Draft Final
Airpark Layout Plan

Drawing Set and Narrative Report for the Clearwater Airpark

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Section 1.0
AVIATION ACTIVITY FORECASTS

1.1 Introduction

The City of Clearwater ("City") is updating the Airport Layout Plan (ALP) and Capital Improvement Program (CIP) for the Clearwater Airpark (CLW or Airpark) based on existing and anticipated demand. The Airpark has experienced increasing demand for use of their facilities over the past few years and has identified an immediate need for additional and/or improved facilities, including aircraft storage and terminal facilities. Accordingly, a new forecast of aviation activity levels was developed to serve as the basis for identifying the facilities required in the near-term (0-5 years), intermediate-term (6-10 years), and long-term (11-20 year) planning periods.

1.2 Overview

Accurate historical data regarding the number of operations conducted at CLW is not available. However, CLW has determined that the forecasts developed by the Florida Department of Transportation (FDOT) provide a reasonable outlook of aviation activity at the Airpark. The existing FDOT forecasts were developed in 2015 for the planning period from 2016-2035 as part of the Continuing Florida Aviation System Planning Process (CFASPP). Since the 20-year forecast planning period for this ALP Update is 2018-2038, forecasts for the 3 years between 2036-2038 were projected based on the FDOT's Average Annual Growth Rate (AAGR) of 1.00% for aircraft operations and 0.51% for based aircraft.

The FDOT's forecast provided the basis for additional aviation activity forecasts developed for CLW, including:

- Itinerant versus local operations;
- Instrument operations;
- Fleet mix (aircraft type); and
- Operational Peaks.

All forecasts have a degree of error from the actual activity levels that occur after their publication. Therefore, the forecasts presented in this section should be reviewed with that fact in mind.

1.3 Aircraft Operations Forecast

The FDOT forecast of aircraft operations, including projections for 2036-2038 developed for this ALP Update, are summarized in **Table 1.1**. The Federal Aviation Administration (FAA) January 2018 Terminal Area Forecast (TAF) for CLW is also provided for reference. However, the FAA TAF does not include any growth in aircraft operations and therefore, was not used for the purposes of these forecasts.

Table 1.1 Aircraft Operations Forecast for Clearwater Airpark

Year	Historical	FAA TAF	FDOT[1]
2014	50,590	50,590	
2015	51,096	50,590	
2016	51,607	50,590	
2017	52,123	50,590	
2018		50,590	52,644
2019		50,590	53,171
2020		50,590	53,702
2021		50,590	54,239
2022		50,590	54,782
2023		50,590	55,330
2024		50,590	55,883
2025		50,590	56,442
2026		50,590	57,006
2027		50,590	57,576
2028		50,590	58,152
2029		50,590	58,733
2030		50,590	59,321
2031		50,590	59,914
2032		50,590	60,513
2033		50,590	61,118
2034		50,590	61,729
2035		50,590	62,346
2036		50,590	62,970
2037		50,590	63,599
2038		50,590	64,235
Average Annual Growth Rate			
Short-term (2018-2023)		0.00%	1.20%
Intermediate-term (2024-2028)		0.00%	1.00%
Long-Term (2029-2038)		0.00%	1.00%
Change (2018-2038)		0.00%	23.24%

Source: FDOT (2015); FAA TAF (2018)

[1] forecasts for years 2036-2038 projected based on FDOT 20-year AAGR for period 2016-2035

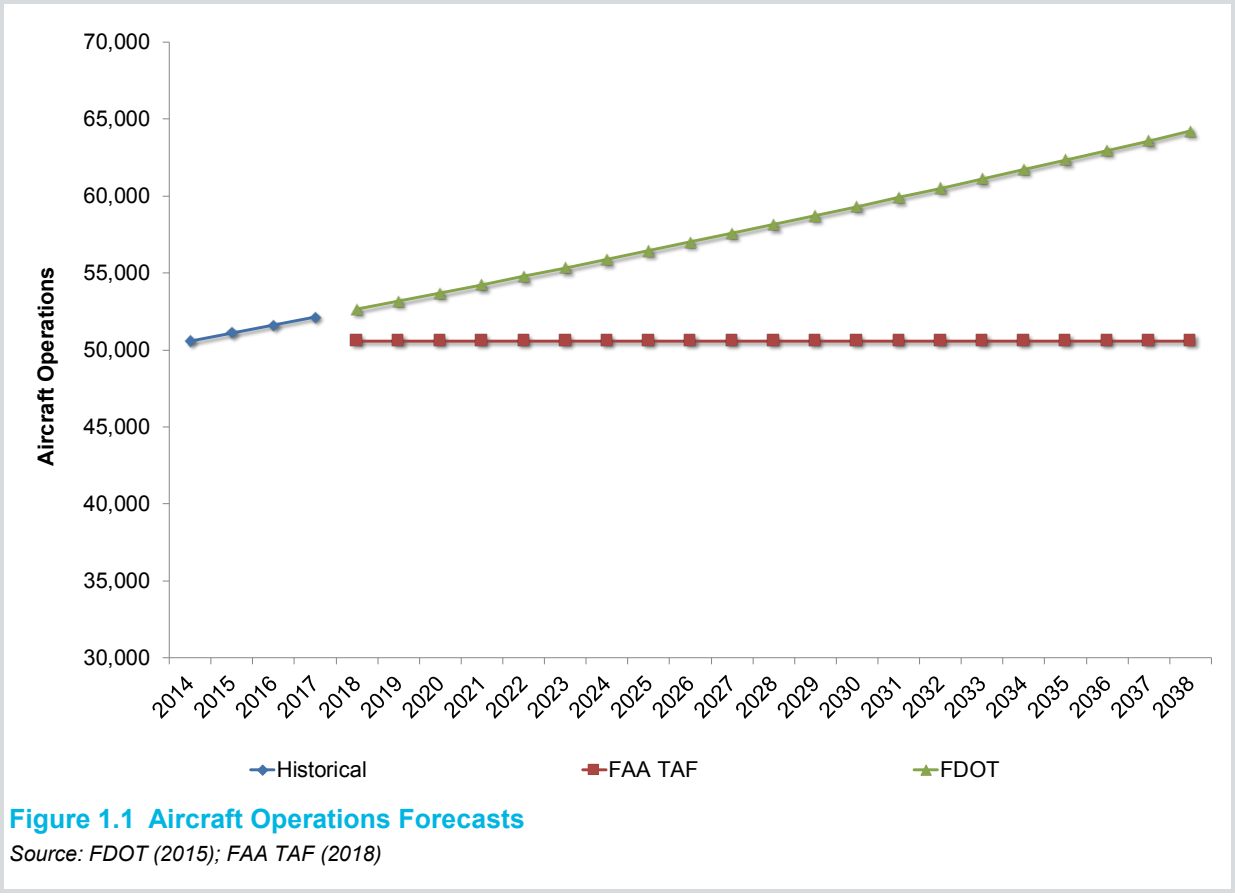


Figure 1.1 Aircraft Operations Forecasts

Source: FDOT (2015); FAA TAF (2018)

1.3.1 Itinerant & Local Operations Forecast

Aircraft operations are defined as the number of arrivals and departures from the airport, including touch and go's. These operations are categorized as either local or itinerant.

- Local operations are those performed by aircraft that are based at the airport and that operate in the local traffic pattern or within sight of the airport
- Itinerant operations are operations performed by an aircraft that lands at an airport, arriving from outside the airport area, or departs an airport and leaves the airport area or local airspace.

Aircraft operations are also further classified by the type of user such as Air Carrier, Air Charter/Air Taxi, GA, and Military. The FDOT FASP provides an overall forecast of aircraft operations but does not separate the category of operations or the user. Therefore, for the purposes of this analysis, the percentages used in the FAA TAF and summarized in **Table 1.2** were used. **Table 1.3** summarizes the forecast of local and itinerant aircraft operations in 2018 and at the end of each planning period.

Table 1.2 FAA Terminal Area Forecast Aircraft Operations by Category and Type

Percentage of Total	Itinerant Operations					Local Operations		
	Air Carrier	Air Taxi	GA	Military	Total	GA (Civil)	Military	Total
	0.0%	.06%	9.96%	.05%	10.07%	89.93%	0.0%	89.93%

Source: FAA TAF (2018)

Table 1.3 Itinerant vs. Local Aircraft Operations

Year	Itinerant Operations					Local Operations			Total
	Air Carrier	Air Taxi	GA	Military	Total	GA (Civil)	Military	Total	
2018	0	31	5,245	25	5,301	47,343	0	47,343	**52,644**
2023	0	33	5,512	25	5,570	49,760	0	49,760	**55,330**
2028	0	34	5,794	25	5,853	52,299	0	52,299	**58,152**
2033	0	36	6,089	25	6,151	54,967	0	54,967	**61,118**
2038	0	38	6,400	25	6,463	57,772	0	57,772	**64,235**

Source: FDOT (2015); FAA TAF (2018)

1.3.1.1 Air Charter / Air Taxi Operations

Air taxi activity includes operations regulated by the FAA under Federal Aviation Regulations (FAR) Part 135 such as on-demand passenger service (charter and fractional), small parcel transport (cargo), and air ambulance activity. Air taxi activity at CLW currently includes occasional charter and air ambulance flights.

1.3.1.2 General Aviation Operations

General Aviation (GA) is the term used to describe a diverse range of aviation activities including all segments of the aviation industry, except for commercial air carriers and military. GA includes common activities such as pilot training, recreational flying, agricultural applications, medical support, and other business and corporate uses. General aviation aircraft can range from small glider and single engine aircraft to large turboprop and jet powered aircraft. In fact, some larger commercial airline aircraft models such as the Boeing 737, known as the Boeing Business Jet (BBJ), have been converted for general aviation uses. GA is the primary type of activity at CLW, accounting for approximately 99 percent of all activity, including flight training activities offered by Tampa Bay Aviation.

1.3.1.3 Military Operations

Military operations at CLW are relatively limited, consisting primarily of Florida National Guard helicopters and smaller fixed wing aircraft. This activity is typically in support of emergency response operations.

1.3.1.4 Instrument Operations

Instrument operations to and from CLW are handled through FAA approach/departure control facilities at Tampa International Airport, which controls the overlying Class B airspace. There are currently no published instrument approach or departure procedures for CLW. Therefore, at this time, there is not enough data available to make an inference about the level of instrument activity at CLW.

1.4 Based Aircraft Forecast

The FDOT forecast of based aircraft, including projections for 2036-2038 developed for this ALP Update, are summarized in **Table 1.4** and illustrated in **Figure 1.2**. The FAA January 2018 TAF for CLW is also provided for reference. Unlike the FAA TAF for aircraft operations, the FAA based aircraft forecast includes future growth at higher AAGRs than the FDOT forecasts. However, the number of based aircraft indicated for 2017 is nearly half the amount of existing based aircraft confirmed by the City.

Table 1.4 Based Aircraft Forecast

Year	Historical	FAA TAF	FDOT[1]
2017	139		
2018		79	143
2019		80	144
2020		81	144
2021		81	145
2022		82	146
2023		82	146
2024		83	147
2025		84	148
2026		85	149
2027		86	149
2028		87	150
2029		88	151
2030		89	152
2031		90	152
2032		91	153
2033		92	154
2034		93	155
2035		94	155
2036		95	156
2037		96	157
2038		97	157
Average Annual Growth Rate			
Short-term (2018-2023)		0.76%	0.99%
Intermediate-term (2024-2028)		1.21%	0.54%
Long-Term (2029-2038)		1.11%	0.48%
Change (2018-2038)		23.08%	13.23%

Source: FDOT (2015); FAA TAF (2018)

[1] forecasts for years 2036-2038 projected based on FDOT 20-year AAGR for period 2016-2035

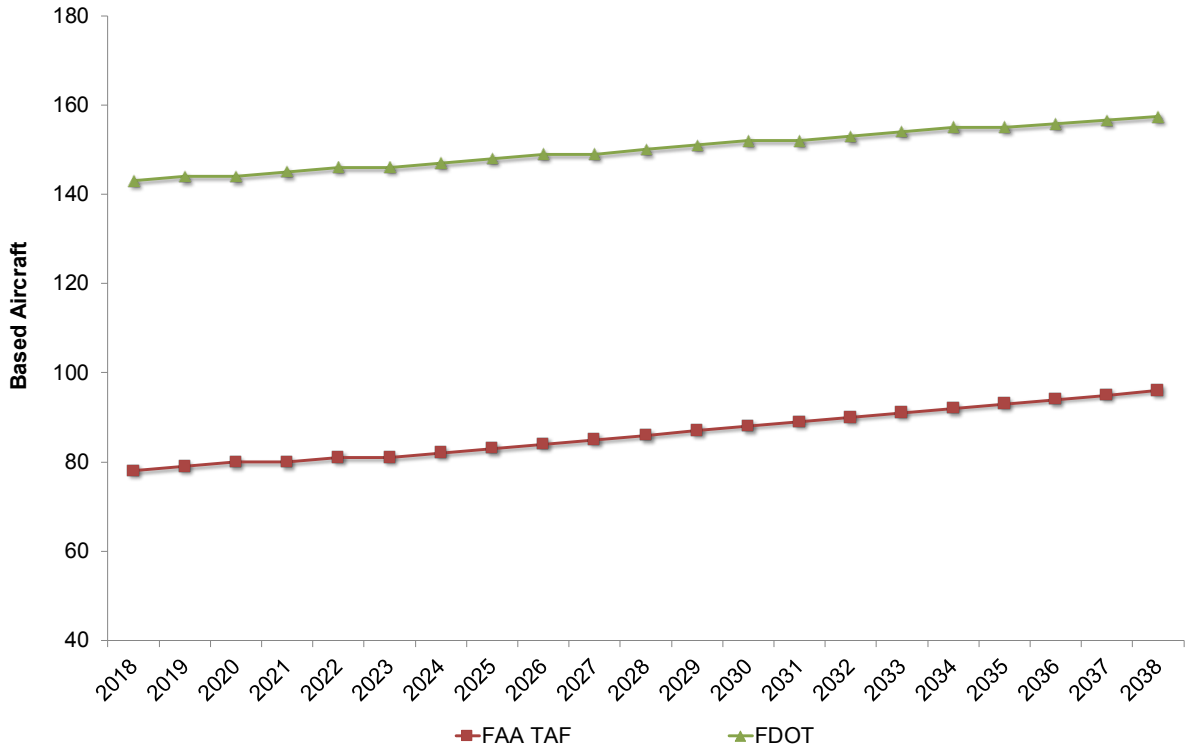


Figure 1.2 Based Aircraft Forecasts

Sources: FDOT (2015); FAA TAF (2018)

1.4.1 Aircraft Fleet Mix

A key part of the forecasting effort is to identify how the current mix of aircraft types and missions will evolve over the 20-year planning period. This information will be used to identify recommended modifications to the airfield and airport facilities.

Aircraft are typically grouped into one of several classifications including single-engine, multi-engine, and rotary (helicopter). Other aircraft types such as jets, sport, experimental, ultra-light, etc. are not based at CLW and are not expected to in the future. The number of based aircraft in each of these classifications impacts the number and size of the recommended aircraft storage facilities and associated modifications to access taxiways/taxilanes.

The forecast fleet mix presented in **Table 1.5** and **Figure 1.3** are reflective of the FDOT based aircraft forecasts as the actual number of based aircraft at CLW in the beginning of 2018 closely matches the FDOT forecasts for that year. Percentages of each aircraft type are based on the data obtained from the City of Clearwater for existing (2017) based aircraft at CLW.

Table 1.5 Aircraft Fleet Mix Forecast

Year	Single-Engine		Multi-Engine		Turboprop		Jet		Helicopter		Total
	Aircraft	%	Aircraft	%	Aircraft	%	Aircraft	%	Aircraft	%	
2017	119	85.6%	14	10.1%	0	0.0%	0	0%	6	4.3%	139
2018	123	86.1%	14	9.4%	0	0.0%	0	0%	6	4.4%	143
2023	125	85.5%	14	9.6%	0	0.0%	0	0%	7	5.0%	146
2028	127	84.7%	15	9.7%	0	0.0%	0	0%	8	5.6%	150
2033	129	84.0%	15	9.8%	0	0.0%	0	0%	10	6.2%	154
2038	131	83.1%	16	9.9%	0	0.0%	0	0%	11	7.0%	157

Source: AECOM Analysis, 2018

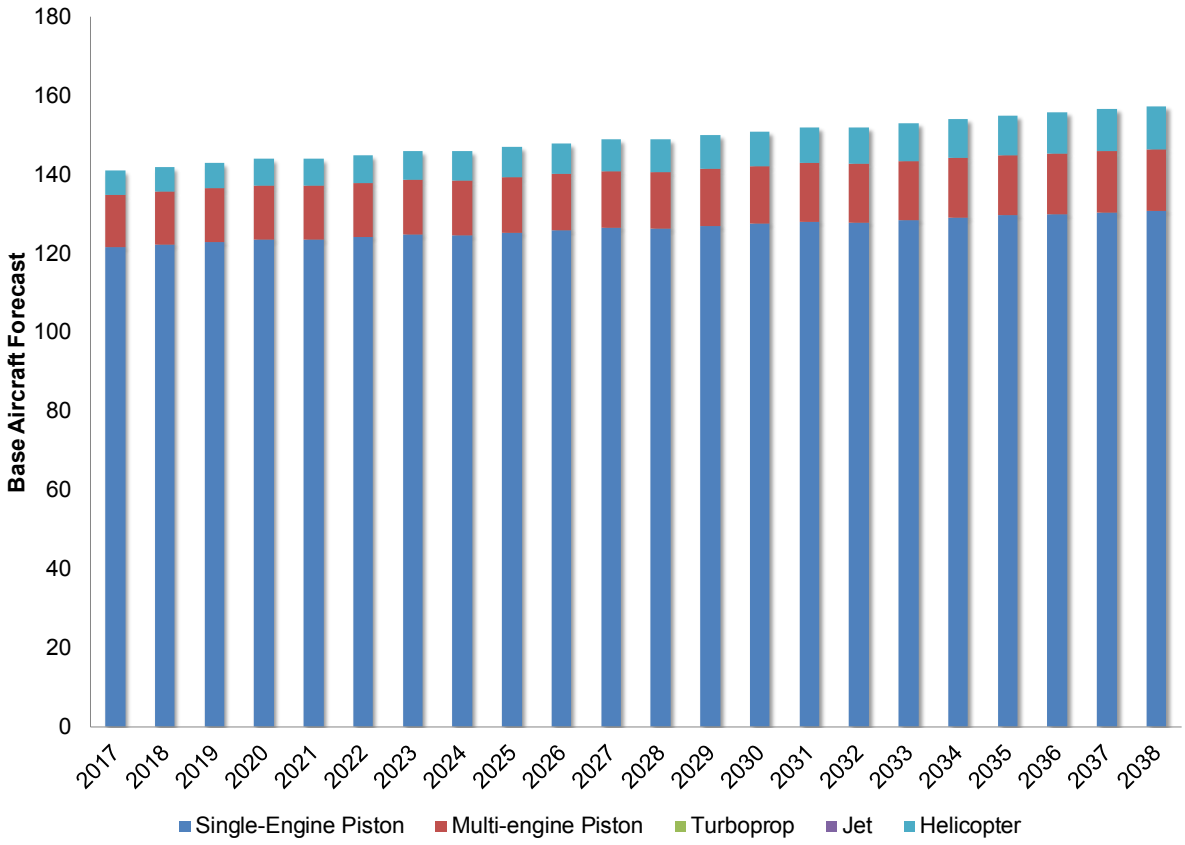


Figure 1.3 Based Aircraft Fleet Mix Forecast

Source: FDOT (2015); AECOM Analysis (2018)

1.5 Critical Aircraft

Evaluating existing airfield facilities and planning for improvements requires the identification of a Critical Aircraft. The Critical Aircraft relates airport design to the operational and physical characteristics of the most demanding aircraft that utilize the airfield on a regular basis. It sets dimensional requirements or key elements of an airport, such as the separation distance between runways, taxiways, and aircraft parking areas as well as other safety related features. According to FAA Advisory Circular (AC) 150/5000-17, Critical Aircraft and Regular Use Determination, an aircraft or grouping of aircraft with similar characteristics must conduct a minimum of 500 annual operations (local and itinerant) per year to be considered the Critical Aircraft.

As previously noted, historical operational data at CLW, including specific aircraft models, is significantly limited. The 2000 CLW Master Plan cited the Piper Cheyenne as the Critical Aircraft. Based on information provided by the City, it is recommended the Piper Cheyenne is maintained as the Critical Aircraft. The Piper Cheyenne represents a grouping of aircraft with similar characteristics operating at the Airport and most of the existing airfield facilities satisfy the standards associated with this group of aircraft.

1.6 Operational Peaks

Activity at an airport is inconsistent on a monthly, daily, and hourly basis. Facility requirements are often identified based on accommodating peak hour operations on the Average Day of the Peak Month (ADPM). Peak hour operations are used to identify requirements for aircraft parking positions for non-based aircraft, terminal/administration buildings, vehicular parking, and fuel storage. The number of peak hour operations in each forecast year was determined based on the following:

- **Peak Month Operations** –Standard forecasting practices often assume a 10% increase over the average monthly operations throughout the course of a year. However, due to seasonal weather variations, tourism, and the high percentage of recreational activity there are larger differences between summer activity levels at CLW. As such, the peak month was calculated at 25% above the monthly average.
- **Average Day Peak Month Operations** – Determined by the average number of daily operations during the peak month (30 days).
- **Peak Hour Operations** –Peak hour operations generally equate to between 12% and 20% of the ADPM operations. For the purpose of these forecasts, a peak hour of 15% of ADPM was used.

Peak activity projections are summarized in **Table 1.6**.

Table 1.6 Operational Peaks

Year	Annual Operations	Average Month Operations	Average Day Peak Month Operations	Peak Hour Operations
2017	52,123	5,429	181	27
2018	52,644	5,484	183	27
2023	55,330	5,764	192	29
2028	58,152	6,058	202	30
2033	61,118	6,366	212	32
2038	64,235	6,691	223	33

Source: AECOM (2018)

1.7 Forecast Comparison to FAA TAF

A comparison of the proposed forecasts to the FAA TAF is required by the FAA, particularly if FAA funding will be requested for any capital improvement project. The FAA TAF helps determine whether an airport satisfies funding eligibility requirements and to determine the relative priority of public funding available for capital improvements. Per FAA guidance, local forecasts that exceed 100,000 annual operations and/or 100 based aircraft are considered consistent with the TAF if they differ by less than 10% in the 5-year forecast period and 15% in the 10-year forecast period. According to FAA policy, differences must be resolved if the forecast is to be used in FAA decision-making and may involve revisions to the CLW submitted forecasts, adjustments to the TAF, or both.

A summary of the CLW forecasts presented in this report and a comparison to the 2018 FAA TAF are summarized in **Table 1.6** and **Table 1.7** respectively.

Forecast annual operations do not exceed 100,000 operations and do not require any further FAA review.

The adopted FDOT forecasts of based aircraft for CLW significantly differ from the FAA's based aircraft forecast, predominantly the result of the FAA forecast starting at nearly half the amount of based aircraft reported by the City in 2017. However, the FAA TAF is based on a 20-year AAGR that is nearly twice the FDOT forecasts (approximately 1.0% to 0.50% respectively).

Table 1.7 Summary of Aviation Activity Forecasts

	Base Yr.	Forecast Level of Aviation Activity					Average Annual Compound Growth				
	2017	2018	2023	2028	2033	2038	2018	2023	2028	2033	2038
A. FORECAST LEVELS AND GROWTH RATES											
Air Carrier	0	0	0	0	0	0	0.00%	0.00%	0.00%	0.00%	0.00%
Commuter	0	0	0	0	0	0	0.00%	0.00%	0.00%	0.00%	0.00%
Total	0	0	0	0	0	0	0.00%	0.00%	0.00%	0.00%	0.00%
OPERATION											
Itinerant											
Air	0	0	0	0	0	0	0.00%	0.00%	0.00%	0.00%	0.00%
Air Taxi	31	31	33	34	36	38	1.00%	1.00%	1.00%	1.00%	1.00%
Total	31	31	33	34	36	38	1.00%	1.00%	1.00%	1.00%	1.00%
General	5,193	5,245	5,512	5,794	6,089	6,400	1.00%	1.00%	1.00%	1.00%	1.00%
Military	25	25	25	25	25	25	0.00%	0.00%	0.00%	0.00%	0.00%
Local											
General	46,874	47,34	49,76	52,29	54,96	57,77	1.00%	1.00%	1.00%	1.00%	1.00%
Military	0	0	0	0	0	0	0.00%	0.00%	0.00%	0.00%	0.00%
Total	**52,123**	**52,64**	**55,33**	**58,15**	**61,11**	**64,23**	1.00%	1.00%	1.00%	1.00%	1.00%
Instrument	0	0	0	0	0	0	0.00%	0.00%	0.00%	0.00%	0.00%
Peak Hour	**27**	**27**	**29**	**30**	**32**	**33**	1.00%	1.00%	1.00%	1.00%	1.00%
Cargo/Mail	0	0	0	0	0	0	0.00%	0.00%	0.00%	0.00%	0.00%
BASED AIRCRAFT											
Single-	119	121	124	125	128	130	2.01%	0.40%	0.24%	0.35%	0.36%
Multi-	14	14	15	15	16	17	2.43%	0.81%	0.65%	0.76%	0.78%
Turboprop	0	0	0	0	0	0	--	--	--	--	--
Rotorcraft	6	6	7	8	9	11	4.50%	2.85%	2.69%	2.80%	2.82%
Jets	0	0	0	0	0	0	--	--	--	--	--
Others	0	0	0	0	0	0	--	--	--	--	--
Total Based	**139**	**142**	**146**	**149**	**153**	**157**	2.16%	0.56%	0.41%	0.53%	0.57%
B. OPERATIONAL FACTORS											
AVERAGE AIRCRAFT SIZE (SEATS)											
Air Carrier	--	--	--	--	--	--	--	--	--	--	--
Commuter	--	--	--	--	--	--	--	--	--	--	--
AVERAGE ENPLANING LOAD FACTOR											
Air Carrier	--	--	--	--	--	--	--	--	--	--	--
Commuter	--	--	--	--	--	--	--	--	--	--	--
GA	**375**	**371**	**379**	**390**	**399**	**408**	-1.13%	0.44%	0.59%	0.47%	0.43%

Source: AECOM (2018)

Table 1.8 Comparison of Derived and FAA TAF Forecast

Year	CLW Forecast	FAA TAF	Difference (%)
TOTAL OPERATIONS			
2018	52,644	50,590	4.1%
2023	55,330	50,590	9.4%
2028	58,152	50,590	14.9%
2033	61,118	50,590	20.8%
2038	64,235	50,590	27.0%
BASED AIRCRAFT			
2018	142	79	81.0%
2023	146	82	78.0%
2028	149	87	72.4%
2033	153	92	67.4%
2038	157	97	61.9%

Source: AECOM (2018)

Note: FAA TAF data is on a U.S. Government FY basis (October through September)

Section 2.0
AIRPARK DEMAND / CAPACITY ANALYSIS AND IDENTIFICATION OF FACILITY DEVELOPMENT NEEDS

2.1 Introduction

The City of Clearwater ("City") is updating the Airport Layout Plan (ALP) and Capital Improvement Program (CIP) for the Clearwater Airpark (CLW or Airpark) based on existing and anticipated demand. The Airpark has experienced increasing demand for use of their facilities over the past few years and has identified an immediate need for additional and/or improved facilities, including aircraft storage and terminal facilities. The purpose of this report is to identify the facilities recommended to accommodate the anticipated demand in the near-term (0-5 years), intermediate-term (6-10 years), and long-term (11-20 year) planning periods.

Facility requirements are calculated based on the aviation activity forecasts previously submitted and visual observations, as well as consultation with Airport staff. The capacities of specific airport facilities, such as the airfield, terminal facilities, aircraft parking areas, support facilities, and automobile parking are evaluated to determine if they are capable of accommodating forecast levels of demand without incurring unacceptable decreases in service levels. Wherever deficiencies are identified, the number and size of facilities needed to address capacity shortfalls are determined.

Based on the analyses summarized in subsequent sections, the following facility improvements are recommended:

- Obtain control of unowned parcels with the Approach Runway Protection Zone (APRZ) and Departure Runway Protection Zone (DPRZ) to the extent practical
- Mitigate non-standard taxiway geometries
- Rehabilitate pavement per the Florida Department of Transportation (FDOT) pavement management report
- Maximize operational safety of aircraft parking areas through aircraft wingspan restrictions on taxilanes or relocation/reconfiguration of parking positions
- 5 additional transient parking positions immediately and another 3 by the end of the planning horizon for a total of 15 in 2038
- 15 additional T-Hangar units
- 2 additional conventional hangars
- Expand the terminal building to roughly 12,500 Square Feet (SF)
- Increase the number of vehicle parking spaces from 25 to 104
- Provide a new secured maintenance shed for storage of the recently purchased tractor
- Reserve the 75-acre site currently occupied by The Landings Golf Club for aeronautical / non-aeronautical purposes

2.2 Critical Aircraft

Evaluating existing airfield facilities and planning for improvements requires the identification of a Critical Aircraft. The Critical Aircraft relates airport design to the operational and physical characteristics of the most demanding aircraft that utilize the airfield on a regular basis. It sets dimensional requirements or key elements of an airport, such as the separation distance between runways, taxiways, and aircraft parking areas as well as other safety related features. According to FAA Advisory Circular (AC) 150/5000-17, *Critical Aircraft and Regular Use Determination,* an aircraft or grouping of aircraft with similar characteristics must conduct a minimum of 500 annual operations (local and itinerant) per year to be considered the Critical Aircraft.

The determination of a future Critical Aircraft is based on an FAA approval of the forecasts. The forecast, as submitted to the FAA, must include a projection of the number of annual operations by the future Critical Aircraft for the planning horizon.

The FAA defines two primary parameters for planning airfield facilities: Runway Design Code (RDC) and Taxiway Design Group (TDG). The RDC identifies standards for the design of runway pavement and safety areas while the TDG defines specifications for design of taxiway pavement.

The RDC is composed of the Aircraft Approach Category (AAC), Aircraft Design Group (ADG), and runway visibility minimums (defined by runway visual range values). The AAC (defined by a letter) relates to aircraft approach speed while ADG (defined by a numeral) relates to aircraft wingspan and tail height. **Table 2.1** depicts the criteria used to determine the RDC.

Table 2.1 Runway Design Code Classifications

Aircraft Approach Category (AAC)				
Category	**Approach Speed (knots)**		**Typical Aircraft Size**	**Example Aircraft**
A*	< 91		Small single-engine	Pilatus PC-12
B*	91-120		Small multi-engine	Beech 200 Super King Air
C	121-140		Short medium-range	A318
D	141-165		Long Range	B737-800; B747-8
E	≥ 166		Military	Military
Aircraft Design Group (ADG)				
Group	**Wingspan (feet)**	**Tail Height (feet)**	**Typical Aircraft Size**	**Example Aircraft**
I	< 49	< 20	Single & multi-engine	King Air 100
II	49 < 79	20 < 30	Commuter Aircraft	Beech 200 Super King Air; Pilatus PC-12
III	79 < 118	30 < 45	Narrowbody	B737
IV	118 < 171	45 < 60	Widebody	B757 / B767
V	171 < 214	60 < 66	Widebody	B777
VI	214 < 262	66 < 80	Jumbo Commercial	A380
Runway Visibility Minimums				
Runway Visual Rage (feet)			**Flight Visibility Category (Statute Mile)**	
VIS			Visual Only	
5000			Not lower than 1 mile	
4000			Lower than 1 mile but not lower than ¾ mile	
2400			Lower than ¾ mile but not lower than ½ mile	
1600			Lower than ½ mile but not lower than ¼ mile	
1200			Lower than ¼ mile	

Source: FAA AC 150/5300-13A (Change 1), Airport Design

** Aircraft with a maximum certificated takeoff weight of 12,500 pounds or less are classified as "small" aircraft*

Conversely, the TDG is a function of an aircraft's main landing gear width and as well as its location relative to the cockpit. **Figure 2.1** depicts the various TDGs per FAA guidelines.

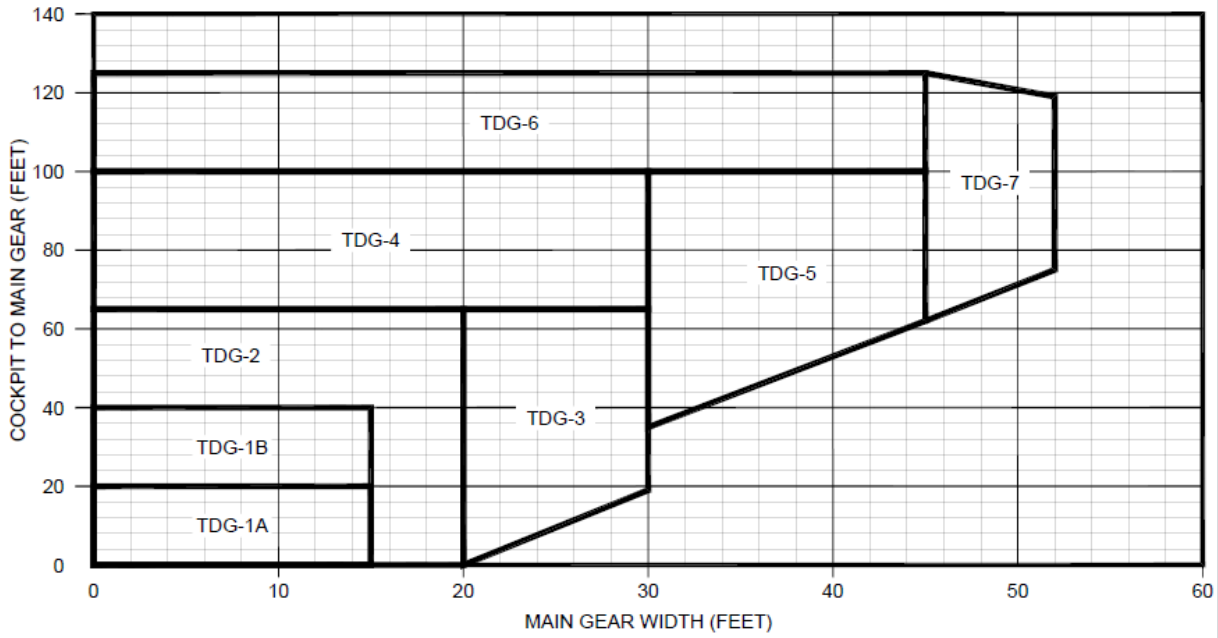


Figure 2.1 FAA Taxiway Design Groups

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

On occasion, the Critical Aircraft for runways and safety areas may be different than the Critical Aircraft for taxiways due to differences in aircraft wingspans, tail heights, and location of the main-gear. For example, the Cessna Citation Mustang jet is an ADG I and TDG 2 aircraft while the Cessna Citation X is an ADG II and TDG 1B aircraft. In this instance, the Citation X would be the Critical Aircraft for runways and safety areas (including taxiways) but the Citation Mustang would be the Critical Aircraft for taxiway design (taxiway width, shoulder width, and fillet design).

As previously noted, historical operational data at CLW, including specific aircraft models, is significantly limited. The 2000 CLW MPU cited the Piper Cheyenne (B-I-2) as the existing Critical Aircraft and the Cessna Citation Jet CJ2 (B-II-2) as the future Critical Aircraft. For the purposes of this ALP Update, it is recommended the Piper Cheyenne be utilized as the Critical Aircraft.

2.3 Airside Facilities

The primary airside facilities (runways, taxiways, and navigational aids) each have a crucial role in the operational capacity, safety, and efficiency of the Airport.

2.3.1 Runway System

The runways are the fundamental component supporting air transportation at any airport. The runway system is a combination of the structural pavement used for takeoffs and landings, shoulders, blast pads, safety areas, protection zones, and obstruction identification surfaces. The following evaluates the existing runway system and future requirements for each component.

2.3.2 Number of Runways

The required number of runways at an airport is based on the annual and hourly demand of the airfield as well as the prevailing wind conditions.

The 2000 Master Plan calculated the annual capacity of the airfield, based on FAA guidance, at roughly 157,000 operations and the hourly capacity during visual meteorological conditions (VMC) at 71 operations. Therefore, the existing airfield provides sufficient capacity for the forecast number of operations.

The FAA also recommends the orientation of runways provides at least 95% wind coverage for the aircraft forecast to use the Airport on a regular basis. Wind data was obtained from the National Centers for Environmental Information (NCEI) for the 10-year period 2008-2017 at station 722110 (Tampa International Airport). Wind data from stations closer to CLW was either unavailable or incomplete for use in this analysis.

The percentage of wind coverage is based on the maximum allowable crosswind component for the aircraft that utilize the Airport on a regular basis. The maximum allowable crosswind component is 10.5 knots for A-I and B-I aircraft and 13 knots for A-II and B-II aircraft. **Table 2.2** summarizes the wind coverage at CLW under all-weather conditions (119,749 observations), VMC (94,845 observations), and Instrument Meteorological Conditions (6,845 observations).

Runway 16-34 provides at least 95% wind coverage in all conditions and crosswind components except in IMC and a 10.5 knot crosswind. Since IMC operations at CLW are minimal, a crosswind runway is not recommended at CLW to accommodate operations by A-I and B-I aircraft in these conditions.

Table 2.2 Wind Coverage

Weather Conditions	10.5 knots	13.0 knots
All-Weather	95.90%	97.98%
VMC	96.03%	98.10%
IMC	92.91%	95.73%

Source: NCEI; AECOM Analysis

2.3.3 Runway Length Requirements

The operating length of a runway is its most important functional element. The length of the primary runway should support the most demanding aircraft operating at a takeoff weight required to reach its destination, otherwise known as the stage length. The required runway length is determined based on the guidelines provided in FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design*.

Since most, if not all, of the aircraft regularly operating at CLW have a MTOW less than 12,500 pounds, the runway length requirement for CLW is approximately 3,200 feet, per Paragraph 205 and Figure 2-1 in FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design.* At a length of 4,108-feet, existing Runway 16-34 is sufficient to accommodate the aircraft operating at CLW.

2.3.4 Runway Geometry and Safety

The geometry of an airfield is subject to the FAA airport design standards which provide for safe operations and consistency among the nation's airports. Runway 16-34 only provides a visual

approach to each end. Accordingly, **Table 2.3** compares the FAA standards for B-I runway with a visual approach (B-I-VIS) against existing conditions.

Although the existing runway does not have paved shoulders or blast pads, they are not required. However, the FAA recommends turf, aggregate-turf, soil cement, lime or bituminous stabilized soil adjacent to paved surfaces accommodating ADG-I and II aircraft such as Runway 16-34.

Runway end blast pads are also not required for jet blast erosion control but are recommended to be included on the ALP in the event the City selects to provide them.

The Runway Protection Zone (RPZ) is a trapezoidal area at each runway end and/or threshold. The main purpose of the RPZ is to protect people and property on the ground. The FAA recommends airports gain control of the RPZs. While it is desirable to keep the entire RPZ clear of all above-ground objects, RPZs should be maintained clear of all incompatible activities at a minimum. Per the FAA, permissible land uses within RPZs include:

- Farming
- Irrigation channels
- Airport service roads
- Underground facilities
- Unstaffed NAVAIDS and facilities (only if fixed by function)

The FAA also recommends airports coordinate with the Airports District Office (ADO) to remove or mitigate the risk of any existing incompatible land uses in the RPZ as practical, including public roads.

The RPZ includes both an ARPZ and a DRPZ. The ARPZ is located 200 feet from the runway threshold. The DRPZ begins 200 feet beyond the runway end, or the far end of the runway end. The size of the ARPZ and DRPZ are the same for both runway ends. It is recommended the Airport obtain control of parcels within the APRZs and DRPZs to the extent practical.

Table 2.3 Existing Runway Design

Item	Standard	Existing
Visibility Minimums	Visual	Visual
Runway Geometry		
Runway Design Code (RDC)	B-I-VIS	B-I-VIS
Runway Length	3,200	4,108
Runway Width	60	75
Shoulder Width	10	-
Blast Pad Width	80	-
Blast Pad Length	60	-
Runway Separation		
Holding Position	125	125
Parallel taxiway/taxilane centerline	150	150
Aircraft parking area	125	≥ 200
Runway Safety Area (RSA)[1]		
Length beyond runway end	240	240
Length prior to threshold	240	240
Width	250	250
Runway Object Free Area (ROFA)[1]		
Length beyond runway end	240	240
Length prior to threshold	240	240
Width	250	250
Runway Obstacle Free Zone (ROFZ)		
Length beyond runway end	200	200
Width	250	250
Approach and Departure Runway Protection Zone (ARPZ and DRPZ)[2]		
Length	1,000	1,000
Inner Width	250	250
Outer Width	450	450

Source: FAA AC 150/5300-13A (Change 1), Airport Design, Table 3-5

Notes:

[1] The Runway 16 RSA and ROFA is partially outside the existing airport property on undeveloped land

[2] The APRZ and DRPZ are not entirely within airport owned or controlled property

2.4 Taxiway System

The taxiway system of an airport provides for the safe and efficient movement of aircraft between the runways, terminal area, and general aviation facilities. The following evaluates the taxiways according to design standard and operational efficiency from a runway exit perspective.

2.4.1 Taxiway Design

Taxiway design standards are based on the ADG and TDG of the aircraft using the taxiways. ADG affects the protection areas, separation standards, and wingtip clearances. TDG determines the width, taxiway edge safety margin (TESM), and shoulder width. A comprehensive review of the existing TESM (main-gear horizontal clearance) available was not completed as part of this analysis. However, proposed taxiway improvements, if any, will adhere to the FAA design standards. The design requirements that apply to taxiways at CLW are summarized in **Table 2.4**.

The FAA standards can be adjusted for aircraft specific operational areas. For example, if an aircraft parking area is restricted to aircraft with wingspans of 37-feet or less (a large majority of single-engine aircraft), the taxilane to fixed/movable object separation is 32.2-feet which is equal to 0.6 times the wingspan plus 10-feet.

Table 2.4 FAA Taxiway Standards

Item	ADG I
Protection	
Taxiway Safety Area	49’
Taxiway Object Free Area	89’
Taxilane Object Free Area	79’
Taxiway Separation	
Parallel taxiway/taxilane centerline	70’
Fixed and/or Movable Object	44.5’
Taxilane Separation	
Parallel taxilane centerline	64’
Fixed and/or Movable Object	39.5’
Wingtip Clearance	
Taxiway	20’
Taxilane	15’
Item	TDG 2
Pavement Design	
Taxiway Width	35’
Taxiway Shoulder Width	15’
Taxiway Edge Safety Margin (TESM)	7.5’

Source: FAA AC 150/5300-13A (Change 1), Airport Design

Figure 2.2 illustrates the existing aircraft parking areas at CLW, including the ADG I taxilane separation standards.

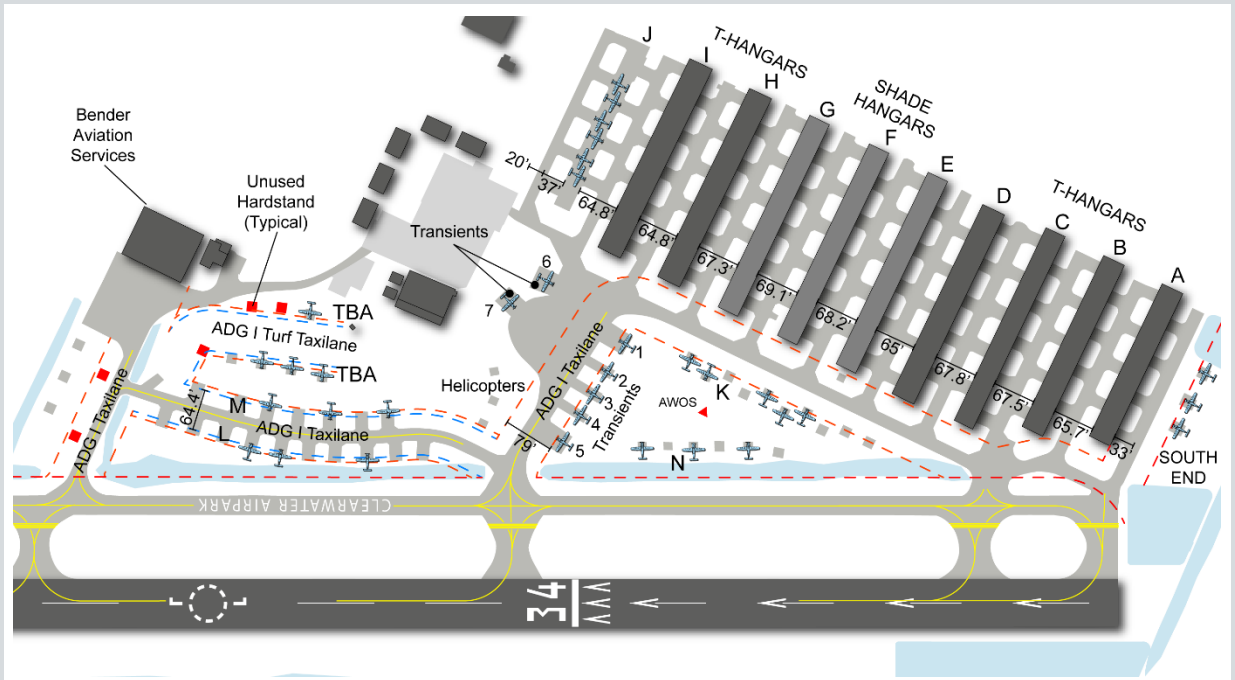


Figure 2.2 Existing Aircraft Parking Areas

TBA: Tampa Bay Aviation

The following summarize the existing issues and recommended improvements:

- Two hardstand pads are within the ADG I Taxilane Object Free Area (TOFA) for the taxilane accessing Bender Aviation Services; it is recommended these hardstands are not used for aircraft parking
- The taxilane accessing hardstands on rows M and L does not provide a standard ADG I TOFA; it is recommended these rows are modified to provide a TOFA that provides sufficient clearance for the aircraft that typically use these hardstands (i.e., aircraft with wingspans less than 37-feet)
- Similarly, the turf taxilane accessing the Tampa Bay Aviation (TBA) rows does not provide sufficient clearance for aircraft that typically utilize these positions; therefore, it is recommended the hardstands are modified to provide a TOFA specific to the aircraft utilized by TBA
- The taxilane accessing the transient aircraft parking positions provides a standard ADG I TOFA; however, pavement markings are recommended to identify the aircraft parking restriction line (APRL)
- Similarly, APRL markings are recommended for hardstands along row K and the 3 south end parking positions
- The separation between Transient positions 3 and 4 (centerlines) is limited to approximately 38-feet; therefore, it is recommended that either the aircraft parking at these positions are restricted or Position 4 is widened to improve the separation
- The existing taxilanes accessing covered parking (T-Hangars and Shade hangars) have varying TOFAs but none satisfy ADG I standards; accordingly, it is recommended access to

these hangars is restricted to aircraft with wingspans proportionate to the TOFA available, providing a minimum recommended wingtip clearance of 10-feet

2.4.2 Taxiway Configurations

FAA design standards emphasize safe and efficient taxiway configurations while minimizing excess pavement, including improvements to existing taxiway geometry and removal of pavement, when necessary, to minimize the risk of runway incursions. Several taxiway configurations are identified in the FAA standards as increasing the potential risk of a runway incursion. As illustrated in **Figure 2.3**, there are four locations at CLW which the FAA considers non-standard as they allow direct access from an apron area to a runway. Solutions to mitigate these non-standard conditions will be evaluated as part of the alternatives analysis.

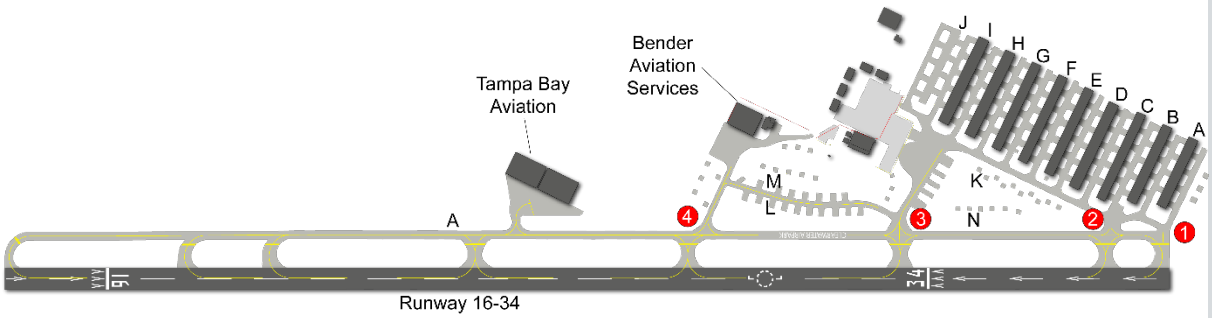


Figure 2.3 Non-Standard Taxiway Configurations

2.4.3 Pavement Condition

FDOT sponsors an airfield pavement management program for numerous public airports to "prioritize pavement maintenance and rehabilitation, determine maintenance scheduling, performing material evaluations and supporting design considerations." **Figure 2.4** depicts the currently available conditions as reported by FDOT in June 2015.

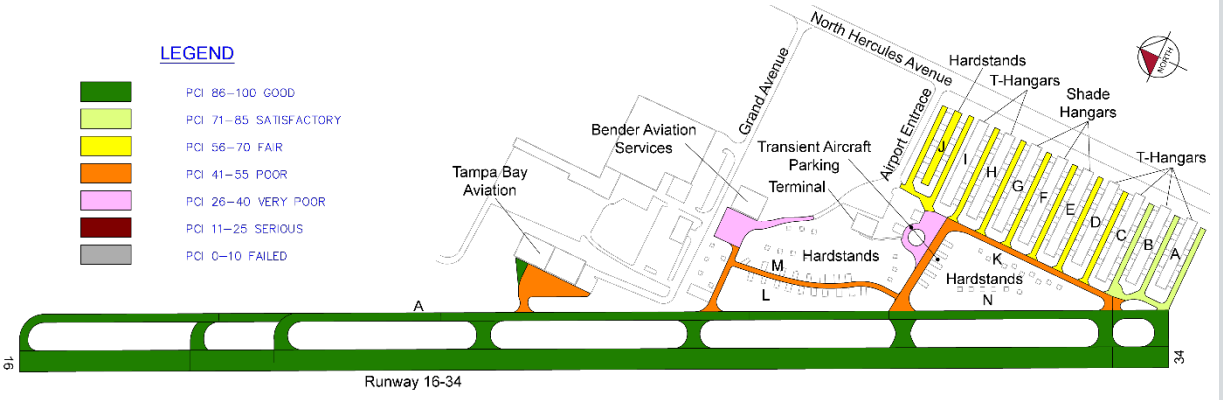


Figure 2.4 FDOT 2015 Pavement Condition Report

Source: FDOT Statewide Airfield Pavement Management Program (June 2015)

Runway 16-34 and Taxiway A (as well as all connector taxiways) are in good condition. The FDOT report identified approximately $2.6 million in near-term (2015) major rehabilitation needs for the Tampa Bay Aviation hangar apron (poor), the Bender Aviation Services hangar apron (very poor), the taxilanes accessing the hardstand rows K, L, M, and N (poor) and J (fair) as well as those accessing covered parking areas C (north), D, E, F, G, H, and I (fair). The FDOT report also identified a $406,000 major rehabilitation of the taxilanes accessing T-Hangars A, B, and C (south) in 2018 (satisfactory). Preventive maintenance during the FDOT report's 10-year planning horizon included another $615,000 in preventative maintenance for an estimated program total of $3.62 million. Since no major pavement rehabilitation has been completed since the 2015 FDOT report, it is recommended the major rehabilitations and preventative maintenance projects are included in CLW's Capital Improvement Program (CIP).

2.4.4 Navigational Aids

Both runway ends 16 and 34 are equipped with a 4-Box Visual Approach Slope Indicator (VASI). These systems are owned and maintained by the FAA. These visual aids adequately satisfy the needs of these runways.

Runway 16-34 is equipped with medium intensity runway edge lighting (MIRL). This lighting satisfies the FAA standard for the approach visibility minimums of each runway and is sufficient to accommodate existing and future aircraft operations. All the existing taxiways at CLW have Medium Intensity Taxiway Lights (MITL). This lighting is sufficient to satisfy existing and future operational requirements.

The primary wind cone is located at the approximate midpoint of the runway, on the west side. A second supplementary wind cone can be found mounted on the western end of a series of T-hangars located east of the Runway 34 threshold. A segmented circle to indicate the non-standard airport traffic pattern is marked on the Runway near the 34 end.

A study was completed in 2015 to access the impacts associated with implementing a non-precision instrument approach procedure at CLW. The impacts the study identified include:

- Increased CFR Part 77 Civil Airport Imaginary Surfaces
- Primary Surface to width of 500 feet
- Transitional Surfaces will be penetrated by trees and buildings
- Approach Surface trapezoid will be larger (albeit at Slope of 20:1)
- Runway Protection Zone will be larger and will have incompatible land uses per Interim RPZ guidance
- 150/5300-18B survey Will NOT pickup objects appropriate to CFR Part 77 or TERPS Departure Surfaces for NP LNAV GPS Approach
- NGS Survey conducted in 2011 for LPV approach to Runway 16
- LPV approach will introduce TERPS OCS Surfaces, Larger Approach Surface and Larger RPZ

2.5 General Aviation Facilities

Facility requirements for General Aviation (GA) facilities are determined from a variety of available guidance, but primarily includes:

- FAA Advisory Circular 150/5300-13A (Change 1), Airport Design
- Transportation Research Board (TRB) Airport Cooperative Research Program (ACRP) Report 113: Guidebook on General Aviation Facility Planning

2.5.1 Aircraft Parking & Storage

Aircraft parking facilities typically requires a large area because they require adequate aircraft storage hangars, tie-down positions, clearance from other fixed and/or movable objects, and access to/from the airfield. The following sections summarize the requirements for the aircraft parking facilities.

Table 2.5 Aircraft Parking and Hangar Storage Requirements

Item	Existing Conditions	Forecast				
		2018	2023	2028	2033	2038
Single-Engine Based Aircraft	119	123	125	127	129	131
Multi-Engine	14	14	14	15	15	16
Helicopters	6	6	7	8	10	11
Total Based GA Aircrafts	**139**	**143**	**146**	**150**	**154**	**157**
T-Hangar Units[1]	87	96	97	99	101	102
T-Hangar Unit Surplus/**(Deficiency)**	-	(9)	(10)	(12)	(14)	(15)
Conventional Storage Hangars	3	4	4	5	5	5
Conventional Storage Hangars Surplus/**(Deficiency)**	-	(1)	(1)	(2)	(2)	(2)
Total Based Aircraft in Storage Hangars	**97**	**108**	**109**	**113**	**116**	**119**
Based Aircraft Parked at Hardstands[2]	42	35	37	37	38	38
Based Aircraft Hardstands Surplus/**(Deficiency)**	6	13	11	11	10	10
Transient Aircraft at Hardstands	12	12	13	13	14	15
Transient Aircraft Hardstands Surplus/ **(Deficiency)**	(5)	(5)	(6)	(6)	(7)	(8)
Total Recommended Hardstands	**54**	**47**	**50**	**50**	**52**	**53**
Surplus/**(Deficiency)** with Hangar Development	(6)	1	(2)	(2)	(4)	(5)
Surplus/**(Deficiency)** without Hangar Development	(6)	(10)	(14)	(18)	(23)	(27)

Notes:

[1] *The existing T-Hangars units are 100% occupied*

[2] *Existing number of hardstand positions only include those paved for aircraft parking*

2.5.1.1 Aircraft Hangars

Hangar storage at CLW is provided via T-Hangars and conventional hangars. T-Hangars are multi-unit hangar buildings typically utilized for small ADG I aircraft with wingspans less than 49 feet. The size of a T-Hangar building is dependent upon the type and number of units it accommodates. For example, the type of T-Hangar buildings at CLW are in a nested configuration which allows access from both sides of the building, creating a shorter but wider structure. Conventional hangars can accommodate aircraft larger than an ADG I. The size of a conventional

hangar is dependent upon the type and number of aircraft to be stored. Conventional hangar buildings are primarily provided as single-unit structures but can also include multi-unit structures.

The following planning parameters were used for determining hangar requirements:

- The existing 87 T-Hangar and Shade Hangar units are 100 percent occupied
- Storage of based single-engine aircraft is based on the following:
  - 69 percent will be stored in T-Hangars or Shade Hangars
  - 30 percent will be stored at tie-down positions
  - 1 percent will be stored in a conventional hangar
- Storage of based multi-engine aircraft is based on the following:
  - 75 percent will be stored in T-Hangars or Shade Hangars
  - 25 percent will be stored in conventional hangar
- Storage of based helicopters is based on the following:
  - 15 percent will be stored in T-Hangars or Shade Hangars
  - 85 percent will be stored in conventional hangar
- A single conventional hangar can accommodate more than one aircraft in the hangar, including either:
  - 2.5 single-engine or multi-engine aircraft; or
  - 4 helicopters

It is recommended that space is reserved for 15 additional T-Hangar units (number of structures to be determined) and two additional conventional storage hangars based on anticipated demand.

2.5.1.2 Aircraft Parking Apron

Appendix C of the ACRP Guidebook for General Aviation Facility Planning provides a method for determining the number of aircraft tie-down positions utilizing annual transient operations. For the purposes of this analysis, itinerant general aviation operations are considered transient. The ACRP formula for calculating number of parking spaces is:

(X/2*T) / 365 * P = Number of Transient Parking Positions

Where,

X = number of forecast operations (general aviation)

T = percent of operations which are transient (40 percent for CLW)

P = percent of transient aircraft that are parked on the apron at the same time (80 percent for CLW).

Based on existing and forecast operations, the number of parking spaces required is currently 12 and will increase to 15 in 2038. Since CLW only has 7 existing aircraft parking positions available for transient operations, there is an immediate need for 5 additional transient aircraft parking positions and a total of 15 throughout the planning horizon.

2.5.2 Terminal

The ACRP Report 113 provides a method for sizing the GA Terminal building based on peak-hour operations and occupancy. The method's planning factors consist of 2.5 people per peak hour operation, and 100 SF to 150 SF of space per person. For planning purposes, 150 SF per person was used to account for the additional spaces required for flight training activities by Tampa Bay Aviation. However, the actual size will be determined during planning and design of the facility based on the needs of the City and its tenants. **Table 2.6** summarizes the recommended terminal building size based on the aviation activity forecasts.

Table 2.6 GA Terminal Building Size Recommendation

Year	Peak Hour Operations	Persons per Peak Hour Operation	Space Per Person (SF)	Recommended Terminal Size (SF)
2017	27	2.5	150	10,125
2018	27	2.5	150	10,125
2023	29	2.5	150	10,875
2028	30	2.5	150	11,250
2033	32	2.5	150	12,000
2038	33	2.5	150	12,375

Source: ACRP Report 113; AECOM Analysis

2.5.3 Vehicle Parking

The existing terminal building includes 25 vehicle parking spaces. The City indicated the parking spaces are 100 percent occupied during peak periods. ACRP Report 113 (Exhibit 5-48) recommends providing a minimum of 2.5 parking spaces per peak hour operation and 1 space for every 200 SF of office or operations area within the building. For the purposes of this analysis, it was assumed vehicle parking for hangars would occur at the tenant's hangar and are not included in the facility requirements.

As summarized in **Table 2.7** and based on the estimated peak hour operations, there is an immediate need for an additional 49 vehicle parking spaces and 79 additional vehicle parking spaces in 2038 for a total of 104 vehicle parking spaces.

Table 2.7 GA Terminal Vehicle Parking Space Recommendations

Parameters	Existing Conditions	Forecast				
		2018	2023	2028	2033	2038
2.5 spaces per peak-hour operation		67	68	71	75	79
1 space per 200 SF of Office/Operations Area		7	21	22	24	25
Total Recommended Vehicle Parking Spaces	**25**	**74**	**90**	**94**	**99**	**104**
Vehicle Parking Spaces Surplus/ **(Deficiency)**	-	(49)	(65)	(69)	(74)	(79)

Source: ACRP Report 113; AECOM Analysis

2.6 Support Facilities

Support facilities analyzed in this section include the airport maintenance and fuel storage facilities.

2.6.1 Airport Maintenance

Historically, the Airport shared landscape maintenance duties with an external contractor. The Airport has recently purchased a large tractor for mowing of grass and other airport maintenance purposes in order to eliminate the need for an external contractor. The two 300 SF maintenance sheds adjacent to the existing terminal are not large enough to store the new tractor. Therefore, a new maintenance storage shed is recommended to provide secure shelter for the new tractor.

2.6.2 Fuel Storage

An adequate supply of fuel is necessary to minimize the frequency of fuel deliveries and the potential impacts to aircraft operations. Based on the operational characteristics of CLW and for the purposes of this analysis, it is recommended that the City maintain a fuel storage capacity of 14 days.

Two types of fuel are available at CLW: AvGas (100 low lead) and Jet-A. AvGas is primarily used by GA piston aircraft operators and Jet-A is used by the Air Taxi, Military, and GA turboprop operators. The existing storage capacity at CLW is 12,000 gallons of AvGas and 12,000 gallons of Jet-A.

Fuel sales data for 2016 was obtained from the City for the purposes of this analysis. GA operations typically include several short-term flights such as touch-and-go's or local sightseeing which do not utilize a large amount of fuel and/or flights to nearby airports where fuel may be purchased prior to returning to CLW. Consequently, the average amount of AvGas demand per operation in 2016 is relatively low at approximately 3 gallons per operation.

Jet-A fuel storage requirements were determined utilizing a demand of 43 gallons per Jet-A operation. For the purposes of this analysis, a Jet-A operation includes all Air Taxi and Military operations as well as 1 percent of all GA operations.

As summarized in **Table 2.8**, the existing fuel storage supply for AvGas and Jet-A is sufficient to provide a 14 day supply throughout the planning horizon.

Table 2.8 Fuel Storage Capacity Recommendations

Item	Existing Conditions	Forecast				
		2018	2021	2026	2031	2036
Average Day Peak Month (ADPM) Operations[1]	181	183	192	202	212	223
ADPM Jet-A Operations	2	2	2	2	2	2
ADPM Jet-A Demand per Operation (gallons/ops)[2]	43	43	43	43	43	43
ADPM Jet-A Demand (gallons)	86	87	91	96	100	105
Existing Jet-A Storage Capacity (gallons)	12,000	12,000	12,000	12,000	12,000	12,000
Existing Jet-A Storage Capacity (days)[3]	139	138	132	126	120	114
Jet-A Storage Capacity Required (gallons)	1,205	1,217	1,276	1,339	1,404	1,473
Existing Jet-A Storage Capacity Surplus / (Deficit)	10,795	10,783	10,724	10,661	10,596	10,527
ADPM AvGas Operations	179	181	190	200	210	221
ADPM AvGas Demand per Operation (gallons/ops)[2]	3	3	3	3	3	3
ADPM AvGas Demand (gallons)	537	542	570	599	630	662
Existing AvGas Storage Capacity (gallons)	12,000	12,000	12,000	12,000	12,000	12,000
Existing Gas Storage Capacity (days)[3]	22	22	21	20	19	18
AvGas Storage Capacity Required (gallons)	7,517	7,592	7,980	8,387	8,815	9,265
Existing AvGas Storage Surplus / (Deficit)	4,483	4,408	4,020	3,613	3,185	2,735

[1] *Includes all operations types*

[2] *Based on 2016 Fuel Sales data*

[3] *A storage capacity of 14 days is recommended*

2.7 Land Use

The property boundary of CLW includes a 75-acre site currently occupied by The Landings Golf Club and zoned as Open Space / Recreational by the City of Clearwater. The lease for this site will expire within the planning horizon of this ALP Update and may not be renewed by the City of Clearwater and/or The Landings Golf Club.

Airports are recognizing the opportunity to utilize surplus land for revenue generating purposes such as corporate hangars and/or industrial parks. It is recommended this site is reserved for aeronautical and/or non-aeronautical purposes in the event the lease is not renewed. A public referendum will be required to change the zoning of this parcel from Open Space / Recreational to Commercial / Industrial.

2.8 Summary of Recommendations

Based on the analyses summarized in previous sections, the following facility improvements are recommended:

- Obtain control of unowned parcels with the APRZ and DPRZ to the extent practical
- Maximize operational safety and efficiency of aircraft parking areas through aircraft wingspan restrictions on taxilanes or relocation/reconfiguration of parking positions
- Mitigate non-standard taxiway geometries
- Rehabilitate pavement per FDOT pavement management report
- 5 additional transient parking positions in the near-term and a total of 15 throughout the planning horizon
- 15 additional T-Hangar units
- 2 additional conventional hangars
- Expand the terminal building to roughly 12,500 SF
- Increase the number of vehicle parking spaces from 25 to 104
- Provide a new secured maintenance shed for storage of the recently purchased tractor
- Reserve the 75-acre site currently occupied by The Landings Golf Club for aeronautical / non-aeronautical purposes

Section 3.0
ALTERNATIVES ANALYSIS

3.1 Introduction

The City of Clearwater ("City") is updating the Airport Layout Plan (ALP) and Capital Improvement Program (CIP) for the Clearwater Airpark (CLW or Airpark) based on existing and anticipated demand. The Airpark has experienced increasing demand for use of their facilities over the past few years and has identified an immediate need for additional and/or improved facilities, including aircraft storage and terminal facilities. The purpose of this report is to identify and evaluate development alternatives recommended to accommodate the facility requirements provided in Working Paper #2, which included:

- Obtain control of unowned parcels with the Approach Runway Protection Zone (APRZ) and Departure Runway Protection Zone (DPRZ) to the extent practical
- Mitigate non-standard taxiway configurations
- Rehabilitate pavement per the Florida Department of Transportation (FDOT) pavement management report
- Provide blast pads for both runway ends
- Maximize operational safety of aircraft parking areas through aircraft wingspan restrictions on taxilanes or relocation/reconfiguration of parking positions
- Provide 8 additional transient parking positions and 56 total aircraft parking positions
- 15 additional T-Hangar units
- 2 additional conventional hangars
- Expand the terminal building to roughly 12,500 Square Feet (SF)
- Increase the number of vehicle parking spaces from 25 to 104
- Provide a new secured maintenance shed for storage of the recently purchased tractor
- Provide a new Airport Rotating Beacon
- Reserve the 75-acre site currently occupied by The Landings Golf Club for aeronautical / non-aeronautical purposes

3.2 Evaluation Criteria

The FAA recommends a standard set of criteria to evaluate development alternatives according to an airport's unique situation. The evaluation process should feature "generally accepted planning principles, be replicable, consistently applied, and well documented."[1] Similarly, the Florida Department of Transportation (FDOT) 2016 Guidebook for Airport Master Planning states "a set list of selection criteria or influencing factors should be identified to help evaluate and select the recommended plan." Accordingly, a set of evaluation criteria were established for use in the alternatives analysis. The criteria are strategic, qualitative, and quantitative to ensure that the evaluation process remained at a master planning level of detail.

The selected criteria include the following:

1. **Achievement of the Objective:** This is primarily based on achieving the specific need identified in the Facility Requirements. Alternatives are assessed and ranked based on the degree to which it satisfies the objective.
2. **Airport Design Standards**: The proposed development should satisfy all applicable airport design standards and maintain or improve the safety and efficiency of the Airpark.
3. **Flexibility:** The alternative should support a reasonable level of flexibility to accommodate changes in demand, including the ability to be expanded in the future.
4. **Collateral Impacts**: This evaluates the extent to which an alternative requires changes or improvements to existing Airpark facilities which otherwise would not require changes or improvements. For example, mitigation of existing stormwater drainage features due to a proposed structure.

3.3 Development Constraints

Certain features or operational factors of the Airpark represent constraints to development due to the costs associated with impacts, political and/or socioeconomic factors, and/or operational safety. Within the existing property boundary of CLW, these constraints include existing infrastructure and environmental features as depicted in **Figure 3.1**.

[1] *FAA Advisory Circular 150/5070-6B, Airport Master Plans, paragraph 904*

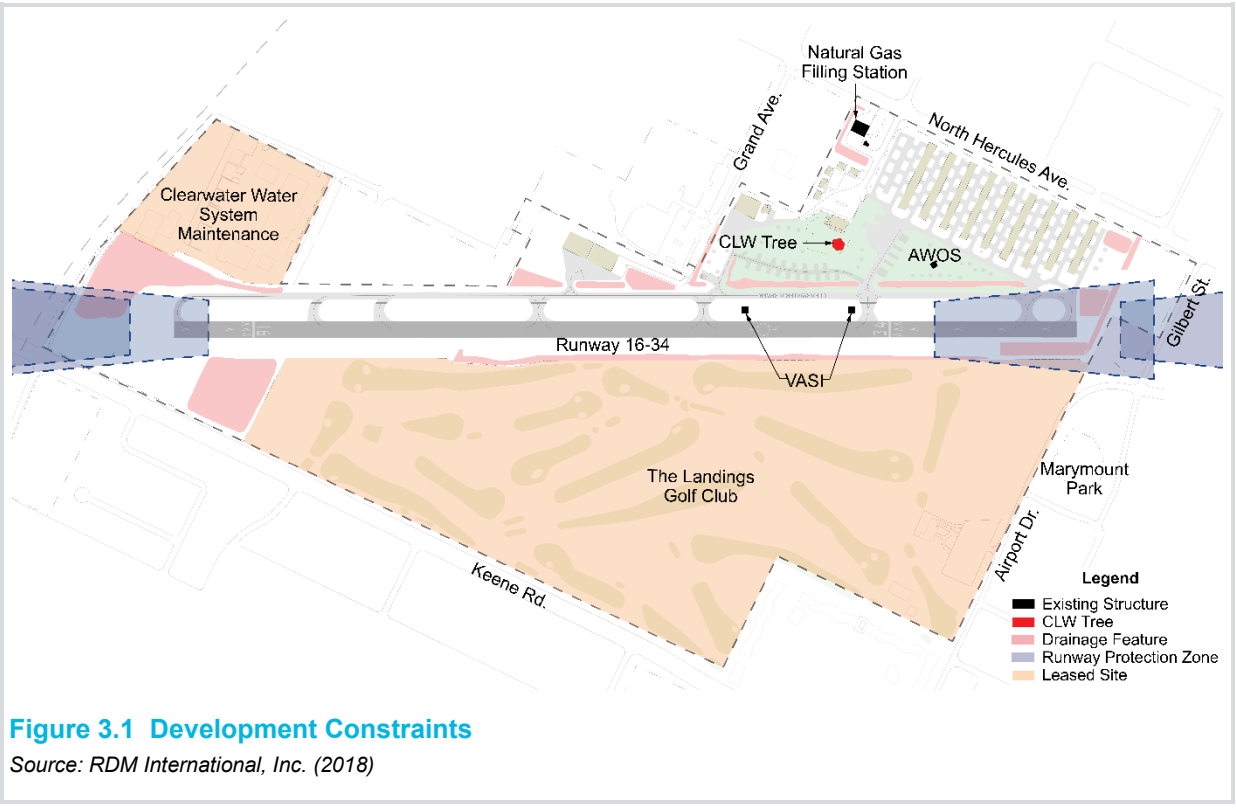


Figure 3.1 Development Constraints

Source: RDM International, Inc. (2018)

3.3.1 Infrastructure Constraints

Existing infrastructure constraints at CLW include:

- Clearwater Gas System Natural Gas Filling Station located at the entrance of the Airpark on North Hercules Avenue
- Existing Automated Weather Observation System (AWOS) located within the aircraft hardstand parking area adjacent to the T-Hangars
- Existing Visual Approach Slope Indicator (VASI) system components at the Runway 34 end
- The City of Clearwater Water System Maintenance complex at the north end of the Airpark
- The Landings Golf Club west of the airfield (while this land may be available for development at some time in the future, no development was proposed on this site for this planning period)

3.3.2 Environmental Constraints

The primary environmental constraints at CLW include existing drainage features. While these drainage features can be mitigated to accommodate new development, there are typically high costs associated with mitigation requirements.

Additionally, an existing 100 plus year-old tree located just outside the existing terminal was also considered a development constraint as it is a widely recognized and valued feature of the Airpark.

3.3.3 Operational Constraints

Operational constraints, other than those associated with aircraft movement safety areas such as the taxiway object free area, include the Runway Protection Zones (RPZs). Based on current FAA design guidelines, no development is proposed inside the RPZs.

3.4 Development Alternatives

This section evaluates several alternatives to address the capacity, efficiency, and safety requirements previously summarized. However, some improvements were not subject to an alternatives analysis if they were recommended to satisfy FAA design standards or restricted by the development constraints summarized in the previous section, including:

- Blast pads at both runway ends
- Mitigation of direct access from the aircraft hardstand parking area to the runway
- Aircraft hardstand parking reconfiguration

Key elements of the existing hardstand parking area are illustrated in **Figure 3.2**.

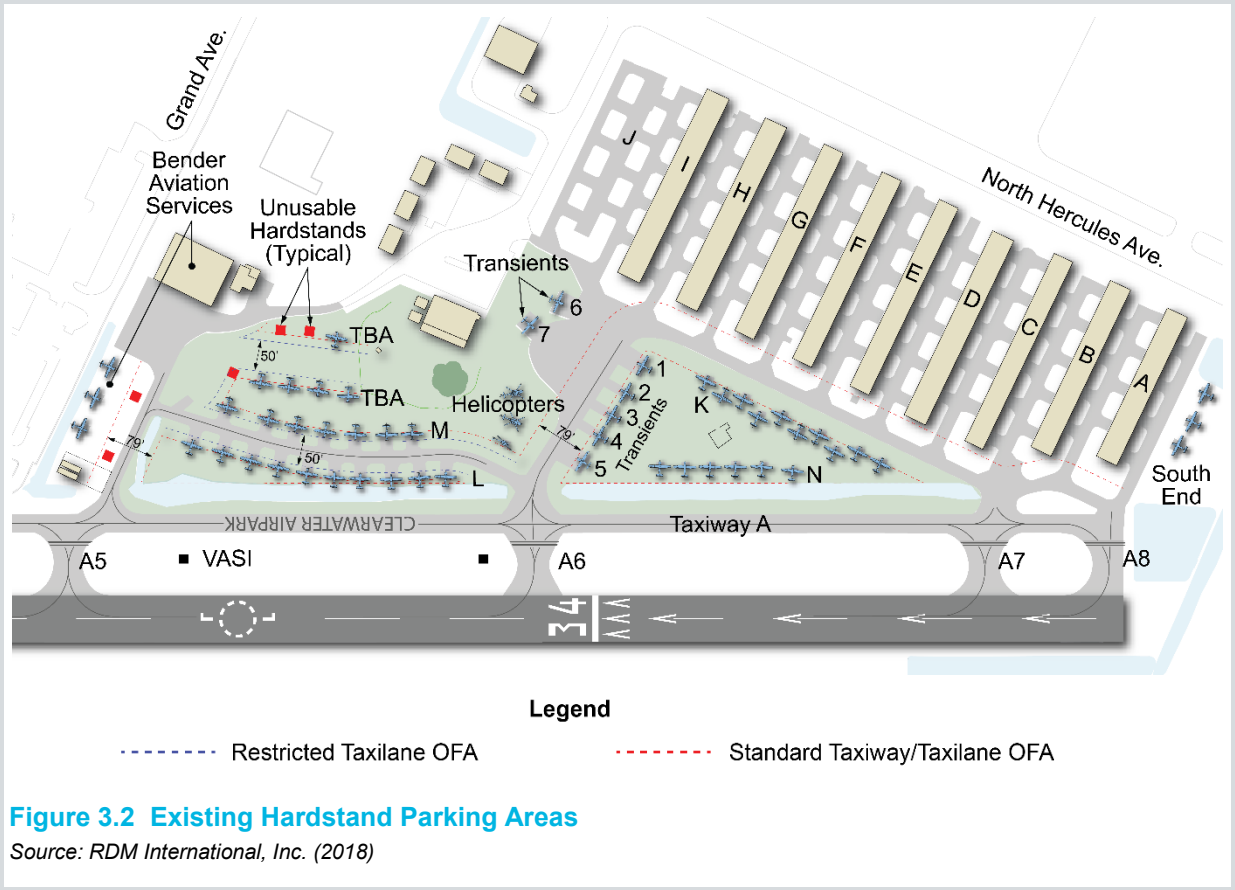


Figure 3.2 Existing Hardstand Parking Areas

Source: RDM International, Inc. (2018)

The existing taxilane from the transient hardstand positions allows for direct access to the runway via Taxiway A6. To mitigate this condition, relocation of the taxiway connector between Taxiway A and Runway 16-34 is recommended. The existing VASI system restricts relocation of this connector to the south. Therefore, it is proposed that the existing connector is removed, and a new connector is constructed south of the existing connector as illustrated in **Figure 3.3**.

Reconfiguration of the hardstand parking Rows K and N (16 positions), as well as transient parking positions 1-5, is restricted by the existing AWOS and drainage ditch parallel to Taxiway A. Therefore, it is recommended the existing condition is maintained due to cost associated with mitigating these restrictions.

Similarly, the reconfiguration of existing hardstand parking Rows M and L as well as the Tampa Bay Aviation positions are restricted by the existing tree outside the terminal and a drainage ditch parallel to Taxiway A. However, reconfiguration of this area is recommended to maximize the number of aircraft hardstand positions and operational safety. As illustrated in **Figure 3.3**, reconfiguration of this area includes realignment and expansion of the hardstand parking rows, relocation of helicopter pads, and new transient parking hardstand pads. The taxilane accessing transient parking positions will provide ADG II aircraft access which requires an expansion of the transient hardstand pads 2-5 to maintain adequate wingtip clearance. A total of 56 aircraft hardstand parking positions is provided.

Three new hardstand parking positions east of the existing fuel farm are also proposed for use by Bender Aviation. These will replace the two existing unusable positions that are currently within the taxilane object free area. These positions are used exclusively by Bender Aviation and are not included in the total number of aircraft parking positions available for based or transient aircraft.

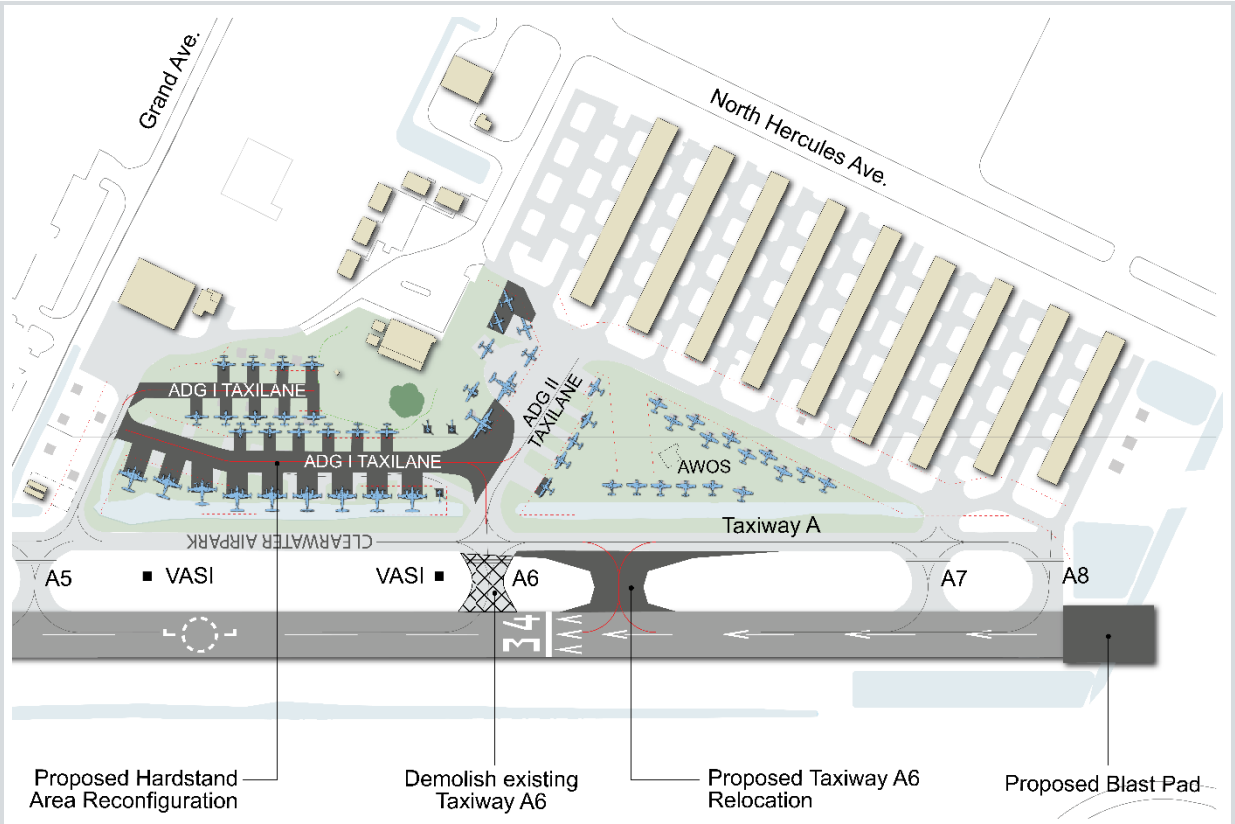


Figure 3.3 Standard Recommended Improvements

Source: RDM International, Inc. (2018)

3.4.1 T-Hangars

The anticipated demand within the planning horizon indicates an additional 15 T-Hangar units can be supported at the Airpark. Each T-Hangar structure can accommodate multiple units. For the purposes of this analysis, two T-Hangar structures are proposed to accommodate the recommended 15 additional units.

3.4.1.1 Alternative 1

The first alternative (**Figure 3.4**) includes the construction of a new structure on existing Row J, currently an uncovered aircraft parking area accommodating 9 positions. Utilizing existing Row J eliminates the need to construct new pavement for access to each unit. However, it is recommended this includes the realignment of the airport security fence to maximize aircraft wingtip clearance on the north side of the structure.

A new 10-unit structure is also proposed south of existing T-Hangar A and parallel to North Hercules Boulevard. This option eliminates 2 existing hardstand positions and requires mitigation of impacts to an existing retention pond, drainage canal, and potentially a berm inside airport property along Gilbert Street.

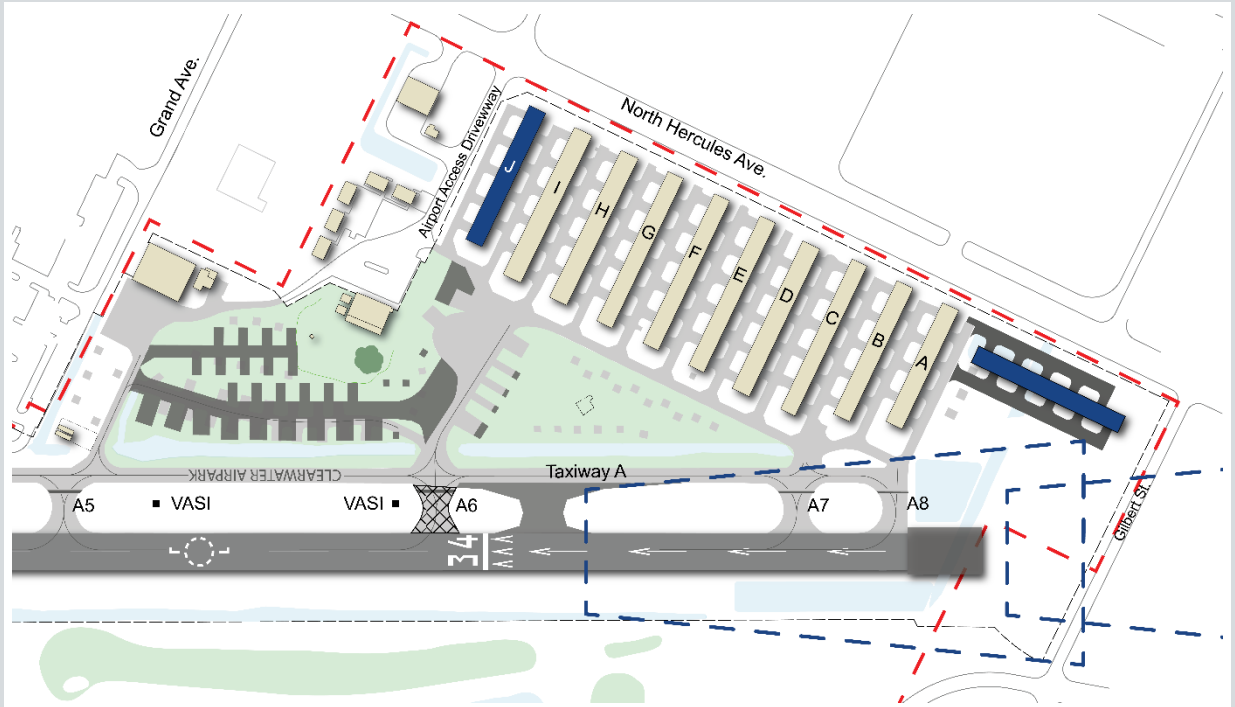


Figure 3.4 T-Hangars - Alternative 1

Source: RDM International, Inc. (2018)

3.4.1.2 Alternative 2

The second alternative (**Figure 3.5**) also includes the construction of a new T-Hangar on existing Row J as in Alternative 1 and a new T-Hangar south of existing T-Hangar A. However, the new T-Hangar south of existing T-Hangar A is aligned to eliminate the need to mitigate the existing retention pond and minimize impacts to the existing drainage canal while also avoiding impacts to the Runway 34 Protection Zones and airspace.

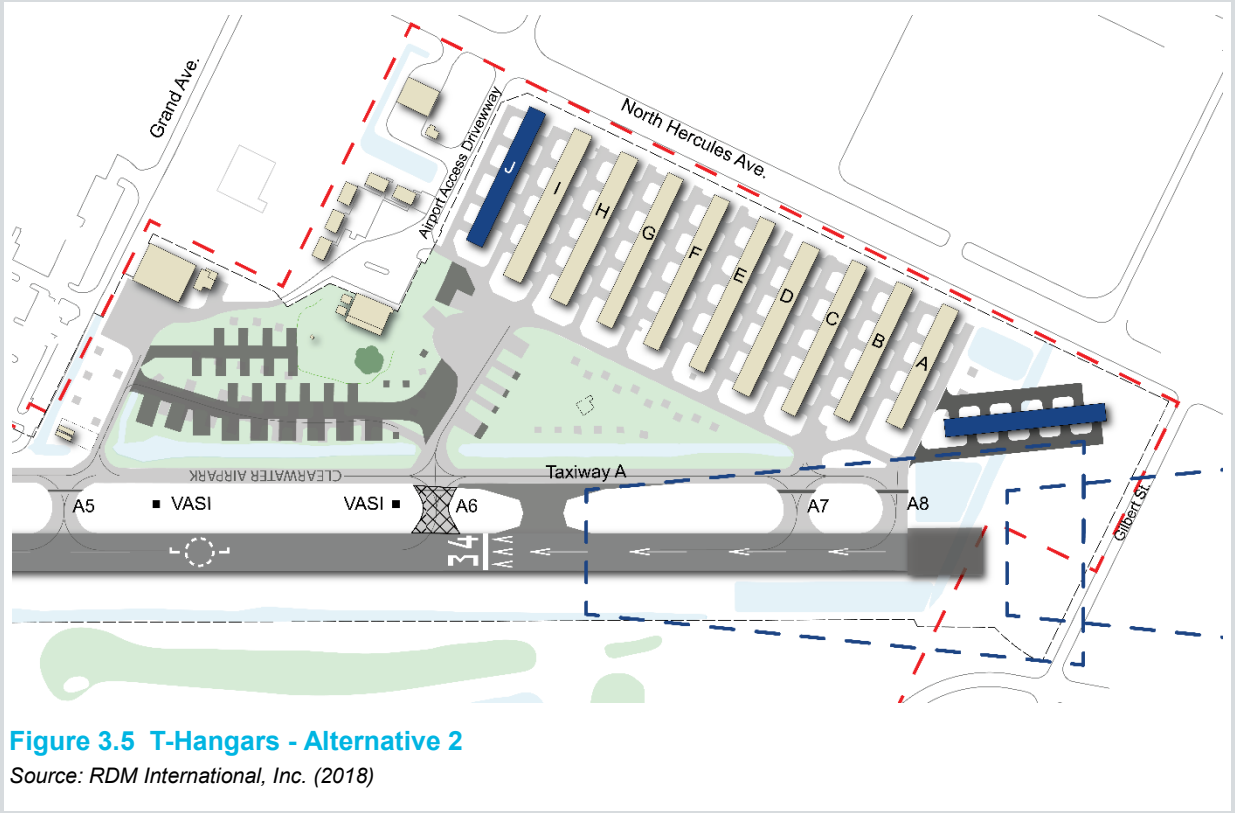


Figure 3.5 T-Hangars - Alternative 2

Source: RDM International, Inc. (2018)

3.4.1.3 T-Hangar Alternatives Evaluation

Table 3.1 summarizes and compares the alternatives according to the evaluation criteria previously identified in this chapter. Based on the evaluation, Alternative 1 is the recommended alternative.

Table 3.1 T-Hangar Alternatives Evaluation

Criteria	Alternative	
	1	2
Achievement of the Objective	Yes	Yes
Airport Design Standards	Partial	Partial
Flexibility	Yes	No
Collateral Impacts	Poor	Fair

Source: RDM International, Inc.

Achievement of the Objective

The primary objective is to provide 15 additional T-Hangar units. Both alternatives can provide approximately 19 units.

Airport Design Standards

The construction of a new covered structure on Row J utilizes the existing pavement which does not in each alternative adheres to FAA design standards.

Flexibility

The new structure proposed south of existing T-Hangar A in Alternative1 can accommodate an expansion of the structure as well as additional hardstand pads without resulting in additional impacts. However, the structure proposed in Alternative 2 cannot accommodate an expansion while maintaining adequate clearance from existing infrastructure.

Collateral Impacts

Each alternative requires mitigation of existing stormwater drainage features. However, Alternative 2 minimizes the impacts and the associated costs.

3.4.2 Conventional Hangars

The anticipated demand within the planning horizon indicates an additional 2 Conventional Hangar units can be supported at the Airpark. The existing Tampa Bay Aviation conventional hangars are approximately 10,000 SF. A 10,000 SF hangar can accommodate approximately 98% of aircraft categorized as ADG I or II[2]. Therefore, a 10,000 SF hangar is recommended to maximize flexibility for the number and type of aircraft that can be stored in the hangar. Three potential locations were identified for development of additional hangars, as illustrated in **Figure 3.6**.

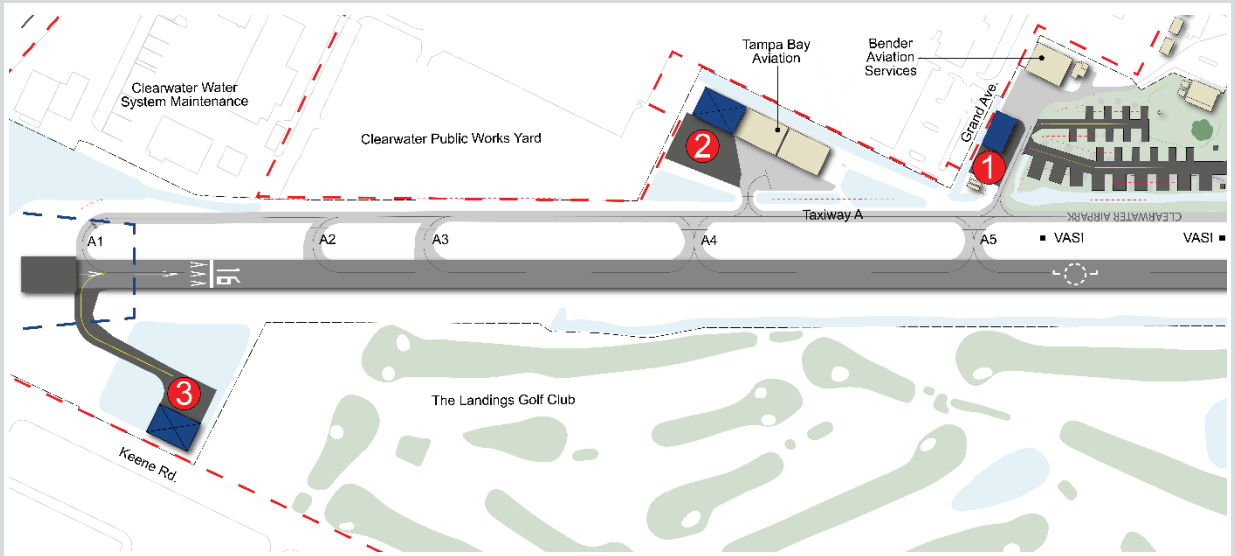


Figure 3.6 Conventional Hangar Alternative Locations

Source: RDM International, Inc. (2018)

3.4.2.1 Alternative 1

The first potential location for a new conventional hangar is south of the existing Bender Aviation Services hangar and north of the existing fuel tanks. This location can accommodate a conventional hangar outside of the taxilane object free area, but the aircraft parking area must be located south of the proposed hangar structure. Additionally, the size of the hangar structure is limited to approximately 6,000 Square Feet (SF) hangar and the aircraft parking apron is restricted to approximately 1,200 Square Yards (SY) due to existing infrastructure. Three existing hardstand pads utilized by Bender Aviation Services are eliminated in this alternative.

3.4.2.2 Alternative 2

The second potential location utilizes a vacant site adjacent to the existing Tampa Bay Aviation hangars. The site can accommodate a 10,000 SF hangar (same as the existing hangars) and an 1,800 SY expansion of the existing aircraft parking apron (the existing apron is approximately 2,300 SY).

3.4.2.3 Alternative 3

The third potential location is along Keene Road on the west side of Runway 16, north of the existing fence line of The Landings Golf Club. Similar to Alternative 2, this site can also accommodate a 10,000 SF hangar and 1,800 SY aircraft parking apron. The site provides easy

[2] *Airport Cooperative Research Program (ACRP) Report 113, Guidebook on General Aviation Facility Planning*

access from Keene Road and flexibility to construct additional hangars and aircraft parking apron in the future if needed. However, this site requires a new taxiway for access to Runway 16-34 and Taxiway A as well as mitigation of an existing retention pond.

3.4.2.4 Conventional Hangar Alternatives Evaluation

Table 3.2 summarizes and compares the alternatives according to the evaluation criteria previously identified in this chapter. Based on the evaluation, Alternative 2 and Alternative 3 are the recommended alternatives for the recommended 2 future hangars.

Table 3.2 Conventional Hangar Alternatives Evaluation

Criteria	Alternative		
	1	2	3
Achievement of the Objective	Partial	Yes	Yes
Airport Design Standards	Yes	Yes	Yes
Flexibility	No	No	Yes
Collateral Impacts	Fair	Good	Very Poor

Source: RDM International, Inc.

Achievement of the Objective

Alternative 2 and Alternative 3 each can accommodate a 10,000 SF hangar. Since the size of the hangar in Alternative 1 is restricted, it is considered to only partially achieve the objective.

Airport Design Standards

Each of the proposed locations can accommodate a new hangar and aircraft parking area without impacting safety areas.

Flexibility

Alternative 3 is the only location that can accommodate future expansion. Alternative 1 is restricted by the existing taxilane, Bender Aviation Services facility, the fuel farm, and Grand Avenue. Alternative 2 is restricted by Taxiway A, an existing drainage ditch, and other existing off-airport infrastructure.

Collateral Impacts

Alternative 1 and Alternative 2 can be constructed without significant mitigation of existing drainage features. However, Alternative 3 is located within an existing retention pond constructed for runoff from Keene Road when it was widened in the mid-2000s and will require extensive mitigation. Furthermore, the Alternative 3 site is within a parcel zoned as Open Space / Recreational and would require a significant rezoning effort before it can be implemented.

3.4.3 Terminal

A larger terminal building, maintenance shed, and vehicle parking area is recommended. Due to existing constraints and recommended developments summarized in the preceding sections, it is recommended the existing terminal site is utilized for a future terminal building and automobile parking area. Two alternatives were identified and evaluated for the future terminal.

Figure 3.7 illustrates the existing terminal and proposed aircraft parking area for reference. There are 5 existing trailers (each approximately 1,000 SF) used by the Civil Air Patrol (CAP), a vehicle parking lot with 25 spaces, and a 3,800 SF terminal structure.

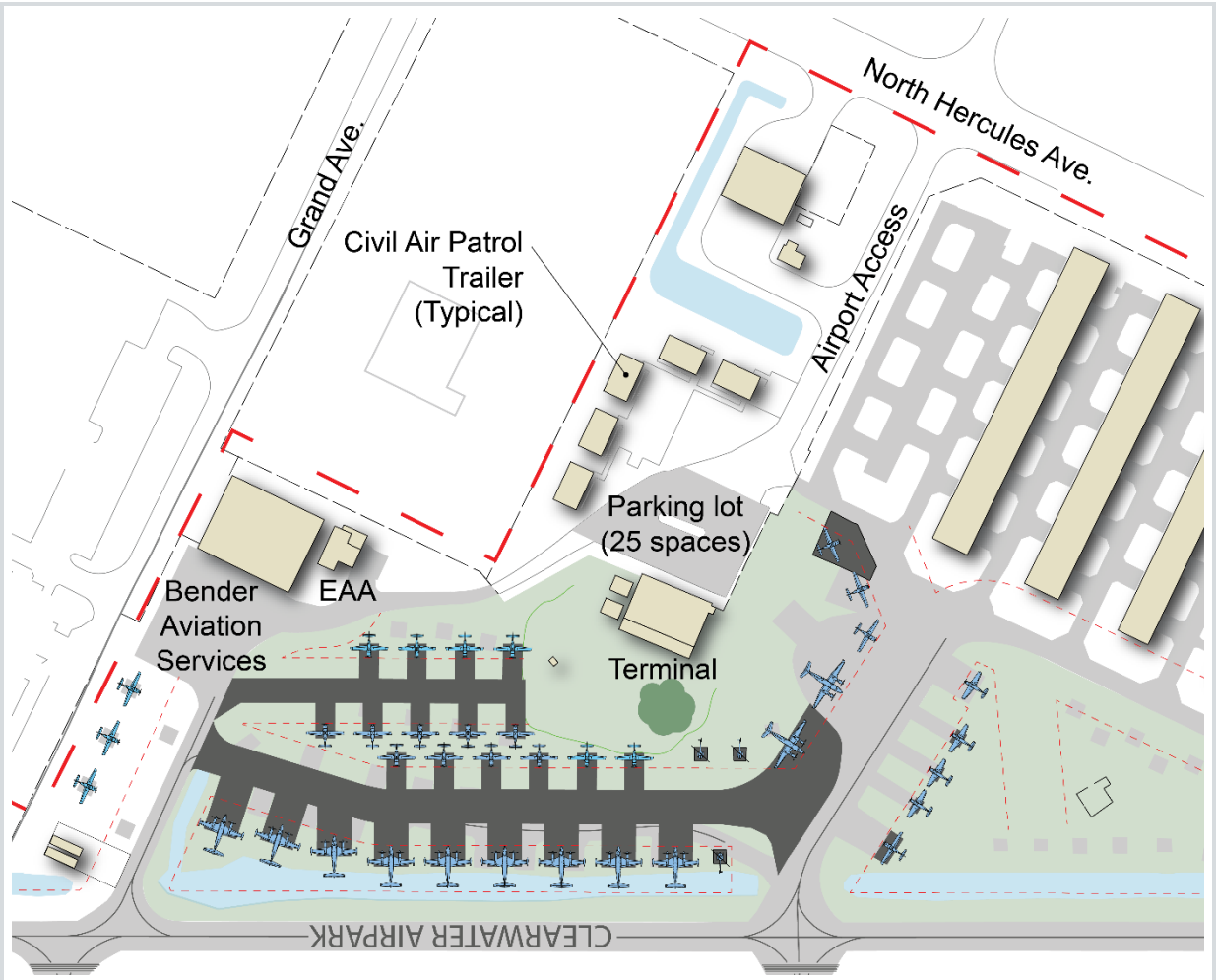


Figure 3.7 Terminal Area

Source: RDM International, Inc. (2018)

3.4.3.1 Alternative 1

The first alternative (**Figure 3.8**) expands the terminal in its existing location and maintains 3 of the existing 5 CAP trailers. To accommodate an expansion of the vehicle parking lot, one of the remaining CAP trailers will be relocated and the other removed. The proposed 12,500 SF single-story terminal structure is sized based on anticipated demand in 2038. A second-story may be necessary to accommodate other features such as a restaurant and/or conference room. Additionally, a temporary building will be required during construction of the proposed terminal.

The proposed expansion of the existing vehicle parking lot is restricted by the CAP trailers and an existing drainage ditch. Therefore, the expansion can only accommodate 94 parking spaces, 11 short of the 105 spaces recommended based on anticipated demand.

A new maintenance shed is proposed adjacent to the EAA facility.

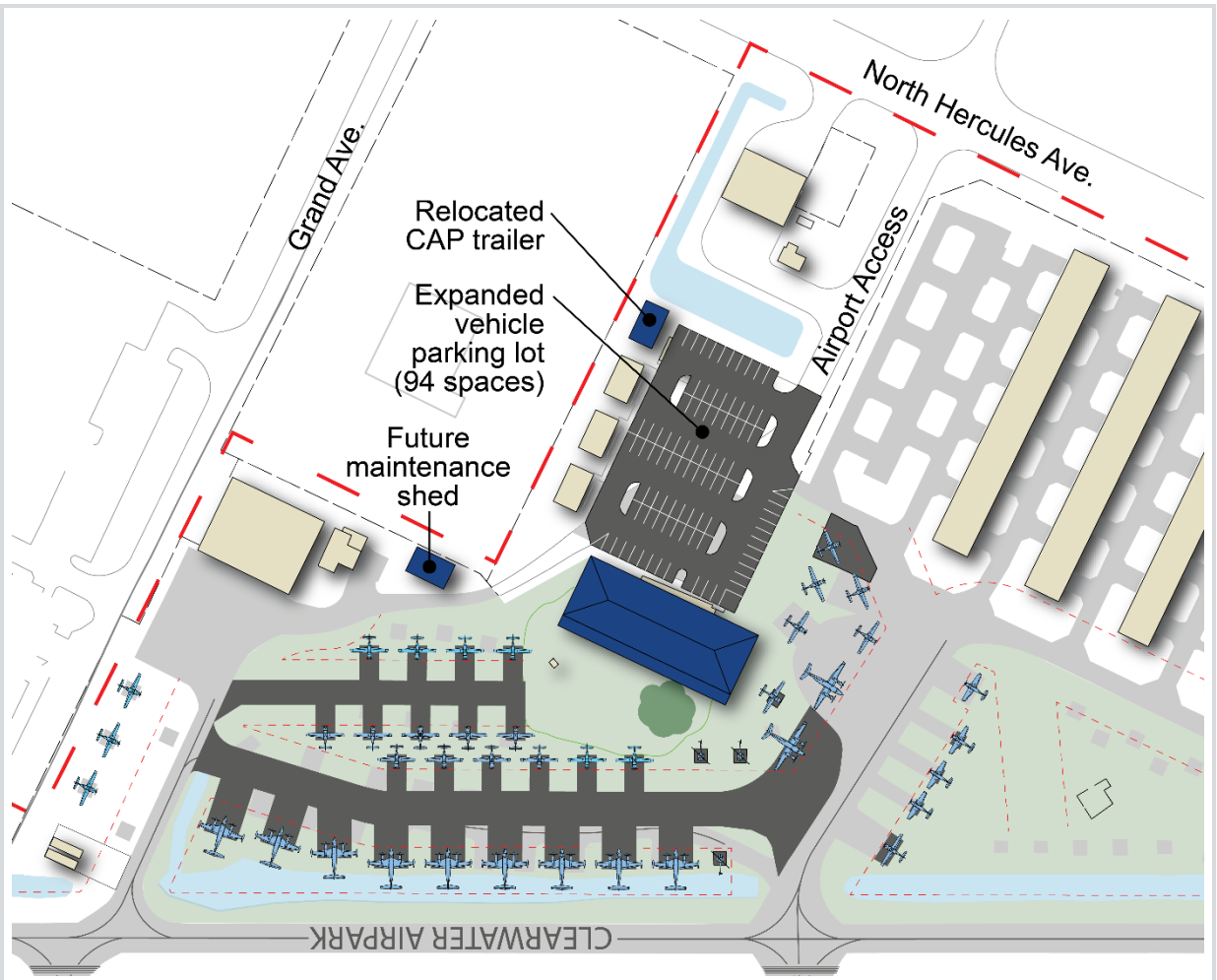


Figure 3.8 Terminal Expansion - Alternative 1

Source: RDM International, Inc. (2018)

3.4.3.2 Alternative 2A

Alternative 2A proposes a 14,500 SF single-story terminal structure and removes all the existing CAP trailers to maximize the number of vehicle parking spaces (105 in this alternative). It is anticipated that CAP activities will be accommodated in the future terminal. It is also intended that the terminal will be constructed in phases to eliminate impacts to airport operations.

A new maintenance shed is proposed adjacent to the future terminal.

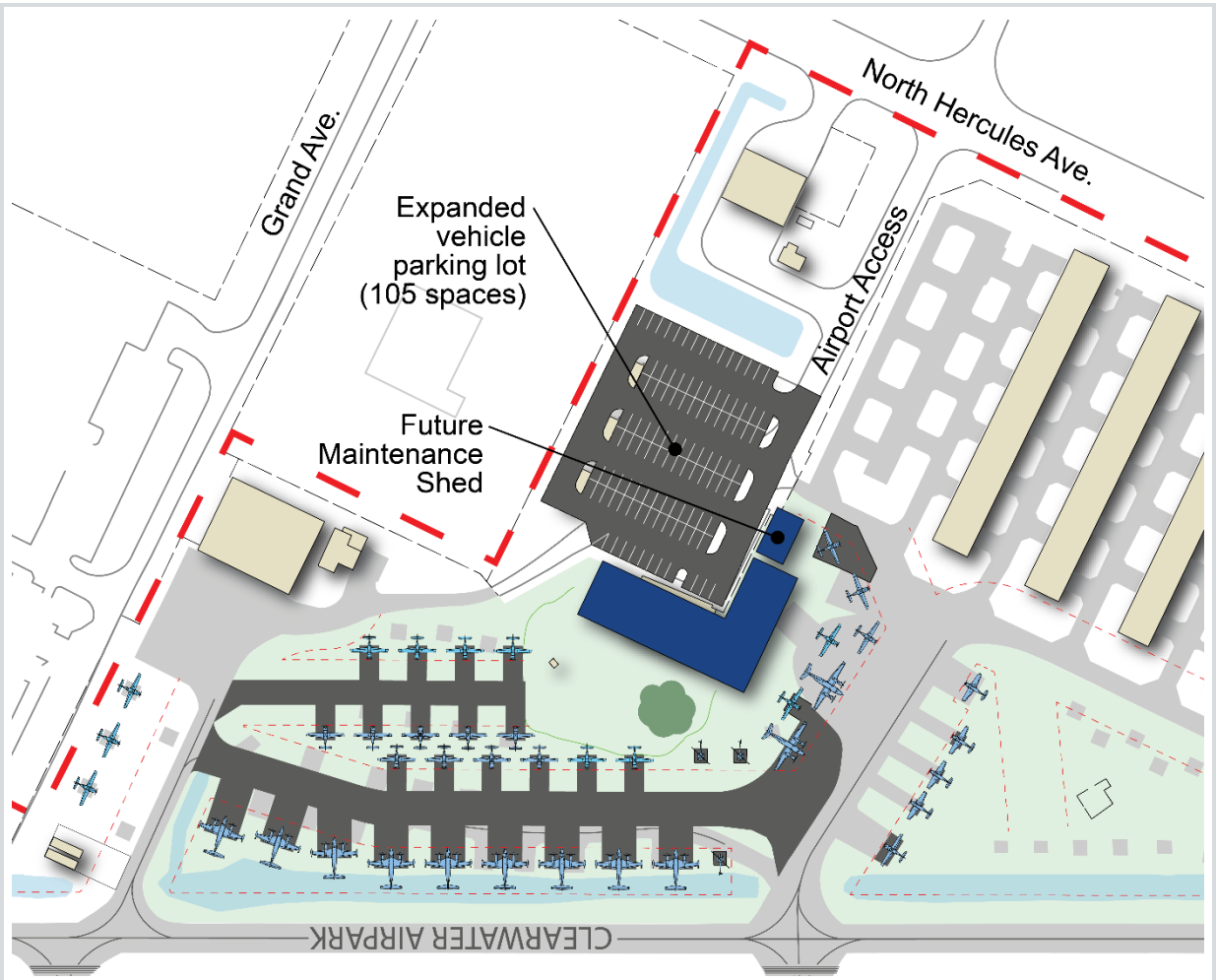


Figure 3.9 Terminal Expansion - Alternative 2A

Source: RDM International, Inc. (2018)

3.4.3.3 Alternative 2B

Alternative 2B is similar to Alternative 2A in that the existing CAP trailers are removed to maximize the number of vehicle parking spaces (also 105 in this alternative). However, this alternative proposes a two-story structure to minimize the footprint of the terminal. As the proposed terminal is 10,500 SF, only a partial second floor is required to accommodate anticipated demand. Similar to Alternative 2A, it is also intended that the terminal will be constructed in phases to eliminate impacts to airport operations.

A new maintenance shed is proposed adjacent to the future terminal.

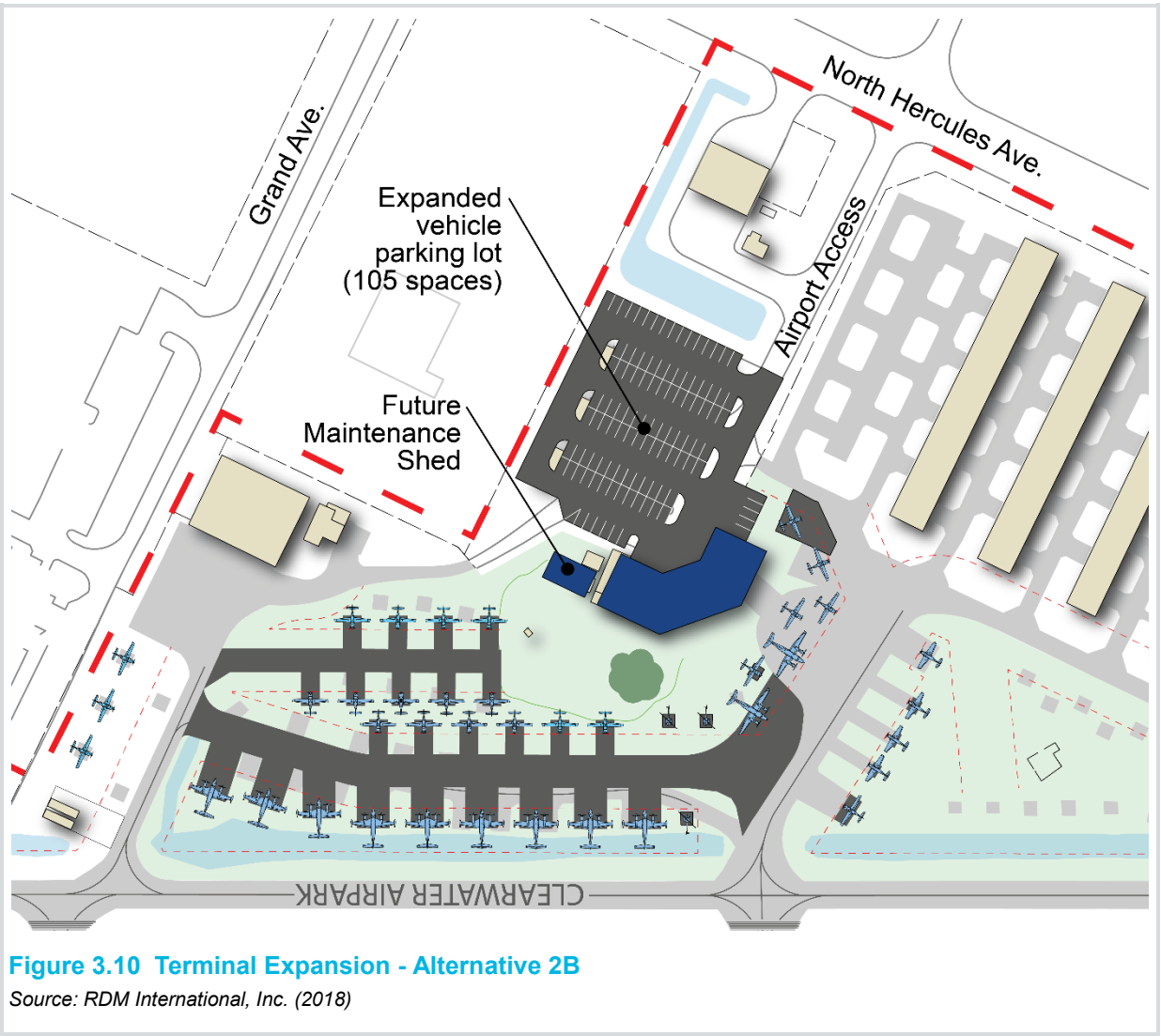


Figure 3.10 Terminal Expansion - Alternative 2B

Source: RDM International, Inc. (2018)

3.4.3.5 Terminal Alternatives Evaluation

Table 3.3 summarizes and compares the alternatives according to the evaluation criteria previously identified in this chapter. Based on the evaluation, Alternative 2A is the recommended alternative for the future terminal structure.

Table 3.3 Terminal Alternatives Evaluation

Criteria	Alternative		
	1	2A	2B
Achievement of the Objective	Partial	Yes	Yes
Airport Design Standards	Yes	Yes	Yes
Flexibility	Partial	Partial	Partial
Collateral Impacts	Good	Fair	Fair

Source: RDM International, Inc.

Achievement of the Objective

Alternative 1 only partially achieves the objective since it does not provide the recommended number of vehicle parking spaces. Alternatives 2 and 3 can accommodate all recommended improvements.

Airport Design Standards

None of the alternatives include non-standard conditions.

Flexibility

Each of the alternatives provides partial flexibility as the terminal building can be expanded by adding and/or expanding a second level; however, the proposed vehicle parking areas cannot accommodate an expansion.

Collateral Impacts

Alternative 1 maintains most of the existing CAP trailers while the other two alternatives remove all of them. It is intended CAP functions can be accommodated in the new terminal building but this

3.4.4 Navigational Aids

The Clearwater Airpark provide Medium Intensity Runway Lights (MIRL). Per FAA Advisory Circular *150/5300-13A (Change 1), Airport Design*, airport rotating beacons are required for any airport with runway edge lights. Accordingly, a rotating beacon is recommended for the Airpark.

The main purpose of the beacon is to indicate the location of a lighted airport. Siting and installation of a rotating beacon is based on the following guidelines:

- Located within 5,000 feet of a runway
- Mount all airport rotating beacons higher than any surrounding obstructions so that the bottom edge of the beacon's light beam, when adjusted correctly, will clear all obstructions
  - Mounted high enough above the surface so that the beam sweep, aimed 2 degrees or more above the horizon, is not blocked by any natural or manmade object

- May be mounted on the roof of hangars or other buildings or on wooden power pole towers and metal towers

Three different beacon tower structures are available. These include the Structural Steel Towers, Tubular Steel Towers, and Tip-Down Pole Towers.

Structural Steel Towers are available in heights of 51, 62, 75, 91, 108, 129, and 152 feet. Tubular Steel Towers consist of different lengths of low alloy, high strength tubular steel sections welded together to obtain a basic tower height of 51 feet. Tip-Down Pole Towers consist of a two-section octagonal tapered structure with a counterweight and hinge that allow the top section to be easily raised and lowered by one person using an internal hand-operated winch for maintenance. These towers are typically available at lengths up to 55 feet. **Figure 3.11** illustrates these three tower types.

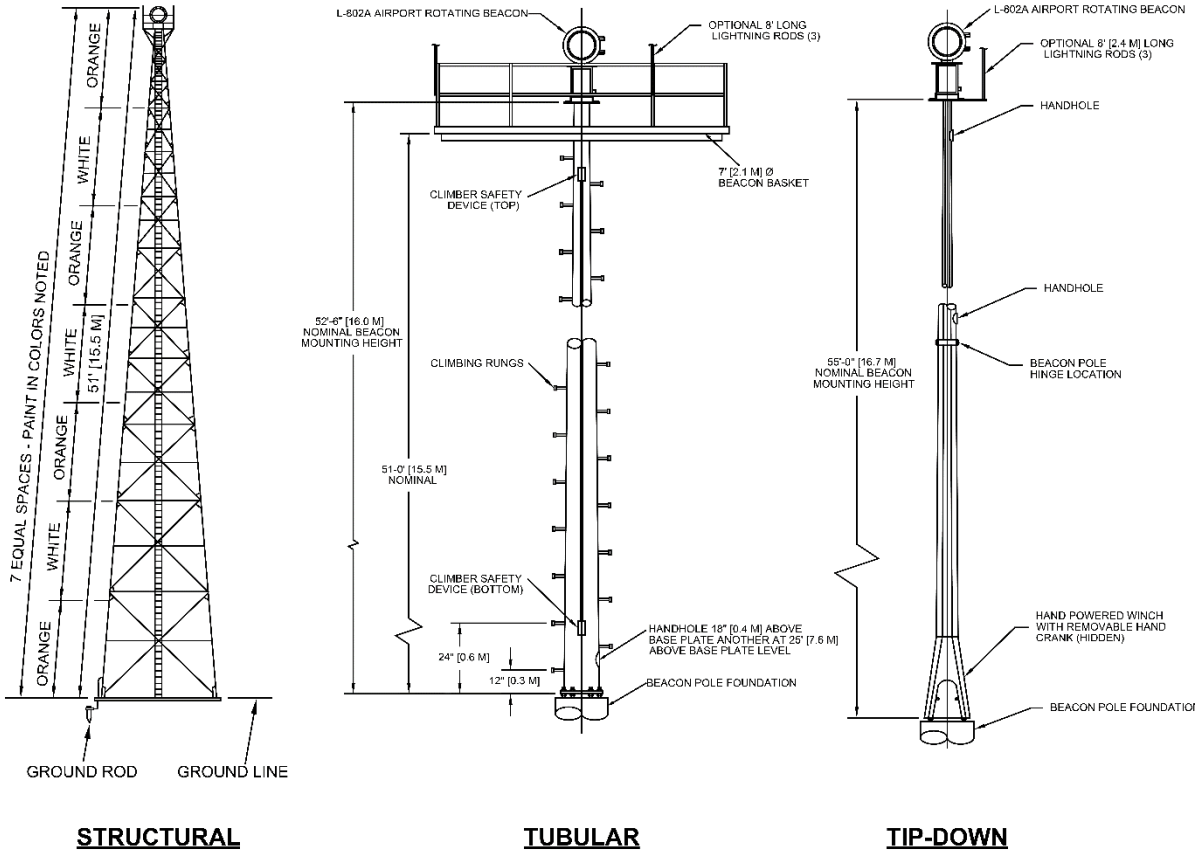


Figure 3.11 Typical Beacon Towers

Source: FAA Advisory Circular 150/5340-30J, Design and Installation Details for Airport Visual Aids (2/12/2018)

Three potential locations for the new beacon are identified for future evaluation. These sites are illustrated in **Figure 3.12** as part of the following section and are adjacent to the proposed terminal, the fuel farm, and the proposed conventional hangar at the existing Tampa Bay Aviation hangars site.

3.4.5 Recommended Development Plan

Figure 3.12 illustrates the recommended development plan based on the analyses summarized in this chapter.

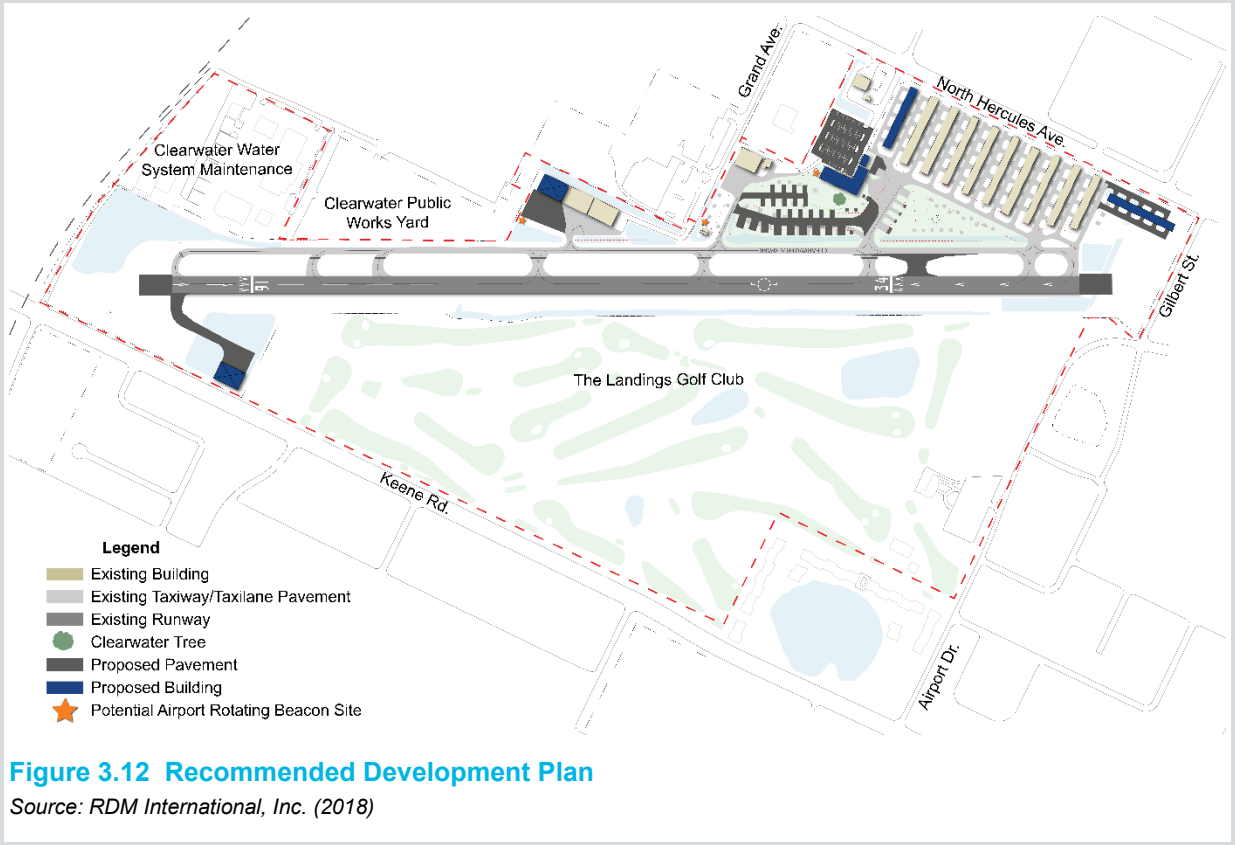


Figure 3.12 Recommended Development Plan

Source: RDM International, Inc. (2018)

3.4.6 Land Use

On-airport and off-airport land uses are a key consideration for airports. Protecting the airspace on parcels outside of airport property maximizes the operational safety of aircraft as well as people and property on the ground. Establishing land uses on airport property allows the airport to allocate limited resources for specific functions and maximize the long-term benefit and financial sustainability of the airport, whether aviation related functions or non-aviation development.

The existing on-airport land uses as defined by the City of Clearwater are illustrated in **Figure 3.13**.

Figure 3.13 Existing On-Airport Land Uses

Source: City of Clearwater (2018)

The majority of Airpark property is designated as Transportation / Utility while The Landings Golf Club (over 300 acres) is designated as Recreational / Open Space. The parcel occupied by the City of Clearwater Water System Maintenance is classified as Industrial Limited as is the parcel north of the Runway 16 end.

For the purposes of this analysis, and in the event The Landings Golf Club ceases operations, potential land uses are identified, for discussion purposes only, in **Figure 3.14**.

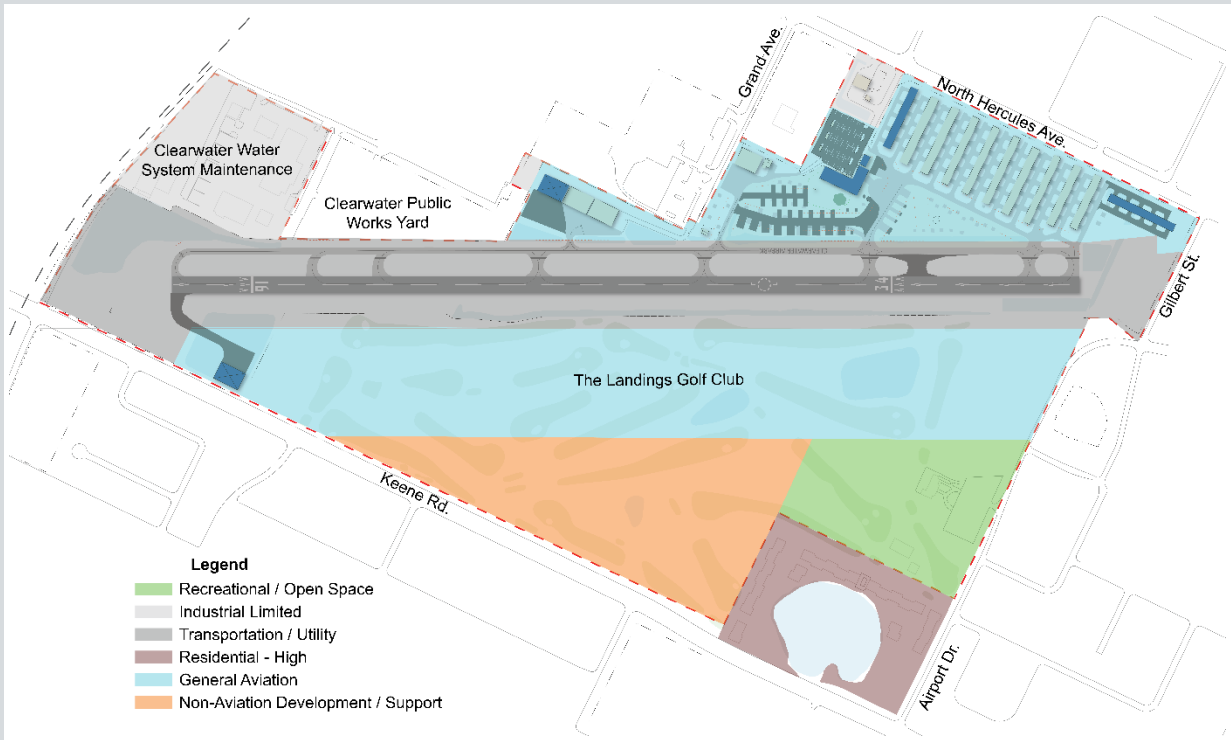


Figure 3.14 Potential Future On-Airport Land Uses

Source: RDM International, Inc. (2018)

Areas supporting general aviation activities such as hangar storage and terminal areas are classified as General Aviation. The runway and taxiways, including safety areas and protection zones, maintain the Transportation / Utility classification. However, an area on the west side of the runway is preserved for a potential future parallel taxiway.

The existing Landings Golf Club site is split into 3 parcels. West of the runway is a large parcel allocated for future General Aviation purposes, including hangar storage and other general aviation related functions.

Another parcel east of the existing residential area at the intersection of Keene Road and Airport Drive is maintained as Recreational / Open Space.

A parcel immediately adjacent to Keene Road is classified as non-aviation development. While this could include commercial development to maximize airport revenues, one of the goals and objectives of the City of Clearwater's Land Use policy is to maintain the residential character of the Keene Road corridor by limiting commercial development. Therefore, this parcel may be best utilized for residential development.

These potential land use reclassifications are for discussion purposes only. A change to existing zoning classifications requires a review and approval process that includes public hearings. Any changes to the existing land use and zoning classifications on airport property should adhere to the processes defined by the City of Clearwater.

Section 4.0
FACILITIES IMPLEMENTATION PLAN

4.1 Introduction

The purpose of the Facilities Implementation Plan is to prepare a Capital Improvement Plan (CIP) that converts the preferred development plan identified in the Alternatives Analysis (Working Paper #3) into a series of potential projects. Projects recommended for the CIP were identified based on numerous factors including safety, adherence to Federal Aviation Administration (FAA) design standards, capacity requirements, and the priorities of the Airport. The scheduled implementation of the projects as projected is based and dependent on many factors including the availability of required funding and environmental or other required approvals.

4.2 Project List and Descriptions

A draft project list was developed from the proposed development plan. The draft project list was then reviewed with the City of Clearwater staff and refined to a final project list. The project list is organized by major airport components (i.e., Airfield, Terminal, General Aviation, and Support). This ordering was used to organize project descriptions, which are presented in the following paragraphs, and the cost estimates which are described later in this Working Paper.

4.2.1 Airfield Projects

Airfield projects are those that are within the aircraft movement area (runways, taxiways, and approach/departure operational areas. The proposed development plan includes five (5) future airfield projects intended to enhance the safety of airport operations.

4.2.1.1 Relocate Taxiway A6

This project consists of constructing a new Taxiway A6 and demolishing the existing taxiway pavement. The purpose of this project is to improve the operational safety of the airfield by eliminating direct access from the aircraft parking area to the runway. The proposed taxiway is to be constructed based on FAA design standards for the Critical Aircraft identified in Working Paper #1, Aviation Activity Forecasts. The new taxiway is located south of the existing Taxiway A6 due to the navigational aids located to the north of the existing taxiway.

4.2.1.2 Construct Blast Pads

This project consists of new blast pads for each runway end. The purpose of this project is to provide blast erosion protection beyond runway ends during jet aircraft operations that occasionally occur at CLW.

4.2.1.3 Property Acquisition at Runway 34 End

This project consists of acquiring approximately 1.3 acres not currently within the airport property boundary. The property to be acquired is currently within the boundaries of Marymount Park which is owned by the City of Clearwater. The market value of the parcel is used for cost estimating purposes.

4.2.1.4 Avigation Easement for Parcels within Runway 34 RPZs

This project consists of obtaining an avigation easement for properties outside the existing airport property boundary but within the Runway 34 RPZs. The FAA's airport design guidelines recommend that airports own the property underneath approach and departure areas to the limits of the RPZ, where practicable. The guidelines further recommend that the RPZ be cleared of all above ground objects where practicable. The purpose of this project is to obtain control of these properties and prevent the potential introduction of obstructions to safe air navigation and comply with the FAA guidelines to the extent practical. The parcels within the RPZ primarily consist of residential housing.

4.2.1.5 Avigation Easement for Parcels within Runway 16 RPZs

This project consists of obtaining an avigation easement for properties outside the existing airport property boundary but within the Runway 16 RPZs. Similar to project #4, the purpose of this project is to obtain control of these properties and prevent the potential introduction of obstructions to safe air navigation and comply with the FAA guidelines to the extent practical. The parcels within the RPZ primarily consist of residential housing.

4.2.2 Terminal Projects

Terminal projects include the terminal building and associated parking areas. The proposed development plan includes two (2) future terminal projects intended to accommodate existing and anticipated demand.

4.2.2.1 Construct New Terminal

This project consists on constructing a new, permanent terminal building. The existing terminal is a temporary structure which was intended to be replaced with a more permanent structure. Construction of the proposed terminal shall be phased to allow uninterrupted operations by the airport and its tenants. Elements included in this project includes new and/or relocated security fencing, utilities, etc.

4.2.2.2 Expand Vehicle Parking Lot

Vehicle parking at the existing terminal is severely limited and does not provide enough parking spaces for peak periods. This project consists of expanding the existing vehicle parking area and quadrupling the number of parking spaces available. The project requires the removal of the existing five (5) trailers currently under a Land Lease Agreement by the Civil Air Patrol (CAP) through 2022.

4.2.3 General Aviation Projects

General Aviation projects consist of the aircraft storage facilities and the pavement used to access them. Most projects proposed in the development plan are General Aviation facilities. The 13 projects identified are summarized below.

4.2.3.1 Replace Shade Hangars with T-Hangars

This project involves removal of the existing three (3) shade hangars (E, F, and G) and replacing them with standard T-Hangars. The purpose of this project is to provide more secure aircraft storage and accommodate customer demand while increasing revenues for the airport. This project does not include any changes to the existing taxilanes accessing these facilities.

4.2.3.2 Expand Transient Aircraft Parking Area

This project involves expanding the existing transient aircraft parking area to provide additional parking positions and Aircraft Design Group (ADG) II clearance for the transient aircraft that utilize CLW. The existing five (5) parking positions to the south of the existing taxilane are expanded and new parking restriction lines marked to identify the location of the ADG II taxilane object free area. The existing circular pavement north of the existing taxilane is also expanded to accommodate additional aircraft parking positions.

4.2.3.3 Reconstruct Transient Aircraft Parking Area

This project consists of reconstructing the north section of the existing transient aircraft parking area pavement. This project was identified in the Florida Department of Transportation (FDOT) Statewide Airfield Pavement Management Program (June 2015). The apron had an average Pavement Condition Index (PCI) of 36 and a rating of "very poor" in the 2015 FDOT pavement study. This project can be completed in conjunction with the expansion of the parking area (Project #9) as determined by the needs of the Airpark and/or funding availability.

4.2.3.4 Construct New Conventional Hangar and Apron

This project consists of constructing a new 10,000 Square Foot (SF) hangar adjacent to the existing Tampa Bay Aviation hangars. The project includes an expansion of the existing aircraft parking apron for access to the new hangar and additional aircraft parking. The purpose of this project is to accommodate existing demand.

4.2.3.5 Rehabilitate Existing Tampa Bay Aviation Hangar Apron

This project is to rehabilitate (mill and overlay) the deteriorating apron pavement at the existing Tampa Bay Aviation hangars. This project was also identified in the FDOT Statewide Airfield Pavement Management Program (June 2015). A large portion of the apron had an average PCI of 54 and a rating of "poor" in the 2015 FDOT pavement study. Implementation of this project will occur when needed based on future pavement study results; however, this project can be completed in conjunction with Project #11 for construction/cost efficiencies.

4.2.3.6 Rehabilitate Existing Taxilanes (Row K and Transient access)

This project is to rehabilitate (mill and overlay) the deteriorating taxilane pavement along the transient aircraft parking area and parallel to the Row K aircraft parking area. These taxilanes provide access to all aircraft parking areas and have a PCI of 52 and a rating of "poor" in the 2015 FDOT pavement study.

4.2.3.7 Construct New T-Hangar on Existing Row J Parking

This project consists of installing a new T-Hangar on the existing Row J aircraft parking area which is currently a paved area used for tie-down aircraft parking. The purpose of this project is to accommodate existing demand for covered parking. This project includes the realignment of the perimeter fence to increase aircraft wingtip clearance and maximize operational safety.

4.2.3.8 Rehabilitate Row J and Row I Taxilanes

This project consists of rehabilitating (mill and overlay) the deteriorating taxilane pavement accessing the Row J and Row I taxilanes. These taxilanes provide access to the Row J and Row I T-Hangars and had a PCI of 52 and a rating of "fair" in the 2015 FDOT pavement study. The FDOT study included the Row J hardstand parking area but this area will be rehabilitated under Project #14.

4.2.3.9 Reconstruct Existing Bender Aviation Apron

This project includes a complete reconstruction of the existing Bender Aviation Services hangar apron and access road. This project was identified in the 2015 FDOT study and indicated the apron had a PCI of 39 and a rating of "poor".

4.2.3.10 Rehabilitate Existing T-Hangar Taxilanes

This project consists of rehabilitating (mill and overlay) of the existing T-Hangars not included in Project #15. These taxilanes provide access to the T-Hangars and had a PCI between 65 and 71 and a rating of "fair" or "satisfactory" in the 2015 FDOT pavement study.

4.2.3.11 Reconfigure Aircraft Parking Area

This project consists of constructing new pavement for the tie-down aircraft parking area between the terminal and Taxiway A. While part of the proposed pavement limits overlaps the existing pavement, the existing pavement was rated as "poor" in the 2015 FDOT study and will be removed as part of this project. New pavement will be added to what is currently a grass area containing eight (8) concrete pads (only 5 are usable). Additionally, the existing taxilane accessing these hardstands and the Bender Aviation Services apron will be rehabilitated as part of this project.

4.2.3.12 Construct New Conventional Hangar, Access Taxiway, and Apron

This project consists of constructing a new 10,000 SF conventional hangar on the west side of the Airpark, along Keene Road, in what is currently undeveloped land. A new taxiway accessing the runway and Taxiway A is included in this project as is an aircraft parking apron adjacent to the hangar facility. The purpose of this project is to accommodate anticipated demand and therefore, the schedule for this project is dependent upon the actual demand for it.

The proposed site for this project is currently a large retention pond that was constructed by FDOT for drainage purposes during the widening of Keene Road. This project will require environmental mitigation of the retention pond.

4.2.3.13 Construct New T-Hangar and Taxilanes

This project consists of constructing a new 10-unit T-Hangar south of the existing T-Hangar structures along North Hercules Avenue. This project requires construction of new taxilanes to provide access to the individual hangars. The purpose of this project is to accommodate anticipated demand. A retention pond is currently within the site limits of the proposed T-Hangar and will require environmental mitigation.

4.2.4 Support Projects

Support projects consist of Navigational Aids (NAVAIDS) and other facilities necessary to properly maintain the airport. The proposed development plan includes two (2) support facilities.

4.2.4.1 Install Rotating Beacon

This project is to install a Rotating Beacon. The location of the beacon will be determined during the planning and design phase of this project. The purpose of this project is to adhere to FAA airport design standards and provide pilots visual reference of the Airpark's location during night-time operations.

4.2.4.2 Construct Maintenance Shed

This project is to install a new maintenance shed in the vicinity of the proposed terminal. The purpose of this project is to provide a covered space large enough to accommodate the Airpark's new tractor and extra space for other maintenance equipment.

4.2.4.3 Security Upgrades

This project is to install access control gates near the terminal and replaces perimeter security fencing where age and condition is questionable. Wildlife fencing will be installed adjacent to the golf course.

4.2.4.4 Airfield Lighting Update

The project includes replacement of all airfield lighting, cable and guidance signs.

4.3 Project Cost Estimates

Conceptual cost estimates were prepared for all CIP projects in 2018 dollars. No escalation factors were applied to project costs. This methodology allows project costs to be escalated based on actual escalation factors from 2018 at the time they are initiated. The cost estimates are summarized for each development phase in the following section.

The cost estimates include construction and program costs. Construction costs include all physical items, labor and a contingency. Program costs include fees associated with engineering design fees and construction phase engineering. The methodology utilized to develop the cost estimates include:

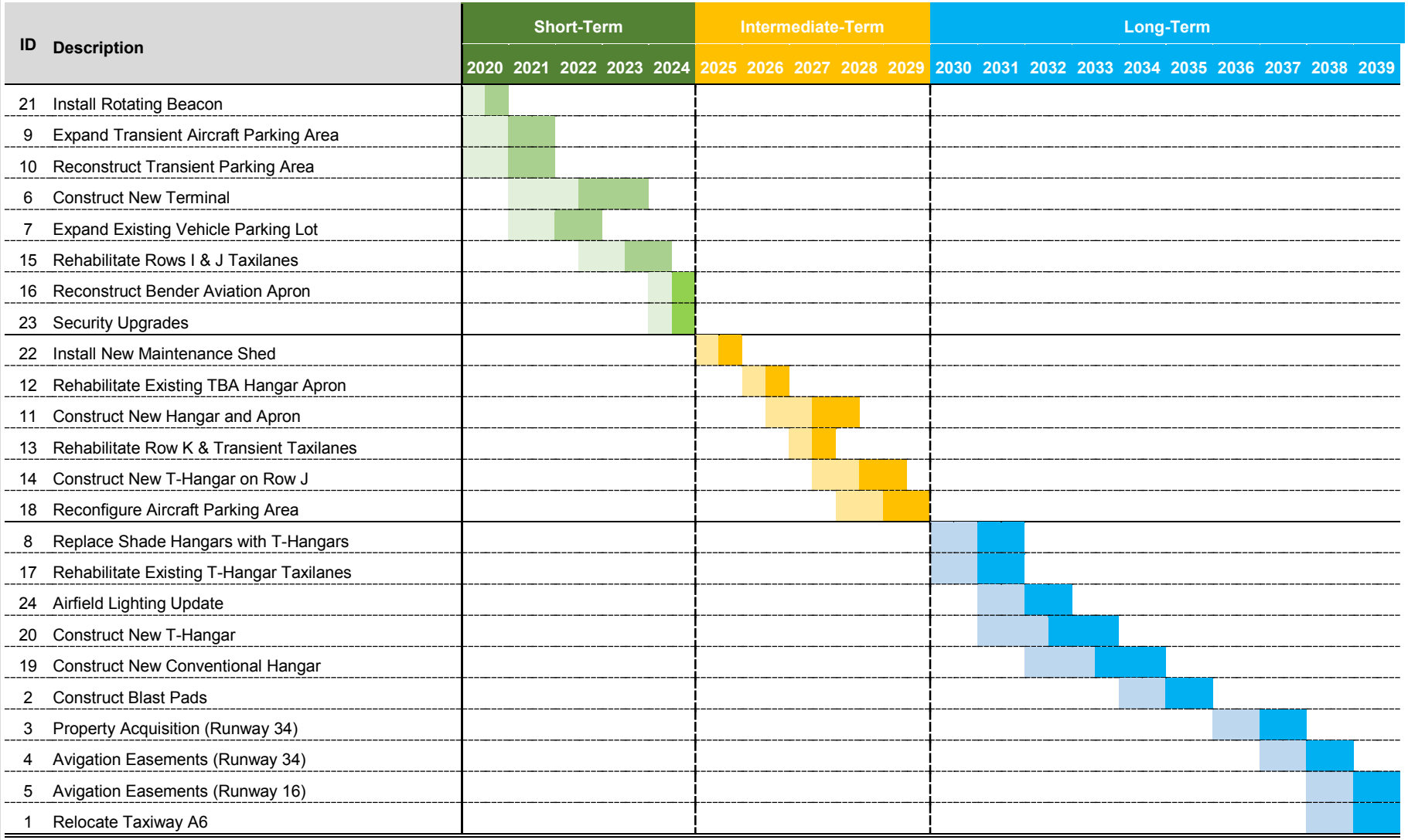
- Total property acquisition costs are based on assessed market value per the Pinellas County Property Appraiser, legal proceedings, and other potential costs that include:
  - Contingency for 2018 Assessed Market Value: 15.0%
  - Survey: 5.0% of Total Acquisition Cost
  - Close-out and Other Costs: 7.0% of Total Acquisition Cost
- Total Avigation Easement costs are based on the following:
  - Acquisition fee: $5,000 per parcel
  - Legal Proceedings: $3,000
  - Contingency: 15%
  - Survey: 20.0% of Total Acquisition Cost
  - Close-out and Other Costs: 25.0% of Total Acquisition Cost
- Total construction costs are based on direct material costs and additional fees associated with the following:
  - Electrical and Communications (as required): 10.0%
  - Sewer and Water (as required): 20.0%
  - Maintenance of Traffic (MOT): 10.0%
  - Mobilization: 15.0%
  - Environmental Controls: 25.0%
  - Contingencies: 15.0%
- Program mark ups are as follows:
  - Engineering, Survey, and Geotech: 10.0%
  - Construction Phase Engineering, RPR, Testing: 7.0%

4.4 Project Phasing

In addition to project descriptions and cost estimates, the CIP also presents proposed project phasing. The scheduling of projects in the CIP was developed through consultation with the City of Clearwater Marine and Aviation Department.

Phasing for CIP projects was categorized as: Short-Term (2020 through 2024), Intermediate-Term (2025 to 2029) and Long-Term (2030 to 2039). The ultimate timing of projects will be determined based on actual demand, funding availability, environmental approvals, and the priorities of tenants or the City of Clearwater.

Figure 4.1 provides a Gantt chart that depicts the sequencing of projects.



TBA = Tampa Bay Aviation

Source: RDM International, Inc. (2019); AECOM (2019)

Figure 4.1 Preliminary Phasing Schedule for CIP Projects

4.4.1 Short-Term Projects

Project priorities in the short-term (2020 to 2024) include the following:

- Constructing new facilities recommended to accommodate existing demand and/or mitigating existing operational inefficiencies
- A focus on the rehabilitation and/or reconstruction of key airfield pavements identified in the 2015 FDOT pavement study

Short-term projects are listed in **Table 4.1** along with their project number and total estimated cost. **Figure 4.2** shows the location of these projects on the Airport.

Table 4.1 Short-Term Projects and Estimated Costs

ID	Description	Component	Estimated Cost ($)[1]
21	Install Rotating Beacon	Support	$88,492
9	Expand Transient Aircraft Parking Area[2]	GA	$126,447
10	Reconstruct Transient Parking Area[2]	GA	$250,993
6	Construct New Terminal	Terminal	$2,408,403
7	Expand Existing Vehicle Parking Lot	Terminal	$869,180
15	Rehabilitate Rows I & J Taxilanes[2]	GA	$480,392
16	Reconstruct Bender Aviation Apron[2]	GA	$329,961
23	Security Upgrades	Support	$159,798
	Total Short-Term Estimated Costs		**$4,713,666**

Source: AECOM (2018)

[1] in 2018 dollars

[2] cost provided in 2015 FDOT Statewide Airfield Pavement Management Program

Figure 4.2 Short-Term Project Locations

Source: RDM International, Inc. (2019)

4.4.2 Intermediate-Term Projects

Project priorities in the intermediate-term (2025 to 2029) include the following:

- A focus on the rehabilitation of existing taxilane
- Reconstruction of the hardstand parking area
- The construction of an additional hangar

Intermediate-term projects are listed in **Table 4.2** along with their project number and total estimated cost. **Figure 4.3** shows the location of these projects on the Airport.

Table 4.2 Intermediate-Term Projects and Estimated Costs

ID	Description	Component	Estimated Cost ($)[1]
22	Install New Maintenance Shed	Support	$163,155
12	Rehabilitate Existing TBA Hangar Apron[2]	GA	$290,940
11	Construct New Hangar and Apron	GA	$2,097,958
13	Rehabilitate Row K & Transient Taxilanes[2]	GA	$431,159
14	Construct New T-Hangar on Row J	GA	$1,428,797
18	Reconfigure Aircraft Parking Area	GA	$770,174
	Total Intermediate-Term Estimated Costs		**$5,182,183**

Source: AECOM (2018)

[1] in 2018 dollars

[2] cost provided in 2015 FDOT Statewide Airfield Pavement Management Program

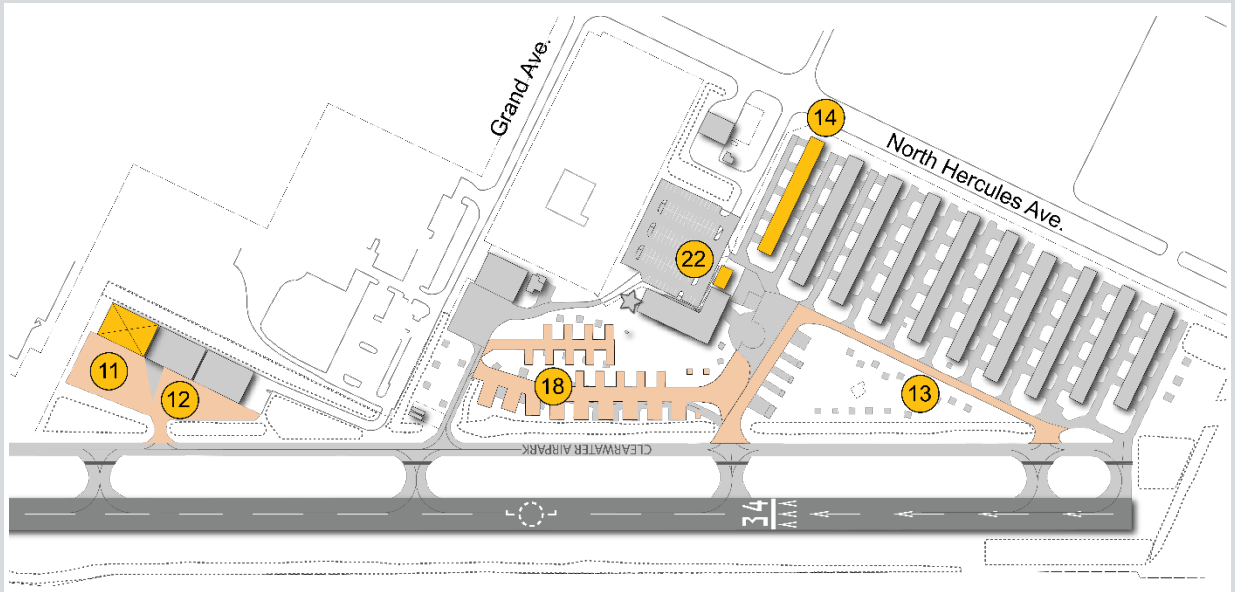


Figure 4.3 Intermediate-Term Project Locations

Source: RDM International, Inc. (2019)

4.4.3 Long-Term Projects

Project priorities in the long-term (2030 to 2039) include the following:

- Gaining control of properties within RPZs through property acquisitions/easements
- Constructing blast pads at each runway end
- Mitigating non-standard taxiway configurations
- The construction of an additional T-Hangar and conventional hangar to accommodate demand
- Replacement of existing Shade Hangars
- Airfield lighting upgrades

Long-term projects are listed in **Table 4.3** along with their project number and total estimated cost. **Figure 4.4** shows the location of these projects on the Airport.

Table 4.3 Long-Term Projects and Estimated Costs

ID	Description	Component	Estimated Cost ($)[1]
8	Replace Shade Hangars with T-Hangars	GA	$4,684,557
17	Rehabilitate Existing T-Hangar Taxilanes	GA	$965,468
24	Airfield Lighting Update	Support	$371,196
20	Construct New T-Hangar	GA	$2,200,662
19	Construct New Conventional Hangar	GA	$2,325,858
2	Construct Blast Pads	Airfield	$409,462
3	Property Acquisition (Runway 34)	Airfield	$106,904
4	Avigation Easements (Runway 34)	Airfield	$205,103
5	Avigation Easements (Runway 16)	Airfield	$105,053
1	Relocate Taxiway A6	Airfield	$382,299
	Total Long-Term Estimated Costs		**$11,756,562**

Source: AECOM (2018)

[1] in 2018 dollars

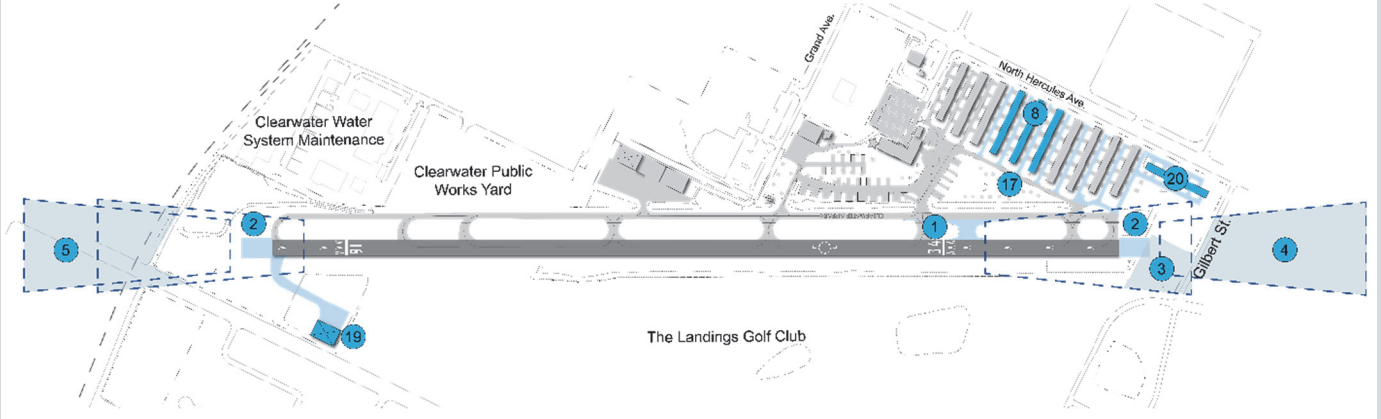


Figure 4.4 Long-Term Project Locations

Source: RDM International, Inc. (2019)

Section 5.0
CAPITAL IMPROVEMENT PHASING PLAN

5.1 Introduction

The final chapter of a master plan is intended to provide guidance on what will be required to demonstrate the airport sponsor's ability to fund the projects in the master plan. A more general discussion of the funding of medium and long-term projects is more reasonable because of the uncertainty of future Local and State funding and possible shifts in the overall importance of those projects in reaction to aviation demand at the airport and changes in the economic climate in a community. The City's ability to fund the recommended projects is a major consideration in preparing the Capital Improvement Plan (CIP). The recommended development plan for the Airport is based on the identification of facility requirements as presented in **Working Paper #4**.

This section of the Airport Master Plan will address the financial implications of implementing the improvements proposed to construct the preferred development alternative. In addition, the potential funding sources; cost of constructing the improvements based upon the Capital Improvement Plan (C.I.P.) required to construct the improvements.

The proposed funding plan contained in this section assumes the City will continue not using the FAA's Airport Improvement Program (AIP), moderate annual funding received from the FDOT, and the growth of the airport's aviation activity, as depicted in the approved forecasts. The intrinsic value that a well-maintained airport brings to a community or region goes far beyond the day-to-day operational costs. In other words, the money spent and benefits received in the community or region by individuals and businesses that use the airport equals or exceeds the expenses, which are a result of operations at the airport.

While some of the costs required to implement and construct the improvements in the CIP can be estimated closely based upon recent construction projects undertaken in the recent past, and revenue projection will be based upon likely funding sources and amounts, it must be understood that these are estimates. Therefore, there is inherent uncertainty in the development of this financial plan due to the basis of the assumptions on estimates. Even with this uncertainty, it is prudent to develop this comprehensive plan to provide an understanding of the variables, and provide a basis upon which adjustments can be made.

Throughout the construction and development of the airport, a continual assessment of the financial position of the project must be completed and adjustments made as warranted.

5.2 Airport Development Plan

Future airport development at Airport, as included in this Airport Master Plan Update, covers a 20-year planning period. Development items are grouped into three phases:

- Short-term (1-5 years)
- Intermediate-term (6-10 years)
- Long-term (11-20 years)

The refined development costs contained in this section are based on the proposed improvements as shown on the Airport Layout Plan, and are included for each item in the financial development plan. The phasing of projects assists the airport sponsor in budgetary planning for future construction projects. **Table 5.1** outlines the 20-year financial development plan. The sequence in which the projects are completed is important, as the ultimate configuration of the Airport will require numerous projects.

Table 5.1 Financial Development Plan Over 20 Years

Phase I Project ID	Short-Term Development	Total	FAA Share	State Share	Local Share
21	Install Rotating Beacon	$88,492	$0	$70,794	$17,698
9	Expand Transient Aircraft Parking Area	$126,447	$0	$101,158	$25,289
10	Reconstruct Transient Parking Area	$250,993	$0	$200,795	$50,199
6	Construct New Terminal	$2,408,403	$0	$1,204,202	$1,204,202
7	Expand Existing Vehicle Parking Lot	$869,180	$0	$434,590	$434,590
15	Rehabilitate Rows I & J Taxilanes	$480,392	$0	$384,314	$96,078
23	Security Upgrades	$159,798	$0	$127,838	$31,960
Total Short-Term Development Cost		**$4,383,705**	**$0**	**$2,523,691**	**$1,860,016**
Phase II Project ID	**Intermediate-Term Development**	**Total**	**FAA Share**	**State Share**	**Local Share**
16	Reconstruct Bender Aviation Apron	$329,961	$0	$263,969	$65,992
22	Install New Maintenance Shed	$163,155	$0	$130,524	$32,631
12	Rehabilitate Existing TBA Hangar Apron	$290,940	$0	$232,752	$58,188
11	Construct New Hangar and Apron	$2,097,958	$0	$1,678,366	$419,592
13	Rehabilitate Row K & Transient Taxilanes	$431,159	$0	$344,927	$86,232
14	Construct New T-Hangar on Row J	$1,428,797	$0	$1,143,038	$285,759
18	Reconfigure Aircraft Parking Area	$770,174	$0	$616,139	$154,035
Total Intermediate-term Development Cost		**$5,512,144**	**$0**	**$4,409,715**	**$1,102,429**
Phase III Project ID	**Long-Term Development**	**Total**	**FAA Share**	**State Share**	**Local Share**
8	Replace Shade Hangars with T-Hangars	$4,684,557	$0	$3,747,646	$936,911
17	Rehabilitate Existing T-Hangar Taxilanes	$965,468	$0	$772,374	$193,094
24	Airfield Lighting Update	$371,196	$0	$296,957	$74,239
20	Construct New T-Hangar	$2,200,662	$0	$1,760,530	$440,132
19	Construct New Conventional Hangar	$2,325,858	$0	1,860,686	$465,172
2	Construct Blast Pads	$409,462	$0	$327,570	$81,892
3	Property Acquisition (Runway 34)	$106,904	$0	$85,523	$21,381
4	Avigation Easements (Runway 34)	$205,103	$0	$164,082	$41,021
5	Avigation Easements (Runway 16)	$105,053	$0	$84,042	$21,011
1	Relocate Taxiway A6	$382,299	$0	$305,839	$76,460
Total Long-Term Development Cost		**$11,756,562**	**$0**	**$9,405,249**	**$2,351,313**
TOTAL DEVELOPMENT COST		**$21,652,411**	**$0**	**$16,338,655**	**$5,313,758**

NOTE: All costs are calculated in 2018 dollars. Assumes 80 percent funding by FDOT on all projects excluding terminal area which is 50 percent FDOT funding.

5.3 Funding Sources

Probable costs (engineer's opinion costs) for the development plan identified in **Working Paper #4**, *Facilities Implementation Plan*, provides the basis for cost of individual projects. Funding comes from the State (FDOT) contributions. This section will identify and quantify the expected sources of capital funds. As previously indicated, FDOT funds represent the majority of expected capital; however, a number of sources are identified and indicated below.

5.3.1 State Funding Program

The FDOT provides most of the funding for capital improvement projects at the Airport. Airport Revenue Diversion *Pursuant to the Airport Revenue Protection Act of 1996*, by accepting federal or state financial grants or property transfers, the airport agrees to abide by certain binding contractual obligations (i.e., signing a contract with a federal or state government where the government provides the funding and the recipient agrees to follow certain rules). One of those rules specifies that all airport-generated revenues should be spent at the airport.

According FDOT Airport Project Funding for:

- **General Aviation:** "Pursuant to Section 332.003 – 332.007, FS, FDOT may provide up to 80 percent of the local share of general aviation airport project costs,"
- **Economic Development:** Pursuant to Section 332.003 – 332.007, FS, FDOT may provide up to 50 percent of the costs to build on-airport revenue-producing capital improvements. One example of an economic development project is industrial park facilities at a general aviation airport.
- **Strategic Airport Investment:** Projects Pursuant to Section 332.007, FS, FDOT may provide up to 100 percent funding for commercial and general aviation airport projects that meet the following criteria:
  - Provide important access and on-airport capacity improvements,
  - Provide capital improvements to strategically position the state to maximize opportunities in international trade, logistics, and the aviation industry,
  - Achieve state goals of an integrated intermodal transportation system, and
  - Demonstrate the feasibility and availability of matching funds through federal, local, or private partners.
- **Statewide Project Funding:** *Pursuant to Section 332.007(1), FS*, FDOT is authorized to receive federal grants for these statewide projects when no local sponsor is available. *Pursuant to Section 332,007(6) (d), FS,* FDOT may provide up to 100 percent of project cost if that project is statewide in scope or involves more than one county where no other governmental entity or appropriate jurisdiction exists.
- **Other Airport Project Funding Resources:** In addition to the FDOT Aviation Grant Program, airports in the state have other project funding resources. These may or may not be applicable to Clearwater Airpark.
  - ***Rural Economic Development Initiative:*** Pursuant to Section 288.0656 (2), FS, a county or community seeking funding through the Rural Economic Development Initiative must meet two qualifications. First, the county or community must meet the statutory definition of "rural" noted in Section 288.0656 (2) (e), FS, to be eligible for a waiver or reduction of

match requirements. Second, the eligible county or community must also have three or more of the "economic distress" conditions identified in Section 288.0656 (2) (c), FS.

- ***State Infrastructure Bank:*** Pursuant to Section 339.55, FS, the State Infrastructure Bank (SIB) is a revolving loan and credit enhancement program consisting of two separate accounts and is used to leverage funds to improve project feasibility. The SIB can provide loans and other assistance to public or private entities carrying out or proposing to carry out projects eligible for assistance under federal and state law. The SIB cannot provide assistance in the form of a grant.
- ***Strategic Intermodal System:*** Pursuant to Section 339.61, FS, the Strategic Intermodal System (SIS) marks a fundamental shift in the way Florida views the development of and investment in its transportation system. The SIS is composed of transportation facilities and services of statewide and interregional significance. It represents an effort to link Florida's transportation policies and investments to the state's economic development strategy, in keeping with the Governor's strategic imperative of diversifying Florida's economy.
- ***Transportation Regional Incentive Program:*** Pursuant to Section 339.2819, FS, the Transportation Regional Incentive Program (TRIP) was created to provide an incentive for regional planning, to leverage investments in regionally significant transportation facilities (roads and public transportation) created pursuant to Section 339.155, FS, and link investments to growth management objectives. TRIP was created with the intent of funding projects that will generate additional capacity through growth in the transportation program. All proposed projects will be evaluated in light of this policy.

Each year, the FDOT ACIP program allocates millions of dollars to match federal grants. As airport sponsors receive a federal grant, they apply to the state for the matching funds. Additionally, some direct or "state only" grants (when the FAA is not participating in the funding) may be available to a sponsor for eligible projects. Historically, FDOT has funded approximately 90 percent of eligible projects, leaving the remaining 10 percent to be funded by the sponsor.

Eligible Applicants - The state, city, town, county, district, authority or other political subdivisions of the state, which owns and operates an airport(s), open to the public on a non-discriminatory basis, is eligible for assistance under the Loan Program. Eligible airports must be identified in the FDOT State Airports System Plan dated February 2012 (or most current version).

Eligible Projects - Typical eligible projects included airport related construction projects for runways, taxiways, aircraft parking ramps, aircraft storage facilities (hangars), fueling facilities, general aviation terminal buildings or pilot lounges, utility services (power, water, sewer, etc.) to the airport runway or taxiway lighting, approach aids (electronic or visual), ramp lighting, airport fencing, airport drainage, land acquisition, planning studies, and under certain conditions, the preparation of plans and specifications for airport construction projects. In addition, projects not eligible for funding under other programs and those designed to improve the airport self-sufficiency, may also be considered.

5.3.2 Local Funding

Airport Rates and Charges - FAA Order 5190.6B, *FAA Airport Compliance Manual*, provides comprehensive guidance on the legal requirement that airport fees be fair, reasonable, and not unjustly discriminatory. The objective of the policy is to provide guidance to airports in establishing rates and charges that will help the airport work towards financial sustainability.

Several revenue generating activities that the City is already doing at the Airport will continue to enhance revenues at the airport, these include:

- Aircraft hangar/T-hangar/shade rentals
- Aircraft tie-down rental
- Fuel sale mark-up

The City should continue to monitor the current rates and charges to ensure they are remaining competitive with other airports in the region and state. Other more conventional methods of securing funding and financing alternatives the City could consider include:

Bank Financing - Some airport sponsors use bank financing as a means of funding airport development. Generally, two conditions are required; first, the sponsor must show the ability to repay the loan plus interest, and second, capital improvements must be less than the value of the present facility or some other collateral used to secure the loan. These are standard conditions which are applied to almost all bank loan transactions.

General Obligation Bonds - General Obligation bonds (GO) are a common form of municipal bonds whose payment is secured by the full faith credit and taxing authority of the issuing agency. GO bonds are instruments of credit and because of the community guarantee, reduce the available debt level of the sponsoring community. This type of bond uses tax revenues to retire debt and the key element becomes the approval of the voters to a tax levy to support airport development. If approved, GO bonds are typically issued at a lower interest rate than other types of bonds.

Force Accounts, In-kind Service, and Donations - Depending on the capabilities of the Sponsor, the use of force accounts, in-kind service, or donations may be approved by the FAA for the Sponsor to provide their share of the eligible project costs. An example of force accounts would be the use of heavy machinery and operators for earthmoving and site preparation of runways or taxiways, the installation of fencing, or the construction of improvements to access roads. In-kind service may include surveying, engineering, or other services. Donations may include land or materials such as gravel or water needed for the project. The values of these items must be verified and approved by the FAA prior to initiation of the project.

Third-Party Support - Several types of funding fall into this category. For example, individuals or interested organizations may contribute portions of the required development funds (pilot associations, economic development associations, Chambers of Commerce, etc.). Although not a common means of airport financing, the role of private financial contributions not only increases the financial support of the project, but also stimulates moral support to airport development from local communities. For example, private developers may be persuaded to invest in hangar development. A suggestion would be for the City to authorize long-term leases to individuals interested in constructing a hangar on airport property. This arrangement generates revenue from the airport, stimulates airport activity, and minimizes the sponsor's capital investment requirements. Another method of third-party support involves permitting the fixed base operator (FBO) to construct and monitor facilities on property leased from the airport. Terms of the lease generally include a fixed amount plus a percentage of revenues and a fuel flowage fee. The advantage to this arrangement is that it lowers the sponsor's development costs, a large portion of which is building construction and maintenance.

The airport funds some or all of the cost of capital projects by generating revenue from tenants, users and other sources. These airport funds can come from annual surplus, reserves, or borrowing. While capital projects are usually funded from variety of sources, in the end, airport contributed funds have a role in almost all projects, particularly as seed money to initiate projects and to provide the match of FAA funds.

5.4 Pavement Maintenance Plan

Periodic maintenance is necessary to prolong the useful life of the airport pavements. The effects of weather, oxidation, and usage cause the pavement to deteriorate. The accumulation of moisture in the pavement causes heaving and cracking, and is one of the greatest causes of pavement distress. The sun's ultraviolet rays oxidize and break down the asphalt binder in the pavement mix, which in turn accelerates raveling and erosion and can reduce asphalt thickness.

The appropriate pavement maintenance will minimize the effects of weather damage and oxidation. Crack sealing is performed to keep moisture from accumulating inside and underneath the pavement and should be done at least every five years prior to fog sealing or overlaying the pavements. Fog seals, slurry seals, and coal tar emulsion (fuel resistant) seals are spread over the entire paved area to replenish the binder lost through aggregate to increase the friction coefficient of the pavement. Asphalt overlays are performed near the end of the useful life of the pavement. A layer of new asphalt is placed over the existing pavement to renew the life of the pavement and to recover lost strength due to deterioration. Unless specially designed, the overlay is not intended to increase the weight bearing capacity of the pavement. Overlays may be supplemented with a porous friction course of grooving to increase friction and minimize hydroplaning. Remarking of the pavement is required following a fog seal or overlay.

The recommended pavement maintenance cycle time frames are listed below in **Table 5.2**. It should be noted that the time frames are recommendations only. Actual pavement deterioration will be affected by use of the Airport and weather exposure. Maintenance actions should be scheduled as necessary through close monitoring and inspection of the pavements.

Table 5.2 Pavement Maintenance Schedule

Pavement Maintenance Cycle	Approximate Time
Frames Crack Seal Pavement	1 - 2 years
Crack Seal, Seal Coat, and Remark Pavements	3 - 8 years
Overlay Pavements	15 - 18 years
Seal Concrete Joints	6 - 8 years

Source: FDOT, 2015

5.5 Financial Plan Recommendations

The ultimate goal of any airport should be the capability to support its own operation and development through airport generated revenues. Unfortunately, few airports similar in size to the Clearwater Airpark are able to do this. For example, it is difficult to financially break even when the fees received from hangar rentals and fuel sales will not adequately amortize the cost of construction projects. The City of Clearwater should consider implementing additional airport sources of revenue.

5.5.1 Airport Revenue Opportunities

Airport revenues are generally produced from the use of land leases, user fees, and property taxes generated from on-airport improvements. Examples of airport revenue generators include:

Land Leases - Property on the airport that is not devoted to airfield use, vehicle parking, or contained within areas required to be cleared of structures may be leased to individual airport users or aviation related businesses. Typically, the individual is provided a long-term lease on which to construct a hangar, business, or other facility. At the termination of the lease, the lessee has the option to renew the lease, sell or lease the buildings, or to remove the buildings.

Hangar Leases - Hangars on the airport owned by the airport sponsor can be leased to private aircraft operators or businesses. Typically, as with land leases, the individual or business is provided a long-term lease of the hangar. At the termination of the lease, the lessee has the option to renew the lease or cease use of the hangar.

Tie-Down Fees - A fee is typically established for the use of fixed ramp tie-downs on paved apron areas. The fees are usually established on a monthly or annual basis for based aircraft and on an overnight basis for transient aircraft.

Airport Usage Fee - This fee is typically imposed on charter aircraft and can be waived if the operator purchases a minimum amount of fuel.

Commercial Activity Fee - This fee is typically imposed on commercial activities operating "for profit" at the airport. Typical commercial activities may include fixed base operators, testing and training, maintenance services, and retail or other goods and services which may be provided at the airport.

Non-Aeronautical Revenue Generating - This fee is imposed on leases of land/buildings that are allocated as airport property but do not have access and/or use for aeronautical activities (i.e. non- aeronautical use). The fee for these areas must be setup at fair market value and all revenue generated from these leases must remain within the airport fund.

In accordance with Florida State Grant Assurances, all revenues generated by the airport must be expended by the airport for the capital or operating costs of the airport.

5.6 Airport Development Recommendations

Based on the findings of the planning process, the following recommendations are provided for the City to consider for development the airport to meet the needs of the community:

- The City has the unique challenge of many airports of not having considerable excess land that can be used for aviation related purposes. Over the long-term, the City should continue looking for non-aeronautical development opportunities on the land that has been designated for such activities on the ALP.
- Locations for additional corporate hangars and T-hangars have been identified in ALP drawing set. The investment in additional hangars will make the airport more competitive with other airports in the region and will provide the airport will additional revenue.
- Continued monitoring of the airport's financial status is necessary in order to adapt and adjust to changing conditions.

5.7 Continuous Planning Process

Airport planning is a continuous process that does not end with the completion of a major capital project. The fundamental issues upon which these airport master plans are based are expected to remain valid for several years; however, several variables such as annual aircraft operations and socioeconomic conditions, are likely to change over time. The continuous planning process necessitates that the Airport consistently monitor the progress of the airport in terms of growth in based aircraft and annual operations, as this growth is critical to the exact timing and need for new airport facilities as recommended within the Airport Master Plan. The information obtained from this monitoring process will provide the data necessary to determine if the development schedule should be accelerated, decelerated, or maintained as scheduled.

Periodic updates of the Airport Layout Plan, Capital Improvement Plan, and Airport Master Plan are recommended to document physical changes to the Airport, review changes in aviation activity and to update improvement plans for the Airport. The primary goal of the airport master planning effort is to develop a safe and efficient airport that will meet the demands of its aviation users and stimulate economic development for airport. The continuous airport planning process is a valuable tool in achieving the strategic plans and goals for the Airport.

5.8 Conclusion

This Section has laid out the recommended capital improvement projects and their financial implications for improving the Airport over the 20-year planning period. A total of 24 CIP projects have been identified **(Table 5.1)**, which are all programmed within the 20-year planning period.

This Airport Master Plan has documented the existing and anticipated aviation demand based on existing conditions, as well as provided a practical and implementable development plan based on input and guidance from the City of Clearwater and FDOT.

This financial analysis is based on the continuation of FDOT funding at the current levels, which average at $600,000/year. However, there is competition for FDOT funds, so the Airport will need to aggressively communicate its CIP needs to the FDOT and other relevant agencies as opportunities arise.

Based on the assumptions and the financial analysis presented herein, the development plan presented on the ALP along with the Capital Improvement Plan (CIP) is considered feasible, and the airport should be able to construct the necessary aviation facilities, as recommended herein.