

Nantucket Memorial Airport Master Plan Update

CHAPTER 3 – ENVIRONMENTAL OVERVIEW

–REVIEW DRAFT – SUBJECT TO CHANGE–



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Nantucket Memorial Airport Master Plan

Chapter 3- ENVIRONMENTAL OVERVIEW

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Chapter 3. Environmental Overview

This section describes the existing environmental conditions ACK and describes the environmental inventories activities to date as part of the Master Plan Process.

3.1. Noise

As a vacation destination, maintenance of peace and quiet on the island is of high importance to the Nantucket community. The airport has been looking into ways to reduce noise from operations for many years.

Volunteer flight patterns were instituted in 1987 with a "Notice to Airmen" included with pilots pay stubs that provided preferred flight paths around the island that were designed to reduce on the ground noise levels.

In 2011, 2012 and 2013 the Nantucket Memorial Airport (ACK) Commission worked with a noise and vibration consultant to evaluate aircraft operations and related noise to ensure that the airport continues to operate as a "good neighbor" to the community. The 2011 study focused on ground operations at the airport to determine existing levels of noise at nearby receptors and identify noise levels of taxiing aircraft and noise from aircraft running their Auxiliary Power Units (APU's). As a result of the study, aircraft are now parked on the Apron with engines pointing away from nearby residential areas, and airmen are encouraged to limit APU use to fifteen minutes or less.

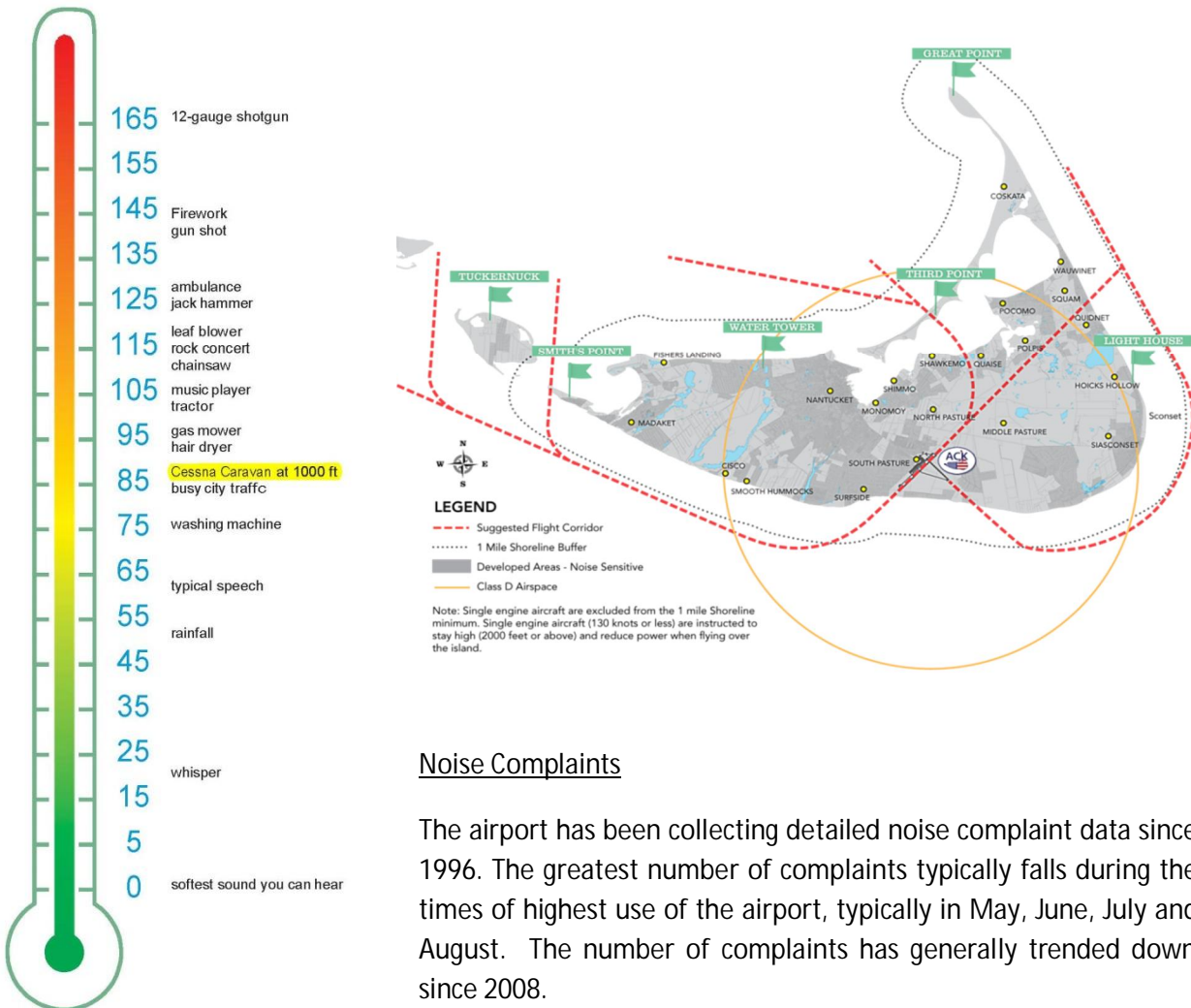
In 2013, six off airport locations were chosen by the ACK airport Commission for noise monitoring during a peak season week at Nantucket. Noise monitoring was coordinated with flight tracks and with different types of aircraft to get a better understanding flight paths and their corresponding ground noise levels. These noise levels provide the baseline for comparison of future noise levels associated with any proposed shift in noise generating activities at the airport so that changes to existing noise levels, if any, will be understood. A technical report on Noise is included in Appendix 3-1. The flight tracks shift more of the flight paths over water rather than over island. Incentives are provided to airlines in the way of reduced landing fees for compliance with the noise abatement program. The figure below (Figure 3-1) shows the flight track patterns currently in use as noise abatement procedures for the airport.

FAA has established noise impact levels for airports and used this evaluation to determine what the threshold is for requiring noise mitigation from a specific project. These standards were used to conduct a noise analysis for the Master Plan.



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Figure 3-1 – Voluntary Flight Paths to Promote Noise Reduction



Noise Complaints

The airport has been collecting detailed noise complaint data since 1996. The greatest number of complaints typically falls during the times of highest use of the airport, typically in May, June, July and August. The number of complaints has generally trended down since 2008.

The airport prepares and issues a monthly noise complaint report and tracks individual commercial compliance with noise abatement procedures. The figure above shows a relative scale of typical activities and where aircraft noise falls within the scale.

3.2 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 (O₃), carbon monoxide (CO), Nitrogen dioxide (NO₂), sulfur dioxide (SO₂), lead (Pb) and particulate matter.



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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. Nantucket Memorial Airport does not exceed 180,000 total operations in a year and is therefore below the threshold for air quality analysis. The proposed actions that may occur as part of the Master Plan will not exceed this threshold.

3.3 Coastal Resources

The entire island of Nantucket is located within the designated coastal zone for Massachusetts. This Master Plan will be distributed to the Massachusetts Office of Coastal Zone Management to ensure consistency with state standards and the Massachusetts Coastal Zone Management Plan. It is not anticipated that any of the Master Plan Elements will be inconsistent with state standards.

The Airport is located on the southern part of the island and its property boundaries include areas of coastal dunes and beaches with public access. Sea level rise and the associated coastal erosion is an ongoing concern at various locations throughout the island, including along the dunes located south of Runway 6-24. The airport coordinates with other island groups to help develop comprehensive plans for best management practices to address coastal erosion.

In order to gain an understanding of potential future changes at the approach end of RW 6, Jacobs assembled existing readily available information on changes that have occurred along the southern beaches in the recent past. This included examination of available historical aerial imagery and shoreline change information prepared by the Massachusetts Office of Coastal Management. Although past changes cannot be assumed to represent an accurate estimate of future changes, they can be useful in identifying trends in erosion and/or accretion that could impact the Airport. The shoreline change data shows that the beaches have been in constant change over the entire period evaluated. Based on the earliest maps available (1845), there has been a general trend of erosion at Nobadeer Beach, where the shoreline has retreated over 1,200 feet in that timeframe. Nobadeer Beach at ACK has shown a net gain in beach since 1994, but has been eroding since 2000. To maximize the benefits of the accretion since 1994, we recommend expanding active beach management at Nobadeer to better stabilize the beach and dune system and help solidify the gains. At the top of the dune, the airport perimeter fence is being undermined as a result of dune loss and will likely need to be relocated.

The coastal resources technical report, including figures showing shoreline historic trends, is included as an Appendix. Consideration of sea level rise, trends in coastal erosion and various methods for minimizing coastal erosion and will be incorporated into planning decisions.



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3.4 Compatible Land Uses

Air service has been ongoing at this location since 1927, when the first planes began flying between Boston and Nantucket. Prior to being used for air service, most of the land was used in agricultural use. The airport was turned over to the town in 1941 and was used by the Navy during World War II from 1941 to 1945. The town constructed two paved runways, taxiways, parking ramps, airfield lights and a control tower. Over the years upgrades have been made to improve operations and comply with FAA guidelines, including a terminal building and construction of a third runway. Of the 1,134 acres owned by the Airport, lands used for aviation and commercial purposes totals approximately 405 acres (37%).

The Nantucket Airport Commission is responsible for the care and operation of the Airport, and the land upon which the airport is located. The seven member volunteer commission is appointed to three-year terms by the County Commission, and represents a cross section of experience and backgrounds.

The Airport “Bunker Parcel” located outside the fence to the north of Runway 15/33, accommodates commercial and industrial land uses that are not compatible with the residential nature of other areas on the island. These uses – including an asphalt batch plant, a concrete batch plant, and storage facilities – 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. The figure below shows the layout of the parcels. Parcels 4B, 1B 3 and 4A are under agreement. Parcels 1A and 4E are currently vacant. Parcels 4C and 4D have been awarded but the lease has not been executed as of the time of this plan.

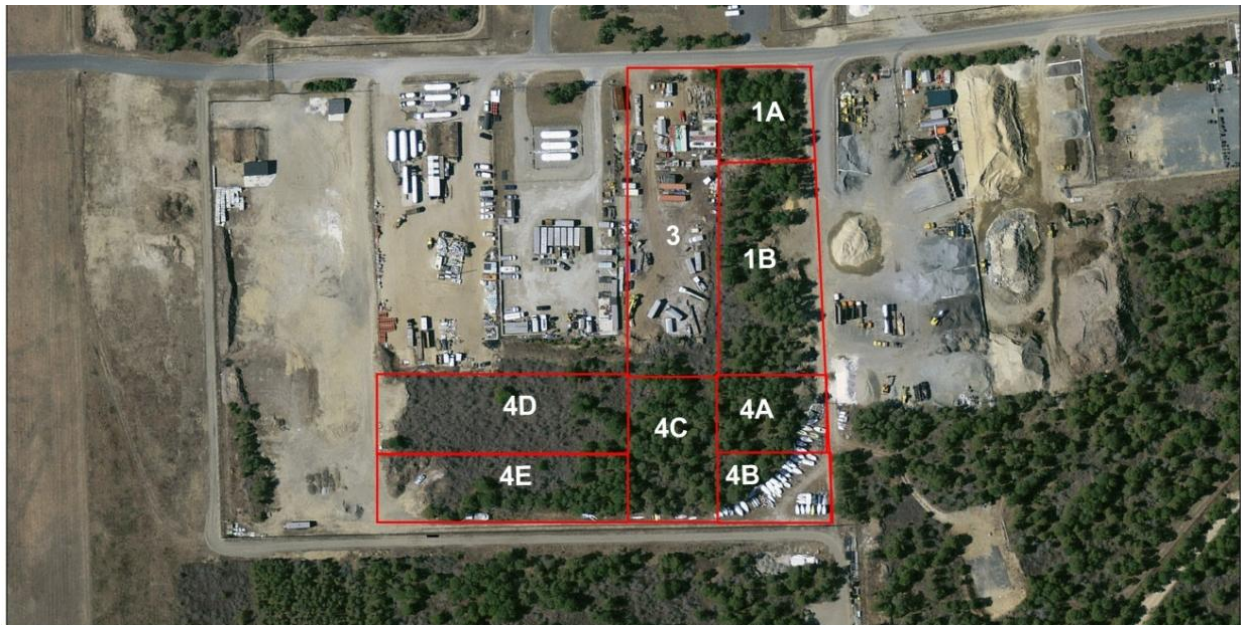


Figure 3-2 Bunker Parcel Future Leases



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3.5 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....” The airport currently hosts a baseball field that is open to the public.

3.6 Farmlands

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

3.7 Fish, Wildlife and Plants (Endangered Species)

Due to its geologic location and vegetation management operations, Nantucket Memorial Airport is home to several species of concern (See Figure 3-2 on page 54 for area of state mapped habitat). These include plant, moth and bird species. 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. Sandplain grasslands and scrublands have become a rare habitat in the northeast due to forest succession and encroaching development. 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 are conducted at the airport regularly.

Federally listed Species of Concern

The Nantucket county listings for endangered species, published by the United States Fish and Wildlife Service, includes three federally protected species. Two of these species, the roseate tern and piping plover, are found in habitats with coastal dunes. And one, the American Burying beetle, is found in upland grassed meadow habitat. Coastal dune habitats are not found within the airfield operating areas at Nantucket Memorial Airport, but are found to the south of the airport, outside the fence area. None of these species were found on the airport property during any previous field studies.

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 (008-123 DFW) issued in 2008 and amended in 2013. 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 2008, the airport instituted a sandplain grassland vegetation management plan. The results of rare species monitoring at the airport are reported to Natural Heritage and Endangered Species Program on a regular basis in compliance with all previous permits. The airport has committed to maintaining this unique ecosystem by continuing to manage the property in accordance with the Conservation Management Plan. Figures 3-3 and 3-4 show the locations of mapped habitat and areas where airport manages habitat for state listed species.



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The 2008 Conservation Management Permit allowed for a “take” of rare species, with provisions and mitigation that would ultimately result in a net benefit to the species affected. The Conservation Management Permit and the Habitat Management Plan require botanical surveys, transplants of potentially affected plants, construction monitoring, and monitoring of invasive species throughout the airport. Of the 1134 acres at the airport, 280 are under long term management for habitat.

Surveys for grassland plant species, were conducted throughout 2012 and 2013. Individuals were located in several locations throughout the airport. The table below indicates the species that were surveyed for and the presence or absence of these species within the airport boundaries. Appendix 3-2 includes the technical report for the Endangered Species surveys.

Summary of presence or absence of State Listed Species in targeted Areas at ACK in 2011-2013

Common Name	Scientific Name	State Status	On NHESP List	Observed in 2012
Moths				
Coastal Heath Cutworm	<i>Abagrotis nefascia</i>	SC	Y	N
Barrens Daggermoth	<i>Acronicta albarufa</i>	T	Y	Y
Gerhard’s Underwing Moth	<i>Catocala herodias gerhardii</i>	SC	Y	Y
Waxed Sallow	<i>Chaetagnalea cerata</i>	SC	N	Y
Melsheimer’s Sack Bearer	<i>Cicinnus melsheimeri</i>	T	Y	Y
Unexpected Cynia	<i>Cynia inopinatus</i>	T	N	Y
Sandplain Euchlaena	<i>Euchlaena madusaria</i>	SC	Y	Y
Slender Clearwing Sphinx	<i>Hemaris gracilis</i>	SC	Y	N
Barrens Buckmoth	<i>Hemileuca maia</i>	SC	Y	Y
Sandplain Heterocampa	<i>Heterocampa varia</i>	T	Y	Y
Pine Barrens Lycia	<i>Lycia ypsilon</i>	T	Y	Y
Barrens Metarranthus	<i>Metarranthus apiciaria</i>	E	Y	N
Coastal Swamp Metarranthus	<i>Metarranthus pilosaria</i>	SC	Y	Y
Imperial Moth	<i>Eacles imperialis</i>	T	Y	Y
Pink Sallow	<i>Psectagnalea carnosa</i>	SC	Y	Y
Southern Ptichodis	<i>Ptichodis bistrigata</i>	T	N	Y



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Pine Barrens Speranza	<i>Speranza exonerata</i>	SC	Y	Y
Faded Gray Geometer	<i>Stenoporpia polygrammaria</i>	T	Y	Y
Pine Barrens Zale	<i>Zale lunifera</i>	SC	Y	N
Beetle				
Purple Tiger Beetle	<i>Cicindela purpurea</i>	SC	Y	Y
Birds				
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	T	Y	Y
Continued from previous page				
Eastern Whip-poor-will	<i>Caprimulgus vociferus</i>	SC	Y	Y
Northern Harrier	<i>Circus cyaneus</i>	T	Y	N
Plants				
Purple Needlegrass	<i>Aristida purpurescens</i>	T	Y	N
Sandplain Flax	<i>Linum intercursum</i>	SC	Y	Y
Lion's Foot	<i>Nabalus serpentarius</i>	E	Y	N
Papillose Nut-Sedge	<i>Scleria pauciflora</i>	E	Y	Y
Sandplain Blue-Eyed Grass	<i>Sisyrinchium fuscatum</i>	SC	Y	Y

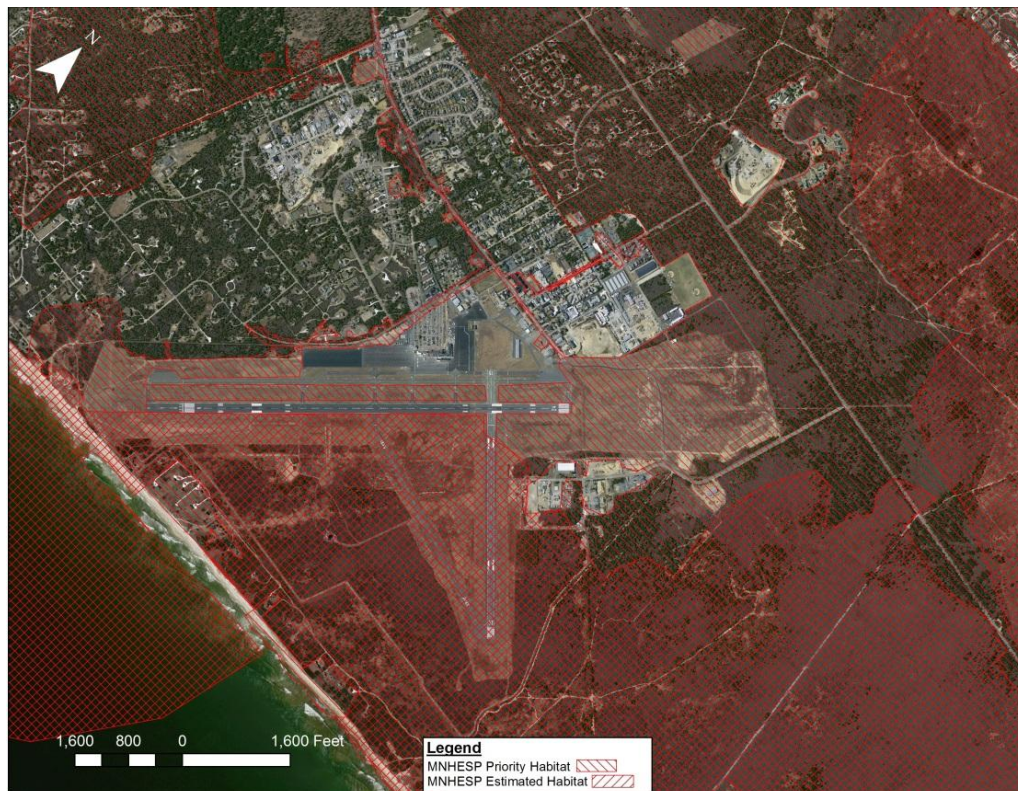
SC=Special Concern, T=Threatened, E=Endangered

The presence of listed species habitat coupled with the commitment of certain areas for long term mitigation for previous impacts, creates challenges for the airport in locating new infrastructure. The airport will continue to monitor these areas for new species and consider ways to avoid impacts to listed species and their habitat. Balancing the requirements and needs of ongoing airport operations with maintenance of habitat can be challenging. Where conflicts arise, safety of airport operations is paramount.



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Figure 3-3 – Mapped Habitat for State Listed Species



The airport actively manages certain areas for habitat protection and betterment in accordance with an approved grasslands management plan and draft Ecological Management Plan. The EMP is an adaptive plan to track management activities and determine their effectiveness in promoting suitable habitat for listed species. A Technical Advisory Committee meets yearly to discuss the EMP, operations and botanical survey results. The TAC helps to make informed changes to the Ecological Management Plan to promote best practices. The Figure below shows the areas currently included in the Vegetative Management Plan for ACK. There are three different schedules or treatments for vegetation management. The first, Schedule 1, is regular mowing to comply with airport operational and safety areas requirements. Schedule 2 areas are proposed to be cut every 2-3 years to keep out woody vegetation, but allow for propagation of herbaceous plant species. Schedule 3 is proposed for areas of the airport that are currently vegetated with scrub oak and pitch pine type cover. These areas provide for moth habitat when the trees are younger. A prescribed burn or selective cutting to reduce older growth in these areas is part of the vegetation management plan for the airport. Portions of this area underwent a controlled burn in late 2013. Others will be selectively burned in 2014 when wind conditions are favorable.

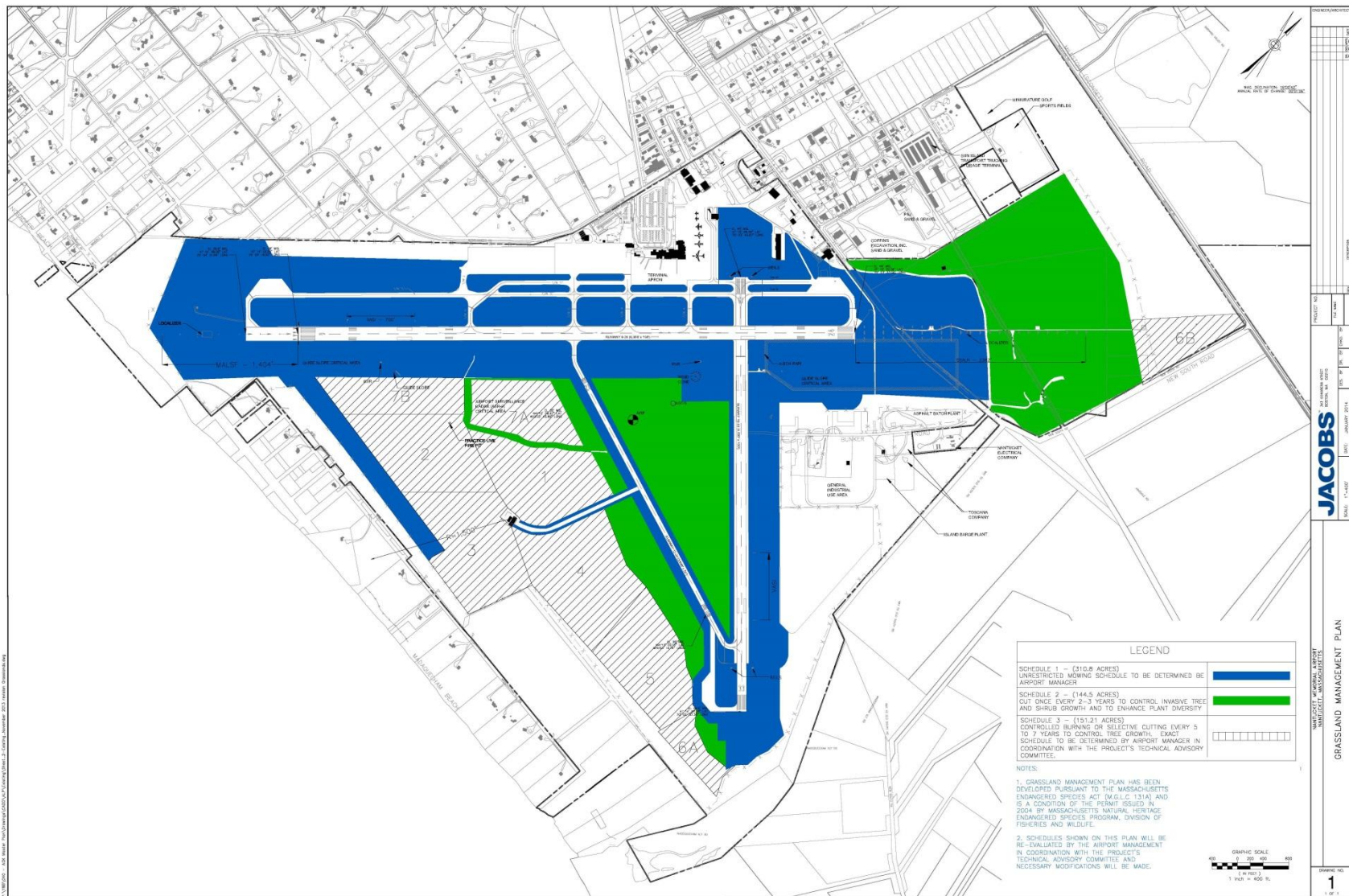


Figure 3-4 – Grassland Management Plan – Nantucket Memorial Airport

3.8 Floodplains

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

3.9 Topography

The topography within the vicinity of the airport is generally flat, with elevations ranging between approximately 30 and 50 meters above sea level NGVD. Elevations slope to the south towards the Atlantic.

3.10 Groundwater

The entire island, including the airport property, is underlain by a designated sole source aquifer. A sole source aquifer is defined as the source of 50 percent or more drinking water for a given area where there are no reasonable alternate sources. The airport is also immediately southeast of the Zone II for the municipal drinking water wells operated by the Wannacomet Water Company. A Zone II is defined by DEP as the areas of an aquifer which contributes to a well under the most severe pumping and recharge conditions that can be realistically anticipated. 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. The slope of the groundwater table in the area of the airport is generally flat. Based on the need for maintaining the high quality of groundwater in the area, the airport is committed to an extensive groundwater management plan. The practices used at the airport to protect this resource include the following:

- Ensuring hazardous materials are handled in compliance with regulations and in accordance with the Spill Prevention Control and Countermeasures Plan
- Upgrading underground fuel tanks older than 10 years
- Developing the groundwater monitoring plan
- Developing and implementing a training program for airport personnel
- Identifying clean up methodologies

Groundwater monitoring is conducted by the Wannacomet Water Company annually at the airport. This monitoring is conducted in compliance with EPA requirements. Testing includes detection of the deicing chemical propylene glycol among the list of monitored substances in the groundwater monitoring program.

3.11 Stormwater

Stormwater management at the Airport is achieved through a series of catch basins, dry wells vegetated swales and leaching basins. The sandy soils allow for infiltration in most areas. Along runway 6/24 stormwater is infiltrated either through dry wells or through a surface infiltration area. Stormwater runoff from runway 12/30 is directed to vegetated swales for infiltration. Stormwater flowing from 15/33 is directed to a series of drywells for infiltration. A combination of vegetated swales and dry wells collect water from the remaining taxiways, parking areas and other paved surfaces at the airport.

3.12 Waste Water

Wastewater generated at the airport is discharged to municipal sewer.



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3.13 Wetlands

There are no jurisdictional wetlands on the airport property.

3.14 Wild and Scenic Rivers

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

3.15 Hazardous Materials/Pollution Prevention/Solid Waste

A Spill Prevention Control and Countermeasures Plan (SPCCP) was developed in 2007 and updated in April of 2012. This plan details the locations of hazardous material both within the operational areas of the airport, and on airport leased property as well as identifies persons with responsibility for each location. The plan is attached in Appendix 3-3.

Of the 1,173 acres of Airport property, approximately 90 are paved for use as taxiways, runways and parking aprons. The eastern portion of the Airport Property, commonly referred to as the Bunker Area, houses two natural gas storage and transfer facilities, an asphalt plant, the Snow Removal Equipment Building and several contractor storage facilities. More than 40 Tenant businesses operate on airport property, the majority of which provide airport related services. Tenant operations include maintenance and servicing of aircraft and associated equipment, aviation fuel transfer and general facility maintenance. Operations related to aircraft maintenance include engine maintenance, electronics repair hydraulics system repair, aircraft washing, body repair, aircraft deicing and wheel and tire maintenance and repair. Maintenance of airport vehicles occurs at the SRE facility, and includes fluid changes, filter changes, refueling, brake repair, body repair, minor painting and washing.

Airport operations responsibilities include fuel transfer, traffic control, airport security equipment operations and maintenance, facility maintenance and ground keeping. Oil and hazardous materials use and storage at the airport includes aviation fuel, oil, lube oil, waste oil, deicing solution, paints, industrial chemicals, compressed gas, solvents and cleaning solutions. Airport Operations Maintains a Massachusetts Hazardous Waste Generator ID (MAD985290634) and is classified as a small quantity generator, generating between 100 kg and 1,000 kg of hazardous waste per month.

The most recent inventory of hazardous material at the airport was conducted as part of the SPCCP update. Inspections of airport tenant facilities are conducted on a regular basis to ensure compliance with Massachusetts Hazardous Waste Regulations (310 CMR 30.000). The Airport SPCCP details best management practices that detail requirements for storage of hazardous material.

After a storm event, stormwater contained within the Airport fuel farm's secondary containment structure is visually inspected for evidence of contamination. Stormwater determined to be free of contamination is discharged via a submersible pump to the Airport's stormwater system, where it is infiltrated. In the event of a discharge of oil or hazardous material to a secondary containment structure or the observation of contaminants in collected stormwater within a containment area, a licensed contractor provides for proper removal, transfer and disposal.



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

3.16 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 (SHPO).

Historic Sensitivity

The airport is located within the Nantucket Historic District, which is listed in the State and National Registers of Historic Places. The historic district is also a National Historic Landmark District and a Local Historic District. The historic district comprises the entire island and includes 2,400 contributing properties. The airport does not contain any properties contributing to the historic district, nor any individual historic resources listed in the Inventory of the Historic and Archaeological Assets of the Commonwealth.

Nantucket Memorial Airport was created in the late 1930's when a Mr. Holm allowed the Town to use the fields south of his farmhouse on Old South Road at Nobadeer as an airfield. The United States Navy assumed control of the airfield during World War II and constructed temporary buildings and ammunition bunkers. The ammunition bunkers remain extant and are typical of their type, built of sandbag concrete and earth construction with steel doors, and are used for general storage. There are also two or three sheds remaining from this period.

Following the war, the Navy's temporary buildings were removed, and a new construction program began in the early 1950s with the construction of the passenger terminal and FAA control tower, maintenance garage, and other buildings, along with runway improvements. During the ensuing years, older buildings were replaced by new structures, the 1950's structures were renovated, additional runway improvements were made, and a radar station was built. In 1992, the passenger terminal and air control tower were remodeled and joined by a connector and were made handicapped-accessible.

The late-nineteenth-century Holm farmhouse remains standing just outside airport property. The building has been heavily altered by additions and lacks any sense of its original open setting, as modern



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residential buildings closely surround it. Houses surrounding the airport for a radius of approximately one-half mile were built within the last 50 years.

Archaeological Sensitivity

The historic period archaeological sensitivity of the Nantucket Airport is based on its proximity to the previously identified eighteenth-century historic Native American settlement of Miacomet on the island. Activities associated with the community may have continued until 1782, when the meetinghouse was finally removed. Eighteenth century Native American houses adapted from the pre-contact period wigwam style were most likely constructed on the ground surface, and could be identified archaeologically based on assemblages found at other historic Native American house sites on Nantucket. Archaeological evidence of later historic period sheep raising activity is also possible.

The archaeological sensitivity of the Nantucket Airport property is suspected to be high based on its favorable environmental setting and the numerous recorded archaeological sites in similar settings close by, as referenced in the MHC State site files. Over 10 pre-contact sites are located within one-mile of the Airport, including a site on airport which yielded a ca. 3000 year old Small Stemmed projectile point collected from the ground surface during an archaeological survey by PAL in 1995 for perimeter fencing. Less than one kilometer (.6 miles) north of the airport along Old South Road, a Contact period or older Native American burial was identified, along with Archaic Period stone projectile points during the removal of sand and gravel sometime between 1940 and 1978 (MHC Site Files). Based on the frequency and temporal range of pre-contact sites within and surrounding the Airport, potential pre-contact site types could range from find spots of single artifacts (points) and small temporary camps to larger multi-component sites dating back at least 8000 years to 450 years ago.

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 SHPO. If archaeological investigations are required by the SHPO, the proposed areas of moderate sensitivity would likely be scoped for intensive survey..

3.17 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.

Nantucket Memorial Airport has already implemented numerous improvements to promote sustainable practices and energy use reduction including a geothermal heating and cooling unit for the terminal building, electric car charging stations, low flow sinks and toilets in the terminal building and promotion of LED use throughout the airport.



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The Nantucket Memorial Airport was recently selected by MassDOT aeronautics and the Volpe Transportation Center to be the first carbon neutral airport in the country. This program will provide the airport with incentives and partnering opportunities to promote reduced energy consumption for its ground facilities and operations, and promote the development of renewable energy production on the airport. This program's first phase, which is currently underway, consists of collecting data to develop a comprehensive baseline inventory of all greenhouse gasses under the airport's control. Staff from Volpe and MassDOT will identify operations emissions, such as transportation and refrigerant use. The key step to the first phase is evaluating proposals from various energy service companies and then selecting a company to implement these energy savings measures.

The second phase consists of implementing the energy savings measures. Net carbon neutrality may be achieved by reducing energy demand, converting remaining energy users to lower carbon sources, and/or offsetting emissions through renewable energy generation or credits. Reducing energy demand will be realized through efficiency projects, such as upgrades to retrofit mechanical equipment and lighting systems, and conservation projects, such as new automation systems, operational changes, and staff training. Some examples of renewable energy sources under consideration are solar panels (both ground and roof mounted), biofuel conversion, and geothermal expansion.

In addition to the sustainable practices already adopted at the airport, the program will promote the development of best practices in energy reduction to be shared with other airports across the United States. Efficiency will likely involve major upgrades to retrofit mechanical equipment, lighting systems and other facilities. New automation systems and operational changes will achieve additional energy savings. On-site renewable energy will be generated with the goal of equaling or exceeding energy consumption that cannot be eliminated.

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. Results of the energy audit and commitments made during the carbon neutral program will be used to help guide decision making within the Master Plan.



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APPENDIX 3-1

Noise Summary Report



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NOISE ANALYSIS – 2013 SUMMARY

K.M. CHNG ASSOCIATES

During the week beginning on Wednesday, August 15, 2013, noise measurements were obtained at several locations in the vicinity of Nantucket Memorial Airport. The primary purpose of the noise study was to quantify the level of environmental noise at typical residential locations both north and south of the airport. The late August time period was selected to be representative of a busy summer weekend period when the aircraft activity at the airport is at a maximum. Aircraft operations are one of the main sources of environmental noise for residents living close to the airport runway centerlines. During the measurement program, data was also collected for individual aircraft events, and airport apron ground operations.

The measurements included A-weighted hourly Leq levels that were obtained for five consecutive days at six residential locations within a mile or two of the airport. Additional A-weighted hourly Leq levels were obtained for two days at two other locations, one of which corresponds to one of the residential locations used in our previous noise studies (2011 and 2012), and the other which was located adjacent to the airport property line. The resulting measurements were reduced to average Leq and DNL for the total time period. The DNL level includes a 10 dB penalty for nighttime operations. **The Federal Aviation Administration (FAA) considers a DNL noise level of 65 dBA to be compatible with residential land use.** [It should be noted that the airport does not normally operate during nighttime hours].

The results of the measurements indicated that the Leq five-day average at the six residential locations varied from approximately 51-58 dBA, and the DNL varied from 53-63 dBA. The hourly background, or L90 levels, varied from approximately 40-44 dBA. Typical background levels included local traffic, children playing, and the sound of the surf at locations south of the airport. The level from most aircraft takeoffs and landings was in the 50-60 dBA range, and largely account for the measured Leq. However, one of the six locations included new home construction activities, which probably dominated the Leq, and was more conspicuous than aircraft noise. In some cases the higher of the DNL levels may reflect summer nighttime activities not related to the airport such as insect noise from crickets.

The two additional measurement locations, which were both very close to the airport, showed Leq two-day averages from approximately 61-64 dBA, and DNL two-day averages from approximately 62-67 dBA. The first of these locations at the end of Okarwaw Avenue was a residential location that also included considerable new home construction activity. The second location was adjacent to the airport and included noise from airport ground operations and nearby traffic on Monohansett Road.

FIVE-DAY HOURLY Leq MEASUREMENT LOCATIONS

Six locations were selected around the airport on Nantucket Island. The selection process and noise measurement locations were determined by the Airport Commission and Management Staff. **Figure 1** shows the locations and **Table 1** identifies the addresses of the properties where the noise measurements were obtained. As seen in the figure, the locations represent typical residential areas that are influenced by the noise produced by airport operations and typical flight tracks.



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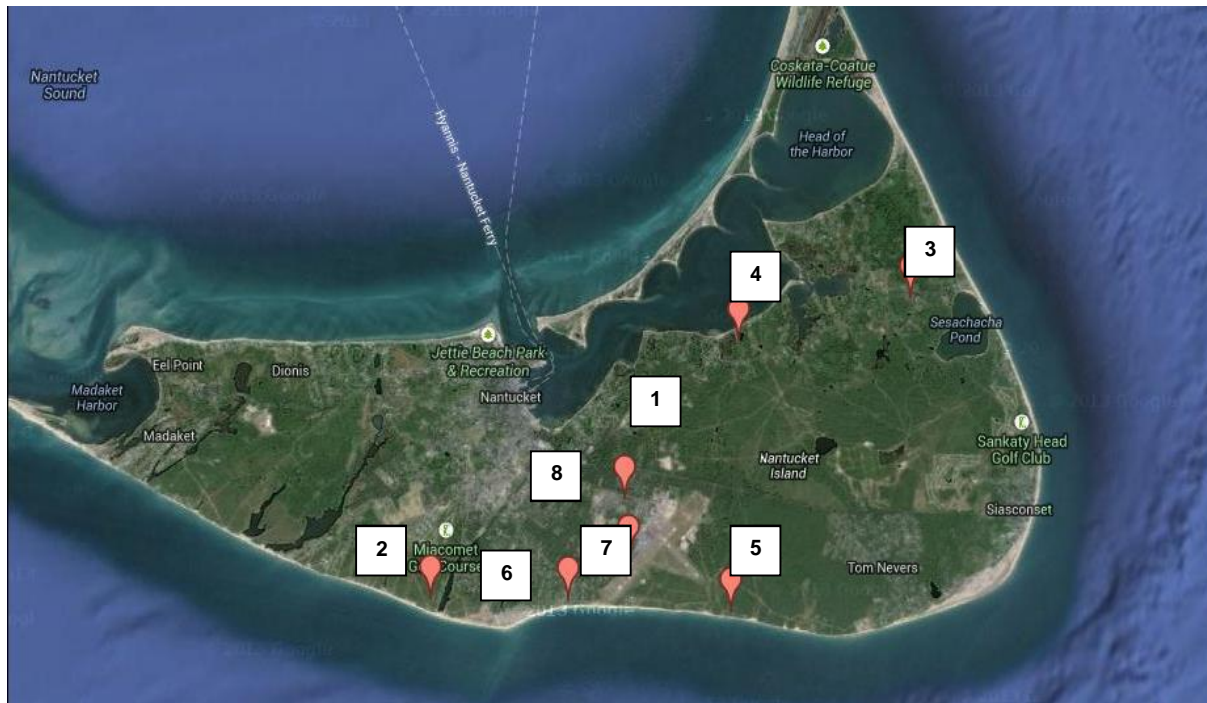


Figure 1: Aerial View of Nantucket Showing Measurement Locations

Table 1: Five-Day Measurement Location Addresses

Measurement Location	Address	Position from Airport
1	84 Egan Lane	Northwest
2	53 West Miacomet Road	Southwest
3	7 Briarpatch Road	Northeast
4	180 Polpis Road	Northeast
5	18 Waiquoit Road	Southeast
6	35 Nobadeer Avenue	Southwest

NOISE MONITORING RESULTS

The results of the noise monitoring at these locations are shown in **Table 2**, which includes the five-day average Leq, DNL, Lmax, Lmin, L10, and L90 (with the exception of Location 5, for which the L10 and L90 were not available due to equipment capability). **Figure 2** shows the DNL levels on the aerial view of the island. It can be seen that noise levels did not vary that much at the different noise measurement locations, and are representative of typical small airport activity. Some local events were also a factor in the noise levels. In particular, all the locations showed higher noise levels on approximately the fourth day



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of measurements (8/19), which was a Sunday afternoon. This may be attributable to weather events or typical Sunday afternoon departures. This pattern can be seen in **Figure 3**, which shows a composite view of the hourly Leq levels during the five-day measurement period. The figure also shows that there were some high noise level events at Location 1 on approximately 8/16 and 8/18, and at Location 6 between 8/19 and 8/20. **Figure 4** shows the range of typical noise levels for common sounds. The FAA considers a DNL noise Level of 65 dBA to be compatible with residential land use.

Table 2: Five-Day Average Measurement Results

Measurement Location	Leq (dBA)	DNL (dBA)	Lmax (dBA)	Lmin (dBA)	L10 (dBA)	L90 (dBA)
1	54.1	62.5	77.3	40.4	51.6	42.8
2	50.9	53.1	73.5	33.7	53.1	39.5
3	54.5	56.3	73.2	39.3	49.6	46.8
4	54.7	56.7	75.1	40.5	57.6	44.1
5	57.5	63.2	84.0	35.6	NA	NA
6	55.4	58.6	83.2	35.2	57.2	40.2

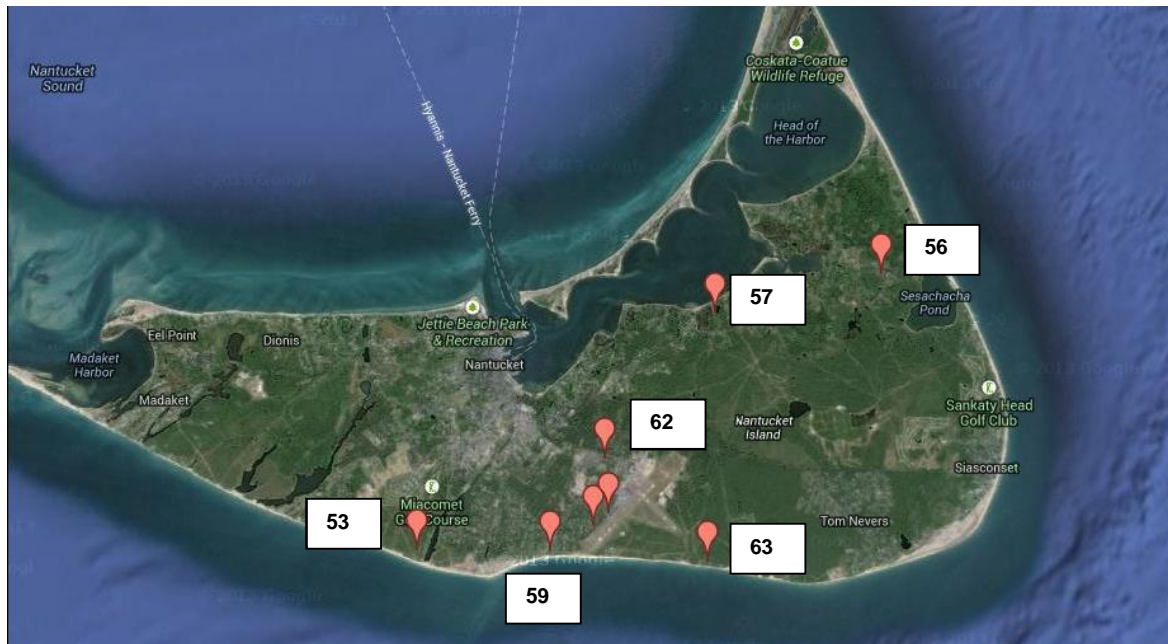


Figure 2: Five-Day Average DNL Noise Levels

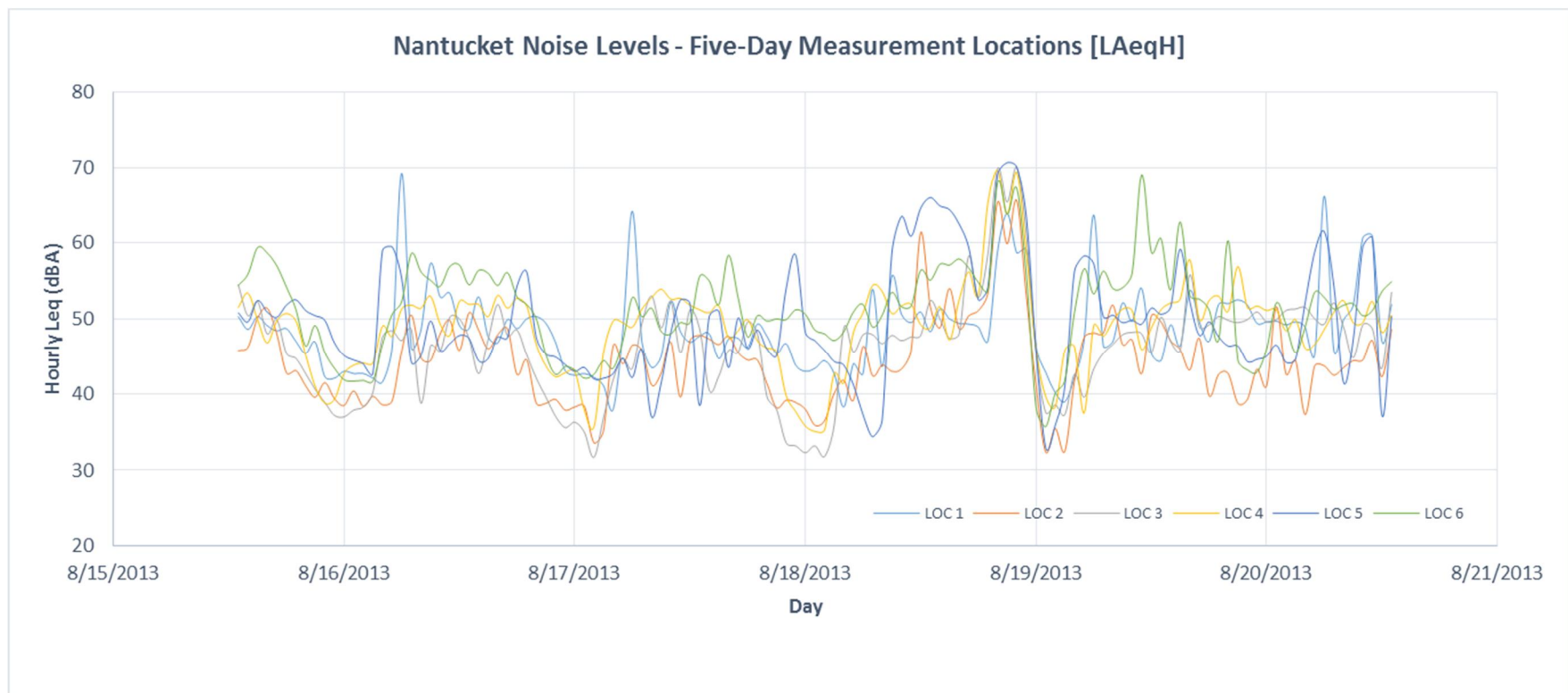


Figure 3: Hourly Leq Noise Levels at All of the Five-Day Measurement Locations

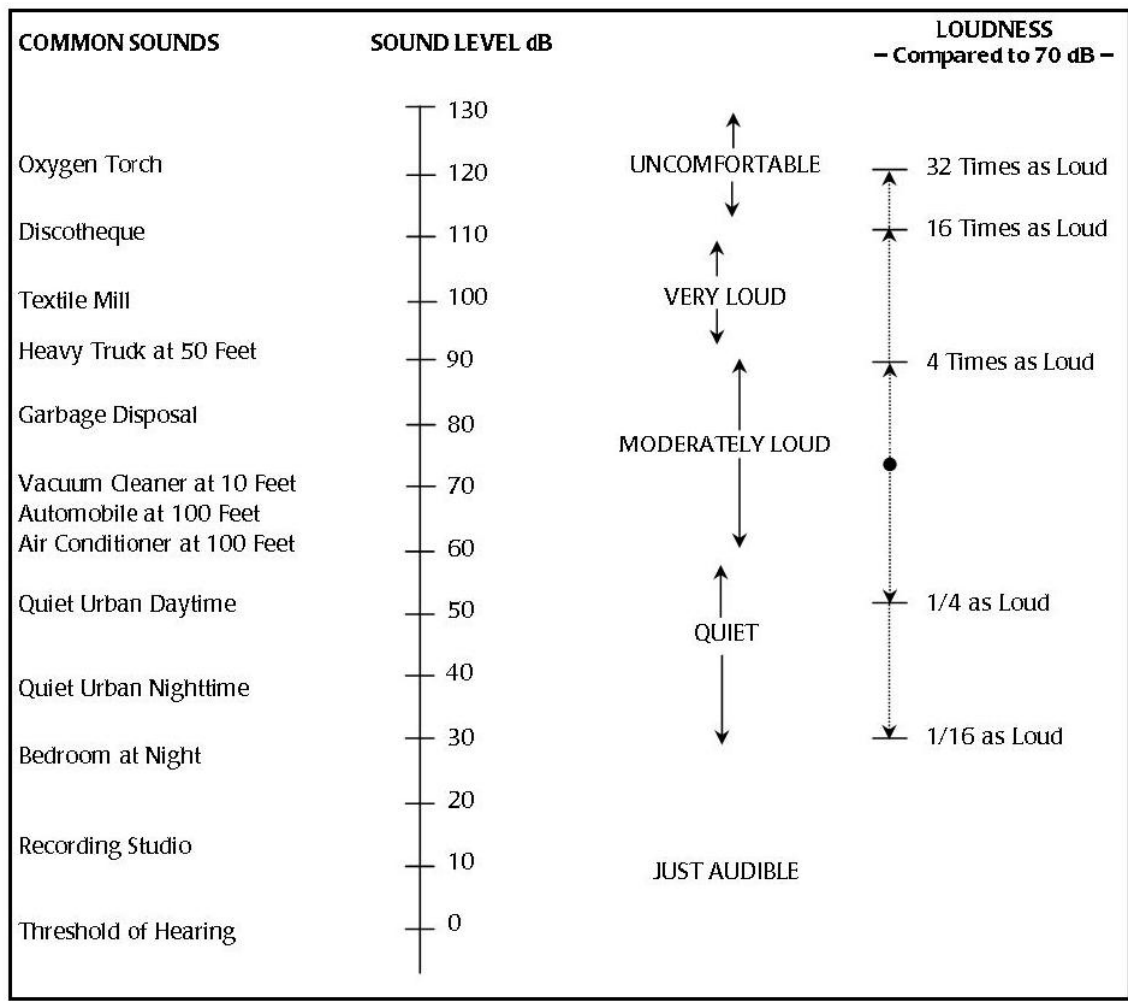


Figure 4: Typical A-weighted Noise Levels of Common Sounds



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TWO-DAY HOURLY Leq MEASUREMENTS

Two locations were selected that were similar to those used in our previous noise measurement programs at Nantucket Airport in 2011 and 2012. However, for various reasons, it was not possible to duplicate the conditions that were present in the previous years. Locations 7 and 8 are shown in **Figure 1**.

The results of the noise monitoring at these locations are shown in **Table 3**, which includes the two-day average Leq, DNL, Lmax, and Lmin (for technical reasons, the sound level meters at these locations were not able to record the L10 and L90 levels).

The noise levels at these locations were somewhat higher in general than those at the 5-day locations. Location 7, at 51 Okarwaw Avenue, was closer to the airport than any of the 5-day locations, and also was subject to noise from construction activity. Location 8 was just at the southwest airport property fence, and includes noise from airport ground operations, as well as fairly regular traffic on Monohansett Road.

Table 3: Two-Day Average Measurement Results

Measurement Location	Leq (dBA)	DNL (dBA)	Lmax (dBA)	Lmin (dBA)
7	60.5	62.2	86.4	38.4
8	63.8	66.9	86.8	44.2

COMPARISON WITH PRIOR YEARS DATA

For comparison purposes, the DNL results from the 2011 and 2012 measurements are shown along with the 2013 DNL measurements in **Table 4**. However, it should be kept in mind that, as explained earlier, the conditions were different for the 2013 measurements, and as a result, higher noise levels were measured at these locations in 2013. The higher levels obtained in 2013 most likely reflect adjacent traffic and home construction activity and do not indicate higher noise levels generated by airport operations.

Table 4: Comparison of DNL Measurement Results

Measurement Location	2011 DNL (dBA)	2012 DNL (dBA)	2013 DNL (dBA)
7	62.4	60.5	62.2
8	60.9	59.5	66.9



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The noise measurements obtained in 2011 and 2012 are more directly comparable because they were obtained at the same locations under the same general conditions. The higher DNL noise levels at measurement Location 7 are probably because this location is closer to the end of Runway 6 where the aircraft sometime sit idling on the taxiway waiting for other aircraft to takeoff and land, power-up for positioning, and then run-up the engines to full power for takeoff. In addition, the decrease in the measured DNL noise levels between 2011 and 2012 may be due to a reduction in the amount of aircraft activity at the airport in 2012, especially in the number of GA jet aircraft operations.

AIRCRAFT GROUND OPERATIONS

On the afternoon of August 15, 2013, noise measurements were obtained on the airport property near the main apron area. The location was immediately adjacent to the South Apron and approximately 1800 feet from the Runway 6/24 as shown in **Figure 5**.

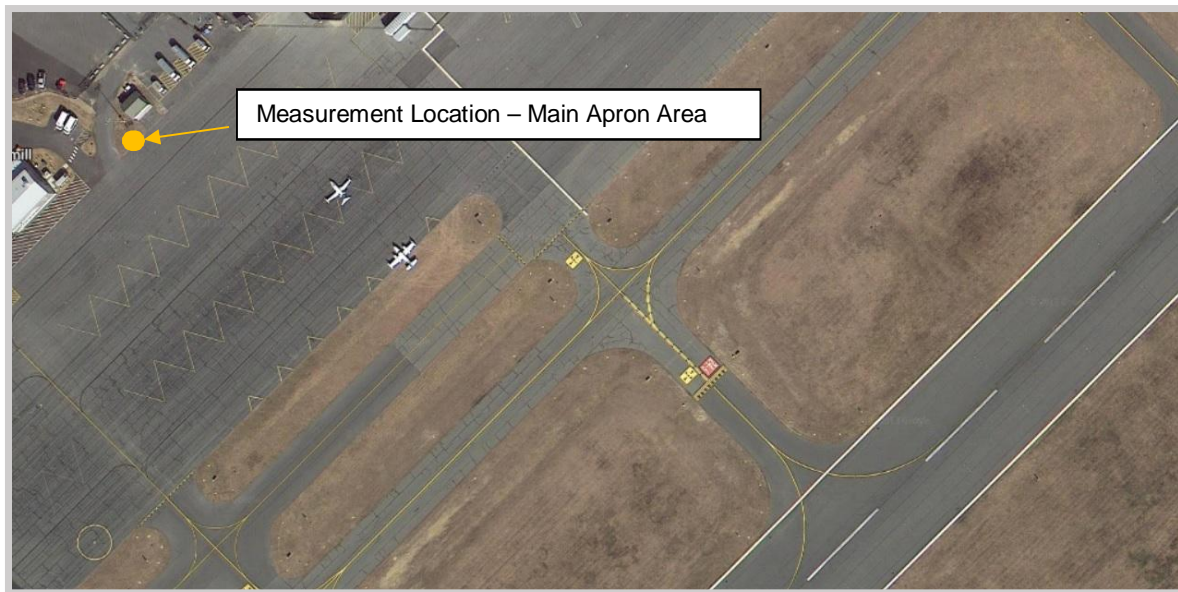


Figure 5: Airport Property Ground Operations Measurement Location

The purpose of these measurements was to obtain noise levels from various aircraft ground operations in the South Apron area. In addition, these noise measurements also picked up aircraft take-offs and landings on Runway 6/24. The measurement system recorded a time history of 1 second Leq noise levels for several 20-minute periods. The results from one of the 20-minute measurement periods are shown in **Figure 6**.

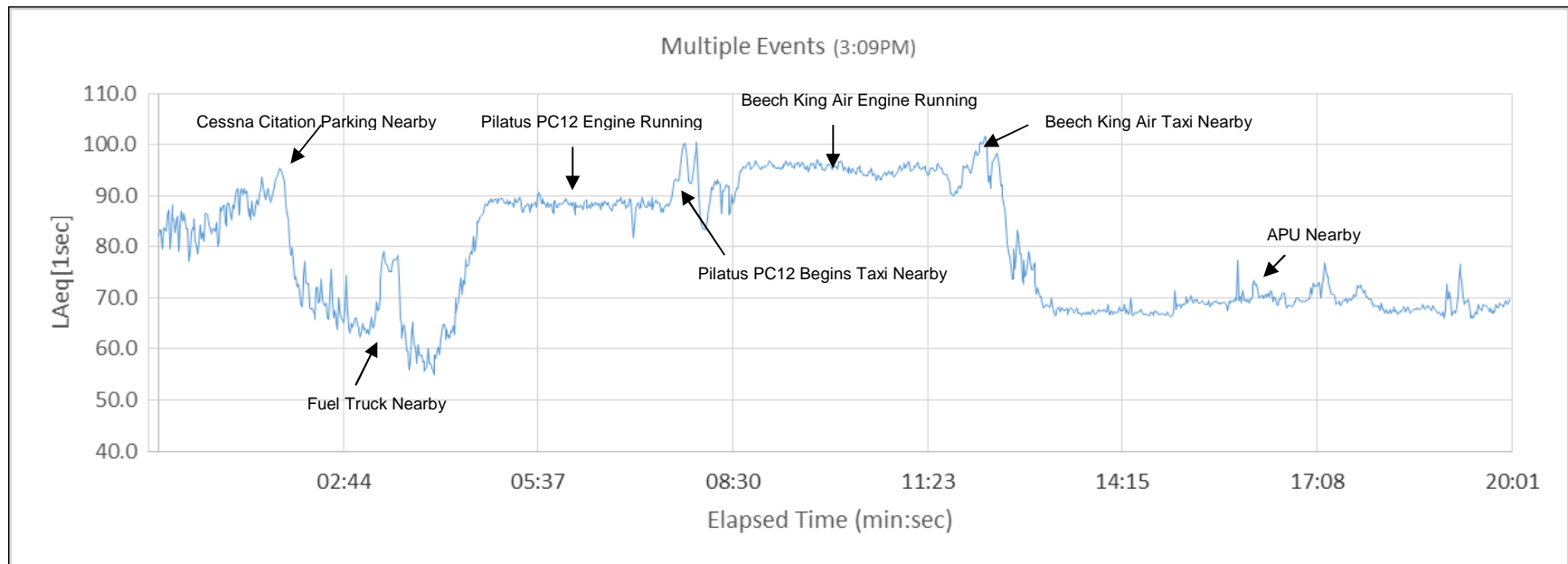


Figure 6: Airport Noise Levels – 20-Minute Time History (Beginning at 3:09 PM)

As **Figure 6** shows, noise levels were typically quite high from approximately 80 dBA for corporate turboprops and jet aircraft idling, as well as service truck activity, to over 90 dBA from nearby taxiing operations by corporate jet and turboprop aircraft. Although not shown in the figure, for a small percentage of time, the background level would drop to about 54 dBA, which is approximately the level of the HVAC units for the adjacent Airport Rescue and Fire Fighting (ARFF) building. Note that the elapsed time shown in the figure is relative to the start time of the measurement (3:09 PM).

Similar noise measurements were obtained in 2011 and 2012. The measured noise levels from the APUs were approximately the same (70 dBA) for the noise measurements obtained for each of the three years. The hourly Leq noise levels of approximately 70 dBA at this location reflect the APU operations immediately adjacent on the South Apron. The measured hourly Leq noise levels are a function of the distance from the aircraft ground operation, the number of ground operations, and the duration of the GA jet aircraft ground operations with APUs running that occur within the apron area during the measurement period.

APU USE RESTRICTIONS

Nantucket Airport has instituted a 'voluntary policy' on restricting the use of aircraft APUs in the apron area. This voluntary policy appears to be working. In general, the length of time that the APUs are operating in the apron area during ground operations prior to takeoff appears to be less than the duration times observed in 2011 before the voluntary policy was initiated. However, the overall measured hourly Leq noise levels were approximately the same for each of the three years. This is because the Leq noise level is a function of the number, as well as the duration, of GA jet aircraft operations that occur within the apron area during the hourly measurement period. So while the duration of individual operations may be reduced, the number of overlapping operations may have increased. The benefit is that while operations may have increased, the Leq's noise levels have not increased.



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APPENDIX 3-2 Endangered Species Survey



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APPENDIX 3-3

Spill Control and Countermeasures Plan (SPCCP)



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Appendix 3-4 Coastal Resources