NAPLES AIRPORT

Airport Master Plan

Working Paper #3
Environmental Overview
Alternatives for Airport Development

Prepared for:
City of Naples Airport Authority
160 Aviation Drive North
Naples, Florida 34104

December 20, 2019
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ESA

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CHAPTER 5
Environmental Overview
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5.1 Introduction

Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5070-6B, Change 2, *Airport Master Plans*, encourages the consideration of environmental factors in airport master planning to “help the sponsor thoroughly evaluate airport development alternatives and to provide information that will help expedite subsequent environmental processing.” Also, Florida Department of Transportation (FDOT) *2016 Guidebook for Airport Master Planning* notes that there are different environmental processes for projects that are funded by the FAA or FDOT. However, both agencies clearly recognize that it is not the intent of a master plan to complete the federal and state environmental review processes. Instead, the information should identify and set the stage for understanding what future environmental evaluations and clearances may be needed.

This chapter provides an overview of known environmental resources that will be considered during the identification and evaluation of development alternatives in this master plan. The types of environmental reviews are addressed at the end of this chapter while potential environmental impacts associated with specific conceptual development alternatives are discussed as part of the evaluation of airfield alternatives. The environmental resources discussed in this chapter include many of those identified in FAA Order 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions*, and FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*. This overview does not constitute an Environmental Assessment (EA); instead, it is intended to help prepare for NEPA review that may be required by the FAA for future projects occurring at Naples Airport (APF).

5.2 Air Quality

The federal *Clean Air Act*, as amended, required the U.S. Environmental Protection Agency (EPA) to establish National Ambient Air Quality Standards (NAAQS) for principle air pollutants considered harmful to public health and the environment. Those areas where the NAAQS are not met are designated as “nonattainment.” Collier County is currently classified as “attainment” for all criteria air pollutants listed in the NAAQS\(^1\). Emission sources at APF, which are typical of airports, include aircraft engines, ground support equipment, auxiliary power units, motor vehicles, temporary use of construction equipment, and various stationary sources. Stationary sources at APF include, back-up electric power generators and fuel storage tanks.

The existing and projected aircraft operations at APF, in conjunction with the County’s attainment status, indicates that continued development at the airport is not likely to substantially affect air

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quality, exceed thresholds that require detailed air quality analyses, or require conformance with a State Implementation Plan. Future airport development projects that require NEPA review will consider the project’s effect on air quality.

5.3 Biological Resources

5.3.1 Biotic Communities and Vegetation

APF covers a land area of approximately 733 acres. The existing land use and cover types have been mapped for APF using the South Florida Water Management District (SFWMD) Florida Land Use, Cover and Forms Classifications Systems (FLUCCS) data for Collier County. The FLUCCS communities are listed in Table 5-1 below and are depicted on Figure 5-1.

<table>
<thead>
<tr>
<th>LAND USE CODE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>140</td>
<td>Commercial and Services</td>
</tr>
<tr>
<td>411</td>
<td>Pine Flatwoods</td>
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<tr>
<td>422</td>
<td>Brazilian Pepper</td>
</tr>
<tr>
<td>437</td>
<td>Australian Pines</td>
</tr>
<tr>
<td>530</td>
<td>Reservoirs (and Surface Waters)</td>
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<tr>
<td>621</td>
<td>Mangrove Swamps</td>
</tr>
<tr>
<td>617</td>
<td>Mixed Wetland Hardwoods</td>
</tr>
<tr>
<td>624</td>
<td>Cabbage Palm</td>
</tr>
<tr>
<td>641</td>
<td>Freshwater Marshes</td>
</tr>
<tr>
<td>811</td>
<td>Airports</td>
</tr>
</tbody>
</table>

Potential impacts to biotic communities are regulated by a variety of agencies at the federal, state and local level depending upon the project type and resource affected. In Collier County, local agencies support development review but it is the federal and state regulatory agencies that have jurisdiction over the resource categories discussed in this section. These agencies and the coordination typically required are discussed in the following sections related to the specific resources they govern, and include federal and state wetland regulations, water quality protection, and federal and state regulations for protected species.
FIGURE 5-1

FLORIDA LAND USE COVER AND FORMS CLASSIFICATION SYSTEM (FLUCCS)

Source: SOUTH FLORIDA WATER MANAGEMENT DISTRICT, 2019; AND ESA, 2019.

Naples Airport Master Plan
5.3.2 Wildlife, Listed Species, and Essential Fish Habitat

Wildlife Hazard Management

A FAA compliant Wildlife Hazard Assessment (WHA) was completed and submitted to the FAA in 2013. Subsequently, it was determined that a Wildlife Hazard Management Plan (WHMP) was required at APF. The WHMP was developed (September 2015) and included recommendations that are currently in place at the airport. The WHMP is included in the airport’s Title 14 Code of Federal Regulations (CFR) Part 139 Airport Operating Certificate and identifies actions and permits required to manage wildlife at the airport, including protected species. APF maintains a Federal Depredation Permit from the U.S. Fish and Wildlife Service (USFWS) and a State-Issued Depredation Permit for Game and Non-Game Species from the Florida Fish and Wildlife Conservation Commission (FFWCC), as part of these controls. Future airport development will need to consider the current WHMP and its recommendations.

Listed Species

In addition to assessing impacts under NEPA, airport development projects are subject to other federal and state laws associated with wildlife and protected species. Most notable is the federal Endangered Species Act, which protects and recovers imperiled species and the habitats upon which they depend. The FAA and/or other federal agencies that may be involved with airport development projects at APF are required to determine if their action(s) would affect listed species. Depending upon the potentially impacted habitat or species affected, coordination with the USFWS and the FFWCC may be required. In cases where wetlands are also impacted, this coordination typically occurs in conjunction with the wetland permitting process. A discussion of the listed wildlife species with a likelihood of occurrence at the airport, and the coordination required for impacts to each, is included in this section.

A review of publically available resources such as the Florida Natural Areas Inventory (FNAI) and previous environmental studies (including the WHA) has identified suitable habitat at APF for a number of federal and state listed wildlife species. Table 5-2 provides a list of the listed species for which suitable habitat exists, or there is a likelihood of occurrence on or near APF.
### Table 5-2
Federal and State Listed Wildlife Species in the Vicinity of APF

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>USFWS Listing</th>
<th>FFWCC Listing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fishes</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mangrove Rivulus</td>
<td><em>Rivulus marmoratus</em></td>
<td>SC</td>
<td></td>
</tr>
<tr>
<td><strong>Reptiles</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>American Alligator</td>
<td><em>Alligator mississippiensis</em></td>
<td>SAT</td>
<td></td>
</tr>
<tr>
<td>American Crocodile</td>
<td><em>Crocodylus acutus</em></td>
<td>T</td>
<td></td>
</tr>
<tr>
<td>Eastern Indigo Snake</td>
<td><em>Drymarchon corais couperi</em></td>
<td>T</td>
<td></td>
</tr>
<tr>
<td>Gopher Tortoise</td>
<td><em>Gopherus polyphemus</em></td>
<td>C T</td>
<td></td>
</tr>
<tr>
<td><strong>Birds</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Florida Scrub Jay</td>
<td><em>Aphelocoma coerulescens</em></td>
<td>T</td>
<td></td>
</tr>
<tr>
<td>Florida Burrowing Owl</td>
<td><em>Athene cunicularia floridana</em></td>
<td>ST</td>
<td></td>
</tr>
<tr>
<td>Crested Caracara</td>
<td><em>Caracara cheriway</em></td>
<td>T</td>
<td></td>
</tr>
<tr>
<td>Piping Plover</td>
<td><em>Charadrius melodus</em></td>
<td>T</td>
<td></td>
</tr>
<tr>
<td>Red-cockaded Woodpecker</td>
<td><em>Dryobates borealis</em></td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>Little Blue Heron</td>
<td><em>Egretta caerulea</em></td>
<td>T</td>
<td></td>
</tr>
<tr>
<td>Reddish Egret</td>
<td><em>Egretta rufescens</em></td>
<td>T</td>
<td></td>
</tr>
<tr>
<td>Tricolored Heron</td>
<td><em>Egretta tricolor</em></td>
<td>T</td>
<td></td>
</tr>
<tr>
<td>American Oystercatcher</td>
<td><em>Haematopus palliates</em></td>
<td>T</td>
<td></td>
</tr>
<tr>
<td>Bald Eagle</td>
<td><em>Haliaeetus leucocephalus</em></td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>Wood Stork</td>
<td><em>Mycteria Americana</em></td>
<td>T</td>
<td></td>
</tr>
<tr>
<td>White Crowned Pigeon</td>
<td><em>Patagioenas leucocephala</em></td>
<td>T</td>
<td></td>
</tr>
<tr>
<td>Roseate Spoonbill</td>
<td><em>Platalea ajaja</em></td>
<td>T</td>
<td></td>
</tr>
<tr>
<td>Black Skimmer</td>
<td><em>Rynchops niger</em></td>
<td>T</td>
<td></td>
</tr>
<tr>
<td>Roseate Tern</td>
<td><em>Sterna dougallii</em></td>
<td>T</td>
<td></td>
</tr>
<tr>
<td>Least Tern</td>
<td><em>Sternula antillarum</em></td>
<td>T</td>
<td></td>
</tr>
<tr>
<td><strong>Mammals</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Florida Bonneted Bat</td>
<td><em>Eumops floridanus</em></td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>West Indian Manatee</td>
<td><em>Trichechus manatus</em></td>
<td>T</td>
<td></td>
</tr>
</tbody>
</table>
TABLE 5-2
FEDERAL AND STATE LISTED WILDLIFE SPECIES IN THE VICINITY OF APF

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>USFWS Listing</th>
<th>FFWCC Listing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sherman’s Fox Squirrel</td>
<td>Sciurus niger shermani</td>
<td>SSC</td>
<td></td>
</tr>
</tbody>
</table>

This information is provided as a guide to project planning, and is not a substitute for site-specific surveys. Such surveys may be needed to assess species’ presence or absence, as well as the extent of project effects on listed species and/or designated critical habitat.

USFWS = United States Fish and Wildlife Service  
FFWCC = Florida Fish and Wildlife Conservation Commission  
E = Endangered  
T = Threatened  
SC/SSC = Species of Special Concern  
C = Candidate for listing at the Federal Level by USFWS  
T(S/A) = Threatened (Similarity of Appearance) to American crocodile - Crocodylus acutus  

NOTE: Candidate species receive no statutory protection under the Endangered Species Act (ESA). The FWS encourages cooperative conservation efforts for these species because they are, by definition, species that may warrant future protection under the ESA.

SOURCE: USFWS, FFWCC, Florida Natural Areas Inventory (FNAI), and ESA, 2019.

Specific species survey, monitoring and permitting guidelines are established by FFWCC and/or USFWS, and those activities would be required prior to or during the permitting process for airport development if there is a potential for impacts to any of these listed species. For species that have been documented at APF, or where proposed development is likely to affect one or more of these species or their habitat, more detail is provided in the following section.

At this time, one active bald eagle (Haliaeetus leucocephalus – Federally protected) nest has been verified within the airport property limits. This nest is located in habitat identified as pine flatwoods, which is located south of Runway 5-23 (see Figure 5-2). The FFWCC approved revisions to the state’s bald eagle rule (68A-16.002, F.A.C.) in 2017, which eliminates the need for applicants to obtain both a state and federal permit for activities with the potential to take or disturb bald eagles or their nests. Under the new revisions, only a federal permit is required. The bald eagle was delisted under the U.S. Endangered Species Act or the Florida Endangered and Threatened Species rules; however, bald eagles remain protected by both the state eagle rule (68A-16.002, F.A.C.) and federally managed under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. Under provisions set by USFWS, landowners are advised to consult with USFWS when proposing land use activities within 660 feet of an eagle nest. The USFWS guidance requires the applicant to maintain a buffer of at least 660 feet (200 meters) between the project activities and the nest, unless there are similar activities to the proposed action within that buffer. If a similar activity is closer than 660 feet, the distance buffer can be as close to the nest as the existing tolerated activity provided all clearing, external construction, and landscaping activities within 660 feet are conducted outside nesting season (October 1st through May 15th). If the buffer cannot be maintained, or the tree must be removed, a permit authorizing removal or relocation of an eagle nest would be required. These permits are suitable in certain instances, including where nest removal is necessary to alleviate a safety emergency or where the take or the mitigation for the take will provide a clear and substantial benefit to eagles. This is the case at APF where the history of
Eagle/aircraft strikes has been well documented. Prior to nest removal, monitoring would be required to determine the activity at the nest (if applicable), and to support the permit application.

Undeveloped upland portions of the airport property may provide suitable habitat for the state-listed gopher tortoise (*Gopherus polyphemus*, Threatened), the Florida burrowing owl (*Athene cunicularia floridana*), and/or the federally-listed Eastern indigo snake (*Drymarchon couperi*, Threatened). Gopher tortoise burrows are found in most upland habitats and are protected from any type of soil disturbance, by a 25-foot buffer. Prior to construction of new facilities in upland portions of airport property that are undeveloped or in mowed or maintained areas that the gopher tortoise may inhabit, a gopher tortoise survey using the methodology established by the FFWCC will be required to determine their presence or absence. If gopher tortoises are present, then coordination with the FFWCC and a gopher tortoise relocation permit may be required. In addition, these upland areas may also support burrowing owl habitat. Appropriate FFWCC survey protocols and permit requirements regulated under 68A-27,007 F.A.C. may be required should incidental take permitting of the burrows be required. Take of burrowing owl burrows is defined as: collapsing a potentially occupied burrow or blocking the entrance of a potentially occupied burrow in a manner that prevents an owl from entering or exiting the burrow, disturbances within 10 feet of a potentially occupied burrow at any time of the year, disturbances within 33 feet of a potentially occupied burrow during the breeding season (February 15th through July 10th), or significant habitat modification (loss of greater than 50 percent of the total foraging habitat within a 1,970-foot radius circle around a potentially occupied burrow.

Indigo snakes can occur within most of the existing, undeveloped habitats on-airport property. Current guidance requires that disturbance of more than 25 acres of undeveloped land triggers coordination with USFWS. The eastern indigo snake has been documented to occur in Collier County, and since it is a commensal species that often utilizes gopher tortoise burrows for shelter and nesting, proposed development areas that are surveyed and determined to contain gopher tortoise burrows may also contain eastern indigo snakes. Their presence would typically be determined during gopher tortoise relocation activities, and eastern indigo snake guidelines and conditions are typically included in a gopher tortoise relocation permit. If the indigo snake is documented within a proposed project area, USFWS and FFWCC coordination and permitting may be required.

The federally listed (Threatened) wood stork (*Mycteria americana*) is a species that typically utilizes shallow waterbodies, including wetlands, coastal areas, ponds, ditches, creeks, and impounded water areas, for foraging opportunities. APF is located within a USFWS designated Wood Stork Core Foraging Area; therefore, given the extent of wetlands and man-made drainage features on-airport property, future development projects that impact appropriate wood stork foraging habitat may require USFWS coordination and possibly mitigation. This coordination is usually completed through the wetland permitting processes and, if required, wood stork habitat mitigation is typically accomplished in conjunction with state and federal permitting actions for impacting wetlands and waterbodies.
FIGURE 5-2
CRITICAL HABITAT AND BALD EAGLE LOCATION

The crested caracara (*Caracara cheriway* – federally threatened) is considered a large falcon that nests throughout much of southern Florida. Breeding activity occurs from September through June, and nests area typically well concealed within the tops of cabbage palms (*Sabal palmetto*), although other canopy species such as live oaks (*Quercus virginiana*) and cypress (*Taxodium distichum*) have been utilized. Nests are protected by a 1,500 meter buffer zone; therefore, USFWS formal survey protocols should be implemented in order to determine if caracaras are nesting within any suitable on-site habitat. Impacts within 1,500 meters of a known nest could be considered a “take” action and USFWS will need to be consulted.

**Essential Fish Habitat**

The *Magnuson-Stevens Fishery Conservation and Management Act* (MSFCMA - 16 U.S.C. 1801, et seq.) reflects the Secretary of Commerce and Fishery Management Council’s authority and responsibilities for the protection of essential fishery habitat. The Act specifies that each federal agency shall consult with the Secretary with respect to any action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken, by such agency that may adversely affect any essential fish habitat (EFH) identified under this Act. EFH is defined by the Act as “…those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” Waters include aquatic areas and their associated physical, chemical, and biological properties that are used by fishes and may include areas historically used by fishes. Substrate includes sediment, hard bottom, structures underlying the waters, and any associated biological communities. Necessary means the habitat required to support a sustainable fishery and the managed species contribution to a healthy ecosystem. Spawning, breeding, feeding, or growth to maturity covers all habitat types used by a species throughout its life cycle. Only species managed under a Federal Fishery Management Plan (FMP) are covered (50 CFR 600).

The National Oceanic and Atmospheric Administration (NOAA) Fisheries, known as NOAA Fisheries or the National Marine Fisheries Service (NMFS), reviews potential impacts to marine listed species (such as smalltooth sawfish) and also coordinates for projects that may affect EFH. EFH assessments are conducted where projects have the potential to affect identified resources, which includes both in-water activities and activities that would affect coastal vegetation or substrate through direct impact or drainage. The Gordon River is considered EFH for a number of species covered under the NMFS Gulf of Mexico Fishery Management Council including red drum (*Sciaenops ocellatus*), and multiple species of shrimp, reef fish, coastal migratory pelagics, and others. An assessment of potential impacts to EFH resources would be required for any development or construction activities that ultimately discharge into Gordon River or Rock Creek. This assessment is typically conducted through the NEPA review or permitting for the proposed project.

**Critical Habitat**

Critical Habitat is designated by USFWS for most of the threatened species and endangered species listed under the Endangered Species Act. Critical habitat is a habitat area essential to the conservation of a listed species, though the area need not actually be occupied by the species at the
time it is designated. Both the Gordon River and Rock Creek are listed by USFWS as critical habitat for the West Indian manatee (see Figure 5-2).

### 5.4 Department of Transportation Act: Section 4(f) and Other Environmentally Sensitive Public Lands

Section 4(f) of the *Department of Transportation Act of 1966* (re-codified and renumbered as Section 303(c) of 49 United States Code) states that the Secretary of Transportation will not approve any program or project that requires the use of publicly-owned land of a public park or recreation area; or wildlife and waterfowl refuge of national, state, or local significance; or land of an historic site of national, state, or local significance as determined by the officials having jurisdiction thereof, unless:

1. There is no feasible and prudent alternative to use of such land and such program, and
2. The program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use.

There are several potential Section 4(f) resources located on or within the immediate vicinity (one mile) of APF property. There are also three conservation easements located within the airport property boundary. These easements include portions of the mangrove forested/cabbage palm wetlands located southwest of Runway 5-23, a small freshwater forested wetland system located along the western property boundary and a mangrove forested wetland system located at the northwestern limit of Runway 14-32 (see Figure 5-3). The potential Section 4(f) onsite resource is the Gordon River Greenway Trail. The trail, managed by the Southwest Florida Land Preservation Trust, allows access along the Gordon River from Golden Gate Parkway to south of the airport, along North Road.

One (1) wildlife and waterfowl refuge is located within a mile of APF. This refuge includes the:

- Conservancy of Southwest Florida, 1495 Smith Preserve Way, Naples Florida (806 meters from APF property boundary)

If a proposed project is anticipated to result in impacts to a Section 4(f) resource, coordination with applicable agencies (U.S. Department of the Interior, USDA, or Housing and Urban Development), in addition to any state/local officials with jurisdiction over and Section 4(f) property that may be potentially impacted by a proposed airport action, would typically be conducted as part of the NEPA process.
FIGURE 5-3
ON-AIRPORT EASEMENTS

5.5 Hazardous Materials and Waste Management

5.5.1 Hazardous Materials

Federal, state, and local laws regulate hazardous materials use, storage, transport, or disposal. Major laws and issue areas include:

- Resource Conservation and Recovery Act (RCRA) - hazardous waste management.
- Hazardous and Solid Waste Amendments Act - hazardous waste management.
- Comprehensive Environmental Response, Compensation, and Liability Act - cleanup of contamination.
- Superfund Amendments and Reauthorization Act (SARA) - cleanup of contamination.
- Emergency Planning and Community Right-to-Know (SARA Title 111) - business inventories and emergency response planning.

According to the Florida Department of Environmental Protection (FDEP) Contamination Locator Map (CLM), there are no petroleum cleanup sites located on-airport property. However, two (2) active petroleum sites are identified just beyond the airport property limits. The first active petroleum cleanup site is associated with the Seminole Petroleum Plant (Horseshoe Drive), located north of the northeast APF property corner (see Figure 5-4). This site is contaminated due to discharges of petroleum and petroleum products from above ground and/or underground storage systems. The original release of petroleum from this site was recorded on July 9, 1988 and later assessed in 1992. A Remedial Action Plan was created in 1993 for soil and groundwater monitoring (latest reported monitoring event occurred on August 2018 for soil sampling and February 2019 for groundwater sampling).
FIGURE 5-4
RCRA AND PETROLEUM CLEANUP SITES

The second petroleum cleanup site is located south of APF’s southeastern property boundary. This site is an abandoned Circle K that has two cleanup site listings. The first listing is under Number 7369, which is now closed; however, the second (Number 2707627) is still listed as an active cleanup site. Documentation indicates that petroleum odor was first discovered in monitoring wells in 1989, with additional fuel discharged into the soil in 2015. Monitoring reports since 2015 have indicated that the site was out of compliance until 2018, when a tank was repaired and subsequent testing since has passed. An understanding of these nearby cleanup sites is important should contaminated soils that could be traced to plumes from either site were to be identified during development at APF.

The RCRA on-line database lists facilities that store, generate, transport, treat, and dispose of hazardous wastes (typically waste oils, paint solvents, and other hazardous materials). It should be noted that sites included in this database do not necessarily involve contamination. A total of four (4) RCRA sites are located on-airport property and 18 RCRA sites adjacent to the airport property boundary. These RCRA sites are summarized in Table 5-3 and also shown on Figure 5-4.

National Priority List (NPL) sites, also referred to as “Superfund” sites, are considered by EPA to have the most significant public health and environmental risks to neighboring areas. A review of EPA on-line databases did not reveal any NPL sites or facilities on or in the vicinity of APF.

### TABLE 5-3
**RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) SITES**

<table>
<thead>
<tr>
<th>Handler ID</th>
<th>Name</th>
<th>Generator Type</th>
<th>Compliance/Enforcement Issues¹</th>
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<td><strong>RCRA Sites On APF Property</strong></td>
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<td>Naples Airport Authority</td>
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<td>Collier Mosquito Control District</td>
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<td>None</td>
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TABLE 5-3
RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) SITES

<table>
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<tr>
<th>HANDLER ID</th>
<th>NAME</th>
<th>GENERATOR TYPE</th>
<th>COMPLIANCE/ENFORCEMENT ISSUES¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>FLR000166843</td>
<td>Naples Boat Mart Special Services LLC</td>
<td>Conditionally Exempt Small Quality Generator</td>
<td>None</td>
</tr>
<tr>
<td>FLR000115279</td>
<td>Germain Acura of Naples</td>
<td>Conditionally Exempt Small Quality Generator</td>
<td>None</td>
</tr>
<tr>
<td>FLR000115378</td>
<td>Saturn of Naples</td>
<td>NA²</td>
<td>None</td>
</tr>
<tr>
<td>FLR000099853</td>
<td>Precision Collision of Naples</td>
<td>Conditionally Exempt Small Quality Generator</td>
<td>1 Quarter with Non-Compliance (2017).</td>
</tr>
<tr>
<td>FLR000124768</td>
<td>Auto Europa Inc.</td>
<td>Conditionally Exempt Small Quality Generator</td>
<td>None</td>
</tr>
<tr>
<td>FLD984209643</td>
<td>Collier Chrysler Plymouth Inc.</td>
<td>NA²</td>
<td>None</td>
</tr>
<tr>
<td>FLD984200352</td>
<td>Euro Tech Motors</td>
<td>Conditionally Exempt Small Quality Generator</td>
<td>None</td>
</tr>
<tr>
<td>FLD984211474</td>
<td>Samer Petroleum Inc.</td>
<td>NA²</td>
<td>None</td>
</tr>
<tr>
<td>FLD984206276</td>
<td>Mercedes Benz of Naples</td>
<td>NA²</td>
<td>None</td>
</tr>
</tbody>
</table>

¹. Compliance and enforcement information available in the EPA ECHO report only available for previous 5-year period.

². Generator type unavailable from EPA at time of search (March 2019).


5.5.2 Waste Management

The FAA Modernization and Reform Act of 2012 included a new requirement for airport master plans to address recycling by:

- Assessing the feasibility of solid waste recycling at the airport;
- Minimizing the generation of waste at the airport;
- Identifying operations and maintenance requirements;
- Reviewing waste management contracts; and
- Identifying the potential for cost savings or generation of revenue.

The APF Recycling, Reuse, and Waste Reduction Plan (RRWRP) includes a review of the airport’s waste management and recycling throughout the General Aviation Terminal, Commercial Airline Terminal, Annex Office Building, and airfield, as well as a review of tenant practices. The RRWRP prepared as part of this master plan is included in Appendix H.
5.6 Historical, Archaeological, and Cultural Resources

Several laws and regulations require that possible effects on historic, archaeological, and cultural resources be considered during the planning and execution of federally-funded projects. The primary laws that pertain to the treatment of historic, architectural, archaeological, and cultural resources during environmental analyses are the National Historic Preservation Act (NHPA), the Archaeological Resources Protection Act, and the Native Graves Protection and Repatriation Act. Historic, architectural, archaeological, and cultural resources may include archaeological sites, buildings, structures, objects, districts, works of art, architecture, and natural features that were important in past human events. They may consist of physical remains, but also may include areas where significant human events occurred, even though evidence of the events no longer exists.

As mentioned previously, several documents and on-line databases were reviewed to determine the extent of cultural resources that have been identified at or within one-half mile of APF property limits. Prior cultural studies at APF, including the July 2014 CRAS and a site search of the Florida Master Site File (March 14, 2019), indicated several historic resources located on APF and within one-half mile of APF property limits. Because of the sensitive nature of historic resource sites, the SHPO provided the following cautionary “because vandalism and looting are common at Florida sites, we ask that you limit the distribution of location information on archaeological sites.” As such, the location of the sites is described generally, but no specific location information is included in this section. These resources include:

- Florida Sites CR00805 - Rock Creek Burial Mound and CR00062 - Naples 3 Site are located outside APF property limits, southeast of the airport’s southern property boundary. These sites are described as sand mounds, where human remains may be encountered.

- Florida Site CR00063 – Naples 4 Site is located within the southern half of the APF property boundary. This site is historically described as a camp site; however, no additional or sufficient information is available.

- Florida Site CR00978 – Airport Interface Site is located within the northern half of the APF property boundary and is identified as a prehistoric midden and camp site. The original CRAS report for this location (Snapp 1996) noted that the site contained both worked and unmodified lithic material, ceramics, and marine shell. This location is listed by the State Historic Preservation Office (SHPO) as Non Eligible.

In addition to the above listed archaeological sites, five (5) resource groups and three (3) historic structures were also identified at APF or within one-half mile of the airport property limit. The resource group site listings include:

- CR01095 – Naples Airport (due to its extensive use during World War II). Listed by SHPO as a Non Eligible Site.

- CR01096 – Runway 5-23, located at APF. Listed by SHPO as a Non Eligible Site.

- CR01373 – linear structure (upland cut ditch structure), located within APF’s Airport Operations Area (AOA). Listed by SHPO as a Non Eligible Site.
Environmental Overview

- CR00928 – Tamiami Canal (linear resource) located off-airport property. Listed by SHPO as an Eligible Site.

All three (3) identified historic structures are located outside APF property limits; however, they are within the half mile review area. These structures include:

- CR00764 – Renfroe Landscape Co Barn Site – 700 Goodlette-Frank Road, Naples – c1920 Frame Vernacular – Listed by SHPO as an Eligible Site.
- CR00765 – 2510 North Road Site – c1940 Frame Vernacular – Listed by SHPO as an Non Eligible Site.

Due to the number of historic resources located within the general vicinity of APF, SHPO identified that “this search area may contain unrecorded archaeological sites, historical structures, or other resources even if previously surveyed for cultural resources.” For that reason, it is recommended that additional cultural surveys be performed, prior to future permitting and construction activities.

5.7 Energy Supply and Natural Resources

Florida Power and Light (FPL) is the electric power supplier to APF and has a network capable of serving existing and prospective tenants at the airport. Most proposed airport improvements projects would require lighting; power for specialized equipment, tools, and processes; office equipment; and air conditioning. Local power utility requirements would primarily include electric service. The City of Naples provides water and sewer services to the airport. Both power and water utilities in the area are anticipated to have capacity to serve APF for the planning horizon of this study. Overall, there is sufficient capacity to accommodate the projects envisioned. Additionally, no substantial energy-related impacts or issues regarding the ability to supply energy to APF were noted during any recent development projects.

5.8 Noise and Compatible Land Use

In order to assess the potential noise impacts that would result from the projected aircraft activity levels, noise contours were developed using the FAA’s Aviation Environmental Design Tool (AEDT) for the base year (2017) and future conditions (2023). The base year noise contours provided on Figure 5-5 reflect the existing airfield configuration with the actual aircraft operational fleet mix that occurred in 2017. The contours developed for the short-term planning horizon (Figure 5-6) were based on the 2023 annual aircraft activity levels and expected operational fleet mix from the approved aviation activity forecasts. For the future scenario, the contours were developed based on both runways having the same end points, displaced thresholds, and useable lengths as in 2017.
As shown on the figures, the day-night average sound level (DNL) 75 and 70 contours remain on-airport property for the base year and future year scenario. For both the base and future years, the DNL 65 contour extends beyond the airport property boundary to the northeast. In this area, the DNL 65 contours encompass predominantly commercial and industrial uses as well as some roads, their associated right-of-ways, and ditch/drainage systems. For both the base and future scenarios, the DNL 60 contours extend beyond the airport property to the northeast, southeast, and southwest. To the northeast, the 60 DNL contours also encompass predominantly commercial and industrial uses while to the southeast and southwest they include a mix of both commercial and residential uses.

Both Figures 5-5 and 5-6 include tables which identify the land use type and amount of area within those portions of the DNL 65 and DNL 60 contours which extend beyond the airport property boundary. Based on the FAA criteria, the off-airport land uses that lie within the DNL 65 contours are considered compatible. While the FAA uses the DNL 65 contour as the threshold of significance for compatibility with residential and noise sensitive uses, the City of Naples and Collier County have adopted the DNL 60 noise contour for the purposes of land use controls. As a result, there are residential areas located both southeast and southwest of the airport that are considered non-compatible with aircraft noise. It should be noted that independent of this master plan process, the Naples Airport Authority is preparing to update its 14 CFR Part 150 noise study.
FIGURE 5-5

2017 DAY-NIGHT AVERAGE SOUND LEVEL (DNL) CONTOURS

Source: Naples Airport Master Plan

Table: Land Use

<table>
<thead>
<tr>
<th>Land Use</th>
<th>DNL 65</th>
<th>DNL 60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waterfront, Mixed Use (City)</td>
<td>N/A</td>
<td>7.94 ACRES</td>
</tr>
<tr>
<td>Residential Medium Density (City)</td>
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<td>0.05 ACRES</td>
</tr>
<tr>
<td>Downtown (City)</td>
<td>N/A</td>
<td>5.61 ACRES</td>
</tr>
<tr>
<td>Commercial Business Park (City)</td>
<td>N/A</td>
<td>45.0 ACRES</td>
</tr>
<tr>
<td>Urban Residential District (County)</td>
<td>N/A</td>
<td>23.43 ACRES</td>
</tr>
<tr>
<td>Industrial District (County)</td>
<td>9.01 ACRES</td>
<td>121.55 ACRES</td>
</tr>
</tbody>
</table>

Source: City of Naples Future Land Use Map (October 3, 2017); Collier County Future Land Use Map (August 2017); and HMMH 2019.
Source: City of Naples Future Land Use Map (October 3, 2017); Collier County Future Land Use Map (August 2017); and HMMH 2019.

2023 DAY-NIGHT AVERAGE SOUND LEVEL (DNL) CONTOURS
5.9 Water Resources

Prior environmental studies, permit actions, reports, GIS data, and other available information was reviewed to determine the extent of wetlands and other water resources on-airport property. The most recent FLUCCS data was utilized to approximate the limits of wetlands and other surface waters where no previously delineated wetland mapping data was available. In Florida, the U.S. Army Corps of Engineers (USACE), FDEP, and the State of Florida’s Water Management Districts have jurisdiction over and regulate activities that impact wetlands, surface waters, and/or stormwater management systems through the Environmental Resource Permit (ERP) Program. For wetland impacts that occur at APF, the SFWMD and USACE maintain jurisdiction over these resources.

5.9.1 Wetlands

In addition to review through the NEPA process, the wetlands at APF are subject to two levels of regulatory jurisdiction: state (SFWMD) and federal (USACE). Even though the agencies have similar missions, the criteria for delineation, permitting, and mitigation of wetlands varies. The majority of wetland areas on the airport have been field reviewed or delineated and the mapping in this document represents the best combination of wetland delineations, aerial photo interpretation, and field reconnaissance. However, since jurisdictional limits of wetlands change over time, project specific wetland delineation/jurisdictional determination and coordination with SFWMD and the USACE would be required for new development projects that have the potential to impact wetland and surface water areas.

If permits are required, the process is completed through independent coordination with each of the agencies for which jurisdictional impacts occur. The USACE jurisdiction is enacted by Section 404(b)(1) of the Clean Water Act of 1972, as amended (CWA). While the USACE permitting process is typically completed concurrently with state permitting, the two processes are separate. The state ERP process combines the environmental regulatory review with the water quality and water quantity (stormwater) review. Where impacts are deemed significant, wetland mitigation may be required and would be determined on a case by case basis. During the permitting process the permittee must first show that steps have been taken to avoid/minimize impacts to wetlands and other aquatic resources and then if impacts still occur, that suitable compensatory mitigation will be provided.

As depicted in Figure 5-7, the airport property contains some wetland and surface water areas. The property contains both freshwater and estuarine/marine wetland systems and a variety of habitats ranging from mangrove swamps (associated with Gordon River and Rock Creek), mixed wetland hardwoods, hydric cabbage palm areas, and freshwater marshes. The airport is located within the West Collier Watershed/Drainage Basin and should potential impacts occur, three mitigation banks exist for this area. These banks include the Big Cypress, Panther Island, and Corkscrew Regional Mitigation Banks which provides freshwater wetland credits.
FIGURE 5-7
AIRPORT WETLAND AREAS AND OTHER SURFACE WATERS

Source: SOUTH FLORIDA WATER MANAGEMENT DISTRICT (SFWMID); U.S. FISH AND WILDLIFE SERVICE - NATIONAL WETLAND INVENTORY, 2018; AND ESA, 2019.
5.9.2 Other Surface Waters

APF maintains a network of upland cut ditches and stormwater ponds associated with the airport’s drainage system, some of which maintain connections to other surface waters and waterbodies. Both the Gordon River, located directly west of airport property and Rock Creek, which borders APF to the south, are listed as impaired by the EPA. According to November 2018 FDEP reports, Gordon River is listed as impaired for dissolved oxygen (percent saturation), fecal coliform, and nutrients (chlorophyll and total nitrogen). Rock Creek is listed as impaired by fecal coliform. Both the Gordon River and Rock Creek flows converge along the southwestern section of APF property, to become Naples Bay. Naples Bay is also listed as impaired by fecal coliform and nutrients (chlorophyll).

APF has been a leader in airport stormwater engineering with efforts ranging from elimination of open water ditches (Runway 5-23 Drainage Improvement project) to partnering with FDOT in their longstanding initiative to standardize the manner that airports address stormwater. FDOT’s Statewide Airport Stormwater Management Program included a multi-year study of airport stormwater quality, quantity, and compatible Best Management Practices with the objective to improve airport safety by reducing wildlife attractants, while still meeting all state and federal water quality and quantity management requirements. During its CY2012 session, the Florida Legislature directed FDEP to commence rulemaking to streamline the ERP process. That led to adoption of a general permit for airport airside development (Section 62-330.449) which provides for the overland flow treatment of stormwater, thus reducing the need for ponds for airfields. As a part of this program, the construction and testing of a full-scale FAA Pond was implemented at APF. There is a provision for insertion of future data and design criteria for a "FAA pond" if the APF pilot project confirms predicted behavior. This project involves three major elements:

- Monitoring of wildlife activity and the chemical analysis of the water and sediment associated with a series of stormwater ponds at APF.
- Reconstructing existing stormwater ponds consistent with FAA guidance and to incorporate features expected to improve water quality within a smaller pond footprint than currently exists.
- Post monitoring of wildlife activity and chemical analysis of water and sediment in the reconstructed ponds to document system performance.

The data from this effort will be used to support the FDOT Airport Stormwater Initiative and the associated manuals and state rule addressing airport stormwater.

The airport operates under a variety of stormwater management permits and implements pollution prevention plans and best management practices in accordance with those permits. Permitting is required for all proposed projects at APF that would impact surface water conveyance or storage. In addition, the EPA has delegated the National Pollutant Discharge Elimination System (NPDES) program to the State of Florida, and the Florida DEP administers this water quality protection program for the State. An NPDES notice or permit is required for projects at APF that disturb more than half an acre, and BMPs would be implemented to assure no adverse effects to water quality occur.
5.9.3 Floodplains

Executive Order 11988, Floodplain Management, directs federal agencies “to take actions to reduce the risk of flood loss, minimize the impact of floods on human safety, health, and welfare, and restore and preserve the natural and beneficial values served by the flood plains.” Department of Transportation Order 5650.2, Floodplain Management and Protection, and FAA Orders 5050.4B and 1050.1F contain policies and procedures for implementing the Executive Order and evaluating potential floodplain impacts. Agencies are required to make a finding that there is no practicable alternative before taking action that would encroach on a floodplain based on a 100-year flood (7 CFR 650.25).

The Federal Emergency Management Agency (FEMA) identifies flood hazard areas that are depicted on Flood Insurance Rate Maps (FIRMs). A floodplain is defined as the lowlands and relatively flat areas adjoining inland and coastal waters including flood prone areas of offshore islands that are, at a minimum, prone to the 100-year flood. The 100-year floodplain is considered the base floodplain. The current FEMA Flood Insurance Rate Maps (FIRM) for Collier County were issued May 16, 2012. The areas or zones found within the airport’s property boundary are depicted on Figure 5-8.
For most of the airport property, the areas identified as AE are Special Flood Hazard Areas (SFHA) with a one percent probability of flooding every year (also known as the 100-year floodplain). Federal floodplain management regulations and mandatory flood insurance purchase requirements apply in these zones and each are assigned a base flood elevation. The airport also has areas of minimal hazard, which are zones that could be flooded by severe, concentrated rainfall coupled with inadequate local drainage systems. Local stormwater drainage systems are not normally considered in a community’s flood insurance study. The failure of a local drainage system can create areas of high flood risk within these zones. As indicated in Figure 5-8, the areas that are shaded in orange and green represent Zone X areas. Areas that are shaded in green represent Zone X areas that have a minimal probability of a flood hazard (above the 500-year flood event), while the areas shaded in orange represent Zone X areas that have a moderate risk of hazard as they are between the 100 and 500-year flood event.

5.10 Construction Impacts

Construction impacts are generally short-term in nature and would vary depending on which projects are implemented. The construction required for any improvement or proposed developments could have the potential to impact air quality, surface transportation, water quality, and noise through the use of heavy equipment and vehicle trips generated from construction workers traveling to and from the project sites. For water quality, each project will have to adhere to the applicable Stormwater Pollution Prevention Plan maintained by APF. Projects would also require notification or permitting through FDEP in compliance with the NPDES program. In Florida, this program is delegated to the state and does not require additional authorization through EPA. This process includes development of, and adherence to, Best Management Practices (BMPs) for preventing or reducing the release of pollutants from a construction site. For projects where construction could take place in proximity to residential areas; this construction would be subject to local noise ordinances. Major roadways border and are within close proximity to APF; therefore, it is likely that construction traffic would avoid residential areas. Construction impacts would be evaluated as part of any NEPA analysis required, prior to constructing any of the proposed development projects.

5.11 Types of Environmental Reviews

5.11.1 Federal Reviews

This chapter provides a desktop review of publically available and known environmental resources that should be considered during the identification and evaluation of development alternatives in this study. The environmental resources discussed in this chapter include many of the categories delineated in FAA Order 5050.4B, FAA Order 1050.1F, and the President’s Council on Environmental Quality (CEQ) Regulations Title 40 CFR, CEQ Regulations for Implementing the Procedural Provisions of NEPA; however, this overview is not intended to meet the NEPA requirements for any proposed project. This environmental overview does not constitute NEPA or regulatory level resource review; instead, it provides a compilation of readily available data to help screen alternatives and provide an environmental basis to identify where additional investigation
or studies may be required. The FAA is responsible for ensuring compliance with NEPA with respect to actions at federally-obligated airports.

The processing of Airport Improvement Program grant applications and Airport Layout Plan approvals are two types of federal actions commonly undertaken by the FAA in support of airport development projects which require environmental review under NEPA. While NEPA requires varying levels of interagency coordination, development of environmental documents under NEPA does not exempt airport development projects from compliance with other federal environmental laws (e.g., *Endangered Species Act*) or state and local environmental regulations.

For those projects that involve a federal action and therefore trigger environmental review under NEPA, the three types of documentation that are used are summarized in Table 5-4. Categorical Exclusions (CatEx) and Environmental Assessments (EA) are usually prepared by the Airport Sponsor and, if the documentation meets FAA requirements, they are accepted by the FAA and become federal documents. Environmental Impact Statements (EIS) are prepared by the FAA.

Every future development project recommended as part of this master plan is subject to the appropriate level of environmental review at such time that a specific project is considered ready for implementation.

### Table 5-4
**Types of FAA NEPA Review Documentation**

<table>
<thead>
<tr>
<th>Categorical Exclusion</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Access and service road construction that does not reduce the level of service on local traffic systems below acceptable levels.</td>
<td></td>
</tr>
<tr>
<td>2. Construction, repair, reconstruction, resurfacing, extending, strengthening, or widening of a taxiway, apron, loading ramp, or runway safety area; or the reconstruction, resurfacing, extension, strengthening, or widening of an existing runway – provided the action would not result in significant erosion or sedimentation and will not result in a significant noise increase over noise sensitive areas or result in significant impacts on air quality.</td>
<td></td>
</tr>
<tr>
<td>3. Construction or limited expansion of accessory on-site structures, including storage buildings, garages, hangars, T-hangars, small parking areas, signs, fences, and other essentially similar minor development items.</td>
<td></td>
</tr>
<tr>
<td>4. Construction or expansion of facilities – such as terminal passenger handling and parking facilities or cargo buildings, or facilities for non-aeronautical uses that do not substantially expand those facilities.</td>
<td></td>
</tr>
<tr>
<td>5. Demolition and removal of FAA or non-FAA on-airport buildings and structures, provided no hazardous substances or contaminated equipment are present on the site of the existing facility. Does not apply to historic structures.</td>
<td></td>
</tr>
<tr>
<td>6. Placing fill into previously excavated land with material compatible with the natural features of the site, provided the land is not delineated as a wetland; or minor dredging or filling of wetlands or navigable waters for any categorically excluded action, provided the fill is of material compatible with the natural features of the site and the dredging and filling qualifies for an U.S. Army Corps of Engineers nationwide or a regional general permit.</td>
<td></td>
</tr>
<tr>
<td>7. Grading of land, removal of obstructions to air navigation, or erosion control measures, provided those activities occur on and only affect airport property.</td>
<td></td>
</tr>
</tbody>
</table>
8. Topping or trimming trees to meet 14 CFR Part 77 standards for removing obstructions which can adversely affect navigable airspace.

An Environmental Assessment (EA) is prepared for proposed actions with expected minor or uncertain environmental impact potential. An EA requires analysis and documentation similar to that of an EIS, but with somewhat less detail and coordination. The FAA will review the EA and decide to either issue a Finding of No Significant Impact (FONSI) or prepare an Environmental Impact Statement (EIS). Future airport development projects and actions at APF that may require an EA are summarized below (emphasis added). See FAA Orders 1050.1F and 5050.4B for more information.

1. Runway extensions due to possible wetland impacts, potential off-airport impacts related to aircraft noise, and potential impacts to affect listed species habitat.

2. Taxiway construction due to possible wetland impacts and potential to affect listed species habitat.

3. Aircraft parking apron; hangar and structures; and/or access road projects that may not qualify for a CATEX due to extraordinary circumstances (e.g., wetland impacts may not qualify for a nationwide or regional general permit).

4. Approval of operations specifications or amendments that may significantly change the character of the operational environment of an airport.

5. New air traffic control procedures (e.g., instrument approach procedures, departure procedures, en route procedures) and modifications to currently approved procedures that routinely route aircraft over noise sensitive areas at less than 3,000 feet above ground level.

An EIS is prepared for major federal actions, which are expected or known to significantly affecting the quality of the human environment. At this time, no future airport development projects at APF are expected to require the preparation of an EIS.

Compiled by ESA, 2019.

5.11.2 State Reviews

In addition to compliance with NEPA, all recommended airport development must be consistent with other federal regulatory guidance, Florida Statutes, growth management, and concurrency requirements, as well as regional and state transportation plans. For projects that require NEPA compliance, state environmental reviews typically initiate with the Florida State Clearinghouse which is administered by the FDEP. A primary function of the Florida State Clearinghouse is to serve as the state’s single point of contact for the receipt of federal activities that require interagency review, which includes activities subject to consistency review under the Florida Coastal Management Program. Upon completion of their review, the Clearinghouse will typically issue a letter summarizing any potential concerns or inconsistencies regarding the proposed activity. The clearance letter will also include information on obtaining necessary state permits and will inform the applicant if there is a need to submit additional information to a specific state agency for review. In cases where NEPA compliance is not required, direct coordination with the relevant federal and state regulatory agencies may still be required. Information related to the specific agencies and coordination and/or permits required, is discussed in the individual resources categories in this chapter.
CHAPTER 6
Alternatives for Airport Development
CHAPTER 6
Alternatives for Airport Development

6.1 Introduction

This chapter evaluates potential improvements required to meet the facility needs identified for the Naples Airport (APF) over the 20-year planning period. The identification and evaluation of development concepts and subsequent recommended alternatives were facilitated through meetings and discussions with airport tenants, customers, stakeholders, airport management, local government, and the public. As part of the study’s public outreach, a number of open houses (see Appendix I) provided stakeholders, members of the community, and local government representatives the opportunity to review the conceptual development alternatives, ask questions, and provide comments.

While a number of projects to maintain and improve the airport will be required over the course of the 20-year planning period, only the most significant are presented in this chapter. These improvements, many of which have the potential to impact existing facilities, the environment, or surrounding community, are categorized as follows:

- Runway System
- Taxiway System
- Aviation Related Development
- Support and Service Facilities
- Non-Aeronautical Development

This alternatives analysis evaluates the viability of meeting the identified needs given the limitations of the airfield and the four quadrants for future improvements. As such, the evaluations primarily include factors related to the operational effects, compatibility, flexibility, potential environmental impacts, and constructability. While there are inherent difficulties in expressing certain factors in comparable terms, at a minimum, each development option must meet the applicable Federal Aviation Administration (FAA) and Florida Department of Transportation (FDOT) standards for safety.

6.2 Airfield Constraints Analysis

An analysis of the operational, physical, and environmental constraints of the airfield was conducted prior to defining airport alternatives. This effort ensured that factors impacting project feasibility, the community, the environment, and the long-term viability of the airport were considered during the development of alternatives. Among the constraints considered, airfield
design standards, surfaces, and setbacks for the safety of operations are critical to the ability of the airport to meet its intended purpose and have significant bearing on an alternative’s feasibility. Figure 6-1 reflects the most critical of these, as well as other features which may affect the practicality of development options, including wetland boundaries, flood zones, easements, and leases.

6.2.1 Airspace Surfaces

Title 14 Code of Federal Regulations (CFR) Part 77, Safe, Efficient Use, and Preservation of the Navigable Airspace defines airspace surfaces for the purpose of identifying obstructions at or in the vicinity of an airport. Some obstructions may be considered a hazard to air navigation. Figure 6-1 depicts the existing Primary Surfaces associated with APF’s two paved runways (the Primary Surface associated with the SW-NE turf runway lies within the Primary Surface for Runway 5-23). The rectangular Primary Surfaces follow the same elevation as that along the nearest point of the adjacent runway centerline. Because the Primary Surfaces at APF are basically at ground level, only those objects essential to air navigation or the movement of aircraft should be located within the Primary Surfaces. The Primary Surfaces also encompass the Runway Safety Areas (RSA) associated with each runway. The extent and size of a Primary Surface would change if the runway endpoints or types of instrument approach procedures are different in the future.

Fixed and moveable objects are also considered obstructions if they penetrate any of the Approach or Transitional Surfaces that extend upward and outward from each Primary Surface. For purposes of clarity, these surfaces are not shown as they vary in height depending on their proximity to the Primary Surface. Instead, a Building Restriction Line (BRL) is shown which delineates where structures approximately 25 feet in height could be located and not penetrate the 14 CFR Part 77 surfaces. The BRL typically follows the Transitional Surface with the same limiting elevation, when there are no other more restrictive surfaces or setbacks. While it is possible to plan and construct facilities inside the 25 foot BRL (such as shorter T-hangar, maintenance facility, or airfield lighting vault type structures), this line defines areas that are not suitable for taller structures or parking aprons for aircraft with tail heights greater than 25 feet.

6.2.2 ATCT Line-of-Sight

The existing APF airport traffic control tower (ATCT) line-of-sight must be considered so that the controllers have an unobstructed view of all aircraft movement areas. The line-of-sight lines depicted on Figure 6-1 are the most critical based on the existing airfield configuration. The evaluation of conceptual development alternatives will consider how the line-of-sight limits may shift in response to potential airfield changes or if line-of-sight would be obstructed by proposed development. Effects on ATCT line-of-sight were based on the established eye height for the ATCT, which is 80 feet above mean sea level (AMSL). It should be noted that based on the initial siting analysis conducted as part of the ATCT technical report included as Appendix F, two sites for a potential new ATCT will be preserved as a part of the long-term development options included in this chapter. The ATCT technical report also determined the height of a new ATCT in the same location as the current facility, in order to eliminate the current line-of-sight issue with Taxiway C at the approach end of Runway 32.
FIGURE 6-1
PRIMARY AIRFIELD CONSTRAINTS

Runway Protection Zones

Existing Runway Protection Zones (RPZ) at APF are shown on Figure 6-1 while the current FAA guidance on land use compatibility within their limits is addressed in a subsequent section. For the purpose of identifying constraints, any new development within an existing or future RPZ is not considered compatible with airport operations. As with the 14 CFR Part 77 surfaces, the location and dimensions of a RPZ could change if the runway endpoints or types of instrument approach procedures change.

6.2.3 VHF Omnidirectional Range

There are some significant development setbacks associated with the terminal VHF omnidirectional range (TVOR) navigational aid located in the West Quad. These primarily include a 1,000 foot radius BRL, where no permanent structures are allowed. There are also setbacks required for both runways and taxiways in order to prevent the facility from being an obstruction to aircraft. These require that the TVOR should not be located closer than 500 feet to any runway centerline or 250 feet to any taxiway centerline. While the TVOR is located 300 feet from Taxiway C, the current TVOR BRL setback impacts the ability to develop most of the airport’s West Quad, with the exception of a small portion to the south, off of Taxiway D. The current 1,000 foot radius BRL is depicted on Figure 6-1.

As documented in the facility requirements chapter, the most recent plan with the FAA Air Traffic Organization (ATO) is to begin decommissioning the APF TVOR in their 2021 fiscal year. In the spring of 2019, the FAA ATO also indicated that it was their intent to leave the physical TVOR facility at APF intact in order to continue to operate and maintain the Distance Measuring Equipment (DME). Once the TVOR facility is decommissioned and only the DME equipment remains operational, the critical area around the facility will be reduced to the line-of-sight required for the DME signal to aircraft in the air. If necessary from a development standpoint, the DME equipment could ultimately be relocated to another location on the airfield or even on the corner of a facility such as a tall hangar.

6.2.4 Wetlands and Floodplains Zones

The wetland areas and floodplains depicted on Figure 6-1 were included as environmental constraints because these resources are protected. As documented in the environmental overview chapter, modifications to wetland areas may require federal and state permits. In general, the permitting process requires the applicant to demonstrate avoidance and minimization of impact. Mitigation is then required to offset any unavoidable impacts.

The environmental overview chapter also documented that potential impacts to any established 100-year floodplain will require a review for permitting. Likewise, floodplain impacts also need to be in compliance with the local flood protection ordinances. The current Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) for the airport became effective in 2012. For APF, the areas identified as AE are Special Flood Hazard Areas (SFHA) and have a one percent probability of flooding every year (also known as the 100-year floodplain). Federal floodplain management regulations and mandatory flood insurance purchase requirements apply in
these zones and each are assigned a base flood elevation (BFE). This is the computed elevation to which floodwater is anticipated to rise during a base flood. The BFE is the regulatory requirement for the elevation or floodproofing of structures.

As shown in Figure 6-1, a majority of the airport’s property surrounding and including the airfield, is located within the 100-year floodplain. This results in limited opportunities to develop, modify, or even relocate facilities without significant attention to floodplains and stormwater management.

The airport also has areas of minimal hazard, which are zones that could be flooded by severe, concentrated rainfall coupled with inadequate local drainage systems. The airport has completed significant drainage system improvements along Runway 14-32 and has similar improvements underway for Runway 5-23. While local stormwater drainage systems are not normally considered in a community’s flood insurance study, the failure of such drainage system can create areas of high flood risk within these zones. On the FEMA maps these are shown as either shaded or unshaded Zone X areas. Shaded Zone X areas have a 0.2 percent probability of flooding every year (also known as the 500-year floodplain) while the unshaded Zone X areas have a minimal risk as they are above the 500-year floodplain. No BFEs are shown within these zones and flood insurance is not required. The impact that the established BFEs have on any new construction is addressed in subsequent sections of this chapter.

6.2.5 Existing Easements and Leases

Identifying the land available for future aviation related development also requires determining what undeveloped areas may have existing easements, leases, or even lease options with existing tenants. Figure 6-1 depicts three recorded conservation easements on the west side of the airport property. Additional information related to these areas is included as part of the airport’s Exhibit “A” Airport Property Inventory Map. Other easements for both the existing and future portions of the Gordon River Greenway trail and boardwalk system are also illustrated on Figure 6-1. With respect to leases on vacant parcels, discussions with airport management identified a few areas under lease for future hangar facility development in the North Quad and the new Aircraft Rescue and Fire Fighting (ARFF) station site in the South Quad.

6.2.6 Physical Constraints

The evaluation of constraints also included the airport’s physical setting within the surrounding developed community. The identification of airport development alternatives considered, in general terms, the potential complexity, cost, and social impacts of acquiring land, relocating residences, impacting businesses, and/or modifying roads.

As shown on Figure 6-1, the airport’s property is bounded by Corporate Flight Drive to the north, North Road to the south, Airport Pulling Road to the east, and the Gordon River to the west. What is not shown on Figure 6-1 is that the southwest corner is also bounded by Rock Creek (see Figure 2-2). The initial findings of the constraints analysis indicated that the potential costs and impacts related to expanding or relocating any of the surrounding roads (and associated business and residential relocations) would only be justified under extraordinary circumstances and that the
identification of alternatives would first investigate meeting future development needs on existing airport property.

APF and land surrounding the airport is generally flat and contains a network of ditches and stormwater systems. The three future stormwater management features currently modeled for the airfield are shown on Figure 6-1. These include a proposed linear wet pond in the North Quad, a linear dry pond in the West Quad, and a crenelated wet ditch system on the southwest side of the airport. Substantial impacts or modifications to the existing APF stormwater management system and/or issues related to long-term management of stormwater at each potential development site were also collectively viewed as a constraint to the various alternatives.

These physical characteristics and the floodplain elevations are key reasons why a sustainability assessment was conducted as part of this master plan with to facilitate improving the overall infrastructure moving forward. The sustainability management plan is included in Appendix H.

### 6.3 Runway System

The facility requirements chapter identified limited improvements to Runway 5-23, the potential to maximize the existing Runway 14-32 pavement, and the ability to develop improved instrument approach procedures. Each of these and any potential options are addressed in the following sections with the primary intent to improve the overall safety and efficiency of the runway system.

#### 6.3.1 Runway 5-23

The improvements identified for Runway 5-23 over the course of the 20-year planning horizon are minor in nature (extended blast pads and periodic maintenance of the pavement) and as a result, alternatives for these projects were not explored. Additionally, it should be reiterated that even though larger and heavier general aviation (GA) jets are being manufactured, many can and do operate at APF under special operating certificates. Therefore, no change to the 75,000 pound aircraft weight limit is included as part of this master plan study.

#### 6.3.2 Runway 14-32

The modification or elimination of declared distances and relocation of landing thresholds were explored as potential operational enhancements for Runway 14-32. The facility requirements evaluation also identified that a few vegetative obstructions lie within the northwest corner of the Runway 14-32 Object Free Area. These obstructions are within an established conservation easement; therefore, coordination with the Conservancy of Southwest Florida (holder of the easement) will be necessary for any proposed clearing. This clearing is considered relatively minor in nature and no alternatives for this action were identified, especially given that airport has an annual budget to address such issues.
Potential to Modify or Eliminate Declared Distances on Runway 14-32

In order to provide the required safety area criteria, the current application of declared distances on Runway 14-32 reduces the length available for takeoffs and landings on the overall 5,001 foot runway pavement. While it was determined that the current takeoff and landing lengths published are sufficient to serve the aircraft requiring this runway for crosswind purposes, any increase in the published lengths available would enhance the overall safety and utility of operations. Therefore, options to reduce or eliminate the current declared distances were explored to maximize the existing 5,001 foot pavement to the extent feasible.

Both ends of Runway 14-32 have displaced thresholds to provide the required RSA. For the existing and future Runway 14-32 RSA, 1,000 feet is needed beyond the runway ends for the protection of takeoffs and landings. Landing aircraft also need 600 feet of RSA prior to the landing threshold. Figure 6-2 illustrates the current declared distances for Runway 14-32 based on the FAA Airport Geographical Information System (AGIS) data obtained as part of this study and the RSA length available off each runway end. As shown, the current displaced thresholds are located to provide a 1,000 foot long RSA between the current landing thresholds and the physical constraints off each end. On the northwest end, the RSA is limited by the existing conservation easement while the airport interior perimeter road limits the RSA on southeast end.

While feasible, expanding the RSA beyond these physical barriers is not considered justified. Therefore, it is not practical to increase the accelerate stop distance available (ASDA) for takeoffs in either direction, since 1,000 feet of the RSA must be provided beyond the far end of the ASDA. The current displaced thresholds could be relocated to obtain additional landing length, since only 600 feet of RSA is required prior to the landing threshold. However, it is not considered practical to obtain the full 5,001 feet of Runway 14-32 for landing operations as 1,000 feet of the RSA must also be provided beyond the far end of the runway declared for the landing distance available (LDA).

Potential to Relocate Runway 14-32 Displaced Thresholds

Based on the RSA criteria alone, it is possible to move the Runway 14 landing threshold back to the end of the runway, eliminating the current 128 foot displaced threshold. For the Runway 32 end, the landing threshold could be moved back 400 feet, leaving a 51 foot displaced threshold. This potential change to the Runway 14-32 thresholds is illustrated in Figure 6-3. In considering the relocation of the current Runway 14-32 displaced thresholds, additional airfield design and safety standards were evaluated.

Runway Visibility Zone

The Runway Visibility Zone (RVZ) provides the proper line-of-sight between aircraft at airfields with two or more runways with intersecting centerlines. This zone must be kept clear of any fixed or movable objects, including parked aircraft, when the ATCT is closed. The RVZ is based on the endpoints of the useable runway pavement. Since no additional runway length is being considered for any of the runways at APF, the existing and future RVZ will not change, even if one or both of the Runway 14-32 landing thresholds are relocated.
EXISTING RUNWAY 14-32 DECLARED DISTANCES

TODA
TAKEOFF DISTANCE AVAILABLE
LENGTH OF TODA + LENGTH OF REMAINING RUNWAY AND/OR CLEARWAY BEYOND THE FAR END OF TODA.

ASDA
ACCELERATE/DECELERATE STOPLength DECLARED AVAILABLE AND SUITABLE FOR THE ACCELERATION AND DECELERATION OF AN AIRCRAFT AVOIDING A TAKEOFF. NEED FULL RSA/ROTA BEYOND ASDA.

LDA
LANDING DISTANCE AVAILABLE
LENGTH OF RUNWAY WHICH IS DECLARED AVAILABLE AND SUITABLE FOR GROUND RUN OF AN AIRCRAFT LANDING. NEED FULL RSA/ROTA PRIOR TO THRESHOLD & BEYOND LDA.

NOTES:
1. DISPLACED THRESHOLD IS AVAILABLE FOR START OF TAKEOFF AND LANDINGS FROM OPPOSITE DIRECTIONS IF 1,000' BEYOND IS AVAILABLE FOR THE SAFETY AREA ON LANDING ROLL OUT.
2. FOR ALL CALCULATIONS NO ADDITIONAL CLEARWAY OR STOPWAY DISTANCES HAVE BEEN DECLARED BEYOND THE PAVED RUNWAY SURFACE.

<table>
<thead>
<tr>
<th>Runway</th>
<th>TODA</th>
<th>ASDA</th>
<th>LDA</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>5,001'</td>
<td>4,550' (5,001' - 451')</td>
<td>4,422' (5,001' - 128')</td>
</tr>
<tr>
<td>32</td>
<td>5,001'</td>
<td>4,873' (5,001' - 128')</td>
<td>4,422' (5,001' - 128' - 451')</td>
</tr>
</tbody>
</table>

RUNWAY SAFETY AREA (RSA)
WIDTH = 500'
LENGTH PRIOR TO LANDING THRESHOLD = 600'
LENGTH BEYOND RUNWAY END = 1,000'

RUNWAY PROTECTION ZONE (RPZ)
INNER WIDTH = 500'
OUTER WIDTH = 1,010'
LENGTH = 1,700'

RUNWAY OBJECT FREE AREA (ROFA)
WIDTH = 800'
LENGTH PRIOR TO LANDING THRESHOLD = 600'
LENGTH BEYOND RUNWAY END = 1,000'


FIGURE 6-2
FIGURE 6-3
POTENTIAL CHANGES TO RUNWAY 14-32 DECLARED DISTANCES

Runway Protection Zones

The current declared distances for Runway 14-32 require separate Approach and Departure RPZs off each runway end. If the Runway 14 displaced threshold is removed, the Approach RPZ would be located where the current Departure RPZ is on this end of the runway. If the Runway 32 displaced threshold is moved back 400 feet, the corresponding Approach RPZ would nearly overlap the Departure RPZ on that end of the runway.

In September of 2012, the FAA issued their Interim Guidance on Land Uses Within a Runway Protection Zone. Under the current guidance, any changes in the size or location of an airport’s existing RPZs needs to be coordinated with the FAA. This coordination is required to determine if any new or modified land uses would be encompassed within the limits of the proposed RPZs and could require the airport to identify and document alternatives to changing the RPZs.

The potential relocation of the Runway 14-32 displaced thresholds was discussed with the FAA Orlando Airports District Office (ADO) staff. After reviewing the information provided, the Orlando ADO did not believe the proposed relocation of the Runway 14-32 thresholds (as reflected on Figure 6-3) would require any formal documentation or determination to be made by the FAA. This opinion was based on the fact that the proposed changes on both ends would reduce the overall area of the RPZs that extend off airport property.

Threshold Siting Criteria

The potential relocation of the displaced thresholds would also change the location of the required airport design approach surfaces. It should be noted that the approach surfaces for this purpose are those defined in FAA Advisory Circular (AC) 150/5300-13A, Change 1, Airport Design, which are not the same as those defined in 14 CFR Part 77. These airport design surfaces (which are categorized by a Runway Type number) are utilized for runway threshold siting, to ensure that the required approach surface is clear of obstacles.

The runway threshold siting standards in FAA AC 150/5300-13A, Change 1 were updated in September 2018 by Engineering Brief (EB) 99. Runway 14-32 is currently designated as a Runway Type 3 (visual runway serving large airplanes) since the FAA classifies runways with only circling approach minimums as visual runways. If the instrument approach visibility minimums are reduced to greater than or equal to ¾ statute mile in the future, the associated runway end would be designated as a Type 4 runway approach. The Type 4 approach threshold siting surface is a 20:1 sloped surface which begins 200 feet prior to the landing threshold, has an inner width of 400 feet, an outer of 3,400 feet, and extends out 10,000 feet. For both ends of Runway 14-32 the FAA AGIS was utilized to determine whether there would be any penetrations to the Type 4 threshold siting surface under the proposed relocations.

For Runway 14, the proposed relocation of the threshold back 128 feet to the physical end of the runway would lower the threshold siting surface by approximately 6.5 feet. No new obstructions to the surface were identified as a result of the proposed shift. On the Runway 32 end, the proposed relocation of the threshold back 400 feet would lower the threshold siting surface by 20 feet. Only one obstruction was identified on the south side of North Road. This obstruction is a single tree
that would penetrate the proposed threshold siting surface to Runway 32 by 2.7 feet. Such an obstruction could be mitigated and therefore not preclude the potential relocation of the Runway 32 threshold.

**Increase in Landing Distance Available**

The proposed relocation of both landing thresholds would result in an increase in the LDA for operations in both directions on Runway 14-32. **Figure 6-3** includes the declared distance calculations under this scenario, where only the available LDA would change by the amount of the relocated thresholds. These increases are:

- Runway 14 LDA increases from 4,422 feet to 4,550 feet.
- Runway 32 LDA increases from 4,422 feet to 4,822 feet.

**Changes to Runway 14-32 Systems**

In order to support the proposed relocation of the landing thresholds, the existing lighting, marking, and landing aids for Runway 14-32 would need to be modified. At a minimum, these changes would include:

- Removal of the outboard threshold lights from the existing Runway 14 displaced threshold.
- Relocation of the Runway 32 outboard threshold lights to the proposed displaced threshold location.
- Reconfiguration of the Medium Intensity Runway Lights (MIRL) system.
- Remarketing of the entire runway surface.
- Relocation of the omnidirectional Runway End Identification Lights (REIL) at each end of the runway.
- Relocation of the Runway 32 Precision Approach Path Indicator (PAPI) system (typically installed within 1,000 feet of threshold – existing PAPI system would be nearly 1,200 feet from the proposed relocated Runway 32 threshold).
- Revision to the non-precision approaches (RNAV/GPS-A and RNAV/GPS-B) to Runway 14-32 and other aeronautical publications for the airport.

**Recommendation for Runway 14-32**

While it is possible to regain additional landing length for both ends of Runway 14-32, without increasing the existing runway pavement, it is not currently recommended. The intent of maximizing the existing 5,001 foot pavement was to enhance the overall safety and utility of the runway, especially for the larger GA jets (with runway design components of C-II and D-II) that utilize Runway 14-32 when the wind favors the runway. However, as noted in the wind coverage analysis included as part of the facility requirements, Runway 14-32 is only required as a crosswind runway for aircraft up to a runway design code of B-I during visual conditions and B-II aircraft.
during instrument conditions. Nearly every one of the aircraft in the B-I and B-II categories can operate on runway 14-32 under the current declared distances and every C-II and D-II aircraft is capable of operating on Runway 5-23.

To effectively increase the utilization of the runway for the larger C-II and D-II GA jets, the preference by these aircraft operators is for a LDA of at least 5,000 feet. Given the costs to change the runway lighting, marking, and landing aids, it is not considered practical to relocate the thresholds, especially since only an additional 128 feet of landing distance on Runway 14 and 400 feet on Runway 32 could be achieved. Similarly, the benefit of the larger GA jets not having to use thrust reversers as much when landing on Runway 14-32 is possibly offset by the slightly lower overflights of those aircraft to the communities off each runway end. It should also be noted that the crosswind runway requirement is the reason why the option of utilizing an Engineered Material Arresting System (EMAS) on either end of the runway was not considered. The application of one or two EMAS beds would not be justified for Runway 14-32, would probably not result in a positive benefit cost analysis, and most likely would not be eligible for funding.

Another potential issue is the fact that the proposed 400 foot relocation of the Runway 32 displaced threshold might actually end up being shorter due to the required markings. As illustrated on Figure 6-3, the configuration at this end would only provide 51 feet of pavement prior to the threshold. For the required pavement markings, this would allow the 5 foot offset and the four 45 foot arrowheads to be painted across the runway, prior to the displaced threshold bar. It would not allow for any of the arrowheads with arrow shafts that are also included as part of the markings for a displaced threshold. Since FAA AC 150/5340-1M, Standards for Airport Markings does not stipulate any “minimum” markings that need to be included prior to a displaced threshold, the FAA Orlando ADO recommended that a marking plan for the 51 foot displaced threshold should be coordinated with the 14 CFR Part 139 Airport Operating Certificate inspector for feedback. While this was not done, at best it would not change the proposed relocation to the Runway 32 threshold, which is still not considered enough to offset the required changes, as described above.

Given all the above, no change to the existing configuration of the Runway 14-32 displaced thresholds is recommended as part of this master plan study.

6.3.3 Changes to Instrument Approach Procedures

There are three categories for instrument approaches: precision approaches, approach procedures with vertical guidance, and non-precision approaches. The approach procedures with vertical guidance that have been established to both ends of Runway 5-23 are straight-in approaches, limited to visibility minimums of not lower than one mile. Under these visibility minimums, these approaches provide the ability for aircraft to descend down to 287 and 305 feet above the Runway 5 and 23 thresholds, respectively. For both ends of Runway 14-32, non-precision procedures with circling approach minimums have been established which are also limited to visibility minimums of not lower than one mile and have a minimum descent altitude of 500 feet.

Lower instrument approach minimums to Runway 5-23 could be achieved by either establishing precision instrument approaches or improving the existing approach procedures with vertical
guidance. With precision approaches, visibility minimums of lower than ¾ of a mile and the ability for aircraft to descend down to heights less than 250 feet above the runway threshold are possible. Instrument procedures with vertical guidance are capable of visibility minimums lower than one mile, but not lower than ¾ mile, and have the potential to allow aircraft to descend down to heights greater than or equal to 250 feet above the runway threshold.

As the crosswind runway, precision approaches to Runway 14-32 are possible, but given the related infrastructure requirements, the more practical option would be to establish procedures with vertical guidance or improve the existing non-precision approach capability. Similar to the procedures with vertical guidance, non-precision approaches can provide straight-in procedures with visibility minimums lower than one mile, but not lower than ¾ mile, and the potential for aircraft to descend down to heights greater than or equal to 250 feet above the runway threshold.

While there are specific requirements for the establishment of each instrument approach (such as obstruction surveys, approach lighting, etc.); for either option to improve the approach minimums to Runway 5-23, a decrease in visibility minimums would occur. The same is true for most every option to improve the existing non-precision approaches to Runway 14-32. A decrease in any of the current instrument approach visibility minimums would result in the need for a larger Approach RPZ (for the corresponding runway end) and changes to the 14 CFR Part 77 surfaces.

**Changes to Runway Protection Zones**

Based on the current instrument approach procedures and critical aircraft, all of the RPZs at APF, including the separate Approach and Departure RPZs for Runway 14-32, have an inner width of 500 feet, an outer width of 1,010 feet, and a length of 1,700 feet. If a vertically guided or non-precision approach with visibility minimums reduced to not lower than ¾ mile were established to any of the runway ends, the corresponding Approach RPZ would increase significantly. For the not lower than ¾ mile visibility minimums, an Approach RPZs with an inner width of 1,000 feet, outer width of 1,510 feet, and length of 1,700 feet is required. The Departure RPZs would not change.

**Figure 6-4** demonstrates the difference between the existing RPZs and the larger Approach RPZ required if the visibility minimums were lowered. The larger Approach RPZs (covering an area of 49 versus 29.5 acres each) would encompass a number of new incompatible land uses off-airport property for three of the runway ends. As noted previously, under the current 2012 FAA interim guidance, any changes in the size or location of an airport’s existing RPZs would require coordination with the FAA to evaluate the compatibility of any new land uses encompassed within the limits of a proposed RPZs.
FIGURE 6-4 IMPACT OF APPROACH PROCEDURES WITH LOWER THAN 1 MILE VISIBILITY MINIMUMS

ABBREVIATIONS
BRL BUILDING RESTRICTION LINE (25')
FPRL FUTURE BUILDING RESTRICTION LINE (25')
FPFZ FUTURE RUNWAY PROTECTION ZONE
RPZ RUNWAY PROTECTION ZONE

NOTES
1. EXISTING APPROACH AND DEPARTURE RPZS ARE 500' X 1,010' X 1,700' (29.47 ACRES). IF ANY APPROACH PROCEDURE IS ESTABLISHED WITH NOT LOWER THAN 1/4 MILE VISIBILITY MINIMUMS, THE ASSOCIATED APPROACH RPZ WOULD INCREASE TO 1,000' X 1,010' X 1,700' (48.98 ACRES).
2. EXISTING PRIMARY SURFACES ARE 500' WIDE. IF AN APPROACH PROCEDURE IS ESTABLISHED WITH VISIBILITY MINIMUMS AS LOW AS 1/4 MILE, THE PRIMARY SURFACE FOR THAT RUNWAY WOULD INCREASE TO 1,000' WIDE.

Impacts Associated with 14 CFR Part 77 Imaginary Surfaces

The required 14 CFR Part 77 imaginary surfaces would change if any of the approach visibility minimums were reduced from the current one mile to as low as ¾ mile. The existing 500 foot wide Primary Surface would need to increase to 1,000 feet wide if an approach with visibility minimums as low as ¾ mile was established to just one end of the runway. As shown on Figure 6-4, a 1,000 foot wide Primary Surface would impact a number of existing facilities and features around both runways. Additionally, a number of hangars, aircraft parking areas, other structures would also become obstructions to the 14 CFR Part 77 Transitional Surfaces. Both the existing and would-be future 25 foot BRL have been included on Figure 6-4. The 25 foot BRL associated with any runway obtaining approach visibility minimums as low as ¾ mile would have a significant impact on existing facilities.

Future Instrument Approach Enhancements

For Runway 5 and Runway 23, the existing approach minimums are only 37 and 55 feet respectively, above the lowest heights aircraft can descend on a vertically guided approach. These minimums are likely the result of minor obstructions to one of the U.S. Standard for Terminal Instrument Procedures (TERPS) surfaces associated with these approaches. A full TERPS analysis would have to be conducted to identify the controlling obstructions and then a determination made as to whether or not they could be mitigated. However, given the facility requirements chapter documented that the vertically guided approaches to Runway 5-23 have accommodated virtually every landing attempted during actual instrument conditions, it is not considered necessary to pursue a full TERPS analysis.

For Runway 14-32, a full TERPS analysis off each end would determine whether or not it is feasible to enhance the approaches currently published. While it is not realistic to decrease the visibility minimums, establishing straight-in procedures to both ends and/or improvements to the height aircraft are allowed to descend down to under instrument conditions may be possible. A TERPS analysis should be conducted to determine if the current non-precision approaches can be converted to straight-in procedures with lower landing minimums. Additionally, FAA AC 150/5300-13A, Change 1 requires a Non-Vertically Guided Survey (NVGS) for any new non-precision approach. Information related to the details of this survey requirement is found in FAA AC 150/5300-18B, General Guidance and Specifications for Submission of Aeronautical Surveys to NGS: Field Data Collection and Geographic Information System (GIS) Standards. Essentially, this AC provides the specifications for the collection of airport survey data needed to support the aeronautical and airport engineering information required. Therefore, a TERPS analysis and NVGS will be included in the capital improvement program to explore this potential as well as to establish the level of environmental review necessary.

It does not appear practical to consider any future approaches with lower than one mile visibility minimums due to the significant on-airport and off-airport impacts that would result. Therefore, an approach lighting system is not recommended to any of the runway ends since they are typically only justified where a visibility credit of at least ¼ statute mile can be achieved. Additionally, the newer avionics make it possible for aircraft to descend “through” the published approach procedure on a heads up display.
6.4 Taxiway System

The following sections address potential improvements to the airport’s taxiway system. These primarily include recommendations to improve the overall aircraft operational safety and efficiency, as well as to address modifications to meet the current FAA taxiway standards. Some of the taxiway or taxilane improvements are included in subsequent sections, since they may depend on the final recommended airside alternatives.

6.4.1 Taxiway A

To comply with the current FAA taxiway design standards, either the portion of Taxiway A3 between Runway 5-23 and Taxiway A or the portion connecting Taxiway A to the Commercial Airline Terminal apron needs to be relocated (to avoid direct access onto a runway from an aircraft parking apron). Figure 6-5 illustrates the relocation of Taxiway A3 between Runway 5-23 and Taxiway A with an offset of 750 feet to both Taxiway A2 and Taxiway C. Such a spacing would improve the number of taxiway exits within the optimal range for aircraft landing on Runway 5-23, but would not significantly improve airfield capacity. Figure 6-6 shows how changes to the Commercial Airline Terminal apron to create an aircraft holding bay area could also eliminate the direct access from the apron to Runway 5-23. The best option for reconfiguring Taxiway A3 will depend on the best alternative for providing additional departing aircraft queuing space in the South Quad, which is addressed in a following section.

6.4.2 Taxiway B

Both Taxiways B1 and B3 need to be reconfigured in order to ensure that aircraft are not able to taxi directly onto Runway 14-32 from an aircraft parking apron area. Relocation of the portion of Taxiway B1 between Taxiway B and the General Aviation Terminal apron would accomplish this at approximately half the cost of relocating the portion between Taxiway B and Runway 14-32. Figure 6-5 shows an alternative that consists of a slight shift from the current alignment, while Figure 6-6 shows the connector taxiway being relocated further to the southeast. The best alternative will depend on the final configuration of the East Quad and the resulting aircraft flows in and out of the General Aviation Terminal apron.

Figures 6-7 and 6-8 illustrate the options to shift Taxiway B3 either to the northwest or southeast to avoid aircraft taxiing directly from the North Quad hangars onto Runway 14-32. The preferred alternative is to shift the taxiway to the southeast as shown in Figure 6-7 to provide a greater separation from the existing taxilanes serving the North Quad.
FIGURE 6-6
SOUTH AIRFIELD IMPROVEMENTS - CONCEPT B

ABBREVIATIONS
APRT  AIRCRAFT RESCUE AND FIRE FIGHTING
ATCT  AIRPORT TRAFFIC CONTROL TOWER
FTFPA  FUTURE TAXIWAY/TAXICLEVE OBJECT FREE AREA
RSA  RUNWAY SAFETY AREA
RVZ  RUNWAY VISIBILITY ZONE
TWY  TAXIWAY/TAXICLEVE

LEGEND
OPTIMAL TAXIWAY EXIT RANGE LANDING FROM OTHER END
FUTURE AIRFIELD IMPROVEMENTS
FUTURE ACCESS IMPROVEMENTS
PAVEMENT TO BE REMOVED

6.4.3 Taxiway C

A reconfiguration of Taxiway C1 is necessary to eliminate the possibility of aircraft directly accessing Runway 14-32 from the Commercial Airline Terminal apron. Similar to Taxiway B1, the portion of Taxiway C1 between Taxiway C and the apron area should be relocated due to the lower costs relative to shifting other portions of the taxiway. An option to slightly shift Taxiway C1 is shown in Figure 6-5; however, the preferred option is illustrated in Figure 6-6 which is part of the large GA departure queuing space (addressed in a subsequent section). When the additional holding bay area is created (as shown on Figure 6-6), pavement opposite of Taxiway C1 could be removed and the pavement marked to eliminate direct access onto Runway 14-32.

6.4.4 Taxiway D

A number of options exist to improve the functionality, safety, and efficiency of Taxiway D. Those identified as part of the facility requirements are described and evaluated in the following section.

Northeast End

The northern end connector of Taxiway D does not tie into Runway 23 at an FAA recommended right angle. Figure 6-7 depicts a re-aligned end connector taxiway to the physical end of Runway 23, as well as an option for a bypass taxiway, and the required widening of the taxiway to 50 feet northeast of the intersection with Taxiway D5. While this configuration has the potential to enhance visibility of the runway environment, both jet blast and prop wash would impact the existing hangar and aircraft parking aprons located immediately adjacent to the taxiway. Given that there have been no incidents related to the visibility of the current Taxiway D and Runway 23 end intersection, no changes to the current geometry are recommended with the exception of widening the parallel portion back to Taxiway D5 to a standard width of 50 feet.

Southwest End

The southwest end of Taxiway D does not tie into the actual physical end of Runway 5 due to the clearance requirements and proximity of North Road. As shown in Figure 6-6, while a re-alignment of North Road is possible on airport property, doing so would trigger impacts to adjacent jurisdictional areas and easements (see Figure 6-1). At the time Taxiway D was extended to the southwest, these impacts were not considered justified given the limited number of aircraft operations originating from this side of the airfield that required the full Runway 5 takeoff length. However, by the end of the 20-year planning horizon, the growth in traffic related to the full build out of the North Quad and development of the West Quad is expected to increase the potential demand for full runway access. Therefore, an extension of Taxiway D to the physical end as shown in Figure 6-6 will be included as part of the new Airport Layout Plan (ALP) drawing set in order to preserve the ability to do so in the future when needed.

In order to relocate North Road, the airport would need to complete National Environmental Policy Act (NEPA) compliance through the FAA and permitting through South Florida Water Management District (SFWMD), the U.S. Army Corps of Engineers (USACE), and City of Naples. Provided the provisions in FAA Order 1050.1F, Environmental Impacts: Policies and Procedures
remain consistent with the current guidance, the NEPA compliance could potentially be accomplished through a Categorical Exclusion provided there are no unmitigatable impacts to special purpose law resources. The applicable Categorical Exclusion criteria from FAA Order 1050.1F include:

5-6.4. Categorical Exclusions for Facility Siting, Construction, and Maintenance.

a. Access road construction, and construction, relocation, or repair of entrance and service roadways that do not reduce the level of service on local traffic systems below acceptable levels. (ATO, ARP, AST)

e. Federal financial assistance, licensing, or Airport Layout Plan (ALP) approval for the following actions, provided the action would not result in significant erosion or sedimentation, and will not result in a significant noise increase over noise sensitive areas or result in significant impacts on air quality.

- Construction, repair, reconstruction, resurfacing, extending, strengthening, or widening of a taxiway, apron, loading ramp, or runway safety area (RSA), including an RSA using Engineered Material Arresting System (EMAS).

The regulatory permitting would require a major modification or individual permit from the SFWMD and the same from the USACE. Because the project would impact wetlands and areas currently within a conservation easement, the permitting would include modification of that easement through the SFWMD. Because the conservation easement is held by the Conservancy of Southwest Florida, coordination with the Conservancy, and agreement on partial release, or replacement, of the impacted portion of the easement would be required in order to permit the desired configuration. Mitigation for impacted wetlands, replacement of the functional value of the impacted easement, and for the original impact that led to the easement would be required.

**High-Speed Exit and Connector Taxiways**

High-speed exists and connector taxiways reduce runway occupancy time and improve airport and airfield capacity. During the 20-year planning horizon, high-speed exits off the northwest side of Runway 5-23 will likely be required to expedite aircraft arrivals to the North and West Quads. Two high-speed exits onto Taxiway D will be included as part of the preferred alternative. While Figures 6-6 and 6-7 depict the two high-speed exits to support landings from either direction on Runway 5-23, their final location cannot be determined until future demand is further realized. This is due to the fact that the performance and operational requirements of the aircraft that would need these exits are continuously evolving. Similar, the future airfield facilities and taxiway geometry will also influence the final location for each. Figures 6-6 and 6-7 also depict the re-alignment of Taxiways A2 and A4 in order to provide the proper high-speed exit angle of 45 degrees versus the current 30 degree alignment with the runway centerline.

Both Figures 6-5 and 6-6 depict an additional connector for Taxiway D aligned with the two options for Taxiway A3. A connector taxiway in this location needs to be planned for the latter portion of the 20-year planning horizon. As activity increases on this side of the airfield due to the
eventual development of the West Quad, an additional connector between Taxiway C and Taxiway D will be necessary to facilitate the safe and efficient movement of aircraft. This is similar to other portions of the airfield, all of which currently have a connector taxiway at the approximate midpoint between the runway intersection and individual runway ends. It should be noted that once either an additional connector or high-speed exit taxiway is required between Runway 5-23 and Taxiway D in this area, the turf runway will need to be decommissioned.

6.4.5 Taxiway T

In order to comply with the current FAA “three-node concept” taxiway standard, it is recommended that Taxiway T be removed when the condition of the pavement can no longer support the safe movement of aircraft or when other changes are made to the surrounding pavement areas. Removal of some or all of the current Taxiway T alignment is depicted in both Figures 6-5 and 6-6 based on the different development concepts for this portion of the South Quad. Depending on the timing of the improvements for this portion of the airfield, the opportunity to remove Taxiway T may occur well before its pavement condition would require.

6.4.6 Bypass Taxiways, Holding Bays, and Run-up Areas

Both bypass taxiways and holding bays were identified as facility requirements to enhance the efficiency and operation of aircraft movements to and from Runway 5-23. Particularly, improvements to the departure flow of the larger GA turboprop and jet aircraft during seasonal peaks are described and evaluated in the following sections. Similarly, run-up areas to improve the ability to manage the smaller piston GA aircraft for departures are also addressed.

Bypass Taxiways

Figure 6-6 shows a bypass taxiway for Taxiway A to serve departures off Runway 5 while Figure 6-8 depicts the same for the Runway 23 end. As noted, each bypass taxiway has a taxiway centerline to centerline separation of 152 feet in order to support simultaneous Airplane Design Group (ADG) III movements. While these bypass taxiways can provide the ability to avoid a preceding aircraft that is not ready for takeoff and therefore, blocking access to the runway, they have limitations. First, unless multiple bypass taxiways are provided, the ability to avoid another aircraft is limited to only those aircraft that are currently on or in-between the end connector and bypass taxiway. Given that many of the ADG III aircraft are upwards of 100 feet in length, this configuration would at best only allow two aircraft to be bypassed. In addition, the bypass connectors do not allow the departing aircraft to access the full runway length available for takeoff. While this length is only reduced by the minimum separation distance between the end connector and bypass taxiways (152 feet), that length can make a significant difference for a number of the GA jets that operate in and out of APF.

Currently, both ends of Runway 5-23 have some bypass capability as part of the Taxiway A parallel taxiway system. Both Taxiway A1 and Taxiway A6 are utilized for some intersection departures by smaller GA aircraft when the end connectors are occupied by aircraft not ready for departure. Therefore, the addition of any new bypass taxiways off Taxiway A for Runway 5-23 is not
considered justified. The possibility of bypass taxiways off Taxiway D as well as for each end of Runway 14-32 are addressed as part of the subsequent run-up areas section.

**Holding Bays**

In lieu of bypass taxiways, holding bays capable of supporting the larger GA aircraft operations are recommended. As noted in the facility requirements, during departure peaks, the air traffic controllers will stage aircraft on the Commercial Airline Terminal apron. This requires a coordinated effort between the ATCT and APF’s operation staff to ensure that aircraft are parked in a manner that provides the ability for departing aircraft to safely taxi across the apron area. If adequate space is not available on the Commercial Airline Terminal apron, ATCT management will utilize Taxiway C and even Taxiway B (both holding short of Taxiway A) to queue aircraft waiting to depart.

**Figure 6-5** illustrates the potential configuration of a 1,120 foot holding bay off the southwest end of Taxiway A to accommodate up to nine of the largest GA aircraft that utilize APF. As depicted, this holding bay would impact the existing public airport observation deck and park. Therefore, either the holding bay would have to be smaller or the airport observation deck relocated. In order to not impact the airport observation deck, the holding bay would have to be reduced by at least one third; significantly decreasing its ability to accommodate the larger GA aircraft during departure peaks. For this reason, the option for a relocated airport observation deck is shown on **Figure 6-5** at a site on the opposite side of Runway 5-23.

The potential for a 650 foot departure queuing area between Taxiways A and C, within the limits of the RVZ, is also depicted on **Figure 6-5**. While the RVZ must be kept clear of any fixed or movable objects (including parked aircraft) when the ATCT is closed, this area could be used to facilitate the queuing of aircraft waiting to depart when the ATCT is open. Combined, the dedicated holding bay and departure queuing space under this concept could support up to 14 of the largest GA aircraft that utilize APF.

An alternative large GA aircraft holding bay and departure queuing area is depicted on **Figure 6-6**. As shown, a majority of the area is within the limits of the RVZ that traverses the South Quad. This concept provides the option to configure some or all of the dedicated holding bay/queuing space shown, and has potential to serve departures when Runway 23 is active. Depending on how the area is utilized, it could provide approximately 2,000 linear feet of taxilane space, which could support approximately 17 of the largest GA aircraft, during a peak departure period.

Another option is to expand and utilize the portion of the General Aviation Terminal apron within the RVZ, as shown in **Figure 6-7**. Even though the East Quad needs additional apron space, this option must be considered to support the need to queue aircraft for departures on Runway 23. Due to the configuration of the north half of the General Aviation Terminal apron and the large stormwater pond north of the Humane Society Naples facility, development of a holding bay closer to the Runway 23 departure end is not possible without significant facility impacts. The configuration shown as part of **Figure 6-7** has the potential to provide approximately 600 linear
feet of taxilane space, which could support approximately five of the largest GA aircraft, during a peak departure period.

When comparing the concepts to facilitate large aircraft departures off Runway 5 the configuration shown in Figure 6-6 appears to be the most advantageous. While the desire is to have a holding bay as close to the runway end as possible, the option to construct along the southwest end of Taxiway A would impact a number of existing facilities. In addition to the airport observation deck, the holding bay shown in Figure 6-5 would also create conflicts with the existing hangar taxilanes, impact the utilization of the individual hangar apron areas, and require significant modification to the drainage system which traverses the area. If the holding bay were reduced in size so as not to impact the airport observation deck; it could only accommodate less than half of the departing aircraft as the holding bay configuration in Figure 6-6. The holding bay in Figure 6-6 also provides a more centralized location on the airfield to support peak departure periods when Runway 23 is active. Therefore, it is recommended to pave and mark the area north of the Commercial Airline Terminal apron and within the RVZ to provide the large GA departure queuing and aircraft holding bay space needed.

In order to plan for additional queuing aircraft space when Runway 23 is active, it is also recommended to pave portions of the General Aviation Terminal apron within the RVZ, as shown in Figure 6-7. Prior to the design of the recommended departure queuing and aircraft holding bay areas, airport and ATCT management need to determine the optimal arrival and departure flows to/from the General Aviation Terminal area to facilitate the most efficient configuration of these areas.

Run-up Areas

Run-up areas at both ends of Taxiway D will be needed toward the end of the planning horizon to support the ultimate buildout of the West Quad. Figure 6-5 illustrates the best location for a run-up area on Taxiway D for the Runway 5 end. Moving the run-up area any further southwest would create unnecessary impacts to the ultimate alignment of North Road and the surrounding wetlands. The configuration shown in Figure 6-5 provides a run-up area centerline to Taxiway D centerline separation of 162 feet, which would allow simultaneous ADG III aircraft movements. While most ADG III aircraft do not conduct run-ups, such spacing and the general size of the proposed run-up area as depicted would provide the bypass capability for two of the largest GA aircraft using APF. If it is determined this is not required at the time of design, the run-up area at this end of Taxiway D could be reduced in size to accommodate only ADG I and II aircraft.

Figure 6-8 shows an inboard run-up area on the northeast end of Taxiway D for the Runway 23 end since development on the northwest side of the taxiway precludes any other option. The inboard run-up area would be limited to ADG I aircraft as the centerline to centerline separation between the run-up area and Taxiway D is 111 feet. This provides the proper separation between ADG I and ADG III aircraft movements while still remaining clear of the RSA and the holding position for Runway 23.
Run-up areas on both sides of Runway 14 are depicted on Figure 6-7. These are the only options for establishing run-up areas for this runway end given the existing development and 300 foot offset for both Taxiways B and C with the Runway 14-32 centerline. The same limitations exist for the development of run-up areas off the other end of both taxiways for Runway 32 (see Figure 6-5). As with the current end connector of Taxiway C with Runway 32, a future run-up area would not have a direct line-of-sight with the ATCT.

Given the limitations for the run-up areas, the alternate option of bypass taxiways for the north side of Runway 23 and at both ends of Runway 14-32 was considered. Figure 6-7 depicts a bypass taxiway parallel to a re-aligned end connector taxiway to Runway 23. While the 152 foot centerline separation would support simultaneous ADG III operations, as with the bypass taxiways evaluated for Taxiway A, very limited bypass capability is actually created. Additionally, bypass taxiways are not ideal for smaller aircraft engine run-ups and the aforementioned prop wash and jet blast impacts to existing facilities should be avoided.

For Runway 14-32, the options for bypass taxiways are illustrated in Figures 6-6 and 6-8, and were aligned with the respective displaced threshold at each end of the runway. Unfortunately, these do not create any bypass capability due to the fact that the holding position lines for Runway 14-32 are offset 250 feet from the runway. As such, the 300 foot offset to both Taxiways B and C do not provide enough space for even an ADG I aircraft to pass another ADG I aircraft holding short on the bypass connector. While no bypass taxiways are recommended for Runway 14-32, a project to relocate Taxiway C3 with Taxiway B3 is needed. As documented in the facility requirements, discussions with ATCT management revealed that congestion regularly occurs along Taxiway B when Runway 14 is active. During these periods, ATCT typically routes the larger aircraft to the Runway 14 end via Taxiways B3 and C3. This allows the larger aircraft to bypass any small aircraft lined up along the northwest end of Taxiway B, performing engine run-ups before departing on Runway 14. If Taxiway C3 is not relocated with Taxiway B3; the ability to efficiently cross the larger aircraft at this intersection will be lost.

### 6.4.7 Recommended Airfield Improvements

Figure 6-9 combines all of the recommended airfield improvements identified in the previous sections, as well as others that did not have any true alternatives into an overall preferred airfield alternative.
FIGURE 6-9
FUTURE AIRFIELD IMPROVEMENTS

Source: Naples Airport Master Plan

6.5 Aviation Related Development

The North, South, East, and West Quads were each evaluated independently and in combination to determined their ability to accommodate the different types of aviation facilities required over the 20-year planning horizon. The key objective was to create a plan where the limited remaining airport land would be developed for the highest and best use to support the improvements needed. This process identifies the most realistic and compatible development concepts, as well as potential redevelopment options, for inclusion in the recommended airport development plan.

6.5.1 Development Considerations

Figure 6-1 illustrated the primary airfield constraints which impact how facilities can be developed or even redeveloped on the airfield. These included required airfield design standards, critical imaginary surfaces, wetland boundaries, flood zones, easements, and leases. What was not addressed was how the base flood elevations (BFE) from the current 2012 Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) will impact facility development. Depending on the type of facility, the BFEs determine the minimum finished floor elevation (FFE) required.

The minimum FFE is an important consideration as it directly correlates to the fill required to develop specific sites. In addition, the FAA has centerline longitudinal gradient standards for both taxiways and taxilanes and maximum allowable surface grades for aircraft parking aprons. The required surface gradients are outlined in Table 6-1.

<table>
<thead>
<tr>
<th>Facilities Serving Aircraft Approach Category (AAC)</th>
<th>Taxiways and Taxilanes (longitudinal)</th>
<th>Aircraft Parking Aprons (any direction)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A and B</td>
<td>2.0%</td>
<td>2.0%</td>
</tr>
<tr>
<td>C and D</td>
<td>1.5%</td>
<td>1.0%</td>
</tr>
</tbody>
</table>

SOURCE: FAA AC 150/5300-13A, Change 1, Airport Design.

The longitudinal and surface gradient standards combined with the minimum FFE for each development site determines the offset needed between proposed aviation facilities and the existing airfield pavements. Different variations of these setbacks have been illustrated for the West Quad in Figure 6-10. The same taxiway, taxilane, and apron offsets have been applied as required to the various development sites around the airfield.
Figure 6-10

West Quad Development Constraints


Abbreviations:

- AAC: Aircraft Approach Category
- AMSL: Above Mean Sea Level
- ARFF: Aircraft Rescue and Fire Fighting
- ATCT: Airport Traffic Control Tower
- BRL: Building Restriction Line (250')
- FLOS: Future Line of Sight
- LOS: Line-of-Sight
- RVZ: Runway Visibility Zone

Legend:

- Gordon River Greenway Easements
- Recorded Conservation Easements

Notes:

1. Minimum 300' offset to provide required 1.5% longitudinal taxiway grade (for AAC C and D aircraft) and 1.0% longitudinal apron grade between taxiway D (5' AMSL) and minimum building FFE (9' AMSL).
2. Minimum 150' offset to provide required 2.0% longitudinal taxiway grade (for AAC A and B aircraft) between taxiway C (6' AMSL) and minimum building FFE (9' AMSL).
As noted on Figure 6-10, the setbacks along Taxiway D are based on the longitudinal taxiway grades needed to support the larger Aircraft Approach Category (AAC) C and D aircraft. Setbacks along Taxiway C are based on those required for the smaller AAC A and B aircraft requirements. For both, multiple FFE setbacks are provided. The BFE + 0’ setback is possible for hangar facilities that would not be occupied and where the proposed building has provisions for flood water to pass through without structural damage. Office and occupied areas must have a finished floor that is a minimum one foot above the base flood elevation (BFE + 1’).

For planning purposes, the FFE for future facilities is based on the respective site’s BFE + 1’. The BFE + 2’ line has also been shown since some future facilities in the West Quad may need to have even higher finished floors in order to meet the dry retention requirements of the current conceptual drainage permits. The BFE + 2’ could also be considered more resilient to future storm or flooding events. Figure 6-10 also identifies the vertical limitations over the West Quad for any proposed structures relative to the existing ATCT line-of-sight requirements. While line-of-sight requirements apply to other portions of the airfield, they have the most potential impact on the development of future facilities in the West Quad based on the current ATCT location and height.

6.5.2 Overview of Development Concepts

The following sections provide an overview of the different development options created for each of the airport’s four quadrants. The primary objective for these concepts was to create a balance where ultimately, the four quadrants could collectively support the demand identified in the facility requirements. By the end of the 20-year planning period, the primary facilities would include:

- Additional General Aviation Terminal Space
- 49 Additional T-hangar Units
- Clearspan Hangars (to accommodate 115 new aircraft)
- Aircraft Parking Apron Space (minimum 93,600 square yards or 19.3 acres)

North Quad

The north side of the airport is fairly well developed with relatively few sites left for future facilities. After the portion of Taxiway D between Taxiway B and Taxiway D5 was re-aligned in 2019, a few additional hangar sites became available along the Runway 5-23 flightline. Both Figures 6-11 and 6-12 illustrate the new large clearspan hangars planned or under construction off this portion of Taxiway D.
Just north of the Taxiway B and Taxiway D intersection, a small amount of space will become available once the existing Aircraft Rescue and Fire Fighting (ARFF) station is relocated to the South Quad. In both North Quad concepts, a site for a future 100LL self-serve tank has been shown off Taxiway C. While the configurations are slightly different, both provide landside access off Citation Point, fuel truck parking, and an ADG I taxilane loop. In addition to the self-serve facility, Concept A also shows the potential for two small clearspan hangars in this area while Concept B reflects one of the new ATCT options addressed in Appendix F. Given the need to preserve this site as a potential location for a new ATCT, Figure 6-11 reflects the recommended alternative for the area immediately north of the Taxiway B and Taxiway D intersection. Any future facility in this location cannot impact the required RVZ. Likewise, the Automated Surface Observing System (ASOS) wind sensor critical area and potential new ATCT line-of-sight requirements must also be taken into consideration.

The largest vacant space available for aviation related development in the North Quad is an area of approximately 15 acres in the northwest corner. Concept A shows the potential to develop large clearspan hangars in this area while Concept B reflects the option for additional T-hangar units. For both, airside access would come off of Taxiway B and landside access off either Corporate Flight Drive or Patriot Way.

**South Quad**

In addition to the Commercial Airline Terminal, clearspan hangars, and T-hangars, the North Quad also accommodates a majority of the airport’s support and service facilities. These include the ATCT, airfield electrical vault, airport maintenance facilities, fuel farm, U.S. Customs and Border Protection (CBP), and future ARFF station. Based on the various analyses in the facility requirements, only the ATCT might need to be relocated during the 20-year planning horizon. Many of the other support and service facilities will need upgrades and/or slight expansions, but for most, such as the airfield electrical vault or airport maintenance facilities, these can be accommodated at the current sites.

There is also approximately 16 acres of undeveloped space in the South Quad between the existing facilities and North Road. Unfortunately, due to the layout and configuration of the existing facilities, none of this vacant land has direct airfield access. Therefore, a number of options were created which explored how airside access could be provided to the south half of the South Quad. Figures 6-13, 6-14, and 6-15 illustrate the primary concepts for the potential buildout of the South Quad. Based on discussions during the master planning process, each of the concepts for the South Quad include preserving space for the rental car companies. While there are a number of ways the South Quad could be developed, a base assumption was that the rental car companies will have consolidated facilities in the future.
SOUTH QUAD - AVERAGE ELEVATION RANGES 4-7' AMSL
BASE FLOODPLAIN ELEVATION (BFE) = 8' AMSL
ALL PROPOSED BUILDINGS SHOWN ASSUME BFE + 1' FOR FINISHED
FLOOR ELEVATION (FFE) = 9' AMSL.

POTENTIAL AIRCRAFT FACILITIES
T-HANGARS: N/A
CLEARSPAN: 6 TO 10, MULTI-ENGINE, JET, AND ROTORCRAFT
PARKING ARRIVAL: 150,000 SF - 2,700 SF - 98,000 SF

FIGURE 6-13
SOUTH QUAD DEVELOPMENT - CONCEPT A
Concept A explores the option of establishing a General Aviation Terminal on the south side of the airfield to include an expansion of the aircraft parking apron to support operations. As noted on Figure 6-13, the General Aviation Terminal shown in the South Quad would provide approximately 25,000 square feet (SF) of space. This size facility would accommodate the 21,000 SF of fixed base operator (FBO) space required by the end of the 20-year planning period. Therefore, this alternative assumes that the current 19,228 SF General Aviation Terminal building in the East Quad would be maintained to provide the 15,800 SF of airport administration space needed by the end of the 20-year planning period.

Concept B provides the ability for the South Quad to accommodate some of the additional T-hangar units, clearspan hangars, and aircraft parking apron space needed by the end of the planning horizon. It also preserves the Commercial Airline Terminal building and most of the adjacent automobile parking. The facilities proposed in Concept C also provide additional T-hangar and clearspan hangar facilities, as well as an expanded, contiguous aircraft parking apron area. As with Concept A, the options depicted under Concept C would redevelop the Commercial Airline Terminal facilities. For all three concepts, the additional apron space that can be realized has been reduced by the approximate 3,700 SY of apron area that currently lies within the RVZ; which cannot be utilized during the times the ATCT is closed. For Concepts B and C, the total apron space was reduced another 7,700 SY due to the current apron space that would be utilized for developing additional T-hangar buildings.

**East Quad**

Currently the East Quad supports the General Aviation Terminal, a number of T-hangar units, multiple clearspan hangar facilities, and the primary aircraft parking apron area for the airport. The area also accommodates the airport’s fuel truck fleet, provides two 100LL self-serve tanks, and facilities used by aviation organizations such as the Civil Air Patrol, Experimental Aircraft Association, and Naples Pilots Association. Figures 6-16, 6-17, and 6-18 illustrate different development concepts for the potential buildout of the East Quad.

Additional aircraft parking apron space has been shown in each of the concepts for the south half of the area. During the course of the master plan study, it was determined that the southern half of the East Quad had the best re-development potential. This was based on the condition of the different hangars in this area, the undeveloped space between the existing facilities and stormwater pond off Airport Pulling Road (approximately five acres), and the recent investment in the T-hangar facilities north of Radio Road. The expansion of the apron area would be a phased approach to enable new facilities to be constructed in other quadrants of the airport to offset those impacted by the apron expansion. As noted on each figure, the additional apron space that can be realized in each East Quad concept was reduced by the approximate 14,100 SY of apron area currently within the RVZ.
**PRELIMINARY**

**EAST QUAD DEVELOPMENT - CONCEPT A**

- **Base Floodplain Elevation (BFE) = 8' AMSL**
- **All proposed buildings shown assume BFE + 1' for finished floor elevation (FFE) = 9' AMSL.**

**POTENTIAL AIRCRAFT FACILITIES**

- **T-HANGARS:** 71
- **CLERESTORY:** 12 TO 14 MULTI-ENGINE JET AND ROTORCRAFT
- **PARKING APRON:** ±55,700 SY - ±14,100 SY = ±41,600 SY

EAST QUAD - AVERAGE ELEVATION RANGES 5-7' AMSL

BASE FLOODPLAIN ELEVATION (BFE) = 8' AMSL

ALL PROPOSED BUILDINGS SHOWN ASSUME BFE + 1' FOR FINISHED FLOOR ELEVATION (FFE) = 9' AMSL.

POTENTIAL AIRCRAFT FACILITIES

T-HANGARS: LDGE 71

CLEAN/STAN: 9 TO 10 MULTI-ENGINE JET AND ROTORCRAFT

PARKING APRON: ±40,400 SF = ±14,100 SY = ±35,300 SY

FIGURE 6-18
EAST QUAD DEVELOPMENT - CONCEPT C

The East Quad concepts explore different options to provide the additional General Aviation Terminal space identified in the facility requirements for both FBO operations and airport administration. Under Concept A it is assumed that a new General Aviation Terminal to accommodate the FBO space would be constructed in either the South or West Quads. The existing General Aviation Terminal would then be expanded to extent possible to provide the both short-term FBO and airport administration space, as well as to ultimately serve as just the airport administration facility.

Both Concepts B and C also include expanding the existing General Aviation Terminal building to the extent possible to provide additional FBO and airport administration space in the short-term, but each also propose a new General Aviation Terminal in the south half of the East Quad. The new facility would be approximately 25,000 SF to accommodate the more than 20,000 SF of additional FBO space calculated as required by 2038, leaving the current General Aviation Terminal building to eventually serve as the airport administration facility. The primary difference between Concepts B and C is the ability to provide the necessary automobile parking that would be required to support both the FBO activity and airport administration operations. If all of the FBO and airport administration facilities remain in the East Quad, it was estimated that a total of 580 automobile spaces would be needed by 2038. To accommodate this demand, Concept B includes a parking structure while Concept C reflects an expansion of the existing surface lots.

Each of the East Quad concepts include additional clearspan hangar space and the potential to renovate the existing Civil Air Patrol facility in its current location. As part of the expansion and redevelopment of the East Quad facilities, each concept also includes a site to provide a future fuel farm area. The potential for a fuel farm in the East Quad would not replace the current facility in the South Quad, rather provide the ability to expand the overall storage capacity as well as to provide a more efficient location for the Jet A fuel trucks to reload.

**West Quad**

While the West Quad represents the largest contiguous piece of airport property available for aviation related development, there are also a number of constraints. The most significant of which is related to the TVOR setbacks; however, these are considered short-term as the FAA intends to begin decommissioning the facility in their 2021 fiscal year. After the TVOR is decommissioned; it is the intent of the FAA Air Traffic Organization to maintain the current facility in order to continue to operate the Distance Measuring Equipment (DME). At that point in time, the critical area around the facility will be reduced to the line-of-sight required for the DME signal to aircraft in the air. If necessary from a development standpoint, the DME equipment could ultimately be relocated to another location on the airfield.

**Figures 6-19, 6-20, and 6-21** illustrate different development concepts for the eventual buildout of the West Quad. As noted in the constraints analysis, the current FEMA floodplain elevations place substantial siting, design, and construction considerations on every new facility constructed at the airport. Future development in the West Quad has perhaps the most significant impacts related to the minimum FEMA floodplain elevations. In fact, each of the concepts of the West Quad illustrate
and include notes about the setbacks required to accommodate a minimum finished floor elevation of 9 feet AMSL based on the current floodplain elevations.

For each of the West Quad concepts, an access road off of North Road, just south of the wooded area utilized for part of the Gordon River Greenway easement, is shown ending at the Collier Mosquito Control District facilities. In addition to providing access to future aviation facilities, this would eliminate the need for any airport related traffic to use the portion of North Road where there are private residences between the airport’s property and the Gordon River. To ensure this, the existing access to the Collier Mosquito Control District off the end of North Road should be removed once the new access road is complete.

Concept A for the West Quad reflects the option of establishing a General Aviation Terminal of approximately 25,000 SF on the west side of the airfield. As with the other options, a facility of this size would accommodate the ultimate 21,000 SF of FBO space required and assumes that the current General Aviation Terminal in the East Quad would provide the ultimate airport administration space. Concept A also includes a large aircraft parking apron to support the general aviation operations, as well as the ability to provide some additional T-hangar units and clearspan hangars.

Under Concept B, the space required for a General Aviation Terminal has been replaced with some additional T-hangar units, a few larger clearspan hangars (including one with an aircraft apron to support aircraft maintenance or other similar services), and the potential option for a new ATCT site (as addressed in Appendix F). Concept C has the ability to provide even more T-hangar units should it be decided that no other sites on the airfield are preferred to meet the demand expected for these facilities. Concept C retains the ability to provide a larger clearspan hangar with an apron to support some type of aircraft services, but does not provide the option of a new ATCT on the west side of the airport.
FIGURE 6-19

WEST QUAD DEVELOPMENT - CONCEPT A

ABBREVIATIONS

AAR
AAC
AMSL
ATCT
BRL
CA
LOS
RVZ
SF
SY

AIRFRIGHT CATEGORY
AIRCRAFT APPROACH CATEGORY
ABOVE MEAN SEA LEVEL
AIRPORT TRAFFIC CONTROL TOWER
BUILDING RESTRICTION LINE (25')
GENERAL AVIATION
LINE-OF-SIGHT
RUNWAY VISIBILITY ZONE
SQUARE FEET
SQUARE YARDS

LEGEND

FUTUER AIRFIELD IMPROVEMENTS
FUTURE ACCESS IMPROVEMENTS
FUTURE BUILDINGS
GORDON RIVER GREENWAY EASEMENTS
RECORDED CONSERVATION EASEMENTS

NOTES

1. Minimum 300' offset to provide required 1.5% longitudinal taxiway grade (for AAC and D aircraft) and 1.0% longitudinal apron grade between taxiway D (5' AMSL) and minimum building FFE (9' AMSL).
2. Minimum 150' offset to provide required 2.0% longitudinal taxiway grade (for AAC A and B aircraft) between taxiway C (6' AMSL) and minimum building FFE (9' AMSL).

WEST QUAD - AVERAGE ELEVATION RANGES 2-6' AMSL

BASE FLOODPLAIN ELEVATION (BFE) = 5' AMSL

ALL PROPOSED BUILDINGS SHOWN ASSUME BFE + 1' FOR FINISHED FLOOR ELEVATION (FTE) = 6' AMSL.

POTENTIAL AIRCRAFT FACILITIES

T-HANGARS: 78 single-engine and light multi-engine
CLEARSPAN: 24 to 30 multi-engine, jet, and rotorcraft
PARKING APRON: 23,000 SY

ABBREVIATIONS

AAC: AIRCRAFT APPROACH CATEGORY
AMSL: ABOVE MEAN SEA LEVEL
ATCT: AIRPORT TRAFFIC CONTROL TOWER
BRL: BUILDING RESTRICTION LINE (25')
CA: GENERAL AVIATION
LOS: LINE-OF-SIGHT
RVZ: RUNWAY VISIBILITY ZONE
SF: SQUARE FEET
SY: SQUARE YARDS

LEGEND

FUTURE AIRFIELD IMPROVEMENTS
FUTURE ACCESS IMPROVEMENTS
FUTURE BUILDINGS
GORDON RIVER GREENWAY EASEMENTS
RECORDED CONSERVATION EASEMENTS

NOTES

1. MINIMUM 300' OFFSET TO PROVIDE REQUIRED 1.5% LONGITUDINAL TAXIWAY GRADE (FOR AAC C AND D AIRCRAFT) AND 1.0% LONGITUDINAL APRON GRADE BETWEEN TAXIWAY D (5' AMSL) AND MINIMUM BUILDING FTE (6' AMSL).
2. MINIMUM 150' OFFSET TO PROVIDE REQUIRED 2.0% LONGITUDINAL TAXIWAY GRADE (FOR AAC A AND B AIRCRAFT) BETWEEN TAXIWAY C (6' AMSL) AND MINIMUM BUILDING FTE (6' AMSL).

6.5.3 Evaluation Criteria

The following describes the six primary attributes utilized to evaluate the different development concepts. As noted in the individual tables, these attributes are ranked between one and five for each of the airport’s four quadrants, with five being the best. Therefore, when comparing different options, the one with the highest total is considered to be the most advantageous.

**Airside Access**

For any aviation related development, an important element to consider is how each site could tie into the ultimate airfield configuration for aircraft operations. This includes the ability to support the movement and parking requirements of the specific aircraft the facility is intended to serve. Different concepts are not rated lower if they require new airside access; however, they would rank lower if the access requires unnecessary replication of airside facilities that already exist or are planned at another location.

Options typically rate higher if the concept provides the ability for more than one taxiway into and out of the area. Depending on the size of the facility being evaluated, such dual access may be a minimum requirement to support activity during peak times as well as the rare occasions when one access point might be temporarily unavailable due to maintenance or an operational issue.

**Landside Access**

Dedicated landside access for the tenants, users, and customers of an aviation facility is mandatory. While in some cases landside access may be acceptable via roads on the secure side of the airfield, and in rare cases across non-movement areas, no landside access can be allowed across an active movement area. For public facilities, the landside access must be provided outside of the secured airfield perimeter. As with airfield access, an option is not penalized if it requires new landside access; however, alternatives will rank lower if they require significant alterations to established roads or traffic patterns.

**Compatibility with Adjacent Uses**

For aviation related development, an option’s compatibility with adjacent uses will have a direct impact on the operational efficiency of each facility. Due to the variety of aviation operators at APF, some sites are more advantageous than others for the activity the facility is intended to serve. Ratings for compatibility are predominantly based on how a proposed facility might positively or negatively impact the overall airfield operation. Compatibility also takes into consideration whether or not the option necessitates the redevelopment of existing facilities.

**Flexibility of Facility Configuration**

The ability to accommodate not only the initial demand, but the facilities for future demand may make one site more desirable than another. A site can obtain the highest rating if the facility requirements for the 20-year planning period are accommodated; likewise, those with the space to provide different layouts or concepts are also considered advantageous.
Potential Environmental Impact

It is important to determine whether any of the proposed concepts might have an impact on the surrounding features documented in the environmental overview chapter. The environmental rating is also influenced based on the sustainability initiatives and screening criteria described in Appendix H with the overall objective of reducing the airport’s environmental impact.

Constructability

This attribute evaluates whether the construction of a proposed option would create any impacts to existing facilities or airfield operations. Most construction will include temporary impacts but may also create permanent changes to the surrounding environment. For some, construction may result in improvements to the area, which would increase the rating of the option. Constructability also takes into account whether the site has the required utility infrastructure and if significant site prep is required.

6.5.4 General Aviation Terminal and Aircraft Apron Space

The facility requirement analysis determined that 36,800 SF of space is ultimately required for FBO and airport administration space by the end of the 20-year planning period. Options for a new 25,000 SF General Aviation Terminal were shown in the development concepts for all but the North Quad. As noted previously, a 25,000 SF facilities would accommodate the minimum 21,000 SF of FBO space required by 2038 while the existing 19,228 SF General Aviation Terminal would be reconfigured to provide the 15,800 SF of airport administration space needed by the end of the 20-year planning period.

As an alternate option for each concept considered, if the future General Aviation Terminal is two story, the 25,000 SF footprint (up to 50,000 SF total area) could accommodate both the FBO and airport administration functions in a single facility. This would allow the existing General Aviation Terminal to be repurposed for another aviation use. In either case, it was estimated that ultimately 580 automobile spaces would be required to support both functions. Under every concept, the aircraft parking apron space is maximized as much as possible to reflect the needs of the FBO operations, especially during seasonal peaks. Table 6-2 reflects the evaluation of the South, East, and West Quads relative to their ability to accommodate the future General Aviation Terminal and aircraft apron needs based on the primary evaluation attributes.
Given that the West Quad is relatively undeveloped, a new General Aviation Terminal on this side of the airport ranked the highest with respect to compatibility. However, due to the wetlands, Gordon River Greenway easement, and conservation area, the West Quad would have limited space to accommodate the associated aircraft parking apron, even if the hangar areas shown in Figure 6-19 were utilized for additional apron space. The West Quad also has the least advantageous landside access, located over a mile and a half from Airport Pulling Road (via North Road) and represents the most potentially vulnerable site given the surrounding environment.

The South and East Quads ranked very close with only slight differences in each of the attributes. From an environmental standpoint, the South Quad ranked lower given that it would place the arrival and departure point of most jet operations closer to the neighboring communities to the south. Doing so would shift a majority of the noise generated by aircraft movements as well as from their engines or auxiliary power units when sitting on the ground, further south.

The South Quad has slightly better airside access given the predominant flow of aircraft when Runway 5 is active. From a landside standpoint, the East Quad has the most visibility including access via a major intersection and does not require any new automobile spaces given the large parking lot in the South Quad would need to be converted to aircraft apron space. The East Quad is slightly better with respect to constructability while the two are similar for constructability. For the South Quad option, the Commercial Airline Terminal building and the large hangar facilities would be impacted (see Figure 6-13), while the East Quad concepts would necessitate the redevelopment of a number of existing hangar facilities and bisect Aviation Drive South (see Figures 6-17 and 6-18).

From an environmental standpoint, the South Quad ranked lower given that it would place the arrival and departure point of most jet operations closer to the neighboring communities to the south. Doing so would shift a majority of the noise generated by aircraft movements as well as from their engines or auxiliary power units when sitting on the ground, further south.

Based on the results in the evaluation matrix, the East Quad is the preferred site for the future expansion of the General Aviation Terminal facilities. All three of the concepts presented for the East Quad reflect an expansion of the current General Aviation Terminal building, given the immediate need for additional FBO and airport administration space. Figures 6-17 and 6-18 both reflect a new 25,000 SF General Aviation Terminal site on the south half of the East Quad, with a key difference being Concept B includes a parking structure while Concept C shows additional parking space.

### Table 6.2: Attributes for Proposed Facility

<table>
<thead>
<tr>
<th>Attributes for Proposed Facility</th>
<th>North Quad</th>
<th>South Quad</th>
<th>East Quad</th>
<th>West Quad</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airside Access</td>
<td>na</td>
<td>4</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Landside Access</td>
<td>na</td>
<td>3</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Compatibility with Adjacent Uses</td>
<td>na</td>
<td>4</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Flexibility of Facility Configuration</td>
<td>na</td>
<td>4</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Potential Environmental Impact</td>
<td>na</td>
<td>4</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Constructability</td>
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</tr>
<tr>
<td>Total</td>
<td>22</td>
<td>26</td>
<td>20</td>
<td>20</td>
</tr>
</tbody>
</table>

Table 6.2: Attributes for Proposed Facility (Source: ESA, 2019)

**NOTE:** Attributes for each site individually ranked 1-5 with 5 being the best.
surface lots. A 600 space parking structure was included in Concept B since the facility would be located on top of the existing 158 space long-term lot. Under Concept C, an expansion of the existing surface lots would provide the additional 264 spaces needed. The primary tradeoff is that Concept C provides a little less aircraft apron space, but is more advantageous overall, especially from a cost perspective. Therefore, Concept C (Figure 6-18) was selected as the recommended new General Aviation Terminal alternative.

A total of 71 T-hangars and one small clearspan hangar will be impacted by the recommended General Aviation Terminal and related facilities alternative. It is anticipated that 35 of the T-hangar units will need to be removed in the short-term to accommodate the first phase of the new General Aviation Terminal facilities. This includes the 20 shade/T-shelter spaces and the 15 unit T-hangar with the pilot’s lounge used by different aviation organizations, as well as the small clearspan hangar. The remaining 36 T-hangar units in the southeast corner of the East Quad will likely not be impacted until the middle part of the 20-year planning period.

### 6.5.5 T-Hangar Facilities

The demand for T-hangars at APF is expected to continue with an additional 49 units required by the end of the 20-year planning period. However, there are 71 existing units that will eventually need to be relocated in order to develop the recommended new General Aviation Terminal and related facilities shown in Figure 6-18. This creates the necessity for 120 additional T-hangar units overall. It is worth noting that no additional T-hangars were considered for the East Quad given the space limitations and the fact that T-hangars do not warrant the premium access and visibility provided in that quadrant. It was determined early in the evaluation of potential airfield development alternatives that T-hangars in this location would not reflect the highest and best use of the land available.

For all of the T-hangar concepts, the buildings shown are based on the Erect-A-Tube N60-48 nested T-hangar building which is 60 feet wide by 264 feet long for a ten unit structure. This is nearly identical in size to Fulfab’s LK48 fully nested T-hangar building, both of which have an overall height just under 20 feet. These popular T-hangar buildings can fit a single aircraft with a wingspan up to 47.5 feet and tail height of 14 feet in each unit. T-hangars of this size were used in developing the concepts since they can accommodate a number of the most common single-engine and light multi-engine (piston and turboprop) general aviation aircraft. All of the taxiways/taxilanes providing access to the T-hangars provide ADG I standards and have been configured to meet the longitudinal grade requirements for AAC A and B aircraft (given the assumed finished floor elevation for each site).

In the North Quad, Figure 6-12 reflects the potential for 64 new T-hangar units. Concepts for the South Quad range from 24 to 42 T-hangar units that could be developed on or adjacent to the existing aircraft parking apron on the east side of the site (see Figures 6-14 and 6-15). Each of the three concepts developed for the West Quad (Figures 6-19, 6-20, and 6-21) include T-hangar building configurations which range from 40 to 126 units. Table 6-3 provides an evaluation of additional T-hangar units in the North, South, and West Quads.
Each of the concepts ranked very similar with respect to airside access, landside access, and compatibility. The North Quad ranked lower on airside access given the proposed site is located off the end of Taxiway B, in a corner of the airport. For landside access the West Quad ranked high since the longer drive off Airport Pulling Road is not critical for T-hangar facilities as it is for the General Aviation Terminal described previously. The South Quad had a slightly lower rating since the proposed T-hangars are the furthest from any public access or automobile parking. From a compatibility standpoint, the North Quad was considered slightly less desirable given the proximity to the rotorcraft operations of the Collier County Sheriff’s Aviation Unit. The mix of rotorcraft and light aircraft operations (including open T-hangar units) creates the potential for issues related to rotor wash.

The sites varied with respect to flexibility given that only the West Quad provides the ability to accommodate the full T-hangar demand required, including the potential for different facility configurations. The North Quad possesses some flexibility while the South Quad is the most constrained. From an environmental perspective, both the North and West Quads ranked lower given the potential vulnerability of the sites given their proximity to the Gordon River and lower surrounding land. For constructability, the concepts for the South Quad rated the lowest since they would alter the existing aircraft parking apron and stormwater system on the east side of the site. These impacts could be problematic during design given the current pavement elevations of the surrounding facilities and infrastructure. Under Concept B (Figure 6-14) the larger number of T-hangars would likely result in the need for dual taxilane access and the need to reconfigure portions of the interior airport perimeter road as well as access to the airport fuel farm.

As shown in Table 6-3, the West Quad ranked the highest with the South and then North Quads not far behind. While Concept C for the West Quad can potentially accommodate the additional T-hangars required (to include the 71 that need to be relocated from the East Quad), the timing needs to be considered. Currently there is no infrastructure in the West Quad to support the immediate development of any T-hangars. When this is combined with the need for additional fill to develop anything in the West Quad, it highlights the need for the airport to have a site that can be developed.

<table>
<thead>
<tr>
<th>Attributes for Proposed Facility</th>
<th>North Quad</th>
<th>South Quad</th>
<th>East Quad</th>
<th>West Quad</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airside Access</td>
<td>4</td>
<td>5</td>
<td>n/a</td>
<td>5</td>
</tr>
<tr>
<td>Landside Access</td>
<td>5</td>
<td>4</td>
<td>n/a</td>
<td>5</td>
</tr>
<tr>
<td>Compatibility with Adjacent Uses</td>
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<tr>
<td>Flexibility of Facility Configuration</td>
<td>4</td>
<td>3</td>
<td>n/a</td>
<td>5</td>
</tr>
<tr>
<td>Potential Environmental Impact</td>
<td>2</td>
<td>5</td>
<td>n/a</td>
<td>2</td>
</tr>
<tr>
<td>Constructability</td>
<td>5</td>
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</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>24</strong></td>
<td><strong>25</strong></td>
<td>n/a</td>
<td><strong>26</strong></td>
</tr>
</tbody>
</table>

NOTE: Attributes for each site individually ranked 1-5 with 5 being the best.

for additional T-hangars more quickly. Both the North and South Quadrants have this ability, which is essential to support the preferred General Aviation Terminal alternative. However, as addressed in the next section, the airport is also in need of space that can be easily developed for the larger clearspan hangar demand. Only the North Quad has space that can be immediately developed for additional large aircraft hangar facilities. Therefore, it is recommended that T-hangar facilities be planned in both the South and West Quads, which creates the ability to develop some of the additional T-hangars units in the short-term and the others as demand dictates.

For the South Quad, Concept B (Figure 6-14) reflects the recommended T-hangar facilities given it has the ability to provide 42 new T-hangar units in the short-term. The concept also includes the ability to develop 14 smaller clearspan hangars (2,500 SF each) along the south edge of the T-hangar area. Therefore, this concept has the potential to support a majority of the hangar facilities that would be impacted by the recommended General Aviation Terminal alternative. As noted previously, the option to provide dual taxilane access for this expanded corner of the South Quad, along with the addition of a 100LL self-serve fuel tank should be considered.

Concept B of the West Quad (Figure 6-20) was selected as the recommended T-hangar alternative for the long-term planning period. While the exact configuration may ultimately change for the facilities built on this side of the airfield, Concept B provided the best balance of additional T-hangar units relative to the projected need.

6.5.6 Clearspan Hangars

By the end of the 20-year planning period, it was determined that additional clearspan hangar space is required to accommodate 115 new based aircraft. While the facility requirements identified the need for both small and large clearspan hangars, it also recognized that most would be utilized by the larger multi-engine and jet aircraft, as well as some rotorcraft. Plans for future hangars must also consider the fact that some will need to provide storage for a mix of aircraft types, some will support specific services such as aircraft maintenance, and others will serve as private facilities. Thus a key element in developing concepts for such facilities is flexibility and the ability to support the larger ADG III aircraft expected in the operational fleet mix.

For nearly every concept, the associated taxiway/taxilane access to the clearspan hangars meet ADG III standards and have been configured with the longitudinal grade requirements for AAC C and D aircraft (given the assumed finished floor elevation for each site). For the largest hangars, clear door widths of up to 110 feet and heights of up to 30 feet have been considered in the concepts to serve the largest aircraft in the ADG III category. Not only does this provide the proper hangar footprint, but also the proper setback given the estimated overall hangar height of 45 feet above ground level. Table 6-4 compares the primary attributes associated with developing clearspan hangars in each of the four quadrants.
Table 6-4

ADDITIONAL CLEARSPAN HANGAR FACILITIES

<table>
<thead>
<tr>
<th>Attributes for Proposed Facility</th>
<th>North Quad</th>
<th>South Quad</th>
<th>East Quad</th>
<th>West Quad</th>
</tr>
</thead>
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<tr>
<td>Airside Access</td>
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<td><strong>28</strong></td>
<td><strong>27</strong></td>
</tr>
</tbody>
</table>

*NOTE: Attributes for each site individually ranked 1-5 with 5 being the best.*


Airside access for the North Quad is slightly less advantageous given the site is located off the end of Taxiway B, in a corner of the airport. Similarly, the clearspan hangars in the South Quad concepts are a bit more remote from the airfield than other locations. With respect to landside access and compatibility, there is no significant differentiation between any of the concepts. This has to do with the fact that the airfield is fairly well established to accommodate the larger general aviation fleet and clearspan hangars do not necessarily need quick access (or visibility).

While none of the quadrants could support the total clearspan hangar space needed, the North and East Quads have the least flexibility for development. In the North Quad, this is due to the limited space available as well as the imaginary surfaces and setbacks associated with the approach end of Runway 14. For the East Quad concepts, limited space as well as the need to maintain certain facilities reduced the potential options. From an environmental standpoint, the North and West Quads were ranked lower given the potential vulnerability of the sites due to their proximity to the Gordon River and lower surrounding land.

With respect to constructability, the South Quad ranked the lowest due to the impacts associated with existing facilities. Under Concept B (Figure 6-14), the Collier County Emergency Management Services (EMS) facility off Taxiway A would be impacted by the required ADG III taxilane access into the proposed clearspan hangar area. The airside access would also bisect Tower Drive and impact the existing rental car service facilities in this area. Concept C (Figure 6-15) for the South Quad would impact the Commercial Airline Terminal building, large automobile parking lot, and rental car service facilities. In the East Quad, all three of the concepts would impact existing hangar facilities and Aviation Drive South.

Due to the immediate need and the space required for these facilities, it is recommended that future airport development plan include clearspan hangars in each of the four quadrants. For the North Quad the general configuration of large clearspan hangars shown in Concept A (Figure 6-11) is the preferred alternative. As mentioned previously, this is the only site on the airport that currently has the ability to be developed immediately.
For the South Quad, Concept B (Figure 6-14) reflects the most advantageous option to provide additional clearspan hangar space in this portion of the airfield. While the required airside access would impact the Collier County EMS Hangar, Tower Drive, and some rental car service facilities, this option preserves the Commercial Airline Terminal and most of the existing surface lots. It is also assumed that the EMS operation could be relocated to one of the other clearspan hangars planned and the concept includes the provision for new rental car facilities in the central portion of the South Quad.

The recommended concept for additional clearspan hangars in the East Quad represent a general layout based on the recommended General Aviation Terminal facilities (Figure 6-18). For the West Quad, the concept of developing clearspan hangars primarily along Taxiway D is recommended. As shown in Figure 6-20, this layout provides the opportunity and flexibility for a variety of hangar facilities given the site’s constraints. It also allows the north half of the West Quad to be reserved for the recommended long-term T-hangar development and preserves the option for a new ATCT on this side of the airfield.

6.5.7 Recommended Development Concepts

With the exception of the recommended General Aviation Terminal alternative for the East Quad, Table 6-5 summarizes the other development concepts for each quadrant of the airport. Combined the proposed facilities will meet or exceed the demand projected over the 20-year planning period.

<table>
<thead>
<tr>
<th>Quadrant</th>
<th>Concept</th>
<th>T-Hangars</th>
<th>Clearspan Hangars</th>
<th>Aircraft Parking Apron</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Quad</td>
<td>Concept A</td>
<td>0</td>
<td>41 aircraft</td>
<td>27,300 SY</td>
</tr>
<tr>
<td>South Quad</td>
<td>Concept B</td>
<td>42</td>
<td>35 aircraft</td>
<td>20,000 SY</td>
</tr>
<tr>
<td>East Quad</td>
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</tr>
<tr>
<td>West Quad</td>
<td>Concept B</td>
<td>78</td>
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<td>127 aircraft</td>
<td>98,700 SY</td>
</tr>
</tbody>
</table>

NOTE: SY = square yards.

6.6 Support and Service Facilities

Concepts for those facilities which directly support the current and expected increase in aviation activity are addressed in the following sections. Many of these facilities have very specific functional criteria which limit options for siting and while alternatives are limited for these facilities, they are included to provide a more complete description of the overall recommended airport development plan.

6.6.1 Airport Traffic Control Tower

As documented in the facility requirements chapter and the ATCT technical report included in Appendix F, the existing ATCT needs additional space and equipment upgrades as soon as possible. Short-term recommendations from the ATCT technical report include the addition of a 1,000 SF modular base building to provide the additional space needed for existing ATCT functions. Following the installation of a base building, a complete renovation and reconfiguration of the ATCT facility is recommended to upgrade and make the facility more efficient. This will require a temporary tower to be deployed during certain elements of the work, particularly during the ATCT cab renovations.

Ultimately, the existing ATCT is expected to reach the end of its useful life as it will be 46 years old at the end of the 20-year planning period. Therefore, the short-term planning period needs to include a formal ATCT siting study in anticipation of designing and constructing a new ATCT in the intermediate-term. The ATCT technical report in Appendix F includes an initial siting analysis which resulted in preserving optional sites in both the North and West Quads for a new ATCT. These have been mentioned in the previous sections and are included in the recommended concepts for those quadrants (Figures 6-11 and 6-20).

6.6.2 Aircraft Rescue and Fire Fighting Station

As noted in the inventory chapter, a new Aircraft Rescue and Fire Fighting (ARFF) station will be constructed in the South Quad, just northeast of the existing ATCT. Because the new ARFF station facility and site have already been established, they have been included on each of the figures of this chapter. Once the new station becomes operational, the old station, which is located within the RVZ, will be removed.

6.6.3 Airport Maintenance Facilities

While the existing airport maintenance facilities are functional, additional space and equipment will be required during the course of the 20-year planning horizon. Both Concepts B and C for the South Quad include options for the expansion of the existing maintenance facilities. Given Concept B (Figure 6-14) includes the recommended alternative for the development of additional T-hangars and clearspan hangars, as well as a potential consolidated rental car facility option, the expanded maintenance facility also reflected in this concept should be preserved.
6.6.4 Fuel Farm

In order to provide additional Jet A fuel storage to accommodate demand during seasonal peaks, the airport is currently expanding the existing fuel farm located in the South Quad. The project includes the addition of two 40,000 gallon Jet A tanks. To accommodate the anticipated increase in aircraft activity throughout the 20-year planning period, additional tank capacity for Jet A and 100LL is required, as well as for any newer fuel(s) that will eventually replace 100LL for piston aircraft.

Given that the existing fuel farm site will pretty much be at capacity after the current expansion and that the General Aviation Terminal facilities will remain in the East Quad, the potential for a second fuel farm in the East Quad should be preserved. As noted previously, this facility would not replace the current fuel farm in the South Quad, rather provide additional storage capacity as well as a more efficient location for the Jet A fuel trucks to reload. The preferred General Aviation Terminal alternative in Figure 6-18 includes a second fuel farm site in the southeast corner of the East Quad.

6.6.5 Interior Airport Perimeter Road

Options to expand and improve the existing interior airport perimeter road system were considered as part of the alternatives analysis. For the approach end to Runway 5, an interior perimeter road around the RSA is recommended. As shown on Figure 6-22, the road would be located between the run-up area at the southwest end of Taxiway A and the southwest end of Taxiway D. For the Taxiway D end, the new perimeter road would either tie into the existing or future end of Taxiway D, depending on which project comes first.

At the approach end of Runway 23, the current interior airport perimeter road needs to be moved out of the RSA. The new alignment around this end of the runway is depicted on Figure 6-22 which also shows that it would require the relocation of a portion of the airport security fencing. As noted in the facility requirements chapter, the relocation of the perimeter fence in this area would eliminate the small area off Corporate Flight Drive that is used as an aircraft viewing area. This unofficial viewing and automobile parking area is within the RPZ and is therefore considered an incompatible use that should be removed regardless of the interior perimeter road project.

As part of the recommended T-hangar development in the South Quad, it was noted that a portion of the interior airport perimeter road would need to be relocated (see Figure 6-22). This is due to improvements needed to provide adequate airfield access to the facilities proposed in the southeast corner of the South Quad. Ultimately, an interior airport perimeter road around the approach end to Runway 14 was not recommended. While concepts were included in both Figures 6-7 and 6-8, neither could provide the ability to go around the RSA without an additional 2,000 linear feet of road.
6.7 Non-Aeronautical Development

Due to the limited space available at APF for the aviation related demand, there are not a lot of opportunities for future non-aeronautical parcels. In fact, only three sites have been identified as part of the overall recommended airport development plan (Figure 6-22).

In the North Quad the undeveloped space north of Citation Point and adjacent to the City of Naples and Collier County Recycling Facilities could be developed for non-aeronautical uses. Given that this area was a former landfill, any development will likely include removing and/or mitigating old landfill materials as was required when the City and County facilities located in this area were developed.

Undeveloped land to the south of North Road in the southwest corner of the airport property also has the potential for non-aeronautical development. Potential constraints to this parcel include the crenelated wet ditch system (see Figure 6-22) planned in this area as part of the airport’s current stormwater management plan. As noted in the airfield constraints analysis, there are also a number of potential environmental considerations in this corner of the airfield as well as setback and height considerations given the proximity to the approach end of Runway 5.

The third site identified for potential non-aeronautical development includes a parcel in the East Quad just south of Radio Road. Limitations to the land available at this site include the recommended General Aviation Terminal facilities, an existing communications building lease, and the stormwater pond off Airport Pulling Road.

6.8 Summary of Development Alternatives

The preceding sections have identified and analyzed the key facilities related to the future improvement of APF. The concepts considered for future aviation related facilities focused on meeting the 20-year requirements while maintaining the airfield’s operational efficiency and safety, as well as incorporating the sustainability initiatives described in Appendix H. The various facility improvements and preferred concepts were combined to create the overall recommended airfield development plan shown in Figure 6-22. This plan will be utilized as the basis for the development of the new ALP drawing set and development program described in the following chapters.
FIGURE 6-22

RECOMMENDED AIRPORT DEVELOPMENT PLAN

APPENDIX F
Air Traffic Control Elements
AIRPORT MASTER PLAN
AIR TRAFFIC CONTROL ELEMENTS
NAPLES AIRPORT (APF)

prepared for:

Naples Airport Authority
Naples, Florida

July 2019

prepared by:

Quadrex Aviation, LLC
Airport Development Services

in association with:

ESA
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A. BACKGROUND

The Air Traffic Control Tower (ATCT) was constructed in 1992 using local funds along with a $1.2 million grant from the Florida Department of Transportation. The 82-foot high Control Tower was originally commissioned in late 1993 and was initially operated as a non-federal control tower (NFCT) with all operational costs (including controller labor) borne by the Airport Authority. In July 1995, the ATCT was accepted in the FAA’s Federal Contract Tower (FCT) Program and FAA took over responsibility for the operational costs to operate the Tower.

Today, the ATCT operates 16 hours daily from 6:00 am until 10:00 pm. There are 8 controllers assigned to the Airport, including one manager. In calendar year 2018, the Naples Air Traffic Control Tower handled a total of 110,508 aircraft operations. On February 16, 2018, they experienced their peak day for the year with 640 operations. Radio communications for air traffic control operates on three frequencies; Local Control on 128.5; Ground Control on 121.6 and; Clearance Delivery on 118.0. Airport weather and other information is broadcast via the Automated Terminal Information Service (ATIS) frequency on 134.225.

The purpose of this report is to document and evaluate the existing facilities, equipment, and operational characteristics of the ATCT and to assess its current and future capacity to accommodate ATC operations. The observations, comments, opinions, and recommendations expressed in this report are those exclusively of Quadrex Aviation and do not reflect the position of the Federal Aviation Administration or that of any other federal, state, or local agency.

B. ATCT FACILITY ASSESSMENT

General

The ATCT shaft structure consists of six floor levels and is constructed with eight-inch block masonry. While the outer dimensions of the shaft is 20 feet square (400 square feet), the area occupied by the stairs, elevator, and passageway for circulation leaves only 91 square feet of space available for use as an office, break room, or ATCT equipment. The six-sided Tower Cab sits atop the shaft 66.9 feet above ground level (AGL) or 74.9 feet above mean sea level (MSL) and has approximately 238 square feet of usable space. Various features of the ATCT facility were evaluated following the FAA’s planning and design criteria, minimum equipment list (MEL), and other standards and practices.

Tower Cab Visibility and Line-of-Sight Constraints

The FAA’s control tower siting criteria requires that controllers have an adequate view in order to identify aircraft and other objects located at each runway end. The minimum “angle of incidence” from the controller eye level (which is set at 5 feet above the tower cab floor) to the end of each runway is 0.80° which allows controllers a line-of-sight perspective view of the airfield. The FAA’s

---

1 An aircraft operation is a take-off or landing

2 Between the hours of 10:00 pm and 6:00 am, 128.5 is used by pilots as a Common Traffic Advisory Frequency (CTAF) for position announcements and other advisories.
ATC Visibility Analysis Tool (ATC-VAT) was used to determine if the minimum line-of-sight angle of incidence (0.80°) is met in the current facility.

The ATCT data was also applied for a two-point lateral discrimination analysis for each runway end. This analysis is used to ensure that the controller has sufficient ability to discriminate between two or more aircraft located near the runway end and other critical points of the airfield. The FAA’s minimum acceptable lateral angle is 0.13° degrees. The view from the ATCT was evaluated based on a scenario of one aircraft lined up on the departure end of runway with another aircraft holding short (250 feet away). The minimum line-of-sight and lateral discrimination angles occur for the end of Runway 23 which is farthest away from the ATCT. As Table 1 shows, the FAA’s criteria for line-of-sight for each runway end is met.

### Table 1
ATCT Line-of-Sight Analysis

<table>
<thead>
<tr>
<th>Runway End</th>
<th>Distance from ATCT to RW End</th>
<th>Line of Sight Angle</th>
<th>Lateral Discrimination Angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>RW 5</td>
<td>2,263’</td>
<td>1.87°</td>
<td>5.88°</td>
</tr>
<tr>
<td>RW 23</td>
<td>4,572’</td>
<td>0.92°</td>
<td>3.01°</td>
</tr>
<tr>
<td>RW 14</td>
<td>3,483’</td>
<td>1.21°</td>
<td>3.58°</td>
</tr>
<tr>
<td>RW 32</td>
<td>2,265’</td>
<td>1.85°</td>
<td>*</td>
</tr>
</tbody>
</table>

* Hold-short area obscured  
[1] FAA Minimum LOS Angle of Incidence = 0.80°  

However, for lateral discrimination, there is an area of the airfield where visibility is obstructed by a hangar structure. Figure 1 illustrates that the top of the east end of the “Charlie Hangars” obscures the view of the intersection of Taxiway C and the taxilane leading to the “3000 Hangars” area. This obscuration occurs near the hold-short line for the aircraft departing on Runway 32. While not an ideal solution, the ATCT has a remote camera providing visibility to the obscured area. The camera’s angle-of-incidence view of the area is lower than the FAA’s standard. Also, ATCT personnel have indicated the video imagery has a four-second latency (lag) which is also contributes to the deficiency. Alternatives for improving the controller’s visibility of the airfield, particularly in the vicinity of Runway 32 will be discussed in a subsequent section.

### ATCT Spatial Characteristics

As mentioned previously, the outer envelope of the ATCT structure is 20 feet by 20 feet (400 square feet). Constructed with eight-inch masonry block, each level of the tower shaft has a total of 336 square feet (sf) of interior space (18’4” by 18’4”). Most of the space on each level is dedicated to circulation within the building including an elevator, a fire-rated stairwell, and other functions. The area these spaces consume include:

- Elevator Shaft: 48.3 sf
- Stairs & Landing: 88.8 sf
- Passageway: 97.8 sf
- Cable Chase: 5.3 sf
- Utility Chase: 7.7 sf
- **Total Circulation & Utilities**: 247.9 sf
Table 2 presents the utilization of the space typically available on Levels 1-6. After the space occupied for circulation (elevator, stairs, and passageway), each of the levels of the shaft have only about 91 sf of total usable floor area remaining, split between two separate spaces at opposed sides of the shaft. The primary area is roughly 62 sf of available space located in the northeast corner. The secondary space occupies the southwest corner and has about 29 sf of usable space.

<table>
<thead>
<tr>
<th>Level</th>
<th>Primary Space</th>
<th>Secondary Space</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td>Elevator Equipment</td>
<td>Janitor Closet (w/sink)</td>
<td></td>
</tr>
<tr>
<td>Level 2</td>
<td>ATCT Equipment (NAA)</td>
<td>ATCT Equipment</td>
<td></td>
</tr>
<tr>
<td>Level 3</td>
<td>ATCT Equipment (FAA)</td>
<td>Storage</td>
<td></td>
</tr>
<tr>
<td>Level 4</td>
<td>ATC Manager’s Office</td>
<td>Vacant (Lockable)</td>
<td>Office not Lockable (per MEL)</td>
</tr>
<tr>
<td>Level 5</td>
<td>Breakroom</td>
<td>Storage</td>
<td>Refrigerator/Microwave/ Sink</td>
</tr>
<tr>
<td>Level 6</td>
<td>Restroom (Lockable)</td>
<td>Landing / Stairs to Cab</td>
<td>One Toilet/One Wash Basin</td>
</tr>
<tr>
<td>Tower Cab</td>
<td>ATCT</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Figure 2 illustrates the Level 1 floor plan and shows the typical areas set aside for the elevator shaft, stairs, and circulation passageway. Entrance to the ATCT is provided by two secured doors. The primary space on this level is set aside for the elevator equipment room. There is also a janitor closet with a service sink in the enclosed secondary space.

**Figure 2**

**Level 1 Space Utilization**

<table>
<thead>
<tr>
<th>Level 1 Notes:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Use of Space:</td>
</tr>
<tr>
<td>Elevator Equipment</td>
</tr>
<tr>
<td>61.8 sf</td>
</tr>
<tr>
<td>Secondary Use of Space:</td>
</tr>
<tr>
<td>Janitor Closet w/Sink</td>
</tr>
<tr>
<td>28.9 sf</td>
</tr>
<tr>
<td>Total Usable Floor Space:</td>
</tr>
<tr>
<td>90.7 sf</td>
</tr>
</tbody>
</table>
Level 2 – Second Floor

This level is dedicated for the airport-owned ATCT equipment. The primary space accommodates equipment racks for radio communications and weather equipment. The secondary area also includes ATCT equipment.

**Figure 3**
**Level 2 Space Utilization**

<table>
<thead>
<tr>
<th>Level 2 Notes:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Use of Space:</td>
<td>ATCT Equipment 61.8 sf</td>
</tr>
<tr>
<td>Secondary Use of Space:</td>
<td>ATCT Equipment 28.9 sf</td>
</tr>
<tr>
<td>Total Usable Floor Space:</td>
<td>90.7 sf</td>
</tr>
</tbody>
</table>

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Level 3 – Third Floor

The Airport’s and FAA’s ATCT equipment occupies much of the third floor primary and secondary spaces.

Figure 4
Level 3 Space Utilization

<table>
<thead>
<tr>
<th>Level 3 Notes:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Use of Space: ATCT Equipment</td>
<td>61.8 sf</td>
</tr>
<tr>
<td>Secondary Use of Space: Storage</td>
<td>28.9 sf</td>
</tr>
<tr>
<td>Total Usable Floor Space:</td>
<td>90.7 sf</td>
</tr>
</tbody>
</table>
Level 4 – Fourth Floor

The ATCT manager’s office is located in the primary area of this level. The 62 sf of office space is open space and not currently configured to allow for a locking door which is a requirement of the FAA’s Minimum Equipment List. The minimal amount of space available for office prevents the manager from hosting a meeting with more than one seated person at a time.

Figure 4
Level 4 Space Utilization

<table>
<thead>
<tr>
<th>Level 4 Notes:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Use of Space: ATCT Manager’s Office</td>
</tr>
<tr>
<td>Secondary Use of Space: Storage/Supplies</td>
</tr>
<tr>
<td>Total Usable Floor Space:</td>
</tr>
</tbody>
</table>
Level 5 – Fifth Floor

The controllers’ breakroom is located in the primary space on this level and is sparsely furnished. The space allocated for the controllers’ breakroom is 62 sf and accommodates a full-size refrigerator, microwave, and a dish sink. The space is furnished with a small table with two straight-backed chairs. The secondary area is enclosed with a lockable door and is currently vacant.

Figure 6
Level 5 Space Utilization

<table>
<thead>
<tr>
<th>5th Floor Notes:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary Use of Space:</strong></td>
<td>Break Room</td>
</tr>
<tr>
<td><strong>Secondary Use of Space:</strong></td>
<td>Locker Room</td>
</tr>
<tr>
<td><strong>Total Usable Floor Space:</strong></td>
<td></td>
</tr>
</tbody>
</table>

Naples Airport

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Level 6 – Sixth Floor

The controllers’ restroom is located in the primary space on this level just below the tower cab. The restroom has one toilet (no urinal) and washbasin behind a lockable door. Secondary area is used as a landing for the stairs leading up to the Cab.

Figure 7
Level 6 Space Utilization

<table>
<thead>
<tr>
<th>Level 6 Notes:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Use of Space:</td>
<td>Restroom</td>
</tr>
<tr>
<td>Total Usable Floor Space:</td>
<td>61.8 sf</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Naples Airport  
rev. 7/18/2019
Level 7 – Tower Cab

The six-sided tower cab is a separate steel frame structure set atop the masonry block shaft. The Cab floor is set at 66.9 feet above ground level (74.9 MSL). The Cab has a total of 238 sf of usable floor space which does not include the stairs and landing. The consoles are 36 inches deep from the wall and surrounds much of the Cab area. The console space is used for communications, weather data displays, and other monitors and controls. The console space consumes 103 sf which leaves only 135 sf of actual floor space for controllers to operate.

**Figure 8**
ATCT Control Cab Space Utilization

<table>
<thead>
<tr>
<th>Cab Floor Notes:</th>
<th>Controller Floor Space</th>
<th>134.6 sf</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Use of Space:</td>
<td>Equipment Consoles</td>
<td>103.5 sf</td>
</tr>
<tr>
<td>Other Use of Space:</td>
<td>Total Usable Floor Space:</td>
<td>238.1 sf</td>
</tr>
</tbody>
</table>
Generally, there are two controllers on duty during the normal hours of operation. One exception occurs during the early morning and late evening periods when there might be only one controller handing all three ATC responsibilities (LCL/GND/CD). At other times there may be a third controller who will handle clearance delivery and during peak seasonal periods where a fourth controller may be on duty in the Cab to assist the local controller. At times, the ATCT manager may also be in the cab as a supervisor or relief controller.

**ATCT Spatial Assessment**

The ATCT was initially designed ostensibly as a fit for a constrained capital budget. Since then, the level and complexity of air traffic in and out of APF has grown significantly since then including the number of jets among the fleet mix. The space needed to handle the responsibilities of providing air traffic control is constrained by the size of the Cab and the available space in the tower shaft levels make it difficult to provide adequate areas suitable for basic functions for offices, training, break room, etc. The area consumed by the stairs, elevator, and the circulation passageways allow only marginal space for accommodating any activity necessary for the operation of the ATCT.

In contrast to more recent contemporary ATCT designs, there is 228 square feet less usable space available in the shaft levels for ATCT purposes after the elevator, stairs, and circulation passageways are accounted for. In the existing Cab, there is 123 square feet less usable floor space (not including the floor space occupied by the consoles) than a modern cab design. **Figure 9** illustrates a scaled comparison between the shaft floor plans and **Figure 10** shows a similar contrast of Cab floor plans.

Alternatives for providing adequate space for meeting current and future air traffic control requirements include:

- Renovation and space reallocation
- Construct base building
- Construct new ATCT

**Renovation and Space Reallocation**

Renovation and reallocation of the available space in the existing ATCT is a potential alternative to relieve the current spatial deficiencies. An extensive program to gain greater efficiencies into how the spaces are used should be evaluated using creative interior and industrial design techniques to take full advantage of the space available on each level.

**ATCT Shaft Levels**

The ATCT equipment rooms (Levels 2 and 3) all appear cluttered with equipment racks with an assortment of operational equipment components. Cables and wires to the equipment is in places disorganized. Available areas for storage for supplies and other materials are scattered among the six levels of the tower shaft. These areas could be reorganized and new equipment racks installed to standardize the placement, layout, and make access to the equipment more efficient. A cable management system would also provide more effective servicing of the ATCT equipment.

The space for the air traffic manager's office (Level 4) is cramped with basic furniture (desk, chair, locking file cabinets, etc.) and does not have a lockable door as required by the FAA's MEL. There is space for only one visitor's chair. Reorganizing this space using modern furniture and a creative layout could help provide adequate room to accommodate more than one visitor and potentially allow reconfiguration for a lockable door.
Figure 9
ATCT Tower Shaft Floor Plan Comparison

Typical Shaft Level Floor Plan (Usable Area = 319 sf)

Existing Shaft Level Floor Plan (Usable Area = 91 sf)
Figure 10
ATCT Tower Cab Comparison

Typical Cab Level Floor Plan (Area = 258 sf)

Existing Cab Level Floor Plan (Floor Area = 135 sf)
The breakroom is sparsely furnished with a refrigerator, microwave, sink, a small table, and two straight-back chairs. Like the ATM’s office space, the breakroom could be redesigned to provide more available space for controllers.

**ATCT Tower Cab**

General planning practices suggest 40 sf per controller (8 ft across and 5 ft back) which suggests that 120 sf is necessary to accommodate three controllers. However, in the existing Cab this leaves little room for much else. Having three to four controllers operating simultaneously in such a constrained space is difficult, especially when each is conducting their own radio communications simultaneously. According to the ATCT manager, at times everybody broadcasting at the same time elevates noise level in the space making it difficult to concentrate. Also, each controller is connected physically by a cord to the radio equipment jacks and can easily get entangled.

The ATCT consoles are 36 inches deep and could be reorganized and reconfigured to make the Cab more efficient when all the positions are occupied. The reconfiguration of the Cab could include the layout of ergonomic features such as chairs, monitors, displays, and control panel for each position and incorporate new cabinets and other storage spaces for manuals, supplies, and other materials.

**Construct/Install Base Building**

The renovation and reallocation of space in the ATCT will not completely resolve the issues related to the dearth of space available in the existing facility for ATC functions. The addition of a base building to support the spatial needs of the tower should be considered. A base building can provide additional space needed to support air traffic control services. These functions can include ATCT equipment, manager/administration offices, breakroom, training room, restrooms, lockers, storage, etc. It is estimated that a total of 1,000 square feet of space would satisfy the spatial needs for relocating and expanding the following functions:

<table>
<thead>
<tr>
<th>Function</th>
<th>Space (sf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manager's Office</td>
<td>200</td>
</tr>
<tr>
<td>Training/Breakroom</td>
<td>350</td>
</tr>
<tr>
<td>Admin Office</td>
<td>150</td>
</tr>
<tr>
<td>Restrooms/Showers</td>
<td>200</td>
</tr>
<tr>
<td>Mechanical Room</td>
<td>100</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,000</strong></td>
</tr>
</tbody>
</table>

**Construct New ATCT**

The existing ATCT is undersized for the level of activity handled at the Airport, especially during the seasonal busy periods. The renovation of the Tower and adding a base building are attempts to make the ATCT more efficient however, these are compromises for a situation that may not be sufficient to support ATC functions over the long-term.

While the current ATCT meets all FAA runway end line-of-sight and other siting criteria, there is the situation where the view of the hold-short line at the end of Runway 32 is obscured. Also, the hold-short lines for Runway 23 are not visible from the Cab.

The location and cab floor height (67’ AGL) will affect the ability to fully develop the West Quadrant of the Airport. The height of structures in this area would be limited to avoid obstructing the view of Taxiway C towards the end of Runway 14.
Considering the future needs of the Airport to support full development of aviation facilities in addition to mitigate the shortcomings of the existing tower would suggest it would be prudent to plan for a new ATCT appropriately sized and located in an optimum location to support air traffic control services. General areas that are potentially available for locating a new ATCT include:

- Site 1 – Adjacent to existing ATCT
- Site 2 – TVOR site (West Quadrant)
- Site 3 – ARFF facility site (North Quadrant)

Figure 11 illustrates the relative location of each alternative site.
While a detailed site analysis was beyond the project's scope, a preliminary assessment of potential ATC sites was conducted to determine minimum ATCT floor heights necessary to provide full unobstructed line-of-sight to the entire airfield after buildout of available aeronautical property. Table 3 presents a summary of the assessment.

### Table 3
**Alternative ATCT Site Assessment**

<table>
<thead>
<tr>
<th>Site</th>
<th>Location</th>
<th>Critical Distance (RW)</th>
<th>Min. Cab Floor Height (AGL)</th>
<th>Controlling Obstruction</th>
<th>Adjusted Cab Floor Height (AGL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site 1</td>
<td>Adjacent to Existing ATCT</td>
<td>4,559' (RW 23)</td>
<td>63.7'</td>
<td>Charlie Hgr</td>
<td>96.7'</td>
</tr>
<tr>
<td>Site 2</td>
<td>TVOR Site</td>
<td>3,796' (RW 23)</td>
<td>53.0'</td>
<td>None</td>
<td>53.3'</td>
</tr>
<tr>
<td>Site 3</td>
<td>Old ARFF Site</td>
<td>4,009' (RW 5)</td>
<td>56.0'</td>
<td>None</td>
<td>56.6'</td>
</tr>
</tbody>
</table>

Notes:

1. Minimum angle of incidence 0.80°

In all cases, a new ATCT would be designed to provide optimum visibility for the entire airfield and have the space available within the structure to accommodate a full-size tower cab as well as adequate office/equipment space in the levels below.

**Alternatives Schedule and Costs**

The schedule for the alternatives to address the ATCT facility issues can be mutually exclusive or combined through sequential phasing. Short-term, the timing for each recommended component will be dependent primarily on the priority given to resolve the issues and the availability of funding. Another factors includes the potential degree of disruption of the day-to-day ATC operation especially during the busy season (November–April). The long-term recommendation (new ATCT) will require extensive planning and programming to satisfy FAA requirements and to program funding for development.

**Renovation and Space Reallocation**

A renovation project could be challenging to the on-going operation of the ATCT however, creative staging of the critical portions of the work could offset the extent and length of necessary disruptions. Renovation of the shaft levels is estimated to take 4-6 weeks and could be accomplished with intermittent outages of equipment but no seriously disruption in the air traffic control operation over an extended period. On the other hand, complete renovation of the Cab could take 6-8 weeks due to the complexity of working with the ATC equipment and will be disruptive at times. In this case, it would be prudent to relocate operations to temporary ATCT facility.

Renovation costs for the ATCT cab and tower shaft levels are difficult to estimate but commissioning an interior/industrial design professional may serve to optimize the cost for the benefits that would be derived by maximizing the efficiency of the limited space available.

For planning purposes, a rate of $150 per square foot applied to the 1,200 square feet of space (cab and shaft floor levels) would suggest that $180,000 be a reasonable estimate to complete the general renovation of the spaces. Installation of new ATCT equipment, relocation of existing equipment, and other special needs could take another $150,000 to $200,000 to implement. For planning purposes, a total of $400,000 should be set aside for the renovation and space reallocation of the ATCT. A more detailed description of the phasing is presented in Table 6.
Construct/Install Base Building

For purposes of providing additional space through the development of a 1,000 square-foot base building, alternatives can include a permanent (bricks and mortar) structure or with the installation of a prefabricated/modular unit. A permanent base building would take up to two years to plan, permit, design, and construction while a modular structure could be installed within 12-18 months. Using a planning figure of $350 per square foot, a permanent base building would cost approximately $350,000.

A modular facility would a swifter and less expensive option. A modular structure could be installed within a 6-9 month timeframe and at an estimated cost of $150 per sf, cost around $150,000. The modular facility option could be used in advance of the renovation project as a means to relocate the manager’s office and breakroom first and free up the space in those levels of the shaft.

For planning and programming purposes, the installation of a modular base building is recommended prior to the renovation of the ATCT facility in order to address the spatial needs of the ATC operation. Both projects should be strongly considered for implementation within the next 12 month.

Construct New ATCT

The construction of a new ATCT to replace the existing tower would serve as the ultimate alternative for providing an adequate facility for providing ATC services. The fundamental steps and timeline for developing a new ATCT include:

a. Siting Analysis/Comparative Safety Assessment (12-18 months)
b. Environmental Assessment (12-18 months) [conducted concurrently with Siting Analysis]
c. Engineering Design (12 months)
d. Construction/Commissioning (12-18 months)

The 3-4 year timeline is based on recent experience with the development of a replacement ATCT and assumes that funding for each step is readily available.

The total cost of development for a replacement ATCT would range from $5 to $7 million based on the ultimate height of the structure and the need for infrastructure to support the tower. ATCT development is eligible for federal (maximum participation at 90 percent) and FDOT (maximum of 80 percent of the Sponsor’s share) funding assistance. The FAA Reauthorization Act (2018) lifted the previous $2 million cap on federal involvement in ATCT development and provided an additional source of federal funding through the FAA’s “Small Airport Fund”.

The existing ATCT facility is 25 years old and will eventually reach the end of its useful life (40 years) requiring replacement on that basis. The initial stages for developing a new ATCT should be programmed as a late short-term/early intermediate term project (5-7 years). In the meantime, areas near the aforementioned alternate sites should be preserved for potential use in future years.

C. MINIMUM EQUIPMENT LIST (MEL)

The FAA requires certain equipment for providing air traffic services by facilities operated under the FCT program. This minimum equipment list (MEL) outlines the number and uses for communicating with aircraft, recording those communications, primary and backup weather data displays and other functions. Attachment A presents a list of ATC equipment owned by the Airport Authority and highlights components that meet the MEL and other needs. The following represents an assessment of the ATCT equipment including deficiencies as noted in the table.
Communications Equipment

Communications Radios

Very High Frequency (VHF) radios, as required, to support level of traffic; i.e., Local Control, Ground Control, Automatic Terminal Information Service, Clearance Delivery, and Emergency; one transmitter and one receiver for each frequency. Note: Handheld radios are not authorized as primary units. Tunable emergency transceiver with backup power supply (to provide backup VHF communication).

There are five ATC communications frequencies that require at least a transmitter and four that require a receiver. The FAA requires that the transmission and reception functions for the primary radios are provided by separate equipment (i.e., no transceivers). While the FAA only requires a single backup radio for any of the frequencies which can be provided by a multi-frequency transceiver, a common practice is to have a backup transmitter and receiver for each frequency. Table 4 presents the list of the communications radios.

<table>
<thead>
<tr>
<th>Function</th>
<th>Frequency</th>
<th>Primary</th>
<th>Backup</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Control (CTAF)</td>
<td>128.5</td>
<td>CM200VT/VR</td>
<td>CM200VT/VR</td>
<td></td>
</tr>
<tr>
<td>Ground Control</td>
<td>121.6</td>
<td>CM200VT/VR</td>
<td>CM200VT/VR</td>
<td></td>
</tr>
<tr>
<td>Clearance Delivery</td>
<td>118.0</td>
<td>CM200VT/VR</td>
<td>CM200VT/VR</td>
<td></td>
</tr>
<tr>
<td>ATIS</td>
<td>134.225</td>
<td>CM200VT</td>
<td>CM200VT</td>
<td>Transmit Only required</td>
</tr>
<tr>
<td>Emergency</td>
<td>All/121.5</td>
<td>IC-A21</td>
<td>n/a</td>
<td>Handheld Transceiver</td>
</tr>
</tbody>
</table>

The ATCT has purposed radio transmitters and receivers for each of its assigned frequencies. ATC equipment also includes backup transmitters and receivers for each frequency as well. The primary and backup transmitters and receivers are Motorola CM200 Voice radio series and were among the original ATC equipment installed in 1996 to meet the FCT MEL. The emergency backup radio is an ICOM A21 handheld transceiver which has a limited transmission range due to its low power-to-signal output.

Voice Switch

Voice switch communication equipment, with direct access line to controlling instrument flight rules facility, capable of radio and telephone ATC communication. This must include the capability of headset use and instructor/student override capabilities.

A Frequentis VCS 3020X voice switching system (VSS) provides touchscreen communications control in the Cab. The VSS processing unit is located on Level 3 while the touchscreen control panels are located at each of the three controller positions. The Frequentis VCS is standard equipment used by the FAA in many of their own control towers. The VSS appears to be fully functional and ATC personnel indicated they have had no technical problems with the equipment.

Voice Recorder

A multi-channel, multi-line digital voice recorder system with a remote alarm, for continuous unattended recording of each position used for receiving/transmitting ATC clearances and ATIS. It must meet the requirements of FAA Orders JO 7210.3 [Facility Operation and Administration] and JO 8020.16 [Air Traffic Organization Aircraft Accident and Aircraft Incident Notification, Investigation, and Reporting Document Information].
A digital voice recorder is required by FAA to assist in the investigation of accidents, incidents, and other ATC matters. The Tower’s voice recorder is an ATIS PL–3200 with the capability of recording up to 32 channels. The unit was replaced in 2008 and although it has reached the end of its useful life (10 years), it remains fully functional. The unit is located in the Cab on one of the consoles which does not provide a quiet or private environment. Remote access of the recordings to review and download broadcasts is performed using a standalone software program which, according to the ATCT manager, is cumbersome.

**Automatic Terminal Information Service (ATIS)**

*Automatic Terminal Information Service (ATIS), (for towers with 50,000 or more annual operations).*

The ATIS provides an informational broadcast for pilots regarding the Airport’s current weather conditions, runways in use, NOTAMs, and other information. Typically the ATIS broadcast is prepared by a controller manually, taking the weather information from the automated weather observation system and adding other important information to the recorded message. Currently, ATIS messages for the Airport are recorded in the Cab using a telephone handset connected to an Inter Alia SB X2 processor. The recorded ATIS is transmitted over a dedicated radio frequency.

The practice of manually recording ATIS messages in the Cab adds to the often noisy environment of the various radio and conversational communications especially during busy periods. Providing a second location where ATIS messages can be recorded to alleviate some of the physical and vocal congestion in the cab.

**ASOS/Automatic Terminal Information Service (ATIS) Interface Unit (AAIU).**

*Facilities equipped with an ATIS and an automated weather system with broadcast capability must be equipped with an FAA-approved interface switch that inhibits the automated system from broadcasting the weather while the FCT is open.*

The FAA requires ATCTs with ATIS have an ASOS/ATIS interface unit (AAIU) to prevent the broadcast of basic ASOS weather information while the ATCT is operational to avoid conflicting information. The ATCT has an Astronics DME ASOS/ATIS interface unit which is operational with no known issues. The original manufacturer was apparently acquired by another firm and does not appear to continue offering the AAIU. Service for the existing unit is still available through the company.

**Backup Weather Equipment**

FAA requires a backup source for basic weather information in case the primary weather source (ASOS) is out of commission. The backup weather information must come from a source independent from the primary weather and includes:

- Wind data (direction/velocity)
- Temperature/dew point
- Altimeter setting

Each of these must have a monitor visible to controllers in the cab.

**Wind Data**

Backup wind data is provided by a standalone RM Young Wind Sensor located on top of a 20-foot tower structure near Taxiway "T". A single RM Young Wind Tracker provides the wind data display in the Cab.
**Sensor Tower**

Typically, the backup wind sensor tower should be located at a height equivalent to that of the primary wind sensor (ASOS) which is normally 30 feet AGL. The existing 20-foot sensor tower should be replaced with a 30-foot tower.

**Backup Temperature/Dewpoint Data**

While required by the FAA's MEL, there is currently no backup temperature and dewpoint information available for display in the Cab. Backup temperature and dewpoint sensors should be installed on the Sensor Tower and a temperature/dewpoint data display located in the Cab.

**Altimeter Setting**

The backup altimeter setting is measured and displayed in the Cab using a calibrated Wallace and Kiernan analog altimeter with the pressure port calibrated for 75 feet AGL (84 feet MSL). While calibrated analog altimeters are acceptable, the W&K altimeter display is not readily observable from each of the three controller positions and requires an up-close inspection of the needle position to discern the current altimeter setting. Also, the W&K altimeter is not among the FAA’s approved list of backup weather equipment.

A digital altimeter setting indicator (DASI) should be installed in the Cab using a digital pressure port located near ground level or calibrated to compensate for the elevation of the pressure port if located elsewhere.

**Operations Floor Equipment**

The FAA has additional equipment requirements for supporting ATC functions in the Cab. These include:

- Digital Clock Calibrated to UTC
- Signal Light Gun
- Controller Chairs
- Binoculars (7 X 50 or greater) – Two Pair

**Digital Clock**

The FAA’s MEL requires at least one digital 24-hour time source with hours-minutes-seconds display visible from operating positions. The digital clock in the Cab is a Spectracom NetClock with a green display. The GPS signal which calibrates the clock to Coordinated Universal Time (UTC) is provided through a Spectracom NetClock/GPS 9200 series receiver. According to the manufacturer, the receiver is no longer supported but an upgraded 9400 series receiver compatible with the clock display is available if necessary.

**Signal Light Gun**

The FAA requires a signal light gun with a backup power source. The ATCT’s signal light gun is made by Thorn DNT which was acquired by Astronics. Astronics continues to manufacture the light gun however the signal light source (incandescent) and rechargeable (NiCad) batteries have been recurring issues. The signal light gun should be replaced to take advantage of updated technology (LEDs and lithium-ion batteries).
Controller Chairs

The FAA requires controller chairs to be fully adjustable and capable of supporting high intensity use. In addition, they must be resistant to electrostatic discharge (ESD). There are currently four chairs by various manufacturers located in the Cab. Three of these are in good condition however, one chair is showing signs of wear and should be replaced.

Non-Operating Equipment

As mentioned earlier, the FAA also specifies the need for a lockable office for the ATCT manager as well as a lockable file cabinet as part of the MEL. Currently, the manager’s office is located in the primary space of Level 4 which includes only 62 sf of usable space. The manager has a lockable cabinet but the office space is open and currently not configured for installing a lockable door without further constraining the space. In practice, whenever the manager needs confidentiality, they lock out the fourth floor stop of the elevator with the understanding that if the fourth floor is unavailable as a choice, the office "door" is closed. However, access to the fourth level is still available using the stairs and is not lockable.

A training/breakroom with desk, chairs, and table are also facilities that are required to be provided. Although not specifically associated with the breakroom, the FAA’s MEL lists a refrigerator, microwave, and a dish sink as requirements. The breakroom is located on Level 5 and consists of a 10 ft by 9 ft area of open space that includes a refrigerator, microwave, and dish sink. The remaining space provides room for only a small table and two straight-backed chairs.

Telecommunications Services

There are several dedicated communications lines installed in the Tower for serving a variety of services. Among the telecommunications requirements FAA expects to be provided by the Airport include a high-speed internet connection to support their telecommunications infrastructure (FTI) lines. The internet connection is provided by a dedicated router that in turn provides a connection to an internal local area network (LAN) which includes:

- network switch for distribution
- uninterruptible power supply (UPS)
- rack-mounted panel for circuit connections

The network router, switch, and patch panel are fully functional with no apparent issues. As can be seen, FAA is responsible for certain voice and data functions. Voice communications are direct lines using voice over IP (VoIP) using FAA leased FTI lines.

The Airport provides other dedicated communications lines primarily for administrative and emergency services. In addition, dedicated phone lines have been set up to connect the Cab with the ASOS unit as well as a means to control the rotating beacon.

Table 5 list the dedicated telecommunication lines associated with the operation of the tower.
Table 5
ATCT DEDICATED TELECOMMUNICATIONS LINES

<table>
<thead>
<tr>
<th>Line</th>
<th>Type</th>
<th>Function</th>
<th>Circuit</th>
</tr>
</thead>
<tbody>
<tr>
<td>FAA Shout Line</td>
<td>Voice</td>
<td>Direct line to RSW TRACON</td>
<td>FTIH-P-024490</td>
</tr>
<tr>
<td>FAA Flight Data (FDIO)</td>
<td>Data</td>
<td>Flight Data Information (Flight Plans)</td>
<td>93.PLNT.208833.UFLG</td>
</tr>
<tr>
<td>FAA Flight Service</td>
<td>Voice</td>
<td>Direct line to Leidos Flight Service</td>
<td>FTIH-P-015425001 (007)</td>
</tr>
<tr>
<td>FAA NOTAM System</td>
<td>Data</td>
<td>NOTAM Entry</td>
<td>FTIH-MS-032965</td>
</tr>
</tbody>
</table>

Provider: Harris Systems

NAA
- ATCT/ASOS Data NWS Weather Display 95.FDDA.213559.UFLG
- ATCT/RSW TRACON Voice Voice Line to RSW (Backup) 93.PLNT.208616.UFLG
- ATCT/Unicom Voice Voice Line to GA Terminal 91.PLNA.208604.UFLG
- ATCT/Emergency Voice NPESD/ARFF/Ops (Crash Phone) 92.PLNA.208617.UFLG

Provider: Embarq (CenturyLink)

There are opportunities to consolidate the Airport’s telecommunications lines by alleviating redundancies and removing existing work-arounds.

Building Equipment/Specifications

The FAA spells out in the MEL other components that are necessary to support the ATCT.

Airfield Lighting Control Panel

Among the equipment required in the Cab includes an airfield lighting control panel (ALCP) which must include an on/off switch for the Airport's rotating beacon. The ALCP for the Cab includes the controls for the runway and taxiway lighting circuits and a switch for the rotating beacon. However, the switch for the rotating beacon is currently inoperative. The beacon is currently controlled by a dedicated phone line which uses a touch-tone code to operate.

Window Shades

Window shades that meet FAA specifications must be included for all tower cab windows. The shades were replaced in October 2018 and are in excellent condition.

Position Lighting

Position lighting with rheostat controls for each controller positions in addition to the administrative area in the cab are also requirements of the FAA's MEL. While not exactly considered position lighting, there are variable controls on each of the three controller positions for ceiling-mounted track lighting focused on their spot.

Floor Covering

Like the controller chairs, the floor cover must be ESD resistant. The current carpeting was replaced in 2017 and meets the ESD compliance requirements.

Restroom Facilities

The FAA requires a restroom one floor below the Cab. The restroom for the ATCT is located on Level 6 and has one toilet (no urinal) and a washbasin behind a lockable door.
Backup Generator

For any ATCT with an elevator, a generator for backup power is required. The ATCT has a 100 KW diesel-powered generator which was replaced in 2007 which not only provides power to the elevator but also supplies backup power to the entire tower.

Other Needs

Discussions with the ATCT manager indicated several needs that would enhance the operational efficiency of the tower

Digital ATIS

A digital ATIS (D-ATIS) where the ATIS message is digitally constructed using ASOS data using text-to-voice technology. A D-ATIS is an add-on component of the AWOS processor that prepares in advance the basic ATIS weather message for broadcast and serves to relieve controller workload by avoiding having to record the message manually.

Controller Assistance Alert

At certain times of the day, only one controller is on duty in the Cab. In the event the controller needs immediate assistance, a “panic button” type signaling and audio paging system would provide an audio and visual alert to all other floors for a response.

Dedicated Crash Phone

Currently, alerting ARFF, law enforcement, and airport operations for an immediate response is provided through one of many “speed dial” settings on the existing phone in the Cab. This has led to occasional false alarms due to mis-dialing. The alert system is also subject to the vulnerabilities of the existing phone.

A dedicated crash phone would provide a segregated and secure communications link for contacting the necessary emergency services. The construction of a new ARFF station next to the ATCT will facilitate this need.

Airfield Video Camera System

The existing video camera system used to view the Runway 32 hold-short area is limited to one low angle perspective which makes it difficult for controllers to discern if aircraft are lined up behind the hold-short line. The system also has a four-second latency and occasionally requires resetting to ensure the image has not locked up.

Another area on the airfield that controllers have difficulty discerning the location of an aircraft in relation to the hold-short line for where Taxiways A and D intersect the end of Runway 23. While aircraft are visible, the actual airfield pavement in this area is not visible from the Cab. At 4,572 feet, the end of Runway 23 is the farthest distance on the airfield from the ATCT. A video camera focusing on both hold-short lines of Taxiways A and D at the end of Runway 23 would enhance the controller the visibility of that area. A video system capable of providing near real-time imagery and that can present a second angle perspective of the area would provide better visibility and an element of redundancy for viewing the areas near the end of the runways.
Integrated Display System

Currently, there are a multitude of base-mounted monitors and displays located on the cab consoles. These include:

- ASOS (Wind/Temperature/Altimeter
- Time (UTC)
- Flight Data Input/Output (FDIO)
- Current ATIS
- Weather Radar
- NOTAMs

Much of this information could be consolidated onto one monitor and alleviate some of the clutter in the Cab. The opportunity to present information to the controllers in an organized array should be considered to provide data in one focused view from anywhere in the Cab.

D. SUMMARY & RECOMMENDATIONS

The Naples Air Traffic Control Tower has served to support ATC services for the past 25 years, averaging 112,000 operations per year during the 1995-2018 period. In 2005, APF logged a record total of 158,400 operations and in 2018, the ATCT handled 110,500 aircraft operations. The facility has not been renovated since its commissioning and the limited amount of space available both in the Cab and the offices and rooms below make for a challenging work environment for the 8 controllers and manager.

The recommendations for the short-term includes the installation of a modular base building to expand and add the amount of area available for support functions currently provided on the shaft levels. These include the manager’s office, breakroom, administration office, breakroom/training room, and a restroom/locker/shower area. Approximately 1,000 square feet of additional space would suffice for accommodating these functions while opening space among the shaft levels for other purposes.

Following the installation of a base building, a complete renovation of the Cab and shaft levels is recommended. The available space on six shaft levels should be renovated and reconfigured to better accommodate the various functions. Application of creative techniques to provide more efficient use of the space through layouts, furniture, and fixtures should provide an improved working environment for the ATC staff. The same opportunity exists for the Cab however, care must be given to avoid disruption of ATC services over an extended period. A temporary tower will likely be necessary in order to work expeditiously in this area.

Ultimately, the existing ATCT will reach the end of its useful life and require replacement. The short-term recommendation (5-7 years) suggests planning for a new ATCT to be constructed during the intermediate-term (8-11 years) in a location that would not compromise nor be compromised by existing or planned development on airport property. Viable sites include the area near the existing TVOR which is slated for decommissioning (Site 2) and the area near the existing ARFF building (Site 3) which is being replaced by a new facility near the existing ATCT.

Other needs that were identified in the ATCT assessment included deficiencies in certain equipment specified in the FAA’s Minimum Equipment List (MEL) including:

- Backup Temperature/Dewpoint Sensor and Monitor (missing)
- Backup Weather Sensor Tower (existing tower too short)
- Backup Altimeter (Digital) (current altimeter non FAA-approved)
These deficiencies should be addressed in the very near-term (1-2 years).

There are also opportunities to upgrade or install new equipment to assist ATC controllers in the Cab. Some of the major items that were identified include:

- Automated ATIS [New]  
  (reduce controller workload)
- Digital Voice Recorder [Upgrade/Replace]  
  (end-of-life/improved efficiency)
- Backup Altimeter (Digital)  
  (current altimeter non FAA-approved)
- Airfield Video Camera System [Upgrade]  
  (improved visibility – RW 32/RW 23)
- Integrated Display System [New]  
  (improved ATC/Weather data display)

Table 6 presents a summary of the facility and equipment needs for the Air Traffic Control Tower. Phasing and rough order-of-magnitude costs are also included in the table.
# ATCT Facility Needs (Short-Term)

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Initiate</th>
<th>Est. Cost</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ATCT Equipment</strong> (Required)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Digital Altimeter (Backup)</td>
<td>10/2020</td>
<td>7,500</td>
<td>MEL - Install Sensor/Display (replace current altimeter (not FAA approved))</td>
</tr>
<tr>
<td>2 Temp/Dew Point (Backup)</td>
<td>10/2020</td>
<td>3,500</td>
<td>MEL - Install Sensor/Display (missing)</td>
</tr>
<tr>
<td>3 Sensor Tower (Backup)</td>
<td>10/2020</td>
<td>17,500</td>
<td>MEL - Replace Sensor Tower (same height as ASOS - 30')</td>
</tr>
<tr>
<td>4 Beacon Switch</td>
<td>10/2020</td>
<td>5,000</td>
<td>MEL - Repair Beacon Switch (on ALCF) (also repair Backup GND Transmitter)</td>
</tr>
<tr>
<td>5 Controller Chair</td>
<td>10/2020</td>
<td>1,800</td>
<td>MEL - Replace Chair (end of useful life)</td>
</tr>
<tr>
<td>6 Cash Phone</td>
<td>10/2020</td>
<td>500</td>
<td>MEL - Dedicated phone/line to ARFF/EMS/Ops</td>
</tr>
<tr>
<td>7 Telecommunications</td>
<td>10/2020</td>
<td>1,500</td>
<td>MEL - Consolidate Phone Lines</td>
</tr>
<tr>
<td>8 Voice Recorder</td>
<td>10/2020</td>
<td>35,000</td>
<td>MEL - Replace/Upgrade</td>
</tr>
<tr>
<td>9 Tunable Emergency Radio (Backup)</td>
<td>10/2020</td>
<td>20,000</td>
<td>MEL - Replace Handheld battery-powered radio</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td></td>
<td>$92,300</td>
<td></td>
</tr>
<tr>
<td><strong>ATCT Equipment</strong> (Optional)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 Digital ATIS</td>
<td>10/2021</td>
<td>55,000</td>
<td>Text-Speech digital messaging (CTO Workload/Cab Environment)</td>
</tr>
<tr>
<td>11 Intercom</td>
<td>10/2020</td>
<td>2,000</td>
<td>Controller Assistance messaging</td>
</tr>
<tr>
<td>12 Aerial Video Camera (Phase I)</td>
<td>10/2021</td>
<td>25,000</td>
<td>High-Res Video of RW 32 Hold Short Line (2nd angle/min latency)</td>
</tr>
<tr>
<td>13 Integrated Display System (Primary)</td>
<td>10/2021</td>
<td>75,000</td>
<td>Integrate Display of ASOS/Wx Radar/Time/Other data</td>
</tr>
<tr>
<td>14 Integrated Display System (Backup)</td>
<td>10/2022</td>
<td>65,000</td>
<td>Integrate Display of Wind/Temp/Altimeter data (Requires AWOS-1)</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td></td>
<td>$222,000</td>
<td></td>
</tr>
<tr>
<td><strong>ATCT Equipment</strong> (Replacement)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communications Radios</td>
<td>10/2023</td>
<td>90,000</td>
<td>MEL - Replace 12 CM-200s installed 1993 / Replace w/CM-300</td>
</tr>
<tr>
<td>Controller Chairs</td>
<td>10/2023</td>
<td>6,000</td>
<td>MEL - Replace 3 Chairs (end of useful life)</td>
</tr>
<tr>
<td>Signal Light Gun</td>
<td>10/2023</td>
<td>7,500</td>
<td>MEL - Upgrade to LED</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td></td>
<td>$103,500</td>
<td></td>
</tr>
<tr>
<td><strong>ATCT Facility (Existing)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Install Temporary Modular Base Building</td>
<td></td>
<td>$175,000</td>
<td></td>
</tr>
<tr>
<td>Planning, Design, &amp; Permitting</td>
<td>10/2019</td>
<td>50,000</td>
<td>Site Plan, Foundation, Utilities, etc.</td>
</tr>
<tr>
<td>Acquisition &amp; Installation</td>
<td>6/2020</td>
<td>125,000</td>
<td>Install Base Building</td>
</tr>
<tr>
<td><strong>Renovate ATCT Levels 1-6</strong></td>
<td></td>
<td>$72,500</td>
<td></td>
</tr>
<tr>
<td>Level 1</td>
<td>6/2020</td>
<td>7,500</td>
<td>Reorganize/Renovate Elevator Equipment Space/Cable Management/Storage Space</td>
</tr>
<tr>
<td>Level 2</td>
<td>6/2020</td>
<td>15,000</td>
<td>Reorganize/Renovate ATCT Equipment/Cable Management/Storage Space</td>
</tr>
<tr>
<td>Level 3</td>
<td>6/2020</td>
<td>15,000</td>
<td>Reorganize/Renovate ATCT Equipment/Cable Management/Storage Space</td>
</tr>
<tr>
<td>Level 4</td>
<td>9/2020</td>
<td>15,000</td>
<td>Relocate ATCT Manager's Office/Reorganize Renovate Office &amp; Storage Space</td>
</tr>
<tr>
<td>Level 5</td>
<td>6/2020</td>
<td>10,000</td>
<td>Relocate Breakroom /Reorganize &amp; Renovate Office &amp; Storage Space</td>
</tr>
<tr>
<td>Level 6</td>
<td>6/2020</td>
<td>10,000</td>
<td>Reorganize/Renovate Restroom/Storage Space</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td></td>
<td>$135,000</td>
<td></td>
</tr>
<tr>
<td><strong>Renovate Tower Cab</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consoles &amp; Cabinets</td>
<td>6/2021</td>
<td>50,000</td>
<td>Reorganize/Renovate Controller Stations/Displays for max open floor space</td>
</tr>
<tr>
<td>Roof Access</td>
<td>6/2021</td>
<td>15,000</td>
<td>Replace Roof Access System</td>
</tr>
<tr>
<td>Relocate Clearance Delivery</td>
<td>9/2020</td>
<td>40,000</td>
<td>Add Voice Switch/FDIO Display/FDIO Printer/ATIS Messaging</td>
</tr>
<tr>
<td>Relocate Beacon to Cab Roof</td>
<td>10/2023</td>
<td>20,000</td>
<td>(Optional) Control/Maintenance/Glare/Recover Tower Real Estate</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td></td>
<td>$135,000</td>
<td></td>
</tr>
<tr>
<td><strong>ATCT Facility (New)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Initial Planning for New ATCT</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ATCT Siting Analysis</td>
<td>10/2024</td>
<td>300,000</td>
<td>Conduct ATCT Siting Analysis per FAA Order 6480.4C</td>
</tr>
<tr>
<td><strong>EA for New ATCT</strong></td>
<td>10/2024</td>
<td>120,000</td>
<td>Conduct EA for Siting Analysis and NEPA Compliance</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td></td>
<td>$420,000</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL SHORT-TERM ATCT DEVELOPMENT NEEDS</strong></td>
<td></td>
<td>$1,250,300</td>
<td></td>
</tr>
</tbody>
</table>

Note: All estimates in 2019 dollars
APPENDIX G
Recycling, Reuse, and Waste Reduction Plan
APPENDIX G
Recycling, Reuse, and Waste Reduction Plan

In 2012, the Federal Aviation Administration (FAA) Modernization and Reform Act of 2012 was issued and included a new requirement for airport master plans to address recycling by:

- Assessing the feasibility of solid waste recycling at the airport;
- Minimizing the generation of waste at the airport;
- Identifying operations and maintenance requirements;
- Reviewing waste management contracts; and
- Identifying the potential for cost savings or generation of revenue.

Subsequent to the passing of the FAA Reauthorization bill, the FAA issued guidance1 on preparing recycling, reuse, and waste reduction plans as part of airport master plans. This appendix provides detailed information regarding the management of Naples Airport (APF) waste and recycling programs. This Recycling, Reuse, and Waste Reduction Plan (RRWRP) includes a review of APF’s waste management and recycling operations throughout the terminal facilities and airfield, as well as a review of tenant practices.

G.1 Airport Description and Background

APF began by recycling cardboard in the 1990’s. In 2009, the airport advanced their recycling program to include mixed recycling, including paper, cardboard, aluminum cans, newspapers, batteries, ink and toner cartridges, waste oil, scrap metal, light bulbs, and electronics, including monitors. In 2010 the airport staff used recycled products whenever possible and the custodial staff used and continue using 100 percent recycled paper products. Collier County does not mandate recycling at the airport. Solid waste and recycling collection is provided by the City of Naples.

Airport management has direct control over waste disposed of in the parking lots, public and APF terminal spaces (General Aviation Terminal, Commercial Airline Terminal, and offices), and the airfield.

There are several airport tenants that have informal recycling programs. For example, there are tenants that currently recycle cardboard and scrap metals.

The majority of waste at an airport is generated by general aviation pilots, passengers, tenants, and other airport users. Common waste disposed of at APF includes:

- Common office/terminal waste: paper, plastic (hard plastic containers and film plastics), cans and bottles, food and food-packaging waste, and cardboard boxes.
- Deplaned waste (e.g., beverage cups and newspapers).
- Aluminum from aircraft parts.
- Construction and demolition waste from construction projects.
- Hazardous waste such as batteries, fluorescent light tubes, and paint.

### G.1.1 Existing Waste and Recycling Handling at APF

Airport management is responsible for collecting waste generated by users and employees of the terminal facilities. The tenants are responsible for their own trash and recycling disposal. In addition to municipal solid waste, APF and some of the tenants have hazardous waste, spill waste, and project-related construction and demolition waste, which are typically managed by a contractor.

Containers used to contain APF’s waste (provided by the City of Naples) for collection are located at various areas around the airport property (Figure G-1).

#### Figure G-1
Examples of APF Waste and Recycling Containers

The City’s recycling facility accepts glass, plastics numbered one through seven, aluminum and other metals, paper, and electronic materials. The primary commodity markets in this area are for scrap metals (e.g., steel, aluminum); presently, several tenants retain these materials for sale in the marketplace.

Most of the waste generated by APF staff is from the office areas; however, this is a small volume relative to the overall waste airport-wide, which is generated by tenants and other airport users. The
airport administrative office has several recycling bins located throughout the office areas (Figure G-2).

Employees are encouraged to use less paper through the use of electronic files. APF monitors paper procurement to ensure there is a decrease in purchasing paper from year to year. Double-sided printing is used when possible. Although the airport does not have scheduled commercial service, charter flights use the commercial terminal occasionally and rental car companies are located in the Commercial Airline Terminal; therefore, there are recycling bins located throughout the public areas of this building.

APF does not have a formalized recycling/waste reduction program; however, the airport and tenants have taken steps to reduce waste and increase recycling. Some of the waste minimization efforts undertaken by one or more tenants include; double-sided printing and electronic document usage/storage.

Other unique examples of recycling by APF airport staff and tenants include periodically donating old project three-ring binders to schools in the area and making recycled waste art shown in Figure G-3. The airport also obtains additional recycling cans for special events.
There are no formalized goals or targets for recycling and no tracking or reporting on the performance of the solid waste recycling programs at APF. Due to the way solid waste and recycling services are billed (i.e., flat rate billing rather than by volume), it is difficult to track and monitor the airport’s performance. A formalized recycling program could be established, but staff time requirements are commonly a challenge to formalizing programs and limited resources are available to implement waste-reduction initiatives.

**G.2 Waste Walk-Through**

Based on the size of APF, a waste walk-through was conducted in February 2019 rather than a full waste audit. The walk-through included a review of the General Aviation Terminal, Commercial Airline Terminal, Annex Office Building, and a sampling of airport tenants.

The City of Naples is responsible for the removal of recyclables from the airport and does not track the actual volume or weight of recycling. The airport has numerous eight-cubic-yard dumpsters for mixed recyclables and trash, located around the airfield. The trash is picked up twice a week and the recycling is picked up once a week. The daily custodial staff sort out the cardboard and the City sorts recycling for trash. The bins in the terminal and office areas were visually inspected during the walk through and some contamination was observed (trash and recycling mixed together).
G.3 Review of Recycling Feasibility

APF currently experiences little to no factors that impact the airport’s ability to recycle. There are many bins and dumpsters available for recycling located throughout the airport facilities. APF is a general aviation airport so it does not accumulate as much recycling as a large commercial-service airport, but the airport has taken many strides in advancing their waste reduction and recycling efforts. APF also has limited staff resources, which could make some recycling programs challenging to implement.

G.4 Operation and Maintenance (O&M) Requirements

Airport janitorial staff are responsible for collecting in-house waste from the terminal space and offices on a daily basis, transporting the waste to the disposal containers, as well as sorting out the cardboard. Additional responsibilities of APF administrative staff include:

- Tracking and paying bills from the City of Naples Department of Electric Utilities, which provides the airport’s recycling removal.
- Waste containers procured by the Collier County Solid Waste Department.

G.5 Review of Waste Management Contracts

The City of Naples is responsible for providing recycling and the County is responsible for waste removal services at APF through internal means rather than a third party. A review of recent billing statements from the County revealed that APF is charged a flat rate for solid waste services and volume information was not available. There is no requirement for, or impediment to, the use of environmentally-preferred products.

APF has more than a dozen commercial business tenants located on airport property. Each company has its own lease, with its own time frame. Individual tenant leases were requested from the County; however, this information was unavailable.

G.6 Potential for Cost Savings or Revenue Generation

The airport may be able to sell scrap metal, particularly from construction and demolition projects. Some of the current tenants sell scrap metals, proving the commodity market is present in the area. However, the low volume of waste limits the potential for savings or revenue generation potential.
G.7 Plan to Minimize Solid Waste Generation

APF does not have a formalized recycling and waste reduction program, but does encourage and support recycling in the airport administrative offices and their terminal facilities. Signage placed in the General Aviation Terminal office spaces directs employees to recycle acceptable materials instead of placing them in the trash (see Figure G-4). The airport and many tenants have been actively recycling municipal solid waste for several years.

Many initiatives were identified for this RRWRP that would advance APF’s waste reduction and recycling efforts. These initiatives include the following.

- **Develop a Waste Reduction Program:** Develop and implement a waste reduction program and encourage employee participation. The program should incentivize waste reduction, diversion, and recycling. Identify relevant waste reduction goals as well as office wide recycling methods (e.g., rechargeable batteries, reusable packaging, etc.) and individual participation (e.g., reusable water bottles, etc.) to further this program. Encourage FBO staff, and other tenants, to increase waste reduction and recycling efforts through individual participation by providing reusable coffee cups and water bottles for pilots to use in lieu of disposable products when possible.
- **Work Towards a Paperless Office:** When possible, encourage all employees and tenants to avoid printing unless absolutely necessary. In particular, work with the FBO staff to devise a plan to eliminate printing faxes with passenger manifests.
- **Develop Environmentally Preferable Purchasing Procedures:** Work to establish procedures for purchasing materials with recycled/bio-based content, low toxicity, or other environmentally-friendly products. Consider Green Label equipment in purchasing guidelines or other equipment that has low emissions and/or low sound levels.
- **Develop an Awareness Campaign:** Educate employees, tenants, and passengers about proper recycling practices; this could include posters and additional signage. The campaign
could also be expanded to encourage the use of reusable water bottles, coffee mugs, and lunch containers.

- **Periodic Monitoring**: Conduct a monthly walk-through of APF’s offices and terminal facilities to monitor the progress of the waste reduction and recycling program.

- **Install Water Bottle Refill Stations**: Convert standard water fountains to include water bottle filling capability. This would significantly reduce the amount of water bottles used in office areas and in the terminals.

- **Convert Soap Dispensers to Foam Soap**: Foam soap reduces the amount of soap dispensed. Foam soap is also pre-lathered, which reduces the amount of water used per wash.

- **Provide Hand Dryers**: Install high-efficiency hand dryers in all restrooms and reposition towel dispensers to reduce paper towel use.

- **Enhance Tenant Engagement**: Coordinate with tenants to consolidate materials and improve economies of scale.

- **Update Contract Language**: Revise existing contract language to establish waste diversion or recycling goals for all tenants, with annual audits and training.

- **Develop and Implement a Construction Waste Plan**: Have a management plan that requires and tracks recycling of land-clearing debris, cardboard, metal, brick, concrete, asphalt, plastic, wood, and glass. This will reduce the construction debris sent to landfills.

- **Host a Periodic Universal Waste Collection Day**: Coordinate with the City of Naples Solid Waste Department to host a periodic (recommend quarterly or semi-annually) collection day for universal waste. Provide an opportunity to airport employees, tenants, and the local community to drop off materials such as batteries, lightbulbs, electronics, pesticides, and more.

This plan would not require any significant capital improvements. The most significant investments would be providing additional in-house recycling receptacles and high-efficiency hand dryers; both of which could be added when there is available operating budget or hand dryers could be included as part of restroom renovations. The airport should consider future development projects, and whether any of the initiatives would become obsolete or if there would be synergy in implementing the initiative as part of a future project (e.g., develop recycling signage when replacing other airport signs).

The recommended plan is flexible and would allow APF to implement initiatives when it is financially and logistically feasible. Many of the initiatives could be implemented in phases or in conjunction with other projects, such as installing high efficiency hand dryers when renovating or constructing new restroom facilities.

It is recommended that airport administration review their waste reduction initiatives annually. In doing so, management should identify whether the initiatives need to be revised/updated to meet current goals or if new goals should be established in the future. The airport’s plan should document the process and requirements for including waste reduction in new development projects as well as establishing goals for utilizing recycled/repurposed materials for new development projects (as applicable).
Additional Resources

Leadership in Energy and Environmental Design (LEED) is a rating system which evaluates the sustainability / environmental performance of building development projects. The LEED rating criteria provide valuable ideas for waste reduction techniques during construction and operation of new facilities, and *LEED for Existing Building O&M* (LEED EBOM)\(^2\) provides ideas for waste reduction at existing facilities. The Sustainable Aviation Guidance Alliance\(^3\) also provides ideas for advancing airport sustainability efforts, including waste reduction and recycling.

\(^2\) [https://www.usgbc.org/articles/getting-know-leed-building-operations-and-maintenance-o&m](https://www.usgbc.org/articles/getting-know-leed-building-operations-and-maintenance-o&m)

\(^3\) [http://airportsustainability.org/](http://airportsustainability.org/)