

APPENDIX O

AIRSPACE ANALYSIS TECHNICAL MEMO



Memo

Prepared for: Los Angeles Aerial Rapid Transit Project Draft Environmental Impact Report

Prepared By: VMC LLC

Date: May 31, 2022

Re: Airspace Analysis for the Los Angeles Aerial Rapid Transit Project

Introduction

This memorandum presents the results of an airspace analysis for the proposed Los Angeles Aerial Rapid Transit project (Project) located in Los Angeles, California (CA). The proposed alignment is located in the vicinity of numerous heliports. The proposed Project is an aerial gondola system that would be approximately 1.2 miles and consist of cables, three passenger stations, a non-passenger junction, three towers, and gondola cabins that could impact the airspace associated with the heliports. VMC LLC (VMC) was engaged to conduct an airspace evaluation of the proposed Project to determine if the Project would impact helicopter operations in the area resulting in a hazard to air navigation. The following memo summarizes the proposed Project, methodology, applied criteria, analysis, and findings.

Proposed Project

The proposed Project would commence adjacent to Los Angeles Union Station (LAUS) and El Pueblo de Los Angeles (El Pueblo) and terminate at Dodger Stadium. The proposed Project alignment would generally be located following Alameda Street and then continuing along Spring Street in a northeast direction through the community of Chinatown to the southernmost corner of the Los Angeles State Historic Park. The alignment would then continue northeast over the western edge of the Los Angeles State Historic Park and the Los Angeles County Metropolitan Transportation Authority (Metro) L Line (Gold) to the intersection of North Broadway and Bishops Road. At this

intersection, the proposed Project alignment would turn and continue northwest following Bishops Road toward its terminus at Dodger Stadium.

The following points shown in **Table 1** were provided for evaluation by VMC.

Table 1: Proposed Project Components

Point	Point Description	Latitude	Longitude	Ground EI (Ft)	Height AGL (Ft)	Height MSL (Ft)
1	Alameda Station	34° 3' 25.20"	118° 14' 14.33"	280	78	358
2	Alameda Tower	34° 3' 37.61"	118° 14' 11.48"	285	195	480
3	Alpine Tower	34° 3' 42.65"	118° 14' 10.15"	287	195	482
4	Chinatown/State Park Station	34° 3' 54.99"	118° 14' 06.43"	293	98	391
5	Broadway Junction	34° 4' 8.76"	118° 13' 59.83"	337	98	435
6	Stadium Tower	34° 4' 18.44"	118° 14' 8.31"	417	179	596
7	Stadium Station	34° 4' 21.40"	118° 14' 10.76"	521	74	595

Source: SCJ, May 2022

Methodology and Criteria Applied

Analysis of the proposed Project was performed according to criteria found in Title 14 Code of Federal Regulations Part 77-*Safe Efficient Use, and Preservation of the Navigable Airspace* (Part 77), FAA Order 7400.2M *Procedures for Handling Airspace Matters*, FAA Order 8260.3D *United States Standards for Terminal Instrument Procedures (TERPS)*, and FAA Order 8260.58 *United States Standards for Performance-Based Navigation Procedures*. VMC analyzed the proposed Project considering the airspace associated with the existing heliports in the area using the Terminal Area Route Generation Evaluation and Traffic Simulation (TARGETS) software.

Part 77 establishes (a) The requirements to provide notice to the FAA of certain proposed construction or the alteration of existing structures; (b) The standards used to determine obstructions to air navigation and navigational and communication facilities; (c) The process for aeronautical studies of obstructions to air navigation or navigational facilities to determine the effect on the safe and efficient use of navigable airspace, air navigation facilities, or equipment; and (d) The process to petition the FAA for discretionary review of determinations, revisions, and extensions of determinations.

FAA 7400.2N provides criteria defining the aeronautical effect of an obstacle. The prime objective of the FAA is to ensure the safety of air navigation and the efficient utilization

of navigable airspace by aircraft. An obstacle is considered a ***hazard to air navigation*** if it is found to have an adverse effect and impacts a significant volume of aeronautical activity.

The FAA 8260 series of regulations provide specific design and protection criteria for Instrument Flight Operations. The following section details the analysis of the proposed LA ART by applying these criteria.

Analysis

Analysis for this effort focused on the definition of existing conditions, notification requirements, application of imaginary obstacle identification and obstacle clearance surfaces, and hazard analysis. Although many of the heliports identified are for public use, the analysis takes a conservative approach and assumes all are open for public use.

Planned enhancements or plans on file for new facilities, expansion of facilities, instrument flight procedures, or airspace changes are protected by Part 77. Evaluation of plans on file follow the same guidelines for airspace protection as applied for the planned components. VMC conducted a search on the FAA Instrument Flight Procedures Gateway website to identify planned procedures. No planned procedures were identified as part of this search.

Through a review of the FAA 5010 Airport Master Record database and by visual examination using Google Earth, VMC identified 21 heliports in the general vicinity (approximately 2 nautical miles) of the Project. There are three heliports not included in the FAA master records: the Cathay Manor Apartments, Men's Central Jail, and Twin Towers Correctional Facility. The Cathay Manor Apartment Helipad visually appears to be in good operational condition. The Men's Central Jail and Twin Towers Correctional Facility landing areas are marked with an "X" indicating closed.

Table 2 provides information associated with the heliports identified in this analysis and lists the closest distance from the heliport to the proposed Project alignment.

Table 2: Heliports in the Vicinity of Proposed Project Alignment

ID	NAME	Elevation (MSL)	Distance From LA ART (Feet)	Lat	Lon
59L	City Hall East	525	1948	34-03-10.70N	118-14-29.88W
5CL6	Edwin Roybal Federal Building	646	1569	34-03-10.39N	118-14-19.86W
	Cathay Manor Apartments	446	779	34-03-31.94N	118-14-22.41W
N/A	Men's Central Jail – Closed	451	N/A	34-03-35.73N	118-14-22.52W
N/A	Twin Towers Correctional Facility – Closed	466	N/A	34-03-35.17N	118-13-48.27W
2CN6	Department of Water & Power Los Angeles	654	3676	34-03-29.11N	118-14-58.11W
58CA	Jay Stephen Hooper Memorial	353	2554	34-03-N15.80	118-13-46.30 W
23CL	LA County Men's Sheriff's Center Jail	352	2425	34-03-40.90N	118-13-41.00W
3CL1	Metro Water District	465	909	34-03-16.86N	118-14-10.12W
CL31	CALTRAN District 7	484	2650	34-03-05.10N	118-14-34.37W
6CA0	Hotel New Otani, Los Angeles	490	2791	34-03-02.37N	118-14-32.96W
4CA0	LAPD Hooper	302	5604	34-02-38.49N	118-14-50.37W
62CA	Bank of America	440	4505	34-03-41.12N	118-15-05.71W
CL08	Biltmore Hotel	443	5646	34-02-57.58N	118-15-13.21W
4CA1	City National Bank	453	6089	34-02-51.79N	118-15-14.89W
35CA	Los Angeles County/USC Medical Center	454	7206	34-03-35.06N	118-12-42.44W
CN25	The Westin Bonaventure Hotel	679	5769	34-03-10.43N	118-15-21.26W
87CL	City National Plaza	980	6295	34-03-05.29N	118-15-25.38W
2CA6	K&T 660 Figueroa Partners	629	7193	34-02-57.91N	118-15-34.05W
CL00	USC University Hospital	476	9804	34-03-41.80N	118-12-05.71W
3CL5	Chase Plaza	412	7583	34-02-44.23N	118-15-31.17W
0CL7	Good Samaritan Hospital	473	8343	34-03-17.45N	118-15-53.90W
55CN	Sunset Glendale	556	7672	34-04-39.58N	118-15-40.29W
CL49	International Tower Heliport	542	8388	34-02-47.61N	118-15-43.08W

Source: FAA 5010 Database, Accessed April 25, 2022, Google Earth Search, April 2022

Notification of Proposed Construction

FAR Part 77 Subpart B Notice Requirements identifies proposed projects' applicability and notice requirements. Part 77.79 (a) and (b) (3) indicate that proposed construction over 200 feet above the ground (AGL) or penetrating a 25 to 1 surface for a horizontal distance of 5,000 ft. from the nearest point of the nearest landing and takeoff area of each heliport are required to file a notice of proposed construction.

Each of the proposed Project components identified in Table 1 was evaluated considering the notification requirements. None of the proposed Project components are over 200 feet, and none penetrate the 25:1 surface identified in Part 77.79 (b) (3). Therefore, notification of proposed Project's construction is not required unless FAA specifically requests the Project Sponsor to file a notice.

Obstacle Identification and Clearance Surfaces

Further analysis was conducted based on the application of Part 77.23 Heliport Imaginary Surfaces to determine if any of the proposed Project components are considered obstacles. Part 77.23 details approach, primary, and transitional imaginary surfaces for the airspace protection of heliports. The criteria are applied based on

takeoff and landing headings for a heliport. No information was available to determine a specific final approach or departure heading for the heliports in the FAA database. Therefore, the analysis was conducted by applying the approach surface criteria (an 8:1 surface beginning at the helipad elevation extending outward 4,000 feet) in the direction of the proposed Project alignment, which assumes helicopters would be flying over the proposed Project on approach to the heliport. Based on this analysis, none of the proposed Project components impact any of the heliports evaluated. The primary finding is that most of the heliports are at a much higher elevation than the proposed Project components or are a sufficient distance away, allowing a clear approach.

The FAA 5010 forms were reviewed for each heliport to identify published Instrument Flight Procedures (IFPs). No IFPs were identified for the heliports reviewed. Therefore, there is no impact.

Hazard Analysis

A hazard to air navigation involves an adverse effect and impact on a significant volume of aeronautical activity. Based on Part 77 analysis, there is no adverse effect and no requirement to file a notice of proposed Project construction. Since there is no adverse effect, no aeronautical activity is impacted.

Summary

Construction and operation of the proposed Project is clear of the airspace associated with the existing heliports in the proposed Project's vicinity. No notification is required for the proposed Project construction unless the FAA makes a specific request to the Project Sponsor.

If the notice of proposed construction is filed to FAA, it is the opinion of VMC that a Determination of No Hazard would result. Most of the heliports in the area are at a higher elevation than the proposed Project construction, and there is no adverse effect on the protective airspace surrounding them.



Appendix A – Heliport Evaluation Data

ID	NAME	Elevation (MSL)	Distance From Proposed Project (Feet)	Height of Proposed Project at Closest Point	FAR PT 77 (8:1) Surf EI	Clear (+)/Pen (-)	FAR Part 77 (25:1) Notification Surf EI	Clear (+)/Pen (-)	Lat	Lon
Unknown	Cathay Manor Apartments	446	785	425	544.13	119.13	477.40	31.40	34-03-31.94N	118-14-22.41W
Unknown	Cathay Manor Apartments	446	1083	480	581.38	101.38	489.32	43.32	34-03-31.94N	118-14-22.41W
3CL1	Metro Water District	465	914	358	579.25	221.25	501.56	36.56	34-03-16.86N	118-14-10.12W
3CL1	Metro Water District	465	1569	358	842.13	484.13	708.76	62.76	34-03-16.86N	118-14-10.12W
5CL6	Edward Roybal Federal Building	646	1965	358	770.63	412.63	603.60	78.60	34-03-10.39N	118-14-19.86W
59L	City Hall East	525	2425	480	655.13	175.13	449.00	97.00	34-03-10.70N	118-14-29.88W
23CL	LA County Men's Sheriff's Center Jail	352	2543	358	670.88	312.88	454.72	101.72	34-03-40.90N	118-13-41.00
58CA	Jay Stephen Hooper Memorial	353	3110	480	741.75	261.75	477.40	124.40	34-03-15.80N	118-13-46.30 W
58CA	Jay Stephen Hooper Memorial	353	2641	358	814.13	456.13	589.64	105.64	34-03-15.80N	118-13-46.30 W
CL31	CALTRAN District 7	484	2791	358	838.88	480.88	601.64	111.64	34-03-05.10N	118-14-34.37W
6CA0	Hotel New Otani, Los Angeles	490	3676	358	1113.50	755.50	801.04	147.04	34-03-02.37N	118-14-32.96W
2CN6	Department of Water & Power Los Angeles Heliport	654	4576	480	1012.00	532.00	623.04	183.04	34-03-29.11N	118-14-58.11W
62CA	Bank of America	440	5612	358	1003.50	645.50	526.48	224.48	34-03-41.12N	118-15-05.71W
4CA0	LAPD Hooper	302	5687	358	1153.88	795.88	670.48	227.48	34-02-38.49N	118-14-50.37W

ID	NAME	Elevation (MSL)	Distance From Proposed Project (Feet)	Height of Proposed Project at Closest Point	FAR PT 77 (8:1) Surf El	Clear (+)/Pen (-)	FAR Part 77 (25:1) Notification Surf El	Clear (+)/Pen (-)	Lat	Lon
CL08	Biltmore Hotel	443	5826	358	1407.25	1049.25	912.04	233.04	34-02-57.58N	118-15-13.21W
CN25	The Westin Bonaventure Hotel	679	5826	358	1407.25	1049.25	912.04	233.04	34-03-10.43N	118-15-21.26W
4CA1	City National Bank	453	6114	358	1217.25	859.25	697.56	244.56	34-02-51.79N	118-15-14.89W
87CL	City National Plaza	980	6308	358	1768.50	1410.50	1232.32	252.32	34-03-05.29N	118-15-25.38W
2CA6	K&T 660 Figueroa Partners	629	7253	358	1535.63	1177.63	919.12	290.12	34-02-57.91N	118-15-34.05W
35CA	Los Angeles County/USC Medical Center	454	7419	480	1381.38	901.38	750.76	296.76	34-03-35.06N	118-12-42.44W
3CL5	Chase Plaza	412	7678	358	1371.75	1013.75	719.12	307.12	34-02-44.23N	118-15-31.17W
55CN	Sunset Glendale	556	7752	595	1525.00	930.00	866.08	310.08	34-04-39.58N	118-15-40.29W
0CL7	Good Samaritan Hospital	473	8415	358	1524.88	1166.88	809.60	336.60	34-03-17.45N	118-15-53.90W
CL49	International Tower Heliport	542	8379	358	1589.38	1231.38	877.16	335.16	34-02-47.61N	118-15-43.08W
CL00	USC University Hospital	476	9980	435	1723.50	1288.50	875.20	399.20	34-03-41.80N	118-12-05.71W
N/A	Men's Central Jail	451	N/A	N/A	N/A	N/A	N/A	N/A	34-03-35.73N	118-14-22.52W
N/A	Twin Towers Correctional Facility	466	N/A	N/A	N/A	N/A	N/A	N/A	34-03-35.17N	118-13-48.27W



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VMC LLC is a woman and minority-owned small business founded on core values of honesty, integrity, and customer service. Since 2004, VMC has earned a strong reputation for delivering project success to our clients, providing innovative solutions and effective leadership through complex processes involving multiple stakeholders with competing interest.

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We pride ourselves on providing quality and best value services in support of meeting our customer's objectives. VMC uses highly skilled technical personnel and management professionals who apply their expertise to advise, manage and execute goals.

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WHY CHOOSE US?

Since 2004, VMC has earned a strong reputation for delivering project success to our clients, providing innovative solutions and effective leadership through complex processes involving multiple stakeholders with competing interests.

Our staff consists of Subject Matter Experts in the areas of Project Management, Program Support and Coordination, Airport Planning and Design, Airport Operations, Air Traffic Control, Flight Technical, Flight Check, Performance Based Navigation Instrument Flight Procedures Development, and National Airspace Systems Engineering and NextGen Systems.

We pride ourselves on providing quality and best value services in support of meeting our customer's objectives. VMC uses highly skilled technical personnel and management professionals who apply their expertise to advise, manage and execute goals.



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Education

Master of Science – Management of Technology, University of Minnesota, 2022

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Professional Affiliations

Air Traffic Controllers Association

Airports Council International-North America – Member

American Association of Airport Executives – Certified Member

Aviation Industry Advisory Board, St. Cloud State University – Former Chairman

Aviation Workforce Development – Board Member

FAA Performance-Based Aircraft Aviation Rulemaking Committee

Federal Aviation Administration, Terminal Area Operations Aviation Rulemaking Committee

Certifications and Licenses

Project Manager Professional Certification

Private Pilot, Single-Engine Land Airplane

Safety Management Systems I, II, and Audit – MITRE Center for Advanced Aviation System Development (CAASD)

Area Navigation (RNAV) – MITRE CAASD

Terminal Area Route Generation Evaluation and Traffic Simulation – MITRE CAASD

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Mr. Varani has nearly 30 years of project experience as a consultant at major airports throughout the world. Mr. Varani is experienced in all phases of airport/airspace planning and aeronautical systems engineering, master planning, airspace redesign, capacity analysis, terminal instrument procedures development, simulation modeling, aeronautical surveys, obstacle evaluations, environmental assessments, environmental impact statements, site selection studies, aviation demand forecasting, airport design, airport layout plans, airport land use planning, construction planning, navigational aid engineering, safety management systems, public relations, and implementation of geographic information systems at airports.

He specializes in aviation technology implementation for communication, navigation, and surveillance and air traffic management and NextGen systems. He has led surface movement, airspace design, performance-based navigation, automated surface movement and guidance system, navigational aid (NAVAID), and capacity related projects for airports that are terrain challenged or located in complex, high-density airspace. He has extensive knowledge of International Civil Aviation Organization and Federal Aviation Administration (FAA) standards and criteria pertaining to airports and airspace, air traffic control, NAVAIDs, and aviation systems.

Mr. Varani served as the lead for the development of a concept of operations (CONOPs) for an airport lighting and control management system at the Abu Dhabi International Airport and has been involved with installations of VOR/DME, GBAS, PAPI's, radars, and other National Airspace System infrastructure. He recently prepared a CONOPs, and supported the development of a request for proposals, selection of a vendor, and preliminary system design for virtual ramp control (VRC) using remote tower technology at Orlando International Airport. He is currently leading a team preparing a CONOPs for VRC at O'Hare International Airport as part of the Terminal Area Plan. He is also leading a research team for the National Academies of Science for remote virtual ramp control.

As part of FAA contracts, Mr. Varani has worked as a program manager for the following projects: Integration and Interoperability Facility, Air Traffic Organization Terminal Engineering and Scientific Research, and AeroNav Products Instrument Flight Procedures Reduction.

For the Transportation Research Board, he serves as the Principal Research for ACRP 10-31 *Remote Ramp Control Facilities*. He previously served as Co-Principal Investigator on Airport Cooperative Research Program (ACRP) 03-33, *NextGen—Airport Planning and Development*, and ACRP 03-34, *NextGen—Understanding the Airport's Role in Performance-Based Navigation*. He also served as a researcher for ACRP Project 07-18: *Large UAS Impacts on Airfield Design*, ACRP Report 38, *Understanding Airspace, Objects, and Their Effects on Airports*.

Mr. Varani currently serves as the Chairman of the NextGen and Airspace Working Group for the American Association of Airport Executives. He was a member of the FAA Terminal Area Operations Aviation Rulemaking Committee and the Performance-Based Aircraft Aviation Rulemaking Committee which were tasked with reviewing and developing operating rules and procedural criteria for the implementation of Category I/II and III NextGen navigational technologies.