3. Facility Requirements

The Facility Requirements chapter serves the purpose of delineating the present and future development prerequisites for CLS (Chehalis-Centralia Airport). These requirements are established through an assessment that considers multiple factors, including the alignment of current facilities with FAA standards, maintenance needs for existing infrastructure, expansion requirements driven by present and anticipated demand, as well as input from Airport staff, the FAA, and other stakeholders.

The analysis of facility requirements commences with an examination of the critical (design) aircraft. This designation is given to the most demanding aircraft or a group of aircraft, each with a minimum of 500 annual operations, which regularly or are expected to operate at the Airport. The critical (design) aircraft plays a pivotal role in shaping CLS design standards, safety zones, facility spacing, and the overall layout of the facility.

As of the present, CLS falls under the classification of an aircraft design group (ADG) B-II airport. According to the FAA-approved Forecast for CLS, it has been definitively established that the existing and foreseeable future needs of the Airport will not surpass the B-II design standards. Consequently, this implies that the Airport will not require immediate airfield infrastructure expansion to accommodate larger design group aircraft as per FAA standards. Nevertheless, the Airport will need to continue planning within the B-II design criteria to effectively address the growing demand.

3.1. EMERGING INDUSTRY TRENDS

The past decade has seen the development and early introductions of technologies which could have significant impacts on general aviation and in turn its supporting airport infrastructure. Many alternatives and methods for implementing these technologies are being proposed for airports across the nation. The airport has the desire and support from the sponsor to be at the leading edge of emerging technology and industry trends, demonstrating application within the industry for GA airports.

Alternative fuels are becoming more prevalent in the aviation industry. One alternative to traditional 100LL avgas is an unleaded 100UL avgas. Unleaded fuels remove harmful lead pollutants from an aircraft's environmental impacts and currently has no known compatibility issues with the current fuel storage tanks or transportation systems at CLS. 100UL would be primarily consumed by piston-engine aircraft at CLS if leaded fuels begin to be phased out of the national aviation fuel inventory. Another developing trend in the field of alternative fuels is Sustainable Aviation Fuel (SAF). SAFs would impact jet engine traffic at CLS and comprises many levels of blended SAF-Jet A mixtures. Both alternative fuel technologies would have minimal compatibility updates or operational impacts if implemented. As of now, there are no FAA recommendations for airports introducing alternative fuels.

In the same vein as alternative propulsion, hydrogen-powered aircraft are also being tested for feasibility. Relative to previously discussed options, hydrogen-powered aircraft would be free of fossil-fuel burn. On-site infrastructure might entirely be determined if hydrogen is delivered to the Airport, generated on-site, or delivered to the Airport by pipeline. Ultimately, a considerable amount of maturation in this market is needed before an airport such as CLS might select which infrastructural choices to support hydrogen aircraft are needed.

Electric powertrains are being similarly studied, developed, and being brought to market for general aviation aircraft and have vastly different airport infrastructure needs from traditional avgas-fueled piston engines. Differing methods for aircraft recharging involve plug-in charging like electric vehicles as well as modular battery replacement. Both methods would have varying infrastructural needs at the Airport. Plug-in charging infrastructure would necessitate the installation of charging stations and associated support infrastructure while modular replacement batteries would require charging facilities in addition to a service provider which handles recharging, installation, and transportation of batteries. Beyond just aircraft charging, the expanded use of airfield electricity will also impact the overall Airport electrical system and necessitate upgrades needed to ensure valuable airport lighting, utilities, and services are not interrupted at the expense of electric aircraft charging. The 2020 WSDOT Electric Aircraft Feasibility Study acknowledges that to address this need, airports may need to pursue expanded electrical capacity through on-site generation or to pursue improvements to electrical grid access. Power distribution equipment at the airport may also require investment to ensure continued operational readiness for both airport needs and aircraft charging.

While not yet brought to market at scale, Advanced Air Mobility (AAM) is a class of aviation operations that is gaining regulatory momentum and manufacturer interest. For general aviation airports, Urban Air Mobility (UAM), Regional Air Mobility (RAM), and Unmanned Aerial Systems (UAS) all offer unique growth in operations, but all with various infrastructure and safety considerations for airport planning. At present, only interim guidance exists for the development of on-airport vertiport infrastructure can be found in the FAA's Engineering Brief 105. It should be noted that many conceptual designs for AAM-class aircraft are planned to from launch or in future iterations be powered by electric, hydrogen, or hybrid powertrains hence the need to develop infrastructure for alternative propulsion at airports. In addition to refueling/recharging infrastructure, some aircraft are being designed for short takeoff and landing (STOL) operations which would make use of existing runways while others are being designed for vertical takeoff and landing (VTOL) and would require heliport-like facilities that are addressed in FAA Engineering Brief 105. Ultimately, supporting infrastructure for AAM at a smaller general aviation facility may be dependent on operators' specific needs for supporting infrastructure. Small UAS operations which fall under 14 CFR Part 107 are also gaining momentum but require different airport considerations from passenger-scaled AAM aircraft. UAS operations of this type should be closely monitored by airport sponsors to maintain safety within the airport environment and its associated Part 77 airspace.

3.2. AIRFIELD AND AIRSPACE REQUIRMENTS

Runways and taxiways serve as the fundamental components of an airport, and the FAA has established protective areas to safeguard these critical assets, ensuring the continued safe operation of the airport in the years ahead. Runways are carefully configured in alignment with the prevailing wind direction, taking into account the necessary length, protective zones, and airspace for aircraft operations. Ensuring the safety of aircraft utilizing the airport remains the utmost priority.

3.2.1. Runway Orientation

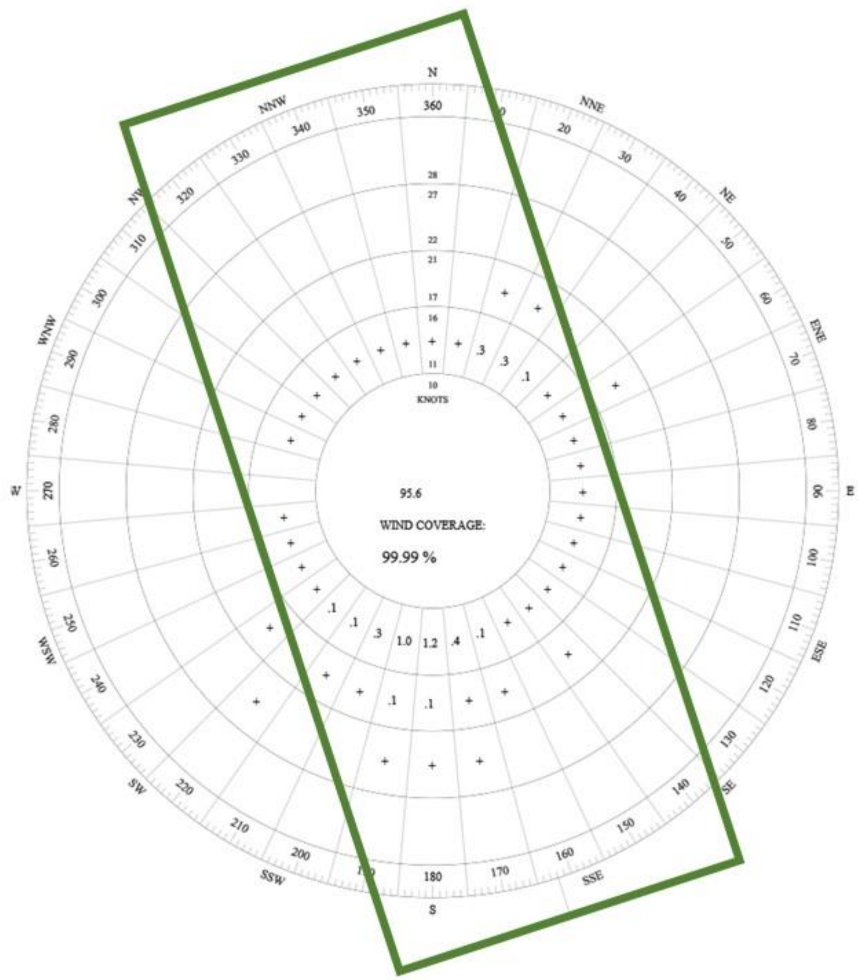
FAA Advisory Circular 150/5300-13B offers guidance for determining the ideal runway orientation by evaluating wind coverage. Typically, a decade of wind data is utilized to create a wind rose diagram for an airport, often sourced from the Automated Weather Observation System (AWOS). In the case of CLS, the available AWOS data goes back a full decade, to 2013. The wind rose diagram, depicted in **Figure 3-1**, accounts for a crosswind component of 13 knots. **Table 3-1** lays out the wind coverage and the original data used to create the wind rose for CLS can be found in **Appendix Xx**.

Table 3-1: CLS Wind Data Table

Runway	10.5 Knots	13 Knots	16 Knots
16/34 VFR	99.48%	99.88%	99.99%
16/34 IFR	99.92%	99.98%	100%
16/34 All Weather	99.55%	99.89%	99.99%

Source: FAA Airport Data and Information Portal, 2023.

Figure 3-1: CLS All Weather Wind Rose



CLS features one runway oriented approximately along a north/south axis with magnetic headings of 160 degrees and 340 degrees. This configuration provides a substantial wind coverage of 99.89% at 13 knots, comfortably exceeding the FAA's 95% crosswind coverage requirement for B-II aircraft. In cases where a runway fails to achieve a 95% or greater crosswind coverage, consideration for an additional crosswind runway becomes necessary.

Given that CLS surpasses the 95% threshold, there is no need for a crosswind runway.

3.2.2. Runway Length, Width, and Surface

In this section, we assess the capability of Runway 16-34 to conform to FAA design standards specified for the Runway Design Code (RDC) B-II aircraft mix. Several factors are taken into account when determining the appropriate runway length, including the airport's elevation, prevailing wind patterns, the average maximum temperature during the hottest month, and the performance of design aircraft at their maximum operating weight. An analysis of runway length is conducted using the criteria laid out in FAA Advisory Circular 150/5325-4B, titled "Runway Length Requirements for Airport Design," to establish the necessary runway length. The results of this analysis are presented in **Table 3-2**. This analysis suggests that the airport, with a runway length of 5,000 feet is suitable for accommodating 100 percent of small aircraft, and 75% of the nation's fleet of large aircraft at 60% useful loads, aligning with the needs of general aviation airports like CLS.

Table 3-2: Runway Length Analysis

Runway 16-34	
Mean Daily Maximum Temperature of the Hottest Month of Year:	95°F (July)
Airport Elevation:	177.2 feet (MSL)
Aircraft Category	**FAA Recommended Runway Length**
Small airplanes (less than 12,500 lbs.) with less than 10 passenger seats:	
95 percent of these small airplanes	3,200'
100 percent of these small airplanes	3,800'
Small airplanes (less than 12,500 lbs.) with 10 or more passenger seats:	
100 percent of these small airplanes	4,300'
Aircraft over 12,500 lbs.	
75% of fleet at 60% useful load	4,700'
100% of fleet at 60% useful load	5,700'
75% of fleet at 90% useful load	7,100'
100% of fleet at 90% useful load	9,100'

Source: FAA AC 150/5325-4B, "Runway Length Requirements for Airport Design"

It is recommended to maintain the existing runway length at 5,000 feet. The Airport is capable of meeting a majority of the aircraft needs for the region with the current length.

According to FAA AC 150/5300-13B Airport Design guidelines, runways intended for B-II aircraft must have a minimum width of 75 feet, along with 10-foot turf shoulders. Runway 16-34 was originally constructed to accommodate large military aircraft in its initial construction. The runway currently has a width of 140 feet. However, it's worth noting that the current set of aircraft commonly using the airport falls under the B-II ADG category.

In this context, the requirements for runway width are in full compliance, as the runway exceeds the minimum width stipulated for B-II aircraft.

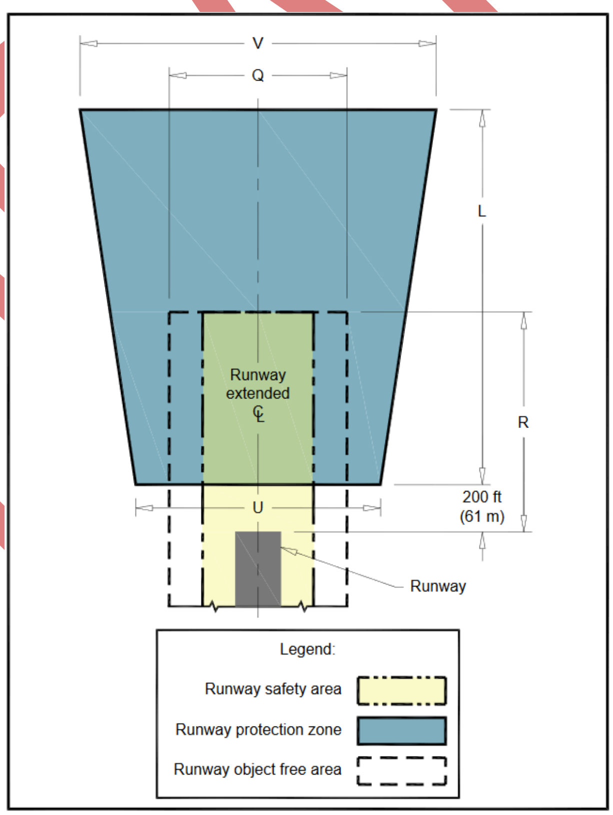
The current runway surface is made of concrete and is reported to possess the necessary pavement strength to support aircraft with single-wheel main gear and gross weights of up to 30,000 pounds, double-wheel main gear and gross weights of 30,000 pounds, and double-tandem main gear and gross weights of 85,000 pounds.

In terms of runway weight-bearing strength and surface condition, the requirements are being met. However, it's important to highlight that ongoing pavement maintenance is not only necessary, but also mandated to ensure the continued safe and efficient operation of the runway.

3.2.3. Runway Protection Areas

The FAA sets standards for runway protection surfaces to ensure the safety of runway operations. **Table 3-3** provides a summary of these standards and other key aspects related to airfield geometry. These designated areas are visually represented in **Figure 3-2** for reference.

Figure 3-2: Example Dimensions of Required Runway Protection Areas



Source: FAA AC 150/5300-13B "Airport Design"

Table 3-3: Runway Design Recommendations (all standards met)

Runway Protection Surfaces	B-II 1 Mile Visibility
Runway Safety Area (RSA)	
Length beyond end of runway	300’
Width	150’
Runway Object Free Area (ROFA)	
Length beyond end of runway	300’
Width	500’
Runway Protection Zone (RPZ)	
Length	1000’
Inner Width	500’
Outer Width	700’
Acres	13.77
Runway Separations	
Aircraft Holding Position	200’
Parallel Taxiway	240’
Building Restriction Line (BRL)	
For structures 21’ or lower	400’

Source: FAA AC 150/5300-13B “Airport Design”
Contributing data: Current ARC Design B-II, CLS RNAV (GPS) RWY 16 Approach; non-precision, 1mile visibility.

On the western side of the runway is a parallel taxiway known as Taxiway A , which extends for the entire length of the runway, connecting to the runway with multiple connector taxiways. Additionally, Taxiway T-04 is a partial parallel taxiway between the runway and Taxiway A that begins on the south end of the airfield at Taxiway A5 and stops at Taxiway A3.

As per the standard for ARC (Aircraft Reference Code) B-II separation between a runway and its parallel taxiway, a minimum distance of 240 feet is required. At CLS, the current separation distance between Runway 16-34 and parallel Taxiway A varies greatly depending on the location as it is a nonstandard parallel taxiway. The distances from the center line to Taxiway A varies from 530-330 feet decreasing in distance to the north, and Taxiway T-04 has been constructed to meet the 240-foot separation requirement on the south end of the airport. With this understood the Airport is meeting and exceeding the necessary separation distance mandated for a B-II airport.

The criteria for runway separation are met. The forthcoming Alternatives chapter will explore potential options for realigning the parallel taxiway, with the aim of enhancing and allowing for further development on the Airport.

3.2.3.1. Runway Safety Area

A Runway Safety Area (RSA) is a specifically designated and graded area surrounding a runway. In the event of an aircraft departing from the runway, this area must have the capability, under typical (dry) conditions, to support the aircraft without causing structural damage to it or harm to its occupants.

In the present configuration, the existing RSA at CLS meets the standards set by the FAA. Therefore, the requirements for the Runway Safety Area are in compliance.

3.2.3.2. Runway Object Free Area

Runway Object Free Areas (ROFA) and Runway Object Free Zones (ROFZ) play a crucial role in enhancing aircraft safety by providing essential clearance around runways and ensuring adequate airspace. The ROFA is centered on the runway centerline at ground level. It is imperative that objects not essential for air navigation or aircraft ground maneuvering, including parked aircraft, are not placed within the ROFA and ROFZ.

The current configuration at CLS aligns with current FAA standards.

3.2.3.3. Runway Protection Zone

The FAA has established specific land use standards for Runway Protection Zones (RPZ), which are areas on the ground located before the threshold or beyond the end of a runway. These zones are designed to enhance the safety of people and property on the ground in the vicinity of the runway. According to FAA Advisory Circular 150/5300-13B Airport Design, it is considered highly desirable to clear the entire RPZ of all above-ground objects. In cases where complete clearance is impractical, airport owners are urged, at a minimum, to ensure that the RPZ remains free of any facilities supporting incompatible activities. Examples of incompatible uses encompass buildings, recreational areas, roads and parking, fuel and hazardous material storage, and above-ground utilities.

Notably, the RPZ south of Runway 34 and north of Runway 16 currently feature significant incompatible land use, particularly in the form of NW Airport Road, located along the southern end of the airport and around the north. The road transitions both RPZs.

Ideally, land containing RPZ areas should be owned by the airport sponsor and maintained without any incompatible objects or activities. The FAA's guidance on land uses within RPZs recommends avoiding the introduction of new uses, altering, or expanding existing incompatible uses, and removing or mitigating these incompatible uses wherever feasible.

The standards for the RPZ to the north and the south are not currently met due to roads transitioning through the RPZ. Nevertheless, appropriate land use controls are in place to prevent the introduction of additional incompatible uses in this area. Recommended mitigation measures to limit concentrations of people within the RPZ include roadway signage alerting vehicles to the RPZs as well as prohibiting stopping and standing in the RPZs.

3.2.3.4. Building Restriction Line

A Building Restriction Line (BRL) serves as a guideline for setting the setback standards for buildings, with the primary aim of safeguarding airspace and ground areas from incompatible structures, especially in consideration of future upgrades. At CLS, the determination of maximum building height for a specific distance from the runway centerline is influenced by non-precision instrument approaches. Once this height is established, the BRL is typically defined along a straight line that runs parallel to the runway.

CLS has concluded that the BRL should be positioned at a distance of 500 feet from the runway centerline, with a maximum allowable structure height of 35 feet.

In accordance with FAA requirements, the BRL at CLS fully complies with the necessary standards and criteria.

3.2.4. Taxiway/Taxilane and Apron Requirements

Taxiways, which are designated paths established for the movement of aircraft from one area of the airport to another (runway to apron), and taxilanes, which provide access from taxiways to hangars and parking areas, form a network of surfaces at CLS. These surfaces are vital for facilitating the safe and efficient movement of aircraft from hangars and tie-down areas to the runways. The design of these surfaces follows the same ARC design standards used for runway and taxiway design as outlined in FAA AC 150/5300-13B.

Currently, the existing taxiway system at CLS provides a somewhat direct route from the apron to the runway, which is contrary to the recommendations in AC 150/5300-13B, which illustrates preferred taxiway routes from parking aprons to the runway. The preferred method would involve a 90 degree turn between the apron area and the runway, of which CLS has more or less a 45 degree turn from the apron to the runway at Taxiway A-3. To address this issue, it is advisable to modify the taxiway layout to prevent direct access from the apron to the runway. One solution could involve creating a designated turn area for aircraft taxiing to the runway, achieved by marking an island on the pavement on the apron side of Taxiway A3.

The dimensions necessary to accommodate taxiway design for a B-II ARC are provided in **Table 3-4**. These dimensions should be taken into account when making adjustments to the taxiway structure to align with FAA guidelines and enhance safety and efficiency at the airport.

Table 3-4: Taxiway and Taxilane Design and Separation Criteria

Taxiway and Taxilane Design Items	B-II Standard
Taxiways	
Taxiway Width	35’
Taxiway Edge Safety Margin	7’ 6”
Taxiway Shoulder Width	15’
Taxiway Safety Area Width	79’
Taxiway Object Free Area	124’
Taxiway Wingtip Clearance	22’ 5”
Separation of Taxiway Centerline to Objects	62’
Taxilanes	
Taxilane Safety Area Width	79’
Taxilane Object Free Area	110’
Taxilane Wingtip Clearance	15’ 5”
Separation of Taxilane Centerline to Objects	55’

Source: FAA AC 150/5300-13B “Airport Design”

The dimensions of Airplane Design Groups (ADG), along with Taxiway Design Group (TDG) standards, play a crucial role in establishing standard taxiway dimensions. The FAA sets standards encompassing width, safety areas, object-free areas, and geometric considerations for turns and intersections. The emphasis is placed on identifying and minimizing potential conflict areas within movement areas to ensure safe operations without requiring pilots to exercise excessive vigilance.

Taxiway fillet designs, which determine the turning geometry of taxiways, are determined based on TDG design criteria, considering the Main Gear Width (MGW) and the Cockpit-to-Main-Gear Distance (CMG) of the design aircraft. At CLS, taxiway fillet design is based on a critical design aircraft with a TDG 2A designation. For instance, the Forecast Chapter Indicated that the design aircraft is the Cessna Citation 525B (CJ3), which has an MGW of 16 feet, falls under the TDG 2A category.

Taxiway and taxilane safety areas (TSA) are established to reduce the risk of damage to aircraft deviating from the main taxiway centerline. Object-Free Areas (OFA) around taxiways and taxilanes ensure there is clear space around taxiing aircraft, free from obstructions such as vehicle service roads, parked aircraft, or other objects (except for necessary air or ground navigation facilities). These dimensions are determined in conjunction with ADG distances and are based on wingtip clearances when aircraft are moving along a marked centerline.

The connecting taxiways at CLS vary in width, ranging from 140 feet (Taxiway A4) to 30 feet (Taxiway A2), with the remainder taxiway connectors meeting the standard 35-foot width. Importantly, all taxiways at CLS meet or exceed the minimum width requirements established by TDG standards apart from Taxiway A2.

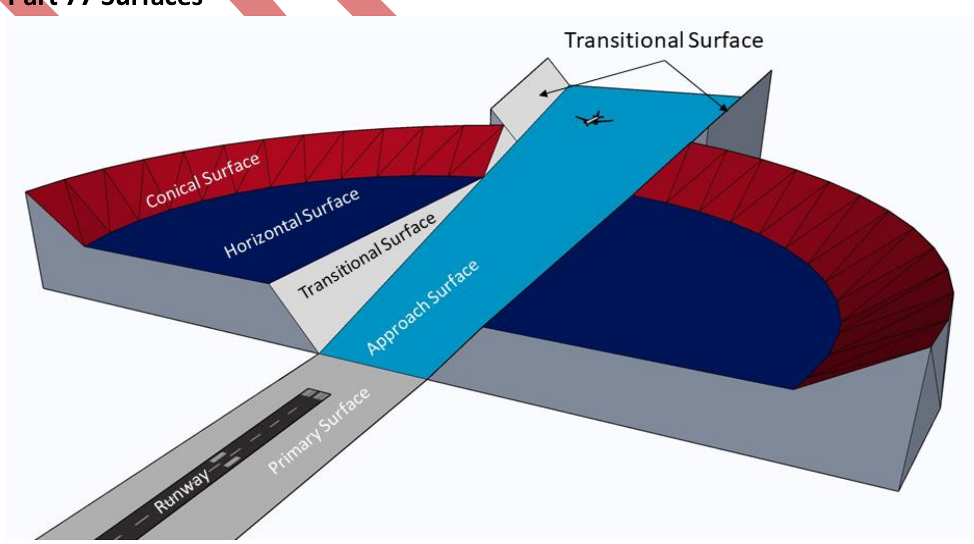
It is recommended that Taxiway A2 be widened to 35' to be within the window of compliance, additionally all taxiway fillets should be constructed to meet standards.

3.2.5. CFR Part 77

The regulation of airspace in the vicinity of airports is primarily governed by the Code of Federal Regulations (CFR) Part 77, titled "Objects Affecting Navigable Airspace." Ensuring the presence of protected airspace around an airport is of utmost importance to ensure the safe operation of arriving and departing aircraft at the facility. Except for a few exceptional cases recently designated for the National Wildlife Service and other agencies, the Federal Aviation Administration (FAA) oversees all airspace within the United States.

Part 77 outlines the imaginary surfaces that envelop an airport. These surfaces, depicted in **Figure 3-3,** go beyond the regulation of objects and activities on the ground, as they also define and control objects that penetrate the airspace above these designated surfaces.

Figure 3-3: Part 77 Surfaces



Source: APG, 2023

Part 77 dimensions are determined based on the type of approaches to each runway and the weight of aircraft intended to be served by each runway. The FAA classifies this as either "Utility" (for aircraft with a maximum takeoff weight of 12,500 pounds or less) or "Other than Utility" (for aircraft exceeding 12,500 pounds). At CLS, the Cessna Citation 525B (CJ3) is considered the critical aircraft, and it falls into the "Other than Utility" category. **Table 3-5** provides the dimensions of Part 77 surfaces at the airport based on the current approach configurations.

Table 3-5: Dimension Requirements for Part 77 Standards at CLS

Surfaces	RWY 16	RWY 34
Primary Surface		
Distance from runway end	200’	200’
Width	500’	500’
Approach surface (begins at the end of the primary surface)		
Inner edge width	500’	500’
Outer edge width	3,500’	3,500’
Horizontal distance	10,000’	10,000’
Slope required	34:1	34:1
Existing slope	34:1	34:1
Transitional Surface (begins at side of primary surface)		
Slope	7:1	7:1
Horizontal Surface		
Height	150’	150’
Arc radius	10,000’	10,000’
Conical Surface		
Slope	20:1	20:1
Horizontal distance	4,000’	4,000’

Other than Utility Runway: runway intended for use of aircraft of 12,500 lbs. or more

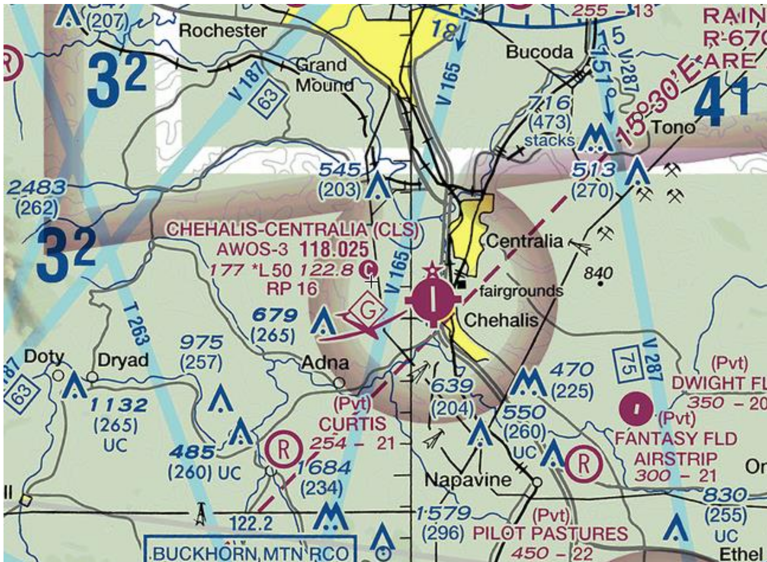
Current: CLS RNAV (GPS) RWY 16 Approach; non-precision,1 mile visibility.

The Airport Layout Plan (ALP) set of drawings illustrate all surveyed objects, including their relationship to FAR Part 77 surfaces. Recommendations for managing these objects are outlined in Chapter 5 (Airport Layout Plan Set), ensuring compliance with airspace regulations and safety measures.

3.2.6. Airspace Classification

The airspace above CLS, as illustrated in **Figure 3-4**, is subject to regulation and administration by the FAA. CLS, as a non-towered airport with an instrument approach, is within Class E Airspace, which extends from 700 feet above ground level (AGL) up to an altitude of 17,999 feet AGL.

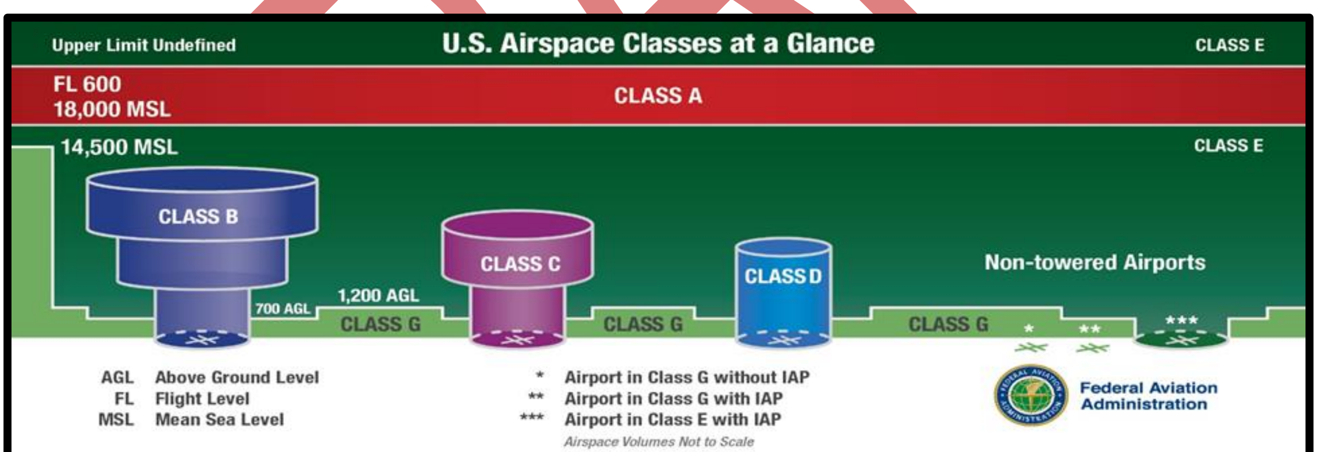
Figure 3-4: CLS Aeronautical Chart



Source: Federal Aviation Administration, 2023.

The FAA classifies airspace into various classes, each with its own set of rules and characteristics. **Figure 3-5** provides an overview of the different airspace classes. These classifications help govern aircraft operations and ensure safe and efficient use of the airspace above and around the airport.

Figure 3-5: FAA Airspace Classification

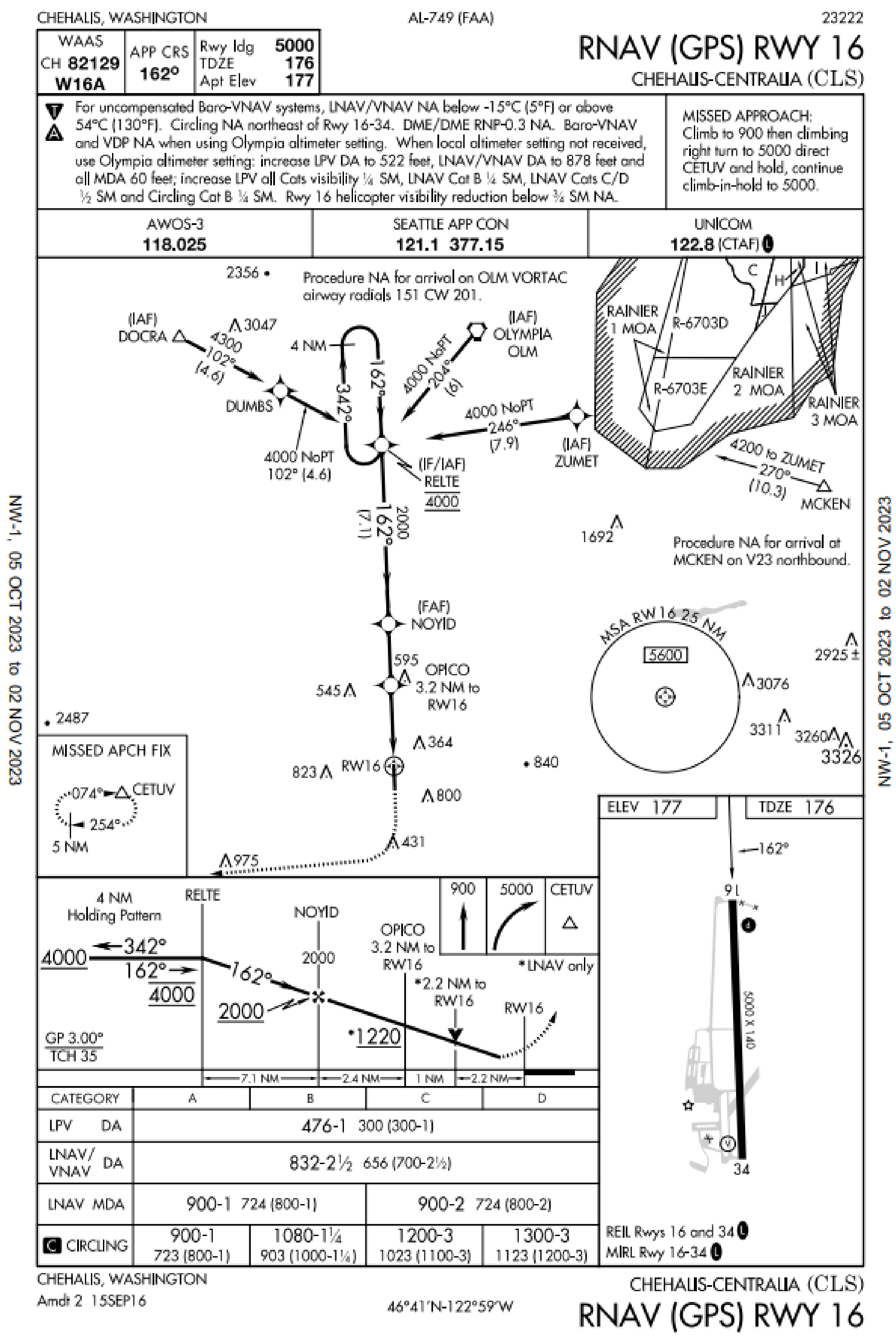


Source: Federal Aviation Administration, 2023.

3.2.7. Approach Capabilities

The Airport currently features an RNAV (GPS) approach with minimums that extend down to 300 feet above ground level (AGL) and visibility requirements of one mile as depicted in **Figure 3-6**. These minimums are established to accommodate the airport's location in an area surrounded by high terrain. However, with the availability of updated obstruction data and advancements in analysis tools, it is prudent to consider the possibility of achieving lower minimums for instrument approaches at CLS.

Figure 3-6: CLS RNAV (GPS RWY 16 Approach)



Source: Federal Aviation Administration, 2023.

It is recommended that the Airport work with the FAA to complete a reevaluation of the instrument approaches at CLS, utilizing AGIS (Airport Geographic Information System) data. This evaluation should aim to determine if lower minimums can be safely achieved.

3.2.8. Airspace Obstruction Analysis

Obstructions in the vicinity of an airport can take the form of either man-made objects or natural topographical features. In the case of CLS, the airport is surrounded by mountainous terrain, which is a natural topographical feature and cannot be feasibly removed. Therefore, the primary challenge is to design airspace procedures that ensure the safe routing of pilots, directing them away from the mountainous terrain. However, there are obstructions that can be mitigated through the removal or lowering of the object. This is particularly applicable to trees and other objects that are in proximity to the airport and where the ground level is not itself an obstruction.

The Part 77 Airport Geographic Information Systems (AGIS) survey conducted in conjunction with this master plan update identifies obstructions to the navigable airspace affecting the Part 77 imaginary surfaces in the immediate vicinity of CLS. Recommendations for mitigating these obstructions, which could pose hazards to air navigation, are outlined in Chapter 5 of the Airport Layout Plan.

3.3. VISUAL AIDS TO NAVIGATION

The Airport is operational around the clock, and therefore, it must have suitable lighting capabilities to ensure safe aircraft operations during nighttime hours. Along the paved surfaces such as runways and taxiways, lighting installations are essential to provide pilots with visibility and guidance. These lights illuminate the path of usable pavement in front of aircraft, helping pilots navigate and land safely in low-light conditions. Proper runway and taxiway lighting and signage are critical for takeoffs, landings, and taxiing. In addition to lighting on paved surfaces, flood lighting on the ramp area is also necessary. These lights provide illumination when aircraft are parked on the ramp, allowing passengers, crew, and ground personnel to move around the aircraft safely and conduct necessary operations during nighttime hours. The combination of runway and taxiway lighting, along with ramp flood lighting, ensures that the Airport can facilitate safe and efficient aircraft operations during both daytime and nighttime conditions.

3.3.1. Precision Approach Path Indicator (PAPI)

Runway 16 features a four-light Precision Approach Path Indicator (PAPI) system which is maintained and owned by the Airport, located on the east side of the runway. This visual aid to navigation helps pilots align on a 3-degree visual glide path to allow for the safe approach to the runway free of obstructions.

In accordance with FAA requirements, the PAPI at CLS fully complies with the necessary standards and criteria.

3.3.2. Visual Approach Slope Indicator (VASI)

Runway 34 features a two-light Visual Approach Slope Indicator (VASI) system which is maintained and owned by the airport. It is located on the west side of the runway. This visual aid to navigation helps pilots align on a 3.5-degree visual glide path to allow for the safe approach to the runway free of obstructions. Typical glidepaths are set at 3-degrees, but can be within a range of 3 to 4.5 degrees for obstacle clearance.

In accordance with FAA requirements, the 3.5-degree VASI at CLS fully complies with the necessary standards and criteria. In the future when the VASI is replaced, it is recommended to be upgraded to a PAPI.

3.3.3. Weather Reporting Equipment

Besides using visual aids, weather conditions at the airfield are monitored, reported, and documented using an Automated Weather Observing System (AWOS). An AWOS-III is employed for this purpose at the Airport. Positioned approximately 740 feet west of the runway centerline and northwest of the segmented circle, this AWOS equipment is situated outside the Object Free Area. The equipment has reached its useful life and should be replaced in the near-term.

The AWOS-III fully meets the requirements for weather reporting equipment standards, but should be replaced in the near-term due to the age of the equipment.

3.3.4. Airfield Lighting and Signage

Runway 16/34 at CLS features multiple forms of airfield lighting to support night operations. Runway lighting on both ends of the runway include Runway End Identifier Lights (REILs) and Medium Intensity Runway Lights (MIRLs) on the runway edges. Runway lighting is only lit when activated via aircraft radio.

Taxiways at CLS are unlit, and instead feature reflectors which provide visual reference to the taxiway edges at night by reflecting aircraft lights. Signage is similarly unlit, relying on the reflection of aircraft lights for visual reference during operations after sunset.

Runway lighting at CLS is in compliance with all relevant FAA Advisory Circulars. As airport signage is replaced, the airport should upgrade taxiway and runway signage from reflective to LED-backlit. While not required, with future activity under instrument flight rules expected to increase, the airport may consider adding taxiway edge lighting. As with the airport's existing lighting being pilot-activated via aircraft radio, additional light fixtures could be similarly operated to limit energy use and light pollution at night.

3.3.5. Beacon

The rotating beacon at CLS is located west of the Airport terminal building and apron prior to the vehicle entry gate heading northwards along the Airport entry road. The beacon is a green and white, rotating light, that is positioned 1,130 feet west of the runway centerline atop of a purpose-built tower. Per FAA Advisory Circular 150/5300-13B, a beacon should be mounted high enough above the surface so that the beam sweep, aimed 2 degrees or more above the horizon, is not blocked by any natural or manmade object. The beacon tower is the tallest structure on the airfield; therefore, the beam of light will not be blocked by other structures.

In accordance with FAA requirements, the beacon fully complies with the necessary standards and criteria. The Airport should continue to maintain the existing beacon and tower structure, and plan to replace the beacon once its useful life has been met.

3.3.6. Wind Cones

The Airport has three wind cones. The primary wind cone is located at the center of the segmented circle, 400 feet west of the runway centerline which falls outside of the ROFA, so no changes are necessary. Secondary wind cones are located with closer proximity to the two ends of the runway. On the north side of the airport, a wind cone is located approximately 350 feet from the runway centerline to the east and approximately 1,000 ft south of the northern threshold of Runway 16. On the south side of the airport, another wind cone is located approximately 300 feet west of the runway centerline and approximately 500 feet north of the southern threshold of Runway 34. Both secondary wind cones are outside of the 250-foot B-II ROFA for Runway 16/34 and therefore do not necessitate any relocation.

No relocation is necessary for any of the three wind cones at CLS. If heliport or vertiport facilities are opened in the future, it would be recommended to ensure a wind cone is installed nearby.

3.4. ROADWAYS AND PARKING LOTS

Airports are accessible via the runway for arriving aircraft and by road for individuals traveling from the nearby community. The infrastructure that links the airport with its local community is a vital component of the airport's sustainability and serves as the gateway for those arriving at CLS by air.

3.4.1. Road Access to Airport

The Airport property is accessible from NW Airport Road. There is a turnoff on the right of NW Airport Road that leads to a gated entrance to the airfield. On that same turn-off road is access to the Fixed Based Operator and Airport offices, Aircraft Maintenance Building, and parking for the airfield.

Presently, no updates are needed to the existing airport access road. Development in other areas of the airfield to the north or east would require new road infrastructure because the existing access road dead-ends into airport apron access.

3.4.2. Public Parking Areas

There is public parking conveniently located right next to the FBO, offering approximately 20 parking spaces allocated for FBO use. At present, parking and public access are relatively unobstructed and user-friendly. An additional 14 spaces are located next to Hangar A and 18 parking spots are located near the Central Aircraft Repair Hangar.

The existing public parking areas are adequately addressing current demands. If the construction of hangars were to affect these parking areas, any replacement parking spaces should adhere to or surpass the requirements stipulated by the City code, including meeting the Americans with Disabilities Act (ADA) requirements.

3.5. SUPPORT FACILITIES

Airports are responsible for owning and maintaining various facilities and equipment that are crucial to supporting general aviation activities. These include snow removal equipment (SRE) and storage buildings, aircraft fuel storage tanks and dispensing equipment, as well as utilities. All these components are essential for ensuring the effective and smooth operation of a general aviation airport.

3.5.1. Airport Maintenance and Snow Removal Equipment

The Airport operates throughout the year, and its staff is responsible for plowing the runway, taxiways, apron, and access roads after each snow event. Snow removal is carried out using both a primary and secondary Snow Removal Equipment (SRE). According to FAA snow removal equipment calculations, the airport is eligible for a minimum of one snow plow through FAA grants, following the latest advisory circular. CLS has a 2008 International MA065 Snow Plow that is stored in building "S" on the western edge of the airport property.

Using FAA AC 150/5220-20A as guidance, CLS's single snow plow is sufficient for SRE standards for a non-commercial airport with over 10,000 annual aviation operations, but less than 15 inches of snowfall annually. The 2008 vehicle has met its 10-year minimum useful life requirement per the FAA, and is eligible for replacement and should be planned for within the planning period of the MPU.

3.5.2. Aircraft Fuel Storage

The Airport currently possesses 12,000 gallons of Jet A storage capacity and 12,000 gallons of 100LL storage capacity. These are stored in double-walled above-ground steel tanks equipped with clock gauges and overfill alarms. The present fuel storage facility is situated adjacent to the aircraft maintenance shop. The fuel tanks allow for self-serve operations, and the Airport operates a fuel truck for fueling services.

Presently, the fuel requirements are being fulfilled at the Airport. Conversion from low lead to unleaded fuel will most likely occur in the future as the industry transitions to removing lead from the avgas. A separate tank may be necessary to accommodate this transition.

3.5.3. Utilities

The existing utilities that facilitate operations at CLS are currently satisfying the facility's immediate requirements. The relocation or expansion of specific utilities to support future development plans, as well as electrification for future electric aircraft, at the Airport will be assessed on a case-by-case basis, depending on the type of development being pursued or analyzed. Furthermore, future requirements may incorporate the latest technological advancements to minimize long-term utility expenses and enhance service availability.

Presently, the utility requirements are being fulfilled, and as additional facilities are constructed at the Airport, there may be a need to extend these utilities.

3.6. FACILITIES

The requirements established for a general aviation airport are designed to guarantee that the airport is properly equipped to serve its clientele. General aviation primarily serves aircraft that are not primarily involved in commercial air travel. Therefore, users of general aviation necessitate tiedowns and hangars as they utilize the airport for their operations.

3.6.1. General Aviation Apron, Tie Down Facilities, Leased Lots and Aircraft Hangars

Aircraft storage and parking facilities are a necessity at any size airport, and as such require careful planning to ensure the demand of airport users is satisfied. CLS features hangars that are both privately owned and owned by the airport and leased to individual users. The apron area features three large and 13 small tie-down spaces available for transient and based aircraft year-round.

The Airport is limited on hangar availability for lease, having a waitlist of pilots eager to secure hangar space when it becomes available. Most of the aircraft parking is done in hangars or on the 230,000 square foot apron to the north of the airport terminal building. All aircraft parking areas are located outside of the ROFA for Runway 16/34.

As discussed in the previous chapter, this Master Plan Update forecasts a growth from 57 based aircraft in 2022 to a total of 66 based aircraft by 2042. At present, the Airport does not have enough hangar capacity to support this many aircraft to be based at CLS. While the CLS forecast only projects a growth of 9 based aircraft over the 20-year forecast horizon, it is important to note that the Airport already holds a waiting list of 40+ aircraft waiting for hangar space to become available. The CLS forecast is limited by historical data that has plateaued with full hangar utilization at CLS, and it can be understood that the construction of any quantity of hangar space for general aviation aircraft would see immediate demand and a spike in based aircraft beyond what is projected in this master plan update.

Having a waiting list of 30+ aircraft owners waiting for hangar space at CLS, it is evident that demand for real estate at the airport exceeds what is already built and available. Operations and fleet mix shifting towards larger jet aircraft within the 20-year forecast period as described in the previous chapter would suggest the need to develop some quantity of hangars suitable for larger aircraft.

Transient operations comprise a larger share of all operations at CLS, and as such the airport should consider maintaining and expanding apron and tie-down availability to aircraft visiting CLS from elsewhere.

In order to meet demand of a based aircraft fleet projected to grow, it is recommended that the airport construct a minimum of 9 hangar spaces over the 20-year period. That said, realistically the airport could build far more hangars and see near immediate utilization of those facilities with greater than expected based aircraft figures.

3.6.2. General Aviation FBO and Terminal Building

The airport maintains and operates the CLS terminal building which offers services and amenities to local and transient pilots as well as their passengers. The terminal building offers restrooms, a pilot lounge, meeting spaces, a waiting area with views of the airport, and more while services provided include aircraft fueling. There are no third-part full service fixed based operators at CLS.

No improvements are immediately necessary to the Terminal Building facilities at CLS.

3.6.3. AAM Terminal Building and Parking

To support AAM operations, CLS will need to construct a new, dedicated AAM terminal on the airport's east side, where such development is marked on the Preferred Alternative. It is expected that this will be a simple terminal due to the airport's limited forecasted AAM operations. These types of terminals contain all required passenger processing facilities for a given operator in one single-unit building. It features a single consolidated passenger check-in area and a common hold room area adjacent to the aircraft parking area. Aircraft boarding is achieved through ground access which leads to the aircraft parking apron. Additionally, walkways painted on the ground should be in place for passenger boarding, and adequate staging areas for ground equipment should be considered.

AAM activity is forecasted for CLS to begin in 2032 with roughly seven flights daily accommodating 35 enplanements. This is forecasted to grow to 63 passenger enplanements and 12 flights per day in 2037, and 98 passengers per day on 17 flights by 2042. Keeping in mind that the flights will be spread out throughout the day, the entire 2042 forecasted passenger load for a day would be able to be accommodated by a 2,500 terminal building per the 2021 International Building Code (2021) as presented in the following table.

Table 3-6: 2021 International Building Code Occupant Load for an Airport Terminal Building

Function of Space	Occupant Load Factor	Area of Space (SF)	Occupant Load
AAM Terminal			
Airport Terminal: Waiting Areas	15	1,000	67
Airport Terminal: Baggage Claim	50	500	25
Airport Terminal: Baggage Handling	300	500	2
Airport Terminal: Concourse	100	500	5
Total		**2,500**	**99**

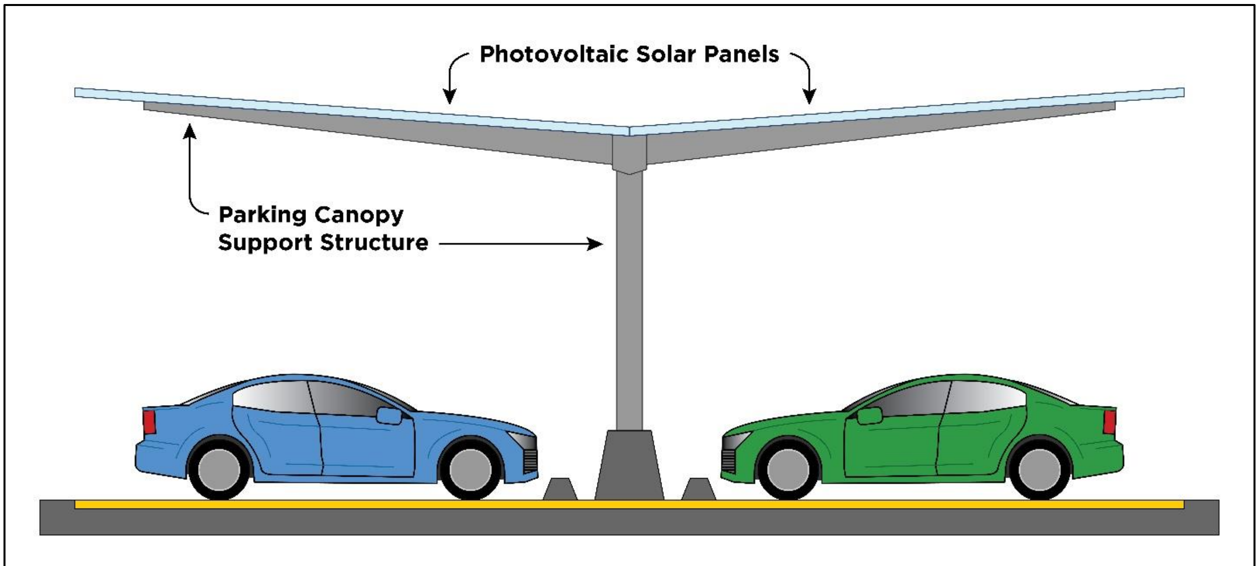
Source: The Building Code Blog, 2023

Flights with fewer than nine passengers do not fall under 49 CFR 1542 Airport Security, excusing such passengers from TSA passenger screening. The forecasts did not estimate AAM operations with nine or more passengers, thereby forecasting a scenario in which AAM operations at CLS would not require screening.

Parking should be considered for the AAM Terminal Building as well. Passengers will utilize the parking spaces while traveling on the AAM aircraft. Some passengers will need just day-use parking while others will require more long-term parking depending on their reason for travel. Based on the 2042 forecast of 35,670 annual enplanements (98 daily enplanements), parking requirements were reviewed versus the Institute for Traffic Engineers (ITE) *Parking Generation Manual*. Using a 15% peaking factor, the 85th percentile parking demand is 0.67 parking spots per daily enplanements. This results in a recommended ultimate parking lot size of approximately 66 stalls by 2042. Long-term planning should also consider additional parking for long-term as passengers utilize AAM for extended multiple-day trips.

In addition, new parking facilities at CLS provide an opportunity to increase renewable energy production. Placing a canopy with photovoltaic (PV) solar panels over part or all of the parking lots would enhance sustainability in two ways, both in the production of solar energy and in saving air conditioning energy consumption in automobiles during hotter months. A conceptual solar panel canopy is shown in **Figure 13-7**.

Figure 1-7: PV Panel Parking Canopy Concept



Source: The Aviation Planning Group (2023).

Lastly, new parking facilities at CLS should cater to electric vehicles to the best extent possible by providing both electric charging stations and offering preferred parking to these vehicles.

No improvements are immediately necessary for AAM Terminal Building facilities at CLS, but should be planned for accordingly as technology and needs require. Opportunities may arise for CLS to build AAM infrastructure as a demonstrator concept airport.

3.7. AIRPORT SECURITY/ACCESS

Fences and gates/access points are all assets which protect the airfield from unwanted outside airfield intrusions. Barriers to entry can be established through both physical infrastructure such as fences or through physical barriers such as the levee.

3.7.1. Apron and Hangar Access

Access onto the airfield is managed through door-sized entrances with a keypad or vehicle-sized motorized gates. All gates are self-closing to ensure airport security and mitigate wildlife hazards. There are three motorized drive-through access gates, and a few keypad-protected walk-through gates. Primarily the walk-through gates are located close to the apron and parking areas, one of which is located on the eastside of the airport on a portion of taxiway A4 for access to retail shops and nearby restaurants.

No improvements at this time, however future hangar and apron development may necessitate the construction of gates at various locations around the airport that are not currently accessible.

3.7.2. Fences and Wildlife Control Measures

The south and east edges of the airport property are secured with an 8-foot fence. The fencing is adequately sized for FAA security and wildlife control requirements at a general aviation. The north and west ends of the airport do not have fencing installed, leaving the airport exposed to wildlife incursions from agricultural and wooded areas west and northwest of the airport across from the airport property on NW Airport Road. Fencing on the west end of the airport stretches from the south up until the apron access gate, after which the airport property is hidden from NW Airport Road by the earthen levee. The north end of the airport is similarly unfenced but concealed by the levee and airport lake area. Wildlife and security issues are presented when an airport does not have perimeter fencing for the entirety of the airport property.

To mitigate small wildlife from entering the airfield, the USDA recommends that skirting be placed around all fencing on the property. It is recommended that staff check that fence lines and access points are maintained. Additional recommendations to mitigate wildlife on the airfield include eliminating forage attractants and installing automatic gates.

Per FAA and USDA recommendations the airfield needs to become fully-fenced for the entirety of the airport perimeter. Wildlife skirting is also recommended for the full perimeter of the airport along with fencing to limit wildlife incursions on the airfield.

3.8. LAND USE

Securing the airspace surrounding CLS by preventing the development of incompatible land uses is important to the safety of aircraft operations as required by FAA grant assurances within and beyond the airport boundary. The Lewis County Code contains restrictions on structures or land uses within the footprint of an airport which might impact aviation activity. The City of Chehalis does not have any further restrictive protections applicable beyond the Lewis County Code.

3.8.1. Off Airport Land Use

Land use in the area beyond the airport property includes a small amount of single residential houses and duplexes on the southwest side of the airfield. Having a residential area near an airfield poses a risk for noise pollution that residents may find unpleasant. Due to regular strong flooding of the nearby Chehalis River, it is highly unlikely that residential land uses will increase on the west side of the airfield in a meaningful capacity. Directly west of the airport is an outdoor golf course used frequently. Golf courses and maintained park areas are often considered compatible land uses near airports due to being relatively flat and not densely-developed, but wildlife habitat features such as water or sheltering structures should be discouraged.

The northwest of the airport features vast agricultural land that has the potential to attract wildlife which could then encroach on airport property and raise a risk to aviation safety. Since the land on the west side of the airfield is not owned by the City of Chehalis, it limits the authority the airport has on that land to mitigate those potential risks. Regular flooding of the Chehalis River does however offer some natural conservation of the present land use on the west side of the airport due to the floor hazard presented to future built structures.

Most of the eastern properties neighboring the airport are built for commercial retail use. The airport owns most of the land to the east of the airport through the Twin City Town Center. Because of this, the airport has authority over what the land can be used for and help mitigate potential risks from commercial building including the height of lighting and the building itself, method of trash containment, outdoor uses, and the amount of open space around the facilities.

It is recommended that the airport continue to monitor the land use and wildlife around the area and implement the appropriate protocols.

3.8.2. Local Zoning Ordinances

The FAA does not provide regulatory authority for the control of local land use. Instead they oblige local governments to develop regulatory guidance (land use planning, zoning, and the like) to maintain safety for air navigation near federally obligated airports. The City of Chehalis maintains an Airport Service District (ASD) within section 17.30 of the Chehalis Municipal Code (CMC). The code provides for compatible land use (CMC 17.30.020), height restrictions (CMC 17.30.030), and special provisions (CMC 17.30.040). Height restrictions extend from the runway surface on all sides at an angle of one foot vertically for every 34 feet horizontally within the ASD runway protection zone, inner safety zone and inner turning zone. Additional restrictions within the code include an angle of one foot vertical protection for every 20 feet horizontal, as measured from the runway, in order to protect the outer safety zone, sideline safety zone, and traffic pattern as defined within the code.

Additionally, Lewis County Code (LCC) provides many restrictions for properties in the vicinity of the three publicly-owned airports within the county. Height limitations in the vicinity of CLS are addressed in LCC 17.80.040 which is consistent with 14 CFR Part 77 but does not restrict the height of any structure built to or under 15.5 feet. LCC 17.80.050 provides further development and use restrictions in the vicinity of the airport in support of the Revised Code of Washington (RCW) in relation to discourage the siting of incompatible land uses around general aviation airports through the development of a comprehensive plan. LCC 17.80.050(2)(b) further expands upon RCW 36.70.547 by stating a list of incompatible land uses for properties within an airport zone as defined in LCC 17.80.035. Lewis County also addresses the visual identification of obstructions that penetrate Part 77 surfaces through LCC 17.80.060(2) and LCC 17.80.110.

While local ordinances provide ample protection regarding nearby land uses, it is encouraged that the airport sponsor continues to engage with local government to maintain these protections of local airspace from obstructions and land use that might otherwise negatively impact the safe operation of aircraft at CLS.

3.9. SUMMARY OF FACILITY REQUIREMENTS

Facility Requirements Table: B-II ARC; IAP with 1 mile viz min			
Airfield and Airspace Requirements			
Item	**Existing Condition**	**Required or recommended**	**Action Required**
Runway			
ARC to Meet Fleet Mix Demand	B-II	B-II	No
Orientation	99.89%	95%	No
Length	5000’	4700’	No - Meets 100% of small GA fleet & 75% of GA fleet over 12,500 lbs. at 60% useful load.
Width	140’	75’	No
Separation Standards	See section 3.2.3 above	See section 3.2.3 above	No
Runway Pavement Condition	Avg. PCI = 73* (Est: 2023)	Avg. PCI = >70	**Yes, the runway will need rehabilitation pavement maintenance in the future. *(*) PCI is likely higher due to recent pavement projects and is to be reevaluated by WSDOT in 2024.***
Taxiway			
Full or partial parallel	Yes	Yes	**Yes, the existing parallel taxiway exceeds dimensional requirements, can be realigned for better space utilization of the Airport.**
Width	See section 3.2.4 above	35’	**Yes, it is recommended that Taxiway A2 be widened to 35’ to be within the window of compliance, additionally all taxiway fillets should be constructed to meet standards.**
Separation Standards	See section 3.2.4 above	See section 3.2.4 above	No
Taxiway/Taxilane Pavement Condition	Avg. PCI = 63* (Est: 2023)	Avg. PCI = >70	**Yes, regular maintenance should be conducted on the taxiways and ramp areas. *(*) PCI is likely higher due to recent pavement projects and is to be reevaluated by WSDOT in 2024.***
Other Airfield Considerations			
Pavement Design Strengths	30,000 lbs.	30,000 lbs.	No, the runway is built to 30,000 pounds single wheel (85,000 pounds double-tandem main gear); however, all paved surfaces need to be considered in determining proper weight bearing strengths
Airfield separation standards (RPZ, RSA, ROFZ)	See section 3.2.3 above	See section 3.2.3 above	**Yes, the standards for the RPZ to the north and the south are not currently met due to roads transitioning through the RPZ. Nevertheless, appropriate land use controls are in place to prevent the introduction of additional incompatible uses in this area. Recommended mitigation measures to limit concentrations of people within the RPZ include roadway signage alerting vehicles to the RPZs as well as prohibiting stopping and standing in the RPZs.**
Airspace separation standards (Part 77)	See section 3.2.5 above	See section 3.2.5 above	No
Signing, Marking, Lighting, Navaids, UNICOM, communications, weather, and IAP considerations	Compliance with FAA AC 150/5340-1L and other ACs	Compliance with FAA AC 150/5340-1L and other ACs	**Yes, (1) Taxiway lighting should be installed to replace the taxiway reflectors; (2) The AWOS-III should be replaced as the current unit has met its useful life; (3) Lower approaches can be investigated with the updated AGIS data from this master plan.**
Airport infrastructure, facilities, and support requirements			
Item	**Existing Condition**	**Required or recommended**	**Action Required**
General Aviation Related Development			
Hangars	At 100% Capacity	Minimum of 9 additional hangar spaces anticipated by 2042	**Yes, hangar occupancy is at 100% currently. A strong waiting list is in place, and demand is anticipated to drive development.**
Apron / Transient Parking	3 large/13 small tiedowns	No specific minimums	No
Apron Pavement Condition	Avg. PCI = 84.5* (Est: 2023)	Avg. PCI = >70	No *(*) PCI is likely higher due to recent pavement projects and is to be reevaluated by WSDOT in 2024.*
GA Terminal / Pilot Lounge	Updated facility	Updated facility	No
AAM Terminal/Parking	None	Updated facility when needed	**Yes, Construct an Advanced Air Mobility Terminal and parking when demand requires.**
Support Facilities			

ARFF / SRE Equipment and Storage	Existing (Outdated)	Updated SRE units	**Yes, SRE equipment needs to be updated, and additional storage for the equipment is necessary.**
Fuel Storage	24,000-gal capacity	No specific minimum	No
Public Access and Parking	20 spots designated for FBO/Terminal Use	No specific minimum	No
Fencing	Not 100% Fenced	100% protection	**Yes, the USDA recommends that fencing with full skirting be in place around 100% of the airport to prevent animals from entering the airfield.**
Utilities	Existing	No specific minimums	No