Chapter 4 – Airport Facility Requirements

The airport facility requirements analysis uses the results of the inventory and forecasts contained in Chapters Two and Three, as well as established planning criteria to determine the future facility needs for Albany Municipal Airport for the current twenty year planning period.

Introduction

The evaluation of airport facility requirements can be divided into two broad primary categories: airside and landside. **Airside** facilities include runways, taxiways, navigational aids and lighting systems. **Landside** facilities include hangars, fixed base operator (FBO) facilities, aircraft parking apron, aircraft fueling, surface access and automobile parking, utilities, and other related items. All airfield items are evaluated based on established standards from the Federal Aviation Administration (FAA).

The facility requirements evaluation is used to identify the adequacy or inadequacy of existing airport facilities and identify what new facilities may be needed during the planning period based on forecast demand. Potential options and preliminary costs for providing these facilities will be evaluated in the Airport Development Alternatives (Chapter Five), to determine the most cost effective and efficient means for meeting projected facility needs.

Organization of Materials

This chapter evaluates facility requirements from two perspectives: (1) conformance of existing facilities with Federal Aviation Administration (FAA) airport design and airspace planning standards; and (2) new

demand based facility needs that reflect the updated aviation activity forecasts presented in Chapter Three.

The evaluation of current and future conformance with FAA airport design standards and airspace planning criteria will be reflected on the updated FAA approved Airport Layout Plan. The evaluation of demand driven items will reflect in gross numbers, new facility needs such as runway length requirements, hangar spaces and aircraft parking positions based on forecast demand and the needs of the design aircraft. Items such as lighting and navigational aids are evaluated based on the type of airport activity, airport classification and capabilities.

The updated inventory of existing facilities presented in Chapter Two, is used to evaluate conformance with FAA standards. **Figures 4-1, 4-2, 4-3, and 4-4** illustrate the location of the non-conforming items identified for the airport design standards described in this chapter. **Figure 4-1** depicts the runway-taxiway system. **Figure 4-2** depicts the west terminal apron area. **Figure 4-3** depicts the south hangar area. **Figure 4-4** depicts the north hangar area.

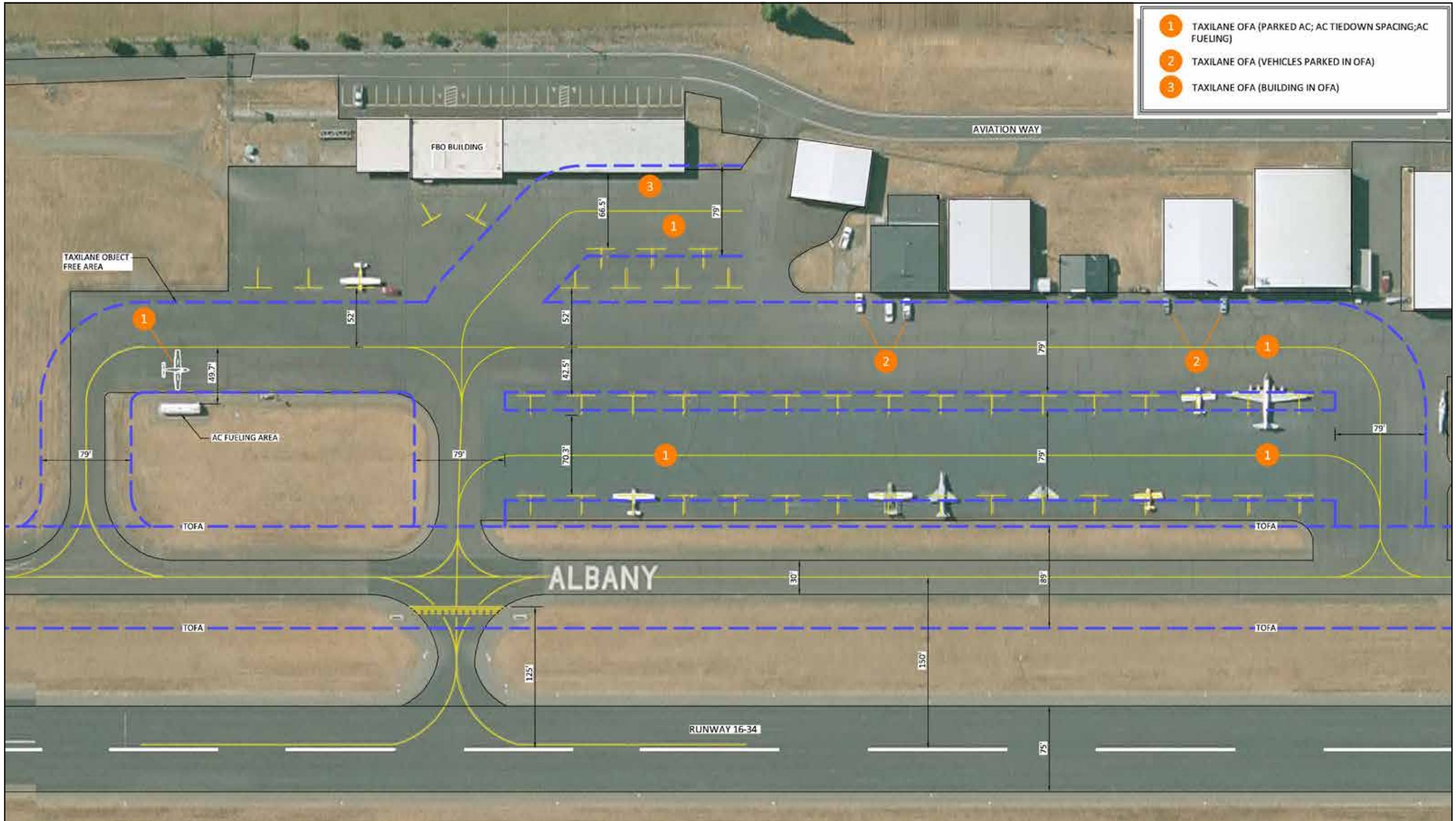
The most common nonstandard items identified in this evaluation are aircraft (wingtip) obstruction clearances for taxilanes located in hangar areas and on the main apron. Although the clearances vary, most aircraft movements occur without incident. However, as facilities are updated or replaced (aircraft parking or hangars), new facilities should be designed to conform with appropriate design standards. It is also observed that vehicles are routinely parked adjacent to taxilanes, within object free areas (OFA), which is not consistent with FAA wingtip clearance standards for taxiing aircraft. Restricting vehicle parking adjacent to defined taxilanes should be considered to address this non-conforming item. The runway and west parallel taxiway meet all applicable FAA design standards. However, as noted in the Inventory chapter the parallel taxiway has an aircraft hold area located at the south end of the runway that is partially located within the taxiway object free area.

Detailed definitions of the standards and their application at the airport are provided throughout the chapter. The reader is encouraged to consult the Glossary of Aviation Terms provided previously to clarify technical information.

ALBANY MUNICIPAL AIRPORT | AIRPORT MASTER PLAN

AIRFIELD CONFORMANCE | **FIG. 4-1**

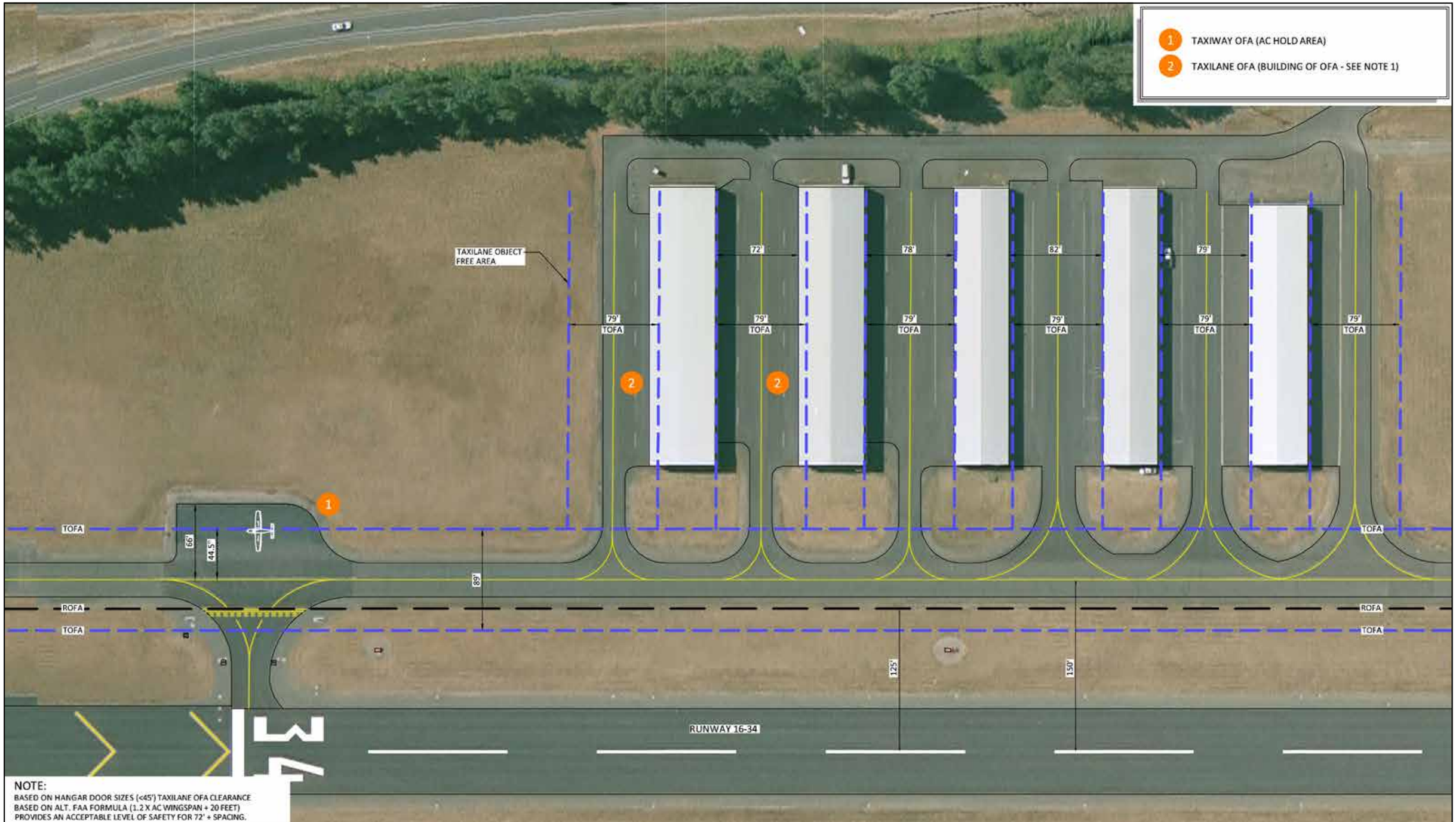
CENTURY WEST ENGINEERING CORPORATION



ALBANY MUNICIPAL AIRPORT | AIRPORT MASTER PLAN

MAIN APRON CONFORMANCE | **FIG. 4-2**

CENTURY WEST ENGINEERING CORPORATION



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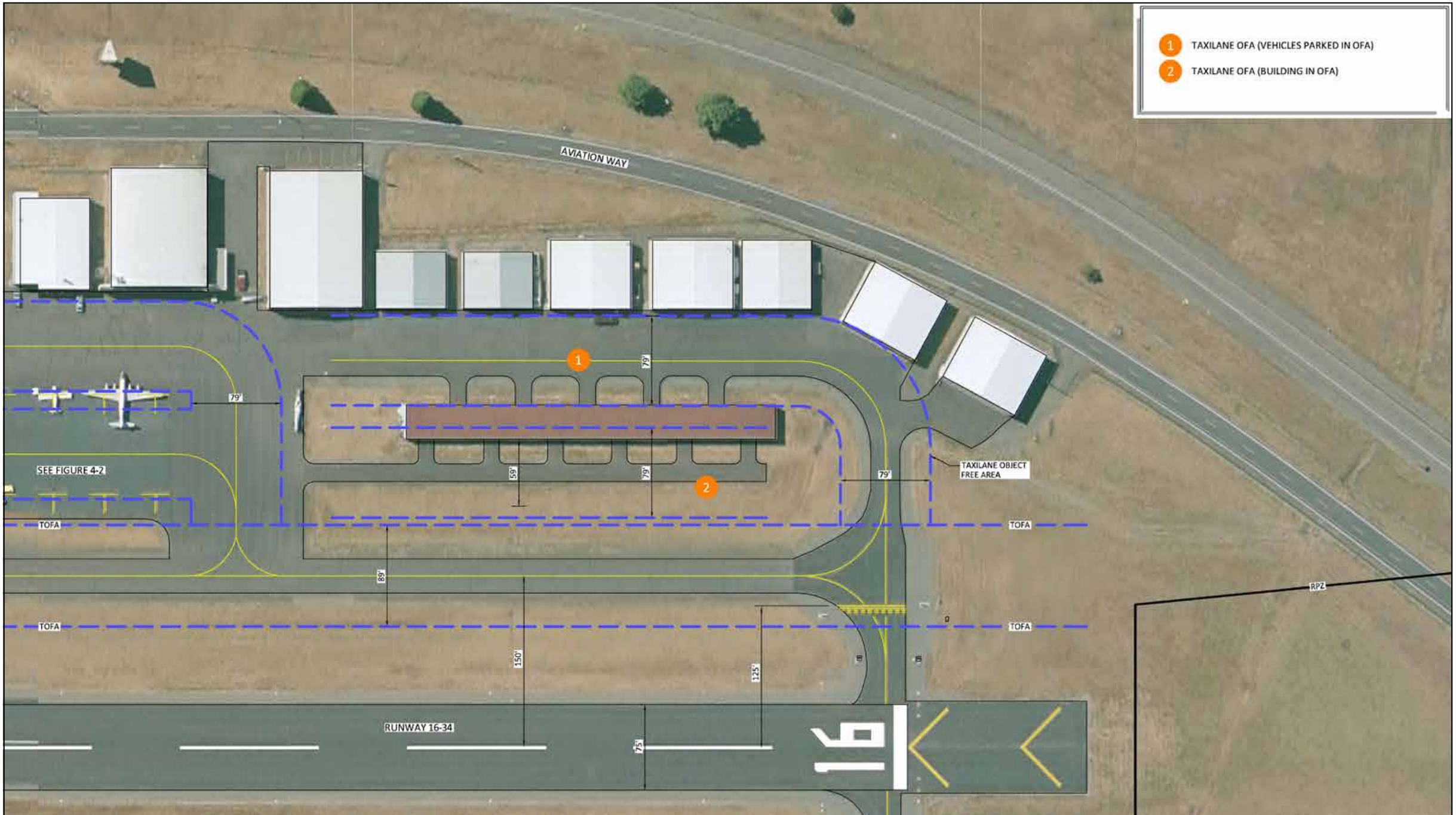
SOUTH HANGAR AREA CONFORMANCE | **FIG. 4-3**

CENTURY WEST ENGINEERING CORPORATION



ALBANY MUNICIPAL AIRPORT | AIRPORT MASTER PLAN

NORTH HANGAR AREA CONFORMANCE | **FIG. 4-4**

CENTURY WEST ENGINEERING CORPORATION

2000-2020 Airport Master Plan Update Overview

The 2000-2020 Albany Municipal Airport Master Plan Update provided recommendations for airport facility improvements for the twenty year planning period that extended to 2020.

The projects summarized in **Table 4-1** were included in the twenty year capital improvement program (CIP) for the master plan. The projects were reviewed to identify those which have been completed (noted in the table). The previously recommended improvements which have not been implemented will be revalidated, modified or eliminated based on the updated assessment of facility needs, current FAA guidelines and the elements of the Airport Master Plan preferred development alternative.

TABLE 4-1: SUMMARY OF 2000-2020 AIRPORT MASTER PLAN UPDATE RECOMMENDED PROJECTS AND CURRENT STATUS

Completed? Yes/No	Projects
	Short Term (2001-2005)
Yes	Slurry Seal – Main Apron
No	Rehab FBO Building - Phase I (classrooms)
Yes	Automated Security Gate (south)
Yes	Airport Access Road Resurface/Reconstruct
Yes*	Perimeter Fencing (south hangar area) *(*additional fencing extended from west terminal area to NE corner of airport)*
No	Rehab Quad Hangar (minor renovation)
Yes	Demo FBO South Bays
Yes	Rehab Large Hangar (partial; work done by tenant)
Yes	Runway End Identifier Lights (Rwy 16 & 34)
No	Rehab FBO Building - Phase II (remaining interior space)
No	Acquire Property – Runway 16 RPZ *(NE corner of RPZ, north of Knox Butte Road)*
Yes*	Airport Access Road – South Extension *(*road extended to southern-most hangar; additional section to proposed FBO apron not constructed)*
No	Slurry Seal North Hangar Apron and Taxilanes
No	Slurry Seal South Hangar Taxiway
Yes	Main Apron Connecting Taxiway (south of fuel area)
No	Demo/Relocate Small Hangar (north of Quad hangar)
	Long Term (2006-2020)
Yes	Construct South Stub Taxiways (1) w/storm drainage
No	Rehab FBO Building - Phase III (north hangar bays)
Yes	Extend Water to South Hangars
No	Automated Vehicle Gate (north)
Yes*	Extend Water to North Hangars *(*limited hangar connections from water line located on west side of frontage road)*

No	Runway/Taxiway/Apron Slurry Seal
No	Main Apron South Expansion
No	Main Apron Southeast Expansion (Fuel Area)
No	Automated Weather Observation System (AWOS/ASOS)
No	PAPI (replace existing VASI)
Yes	Apron Flood Lighting
No	East Aircraft Tiedown Apron (Phase II)
No	Relocate Segmented Circle
No	Resurface Main Apron
No	Resurface West Parallel Taxiway and South Access Taxiway

Source: 2000-2020 Airport Master Plan Update (Table 6-3)

In addition to the master plan recommended items noted above, several other projects have been completed since 2002 including runway rehabilitation, blast pad/overrun paving, runway lighting replacement, fencing upgrades, replacement of the lighted wind cone, and private hangar construction. The south aircraft apron, located within the runway protection zone (RPZ) for Runway 34 was acquired by the City.

Design Aircraft

As indicated in Chapter 3 (Aviation Activity Forecasts), the current and future design aircraft identified for Albany Municipal Airport is a light twin-engine (piston) aircraft, included in **Aircraft Approach Category B** and **Airplane Design Group I.** This aircraft weighs less than 12,500 pounds, which places it in the "small" airplane category **(Airport Reference Code: B-I, small)**.

The design aircraft represents the most demanding aircraft using the airport on a regular basis (minimum of 500 annual operations) and determines the appropriate airport design standards for the current twenty year planning period. As noted in the forecast chapter, the airport currently accommodates three locally-based business jets, all of which weigh less than 12,500 pounds and are included in ARC B-I. These aircraft are among the most demanding aircraft in terms of runway length, included in the "B-I small" category. The continued use of standards consistent with "small aircraft" and "utility" runways, as defined in FAR Part 77, is appropriate for Runway 16/34.

As noted earlier, Albany Municipal Airport occasionally accommodates Airplane Design Group II activity although current and forecast levels are considerably lower than the 500 annual operations required by FAA when defining a design aircraft. Typical aircraft in this category include single-engine or multi-engine turboprops, some business jets, and the 4-engine piston aircraft (deHavilland Heron) based at the airport. The types of ADG II aircraft that can operate at the airport is determined primarily by available runway length.

Airport Design Standards

Federal Aviation Administration (FAA) **Advisory Circular (AC) 150/5300-13A, Airport Design**, serves as the primary reference in planning airfield facilities. **Federal Air Regulation (FAR) Part 77.25, Objects Affecting Navigable Airspace**, defines airport imaginary surfaces which are established to protect the airspace immediately surrounding a runway. The airspace and ground areas surrounding a runway should be free of obstructions (i.e., structures, parked aircraft, trees, etc.) to the greatest extent possible to provide a safe operating environment for aircraft. **FAA Order 8260.3B - United States Standard for Terminal Instrument Procedures (TERPS)** defines protected airspace surfaces associated with instrument approaches and departures.

Table 4-2 summarizes existing facility dimensions and standards based on small airplanes included in Airplane Design Group I (ADG I) and Aircraft Approach Category B. **Figures 4-1, 4-2, 4-3, and 4-4 presented earlier in the chapter illustrate nonstandard runway or taxiway conditions noted in the sections below. Figure 4-1** also depicts the footprint of the runway safety area, object free area, obstacle free zone, and runway protection zones that are associated with the current runway based on 1-mile approach visibility minimums and ARC B-I, small.

TABLE 4-2: AIRPORT DESIGN STANDARDS SUMMARY (DIMENSIONS IN FEET)

FAA Standard	Runway 16/34 *Existing Conditions*[1]	Conforms to FAA Standard (Yes/No)	Airplane Design Group I *A&B Aircraft (Small Aircraft) Approach Visibility ≥ 1- mile*
Runway Length	3,004	No	3,040/3,610 [6]
Runway Width	75	Yes	60
Runway Shoulder Width	10	Yes	10
Blast Pad Width	80	Yes	80
Blast Pad Length	60	Yes	60
Runway Safety Area (RSA) • Width • Length Beyond Departure End • Length Prior to Landing Threshold	 120 240 240	 Yes Yes Yes	 120 240 240
Runway Obstacle Free Zone (ROFZ) • Width • Length Beyond Runway End • Length Prior to Landing Threshold	 250 200 200	 Yes Yes Yes	 250 200 200

Runway Object Free Area (ROFA) • Width • Length Beyond Runway End • Length Prior to Landing Threshold	 250 240 240	 Yes Yes Yes	 250 240 240
Approach/Departure Runway Protection Zone (RPZ) • Length • Inner Width • Outer Width	 1,000 250 450	 Yes Yes Yes	 1,000 250 450
Runway Centerline to: • Parallel Taxiway/Taxilane Centerline • Aircraft Parking Line • Building Restriction Line	 150 (west & east) 200 (west & east) [2] 250 (west & east) [3]	 Yes Yes Yes	 150 195.5/320.5[7] 250/375[8]
Taxiway Width	30	Yes	25
Taxiway Shoulder Width	10	Yes	10
Taxiway Safety Area Width	49 [9]	No	49
Taxiway Object Free Area Width	<89 [4]	No	89
Taxiway Centerline to Fixed/Movable Object	<44.5 [4]	No	44.5
Taxilane Object Free Area Width	<79 [5]	No	79
Taxilane Centerline to Fixed/Movable Object	<39.5 [5]	No	39.5

Table 4-2 Notes:

1. Existing airfield dimensions effective March 2013.
2. Nearest aircraft parking is located approximately 200 feet west and east of runway centerline.
3. The nearest structures (hangars) on the west side of the runway (south hangar area) are approximately 250 feet from runway centerline. The open-front T-hangar located in the North Hangar area is approximately 270 feet from runway centerline.
4. Parallel Taxiway OFA clearance limited at south aircraft holding area (adjacent to Rwy 34 threshold).
5. Main apron clearances from taxilane centerlines to aircraft fueling position, aircraft tiedowns, and hangars vary (less than ADG I standard).
6. Per FAA Runway Length Model: Runway lengths required to accommodate 95 and 100 percent of the small airplane fleet (12,500 pounds or less) at Albany Municipal Airport. 81.6 degrees F, 1-foot change in runway centerline elevation.
7. 194.5 feet is required to clear the taxiway object free area for the existing 150-foot runway-parallel taxiway separation. Existing APL, as depicted on the 2002 ALP is 200 feet, which will accommodate an aircraft tail height of approximately 10.7 feet (@ APL) without penetrating the 7:1 transitional surface that extends from the existing visual (250 feet wide) primary surface/future option nonprecision instrument primary surface (500 feet wide) requires 325 feet for APL to obtain the same tail height clearance.
8. Distance required to accommodate 17.8-foot structure (typical small/medium hangar roof heights) without penetrating the 7:1 transitional surface that extends from the existing visual (250 feet wide) primary surface/future option nonprecision instrument primary surface (500 feet wide) and to remain clear of the object free area established for Taxiway A. Setbacks for larger hangars are greater and would depend on roof elevation and clearance of transitional surface slope.
9. All taxiways on the airport appear to meet the TSA dimensional standard, with the exception of the bridge on the south access taxiway (approximately 30 feet wide).

Airport Planning & Design Standards Note:

The following FAA standards are recommended for use in evaluating Runway 16/34 and its taxiway system:

Runway 16/34 (Existing/Future) *– Airport Reference Code (ARC) B-I, Small Aircraft Exclusively. Runway design standards for aircraft approach category A & B runways with not lower than* ***1-statute mile*** *approach visibility minimums. Runway Protection Zones based on the approach visibility standard "visual and not lower than 1-mile" for Aircraft Approach Categories A and B.*

FAR Part 77 airspace planning criteria based on "utility runways" with future approach capabilities (visual or non-precision instrument) discussed later in the chapter.

All references to the "standards" are based on these assumptions, unless otherwise noted. (Per FAA Advisory Circular 150/5300-13a and FAR Part 77.25)

INSTRUMENT APPROACH NOTE:

As noted in the Inventory chapter, the existing instrument approach for Albany Municipal Airport is a nonprecision approach with a visual final approach segment. The approach is classified as a "circling" or "circle to land" procedure since it requires pilots to establish visual contact with the airport environment at or before a fixed "missed approach point" and land on any runway end while maintaining visual contact. According to local pilots, the descent minimums (714 feet AGL) for the current procedure are marginally effective and there is interest in developing a procedure with better minimums. The potential exists to develop a straight-in nonprecision approach to a particular runway end that may provide improved minimums. It may also be possible to develop a new "circling" procedure with improved approach minimums. In both cases however, the degree of improvement is dependent on the number, elevation and location of nearby obstructions within the protected TERPS[1] airspace for both the approach and missed approach paths. Preliminary coordination with the FAA Flight Procedures Office is being conducted during the master plan update. However, development of a new approach will require an updated obstruction survey and a formal process for procedure development, flight check, and publishing.

A straight-in approach requires larger protected airspace surfaces than visual approaches. For utility runways, a 500-foot wide primary surface is required, compared to the existing 250-foot wide visual primary surface. An increase in primary surface width shifts the beginning of the 7:1 transitional surface, which can affect obstruction clearance over of aprons (parked aircraft, fueling facilities etc.) and buildings. The approach surface slope for nonprecision instrument approaches on utility runways is 20:1, the same as required for visual approaches. Please see the FAR Part 77 Airspace section later in the chapter for a description of the primary and transitional surfaces.

The dimensions of most runway-related design standards (runway protection zone, runway safety area, etc.) would not be affected since the runway would still be designed for small aircraft and the approach

[1] TERPS: Terminal Instrument Procedures, as defined in FAA Order 8260.3B

visibility minimums would not be reduced below 1-mile. However, the aircraft parking line (APL) and building restriction lines (BRL) on both sides of Runway 16/34 would be affected. These items will be addressed in the appropriate sections of the chapter.

Runway Safety Area (RSA)

The FAA defines runway safety area (RSA) as *"A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway."* Runway safety areas are most commonly used by aircraft that inadvertently leave (or miss) the runway environment during landing or takeoff.

By FAA design standard, the runway safety area *"shall be:*

(1) cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations;

(2) drained by grading or storm sewers to prevent water accumulation;

(3) capable, under dry conditions, of supporting snow removal equipment, aircraft rescue and firefighting equipment, and the occasional passage of aircraft without causing structural damage to the aircraft; and

(4) free of objects, except for objects that need to be located in the runway safety area because of their function. Objects higher than 3 inches above grade should be constructed on low impact resistant supports (frangible mounted structures) of the lowest practical height with the frangible point no higher than 3 inches. Other objects such as manholes, should be constructed at grade. In no case should their height exceed 3 inches."

The recommended transverse grade for the RSA located along the sides of a runway ranges between 1½ and 5 percent from runway shoulder edges. The recommended longitudinal grade for the first 200 feet of RSA beyond the runway end is 0 to 3 percent. The remainder of the RSA must remain below the runway approach surface slope. The maximum negative grade is 5 percent. Limits on longitudinal grade changes are plus or minus 2 percent per 100 feet within the RSA.

The RSA for Runway 16/34 (120 feet wide, extending 240 feet beyond each runway end) appears to meet FAA dimensional and surface condition standards. The RSA appears be free of physical obstructions, except items permitted by FAA that are installed on frangible (break away) supports (runway lights, information/directional signs, runway end identifier lights and precision approach path indicators). Portions of the RSA at both ends of the runway have paved runway overruns. The ends of the RSA are measured from the end of useable runway (threshold bars) at each runway end. Future use of the paved

overruns as useable runway may require extending the RSA to meet FAA standards, depending on the runway configuration.

Runway pavement edges should be periodically inspected to ensure that grass, dirt or gravel build ups do not exceed 3 inches. The RSA should be regularly cleared of brush or other debris and periodically graded and/or compacted to maintain FAA standards, as needed. Any future runway extensions will require corresponding RSA improvements based on the applicable design standard.

Runway Object Free Area (ROFA)

Runway object free areas (ROFA) are two dimensional surfaces intended to be clear of ground objects that protrude above the runway safety area edge elevation. Obstructions within the object free area may interfere with aircraft flight in the immediate vicinity of the runway. The FAA defines the object free area clearing standard:

"The object free area clearing standard requires clearing the object free area of above ground objects protruding above the runway safety area edge elevation. Except where precluded by other clearing standards, it is acceptable to place objects that need to be located in the object free area for air navigation or aircraft ground maneuvering purposes and to taxi and hold aircraft in the object free area. Objects non-essential for air navigation or aircraft ground maneuvering purposes are not to be placed in the object free area. This includes parked airplanes and agricultural operations."

The ROFA for Runway 16/34 (250 feet wide, extending 240 feet beyond each runway end) appears to be free of physical obstructions (excluding navigational aids, lighting, airfield signs, etc.) and meets FAA dimensional standards. Any future runway extensions will require corresponding object free area improvements based on the applicable design standard. The ROFA should be periodically inspected to remove any protruding objects and clear vegetation.

Obstacle Free Zone (OFZ)

Obstacle free zones (OFZ) are planes of clear airspace extending upward above runways that are intended to protect close-in obstructions that may create hazards for aircraft. The FAA defines the following clearing standard for the OFZ:

"The obstacle free zone clearing standard precludes taxiing and parked airplanes and object penetrations, except for frangible visual NAVAIDs [navigational aids] *that need to located in the obstacle free zone because of their function."*

The FAA defines four types of obstacle free zones based on approach capabilities, runway configuration and type of aircraft use. For Runway 16/34 only the *Runway* OFZ is required. Other OFZ types designed

for runway ends with approach lights, significantly lower approach visibility minimums, or precision instrument approaches are not applicable to Runway 16/34.

The FAA defines the Runway Obstacle Free Zone as:

"The runway OFZ [obstacle free zone] *is a defined volume of airspace centered above the runway centerline. The runway OFZ is the airspace above a surface whose elevation at any point is the same as the elevation of the nearest point on the runway centerline. The runway OFZ extends 200 feet beyond each end of the runway."*

The FAA recommended ROFZ width for Runway 16/34 is 250 feet, based on the design aircraft (B-I small). Based on a recent visual inspection conducted during the master plan inventory, no penetrations to the existing runway OFZ were observed, other than the runway lights, precision approach path indicator units, runway end identifier lights, directional signage, and distance remaining signs which have locations fixed by function. All items currently located within the runway OFZ meet the FAA frangibility (break away) standard. Aircraft hold lines are located 125 feet from runway centerline on each of the exit taxiways connecting to the runway, which keeps holding aircraft entirely outside the runway OFZ.

Taxiway Safety Area

Taxiway safety areas (TSA) serve a similar function as runway safety areas and use the same design criteria for surface condition (see description of runway safety area provided earlier in this chapter), with varying dimensions based on airplane design group. The main taxiways on the airfield are designed to accommodate the same design aircraft as the runway (Airplane Design Group I). The ADG I standard TSA dimension is 49 feet, centered on the taxiway, extending 24.5 feet each side of centerline. Based on the existing 30-foot width on the parallel taxiway, the outer edge of the TSA extends 9.5 feet beyond the taxiway pavement edge. As noted in the Inventory chapter, the widths of the exit taxiways vary from 25 to 35 feet, which results in the outer, unpaved portions of the TSAs varying from 7 to 12.5 feet on each side.

The south access taxiway also appears to meet safety area standards, with the exception of the bridge crossing Cox Creek. The bridge is approximately 30 feet wide, elevated approximately 12 to 15 feet above the creek at mid-channel. The bridge provides approximately 19 feet less safety area width than the ADG I standard (49 feet).

Items within TSAs that have locations fixed by function (taxiway reflectors, edge lights, signs, etc.) must be mounted on frangible (break away) mounts. Based on a recent visual inspection conducted during the master plan inventory, the west and east parallel taxiways, exit taxiways and south access taxiway (with the exception of the taxiway bridge) appear to meet the surface condition and obstruction clearing standards required for taxiway safety areas.

As with runway safety areas, the ground surface located immediately adjacent to the taxiways periodically requires maintenance or improvement to adequately support the weight of an aircraft or an airport vehicle. Grading and/or soil compaction within taxiway safety areas should be completed as needed, and grass, brush or other debris should be regularly cleared to maintain FAA standards. Taxiway pavement edges should be periodically inspected to ensure that grass, dirt or gravel build ups do not exceed 3 inches.

It is noted that safety area standards do not apply to *taxilanes* typically located within hangar developments or aircraft parking aprons. Taxilanes provide aircraft access within a parking or hangar area; taxiways provide aircraft access between points on the airfield and serve runways (e.g. parallel taxiways and exit taxiways).

Taxiway/Taxilane Object Free Area

Taxiway and taxilane object free areas (OFA) are intended to provide unobstructed taxi routes (adequate wingtip clearance) for aircraft. The outer edge of the OFA defines the recommended standard distance from taxiway or taxilane centerline to a fixed or moveable object. The FAA clearing standard prohibits service vehicle roads, holding or parked aircraft, and above ground objects (hangars, other built items, etc.), except for objects with locations that are fixed by function (navigational aids, airfield signs, etc.).

All taxiways and taxilanes at Albany Municipal Airport are designed to meet ADG I standards, or the corresponding Taxiway Design Group I (TDG I) standards (new in 2012). The FAA added taxiway design groups in the last major update (9/28/12) of its Airport Design advisory circular (AC 150/5300-13A). The standards are based on the outer main gear width and cockpit to main gear distance. Some design elements associated with taxiways remain under airplane design group, while others are included under taxiway design group. With very few exceptions, most aircraft that are included in ADG I will also be included in TDG I. For the purposes of this discussion, the standards will be combined (ADG/TDG I).

TAXIWAYS

The standard ADG/TDG I taxiway OFA width dimension is 89 feet, which extends outward 44.5 feet from centerline in both directions. As with the taxiway safety area, any items within the taxiway OFA that have locations fixed by function, must be frangible (break away mount) to meet the FAA clearing standard.

As noted in the Inventory chapter, the west parallel taxiway is physically separated from adjacent aircraft parking aprons and hangars and these items are located beyond the western edge of the taxiway OFA. However, the south aircraft holding area located near the Runway 34 threshold directly abuts the parallel taxiway on its west side and a portion (approximately 2/3) of the hold area is located within taxiway OFA. An aircraft performing a pre-takeoff checklist, engine run-up or awaiting an instrument flight plan clearance will be partially located in the taxiway OFA, creating an obstacle for aircraft passing on the

adjacent taxiway. Expanding the hold area to allow aircraft to be positioned entirely outside the taxiway OFA should be considered in the alternatives evaluation.

The short section of east parallel taxiway that connects to the north end of the runway directly abuts the adjacent aircraft parking apron. The single row of eight west-facing tiedowns is located approximately 52 feet from the taxiway centerline (distance to the top of the painted "T"). This separation ensures that both the tiedowns and the aircraft that occupy the tiedowns are located beyond the taxiway OFA.

The OFA for the south access taxiway appears to be free of obstructions.

TAXILANES

The airport has a variety of taxilanes including apron taxilanes and hangar taxilanes that serve predominantly ADG I aircraft. The ADG I taxilane OFA standard dimension is 79 feet wide, extending 39.5 feet from centerline.

South Hangar Area Taxilanes.

As noted in the Inventory chapter, the clearances provided on these taxilanes (measured as the opening between hangar rows) is typically 79 feet, although the opening between the two southern-most hangars is approximately 72 feet.

The FAA allows a modification to standards for Taxilane OFA clearance based the following formula: 1.2 x airplane wingspan plus 20 feet. Using this formula, small hangars with 40-foot wide doors can accommodate most small single-engine and some smaller multi-engine aircraft. Assuming 1-foot of wingtip clearance on both sides, a 40-foot wide door opening could accommodate an aircraft with up to a 38-foot wing span. Based on an aircraft with a 38-foot wingspan, the corresponding taxilane OFA clearance derived from this formula would be approximately 66 feet (38' x 1.2 + 20' = 65.6'). For comparison, a Cessna 172 and 182 both have wingspans of 36 feet; a Cessna 150 has a wingspan of 33.3 feet.

While relocation of most hangars is not considered highly feasible, any new hangars (and the associated taxilanes) planned for this area should meet the applicable ADG I taxilane object free area clearance standard. A modification to FAA standards using the FAA-defined formula, providing an acceptable level of safety, should be noted for these hangars.

North Hangar Taxilanes.

The north hangar area located at the north end of the airport's west landside area has two taxilanes providing access to adjacent hangars. The north hangar taxilane extends from the parallel taxiway

(Taxiway A) and Taxiway A1 and connects to the north end of the main apron. The opening between the open-front T-hangar and the adjacent row of conventional hangars is approximately 80 feet, however, the taxilane centerline is offset, approximately 45 feet from the front of the conventional hangars and 35 feet from the west side of the adjacent open-front T-hangar. As a result, the clearance on the east side of the taxilane is slightly below the 39.5-foot ADG I taxilane OFA standard. In addition, most vehicles observed parked in front of conventional hangars along the taxilane are obstacles within the taxilane OFA.

The T-hangar stub taxilane located on the east side of the building does not meet taxilane OFA standards based on its centerline clearance from the hangar (approximately 30 feet).

West Apron Taxilanes.

Several taxilanes on the west apron provide access within the apron and serve hangars and the FBO building located along the back edge of the apron. The apron has two main sections. The southern section provides access to the FBO building, attached hangars, aircraft tiedowns, and the aircraft fueling area. The northern section of the apron accommodates aircraft tiedowns and provides access to conventional hangars located along the western edge of the apron. The apron has three taxilane connections to the parallel taxiway (Taxiway A)—one located at each end and one directly in line with Taxiway A2, the mid-runway exit taxiway.

The north section of the apron has two rows of single, west-facing tiedowns that are served by two taxilanes. The eastern tiedown row has tail-in positions that are accessed from the eastern taxilane; the western row of tiedowns is accessible from either taxilane. The apron taxilanes are not marked with centerline striping.

The eastern taxilane has approximately 70 feet of clearance between the adjacent tiedown "T" markings which does not meet the FAA ADG I standard (79 feet). Since the OFA clearance is measured from the taxilane centerline to a fixed/moveable object (parked aircraft), the actual use of the tiedowns further reduces OFA clearance. For most small airplanes, the front portion of the aircraft extends 3 to 5 feet forward of the tiedown markings (into the adjacent taxilane). This can reduce the 70-foot opening on the eastern taxilane to 65-67 feet; when larger aircraft, such as the 4-engine ADG II aircraft or business jets, are parked in the small airplane tiedowns, the adjacent taxilane clearance is reduced even more, and can be significantly more when the large aircraft are parked in close proximity in east and west tiedown rows.

The western taxilane has approximately 90 feet of clearance between the western row of tiedown "T" markings and the fronts of adjacent hangars. While the space is sufficient to meet the taxilane OFA standard, vehicles parked directly in front of the City maintenance shop and the hangars located along the west edge of the apron reduce the actual clear area by 20 to 30 feet and large aircraft parked in the western

tiedown row can extend up to 18 feet into the taxilane OFA. The taxilane and its setback is not marked, which makes it difficult to distinguish between protected taxilane and the areas used for vehicle parking.

A small taxilane located between the north end of the FBO hangars and a double row of tiedowns has approximately 70 feet of clearance, which is less than the ADG I standard taxilane OFA (79 feet).

The aircraft fueling area located at the south end of the terminal apron is adjacent to a north-south section taxilane that extends from the apron to the south connection to the parallel taxiway. The fuel storage tank and pumps are located beyond the taxilane OFA, but the aircraft fueling position is on the west side of the tank, within the taxilane OFA.

Figure 4-2, presented earlier in the chapter, illustrates the nonstandard taxilane clearances on the apron. Options for addressing existing apron configuration and conforming to OFA clearance standards will be included in the alternatives analysis. When required by FAA, changes in parking configurations are typically implemented when the apron areas are rehabilitated, reconfigured, or expanded. All new aircraft parking aprons should be designed to provide standard taxilane OFA clearances to the adjacent parked aircraft, rather than tiedown anchors. As noted earlier, the configuration of the east tiedown apron relative to the adjacent taxiway illustrates the desired clearance between parked and taxiing aircraft. Options for relocating vehicle parking to areas adjacent to apron should also considered in the alternatives evaluation.

Building Restriction Line (BRL)

A building restriction line (BRL) identifies the minimum setback required to accommodate a typical building height, such as a T-hangar or large conventional hangar, based on the ability to remain clear of all runway and taxiway clearances on the ground, and the protected airspace surrounding a runway. Taller buildings are located progressively farther from a runway in order to remain beneath the 7:1 Transitional Surface slopes that extend laterally from both sides of a runway.

The 2002 Airport Layout Plan depicts 250-foot BRLs on both sides of the Runway 16/34. The 250-foot BRLs can accommodate structures with roof heights up to 17.8 feet above runway elevation (at the BRL without penetrating the runway transitional surface associated with the existing visual approach).

All new construction on the airport and in the immediate vicinity of the airport should routinely involve FAA review for airspace compatibility. FAA Form 7460-1, Notice of Proposed Construction or Alternation, should be prepared and submitted to FAA at least 60 to 90 days prior to planned construction. The 7460 form should be submitted by the City for any projects located on the airport and submitted by the applicant for any projects located off airport property (coordinated with Linn County and City of Albany). The FAA reviews all proposed development to determine if the proposed action

would create any obstructions to FAR Part 77 airspace surfaces. In general, the FAA will object to proposals that result in a penetration to any FAR Part 77 airspace surfaces on the basis of safety.

WEST BRL (250 FEET FROM RUNWAY CENTERLINE)

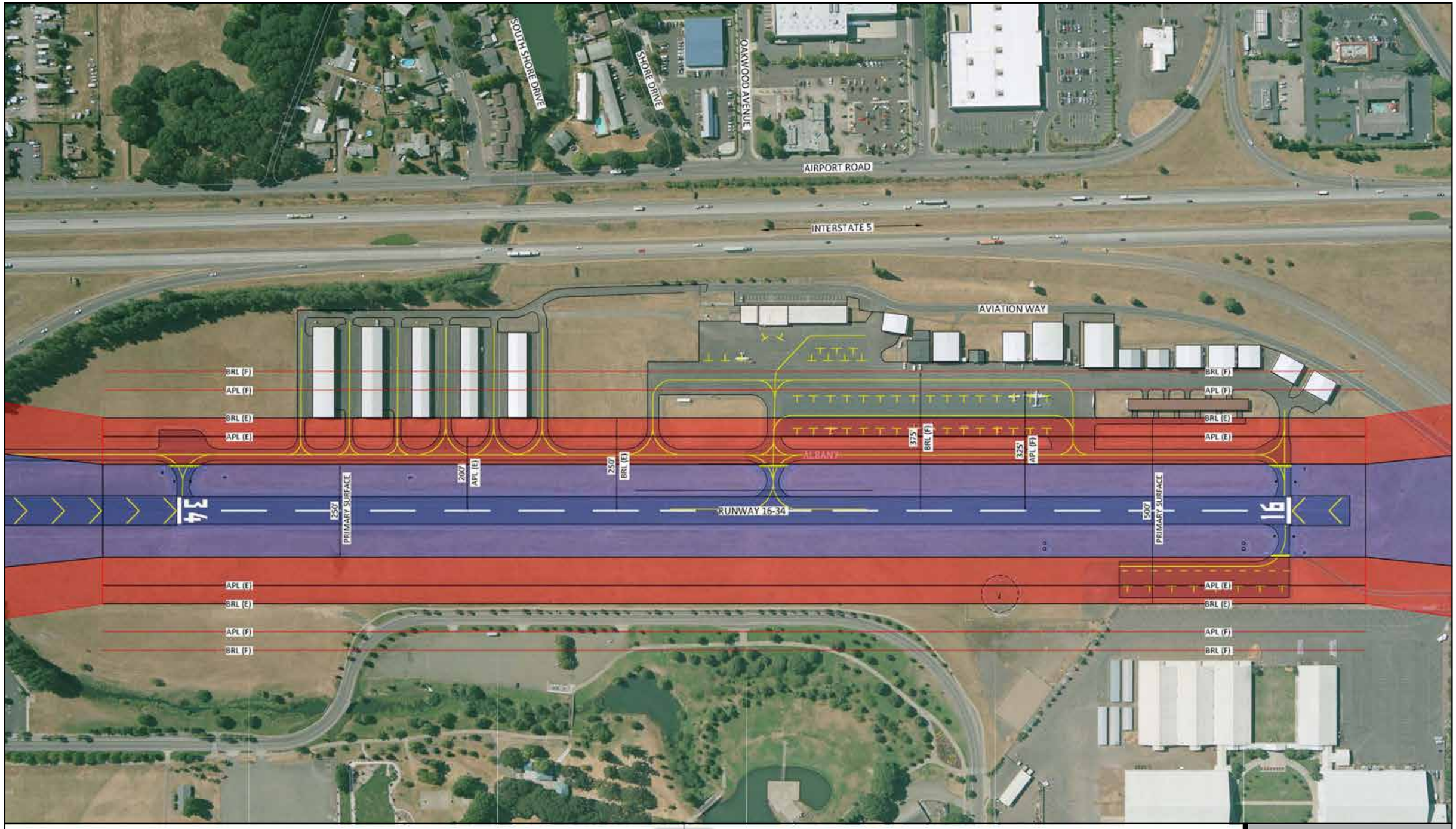
The nearest buildings on the west side of Runway 16/34 are the east ends of the T-hangars located in the south hangar area, located approximately 250 feet from runway centerline. The open-front T-hangar located in north hangar area is located approximately 270 feet from runway centerline. Hangars located along the western edge of the apron are approximately 400 feet from runway centerline and conventional hangars in the north hangar area are located 290 to 380 feet from runway centerline. Most buildings located along the back of the apron roof peak heights ranging from approximately 16 feet to 24 feet. None of the buildings appear to obstruct existing protected airspace associated with Runway 16/34.

EAST BRL (250 FEET FROM RUNWAY CENTERLINE)

There are no structures (on airport property) located on the east side of Runway 16/34. The nearest off-airport structures are located approximately 270 to 330 feet from runway centerline. The structures are not listed as obstructions on the 2002 Airspace Plan, but the roof heights for the close-in structures should be verified during a future obstruction survey.

Instrument Approach Upgrade Note:

As noted earlier, the potential development of a straight-in instrument approach to either runway end requires a 500-foot wide primary surface, compared to current 250-foot wide primary surface. The impact on the BRLs for Runway 16/34 would be a 125-foot lateral shift, caused by the corresponding shift of the transitional surface and the beginning of its 7:1 slope. To maintain the same 17.8-foot vertical clearance of the existing BRL, the new BRL would need to be located 375 feet from runway centerline. The south T-hangars located approximately 250 feet from runway centerline would be at the outer edge of the wider primary surface and the entire east end elevation of the structures would penetrate the transitional surface. Hangars located along the western edge of the apron, approximately 400 feet from runway centerline, could have roof elevations of approximately 21 feet with penetrating the shifted transitional surface. The open-front T-hangar in the north hangar area would also penetrate a shifted transitional surface. Some conventional hangars in the north hangar area would penetrate a shifted transitional surface. Penetrating objects would at a minimum require red obstruction lighting and any potential impact on the approach minimums would be determined during procedure design. **Figure 4-5** illustrates the changes in building restriction lines and aircraft parking lines that would be associated with an upgrade to a straight-in instrument approach.



ALBANY MUNICIPAL AIRPORT | AIRPORT MASTER PLAN

BRL/APL LOCATIONS PER FAR PART 77 | **FIG. 4-5**

CENTURY WEST ENGINEERING CORPORATION

Runway Protection Zones (RPZ)

The FAA provides the following definition for runway protection zones:

"The RPZ's [runway protection zone] *function is to enhance the protection of people and property on the ground. This is achieved through airport owner control over RPZ's. Such control includes clearing RPZ areas (and maintaining them clear) of incompatible objects and activities. Control is preferably exercised through the acquisition of property interest in the RPZ. The RPZ is trapezoidal in shape and centered about the extended runway centerline. The RPZ's begins 200 feet beyond the end of the area useable for takeoff or landing."*

Runway protection zones (RPZ) with buildings, roadways, or other items do not fully comply with FAA standards. It is recognized that realigning major surface roads located within the runway protection zone may not always be feasible. It is recommended that airport sponsors control the RPZs through ownership whenever possible. Alternatively, avigation easements[2] should be acquired where the airport purchases an easement that limits the height of any constructed items and may limit types of uses or activities that are allowed in the area.

The 2002 Airport Layout Plan depicts existing and future RPZs for Runway 16 and 34 based on standards for small aircraft and approach visibility minimums ("visual and not lower than 1-mile"). This standard is consistent with the current design aircraft and the existing circling and potential straight-in nonprecision instrument approaches.

Note: FAA Guidance of RPZs and Roads (Fall 2012)

In October 2012, the FAA released new guidance regarding runway protection zones and roads. In short, the policy directs airport sponsors to evaluate any planned changes to existing RPZs that introduce or increase the presence of roads in RPZs. Existing roads within RPZs are also to be evaluated during master planning to determine if feasible alternatives exist for realignment of roads outside RPZs or for changes to the RPZs themselves. Any proposed changes in the length of Runway 16/34 that change the location of existing RPZs evaluated in this study are subject to review by FAA headquarters in Washington D.C.

The FAA is also strongly discouraging development within RPZs. As noted in the inventory, the south apron and a portion of the south access taxiway are located within the Runway 34 RPZ. These facilities are not consistent with current FAA RPZ development guidelines and FAA has indicated that future improvements to these facilities or other development within the RPZ would not be supported.

[2] An avigation easement (*avigation = aviation + navigation*) involves the purchase of airspace rights over a particular defined ground area. The easement normally limits the maximum height of any natural or built items and may include provisions restricting the type of activities permitted. Compensation is negotiated between the airport owner and property owner.

Aircraft Parking Line

The aircraft parking line (APL) represents the minimum setback required for locating aircraft parking in order to clear the adjacent runway-taxiway system. The location of the APL is generally determined by the more demanding of runway airspace clearance and taxiway obstruction clearance.

The 2002 Airport Layout Plan depicts 200-foot APLs on both sides of the Runway 16/34. At 200 feet from runway centerline, an aircraft tail height of approximately 10.7 feet can be accommodated without penetrating the runway transitional surface that extends outward along the sides of the runway. Most small single-engine aircraft have tail heights less than 10 feet. Larger aircraft often have tail heights exceeding 10 feet and these aircraft require increased setback distances to avoid penetrating the transitional surface.

Instrument Approach Upgrade Note:

The potential development of a straight-in instrument approach to either runway end requires a 500-foot wide primary surface, compared to current 250-foot wide primary surface. Per FAR Part 77, the primary surface should be free of physical obstructions such as parked aircraft or structures. As with the BRLs, the impact on the APLs for Runway 16/34 would be a 125-foot lateral shift to accommodate the wider primary surface and shifted transitional surface. To maintain the same 10.7-foot vertical clearance of the existing APL, the new APL would need to be located 325 feet from runway centerline. (See **Figure 4-5**, presented earlier in the chapter). The eastern row of tiedowns on the main apron and the tiedowns on the east tiedown apron would be located within the expanded primary surface and would not be usable. The tails of aircraft parked in the western row of tiedowns of tiedowns would penetrate the transitional surface by an average of 2 to 5 feet (small single engine aircraft). It appears that the impact on the western row of tiedowns could be mitigated by modifying the tiedown row and/or reducing clearance slightly to accommodate single engine aircraft with typical tail heights of 8 to 9 feet. Larger aircraft parking would need to be located to avoid tail penetrations to the transitional surface.

These changes would increase the runway setback required for parked aircraft to avoid surface penetrations. With a 500-foot wide primary surface, a 306-foot setback would be required to accommodate a typical single engine airplane with a tail height of 8 feet, which represents a loss of 106 feet of useable apron from the current 200-foot APL.

Runway - Parallel Taxiway Separation

Runway 16/34 has a full length west and partial-length east parallel taxiway with runway separation of 150 feet, which meets the B-I small standard.

FAR Part 77 Surfaces

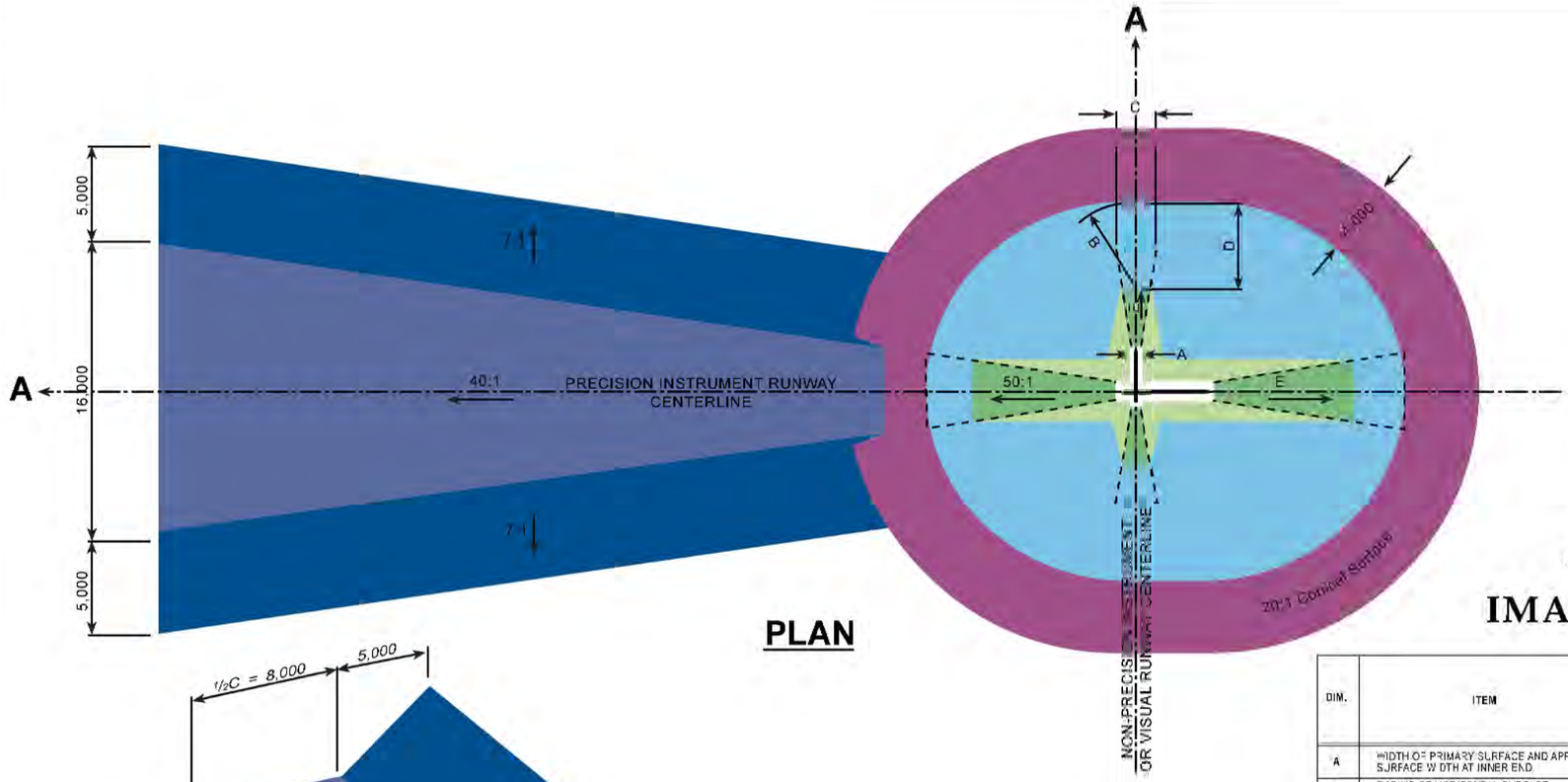
Airspace planning for U.S. airports is defined by Federal Air Regulations (FAR) Part 77 – Objects Affecting Navigable Airspace. FAR Part 77 defines imaginary surfaces (airspace) to be protected surrounding airports. **Figures 4-6 and 4-7** on the following pages illustrate plan and isometric views of generic Part 77 surfaces.

The 2002 Airspace Plan depicts airspace surfaces based on "utility" visual approaches for Runway 16/34. As noted earlier, the existing airspace associated with Runway 16/34 supports the current nonprecision instrument approach with a visual final approach segment. The 2002 Airspace Plan identified several items of interest in the immediate vicinity of the runway, although only one item (vehicles traveling on the airport access road) was listed as an obstruction (<1 foot in the Runway 16 approach). No areas of terrain penetration are depicted on the 2002 Airspace Plan. A review of topographical mapping will be conducted to verify the obstruction clearance for all airspace surfaces associated with Albany Municipal Airport as part of the drawing update. Updated obstruction data (where available) will be added to the updated airspace plan being prepared in the master plan update. Data gathered during future obstruction surveys should be added to the airspace plan drawing through periodic updates.

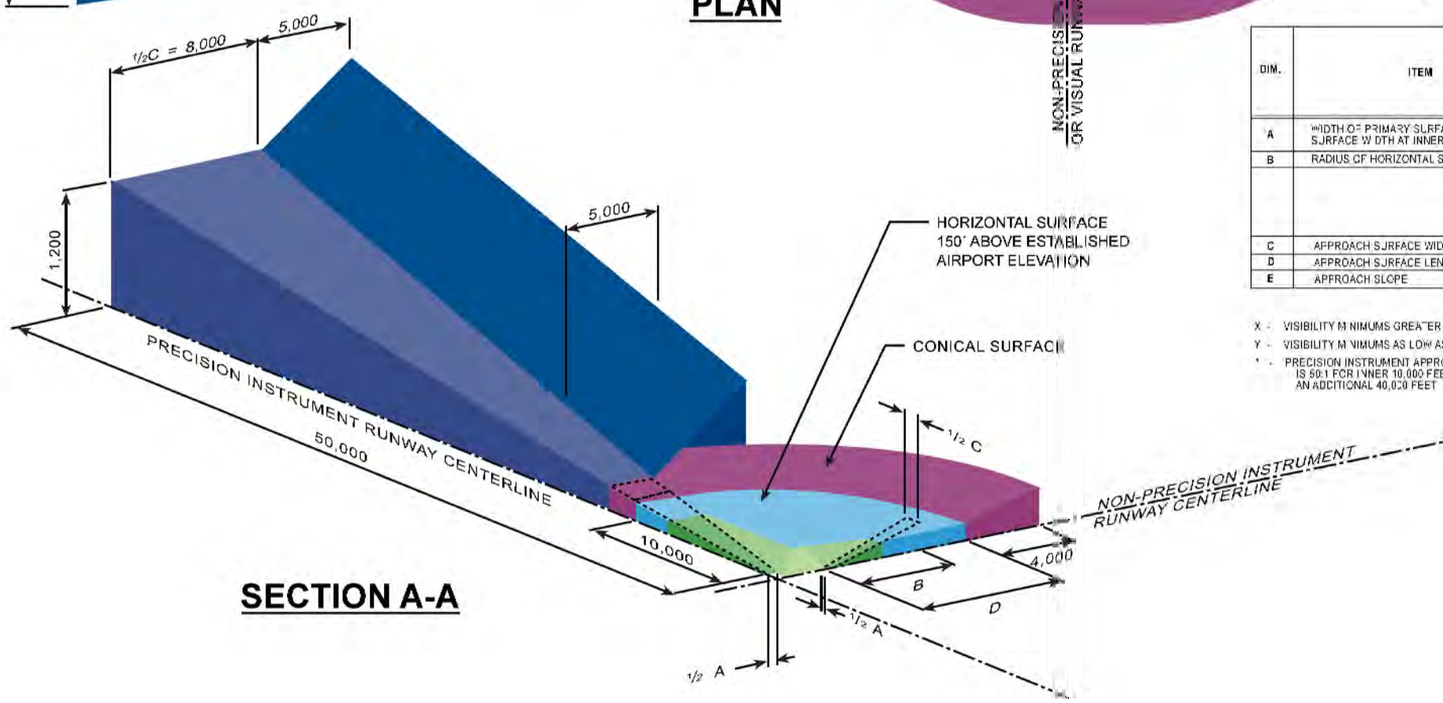
Table 4-3 summarizes the airspace surface dimensions for Albany Municipal Airport based on current and future approach options.

TABLE 4-3: FAR PART 77 AIRSPACE SURFACES

Item	**Runway 16/34** *(Utility - Visual)* *(Current Standard, as depicted on 2002 Airspace Plan)*	**Runway 16/34** *(Utility Non-Precision Instrument)* *(Optional Future Standard)*
Width of Primary Surface	250 feet	**500 feet**
Transitional Surface	7:1 Slope to 150 feet above runway	7:1 Slope to 150 feet above runway
Approach Surface Width at End	1,250 feet	**2,000 feet**
Approach Surface Length	5,000 feet	5,000 feet
Approach Surface Slope	20:1	20:1
Horizontal Surface Elevation Horizontal Surface Radius	150 feet above airport elevation 5,000 feet	150 feet above airport elevation 5,000 feet
Conical Surface	20:1 for 4,000 feet	20:1 for 4,000 feet



PLAN



SECTION A-A

SURFACE SLOPE KEY

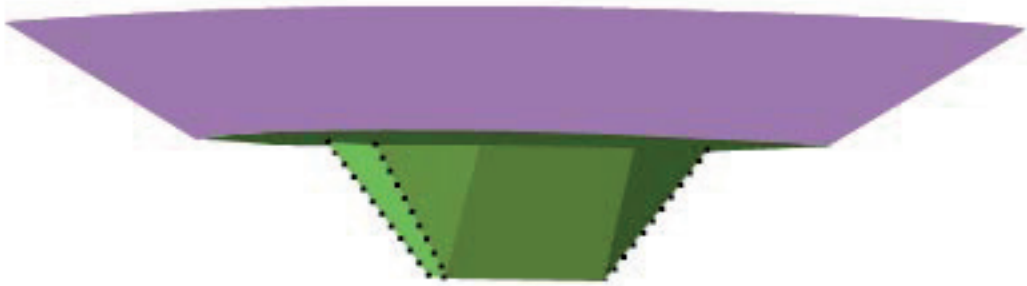
- HORIZONTAL SURFACE
- 20:1
- 7:1
- 7:1
- VARIES (SEE "E" VALUE IN TABLE BELOW)
- 40:1 (PRECISION INSTRUMENT RUNWAY ONLY)

CIVIL AIRPORT IMAGINARY SURFACES

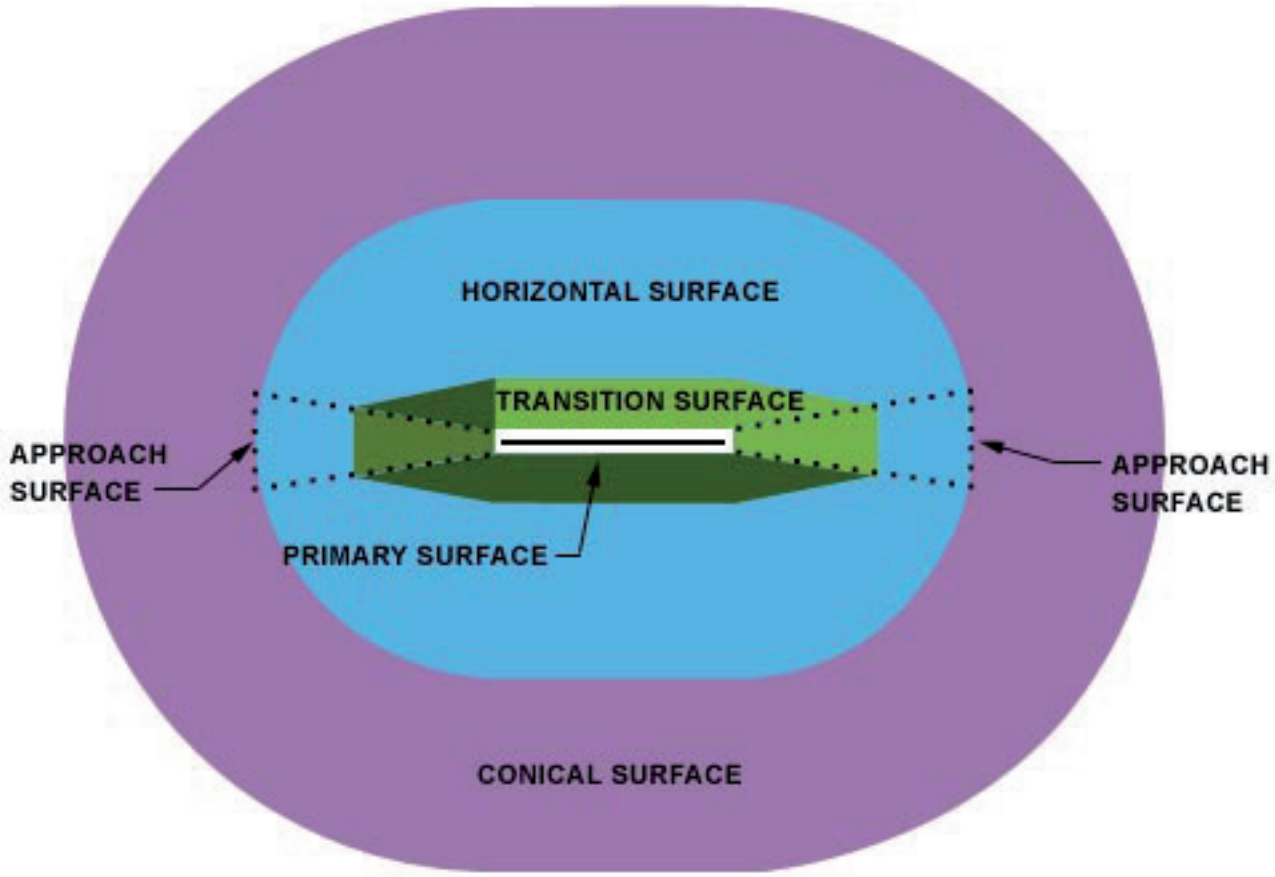
DIM.	ITEM	DIMENSIONAL STANDARDS (FEET)					
		VISUAL RUNWAY		NON-PRECISION INSTRUMENT RUNWAY			PRECISION INSTRUMENT RUNWAY
		UTILITY	LARGER THAN UTILITY	UTILITY	LARGER THAN UTILITY		
					X	Y	
A	WIDTH OF PRIMARY SURFACE AND APPROACH SURFACE WIDTH AT INNER END	250	500	500	500	1,000	1,000
B	RADIUS OF HORIZONTAL SURFACE	5,000	5,000	5,000	10,000	10,000	10,000
		VISUAL APPROACH		NON-PRECISION INSTRUMENT APPROACH			PRECISION INSTRUMENT APPROACH
		UTILITY	LARGER THAN UTILITY	UTILITY	LARGER THAN UTILITY		
					X	Y	
C	APPROACH SURFACE WIDTH AT END	1,250	1,500	2,000	3,500	4,000	16,000
D	APPROACH SURFACE LENGTH	5,000	5,000	5,000	10,000	10,000	*
E	APPROACH SLOPE	20:1	20:1	20:1	34:1	34:1	*

X - VISIBILITY MINIMUMS GREATER THAN 3/4 MILE
Y - VISIBILITY MINIMUMS AS LOW AS 3/4 MILE
* - PRECISION INSTRUMENT APPROACH SLOPE IS 50:1 FOR INNER 10,000 FEET AND 40:1 FOR AN ADDITIONAL 40,000 FEET

HEIGHT HAZARD AIRSPACE ZONES



PROTECTED AIRSPACE



OVERHEAD VIEW

Approach Surfaces

Runway approach surfaces extend outward and upward from each end of the primary surface, along the extended runway centerline. As noted earlier, the dimensions and slope of approach surfaces are determined by the type of aircraft intended to use the runway and most demanding approach planned for the runway.

The 2002 Airspace Plan depicts 20:1 approach surfaces for Runway 16/34 that are consistent with the runway category, existing approach capabilities, and approach visibility minimums. The approach surfaces extend 5,000 feet from the end of the runway primary surface. As noted earlier, a minor penetration (<1 foot) was previously identified (airport access road) for the Runway 16 approach surface based on an estimated road elevation and vehicle traveling on the roadway. Knox Butte Road was listed for reference only (no obstruction) within the Runway 16 approach surface. Elevation data and locations for numerous overhead light poles recently installed along the I-5 exit northbound exit will be added to the airspace plan. Four items (trees, powerline, Santiam Highway, and I-5 Off Ramp) are located within the Runway 34 approach surface but do not appear to penetrate the surface. The obstruction data for these items will be reviewed.

PRIMARY SURFACE

The primary surface is a rectangular plane of airspace, which rests on the runway (at centerline elevation) and extends 200 feet beyond the runway end. The primary surface should be free of any penetrations, except items with locations fixed by function (i.e., PAPI, runway or taxiway edge lights, etc.). The primary surface end connects to the inner portion of the runway approach surface.

The 2002 Airspace Plan depicts a 250-foot wide primary surface for Runway 16/34 that is consistent with the runway category, existing approach capabilities and approach visibility minimums. No obstructions to the primary surface were identified on the 2002 plan.

TRANSITIONAL SURFACE

The transitional surface is located at the outer edge of the primary surface, represented by a plane of airspace that rises perpendicularly at a slope of 7 to 1, until reaching an elevation 150 feet above runway elevation. This surface should be free of obstructions (i.e., parked aircraft, structures, trees, etc.). No building or parked aircraft penetrations were identified within the Runway 16/34 transitional surfaces on the 2002 Airspace Plan.

HORIZONTAL SURFACE

The horizontal surface is a flat plane of airspace located 150 feet above runway elevation with its boundaries defined by the radii (5,000 feet for utility runways) that extend from each runway end. The outer points of the radii for each runway are connected to form an oval, which is defined as the horizontal surface.

The 2002 Airspace Plan depicted airport elevation at 225.91 feet (rounded to 226 feet) above mean sea level (MSL) with a horizontal surface elevation of 376 feet above mean sea level (MSL). No terrain penetrations or other obstructions were identified within the horizontal surface on the 2002 Airspace Plan.

CONICAL SURFACE

The conical surface is an outer band of airspace, which abuts the horizontal surface. The conical surface begins at the elevation of the horizontal surface and extends outward 4,000 feet at a slope of 20:1. The top elevation of the conical surface for Runway 16/34 is 576 feet MSL, 200 feet above the horizontal surface and 350 feet above airport elevation. No terrain penetrations or other obstructions were identified within the conical surface on the 2002 Airspace Plan.

Airside Requirements

Airside facilities are those directly related to the arrival and departure and movement of aircraft:

- Runways
- Taxiways
- Airfield Instrumentation and Lighting

RUNWAYS

The adequacy of the existing runway system at Albany Municipal Airport was analyzed from a number of perspectives including runway orientation, airfield capacity, runway length, and pavement strength.

<u>Runway Orientation & Wind Coverage</u>

The orientation of runways for takeoff and landing operations is primarily a function of wind velocity and direction, combined with the ability of aircraft to operate under adverse wind conditions. A runway's wind coverage is measured by an aircraft's ability to operate with a "direct" crosswind, which is defined as 90 degrees to the direction of travel. For runway planning purposes, the maximum direct crosswind for small aircraft is 12 miles per hour; larger general aviation aircraft are typically designed to accommodate a

15 mile per hour direct crosswind. Aircraft are able to operate safely in progressively higher wind speeds as the crosswind angle decreases and the wind direction turns more closely to the direction of flight. In addition, some aircraft are designed to safely operate with higher crosswind components. Ideally, an aircraft will take off and land directly into the wind or with light crosswind. The FAA recommends that primary runways accommodate at least 95 percent of local wind conditions; when this level of coverage is not provided, the FAA recommends development of a secondary (crosswind) runway.

The 2002 Airport Layout Plan indicates that Runway 16/34 has estimated wind coverage of 99 percent at 15 miles per hour. The source of the wind data is not available, although local pilots indicate that the existing runway alignment is generally favorable with the local prevailing winds.

Runway Length

Runway length requirements are based primarily upon airport elevation, mean maximum daily temperature of the hottest month, runway gradient, and the critical aircraft type expected to use the runway. For general aviation airport runways used predominantly by small aircraft (maximum takeoff 12,500 pounds of less), the FAA recommends an evaluation based on a percentage of the small airplane fleet that is consistent with aircraft use. A common planning approach for general aviation runways accommodating a combination of single engine and multi-engine piston aircraft is to base future runway length planning on 95 or 100 percent of the small airplane fleet (aircraft 12,500 pounds and less).

The 2002 Airport Master Plan recognized the existing runway's ability to accommodate 95 percent of the small airplane fleet and recommended use of the 100 percent segment for long term planning. It was also noted that the length required to accommodate 100 percent of the small airplane fleet (approximately 3,600 feet) is equivalent to various runway lengths required for a typical multi-engine turboprop or small jet (accelerate-stop or balanced field lengths) operating at the airport.

The existing and future design aircraft identified in the updated aviation activity forecasts (Chapter 3) is a multi-engine piston aircraft. However, Albany Municipal Airport also accommodates three locally-based turbine aircraft (business jets) and various transient turbine aircraft under 12,500 pounds. The small business jets and multi-engine turboprops have runway length requirements that represent the upper range of runway length requirements for small aircraft. Based on the specific composition of the based aircraft, the use of the 100 percent of the small airplane fleet is most consistent with actual use. The majority of these aircraft are included in Aircraft Approach Category B and Airplane Design Group I (ADG I).

FAA Advisory Circular (AC) 150-5325-4B, Runway Length Requirements for Airport Design provides the following guidance on determining the appropriate percentage of the fleet for runway length planning for small aircraft:

(a) **Selecting Percentage of Fleet.** The differences between the two percentage categories are based on the airport's location and the amount of existing or planned aviation activities. The airport designer should make the selection based on the following criteria.

(1) **95 Percent of Fleet.** This category applies to airports that are primarily intended to serve medium size population communities with a diversity of usage and a greater potential for increased aviation activities. Also included in this category are those airports that are primarily intended to serve low-activity locations, small population communities, and remote recreational areas. Their inclusion recognizes that these airports in many cases develop into airports with higher levels of aviation activities.

(2) **100 Percent of Fleet.** This type of airport is primarily intended to serve communities located on the fringe of a metropolitan area or a relatively large population remote from a metropolitan area.

(b) **Future Airport Expansion Considerations.** Airports serving small airplanes remain fairly constant in terms of the types of small airplane using the airport and their associated operational requirements. However, it is recommended that the airport designer assess and verify the airport's ultimate development plan for realistic changes that, if overlooked, could result in future operational limitations to customers. The airport designer should at least assess and verify the impacts of:

(1) Expansions to accommodate airplanes of more than 12,500 pounds (5,670 kg). Failure to consider this change during an initial development phase may lead to the additional expense of reconstructing or relocating facilities in the future.

(2) Requirements to operate the runway during periods of Instrument Meteorological Conditions (IMC). The requirement for this capability is highest among airplanes used for business and air taxi purposes.

It is evident that the two considerations noted in item b (Future Airport Expansion Considerations) already exist at Albany Municipal Airport. The presence of small business jets at an airport Albany's size is unique and creates operational considerations that might not exist at other similar airports in communities the size of Albany and larger. The diverse mix of multi-engine piston and turbine aircraft that weigh 12,500 pounds or less included in ARC B-I effectively represent the last 5 percent of the small airplane fleet in terms of runway length requirements. For these reasons, the runway length required to accommodate 100 percent of the small airplane fleet is recommended for runway planning at Albany Municipal Airport. A summary of FAA recommended runway lengths for planning based on the requirements of small aircraft is presented in **Table 4-4**.

TABLE 4-4: FAA RECOMMENDED RUNWAY LENGTHS FOR PLANNING- (FROM FAA COMPUTER MODEL)

Runway Length Parameters for Albany Municipal Airport

- Airport Elevation: 226 feet MSL
- Mean Max Temperature in Hottest Month: 81.6 F
- Maximum Difference in Runway Centerline Elevation: 0.56 Feet
- Existing Runway Length: 3,004'

Small Airplanes with less than 10 seats	
➢ *75 percent of these airplanes*	*2,940 feet*
➢ *95 percent of these airplanes*	*3,040 feet*
➢ ***100 percent of these airplanes***	***3,610 feet***
➢ *Small airplanes with 10 or more seats*	*4,160 feet*

Based on local conditions and the methodology outlined in **AC 150/5324-4B,** a runway length of 3,610 feet is needed to accommodate 100 percent of small airplane fleet (12,500 pounds or less maximum gross takeoff weight) on Runway 16/34.

To further illustrate the potential capability for the runway to support increased turbine aircraft activity, the runway length requirements for several small business jets and turboprops are summarized in **Table 4-5**. It is noted that several small business jets currently have the ability to operate on the runway at reduced weights. The margin of safety for these turbine operations and all multi-engine operations would be improved with a runway capable of accommodating 100 percent of the small airplane fleet under typical load and summer day weather conditions.

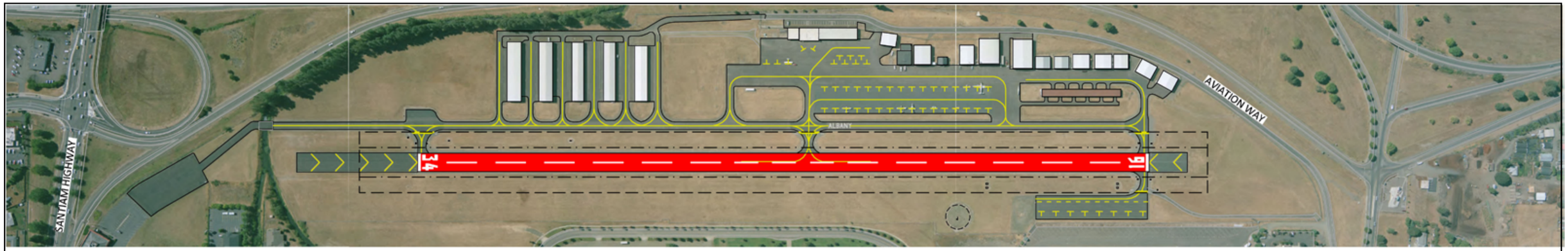
TABLE 4-5: TYPICAL BUSINESS AIRCRAFT RUNWAY REQUIREMENTS

Aircraft	Passengers (typical configuration)	Maximum Takeoff Weight	Runway Length Required for Takeoff [1,3]	Runway Length Required for Landing [2,3]
Beechcraft King Air 200	6-8	12,500	3,300 (a)	2,550 (a)
Cessna Citation Mustang	4-5	8,645	3,000(est.)	2,700 (est.)
Cessna Citation I	4-6	11,850	3,640	2,360
Cessna Citation CJ1+	4-6	10,700	3,990	2,690
Cessna Citation CJ2+	6-7	12,500	3,810	3,100

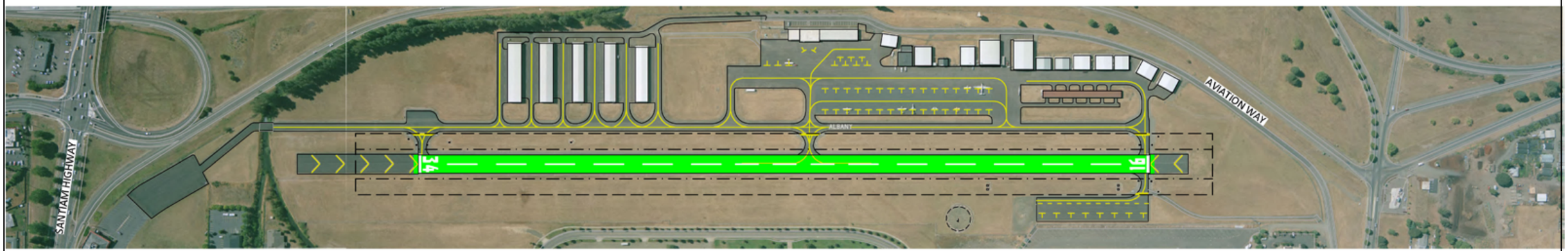
1. FAR Part 25 or 23 Balanced Field Length (Distance to 35 Feet Above the Runway); Sea Level, 86 degrees F; Zero Wind, Dry Level Runway, 15 degrees flaps, except otherwise noted.
2. Distance from 50 Feet Above the Runway; Flaps Land, Zero Wind.
3. Citation I Takeoff and Landing Temperature 90 degrees F

(a) For general comparison only. Manufacturer runway length data based on sea level and standard day temperature (59 degrees F) at maximum takeoff/landing weight.

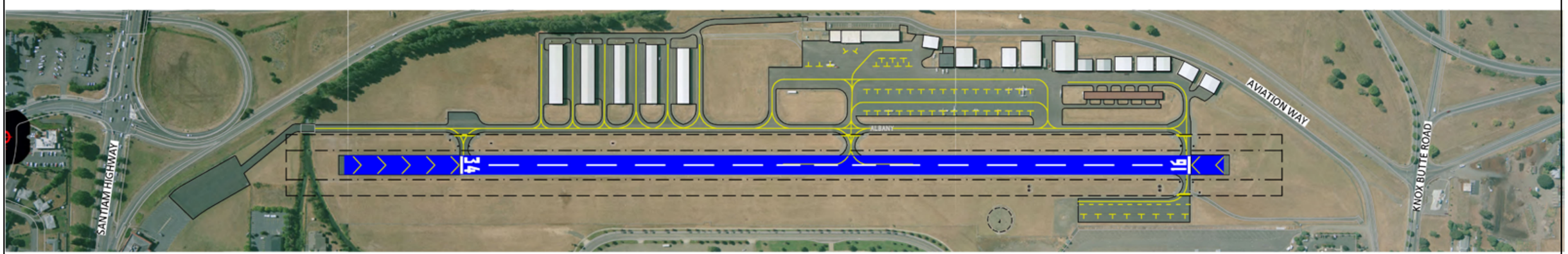
Source: Aircraft manufacturers operating data, flight planning guides.



RUNWAY 3004' X 75' (EXISTING)



RUNWAY 3040' X 75' - 95% SMALL AIRPLANE FLEET



RUNWAY 3610' X 75' - 100% SMALL AIRPLANE FLEET

NOTE:

1. THE INFORMATION DEPICTED IN THIS FIGURE IS FOR RUNWAY LENGTH ILLUSTRATION PURPOSES ONLY AND DOES NOT REFLECT A SPECIFIC RECOMMENDATION OR RUNWAY CONFIGURATION.

Runway Width

Runway 16/34 is 75 feet wide, which exceeds the ADG I standard of 60 feet.

AIRFIELD PAVEMENT

As noted in the Inventory chapter, the runway and exit taxiways have been rehabilitated since the last formal pavement inspection in 2008. The 2012 Pavement Evaluation / Maintenance Management Program for Albany Municipal Airport was based on pavement inspections conducted in July 2012. **Table 4-6** summarizes the pavement condition index (PCI) ratings for 2012 and the predicted conditions for 2017 and 2022, assuming no maintenance is performed. The PCI rating scale is 0 to 100. 100 represents new pavement and 0 represents "failed" pavement. The majority of existing airfield pavements are rated fair or better (55+) with recently rehabilitated pavements rated 100. The paved overruns at both ends of the runway were not rated in the recent inspection, but would be similar to the runway. Pavements with lower ratings include the center and outer sections of the main apron, the north hangar taxiway, the south aircraft hold area, south apron and the section of the south access taxiway located south of the bridge. It is expected that these pavements will require rehabilitation or reconstruction during the current twenty year planning period if they are to remain in service.

All airfield pavements require periodic crackfilling, vegetation removal and sealcoating to optimize useful life. With effective maintenance, the runway and other recently rehabilitated pavements should not require rehabilitation in the current twenty-year planning period.

TABLE 4-6: SUMMARY OF AIRFIELD PAVEMENT CONDITION (PCI RATINGS)

Pavement Section	2012	2017	2022
Runway 16/34	100	94	89
Runway Blast Pads (both runway ends)	Not rated	Not rated	Not rated
Paved Overruns	Not rated	Not rated	Not rated
West Parallel Taxiway Exit Taxiways (A1-A3)	84-89 100	82-84 96	82 88
Main Apron	72-80	44-57	14-56
East Tiedown Apron	85	79	76
North Hangar Taxilane	68	64	56
North T-Hangar Stub Taxilane	96	84	71
South Apron	44	41	40

South Access Taxiway	85 (N of bridge) 50 (S of bridge)	82 (north) 37 (south)	82 (north) 27 (south)
South Hangar Taxilanes	71-94	69-82	69-74

TAXIWAYS

Taxiways are constructed primarily to facilitate aircraft movements to and from the runway system. Some taxiways are necessary simply to provide access between apron and runways, while other taxiways become necessary as activity increases and safer and more efficient use of the airfield is needed. The existing taxiway system at Albany Municipal Airport provides aircraft access to the runway and all landside facilities.

Parallel Taxiway

The west parallel taxiway serving Runway 16/34 provides efficient access to the runway from the airport's primary landside facilities. The parallel taxiway has three 90-degree connecting exit taxiways which facilitate movement of aircraft between the runway and parallel taxiway. The west parallel taxiway's aircraft holding area located near the end of Runway 34 does not fully conform to ADG I taxiway object free area clearance standards (wingtip clearances between taxiing and holding aircraft). No major capacity or service related improvements are anticipated. The west parallel taxiway is 30 feet wide, which exceeds the ADG I taxiway width standard (25 feet).

Taxilanes

The future development of new hangars or aircraft parking on the airport will require additional taxilane access. Access taxiways and taxilanes serving small hangar developments are 25 feet wide for ADG I aircraft with a 79-foot wide object free area. As noted earlier in this chapter, several existing hangar taxilanes do not meet FAA taxilane object free area clearing standards. While it may not be feasible to relocate existing hangars, new hangars should be configured to meet FAA standards.

The taxilanes located within the main aircraft apron should be configured to provide the standard object free area clearances. Light airplane tiedown rows and adjacent taxilanes are typically designed to accommodate airplane design group (ADG) I aircraft; parking positions for larger multi-engine aircraft should be sized appropriately. The taxilane centerline to the nearest fixed/moveable object (parked aircraft) of 39.5 corresponds to the object free area dimensions for ADG I.

The east aircraft parking apron is served by a taxilane that connects to Taxiway C at the north end of the runway. The taxilane is parallel to the runway and meets FAA design standards for both runway separation (150 feet) and taxilane object free area clearance to adjacent parked aircraft. Any future

expansion of the east tiedown apron or other landside development to south of the apron, would require extending the east taxilane or adding a section of east parallel taxiway.

AIRFIELD INSTRUMENTATION, LIGHTING AND MARKING

Navigational Aids

Runway 16/34 currently supports a circling nonprecision instrument approach through conventional ground based navigational aids (the Corvallis VOR/DME, located 13 nautical miles southwest of Runway 16/34). There are no ground based electronic navigational aids located on the airport. The ongoing development and evolution of satellite-based instrument approach platforms has largely eliminated the need for airports to install and maintain conventional navigational aids, such as localizers or instrument landing systems (ILS). Instrument approaches currently being designed for general aviation airports typically use WAAS or LPV platforms, depending on the airfield capabilities and surrounding airspace. The FAA is currently implementing "NextGen" capabilities in the national airspace system that will eventually allow more efficient movement of aircraft between airports and provide more innovative instrument approach and departure routing and other capabilities.

Runway/Taxiway Lighting

The lighting systems associated with Runway 16/34 were installed new as part of the runway rehabilitation conducted in 2011. The lighting systems include medium intensity runway edge lighting (MIRL), runway end identifier lights (REIL), and visual approach slope indicators (VASI). The systems meet the standard for general aviation runways with visual or nonprecision instrument approaches.

The parallel taxiways and exit taxiways are not equipped with edge lighting. Medium-intensity taxiway lighting (MITL) may be considered if an upgrade from edge reflectors was desired or the level of night operations increased significantly.

Runway Markings

Runway 16/34 has basic (visual) markings, consistent with existing approach capabilities. The markings (threshold marking bars, runway end numbers, centerline stripe) are in excellent condition and were applied in the 2011 rehabilitation project. The runway exit taxiways have yellow aircraft hold line markings located 125 feet from runway centerline, which meets the runway OFA and OFZ clearing standard.

Airfield Signage

The lighted airfield signage (location, mandatory, directional, destination, and distance remaining signs) are internally illuminated and were installed new during the runway and lighting rehabilitation projects.

Airfield Lighting

Airport management reports that the existing airport beacon operates normally.

The internally lighted wind cone on the east side of the runway is in excellent condition.

ON FIELD WEATHER DATA

Albany Municipal Airport does not currently have on-site weather observation. Aircraft conducting instrument approaches at the airport are required to use the altimeter and Automated Weather Observation System (AWOS) at Corvallis Municipal Airport. The addition of on-site weather observation capabilities was recommended in the 2002 airport master plan to provide weather data to support airport operations in both visual and instrument conditions. Having onsite weather would also allow aircraft licensed under FAR Part 135 (air taxi/charter) to operate in IFR conditions.

Landside Facilities

For general aviation airports, landside facilities are generally defined as those that serve aircraft, passenger needs and their related functions. At Albany Municipal Airport, landside facilities include aircraft aprons, hangars, and fixed base operator (FBO) space and aircraft fueling facilities. The airport does not currently have an FBO to provide services to local or transient general aviation users and all fueling is self-service.

The 2002 Airport Layout Plan depicted apron expansion on the east side of the existing aviation fuel storage tank, a south taxilane connection on the main apron, vehicle parking behind the hangars located on the main apron, new hangar construction adjacent to the main apron and in the north and south hangar areas, and a future FBO reserve and large apron near the southwest corner of the airport. As noted in the Inventory chapter, several new hangars and the south taxilane connection on the apron have been constructed since the last master plan was completed.

AIRCRAFT PARKING AND TIEDOWN APRON

Aircraft aprons provide parking for locally based aircraft that are not stored in hangars and for transient aircraft visiting the airport and ground operations such as aircraft fueling. At Albany Municipal Airport, the main apron area accommodates small airplane tiedowns, aircraft fueling, and occasional aerial applicator activity. Larger aircraft parking is also accommodated on the apron (in small airplane tiedown

rows), although there are no parking positions designed for larger aircraft. As noted earlier, larger aircraft parked in the small airplane tiedown rows typically extend well into the adjacent taxilanes, which reduces the available taxilane clearance. The addition of parking positions for twin-engine or other larger aircraft should be addressed in the apron alternatives evaluation.

The west apron area currently has 44 small airplane tiedowns. As noted earlier, the existing apron configuration does not meet FAA taxilane object free area clearance standards for ADG I aircraft in several areas. Options for reconfiguring the apron to meet standards will be included in the alternatives evaluation. It is noted that in order to meet FAA design standards, some reduction in the number of tiedown positions may be needed. Based on this possibility, future space calculations should not assume that 100 percent of existing tiedown capacity will be available to meet forecast demand.

The east tiedown apron has 8 small airplane tiedowns, although the apron has no vehicle access and limited pedestrian access. The east tiedown apron is convenient when staying at the adjacent hotels or attending events at the Fair and Expo Center, but is otherwise separated from aircraft fueling or surface access. The south apron has space to accommodate 12 aircraft, but due to its location in the Runway Protection Zone for Runway 34, it will not be included in the calculation of available apron capacity.

In order to address the uncertainty associated with predicting long term demand, aircraft apron reserve areas should be identified to preserve the airport's ability to accommodate user needs. A development reserve area equal to 50 to 100 percent of the net twenty year parking demand will provide a conservative planning guideline to accommodate unanticipated demand, changes in existing apron configurations, and demand beyond the current planning period. The location and configuration of the development reserves will be addressed in the alternatives analysis.

Aircraft Parking Demand (Local and Itinerant)

For planning purposes, it is assumed that 85 percent of forecast based aircraft will be stored in hangars and 15 percent will use apron parking. Based on these assumptions, 16 light aircraft tiedowns will be required for locally-based aircraft by 2032. These estimates may prove to be overly optimistic in gauging apron parking demand for based aircraft as additional hangar space is developed at the airport. However, this approach will ensure that adequate apron is preserved for long term use.

FAA **Advisory Circular 150/5300-13** suggests a methodology by which itinerant parking requirements can be determined from knowledge of busy day operations. Future demand for itinerant parking spaces was estimated based on 30 percent of design day itinerant operations (30% of daily itinerant operations divided by two, to identify peak parking demand). The FAA planning criterion of 360 square yards per itinerant aircraft was applied to the number itinerant spaces to determine future itinerant ramp requirements. By 2032, itinerant aircraft parking requirements are estimated to be 15 aircraft parking

positions including aircraft 10 small airplane tiedowns, 4 twin-engine tiedowns or business aircraft drive-through parking positions and 1 transient helicopter parking position (see below). **Table 4-7** summarizes projected aircraft parking requirements based on the updated aviation activity forecasts.

As noted earlier, the main apron is not currently configured to allow efficient parking for larger B-I aircraft (multi-engine piston, turboprop, business jets). The alternatives analysis will consider options for accommodating a limited amount of aircraft parking for these types of the aircraft.

Aircraft Fueling Apron

The existing aircraft fueling area can accommodate one or two small aircraft on the apron located on the west side of the fuel tanks. However, as noted earlier, the existing clearance between the fueling area and the adjacent taxilane to the west does not meet FAA taxilane OFA standards. Options for reconfiguring, expanding or relocating the fueling apron will be addressed in the airport development alternatives.

Aerial Applicator Loading Area

A small area located at the south end of the main apron is periodically used by an agricultural aircraft operator. There are no permanent facilities in place and the site has no secondary containment in the area used for aircraft loading. Options for upgrading this facility or eliminating its use should be considered in the alternatives analysis.

AIRCRAFT HANGARS

Albany Municipal Airport accommodates a wide variety of hangars including commercial hangars and hangars used primarily for aircraft storage. It is estimated that 85 percent of the airport's 80 based aircraft are stored in hangars, with the remaining aircraft parked on aircraft apron. For planning purposes, it is assumed that existing hangar space is committed and all additional (forecast) demand would need to be met through new construction.

As indicated in the aviation activity forecasts, the number of based aircraft at Albany Municipal Airport is projected to increase by 28 aircraft during the twenty year planning period. Based on a projected 85 percent hangar utilization level, additional long term demand for new hangar space is estimated to be 24 spaces. A planning standard of 1,500 square feet per based aircraft stored in hangars is used to project gross space requirements (24 aircraft = 36,000 square feet). The projected hangar requirements for aircraft storage at Albany Municipal Airport are presented in **Table 4-7.**

In addition to aircraft storage, additional demand for business related and commercial hangar needs should be anticipated. Specialized aviation service businesses such as engine & airframe repair, avionics, interior and paint shops generally prefer locations that provide convenient aircraft access. Highly

successful aviation service businesses generally rely on both locally based aircraft and their ability to attract customers from outside the local area. While there is no specific formula to predict demand for general aviation service businesses at a particular airport, reserving several spaces for larger commercial hangars is recommended.

Individual aircraft owners needs vary and demand can be influenced by a wide range of factors beyond the control of an airport. In addition, the moderate forecast growth in based aircraft may be exceeded if conditions are favorable. For this reason, it is recommended that hangar development reserves be identified to address the uncertainty of hangar market conditions and demand factors. Conservative development reserves should be established to accommodate a combination of conventional hangars -and T-hangars, roughly equal to 50 to 100 percent of the twenty year forecast (net) demand. The location and configuration of the development reserves is addressed in the alternatives analysis.

TABLE 4-7: APRON AND HANGAR FACILITY REQUIREMENTS SUMMARY

Item	Base Year (2012)	2017	2022	2027	2032
Based Aircraft Forecast	**80**	**87**	**93**	**100**	**108**
Aircraft Parking Apron ***(Note: capacities reflect current configuration of existing apron areas, actual capacity when reconfigured may be significantly different.)***					
Small Aircraft Tiedowns (SE)	52				
Other Designated Parking Positions	0				
Total Designated Parking Spaces Available	52*				
Total Apron Area *(includes taxilanes and unusable space required for hangars access)*	30,000 sy				
Projected Needs (*Gross Demand*) [1]					
Itinerant Single Engine Aircraft Tiedowns (@ 360 SY each)		7 spaces / 2,520 sy	9 spaces / 3,240 sy	9 spaces / 3,240 sy	10 spaces / 3,600 sy
Locally Based Tiedowns (@ 300 SY each)		13 spaces / 3,900 sy	14 spaces / 4,200 sy	15 spaces / 4,500 sy	16 spaces / 4,800 sy
Multi-Engine Aircraft Parking (@ 625 SY each)		2 spaces / 1,250 sy	2 spaces / 1,250 sy	3 spaces / 1,875 sy	4 spaces / 2,500 sy
Small Helicopter Parking Positions (@ 380 SY each)		1 space / 380 sy	1 space / 380 sy	1 space / 380 sy	1 space / 380 sy
Total Apron Needs		**23 spaces 8,050 SY**	**26 spaces 9,070 SY**	**28 spaces 9,955 SY**	**31 spaces 11,280 SY**
Aircraft Hangars ***(Existing Facilities)***					

Existing Hangar Spaces (est.)	110-115				
Projected Needs ***(Net Increase in Demand)*** [2]					
(New) Hangar Space Demand (@ 1,500 SF per space) *(Cumulative twenty year projected demand: 24 spaces / 36,000 SF)*		**+6 spaces / 9,000 sf**	**+5 spaces / 7,500 sf**	**+6 spaces / 9,000 sf**	**+7 spaces / 10,500 sf**

1. Aircraft parking demand levels identified for each forecast year represent forecast gross demand.
2. Hangar demand levels identified for each forecast year represent the net increase above current hangar capacity.

Surface Access and Vehicle Parking

The primary surface access to the west landside area of the airport is provided by Aviation Way, which connects to Knox Butte Road. Existing access to all developed areas is adequate, although road extensions may be required if additional development occurs south of the south hangar area. The airport may want to consider providing vehicle access to the east tiedown apron through a controlled access gate to improve accessibility and increase its use.

Although the access provided by the Aviation Way serves all current tenants, the location of designated vehicle parking areas (adjacent to the FBO building and some large hangars) does not appear adequate for current needs. As noted earlier, vehicles are observed parking along the west edge of the main apron and north hangar taxiway, adjacent to individual hangars within defined object free areas for taxilanes. The 2002 airport layout plan depicted future vehicle parking areas behind the hangars with access provided from the adjacent roadway. However, a conventional hangar was constructed in the location where access was recommended (immediately north of the FBO building). Options for providing functional vehicle parking in the west landside area should be addressed in the alternatives evaluation. The City of Albany parking code can provide guidance on parking allocations based on building square footage or another acceptable metric.

Support Facilities

AVIATION FUEL STORAGE

The city-owned aviation fuel storage (12,000 gallon Aviation Gasoline) and dispensing facilities appear to be adequate to accommodate current demand. As noted earlier, the existing clearance between the fueling area and the adjacent taxilane does not meet FAA standards. Options for addressing the current configuration will be included in the evaluation of airport development alternatives. In addition, adequate space should be reserved to accommodate additional tanks that may be needed for jet fuel or automobile gasoline. The growth in manufacturing of small turbine aircraft, particularly single engine turboprops, very light jets, and turbine helicopters will increase demand for jet fuel for transient aircraft in

addition to demand from locally-based turbine aircraft. It is also noted that several light airplane manufacturers are now offering diesel engines (that burn jet fuel) as an alternative to conventional AVGAS fueled piston engines.

The development of a secondary containment area for (future) mobile fuel truck parking should also be considered. Most mobile fuel trucks in use today have single wall tank construction and do not provide the secondary containment of double wall aboveground bulk storage tanks. It is anticipated that federal or state regulations will eventually require secondary containment for single wall tank mobile fuel trucks when unattended, such as for overnight parking when the trucks are not in service or otherwise monitored. Locating secondary containment areas for airport fuel trucks in close proximity to the bulk fuel storage areas may be the most efficient use of land in the terminal area.

AIRCRAFT WASH DOWN FACILITIES

Wash down facilities are recommended to accommodate general aviation aircraft with a catch basin and hard piping to divert wash residue into a sewer or stormwater treatment system. Wash facilities are typically sized to accommodate one aircraft on a pad approximately 50 feet by 50 feet. The wash pad may be located adjacent to existing parking apron or hangars; close access to utility systems is a key siting factor. Albany Municipal Airport does not currently have aircraft wash down facilities.

AIRPORT UTILITIES

The existing utilities on the airport appear to be adequate both in capacity and service within the developed areas of the airport. Extensions of water, sanitary sewer and electrical service to serve future landside developments may be required. All power lines located in the vicinity of the airfield are required to be buried. Expansion or upgrade of existing stormwater systems will be required as the impervious surface on the airport increases through development.

SECURITY

The airport has chain link fencing and gates extending along the west landside area and around the north end of the airport to the east side where it connects to chain link fencing for the Fair and Expo Center. A project to extend chain link fencing around the southern perimeter of the airport is planned for 2013.

As noted in the Inventory chapter, the airport has an automated vehicle gate near the FBO building that is intended to control access to the south hangar area. However, a swing gate located immediately north of the FBO building is used to provide tenant access to the main apron and the north hangar area. This gate is generally left unlocked and open, which allows uninterrupted access to the airport. Replacing the swing gate with an automated gate should be considered to provide consistent access control.

Additional flood lighting should be provided in expanded aircraft parking and hangar areas and any other new development areas on the airport to maintain adequate security. The use of full or partial cutoff light fixtures is recommended for all exterior lighting on the airport to limit upward glare.

Facility Requirements Summary

The projected twenty year facility needs for Albany Municipal Airport are summarized in Table 4-8. As noted in the table, maintaining existing pavements represents a significant, ongoing facility need. The updated forecasts of aviation activity anticipate moderate growth in activity that will result in similarly moderate airside and landside facility demands beyond existing capabilities. The existing airfield facilities have the ability to accommodate a significant increase in activity, with targeted facility improvements. For the most part, the need for new or expanded facilities, such as aircraft hangars, will be market driven, although there will be significant front end investments required in preparation, utility extensions, road extensions, and taxiway/taxilane construction. The nonconforming items noted at the beginning of this chapter are relatively minor and can be addressed systematically during the current planning period to improve overall safety for all users.

TABLE 4-8: FACILITY REQUIREMENTS SUMMARY

Item	Short Term	Long Term
Runway 16/34	Pavement Maintenance[1] 600-foot Runway Extension based on accommodating 100% of small airplane fleet	Pavement Maintenance[1]
Taxiways	Expand/Reconfigure aircraft holding area at Rwy 34 end Rehabilitate Parallel Taxiway (Taxiway A) Rehabilitate Hangar Taxilanes Taxiways/Taxilanes to New Hangar Areas Pavement Maintenance[1]	Pavement Maintenance[1] Taxiways/Taxilanes to New Hangar Areas
Aircraft Aprons	Reconfigure Main Apron (rehabilitate / reconstruct older sections) to meet FAA Design Standards Expand Aircraft Fueling Apron Pavement Maintenance[1]	Pavement Maintenance[1] Apron Development Reserves
Hangars	Define development areas for T-hangars, conventional Hangars, and commercial Hangars	Hangar development reserves
Navigational Aids and Lighting	Upgrade Instrument Approach	Taxiway Edge Lighting (MITL) - Taxiway A
Fuel Storage	Expand Fueling Area (address nonstandard taxilane clearances)	Identify Secondary Containment Area(s) for Fuel

	Define Reserve Area for additional fuel tanks/grades	Truck Parking
FBO	Identify FBO reserve(s) for commercial aviation tenants	Same
Utilities	Extend Service to New Development Areas	Same
Roadways	Extend/Improve Roads to New Development Areas	Same
Security	Complete Perimeter Fencing; Add Automated Gates for main apron and north hangar area Flood Lighting	Same

1. Vegetation control, crackfill, sealcoat, slurry seal, localized patching, joint rehabilitation, etc., as required.

AIRFIELD CAPACITY

Annual service volume (ASV) is a measure of estimated airport capacity and delay used for long-term planning. ASV, as defined in FAA Advisory Circular (AC) 150/5060-5, Airport Capacity and Delay, provides a reasonable estimate of an airport's operational capacity. The ratio between demand and capacity helps to define a timeline to address potential runway capacity constraints before they reach a critical point. If average delay becomes excessive (greater than 3 minutes per aircraft), significant congestion can occur on a regular basis, which significantly reduces the efficient movement of air traffic. ASV is calculated based on the runway and taxiway configuration, percent of VFR/IFR traffic, aircraft mix, lighting, instrumentation, the availability of terminal radar coverage and the level of air traffic control at an airport.

For long-term planning purposes, the FAA estimates ASV for a single runway with no air carrier traffic is approximately 230,000; hourly capacity is estimated to be 98 operations during visual flight rules (VFR) conditions and 59 operations during instrument flight rules (IFR) conditions. Although these estimates assume optimal conditions (air traffic control. etc.), they provide a reasonable basis for approximating existing and future capacity:

Existing Capacity: 20,000 Annual Operations / 230,000 ASV = 8.7% (demand/capacity ratio)

Future Capacity: 32,400 Annual Operations/ 230,000 ASV = 14.1% (demand/capacity ratio)

Based on these ratios, the average delay per aircraft would be expected to remain below one minute through the planning period. The FAA recommends that airports proceed with planning to provide additional capacity when 60 percent of ASV is reached. Even applying a more realistic annual capacity in the range of 80,000 to 100,000 operations without an air traffic control tower, forecast demand is expected to remain well below available capacity during the current planning period and well beyond.