

Final Report

**MASTER
PLAN
UPDATE
FRIDAY
HARBOR
AIRPORT**



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March 2015

MASTER PLAN UPDATE FRIDAY HARBOR AIRPORT



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CHAPTER A.

Inventory of Existing Conditions

INTRODUCTION. The purpose of an Airport Master Plan is to prepare and present a comprehensive analysis of the airport facilities and its environs, and to communicate the sponsor's goals and objectives for the future maintenance, modernization, and/or expansion of the facility. It is a guidance document that identifies the key planning and development issues at the airport, as well as recommends a phased implementation strategy of the various development projects that are required to accomplish the sponsor's goals. Therefore, it is the sponsor's proposed strategy for the future development of the airport.

Friday Harbor Airport (FHR) is owned and operated by the Port of Friday Harbor and is designated a non-hub primary commercial service airport by the FAA's National Plan of Integrated Airport Systems (NPIAS). It is an integral component of the national airport system, as well as a vital part of the northern Puget Sound transportation infrastructure within San Juan County.

The most recent comprehensive planning document prepared for Friday Harbor Airport (i.e., the *Airport Master Plan*) was completed in 2006. Through consultation with the Airport Sponsor during the project scoping process, it was determined that many sections of the existing planning document are still valid and accurately represent the strategy, goals, and objectives of the Port of Friday Harbor. However, the *Friday Harbor Airport Modification of Airport Design Standards Study*, which was prepared and approved in 2010, documented the Airport's ability to safely operate with Airport Reference Code B-I (small aircraft only) dimensional standards, provided the parallel taxiway is shifted six feet to the west. Therefore, the Port of Friday Harbor has elected to prepare this *Airport Master Plan Update*, which will establish the specific framework to integrate the modification of standards with the future growth of the Airport in a manner that cost-effectively satisfies aviation demand. Therefore, the scope of this planning assignment will focus on updating those sections of the 2006 Airport Master Plan (2006 MP) that will be impacted by the previously described planning issues (i.e., the 2010 *Friday Harbor Airport Modification of Airport Design Standards Study*), and include an update of the Airport Layout Plan Drawing Set.

The study is comprised of an abbreviated version of the following *typical* airport master planning components:

- **Inventory of Existing Conditions**
- **Aviation Activity Forecasts**
- **Facility Requirements**
- **Alternatives Development**
- **Conceptual Development Plan**
- **Airport Plans**
- **Implementation Program**

Airport Role and Facilities

Friday Harbor Airport is located adjacent to and southwest of the City of Friday Harbor, on San Juan Island north of the Strait of Juan De Fuca. Friday Harbor is the county seat of San Juan County, which is located in the northwest corner of Washington State.

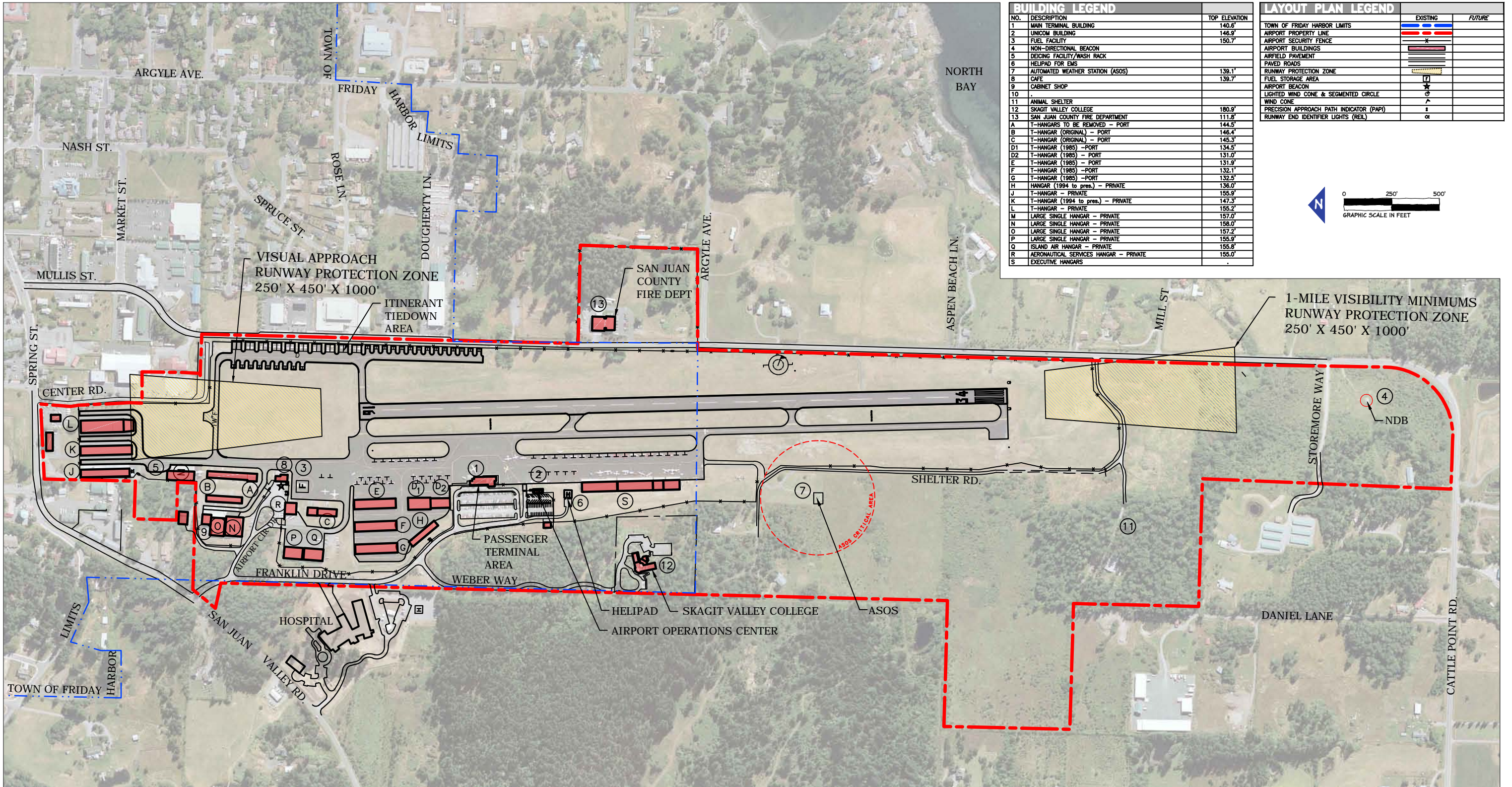
- **Airport Reference Point:** Latitude N 48° 31' 19.10" and Longitude W 123° 01' 27.70"
- **FAA Site Number:** 26219.4A
- **Airport Elevation:** 113 feet above mean sea level (AMSL)
- **Acreage:** 145 acres
- **Mean Normal Temperature of hottest month:** 71° F.

Airside Facilities

The following figure, entitled *EXISTING AIRPORT LAYOUT*, provides a graphic illustration of all airport facilities.

Runway System.

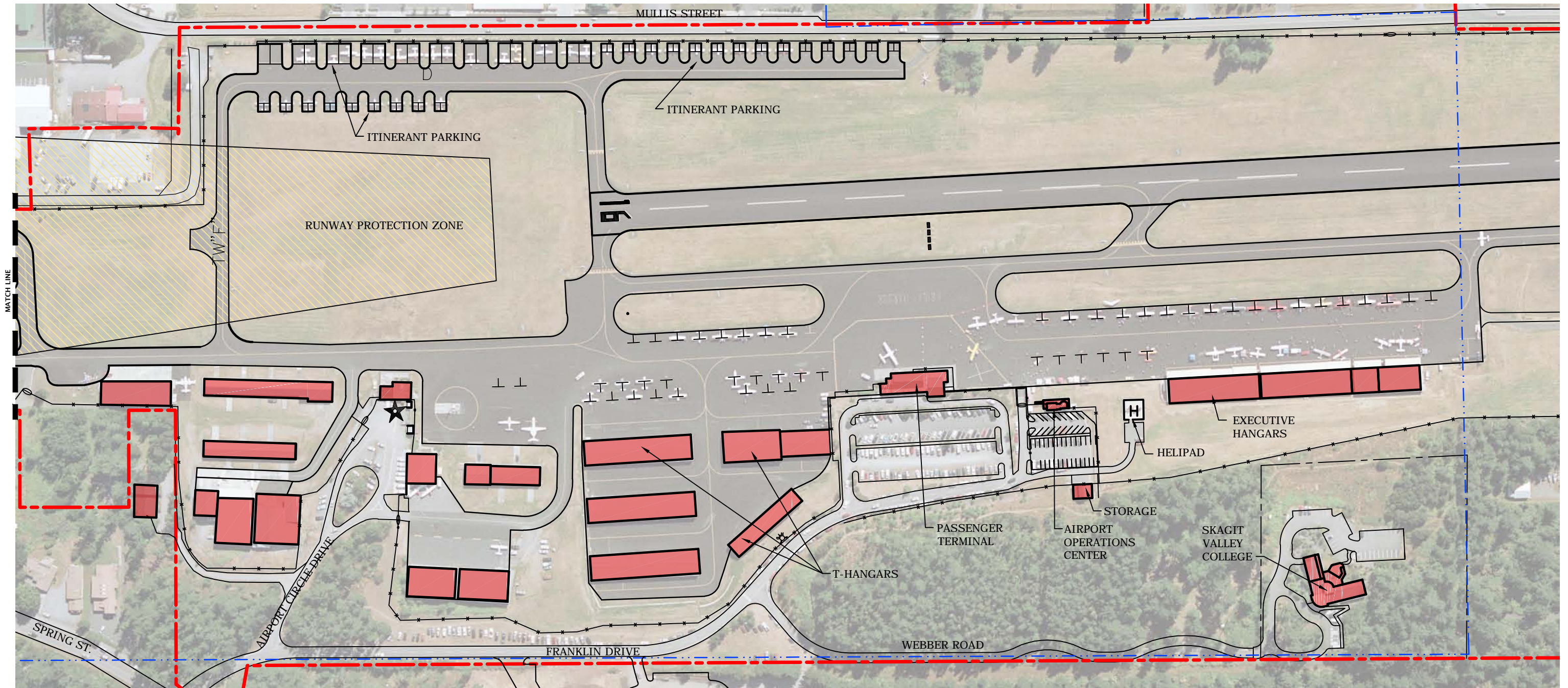
- **Runway 16/34:** 3,402 feet in length and 75 feet in width.
- **Pavement:** Constructed of asphalt, gross weight bearing capacity of 12,500 pounds single wheel main landing gear configuration.
- **Lighting:** Medium Intensity Runway Lighting (MIRL), threshold lights, 4-light Precision Approach Path Indicator (PAPI), and Runway End Identifier Lights (REIL) at Runway 34.
- **Marking:** Basic.



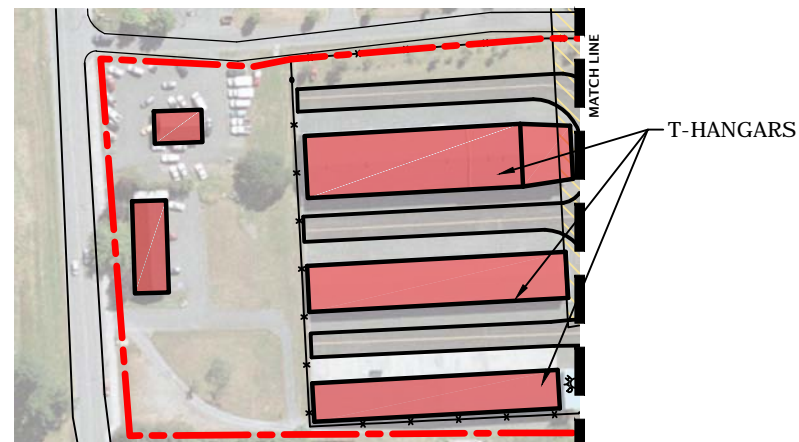
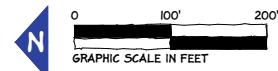
■ Figure A1 Existing Airport Layout



Sources: Airport Runway Overlay Site Plan by MPD, Inc. P.S. 8/27/02
 Airport Layout Plan by MPD, Inc. P.S. 4/96, Aerial Photo Town of Friday Harbor 2011



LAYOUT PLAN LEGEND	EXISTING	FUTURE
TOWN OF FRIDAY HARBOR LIMITS	—	—
AIRPORT PROPERTY LINE	—	—
AIRPORT SECURITY FENCE	—	—
AIRPORT BUILDINGS	—	—
AIRFIELD PAVEMENT	—	—
PAVED ROADS	—	—
RUNWAY PROTECTION ZONE	—	—
FUEL STORAGE AREA	—	—
AIRPORT BEACON	—	—
LIGHTED WIND CONE & SEGMENTED CIRCLE	—	—
WIND CONE	—	—
PRECISION APPROACH PATH INDICATOR (PAPI)	—	—
RUNWAY END IDENTIFIER LIGHTS (REIL)	—	—



■ Figure A2 Existing Terminal Area Layout Detail



Taxiway System.

- **Taxiway “A”:** Full-length parallel taxiway, 35 feet in width, located 150 feet (runway centerline to taxiway centerline) west of Runway 16/34. The parallel taxiway shift of six feet to the west is programmed for construction in 2012.
- **Taxiways “A1” and “A2”:** Midfield exit taxiways located approximately equidistant from each runway end, 35 feet in width.
- **Taxiway “A3”:** Entrance taxiway located at the Runway 34 threshold, 35 feet in width.
- **Taxiway “B”:** Access taxiway providing access on the aircraft apron and to the T-hangars located at the north end of airport property, 35 feet in width.
- **Taxiway “E”:** Access taxiway providing access from Taxiway “B” to the T-hangars at the north end of airport property, 35 feet in width.
- **Taxiway “F”:** Access taxiway providing access from Taxiway “B” to the tie-down area on the east side of the Airport, located north of the Runway 16 threshold, 35 feet in width.
- **Taxiway “G”:** Entrance taxiway located at the Runway 16 threshold, 35 feet in width.
- **Holding Bays:** Located at each runway end, accessed from Taxiways “G” and “A3”.
- **Pavement:** Asphalt.
- **Marking:** Centerline stripes and holding position lines.

Helipad.

Located on the west side of the runway, south of the Airport Operations Center/Unicom Building, is restricted for exclusive use by medevac operators, and is 40 feet square.

Aprons.

- **Terminal Apron:** Provides approximately 12,500 square feet of ramp space and four commuter aircraft parking spaces.
- **South Tiedown Apron:** Provides approximately 150,400 square feet of ramp space and 25 tiedown spaces.
- **North Tiedown Apron:** Provides approximately 111,600 square feet of ramp space and 30 tiedown spaces.
- **Northeast Itinerant Tiedown Apron:** Provides approximately 121,250 square feet and 36 tiedown spaces.

Landside Facilities

Terminal Facilities.

- **Terminal Building:** Provides approximately 3,800 square feet, consisting of two passenger boarding ground level gates, airline ticket counters/administrative offices, and baggage handling area.
- **Vehicular Parking:** Provides approximately 44,100 square feet and 113 vehicle parking spaces.

General Aviation Facilities.

- **FBO Hangar:** Provides aircraft services from two hangars located in the northwest portion of airport property.
- **Island Air Hangar:** Located in the northwest portion of airport property, providing custom, on-demand aircraft charter service, approximately 5,455 square feet.
- **Aeronautical Services Hangar:** Located just west of the fuel facility, approximately 3,605 square feet.
- **Executive Hangars:** Located at the south end of the south tie-down apron, west side of the apron, provides approximately 25,767 square feet aircraft storage space.
- **12 T-hangars:** Provide approximately 100 aircraft storage spaces.
- **4 Large Single Hangars:** Provide storage spaces for larger aircraft, located in the northwest portion of airport property.

The following table, entitled *SUMMARY OF HANGAR FACILITIES*, presents the generalized inventory information about the hangars.

Table A1
Summary of Hangar Facilities

Building Number	Hangar Type	Ownership	Number of Bays	Hangar Size	Condition/Status
A	T-Hangar	Port	---	35 x 260	Poor
B	T-Hangar	Port	---	35 x 180	Poor
C	T-Hangar	Port	---	40 x 150	Poor
D1	T-Hangar	Port	---	60 x 120	Fair
D2	T-Hangar	Port	1	50 x 100	Fair
E	T-Hangar	Port	---	50 x 220	Fair
F	T-Hangar	Port	---	50 x 220	Poor
G	T-Hangar	Port	---	50 x 220	Fair
H	Hangar	Private	---	35 x 170	Good
J	T-Hangar	Private	---	45 x 260	Excellent
K	T-Hangar	Private	---	50 x 270	Excellent
L	T-Hangar	Private	---	60 x 220	Excellent
M	Large Single Hangar	Private	1	75 x 145	Excellent
N	Large Single Hangar	Private	1	60 x 100	Excellent
O	Large Single Hangar	Private	1	75 x 100	Good
P	Large Single Hangar	Private	1	65 x 65	Good
Q	Island Air Hangar	Private	1	60 x 90	Good
R	Aeronautical Service Hangar	Private	1	60 x 90	Fair

Source: Friday Harbor Airport personnel.

Support Facilities.

- **Fuel Facility:** Two 10,000-gallon 100LL Avgas underground storage tank (UST) with automated pump system, located at northwest corner of the north tiedown apron. The Port of Friday Harbor indicates that because of age and condition, the fuel storage facility is in need of replacement.
- **Deicing Facility/Wash Rack:** Located on west edge of Taxiway “B”, in the northern portion of airport property.
- **Rotating Beacon:** Located north of the fuel facility, west of the café.
- **Lighted Wind Indicator and Segmented Circle:** Located east of Taxiway “A2”, east of the runway.
- **Automated Weather Station (ASOS):** Located west of the runway, west of Taxiway “A2”.

-
- **Non-Directional Beacon:** Located in the southern portion of airport property, approximately 1,850 feet south of the Runway 34 threshold.

Other On-Airport Buildings.

- **Ernie's Café:** Located north of the fuel facility, just west of Taxiway "B".
- **Airport Operations Center/Unicom Building:** Located southwest of the terminal building, adjacent to the general aviation apron.
- **Skagit Valley College:** Located in the west portion of airport property, west of the executive hangars.
- **San Juan County Fire Department:** Located east of Mullis Avenue in the eastern portion of airport property.
- **Storage Barn:** Located west of the Airport Operations Center/Unicom Building parking lot.

Vehicular Access and Parking.

- **Entrance Road.** Franklin Road serves as the primary airport entrance road, providing access to the terminal building from Spring Street. Airport Circle Drive provides access from Franklin Road to the café.
- **Vehicular Parking.** 40 vehicle parking spaces provided adjacent to the Airport Operations Center/Unicom Building, undetermined amount of spaces near Ernie's Café, the Aeronautical Services Hangar, and the FBO hangar

Airport Environs

Because airport operations influence the surrounding land uses, and surrounding land uses have an influence on airport operations, it is critical to document the existing zoning in the vicinity of the Airport. The following narrative and figures describe the existing zoning within the Friday Harbor Airport environs.

Existing Zoning

According to the Friday Harbor Municipal Code, the Airport is zoned public service. The zoning classification for the land immediately adjacent to the Airport is light industrial and commercial. The light industrial zoning is located to the west of the Airport, between the airport boundary and San Juan Valley road. To the east, east of Mullis Street, light industrial, light manufacturing, and single and multi-family zoning is designated. Northeast of the Airport, adjacent to Spring Street, professional services and commercial zoning dominate. North of the Airport, between the Airport

and Spring Street, light industrial zoning is applied. Further to the north of Spring Street, commercial and public services zoning dominates, with some multi-family zoning applied. Northwest of the Airport, north of Spring Street, single family zoning is the dominant category, with some multi-family and utility zoning occurring. The southern portion of the Airport and areas to the south are located outside the Friday Harbor town limits and, therefore, are under the zoning jurisdiction of San Juan County. According to the San Juan County Comprehensive Plan Land Use and Shoreline Master Program District 1 map, the area immediately south of the Airport is designated as rural general, with the areas to the southwest and southeast primarily being designated as rural farm forest. Immediately east of the airport property, rural general zoning classification is applied.

Additionally, San Juan County has the authority to adopt an Airport Overlay District (AOD), which is intended to protect the public health, safety and welfare, to recognize and protect those areas devoted to public-use aviation and associated activities from airspace obstructions or hazards, and to promote compatibility between airport uses and land uses and activities in the airport vicinity and environs. This is accomplished by restricting the type and height of development within certain designated and defined areas surrounding the Airport. It should be noted that the AOD guidelines have not yet been implemented to county lands adjacent to the Airport that are outside the Friday Harbor town limits, or to the Town of Friday Harbor. The existing zoning for the airport environs is presented in the following illustration entitled *GENERALIZED EXISTING ZONING*.

Airspace System/Navigational Aids (NAVAIDS)

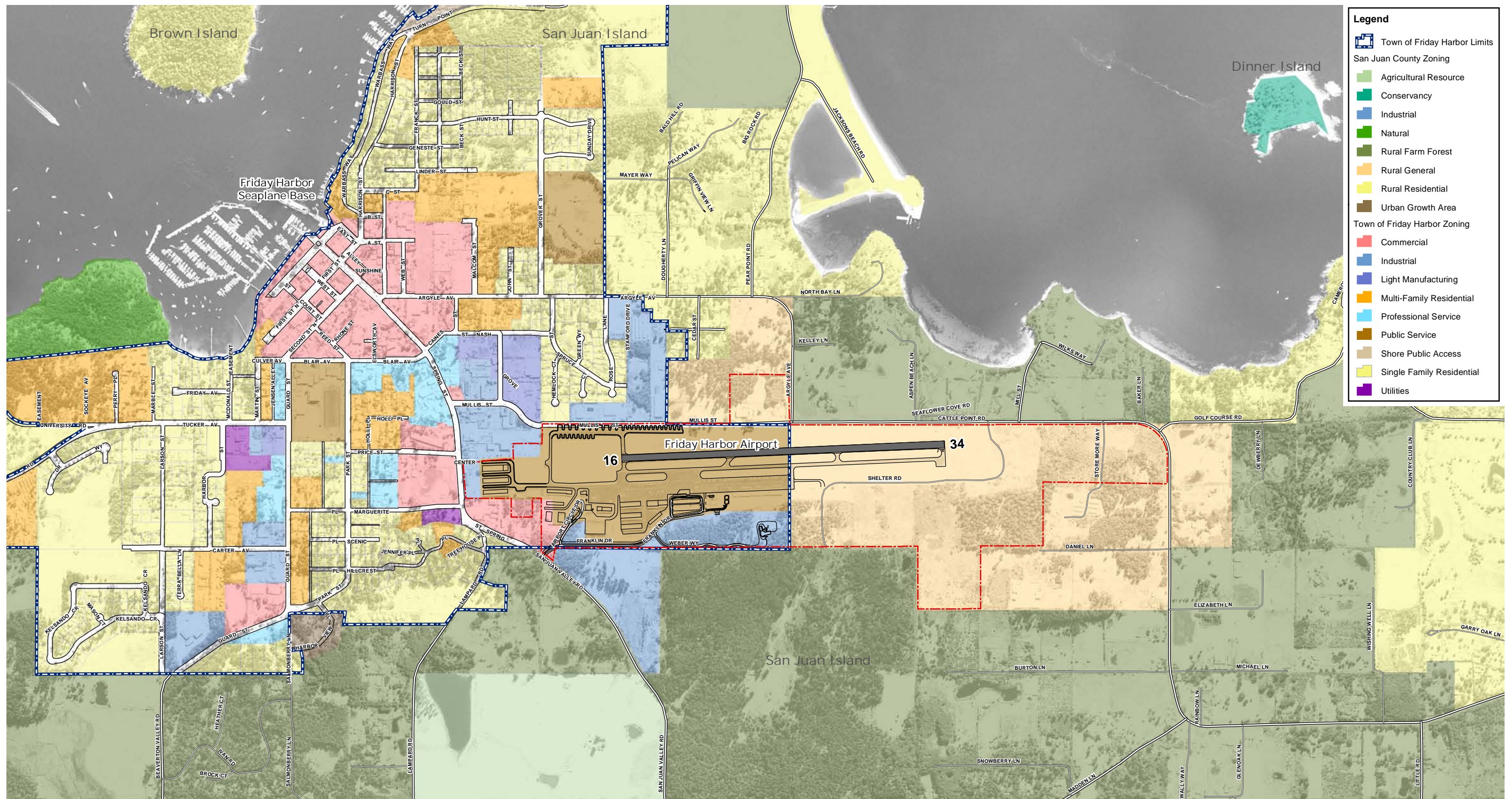
Friday Harbor Airport operates within the local, regional, and national system of airports and airspace. This section presents a brief description of the Airport's role as an element within these systems.

Airspace

- **Local Airspace.** Class E, established at 700 feet above ground level (AGL).
- **Military Operations Area (MOA).** Chinook B MOA, located approximately 20 NM to the south
- **Alert Area.** A-680, located approximately 24 NM to the southeast

NAVAIDS

- **Friday Harbor NDB (284 FHR).** Located on the airport.
- **Lopez Island NDB (356 OPZ).** Located approximately 5 NM to the southeast.
- **Penn Cove VOR-DME (117.2).** Located approximately 22 NM to the southeast.



0 1,000 2,000 Feet

Figure A3 Existing Generalized Zoning



- **Victoria VOR-DME (113.7).** Located approximately 24 NM to the northwest.

The figure entitled *AIRSPACE/NAVAIDS SUMMARY*, illustrates the airspace and NAVAIDS within the vicinity of Friday Harbor Airport.

Existing Instrument Approaches

Currently, there are four published straight-in Instrument Approach Procedures (IAPs) at the Airport, which are presented in the following table entitled *EXISTING INSTRUMENT APPROACH PROCEDURES*.

Table A2
Existing Instrument Approach Procedures

Approach	Runway	Ceiling Minimum	Visibility Minimums
LPV RNAV (GPS) ⁴	Runway 34	392' AGL	1¼-mile ¹
LNAV/VNAV RNAV (GPS) ⁴	Runway 34	472' AGL	1½-mile ¹
LNAV RNAV (GPS) ⁴	Runway 34	532' AGL	1-mile ² , 1½-mile ³
NDB ⁴	Runway 34	692' AGL	1-mile ² , 2-miles ³

Source: U.S. Terminal Procedures, NW-1, 25 August 2011 to 22 September 2011.

Notes: ¹ Category A, B, and C aircraft. ² Category A and B aircraft. ³ Category C aircraft. ⁴ Category D aircraft not authorized to use this approach.

It should also be noted that an IAP obstruction survey will be prepared for Friday Harbor Airport as a companion study to this planning effort, with the results being incorporated into the final planning recommendations of the MP Update.

Existing Traffic Patterns

- **Runway 16.** Right-hand traffic pattern
- **Runway 34.** Right-hand traffic pattern
- **Traffic Pattern Altitude.** 1,100 feet AMSL

The illustration entitled *EXISTING AIRPORT TRAFFIC PATTERNS*, presents the approximate location of these established pattern locations.

Existing Noise Abatement Procedures

- **Departures.** Specified right-hand traffic pattern with reduced power settings, as safety and performance capabilities allow. Recommend climb to 1,100 feet AMSL before turning, when



Scale: 1" = 7 Nautical Miles

Figure A4 Airspace/NAVAIDS Summary



MASTER PLAN UPDATE
Friday Harbor Airport

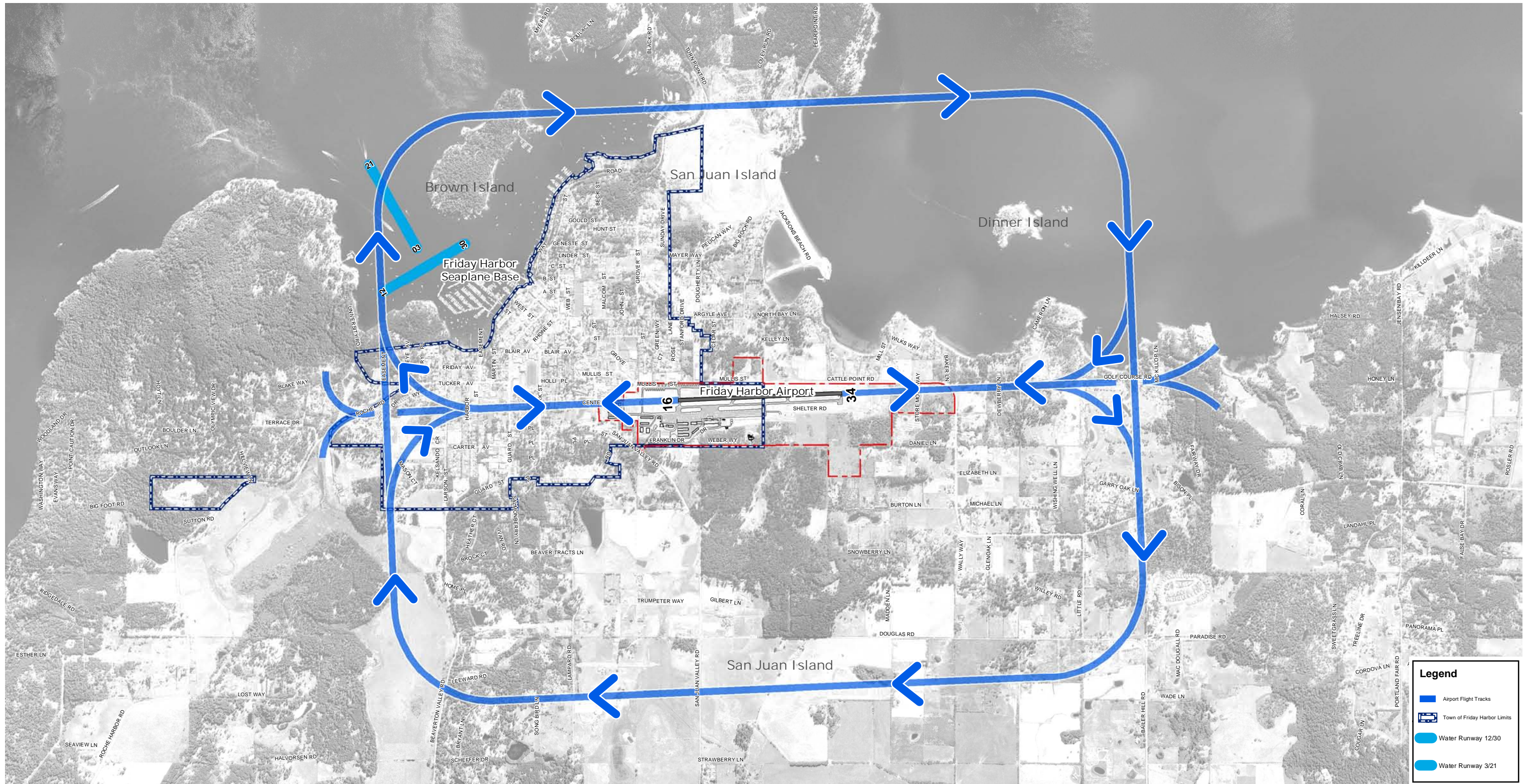


Figure A5 Existing Airport Traffic Pattern



possible, and only after passing marina for northbound flights and golf course for southbound flights. Avoid departures between 10:00 p.m. and 7:00 a.m.

- **Arrivals.** Specified right-hand traffic pattern. Recommend that aircraft maintain the highest altitude AGL as practical when on final approach and fly at or above existing PAPI glide path angle.



CHAPTER B.

Aviation Forecasts

INTRODUCTION. Forecasting is a key element in the planning process and is essential for effective decision making. The projections contained in this Master Plan Update will be used to analyze existing airport facilities and identify the need for new or expanded facilities. However, by its very nature, forecasting is not an exact science, but it does identify some general parameters for development and, when soundly established, provides a defined rationale for various development activities.

The forecasting element for this Master Plan Update incorporates the forecasts assumptions and methodologies contained in the recently approved *Friday Harbor Airport Modification of Airport Design Standards Study*, which were prepared in 2010, and the entire study is contained in Appendix One. However, an update of the base year data to reflect the most current activity at the Airport (i.e., calendar years 2010 and 2011) has been conducted and the forecasts adjusted accordingly. A thorough examination of the updated base year data revealed no significant variations from the 2009 data used in the *Friday Harbor Airport Modification of Airport Design Standards Study*, even though enplanements have decreased and total operations have increased. Therefore, no deviation of the assumptions and methodologies used to generate the forecasts is required.

Existing Activity

The updated existing (i.e., calendar years 2010 and 2011) enplanements and operations activity is presented in the following table.

Table B1
Updated Existing Aviation Activity, 2010 & 2011

Year	Enplanements	Air Taxi/Commuter Operations	General Aviation Operations	Total Operations
2010 ⁽¹⁾	10,799	9,165 ⁽²⁾	39,574	48,739
2011 ⁽¹⁾	10,242	10,198 ⁽³⁾	44,050	54,248

Source: Friday Harbor Airport personnel.
⁽¹⁾ Actual calendar year data.
⁽²⁾ Includes 657 operations of air cargo aircraft.
⁽³⁾ Includes 660 operations of air cargo aircraft.

Forecasts

The revised passenger enplanements, air taxi/commuter aircraft operations, and general aviation aircraft operations forecasts are presented in the following table, entitled *SUMMARY OF ENPLANEMENTS AND OPERATIONS FORECASTS, 2010-2031*.

Enplanements Forecast:

The updated enplanement forecast reflects a variable growth rate, with an overall average annual growth rate of 1.9%. It is expected that enplanements at Friday Harbor Airport will experience no growth for the first two years and only limited growth during the initial five year planning period. This correlates with the uncertainty of the timing and strength of an economic recovery nationwide, and consequently, with the recovery of aviation demand. However, during the following five years of the forecast period, enplanements are expected to parallel the projected population growth rate of San Juan County (i.e., 1.7% average annual growth rate), and during the long-term planning period, (i.e., 10- to 20-year time period), enplanements are forecast to increase at an average annual growth rate of 2.4%, which is the growth rate identified for Friday Harbor Airport in the *FAA APO Terminal Area Forecasts Fiscal Years 2009-2040*.

Table B2
Summary of Enplanements and Operations Forecast, 2010-2031

Year	Enplanements Forecast (1.9%)	Air Taxi/Commuter Forecast (0.7%)	Air Cargo Forecasts (0.0%)	General Aviation Forecast (1.3%)	Total Operations Forecast (1.2%)
2010 ⁽¹⁾	10,799	8,508	657	39,574	48,739
2011 ⁽¹⁾	10,242	8,508	660	45,080	54,248
2012	10,242	8,508	660	45,080	54,248
2013	10,242	8,550	660	45,080	54,290
2014	10,415	8,580	660	45,395	54,635
2015	10,595	8,620	660	45,715	54,995
2016	10,770	8,650	660	46,030	55,340
2021	11,880	8,800	660	49,100	58,560
2026	13,375	9,410	660	53,420	63,490
2031	15,060	9,850	660	58,120	68,630

Source: Barnard Dunkelberg & Company.
⁽¹⁾ Actual calendar year data.

Air Taxi/Commuter Operations Forecast

Commercial service aircraft operations are, like enplanements, expected to remain flat during the initial timeframe of the planning period. Because seating capacity is available with the existing flight

schedule, it is not anticipated that significant additional flights will be necessary to accommodate the increased passenger demand until the latter stages of the planning period.

Air Cargo Operations Forecast

Air cargo aircraft operations are not expected to change during the course of the planning period.

General Aviation Operations Forecast

Because of the lingering economic recession and the continued uncertainty regarding the timing and strength of a recovery in aviation demand, the updated general aviation operations forecasts are expected to remain at existing levels for two years. During the following five-year time period, a slight increase is expected that parallels the average annual growth rate of 0.7% used to project nationwide general aviation operations growth in the *FAA APO Terminal Area Forecasts 2009-2030*. During the latter stages of the planning period, general aviation operations are expected to have an average annual growth rate of 1.7%, which is the expected population growth rate for San Juan County, resulting in a 1.3% average annual growth rate for the overall planning period.

Forecast Operations by Aircraft Type

The updated existing data provided by airport personnel was used to assess the individual and collective use of various aircraft type categories. The methodology involved applying the individual percentages derived from the 2009 Aircraft Situation Display to Industry (ASDI) records and used in the *Friday Harbor Airport Modification of Airport Design Standards Study* to the updated base year data and is presented in the following table entitled *OPERATIONS BY AIRCRAFT TYPE, 2011-2031*.

Table B3
Operations By Aircraft Type, 2011-2031

Aircraft Type	2011	2016	2021	2026	2031
<i>Air Taxi/Commuter</i>	8,508	8,650	8,800	9,410	9,850
Single Engine Piston	5,574 ⁽¹⁾	5,663	5,720	6,061	6,255
Single Engine Turboprop	2,433 ⁽¹⁾	2,477	2,553	2,766	2,955
Multi-Engine Piston	501 ⁽¹⁾	510	527	583	655
<i>Air Cargo</i>	660	660	660	660	660
Single Engine Turboprop	660 ⁽¹⁾	660	660	660	660
<i>General Aviation</i>	45,080	46,030	49,100	53,420	58,120
Single Engine	40,216 ⁽²⁾	41,066	43,748	47,496	51,623
Multi-Engine	4,470 ⁽²⁾	4,542	4,764	5,182	5,595
Turboprop	232 ⁽²⁾	250	360	490	575
Business Jet	72 ⁽²⁾	80	130	145	210
Helicopter	90 ⁽²⁾	92	98	107	117
Total	54,248	55,340	58,560	63,490	68,630

Source: Barnard Dunkelberg & Company. ⁽¹⁾ Actual, using information provided by airport personnel. ⁽²⁾ Estimate using Aircraft Situation Display to Industry (ASDI) data for 2009.

Forecast Operations by ARC

The updated existing operations have been further refined by aircraft use within the respective Airport Reference Code (ARC). The following table, entitled *OPERATIONS BY AIRPORT REFERENCE CODE (ARC), 2011-2031*, presents the updated data.

Table B4
Operations By Airport Reference Code (ARC), 2011-2031

ARC	2011⁽¹⁾	2016	2021	2026	2031
A-I through B-I	50,847	51,878	54,997	59,689	64,615
A-II through B-II (General Aviation)	308	325	350	375	400
A-II through B-II (Commercial Service & Air Cargo)	3,093	3,137	3,213	3,426	3,615
Total	54,248	55,340	58,560	63,490	68,630

Source: Barnard Dunkelberg & Company. ⁽¹⁾ Estimate using Aircraft Situation Display to Industry (ASDI) data for 2009.

Based Aircraft Forecasts

Using updated data of aircraft currently based at Friday Harbor Airport, future projections have been generated and are presented in the following table entitled *BASED AIRCRAFT FORECASTS BY AIRCRAFT TYPE, 2011-2031*.

Table B5
Based Aircraft Forecasts By Aircraft Type, 2011-2031

Based Aircraft	2011 ⁽¹⁾	2016	2021	2026	2031
Single Engine	135	140	144	148	151
Multi-Engine	4	4	5	5	6
Business Jet	1	1	1	1	1
Helicopter	3	3	3	3	4
Total	143	148	153	157	162

Source: Barnard Dunkelberg & Company. ⁽¹⁾ Actual.

Forecast Approval

In accordance with guidance contained in *Aviation Forecast Guidance APP-400*, local aviation forecasts are approved by Airport District Offices (ADO) or Regional Airports Divisions (RO). Local forecasts that are consistent with the Terminal Area Forecasts (TAF) do not need to be coordinated with APP-400 and APO-110. Consistency with the TAF is defined as the local forecast differing by less than 10% in the first five years, and by less than 15% in the remaining forecast periods. As presented in the following table, the forecasts for this *Master Plan Update* are less than the specified TAF threshold differentials for acceptance. Both tabs of the FAA-supplied TAF summary spreadsheet are contained in Appendix Two.

Table B6
Summary of Airport Reference Code Classification Study & TAF Forecast Comparison, 2011-2026

Airport Name: Friday Harbor Airport	Year	Airport Forecast	TAF	AF/TAF (% Difference)
Passenger Enplanements				
Base yr.	2011	10,242	10,242	0.0%
Base yr. + 5yrs.	2016	10,770	12,944	-16.8%
Base yr. + 10yrs.	2021	11,880	14,562	-18.4%
Base yr. + 15yrs.	2026	13,380	16,386	-18.3%
Commercial Operations ⁽¹⁾				
Base yr.	2011	9,165	9,165	0.0%
Base yr. + 5yrs.	2016	9,310	19,882	-53.2%
Base yr. + 10yrs.	2021	9,460	21,952	-56.9%
Base yr. + 15yrs.	2026	10,070	24,238	-58.5%
Total Operations				
Base yr.	2011	54,248	54,248	0.0%
Base yr. + 5yrs.	2016	55,340	65,727	-15.8%
Base yr. + 10yrs.	2021	58,560	72,068	-18.7%
Base yr. + 15yrs.	2026	63,490	79,033	-19.7%

Source: Barnard Dunkelberg & Company. ⁽¹⁾ Airport forecast data includes combined commercial service operations and 660 air cargo operations.

CHAPTER C.

Facility Requirements

INTRODUCTION. This chapter will examine the existing facilities at Friday Harbor Airport and determine if they are adequate to meet the aviation demand expected to be placed on them during the 20-year planning period. This evaluation requires translating the aviation forecasts presented in the previous chapter into specific physical facilities. Any facilities determined to be deficient will have the necessary improvements identified that safely and efficiently meet the requirements. This assessment will focus on the function and interaction of airside facilities (i.e., runways and taxiways) and landside facilities (i.e., aprons, hangars, support services, and vehicular access).

Although the forecasts presented in the previous chapter will be used to establish future requirements at the Airport, it is not meant to dismiss the possibility that due to unique circumstances accelerated growth or consistently higher or lower levels of aviation activity may occur. Aviation activity levels should be monitored for consistency with the forecasts, and in case of dramatic changes, the development schedule should be adjusted to correspond with actual demand.

Airport facilities are typically designed in accordance with the specified Airport Reference Code (ARC), which is based on the “Design Aircraft”. FAA criteria indicate that at least 500 annual operations by an aircraft or group of aircraft are required to include the airport in the representative ARC. As presented in the previous chapter, there are approximately 3,400 operations by aircraft within the ARC A-II or B-II category. The majority of these operations are conducted by the Cessna 208 Caravan utilized by Kenmore Air for scheduled commercial service and by FedEx for air cargo service. General aviation operations of ARC A-II and B-II aircraft include the Beechcraft Super King Air and the Pilatus PC-12.

However, the *Friday Harbor Airport Modification of Airport Design Standards Study*, recently approved by the FAA, documented the Airport’s ability to safely operate with ARC B-I small aircraft only dimensional standards, provided the parallel taxiway centerline separation from the runway is increased by six feet to a total of 156 feet (see Modification of Airport Design Standards in Appendix One). This course of action will allow unrestricted operations by aircraft with wingspans equal to or less than 55 feet.

Airside Facility Requirements

The analysis of airside facility requirements focuses on determining the necessary elements and the spatial relationship of these elements that are related to the actual operation of aircraft on the airfield (i.e., runways and taxiways). This evaluation includes the delineation of airfield dimensional standards, instrument approach needs, visual and electronic navigational aids, pavement marking, lighting needs, and signage.

Dimensional Standards

Standard dimensional criteria for airport facilities are contained in FAA Advisory Circular (AC) 150/5300-13, *Airport Design*. As stated previously, dimensional standards are regulated with respect to the ARC, but are also dependent on the designated or planned Instrument Approach Procedure (IAP) having the lowest visibility minimums. Dimensional standards applicable at Friday Harbor Airport are presented in the following table entitled *DIMENSIONAL STANDARDS, IN FEET*. As can be seen, the Airport meets most of the dimensional standards associated with ARC B-I small aircraft only, with the noted exceptions.

- **Taxilane Object Free Area:** Taxilane “B” does not meet the Taxilane Object Free Area (OFA) dimensional standards. The aircraft tiedowns located on either side of the taxilane centerline are located such that the standard dimension of 79 feet is deficient by 19 feet.
- **Runway Centerline to Parallel Taxiway Centerline:** As presented previously, the MOS indicated the Airport’s ability to safely operate with ARC B-I small aircraft only standards, provided that the Taxiway “A” centerline separation distance is shifted an additional six feet to a total of 156 feet. This project is programmed for construction in 2012.

Figure C1, entitled *NON-STANDARD DIMENSIONAL CRITERIA*, provides an illustration of the deficient Taxilane “B” OFA dimensional standard.

Table C1
Dimensional Standards, In Feet

Item	Existing Dimension	ARC B-I Small Aircraft Only Dimension
Runway:		
Width	75 ⁽¹⁾	60
Safety Area Width	120	120
Safety Area Length (beyond runway end)		
Runway 16	240	240
Runway 34	240	240
Object Free Area Width	250	250
Object Free Area Length (beyond runway end)		
Runway 16	240	240
Runway 34	240	240
Obstacle Free Zone Width	250	250
Obstacle Free Zone Length (beyond runway end)		
Runway 16	200	200
Runway 34	200	200
Taxiway:		
Width	25, 35	25
Safety Area Width	49	49
Object Free Area Width	89	89
Taxilane Object Free Area Width	60	79
Runway Centerline to:		
Holdline	125	125
Parallel Taxiway Centerline	156⁽²⁾	150
Aircraft Parking Area	250	125
Taxiway Centerline to:		
Parallel Taxiway/Taxilane Centerline	160	69

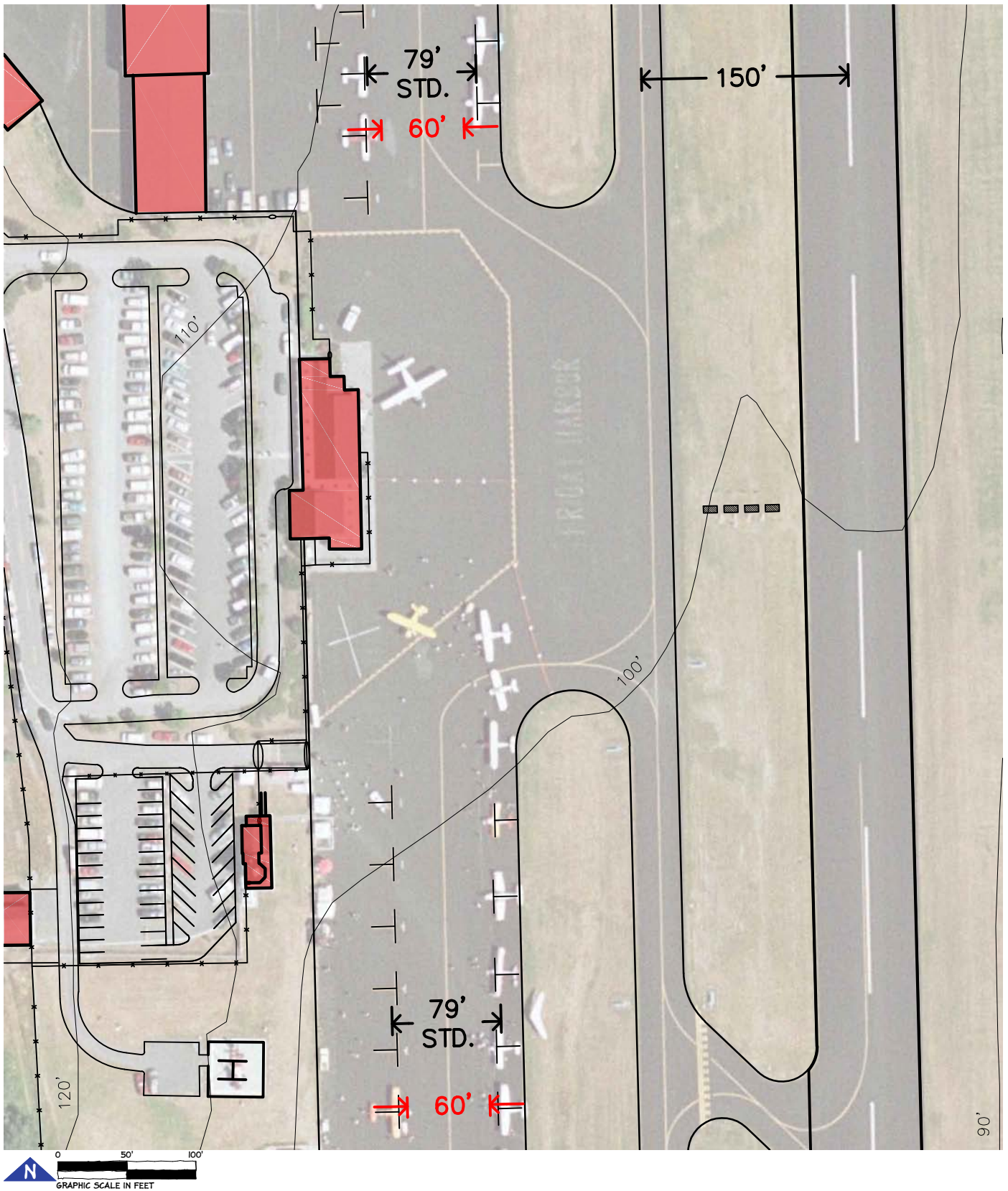
Source: FAA AC 150/5300-13, *Airport Design*, and existing airport conditions.

⁽¹⁾ The existing width of 75 feet is being retained to increase the percentage of time the runway accommodates aircraft operations during crosswind conditions.

⁽²⁾ *Friday Harbor Airport Modification of Airport Design Standards Study* approved a parallel taxiway centerline separation distance of 156 feet from the runway centerline. It is anticipated that this project will be completed in Fiscal Year 2012.

Weather and Wind Analysis

Surface wind conditions and climatological conditions specific to the location of each airport influence the layout of the airfield and impact the utilization of the runway system. Variations in weather conditions (i.e., limited cloud ceilings and reduced visibility) restrict the time an airport is available for use by aircraft, while wind direction and velocity dictate runway usage.



■ Figure C1 Non-Standard Dimensional Criteria



Weather data under various meteorological conditions were obtained from observations taken at the Airport for the period January 2000 through December 2009. The following table, entitled *METEOROLOGICAL CONDITIONS*, presents the weather conditions under which the Airport operates and the percentage of time the specific conditions occur.

Table C2
Meteorological Conditions

Weather Conditions	Percent of Time
VFR (ceiling equal to or greater than 1,000' AGL and visibility equal to or greater than 3 statute miles)	92.8%
VFR minimums to existing IAP minimums (ceiling less than 1,000' AGL and/or visibility less than 3 statute miles, but ceiling equal to or greater than 400' AGL and visibility equal to or greater than 1-1/4 statute miles)	4.2%
VFR minimums to optional IAP minimums (ceiling less than 1,000' AGL and/or visibility less than 3 statute miles, but ceiling equal to or great than 400' AGL and visibility equal to or greater than 1 statute mile)	4.3%
VFR minimums to optional IAP minimums (ceiling less than 1,000' AGL and/or visibility less than 3 statute miles, but ceiling equal to or greater than 300' AGL and visibility equal to or great than 1 statute mile)	5.0%
VFR minimums to typical Category I ILS minimums (ceiling less than 1,000' AGL and/or visibility less than 3 statute miles, but ceiling equal to or greater than 200' AGL and visibility equal to or greater than ½ statute mile)	5.8%
Below typical Category I ILS minimums (ceiling less than 200' AGL and visibility less than ½ statute mile)	0.7%

Source: National Oceanic and Atmospheric Administration, National Climatic Data Center, Station #72798 – Friday Harbor, Washington. Period of Record – January 2000-December 2009.

Wind direction and velocity data were analyzed to analyze the runway alignment. Wind conditions affect all aircraft to varying degrees; however, the ability to operate safely in crosswind conditions varies according to pilot proficiency and aircraft type. Generally, the smaller the aircraft, the more it is affected by crosswinds. The allowable crosswind component is dependent on the ARC for the type of aircraft operating, or expecting to operate, at the Airport on a regular basis. As presented earlier, the approved MOS allows the use of ARC B-I small aircraft only standards to be applied at Friday Harbor Airport. The appropriate crosswind component for this ARC is 10.5 knots. However, because the Airport is utilized by aircraft in ARC A-II and B-II categories, an analysis of the 13-knot crosswind component has also been conducted.

The desirable wind coverage for an airport is 95%, which means that the runway system is oriented so that the maximum crosswind component is not exceeded more than 5% of the time annually. The following table, entitled *WIND COVERAGE SUMMARY*, quantifies the wind coverage offered by the Airport’s runway system, including the coverage for each runway end, based on all weather conditions, existing IAP minimums, the proposed IAP minimums, and typical Category I ILS minimums. Additionally, the following illustration, entitled *ALL WEATHER & IFR WIND ROSES*, graphically depict the wind coverage provided at Friday Harbor Airport.

Table C3
Wind Coverage Summary

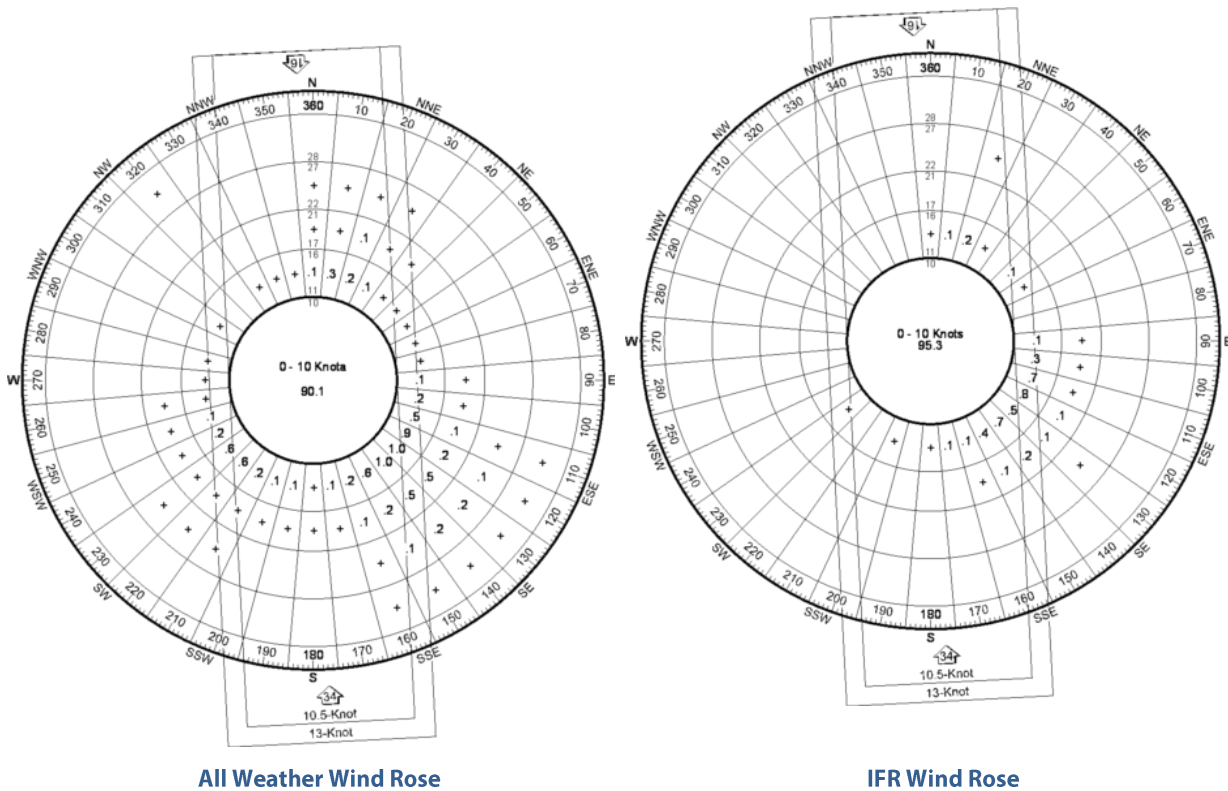
Meteorological Condition/Runway End	10.5-Knot Crosswind ⁽¹⁾	13-Knot Crosswind ⁽¹⁾
All Weather		
Runway 16	87.79%	90.10%
Runway 34	78.68%	79.01%
Combined	95.51%	97.86%
Existing IAP Minimums (ceiling 400’ AGL and visibility 1-1/4 statute miles)		
Runway 16	92.35%	93.98%
Runway 34	80.95%	81.44%
Combined	96.85%	98.57%
Proposed IAP Minimums (ceiling 400’ AGL and visibility 1 statute mile)		
Runway 16	92.26%	93.85%
Runway 34	81.32%	81.81%
Combined	96.92%	98.60%
Proposed IAP Minimums (ceiling 300’ AGL and visibility 1 statute mile)		
Runway 16	92.67%	94.06%
Runway 34	82.47%	82.90%
Combined	97.31%	98.78%
Typical Category I ILS Minimums (ceiling 200’ AGL and visibility 1/2 statute mile)		
Runway 16	92.90%	94.11%
Runway 34	84.11%	84.49%
Combined	97.66%	98.94%

Source: National Oceanic and Atmospheric Administration, National Climatic Data Center, Station #72798 – Friday Harbor, Washington. Period of Record – January 2000-December 2009.
⁽¹⁾ Includes 5-knot tailwind.

The all weather wind analysis indicates that Runway 16/34 provides just slightly more than 95% wind coverage for the 10.5-knot crosswind component, and almost 98% wind coverage for the 13-knot crosswind component.

The various IAP weather minima analyses indicates that an approach from the north (i.e., an approach to Runway 16) would provide greater wind coverage than an approach from the south (i.e., an approach to Runway 34), and thus, would be more beneficial to airport users during adverse weather conditions. However, it is understood that an approach to Runway 16 is not feasible because of the existing constraints of rising terrain to the north and west of the Airport. Therefore, an IAP analysis to Runway 34 will be conducted in a later section of this chapter.

Figure C2
All Weather & IFR Wind Roses



Source: National Oceanic and Atmospheric Administration. National Climatic Data Center. Station #72798 – Friday Harbor, Washington. Period of Record: January 2000-December 2009.

Taxiway Requirements

- **Taxiway “A”:** As presented earlier, the MOS allows the unrestricted operations by aircraft with wingspans equal to or less than 55 feet, provided that the centerline of Taxiway “A” is

relocated to a total of 156 feet from the runway centerline. The parallel taxiway centerline relocation construction project is expected to occur in Fiscal Year 2012.

- **Taxilane “B”:** Taxilane “B” located on the terminal apron does not meet the required Taxilane OFA dimensional standards between the aircraft tiedowns. Alternatives to resolve this deficiency will be examined in the following chapter of this Master Plan Update.

Runway Marking, Lighting, and Signage

- **Runway Marking and Signage:** Currently, the runway is equipped with basic markings. According to Appendix 16 of FAA AC 150/5300-13, *Airport Design*, for an IAP with vertical guidance and visibility minimums of one mile to be implemented, non-precision runway markings and signs will be required.
- **Runway Lighting:** FAA AC 150/5300-13, Appendix 16 indicates that Medium Intensity Runway Lights (MIRL) is required for an IAP with vertical guidance and visibility minimums of one mile to be implemented. Approach lights are not required, but are recommended.

Instrument Approach Procedures

Satellite-based Global Positioning System (GPS) technology is the FAA’s standard approach technology that has the potential for providing new or improved IAPs to nearly every runway end in the United States. It is expected that Friday Harbor Airport will continue to experience increased use by more sophisticated aircraft. Therefore, the ability to implement improved IAPs should be explored and preserved. Currently, Runway 34 has a Localizer Performance with Vertical Guidance (LPV) approach with visibility minimums of 1-¼ mile and ceiling minimums of 392 feet above ground level (AGL). The Port of Friday Airport has commissioned an obstruction survey to determine the exact location and height of surrounding objects, with the objective being the ability to provide the lowest possible minimums for the LPV approach. There are three options to choose from:

- **Remove existing obstructions for the current 392-foot ceiling minimums.**
- **Remove obstructions to 350-foot ceiling minimums.**
- **Remove obstructions to 300-foot ceiling minimums.**

Landside Facility Requirements

Landside facilities are those components of the airport that support the airside facilities, but are not actually part of the aircraft operating surfaces. They consist of such facilities as terminal buildings, aprons, hangars, access roads, fuel storage facilities, and other support facilities.

Aircraft Storage

The following table, entitled *GENERAL AVIATION AIRCRAFT STORAGE REQUIREMENTS, 2011-2031*, presents the type of facilities and the number of units and square yards needed for that facility in order to meet the forecast demand. It is assumed that future storage patterns will reflect the characteristics exhibited by existing aircraft owners at Friday Harbor Airport (i.e., the majority of based aircraft will continue to be stored in hangars).

- **Apron Storage:** Approximately 17,500 square yards of itinerant apron space will be required by the end of the planning period, which is an increase of more than 4,000 square yards over existing conditions. Based aircraft apron space appears adequate to meet future demand.
- **Hangar Storage:** The forecasts indicate that approximately seven additional T-hangar spaces and two executive/corporate hangars will be required to meet future demand, although the actual number, type, size, and location will depend on user needs and financial feasibility at the time actual demand occurs. The development plan of future hangars at Friday Harbor Airport will focus on identifying potential parcels, in consideration of the ability to provide taxiway and roadway access in an efficient and secure manner.

Table C4
General Aviation Aircraft Storage Requirements, 2011-2031

Facility	2011 ⁽¹⁾	2016	2021	2026	2031
Itinerant Apron (sy)	13,470	12,185	13,615	15,485	17,580
Based Aircraft Apron (sy)	21,640	17,030	17,820	17,425	17,425
Total Apron (sy)	35,110	29,215	31,435	32,910	35,005
Hangar Space					
T-hangars (no./sy)	80/36,000	83/37,350	84/37,800	86/38,700	87/39,150
Executive/Corporate (no./sy)	4/6,560	4/6,560	5/7,870	5/7,870	6/10,170
Total	77,670	70,710	75,650	78,055	82,445

Source: Barnard Dunkelberg & Company. ⁽¹⁾ Actual, using information provided by airport personnel.

Support Facility Requirements

- Fuel Facility:** The fuel storage facility has quantifiable requirements that are presented in the following table entitled *FUEL STORAGE REQUIREMENTS, 2011-2031*. It appears that the existing capacity of the AVGAS fuel storage facility is adequate for the expected demand during the planning period. However, because of age and condition, it is in need of replacement and locations will be examined and reviewed in the following chapter. Additionally, because of the expected increase use by turbine-powered commercial service and general aviation aircraft in the future, it is recommended that Jet A fuel storage capability be planned for future installation at the Airport in the latter stages of the planning period.

Table C5
Fuel Storage Requirements, 2011-2031

Quantity	2011 ⁽¹⁾	2016	2021	2026	2031
Average Day Operations of Peak Month	243.7	250.0	266.5	292.9	312.0
Two Weeks of Operation	3,411.7	3,500.3	3,730.8	4,100.1	4,367.7
Gallons Sold Per Aircraft Operation	0.74	0.75	0.78	0.82	0.85
Fuel Storage (gallons)	20,000	2,625.2	2,910.0	3,362.1	3,712.6

Source: Barnard Dunkelberg & Company. ⁽¹⁾ Actual.

Summary

Although most of the existing airport facilities are sufficient to accommodate the aviation demand throughout the planning period, others require improvement or replacement to provide a safe and efficient airport facility. The requirements detailed in this chapter will be used to formulate the overall future Development Plan of the Airport. The necessary projects will only be implemented when actual demand is demonstrated, it is financially feasible, and any potential environmental impacts can be avoided or mitigated.

CHAPTER D.

Alternatives Analysis and Conceptual Development Plan

INTRODUCTION. This chapter presents the Conceptual Development Plan for Friday Harbor Airport. It does so by a thorough examination of alternative development concepts and a presentation of the reasoning utilized. As noted in the *Inventory of Existing Conditions* chapter of this document, it was confirmed that many sections of the existing 2006 Master Plan (2006 MP) document are still valid and accurately represent the strategy, goals, and objectives of the Port of Friday Harbor. Therefore, the scope of this alternatives analysis will focus on updating those sections of the 2006 MP (i.e., airside taxilane dimensional criteria, landside design/layout standards for future general aviation development, and future land use development considerations for non-aviation or aviation-compatible development property on the Airport) that will be impacted by the 2011 approval of the requested modification of design standards for runway to taxiway centerline separation.

First, in order to direct future development of the Airport, basic assumptions and goals have been established that are supported by the aviation forecasts and demand considerations presented earlier. They also include a commitment for continued airport development, which supports the economic development needs of the community and region.

Development Assumptions

- **Assumption One:** Runway 16/34 will be maintained to Airport Reference Code (ARC) B-I small aircraft only dimensional standards¹.
- **Assumption Two:** The existing visibility minimums of not-lower-than one mile will continue to be planned for and protection afforded accordingly.
- **Assumption Three:** The airport's landside development potential will be maximized through infill development, redevelopment of outdated facilities, and allocation of priority space to revenue producing elements.

¹ This assumption was confirmed with FAA's 2011 approval of the requested modification of design standards for runway to taxiway centerline separation.

-
- **Assumption Four:** The existing passenger terminal building and surrounding area are sufficient to meet the expected demand through the planning period and, therefore, will not be examined for redevelopment.
 - **Assumption Five:** All airport property will be analyzed for appropriate uses and the highest and best use for each parcel will be recommended.

Development Goals

- **Plan the Airport to accommodate the forecast aircraft fleet safely and efficiently.**
- **Program facilities to be constructed when actual demand is realized, not based on forecast demand.**
- **Enhance the self-sustaining capability of the Airport and ensure the financial feasibility of all future development.**
- **Develop property acquisition priorities (if necessary) related to airport safety, future airport development, and land use compatibility.**
- **Encourage the protection of existing public and private investment in land and facilities, and advocate the resolution of any potential land use conflicts, both on and off airport property.**
- **Plan and develop airport facilities to be environmentally compatible with the community and minimize environmental impacts on airport property.**
- **Maintain compatibility with existing and proposed surrounding land uses and zoning ordinances.**
- **Provide effective direction for future airport development through the preparation of a rational plan and adherence to the adopted development program.**
- **Integrate the airport's ground transportation access requirements with the area's regional transportation goals.**

Airside Development Alternatives and Recommendations

Because all other airport functions are related to and revolve around the airfield configuration, airside development issues must first be resolved. As identified in the previous chapter, the Taxilane Object Free Area (OFA) deficiency associated with Taxilane "B" is the lone deficiency associated with ARC B-I small aircraft only dimensional standards. Three alternatives are analyzed and presented in the following text.

Alternative One/Shift Taxilane "B" Centerline to the East

This alternative shifts the centerline of Taxilane "B" north of the terminal building by 9.5 feet to the east, which results in the loss of nine tiedown spaces (although only seven are used) along the east

side of the apron. To the south of the terminal building, the centerline of Taxilane “B” is shifted by 12.5 feet to the east, which results in the loss of 18 aircraft tiedown spaces along the east side of the apron. This alternative is presented in the following figure, entitled *TAXILANE “B” RECONFIGURATION ALTERNATIVE ONE*.

Advantages.

- **Allows unrestricted aircraft access to existing hangar facilities.**
- **Meets ARC B-I small aircraft only dimensional standards.**

Disadvantages.

- **Loss of 25 aircraft tiedown spaces along eastern edge of apron.**

Alternative Two/Shift Taxilane “B” Centerline to the West

This alternative shifts the centerline of Taxilane “B” north of the terminal building by 9.5 feet to the west, resulting in the loss of nine tiedown spaces along the west side of the taxilane. South of the terminal building, this alternative shifts the Taxilane “B” centerline by 12.5 feet to the west. This results in the removal or relocation of six tiedowns along the west edge of the taxilane. Alternative Two is presented in the following figure, entitled *TAXILANE “B” RECONFIGURATION ALTERNATIVE TWO*.

Advantages.

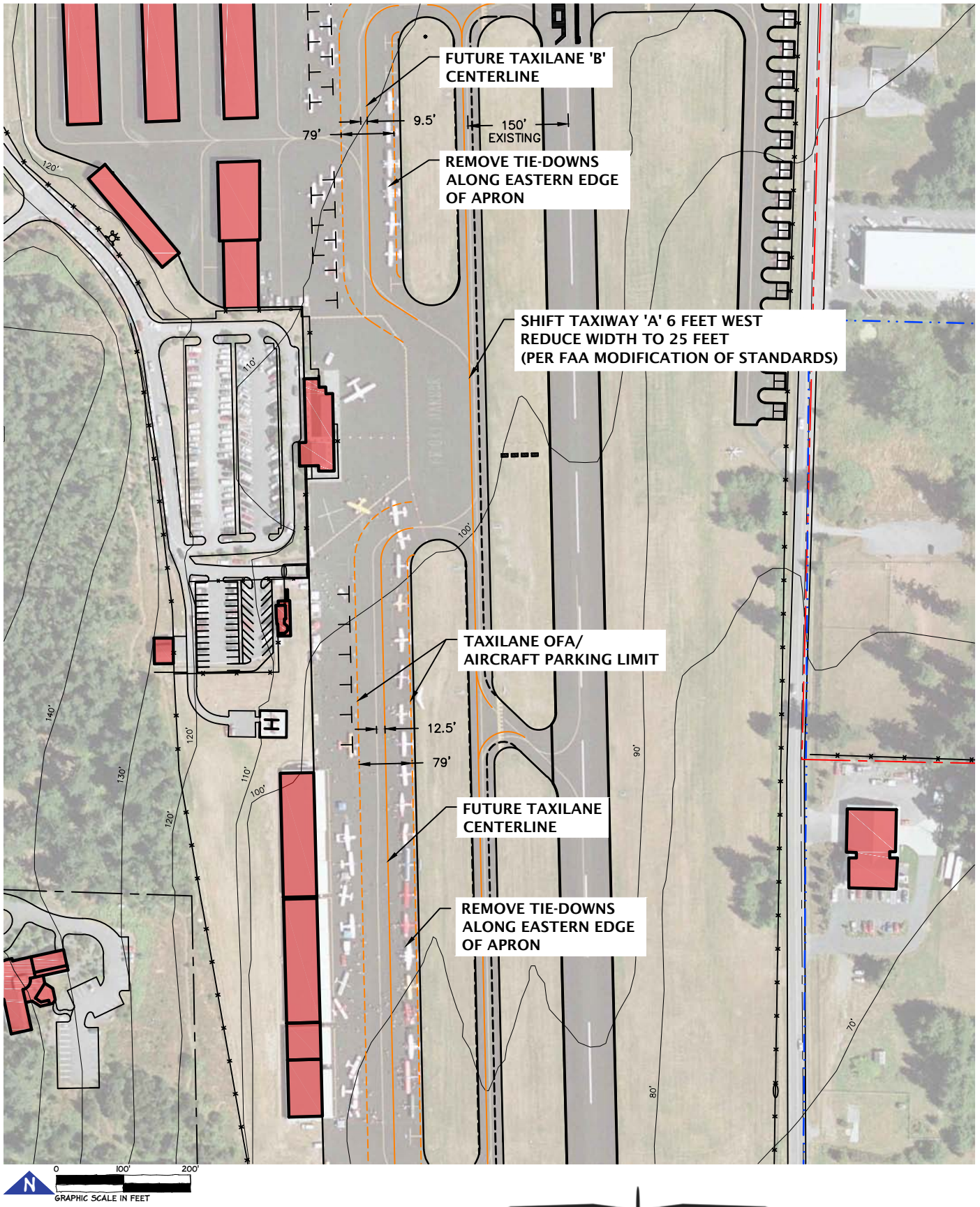
- **Allows unrestricted aircraft access to existing hangar facilities.**
- **Meets ARC B-I small aircraft only dimensional standards.**

Disadvantages:

- **Removes nine aircraft tiedowns on the west side of Taxiway “B” north of the terminal building.**
- **Removes or relocates six tiedowns on the west side of Taxiway “B” south of the terminal building.**

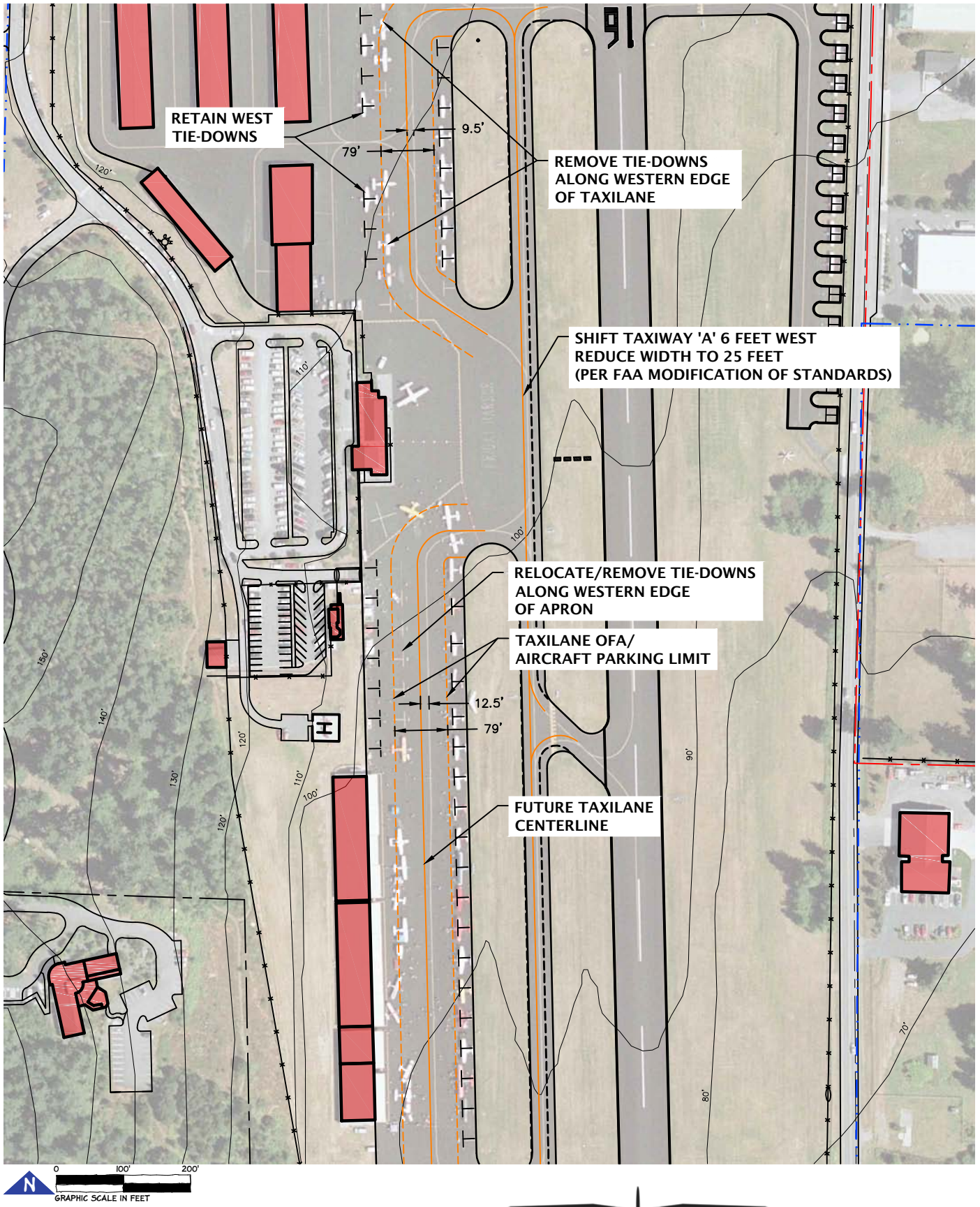
Alternative Three/Shift Taxilane “B” Centerline to the East and Construct Additional Apron

Similar to Alternative One, this alternative also shifts the centerline of Taxilane “B” by 9.5 feet to the east in the area north of the terminal building, and by 12.5 feet to the east in the area south of the terminal building. However, this alternative constructs a 23-foot wide strip of apron on the east side of the existing apron to compensate for the lost tiedowns. The two tiedowns at each end of the row located in the north apron area would not be relocated as they would be within the standard 79-foot Taxilane OFA. This alternative is presented in Figure D3, entitled *TAXILANE “B” RECONFIGURATION ALTERNATIVE THREE*.



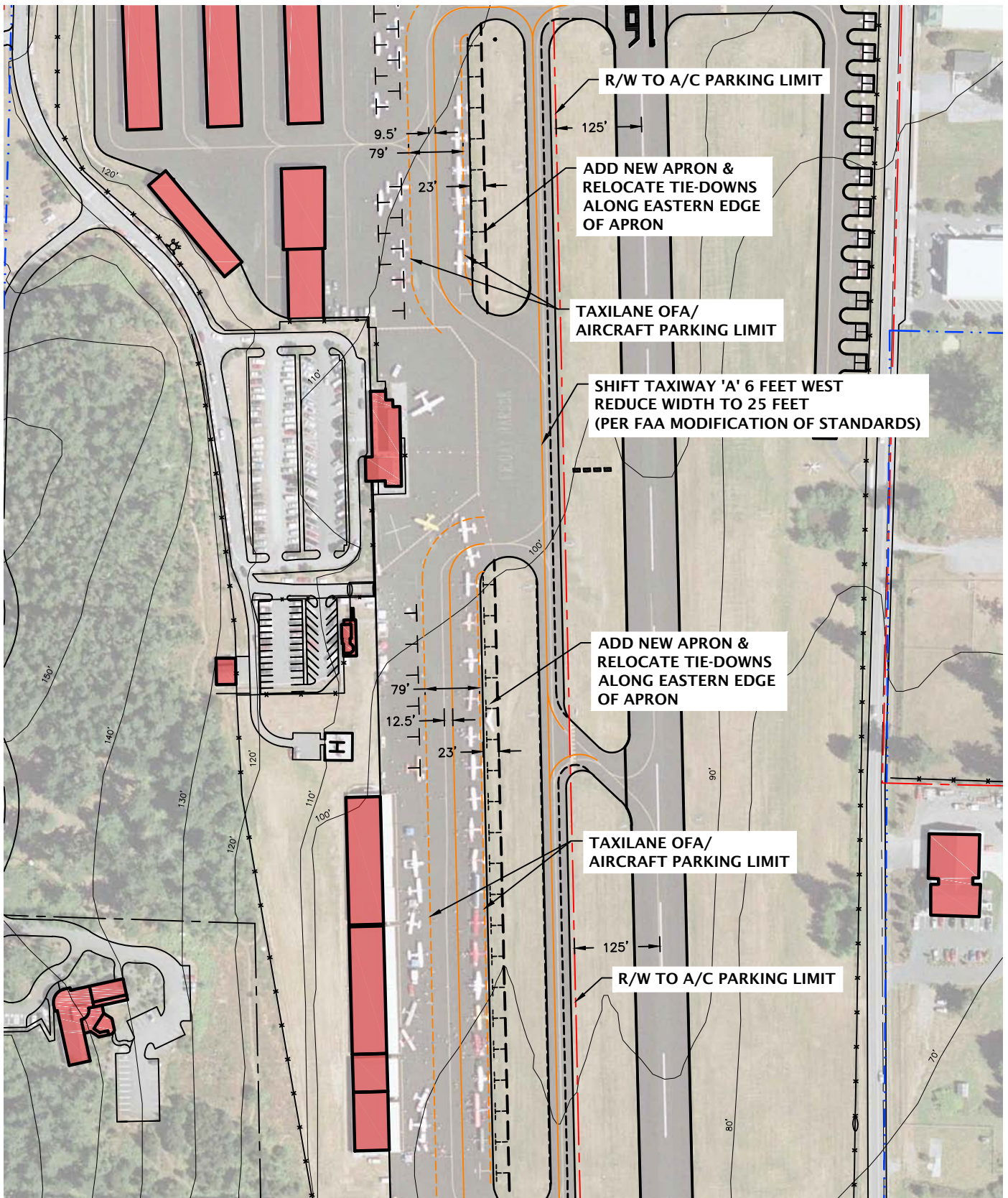
■ Figure D1 Taxiway "B" Reconfiguration/Alternative One





■ Figure D2 Taxiway "B" Reconfiguration/Alternative Two





■ Figure D3 Taxiway "B" Reconfiguration/Alternative Three



Advantages.

- **Retains largest number of apron tiedowns.**
- **Allows unrestricted aircraft access to existing hangar facilities.**
- **Meets ARC B-I small aircraft only dimensional standards.**

Disadvantages.

- **Relocated aircraft tiedowns along east edge of apron encroach upon Federal Aviation Regulations (FAR) Part 77 primary surface.**

Preferred Airside Development Alternative

The Port of Friday Harbor has selected a combination of Alternatives One and Two as the preferred airside development alternative, which is detailed in the Alternatives Summary section at the end of this chapter. Additionally, the recommended airside improvements are incorporated into the Conceptual Development Plan (presented graphically as Figure D9) at the end of this chapter, as well as on the Airport Layout Drawing (Figure E1) and the Terminal Area Plans (Figures E7 and E8) in the following chapter of this document.

Landside Development Concepts, Alternatives, and Recommendations

The overall objectives of the Friday Harbor Airport landside development plan are the provision of facilities that are conveniently located, accessible to the community, maximize the economic viability of the Airport, and accommodate the specific requirements of airport users and tenants.

Landside Development Concepts

For purposes of this Master Plan Update, landside facilities are categorized into five generalized development groups, described in the following text.

- **Aviation Use:** Development areas related to aircraft storage and handling, requiring direct airfield access, consisting of facilities such as aprons, hangars, and access taxiways. There are two primary concepts that influence the ability to designate areas for aviation use. First, an area must be located beyond protected airfield spaces such as runways, taxiways, and approach protection areas. Second, the areas must have physical attributes that make access to the airfield system economically feasible.
- **Aviation-Related or Aviation-Compatible Use:** Development areas consisting of those facilities that may benefit from close proximity to airport facilities, but do not require direct airfield access, such as commercial, office, and/or light industrial facilities that are compatible with

airport operations and surrounding land uses, which generate revenue to the Airport and should be marketed as potential revenue producing properties. Development concepts used to designate areas for aviation-related or aviation-compatible use facilities also include areas beyond protected airfield spaces that cannot be easily developed for aviation uses because of physical constraints such as topography, floodplains/drainage, major roadways, or because airside access would be cost prohibitive.

- **Aviation Support:** Aviation support facilities are required for airports to operate properly, but do not relate directly to aircraft storage and handling and are not part of the airfield system, consisting of facilities such as fuel storage and dispensing, control towers, on and off airport fire protection facilities, and airport maintenance facilities. Development concepts used to designate areas for aviation support facilities include close proximity to the airfield that are economically feasible to develop without encroaching into the prime aviation use development areas.
- **Airport Infrastructure Development:** Future development of both aviation and/or aviation-related and aviation-compatible development will require the extension of access roadways, utilities, and stormwater management facilities. These future infrastructure requirements will be incorporated into the preparation of both the airside and landside development alternatives.
- **Property/Easement Acquisition:** Future property or easement acquisition at airports can often be required to protect existing or future runway protection zone areas and safety-related dimensional standards, as well as future airside and landside development areas. However, the future property and easement acquisition recommendations that were presented in the current Airport Master Plan will be re-examined in consideration of the FAA's approval of the 2010 *Friday Harbor Airport Modification of Airport Design Standards Study*.

Landside Development/Aviation Use

In accordance with the forecast based aircraft counts and facility requirement projections that were presented in previous sections, it has been concluded that adequate future aviation use development property is available on the Airport to accommodate this projected aviation demand for the 20-year planning period of this study. In addition, infill and redevelopment alternatives will be prepared for the northwest quadrant of the Airport, with development expansion options being evaluated for the southwest quadrant of the Airport.

It should also be emphasized that the future development of aircraft storage facilities at the Airport will be demand dictated. Therefore, the number, size, and location of these hangars will vary depending on the demand for specific facilities, and the development plans must be flexible to

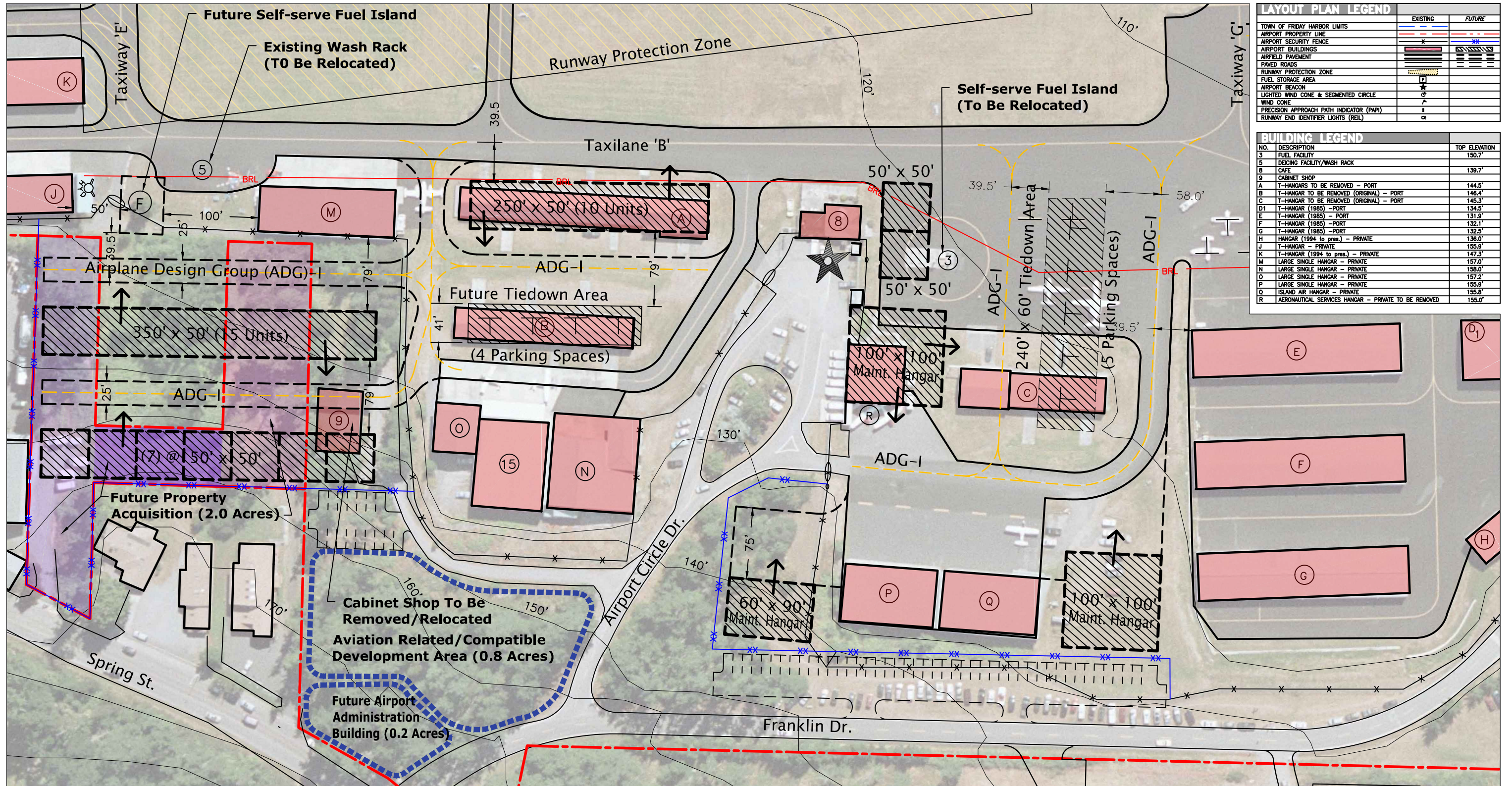
accommodate a variety of user groups. In addition, there are important development guidelines that the Airport Sponsor should consider when making hangar placement determinations. These include:

- Each executive hangar should be supplied with taxiway access that is separated from automobile access and adjacent automobile parking. This is most efficiently accomplished when a row of hangars is developed and provided with taxiway access on one side and automobile access and parking on the other side.
- Each T-hangar should be nested and developed with taxiway access to both sides of the hangar. Controlled automobile access should be provided to the taxiway/apron area near the T-hangars, and a public access parking area should be provided near the T-hangar facilities to accommodate both users and visitors.

It is most efficient to “double load” both the taxiway access and the automobile access routes with hangars. More specifically, the access taxiways/taxilanes are to be lined with hangars on both sides and the automobile roadways/parking areas are also to be lined with hangars on both sides. Typically, the airside spacing between the hangars is dictated by the clear width door design of the hangars, with a 79-foot Taxilane OFA width being specified for Airplane Design Group (ADG) I aircraft.

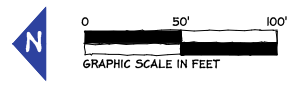
Based upon input received from the Airport Sponsor, and the projected aircraft storage improvements that will be needed to serve the aviation users, the following hangar, apron, and access taxiway development alternatives have been identified, and are presented on the following detailed illustrations.

Northwest Aviation Infill & Redevelopment Area/Alternative One. This alternative proposes the redevelopment of three Port owned T-hangars (i.e., Hangars A, B, and C), as well as one privately owned aeronautical service hangar (i.e., Hangar R). The existing space associated with Hangars B and C would be converted to tiedowns, with additional T-hangars and executive hangars being constructed on undeveloped property located west of the deicing/wash rack pad. Property acquisition, consisting of approximately 2.0 acres, would also be required to accommodate the full build-out of the T-hangars and executive hangars, and new taxilanes would be constructed, extending west from Taxilane “B” to serve the new hangar development area. In addition, infill development for two new maintenance/storage hangars with auto parking is proposed along Franklin Drive. This alternative is presented in the following figure, entitled *NORTHWEST AVIATION INFILL & REDEVELOPMENT AREA/ALTERNATIVE ONE*.



LAYOUT PLAN LEGEND		
	EXISTING	FUTURE
TOWN OF FRIDAY HARBOR LIMITS	---	---
AIRPORT PROPERTY LINE	---	---
AIRPORT SECURITY FENCE	---	---
AIRPORT BUILDINGS	█	█
AIRFIELD PAVEMENT	▨	▨
PAVED ROADS	▨	▨
RUNWAY PROTECTION ZONE	▨	▨
FUEL STORAGE AREA	█	█
AIRPORT SEACON	○	○
LIGHTED WIND CONE & SEGMENTED CIRCLE	○	○
WIND CONE	○	○
PRECISION APPROACH PATH INDICATOR (PAPI)	---	---
RUNWAY END IDENTIFIER LIGHTS (REIL)	---	---

BUILDING LEGEND		
NO.	DESCRIPTION	TOP ELEVATION
3	FUEL FACILITY	150.7'
5	DEICING FACILITY/WASH RACK	
8	CAFE	139.7'
9	CABINET SHOP	
A	T-HANGARS TO BE REMOVED - PORT	144.5'
B	T-HANGAR TO BE REMOVED (ORIGINAL) - PORT	148.4'
C	T-HANGAR TO BE REMOVED (ORIGINAL) - PORT	145.3'
D1	T-HANGAR (1985) - PORT	134.5'
E	T-HANGAR (1985) - PORT	131.9'
F	T-HANGAR (1985) - PORT	132.1'
G	T-HANGAR (1985) - PORT	132.5'
H	HANGAR (1994 to pres.) - PRIVATE	136.0'
J	T-HANGAR - PRIVATE	155.9'
K	T-HANGAR (1994 to pres.) - PRIVATE	147.3'
M	LARGE SINGLE HANGAR - PRIVATE	157.0'
N	LARGE SINGLE HANGAR - PRIVATE	158.0'
O	LARGE SINGLE HANGAR - PRIVATE	157.2'
P	LARGE SINGLE HANGAR - PRIVATE	155.9'
Q	ISLAND AIR HANGAR - PRIVATE	155.8'
R	AERONAUTICAL SERVICES HANGAR - PRIVATE TO BE REMOVED	155.0'



■ Figure D4 Northwest Aviation Infill & Redevelopment Area/Alternative One



Sources: Airport Runway Overlay Site Plan by MPD, Inc. P.S. 8/27/02
 Airport Layout Plan by MPD, Inc. P.S. 4/96, Aerial Photo Town of Friday Harbor 2011

Advantages.

- **Accommodates a variety of hangar types within the available infill development sites.**
- **Accommodates both hangar and tiedown apron development options.**
- **Maintains location of existing fuel storage/distribution facilities.**

Disadvantages.

- **Requires redevelopment of existing aeronautical service hangar.**
- **Requires property acquisition to accommodate full build-out of future executive hangar development area.**
- **Requires removal/relocation of existing cabinet shop building.**

Northwest Aviation Infill & Redevelopment Area/Alternative Two. Presented as a variant of Alternative One described above, this alternative proposes the redevelopment of three Port owned T-hangars (i.e., Hangars A, B, and C), with the existing space associated with Hangars B and C being converted to tiedowns. One 6-unit T-hangar and five executive hangars would be constructed on undeveloped property located west of wash rack area, with additional property acquisition of 1.75 acres being required. Also, infill development for two new maintenance/storage hangars with auto parking is proposed east of Franklin Drive. This alternative is presented in Figure D5, entitled *NORTHWEST AVIATION INFILL & REDEVELOPMENT AREA/ALTERNATIVE TWO.*

Advantages.

- **Accommodates a variety of hangar types within the available infill development sites.**
- **Accommodates both hangar and tiedown apron development options.**
- **Maintains location of existing fuel storage/distribution facilities.**
- **Maintains the existing aeronautical service hangar and cabinet shop building.**
- **Reduces future property acquisition requirements.**

Disadvantages.

- **Accommodates the development of fewer aircraft storage hangars.**

Preferred Northwest Aviation Infill & Redevelopment Area Alternative. The Port of Friday Harbor has selected components of each alternative as the preferred landside development alternative within the Northwest area of the Airport. A detailed description of the recommended development plan for this area is presented in the Alternatives Summary section at the end of this chapter. Additionally, the recommended Northwest Development Area improvements are incorporated into the Conceptual Development Plan (presented graphically as Figure D9) at the end of this chapter, as

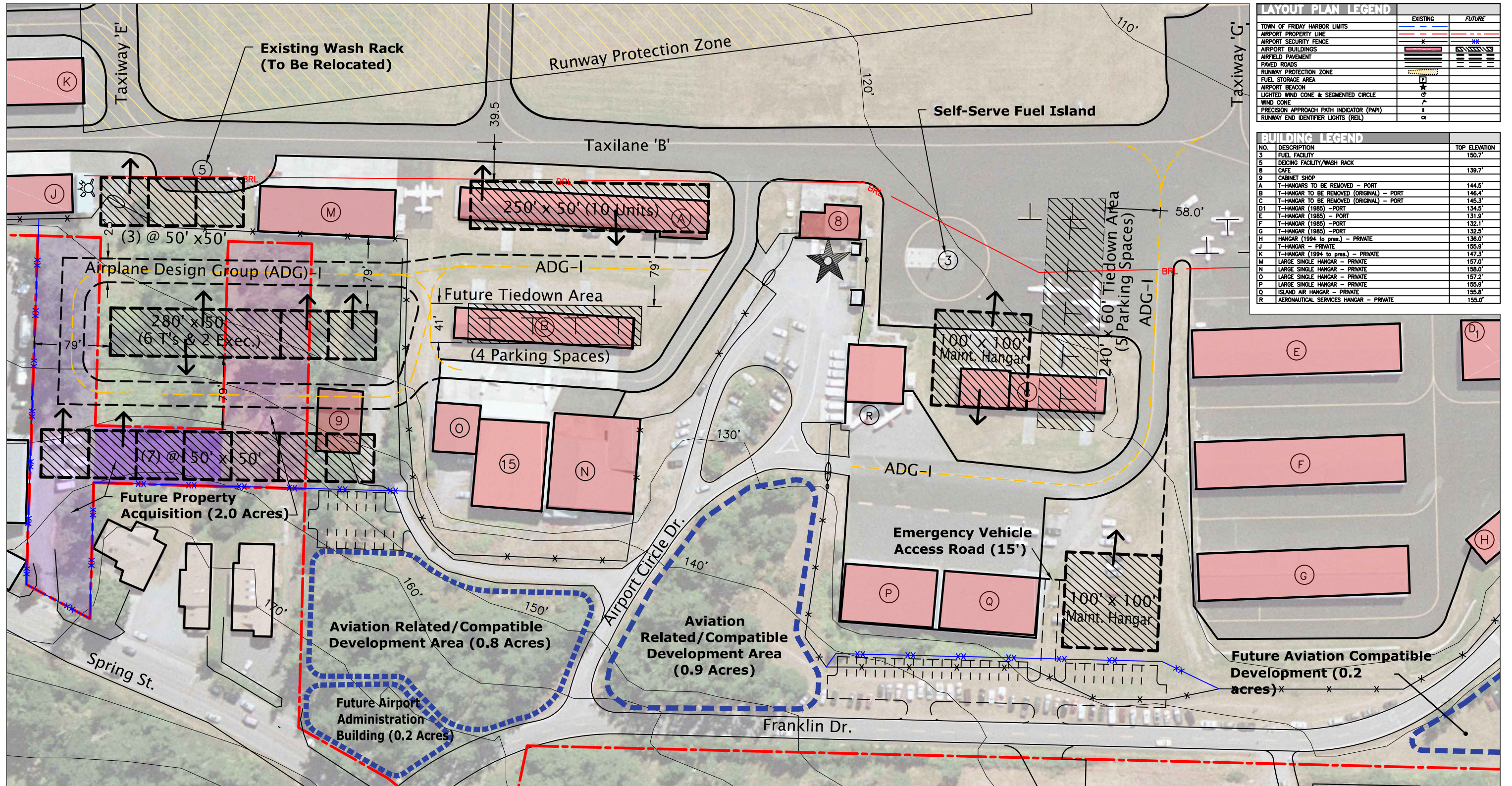


Figure D5 Northwest Aviation Infill & Redevelopment Area/Alternative Two

well as on the Airport Layout Drawing (Figure E1) and the Terminal Area Plan-North (see Figure E7) in the following chapter of this document.

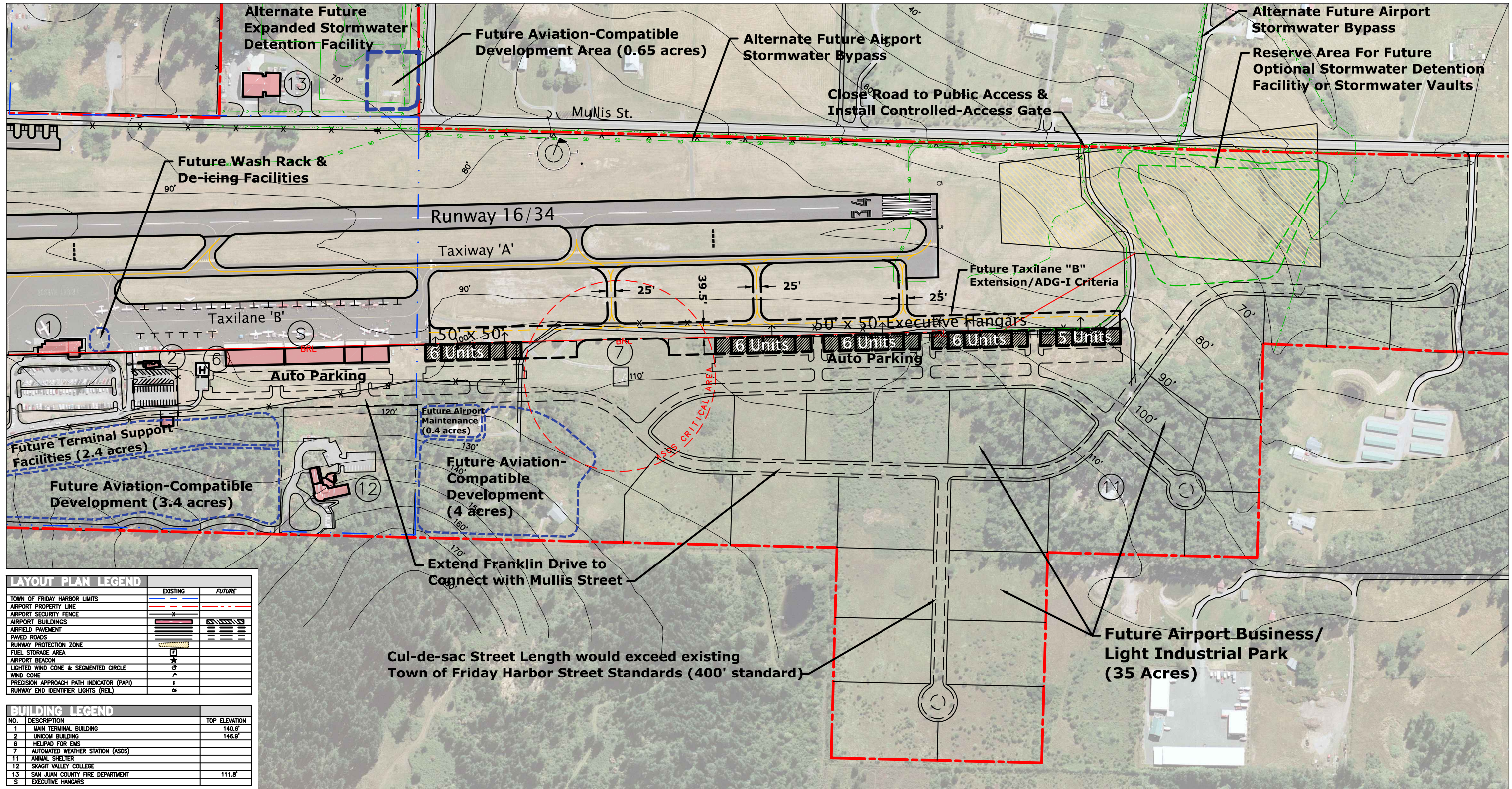
Southwest Aviation Expansion Area/Alternative One. This alternative proposes the single row expansion of executive hangars extending south from the terminal apron area to the south end of the runway. Airside access would be provided via the extension of Taxilane “B” and additional connector taxiways linking to Taxiway “A”. Landside access would be provided by the extension of Franklin Drive south from the passenger terminal area to Storemore Way and Mullis Street at the south end of airport property. The proposed alignment of this road will be the focus of alternatives for future aviation-related or aviation-compatible development for the southwest quadrant of the Airport. This alternative is presented in Figure D6, entitled *SOUTHWEST AVIATION EXPANSION AREA/ALTERNATIVE ONE*.

Advantages.

- **Minimizes site development costs.**
- **Provides new vehicular access to serve both future aviation and aviation-related/compatible development areas within the southwest quadrant of the Airport.**
- **Provides a variety of lot sizes to serve potential aviation and aviation-related/compatible development lease holders.**
- **Maintains location of existing ASOS facility.**

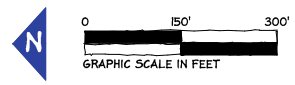
Disadvantages.

- **Restricts both future aviation and aviation-related/compatible development options within the existing ASOS critical area.**
- **The proposed build-out of executive hangars excludes the increased development density provided by nested T-hangars.**



LAYOUT PLAN LEGEND		EXISTING	FUTURE
TOWN OF FRIDAY HARBOR LIMITS		---	---
AIRPORT PROPERTY LINE		---	---
AIRPORT SECURITY FENCE		---	---
AIRPORT BUILDINGS		█	█
AIRFIELD PAVEMENT		█	█
PAVED ROADS		█	█
RUNWAY PROTECTION ZONE		█	█
FUEL STORAGE AREA		█	█
AIRPORT BEACON		★	★
LIGHTED WIND CONE & SEGMENTED CIRCLE		○	○
WIND CONE		▲	▲
PRECISION APPROACH PATH INDICATOR (PAPI)			
RUNWAY END IDENTIFIER LIGHTS (REIL)		○	○

BUILDING LEGEND		TOP ELEVATION
NO.	DESCRIPTION	
1	MAIN TERMINAL BUILDING	140.6'
2	UNICOM BUILDING	148.9'
6	HELIPAD FOR EMS	
7	AUTOMATED WEATHER STATION (ASOS)	
11	ANIMAL SHELTER	
12	SKAGIT VALLEY COLLEGE	
13	SAN JUAN COUNTY FIRE DEPARTMENT	111.8'
S	EXECUTIVE HANGARS	



■ Figure D6 Southwest Aviation Expansion Area/Alternative One



Southwest Aviation Expansion Area/Alternative Two. Presented as a variant of Alternative One described above, this alternative proposes the single row expansion of executive hangars and nested T-hangars extending south from the terminal apron area to the south end of the runway. Airside and landside access to the hangars would be the same as illustrated in Alternative One, and this alternative is presented in Figure D7, entitled *SOUTHWEST AVIATION EXPANSION AREA/ALTERNATIVE TWO*.

Advantages.

- **The proposed build-out of T-hangars would increase the development density offered by the executive hangars presented in Alternative One.**
- **Provides 14 acres of future aviation development reserve.**
- **Provides new vehicular access to serve both future aviation and aviation-related/compatible development areas within the southwest quadrant of the Airport.**
- **Provides a variety of lot sizes to serve potential aviation and aviation-related/compatible development lease holders.**
- **Maintains location of existing ASOS facility.**

Disadvantages.

- **Restricts both future aviation and aviation-related/compatible development options within the existing ASOS critical area.**
- **Development costs would be greater than Alternative One due to additional site work, grading, and taxiway construction to serve the nested T-hangars.**
- **Would require relocation of the existing animal shelter facility.**

Southwest Aviation Expansion Area/Alternative Three. Presented as a variant of Alternatives One and Two described above, this alternative proposes the single row expansion of executive hangars and nested T-hangars extending south from the terminal apron area to the south end of the runway. In addition, this alternative would propose the relocation of the existing ASOS to accommodate the construction of additional aircraft storage facilities. A possible relocation site for the ASOS would be identified on the east side of the Airport, adjacent to the San Juan County Fire Station. Airside and landside access to the hangars would be similar to that illustrated in Alternatives Two and Three, and this alternative is presented in Figure D8, entitled *SOUTHWEST AVIATION EXPANSION AREA/ALTERNATIVE THREE*.

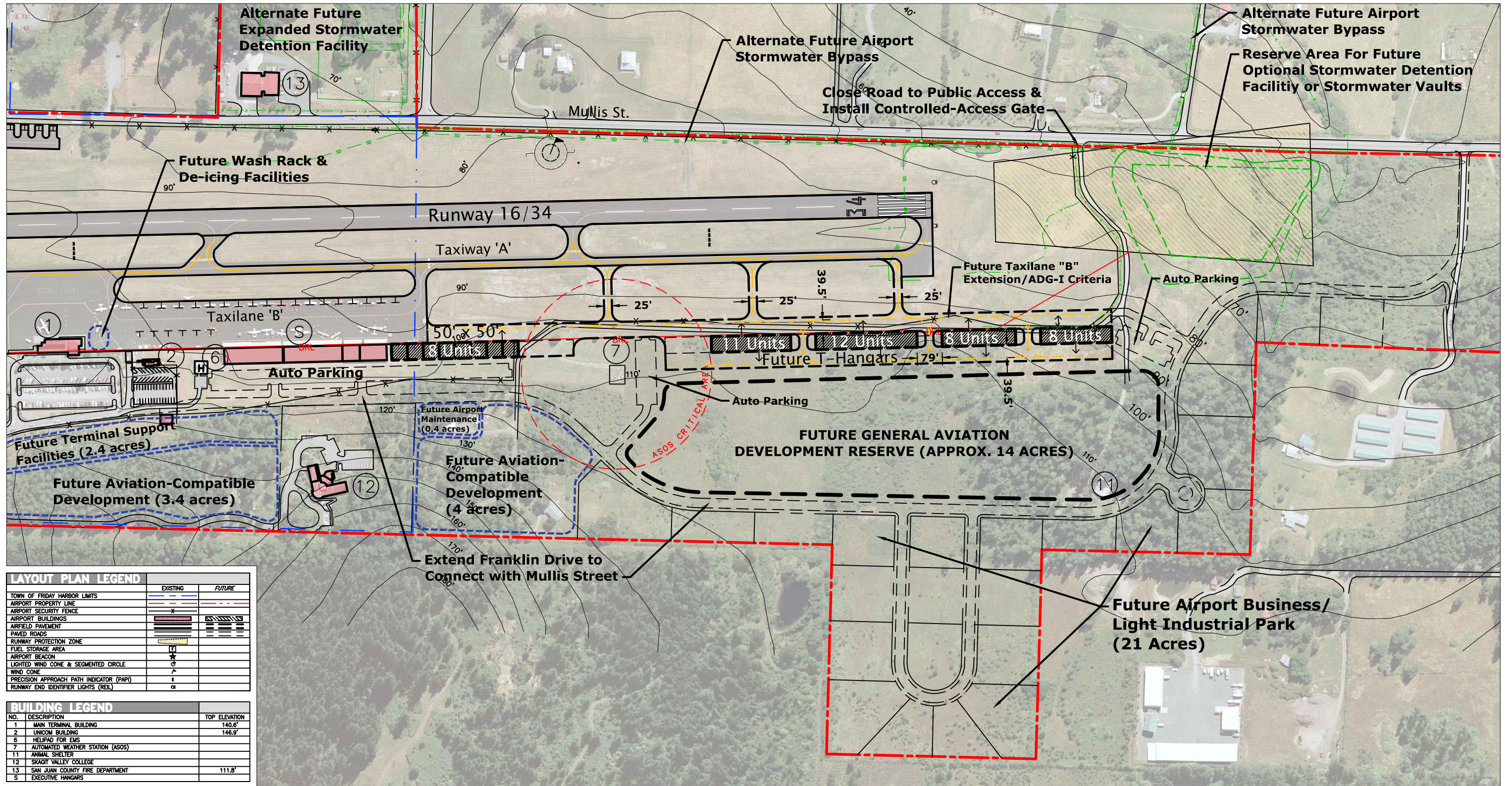
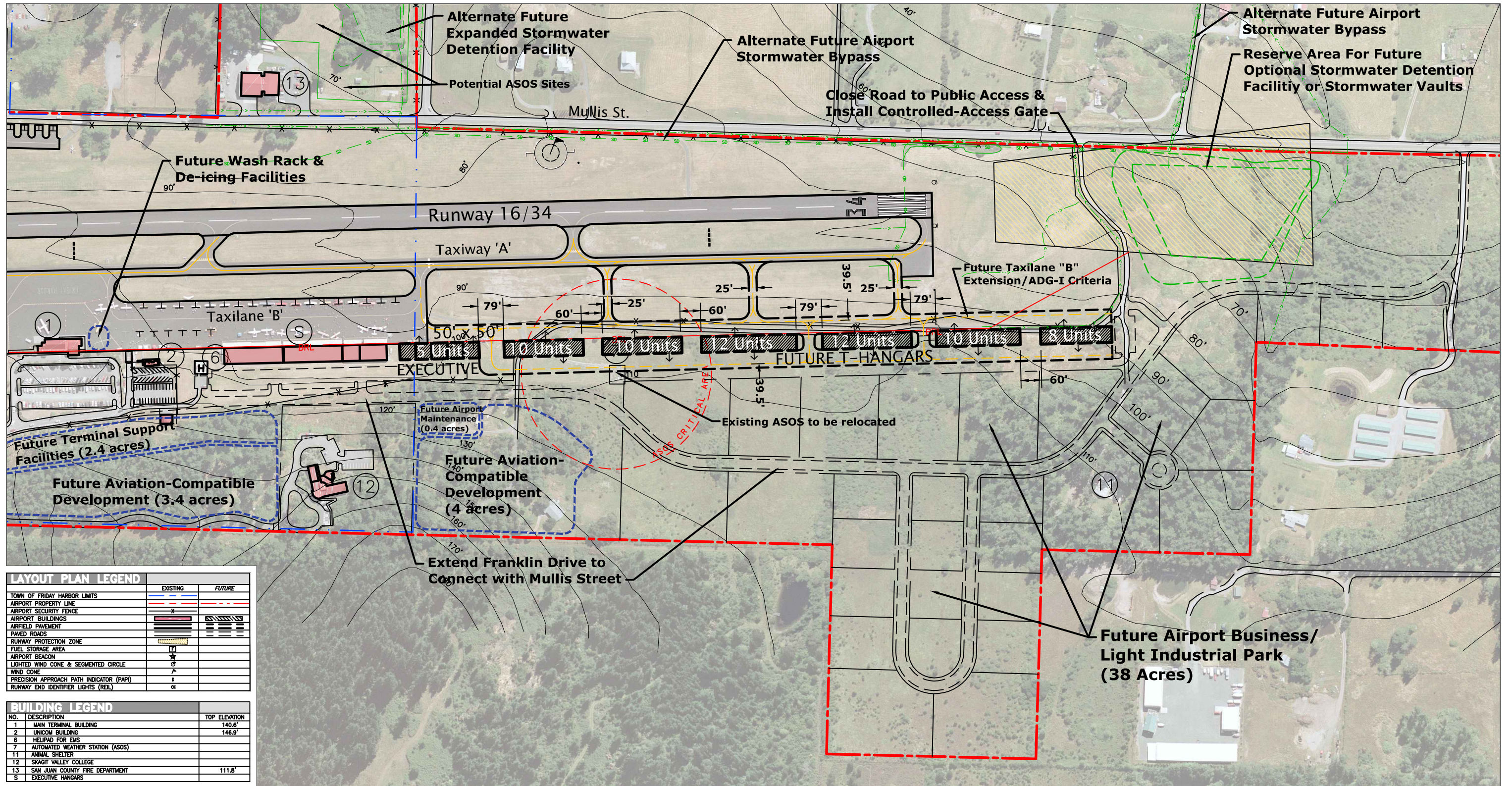


Figure D7 Southwest Aviation Expansion Area/Alternative Two



LAYOUT PLAN LEGEND		EXISTING	FUTURE
TOWN OF FRIDAY HARBOR LIMITS		---	---
AIRPORT PROPERTY LINE		---	---
AIRPORT SECURITY FENCE		---	---
AIRPORT BUILDINGS		█	█
AIRFIELD PAVEMENT		▨	▨
PAVED ROADS		▬	▬
RUNWAY PROTECTION ZONE		▨	▨
FUEL STORAGE AREA		□	□
AIRPORT BEACON		★	★
LIGHTED WIND CONE & SEGMENTED CIRCLE		⊙	⊙
WIND CONE		▲	▲
PRECISION APPROACH PATH INDICATOR (PAPI)			
RUNWAY END IDENTIFIER LIGHTS (REIL)		⊕	⊕

BUILDING LEGEND		
NO.	DESCRIPTION	TOP ELEVATION
1	MAIN TERMINAL BUILDING	140.6'
2	UNICOM BUILDING	148.9'
6	HELIPAD FOR EMS	
7	AUTOMATED WEATHER STATION (ASOS)	
11	ANIMAL SHELTER	
12	SKAGIT VALLEY COLLEGE	
13	SAN JUAN COUNTY FIRE DEPARTMENT	111.8'
S	EXECUTIVE HANGARS	

Figure D8 Southwest Aviation Expansion Area/Alternative Three

Advantages.

- **The proposed build-out of T-hangars would increase the development density offered by the executive hangars presented in Alternative One.**
- **Expands both future aviation and aviation-related/compatible development options within the relocated ASOS critical area.**
- **Provides new vehicular access to serve both future aviation and aviation-related/compatible development areas within the southwest quadrant of the Airport.**
- **Provides a variety of lot sizes to serve potential aviation and aviation-related/compatible development lease holders.**

Disadvantages.

- **Development costs would be greater than Alternative One due to additional site work, grading, and taxilane construction required to serve the nested T-hangars.**
- **Relocates the existing ASOS facility to the east side of the Airport (i.e., adjacent to the County Fire Station). This proposed ASOS development site would have to be confirmed by the FAA.**

Preferred Southwest Aviation Expansion Area Alternative. The Port of Friday Harbor has selected Alternative Two as the preferred landside development alternative within the southwest area of the Airport. A detailed description of the recommended development plan for this area is presented in the Alternatives Summary section at the end of this chapter. Additionally, the recommended Southwest Development Area improvements are incorporated into the Conceptual Development Plan (presented graphically as Figure D9) at the end of this chapter, as well as on the Airport Layout Drawing (Figure E1) and Terminal Area Plan-South (see Figure E8) in the following chapter of this document.

Landside Development/ Aviation-Related or Aviation-Compatible Use

The siting requirements for aviation-related/compatible facilities can vary significantly, with some facilities requiring large development sites for initial construction and future expansion capability, while others require only small shops or small portions of larger facilities. Depending upon the specific operation, these facilities may, or may not, require direct airside access, but all must be provided convenient landside access and adequate vehicular parking for both customers and employees.

North Aviation-Compatible Development. There is one tract of airport property, consisting of approximately ½ acre, which has been identified within the extended Runway 16 approach area for aviation-related/compatible development. The site is located adjacent to Spring Street, just north of the K and J T-hangars that are positioned beyond the Runway 16 RPZ. It should be noted that this

area was previously development restricted due to an “Airport Operations Protected Area” designation on the Airport Land Use Drawing of the ALP drawing set. This designation, which was driven by a combination of planned upgrades to more restrictive airport dimensional criteria (i.e., ARC B-II standards), and the inclusion of an extended ROFA designation to support future property acquisition goals on the north side of Spring Street, can now be revised based on FAA’s approval of the *Friday Harbor Airport Modification of Airport Design Standards Study* for runway to taxiway centerline separation. The site would be well-suited for future commercial or office development, and could be provided with convenient vehicular access from Spring Street. Due to existing topographic/landform constraints, this site could not be equipped with taxiway access to the airfield.

Northwest Aviation-Compatible Development. There is one tract of airport property, consisting of approximately one acre that was previously identified on Figures D4 and D5 for potential aviation-related/compatible development. The site, which is located at the intersection of Franklin Drive and Spring Street, is heavily wooded and would be well-suited for future commercial or office development.

Southwest Aviation-Compatible Development. There is a large tract of airport property within the southwest quadrant of the Airport, consisting of over 40 acres, that was identified previously on Figures D6, D7, and D8 for potential aviation-related/compatible development. The boundary of the tracts would ultimately be defined by the future extension/alignment of Franklin Drive to Mullis Street, including the various cul-de-sacs and/or looped roadways that could be developed from Franklin Drive. Three alternative roadway alignments have been developed, which could support a variety of possible commercial, office, or light industrial park development options. As with the other potential aviation-related/compatible development areas, existing topographic/landform constraints would prohibit taxiway access from the airfield to these parcels.

Landside Development/ Aviation Support

As noted previously, aviation support facilities are required for the Airport to operate properly, but are not part of the runway/taxiway system and do not relate directly to aircraft storage facilities. The support facilities at Friday Harbor Airport, which require development recommendations, include a new/upgraded fuel storage facility and possible relocation of the airport’s existing weather reporting facilities (i.e., automated surface observing system).

Fuel Storage Facility. According to existing fuel storage and sales data compiled in the previous chapter, it was calculated that the existing capacity of the AVGAS fuel storage facility is adequate for the expected demand during the planning period. However, because of age and condition, it is in

need of replacement/upgrade, and presents an opportunity to also evaluate the existing storage site for possible relocation or redevelopment opportunities.

There were two redevelopment options presented for the fuel storage facility (see previous Figures D4 and D5). Alternative One would relocate the existing fuel storage facility and self-serve island to the existing aircraft wash rack area and redevelop the existing fuel storage site to accommodate new aircraft hangar facilities. Alternative Two proposes the upgrade of the facility at its existing location on the ramp. In addition, each alternative would include expansion capabilities to add Jet A fuel storage facilities.

Automated Surface Observing System (ASOS). The Airport is presently served by a Type 3 ASOS that is located within the southwest quadrant of the Airport (i.e., approximately 1,000 feet north of the Runway 34 threshold and 500 feet west of the runway centerline. As presented in the landside development alternatives for the southwest development area (i.e., Figures D6 through D8), the ASOS has a wind sensor critical area that extends for 300 feet surrounding the facility that would restrict the development of future buildings or hangars in this area. Two of the landside development alternatives for this area, Alternatives One and Two, would maintain the location of the existing ASOS, while Alternative Three would propose the relocation of the ASOS to the east side of the Airport to maximize landside development options within the southwest quadrant of the Airport. Also, a detailed ASOS sighting study would have to be conducted to confirm whether the potential east side location would be suitable to accommodate the relocated ASOS facility.

Landside Development/ Airport Infrastructure Development

A detailed description of the airport's existing infrastructure development was presented in the 2006 *Friday Harbor Airport Master Plan* document, and it is acknowledged that the existing access roads, utilities, and stormwater management facilities would have to be expanded to accommodate the future development and expansion of both aviation and/or aviation-related and aviation-compatible facilities.

Airport Access Roadways. Ground access is an important element in the overall ability of an airport to function properly. Not only is it vital that airport users have easy access to and from the aviation facilities using ground transportation, but also surface transported freight must be easily shipped to and from the businesses located on and/or in the vicinity of that airport. Also, because airports are employment centers, proper access for people employed on airport property must be provided.

As presented in the description of the landside development alternatives for the southwest quadrant of the Airport, the proposed extension of Franklin Drive south from the passenger terminal area to

Storemore Way and Mullis Street, at the south end of airport property, would provide landside access to future aviation and aviation-related/compatible development within this currently undeveloped area of the Airport. The proposed alignment of the road, and the location of various connector roadways (e.g., looped roads and cul-de-sacs), would be dictated by the selection of the specific development alternative for this area of the Airport. In addition, the Town of Friday Harbor Street Standards were reviewed and it is recommended that the extension of Franklin Drive be designed in accordance with the “Local Access” roadway design standards, requiring a minimum 50-foot right-of-way and a minimum 30-foot pavement width.

Airport Utilities. As noted in the 2006 *Friday Harbor Airport Master Plan* document, the existing utility infrastructure located on the Airport includes electric power, standard and cellular telephone communications, fiber optics, water, sanitary sewer, and stormwater management. It was specified in the 2006 Airport MP that each of these facilities could be expanded as needed to accommodate future airport development. In addition, further study is on-going by the Port of Friday Harbor regarding the design and location of future stormwater management facilities on airport property. Various options for the placement of these facilities have been included on the development alternatives for the southwest quadrant of the Airport (see Figures D6, D7, and D8). In addition, the projected cost of this infrastructure development, which includes design and engineering, will be incorporated into the future development costs for the Airport, and specific infrastructure projects will be identified in the 20-year development program for this study.

Landside Development/ Property/Easement Acquisition

It should be noted that one of the results of FAA’s approval of the *Friday Harbor Airport Modification of Airport Design Standards Study* was the elimination of future property acquisition requirements associated with the previously planned upgrade of the airport’s dimensional criteria to ARC B-II standards. This upgrade would have resulted in the enlargement of the RPZs, and the expansion of runway/taxiway safety area and object free area setbacks, which would have dictated additional property acquisition.

At present, the Port of Friday Harbor owns the existing RPZ property associated with Runway 16 and owns/controls the property associated with the Runway 34 RPZ in both fee and avigation easement. Therefore, no additional property acquisition would be required within the existing RPZ areas. Additional property acquisition, ranging from approximately 1.75 to 2.0 acres, was identified on the landside development alternatives for the Northwest Development Area, with the two tracts on Alternative Two having been illustrated previously for acquisition in the 2006 Airport MP. As with previous sections in this chapter, the future property acquisition recommendations for the Northwest Development Area will be dictated by the selection of landside development alternatives.

Alternatives Summary

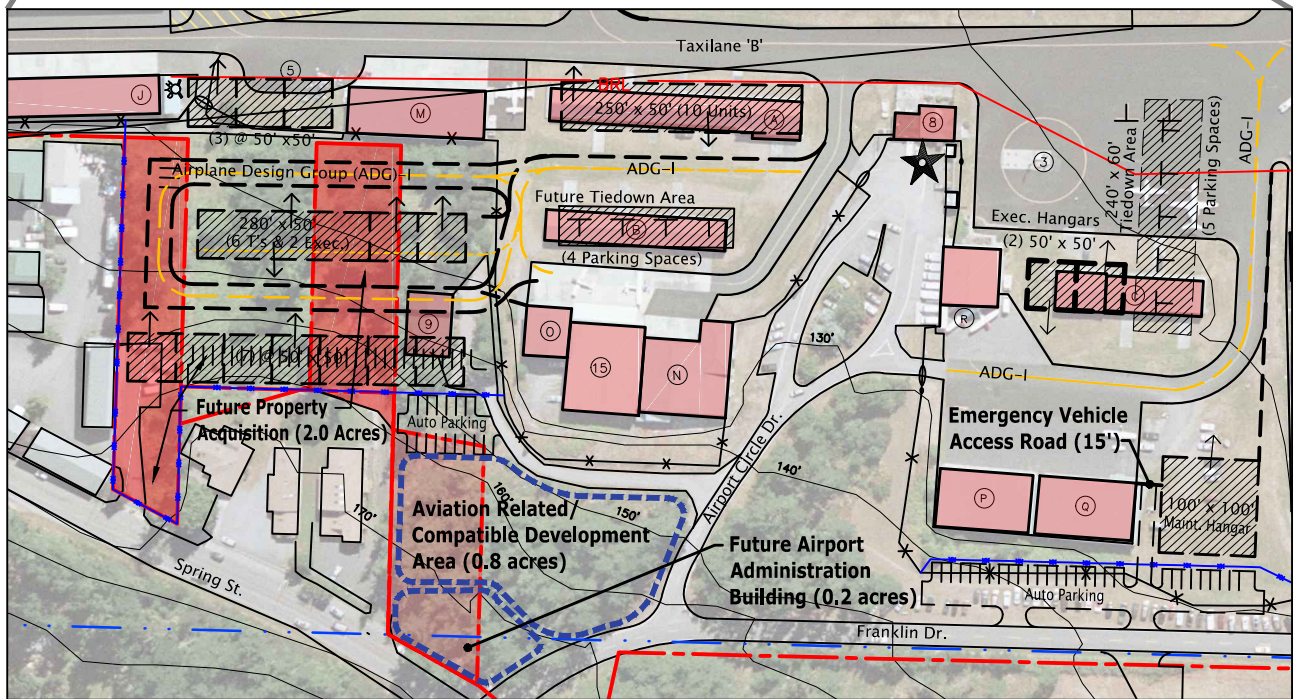
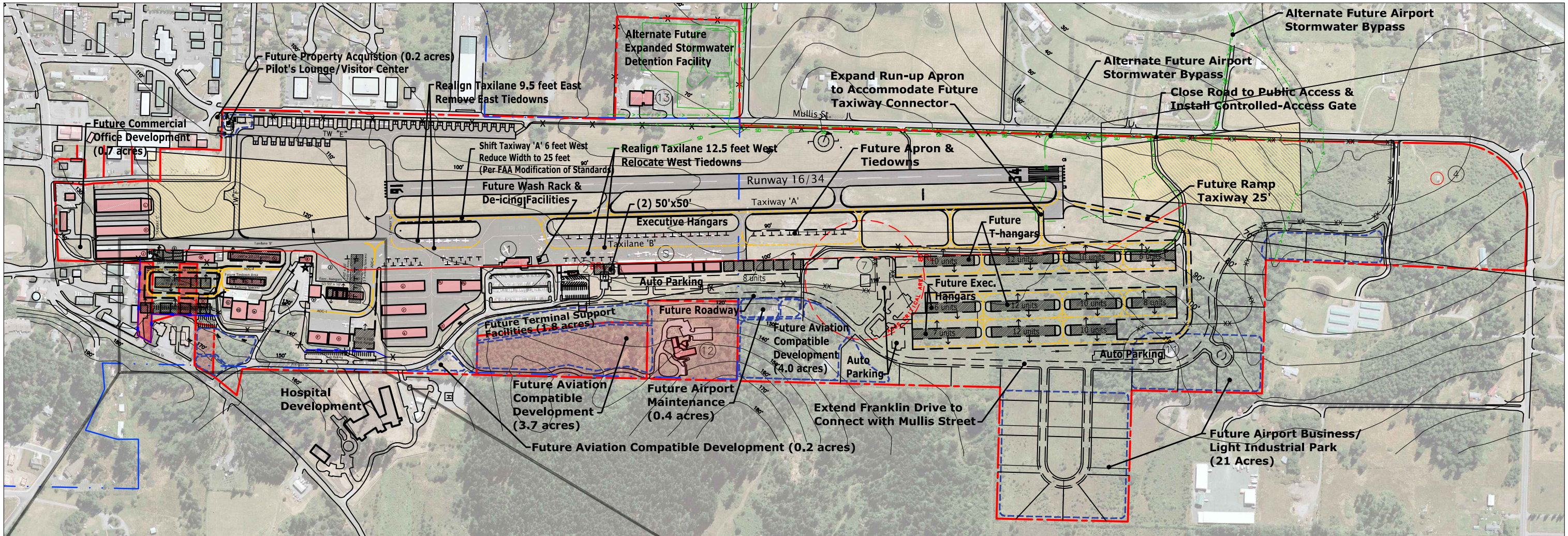
The proposed development alternatives for Friday Harbor Airport are intended to present the Airport Sponsor (i.e., the Port of Friday Harbor) with a variety of options for future facility expansion, based on input and comments provided by interested citizens and airport users within the general aviation community. Following a careful assessment of the potential impacts of the proposals for each development issue, in conjunction with a detailed FAA evaluation, the Airport Sponsor has selected the components of the recommended *CONCEPTUAL DEVELOPMENT PLAN*, which is presented in the following illustration. The conceptual development plan will be confirmed and presented in the *Airport Plans* chapter of this document to represent the ultimate airport configuration.

Selected Airside Development

As stated earlier, the Airport Sponsor has selected a combination of *Taxilane “B” Reconfiguration Alternatives One and Two* for airside development implementation. North of the terminal building, the Alternative One Taxilane “B” realignment proposal is selected, which relocates the centerline of the taxilane 9.5 feet to the east. The resulting loss of seven tiedowns along the east side of the taxilane will be compensated by infill redevelopment within the existing landside development areas. The centerline of Taxilane “B” south of the terminal building is proposed to be shifted by 12.5 feet to the west, as proposed by Alternative Two. The six tiedowns located west of the taxilane will be relocated to the west edge of the apron, beyond the Taxilane OFA.

Selected Landside Development

Northwest Development Area. As stated earlier, components from each of the *Northwest Aviation Infill & Redevelopment Area* alternatives have been selected and incorporated into the conceptual plan for the Northwest Development Area. The redevelopment of the wash rack area, north of Hangar M, with two executive hangars is shown west of Taxiway “B”. One 6-unit T-hangar and two executive hangars are illustrated immediately west of Hangar M, with initial taxiway access provided on the east side of the hangars. Ultimately, this taxiway will continue to the west for access to the seven proposed executive hangars. The ultimate configuration of the hangar layout requires the purchase of approximately 1.1 acres.



BUILDING LEGEND		
NO.	DESCRIPTION	TOP ELEVATION
1	MAIN TERMINAL BUILDING	140.5'
2	UNICOM BUILDING	146.9'
3	FUEL FACILITY	150.7'
4	NON-DIRECTIONAL BEACON	
5	DEICING FACILITY/WASH RACK	
6	HELIPAD FOR EMS	
7	AUTOMATED WEATHER STATION (ASOS)	139.1'
8	CAFE	139.7'
9	CABINET SHOP (to be removed)	
10		
11	ANIMAL SHELTER	
12	SKAGIT VALLEY COLLEGE	180.9'
13	SAN JUAN COUNTY FIRE DEPARTMENT	111.8'
A	T-HANGARS TO BE REMOVED - PORT	144.5'
B	T-HANGAR (ORIGINAL) - PORT	146.4'
C	T-HANGAR (ORIGINAL) - PORT	145.3'
D1	T-HANGAR (1985) - PORT	134.5'
D2	T-HANGAR (1985) - PORT	131.0'
E	T-HANGAR (1985) - PORT	131.9'
F	T-HANGAR (1985) - PORT	132.1'
G	T-HANGAR (1985) - PORT	132.5'
H	HANGAR (1994 to pres.) - PRIVATE	136.0'
J	T-HANGAR - PRIVATE	155.9'
K	T-HANGAR (1994 to pres.) - PRIVATE	147.3'
L	T-HANGAR - PRIVATE	155.2'
M	LARGE SINGLE HANGAR - PRIVATE	157.0'
N	LARGE SINGLE HANGAR - PRIVATE	158.0'
O	LARGE SINGLE HANGAR - PRIVATE	157.2'
P	LARGE SINGLE HANGAR - PRIVATE	155.9'
Q	ISLAND AIR HANGAR - PRIVATE	155.8'
R	AERONAUTICAL SERVICES HANGAR - PRIVATE	155.0'
S	EXECUTIVE HANGARS	

LAYOUT PLAN LEGEND		
	EXISTING	FUTURE
TOWN OF FRIDAY HARBOR LIMITS	---	---
AIRPORT PROPERTY LINE	---	---
AIRPORT SECURITY FENCE	---	---
AIRPORT BUILDINGS	█	█
AIRFIELD PAVEMENT	█	█
PAVED ROADS	---	---
RUNWAY PROTECTION ZONE	---	---
FUEL STORAGE AREA	█	█
AIRPORT BEACON	★	★
LIGHTED WIND CONE & SEGMENTED CIRCLE	○	○
WIND CONE	▲	▲
PRECISION APPROACH PATH INDICATOR (PAPI)	■	■
RUNWAY END IDENTIFIER LIGHTS (REIL)	α	α

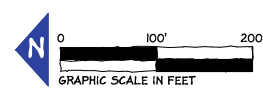
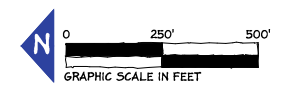


Figure D9 Conceptual Development Plan



Hangar A is proposed for redevelopment into a 10-unit T-hangar, and Hangars B and C are proposed for redevelopment into apron tiedown spaces. The Airport Sponsor has determined that two executive hangars are better suited for development on a portion of the space currently occupied by Hangar C, with a maintenance/storage hangar proposed south of Hangar Q. It was determined that the fuel storage facility will remain in its existing location, with the opportunity to upgrade the facility and include Jet A fuel storage and dispensing in the future when demand dictates and favorable economic conditions occur. An emergency vehicle access roadway and gate are proposed south of Hangar Q, between it and the proposed maintenance/storage hangar.

The Airport Sponsor proposes relocating the airport administration building to the intersection of Franklin Drive and Spring Street, within the heavily wooded parcel identified for aviation-compatible development. Aviation-compatible development is also programmed for the nearly one acre parcel located southeast of the Airport Circle Drive and Franklin Drive intersection, as is the 0.2 acre triangular-shaped parcel located northwest of the Franklin Drive and Webber Road intersection.

Southwest Development Area. As stated earlier, *Southwest Aviation Expansion Area/Alternative Two* was selected as the primary component for the Southwest Development Area. The *Conceptual Development Plan* provides for single row expansion of executive hangars extending south of the terminal apron area, with continued development of tiedowns along the east side of the apron. The decision was made to retain the ASOS in its existing location; therefore the critical area radius of 300 feet is maintained. Nested T-hangars are provided adjacent to an extension of Taxiway “B” south of the ASOS. The Airport Sponsor has decided to relocate the wash rack immediately south of the terminal, adjacent the west edge of the apron. This facility will be co-located with a new de-icing facility. Additional long-term aviation development is reserved for the area west of the T-hangars on the plateau. Providing a taxiway south of the run-up apron, turning west and then north provides airside access to the more level ground on the plateau. At the maximum taxiway gradient of 2% allowable for Aircraft Approach Categories A and B, a length of approximately 1,500 feet of taxiway is necessary to access the higher terrain of this area.

The extension and location of Franklin Drive south to Storemore Way and Mullis Street provide landside access for the proposed aviation development to the east and the aviation-compatible development to the west. Approximately 2.4 acres of future terminal support development, as proposed in *Southwest Aviation Expansion Area/Alternative Three*, has been selected by the Airport Sponsor and is provided west of the terminal building, west of Franklin Drive. Future aviation-compatible development consisting of approximately 3.4 acres is proposed for the area west of the terminal support development, with additional aviation-compatible development proposed to the south of the Skagit Valley College site. Existing topographic/landform constraints prohibit taxiway

access from the airfield to the area south of the college. When the airport administration building is relocated, redevelopment of the existing site for U.S. Customs use is proposed. A future airport maintenance building is programmed west of the extended Franklin Drive just south of the Skagit Valley College site.

North Development Area. As presented previously, the North Development Area (north of T-hangars K and J) is well suited for future commercial or office development as the existing topographic/landform constraints inhibit the provision of cost effective taxiway access. Excellent landside access can be provided by Spring Street.

Northeast Development Area. The Airport Sponsor desires to provide a guest services/pilots' lounge within the Northeast Development Area of the Airport. Two alternative locations have been proposed, one north of Taxiway "F" at the north end of Taxiway "E"; the other east of Taxiway "E" at the east end of Taxiway "G". Concerns about providing adequate clearance for approach surfaces to Runway 16 will greatly influence the selected location based on the size, height, and design of the building.

Conceptual Development Plan Projects and Phasing

The major airside and landside projects associated with the *Conceptual Development Plan* are presented in the following text. As presented earlier, the likely phasing of many of the projects will be demand dictated; therefore, the estimated development order of the projects will continue to change from year to year throughout the planning period of this MP Update.

Airside Projects.

- **South of the terminal apron, realign Taxiway "B" 12.5 feet to the west and relocate six tiedowns.**
- **North of the terminal apron, realign Taxiway "B" 9.5 feet to the east and relocate seven tiedowns.**
- **Implement obstruction removal within the Runway 34 approach area.**
- **Implement runway and taxiway pavement maintenance projects.**

Landside Projects.

- **Reconstruct Hangar F as enclosed, nested T-hangar in existing location.**
- **Relocate wash rack to south side of the terminal building (in conjunction with a de-icing facility) and redevelop existing site with two executive hangars (multiple phases).**
- **Redevelop Hangar A with 10-unit T-hangar.**
- **Acquire approximately 1.1 acres of property north and west of the Northwest Development Area.**
- **Provide emergency vehicle access roadway and gate south of Hangar Q.**

-
- **Expand executive hangars south of the terminal apron, with apron and taxiway access (multiple phases and post-planning period).**
 - **Construct stormwater management facilities (likely multi-phased).**
 - **Relocate airport administration building and redevelop existing site for U.S. Customs use.**
 - **Extend Franklin Drive to Mullis Street (multiple phases).**
 - **Construct airport maintenance building.**
 - **Provide apron tiedown areas within the Northwest Development Area (likely multi-phased).**
 - **Construct large maintenance/FBO hangar, apron, and vehicle access and parking (multiple phases).**
 - **Construct executive hangars and taxiway access west of Hangar M (multiple phases).**
 - **Construct guest services/pilots' lounge in Northeast Development Area.**
 - **Implement utility infrastructure upgrades, extensions, and relocations as required to serve the new and expanded aviation and aviation-compatible development areas.**
 - **Implement apron pavement maintenance projects.**
 - **Implement roadway pavement maintenance projects.**

CHAPTER E.

Airport Plans

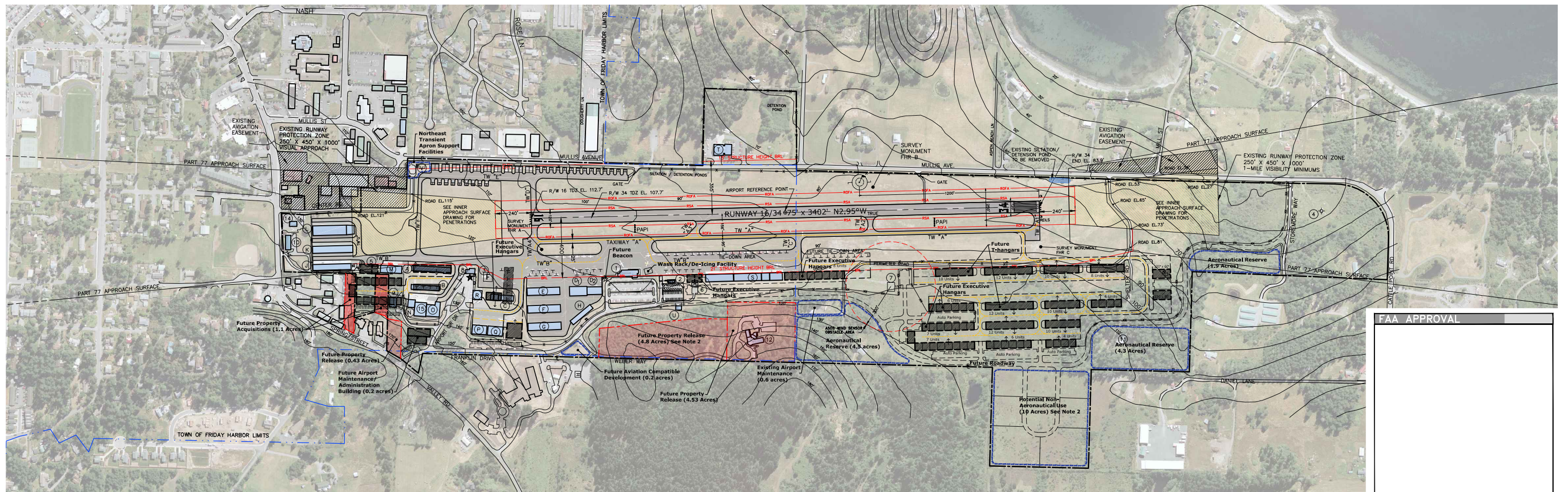
INTRODUCTION. Because previous chapters have established and quantified the future development needs of Friday Harbor Airport, this chapter categorically reviews the various elements of the selected plan in an outline and graphic format. A brief written description of the individual elements is accompanied by a graphic depiction presented in the form of the *Airport Layout Drawing, Airspace Drawings, Approach Profiles and Inner Approach Surface Drawings, Runway Departure Surface Drawing, Terminal Area Development Plans, Land Use Drawing, and Property Map.*

Airport Layout Drawing

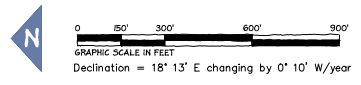
The Airport Layout Drawing is a graphic depiction of the existing and ultimate airside and landside facilities required for the Airport to properly accommodate the forecasted future demand. Additionally, the drawing provides detailed design criteria that define the relationship of airport facilities with applicable FAA standards. The following figure, entitled *AIRPORT LAYOUT DRAWING*, and the following narrative present the major components of the future development plan for Friday Harbor Airport.

Runway System

- **Airport Reference Code (ARC) Dimensional Criteria:** As presented in previous chapters, and as confirmed by the FAA's approval of the *Friday Harbor Airport Modification of Airport Design Standards Study*, the Airport is able to operate safely with ARC B-I (small aircraft only) dimensional criteria. Therefore, the Airport Layout Drawing will illustrate dimensional standards associated with this ARC.
- **Dimensions:** The existing runway length of 3,402 feet and width of 75 feet will be maintained, as will the existing Runway Safety Area (RSA) dimensions (i.e., 120 feet wide and 240 feet in length beyond each runway end) and Runway Object Free Area (ROFA) dimensions (i.e., 250 feet wide and 240 feet in length beyond each runway end).
- **Pavement:** The runway's existing published gross weight bearing capacity (i.e. 12,500 pounds single wheel main landing gear configuration) will be maintained.



MODIFICATION OF STANDARDS							
AIRPORT REFERENCE CODE	STANDARD		MODIFICATION		REMARKS		
	EXISTING	FUTURE	EXISTING	FUTURE			
RUNWAY 16/34 TO TAXIWAY 'A' SEPARATION	8-1 SMALL A/C	8-1 SMALL A/C	150'	150'	156'	156'	MODIFICATION CONDITIONALLY APPROVED 9/12/2011, PROVIDED THE AIRPORT PLACE A NOTICE IN THE AIRPORT FACILITY DIRECTORY STATING, "AIRCRAFT WITH WINGSPANS GREATER THAN 55 FEET ARE REQUIRED TO CONTACT THE AIRPORT MANAGER 24 HOURS IN ADVANCE OF LANDING."



THE PREPARATION OF THIS DOCUMENT MAY HAVE BEEN SUPPORTED, IN PART, THROUGH THE AIRPORT IMPROVEMENT PROGRAM FINANCIAL ASSISTANCE FROM THE FEDERAL AVIATION ADMINISTRATION AS PROVIDED UNDER TITLE 49, UNITED STATES CODE, SECTION 47104. THE CONTENTS DO NOT NECESSARILY REFLECT THE OFFICIAL VIEWS OR POLICY OF THE FAA. ACCEPTANCE OF THIS PLAN BY THE FAA DOES NOT IN ANY WAY CONSTITUTE A COMMITMENT ON THE PART OF THE UNITED STATES TO PARTICIPATE IN ANY DEVELOPMENT DEPICTED THEREIN NOR DOES IT INDICATE THAT THE PROPOSED DEVELOPMENT IS ENVIRONMENTALLY ACCEPTABLE IN ACCORDANCE WITH APPROPRIATE PUBLIC LAWS.

REVISIONS		
NO.	DESCRIPTION	DATE
1		

FAA APPROVAL	
SPONSOR SIGNATURE	
SPONSOR SIGNATURE	DATE

SURVEY MONUMENTS			
NO.	DESCRIPTION	LOCATION	ELEVATION
FHR A	SECONDARY AIRPORT CONTROL STATION	LAT. 48° 31' 35.08846"(N) LON. 123° 01' 32.05207"(W)	122.6'
FHR B	SECONDARY AIRPORT CONTROL STATION	LAT. 48° 31' 13.18496"(N) LON. 123° 01' 24.44488"(W)	88.7'
FHR C	PRIMARY AIRPORT CONTROL STATION	LAT. 48° 31' 02.14610"(N) LON. 123° 01' 30.47116"(W)	90.9'

National Geodetic Survey, Retrieval Date = JULY 6, 2005

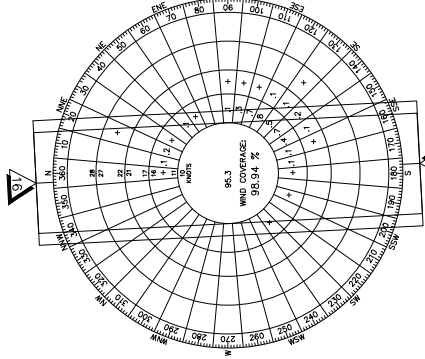
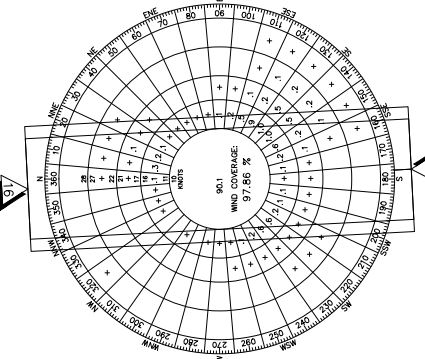
NOTES

- This drawing reflects current planning standards applicable to Friday Harbor Airport. This drawing is not intended to be used for construction documentation or navigation.
- Subject to FAA Review & Approval.

BUILDING LEGEND		
NO.	DESCRIPTION	TOP ELEVATION
1	MAIN TERMINAL BUILDING	140.6'
2	UNCOM BUILDING	146.9'
3	FUEL FACILITY	150.7'
4	NON-DIRECTIONAL BEACON (NDB)	
5	DECING FACILITY/WASH RACK	
6	HELIPAD FOR EMS	
7	AUTOMATED WEATHER STATION (ASOS)	139.1'
8	CAFE - TO BE RELOCATED	139.7'
9	CABINET SHOP	
10		
11	ANIMAL SHELTER	
12	SKAGIT VALLEY COLLEGE	180.9'
13	SAN JUAN COUNTY FIRE DEPARTMENT	111.8'
14	FBO MAINTENANCE/EXECUTIVE HANGAR	
15	T-HANGAR - PORT (TO BE REMOVED)	144.5'
A	T-HANGAR (ORIGINAL) - PORT (TO BE REMOVED)	146.4'
B	T-HANGAR (ORIGINAL) - PORT (TO BE REMOVED)	146.4'
C	T-HANGAR (ORIGINAL) - PORT (TO BE REMOVED)	145.3'
D1	T-HANGAR (1985) - PORT	134.5'
D2	T-HANGAR (1985) - PORT	131.0'
E	T-HANGAR (1985) - PORT	131.9'
F	T-HANGAR (1985) - PORT	132.1'
G	T-HANGAR (1985) - PORT	132.5'
H	HANGAR (1994 to pres.) - PRIVATE	136.0'
J	T-HANGAR - PRIVATE	155.9'
K	T-HANGAR (1994 to pres.) - PRIVATE	147.3'
L	T-HANGAR - PRIVATE	155.2'
M	LARGE SINGLE HANGAR - PRIVATE	157.0'
N	LARGE SINGLE HANGAR - PRIVATE	158.0'
O	LARGE SINGLE HANGAR - PRIVATE	157.2'
P	LARGE SINGLE HANGAR - PRIVATE	155.9'
Q	ISLAND AIR HANGAR - PRIVATE	155.8'
R	AERONAUTICAL SERVICES HANGAR - PRIVATE	155.0'
S	EXECUTIVE HANGARS	
T	SAN JUAN COUNTY FIRE DEPARTMENT	
U	STORAGE BARN	
V	PILOT WELCOME CENTER	

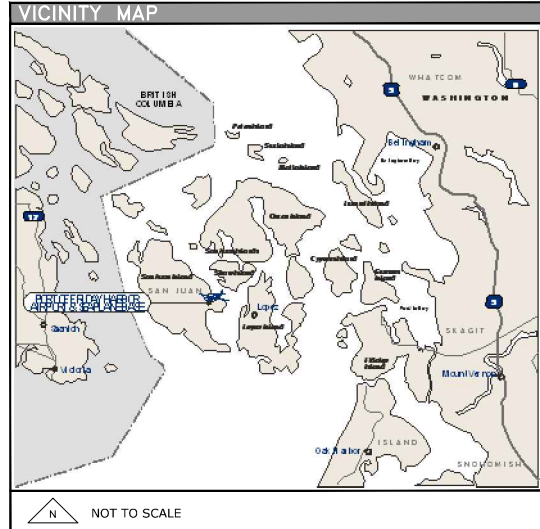
ALL WEATHER WIND COVERAGE SUMMARY			
Friday Harbor Airport Master Plan Update			
Runway Designation	13-Knot Crosswind & 5-Knot Tailwind Component	10.5-Knot Crosswind & 5-Knot Tailwind Component	WIND COVERAGE 97.95%
Runway 16/34	97.86%	95.51%	
Runway 16	90.10%	87.79%	
Runway 34	79.04%	76.69%	

Source: Wind only re-valuation provided by Sneed Consulting & Company using the FAA Airport Design Software (version 11.0) 11/01/13.



IFR WIND COVERAGE SUMMARY			
Friday Harbor Airport Master Plan Update			
Runway Designation	Wind Coverage Provided Under IFR Conditions (1) 13-Knot or Maximum Crosswind & 5-Knot Tailwind	Wind Coverage Provided Under IFR Conditions (2) 10.5-Knot Maximum Crosswind & 5-Knot Tailwind	WIND COVERAGE 98.94%
Runway 16/34	98.94%	97.66%	
Runway 16	94.11%	92.90%	
Runway 34	84.49%	84.11%	

Source: Wind only re-valuation provided by Sneed Consulting & Company using the FAA Airport Design Software (version 11.0) 11/01/13.
 (1) Ceiling of less than 1,000 feet, but equal to or greater than 500 feet and/or visibility less than 3 statute miles, but equal to or greater than 1 statute mile.



RUNWAY DATA			
		EXISTING	FUTURE
APPROACH VISIBILITY MINIMUMS		VISUAL 1/1-MILE	VISUAL 1/1-MILE
FAR PART 77 APPROACH SLOPE		201/146.1	201/146.1
FAR APPROACH CATEGORY		A(I) / A(NP)	A(I) / A(NP)
RUNWAY WIDTH X LENGTH		75' X 3402'	75' X 3402'
PAVEMENT TYPE		ASPHALT	ASPHALT
PAVEMENT STRENGTH (IN 1000 LBS.)		12.5 s	12.5 s
RUNWAY LIGHTING		MIR	MIR
EFFECTIVE RUNWAY GRADIENT %		0.8	0.8
MAXIMUM GRADE WITHIN RUNWAY LENGTH		0.8	0.8
RUNWAY LINE-OF-SITE		CRITERIA MET	CRITERIA MET
RUNWAY MARKING		V/NPI	V/NPI
VISUAL APPROACH AIDS		PAPI/PAPI, REELS	PAPI/PAPI, REELS
INSTRUMENT APPROACH AIDS		NONE/GPS, NDB	NONE/GPS
AIRPORT REFERENCE CODE		B-1 SMALL A/C	B-1 SMALL A/C
CRITICAL AIRCRAFT		PPPR MAXWID CHRTM	PPPR MAXWID CHRTM
RUNWAY SAFETY AREA (RSA) WIDTH		120'/120'	120'/120'
RSA LENGTH BEYOND STOP END		240'/240'	240'/240'
RUNWAY OBJECT FREE AREA (OFA) WIDTH		250'	250'
OFA LENGTH BEYOND STOP END		240'/240'	240'/240'
OBSTACLE FREE ZONE (OFZ) WIDTH		250'/250'	250'/250'
OFZ LENGTH BEYOND STOP END		200'/200'	200'/200'
RUNWAY CENTERLINE TO HOLD LINE		125'	125'
RUNWAY END COORDINATES		NGS 405 08/03 (NAD 83)	
RUNWAY ELEVATIONS			
END		112.7/83.9'	112.7/83.9'
NGS 405 01/03 (NAVD 88) HIGH POINT		112.7'	112.7'
LOW POINT		83.9'	83.9'
TOUCHDOWN ZONE ELEVATION		112.7/107.7'	112.7/107.7'

NOTES:

AIRPORT DATA		
	EXISTING	FUTURE
AIRPORT ELEVATION (AMSL) NGS 405 (NAVD 88)	112.7'	112.7'
AIRPORT REFERENCE POINT (ARP) NGS 405 (NAD 83)	112.7'	112.7'
AIRPORT REFERENCE CODE	B-1 SMALL A/C	B-1 SMALL A/C
NPIAS CATEGORY	PRIMARY COMM. SERV.	PRIMARY COMM. SERV.
MEAN MAX. TEMPERATURE (HOTTEST MONTH)	71°	71°
TAXIWAY LIGHTING	LTL	LTL
TAXIWAY MARKING	CENTERLINE	CENTERLINE
AIRPORT & TERMINAL NAVAIDS	NDB, ASR*, GPS	ASR*, GPS

* AIRPORT SURVEILLANCE RADAR (ASR) LOCATED AT NAS WIDEBY IS.

LAYOUT PLAN LEGEND		
	EXISTING	FUTURE
AIRPORT PROPERTY LINE	---	---
AIRPORT SECURITY FENCE	---	---
AIRPORT BUILDINGS	---	---
AIRFIELD PAVEMENT	---	---
PAVED ROADS	---	---
RUNWAY PROTECTION ZONE	---	---
AVIGATION EASEMENT	---	---
BUILDING RESTRICTION LINE	---	---
RUNWAY SAFETY AREA	---	---
FUEL STORAGE AREA	---	---
AIRPORT BEACON	---	---
LIGHTED WIND CONE & SEGMENTED CIRCLE	---	---
NON-DIRECTIONAL BEACON (NDB)	---	---
PRECISION APPROACH PATH INDICATOR (PAPI)	---	---
RUNWAY END IDENTIFIER LIGHTS (REL)	---	---
CITY LIMITS	---	---
DEVELOPMENT AREA	---	---

MASTER PLAN UPDATE
Friday Harbor Airport
 Friday Harbor, Washington

Reid Middleton 728 134th Street SW, Suite 200, Everett, WA 98204 - (425) 741-3800

Barnard Dunkelberg Company 1616 East 15th Street, Tulsa, Oklahoma 74120 - 918.585.8844

-
- **Instrument Approach Criteria:** Runway 34 is currently served with an Instrument Approach Procedure (IAP) having visibility minimums of 1¼-mile and ceiling minimums of 392 feet. Runway 16 has a visual approach. It is anticipated that the Runway 34 IAP ceiling minimums will be improved to as low as 300 feet Above Ground Level (AGL) and the visibility minimums will remain at or above one-mile.
 - **Runway Protection Zone:** The existing Runway Protection Zone (RPZ) dimensions will remain at 250 feet x 1,000 feet x 450 feet.
 - **Runway Lighting, Markings, and Navigational Aids:** The existing Medium Intensity Runway Lights (MIRL), threshold lights, and the 4-light Precision Approach Path Indicator (PAPI) will be maintained on the Airport Layout Drawing. The Runway End Identifier Lights (REIL) serving Runway 34 will also be retained. Basic runway markings will be maintained, as will the Non-directional Beacon (NDB) south of Runway 34.

Taxiway System

- **Dimensions:** According to the *Friday Harbor Airport Modifications of Airport Design Standards Study*, the Airport can operate safely with ARC B-I small aircraft only standards provided the centerline of the parallel taxiway (Taxiway “A”) is shifted six feet to the west. The width of Taxiway “A” is to be reduced to 25 feet. Taxilane “B” is to be shifted 12.5 feet to the west on the apron south of the terminal building, and shifted 9.5 feet to the east in the area north of the terminal building. The Airport Layout Drawing reflects these changes to the taxiway layout.
- **Pavement:** The existing pavement strength of 12,500 pounds will be maintained and reflected on the Airport Layout Drawing.
- **Lighting:** The Medium Intensity Taxiway Lights (MITL) will be relocated in conjunction with the Taxiway “A” relocation and width reduction to 25-feet.

Airspace Drawing

The Airspace Drawing for Friday Harbor Airport is based on Federal Aviation Regulations (FAR) Part 77, *Objects Affecting Navigable Airspace*. Federal criteria contained in FAR Part 77 have been established to provide guidance in controlling the height of objects near airports in order to protect airspace and approaches from hazards that could negatively affect the safe and efficient operation of aircraft. FAR Part 77 criteria specify a set of imaginary surfaces which, when penetrated, designate an object as being an obstruction. However, some obstructions can be determined to be non-hazardous by an aeronautical study by virtue of their location and/or marked and lighted as specified in the

aeronautical study determination. Airfield navigation aids, as well as lighting and visual aids, by nature of their location, may constitute obstructions, but these objects do not violate FAR Part 77 criteria, as they are essential to airport operations.

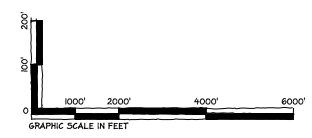
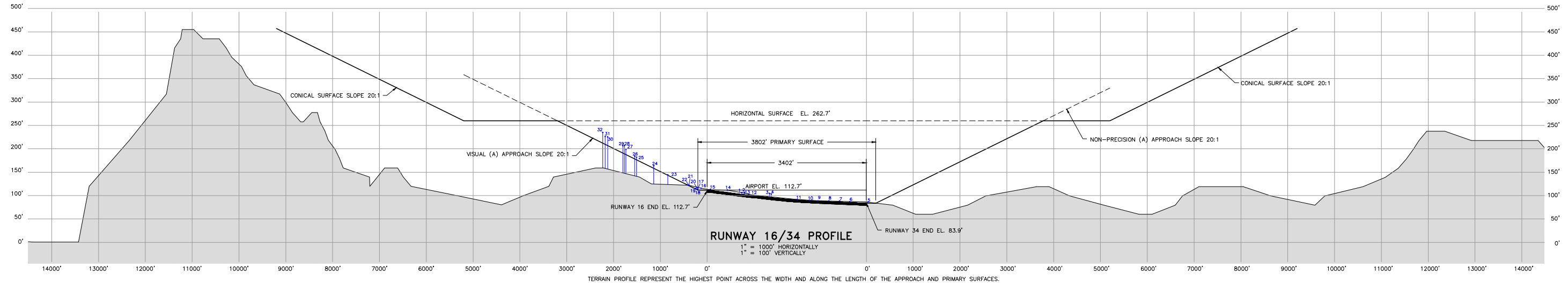
The *AIRPORT AIRSPACE PLAN* and *AIRPORT AIRSPACE PROFILE* drawings, which are presented in the following figure, provide plan and profile views depicting the FAR Part 77 criteria as they specifically relate to Friday Harbor Airport. The plan is based on the ultimate runway configuration, approaches, and elevation. Therefore, the criteria are based on utility category (i.e., runways designated for aircraft weighing less than 12,500 pounds, gross weight) with a visual approach to Runway 16 and a non-precision instrument approach with visibility minimums not less than one-mile to Runway 34.

There are five defined imaginary surfaces specified by FAR Part 77 guidelines. These include the primary, transitional, horizontal, conical, and approach surfaces. A brief definition of each surface is presented in the following text.

- **Primary Surface:** A surface longitudinally centered on the runway extending 200 feet beyond each runway end. The elevation of any point on the primary surface is the same as the nearest point on the runway centerline. The width of the primary surface at Friday Harbor Airport is 500 feet.
- **Transitional Surface:** Surfaces that extend upward and outward at right angles to the runway centerline, and the extended runway centerline, at the edges of the primary surface at a slope of 7:1. Transitional surfaces end where they intersect the horizontal surface.
- **Horizontal Surface:** A horizontal plane established at an elevation of 150 feet above the airport elevation. The perimeter of the horizontal surface is established by swinging arcs from the center of each end of the primary surface and connecting the arcs with tangent lines. The radii of the arcs are 5,000 feet at Friday Harbor Airport.
- **Conical Surface:** This surface extends upward and outward from the horizontal surface at a slope of 20:1 for a horizontal distance of 4,000 feet.
- **Approach Surface:** Surfaces longitudinally centered on the extended runway centerline, extended outward and upward from each end of the primary surface. The inner edges are the same width as the primary surface. The horizontal distance of approach surfaces is determined by the visibility minimums associated with each runway end, which is 5,000 feet at Friday Harbor Airport. Approach surfaces expand uniformly along their entire length until reaching an outer edge width, which is also determined by the visibility minimums.

OBSTRUCTIONS					
No.	Description	Elevation (ft)	Surface	Penetration (ft)	Disposition
1	TREE	107.50	PRIMARY	4.53	TRIM/REMOVE
2	TREE	107.50	PRIMARY	5.11	TRIM/REMOVE
3	TREE	105.46	PRIMARY	8.95	TRIM/REMOVE
4	TREE	104.50	PRIMARY	8.49	TRIM/REMOVE
5	GROUND	86.28	PRIMARY	1.68	NONE
6	GROUND	87.71	PRIMARY	1.44	NONE
7	GROUND	88.92	PRIMARY	2.06	NONE
8	GROUND	89.15	PRIMARY	1.29	NONE
9	GROUND	89.23	PRIMARY	0.2	NONE
10	GROUND	90.06	PRIMARY	0.24	NONE
11	GROUND	92.10	PRIMARY	0.37	NONE
12	GROUND	101.32	PRIMARY	0.24	NONE
13	GROUND	106.69	PRIMARY	3.86	NONE
14	GROUND	110.62	PRIMARY	2.31	NONE
15	GROUND	113.87	PRIMARY	1.44	NONE
16	GROUND	116.59	PRIMARY	3.48	NONE
17	GROUND	114.55	PRIMARY	1.86	NONE
18	GROUND	113.48	PRIMARY	0.59	NONE
19	GROUND	116.02	RW 16 APP.	1.07	NONE
20	GROUND	117.43	RW 16 APP.	3.99	NONE
21	GROUND	123.05	RW 16 APP.	1.01	NONE
22	GROUND	122.84	RW 16 APP.	0.24	NONE
23	TREE	145.38	RW 16 APP.	0.83	TRIM/REMOVE
24	TREE	164.84	RW 16 APP.	5.17	TRIM/REMOVE
25	TREE	183.11	RW 16 APP.	5.11	NONE
26	TREE	185.00	RW 16 APP.	5.11	NONE
27	TREE	199.76	RW 16 APP.	10.46	NONE
28	TREE	207.77	RW 16 APP.	16.82	NONE
29	TREE	207.32	RW 16 APP.	14.63	NONE
30	TREE	226.22	RW 16 APP.	17.37	NONE
31	TREE	227.12	RW 16 APP.	15.55	NONE
32	TREE	235.58	RW 16 APP.	21.41	NONE

NOTE: OBSTRUCTIONS FROM SURVEY BY REID MIDDLETON MARCH 2012



REVISIONS		
NO.	DESCRIPTION	DATE
1		

NOTES: 1. This drawing reflects current planning standards applicable to Friday Harbor Airport. This drawing is not intended to be used for construction documentation or navigation.
2. FAR Part 77 Object Affecting Navigable Airspace-Subpart C 77.25 Imaginary Surfaces

AIRPORT DATA		
	EXISTING	FUTURE
AIRPORT ELEVATION (AMSL) NGS 405 (NAVD 88)	112.7'	112.7'
AIRPORT REFERENCE POINT (ARP) NGS 405 (NAVD 83)	112.7'	112.7'
AIRPORT REFERENCE CODE	B-I SMALL A/C	B-I SMALL A/C
NPAS CATEGORY	PRIMARY COMM. SERV.	PRIMARY COMM. SERV.
MEAN MAX. TEMPERATURE (HOTTEST MONTH)	71°	71°
TAXIWAY LIGHTING	LTL	LTL
TAXIWAY MARKING	CENTERLINE	CENTERLINE
AIRPORT & TERMINAL NAVAIDS	NDB, ASRY, GPS	ASRY, GPS

* AIRPORT SURVEILLANCE RADAR (ASR) LOCATED AT NAS WIDEBY IS.

For Runway 16, the outer width is 1,250 feet; for Runway 34, it is 2,000 feet. The approach surfaces have a slope of 20:1 at Friday Harbor Airport.

According to application of these imaginary surface criteria with the new obstruction survey data that was acquired for this project, 169 obstructions have been identified for evaluation on the obstruction data table. It should be noted that the identified obstructions will be evaluated by the FAA through the airspace review process (i.e., an aeronautical study) to reach a hazard/no hazard determination and disposition for each obstruction.

Inner Portion of the Approach Surface Drawings

The *INNER PORTION OF THE APPROACH SURFACE DRAWINGS*, which follow, present a more detailed view of the inner portions of the FAR Part 77 imaginary approach surfaces. They provide large-scale plan and profile delineation of the approach surfaces out to a distance where the surface reaches 100 feet above the runway end elevation. They facilitate the identification of roads, utility lines, railroads, structures, and other possible obstructions that may exist with the confines of, or near, the approach surfaces.

Because they are enlarged views of the Airport Airspace Drawing near the ends of each runway, the Inner Portion of the Approach Surface Drawings have the same criteria. The Runway 16 criteria are based on utility category with a visual approach; the Runway 34 criteria are based on utility category with a non-precision approach having visibility minimums not less than one-mile. Based upon these criteria, there were sixteen Part 77 obstructions identified for the Runway 16 approach end and one Part 77 obstruction for the Runway 34 approach end.

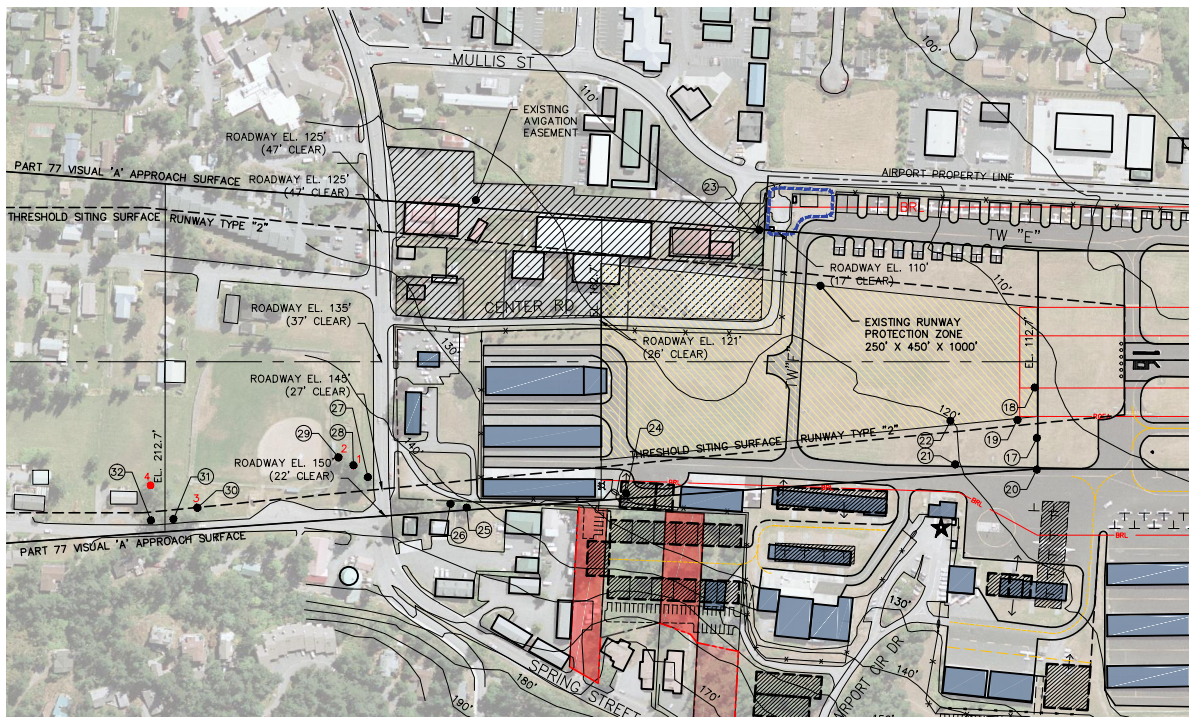
Additionally, these drawings illustrate the approach clearance requirements specified by threshold siting surface (TSS) criteria. According to Appendix Two of FAA AC 150/5300-13, “the standard shape, dimensions, and slope of the surface used for locating a threshold are dependent upon the type of aircraft operations currently conducted or forecasted, the landing visibility minimums desired, and the types of instrumentation available or planned for that runway end.” For Friday Harbor Airport, the following threshold siting surfaces were identified for evaluation.

- **Runway 16:** Runway Type “2” - Approach end of runways expected to serve small airplanes with approach speeds of 50 knots or more. (Visual runways only, day/night)
- **Runway 34:** Runway Type “4” - Approach end of runways expected to support instrument night operations serving approach category A and B aircraft only).

THRESHOLD SITING OBSTRUCTIONS					
NO.	Description	Elevation (in feet)	Surface (in feet)	Penetration (in feet)	Disposition *
1	TREE	207.77	RW16 TSS	6.7	TRIM/REMOVE
2	TREE	207.32	RW16 TSS	4.62	TRIM/REMOVE
3	TREE	226.22	RW16 TSS	7.27	TRIM/REMOVE
4	TREE	225.59	RW16 TSS	1.28	TRIM/REMOVE

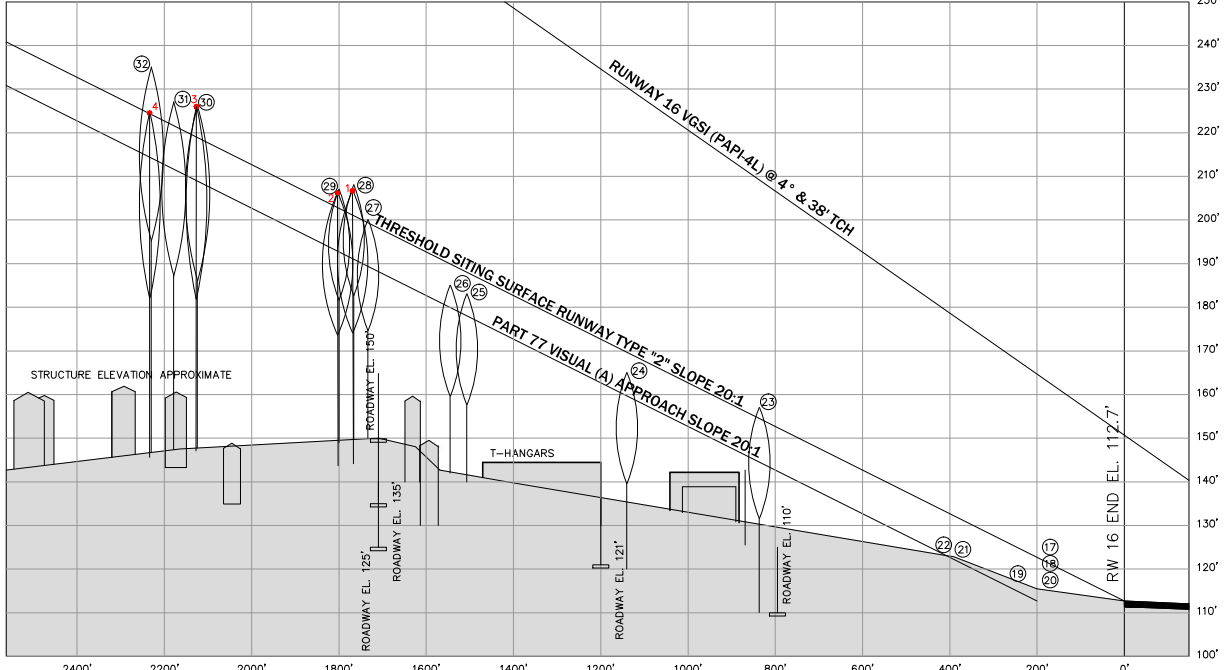
* OBSTRUCTIONS ARE CURRENTLY MITIGATED WITH RUNWAY 16 PAPI. TRIM/REMOVAL REQUIREMENT FOR DISPOSITION TO BE CONFIRMED BY FAA.

NOTE: OBSTRUCTIONS FROM SURVEY BY REID MIDDLETON, MARCH 2012



RUNWAY 16 PLAN
1" = 200'

NOTE: TERRAIN PROFILE REPRESENTS THE HIGHEST POINT ACROSS THE WIDTH AND ALONG THE LENGTH OF THE PART 77 APPROACH SURFACE.



RUNWAY 16 PROFILE
1" = 200' HORIZONTALLY
1" = 20' VERTICALLY

RUNWAY DATA	
RUNWAY 16/34	
APPROACH VISIBILITY MINIMUMS	EXISTING: VISUAL/1-MILE FUTURE: VISUAL/1-MILE
FAR PART 77 APPROACH SLOPE	20:1/34:1
RUNWAY WIDTH X LENGTH	75' X 3402'
PAVEMENT TYPE	ASPHALT
PAVEMENT STRENGTH (IN 1000 LBS.)	12.5 s
RUNWAY LIGHTING	MIRL
EFFECTIVE RUNWAY GRADIENT %	0.8
MAXIMUM GRADE WITHIN RUNWAY LENGTH	0.8
RUNWAY LINE-OF-SITE	CRITERIA MET
RUNWAY MARKING	NPI
VISUAL APPROACH AIDS	PAPI/PAPI, REIS
INSTRUMENT APPROACH AIDS	NONE/GPS, NDB
AIRPORT REFERENCE CODE	B-1 SMALL A/C
CRITICAL AIRPORT	PPER WABKE CDETIN
RUNWAY SAFETY AREA (RSA) WIDTH	120'/240'
RSA LENGTH BEYOND STOP END	240'/240'
RUNWAY OBJECT FREE AREA (OFA) WIDTH	250'
OFA LENGTH BEYOND STOP END	240'/240'
OBSTACLE FREE ZONE (OFZ) WIDTH	250'/250'
OFZ LENGTH BEYOND STOP END	200'/200'
RUNWAY CENTERLINE TO HOLD LINE	125'
RUNWAY END COORDINATES	NGS 405 08/03 (NAD 83)
RUNWAY ELEVATIONS	END: 112.7/83.9'
NGS 405 01/03 (NAVD 88)	HIGH POINT: 112.7'
	LOW POINT: 83.9'
	TOUCHDOWN ZONE ELEVATION: 112.7/107.7'
NOTES:	

PART 77 OBSTRUCTIONS					
No.	Description	Elevation (in feet)	Surface (in feet)	Penetration (in feet)	Disposition
17	GROUND	114.56	PRIMARY	1.86	NONE
18	GROUND	113.48	PRIMARY	0.59	NONE
19	GROUND	116.02	RW 16 APP.	1.07	NONE
20	GROUND	117.43	RW 16 APP.	3.99	NONE
21	GROUND	123.05	RW 16 APP.	1.01	NONE
22	GROUND	122.84	RW 16 APP.	0.24	NONE
23	TREE	145.38	RW 16 APP.	0.83	TRIM/REMOVE
24	TREE	164.84	RW 16 APP.	5.17	TRIM/REMOVE
25	TREE	183.11	RW 16 APP.	5.11	NONE
26	TREE	185.00	RW 16 APP.	5.11	NONE
27	TREE	199.76	RW 16 APP.	10.46	NONE
28	TREE	207.77	RW 16 APP.	16.82	NONE
29	TREE	207.32	RW 16 APP.	14.63	NONE
30	TREE	226.22	RW 16 APP.	17.37	NONE
31	TREE	227.12	RW 16 APP.	15.55	NONE
32	TREE	235.58	RW 16 APP.	21.41	NONE

NOTE: OBSTRUCTIONS FROM SURVEY BY REID MIDDLETON MARCH 2012

AIRPORT DATA		
	EXISTING	FUTURE
AIRPORT ELEVATION (AMSL) NGS 405 (NAVD 88)		112.7'
AIRPORT REFERENCE POINT (APP) NGS 405 (NAD 83)		112.7'
NPIAS CATEGORY	B-1 SMALL A/C	B-1 SMALL A/C
MEAN MAX. TEMPERATURE (HOTTEST MONTH)	71°	71°
TAXIWAY LIGHTING	LITL	LITL
AIRPORT & TERMINAL NAVAIDS	NDB, ASR* GPS	ASR* GPS

* AIRPORT SURVEILLANCE RADAR (ASR) LOCATED AT NAS WIDEBY IS.

LAYOUT PLAN LEGEND		
	EXISTING	FUTURE
AIRPORT PROPERTY LINE	---	---
AIRPORT SECURITY FENCE	-X-	-XX-
AIRPORT BUILDINGS	▒	▒
AIRFIELD PAVEMENT	▨	▨
PAVED ROADS	▤	▤
RUNWAY PROTECTION ZONE	▩	▩
AVIGATION EASEMENT	▧	▧
BUILDING RESTRICTION LINE	---BRL---	---
RUNWAY SAFETY AREA	---RSA---	---
RUNWAY OBJECT FREE AREA	---OFA---	---
FUEL STORAGE AREA	---FSA---	---
AIRPORT BEACON	★	★
LIGHTED WIND CONE & SEGMENTED CIRCLE	⊙	⊙
NON-DIRECTIONAL BEACON (NDB)	⊕	⊕
PRECISION APPROACH PATH INDICATOR (PAPI)	⊥	⊥
RUNWAY END IDENTIFIER LIGHTS (REL)	⊕	⊕

REVISIONS		
NO.	DESCRIPTION	DATE
1		

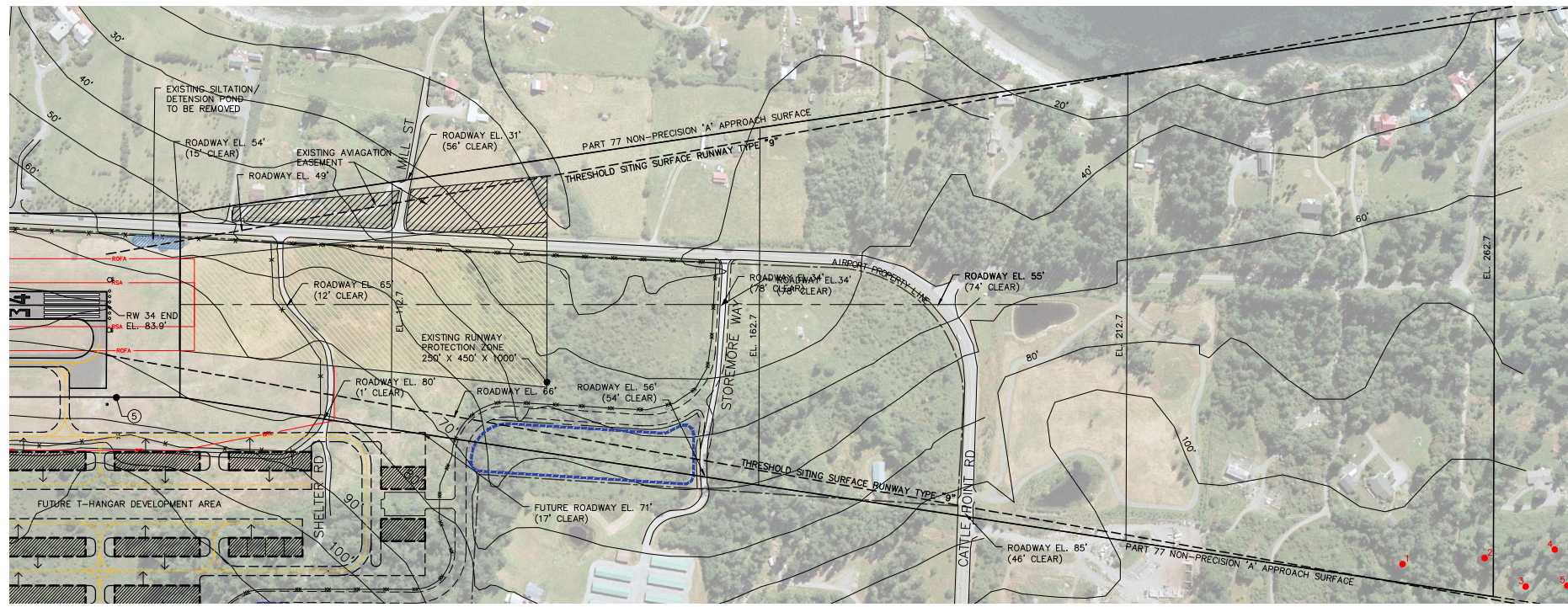
NOTES:

1. This drawing reflects current planning standards applicable to Friday Harbor Airport. This drawing is not intended to be used for construction documentation or navigation.
2. FAR Part 77 criteria used to determine roadway clearance.



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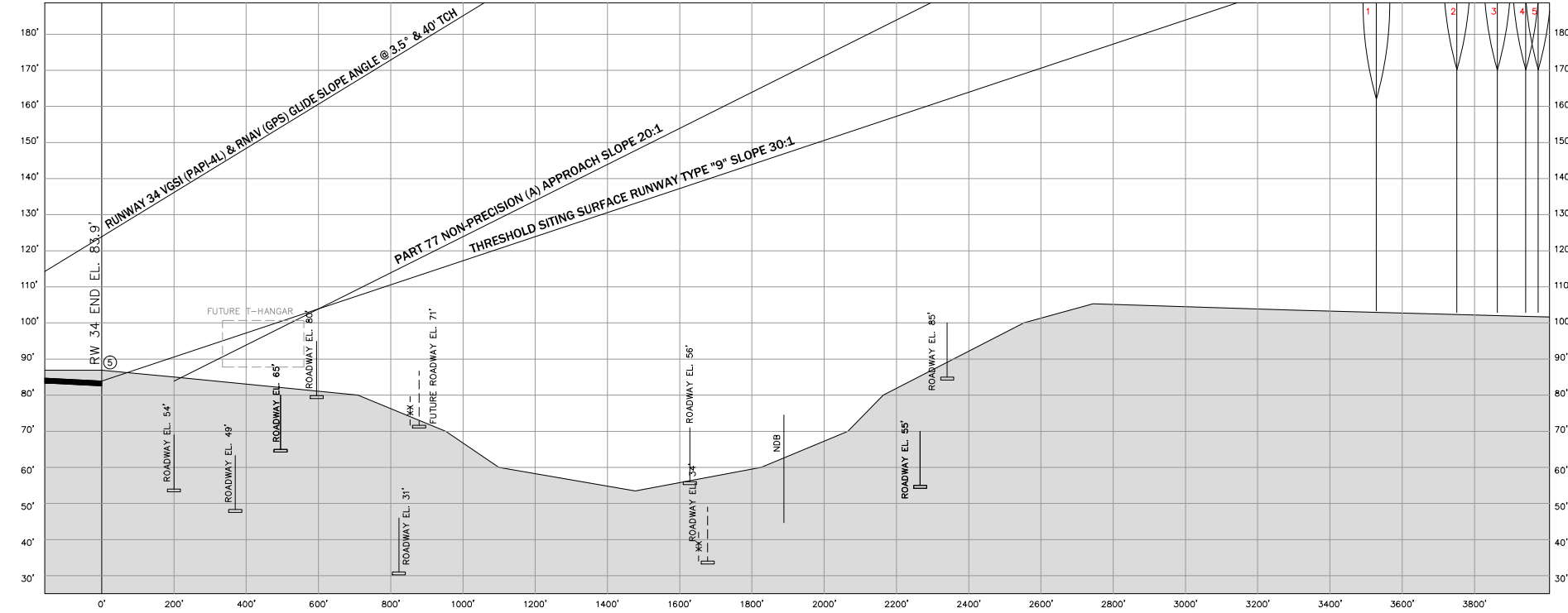


RUNWAY 34 PLAN
1" = 200'

REVISIONS		
NO.	DESCRIPTION	DATE
1		

NOTES:
1. This drawing reflects current planning standards applicable to Friday Harbor Airport. This drawing is not intended to be used for construction documentation or navigation.
2. FAR Part 77 criteria used to determine roadway clearance.

NOTE: TERRAIN PROFILE REPRESENTS THE HIGHEST POINT ACROSS THE WIDTH AND ALONG THE LENGTH OF THE PART 77 APPROACH SURFACE.



RUNWAY 34 PROFILE
1" = 200' HORIZONTALLY
1" = 20' VERTICALLY

RUNWAY DATA		
	RUNWAY 16/34	
	EXISTING	FUTURE
APPROACH VISIBILITY MINIMUMS	VISUAL/1-MILE	VISUAL/1-MILE
FAR PART 77 APPROACH SLOPE	20:1/34:1	20:1/34:1
RUNWAY WIDTH X LENGTH	75' X 3402'	75' X 3402'
PAVEMENT TYPE	ASPHALT	ASPHALT
PAVEMENT STRENGTH (IN 1000 LBS.)	12.5 s	12.5 s
RUNWAY LIGHTING	MIRL	MIRL
EFFECTIVE RUNWAY GRADIENT %	0.8	0.8
MAXIMUM GRADE WITHIN RUNWAY LENGTH	0.8	0.8
RUNWAY LINE-OF-SITE	CRITERIA MET	CRITERIA MET
RUNWAY MARKING	NPI	NPI
VISUAL APPROACH AIDS	PAPI/PAPI, REILS	PAPI/PAPI, REILS
INSTRUMENT APPROACH AIDS	NONE/GPS, NDB	NONE/GPS
AIRPORT REFERENCE CODE	B-I SMALL A/C	B-I SMALL A/C
CRITICAL AIRCRAFT	PAPER WORKSHEET	REID MIDDLETON
RUNWAY SAFETY AREA (RSA) WIDTH	120'/240'	120'/240'
RSA LENGTH BEYOND STOP END	240'/240'	240'/240'
RUNWAY OBJECT FREE AREA (OFA) WIDTH	250'	250'
OFA LENGTH BEYOND STOP END	240'/240'	240'/240'
OBSTACLE FREE ZONE (OFZ) WIDTH	250'/250'	250'/250'
OFZ LENGTH BEYOND STOP END	200'/200'	200'/200'
RUNWAY CENTERLINE TO HOLD LINE	125'	125'
RUNWAY END COORDINATES	LAT. N 48°31'35.8395" LONG. W 123°01'29.0329"	LAT. N 48°31'35.8395" LONG. W 123°01'29.0329"
NGS 405 08/03 (NAD 83)	LAT. N 48°31'02.3160" LONG. W 123°01'26.4319"	LAT. N 48°31'02.3160" LONG. W 123°01'26.4319"
RUNWAY ELEVATIONS	END 112.7/83.9'	END 112.7/83.9'
NGS 405 01/03 (NAVD 88)	HIGH POINT 112.7'	HIGH POINT 112.7'
	LOW POINT 83.9'	LOW POINT 83.9'
	TOUCHDOWN ZONE ELEVATION 112.7/107.7'	TOUCHDOWN ZONE ELEVATION 112.7/107.7'

NOTES:

THRESHOLD SITING OBSTRUCTIONS					
NO.	Description	Elevation (in feet)	Surface	Penetration (in feet)	Disposition *
1	TREE	206.76	RW16 TSS	3.0	TRIM/REMOVE
2	TREE	211.89	RW16 TSS	3.0	TRIM/REMOVE
3	TREE	214.41	RW16 TSS	1.76	TRIM/REMOVE
4	TREE	218.28	RW16 TSS	3.01	TRIM/REMOVE
5	TREE	224.58	RW16 TSS	8.16	TRIM/REMOVE

* OBSTRUCTIONS ARE CURRENTLY MITIGATED WITH RUNWAY 34 PAPI & RNAV (GPS) GLIDE SLOPE. TRIM/REMOVAL REQUIREMENT FOR DISPOSITION TO BE CONFIRMED BY FAA.
NOTE: OBSTRUCTIONS FROM SURVEY BY REID MIDDLETON, MARCH 2012

PART 77 OBSTRUCTIONS					
NO.	DESCRIPTION	ELEVATION	SURFACE	PENETRATION	DISPOSITION
5	GROUND	86.28'	PRIMARY	1.86'	NONE

NOTE: OBSTRUCTIONS FROM SURVEY BY REID MIDDLETON MARCH 2012

AIRPORT DATA		
	EXISTING	FUTURE
AIRPORT ELEVATION (AMSL) NGS 405 (NAVD 88)	112.7'	112.7'
AIRPORT REFERENCE POINT (ARP) NGS 405 (NAD 83)	LAT. N 48°31'02.3160" LONG. W 123°01'26.4319"	LAT. N 48°31'02.3160" LONG. W 123°01'26.4319"
AIRPORT REFERENCE CODE	B-I SMALL A/C	B-I SMALL A/C
NPAS CATEGORY	PRIMARY COMM. SERV.	PRIMARY COMM. SERV.
MEAN MAX. TEMPERATURE (HOTTEST MONTH)	71°	71°
TAXIWAY LIGHTING	LITL	LITL
TAXIWAY MARKING	CENTERLINE	CENTERLINE
AIRPORT & TERMINAL NAVAIDS	NDB, ASR*, GPS	ASR*, GPS

* AIRPORT SURVEILLANCE RADAR (ASR) LOCATED AT NAS WIDBEY IS.

LAYOUT PLAN LEGEND		
	EXISTING	FUTURE
AIRPORT PROPERTY LINE	---	---
AIRPORT SECURITY FENCE	X	XX
AIRPORT BUILDINGS	▭	▭
AIRFIELD PAVEMENT	▨	▨
PAVED ROADS	▨	▨
RUNWAY PROTECTION ZONE	▨	▨
AVIGATION EASEMENT	▨	▨
BUILDING RESTRICTION LINE	BRL	BRL
RUNWAY SAFETY AREA	RSA	RSA
RUNWAY OBJECT FREE AREA	OFA	OFA
FUEL STORAGE AREA	FS	FS
AIRPORT BEACON	★	★
LIGHTED WIND CONE & SEGMENTED CIRCLE	☼	☼
NON-DIRECTIONAL BEACON (NDB)	⊕	⊕
PRECISION APPROACH PATH INDICATOR (PAPI)	⊥	⊥
RUNWAY END IDENTIFIER LIGHTS (REL)	⊕	⊕

According to the application of these TSS criteria, there were four obstructions identified for the Runway 16 approach end and five obstructions for the Runway 34 approach end. Appendix Two of FAA AC 150/5300-13 provides guidance siting thresholds to meet approach obstacle clearance requirements. In accordance with this guidance, the installation of an approved Visual Glide Slope Indicator (VGSI) (i.e., a 4-light Precision Approach Path Indicator) serving each runway end has been used to mitigate the existing obstructions to the specified TSS.

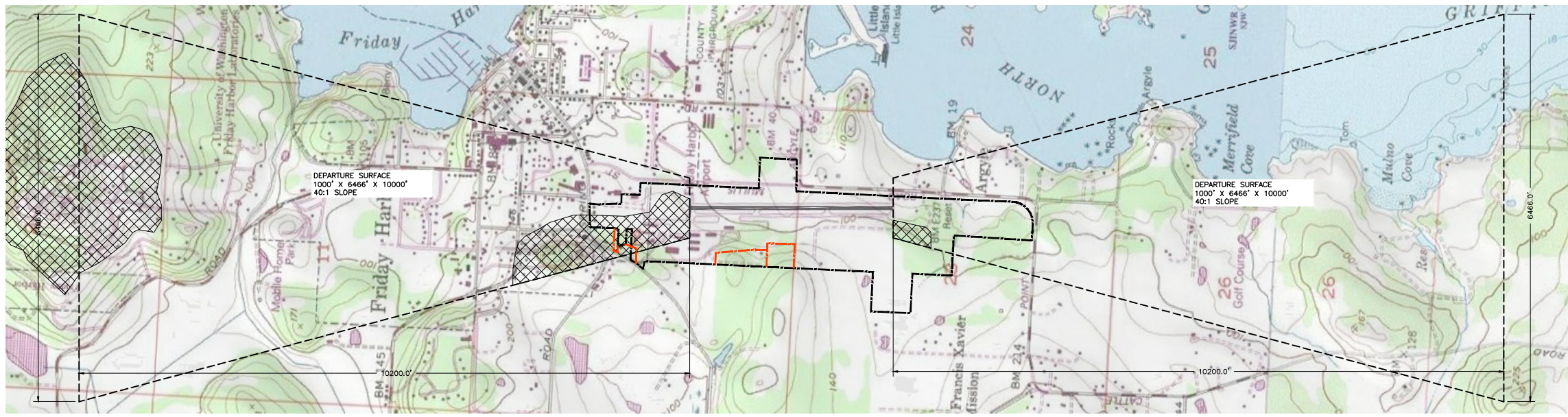
Runway Departure Surface Drawing

The following figure, entitled *RUNWAY 16/34 DEPARTURE SURFACE DRAWING*, is a large-scale plan and profile illustration depicting the dimensions and slope associated with the departure end of each runway. The applicability of the surface is determined through consultation between the Airport Sponsor and the FAA's Regional Airspace Procedures Team (RAPT). For the purposes of this analysis, the departure surfaces for each runway end will be evaluated.

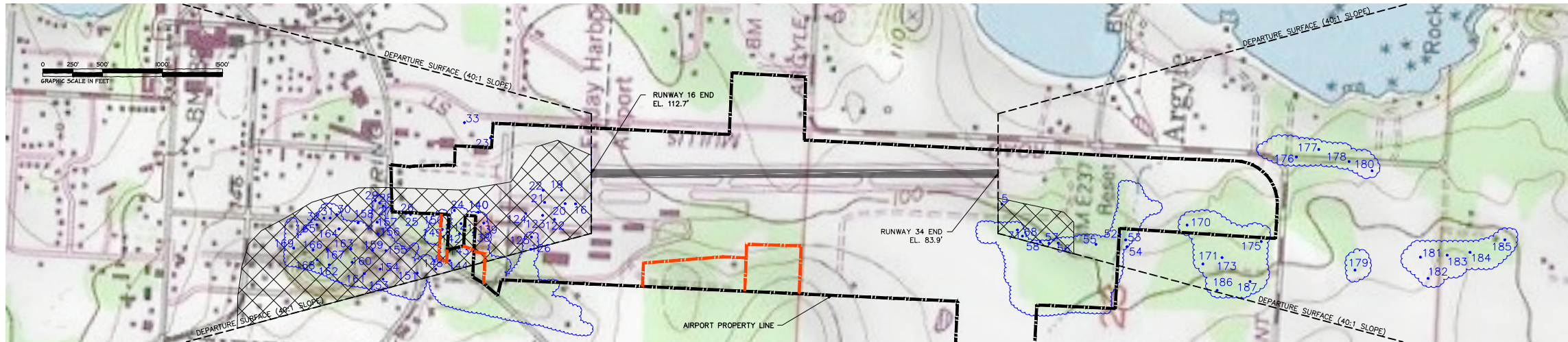
Appendix Two of FAA AC 150/5300-13 specifies that runways providing instrument departure capability should not have any objects penetrate a surface beginning at the elevation of the runway end or end of the clearway, whichever is greater, that slopes at a 40:1 gradient. Based upon a 200 feet/nautical mile (NM) climb rate, a standard departure is designed to provide a minimum of 48 feet/ NM clearance above objects that do not penetrate the obstacle clearance surface (OCS). However, due to the size of the departure surface it's not uncommon to have obstacles that penetrate the surface, and recent changes in TERPS criteria have made the OCS criteria more restrictive.

According to the application of these departure surface criteria, there were sixteen obstructions identified for Runway 16 departures and thirty-nine obstructions for Runway 34 departures. Appendix Two of FAA AC 150/5300-13 provides guidance siting thresholds to meet departure obstacle clearance requirements. In accordance with this guidance, the FAA has the option of mitigating these obstructions by requiring that non-standard climb rates and/or non-standard (higher) departure minimums be published for the airport/runway. Currently, U.S. Terminal Procedures published by the FAA for Friday Harbor indicate that take-off minimums for Runway 34 departures have been increased to 400 feet and 2 miles to mitigate the existing obstructions to the specified departure surface.

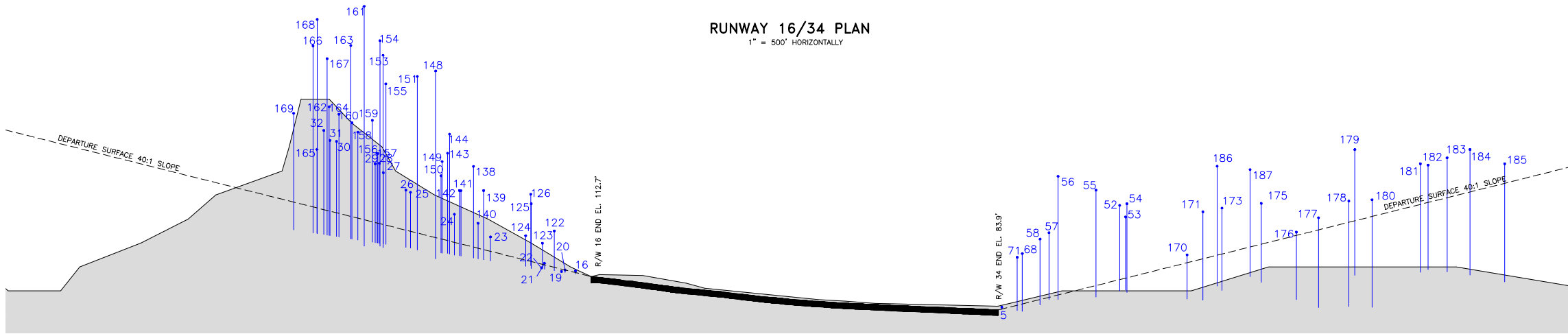
Appendix Two of FAA AC 150/5300-13 also specifies that runways providing instrument departure capability for Air Carrier operations (i.e., commercial service aircraft operations) should not have any objects penetrate a surface beginning at the elevation of the runway end or end of the clearway,



DEPARTURE SURFACE PLAN
1" = 1000' HORIZONTALLY



RUNWAY 16/34 PLAN
1" = 500' HORIZONTALLY



RUNWAY 16/34 PROFILE
1" = 500' HORIZONTALLY
1" = 50' VERTICALLY

OBSTRUCTIONS					
No.	Description	Elevation (in feet)	DEPARTURE RUNWAY	PENETRATION (in feet) (SLOPE 40:1)	Disposition
5	GROUND	86.28	RW 16	1.58	NONE
16	GROUND	116.59	RW 34	1.40	NONE
19	GROUND	116.02	RW 34	N/A	NONE
20	GROUND	117.43	RW 34	N/A	NONE
21	GROUND	123.05	RW 34	1.92	NONE
22	GROUND	122.84	RW 34	N/A	NONE
23	TREE	145.38	RW 34	12.02	NONE
24	TREE	164.84	RW 34	23.30	NONE
25	TREE	183.11	RW 34	32.50	NONE
26	TREE	185.00	RW 34	33.40	NONE
27	TREE	199.76	RW 34	43.23	NONE
28	TREE	207.77	RW 34	50.32	NONE
29	TREE	207.32	RW 34	49.01	NONE
30	TREE	226.22	RW 34	59.55	NONE
31	TREE	227.12	RW 34	59.07	NONE
32	TREE	235.58	RW 34	66.13	NONE
52	TREE	171.21	RW 16	61.95	NONE
53	TREE	161.58	RW 16	51.02	NONE
54	TREE	172.19	RW 16	61.84	NONE
55	TREE	158.43	RW 16	79.69	NONE
56	TREE	147.00	RW 16	99.02	NONE
57	TREE	148.44	RW 16	83.95	NONE
58	TREE	143.13	RW 16	50.49	NONE
68	TREE	130.98	RW 16	42.05	NONE
71	TREE	127.92	RW 16	40.06	NONE
123	BEACON	140.44	RW 34	17.58	NONE
124	BUILDING	146.75	RW 34	20.37	NONE
125	TREE	173.38	RW 34	48.19	NONE
126	TREE	181.27	RW 34	55.95	NONE
138	TREE	204.62	RW 34	67.34	NONE
139	TREE	184.37	RW 34	49.23	NONE
140	TREE	157.07	RW 34	20.78	NONE
141	TREE	184.28	RW 34	44.39	NONE
142	TREE	184.46	RW 34	44.26	NONE
143	TREE	215.6	RW 34	72.93	NONE
144	TREE	231.44	RW 34	89.19	NONE
148	TREE	284.25	RW 34	139.08	NONE
149	TREE	208.67	RW 34	64.87	NONE
150	TREE	196.79	RW 34	52.74	NONE
151	TREE	279.71	RW 34	130.66	NONE
153	TREE	297.35	RW 34	141.18	NONE
154	TREE	309.5	RW 34	152.70	NONE
155	TREE	273.41	RW 34	117.84	NONE
156	WATER TANK	215.45	RW 34	58.05	NONE
157	TREE	215.45	RW 34	58.19	NONE
158	TREE	233.22	RW 34	71.83	NONE
159	BUILDING	243.1	RW 34	84.71	NONE
160	TREE	341.09	RW 34	78.45	NONE
161	TREE	338.12	RW 34	177.99	NONE
162	TREE	354.41	RW 34	87.00	NONE
163	TREE	305.54	RW 34	142.61	NONE
164	TREE	248.12	RW 34	82.75	NONE
165	TREE	218.78	RW 34	48.82	NONE
166	TREE	305.18	RW 34	134.34	NONE
167	BUILDING	294.47	RW 34	126.65	NONE
168	TREE	327.32	RW 34	157.40	NONE
169	TREE	248.93	RW 34	74.08	NONE
170	TREE	133.34	RW 16	6.55	NONE
171	TREE	169.5	RW 16	39.25	NONE
173	TREE	172.38	RW 16	38.26	NONE
175	TREE	176.34	RW 16	34.07	NONE
176	TREE	152.22	RW 16	2.74	NONE
177	TREE	164.73	RW 16	10.08	NONE
178	TREE	178.62	RW 16	17.76	NONE
179	TREE	218.82	RW 16	59.51	NONE
180	TREE	176.52	RW 16	13.93	NONE
181	TREE	206.76	RW 16	33.84	NONE
182	TREE	205.05	RW 16	31.24	NONE
183	TREE	211.89	RW 16	33.26	NONE
184	TREE	218.28	RW 16	35.48	NONE
185	TREE	206.13	RW 16	16.22	NONE
186	TREE	207.30	RW 16	74.28	NONE
187	TREE	204.69	RW 16	64.61	NONE

NOTE: OBSTRUCTIONS FROM SURVEY BY REID MIDDLETON MARCH 2012

- TREE OBSTRUCTING AREA
- TERRAIN OBSTRUCTING AREA

AIRPORT DATA		
AIRPORT ELEVATION (AMSL) NGS 405 (NAVD 88)	EXISTING	FUTURE
AIRPORT REFERENCE POINT (ARP) NGS 405 (NAVD 83)	112.7'	112.7'
AIRPORT REFERENCE CODE	4E1	4E1
NPIAS CATEGORY	PRIMARY COMM. SERV.	PRIMARY COMM. SERV.
MEAN MAX. TEMPERATURE (HOTTEST MONTH)	71°	71°
TAXIWAY LIGHTING	LTL	LTL
TAXIWAY MARKING	CENTERLINE	CENTERLINE
AIRPORT & TERMINAL NAVIADS	NDB/ASR*GPS	ASR*, GPS
* AIRPORT SURVEILLANCE RADAR (ASR) LOCATED AT NAS WIDEBY IS.		

REVISIONS	
NO.	DATE
1	

NOTES: 1. This drawing reflects current planning standards applicable to Friday Harbor Airport. This drawing is not intended to be used for construction documentation or navigation.



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whichever is greater, that slopes at a 62.5:1 gradient. It should be noted that this criteria, which will apply to a One Engine Inoperative (OEI) Obstacle Identification Surface (OIS) is currently under development by the FAA, and it's unknown whether this criteria will be applicable at FHR. Therefore, this additional OEI/OIS information is included on the map for reference and comparison purposes only.

Terminal Area Plans

Based upon input received from the Port of Friday Harbor, the landside development plans are identified in the following figures, entitled *TERMINAL AREA PLAN - NORTH* and *TERMINAL AREA PLAN - SOUTH*.

Northwest Development Area Plan

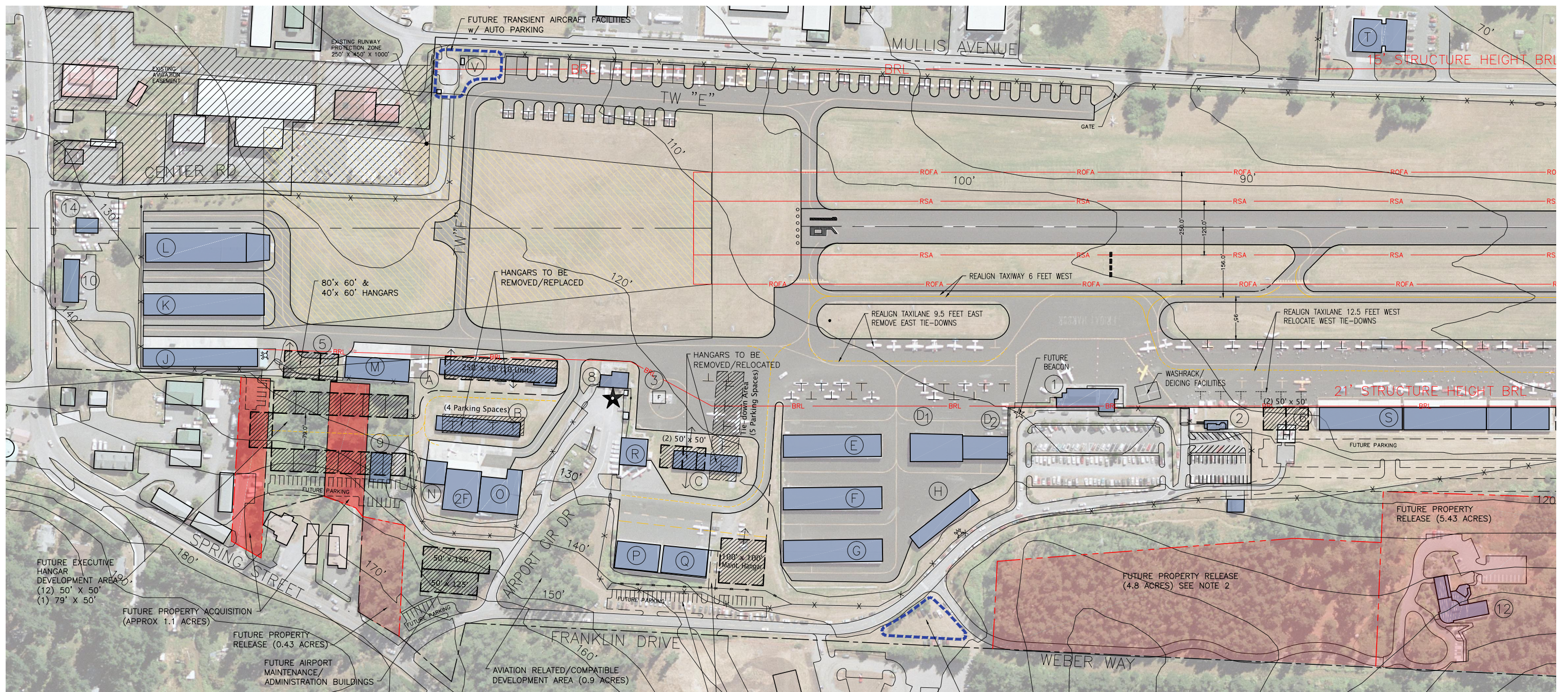
As identified in the previous chapter, within the northwest quadrant of the Airport the selected proposal includes infill and redevelopment possibilities that meet the anticipated aviation demand throughout the planning period. Major components of the Northwest Development Area Plan include:

- **Redevelopment of the wash rack with two executive hangars.**
- **Redevelopment of three Port owned T-hangars into one new T-hangar and two apron tiedown areas.**
- **One large maintenance/storage hangar with automobile parking.**
- **Construction of nine new executive hangars and a 6-unit T-hangar, with taxilane access and automobile parking.**
- **Redevelopment of Hangar C with two executive hangars.**
- **Relocation of the airport administration building.**
- **Allocation of approximately two acres of aviation related/compatible development.**

Southwest Development Area Plan

The major components of the Southwest Development Area proposal include:

- **Continuation of the single row executive hangars extending south of the terminal apron area.**
- **Nested T-hangars provided south of the ASOS.**
- **Long-term aviation development reserved on the plateau, accessed by a ramp taxiway extending south of the existing run-up apron.**
- **Extension of Franklin Drive south to Storemore Way and Mullis Street.**



BUILDING LEGEND		
NO.	DESCRIPTION	TOP ELEVATION
1	MAIN TERMINAL BUILDING (TO BE RELOCATED)	140.6'
2	UNICOM BUILDING	146.9'
3	FUEL FACILITY	150.7'
5	DEICING FACILITY/WASH RACK	
6	HELIPAD FOR EMS (TO BE RELOCATED)	
7	AUTOMATED WEATHER STATION (ASOS)	139.1'
8	CAFE - TO BE RELOCATED	139.7'
9	CABINET SHOP	
10		
11	ANIMAL SHELTER	
12	SKAGIT VALLEY COLLEGE	180.9'
13	SAN JUAN COUNTY FIRE DEPARTMENT	111.8'
14		
A	T-HANGARS TO BE REMOVED - PORT	144.5'
B	T-HANGAR (ORIGINAL) - PORT (TO BE REMOVED)	146.4'
C	T-HANGAR (ORIGINAL) - PORT (TO BE REMOVED)	145.3'
D1	T-HANGAR (1985) - PORT	134.5'
D2	T-HANGAR (1985) - PORT	131.0'
E	T-HANGAR (1985) - PORT	131.9'
F	T-HANGAR (1985) - PORT	132.1'
G	T-HANGAR (1985) - PORT	132.5'
H	HANGAR (1994 to pres.) - PRIVATE	136.0'
J	T-HANGAR - PRIVATE	155.9'
K	T-HANGAR (1994 to pres.) - PRIVATE	147.3'
L	T-HANGAR - PRIVATE	155.2'
M	LARGE SINGLE HANGAR - PRIVATE	157.0'
N	LARGE SINGLE HANGAR - PRIVATE	158.0'
O	LARGE SINGLE HANGAR - PRIVATE	157.2'
P	LARGE SINGLE HANGAR - PRIVATE	155.9'
Q	ISLAND AIR HANGAR - PRIVATE	155.8'
R	AERONAUTICAL SERVICES HANGAR - PRIVATE	155.0'
S	EXECUTIVE HANGARS	

BUILDING LEGEND		
NO.	DESCRIPTION	TOP ELEVATION
T	SAN JUAN COUNTY FIRE DEPARTMENT	
V	PILOT WELCOME CENTER	

AIRPORT DATA		
	EXISTING	FUTURE
AIRPORT ELEVATION (AMSL) NGS 405 (NAVD 88)	112.7'	112.7'
AIRPORT REFERENCE POINT (ARP) NGS 405 (NAVD 83)	112.7'	112.7'
NIPAS CATEGORY	B-1 SMALL A/C	B-1 SMALL A/C
MEAN MAX. TEMPERATURE (HOTTEST MONTH)	71°	71°
TAXIWAY LIGHTING	CENTERLINE	CENTERLINE
AIRPORT & TERMINAL NAVAIDS	NDB, ASR*, GPS	ASR*, GPS

* AIRPORT SURVEILLANCE RADAR (ASR) LOCATED AT NAS WIDEBY IS.

LAYOUT PLAN LEGEND		
	EXISTING	FUTURE
AIRPORT PROPERTY LINE	---	---
AIRPORT SECURITY FENCE	XX	XX
AIRPORT BUILDINGS	█	█
AIRFIELD PAVEMENT	▨	▨
PAVED ROADS	▩	▩
RUNWAY PROTECTION ZONE	▨	▨
AVIATION EASEMENT	---	---
BUILDING RESTRICTION LINE	BRL	BRL
RUNWAY SAFETY AREA	---	---
RUNWAY OBJECT FREE AREA	---	---
FUEL STORAGE AREA	[F]	[F]
AIRPORT BEACON	★	★
LIGHTED WIND CONE & SEGMENTED CIRCLE	⊙	⊙
NON-DIRECTIONAL BEACON (NDB)	⊕	⊕
PRECISION APPROACH PATH INDICATOR (PAPI)	⊥	⊥
RUNWAY END IDENTIFIER LIGHTS (REL)	α	α

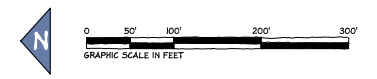
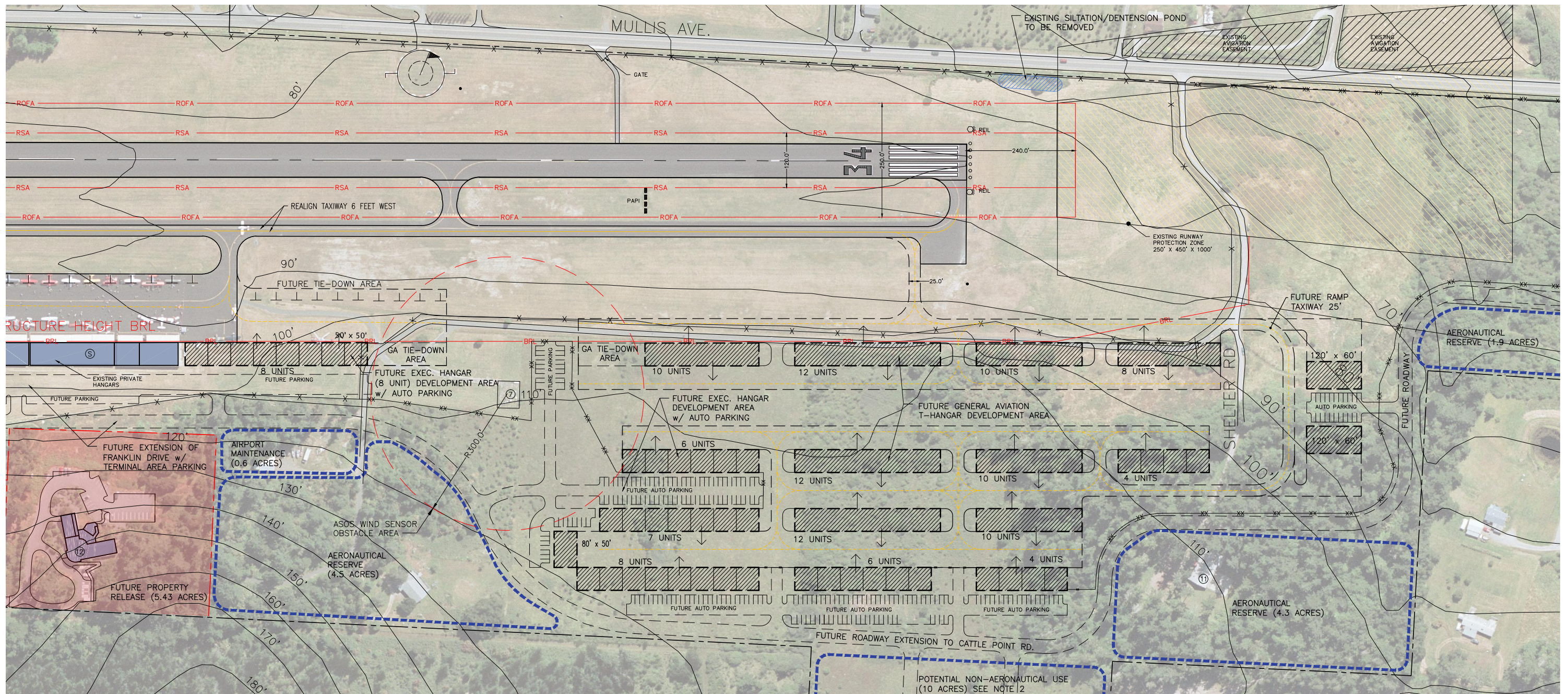
REVISIONS		
NO.	DESCRIPTION	DATE
1		

NOTES: 1. This drawing reflects current planning standards applicable to Friday Harbor Airport. This drawing is not intended to be used for construction documentation or navigation.
2. Subject to FAA review and approval.

MASTER PLAN UPDATE
Friday Harbor Airport
Friday Harbor, Washington

ReidMiddleton 728 134th Street SW, Suite 200, Everett, WA 98204 - (425) 741-3800

Barnard Dunkelberg Company 1616 East 15th Street, Tulsa, Oklahoma 74120 - 918.585.8844



REVISIONS		
NO.	DESCRIPTION	DATE
1		

NOTES: 1. This drawing reflects current planning standards applicable to Friday Harbor Airport. This drawing is not intended to be used for construction documentation or navigation.
2. Subject to FAA review and approval.

BUILDING LEGEND		
NO.	DESCRIPTION	TOP ELEVATION
5	EXECUTIVE HANGARS	
7	AUTOMATED WEATHER STATION (ASOS)	139.1'
11	ANIMAL SHELTER	
12	SKAGIT VALLEY COLLEGE	180.9'

AIRPORT DATA		
	EXISTING	FUTURE
AIRPORT ELEVATION (AMSL) NGS 405 (NAVD 88)	112.7'	112.7'
AIRPORT REFERENCE POINT (ARP) NGS 405 (NAD 83)	112.7'	112.7'
AIRPORT REFERENCE CODE	B-1 SMALL A/C	B-1 SMALL A/C
NPAS CATEGORY	PRIMARY COMM. SERV.	PRIMARY COMM. SERV.
MEAN MAX. TEMPERATURE (HOTTEST MONTH)	71'	71'
TAXIWAY LIGHTING	LITL	LITL
TAXIWAY MARKING	CENTERLINE	CENTERLINE
AIRPORT & TERMINAL NAVAIDS	NDB, ASR*, GPS	ASR*, GPS
* AIRPORT SURVEILLANCE RADAR (ASR) LOCATED AT NAS WIDEBY IS.		

LAYOUT PLAN LEGEND		
	EXISTING	FUTURE
AIRPORT PROPERTY LINE	---	---
AIRPORT SECURITY FENCE	X	X
AIRPORT BUILDINGS	█	█
AIRFIELD PAVEMENT	▨	▨
PAVED ROADS	▩	▩
RUNWAY PROTECTION ZONE	▨	▨
AVIGATION EASEMENT	▨	▨
BUILDING RESTRICTION LINE	BRL	BRL
RUNWAY SAFETY AREA	RSA	RSA
RUNWAY OBSECT FREE AREA	ROFA	ROFA
FUEL STORAGE AREA	F	F
AIRPORT BEACON	★	★
LIGHTED WIND CONE & SEGMENTED CIRCLE	⊙	⊙
NON-DIRECTIONAL BEACON (NDB)	⊙	⊙
PRECISION APPROACH PATH INDICATOR (PAPI)	⊙	⊙
RUNWAY END IDENTIFIER LIGHTS (REL)	α	α

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-
- **Aviation related/compatible development area reserved north and south of Skagit Valley College site.**
 - **Allocation of approximately two acres of property for future terminal support development.**
 - **Reservation of approximately 21 acres for a future airport business/light industrial park.**

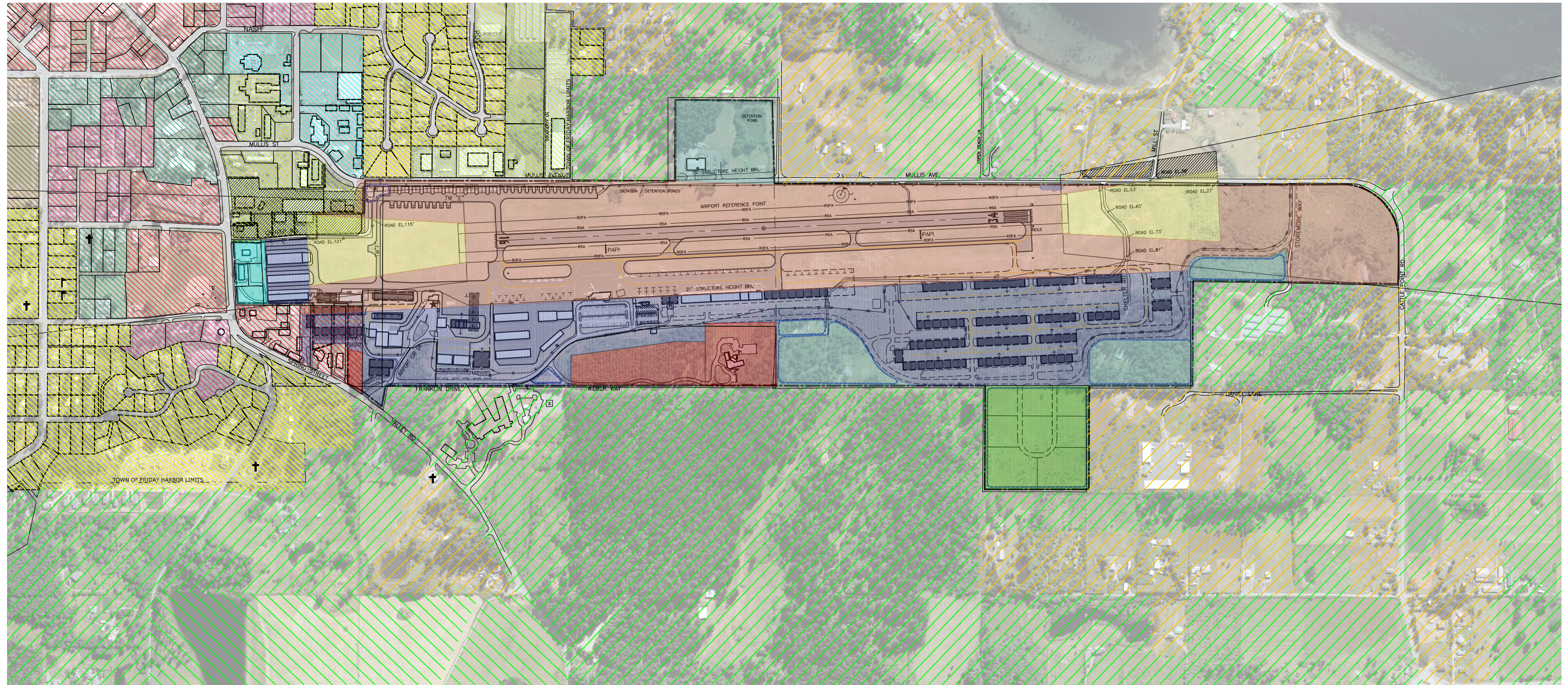
Land Use Drawing

The following figure, entitled *LAND USE DRAWING*, depicts the existing and recommended use of all land contained within the airport property line. The purpose of the Land Use Drawing is to provide airport management a plan for leasing revenue-producing areas on the Airport. All existing and future development within the property owned by Friday Harbor Airport will be compatible with the primary purpose and function of the Airport, and will generate lease revenue to support the operation of the Airport. Those areas not likely to be provided with taxiway access can be utilized for non-aeronautical support activities.

Specific proposals of airport property for future non-aeronautical uses will be subject to additional FAA review and approval for release from federal obligations and land use requirements. The FAA can grant releases from federal obligations for the change in the use, operation, or designation of on-airport property¹. However, Airport Sponsor's must submit written release requests with supporting material that, among others, justifies the reason for the request and reimburse the federal government an amount equal to the government proportional share of the current fair market value. The FAA evaluates the total impact of the request on the airport and the Airport Sponsor's federal obligations, based on pertinent factors including:

- **All the ways in which an Airport Sponsor is federally obligated.**
- **The Airport Sponsor's past and present compliance record under all its agreements and its actions to make available a safe and usable airport.**
- **The reasonableness and practicality of the Airport Sponsor's request in light of maintaining necessary aeronautical facilities and the priority of the airport in the National Plan of Integrated Airport Systems (NPIAS).**
- **The net benefit to be derived by civil aviation and the compatibility of the proposal with the needs of civil aviation.**
- **Consistency with the guidelines contained in FAA Order 5190.6B for specific types of releases.**

¹ Federal Aviation Administration (September 30, 2009). *FAA Airport Compliance Manual* (Order 5190.6B). Retrieved from http://www.faa.gov/documentLibrary/media/Order/5190_6b.pdf



REVISIONS		
NO.	DESCRIPTION	DATE
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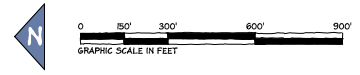
NOTES: 1. This drawing reflects current planning standards applicable to Friday Harbor Airport. This drawing is not intended to be used for construction documentation or navigation.

LAND USE LEGEND	
ON AIRPORT	
	RUNWAY PROTECTION ZONE (APPROX. 16.0 ACRES)
	AIRPORT OPERATIONS PROTECTED AREA (APPROX. 88.7 ACRES)
	AERONAUTICAL DEVELOPMENT AREA (APPROX. 57.72 ACRES)
	AERONAUTICAL RESERVE (APPROX. 19.59 ACRES)
	APPROACH PROTECTION & EXISTING/FUTURE RELEASE FOR NON-AERONAUTICAL USE (APPROX. 1.5 ACRES)
	FUTURE RELEASE FOR NON-AERONAUTICAL/CONCURRENT USE (APPROX. 10.2 ACRES)
	FUTURE AIRPORT PROPERTY RELEASE (APPROX. 8.98 ACRES) (RETAIN AVIGATION EASEMENT)
TOWN OF FRIDAY HARBOR	
	SF
	MF
	CO
	PS
	LM
	PU
	IN
SAN JUAN COUNTY	
	AG
	RFF
	RR
	CHURCH
	SCHOOL

AIRPORT DATA		
	EXISTING	FUTURE
AIRPORT ELEVATION (AMSL) NGS 405 (NAVD 88)	112.7'	112.7'
AIRPORT REFERENCE POINT (ARP) NGS 405 (NAVD 83)	112.7'	112.7'
AIRPORT REFERENCE CODE	B-I SMALL A/C	B-I SMALL A/C
NPIAS CATEGORY	PRIMARY COMM. SERV.	PRIMARY COMM. SERV.
MEAN MAX. TEMPERATURE (HOTTEST MONTH)	71°	71°
TAXIWAY LIGHTING	LITL	LITL
TAXIWAY MARKING	CENTERLINE	CENTERLINE
AIRPORT & TERMINAL NAVAIDS	NDB, ASR*, GPS	ASR*, GPS

* AIRPORT SURVEILLANCE RADAR (ASR) LOCATED AT NAS WIDEBAY IS.

LAYOUT PLAN LEGEND		
	EXISTING	FUTURE
AIRPORT PROPERTY LINE	---	---
AIRPORT SECURITY FENCE	---	---
AIRPORT BUILDINGS	---	---
AIRFIELD PAVEMENT	---	---
PAVED ROADS	---	---
RUNWAY PROTECTION ZONE	---	---
AVIGATION EASEMENT	---	---
BUILDING RESTRICTION LINE	---	---
RUNWAY SAFETY AREA	---	---
RUNWAY OBJECT FREE AREA	---	---
FUEL STORAGE AREA	---	---
AIRPORT BEACON	---	---
LIGHTED WIND CONE & SEGMENTED CIRCLE	---	---
NON-DIRECTIONAL BEACON (NDB)	---	---
PRECISION APPROACH PATH INDICATOR (PAPI)	---	---
RUNWAY END IDENTIFIER LIGHTS (REL)	---	---




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The Land Use Drawing also provides guidance to local authorities for establishing appropriate land use zoning near the Airport. As specified by the FAA, Grant Assurance #21, entitled *Compatible Land Use*, states the Airport Sponsor “will take appropriate action, to the extent reasonable, including the adoption of zoning laws, to restrict the use of land adjacent to or in the immediate vicinity of the airport to activities and purposes compatible with normal airport operations, including landing and takeoff of aircraft.”

Airport Property Map

The *AIRPORT PROPERTY MAP*, presented on the following figure, indicates how the various tracts of land within the airport boundary were acquired (e.g., federal funds, surplus property, local funds, etc.) and the dates of acquisition. The purpose of the map is to provide documentation of the current and future aeronautical use of land acquired with federal funds and to identify parcels recommended for future property/easement acquisition or release. According to existing property records, there is a total of 683.82 acres of fee simple property owned/controlled by the Port of Friday Harbor, and the Port plans to acquire approximately 1.1 acres of property for landside development within the Northwest Development Area and 0.2 acres of property for landside development within the Northeast Development Area.

As noted in the previous section, the Port has also identified two projects/locations on the Airport where a “request for release from aeronautical use designation” (i.e., aeronautical to aviation-compatible) will be requested. The first project (i.e., B.22) is delineated as Parcel 27a and would re-designate approximately 0.5 acres. The second project (i.e., C.9) is delineated as a portion of Parcel 44, and would re-designate approximately 10.0 acres.

CHAPTER F.

Development Program

INTRODUCTION. This chapter establishes a strategy for implementing the necessary improvements that satisfy the expected aviation demand while also providing guidance on the requirements to demonstrate Friday Harbor Airport’s ability to fund the identified improvement projects. The overall concept is to maximize opportunities for receiving federal and state grants, within the context of, and in recognition of, the amount of local funds available for capital needs.

It is recognized that future demand for facilities cannot accurately be predicted at the Airport, especially during the latter stages of the 20-year planning period. Therefore, particular emphasis is placed on the initial portion of the planning period, the first five years. Here, projections are more definable and the magnitude of program accomplishment is more pronounced. Additionally, carefully guided development within the initial planning stages is essential to the future expansion of the Airport and the continued enhancement of aviation development.

Implementation Schedule and Project List

A pro-active list of capital improvement projects has been assembled from the facility requirements analysis and conceptual development plan presented previously. The project list has been coordinated with airport management, the Airport Sponsor, and the FAA. The implementation schedule and project lists is divided into three phases: short-range (1-5 years); intermediate-range (6-10 years); and long-range (11-20 years). The short range implementation schedule list projects in priority order by year; the intermediate- and long-range schedule and projects are listed in priority order without year designators. Friday Harbor Airport’s implementation schedule, project list, and associated costs are presented in Tables F1, F2, and F3 of this chapter. It should be noted that it is anticipated the implementation schedule will invariably change as local and federal priorities evolve over the coming years.

Cost Estimates

Individual project cost estimates have been prepared for the improvements identified as necessary during the 20-year planning period. Facility costs have been formulated using unit prices extended by the size of the particular project and tempered with specific considerations related to the region, the Airport, and the individual development sites. That being said, these estimates are intended for

planning purposes only and should not be construed as construction cost estimates, which can only be compiled following the preparation of detailed engineering plans and specifications. All cost estimates presented in the tables are based on 2012 costs; no increases have been made based on inflation for future year projects.

The cost estimates have been categorized by the total cost for each project, the total monies expected for projects eligible for Airport Improvement Program (AIP) grants, and that part anticipated having FAA funding participation. Additionally, categories for that portion to be borne locally by the Port of Friday Harbor, anticipated WSDOT Aviation Division grant monies, and that part expected from private entities (i.e., individuals or businesses) are provided. In addition to the Port of Friday Harbor funding, the anticipated local share can include sources such as state or local economic development funds, regional commissions and organizations, and other units of local government.

As presented in the respective tables, the cost estimates for the entire 20-year planning period amount to approximately \$41,060,131. First phase projects require approximately \$11,177,126, second phase projects require the expenditure of approximately \$22,474,824, and third phase expenditures total approximately \$7,408,181. The total anticipated FAA share is some \$11,170,175 and the Port of Friday Harbor share is about \$14,662,676. Total anticipated WSDOT Aviation Division grants account for approximately \$162,209 and the remaining \$15,117,604 is classified as private or other financing. Private financing is expected to be spent primarily on projects that will generate revenue and are typically funded by tenants or private developers such as hangars. However, in some cases where it is justified by projected revenue, these projects might be financed by revenue bonds or special tax assessments from the Port of Friday Harbor. Other financing sources anticipated to help fund the 20-year development projects include City of Friday Harbor funds, PeaceHealth Peace Island Medical Center funding, and other governmental agency grants.

The following tables identify FAA expenditures of \$5,687,272 during the first phase, \$5,009,528 during the second phase, and \$473,675 during the last phase. This is an average annual expenditure of roughly \$571,871 in federal monies to fund the entire 20-year development plan. For projects identified as eligible for, and grants expected from, WSDOT Aviation Division, \$156,779 is included in the first phase, with \$5,250 in the second phase (a 20-year average of approximately \$8,101).

Of the Port of Friday Harbor share of project costs, approximately \$1,536,007 is required during the first phase, \$6,767,602 during the second phase, and \$6,359,067 during the final phase. For the entire 20-year planning period, an average of \$733,134 per year will be required from the Port of Friday Harbor. Of the projects identified as potentially financed by private or other sources,

approximately \$3,849,720 is required in the first phase, \$10,692,444 in the second phase, and \$575,440 in the third phase, which equals approximately \$753,318 per year.

Table F1
Phase One (1-6 Years) Development Plan Project Costs

Project Description	Note	Total Cost	Total AIP Cost	Federal ^(a)	Port of Friday Harbor	WSDOT	Private/ Other
2014 Projects							
A.1 Design Runway 34 RSA Drainage Improvements (2013 carryover project)		\$50,000	\$50,000	\$45,000	\$2,500	\$2,500	\$0
A.2 Runway, Taxiway B, and Connecting Taxiway Striping and Tiedown Relocation		\$118,750	\$118,750	\$106,875	\$5,938	\$5,938	\$0
A.3 Construct Runway 34 RSA Drainage Improvements		\$300,000	\$300,000	\$270,000	\$15,000	\$15,000	\$0
A.4 Construct RW LED, Electrical Upgrades, PAPI Replacement and AGIS Survey		\$800,000	\$800,000	\$720,000	\$40,000	\$40,000	\$0
Sub-Total/2014 Projects		\$1,268,750	\$1,268,750	\$1,141,875	\$63,438	\$63,438	0
2015 Projects							
A.5 Conduct Environmental Assessment/EIS or Update for Obstruction Removal	1	\$163,000	\$163,000	\$146,700	\$16,300	\$0	\$0
A.6 Conduct Environmental Assessment/EIS for Land Acquisition (Parcels 56 & 66)		\$50,000	\$50,000	\$45,000	\$5,000	\$0	\$0
A.7 Design Apron, Taxilane, Storm Drainage SW of Fuel Tanks		\$35,000	\$35,000	\$31,500	\$3,500	\$0	\$0
A.8 Design TW E Rehabilitation & Transient Apron with Underdrain		\$100,000	\$100,000	\$90,000	\$10,000	\$0	\$0
A.9 Design and Construct Access Road and Gate for Hospital Use		\$126,830	\$0	\$0	\$0	\$0	\$126,830
A.10 Fuel Tank Replacement/Design by Tenant		\$10,000	\$0	\$0	\$0	\$0	\$10,000
A.11 Weber Way Business Park Site Planning		\$40,000	\$0	\$0	\$40,000	\$0	\$0
A.12 Redevelop (Re-Design and Construct) Hangar F in Existing Location and Hangars D, E, and G Roofs		\$750,000	\$0	\$0	\$750,000	\$0	\$0
A.13 Design and Construct Two Executive Hangars in Northwest Development Area 1		\$500,000	\$0	\$0	\$0	\$0	\$500,000
Sub-Total/2015 Projects		\$1,774,830	\$348,000	\$313,200	\$824,800	\$0	\$141,830

Notes: ^(a) Eligible for FAA Airport Improvement Program (AIP), Passenger Entitlement, and Discretionary Grants.
¹ Refer to Airport Airspace Plan Obstruction Data Block for information on tree trimming/removal.
 Cost estimates, based upon 2012 data, are intended for preliminary planning purposes and do not reflect a detailed engineering evaluation.

Table F1 (continued)
Phase One (1-6 Years) Development Plan Project Costs

Project Description	Note	Total Cost	Total AIP Cost	Federal ^(a)	Port of Friday Harbor	WSDOT	Private/Other
2016 Projects							
A.14 Acquire Easements and Remove Off-Airport Runway 34 IAP Obstructions (Phase 2)	1	\$250,000	\$250,000	\$225,000	\$25,000	\$0	\$0
A.15 Construct TW E Rehabilitation & Transient Apron with Underdrain		\$810,000	\$810,000	\$729,000	\$81,000	\$0	\$0
A.16 Acquire Parcels 56 & 66		\$350,000	\$350,000	\$315,000	\$35,000	\$0	\$0
A.17 Reconstruct Apron, Taxilane, & Storm Drainage SW of Fuel Tanks		\$260,000	\$260,000	\$234,000	\$26,000	\$0	\$0
A.18 Weber Way Business Park Design Improvements		\$180,000	\$0	\$0	\$0	\$0	\$727,650
A.19 Design and Construct Commercial Hangar at Old NDB Site (Tenant Funded)		\$950,000	\$0	\$0	\$0	\$0	\$950,000
A.20 Fuel Tank Replacement		\$200,000	\$0	\$0	\$200,000	\$0	\$0
Sub-Total/2016 Projects		\$3,000,000	\$1,670,000	\$1,503,000	\$367,000	\$0	\$1,677,650
2017 Projects							
A.21 Design & Replace Seaplane Float	2	\$150,000	\$150,000	\$135,000	\$15,000	\$0	\$0
A.22 Design Northwest Hangar Development Area (Phase 2)		\$112,000	\$112,000	\$100,800	\$11,200	\$0	\$0
A.23 Design/Construct Runway 16/34 Repairs (Remove Dip) & Crack Seal		\$440,000	\$440,000	\$396,000	\$22,000	\$22,000	\$0
A.24 Design Stormwater Treatment (North Basin)		\$71,250	\$71,250	\$64,125	\$3,563	\$3,563	\$0
A.25 Conduct Wildlife Hazard Evaluation and Management Plan (Project Completed)		\$10,000	\$10,000	\$9,000	\$1,000	\$0	\$0
Sub-Total/2017 Projects		\$783,250	\$783,250	\$704,925	\$52,763	\$25,563	\$0
2018 Projects							
A.26 Construct Stormwater Treatment (North Basin)		\$277,778	\$277,778	\$222,222	\$27,778	\$27,778	\$0
A.27 Rehabilitate South Apron		\$402,278	\$402,278	\$362,050	\$40,228	\$0	\$0
A.28 Construct Northwest Hangar Development Area (Phase 2) – Taxiway, Drainage, & Erosion Control		\$800,000	\$800,000	\$720,000	\$40,000	\$40,000	\$0
A.29 Weber Way Business Park – Construct Phase I Sites		\$727,650	\$0	\$0	\$0	\$0	\$727,650
Sub-Total/2018 Projects		\$2,207,706	\$1,480,056	\$1,304,272	\$108,006	\$67,778	\$727,650
2019 Projects							
A.30 Rehab/Resurface Runway 16/34 & Underdrain		\$800,000	\$800,000	\$720,000	\$80,000	\$0	\$0
A.31 Design/Construct Pilot Welcome Center and Sidewalk (Project Completed)		\$142,590	\$0	\$0	\$40,000	\$0	\$102,590
A.32 Hangar Construction (Northwest Development Area)		\$1,200,000	\$0	\$0	\$0	\$0	\$1,200,000
Sub-Total/2019 Projects		\$2,142,590	\$800,000	\$720,000	\$120,000	\$0	\$1,302,590
Total/Phase I (2014-2019)		\$11,177,126	\$6,350,056	\$5,687,272	\$1,536,007	\$156,779	\$3,849,720

Notes: ^(a) Eligible for FAA Airport Improvement Program (AIP), Passenger Entitlement, and Discretionary Grants.

¹ Refer to Airport Airspace Plan Obstruction Data Block for information on tree trimming/removal.

² Project to be implemented at Friday Harbor Seaplane Base.

Cost estimates, based upon 2012 data, are intended for preliminary planning purposes and do not reflect a detailed engineering evaluation.

Table F2
Phase Two (7-10 Years) Development Plan Project Costs

	Project Description	Note	Total Cost	Total AIP Cost	Federal^(a)	Port of Friday Harbor	WSDOT	Private/ Other
B.1	Purchase Snow Removal Equipment (SRE): Snow Blower and Sand Spreader Attachments		\$60,000	\$60,000	\$54,000	\$6,000	\$0	\$0
B.2	Design Apron, Taxilanes, Drainage, and Utilities for Southwest Hangar Development Area (Phase I)		\$140,250	\$140,250	\$126,225	\$14,025	\$0	\$0
B.3	Construct Taxiway and Apron in Southwest Hangar Development Area (Phase I)		\$2,000,000	\$2,000,000	\$1,800,000	\$200,000	\$0	\$0
B.4	Design and Construct Airport Administration Building, Airport Maintenance Building, and Vehicle Parking		\$1,200,000	\$0	\$0	\$1,200,000	\$0	\$0
B.5	Design and Construct Eight Executive Hangars in Southwest Development Area (Phase I)		\$3,451,109	\$0	\$0	\$0	\$0	\$3,451,109
B.6	Redevelop (Re-Design and Construct) Hangar A		\$500,000	\$0	\$0	\$500,000	\$0	\$0
B.7	Hangar C Tiedown Apron and Taxilane		\$1,055,313	\$537,813	\$484,032	\$53,781	\$0	\$517,500
B.8	Rehabilitate Terminal Apron		\$849,989	\$849,989	\$764,990	\$84,999	\$0	\$0
B.9	Design and Construct Snow Removal Equipment Storage Building, Including Vehicle Parking		\$884,079	\$884,079	\$795,671	\$88,408	\$0	\$0
B.10	Design and Construct Extension of Franklin Road to Serve Southwest Hangar Development Area (Phase I)		\$845,368	\$0	\$0	\$845,368	\$0	\$0
B.11	Rehabilitate Taxiway Pavement (Sealcoat)		\$83,927	\$83,927	\$75,534	\$8,393	\$0	\$0
B.12	Rehabilitate Apron Pavement (Sealcoat)		\$121,769	\$121,769	\$109,592	\$12,177	\$0	\$0
B.13	Rehabilitate Roadway Pavement (Overlay)		\$1,879,953	\$0	\$0	\$1,879,953	\$0	\$0
B.14	Rehabilitate Terminal Building		\$596,831	\$0	\$0	\$596,831	\$0	\$0
B.15	Design and Construct Access Taxiway Linking T-hangar Area and Taxiway "A"		\$104,979	\$104,979	\$94,481	\$10,498	\$0	\$0
B.16	Design and Construct Two T-hangars in Southwest Development Area		\$6,157,885	\$0	\$0	\$0	\$0	\$6,157,885
B.17	Purchase Airport Snow Removal Equipment		\$313,920	\$313,920	\$282,528	\$31,392	\$0	\$0
B.18	Purchase Airport Maintenance Equipment		\$109,872	\$109,872	\$98,885	\$10,987	\$0	\$0
B.19	Design and Construct Pedestrian Access Sidewalk from Passenger Terminal Building to Spring Street		\$82,746	\$0	\$0	\$82,746	\$0	\$0
B.20	Trim/Remove On-Airport FAR Part 77 Tree Obstructions (Phase II)	1	\$254,544	\$254,544	\$229,090	\$25,454	\$0	\$0
B.21	Construct Phase II Sites for Business Park Development Along Weber Way		\$565,950	\$0	\$0	\$0	\$0	\$565,950
B.22	Port to Request Release Portion of Parcel 27a for Change-In-Use Designation (Aeronautical to Aviation-Compatible)	2	\$15,000	\$0	\$0	\$15,000	\$0	\$0
B.23	Design and Construct Passenger Terminal Building Overflow Auto Parking Area		\$1,096,340	\$0	\$0	\$1,096,340	\$0	\$0
B.24	Replace Hangar B With Tiedown Apron		\$105,000	\$105,000	\$94,500	\$5,250	\$5,250	\$0
Total/Phase II (2018-2022)			\$22,474,824	\$5,556,142	\$5,009,528	\$6,767,602	\$5,250	\$10,692,444

Notes: ^(a) Eligible for FAA Airport Improvement Program (AIP), Passenger Entitlement, and Discretionary Grants.

¹ Refer to Airport Airspace Plan Obstruction Data Block for information on tree trimming/removal.

² Refer to Airport Land Use Plan and Property Map for information on release request.

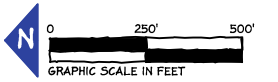
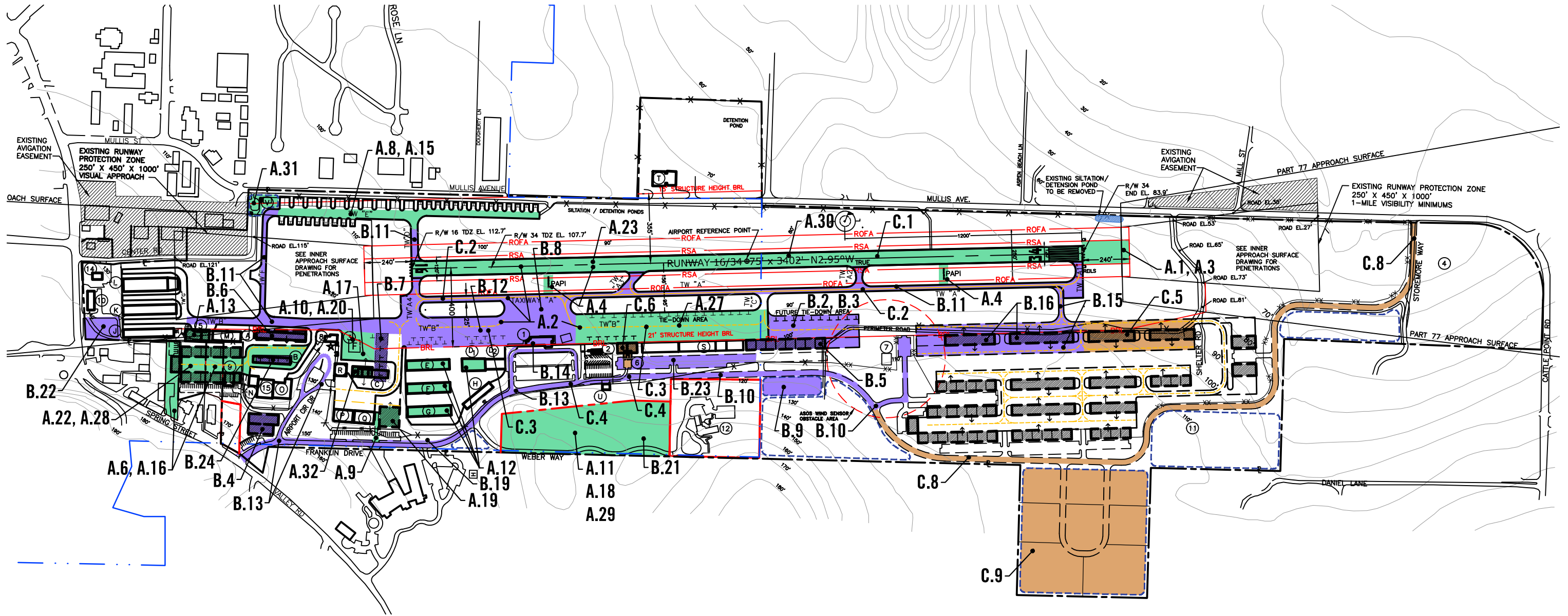
Cost estimates, based upon 2012 data, are intended for preliminary planning purposes and do not reflect a detailed engineering evaluation.

Table F3
Phase Three (11-20 Years) Development Plan Project Costs

Project Description	Note	Total Cost	Total AIP Cost	Federal ^(a)	Port of Friday Harbor	WSDOT	Private/Other
C.1 Rehabilitate Runway Pavement (Sealcoat)		\$66,065	\$66,065	\$59,459	\$6,607	\$0	\$0
C.2 Rehabilitate Taxiway Pavement (Sealcoat)		\$83,927	\$83,927	\$75,534	\$8,393	\$0	\$0
C.3 Rehabilitate Apron Pavement (Sealcoat)		\$121,769	\$121,769	\$109,592	\$12,177	\$0	\$0
C.4 Rehabilitate Roadway Pavement (Sealcoat)		\$78,828	\$0	\$0	\$78,828	\$0	\$0
C.5 Design and Construct Two T-hangars in Southwest Development Area		\$4,731,459	\$0	\$0	\$4,731,459	\$0	\$0
C.6 Decommission Airport Helipad and Design and Construct Two Executive Hangars with Auto Parking		\$575,440	\$0	\$0	\$0	\$0	\$575,440
C.7 Trim/Remove On-Airport FAR Part 77 Tree Obstructions (Phase III)	1	\$254,544	\$254,544	\$229,090	\$25,454	\$0	\$0
C.8 Design and Construct Extension of Franklin Road to Mullis Ave. (Phase II)		\$1,477,255	\$0	\$0	\$1,477,255	\$0	\$0
C.9 Port to Request Release of Portion of Parcel 44 for Change-In-Use Designation (Concurrent Use Airport Business/Light Industrial Park)	2	\$18,894	\$0	\$0	\$18,894	\$0	\$0
Total/Phase III (2023-2032)		\$7,408,181	\$526,305	\$473,675	\$6,359,067	\$0	\$575,440
GRAND TOTAL		\$41,060,131	\$12,442,503	\$11,170,475	\$14,662,676	\$162,029	\$15,117,604

Notes: ^(a) Eligible for FAA Airport Improvement Program (AIP), Passenger Entitlement, and Discretionary Grants.
¹ Refer to Airport Airspace Plan Obstruction Data Block for information on tree trimming/removal.
² Refer to Airport Land Use Plan and Property Map for information on release request.
Cost estimates, based upon 2012 data, are intended for preliminary planning purposes and do not reflect a detailed engineering evaluation.

The implementation schedule and project lists indicate the suggested phasing during the planning period, which is illustrated graphically on the following figure entitled *PHASING PLAN*. This is a suggested schedule and variance from it may be necessary, especially during the latter time periods. Much attention and thought has been given to the first five years, and the identified projects are determined as most critical. Therefore, the scheduled projects outlined in that time frame should be adhered to as much as is possible and feasible. The demand for certain facilities and their economic feasibility are the primary factors influencing the timing of individual project implementation, especially in the latter time periods. Care must be taken to provide for adequate lead-time for detailed engineering and construction of facilities in order to meet aviation demands. It is also important to minimize the disruptive scheduling where a portion of the facility may become inoperative due to construction, and to prevent extra costs resulting from improper project scheduling.



■ Figure F1 Phasing Plan

PHASING LEGEND	
	PHASE I (0-6 Years)
	PHASE II (7-10 Years)
	PHASE III (11-20 Years)

BUILDING LEGEND		
NO.	DESCRIPTION	TOP ELEVATION
1	MAIN TERMINAL BUILDING	140.6'
2	UNICOM BUILDING	146.9'
3	FUEL FACILITY	150.7'
4	NON-DIRECTIONAL BEACON (NDB)	
5	DEICING FACILITY/WASH RACK	
6	HELIPAD FOR EMS	
7	AUTOMATED WEATHER STATION (ASOS)	139.1'
8	CAFE - TO BE RELOCATED	139.7'
9	CABINET SHOP	
10		
11	ANIMAL SHELTER	
12	SKAGIT VALLEY COLLEGE	180.9'
13	SAN JUAN COUNTY FIRE DEPARTMENT	111.8'
14		
15	FBO/MAINTENANCE/EXECUTIVE HANGAR	
A	T-HANGARS - PORT (TO BE REMOVED)	144.5'
B	T-HANGAR (ORIGINAL) - PORT (TO BE REMOVED)	146.4'
C	T-HANGAR (ORIGINAL) - PORT (TO BE REMOVED)	145.3'
D1	T-HANGAR (1985) - PORT	134.5'
D2	T-HANGAR (1985) - PORT	131.0'

BUILDING LEGEND		
NO.	DESCRIPTION	TOP ELEVATION
E	T-HANGAR (1985) - PORT	131.9'
F	T-HANGAR (1985) - PORT	132.1'
G	T-HANGAR (1985) - PORT	132.5'
H	HANGAR (1994 to pres.) - PRIVATE	136.0'
J	T-HANGAR - PRIVATE	155.9'
K	T-HANGAR (1994 to pres.) - PRIVATE	147.3'
L	T-HANGAR - PRIVATE	155.2'
M	LARGE SINGLE HANGAR - PRIVATE	157.0'
N	LARGE SINGLE HANGAR - PRIVATE	158.0'
O	LARGE SINGLE HANGAR - PRIVATE	157.2'
P	LARGE SINGLE HANGAR - PRIVATE	155.9'
Q	ISLAND AIR HANGAR - PRIVATE	155.8'
R	AERONAUTICAL SERVICES HANGAR - PRIVATE	155.0'
S	EXECUTIVE HANGARS	
T	SAN JUAN COUNTY FIRE DEPARTMENT	
U	STORAGE BARN	
1F	FUTURE TERMINAL	
2F	FUTURE FBO/MAINTENANCE/EXECUTIVE HANGAR	
3F	FUTURE T-HANGAR	
4F	FUTURE NON-DIRECTIONAL BEACON	

LAYOUT PLAN LEGEND		
	EXISTING	FUTURE
AIRPORT PROPERTY LINE	---	---
AIRPORT SECURITY FENCE	X	XX
AIRPORT BUILDINGS	█	█
AIRFIELD PAVEMENT	▨	▨
PAVED ROADS	▩	▩
RUNWAY PROTECTION ZONE	▨	▨
AVIGATION EASEMENT	▨	▨
BUILDING RESTRICTION LINE	---	---
RUNWAY SAFETY AREA	▨	▨
RUNWAY OBJECT FREE AREA	▨	▨
FUEL STORAGE AREA	▨	▨
AIRPORT BEACON	⊙	⊙
LIGHTED WIND CONE & SEGMENTED CIRCLE	⊙	⊙
NON-DIRECTIONAL BEACON (NDB)	⊙	⊙
PRECISION APPROACH PATH INDICATOR (PAPI)	⊙	⊙
RUNWAY END IDENTIFIER LIGHTS (REL)	⊙	⊙



Capital Improvement Program

To assist the preparation of the FAA's effort of providing grant funding for the most needed projects, a Capital Improvement Program (CIP) is kept on file and up-to-date with the FAA by airport staff. The purpose of the CIP is to provide a progressive projection of capital needs that can then be used in local and federal financial programming. From the FAA's perspective, the CIP provides a detailed list of projects and costs that is critical for their use in establishing priorities and budgeting expenditures at Friday Harbor Airport, when compared to the needs at other airports. For the Port of Friday Harbor, the CIP identifies improvement needs and allows budgeting/financial decisions to be made with a comprehensive understanding of financial implications. It should be noted that, although the CIP will be used for programming by the FAA, it does not represent a financial commitment on the part of either the FAA or the Port of Friday Harbor.

Summary

The development program presented in this chapter is aggressive; the monetary commitments are significant. It is also a solid plan that represents the Airport's best opportunity to meet its potential. However, it also represents a series of alternatives and choices for the Airport. The ultimate success of Friday Harbor Airport does not rely upon the completion of every single capital item programmed in the development plan. In order to meet realistic funding expectations, it will be necessary to weigh the items of the development program in a thoughtful and globally-thinking manner. In other words, to keep from being short-sighted, the Port of Friday Harbor may be required to selectively implement the capital items. Knowing the full scope of development possibilities enables the Port to capitalize on opportunities, respond to financial realities, and select development items that are in harmony with the overall development program.

The projects are presented as potentially needed and are based on forecast demand. However, only those projects that are required by actual demand will be proposed for construction. If actual demand does not materialize as rapidly as anticipated, many of the proposed projects should be revised, delayed, or even eliminated. It should be noted that the level of FAA funding is governed by congressional appropriations to the AIP, and the amount dedicated to any one specific airport is determined by demonstrated need compared to need at other airports within the regional and national airport system. The object of this MP Update for Friday Harbor Airport is to provide a flexible planning document useful for directing airport development that meets future aviation demand safely, efficiently, and properly as it occurs.

It is recognized that maintenance and operation expenses will increase as the Airport develops and more airport facilities are completed. Revenues generated by the additional facilities should also

increase and help offset the increased maintenance and operation expenses. It is a worthy and feasible goal that operational expenses and revenues should balance at the Airport. This relationship should be monitored closely so that future imbalances can be anticipated and provided for in the budgeting and capital improvement processes.

If aviation demands continue to indicate that improvements are needed, and, if the proposed improvements prove to be environmentally acceptable, the financial implications presented here are likely to be acceptable for both the FAA and the Port of Friday Harbor. However, it must be remembered that this is only a programming analysis and not a commitment on the part of the FAA or the Port. If the cost of an improvement project is not financially feasible, it will not be pursued at that time.

Final Report

**MASTER
PLAN
UPDATE
FRIDAY
HARBOR
AIRPORT**



**APPENDIX ONE
Friday Harbor
Airport Modification
of Airport Design
Standards**

ReidMiddleton

Barnard Dunkelberg & Company
a Mead & Hunt company

U.S. DEPARTMENT OF TRANSPORTATION
 FEDERAL AVIATION ADMINISTRATION
 NORTHWEST MOUNTAIN REGION
 AIRPORT IMPROVEMENT PROGRAM

MODIFICATION OF AIRPORT DESIGN STANDARDS

BACKGROUND		
1. AIRPORT: Friday Harbor Airport	2. LOCATION(CITY,STATE): Friday Harbor, San Juan island, WA	3. LOC ID: FHR
4. EFFECTED RUNWAY/TAXIWAY: Runway 16/34 Taxiway A (parallel)	5. APPROACH (EACH RUNWAY): <input type="checkbox"/> PIR <input checked="" type="checkbox"/> NPI RW 34 <input checked="" type="checkbox"/> VISUAL RW 16	6. AIRPORT REF. CODE (ARC): B-I (small)
7. DESIGN AIRCRAFT (EACH RUNWAY/TAXIWAY): Aircraft Design Group (ADG) I		
MODIFICATION OF STANDARDS		
8. TITLE OF STANDARD BEING MODIFIED (CITE REFERENCE DOCUMENT): Runway to Taxiway Separation, AC 150/5300-13, Airport Design		
9. STANDARD/REQUIREMENT: Background <p>The Friday Harbor Airport is configured as an ARC B-I (small) airport with the standard runway to taxiway centerline separation of 150 feet. Over 90 percent of total airport operations are by private aircraft and charter operations conducted with ADG I aircraft. However, the airport has scheduled air service and cargo operations using aircraft with a wingspan slightly wider than the 49-foot ADG I wing-span limit. In 2009, Kenmore Air conducted 2,517 passenger operations with a Cessna 208 Grand Caravan (Caravan), which has a wingspan of 52.08 feet. Fed Ex conducted 680 annual cargo operations using the Caravan. Due to wingspan only, the Caravan is considered an ADG II aircraft.</p> <p>Private ADG II aircraft traffic at Friday Harbor include the Super Beechcraft King Air B-200 (King Air) and the Pilatus PC-12 (Pilatus). The King Air (54.5-foot wingspan) and the Pilatus (53.25-foot wingspan) exceed the ADG I 49-foot wingspan limit by 5.5 feet and 4.25 feet respectively. But these private aircraft operate infrequently; approximately 100 annual operations for the King Air and 40 operations for the Pilatus.</p> <p>Standards/Requirements FAA Advisory Circular 150/5300-13, CHG 15 Table 2.1, Runway and Taxiway Separation Standards for Aircraft Approach Categories A and B, lists the runway to taxiway separation distance as 150 feet for ARC B-I (small) airports and 240 feet for ARC B-II airports.</p>		
10. PROPOSED: <p>The proposed course of action is to have the runway to parallel taxiway separation at 156 feet and allow unrestricted operations by aircraft with wingspans equal to or less than 55 feet. The taxiway will be shifted over to 156 feet in a FY12 reconstruction project. In the interim, a NOTAM was issued requiring large wingspan aircraft to announce themselves and all other aircraft to remain clear of the taxiway during large wingspan operations (see attached). This remark will also be in the Airport Facility Directory until the taxiway is shifted. Airport has also posted these notices around the airport, and contacted all tenants.</p>		

11. EXPLAIN WHY STANDARD CANNOT BE MET (FAA ORDER 5300.1E):

To meet the 240-foot separation standard, either the runway or the taxiway, or both, would need to be relocated. These are not viable options due to Friday Harbor's limited real estate (relocating either surface to this extent would require the relocation of numerous other facilities), the exorbitant costs involved, and the environmental impacts.

a) Relocating the runway is not viable due to limited airport real estate on the east side. Acquisition of land for runway purposes, and demolition of existing community facilities on that land, is not supported by the community due to prohibitive costs (\$40M) and environmental concerns. Relocating the parallel taxiway to the extent needed for a 240-foot separation would encroach significantly into the terminal side of the airport. Relocation of the terminal facilities and hangars is not viable due to limited airport real estate and steep, rocky terrain. The cost (\$35M) is also prohibitively expensive, and environmental impacts are a community concern.

b) If the terminal were to remain in its present location, taxiway relocation would require elimination of the apron taxiway through the busy terminal area. All terminal side traffic would then have to utilize the parallel taxiway to maneuver to the runway, as well as to the terminal area, fuel facilities, hangar areas, and other facilities. The resulting congestion would mean aircraft frequently meeting nose-to-nose on the parallel taxiway with no way to pass each other. The number of gate positions at the terminal would be reduced from four to two, and require relocation to constrained positions near the ends of the terminal building. Two gate positions would not meet the operational needs of the airlines, charters, and other operations.

12. DISCUSS VIABLE ALTERNATIVES (FAA ORDER 5300.1E):

Do Nothing: This is not a viable alternative since ADG II aircraft with commercial operations in excess of 500 annual operations are using the airport.

Prohibit ADG II commercial service aircraft from operating at Friday Harbor Airport: This would eliminate the use of the Caravan, the cost-effective aircraft operated by Kenmore Air, which has provided the majority of passenger service to Friday Harbor for 5 years. Kenmore would have to drastically change if not eliminate its service to Friday Harbor. Because this is an island, it would jeopardize one of two public transportation options to access the island (the other is ferry), and would not achieve a general aviation airport's goal to meet current demand.

Establish an alternate airport site: Significant planning, environmental, and public involvement effort over 7 years went into determining the current location of Friday Harbor Airport. There is a lack of viable alternate locations on the island. During the effort, there was very strong political and environmental resistance to having the airport in any other location. This sentiment has not abated with time.

1) The ADG I wingspan standard is only exceeded by a minor amount. ADG II aircraft that operate at FHR are representative of the shorter wingspan aircraft within this designated category (i.e. the ADG II wingspan begins at 49 feet and includes aircraft up to, but not including a 79-foot wingspan). The Caravan's wingspan is only 1.5 feet, per side, into the ADG II category. Per side, the Pilatus wingspan is only 2.12 feet in, and the King Air only 2.75 feet in. Per side then, an additional 3 feet of clearance would result in the same wingtip clearance for these aircraft as if they were ADG I aircraft. Therefore, a 156-foot runway to taxiway separation provides a wingtip clearance of 101 feet for the largest aircraft operating at FHR if one is on the runway at the same time one is on the parallel taxiway. This equals the standard 101-foot wingtip clearance for ADG I aircraft.

2) There is a strong history of safety at Friday Harbor Airport.

A review of the airport's safety record shows there has not been a runway, taxiway, or taxiway wingtip clearance accident over the life of the airport (25+years). The Caravan and King Air have operated at Friday Harbor for 5 years, and there has been no aircraft veering off the runway or taxiway.

3) Current operations and forecasts indicate the majority of operations (over 90 percent) are by ADG I general aviation aircraft.

Current forecasts have been prepared to accurately predict enplanements and aircraft operations for the next twenty years. Starting from 12,864 actual enplanements in 2009, and a growth rate that reflects current and anticipated future economic climates, there is no anticipated increase in enplanements through 2012; enplanements are then shown to grow to 19,050 by 2030. The forecasts reflect an average growth rate of 1.9 percent for the overall planning period. Total commercial service aircraft saw 8,800 actual operations in 2009. However, these operations are expected to increase only slightly (to 10,100) over the planning period because seating capacity is still available within the existing flight schedule for quite some time. Commercial service ARC A-II and ARC B-II operations are projected to increase from approximately 3,200 to 3,700 annual operations over the planning period.

Similarly, the general aviation forecasts have been updated. 2009 saw 41,000 actual operations. The forecast holds flat until 2012, then an increase to 53,700 by 2030; an average growth rate of 1.3 percent is reflected for the overall planning period. General aviation ARC A-II and ARC B-II aircraft operations are expected to increase from 308 annual operations to 400 operations by the end of the planning period.

4) There is no anticipated increase in the wingspan of aircraft operating at FHR. This is due to aircraft performance limitations with the 3,400-foot runway length and 12,500-pound pavement strength. Per historical operations, ADG II aircraft weighing less than 12,500 pounds, with wingspans slightly greater than 49 feet, can operate safely on the 3,400-foot runway length. However, aircraft weighing more than 12,500 pounds, with wingspans significantly greater than 49 feet, cannot operate safely on the 3,400-foot runway length. A survey of the air carriers at FHR indicates they expect to continue to fly the aircraft they are currently using. Therefore, ADG II aircraft, other than that described herein, are not expected to use the Friday Harbor Airport.

5) There is a historical basis for the airport configuration.

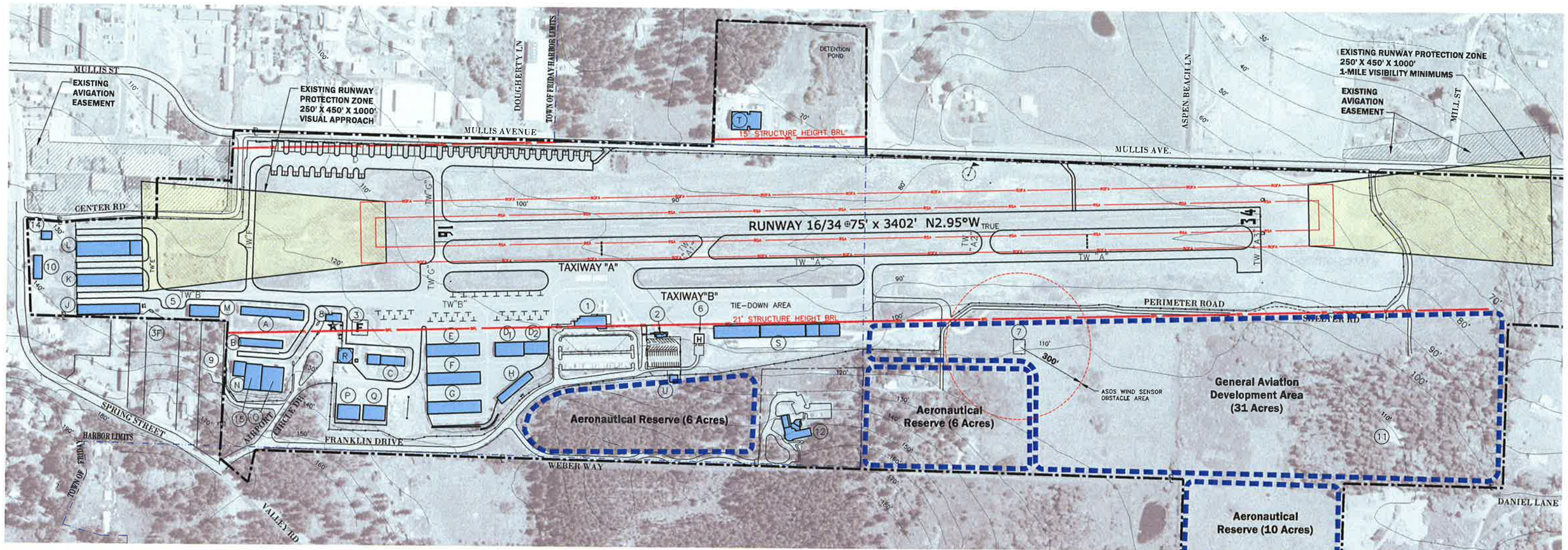
The Seattle Airports District Office files contain a document (circa 1983, unsigned), that states the airport would be constructed to meet all but one standard contained in AC 150/5300-4B (design standard at that time), per the approved Airport Layout Plan (ALP). The exception stated was the runway to taxiway separation distance. The standard was known at 240 feet (same as today) while the approved ALP said only 150 feet would be provided due to physical site constraints, the cost to remove them, and that the majority of aircraft using the airport would be in the general aviation category. These same conditions exist today except for a slight increase in the wingspan of some aircraft operating at FHR, which is being mitigated for with a 156-foot runway to taxiway separation.

ATTACH ADDITIONAL SHEETS AS NECESSARY – INCLUDE SKETCH/PLAN

U.S. DEPARTMENT OF TRANSPORTATION
 FEDERAL AVIATION ADMINISTRATION
 NORTHWEST MOUNTAIN REGION
 AIRPORT IMPROVEMENT PROGRAM

MODIFICATION OF AIRPORT DESIGN STANDARDS

MODIFICATION: RW 16/34 to TW A Separation		LOCATION: Friday Harbor Airport		PAGE 5 OF 6	
14. SIGNATURE OF ORIGINATOR: Marilyn O'Connor		15. ORIGINATOR'S ORGANIZATION: Port of Friday Harbor		16. TELEPHONE: (360) 378-2688	
17. DATE OF LATEST FAA SIGNED ALP November 21, 2007					
18. ADO RECOMMENDATION: <i>approve</i>		19. SIGNATURE: <i>Marilyn O'Connor</i>		20. DATE: <i>5/11/11</i>	
21. FAA DIVISIONAL REVIEW (AT, AF, FS):					
ROUTING SYMBOL	SIGNATURE	DATE	CONCUR	NON-CONCUR	
<i>ANM-201/AFS</i>	<i>[Signature]</i>	<i>6/3/11</i>	✓		
<i>AAS-100</i>	<i>[Signature]</i>	<i>9/12/11</i>	✓		
COMMENTS: Request your concurrence of proposal in Block 10. Letter from sponsor attached.					
22. AIRPORTS DIVISION FINAL ACTION: <i>Approved with condition outlined in Port of Friday Harbor letter dated 9/1/11, copy attached.</i>					
<input type="checkbox"/> UNCONDITIONAL APPROVAL		<input checked="" type="checkbox"/> CONDITIONAL APPROVAL		<input type="checkbox"/> DISAPPROVAL	
DATE: <i>9/12/11</i>	SIGNATURE: <i>W h Watson</i>		TITLE: <i>Mgr., ANM safety & stds Branch</i>		

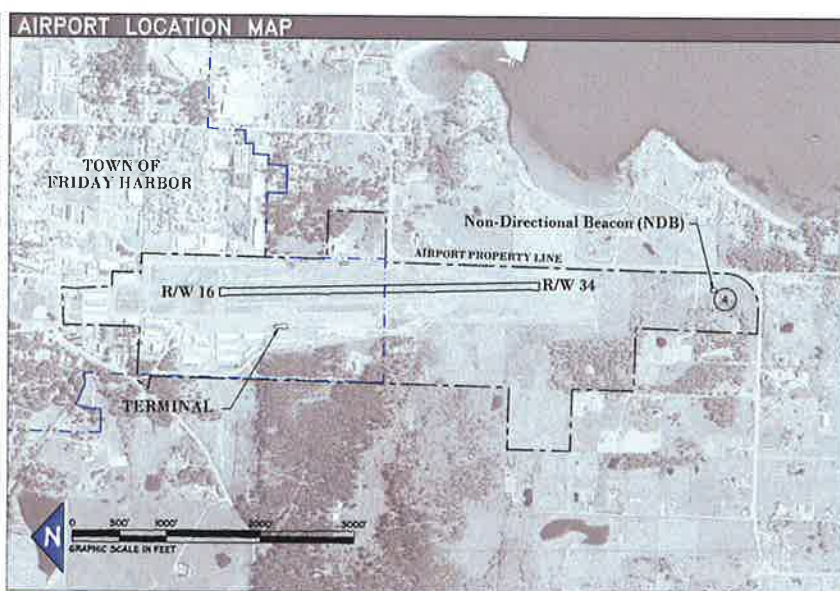


NOTES

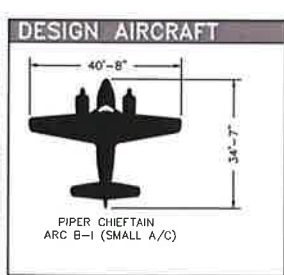
1. This drawing reflects current planning standards applicable to Friday Harbor Airport. This drawing is not intended to be used for construction documentation or navigation.

RUNWAY DATA		RUNWAY 16/34
APPROACH VISIBILITY MINIMUMS	VCSM/1-MILE	EXISTING
FAR PART 77 APPROACH SLOPE	20:1/34:1	
RUNWAY WIDTH X LENGTH	75' X 3402'	
PAVEMENT TYPE	ASPHALT	
PAVEMENT STRENGTH (IN 1000 LBS.)	12.5 s	
RUNWAY LIGHTING	HRL	
EFFECTIVE RUNWAY GRADIENT %	0.8	
MAXIMUM GRADE WITHIN RUNWAY LENGTH	0.8	
RUNWAY LINE-OF-SITE	CRITERIA MET	
RUNWAY MARKING	V/V	
VISUAL APPROACH AIDS	PAP/PAPL REILS	
INSTRUMENT APPROACH AIDS	NONE/GPS, NDB	
AIRPORT REFERENCE CODE	B-I	
CRITICAL AIRCRAFT	PIPER BAWAHO CHIEFTAIN	
RUNWAY SAFETY AREA (RSA) WIDTH	120', 150' END OF RW	
RSA LENGTH BEYOND STOP END	300'/300'	
RUNWAY OBJECT FREE AREA (OFA) WIDTH	300'	
OFA LENGTH BEYOND STOP END	300'/300'	
OBSTACLE FREE ZONE (OFZ) WIDTH	250'/250'	
OFZ LENGTH BEYOND STOP END	200'/200'	
RUNWAY CENTERLINE TO HOLD LINE	725'	
RUNWAY END COORDINATES	LAT. N 48°13'53.880"	
	LONG. W 123°01'29.0290"	
NGS 405 08/03 (NAD 83)		
	LAT. N 48°13'02.3168"	
	LONG. W 123°01'26.4119"	
RUNWAY ELEVATIONS	END	
NGS 405 01/03 (NAVD 88)	HIGH POINT	112.7'
	LOW POINT	83.9'
	TOUCHDOWN ZONE ELEVATION	112.7'/107.7'

NOTES:



BUILDING LEGEND		TOP ELEVATION
1	MAIN TERMINAL BUILDING (TO BE RELOCATED)	140.6'
2	UNCOM BUILDING	146.9'
3	FUEL FACILITY	150.7'
4	NON-DIRECTIONAL BEACON	
5	DECKING FACILITY/WASH BACK	
6	HELIPAD FOR EMS (TO BE RELOCATED)	
7	AUTOMATED WEATHER STATION (ASOS)	139.1'
8	CAFE - TO BE RELOCATED	139.7'
9	CABINET SHOP	
10		
11	ANIMAL SHELTER	
12	SKAGIT VALLEY COLLEGE	180.9'
13	SAN JUAN COUNTY FIRE DEPARTMENT	111.8'
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15	FBO/MAINTENANCE EXECUTIVE HANGAR	
A	T-HANGAR (TO BE REMOVED) - PORT	144.5'
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P	LARGE SINGLE HANGAR - PRIVATE	155.9'
Q	ISLAND AIR HANGAR - PRIVATE	155.8'
R	AERONAUTICAL SERVICES HANGAR - PRIVATE	155.0'
S	EXECUTIVE HANGARS	
T	SAN JUAN COUNTY FIRE DEPARTMENT	
U	STORAGE BARN	



LAYOUT PLAN LEGEND	
AIRPORT PROPERTY LINE	EXISTING
AIRPORT SECURITY FENCE	
AIRPORT BUILDINGS	
AIRFIELD PAVEMENT	
PAVED ROADS	
RUNWAY PROTECTION ZONE	
AVIGATION EASEMENT	
BUILDING RESTRICTION LINE	
RUNWAY SAFETY AREA	
RUNWAY OBJECT FREE AREA	
FUEL STORAGE AREA	
AIRPORT BEACON	
LIGHTED WIND CONE & SEGMENTED CIRCLE	
WIND CONE	
PRECISION APPROACH PATH INDICATOR (PAPI)	
RUNWAY END IDENTIFIER LIGHTS (REIL)	

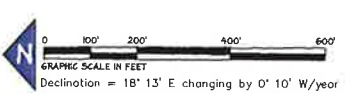
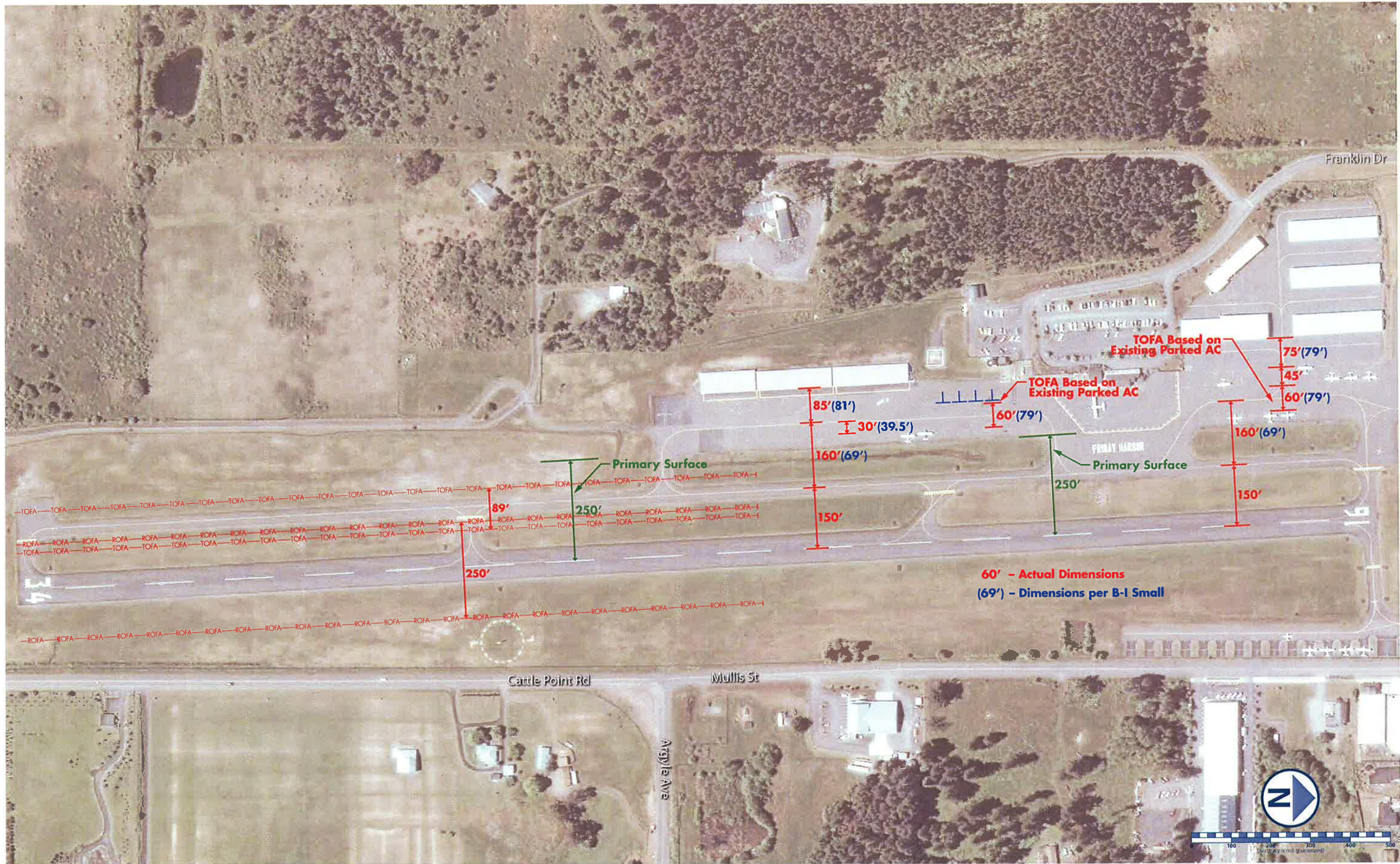
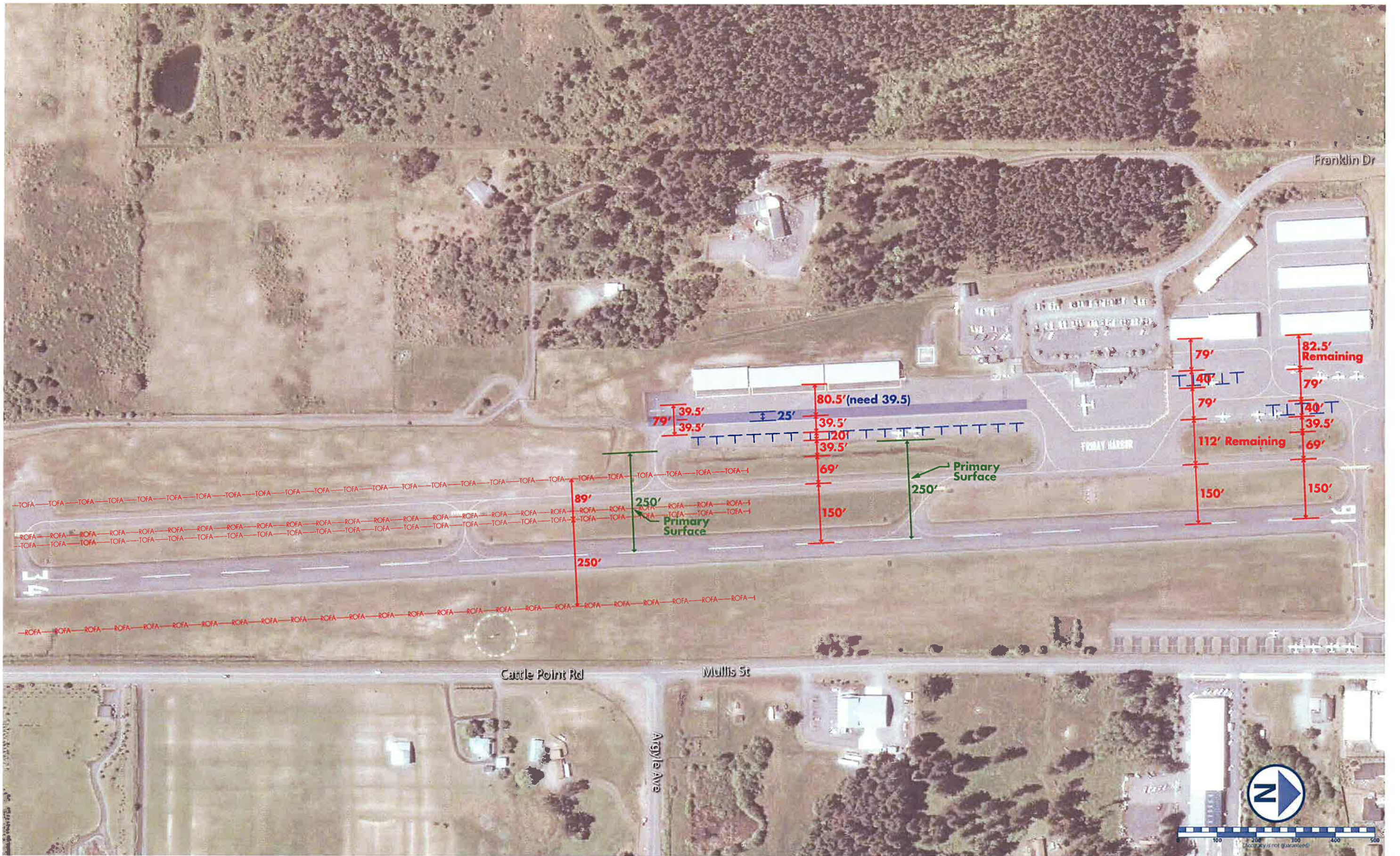
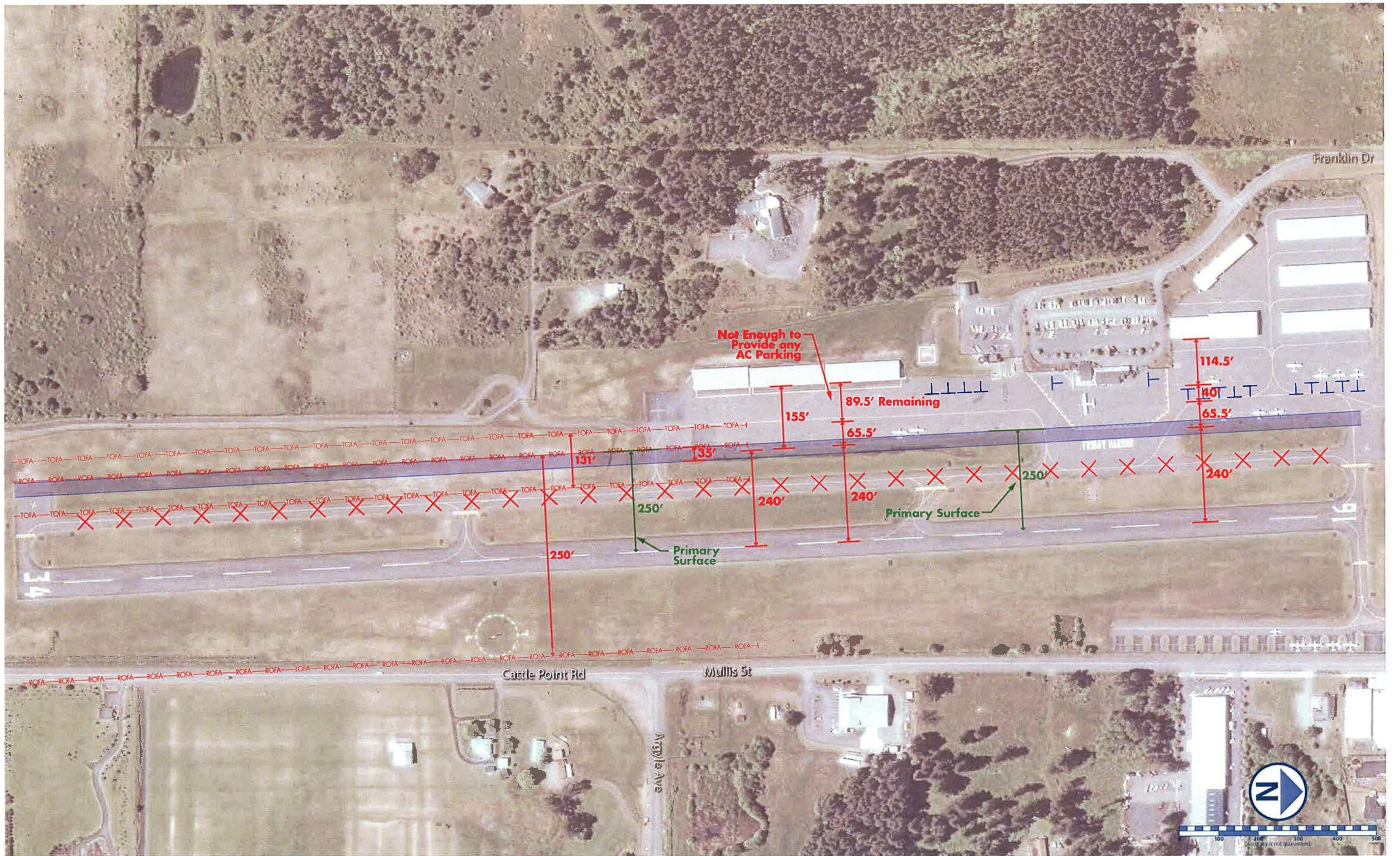


Figure 1 Existing Airport Layout
ARC B-I (Small Aircraft Only)

PORT OF FRIDAY HARBOR AIRPORT & SEAPLANE BASE







Friday Harbor Airport



NOTAM

SEATTLE FSS PHONE 1-877-487-6867
SEATTLE FSS FAX No Fax
KFHR Phone (360) 378-4724

FSS NOTAM #
INT'L NOTAM #
KFHR NOTAM #
ISSUED -
DATE
TIME
BY
TO

NOTAM

D- ADVISORY - AIRCRAFT WITH GREATER THAN 49' WINGSPAN SHALL ADVISE 'LARGE WINGSPAN AIRCRAFT' DURING ARRIVAL AND DEPARTURE ON CTAF (128.25). OTHER AIRCRAFT MUST REMAIN CLEAR OF TAXIWAY "ALPHA" DURING LARGE WINGSPAN AIRCRAFT ARRIVAL AND DEPARTURE. AIRCRAFT ARE PERMITTED IN RUNUP AREAS TXWY A3 AND TXWY G.

DISTRIBUTION

D. Ryan _____
KFHR Ops. _____

CANCELLATION

DATE
TIME
BY
FSS



800 Franklin Dr., Friday Harbor, WA 98250 * 360-378-4724 * fax 360-378-6120 * <http://www/portfridayharbor.org>
Commissioners: Mike Ahrenius * Greg Hertel * Barbara Marrett

Seattle Airports District Office
ATTN: Karen Miles P.E.
RE: "Modification to Standards"
Friday Harbor Airport

September 1st, 2011

The Port of Friday Harbor will place a notice in the Airport Facility Directory worded as follows: "Aircraft with wingspans greater than 55 feet are required to contact the airport manager 24 hrs. in advance of landing. Call 360-378-4724 or cell# 360-317-8674."

This will allow airport personnel to monitor traffic and advise other aircraft to remain clear of the taxiway during these operations.

Regards,



Dave

David M. Ryan
Airport Manager, Friday Harbor Airport
800 Franklin Drive
Friday Harbor, WA 98250

Friday Harbor Airport Airport Reference Code Classification Study

Aviation Forecast Review/Update

Historical and Existing Activity

The historical and existing (through calendar year 2009) enplanements and operations activity is presented in the following table.

HISTORICAL AVIATION ACTIVITY, 2000-2009

Year	Enplanements	Air Taxi Operations	General Aviation Operations	Total Operations
2000	17,031	15,000	45,000	60,000
2001	13,722	15,000	45,000	60,000
2002	8,361	15,000	45,000	60,000
2003	19,574	20,934	51,735	72,693
2004	22,328	17,804	52,687	70,541
2005	21,268	15,588	51,265	66,901
2006	12,542 ⁽¹⁾	16,328	52,234	68,612
2007	15,462 ⁽¹⁾	16,655	53,215	69,920
2008	15,090 ⁽¹⁾	21,135	42,270	63,405
2009	12,864 ⁽¹⁾	9,481 ⁽¹⁾⁽²⁾	40,936 ⁽¹⁾	50,417 ⁽¹⁾

Source: Barnard Dunkelberg & Company, using *FAA APO Terminal Area Forecasts 2009-2030*, unless otherwise noted. ⁽¹⁾ Friday Harbor Airport personnel. ⁽²⁾ Includes 680 operations of air cargo aircraft.

Enplanements Forecast

ENPLANEMENTS FORECAST, 2009-2030

Year	MP 2006	Low-Range Forecast (1.7%)	Moderate-Range Forecast (2.2%)	High-Range Forecast (2.4%)	Selected Forecast (1.9%)
2009	14,937	12,864 ⁽¹⁾	12,864 ⁽¹⁾	12,864 ⁽¹⁾	12,864 ⁽¹⁾
2010	15,459	13,083	13,147	13,171	12,864
2011	16,001	13,305	13,436	13,485	12,864
2012	16,561	13,531	13,732	13,807	12,864
2013	17,140	13,761	14,034	14,137	13,083
2014	17,740	13,995	14,343	14,474	13,305
2015	18,361	14,233	14,658	14,819	13,531
2020	21,807	15,485	16,343	16,674	15,027
2025		16,847	18,222	18,760	16,919
2030		18,328	20,316	21,108	19,049

Source: Barnard Dunkelberg & Company. ⁽¹⁾ Actual.

MP 2006. Selected enplanements forecast prepared for the Port of Friday Harbor Airport & Seaplane Base Master Plan, December 2006 (i.e., 2006 MP). It should be noted that the 2006 MP utilized 2003 calendar year baseline data that reflected 12,151 enplanements. This compares to the 19,574 enplanements that were recorded for FAA's TAF data from the 2003 fiscal year.

Low-Range Forecast. This enplanements forecast scenario is based on the San Juan County projected population of 1.7% average annual growth rate from the years 2010 through 2030, as published by the Washington Office of Financial Management (October 2007).

Moderate-Range Forecast. This enplanement forecast scenario utilizes the projected domestic market mainline air carrier enplanements forecasts of 2.2% average annual growth rate, as presented in the *FAA Aerospace Forecasts Fiscal Years 2010-2030*.

High-Range Forecast. This enplanement forecast scenario is based on the average annual growth rate of 2.4%, as projected for enplanements at Friday Harbor Airport in the *FAA APO Terminal Area Forecasts 2009-2030*.

Selected Forecast. The selected enplanement forecast reflects a variable growth rate, with an average annual growth rate of 1.9%. It is projected that Friday Harbor Airport enplanements will experience no growth for the next three years and only limited growth during the initial five year planning period. This correlates with the uncertainty of the timing and strength of an economic recovery nationwide, and consequently, with the recovery of aviation demand. It should be noted that airport personnel indicate the trending 2010 enplanements will be less than the 2009 enplanements. However, during the following five years of the forecast period, enplanements are expected to parallel the projected population growth rate of San Juan County (i.e., 1.7% average annual growth rate). During the long-term planning period, (i.e., 10- to 20-year time period), enplanements are forecast to increase at an average annual growth rate of 2.4%, which is the growth rate identified in the *FAA APO Terminal Area Forecasts 2009-2030*. It should also be noted that the updated 2009 baseline enplanement level is very close to the baseline enplanement total that was recorded for the 2006 MP (i.e., 12,864 vs. 12,151).

Commercial Service Operations Forecast

Commercial service aircraft operations are, like enplanements, expected to remain flat during the initial timeframe of the planning period. Significant additional operations would not be required to meet the increasing passenger demand until the long-term time period, because seating capacity is available with the existing flight schedule (i.e., BLF remains below 60%). It is anticipated that additional flights will be necessary to accommodate the increased passenger demand in the latter stages of the planning period.

For comparison, the 2006 MP utilized 2003 calendar year baseline data that reflected 10,493 commercial service operations to transport the 12,151 enplanements that were recorded for that year. As can be noted for 2009, commercial service flight schedules have been adjusted downward to improve boarding load factors and profitability of the carriers.

COMMERCIAL SERVICE COMMUTER AIRCRAFT COMPARISON

Aircraft Type/Model	Airline	ARC	No of Passengers	Tail Height	Max Takeoff Weight	FAA Takeoff Length
Existing						
Cessna 208 Caravan	Kenmore Air	A-II	9	14.8	8,000	2,420
Cessna 206/207	San Juan Airlines	A-I	5	9.6	3,600	1,860
Cessna 172	Island Air, Northwest Sky Ferry	A-I	3	8.9	2,450	1,685
Potential						
Pilatus PC-12	SeaPort Airlines	A-II	9	14.0	10,450	2,300

Source: Friday Harbor Airport personnel and aircraft manufacturer data.

COMMERCIAL SERVICE OPERATIONS FORECAST, 2009-2030

	2009 ⁽¹⁾	2015 (0.1%)	2020 (0.2%)	2025 (1.1%)	2030 ⁽²⁾ (1.4%)
Average Seats Per Departure	5.8	5.8	5.9	6.1	6.5
Enplanements	12,864	13,531	15,027	16,919	19,049
Boarding Load Factor (BLF)	50.0%	52.7%	57.1%	58.8%	58.1%
Departures	4,401	4,429	4,465	4,720	5,048
Total Operations	8,801	8,858	8,930	9,440	10,096

Source: Barnard Dunkelberg & Company. ⁽¹⁾ Actual. ⁽²⁾ Forecasted average annual growth rate of 0.7% between 2009 and 2030.

General Aviation Operations Forecast

GENERAL AVIATION OPERATIONS FORECAST, 2009-2030

Year	MP 2006	Low-Range Forecast (0.7%)	Moderate-Range Forecast (1.1%)	High-Range Forecast (1.7%)	Selected Forecast (1.3%)
2009	58,853	40,936 ⁽¹⁾	40,936 ⁽¹⁾	40,936 ⁽¹⁾	40,936 ⁽¹⁾
2010	59,913	41,227	41,386	41,612	40,936
2011	60,991	41,519	41,842	42,299	40,936
2012	62,089	41,814	42,302	42,997	41,223
2013	63,206	42,111	42,767	43,707	41,511
2014	64,344	42,410	43,238	44,429	41,802
2015	65,502	42,711	43,713	45,162	42,094
2020	71,614	44,249	46,171	49,015	45,346
2025		45,842	48,767	53,197	50,172
2030		47,492	51,509	57,736	53,672

Source: Barnard Dunkelberg & Company. ⁽¹⁾ Actual.

MP 2006. Selected general aviation aircraft operations forecast prepared for the Port of Friday Harbor Airport & Seaplane Base Master Plan, December 2006. The 2006 MP utilized 2003 calendar year baseline data that reflected 52,879 general aviation operations, which included a combination of 44,360 general aviation operations and 8,519 air taxi operations that were conducted by general aviation aircraft.

Low-Range Forecast. This forecast scenario utilizes the average annual growth rate of 0.7%, as projected for general aviation aircraft operations at both Friday Harbor Airport and nationwide activity in the *FAA APO Terminal Area Forecasts 2009-2030*.

Moderate-Range Forecast. This forecast scenario is based on the average annual growth rate of 1.1% used in forecasting general aviation operations at airports with FAA and contract traffic control service in the *FAA Aerospace Forecasts Fiscal Years 2010-2030*.

High-Range Forecast. This forecast scenario uses the San Juan County forecast population average annual growth rate of 1.7% from the years 2010 through 2030, as projected by the Washington Office of Financial Management (October 2007).

Selected Forecast. The selected general aviation operations forecast also reflects a variable growth rate. Because of the lingering economic recession and the uncertainty regarding the timing and strength of a recovery in aviation demand, operations are projected to remain at existing levels for two years, with a slight increase during the following five-year time period using an average annual growth rate of 0.7% following the projected general aviation operations growth rate used in the *FAA APO Terminal Area Forecasts 2009-2030*. It should be noted that airport personnel report the 2010 trend is for flat growth. During the latter stages of the planning period, the general aviation operations average annual growth rate increases to 1.7%, which is the expected population growth rate for San Juan County. This results in a 1.3% average annual growth rate for the overall planning period.

Forecast Operations by Aircraft Type

A further assessment of aircraft operations forecasts involves the individual and collective use of the Airport by various types of aircraft. Existing data provided by airport personnel and derived from Aircraft Situation Display to Industry (ASDI) records (see Appendix One for a compilation of the ASDI dataset) indicates that a large majority of operations at Friday Harbor Airport are conducted by single engine aircraft, both piston and turboprop. Overall, it is projected that turbine-powered aircraft will experience a slight increase in use at the Airport throughout the planning period. However, it should be noted that the estimated number of general aviation operations conducted by business jets is significantly reduced for the updated 2009 base year when compared to the 2003 base year data from the 2006 MP (i.e., 529 for 2003 vs. 78 for 2009).

OPERATIONS BY AIRCRAFT TYPE, 2009-2030

Aircraft Type	2009	2015	2020	2025	2030
<i>Commercial Service</i>	8,801	8,858	8,930	9,440	10,096
Single Engine Piston	5,766 ⁽¹⁾	5,800	5,805	6,080	6,411
Single Engine Turboprop	2,517 ⁽¹⁾	2,535	2,590	2,775	3,030
Multi-Engine Piston	518 ⁽¹⁾	523	535	585	655
<i>Air Cargo</i>	680	680	680	680	680
Single Engine Turboprop	680 ⁽¹⁾	680	680	680	680
<i>General Aviation</i>	40,936	42,094	45,346	50,172	53,672
Single Engine	36,487 ⁽²⁾	37,548	40,358	44,603	47,660
Multi-Engine	4,053 ⁽²⁾	4,125	4,400	4,817	5,100
Turboprop	236 ⁽²⁾	253	363	502	590
Business Jet	78 ⁽²⁾	84	135	150	215
Helicopter	82 ⁽²⁾	84	90	100	107
Total	50,417	51,632	54,956	60,292	64,448

Source: Barnard Dunkelberg & Company. ⁽¹⁾ Actual, using information provided by airport personnel. ⁽²⁾ Estimate using Aircraft Situation Display to Industry (ASDI) data for 2009.

Forecast Operations by ARC

The ASDI dataset for Friday Harbor Airport can provide some insight into the proper distribution of existing aircraft operations based on their Airport Reference Code (ARC). It is projected that the number of operations for aircraft within ARC A-II through B-II, excluding air taxi and air cargo operations, will increase slightly throughout the planning period, but will not represent a significant percentage of total general aviation operations in the future. A complete listing of aircraft operations provided by the ASDI data for 2009 can be found in Appendix One, with aircraft categorized in Airplane Design Group (ADG) II being highlighted for reference.

As can be noted from the table below, the Airport will continue to record between 3,200 and 3,700 commercial service and air cargo operations within the planning period that are categorized within ADG II. In addition, it is projected that less than 500 general aviation operations that are categorized within ADG II will be recorded at the Airport for the same period, and a partial list of these aircraft that were recorded for 2009 are included in Appendix One for review.

OPERATIONS BY AIRPORT REFERENCE CODE (ARC), 2009-2030

ARC	2009 ⁽¹⁾	2015	2020	2025	2030
A-I through B-I	46,912	48,092	51,336	56,462	60,338
A-II through B-II (General Aviation)	308	325	350	375	400
A-II through B-II (Commercial Service & Air Cargo)	3,197	3,215	3,270	3,455	3,710
Total	50,417	51,632	54,956	60,292	64,448

Source: Barnard Dunkelberg & Company. ⁽¹⁾ Estimate using Aircraft Situation Display to Industry (ASDI) data for 2009.

Based Aircraft Forecasts

Based aircraft at Friday Harbor Airport are expected to remain relatively flat during the initial five-year timeframe, with an increase expected toward the later stages of the planning period. This forecast somewhat parallels the expectations of the general aviation operations. However, based aircraft are expected to have a slightly smaller average annual growth rate of 0.6%. This corresponds to the limited hangar storage space currently available at the Airport, but also correlates to a nationwide trend in declining student pilots for the past five years, the increasing expense for student pilots to receive their license, and the increasing average pilot age.

GENERAL AVIATION BASED AIRCRAFT FORECAST, 2009-2030

Year	MP 2006	TAF (1.2%)	Selected Forecast (0.6%)
2009	138	145 ⁽¹⁾	145 ⁽¹⁾
2010	140	147	145
2011	142	149	145
2012	144	151	145
2013	146	152	146
2014	148	154	147
2015	150	156	147
2020	160	167	152
2025		177	158
2030		187	165

Source: Barnard Dunkelberg & Company. ⁽¹⁾ Actual.

The percentage of multi-engine aircraft (both piston- and turbine-powered) based at the airport is projected to experience a slight increase throughout the planning period. However, single engine aircraft will remain the dominant based aircraft at Friday Harbor Airport. For comparison, the 2003 baseline data for the 2006 MP included 128 based aircraft.

BASED AIRCRAFT BY AIRCRAFT TYPE, 2009-2030

Based Aircraft	2009 ⁽¹⁾	2015	2020	2025	2030
Single Engine	135	137	141	145	149
Multi-Engine Piston	4	4	5	5	6
Multi-Engine Turboprop	3	3	3	5	6
Helicopter	3	3	3	3	4
Total	145	147	152	158	165

Source: Barnard Dunkelberg & Company. ⁽¹⁾ Actual.

General Aviation Storage Requirements

Utilizing the forecast general aviation activity presented previously, future storage requirements can be projected. The following table presents the type of facilities and the number of units or square yards needed for those facilities in order to meet the projected general aviation aircraft storage demand throughout the planning period. It is expected that additional storage facilities will be required, as demand will exceed existing airport facilities. It should be noted that there are 44 people on the Airport's current wait list for enclosed hangar space, which includes some who currently tie-down their aircraft on the existing apron. However, it appears that the defined future aircraft storage facilities are capable of accommodating the demand without purchasing additional property [as identified in the 2006 MP and on the existing Airport Layout Plan (ALP)].

GENERAL AVIATION AIRCRAFT STORAGE REQUIREMENTS, 2009-2030

Facility	2009 ⁽¹⁾	2015	2020	2025	2030
Itinerant GA Apron	16,889	16,766	18,289	20,489	22,189
Based Aircraft GA Apron	21,667	12,672	12,276	12,276	12,276
Total Apron (yd ²)	38,556	29,438	30,565	32,765	34,465
Hangar Space					
T-hangars (no./yd ²)	87/39,000	100/44,456	105/46,679	111/49,346	118/52,458
Exec./Corp. (no./yd ²)	14/22,946	15/24,858	16/26,224	16/26,224	17/27,863
Total Requirement (yd ²)	100,502	98,479	103,468	108,468	114,786

Source: Barnard Dunkelberg & Company projections using guidelines found in FAA AC 150/5300-13, *Airport Design*, and existing hangar storage patterns ⁽¹⁾ Actual.

Forecast Approval

In accordance with guidance contained in *Aviation Forecast Guidance APP-400*, local aviation forecasts are approved by Airport District Offices (ADO) or Regional Airports Divisions (RO). Local forecasts that are consistent with the Terminal Area Forecasts (TAF) do not need to be coordinated with APP-400 and APO-110. Consistency with the TAF is defined as the local forecast differing by less than 10% in the first five years, and by less than 15% in the remaining forecast periods. As presented in the following table, the forecasts for this *Airport Reference Code*

Classification Study are not consistent with the specified TAF differentials, and therefore, must be further revised or approved prior to the FAA making a determination of the requested Modification of Standards. Both tabs of the FAA-supplied TAF summary spreadsheet are contained in Appendix Two.

SUMMARY OF AIRPORT REFERENCE CODE CLASSIFICATION STUDY & TAF FORECAST COMPARISON, 2009-2025

Airport Name: Friday Harbor Airport	Year	Airport Forecast	TAF	AF/TAF (% Difference)
Passenger Enplanements				
Base yr.	2009	12,864	12,864	0.0%
Base yr. + 5yrs.	2015	13,531	15,450	-12.4%
Base yr. + 10yrs.	2020	15,027	17,382	-13.5%
Base yr. + 15yrs.	2025	16,919	19,557	-13.5%
Commercial Operations ⁽¹⁾				
Base yr.	2009	9,481	9,481	0.0%
Base yr. + 5yrs.	2015	9,538	24,277	-60.7%
Base yr. + 10yrs.	2020	9,610	26,803	-64.1%
Base yr. + 15yrs.	2025	10,120	29,593	-65.8%
Total Operations				
Base yr.	2009	50,417	50,417	0.0%
Base yr. + 5yrs.	2015	51,632	72,276	-28.6%
Base yr. + 10yrs.	2020	54,956	79,367	-30.8%
Base yr. + 15yrs.	2025	60,292	87,161	-30.8%

Source: Barnard Dunkelberg & Company. ⁽¹⁾ Airport Forecast data includes combined commercial service operations and 680 air cargo operations.

Appendix One

Friday Harbor Airport
2009 Aircraft Situation Display to Industry (ASDI) operational records

2009 Aircraft Situation Display to Industry (ASDI) Data

Row Labels	Sum of OPS
AERO COMMANDER 200D Class PISTON	1
AERO COMMANDER 560-A Class PISTON	1
Aircraft - N208BA Class TURBO	1
Aircraft - N25NX Class TURBO	3
Aircraft - N303WA Class PISTON	16
Aircraft - N458OK Class PISTON	1
Aircraft - N45DV Class PISTON	1
Aircraft - N45PM Class TURBO	4
Aircraft - N502PL Class PISTON	1
Aircraft - N564JH Class PISTON	5
Aircraft - N564JU Class PISTON	1
Aircraft - N580U Class PISTON	1
Aircraft - N700QQ Class TURBO	1
Aircraft - N703X Class PISTON	1
Aircraft - N709KM Class PISTON	1
Aircraft - N723FY Class PISTON	1
Aircraft - N78JE Class PISTON	2
Aircraft - N862TB Class PISTON	1
Aircraft - N878MM Class JET	1
Aircraft - N923KA Class PISTON	1
Aircraft - N926ET Class JET	1
Aircraft - N952GC Class JET	1
Aircraft - N958NG Class TURBO	1
Aircraft - N981BB Class TURBO	6
Aircraft - N989OQ Class PISTON	1
BAUMER MARTIN GLASTAR Class JET	1
BEECH 200 Class TURBO	4
BEECH 300 Class TURBO	3
BEECH 35 Class PISTON	1
BEECH 35-B33 Class PISTON	6
BEECH 35-C33 Class PISTON	4
BEECH 58P Class PISTON	10
BEECH 58TC Class PISTON	3
BEECH 95-55 Class PISTON	2
BEECH 95-B55 (T42A) Class PISTON	7
BEECH A23-19 Class JET	3
BEECH A24R Class PISTON	1
BEECH A36 Class PISTON	22
BEECH B19 Class JET	11
BEECH B200 Class TURBO	17
BEECH B24R Class PISTON	3
BEECH B35 Class PISTON	1
BEECH B36TC Class PISTON	11
BEECH B-55 Class PISTON	7

BEECH B90	Class TURBO	2
BEECH C23	Class PISTON	2
BEECH C24R	Class PISTON	8
BEECH C90	Class TURBO	16
BEECH C90A	Class TURBO	2
BEECH D-45	Class PISTON	2
BEECH D95A	Class PISTON	3
BEECH E-55	Class JET	1
BEECH E-55	Class PISTON	8
BEECH E-90	Class TURBO	6
BEECH F33A	Class PISTON	41
BEECH H35	Class PISTON	1
BEECH K35	Class PISTON	1
BEECH M35	Class PISTON	5
BEECH P35	Class PISTON	1
BEECH S35	Class PISTON	5
BEECH V35	Class PISTON	1
BEECH V35A	Class PISTON	9
BEECH V35B	Class PISTON	8
BELL 206B-III	Class PISTON	1
BOEING A75N1(PT17)	Class PISTON	1
BROWN B.J SPORTSTER	Class PISTON	3
CADWELL CARLTON EPIC LT	Class TURBO	2
CESSNA 140	Class PISTON	1
CESSNA 150E	Class PISTON	1
CESSNA 150G	Class PISTON	1
CESSNA 150J	Class PISTON	1
CESSNA 150M	Class PISTON	7
CESSNA 152	Class PISTON	9
CESSNA 172	Class PISTON	2
CESSNA 172A	Class PISTON	14
CESSNA 172D	Class PISTON	6
CESSNA 172E	Class PISTON	1
CESSNA 172F	Class PISTON	1
CESSNA 172G	Class PISTON	3
CESSNA 172H	Class PISTON	2
CESSNA 172I	Class PISTON	9
CESSNA 172K	Class PISTON	7
CESSNA 172L	Class PISTON	48
CESSNA 172M	Class PISTON	105
CESSNA 172N	Class PISTON	54
CESSNA 172P	Class PISTON	54
CESSNA 172R	Class PISTON	7
CESSNA 172RG	Class PISTON	7
CESSNA 172S	Class PISTON	92
CESSNA 175	Class PISTON	1
CESSNA 177B	Class PISTON	11

CESSNA 177RG	Class PISTON	15
CESSNA 180	Class PISTON	3
CESSNA 180A	Class PISTON	1
CESSNA 180G	Class PISTON	1
CESSNA 180J	Class PISTON	2
CESSNA 180K	Class PISTON	20
CESSNA 182A	Class PISTON	10
CESSNA 182B	Class PISTON	3
CESSNA 182D	Class PISTON	3
CESSNA 182E	Class PISTON	7
CESSNA 182F	Class PISTON	1
CESSNA 182G	Class PISTON	2
CESSNA 182H	Class PISTON	6
CESSNA 182J	Class PISTON	1
CESSNA 182K	Class PISTON	6
CESSNA 182L	Class PISTON	5
CESSNA 182M	Class PISTON	4
CESSNA 182N	Class PISTON	13
CESSNA 182P	Class PISTON	20
CESSNA 182Q	Class PISTON	44
CESSNA 182R	Class PISTON	5
CESSNA 182S	Class PISTON	9
CESSNA 182T	Class PISTON	62
CESSNA 188B	Class PISTON	1
CESSNA 206H	Class PISTON	2
CESSNA 207A	Class PISTON	1
CESSNA 208	Class TURBO	5
CESSNA 208B	Class TURBO	2
CESSNA 210-5	Class PISTON	3
CESSNA 210-5(205)	Class PISTON	2
CESSNA 210D	Class PISTON	4
CESSNA 210K	Class PISTON	2
CESSNA 210L	Class PISTON	88
CESSNA 210N	Class PISTON	13
CESSNA 310Q	Class PISTON	2
CESSNA 310R	Class PISTON	1
CESSNA 337D	Class PISTON	1
CESSNA 340	Class PISTON	9
CESSNA 340A	Class PISTON	19
CESSNA 414	Class PISTON	1
CESSNA 414A	Class PISTON	16
CESSNA 421B	Class PISTON	3
CESSNA 421C	Class PISTON	7
CESSNA 441	Class TURBO	2
CESSNA 501	Class JET	2
CESSNA 525	Class JET	44
CESSNA 550	Class JET	6

CESSNA 551	Class JET	10
CESSNA 560	Class JET	5
CESSNA A185E	Class PISTON	1
CESSNA A185F	Class PISTON	2
CESSNA P210N	Class PISTON	21
CESSNA R172K	Class PISTON	6
CESSNA R182	Class PISTON	36
CESSNA S550	Class JET	5
CESSNA T182	Class PISTON	1
CESSNA T182T	Class JET	1
CESSNA T182T	Class PISTON	82
CESSNA T206H	Class PISTON	18
CESSNA T210F	Class PISTON	1
CESSNA T210L	Class PISTON	7
CESSNA T210M	Class PISTON	3
CESSNA T210N	Class PISTON	18
CESSNA T310Q	Class PISTON	1
CESSNA T337G	Class PISTON	1
CESSNA TP206B	Class PISTON	4
CESSNA TR182	Class PISTON	39
CESSNA TU206B	Class PISTON	1
CESSNA TU206F	Class PISTON	3
CESSNA TU206G	Class PISTON	6
CESSNA U206	Class PISTON	8
CESSNA U206A	Class PISTON	1
CESSNA U206C	Class PISTON	3
CESSNA U206E	Class PISTON	1
CESSNA U206F	Class PISTON	6
CESSNA U206G	Class PISTON	59
CHAMBERS CHARLES S LANCAIR ES	Class PISTON	1
CHAMPION 7ECA	Class PISTON	1
CIRRUS DESIGN CORP SR20	Class PISTON	21
CIRRUS DESIGN CORP SR22	Class PISTON	57
COLUMBIA AIRCRAFT MFG LC41-550FG	Class PISTON	2
COLUMBIA AIRCRAFT MFG LC42-550FG	Class PISTON	2
COMMANDER AIRCRAFT CO 114TC	Class PISTON	6
DEHAVILLAND BEAVER DHC-2 MK.1	Class PISTON	4
DEHAVILLAND DHC-2 MK. I(L20A)	Class JET	1
DEHAVILLAND DHC-2 MK. I(L20A)	Class PISTON	2
DIAMOND AIRCRAFT IND INC DA 20-C1	Class JET	1
DIAMOND AIRCRAFT IND INC DA 20-C1	Class PISTON	5
DIAMOND AIRCRAFT IND INC DA 40	Class JET	6
DIAMOND AIRCRAFT IND INC DA 40	Class PISTON	58
DIAMOND AIRCRAFT IND INC DA 42	Class JET	9
DION WILLIAM J GLASAIR IIS-FT	Class PISTON	1
DITTUS/KATSARIS GLASAIR FT	Class PISTON	1
DOUGLAS ERA-3B	Class PISTON	1

EAA BIPLANE 1 Class JET	1
ECLIPSE AVIATION CORP EA500 Class JET	2
ERCOUPE 415-C Class JET	2
EUROCOPTER DEUTSCHLAND GMBH EC 135 T2+ Class JET	2
EVEKTOR-AEROTECHNIK AS SPORTSTAR PLUS Class PISTON	1
EVEKTOR-AEROTECHNIK AS SPORTSTAR Class PISTON	2
FLEET FLEET 16B Class PISTON	1
FRAZIER ROBERT L RV-6A Class PISTON	1
GELDERMANN BERT E LANCAIR LEGACY Class PISTON	8
GLOBE GC-1A Class JET	1
GONZALEZ MANUEL A RV-7A Class PISTON	1
GRUMMAN AMERICAN AVN. CORP. AA-5 Class PISTON	2
GRUMMAN AMERICAN AVN. CORP. AA-5B Class PISTON	2
HART TOM J RV-7A Class JET	1
HAWKER BEECHCRAFT CORP B200 Class TURBO	2
HAWKER BEECHCRAFT CORP B200GT Class TURBO	1
HEBERLEIN RONALD VAN'S RV-9A Class JET	1
HUGHES 269A Class PISTON	1
HUTTON WILLIAM/HUTTON JOANNE RV-6A Class JET	1
KLEEN C W/KLEEN I RV-6 Class JET	1
LANCAIR COMPANY LC41-550FG Class PISTON	5
LEBAUGH CHRIS RV6 Class PISTON	1
MASHBURN RON RV-4 Class JET	1
MAULE M-7-235C Class PISTON	1
MAULE MX-7-235 Class PISTON	1
MILLER F P/WEITMAN D GLASAIR III SH-3R Class PISTON	1
MOONEY AIRCRAFT CORP. M20 Class PISTON	1
MOONEY AIRCRAFT CORP. M20K Class PISTON	63
MOONEY M20B Class PISTON	1
MOONEY M20C Class PISTON	12
MOONEY M20D Class PISTON	3
MOONEY M20E Class JET	2
MOONEY M20E Class PISTON	5
MOONEY M20F Class PISTON	3
MOONEY M-20G Class PISTON	2
MOONEY M20J Class PISTON	26
MOONEY M20M Class PISTON	3
MOONEY M20R Class PISTON	13
MORRIS LLOYD C VANS RV-6 Class PISTON	2
NEW PIPER AIRCRAFT INC PA-34-220T Class PISTON	2
NEW PIPER AIRCRAFT INC PA-46-500TP Class TURBO	1
NICHOLAS KIM A VANS RV-9A Class PISTON	2
OBERHEIM EARNEST F OBIE MUSTANG Class PISTON	2
PAJARES FRANK S RV6A Class PISTON	1
PARR RUSSELL RV-4 Class PISTON	1
PARTENAVIA S.P.A P 68 C/TC Class PISTON	2
PAXHIA ALAN J MURPHY SR3500 Class JET	1

PAYNE STEVEN R RV-8 Class PISTON	1
PIAGGIO P180 Class TURBO	1
PILATUS AIRCRAFT LTD PC-12 Class TURBO	1
PILATUS AIRCRAFT LTD PC-12/45 Class TURBO	5
PILATUS AIRCRAFT LTD PC-12/47 Class TURBO	32
PILATUS AIRCRAFT LTD PC-12/47E Class TURBO	3
PILATUS FLUGZEUGWERKE AG PC-12/45 Class TURBO	1
PILATUS PC-12/45 Class TURBO	20
PIPER AEROSTAR 601P Class PISTON	2
PIPER AIRCRAFT CORPORATION PA-60-601P Class PISTON	1
PIPER AIRCRAFT INC PA46R-350T Class PISTON	2
PIPER PA 46-350P Class JET	2
PIPER PA 46-350P Class PISTON	38
PIPER PA 46-350P Class TURBO	1
PIPER PA-18A Class JET	1
PIPER PA-22-150 Class PISTON	1
PIPER PA-23-250 Class PISTON	3
PIPER PA-24-250 Class PISTON	6
PIPER PA-24-260 Class PISTON	1
PIPER PA-28-140 Class PISTON	36
PIPER PA28-151 Class PISTON	17
PIPER PA-28-161 Class PISTON	25
PIPER PA-28-180 Class PISTON	7
PIPER PA-28-181 Class PISTON	11
PIPER PA-28-235 Class PISTON	2
PIPER PA-28-236 Class PISTON	7
PIPER PA-28R-180 Class PISTON	1
PIPER PA-28R-200 Class PISTON	19
PIPER PA-28R-201 Class PISTON	6
PIPER PA-28R-201T Class PISTON	2
PIPER PA-31-350 Class PISTON	2
PIPER PA-31T Class TURBO	6
PIPER PA-31T2 Class TURBO	3
PIPER PA-32-260 Class PISTON	2
PIPER PA-32-300 Class PISTON	4
PIPER PA-32R-301T Class PISTON	1
PIPER PA-34-200T Class PISTON	2
PIPER PA-34-220T Class PISTON	20
PIPER PA-44-180 Class PISTON	3
PIPER PA-46-310P Class PISTON	26
PIPER PA-46-310P Class TURBO	8
PIPER PA46-500TP Class JET	1
RAYTHEON AIRCRAFT COMPANY 390 Class JET	2
RAYTHEON AIRCRAFT COMPANY 58 Class PISTON	16
RAYTHEON AIRCRAFT COMPANY A36 Class PISTON	18
RAYTHEON AIRCRAFT COMPANY B200 Class TURBO	94
RAYTHEON AIRCRAFT COMPANY B300 Class TURBO	49

RAYTHEON AIRCRAFT COMPANY B36TC Class PISTON	23
RAYTHEON AIRCRAFT COMPANY C90A Class TURBO	8
RENQUIST GEORGE GS-2 SPORTSMAN Class PISTON	15
ROCKWELL INTERNATIONAL 114 Class PISTON	4
ROCKWELL INTERNATIONAL 690A Class TURBO	1
ROCKWELL INTERNATIONAL 690B Class TURBO	3
SMITH AEROSTAR 601P Class PISTON	2
SOCATA TB 10 Class PISTON	10
SOCATA TB-20 TRINIDAD Class PISTON	4
SOCATA TB21 Class PISTON	4
SOCATA TB21TC Class PISTON	1
SOCATA TBM 700 Class JET	16
SOCATA TBM 700 Class TURBO	28
STINSON 108-3 Class PISTON	4
SWEARINGEN SA-226T Class TURBO	10
Total Operations 2	0
TURPEN KENNETH P RV-8 Class PISTON	1
Grand Total	2591

General Aviation Airplane Design Group II Total Operations 308

Highlighted text represents Airplane Design Group II aircraft and operations.

Appendix Two

Forecasting Aviation Activity by Airport, July 2001
Appendix B & C Terminal Area Forecast (TAF) Comparison Tables

Template for Comparing Airport Planning and TAF Forecasts

AIRPORT NAME: Friday Harbor Airport

	<u>Year</u>	<u>Airport Forecast</u>	<u>TAF</u>	<u>AF/TAF (% Difference)</u>
Passenger Enplanements				
Base yr.	2009	12,864	12,864	0.0%
Base yr. + 5yrs.	2015	13,531	15,450	-12.4%
Base yr. + 10yrs.	2020	15,027	17,382	-13.5%
Base yr. + 15yrs.	2025	16,919	19,557	-13.5%
Commercial Operations				
Base yr.	2009	9,481	9,481	0.0%
Base yr. + 5yrs.	2015	9,538	24,277	-60.7%
Base yr. + 10yrs.	2020	9,610	26,803	-64.1%
Base yr. + 15yrs.	2025	10,120	29,593	-65.8%
Total Operations				
Base yr.	2009	50,417	50,417	0.0%
Base yr. + 5yrs.	2015	51,632	72,276	-28.6%
Base yr. + 10yrs.	2020	54,956	79,367	-30.8%
Base yr. + 15yrs.	2025	60,292	87,161	-30.8%

**NOTES: TAF data is on a U.S. Government fiscal year basis (October through September).
AF/TAF (% Difference) column has embedded formulas.**

Template for Summarizing and Documenting Airport Planning Forecasts
(Sample data shown - replace with actuals)

AIRPORT NAME: Friday Harbor Airport	A. Forecast Levels and Growth Rates					Average Annual Compound Growth Rates			
	Specify base year:	2009				Base yr. to +1	Base yr. to +5	Base yr. to +10	Base yr. to +15
	<u>Base Yr. Level</u>	<u>Base Yr. + 1yr.</u>	<u>Base Yr. + 5vrs.</u>	<u>Base Yr. + 10vrs.</u>	<u>Base Yr. + 15vrs.</u>				
Passenger Enplanements									
Air Carrier	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Commuter	12,864	12,864	13,531	15,027	16,919	0.0%	1.0%	1.6%	1.8%
TOTAL	12,864	12,864	13,531	15,027	16,919	0.0%	1.0%	1.6%	1.8%
Operations									
<u>Itinerant</u>									
Air carrier	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Commuter/air taxi	9,481	9,481	9,538	9,610	10,120	0.0%	0.1%	0.1%	0.4%
Total Commercial Operations	9,481	9,481	9,538	9,610	10,120	0.0%	0.1%	0.1%	0.4%
General aviation	31,930	31,930	33,254	36,277	40,639	0.0%	0.8%	1.3%	1.6%
Military	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
<u>Local</u>									
General aviation	9,006	9,006	8,840	9,069	9,533	0.0%	-0.4%	0.1%	0.4%
Military	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
TOTAL OPERATIONS	50,417	50,417	51,632	54,956	60,292	0.0%	0.5%	0.9%	1.2%
Instrument Operations	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Peak Hour Operations	40	42	44	47	50	5.0%	1.9%	1.6%	1.5%
Cargo/mail (enplaned+deplaned tons)	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Based Aircraft									
Single Engine (Nonjet)	135	135	137	141	145	0.0%	0.3%	0.4%	0.5%
Multi Engine (Nonjet)	7	7	7	8	10	0.0%	0.0%	1.3%	2.4%
Jet Engine	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Helicopter	3	3	3	3	3	0.0%	0.0%	0.0%	0.0%
Other	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%
TOTAL	145	145	147	152	158	0.0%	0.3%	0.5%	0.6%
	B. Operational Factors								
	<u>Base Yr. Level</u>	<u>Base Yr. + 1yr.</u>	<u>Base Yr. + 5vrs.</u>	<u>Base Yr. + 10vrs.</u>	<u>Base Yr. + 15vrs.</u>				
Average aircraft size (seats)									
Air carrier	0.0	0.0	0.0	0.0	0.0				
Commuter	5.8	5.8	5.8	5.9	6.1				
Average enplaning load factor									
Air carrier	0.0%	0.0%	0.0%	0.0%	0.0%				
Commuter	50.0%	50.0%	52.7%	57.1%	58.8%				
GA operations per based aircraft	282	282	286	298	318				

**Note: Show base plus one year if forecast was done.
If planning effort did not include all forecast years shown
interpolate years as needed, using average annual
compound growth rates.**

NOTE: Right hand side of worksheet has embedded formulas for average annual compound growth rate calculations.

Appendix Three: Friday Harbor Critical Aircraft/ARC/Weight/Wingspan Analysis

	2009	2015	2020	2025	2030	ARC	Weight (lbs.)	Wingspan (ft.)	RW Length (ft.)
Commercial Service (CS)									
Cessna 208B Grand Caravan	2,517	2,535	2,590	2,775	3,030	A-II	8,750	52.1	2,500
Cessna 206/207	3,400	3,422	3,425	3,587	3,781	A-I	3,614	35.1	1,900
Cessna 172	2,366	2,378	2,380	2,493	2,628	A-I	2,658	36.1	1,700
Piper PA-31 Chieftan	518	523	535	585	655	B-I	7,000	40.7	2,510
Total	8,801	8,858	8,930	9,440	10,096				
Air Cargo									
Cessna 208B Grand Caravan	680	680	680	680	680	A-II	8,750	52.1	2,500
Total	680	680	680	680	680				
General Aviation									
Cessna 172 (SE)	36,420	37,478	40,286	44,528	47,580	A-I	2,658	36.1	1,700
Beech 58P (ME)	1,500	1,526	1,664	1,858	1,989	B-I	6,200	37.8	2,450
Cessna 414 (ME)	1,824	1,856	2,030	2,280	2,448	B-I	6,785	44.1	2,595
Piper PA-34 Seneca (ME)	729	743	793	867	918	B-I	4,570	38.9	1,860
Beech King Air F90 (TP)	22	27	44	65	89	B-I	10,950	45.9	2,860
Beech King Air C90 (TP)	32	34	38	45	50	B-II	9,650	45.9	2,260
Beech Super King Air B200 (TP)	182	192	208	215	224	B-II	12,500	54.5	2,845
Pilatus PC-12 (SE) ⁽¹⁾	67	70	72	75	80	B-II	9,920	53.3	2,300
Cessna Citation 500 (BJ)	5	5	8	9	12	B-I	11,850	47.1	3,100
Cessna 525 CitationJet (BJ)	44	48	77	85	122	B-I	10,400	46.8	3,080
Cessna Citation 550 (BJ)	22	24	26	30	34	B-II	13,300	51.7	3,000
Cessna Citation 560 (BJ)	5	5	6	10	12	B-II	16,830	55.8	3,560
Raytheon Premier 1 (BJ)	2	2	4	5	7	B-I	12,500	45	3,800
Helicopter	82	84	90	100	107	N/A			
Total	40,936	42,094	45,346	50,172	53,672				
subtotal CS & AC ADG II Ops	3,197	3,215	3,270	3,455	3,710				
subtotal GA ADG II Ops	308	325	350	375	400				
subtotal App. Cat C Ops	0	10	20	35	50				
subtotal Ops > 12,500lbs.	30	35	50	60	80				

Note: ⁽¹⁾ The Pilatus PC-12 is a single engine turboprop-powered aircraft

Final Report

**MASTER
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UPDATE
FRIDAY
HARBOR
AIRPORT**



**APPENDIX TWO
Appendix B & C
Terminal Area
Forecast (TAF)
Comparison Tables**

ReidMiddleton

Barnard Dunkelberg & Company
a Mead & Hunt company

Template for Comparing Airport Planning and TAF Forecasts

AIRPORT NAME: Friday Harbor Airport

	<u>Year</u>	<u>Airport Forecast</u>	<u>TAF</u>	<u>AF/TAF (% Difference)</u>
Passenger Enplanements				
Base yr.	2011	10,242	10,242	0.0%
Base yr. + 5yrs.	2016	10,770	12,944	-16.8%
Base yr. + 10yrs.	2021	11,880	14,562	-18.4%
Base yr. + 15yrs.	2026	13,380	16,386	-18.3%
Commercial Operations				
Base yr.	2011	9,168	9,168	0.0%
Base yr. + 5yrs.	2016	9,310	19,882	-53.2%
Base yr. + 10yrs.	2021	9,460	21,952	-56.9%
Base yr. + 15yrs.	2026	10,070	24,238	-58.5%
Total Operations				
Base yr.	2011	54,248	54,248	0.0%
Base yr. + 5yrs.	2016	55,340	65,727	-15.8%
Base yr. + 10yrs.	2021	58,560	72,068	-18.7%
Base yr. + 15yrs.	2026	63,490	79,033	-19.7%

**NOTES: TAF data is on a U.S. Government fiscal year basis (October through September).
AF/TAF (% Difference) column has embedded formulas.**

Template for Summarizing and Documenting Airport Planning Forecasts
(Sample data shown - replace with actuals)

AIRPORT NAME: Friday Harbor Airport		A. Forecast Levels and Growth Rates					Average Annual Compound Growth Rates			
		Specify base year: 2011								
	<u>Base Yr. Level</u>	<u>Base Yr. + 1yr.</u>	<u>Base Yr. + 5vrs.</u>	<u>Base Yr. + 10vrs.</u>	<u>Base Yr. + 15vrs.</u>	<u>Base yr. to +1</u>	<u>Base yr. to +5</u>	<u>Base yr. to +10</u>	<u>Base yr. to +15</u>	
Passenger Enplanements										
Air Carrier	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	
Commuter	10,242	10,242	10,770	11,880	13,380	0.0%	1.0%	1.5%	1.8%	
TOTAL	10,242	10,242	10,770	11,880	13,380	0.0%	1.0%	1.5%	1.8%	
Operations										
<u>Itinerant</u>										
Air carrier	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	
Commuter/air taxi	9,168	9,168	9,310	9,460	10,070	0.0%	0.3%	0.3%	0.6%	
Total Commercial Operations	9,168	9,168	9,310	9,460	10,070	0.0%	0.3%	0.3%	0.6%	
General aviation	18,032	18,032	19,333	21,604	24,573	0.0%	1.4%	1.8%	2.1%	
Military	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	
<u>Local</u>										
General aviation	27,048	27,048	26,697	27,496	28,847	0.0%	-0.3%	0.2%	0.4%	
Military	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	
TOTAL OPERATIONS	54,248	54,248	55,340	58,560	63,490	0.0%	0.4%	0.8%	1.1%	
Instrument Operations	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	
Peak Hour Operations	27	27	28	29	32	0.0%	0.7%	0.7%	1.1%	
Cargo/mail (enplaned+deplaned tons)	0	0	0	0	0	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	
Based Aircraft										
Single Engine (Nonjet)	135	136	140	144	148	0.7%	0.7%	0.6%	0.6%	
Multi Engine (Nonjet)	4	4	4	5	5	0.0%	0.0%	2.3%	1.5%	
Jet Engine	1	1	1	1	1	0.0%	0.0%	0.0%	0.0%	
Helicopter	3	3	3	3	3	0.0%	0.0%	0.0%	0.0%	
Other	0	0	0	0	0	0.0%	0.0%	0.0%	0.0%	
TOTAL	143	144	148	153	157	0.7%	0.7%	0.7%	0.6%	
B. Operational Factors										
	<u>Base Yr. Level</u>	<u>Base Yr. + 1yr.</u>	<u>Base Yr. + 5vrs.</u>	<u>Base Yr. + 10vrs.</u>	<u>Base Yr. + 15vrs.</u>					
Average aircraft size (seats)										
Air carrier	0.0	0.0	0.0	0.0	0.0					
Commuter	5.8	5.8	5.8	5.9	6.1					
Average enplaning load factor										
Air carrier	0.0%	0.0%	0.0%	0.0%	0.0%					
Commuter	50.0%	50.0%	52.7%	57.1%	58.8%					
GA operations per based aircraft	315	313	311	321	340					

**Note: Show base plus one year if forecast was done.
If planning effort did not include all forecast years shown
interpolate years as needed, using average annual
compound growth rates.**

NOTE: Right hand side of worksheet has embedded formulas for average annual compound growth rate calculations.

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Barnard Dunkelberg >> Company
a Mead & Hunt company