

TECHNICAL REPORT

**SITING ANALYSIS FOR A
NEW AIR TRAFFIC CONTROL TOWER**

at the

**Boulder City Municipal Airport
Boulder City, Nevada**

May 2022

prepared for:



Federal Aviation Administration

and the



City of Boulder City, Nevada

prepared by:

Q *Quadrex Aviation, LLC*
Airport Development Services

in association with:

Kimley»Horn



AJT ENGINEERING INC

EXECUTIVE SUMMARY

The City of Boulder City, owner and operator of the Boulder City Municipal Airport (BVU), applied to enter the Federal Contract Tower (FCT) program and in April 2018, the FAA determined the Benefit/Cost for the development and operation of a new air traffic control tower (ATCT) to be 2.23. As a candidate for the FCT program, the City is required to provide an ATCT structure that meets the FAA's siting and design criteria.

Consequently, an extensive site analysis study was conducted to determine the optimum location for an ATCT at BVU. After screening potential locations for an ATCT on airport property, three sites were chosen for a more detailed siting analysis. The City conducted extensive aerial photography using drones and developed a three-dimensional model of an ATCT situated at each potential site.

On December 1, 2021, a siting team comprised of the City's planning, engineering, and environmental consultants, local air traffic control personnel, and representatives of various FAA lines of business reviewed each of the 3-D models following the FAA's VISTA process¹. Site 1 was eliminated from further analysis due to airfield visibility restrictions. The siting team reached a consensus that Site 3 met the FAA siting criteria and in comparison to the other sites, should be the recommended location due to its visibility of the airfield and proximity to existing utilities and infrastructure.

On December 2, 2021, Sites 2 and 3 were reviewed by a Safety Risk Management (SRM) panel comprised of FAA and FCT air traffic controllers, subject matter experts (SMEs), and stakeholders. No medium or high risks were identified for either of the sites and the panel reaffirmed the selection of Site 3 as the recommended site. The City concurred with the recommendation.

After the first siting panel review, the potential for lowering the Site 3 ATCT cab floor elevation was evaluated in addition to incorporating columns and slat wall into the cab layout. A second siting and SRM panel was conducted on March 4, 2022 to review the visibility performance of changes. While no adverse effects were identified by the participants, it was recommended that the ATCT Cab be rotated 30 degrees to the right to avoid potential airfield visibility constraints. A third siting and SRM panel review of the realigned Cab was conducted on March 25, 2022 and with no adverse effects identified, the consensus of the SRM panel that Site 3 is the preferred site was ratified unanimously.

The Site 3 ATCT would have a Cab eye level height of 95 feet AGL (2,268 feet MSL) to provide controllers with an unobstructed view of the entire air operations area (AOA). The elevation of the ATCT structure including antennas or lightning protection) would be 125 feet AGL (2,298 feet MSL).

¹ FAA Memorandum, *Virtual Immersive Siting Tower Assessment (VISTA) Siting Process for FAA Airport Traffic Control Tower (ATCT) and Federal Contract Tower (FCT)/ Non-Federal Tower (NFT) Sitings*, dated 11/5/2021

Conceptually, the ATCT facility will be a precast concrete structure capped by a 600 square-foot steel-framed eight-sided cab with mullions supporting the window glazing. Modular slat-wall fixtures will be used to mount ATCT equipment and to provide flat surfaces for ATCT Cab. The estimated construction cost is \$8.3 million. The ATCT will be equipped with communications and weather equipment meeting the current FAA minimum equipment list (MEL) for FCT facilities.

Construction of the ATCT is anticipated to begin in FY 2023 with funding provided by FAA and local resources. The ATCT is expected to be operational by the end of FY 2024.

APPROVAL AUTHORITIES

Director of Air Traffic Services, Western Service Area

Date

Director of Technical Operations, Western Service Area

Date

Director of Air Traffic Control Facilities, FAA Headquarters

Date

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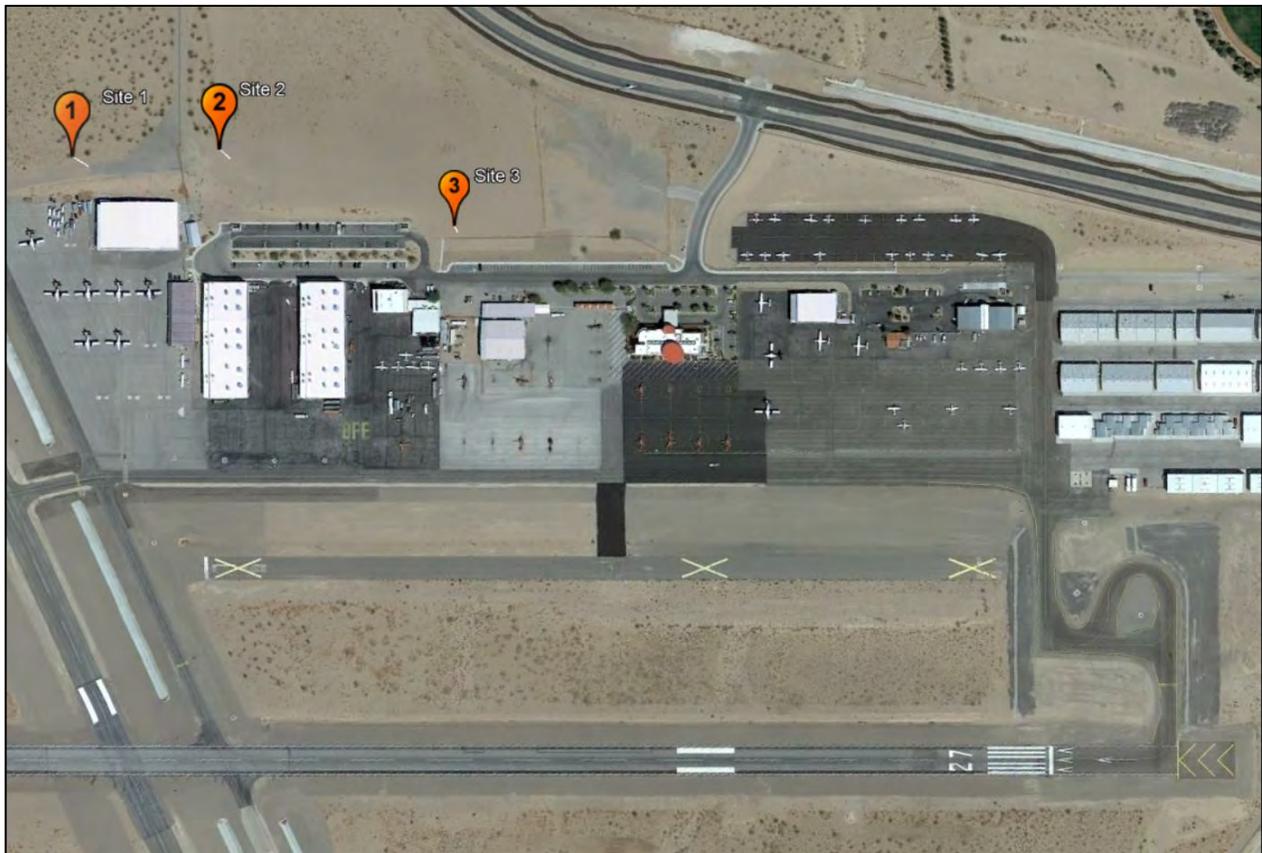
1.0 PREFERRED SITES

A preliminary evaluation of general areas on airport property indicated that only sites located in the vicinity of the terminal area would be practical for meeting the FAA siting criteria when considering the need for supporting infrastructure (access roads, utilities, etc.) and associated development costs.

1.1 Preferred Sites Aerial View

Three potential sites located in the terminal area were identified for closer examination towards meeting the siting criteria. **Figure 1** presents the aerial view of the three sites.

Figure 1. Preferred Sites Aerial View



Source: Google Earth

1.2 Site Comparison Chart

Table 1

Criteria	Site 1 ^[1]	Site 2	Site 3 ^[2]
Latitude:	35° 57' 1.70" N	35° 56' 58.85" N	35° 56' 58.85" N
Longitude:	114° 51' 33.33"W	114° 51' 26.67"W	114° 51' 26.67"W
Site Elevation:	2,178' MSL	2,173' MSL	2,173' MSL
Minimum Controller Eye Level (AGL/MSL)	125' / 2,303'	125' / 2293'	95' / 2,268'
ATCT Structural Height (AGL/MSL)	155' / 2,333'	155' / 2323'	125' / 2,298'
Maximum Distance to RW/TW End (RW 33 - Future)	3,755'	3,670'	3,670'
1. Visual Performance			
a. Controlling Obstruction (Shadow)	Hangar 2 (BFE)	Hangar 1	Hangar 1
b. ATCVAT Angle of Incidence (min 0.80°)	Pass	Pass	Pass
c. ATCVAT Object Discrimination (C-172)	Pass	Pass	Pass
d. Two-Point Lateral Discrimination (min 0.13°)	Pass	Pass	Pass
2. Impact to Instrument Approaches (TERPS)	No Impact	No Impact	No Impact
3. Impact to 14 CFR Part 77 Surfaces	No Impact	No Impact	No Impact
4. Sunlight/Daylight	No Impact	No Impact	No Impact
5. Artificial Lighting	Rotating Beacon	Rotating Beacon	Rotating Beacon
6. Weather & Other Atmospheric Conditions	No Impact	No Impact	No Impact
7. Industrial/Municipal Discharge	No Impact	No Impact	No Impact
8. Site Access Road & Parking	new / 1,250 lf	new / 1,250 lf	new / 500 lf
9. Interior Physical Barriers			
a. ATCT Orientation	South	South	South
b. Look Across Line-of-Sight	Good	Good	Good
c. Cab Mullions (design issue)	Mullions	Mullions	Mullions
d. Look Up Angle	Excellent	Excellent	Excellent
10. Estimated Construction Cost	\$9,849,000	\$9,849,000	\$8,316,000
11. Other Considerations			
a. Communications & NAVAIDS	No Impacts	No Impacts	No Impacts
b. Environmental (NEPA)	No Impacts	No Impacts	No Impacts
c. Utilities (Water/Sewer/Telco)	Accessible	Accessible	Accessible
d. Security Requirements	Fencing/Access	Fencing/Access	Fencing/Access
e. Aesthetics	Excellent	Excellent	Excellent
12. Safety Risk Assessment (see Appendix K)			
Hazard	See Note [1]	None	None
a. Initial Risk	N/A	None	None
b. Predicted Residual Risk (after mitigation)	N/A	None	None

[1] Site 1 was eliminated from further consideration due to restricted visibility of the airfield

[2] Site 3 was recommended by Siting Panel

1.3 Site 2

1.3.1 Description

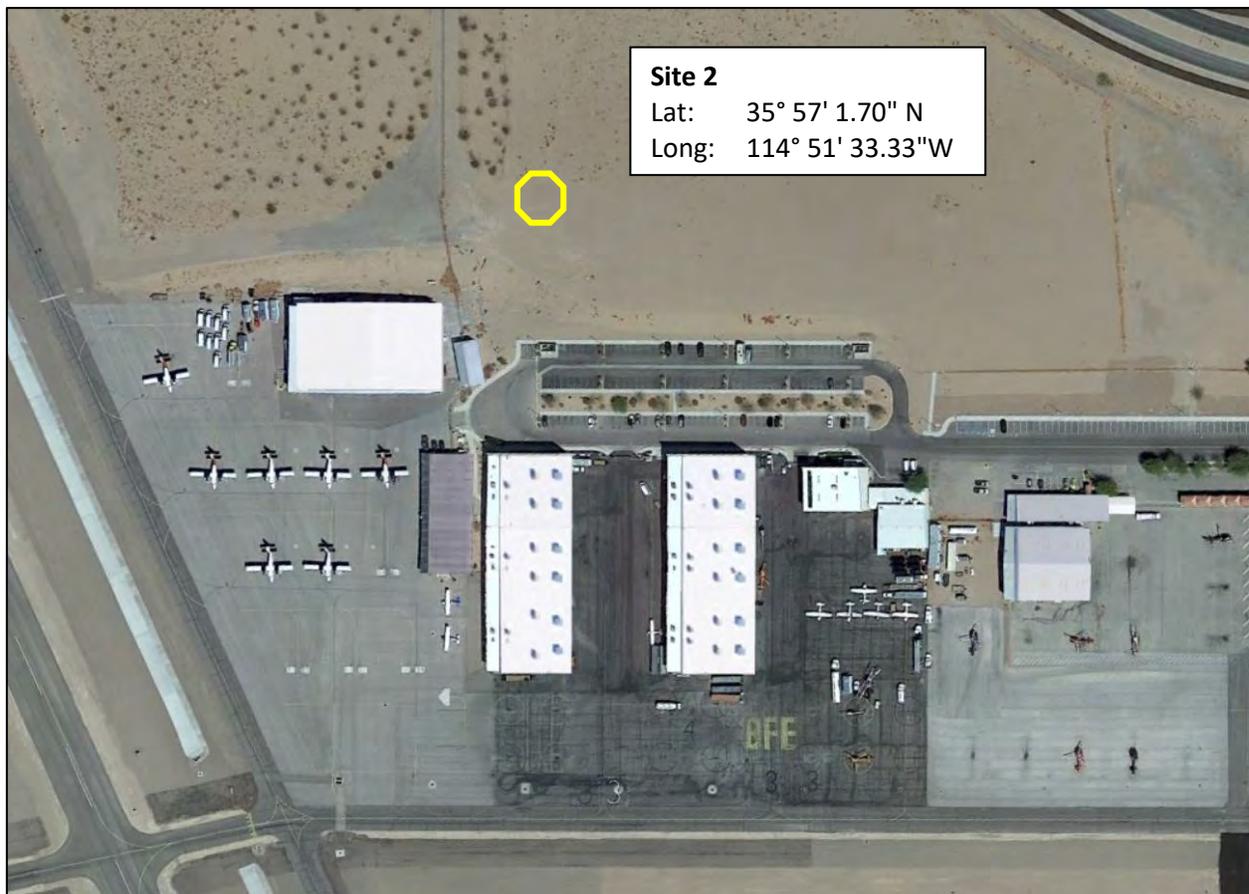
Site 2 is located in the northeast quadrant of the airport (as defined by Runways 9/27 and 15/33) near the west end of the terminal area.

1.3.2 Site Reference Data

Latitude: 35° 57' 1.70" N
Longitude: 114° 51' 33.33"W
Site Elevation: 2,178' MSL

1.3.3 Aerial View

Figure 2. Site 2 Aerial View



Source: Google Earth

1.3.4 Tower Height Chart

Based on current ATCT architectural designs, the optimum cab floor elevation was determined to be approximately 127 feet above ground level which is 7 feet higher than the final VISTA siting analysis and SRM which used a height of 120 feet (125-foot controller eye level). Accounting for antennas and air terminals for lightning protection, the top height for the Site 2 ATCT will be 162 feet above ground level.

**Site 2
ATCT Height Chart**

Level	Function	Height (AGL)	Elevation (AMSL)
Level 1	Equipment Room	0' 0"	2,176.0'
Level 2	Unfinished	12' 3"	2,188.3'
Level 3	Unfinished	23' 4"	2,199.3'
Level 4	Unfinished	34' 5"	2,210.4'
Level 5	Unfinished	45' 6"	2,210.4'
Level 6	Unfinished	56' 7"	2,221.5'
Level 7	Training / Break Room	67' 8"	2,232.6'
Level 8	ATM Office	78' 9"	2,243.7'
Level 9	Airport Equipment Room	89' 10"	2,254.8'
Level 10	FAA Equipment Room	100' 11"	2,265.8'
Level 11	Break Room	112' 0"	2,276.9'
Level 12	Cab Floor	127' 2"	2,288.0'
	Roof	139' 2"	2,303.2'
	Parapet	144' 2"	2,315.2'
	Antennas/Air Terminals	162' 2"	2,320.2'

Note: Ground Elevation = 2,176.0' AMSL

1.3.5 Siting Criteria Evaluation

A. TERPS

Based on a preliminary assessment by FAA personnel, there will be no impact on any instrument approaches created by Site 2.

Refer to Appendix F.

B. 14 CFR Part 77, Obstruction Evaluation/Airport Airspace Analysis (OE/AAA) requirements

Based on a preliminary assessment by FAA personnel, Site 2 will not impose an impact on any airspace protected under 14 CFR Part 77.

Refer to Appendix F.

C. Impacts to Communications, Navigation and Surveillance Equipment (NASWATCH)

Based on a preliminary assessment by FAA personnel, Site 2 may interfere with the Airport Surveillance Radar (ASR) located at LAS. FAA recommended a "Level 3" analysis through an OE/AAA aeronautical study.

Refer to Appendix J.

D. Visibility Performance Requirements

Using the ATCVAT tool, Site 2 at the proposed location and elevation passed all of the evaluation criteria. Subsequent analyses of the visibility restrictions posed by hangars and

other structures were assessed and it was determined that Site 2 provides an unobstructed view of the airfield.

Refer to Appendix D and Appendix H.

E. Safety Assessment

During the initial SRM panel meeting, there were no significant hazards (assessed as “high” or “medium”) identified for Site 2.

Refer to Appendix K.

F. Operational Requirements

1. *ATCT Orientation* – Cab will have a south orientation perpendicular to the primary runway (RW 9/27)
 - a. Direct sun glare – Glare from sunrise conditions will affect visibility to the east on a seasonal basis but will be mitigated with doubled window shades. Mountains to the west will prevent low-angle glare during sunset conditions.
 - b. Indirect sun glare off natural and manmade surfaces – None
 - c. Night-time lighting glare – None
 - d. External light sources – None
 - e. Thermal distortion – None
2. *Weather* – A review of 10 years of historical weather conditions indicated that BVU experiences VFR conditions 99.6 percent of the time. The prevailing winds are from the northeast and southeast. There were no persistent or extraordinary conditions (fog, low ceilings, etc.) identified that would interfere with ATC operations.
3. *Look-Down Angle* – The calculated look-down angle from the controller’s perspective in the ATCT cab at Site 2 to the nearest point of the movement area is 13.6° down from the horizontal which provides an adequate field of view. The look-down angle to the nearest non-movement area is 22.6°. During the VISTA² session, ATCT personnel affirmed that the cab consoles and turrets will not interfere with visibility of any aircraft movement areas.
4. *Look-Across Angle* – The clear floor span of the ATCT cab design is 425 feet wide which is adequate to provide clear line-of site for each controller position to have an unobstructed view of each runway end. This was affirmed by ATCT personnel during the VISTA session.

² FAA Memorandum, *Virtual Immersive Siting Tower Assessment (VISTA) Siting Process for FAA Airport Traffic Control Tower (ATCT) and Federal Contract Tower (FCT)/ Non-Federal Tower (NFT) Sitings*, dated 11/5/2021

5. *Cab Mullion/Column Orientation* – The ATCT cab design will be oriented so that mullions will not obstruct controllers’ clear line-of-sight for critical areas of the movement area. This was affirmed by ATCT personnel during the VISTA session.

Refer to Appendix K.

6. *Look-up Angle* – ATCT cab windows extend up 10 feet from the console height and provide an upward viewing angle of 35° from the controller’s eye level position which is adequate to ensure visibility of aircraft in the traffic pattern, missed approaches, and approaching/departing overflights. This was affirmed by ATCT personnel during the VISTA session.
7. *Construction* – Not applicable (no existing ATCT).
8. *Access* – Access to Site 2 does not require crossing any aircraft operations areas. Site 2 will require 1,250 feet of dedicated access road which will be developed on airport property.
9. *Non-Movement Areas* – While not a siting requirement, Site 2 provides adequate visibility of most all airside non-movement areas. This was affirmed by ATCT personnel during the VISTA session.
10. *Cab Size Evaluation* – The ATCT cab design is adequate to accommodate initial controller positions with space for circulation and additional positions. This was affirmed by ATCT personnel during the VISTA session.

G. Economic Considerations

The estimated cost for the development of an ATCT at Site 2 is \$9.8 million.

Refer to Appendix B

H. Environmental Consequences (NEPA)

There is an on-going environmental assessment for the development of an ATCT at BVU to satisfy NEPA requirements. Initial findings indicate that there are no significant negative environmental impacts associated with the development of an ATCT at Site 2. The final environmental assessment will document the findings along with any recommended measures to mitigate adverse impacts.

Refer to [Appendix G](#).

I. Cab Size

The ATCT cab will be 8-sided with mullions. Total area of the cab will be 600 square feet with approximately 450 square feet of open floor space.

Refer to Appendix E.

1.4 Site 3

1.4.1 Description

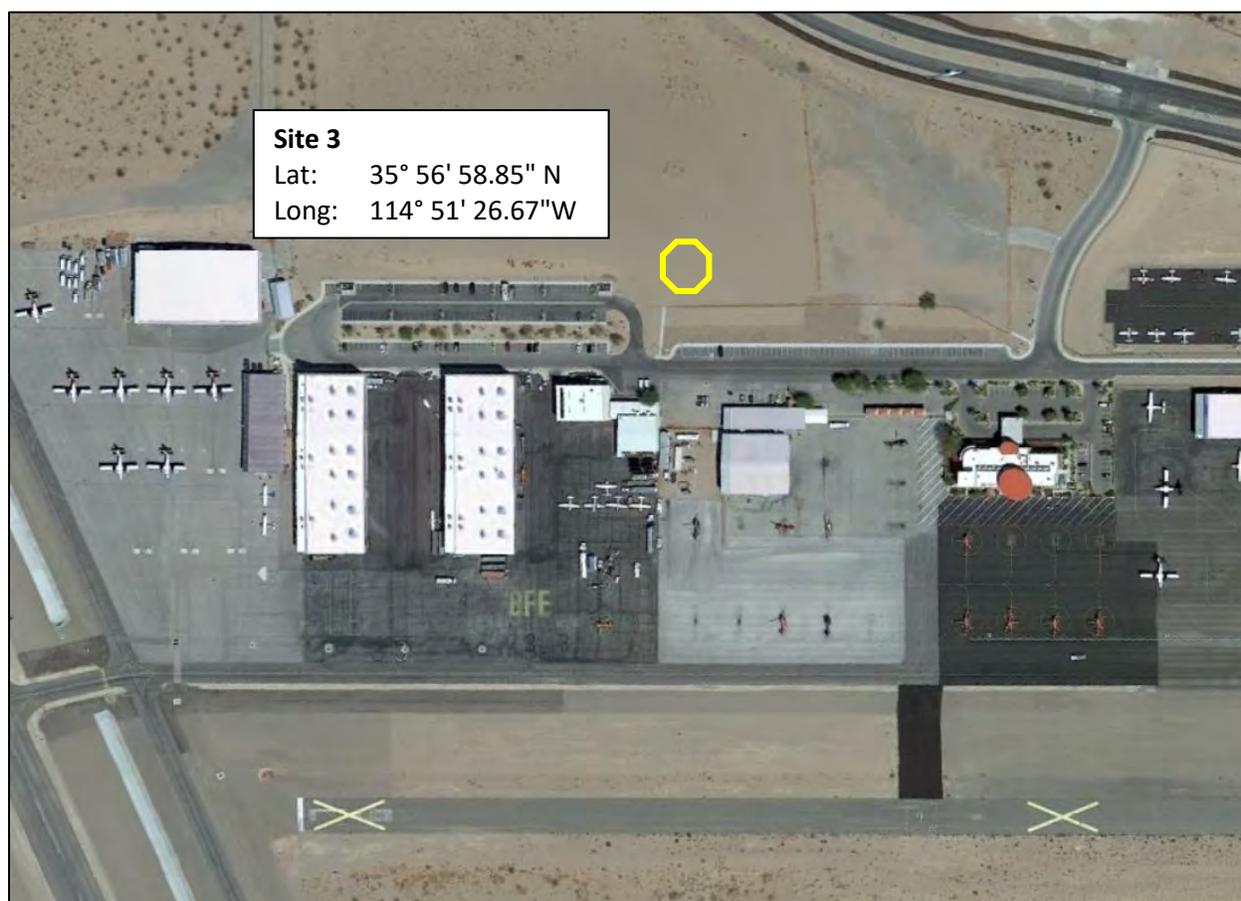
Site 3 is located in the northeast quadrant of the airport (as defined by Runways 9/27 and 15/33) near the central portion of the terminal area.

1.4.2 Site Reference Data

Latitude: 35° 56' 58.85" N
Longitude: 114° 51' 26.67" W
Site Elevation: 2,173' MSL

1.4.3 Aerial View

Figure 3. Site 3 Aerial View



Source: Google Earth

1.3.4 Tower Height Chart

Based on current ATCT architectural designs, the optimum cab floor elevation was determined to be approximately 94 feet above ground level which is 4 feet higher than the final VISTA siting analysis and SRM which used a height of 90 feet (95-foot controller eye level). Accounting for

antennas and air terminals for lightning protection, the top height for the Site 3 ATCT will be 129 feet above ground level.

**Site 3
ATCT Height Chart**

Level	Function	Height (AGL)	Elevation (AMSL)
Level 1	Equipment Room	0.0'	2,173.0'
Level 1	Equipment Room	0' 0"	2,173.0'
Level 2	Unfinished	12' 3"	2,185.3'
Level 3	Unfinished	24' 4"	2,197.3'
Level 4	Training / Break Room	34' 5"	2,207.4'
Level 5	ATM Office	45' 6"	2,218.5'
Level 6	Airport Equipment Room	56' 7"	2,229.6'
Level 7	FAA Equipment Room	67' 8"	2,240.7'
Level 8	Break Room	78' 9"	2,251.8'
Level 9	Cab Floor	93' 11"	2,266.9'
	Roof	105' 11"	2,278.9'
	Parapet	110' 11"	2,283.9'
	Antennas/Air Terminals	128' 11"	2,301.9'

Note: Ground Elevation = 2,173.0' MSL

See **Appendix E** for a profile illustration of the proposed ATCT at Site 3.

1.3.5 Siting Criteria Evaluation

A. TERPS

Based on a preliminary assessment by FAA personnel, there will be no impact on any instrument approaches created by Site 3. A request for a formal aeronautical study through the OE/AAA³ electronic portal was submitted as an “on-airport” case on May 4, 2022. The final determination of the airport airspace analysis issued on May 31, 2022 indicated there were no objections to the development.

Refer to Appendix F

B. 14 CFR Part 77, Obstruction Evaluation/Airport Airspace Analysis (OE/AAA) requirements

Based on a preliminary assessment by FAA personnel, Site 3 will not impose a hazard to air navigation on any airspace protected under 14 CFR Part 77. The FAA's final determination of the obstruction evaluation dated May 31, 2022 indicated no objections to the development provided the conditions for marking and lighting the control tower

³ [Obstruction Evaluation/Airport Airspace Analysis](#)

as specified in FAA Advisory Circular 70/7460-1M, Obstruction Marking and Lighting are met.

Refer to Appendix F

C. Impacts to Communications, Navigation and Surveillance Equipment (NASWATCH)

Based on a preliminary assessment by FAA personnel, Site 3 may interfere with the Airport Surveillance Radar (ASR) located at LAS. The results of a “Level 3” analysis conducted as part of the OE/AAA aeronautical study did not indicate any interference with communications, navigation or surveillance systems.

Refer to Appendix F.

D. Visibility Performance Requirements

Using the FAA’s online ATCVAT⁴ tool, Site 3 at the proposed location and elevation passed all of the evaluation criteria. The summarized results of the ATCVAT analysis are included in Appendix H. Subsequent analyses of the visibility restrictions posed by hangars and other structures were assessed using the VISTA model and it was determined that Site 3 provides an unobstructed view of the airfield.

Refer to Appendix D and Appendix H for the results of the detailed ATCVAT analysis .

E. Safety Assessment

During the SRM panel meetings (3 total), there were no significant hazards (assessed as “high” or “medium”) identified for Site 3.

Refer to Appendix K

F. Operational Requirements

1. *ATCT Orientation* – Cab will have a south orientation perpendicular to the primary runway (RW 9/27)
 - a. Direct sun glare – Glare from sunrise conditions will affect visibility to the east on a seasonal basis but will be mitigated with doubled window shades. Mountains to the west will prevent low-angle glare during sunset conditions.
 - b. Indirect sun glare off natural and manmade surfaces – None
 - c. Night-time lighting glare – None
 - d. External light sources – None
 - e. Thermal distortion – None

⁴ [Air Traffic Control Visibility Analysis Tool](#)

2. *Weather* – A review of 10 years of historical weather conditions indicated that BVU experiences VFR conditions 99.6 percent of the time. The prevailing winds are from the northeast and southeast. There were no persistent or extraordinary conditions (fog, low ceilings, etc.) identified that would interfere with ATC operations.
3. *Look-Down Angle* – The calculated look-down angle from the controller’s perspective in the ATCT cab at Site 3 to the nearest point of the movement area is 12.6° down from the horizontal which provides an adequate field of view. The look-down angle to the nearest non-movement area is 21.2°. During the original and subsequent VISTA sessions, ATCT personnel affirmed that the cab consoles and turrets will not interfere with visibility of any aircraft movement areas.
4. *Look-Across Angle* – The clear floor span of the ATCT cab design is 425 feet wide which is adequate to provide clear line-of site for each controller position to have an unobstructed view of each runway end. This was affirmed by ATCT personnel during the VISTA session.
5. *Cab Mullion/Column Orientation* – The ATCT cab design will be oriented so that mullions will not obstruct controllers’ clear line-of-sight for critical areas of the movement area. This was affirmed by ATCT personnel during the final VISTA session.

Refer to Appendix K.

6. *Look-up Angle* – ATCT cab windows extend up 10 feet from the console height and provide an upward viewing angle of 35° from the controller’s eye level position which is adequate to ensure visibility of aircraft in the traffic pattern, missed approaches, and approaching/departing overflights. This was affirmed by ATCT personnel during the final VISTA session.
7. *Construction* – Not applicable (no existing ATCT).
8. *Access* – Access to Site 3 does not require crossing any aircraft operations areas. Site 3 will require 500 feet of dedicated access road which will be developed on airport property.
9. *Non-Movement Areas* – Site 3 provides adequate visibility of all non-movement areas. This was affirmed by ATCT personnel during the VISTA session.
10. *Cab Size Evaluation* – The ATCT cab design is adequate to accommodate initial controller positions with space for circulation and additional positions. This was affirmed by ATCT personnel during the VISTA session.

G. Economic Considerations

The estimated cost for the development of an ATCT at Site 3 is \$8.3 million.

Refer to Appendix B

H. Environmental Consequences (NEPA)

There is an on-going environmental assessment for the development of an ATCT at BVU to satisfy NEPA requirements. Initial findings indicate that there are no significant negative environmental impacts associated with the development of an ATCT at Site 3. The initial assessment of the environmental consequences for Site 3 is summarized in Appendix G, Table G-1. The final environmental assessment will document the findings along with any recommended measures to mitigate adverse impacts.

Refer to Appendix G.

I. Cab Size

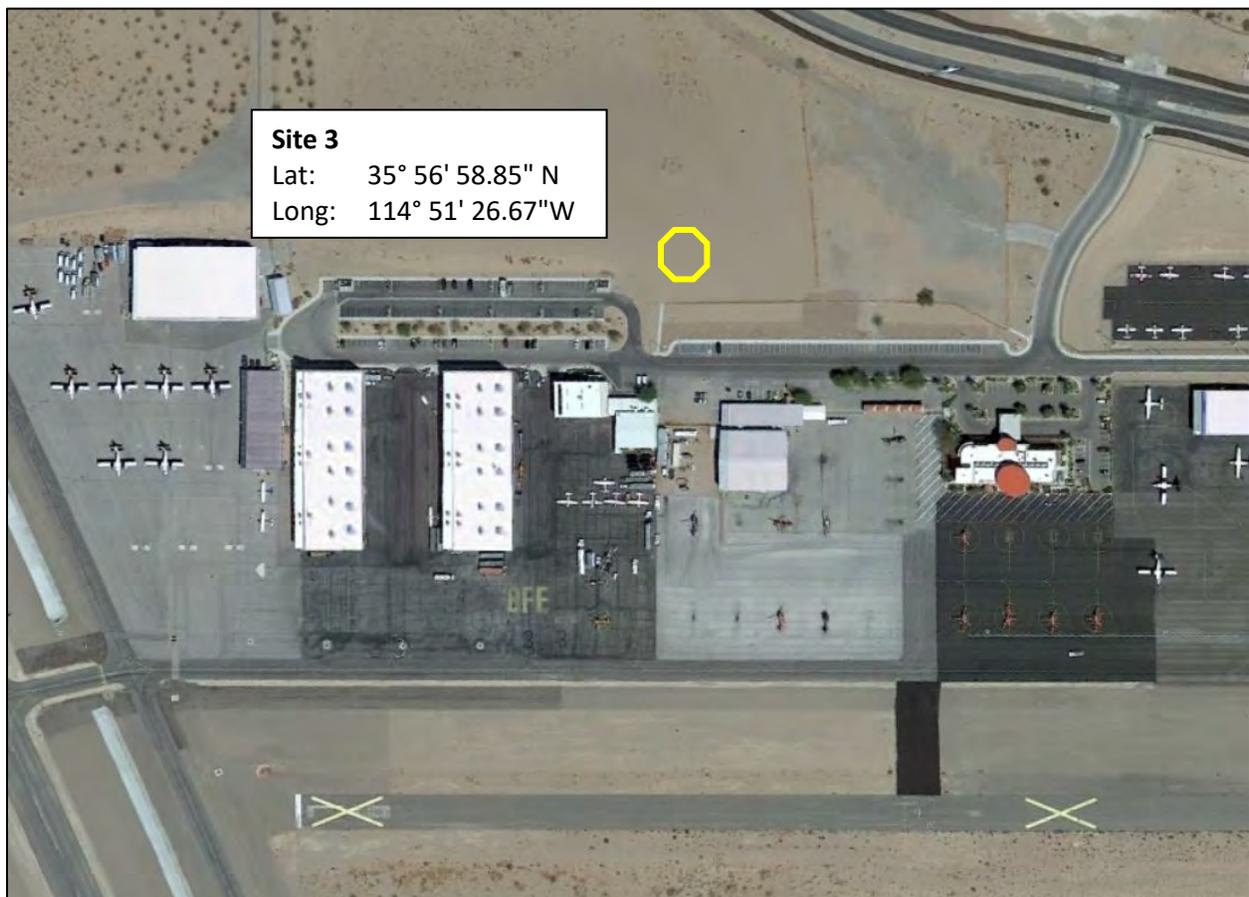
The ATCT cab will be 8-sided with mullions. Total area of the cab will be 600 square feet with approximately 450 square feet of open floor space.

Refer to Appendix E.

2.0 FINAL SITE RECOMMENDATION

After reviewing the site data and the VISTA model for both sites, the air traffic controllers recommended **Site 3**. The Sponsor concurred with its selection as the final recommended site. Refer to Section 1.2, Site Comparison Chart, for additional data.

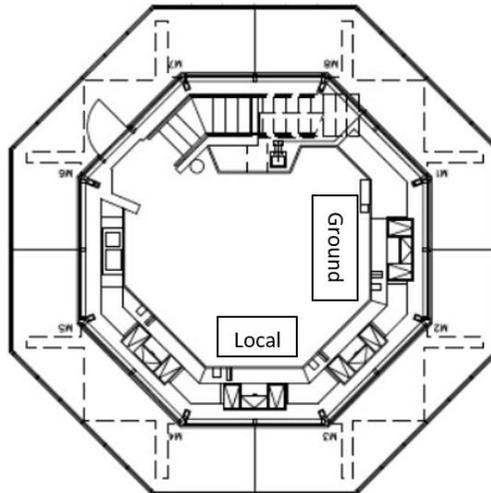
Figure 4. Recommended Site – Site 3



3.0 CAB SIZE AND ORIENTATION

Cab Size: 600 sq. ft.
Floor Space : 450 sq. ft.

Figure 5. Site 3 Cab Orientation



4.0 SUPPLEMENTAL INFORMATION

- Appendix A – Airport Concurrence Letter
- Appendix B – Cost Estimate
- Appendix C – All Sites Evaluated
- Appendix D – Panoramic Views from VISTA
- Appendix E – Drawings & Graphics
- Appendix F – Obstruction Evaluations/Airport Airspace Analysis (OE/AAA)
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Appendix A
Airport Concurrence Letter



City of Boulder City
 401 California Avenue
 Boulder City, NV 89005
 www.bcnv.org

May 9, 2022

BOULDER CITY
 CITY COUNCIL

MAYOR
 KIERNAN MCMANUS

COUNCIL MEMBERS:
 James Howard Adams
 Claudia M. Bridges
 Matt Fox
 Sherri Jorgensen

Director of Technical Operations
 FAA Western Service Area
 2200 S. 216th St.
 Des Moines, WA 98198

**RE: Airport Concurrence Form
 New Airport Traffic Control Tower
 Boulder City Municipal Airport (BVU)
 Boulder City, Nevada**

MEETING LOCATION:
 CITY COUNCIL CHAMBER
 401 CALIFORNIA AVENUE
 BOULDER CITY, NV 89005

MAILING ADDRESS:
 401 CALIFORNIA AVENUE
 BOULDER CITY, NV 89005

WEBPAGE:
 WWW.BCNV.ORG

This letter is written to establish the City of Boulder City's concurrence with the siting requirements and impacts of a new Airport Traffic Control Tower (ATCT) planned for construction at the Boulder City Municipal Airport. This signed document is intended to satisfy FAA national policy regarding written confirmation from the Airport owner/operator stating that the Airport's user community has been advised about the new ATCT and the impacts that the project would have on their operations.

Section 1. Siting Requirements

- 1) The location of the ATCT (NAD-83) is identified as Site 3.
 Lat. 35° 56' 58.85" N
 Long. 114° 51' 26.67" W
- 2) The ATCT height will be 125' MSL (2,298' AGL).
- 3) The ATCT controller eye height used for evaluating of line-of-sight is 95' MSL (2,268' AGL).
- 4) The exact ATCT height is subject to and in accordance with Official Airspace Approval per FAA Form 7460-1 and FAA TERPS analysis (NASWATCH Report). The Airspace Final Determination is pending FAA review through the OE/AAA and is referenced as:
 - a. 2022-AWP-2301-NRA
 - b. 2022-AWP-2302-NRA
 - c. 2022-AWP-2303-NRA
 - d. 2022-AWP-2304-NRA
- 5) Visibility of all movement areas and non-movement areas, look-down, -up, and -across angles, sunrise, sunset, fog, snow, rain, ramp lighting, glare, existing obstructions around the airport, and other issues that can adversely affect the Controller's Line-of-Sight have been considered for the ATCT location.

CITY MANAGER:
 TAYLOUR TEDDER, CECD

CITY ATTORNEY:
 BRITTANY WALKER, ESQ

CITY CLERK:
 TAMI MCKAY, MMC, CPO

COMMUNITY DEVELOPMENT
 DIRECTOR:
 MICHAEL MAYS, AICP

PUBLIC WORKS DIRECTOR:
 KEEGAN LITRELL, P.E.

UTILITIES DIRECTOR:
 Joseph Stubitiz

POLICE CHIEF:
 TIM SHEA

FIRE CHIEF:
 WILL GRAY, CFO

FINANCE DIRECTOR:
 DIANE PELLETIER, CPA

PARKS & RECREATION DIRECTOR
 ROGER HALL

Section 2. Identified Impacts

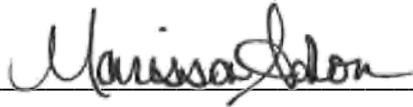
There were no irreversible adverse impacts identified in the Safety Risk Management analysis for the proposed construction of a new ATCT at Site 3.

Measures to enhance safety for the operation of the ATCT will include:

- 1) Obstruction marking and lighting of the ATCT structure will be in accordance with the recommendations specified in the FAA's final airspace determination.
- 2) Double transparent shades in the new control cab will be installed to mitigate the impacts of sunrise and sunset glare.

The submission of this signed document constitutes concurrence and adherence to FAA policy concerning appropriate public notification of the airport community regarding the intent to build a new ATCT and any impacts therein concerning the use of the airport. The submission of this document does not waive the requirement of public comment as defined in the National Environmental Policy Act (NEPA), the Council on Environmental Quality (CEQ) regulations implementing NEPA Title 40 of the United States Code of Federal Regulations (CFR), Parts 1500-1517, and other statutes, orders, directives, or policy concerning environmental assessment and alternatives.

The City of Boulder City hereby confirms that the Airport's user community has been advised of the proposed new ATCT and the effects the above impacts would have on its operations at the airport.



Marissa Adou
Airport Manager
Boulder City Municipal Airport

May 9, 2022

Date

Appendix B

Cost Estimates

Table B-1
ATCT Construction Cost Estimates
BVU ATCT - Site 2

	<u>Site 2</u>	<u>Remarks</u>
ATCT Development Characteristics	13/125'	<i>(Levels/Cab Floor Height)</i>
<u>Common Features</u>		
Level 1	600,000	<i>Includes Electrical Service/ Telecommunications/Fire Sytems/Elevator</i>
Level 2	100,000	<i>Required to meet Tower Cab elevation</i>
Level 3	100,000	<i>Required to meet Tower Cab elevation</i>
Level 4	100,000	<i>Required to meet Tower Cab elevation</i>
Level 5	100,000	<i>Required to meet Tower Cab elevation</i>
Level 6	100,000	<i>Required to meet Tower Cab elevation</i>
Level 7	100,000	<i>Required to meet Tower Cab elevation</i>
Level 8	150,000	<i>Training Room / Conference Room</i>
Level 9	150,000	<i>Air Traffic Manager's / Admin Office</i>
Level 10	150,000	<i>Sponsor Equipment & Racks</i>
Level 11	150,000	<i>FAA & Equipment Rack</i>
Level 12	150,000	<i>Break Room / Restroom</i>
<u>Cab Level</u>	<u>750,000</u>	<i>ATCT Control Tower Cab Structure, Glazing, Catwalk, Parapet, etc.</i>
Subtotal (Common Features)	2,700,000	
<u>Other Specific Features</u>		
General Conditions (20% of Common Features)	540,000	
Fire Pump & FP (10% of Common Features)	270,000	
Fireproofing & Special Structural Features	150,000	<i>Required for structures w/occupied levels above 100'</i>
Site Civil (Access Road, Parking, Security)		
Access Road	232,500	<i>(1,250' x 22' = 3,100 sy) @ \$75 per sy</i>
Parking (10 spaces)	31,500	<i>(10 spaces 9' x 18' + 24' access = 420 sy @ \$75 per sy)</i>
Security Fencing & Gates	27,200	<i>(120' x 120' = 480 lf @ \$15 per lf + \$20,000)</i>
Site Civil (Utilities)	125,000	<i>Connection to water/sewer</i>
Site Civil (Electrical & Telecommunications)	<u>125,000</u>	<i>Connection to electrical power</i>
Subtotal (Site Specific Features)	1,501,200	
Subtotal Construction Costs	4,201,200	
Location Factor (15%)	<u>630,000</u>	<i>Index for Las Vegas area construction</i>
Subtotal	4,831,200	
Escalation & Inflation (5%)	<u>242,000</u>	<i>Cost increases during construction</i>
Subtotal	5,073,200	
Contingencies - Supply Chain & Logistics (20%)	1,014,640	<i>Materials supply chain & transportation</i>
Contingencies (20%)	<u>1,015,000</u>	<i>Unforeseen circumstances</i>
Total Estimated Construction Cost	7,102,840	
<u>Design, Construction Support, Equipment</u>		
Design (through Construction Documents)	852,000	<i>12% of Construction</i>
Construction Observation & Administration	710,000	<i>10% of Construction</i>
Bid Ads, Publications, etc	9,000	<i>Bid Notices, Printing, etc.</i>
Testing & Special Inspections	75,000	<i>Geotech, Materials, Building, etc.</i>
FAA Equipment Installation (RA)	300,000	<i>Reimbursible Agreement - Engineering & Installation of FAA equipment</i>
FAA Equipment Telecom (RA)	175,000	<i>Reimbursible Agreement - Installation of FAA Telecom Equipment + 2 yrs Service</i>
ATCT Equipment (Sponsor)	475,000	<i>Required for FAA FCT minimum equipment list</i>
ATCT Cab (Slatwall Option)	125,000	<i>Optional</i>
<u>Furniture & Accessories</u>	<u>25,000</u>	<i>ATC Manager, Training, Break Rooms, & Tower Cab furniture</i>
Subtotal (Design, Construction Support, Equipment, etc)	2,746,000	
Total Estimated ATCT Development Costs	9,848,840	

Table B-2
ATCT CONSTRUCTION COST ESTIMATE
BVU ATCT - Site 3

	<u>Site 3</u>	<u>Remarks</u>
ATCT Development Characteristics	9/95'	<i>(Levels/Cab Floor Height)</i>
<u>Common Features</u>		
Level 1	General Equipment Room	600,000
Level 2	Unfinished Space	100,000
Level 3	Unfinished Space	100,000
Level 4	Training / Conference Room	150,000
Level 5	ATM Office	150,000
Level 6	FCT Equipment	200,000
Level 7	FAA Equipment	150,000
Level 8	Break Room	150,000
Level 9	<u>Control Tower Cab</u>	<u>750,000</u>
Subtotal (Common Features)	2,350,000	
<u>Other Specific Features</u>		
	General Conditions (20% of Common Features)	470,000
	Fire Pump & FP (10% of Common Features)	235,000
	<u>Site Civil (Access Road, Parking, Security)</u>	
	Access Road	93,750
	Parking (10 spaces)	31,500
	Security Fencing & Gates	27,200
	Site Civil (Utilities)	125,000
	Site Civil (Electrical & Telecommunications)	<u>125,000</u>
Subtotal (Site Specific Features)	1,107,450	
<u>Subtotal Construction Costs</u>		
	3,457,450	
	Location Factor (15%)	<u>519,000</u>
		<i>Index for Las Vegas area construction</i>
Subtotal	3,976,450	
	Escalation & Inflation (5%)	<u>199,000</u>
		<i>Cost increases during construction</i>
Subtotal	4,175,450	
	Contingencies - Supply Chain & Logistics (20%)	835,090
	Contingencies - Other (20%)	<u>835,000</u>
		<i>Unforeseen circumstances</i>
Total Estimated Construction Cost	5,845,540	
<u>Design, Construction Support, Equipment</u>		
	Design (through Construction Documents)	701,000
	Construction Observation & Administration	585,000
	Bid Ads, Publications, etc	9,000
	Testing & Special Inspections	75,000
	FAA Equipment Installation (RA)	300,000
	FAA Equipment Telecom (RA)	175,000
	ATCT Equipment (Sponsor)	475,000
	ATCT Cab (Slatwall Option)	125,000
	<u>Furniture & Accessories</u>	<u>25,000</u>
		<i>ATC Manager, Training, Break Rooms, & Tower Cab furniture</i>
Subtotal (Design, Construction Support, Equipment)	2,470,000	
Total Estimated ATCT Development Costs	8,315,540	

Appendix C

All Sites Evaluated

Appendix C

All Sites Considered

A. INITIAL ATCT SITE AREAS

1. Initial Area Identification & Evaluation

The Boulder City Municipal Airport is laid out in configuration where the primary and crosswind runway intersect and separates airport property into four quadrants. Runway 9/27 bisects airport property north and south while Runway 15/33 divides the airport into east and west sections. These quadrants represent the general areas that were considered for potential sites that could meet the basic minimum criteria for ATCT development. **Figure 1** illustrates the four areas for consideration

Basic criteria for considering the viability of these areas included:

- Available access
- Available utilities
- Terrain characteristics
- ATCT orientation

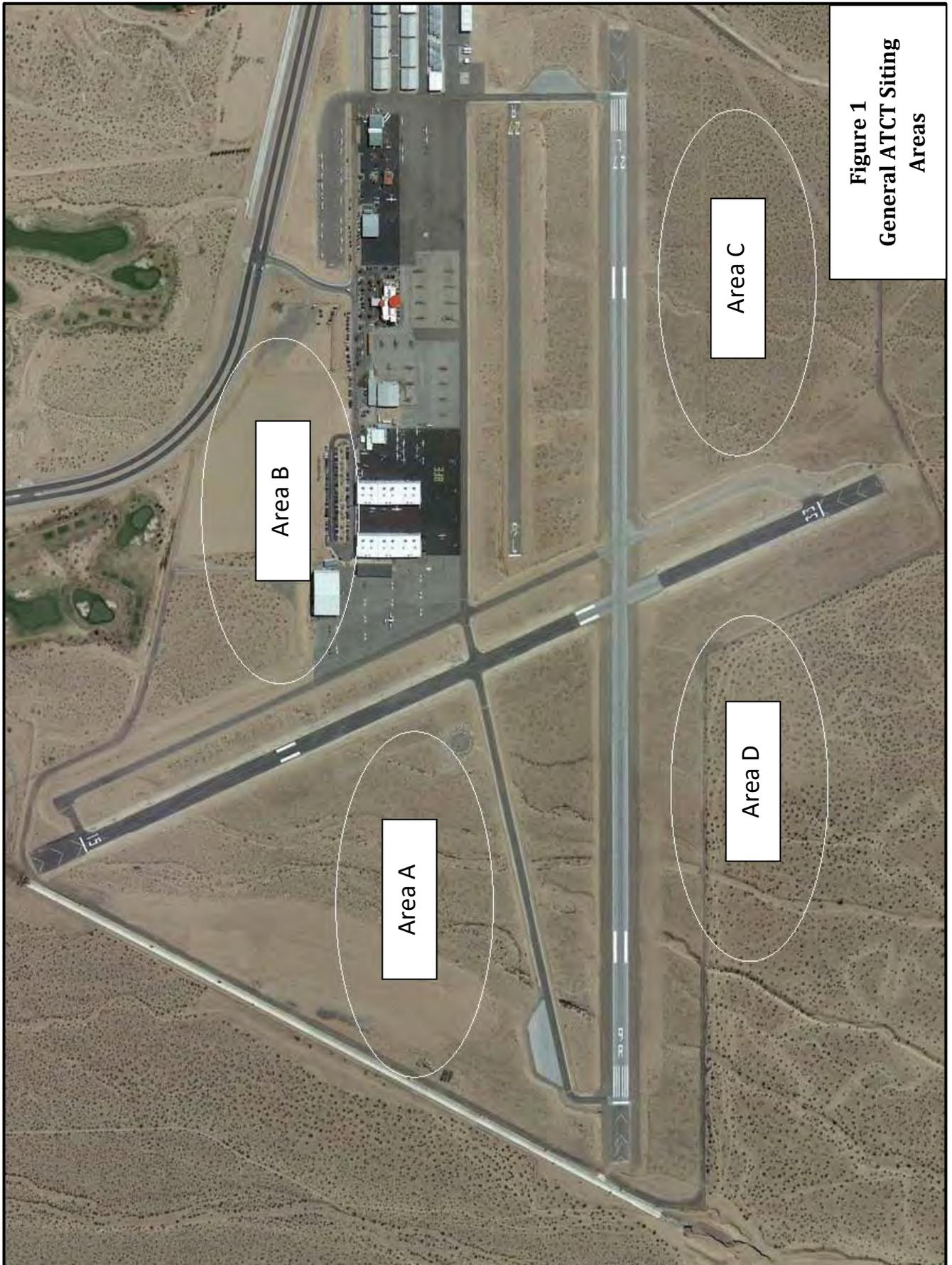
Each general area was screened against these factors to determine its suitability for supporting ATCT development at the Airport.

a. Area A - Northwest Quadrant

This area is undeveloped other than a major stormwater drainage structure along the airport western perimeter. The terrain is relatively level and even with the airfield. The AWOS sensors are located in Area A. A 500-foot radius around the sensors is reserved to protect the AWOS.

Area A Northwest Quadrant

<u>Pros</u>	<u>Cons</u>
<ul style="list-style-type: none">- Unobstructed airfield view- Utilities (electric only)- East/Southwest view of Runway 9/27- North view of Runway 15	<ul style="list-style-type: none">- Access road length required (\pm 4,700')- No utilities (water, sewer, telecom, etc.)- Remote from developed areas- Distance to electrical vault (airfield lighting)- South view of Runway 33



b. Area B - Northeast Quadrant

This area represents the terminal area of the airport where most all of the current development is located. There are still parcels available for development however a major portion of the undeveloped property accommodates the parachute landing area (PLA) for the tandem skydiving operator. The terrain is generally above the level of the airfield.

**Area B
Northeast Quadrant**

<u>Pros</u>	<u>Cons</u>
<ul style="list-style-type: none"> - Existing access to area - Existing utilities in proximity - Terrain elevation higher than airfield - Northwest view of Runway 15 	<ul style="list-style-type: none"> - Potential for obstructed view of AOA - Proximity of Parachute Landing Area - Southeast/Southwest view of Runway 9/27 - South view of Runway 33

c. Area C - Southeast Quadrant

This area is undeveloped. The terrain slopes away from and falls below the general level of the airfield.

**Area C
Southeast Quadrant**

<u>Pros</u>	<u>Cons</u>
<ul style="list-style-type: none"> - Unobstructed view of airfield - Future hangar development area - Northeast/Northwest view of Runway 9/27 - North/Southwest view of Runway 15/33 	<ul style="list-style-type: none"> - Access road length required (3,200') - No Utilities - Terrain elevation lower than airfield - Remote location away from developed areas

d. Area D - Southwest Quadrant

This area is undeveloped. Airport property line only extends 400 feet from Runway 9/27 centerline. The terrain slopes away from and falls below the general level of the airfield.

**Area D
Southwest Quadrant**

<u>Pros</u>	<u>Cons</u>
<ul style="list-style-type: none"> - Unobstructed view of airfield - Limited on-airport property - East/West view of Runway 9/27 - North/Southeast view of Runway 15/33 	<ul style="list-style-type: none"> - No area for ATCT development - Access road length required (± 8,000') - No Utilities - Terrain elevation lower than airfield - Remote location away from developed

2. Analysis of Initial Sites

A cursory review of the four potential areas for ATCT development indicated that only one of the four areas have the potential for cost-effectively supporting the project. Area B is located in the terminal area of the airport and development would be supported by existing infrastructure. Area D is unsuitable for further consideration due to the lack of available developable property. Areas A and C would require the extensive infrastructure development including a lengthy access road and most all utilities necessary to support the ATCT. According the ALP, Area C has been set aside for future development of additional apron and aircraft hangars and includes access road improvements to reach the area. A proposed ATCT site in Area C could possibly serve as a springboard for initiating development in this area. However, Area C has terrain that is generally lower than the airfield and would require a relatively high ATCT structure to meet FAA look-down angles and other line-of-sight (LOS) criteria.

While in closer proximity to the terminal area than Area C, Area A is only marginally fit for consideration as a potential ATCT location, again due to the cost of providing utilities and an access road. No additional development has been proposed for this area.

3. Summary Comparison of Initial Sites

Area B appears to be the optimum location for further investigation of parcels that could be considered for potential ATCT use. The terrain is generally higher than the airfield and reduces the ATCT height required to meet the LOS criteria. Existing access along with available utilities also contribute to reducing the complexity and cost for ATCT development in Area B.

While the orientation of any ATCT in Area B would not meet the optimum goal of northward airfield views, this can be surmounted with window shades as is commonly done at many locations. There are several hangars and other structures in Area B which could potentially interfere with the visibility of the complete air operations area (AOA) but this is generally overcome by extending the ATCT cab floor height.

Given the need to keep costs down and to leverage the ability to provide support facilities for the ATCT, specific sites for consideration will be restricted to Area B. If no practical site emerges from the evaluation of Area B sites, Area C may be re-opened for consideration.

B. IDENTIFICATION OF PRELIMINARY SITES

1. General

In identifying and evaluating potential sites in Area B, a number of assumptions were made to consider the effect of meeting FAA LOS and other criteria. These assumptions include:

- Former Runway 9R/27L will remain permanently closed and reused primarily for heliports
- Taxiway D will continue to serve as an apron-edge taxiway
- No new development will be allowed to encroach into the proposed ATCT LOS limits
- Runway 9 will eventually be extended 1,000 feet to the west

Based on these assumptions and the FAA's specific siting criteria, three sites were identified for more detailed analysis. **Figure 2** illustrates the locations of these sites.

2. Candidate Site Descriptions

Site 1 is located in a vacant area just north of the Grand Canyon hangar along the far western section of the Terminal area. The terrain is a flat site with an elevation of 2,179 feet (MSL). Site 2 is approximately 350 feet east of Site 1. The terrain appears to have been semi-prepared and sits at an elevation of 2,176 feet. Site 3 is located near the center of the terminal area north of the Papillion Helicopters hangar area. The site has been graded and is at an elevation of 2,173 feet. All of the sites are easily accessible and have nearby utilities. **Table 1** presents general data on the various sites.

Table 1
PRELIMINARY ATCT SITE DATA
Boulder City Municipal Airport

	Site 1	Site 2	Site 3
Location			
Latitude	35° 57' 2.63" N	35° 57' 1.70" N	35° 56' 58.21"N
Longitude	114° 51' 37.01" W	114° 51' 33.33" W	114° 51' 25.67"W
Ground Elevation (MSL)	2,179'	2,176'	2,173'
Site Location			
Station (RW 9 = STA 0+00)	23+24.2	26+91.5	33+08.1
Offset (North)	1,650.2	1,539.5	1,327.8
Distance to Existing RW Ends (El)			
RW 9 (2,108.6')	2,850.6	3,100.7	3,564.6
RW 27 (2,137.9')	2,976.8	2,614.2	2,000.4
RW 15 (2,203.3')	1,405.7	1,762.8	2,396.6
RW 33 (2,089.9')	2,649.3	2,495.9	2,330.3

These sites were evaluated in greater during the VISTA process. Site 1 was eliminated from further consideration due to the distance from the end of RW 27 and the height necessary for meeting the FAA's siting criteria.

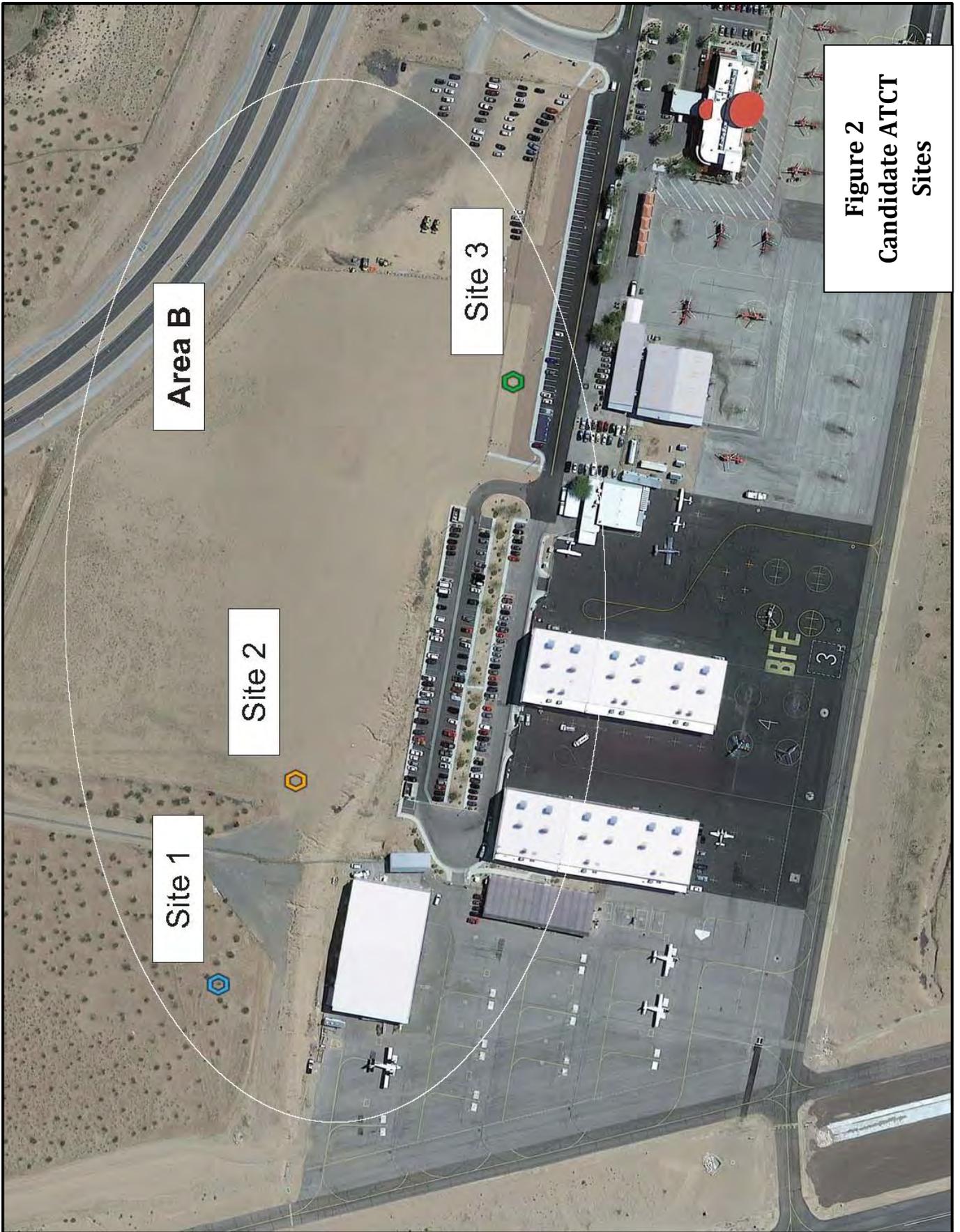
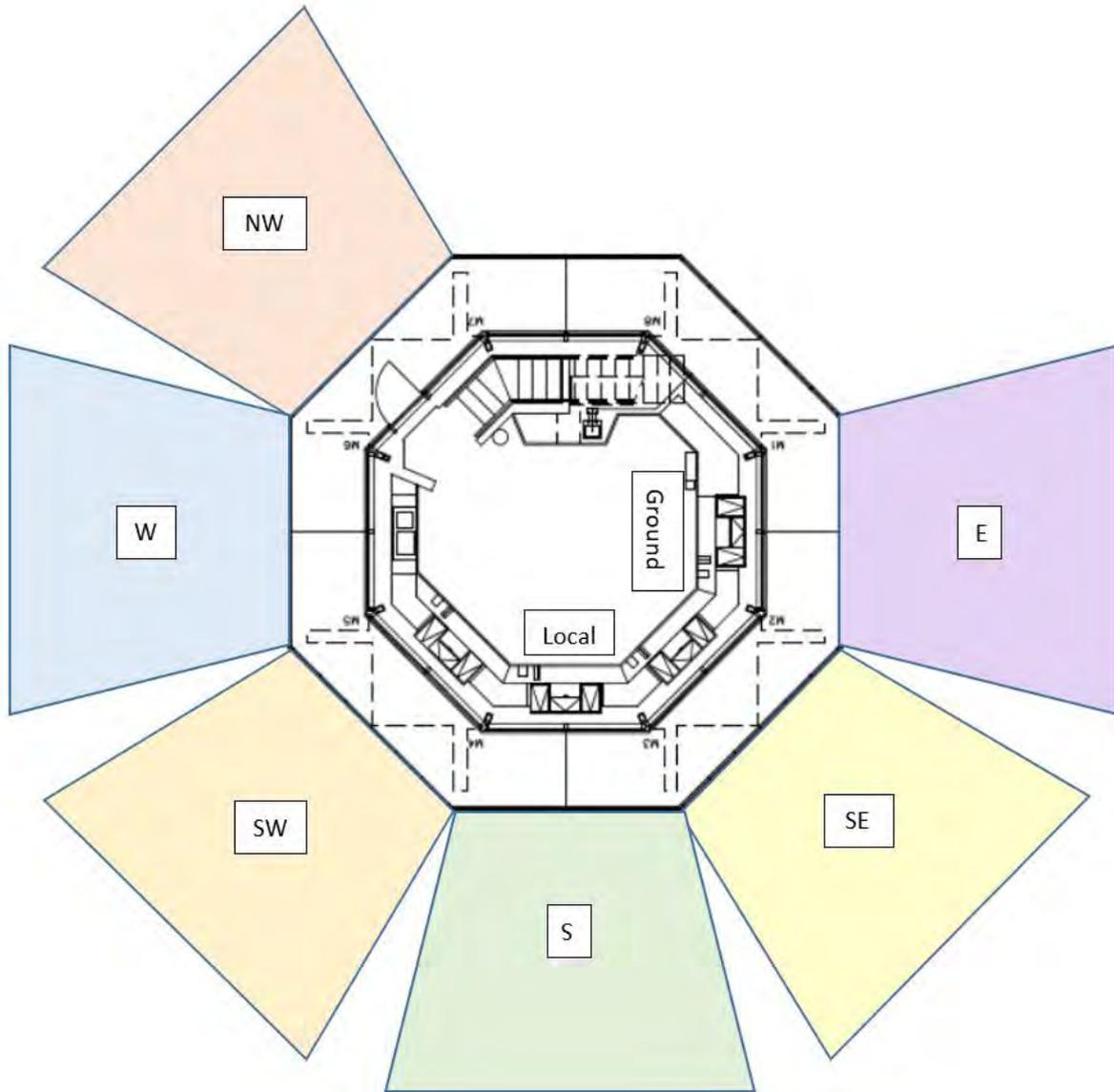


Figure 2
Candidate ATCT
Sites

Appendix D

Panoramic Views from VISTA

Figure D-1
Key to Panoramic View from VISTA Model



Controller Eye Height

- Site 2 125' AGL
- Site 3 95' AGL

Figure D-2
Site 2 – Looking East



Figure D-3
Site 2 – Looking Southeast



Figure D-4
Site 2 – Looking Southwest



Figure D-5
Site 2 – Looking West

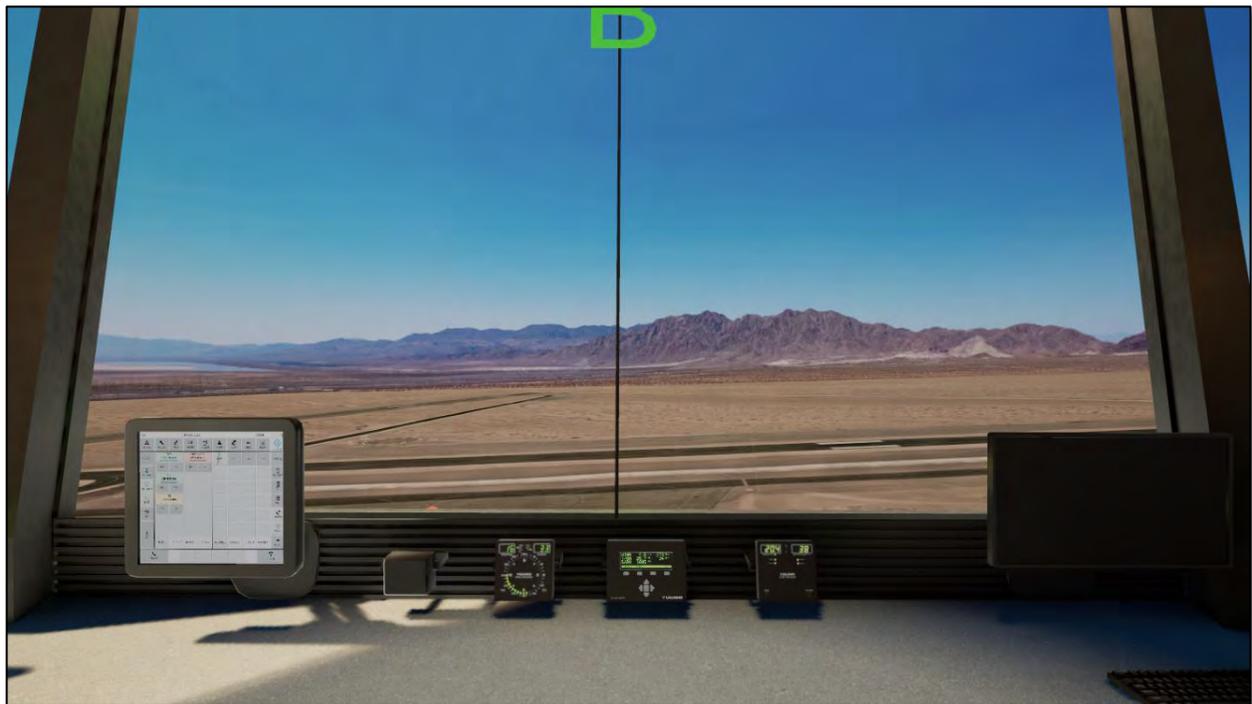


Figure D-6
Site 2 – Looking Northwest

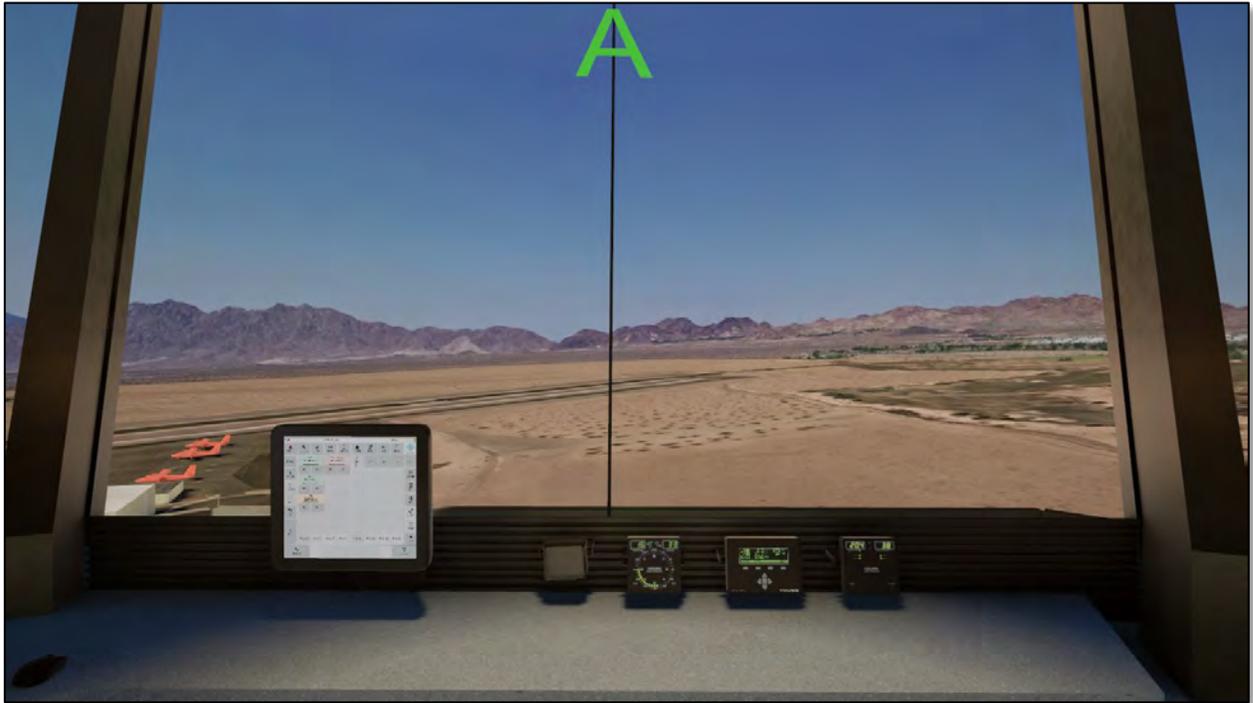


Figure D-7
Site 3 – Looking East



Figure D-8
Site 3 – Looking Southeast



Figure D-9
Site 3 – Looking South

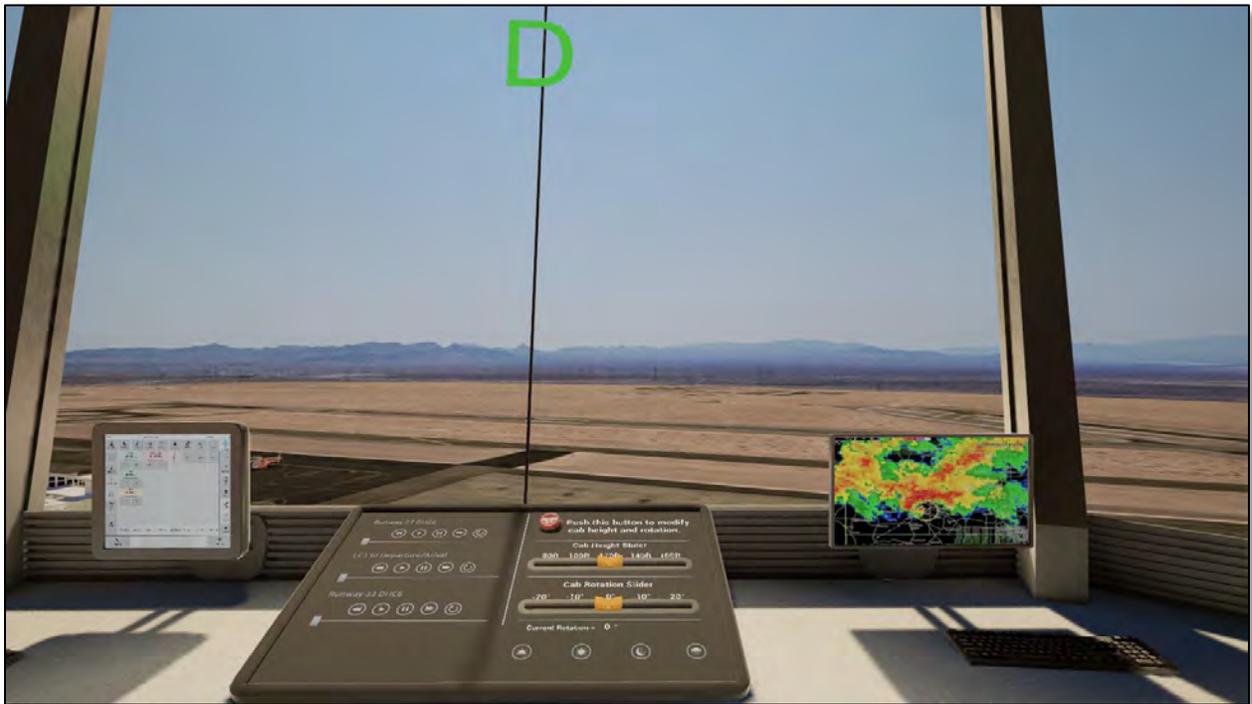


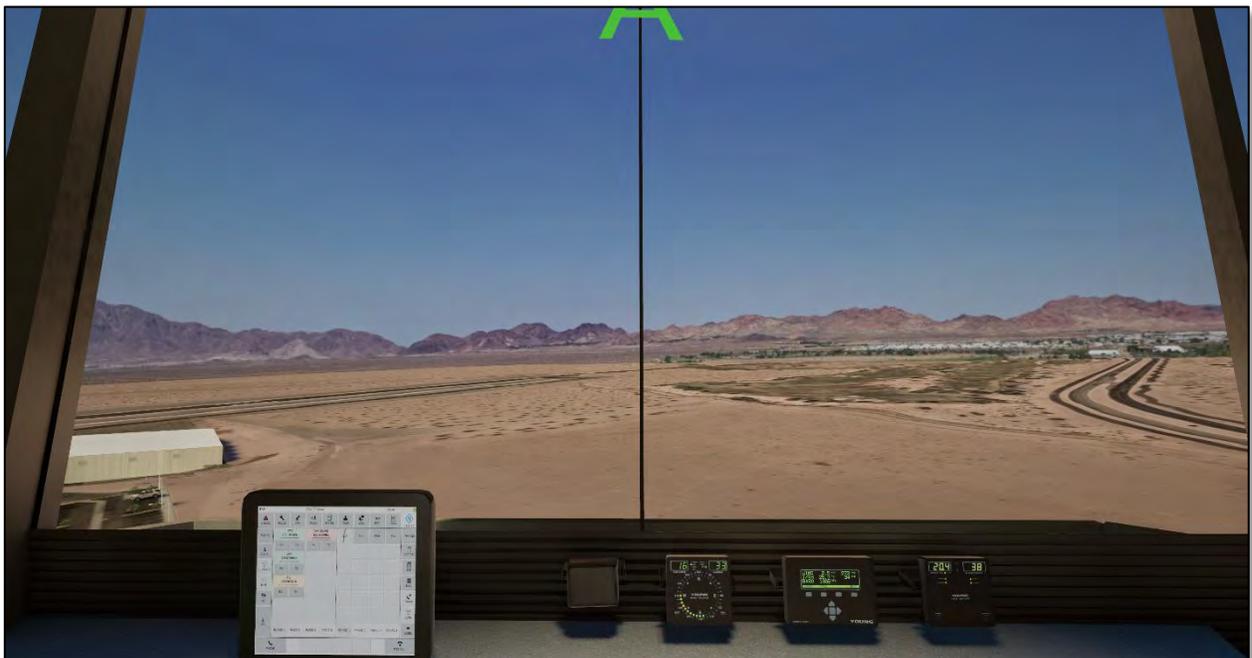
Figure D-10
Site 3 – Looking Southwest



Figure D-11
Site 3 – Looking West



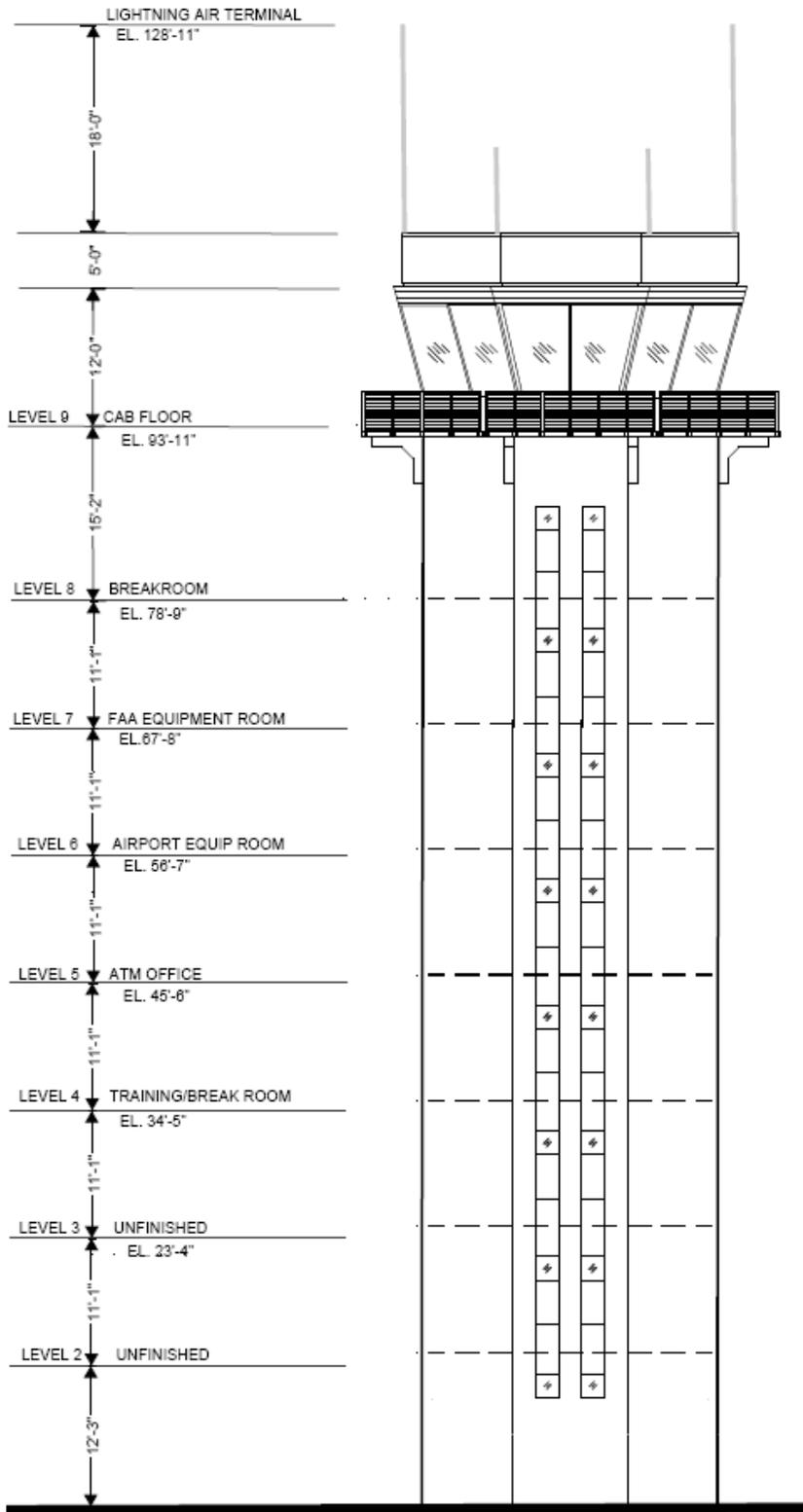
Figure D-12
Site 3 – Looking Northwest



Appendix E

Drawings & Graphics

Site 3 Elevation Sketch



20086

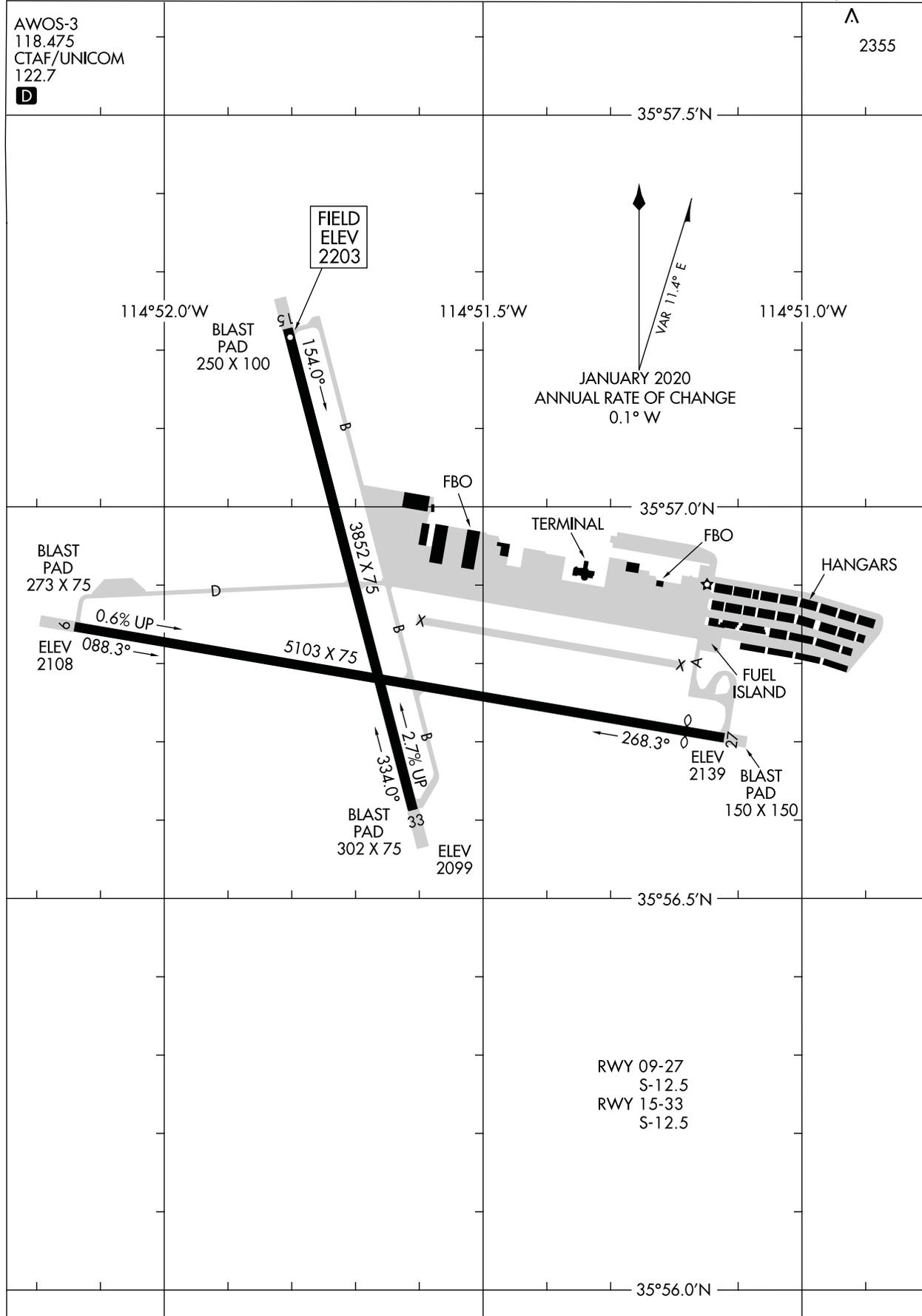
AIRPORT DIAGRAM

AL-612 (FAA)

BOULDER CITY MUNI (BVU)
BOULDER CITY, NEVADA

AWOS-3
118.475
CTAF/UNICOM
122.7
D

A
2355



SW-4, 21 APR 2022 to 19 MAY 2022

SW-4, 21 APR 2022 to 19 MAY 2022

Appendix F
Obstruction Evaluations &
Airport Airspace Analysis
(OE/AAA)

Appendix F-1
Airport Sponsor Letter Certifying Model Accuracy

Site 3:

Latitude: 35° 56' 58.85" N
Longitude: 114° 51' 26.67"W
Ground Elevation: 2,173.0' MSL

Horizontal Datum Source (select all that apply):

Ground Survey GPS Survey NAD 83 NAD 27

Vertical Datum Source (select all that apply):

Ground Survey GPS Survey NAD 83 NAD 27

Date Model Developed: March 1, 2022

ALP Version: September 20, 2018

CERTIFICATION: I certify that the provided airport model is accurate within the following tolerances:

Horizontal: ± 5.0 feet
Vertical: ± 1.5 feet

Signature (Seal):



Name: Kory Andryscik

Professional Engineer / Surveyor #: NV 020401

Company: Kimley-Horn

Phone: 702-862-3600

Email: kory.andryscik@kimley-horn.com

Date: May 3, 2022

Appendix F-2

Tech Ops Preliminary Report (TOPR)
For
Boulder City, NV (BVU) ATCT Facility

October 2021



Limited Content - Not for Official Use

PROPOSAL:

The proposal is for a new ATCT with several potential locations at BVU Airport.

ANALYSIS:

The proposal was analyzed using the NASWATCH iOEAAA tool as well as performing quantitative calculations for potential impacts to aviation facilities. Please see the following disclosure:

Not intended for supplemental use outside OESG Tech Ops purview. NASWATCH is an iOEAAA tool intended for use strictly by OESG Tech Ops in OE/AAA airspace case evaluation providing conservative results – dependent on facility type and available database resources within iOEAAA.

RESULTS:

The following nearby facilities were identified and analyzed for potential impacts with the following results:

- Site 1
 - o LAS ASR – Radar platform LOS is possible with positive elevation angle; Level 3 analysis needed.
 - o CCB, BVU AWOS – Proposal is within 1000 ft of facility. Level 3 analysis needed.
- Site 2
 - o LAS ASR – Radar platform LOS is possible with positive elevation angle; Level 3 analysis needed.
- Site 3
 - o LAS ASR – Radar platform LOS is possible with positive elevation angle; Level 3 analysis needed.
- Site 4a
 - o LAS ASR – Radar platform LOS is possible with positive elevation angle; Level 3 analysis needed.
- Site 4b
 - o LAS ASR – Radar platform LOS is possible with positive elevation angle; Level 3 analysis needed.

The predicted impacts to the nearby aviation facilities are depicted in the following pictures. The potential impact is calculated using the following ATCT elevations:

- Site 1:
 - o Overall Tower Height – 2340 ft. AMSL

- Site 2:
 - o Overall Tower Height – 2340 ft. AMSL
- Site 3:
 - o Overall Tower Height – 2334 ft. AMSL
- Site 4a:
 - o Overall Tower Height – 2274 ft. AMSL
- Site 4b:
 - o Overall Tower Height – 2264 ft. AMSL



Figure 1. LAS ASR-9

In calculating the potential impact for the LAS ASR-9 located approximately 15 NM NNW of the proposed ATCT site locations at the closest point, it was found that the towers would have optical Line-of-Sight to the ASR with a positive elevation angle since the proposed towers are higher than the ASR Radar Platform Height. To confirm that this will not adversely impact the functionality of the ASR, additional Level 3 analysis is needed.



Figure 2. CCB, BVU AWOS

In calculating the potential impact for the CCB and BVU AWOS located approximately 1000 ft NNE of the proposed ATCT site locations at the closest point, it was found that Site 1 would be within the Level 3 protection area for the AWOSs. To confirm that this will not adversely impact the functionality of the AWOSs, additional Level 3 analysis is needed.



Federal Aviation Administration

May 31, 2022

TO: Boulder City Municipal Airport
Attn: Kerry Ahern, Airport Manager
1201 Airport Rd
Ste. 200
Boulder City, NV 89005-3673
KAhearn@bcnv.org

CC: CITY OF BOULDER CITY
401 CALIFORNIA AVENUE
BOULDER CITY, NV 89005
WWilliamson@bcnv.org

CC: Quadrex Aviation, LLC
Attn: David Byers
P.O. Box 34155
Melbourne, FL 32903-1155
dabyers@Quadrex.aero

RE: (See attached Table 1 for referenced case(s))
FINAL DETERMINATION

Table 1 - Letter Referenced Case(s)

Table with 7 columns: ASN, Prior ASN, Location, Latitude (NAD83), Longitude (NAD83), AGL (Feet), AMSL (Feet). It lists four cases (AWP-2301-NRA to AWP-2304-NRA) all located in Boulder City, NV, with consistent coordinates and altitudes.

Description: Pt. 1 ATCT Cab Corner Final Site Analysis for New Air Traffic Control Tower @ BVU

We do not object with conditions to the construction described in this proposal provided:

You comply with the requirements set forth in FAA Advisory Circular 150/5370-2, "Operational Safety on Airports During Construction."

The proponent is required to coordinate all associated activities with the Airport Manager/Airport Traffic Control Tower (ATCT) 5 business days prior to the beginning of the project.

This determination is subject to review if disruption to FAA Operations should occur.

The new development must be coordinated with the Airport Sponsor and Airport District Office and included on the next update to the Airport Layout Plan (ALP).

As a condition to this Determination, the structure is marked and/or lighted in accordance with (Buildings, Structures, Antennas, etc.) Chapters 4 and 5 of Advisory Circular 70/7460-1M, Obstruction Marking and Lighting.

Any failure or malfunction that lasts more than thirty (30) minutes and affects a top light or flashing obstruction light, regardless of its position, should be reported immediately to (877) 487-6867 so a Notice to Airmen (NOTAM) can be issued. As soon as the normal operation is restored, notify the same number.

A separate notice to the FAA is required for any construction equipment, such as temporary cranes, whose working limits would exceed the height and lateral dimensions of your proposal.

This determination does not constitute FAA approval or disapproval of the physical development involved in the proposal. It is a determination with respect to the safe and efficient use of navigable airspace by aircraft and with respect to the safety of persons and property on the ground.

In making this determination, the FAA has considered matters such as the effects the proposal would have on existing or planned traffic patterns of neighboring airports, the effects it would have on the existing airspace structure and projected programs of the FAA, the effects it would have on the safety of persons and property on the ground, and the effects that existing or proposed manmade objects (on file with the FAA), and known natural objects within the affected area would have on the airport proposal.

This determination expires on November 30, 2023 unless:

- (a) extended, revised or terminated by the issuing office.
- (b) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for the completion of construction, or the date the FCC denies the application.

NOTE: Request for extension of the effective period of this determination must be obtained at least 15 days prior to expiration date specified in this letter.

If you have any questions concerning this determination contact Lloyd E. Lewis (424) 405-7316 lloyd.e.lewis@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2022-AWP-2301-NRA.

Lloyd E. Lewis

DivUser

Signature Control No: 528180836-534393182

Appendix G

Environmental Documentation

Table G-1
PRELIMINARY ENVIRONMENTAL CONSEQUENCES SUMMARY
BVU ATCT - Site 3

Project: Construct 125' Air Traffic Control Tower at Site 3 including a 25' x 25' structural shaft, base building, 500' access road, and parking.

EVALUATION CRITERIA <i>(refer to FAA Order 1050.1F – Desk Reference, Sections 1 - 16)</i>	Potential Impact		
	Yes	No	N/A
1. Air Quality [para 1.3.6]			
a. Is the project located in a Clean Air Act non-attainment or maintenance area?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b. Does the project have the potential to increase landside or airside capacity, including an increase of surface vehicles?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c. Could the project impact air quality or violate local, State, Tribal or Federal air quality standards under the Clean Air Act Amendments of 1990 either during construction or operations?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2. Biological Resources [para 2.3.1]			
a. Does the project area contain resources protected by the Fish and Wildlife Coordination Act?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b. Are there any federal or state listed endangered, threatened, or candidate species or designated critical habitat in or near the project area?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c. Does the project affect or have the potential to affect, directly or indirectly, any federal or state-listed, threatened, endangered or candidate species, or designated habitat under the Endangered Species Act?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d. Does the project have the potential to take birds protected by the Migratory Bird Treaty Act?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3. Climate [para 3.3.4]			
Will the project create significant amount of greenhouse gases (GHGs)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4. Coastal Resources [para 4.3.1]			
a. Will the project occur in or impact a coastal zone as defined by the State's Coastal Zone Management Plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
b. Will the project occur in or impact the Coastal Barrier Resource System as defined by the US Fish and Wildlife Service?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5. Department of Transportation Act Section 4(f) & 6(f) Resources [para 5.3.7]			
a. Are there any properties protected under Section 4(f) (as defined by FAA Order 1050.1F) in or near the project area?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Will project construction or operation physically or constructively "use" any Section 4(f) resource?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c. Will the project affect any recreational or park land purchased with Section 6(f) Land and Water Conservation Funds?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d. Is a Wilderness Area located in the project area?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6. Farmland [para 6.3.1]			
a. Is there prime, unique, state, or locally important farmland in/near the project area?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b. Does the project include the acquisition and conversion of farmland?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7. Hazardous Materials, Solid Waste, & Pollution Prevention [para 7.3.5]			
a. Will the project be affected by federal, state, local, or tribal hazardous materials and/or solid waste standards?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b. Will the project involve a contaminated site?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c. Will the project produce an appreciably different quantity or type of hazardous waste?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d. Will the project generate an appreciably different quantity or type of solid waste	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e. adversely affect human health and the environment	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
f. Will the project use a different method of collection or disposal?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
g. Will the project exceed local capacity of current solid waste facilities?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Table G-1
PRELIMINARY ENVIRONMENTAL CONSEQUENCES SUMMARY
BVU ATCT - Site 3

EVALUATION CRITERIA <i>(refer to FAA Order 1050.1F and 1050.1F – Desk Reference, Sections 1 - 16)</i>	Potential Impact		
	Yes	No	N/A
8. National Historic Preservation Act (NHPA) Resources [para 8.3.2]			
a. Are there historic/cultural resources listed (or eligible for listing) on the National Register of Historic Places located in the Area of Potential Effect?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b. Does the project have the potential to cause effects?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c. Is the project area undisturbed?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d. Will the project impact tribal land or land of interest to tribes?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9. Land Use [para 9.3.1]			
a. Will the project disrupt a community, planned development or be inconsistent with plans or goals of the community?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b. Are residents or businesses being relocated as part of the project?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c. Will there be any induced socioeconomic impacts (positive or negative)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Natural Resources & Energy Supply [para 10.3.2]			
a. Will the project change energy requirements or use consumable natural resources either during construction or during operations?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b. Will the project change aircraft/vehicle traffic patterns that could alter fuel usage either during construction or operations?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
11. Noise & Noise Compatible Land Use [para 11.3.1]			
a. Does the forecast exceed 90,000 annual propeller operations, 700 annual jet operations or 10 daily helicopter operations or a combination of the above?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Will the project result in an increase in aircraft operations, nighttime operations, or change aircraft fleet mix?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c. Will the project cause a change in airfield configuration, runway use, or flight patterns either during construction or after the project is implemented?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
d. Could the project have a significant impact (DNL 1.5 dB or greater increase) on noise levels over noise sensitive areas within the 65+ DNL noise contour?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e. Has a noise analysis been conducted, including but not limited to generated noise contours, a specific point analysis, area equivalent method analysis, or other screening method.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
12. Socioeconomics, Environmental Justice, Children’s Environmental Health & Safety Risks			
a. Socioeconomics [para 12.1.3.1]			
Will the project cause a significant increase in surface traffic congestion or cause a degradation of level of service provided?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Will the project require a permanent road relocation or closure?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b. Environmental Justice [para 12.2.3.2]			
Are there minority and/or low-income populations in/near the project area?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Will the project cause any disproportionately high and adverse impacts to minority and/or low-income populations?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c. Children’s Environmental Health and Safety Risks [para 12.3.3.2]			
Will the project have the potential to lead to a disproportionate health or safety risk to children.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
13. Visual Effects [para 13.3.3]			
a. Will the project have the potential to create annoyance or interfere with normal activities from light emissions?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b. Will the project have the potential to affect the visual character (e.g., importance, uniqueness, or aesthetic value) of the area due to the light emissions?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c. Will the project would have the potential to block or obstruct the views of visual resources (even if the resources would still be viewable from other locations)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

**Table G-1
PRELIMINARY ENVIRONMENTAL CONSEQUENCES SUMMARY
BVU ATCT - Site 3**

EVALUATION CRITERIA <i>(refer to FAA Order 1050.1F – Desk Reference, Sections 1 - 16)</i>	Potential Impact		
	Yes	No	N/A
14. Water Resources			
a. Wetlands and Other Waters of the U.S. <i>[para 14.1.3.1]</i>			
Are there any wetlands or other waters of the U.S. in or near the project area?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Has wetland delineation been completed within the proposed project area?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
If wetlands are present, will the project result in impacts, directly or indirectly (including tree clearing)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Is a USACE Clean Water Act Section 404 permit required?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b. Floodplains <i>[para 14.2.3.5]</i>			
Will the project be located in, encroach upon or otherwise impact a floodplain?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c. Surface Water <i>[para 14.3.3.1]</i>			
Will the project adversely affect federal , state, local or tribal water quality standards?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Will the project contaminate public drinking water supplies?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Will the project potentially affect stormwater drainage during construction?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Groundwater <i>[para 14.4.3.1]</i>			
Will the project adversely affect federal, state, local, or tribal groundwater quality standards?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Will the project contaminate the aquifer used for public drinking water supplies?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
e. Wild and Scenic Rivers <i>[para 14.5.3.1]</i>			
Is there a river on the Nationwide Rivers Inventory, a designated river in the National System, or river under State jurisdiction (including study or eligible segments) near the project?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Will the project directly or indirectly affect the river or an area within ¼ mile of its ordinary high water mark?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
15. Cumulative Impacts			
Will the project potentially add to the adverse effects of other past, present, or reasonably foreseeable future actions?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
16. Irreversible and Irrecoverable Commitment of Resources			
a. Will the project require the significant use of resources (e.g., fossil fuels, electricity, etc.)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
b. Will the project require the significant use of natural resources (e.g., metals, raw building materials, water, etc.)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
c. Will the project significantly alter or destroy biological resources (such as soil or habitat) or cultural resources (such as archeological sites or historic properties)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
17. Public Involvement			
Has the public been offered a meaningful opportunity to comment on the project?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Notes:

Item 5a – a public golf course and a series of baseball diamonds are located immediately north of the airport.
Item 11.a - The FAA’s Terminal Area Forecast estimates 120,405 total operations by FY 2045. BVU is home to 25 helicopters used primarily for aerial tourism.
Item 14.c – Generally accepted methods to control and contain stormwater runoff will be incorporated into the design and construction of the ATCT to prevent excessive erosion and siltation.
Item 17 – Public information and consultation meeting was conducted by Sponsor on November 15, 2021.
Refer to full Environmental Assessment Report for more detail.

Appendix H
Air Traffic Control Visibility
Analysis Tool (ATCVAT)

Table H
Air Traffic Control Visibility Analysis Tool (ATCVAT)
Boulder City Municipal Airport

Perspectives

Lighting Level: Overcast Day
Visibility Range: 3 miles (4.83 km)
Turbulence: Medium
Target Object: Cessna 172
Target Area: Front View

ATCT Site	RW End	ATCT Cab Floor Elev (AGL)	Controller Eye Level (AGL)	Controller Eye Level (MSL)	RW End Elevation (MSL)	Cab to RW End Distance	Elevation Differential	LOS Angle of Incidence	Object Detection	Object Recognition	Object Identification	Minimum Eye Level (AGL)
Site 2 2,176' Ground Elev (MSL)	RW 9 (E)	120	125	2,301	2,108	3,093	193	3.57	100%	99.6%	94.3%	43
	RW 27 (E)	120	125	2,301	2,138	2,651	163	3.52	100%	99.8%	97.1%	37
	RW 9 (F)	120	125	2,301	2,108	3,093	193	3.57	100%	99.6%	94.3%	43
	RW 27 (F)	120	125	2,301	2,139	2,651	162	3.50	100%	99.8%	97.1%	37
	RW 15 (E)	120	125	2,301	2,203	1,732	98	3.24	100%	100.0%	99.5%	24
	RW 33 (E)	120	125	2,301	2,099	2,531	202	4.57	100%	99.8%	97.6%	35
	RW 15 (F)	120	125	2,301	2,170	2,548	131	2.94	100%	99.8%	97.5%	36
	RW 33 (F)	120	125	2,301	2,100	3,755	201	3.06	100%	98.9%	87.1%	52

Site 3 2,173' Ground Elev (MSL)	RW 9 (E)	90	95	2,268	2,108	3,534	160	2.59	100%	99.2%	89.6%	49
	RW 27 (E)	90	95	2,268	2,138	2,073	130	3.59	100%	99.9%	99.0%	29
	RW 9 (F)	90	95	2,268	2,108	3,534	160	2.59	100%	99.2%	89.6%	49
	RW 27 (F)	90	95	2,268	2,139	2,073	129	3.59	100%	99.9%	99.0%	29
	RW 15 (E)	90	95	2,268	2,203	2,332	65	1.60	100%	99.9%	98.4%	33
	RW 33 (E)	90	95	2,268	2,099	2,374	169	4.07	100%	99.9%	98.3%	33
	RW 15 (F)	90	95	2,268	2,170	3,167	98	1.77	100%	99.5%	93.5%	44
	RW 33 (F)	90	95	2,268	2,100	3,670	168	2.62	100%	99.0%	88.0%	51

Source: <http://www.hf.faa.gov/visibility>

Appendix I

Servicing Security Element

Appendix I
SERVICING SECURITY ELEMENT

In compliance with FAA Order 1600.69C, *FAA Facility Security Management Program*, the following required protective measures will be included as part of the development of the Air Traffic Control Tower as a “Critical Infrastructure (CI)” facility:

<u>Description</u>	<u>Reference*</u>
a. Crime Prevention through Environmental Design	[para. 4-1-3]
b. HVAC Controls	[para. 4-1-5]
(1) Emergency Shutdown Capability	
(2) Written Procedures for Emergency Shutdown	
c. Buffer Zones	[para. 4-1-6]
d. Signs	[para. 4-1-7]
e. Perimeter Fencing	[para. 4-1-8]
f. Security Lighting (Site Entrances & Exits)	[para. 4-1-9]
g. Securing Doors, Windows & Other Openings	[para. 4-1-11]
f. Locking Systems	[para. 4-1-12]

* *FAA Order 1600.69C, FAA Facility Security Management Program, Section 4-1. Facility Siting and Structural Protective Measures, Table 4-1-1.*

Additional protective measures may be included based on the evaluation of the site and ATCT facility in the FAA’s design review by the designated Servicing Security Element (SSE).

Appendix J
Meeting Minutes & Other
Pertinent Information

Boulder City Municipal Airport FCT Siting

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Federal Aviation Administration (FAA) Northwest Mountain Region representatives of the Western Service Area (WSA) and Boulder City Municipal Airport (BVU) participated in the new Federal Contract Tower (FCT) siting activities at BVU located in Boulder City, Nevada, on 12/01/21. The team followed FAA Siting Order 6480.4C, which incorporates a new process for the siting process.

Facilitator: Frank Boyer

SRM Panel Facilitator: Garry Brown

Modeler: Kimley-Horn (Dr. Byers)

Airport Manager: Marisa Adou

ATC: John Hanf and Scott French

Participants: See Attachment 1

1. Purpose of Visit

To determine a recommended site for a new ATCT at BVU.

2. Agenda

- a. Introductions
- b. Overview of siting process
- c. ALP/Airport overview
- d. 3-D familiarization for control personnel – Modeler
- e. Assessment of preferred sites – Control personnel
- f. SRM Panel assessment
- g. Out-brief

3. Background

There is no existing tower. The new tower project started in 2010 and now in 2021 is again in the planning process. The increasing traffic with several different operators [mostly helicopters plus fixed-wing tourism traffic (Grand Canyon traffic)] suggests a control tower is needed. A preliminary site analysis was conducted 5 years ago in all four quadrants of the airport. There were five viable sites selected; three in the North quadrant and two in the South quadrant. The sites to the South were eliminated due to distance from the runway ends, and line of sight issues. Sites 1, 2 & 3 were selected to move forward as preferred. Site 3 was selected as the recommended site due to best overall view of the movement areas.

4. TERPS. There were no TERPS issues.

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5. **TOPR.** See attachment 4. There is potential interference from LAS radar platform; further analysis will be required when 7460 is submitted.
6. **SRM Panel.** There were no high hazards; the official assessment will be sent at a later date.
7. **Site Comparison Chart.** See Attachment 8.
8. **Sites Chart.** See Attachment 2.
9. **Tower Height Chart.**
10. **Human Factors.** (ATCVAT) passes for all three sites.
11. **Overview of Preferred Sites**

All three preferred sites are located near the terminal area. Site 3 is located on what was a drop zone/tandem sky diving operation (but they are no longer at the airport).

RWY 15/33 – Takeoffs are uphill and landings are downhill. The plan is to abandon current RWY 15/33 and build a new parallel 15/33, which then becomes the longest distance for each site to end of RWY.

Rotating Beacon will be moved to the top of the new tower.

Cab – All sites were assessed with a 600 sf cab, with mullions and a slat wall configuration.

Site 1 was eliminated due to line of site issues.

12. Preferred Site Assessment by the Air Traffic Control Team

a. Site 1 Eliminated

Orientation: South

AGL: 120 ft AGL cab floor

Non-Viable: This site was deemed non-viable by Air Traffic.

Advantages: There were no advantages.

Disadvantages:

- Cannot see TWY B from GC.
- Cannot see all of RWY 15/33 from LC.
- Raised height to 125, this was a better view but not for the overall views of the movement areas.

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b. Site 2

Orientation: South

AGL: 120 ft AGL cab floor

Viable Site: This site is viable.

Advantages:

- LC: Much better than site 1. Clear view of flight pattern, better view of approach end of RWY 27.
- Can see both ramps.
- Better overall view of movement areas than Site 1.

Disadvantages:

- Cannot raise height because it would impact seismic requirements.
- Loss of controller situational awareness. GC cannot see TWY B north of TWY D. This was determined to be a low hazard.

c. Site 3: Recommended Site

Orientation: South

AGL: 120 ft AGL cab floor

Advantages:

- Control personnel indicated that Site 3 has best overview of the movement areas and traffic patterns.

Disadvantages:

- GC obstructed view to the intersection of runway 15/33 and 9/27. The mullion between C and D blocks the runway intersection. The controller can move slightly left or right of the mullions to see intersection traffic.

Marissa will talk with her controllers and designers to discuss the design and column options and any potential redesign. If they make a decision for another option, will be have to reconvene to reassess LOS and SRM Panel.

12. Conclusions

- Recommended Site.** ATC and the Airport concurred that Site 3 is the recommended site.
- SRM Panel Summary.** Site 2 and Site 3 both resulted in Low Risk; both initial and predictive. Monitoring plan associated with Site 3 that will need to be implemented once the tower is operational.

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13. Actions

- a. The airport manager will coordinate with team to determine if they want to consider columns as an option. If so, the VISTA team will assist with the siting exercise; another SRM Panel will be necessary.

List of Attachments:

Attachment 1 – Participants

Attachment 2 – Preferred Site Chart

Attachment 3 – TERPS Analysis

Attachment 4 – TOPR

Attachment 5 – Cab Layout –slatwall & sector locations

Attachment 6 – SRM Document

Attachment 7 – Post Siting Actions.

Attachment 8 – Comparison Chart (Consultant chart)

Attachment 9 Tower Height Chart

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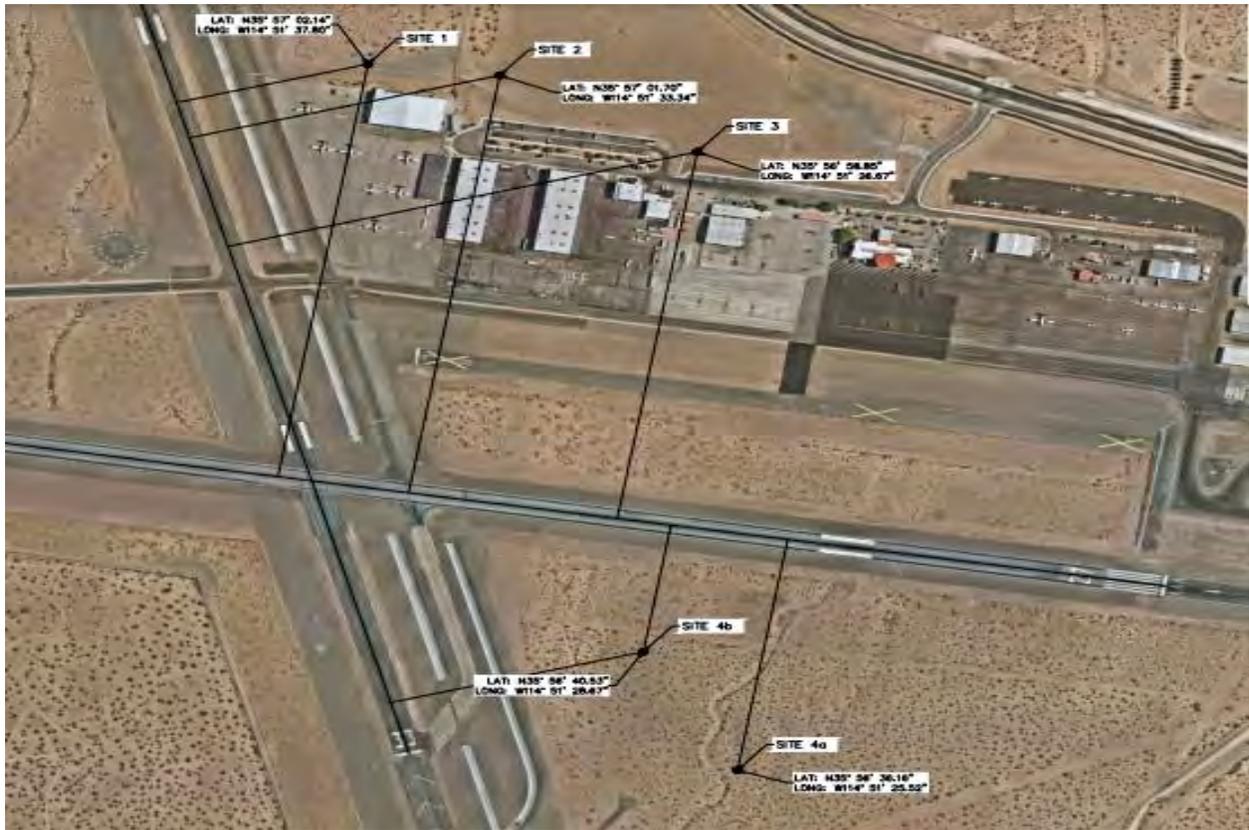
December 1–2, 2021

Attachment 1 – Participants List

Aaron Shaw
Corey Andrews
Dave Byers
Garry Brown
Gary Sims
Jared Raymond
Jeff Fischer
John Hemp
Jordan Flores
Ken Legary
Kevin Fix
Kory Andryscik
Larry Crowley
Marisa Adou
Mathew Bilsbarrow
Matt Ballon
Matthew McAelvey
Mike Dasaro
Nick Colvin
Pete Deeks
Regan Rasband
Scott French
Shari Teel
Steve Mares
Steve Szehner

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Attachment 2 – Preferred Site Chart



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Attachment 3 – TERPS Analysis

RS Results KBVU RNAV (GPS) RWY Z7

Results Name: **RS Results KBVU RNAV (GPS) RWY Z7**

Display Options:
 Round for Publication
 Apply Acc-Adj Vals for Controller
 Course Display
 True Magnetic

Penetrating Obstacle
 Penetrating Controller
 Cleared Controller
 Accuracy Code Overrides

Last evaluation: 09-Sep-2021 09:56:12
 Reference Software version: 2.6.0
 Project Chart Date: 12/02/2021

Intermediate Final Segment Minima Missed Approach Circling FAS Data Block Results Input Show/Hide/Color OEA's Procedure Notes

Flight Path 6AS5 Obstacle Evaluation

LP DNAV Visual

Controlling Obstacles ZAGLI to ADDUG ADDUG to FTP 7:1 Obstacles

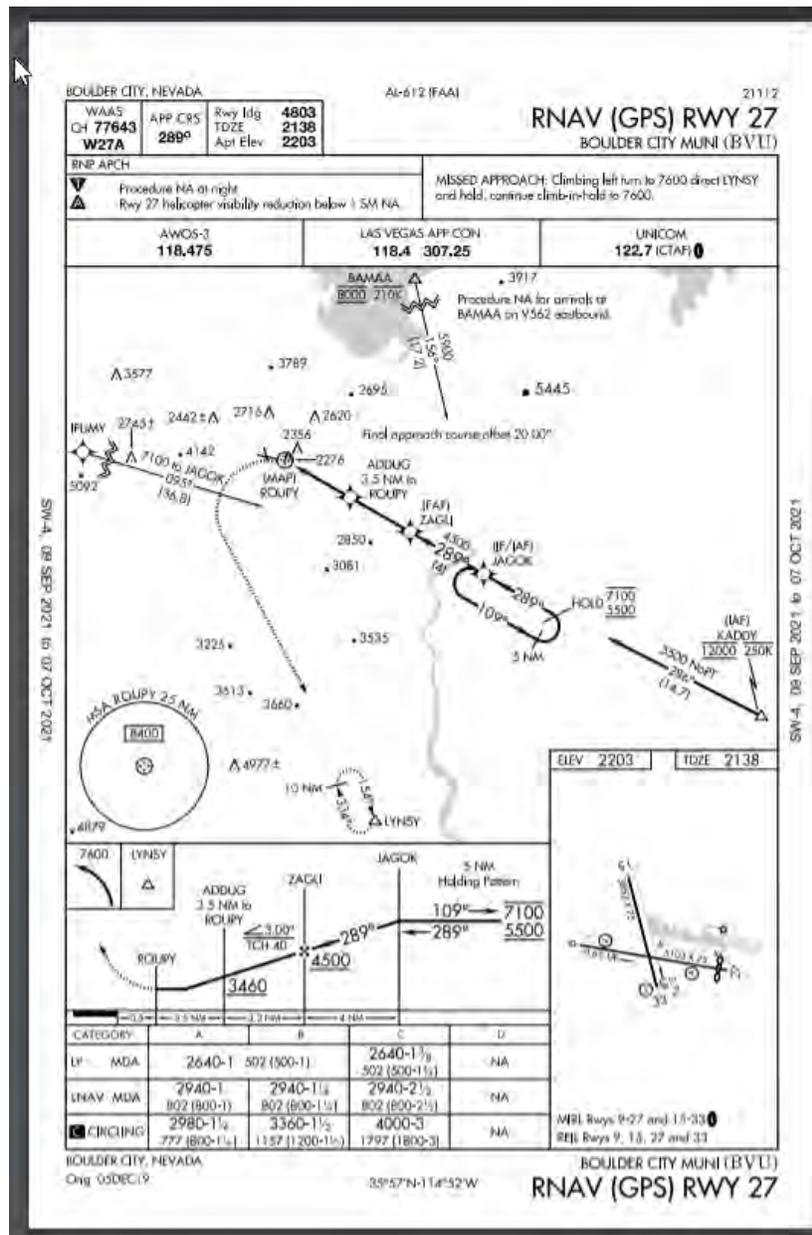
Area	Name	Source	Obs Type	Latitude	Longitude	Height (ft) AGL	Height (ft) AMSL	AC (M) (ft)	Effective Height (ft)	Primary ROC (ft)	Distance to Primary (ft)	SA	Primary Equiv Height (ft) MSL	PR	RA	Minimum Alt (ft) AMSL	7:1 Excludable
Primary	LD00 03	LD	AAO	N35° 56' 58.8900" W	114° 51' 26.6700" W	2355.0	2355.0	1A (+20/+3)	2355.0	250		0	2355	0	0	2620	False
Primary	LD00 04B	LD	AAO	N35° 56' 40.5300" W	114° 51' 26.6700" W	2293.0	2293.0	1A (+20/+3)	2293.0	250		0	2293	0	0	2560	False
Primary	LD00 04A	LD	AAO	N35° 56' 36.1600" W	114° 51' 26.5200" W	2279.0	2279.0	1A (+20/+3)	2279.0	250		0	2279	0	0	2540	False

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I didn't include a NEH since it didn't make much sense. Of the 5 proposed locations, the one that comes closest to impacting the current procedure is Site 3. At 160 ft AGL, Site 3 would allow for LNAV minimums 320 ft lower than what is currently published on the RNAV (GPS) Rwy 27 procedure (comparing the minimum altitude entry on the right side of the highlighted green line to what's currently published on the plate). That comparison shows me that the terrain/obstacles on final are what are driving the minimums so high and not an obstacle on the airfield. In order for Site 3 to raise the LNAV minimums from 2940 to 2960, the minimum non-precision increment of 20 ft, the tower would have to be a minimum of 496 ft AGL. A 495 ft AGL tower at site 3 would leave the current LNAV minimums unchanged.



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Results Name: RS Results KBVU RNAV (GPS) RWY 27L

Display Options:
 Round for Publication
 Apply AIC-Add TAB for Controller
 Course Display
 True Magnetic

Penetrating Obstacle
 Penetrating Controller
 Cleared Controller
 Accuracy Code Override

Last evaluation: 10-Sep-2021 07:51:52
 Reference Software version: 2.6.0
 Project Chart Date: 12/02/2021

Final Segment | Minima | Missed Approach | Results | Input | Show/Hide/Color OEA's | Procedure Notes

Flight Path | RASS | Obstacle Evaluation

LNAV | Visual

Controlling Obstacles | ZAGL to ADDUG | ADDUG to FTP | 7:1 Obstacles

Area	Name	Source	Obs Type	Latitude	Longitude	Height (ft)	Height (ft) AGL	Height (ft) ANSL	AC (ft) (ft)	Effective Height (ft)	Primary ROC (ft)	Distance to Primary (ft)	SA	Primary Equip Height (ft) ANSL	PR	RA	Minimum Alt (ft) ANSL	7:1 Excludable
Primary	LD0 03	LD	AO	N35° 56' 48.8500"	W114° 51' 26.6700"	2593.0	496.0	2593.0	1A (4-20/4-3)	2593.0	250	0	0	2593.0	0	0	2550	False
Primary	LD0 04B	LD	AO	N35° 56' 48.8500"	W114° 51' 28.6700"	2593.0	160.0	2293.0	1A (4-20/4-3)	2293.0	250	0	0	2293.0	0	0	2550	False
Primary	LD0 04A	LD	AO	N35° 56' 36.1600"	W114° 51' 25.5200"	2279.0	160.0	2279.0	1A (4-20/4-3)	2279.0	250	0	0	2279.0	0	0	2550	False

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Attachment 4 – TOPR

The proposal is for a new ATCT with several potential locations at BVU Airport.

ANALYSIS:

The proposal was analyzed using the NASWATCH iOEAAA tool as well as performing quantitative calculations for potential impacts to aviation facilities. Please see the following disclosure:

Not intended for supplemental use outside OESG Tech Ops purview. NASWATCH is an iOEAAA tool intended for use strictly by OESG Tech Ops in OE/AAA airspace case evaluation providing conservative results – dependent on facility type and available database resources within iOEAAA.

RESULTS: The following nearby facilities were identified and analyzed for potential impacts with the following results:

- Site 1 LAS ASR – Radar platform LOS is possible with positive elevation angle; Level 3 analysis needed.
- CCB, BVU AWOS – Proposal is within 1000 ft of facility. Level 3 analysis needed.
- Site 2 LAS ASR – Radar platform LOS is possible with positive elevation angle; Level 3 analysis needed.
- Site 3 LAS ASR – Radar platform LOS is possible with positive elevation angle; Level 3 analysis needed.
- Site 4a LAS ASR – Radar platform LOS is possible with positive elevation angle; Level 3 analysis needed.
- Site 4b LAS ASR – Radar platform LOS is possible with positive elevation angle; Level 3 analysis needed.

The predicted impacts to the nearby aviation facilities are depicted in the following pictures. The potential impact is calculated using the following ATCT elevations:

- Site 1: Overall Tower Height – 2340 ft. AMSL
- Site 2: Overall Tower Height – 2340 ft. AMSL
- Site 3: Overall Tower Height – 2334 ft. AMSL
- Site 4a: Overall Tower Height – 2274 ft. AMSL
- Site 4b Overall Tower Height – 2264 ft. AMSL

In calculating the potential impact for the LAS ASR-9 located approximately 15 NM NNW of the proposed ATCT site locations at the closest point, it was found that the towers would have optical Line-of-Sight to the ASR with a positive elevation angle since the proposed towers are higher than the ASR Radar Platform Height. To confirm that this will not adversely impact the functionality of the ASR, additional Level 3 analysis is needed.

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Attachment 5 – Cab Layout

TBD

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Attachment 6 – SRM Panel

TBD

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Attachment 7 – Post Action Items

Item	Action	POC	Telephone	Due Date	Comments
1	Add Recommended Site to ALP	Airport Sponsor			Add the Recommended site to the ALP.
2	View Final 3-D Model and Cab Size Recommendation	3-D Modeler Airport Sponsor			The 3-D modeler will provide the final proposed cab model, orientation and equipment, and 360° screenshots to the Airport Sponsor for each preferred site, for use in the Siting Report preparation. These items document the cab layout, cab size, column/mullion configuration, and orientation (referenced to a runway) for each preferred site.
3	Final Airspace Studies	Airport Sponsor			The Airport Sponsor must comply with the FAA OE/AAA requirements on the preferred sites (refer to the OE/AAA Web site). Include final determination letter on the preferred sites.
4	Environmental Study. The Airport Sponsor is responsible for obtaining applicable environmental approvals per Federal, state, and local requirements.	Airport Sponsor			The Airport Sponsor is responsible for obtaining applicable environmental approvals per Federal, state, and local requirements.

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Item	Action	POC	Telephone	Due Date	Comments
5	Prepare Siting Report. The Airport Sponsor is responsible for development of the Siting Report. If the Airport Sponsor developed the model, the Airport Sponsor must include, in the Siting Report, a letter from the licensed engineer certifying the model is developed in accordance with the required accuracy (within ± 18 inches vertical / ± 5 feet horizontal), as well as the signature of the engineer and the appropriate seal. A template is available.	Airport Sponsor			The initial draft and final draft Siting Report must be developed in accordance with Appendix C. The Airport Sponsor will deliver the initial and final drafts of the Siting Report to all participants. After the Airport Sponsor has resolved all comments, the Airport Sponsor will submit the final report to the FCT PPM.
6	Service Area Siting Report Briefing and Approval.	PPM			The FCT PPM will brief the Siting Report to the Service Area Director of Air Traffic Operations and Service Area Director of Technical Operations for their concurrence.
7	Headquarters Final Siting Report Briefing and Approval.	PPM			The FCT PPM will submit the final siting report to Terminal Facilities Execution, who will brief the Siting Report to the Director of Air Traffic Control Facilities and Engineering Services for their concurrence.

**Boulder City Municipal Airport FCT Siting
Meeting Minutes
December 1–2, 2021**

Item	Action	POC	Telephone	Due Date	Comments
8	Final Report Distribution.	Technical Writer			After Headquarters approval of the Siting Report, the report will be posted on the Terminal Facilities Execution DEI Siting KSN Web site at the following address: https://ksn2.faa.gov/AJW/AJW244C/dei/siting/default.aspx . An electronic copy of the Siting Report will be delivered, and the original signed report will be mailed, to the Airport Sponsor (if hard copy).
9	Design Phase: ATC Review Control Positions	Airport Sponsor ATC			During the Design phase, ATC should review the control positions to optimize configuration.
10	Siting Report Renewal Process. Refer to Chapter 8, Siting Report Renewal Process.	National Coordinator			

Boulder City Municipal Airport FCT Siting

Meeting Minutes

December 1–2, 2021

Attachment 8– Site Comparison Chart

**ATCT Site Analysis Summary [DRAFT]
Boulder City Municipal Airport**

Criteria	Site 1 (Eliminated)	Site 2	Site 3
Latitude:	35° 57' 2.14" N	35° 57' 1.70" N	35° 56' 58.85" N
Longitude:	114° 51' 37.80"W	114° 51' 33.33"W	114° 51' 26.67"W
Minimum Controller Eye Level (AGL/MSL)	125' / 2298'	125' / 2297'	120' / 2291'
ATCT Structural Height (AGL/MSL)	155' / 2333'	155' / 2332'	155' / 2326'
Maximum Distance to RW/TW End (RW 33 - Future)	3720'	3755'	3670'
1. Visual Performance			
a. Shadowing Structures	Hangar 2 (BFE)	Hangar 2 (BFE)	Hangar 1
b. ATCVAT Angle of Incidence (0.800°)	Pass	Pass	Pass
c. ATCVAT Object Discrimination (C-172)	Pass	Pass	Pass
d. Two-Point Lateral Discrimination (0.13°)	Pass	Pass	Pass
2. Impact to Instrument Approaches (TERPS)	No Impact	No Impact	No Impact
3. Impact to 14 CFR Part 77 Surfaces (7:1)	No Impact	No Impact	No Impact
4. Sunlight/Daylight	No Impact	No Impact	No Impact
5. Artificial Lighting	Rotating Beacon	Rotating Beacon	Rotating Beacon
6. Weather & Other Atmospheric Conditions	No Impact	No Impact	No Impact
7. Industrial/Municipal Discharge	No Impact	No Impact	No Impact
8. Site Access Road & Parking	new / 1,400 lf	new / 1,250 lf	new / 500 lf
9. Interior Physical Barriers	None	None	None
a. ATCT Orientation	South	South	South
b. Look Across Line-of-Sight	Fair	Fair	Good
c. Cab Mullions (design issue)	Fair	Good	Very Good
d. Look Up Angle	Excellent	Excellent	Excellent
10. Estimated Construction Cost (ATCT Structure @ \$62,000 per foot)	\$8,680,000	\$8,680,000	\$8,370,000
11. Other Considerations			
a. Communications & NAVAIDS	No Impacts	No Impacts	No Impacts

Boulder City Municipal Airport FCT Siting

Meeting Minutes

December 1–2, 2021

Criteria	Site 1 (Eliminated)	Site 2	Site 3
b. Environmental (NEPA)	No Impacts	No Impacts	No Impacts
c. Utilities	Water/Sewer/Telecon	Water/Sewer/Telecon	Water/Sewer/Telecon
d. Security	new Fencing/Access	new Fencing/Access	new Fencing/Access
e. Aesthetics	Excellent	Excellent	Excellent
12. Safety Risk Assessment			
Hazard	<i>TBD</i>	<i>TBD</i>	<i>TBD</i>
a. Initial Risk	<i>TBD</i>	<i>TBD</i>	<i>TBD</i>
b. Predicted Residual Risk (<i>after mitigation</i>)	<i>TBD</i>	<i>TBD</i>	<i>TBD</i>

REV. 12/8/2021

Boulder City Municipal Airport FCT Siting

Meeting Minutes

December 1–2, 2021

Attachment 9. Tower Height Chart

ATCT Height Chart (Typical Elevations)

<u>Level</u>	<u>Function</u>	<u>Height (AGL)</u>
Level 1	Equipment Room	0.0'
Level 2	Unfinished	12.0'
Level 3	Unfinished	22.0'
Level 4	Unfinished	32.0'
Level 5	Unfinished	42.0'
Level 6	Unfinished	52.0'
Level 7	Unfinished	62.0'
Level 8	Training / Break Room	72.0'
Level 9	ATM Office	82.0'
Level 10	Airport Equipment Room	92.0'
Level 11	FAA Equipment Room	103.0'
Level 12	Break Room	114.0'
	Cab Floor	125.0'
	Roof	137.0'
	Antennas/Air Terminals	160.0'

Boulder City Municipal Airport FCT Siting – Site 3 Reassessment

Meeting Minutes

March 4, 2022

Federal Aviation Administration (FAA) Northwest Mountain Region representatives of the Western Service Area (WSA) and Boulder City Municipal Airport (BVU) participated in the new Federal Contract Tower (FCT) siting activities at BVU located in Boulder City, Nevada, on 12/01/21. The team followed FAA Siting Order 6480.4C, which incorporates a new process for the siting process.

Facilitator: Frank Boyer

SRM Panel Facilitator: Garry Brown

Modeler: Kimley-Horn (Dr. Byers)

Airport Manager: Marisa Adou

ATC: John Hanf

Participants: Marissa Adou, Jeff Hanf, Kevin Fix, Jeff Fischer, Ken Legary, Frank Boyer, Larry Crowley, Steve Szehner, Garry Brown, Matt Ballon, Jared Raymond, Pete Deeks, Nick Colvin; Nick Colvin will brief Scott French on outcomes.

1. Purpose

Assess Site 3 LOS using columns and conduct safety assessment with column configuration.

2. Agenda

- a. Introductions
- b. Assessment of Site 3 with Columns
- c. SRM Panel assessment
- d. Out-brief

3. LOS Assessment from Site 3

Floor height: 90 ft AGL

Eye level: 95 ft AGL

Cab size: 505 sq ft cab (usable floor space 255 sf)

8-sided cab with 4 columns, two in the front and two in the back, columns will be about 6x8.

BVU consultant is recording final rotation/orientation. 30 deg CW

LOS is verified.

4. **SRM Panel:** Garry Brown conducted the SRM Panel. No Hazards. Draft in approx. 10 days.

Boulder City Municipal Airport FCT Siting – Site 3 Reassessment

Meeting Minutes

March 4, 2022

5. Servicing Security Element: Dave Byers requested clarification of Servicing Security Element requirements. Confirmed setbacks at 20 ft outside of the fence and 20 ft from tower to the fence (minimums).

6. Conclusions

- a. **Recommended Site.** ATC and the Airport reconfirmed that Site 3 is the recommended site at 90 ft AGL floor height, with a 505 sq ft cab with four columns (two in the front and two in the back), approximately 6x8 inches.
- b. **SRM Panel Summary.** Site 3 has no hazards

**FCT Siting – Site 3 Reassessment
Boulder City Municipal Airport
Meeting Minutes
March 25, 2022**

All; the following are the minutes for the subject TELECON and new tower assessment:

1. Scott French initiated the request to review the final outcome for the replacement tower;
2. Final Outcome. The Airport Manager, subsequent to the final siting exercise, requested another assessment and safety assessment to view the line of sight with a four column, slatwall configuration and height of 90 feet. That configuration was approved by all concerned. However, Scott French, Nick Colvin and Brian Arnett were unable to attend the assessment. Accordingly, the reason for the 3/25/2022 review.
3. Outcome: All concerned agreed to the 90 feet, columns, and slatwall configuration.
4. Column Discussion: The control personnel requested that the smaller columns be placed in the front and the larger in the rear. Apparently, the columns presented are all the same size. Frank will enlist advice from FAA engineer – Scott Iwamoto – to work with Pete Deeks on options;
5. Phases. The airport is waiting on the siting report approval, and environment assessment to move forward; if those completions take too long, the Airport Manager may need to request an extension. The ADO and Airport Manager are working the situation.
6. There are no safety issues.
7. Actions:
 - a. Pete Deeks will determine the column configuration and so advise the airport and air traffic team.

Appendix K
Safety Risk Management
Document (SRMD)

12/16/2021 Panel Review Draft
Boulder City Municipal Airport New FCT Siting CSA

EXECUTIVE SUMMARY

Title: Boulder City Municipal Airport New FCT Siting CSA

Initiating Organization: BVU

Impacted Organizations: BVU

Safety Analysis Type: OPS

SMTS Project Overview

The Boulder City Municipal Airport (BVU) is a public use non-towered airport owned by the Boulder City Municipality located about 25 miles southeast of Las Vegas, in Clark County, Nevada. BVU has two intersecting runways with asphalt surfaces: Runway 9/27 is 5,103 by 75 feet and Runway 15/33 is 3,852 by 75 feet.

BVU had about 120,000 aircraft operations, an average of about 330 operations per day: 88 percent air taxi, nine percent local general aviation, two percent transient general aviation, and less than one percent military for the 12-month period ending July 31, 2019. Currently 240 aircraft are based at BVU.

A Siting assessment meeting was conducted December 1 and 2, 2021 at the City Hall building in Boulder City by the FAA Terminal Facilities Siting team to determine the best location for a new FAA Contract Tower (FCT). The FCT Siting assessment was completed virtually using 3-D goggles.

Meeting attendees both in the room and virtually via Zoom participated in siting activities for the proposed BVU FCT and conducted an SRM Panel to generate a Comparative Safety Assessment (CSA) of viable FCT sites. Attendees applied the Air Traffic Organization (ATO) Safety Risk Management (SRM) process as defined by the ATO Safety Management System (SMS) Manual.

The SRM Panel convened to assess the change to the National Airspace System (NAS) and associated hazards. The sponsor with support from AFTIL and the Western Service Center (WSC) Quality Control Group (QCG) organized the SRM Panel, comprising stakeholders associated with the change. Stakeholders included representatives from Henderson Municipal Airport (HND) FCT, the WSC Planning and Requirements Group, Engineering Services, Terminal Facilities Planning, the Facilities Group, the Airport Modeling and Simulation Branch, Program Implementation Management, Quadrex Aviation, TWLA District and the National Air Traffic Controllers Association (NATCA).

Of the three preferred sites, two were identified as viable. All items in the Siting Criteria (Order 6480.4B) were discussed and impacts assessed and documented. The Siting Team Members provided inputs on the advantages and disadvantages of each of the viable sites. Air Traffic representatives followed FAA Siting Order 6480.4B and AFTIL procedures to identify two viable sites for a new FCT location:

- Site 2: Latitude: 35° 57' 1.70" N, Longitude: 114° 51' 33.33"W; Eye Level AGL 125 feet.
- Site 3: Latitude: 35° 56' 58.85" N, Longitude: 114° 51' 26.67"W; Eye Level AGL 120 feet.

The safety analysis identified risk associated with preferred Site 3 and potential Site 2. SRM Panel attendees identified one hazard for each site relating to loss of controller situational awareness with low initial and predicted residual risk. Based on the safety analysis, SRM Panel members determined that the change can be introduced into the NAS with an acceptable level of risk as defined in the latest FAA ATO Safety Management System (SMS) Manual.

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Boulder City Municipal Airport New FCT Siting CSA

Risk Summary

Using the Preliminary Hazard List (PHL) as a foundation for completing the Hazard Analysis Worksheet (HAW), SRM Panel attendees analyzed each hazard to determine cause, system state, controls, and effects. SRMP members determined severity, likelihood, and initial/predicted residual risk; and attendees identified Safety Requirements and determined Safety Performance Targets.

SRM Panel attendees identified two hazards:

- Hazard BVU CSA-01

Controller loss of situational awareness associated with Ground Control (GC) not being able to see Taxiway B north of Taxiway D.

- Hazard BVU CSA-02

Controller loss of situational awareness associated with GC having an obstructed view to the intersection of Runways 15/33 and Runways 9/27.

SRMP attendees focused on controller Line of Sight (LOS) considering tower location/height and controller positions.

SRM Panel attendees discussed both hazards and expressed concern about controller blind spots associated with mullion placement and position locations. Blind spots may impair controller vision and the ability to see identified taxiway and runway intersections movement areas. Moving to see around obstacles and raising/lowering equipment will assist controllers to see more clearly and add a measure of safety and reduce risk. Attendees said adequate controls will be in place for the new FCT.

SRM Panel attendees talked extensively about the impact of mullion placement on the ground controller's ability to provide LOS control instructions and scanning to assist Local Control (LC).

.Hazard Summary

Hazard ID	Hazard	Initial Risk	Predicted Residual Risk
BVU CSA Site 2-01	Loss of controller situational awareness	5E: Low	5E: Low
BVU CSA Site 3-02	Loss of controller situational awareness	4E: Low	5E: Low

Hazard 1 Loss of Controller Situational Awareness Site 2

SRM Panel attendees determined that loss of controller situational awareness is a hazard caused by GC not being able to see Taxiway B north of Taxiway D in the following system state: Tower operational and controllers in the tower working, all flows, and in all weather conditions. Attendees determined the worst credible effect is a loss of approved separation.

SRM Panel members determined that Severity is 5: Minimal based on the following: Runway Incursion (RI) would be improbable due to GC not being able to see parts of Taxiway B north of Taxiway D, less impact due to LC having the main responsibility for scanning the runways and GC can assist. Members determined that Likelihood is E: Extremely Improbable based on the following: training will be accomplished emphasizing visual scanning and pointing out possible LOS scenarios in the new tower for all positions, unlikely to occur, and using Likelihood Table 3.6.

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Boulder City Municipal Airport New FCT Siting CSA

Attendees developed a Monitoring Plan with a Safety Performance Target of less than one Category D RI due to a loss of controller situational awareness attributed to GC not being able to see Taxiway B north of Taxiway D for a 2-year period once the tower is officially occupied for ATC services. Monitoring activity will be reviewing MORs with quarterly reporting for two years. SRMP members agreed that the initial risk is 5E: Low. Members identified the following Safety Requirements: controller movement to the west side of the tower cab to see Taxiway B, GC to move around obstruction for LOS. Members agreed that predicted residual risk remained 5E: Low after Safety Requirement implementation (to start after the FCT goes operational).

Hazard 2 Loss of Controller Situational Awareness Site 3

SRM Panel attendees determined that loss of controller situational awareness is a hazard caused by GC has an obstructed view to the intersection of Runways 15/33 and Runways 9/27 in the following system state: Tower operational and controllers in the tower working, all flows, and in all weather conditions. Attendees determined the worst credible effect is a loss of approved separation.

SRM Panel members determined that Severity is 4: Minor based on the following: RI could happen due to the proximity of the intersection and GC cannot easily determine if aircraft holds short of the runway. Using the Risk Analysis Event Indicator ATC Mitigation from Severity Table 3.3. The possibility of a vehicle crossing the hold short line with GC assisting LC in scanning is minimal. Members determined that Likelihood is E: Extremely Improbable based on the following: GC can assist LC in scanning by moving in the tower cab to prevent a possible RI, not enough of an obstruction to prevent seeing a potential RI, and using Likelihood Table 3.6.

Attendees developed a Monitoring Plan with a Safety Performance Target of less than one Category D RI due to a loss of controller situation awareness attributed to GC obstructed view to the intersection of Runways 15/33 and Runways 9/27 for a 2-year period once the tower is officially occupied for ATC services. SRMP members agreed that the initial risk is 4E: Low. Members agreed to lower the initial risk of 4E to a predicted residual risk of 5E: Low after Safety Requirement implementation (to start after the FCT goes operational).

SECTION 1: CURRENT SYSTEM

BVU is a public use non-towered airport owned by the Boulder City Municipality located about 25 miles southeast of Las Vegas, in Clark County, Nevada. BVU has two intersecting runways with asphalt surfaces: Runway 9/27 is 5,103 by 75 feet and Runway 15/33 is 3,852 by 75 feet.

BVU had about 120,000 aircraft operations, an average of about 330 operations per day: 105,600 air taxi, 10,800 local general aviation, 2400 transient general aviation, and less than 1200 military for the 12-month period ending July 31, 2019. Currently 240 aircraft are based at BVU.

**12/16/2021 Panel Review Draft
Boulder City Municipal Airport New FCT Siting CSA**

5M Model

Mission (purpose of NAS change/operation)	Safely conduct air traffic operations in the new BVU FCT
(hu)Man (operators, stakeholders)	Controllers, pilots
Machine (equipment used in system)	FCT cab equipment positioning/adjustability
Management (procedures, policies governing/managing system)	JO 7110.65, JO 7210.3, FAA Order 6480.4C, SOP, LOA, ACAC checklist, Advisory Circular, CSPP, NOTAM
Media (environment system is operated)	BVU, L30, ZLA

SECTION 2: DESCRIPTION OF CHANGE

A Siting assessment meeting was conducted in Boulder City, NV by the FAA Terminal Facilities Siting team to determine the location for a new FCT at BVU. The FCT Siting assessment was completed virtually using 3-D goggles. The goal is to assess efforts and apply the best outcome to a new FCT Siting process.

BVU proposes to identify viable sites and determine physical characteristics for a new FCT. Representatives followed FAA Siting Order 6480.4 and AFTIL procedures to identify two viable sites for a potential new FCT:

- Site 2: Latitude: 35° 57' 1.70" N, Longitude: 114° 51' 33.33"W; Eye Level AGL 125 feet.
- Site 3: Latitude: 35° 56' 58.85" N, Longitude: 114° 51' 26.67"W; Eye Level AGL 120 feet.

Tower Selection Worksheets for Sites 2 and 3 along with a BVU image that shows site locations are SMTS attachments.

12/16/2021 Panel Review Draft
Boulder City Municipal Airport New FCT Siting CSA

SECTION: 3 HAZARD AND RISK ANALYSIS/MONITORING PLAN

Hazard ID	Hazard Description	Cause	System State	Controls	Control Justification
BVU CSA Site 2-01	Loss of controller situational awareness	GC cannot see Taxiway B north of Taxiway D	<u>Site 2</u> Tower operational, controllers in the tower working All flows All weather conditions	JO 7110.65, JO 7210.3 SOP, LOA, ATIS, TCAS AWOS, Surface Memory Aid Controller/Pilot Training, Controller/Pilot Intervention, ATC Scanning Frequency Monitoring Operational Supervision NOTAM, Charts, Chart Supplemental, AIM Outreach, CRM, Daily Briefings/Notes, TMI Traffic management board	7110.65, 2-1-26/28, Chap. Sec. 2-4, 6, 9 Chap. 3, Sec. 5-8, 10, Chap.4, Sec. 2, 4, 5, 7, Chap. 7 Sec. 4, Chap. 10 Emergencies, Chap. 11 Traffic Management Procedures 7210.3, 2-2-11, 2-6-1/3, 3-6-7, Chap. 4 Sec. 3, 10-3-9 Special events Serco requirement

Effect	Severity	Severity Rationale	Likelihood	Likelihood Rational	Initial Risk
Loss of approved separation	5: Minimal	RI would be improbable due to GC not being able to see parts of Taxiway B north of Taxiway D, less impact due to LC having the main responsibility for scanning the runways and GC can assist.	E: Extremely Improbable	Training will be accomplished emphasizing visual scanning and pointing out possible LOS scenarios in the new tower for all positions, unlikely to occur, and using Likelihood Table 3.6.	5E Low

Safety Requirements	Org. Responsible for Implementing Safety Requirements	Predicted Residual Risk	Safety Performance Target
Movement to the west side of the cab to see Taxiway B GC to move around obstruction for LOS	BVU FCT ATM	5E Low	Less than one Category D RI due to a loss of controller situation awareness attributed to GC cannot see Taxiway B north of Taxiway D for a 2-year period once the tower is officially occupied for ATC services.

Safety Performance Target Monitoring		
Monitoring Activity	Reporting Frequency	Reporting Duration
Review MORs	Quarterly	2 Years (to start after the FCT goes operational)

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Boulder City Municipal Airport New FCT Siting CSA

Hazard ID	Hazard Description	Cause	System State	Controls	Control Justification
BVU CSA Site 3-02	Loss of controller situational awareness	GC obstructed view to the intersection of Runways 15/33 and Runways 9/27	<u>Site 3</u> Tower operational, controllers in the tower working All flows All weather conditions	JO 7110.65, JO 7210.3 SOP, LOA, ATIS, TCAS AWOS, Surface Memory Aid, Controller/Pilot Training, Controller/Pilot Intervention, ATC Scanning Frequency Monitoring Operational Supervision NOTAM, Charts, Chart Supplemental, AIM Outreach, CRM, Daily Briefings/Notes, TMI Traffic management board	7110.65, 2-1-26/28, Chap. Sec. 2-4, 6, 9 Chap. 3, Sec. 5-8, 10, Chap.4, Sec. 2, 4, 5, 7, Chap. 7 Sec. 4, Chap. 10 Emergencies, Chap. 11 Traffic Management Procedures 7210.3, 2-2-11, 2-6-1/3, 3-6-7, Chap. 4 Sec. 3, 10-3-9 Special events Serco requirement

Effect	Severity	Severity Rationale	Likelihood	Likelihood Rational	Initial Risk
Loss of approved separation	4: Minor	RI could happen due to the proximity of the intersection and GC cannot easily determine if aircraft holds short of the runway. Using the Risk Analysis Event Indicator ATC Mitigation from Severity Table 3.3. The possibility of a vehicle crossing the hold short line with GC assisting LC in scanning is minimal	E: Extremely Improbable	GC can assist LC in scanning by moving in the tower cab to prevent a possible RI, not enough of an obstruction to prevent seeing a potential RI, and using Likelihood Table 3.6.	4E: Low

Safety Requirements	Org. Responsible for Implementing Safety Requirements	Predicted Residual Risk	Safety Performance Target
Slight movement left or right by GC to move around obstruction for LOS Explore moving the mullion near GC	BVU FCT ATM Frank Boyer	5E: Low	Less than one Category D RI due to a loss of controller situation awareness attributed to GC obstructed view to the intersection Runways 15/33 and Runways 9/27 for a 2-year period once the tower is officially occupied for ATC services.

Safety Performance Target Monitoring		
Monitoring Activity	Reporting Frequency	Reporting Duration
Review MORs	Quarterly	2 Years (to start after the FCT goes operational)

SECTION 4: DISSENTION

Not applicable.

12/16/2021 Panel Review Draft
Boulder City Municipal Airport New FCT Siting CSA

SECTION 5: SRM PANEL ATTENDEES

The SRM panel convened on December 1 and 2, 2021 to perform a thorough analysis of the mission statement. SMEs from across the agency were invited to leverage their operational experience, and experts in the SRM process were present to maintain its integrity. Table 6.1 lists the panel participants by their organizations.

Change Proponent

Name	Title, Organization	Email	Phone
Franklin Boyer	Facilitator, National Coordinator Liaison	franklin.e-ctr.boyer@faa.gov	941 504-0210

Members

Name	Title, Organization	Email	Phone
Scott French	TWLA1-L30, Support Manager	scott.r.french@faa.gov	725-600-7068
John Hanf	SERCO, HND ATM	imhanf@serco-na.com	702-261-4809

Subject Matter Experts

Name	Title, Organization	Email	Phone
Marissa Adou	Airport Manager, BVU	mdou@bcnv.org	702-293-9405
Kory Andryscik	Representative, Kimley and Horn	kory.andryscik@kimley-horn.com	--
Dave Byers	Quadrex Aviation	dabyers@quadrex.aero	321-574-5636
Michael Dasaro	AJV-W31, Support Specialist	michael.dasaro@faa.gov	206-231-2918
Jeff Fischer	AJW-244, 3-D Modeler	jeff.ctr.fischer@faa.gov	303-601-9864
Kevin Fix	Representative, Kimley and Horn	kevin.fix@kimley-horn.com	--
Matthew McAlevey	Airport Operations, BVU	mmcalevey@bcnv.org	702-293-9405
Aaron Shaw	AJW-2W11C, Project Engineer	aaron.shaw@faa.gov	206-231-2569
Shari Teel	AJW-244, Technical Writer/NC	shari.a-ctr.teel@faa.gov	281-507-9232

Observers

Name	Title, Organization	Email	Phone
Jordan Flores	AJV-W37, Engineer	jordan.flores@faa.gov	206-231-2563
Charles Kolb	Systems Engineer, Facilities Group	charles.ctr.kolb@faa.gov	206-231-2944
Steve Szehner	Technical Writer, QCG, WSC	stephen.szehner@faa.gov	206-231-2325

**12/16/2021 Panel Review Draft
Boulder City Municipal Airport New FCT Siting CSA**

Facilitation Team

Name	Title, Organization	Email	Phone
Franklin Boyer	Facilitator, NC Liaison	franklin.e-ctr.boyer@faa.gov	941 504-0210
Garry Brown	Facilitator, SRM Specialist, QCG, WSC	garry.f.brown@faa.gov	206-231-2317
Larry Crowley	Facilitator, SRM Specialist, QCG, WSC	larry.crowley@faa.gov	206-231-2320
Kenneth Legary	Technical Writer, QCG, WSC	kenneth.ctr.legary@faa.gov	206-231-2319

APPENDICES/SMTS ATTACHMENTS

1. BVU Diagram
2. Tower Selection Worksheet for BVU FCT Site 2
3. Tower Selection Worksheet for BVU FCT Site 3
4. BVU Airfield Photo showing Potential FCT Sites 2 and 3

3/31/2022 Panel Review Draft
Boulder City Municipal Airport New FCT CSA

EXECUTIVE SUMMARY

Title: Boulder City Municipal Airport New FCT CSA

Initiating Organization: BVU

Impacted Organizations: BVU, L30, TWLA

Safety Analysis Type: OPS

Signatures:

Concurrence: Scott French, Support Manager, Los Angeles District (TWLA1-L30)

Approval: Regan Rasband, General Manager, Los Angeles District (TWLA1-GM)

SMTS Project Overview

The Boulder City Municipal Airport (BVU) is a non-towered non-hub commercial service airport owned by the City of Boulder City, Nevada and located about 25 miles southeast of Las Vegas, in Clark County, Nevada. BVU has two intersecting runways with asphalt surfaces: Runway 9/27 is 5,103 by 75 feet and Runway 15/33 is 3,852 by 75 feet.

In CY 2019, the airport hosted approximately 162,000 enplaned passengers. BVU had about 120,000 aircraft operations, an average of about 330 operations per day: 88 percent air taxi, nine percent local General Aviation (GA), two percent transient GA, and less than one percent military for the 12-month period ending July 31, 2019. Currently, 240 aircraft are based at BVU.

A Siting Comparative Safety Assessment (CSA) meeting was conducted virtually on March 4 and March 25, 2022 by the FAA Terminal Facilities Siting team to determine if Site 3 (the preferred best location) for a new FAA Contract Tower (FCT) at BVU introduces hazards as a NAS change. The FCT Siting assessment was completed virtually using 3-D goggles.

Meeting attendees both in the room and virtually via Zoom participated in siting activities for the proposed BVU FCT and conducted a Safety Risk Management (SRM) Panel (SRMP) for Site 3. Attendees applied the Air Traffic Organization (ATO) SRM process as defined by the ATO Safety Management System (SMS) Manual.

The SRM Panel convened to assess the change to the National Airspace System (NAS) and associated hazards. The sponsor with support from the Virtual Immersive Siting Tower Assessment (VISTA) team and the Western Service Center (WSC) Quality Control Group (QCG) organized the SRM Panel, comprising stakeholders associated with the change. Stakeholders included representatives from Henderson Executive Airport (HND) FCT, the WSC Planning and Requirements Group (PRG), Engineering Services, Terminal Facilities Planning, the Facilities Group, the Airport Modeling and Simulation Branch, Program Implementation Management, Quadrex Aviation, Las Vegas TRACON (L30), TWLA District, and the National Air Traffic Controllers Association (NATCA).

All items in the Siting Criteria were discussed and impacts assessed and documented. The siting team members provided inputs on the advantages and disadvantages of Site 3. Air Traffic representatives followed FAA Siting Order 6480.4 and VISTA procedures for a new FCT location:

- Site 3: Latitude: 35° 56' 58.85" N, Longitude: 114° 51' 26.67"W; Floor Level 90 feet Above Ground Level (AGL), Eye Level 95 feet AGL.

The SRM Panel safety analysis did not reveal hazards or any perceived/calculated increase in safety risk. SRM Panel attendees determined that no further safety analysis is required according to the Air Traffic Organization

3/31/2022 Panel Review Draft
Boulder City Municipal Airport New FCT CSA

Safety Management System Manual, April 2019 Version, and the proposed change may be implemented into the NAS.

SECTION 1: CURRENT SYSTEM

BVU is a non-towered non-hub commercial service airport owned by the city of Boulder City, Nevada. The airport is located about 25 miles southeast of Las Vegas, in Clark County, Nevada. BVU has two intersecting runways with asphalt surfaces: Runway 9/27 is 5,103 by 75 feet and Runway 15/33 is 3,852 by 75 feet. BVU has one parallel Taxiway B (north/south) and one partial parallel Taxiway D (east/west). Boulder City has nearly perfect flying weather with about 300+ days of sunshine annually.

BVU is ranked third busiest commercial airport in the State of Nevada with nearly 162,000 enplaned passengers in CY 2019. BVU had about 120,000 aircraft operations, an average of about 330 operations per day: 105,600 air taxi, 10,800 local GA, 2400 transient GA, and less than 1200 military for the 12-month period ending July 31, 2019. Currently, 240 aircraft are based at BVU.

5M Model

Mission (purpose of NAS change/operation)	Safely conduct air traffic operations in the proposed new BVU FCT. Identify potential safety hazards, assess risk, and propose mitigations associated with the proposed NAS change.
(hu)Man (operators, stakeholders)	Controllers, pilots, L30, TWLA
Machine (equipment used in system)	FCT cab equipment positioning/adjustability
Management (procedures, policies governing/managing system)	JO 7110.65, JO 7210.3, FAA Order 6480.4, SOP, LOA, ACAC checklist, Advisory Circular, CSPP, NOTAM
Media (environment system is operated)	BVU, L30, ZLA

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A Siting assessment meeting was conducted in Boulder City’s municipal building on 03/04/2022 and the Town Square Las Vegas, NV on 03/25/2022 by the FAA Terminal Facilities Siting team to determine the location and configuration for a new FCT at BVU. The FCT Siting assessment was completed virtually using 3-D goggles. The goal is to assess efforts and apply the best outcome to a new FCT Siting process.

BVU proposes to identify Site 3 as the preferred site and determine physical characteristics for a new FCT. Representatives followed FAA Siting Order 6480.4 and VISTA procedures/process to identify the site for the FCT:

- Site 3: Latitude: 35° 56' 58.85" N, Longitude: 114° 51' 26.67"W; Floor Level 90 feet AGL, Eye Level 95 feet AGL.

The Tower Selection Worksheet for Site 3 along with a BVU image that shows the original site locations are SMTS attachments.

SECTION 3: RATIONALE FOR A SAFETY FINDING WITHOUT HAZARDS

SRM Panel attendees conducted a thorough safety analysis using the siting checklist for a new FCT at BVU using 3D goggles virtually and VISTA procedures. Attendees applied the ATO SRM process and discussed

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SRM Panel attendees brainstormed to develop a Preliminary Hazard List (PHL), but did not identify hazards associated with the change. Attendees agreed that Site 3 location and access would not increase risk. The SRMP determined that the changes do not introduce hazards into the NAS and, therefore, no further safety analysis is required according to the ATO SMS Manual.

SECTION 4: DISSENTION

Not applicable.

SECTION 5: SRM PANEL ATTENDEES

The SRM Panel convened on March 4 and 25, 2022 to perform a thorough analysis of the mission statement. SMEs from across the agency were invited to leverage their operational experience, and experts in the SRM process were present to maintain its integrity. The following table lists SRM Panel attendees.

Change Proponent

Name	Title, Organization	Email	Phone
Franklin Boyer	Facilitator, National Coordinator Liaison	franklin.e-ctr.boyer@faa.gov	941-504-0210

Members

Name	Title, Organization	Email	Phone
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Subject Matter Experts

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#Kevin Fix	Representative, Kimley and Horn	kevin.fix@kimley-horn.com	702-862-3624

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Kenneth Legary	Technical Writer, QCG, WSC	kenneth.ctr.legary@faa.gov	206-231-2319

March 4 only, * March 25 only

APPENDICES/SMTS ATTACHMENTS

1. BVU Diagram
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4. BVU FCT Site Schematic

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Boulder City Municipal Airport New FCT CSA

EXECUTIVE SUMMARY

Title: Boulder City Municipal Airport New FCT CSA

Initiating Organization: BVU

Impacted Organizations: BVU, L30, TWLA

Safety Analysis Type: OPS

Signatures:

Concurrence: Scott French, Support Manager, Los Angeles District (TWLA1-L30)

Approval: Regan Rasband, General Manager, Los Angeles District (TWLA1-GM)

SMTS Project Overview

The Boulder City Municipal Airport (BVU) is a primary non-hub commercial service use non-towered airport owned by the City of Boulder City, Nevada located about 25 miles southeast of Las Vegas, in Clark County. BVU has two intersecting runways with asphalt surfaces: Runway 9/27 is 5,103 by 75 feet and Runway 15/33 is 3,852 by 75 feet.

BVU had about 120,000 aircraft operations, an average of about 330 operations per day: 88 percent air taxi, nine percent local General Aviation (GA), two percent transient GA, and less than one percent military for the 12-month period ending July 31, 2019. Currently, 240 aircraft are based at BVU.

A Siting Comparative Safety Assessment (CSA) meeting was conducted virtually on March 4 and March 25, 2022 by the FAA Terminal Facilities Siting team to determine if Site 3 (the preferred best location) for a new FAA Contract Tower (FCT) at BVU introduces hazards as a NAS change. The FCT Siting assessment was completed virtually using 3-D goggles.

Meeting attendees both in the room and virtually via Zoom participated in siting activities for the proposed BVU FCT and conducted a Safety Risk Management (SRM) Panel (SRMP) for Site 3. Attendees applied the Air Traffic Organization (ATO) SRM process as defined by the ATO Safety Management System (SMS) Manual.

The SRM Panel convened to assess the change to the National Airspace System (NAS) and associated hazards. The sponsor with support from the Virtual Immersive Siting Tower Assessment (VISTA) team and the Western Service Center (WSC) Quality Control Group (QCG) organized the SRM Panel, comprising stakeholders associated with the change. Stakeholders included representatives from Henderson Executive Airport (HND) FCT, the WSC Planning and Requirements Group (PRG), Engineering Services, Terminal Facilities Planning, the Facilities Group, the Airport Modeling and Simulation Branch, Program Implementation Management, Quadrex Aviation, Las Vegas TRACON (L30), TWLA District, and the National Air Traffic Controllers Association (NATCA).

All items in the Siting Criteria were discussed and impacts assessed and documented. The siting team members provided inputs on the advantages and disadvantages of Site 3. Air Traffic representatives followed FAA Siting Order 6480.4 and VISTA procedures for a new FCT location:

- Site 3: Latitude: 35° 56' 58.85" N, Longitude: 114° 51' 26.67"W; Floor Level 90 feet Above Ground Level (AGL), Eye Level 95 feet AGL.

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The SRM Panel safety analysis did not reveal hazards or any perceived/calculated increase in safety risk. SRM Panel attendees determined that no further safety analysis is required according to the Air Traffic Organization Safety Management System Manual, April 2019 Version, and the proposed change may be implemented into the NAS.

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Appendix K
PRELIMINARY HAZARD LIST
FCT Site 3 (90 feet rotated 30 degrees)
Boulder City Municipal Airport

1. Potential interference with navigation equipment, both planned and existing
2. Potential interference with communication equipment, both planned and existing
3. Potential interference with existing and/or proposed surveillance equipment
4. TERPS surfaces penetrations
5. 14 CFR Part 77 surfaces penetrations
6. Relevant airport design standards violated
7. Direction of view: none
 - a. North
 - b. East
 - c. West
 - d. South
8. Line of sight/angle of view: no issues
 - a. Up
 - b. Down
9. Visual Performance: no issues
 - a. Unobstructed view
 - b. Object discrimination
 - c. Line of sight angle of incidence
 - d. Two-point lateral discrimination
10. Lighting and Atmospheric Limitations – Daylight: no issues
 - a. Sun angle
 - b. Sun glare
 - c. Sun shadows
 - d. Thermal distortion
 - e. Light changes/contrast eye adaptation
11. Lighting and Atmospheric Limitations – Night: no issues
 - a. Dawn
 - b. Dusk

C. Night

Artificial Lighting: no issues

- c. Airport lighting equipment outages
- d. Lighting shadows

C. Airport lighting

- d. Construction lighting
- e. Residential/industrial lighting
- f. Background clutter

12. Naturally occurring atmospheric conditions: no issues

- a. Dust
- b. Ash
- c. Smoke
- d. Haze
- e. Fog
- f. Rain
- g. Sleet
- h. Snow
- 1. Sun glare off snow

J. Minimum ceiling heights (historical data)

13. Industrial/municipal discharges: no issues

- a. Dust
- b. Ash
- c. Smoke

14. Access to proposed site does not cross existing ground/air traffic patterns: no issues

15. Interior physical barriers: no issues

- a. Position of controllers in tower cab
- b. Position of tower cab equipment
- c. Position of tower cab mullions

16. Exterior physical barriers; no issues

- a. Construction equipment
- b. Proposed new structures and airport expansion (ALP)

17. Existing ATCTCab size evaluation; no issues
 - a. During peak traffic
 - b. When fully staffed
 - c. During consolidated operations with slowest amount of traffic
18. Other

Appendix L

Siting Report Amendments