULCC service are all achieved as well as a 2% annual market recapture being accomplished. The "upper bound" scenario considers the new airline scenarios, but rather than a two percent recapture, calculates a 1.5% annual passenger market recapture.

Table 4-9: Enplanements Scenario Forecasts

Year	New Summer Seasonal	New Year-Round Regional	New ULCC	Combined	Baseline	Scenario Max	"Upper Bound"
1	5,335	30,888	7,363	43,586	26,104	69,690	26,190
5	5,609	32,535	9,629	47,773	27,121	74,894	41,747
10	6,357	35,556	12,461	54,373	28,193	82,566	73,416
20	7,538	40,360	18,125	66,023	30,484	96,507	89,557

Source: McFarland Johnson, 2020.

4.5.5. Peak Hour Enplanements/Peaking Characteristics

Traditional peaking characteristics for airport planning such as using 10-12% of annual activity for the peak month and between 15-20% for the peak hour would result in a significantly understated peak hour enplanement number compared to what occurs during the peak month.

For secure enplanements the average day of the peak month consist of a 100-seat JetBlue E-190 with an average load factor of about 82% and approximately four 9-seat Cape Air aircraft throughout the day. The peak hour enplanements would be approximately 87 passengers for the average day peak month; however, the Airport should plan for accommodating full aircraft meaning approximately 109 passengers. When flights are eventually up-gauged to the 140-seat A220, the peak hour enplanements are projected to be approximately 120 for the average day peak month with the Airport having capability to accommodate up to 149 passengers in the sterile area.

Non-secure enplanements will also vary greatly with the seasons. The peak hour of the average day of the peak month is approximately three 9-seat aircraft plus the potential for a chartered aircraft (same size) also departing from the terminal equating to a maximum of 36 non-secure peak hour enplanements. Unlike the secure enplanements, this number is not expected to grow over the planning period as previously discussed.

4.6. AIRCRAFT OPERATIONS

The FAA defines an aircraft operation as a takeoff or a landing and categorizes the operations by aircraft type and purpose. These categories include commercial (all airline operations at the passenger terminal), GA (both recreational and corporate), and military. The forecasting of these operations by category is used in the planning of terminal buildings, runways, taxiways, and other airport infrastructure.

The growth elements discussed for each operation type below include both local and airline industry factors that could impact aircraft operations at HYA.

4.6.1. Historical Activity

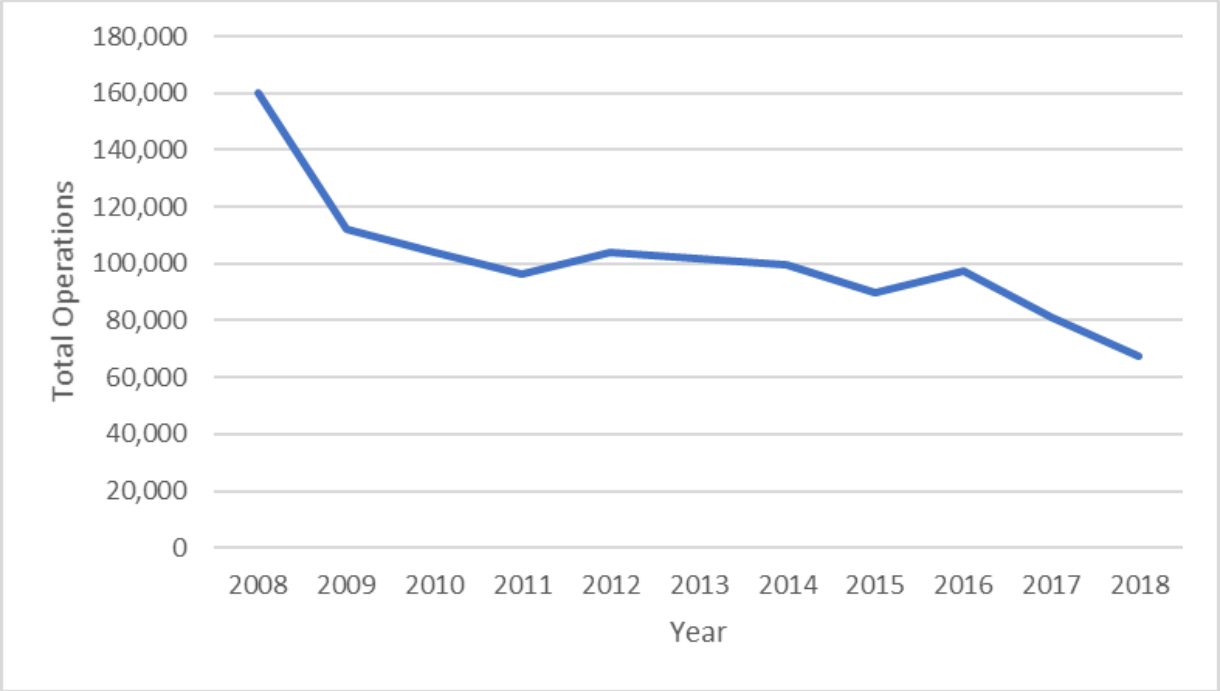
The historical data for aircraft operations, shown in **Table 4-10**, depicts various trends for each type of operation. Overall activity has declined at an average annual growth rate (AAGR) rate of -5.5 percent since 2008, as shown in **Figure 4-5**.

Table 4-10: Historical Aircraft Operations

Year	Air Carrier Ops	Air Taxi Ops	GA Itinerant Ops	GA Local Ops	Military Ops	Total Ops
2008	0	118,418	35,603	5,546	292	159,859
2009	12	84,246	20,774	7,070	271	112,373
2010	1	77,929	20,325	5,543	202	104,000
2011	0	69,238	19,783	7,058	201	96,280
2012	0	70,956	23,693	9,167	333	104,149
2013	0	67,798	24,796	9,067	367	102,028
2014	149	64,419	26,513	8,220	222	99,523
2015	159	58,758	24,067	6,733	251	89,968
2016	255	58,001	29,316	9,381	212	97,165
2017	186	47,092	26,521	7,081	136	81,016
2018	183	35,595	22,340	9,009	223	67,350
2019	167	32,483	22,241	10,839	387	66,117

Source: Barnstable Municipal Airport Management, 2020.

Figure 4-5: Historical Aircraft Operations



Source: Barnstable Municipal Airport Management, 2019.

4.6.2. Forecast Methodologies

The following forecast methodologies were reviewed to determine which would be the most realistic for HYA. Different methodologies were deemed the most appropriate to use for each type of operation at HYA. Air carrier and air taxi operations utilized the FAA National Aerospace Forecast methodology. GA jet operations utilized a blended forecast of the New England Region market share and the national growth rate. Light GA operations utilized a forecast that is a blend of the ten-year trend analysis and the National Aerospace forecast.

Trend Analysis – This forecast methodology examines historical trends in activity at a specific airport and applies the historical trends to current demand levels to produce projections of future activity. Trend line analysis assumes that activity patterns, and the factors that have historically affected activity, will continue to influence demand levels, remain similar over an extended period of time. Linear trend projections are typically used to provide baseline forecast that reflect stable market conditions. AAGR for 5 and 10-year increments were looked at for HYA.

Market Share Analysis – This forecast methodology is a method for projecting future aeronautical activity that can be applied to any measure for which a reliable higher-level forecast is available. Using this methodology, historical shares are calculated and used as a basis for projecting future shares. This approach is a "top-down" method of forecasting since forecasts of larger aggregates are used to derive forecasts for smaller elements of the system – in this case, HYA.

National Aerospace Forecast – This forecast methodology looks at FAA presented aviation activity forecasts from several different sources which can be referenced when forecasting future aeronautical demands for a specific airport. Primarily, they include the FAA National Aerospace

Forecast which provides growth projections for the entire aviation industry and the FAA TAF which utilizes identified national growth trends coupled with historical local growth trends to produce airport-specific activity forecast. The FAA's National Aerospace Forecast for 2019-2039 identifies projected AAGR for a variety of fixed wing aircraft through the end of its forecast period (2040).

Operations Per Based Aircraft (OPBA) – This forecast methodology assigns a representative level of aircraft operations for each based aircraft. The existing OPBA ratio (31,349/38 or 825) was utilized as the OPBA metric in this analysis of GA operations and the existing OPBA ratio (67,350/38 or 1,772) was utilized as the OPBA metric in this analysis of all aircraft operations.

Massachusetts Statewide Airport System Plan - The Massachusetts Statewide Airport System Plan (MSASP) guides the development of 37 public use Massachusetts airports. It is the goal of Massachusetts Department of Transportation, Aeronautics Division (MassDOT Aeronautics) "to help facilitate the state's vision of fully integrated, safe, efficient, and seamless transportation link between the people and products of Massachusetts with national and international destinations through an efficient airport system that will help build upon economic development success and improve the quality of life in the Commonwealth."[7] The MSASP provides an assessment of current system conditions and recommendations to facilitate the long-term growth of the state airports as they fit within the greater statewide transportation system. The MSASP forecasted an AAGR for GA operations of 1.4 percent from 2008 to 2030.

4.6.3. Growth Influencers

Air Carrier/Taxi – As airlines, especially major/network carriers, up-gauge, it is anticipated they will deploy larger aircraft in place of greater frequency. This will maintain or even boost enplanements however it will slow overall operational growth.

Trends for low cost carriers (LCCs) and ultralow cost carriers (ULCCs) are expected to continue into the future, with growth coming from the introduction of additional weekly frequencies and/or additional destinations (likely seasonal to start). Potential new destinations could include Philadelphia, PA; New York City area; or Washington DC.

Growth is expected to be extremely limited in the aircraft segment of fewer than 60 seats until there is an industry change that significantly improves the availability of pilot resources (i.e. single pilot operations) and/or provides significant fuel saving advantages (i.e. electric powered aircraft).

General Aviation – Initially starting with heightened security procedures after 9/11 followed by the combination of the Great Recession and increased fuel and ownership costs have resulting in sharp declines in discretionary GA activity over the last 10-20 years. After being stripped to near-core demand only, itinerant GA has begun to grow again. Much of this growth is due to enhancement in turbine aircraft efficiencies and the introduction of smaller turbine powered aircraft which has made entry-level business aviation more affordable than ever. Single engine turbine powered

[7] *Massachusetts Department of Transportation, Aeronautics Division. Massachusetts Statewide Airport System Plan. 2010.*

aircraft like the 9-seat Pilatus PC-12 and the 4-9 seat very-light-jet Embraer Phenom 100/300 can rival the affordability of commercial aviation in some cases.

Civil (Local) aviation bared the brunt of the recession and fuel spike. However, now with the pilot shortage and increased need for flight training, civil aviation has begun to grow again.

Military – The growth of military operations is largely dependent on the security interests of the nation. Military aircraft are constantly relocated throughout the aviation system. Threats to the United States and disaster relief efforts may impact the amount of military operations at and around the Airport. Most military operations conducted at civilian airports is associated with training activity.

Unmanned Aerial Systems (UAS) - Presently the FAA does not have a counting metric for UAS activity at airports as their integration into the national airspace has been limited. Operations forecasts should be reviewed and updated as UAS integrate as part of the national airspace and airport operations and FAA identifies a metric/category in which to account for this activity.

4.6.4. Air Carrier and Air Taxi

Air carrier operations at HYA are limited to the summertime JetBlue activity as this category represents operations on aircraft with greater than 60 seats. The recommended forecast for this category is to use the FAA Aerospace Forecast at 2.1% annual growth as is reflects the national trends associated with the air carrier operations throughout the national airspace system. Should any of the derivative scenarios come to fruition, the additional operations would also be categorized as air carrier.

Air taxi and commuter operations are those commercial in nature with less than 60 seats, this includes charter operator activities. All Cape Air, Rectrix, and similar type operators fall in this category. The National Aerospace Forecast projects a decline of 0.6% in this market segment over the next 20 years, likely due to the larger gauge in regional jets (increasing from 50 to 70+) and the increased strain on available pilots for smaller capacity aircraft flying. The latter of those factors has been one of the reasons for decreased frequency on routes to Nantucket and Boston. As discussed in the enplanements section, the flying to the Islands is expected to continue to decline as result of increased high-speed ferry service. Based on these factors, a negative growth rate of 0.6% is considered prudent for this market segment.

4.6.5. General Aviation

When looking at the historic data, incremental trends, market share, national growth rates, and operations per based aircraft were analyzed. The preferred methodologies used to forecast aircraft operations for GA operations were blended forecasts of the New England Region market share and the national growth rate for itinerant GA as provided by the National Aerospace Forecast. The GA local preferred methodology was the AAGR of the 10-year historic trend and the national growth rate for local GA as provided by the National Aerospace Forecast.

4.6.6. Military

With constant changes in national security and relief needs, military operations tend to fluctuate over time. At HYA, itinerant military operations have been relatively stable over the past 10 years

averaging approximately 223 total annual operations: 95 itinerant operations and 128 local operations. The FAA TAF reports zero growth in military operations at HYA; it is anticipated the annual averages will remain near the historical average.

4.6.7. Annual Operations by Type

The annual operations forecast broken down by type are shown in **Table 4-11**.

Table 4-11: Annual Operations Forecast by Type

	Itinerant					Local			Total
Year	Air Carrier	Air Taxi	GA	Mil	Total	GA	Mil	Total	Ops
Baseline	183	35,595	22,340	95	58,213	9,009	128	9,137	67,350
2025	197	32,360	24,639	95	57,291	9,800	128	9,928	67,219
2030	219	31,401	26,514	95	58,229	10,447	128	10,575	68,804
2040	270	29,567	30,956	95	60,888	11,985	128	12,113	73,001

Sources: Barnstable Municipal Airport Management, 2019; McFarland Johnson, 2019.

4.6.8. Peaking Characteristics - Aircraft Operations

Like the peaking characteristics used for passenger enplanements, annual operations numbers, when divided equally over the year and throughout the day, will not accurately identify capacity constraints or facility needs during busier periods. To accurately identify airport requirements for facility planning, peaking characteristics are broken down into the following elements:

Peak Month – The peak month at an airport represents the busiest month during a calendar year. The peak month may not be the same each year; for HYA, the peak months typically occur during the summer, Memorial Day through Labor Day. Peak month operations at HYA account for 11.5 percent of total annual operations.

Average Day Peak Month – The average day of the peak month (ADPM) is the industry standard measure used when planning and analyzing an airport's peaking characteristics. In the case of HYA the peak month activity is divided by 31 days.

Peak Hour – Peak hour operations is a critical metric when planning for airfield capacity. Traditionally the operational peak hour typically represents between 12 percent and 17 percent of the daily operations total. A peaking factor of 17 percent will be applied to the peak hour planning for HYA.

Peak operational characteristics for HYA are displayed in **Table 4-12**.

Table 4-12: Peaking Characteristics

	Baseline	2025	2030	2040
Operations	67,350	67,219	68,804	73,001
Peak Month	7,745	7,730	7,912	8,395
Average Day Peak Month	258	249	255	271
Peak Hour	44	42	43	46

Sources: Barnstable Municipal Airport Management, 2019 and McFarland Johnson, 2019.

4.7. BASED AIRCRAFT

Forecasting the number and type of based aircraft is critical to planning future GA facilities, especially for the type and size of hangers and aircraft movement and parking areas. The growth elements below discuss the factors that influence the number of based aircraft at HYA.

4.7.1. Historical Activity

The FAA defines a based aircraft as an aircraft that is operational and airworthy which is based at the facility in question for most of the year. Based aircraft are major contributors to the economics of an airport as they generate revenue from tie-down, hangar rentals, and fuel sales. Airport Management keeps record of based aircraft at the Airport. Cape Air has been operating out of HYA since the early 1990s. Since Cape Air flies in and out of the Airport daily, Cape Air aircraft RON on a nightly basis. Therefore, to account for these aircraft, ten additional multi-engine aircraft were added to each year of the historic based aircraft. The historical based aircraft by type can be seen in Table 4-13. Figure 4-6 shows the history of total based aircraft at the Airport.

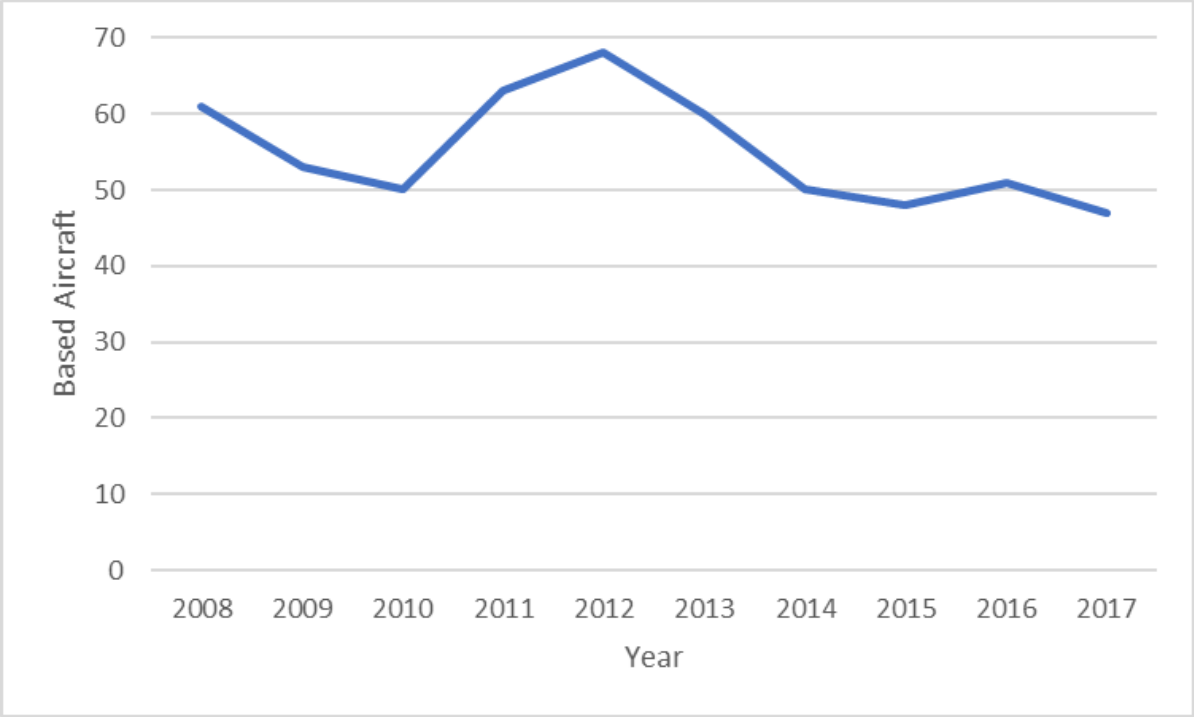
Table 4-13: Historical Based Aircraft by Type

Year	Single Engine	Multi-Engine	Jet	Other	Total*
2008	43	17	0	1	61
2009	37	15	0	1	53
2010	34	15	1	0	50
2011	43	17	3	0	63
2012	43	21	3	1	68
2013	37	17	5	1	60
2014	33	17	0	0	50
2015	31	17	0	0	48
2016	31	19	1	0	51
2017	31	16	0	0	47
2018	31	16	0	0	47

Note: 10 Cape Air planes added to based aircraft numbers

Sources: FAA TAF, 2019 (2011 only) and Barnstable Municipal Airport Management, 2019.

Figure 4-6: History of Based Aircraft



Sources: FAA TAF, 2019; Barnstable Municipal Airport Management, 2019.

4.7.2. Forecast Methodologies

The following forecast methodologies were reviewed to determine which would be the most realistic for HYA.

Trend Analysis – This forecast methodology examines historical trends in activity at a specific airport and applies the historical trends to current demand levels to produce projections of future activity. Trend line analysis assumes that activity, and the factors which have historically affected activity, will continue to influence demand levels are similar rates over an extended period of time. Linear trend projections are typically used to provide baseline forecast that reflect stable market conditions. AAGR for 5 and 10-year increments were looked at for HYA.

Market Share Analysis – This forecast methodology is a method for projecting future aeronautical activity that can be applied to any measure for which a reliable higher-level forecast is available. Using this methodology historical shares are calculated and used as a basis for projecting future shares. This approach is a "top-down" method of forecasting since forecasts of larger aggregates are used to derive forecasts for smaller elements of the system – in this case, HYA.

National Growth Rate – This forecast methodology looks at FAA presented aviation activity forecasts from several different sources which can be referenced when forecasting future aeronautical demands for a specific airport. Primarily, they include the FAA National Aerospace Forecast which provides growth projections for the entire aviation industry and the FAA TAF which utilizes identified national growth trends coupled with historical local growth trends to produce

airport-specific activity forecast. The FAA's National Aerospace Forecast for 2019-2039 identifies projected AAGR for a variety of fixed wing aircraft through the end of its forecast period (2040).

Massachusetts Statewide Airport System Plan - The MSASP provides an assessment of current system conditions and recommendations to facilitate the long-term growth of the state airports as they fit within the greater statewide transportation system. The MSASP utilized a based aircraft annual average growth rate of 1.4% from 2009 to 2030.

4.7.3. Growth Factors

Single/Multi Piston – Piston (single and multi) aircraft are forecasted to follow a negative growth rate over the next 20 years. As the economic advantage of aircraft leasing, renting, fractional ownership, and flying clubs become more popular, the number of individually owned piston engine aircraft is decreasing in most regions. While the aircraft counts are negative, the negative aspects are offset from enhanced utilization from a broader user base not burdened by high-entry costs.

Turbine/Jet – Advancements in fuel efficiency and aircraft technology has resulted in a wide variety of new products entering the turbine and jet aircraft market. More aircraft options at lower costs have increased the number of aircraft in the business aviation market not only as a lease/purchase capacity but also more fractional ownership and charter options. With this, and the national forecast for based turbine aircraft following a positive trend, it is forecasted that turbo propeller and turbo jet aircraft will increase throughout the planning period.

Unmanned Aerial Systems (UAS) - Presently the FAA does not have a counting metric for UAS aircraft based at airports as their integration into the national airspace has been limited. Based aircraft forecasts should be reviewed and updated as UAS integrate as part of the national airspace and airport operations and FAA identifies a metric/category in which to account for this activity.

4.7.4. Based Aircraft Forecast

Forecasting the number and type of based aircraft is critical to planning future GA facilities, especially for hangers, aircraft movement areas, and aircraft parking areas. The growth elements below discuss the factors that influence the number of based aircraft at HYA.

The National Aerospace Forecast was utilized to calculate the based aircraft growth at the Airport. Separate growth rates were used for single engine, piston multi-engine, turbo prop, and turbo jet aircraft when calculating the total based aircraft. The multi-engine growth displayed in the table below combines both the declining multi-engine piston aircraft as well as the growth in turbo prop aircraft. Cape Air operates out of the Airport with multiple multi-engine piston aircraft. While these aircraft are listed as RON, these aircraft RON daily and therefore are accounted for within the based aircraft. Ten Cape Air aircraft were added to the forecast and are expected to remain consistent throughout the planning period.

The based aircraft forecast broken up by type are in Table 4-14.

Table 4-14: HYA Based Aircraft Forecast

Year	Single Engine	Multi-Engine	Jet	Total
Baseline	31	16	1	48
2025	29	17	1	47
2030	27	17	1	45
2040	25	17	2	44

Note: Baseline utilized 2020 data.
Source: McFarland Johnson, 2020.

4.8. ITINERANT GENERAL AVIATION PASSENGERS

GA passengers are defined as the boarding of a passenger on an aircraft at an airport. For HYA, GA passengers consist of passengers traveling to/from the Airport (itinerant) using GA facilities (excluding pilots). Unlike commercial airline passengers and charters, the number of GA passengers is not recorded by either the FAA or the Airport.

To estimate GA passenger enplanements at the Airport, guidance pertaining to the sizing of GA Terminal Buildings contained in *ACRP Report 113, Guidebook on General Aviation Facility Planning* (ACRP 113) is utilized to establish a reasonable point of reference. ACRP 113 states that for planning purposes, a factor of 2.5 people (pilots and passengers) can be assumed. For this analysis, the planning factor of 2.5 people is applied to baseline GA itinerant operations to determine the reasonableness of the Airport's GA passenger and crew estimate. Additionally, since the purpose of this analysis is to forecast passengers only, the factor was also reduced to 1.5 people per GA itinerant operation. The results are presented in Table 4-15.

Table 4-15: GA Passengers

Item	GA Passengers and Crew	GA Passengers Only
Baseline GA Itinerant Operations	22,340	22,340
Planning Factor (People per Operation)	2.5	1.5
Baseline GA Passengers	55,850	33,510
2040 GA Passengers	77,389	46,433

Sources: McFarland Johnson, 2019; Barnstable Municipal Airport Management, 2019.

4.9. ANNUAL INSTRUMENT OPERATIONS

Annual instrument arrivals are important to an airport when planning for capacity and demand instrument conditions. Most GA pilots are visual flight rules (VFR) pilots, but those who are instrument flight rules (IFR) certified and plan on flying into inclement weather will need to file a flight plan. Flight plans may be filed for both VFR and IFR flights but are most commonly used for IFR or combined IFR and VFR flights. The FAA's Traffic Flow Management System Count (TFMSC) identified 16,303 instrument operations in 2018. In 2018, the TAF reported HYA to have 72,442 total aircraft operations. The 16,303 instrument approaches account for approximately 23 percent of total operations. The 10-year AAGR has been -5.83%. In 2010, Island Airlines had a change in leadership within the company after the firing of the company president. Airline operations began to see a decrease after 2010 and the airline suddenly closed in December of 2015, ending 24 years

of service at the Airport[8]. Air taxi growth at HYA is consistent with the national trends over the years. From 2016 to 2018, there has been a growth rate of 7.09% annually for instrument operations. Instrument operations are forecasted to maintain the current percentage of total instrument operations to total commercial operations resulting in a total of 13,597 instrument operations in 2040.

Table 4-16 shows the historical annual instrument operations at the Airport.

Table 4-16: Historical Annual Instrument Operations

Year	Total Instrument Operations
2009	27,989
2010	26,659
2011	21,474
2012	18,178
2013	19,887
2014	17,696
2015	17,708
2016	14,215
2017	15,544
Baseline	16,303

Source: FAA Traffic Flow Management System Count; Retrieved November 14, 2019.

4.10. FORECAST SUMMARY

4.10.1. Comparison with FAA Terminal Area Forecast

To confirm validity, master plan aviation forecasts are often compared with other aviation forecasts prepared for the Airport and the region. Ideally, this report's forecasts should be reasonably consistent with other forecasts of future airport activity, and compatible with forecasts for the larger region. With master plan forecasts being much more specific to an airport, it is not unusual to see some variation from national forecasts. The most useful forecasts for comparison are those prepared by the FAA with the standard being the TAF and the national and regional forecasts previously referenced in this report. The TAF is prepared annually and includes airport forecasts for all active National Plan of Integrated Airport Systems (NPIAS) airports. Table 4-17 shows the compared results between the selected forecast and that of the FAA's TAF.

[8] https://www.capecodtimes.com/article/20151211/news/151219811; *Retrieved November 18, 2019.*

Table 4-17: Aviation Demand Forecast Compared to FAA Terminal Area Forecast

	Actual	Forecast		
	Baseline	2025	2030	2040
FAA TAF				
Enplanements	26,104	27,121	28,193	30,484
Total Operations	62,983	64,991	67,075	71,483
Based Aircraft[1]	39	46	51	61
Master Plan Forecast				
Enplanements	26,104	27,121	28,193	30,484
Total Operations	67,350	67,219	68,804	73,001
Based Aircraft	48	47	45	44
Pct. Difference From TAF				
Enplanements	0.00%	0.00%	0.00%	0.00%
Total Operations	6.93%	3.43%	2.58%	2.12%
Based Aircraft[1]	23.08%	2.17%	-11.76%	-27.87%

[1]TAF does not include 10 Cape Air aircraft

Sources: FAA TAF, 2020; Barnstable Municipal Airport Management, 2019; and McFarland Johnson, 2020.

4.11. EXISTING AND FUTURE DESIGN AIRCRAFT

The Runway Design Code (RDC) used in airport planning is derived from the features of the most demanding aircraft using the Airport on a regular basis coupled with the best available instrument approach minimums. The first component, depicted by a letter, is the Aircraft Approach Category (AAC) and relates to aircraft approach speed (operational characteristics). The second component, depicted by a Roman numeral, is the Airplane Design Group (ADG) and relates to either the aircraft wingspan or tail height (physical characteristics), whichever is most restrictive. The third component relates to the visibility minimums expressed by Runway Visual Range (RVR) values. Table 4-18 displays the RDC criteria used in airport planning.

In 2019, 422 aircraft operations fell within ADGs III and IV. The TFMSC accounts for only 23 percent of airport operations. Therefore, it is reasonable to expect that at least 80 ADG III and IV aircraft landed at the airport within the remaining 77 percent of operations that were not reported under traffic flow reports.

The following ADG III aircraft operated at HYA in 2019:

- Embraer 190 (E190)
- Gulfstream V / G500
- Bombardier BD-700 Global 5000 (GL5T)
- Bombardier BD-700 Global Express (GLEX)

Currently, Jet Blue operates the Embraer 190 at HYA. Over the next five years, Jet Blue will be replacing all E190 aircraft with Airbus 220 aircraft. Existing and future commercial and GA design aircraft are shown in Table 4-19 and Table 4-20, respectively. The A220-300 is one of many C-III aircraft that use the Airport on a regular basis. Other C/D-III aircraft that frequently use HYA

include Gulfstreams, Global Express, and other large business jets. The existing and future AAC-ADG for HYA is C/D-III.

Table 4-18: FAA Airport Reference Code

FAA Airport Reference Code Parameters				
Category	Approach Speed	Group No.	Wing Span (ft.)	Tail Height (ft.)
	(knots)	I	< 49	< 20
A	<91	II	49 to < 79	20 to < 30
B	91 to < 121	III	79 to < 118	30 to < 45
C	121 to < 141	IV	118 to < 171	45 to < 60
D	141 to < 166	V	171 to < 214	60 to < 66
E	166 or more	VI	214 to < 262	66 to < 80

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

Table 4-19: Existing and Future Commercial Design Aircraft

Both Runways	Existing	Future
Aircraft Model	**E190**	**A220-300**
Length Overall	118.9’	127’
Wingspan	94.3’	115.1’
Tail Height	34.6’	38.7’
Maximum Takeoff Weight (pounds)	105,359	149,000
Typical Approach Speed (knots)	124	130
Approach Speed Category	C	C
Aircraft Design Group	III	III

Source: FAA Aircraft Characteristics Database, Oct. 2018.

Table 4-20: Existing and Future GA Design Aircraft

Both Runways	Existing	Future
Aircraft Model	Gulfstream V / G500	Gulfstream V / G500
Length Overall	91.2’	91.2’
Wingspan	86.3’	86.3’
Tail Height	25.5’	25.5’
Maximum Takeoff Weight (pounds)	79,600	79,600
Typical Approach Speed (knots)	150	150
Approach Speed Category	D	D
Aircraft Design Group	III	III

Source: FAA Aircraft Characteristics Database, Oct. 2018.