Draft Documentation Report

San Jose International Airport
Obstruction Clearance Study

Prepared for:
City of San Jose Airport Department

Prepared by:
Ricondo & Associates, Inc.
Jacobs Consultancy, Inc.

DRAFT
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Table of Contents

I. Introduction 1

II. Obstacle Evaluation Procedures 3

- 2.1 FAR Part 77 Evaluation 3
- 2.2 FAA Obstruction Evaluation Processing 3
- 2.3 Sources for Obstacle Data Used by FAA, Airlines or Other Mapping Companies 3
  - 2.3.1 NOAA Obstruction Chart and Aeronautical Data Sheet 3
  - 2.3.2 NACO Digital Obstacle File 4
  - 2.3.3 Miscellaneous Sources 4
- 2.4 Part 25 Evaluation 4

III. Obstacle Clearance Criteria and Surfaces 8

- 3.1 FAR Part 77 9
- 3.2 FAR Part 25 9
- 3.3 TERPS Analysis 17

IV. Height Restriction Maps 20

V. Findings and Policy Considerations 30

- 5.1 Need for Verification of Location of Planned Development 30
- 5.2 Impacts of Increasing Building Heights above the OEI Surfaces 30
- 5.3 New Aircraft Technology Not Likely to Resolve This Issue 32
- 5.4 Implications for Future Development in Downtown San Jose 32

Appendix A A-1

Appendix B B-1

Appendix C C-1

List of Tables

Table III-1: Runway Endpoint Coordinates and Elevation....8
Table III-2: DER and SER Coordinates and Elevation....9
Table III-3: Declared Distances....9
Table III-4: Airlines Serving San Jose International Airport....11
Table III-5: Airline/Aircraft/Market Scenarios for Part 25 Analysis....12
Table III-6: Critical Obstacles for One Engine Inoperative (OEI) Procedures....17
Table III-7: TERPS Obstacle Clearance Surfaces Evaluated over Downtown Study Area....19

List of Exhibits

Exhibit II-1: Obstacles in NOAA Obstruction Chart / Airport Data Sheet Within the Study Area 6

Exhibit II-2: Obstacles in the NACO Digital Obstacle File Within the Study Area............................ 7

Exhibit III-1: FAR Part 77 Imaginary Surfaces Contours and Characteristics.................................. 10

Exhibit III-2: Engine Out Departure Procedure Clearance Surfaces 14

Exhibit III-3: Methodology for Developing One Engine Inoperative (OEI) Departure Clearance Surfaces.. 15

Exhibit III-4: Identified Obstacles Within the Study Area 16

Exhibit IV-1: OEI Coverage Areas South of the Airport.. 21

Exhibit IV-2: One Engine Inoperative Composite Obstruction Clearance Surface Over the Study Area 22

Exhibit IV-3: Part 77 Composite Obstruction Clearance Surface Over the Study Area 23

Exhibit IV-4: TERPS Composite Obstruction Clearance Surface Over San Jose Downtown Area .. 24

Exhibit IV-5: Governing Obstruction Clearance Criteria Over San Jose Downtown Area................ 25

Exhibit IV-6: TERPS and One Engine Inoperative Composite Obstruction Clearance Surface Over San Jose Downtown Area 26

Exhibit IV-7: Governing Obstruction Clearance Criteria Excluding San Jose Downtown Area 27

Exhibit IV-8: Part 77 and One Engine Inoperative Composite Obstruction Clearance Surface Excluding San Jose Downtown Area.. 28

Exhibit IV-9: Composite Obstruction Clearance Surfaces Over the Study Area 29

Exhibit V-1: Comparison of Types of OEI Surfaces 33

Exhibit V-2: Comparison of TERPS vs. OEI Areas of Influence With Noise Contours.................... 34

Exhibit V-3: Elevation Differences Between TERPS and OEI Surfaces 35

I. Introduction

Unobstructed airspace is a critical factor in determining the air service capability of an airport. Obstructions in the form of tall structures, towers, or terrain dictate the ability to operate to and from the runways at an airport and the markets that can be served from it nonstop. Obstructions or intrusions by new structures into airspace needed for aircraft safety erode the types of air service that can be provided to the airport. Once this critical airspace is lost, air service is lost. Airspace protection around the Norman Y. Mineta - San Jose International Airport (SJC) has recently become a concern as additional high-rise development in downtown San Jose is encouraged and implemented.

In January 2006, the consultant team of Ricondo & Associates, Inc. and Leigh Fisher Associates (now Jacobs Consultancy, Inc.) was retained by the City of San Jose to prepare an Airport Obstruction Study to assist the City in its interest to minimize potential compatibility problems between its goals for both downtown high-rise building development and the growth and development of the airport. The primary objective of the study has been to prepare a database of obstacle clearance surfaces within a 3-mile radius of SJC in order to identify potential building height limits of new development, particularly in downtown San Jose, to protect the local airspace around the Airport. This report presents the consolidated documentation specified in the study workscope.

This study examined three sets of obstacle clearance surfaces (OCSs) in the airspace surrounding the Airport:

- **"Part 77" surfaces –** Civil airport imaginary surfaces, as described in Part 77 of the Code of Federal Regulations, Title 14, *Objects Affecting Navigable Airspace*;
- **"OEI" surfaces –** One-engine inoperative (OEI) aircraft climb gradient surfaces, associated with aircraft certification criteria described in Part 25 of the Code of Federal Regulations, Title 14; and,
- **"TERPS" surfaces –** Obstacle clearance surfaces described in FAA Order 8260.3B, *United States Standard for Terminal Instrument Procedures*.

The Part 77 and OEI surfaces were evaluated for the study area, defined as a three-mile radius around the Airport. The TERPS surfaces were evaluated just for the Downtown San Jose sub-area, as defined by City staff.

The criteria and methods used for developing the OCS in this report are based on the following regulatory documents, along with documentation provided by individual airlines regarding their procedures:

- Federal Aviation Regulations (FAR) Part 77
- FAA Advisory Circular (AC) 120-91, *Airport Obstacle Analysis*
- ICAO Annex 6 to the Convention on International Civil Aviation, *Operation of Aircraft*, Eighth Edition
- FAA Order 8260.3B, *United States Standard for Terminal Instrument Procedures (TERPS)*, Change 19, and supporting TERPS criteria
- TERPS instruction letters (TILs)

- FAA Order 8260.38A Change 1, *Civil Utilization of Global Positioning System (GPS)*
- FAA AFS-420 directives
- FAA Order 7400.2E, *Procedures for Handling Airspace Matters*

II. Obstacle Evaluation Procedures

This section identifies and documents the obstacle evaluation procedures used by the FAA and the airlines to comply with the regulations listed in Section I. It also identifies data sources that are used as part of the evaluation and how these sources are maintained and updated.

2.1 FAR Part 77 Evaluation

The US Code of Federal Regulations (CFR), Title 14 – Federal Aviation Regulations (FAR), Part 77 – *Objects Affecting Navigable Airspace* establishes standards and notification requirements for objects affecting navigable airspace. The functions of FAR Part 77 include:

- Identifying structures around airports that may affect operating procedures;
- Determining the need for an FAA Aeronautical Study;
- Charting new man-made or natural objects; and,
- Identifying mitigating measures such as marking and lighting to enhance the safety of air navigation.

2.2 FAA Obstruction Evaluation Processing

The Obstruction Evaluation / Airport Airspace Analysis (OE/AAA) process is carried out by the FAA to evaluate proposed obstructions that may affect navigable airspace. For all structures outside the airport boundary, the OE process is administered by FAA's Obstruction Evaluation Service (OES), part of the Air Traffic Division, with the coordinated assistance of the Flight Procedures Office, Airway Facilities Division and Airports Divisions. Proposals for structures on airport property are evaluated in the airport airspace analysis process by the Airports Division, with assistance from Flight Procedures Office, Airway Facilities Division and Air Traffic (AT) Division. See **Appendix C** for a description of the various steps involved in conducting an OE for proposed construction or alteration that is outside airport boundaries.

2.3 Sources for Obstacle Data Used by FAA, Airlines or Other Mapping Companies

A number of sources for obstacle data are used by different parties, as described in this section.

2.3.1 NOAA Obstruction Chart and Aeronautical Data Sheet

The US Department of Commerce, National Oceanic and Atmospheric Administration (NOAA) is contracted by the FAA to update official airport obstruction charts (OC) and accompanying aeronautical data sheets (ADS). Based on field surveys, and prior versions of the OC/ADS, the latest version of an OC/ADS includes geographic coordinates (latitude / longitude) and elevations for runway endpoints, runway thresholds, runway high points and intersections, NAVAIDS, objects and terrain found to penetrate FAR Part 77 imaginary surfaces, and other notable objects and terrain.

The OC/ADS for each airport is updated approximately every 5 to 10 years. The frequency of updates depends on a variety of factors, including changes to runway configurations, additions of significant obstacles, and other changes to an airport's environment or airspace. The OC/ADS is a "snapshot in time" representing the day the airport was surveyed by NOAA; therefore the data can become less accurate over time, especially with impermanent objects such as construction cranes and telephone poles, and with trees and other vegetation that may grow taller, or may be pruned or removed.

The NOAA OC/ADS serves as FAA's base source of runway coordinate data; and can also be utilized by airlines, airports, and other vendors or consultants for use in obstacle evaluation, flight procedure design, general airport planning work, and related endeavors.

For further information, see http://www.ngs.noaa.gov/AERO/aero.html

Exhibit II-1 shows the various obstacles listed on the OC/ADS within the study area.

2.3.2 NACO Digital Obstacle File

The National Aeronautical Charting Office (NACO) is part of the Aviation System Standards Division of the FAA. NACO creates, maintains, and publishes various types of aeronautical charts, including the Digital Obstacle File (DOF). The DOF is a repository for obstacle data from the OE/AAA process and other sources. Obstacle data from the OE/AAA process includes DNH data for proposed / approved structures that results from filing a Form 7460-1, *Notice of Proposed Construction or Alteration*, and data for finished structures from Form 7460-2, *Notice of Actual Construction*. The FAA Obstacle Evaluation team within the Air Traffic Division tracks both Forms 7460-1 and 7460-2. NACO obtains obstacle information from the AT database and adds it to the DOF, which contains information only on man-made obstacles.

The DOF can be used by the FAA for obstacle evaluation and flight procedure design, and can be purchased from NACO by airlines, airports, and other vendors or consultants for use in obstacle evaluation, flight procedure design, general airport planning work, and related endeavors. Because the DOF is updated more frequently than the OC/ADS, it can contain more up-to-date information on newly approved or constructed obstacles than the OC/ADS. However, because it is not based on periodic field surveys, the DOF can contain obstacles that have been removed, or were approved by FAA but never built, or were reviewed by FAA at a certain height / location but constructed at a different height / location.

For further information, see http://naco.faa.gov

Exhibit II-2 shows the various obstacles listed on the DOF within the study area.

2.3.3 Miscellaneous Sources

Different airlines, flight procedure designers, or planning / engineering companies use various other sources of obstacle data to complement their OC/ADS and DOF data. These sources include independently-commissioned professional field surveys, georegistered / orthorectified aerial photography, digital terrain models, and military data; as well as Internet sources that are increasingly prevalent, but may lack the necessary level of accuracy for aeronautical study, such as Google Earth and Microsoft's similar "live.com" globe model.

2.4 Part 25 Evaluation

Separate from federal regulations governing notification and review of potential airspace obstructions, the FAA requires each airline to develop one-engine inoperative (OEI) emergency procedures for each aircraft type operating from each runway at each airport under FAR Part 25, *Airworthiness Standards: Transport Category Airplanes*. These procedures, which must be reviewed and approved by the FAA, provide safe flight paths for an aircraft in the event of a total loss of power to one engine during a takeoff procedure. The procedures are based on the most constraining factors of aircraft performance with a single engine for the specific runway, including maximum takeoff weight (composed of airframe weight, fuel, passengers, baggage, and cargo), air temperature and pressure, wind, terrain, and obstacles. The procedures are designed such that the aircraft would gain some altitude, and follow a simple flight path over the lowest terrain and obstacles that would eventually allow a return to the nearest airport.

Because of differences in aircraft types, engine types installed on each aircraft, and other factors, each airline's OEI procedures are somewhat different. The FAA does not recognize individual airline OEI procedures as a factor in the FAA airspace obstruction determinations. The OEI procedures could be adjusted by changing designated flight path, and / or the aircraft could be further weight-restricted to improve climb performance such that they would clear the new obstacles. Adjustments to OEI procedures may cause a negative financial impact to the airline, sometimes such that certain markets served become physically impossible or economically infeasible, and service to those markets can be cancelled.

The airspace protection surfaces considered for OEI procedures are, in many cases, lower than the airspace protection surfaces used by the FAA in its airspace obstruction evaluations of tall structures. Therefore, it is possible for a building to be considered not to be a hazard to air navigation by the FAA but limit an airline's ability to serve a market without unloading passengers and cargo (i.e., weight penalties, loss of airline revenue, and lower passenger level-of-service). Given airline profit margins on flights, small weight penalties can mean the economic difference between a profit and loss on a flight. Therefore, obstructions within the surrounding airspace dictate the air service capability of each aircraft and the airport in general.

All aircraft manufacturers are required to meet FAR Part 25 aircraft certification requirements. The airplane flight manual is developed through the certification process, which specifies aircraft performance including climb rate with one engine inoperative (OEI). As part of the FARs governing commercial airline operations, the airlines are required to clear all obstacles by 35 feet vertically and 300 feet laterally should an aircraft experience the loss of an engine on takeoff. This may require the development of specific flight procedures to avoid obstructions, or restrict aircraft departure weight to enable a sufficient climb rate.

FAR Part 25 aircraft certification requirements specify minimum climb gradient requirements that are required to be met with a loss of engine on takeoff. For example, all two engine aircraft are required to meet a 1.6% (62.5:1 slope) climb gradient with OEI on takeoff. These climb requirements are less stringent for three and four engine aircraft. Based on discussions with the airlines' aircraft performance engineering departments, it was established that OEI departure clearance surfaces start at the shorter distance of the takeoff run available (TORA), takeoff distance available (TODA) or the accelerate-stop distance available (ASDA).

Legend

- San Jose downtown area
- Street
- Interstate highway
- U.S. Route
- Highway
- Obstacle in NOAA Obstruction Chart UDDF

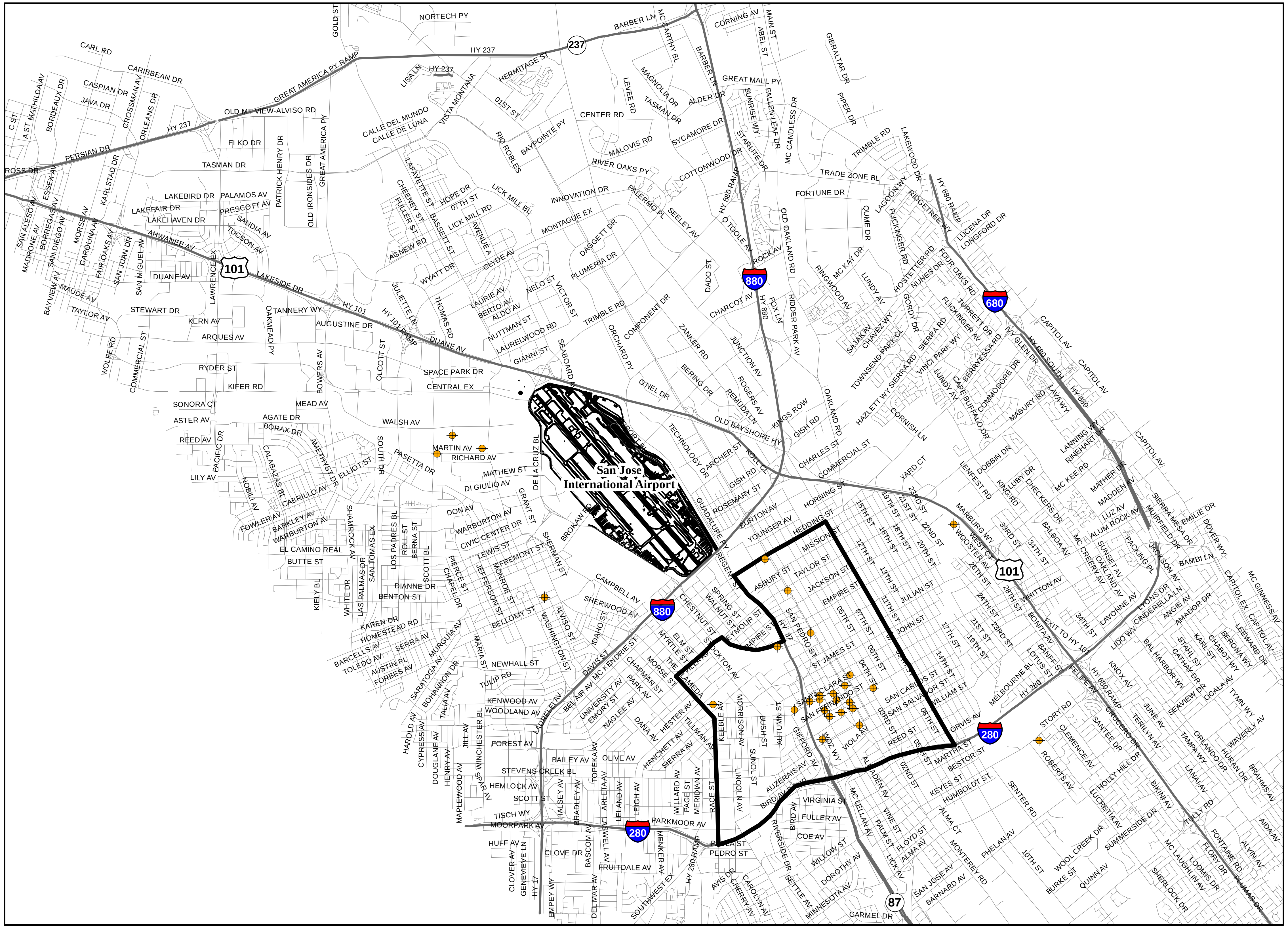
Sources: Basemap and parcel data: Santa Clara County; obstruction analysis: Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

0 1 mile

north

Exhibit II-1

Obstacles In NOAA Obstruction Chart Universal Digital Data File Within The Study Area



Legend

- San Jose downtown area
- Street
- Interstate highway
- U.S. Route
- Highway
- Obstacle in National Aeronautical Charting Office (NACO) Digital Obstacle File

Sources: Basemap and parcel data: Santa Clara County; obstruction analysis: Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

0 1 mile

north

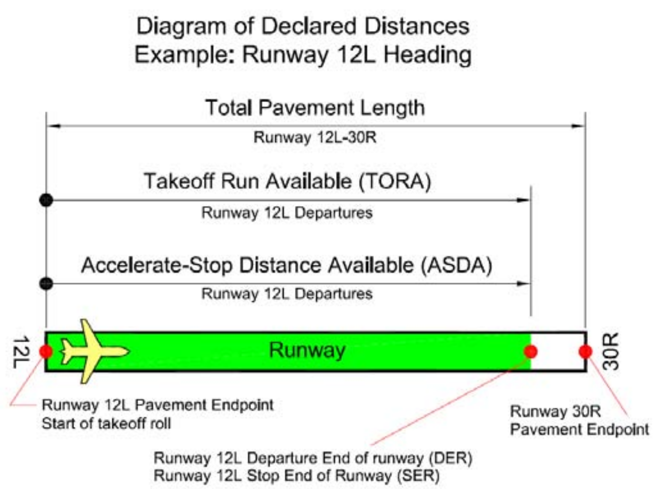
Exhibit II-2

Obstalces In NACO Digital Obstacle File Within The Study Area

III. Obstacle Clearance Criteria and Surfaces

To develop the obstacle clearance surfaces in the vicinity of the Airport, relevant data were obtained from published sources including Airport Layout Plan, Obstruction Chart and Airport Facilities Directory and reviewed for inconsistencies. These data were then confirmed by field surveys conducted by City staff in February 2006, followed by additional survey information provided by the Airport in July 2006. **Table III-1** contains runway pavement endpoint location and elevations that were used for this analysis. **Table III-2** presents the location and elevation of the endpoints of takeoff run available (TORA) and accelerate-stop distance available (ASDA) used to construct certain obstacle clearance surfaces. The endpoint of TORA, known as the Departure End of Runway (DER), is the point on a departure procedure where an aircraft must become airborne. The endpoint of ASDA, known as the Stop End of Runway (SER), is the point on an aborted departure procedure where a braking aircraft must come to a halt. At SJC, the DER and SER for each runway heading are coincident.

TORA and ASDA are two types of "declared distances", meaning portions of the runway length, less than the total pavement endpoint-to-endpoint length of the runway, that are declared available for certain procedures (see diagram). **Table III-3** contains the published declared distances for SJC.



Jacobs Consultancy Inc.

Table III-1

Runway Pavement Endpoint Coordinates and Elevation

Runway Pavement Endpoint	Latitude	Longitude	Elevation (feet MSL)
30R	37° 21' 08.128"	121° 54' 54.911"	60.9
12L	37° 22' 29.972"	121° 56' 24.633"	37.5
30L	37° 21' 03.570"	121° 55' 01.434"	62.0
12R	37° 22' 25.416"	121° 56' 31.160"	38.0
29	37° 21' 22.994"	121° 55' 34.240"	51.4
11	37° 21' 57.209"	121° 56' 11.750"	41.5

Source: San Jose International Airport, 2007 Airport Layout Plan (ALP)
Prepared By: Ricondo & Associates, Inc., Jacobs Consultancy Inc.

Table III-2

DER and SER Coordinates and Elevation

Runway Heading	Latitude	Longitude	Elevation (feet MSL)
30R	37° 22' 23.529"	121° 56' 17.567"	37.4
12L	37° 21' 14.531"	121° 55' 01.928"	56.8
30L	37° 22' 19.103"	121° 56' 24.237"	37.7
12R	37° 21' 11.884"	121° 55' 10.546"	57.2

Note: The TORA and ASDA endpoints are collocated for Runways 12L-30R and 12R-30L. Declared distances do not apply to Runway 11-29.

Source: San Jose International Airport, 2007 Airport Layout Plan (ALP)
Prepared By: Ricondo & Associates, Inc., Jacobs Consultancy Inc.

Table III-3

Declared Distances

Runway Heading	TODA (feet)	TORA (feet)	ASDA (feet)	LDA (feet)
30R	11,000	10,134	10,134	7,587
12L	11,000	10,139	10,139	8,883
30L	11,000	10,150	10,150	7,612
12R	11,000	9,883	9,883	8,585
29	4,600	4,600	4,600	4,600
11	4,600	4,600	4,600	4,600

NOTE: TODA = takeoff distance available; TORA = takeoff run available; ASDA = accelerate-stop distance available; LDA = landing distance available

Source: San Jose International Airport, 2007 Airport Layout Plan (ALP)
Prepared By: Ricondo & Associates, Inc., Jacobs Consultancy Inc.

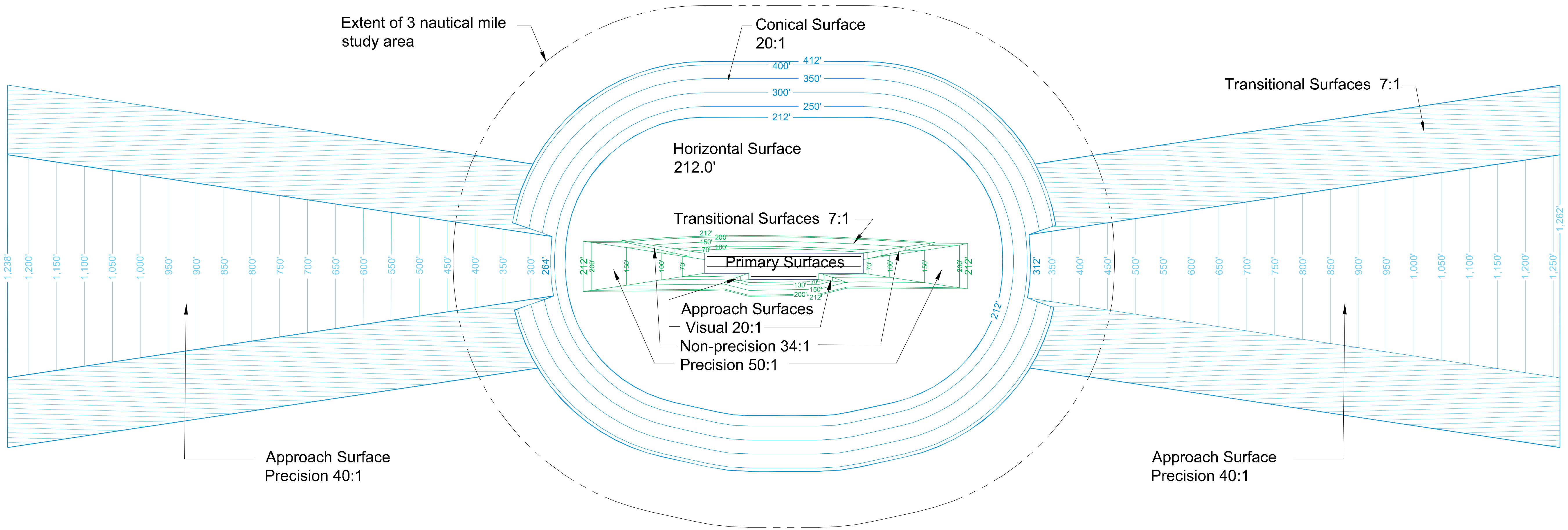
3.1 FAR Part 77

As part of this study, updated Part 77 surfaces for the Airport were drawn, shown on **Exhibit III-1**. This exhibit was prepared by drawing primary, transitional and approach surfaces for all runways and the horizontal surface and conical surfaces for the airport as defined under FAR §77.25.

3.2 FAR Part 25

As part of this study, all the airlines operating at the Airport were contacted to collect information regarding the various obstacle identification criteria used by these airlines to meet the OEI departure requirements. Information about markets that are being served as of August 2006, or were served in the past by these airlines was also obtained, and is provided in **Table III-4**.

According to the rules that govern commercial airlines, aircraft operators must be able to safely climb and avoid obstacles if an engine is lost during takeoff. In this respect, the minimum certification criteria under Part 25 for engine-out climb performance are related to aircraft operations and can directly affect the ability of an air carrier to economically serve a specific market. For simplicity in this report, the imaginary surfaces used by airlines to meet OEI departure criteria are referred to as "Part 25 surfaces."



Runway End	Elevation (MSL)	Category	Approach Slope
12L	37.5'	Non-Precision/VisMin>3/4 mile	34:1
30R	60.9'	Non-Precision/VisMin>3/4 mile	34:1
12R	38.0'	Precision	50:1, then 40:1
30L	62.0'	Precision	50:1, then 40:1
11	41.5'	Visual	20:1
29	51.4'	Visual	20:1

Source: Ricondo & Associates, Inc.; Federal Aviation Regulations Part 77; San Jose International Airport staff
Prepared By: Ricondo & Associates, Inc.

Exhibit III-1

0 8,000 feet north

FAR Part 77 Imaginary Surfaces Contours and Assumptions

P:/SJC/San Jose Airspace Analysis/Part77/SJC_P77_2d and 3d.dwg

Table III-4

Airlines Serving San Jose International Airport, August 2006

Airline	Aircraft	Airports Served
Alaska Airlines (AS)	B737-400	PDX, SEA
	B737-900	SEA
	B737-800	PDX, SEA
	MD-80	PDX, SEA
America West Airlines (HP)/	A319	PHX
US Airways (US) merged	A320	LAS, PHX
	B737-300	LAS, PHX
(Mesa Airline)	CRJ-900	LAS
(Mesa Airline)	CRJ-200	LAS
American Airlines (AA)	B777-200	NRT (discontinued in October 2006)
(American Eagle)	EMB-140	LAX, SAN, SNA
	MD-80	AUS, DFW, SNA
	MD-83	DFW, LAS, ORD
Continental Airlines (CO)	B737-300, -800	IAH
	B737-800	EWR
Delta Airlines (DL)	B737-800	ATL, SLC
	B757-200	ATL
(Skywest Airline)	CRJ-200	SLC
FedEx	DC-10-10	MEM
	DC-10-30	MEM
Frontier Airlines (F9)	A319	DEN
	CRJ-700	DEN
Hawaiian Airlines (HA)	B767-300	HNL
Horizon Airlines (QX)	CRJ-700	PDX
	Dash8-Q400	BOI
JetBlue Airlines (B6)	A320	BOS, JFK
Mexicana Airlines (MX)	A319	MEX
	A320	GDL, MLM
Northwest Airlines (NW)	A319	MSP
	A320	MSP
Southwest Airlines	B737-300	BUR, LAS, LAX, ONT, PDX, RNO, SAN, SEA
	B737-500	PHX
	B737-700	BUR, LAS, LAX, MDW, ONT, PDX, PHX, RNO, SAN, SEA
United Airlines	A319	DEN, IAD, ORD
	A320	DEN
	B737-300	DEN
	B737-500	DEN
	B757-200	DEN, ORD
(United Express/Skywest Airline)	CRJ-200	LAX
(United Express/Skywest Airline)	EMB-120	LAX, SBA
UPS	B757-200	SDF
	B767-300	SDF
	B767-300	RFD

Airport Key:
ATL: Atlanta (Intl), GA. **AUS**: Austin (Bergstrom Intl), TX. **BOI**: Boise, ID. **BOS**: BOS-Boston (Logan Intl), MA. **BUR**: Burbank, CA. **DEN**: Denver (Intl), CO. **DFW**: Dallas/Ft. Worth (Intl), TX. **GDL**: Guadalajara, Mexico. **HNL**: Honolulu, HI. **IAD**: Washington (Dulles Intl), DC. **IAH**: Houston (G. Bush Intl), TX. **JFK**: New York (Kennedy) **LAS**: Las Vegas (McCarran Intl), NV. **LAX**: Los Angeles (Intl), CA. **MDW**: Chicago (Midway), IL. **MEM**: Memphis, TN. **MEX**: Mexico City (Juarez), Mexico. **MLM**: Morelia, Mexico. **MSP**: Minneapolis/St. Paul (Intl), MN. **NRT**: Tokyo (Narita), Japan. **ONT**-Ontario, CA. **ORD**: Chicago (O'Hare), IL. **PDX**: Portland, OR. **PHX**: Phoenix (Sky Harbor), AZ. **RFD:** Rockford, IL. **RNO**: Reno, NV. **SAN**: San Diego (Intl), CA. **SBA**: Santa Barbara, CA. **SDF**: Louisville (Standiford), KY. **SEA**: Seattle/Tacoma (Intl), WA. **SNA**: Santa Ana/Orange County (John Wayne), CA.

Source: Official Airline Guide (OAG), Airlines
Prepared By: Ricondo & Associates, Inc., Jacobs Consultancy Inc.

The following criteria are used by the airlines and are shown on **Exhibit III-2.**

1. FAA Advisory Circular (AC) 120-91, *Aircraft Obstacle Analysis*, May 5, 2006
2. ICAO Annex 6 to the Convention on International Civil Aviation, *Operation of Aircraft*, Eight Edition, July 2001.
3. Northwest Airlines flight performance group modification of AC 120-91
4. FAR Part 25 aircraft certification regulations, as encapsulated in the Airplane Flight Manual.

Airlines, within the guidance established by the FAA, have some flexibility in the design of their OEI procedures. When an airline develops an OEI procedure and it is approved by the FAA, it is used for all aircraft for that airline. At SJC, some airlines have already instituted a turning OEI procedure for departures from Runways 12L and 12R, in order to avoid high-rise downtown structures that are on the straight runway heading. This right turn is near the limit allowed by the FAA without significant additional aircraft weight and building height limitations. The right turn OEI path takes advantage of the relatively unobstructed corridor (lower structures) west of Highway 87. This procedure is used by American Airlines with its longer range flights to Tokyo (this service was discontinued in October 2006), Dallas/Fort Worth, and Chicago, as well as by Hawaiian Airlines with its flights to the Hawaiian Islands; and it would be most likely the only path available for potential future long-range destinations (i.e. Asia or Europe). The right-turn OEI procedure results in more significant height restrictions west of Highway 87, relative the downtown core.

Based on consultation with City staff, it was decided that the airline/aircraft/city service scenarios shown in **Table III-5** provide a representative sample for evaluating airspace protection requirements for future Airport growth.

Table III-5

Airline/Aircraft/Market Scenarios for Part 25 Analysis

Destination	Aircraft	Airline	Procedure over Downtown
Tokyo	B777-200	American Airlines	Turn, AC 120-91
Hong Kong	B777-200	Foreign flag carrier	Turn, ICAO
Paris	B767-300	American Airlines	Turn, AC 120-91
Boston	A320-200	JetBlue Airlines	Straight, Part 25
Washington	A320-200	United Airlines	Straight, ICAO
Detroit	A319	Northwest Airlines	Straight, airline-specific
Chicago	MD-80	American Airlines	Turn, AC 120-91
Newark	B737-300	Continental Airlines	Straight, AC 120-91
Baltimore	B737-700	Southwest Airlines	Straight, Part 25
Denver	CRJ-700	Frontier Airlines	Straight, AC 120-91

Source: City of San Jose
Prepared By: Ricondo & Associates, Inc., Jacobs Consultancy Inc.

The methodology of depicting the geometry of OEI surfaces requires accurate data not only of runway endpoints and DER/SER endpoints, but also critical obstacles – obstacles that are determining factors for the flattest achievable slope of segments of the OEI surface. In order to improve the quality of obstruction information for purposes of this study, City staff assembled the obstruction data provided in the NOAA OC/ADS and NACO DOF, which formed the baseline obstruction data, and then augmented and adjusted the data in the following manner:

1. City staff field-surveyed all existing runway pavement endpoints, thresholds, and DER/SER endpoints, including the newly extended Runway 12R-30L.
2. City staff carefully observed the areas around the airport verify the presence and approximate heights of obstacles one by one. This allowed the elimination of many trees, the crane at the Adobe Headquarters complex, and other impermanent obstacles from the NOAA OC/ADS; and the elimination of several buildings on the NACO DOF that had been removed or had never been constructed as planned.
3. City staff field-surveyed several structures that were deemed likely to constitute a critical obstacle for one or more OEI procedures.
4. A professional field survey of the Adobe Headquarters complex, including parapets, mechanical screens, and antennas, was conducted as part of another study in 2005, and was shared with the Airport and several airlines.

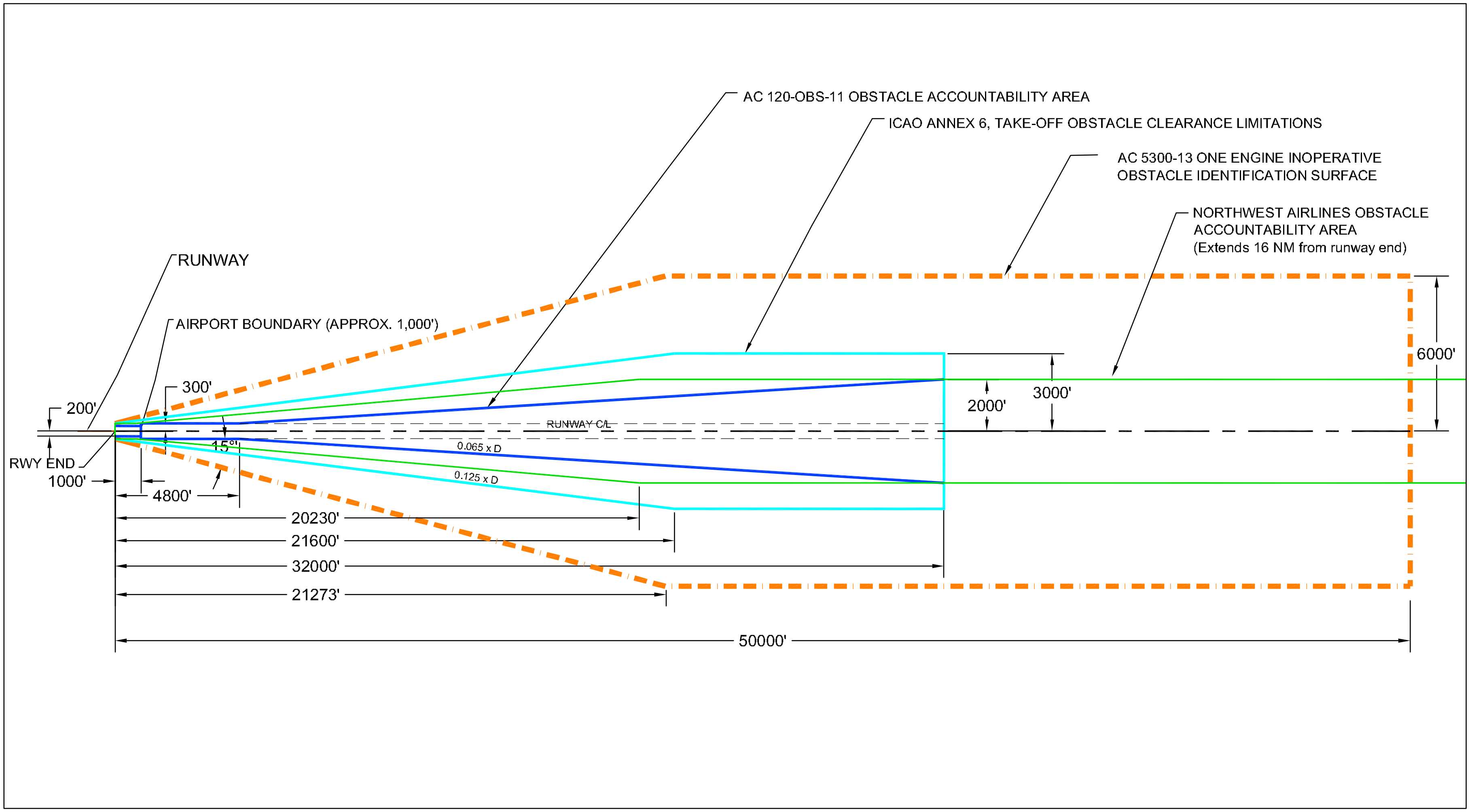
Some of the adjustments that were made are as follows:

1. A 290 feet MSL Building in the NACO database (Latitude: 37°20’15”, Longitude: 121°53’54”) does not exist. This point is a Route 87 freeway on-ramp from Julian St. There is no structure close to that elevation anywhere in the immediate vicinity of that point.
2. A 366 feet MSL OL on Building in OC database (Latitude: 37°19’50”, Longitude: 121°53’18.8”) is the same point as the Marriott Hotel on City building list with a 359 ft elevation, which was specifically surveyed and was retained for the analysis.
3. A 255 feet MSL Tank in the NACO database (Latitude: 37°20’2”, Longitude: 121°54’8”) does not exist. This point is in the parking lot of the San Jose Arena. Perhaps a tank structure was once located on site and removed when arena was constructed circa 1990.
4. A 329 feet MSL Building in the NACO database (Latitude: 37°20’14”, Longitude: 121°53’39”) is at least 50 feet too high. SJC has no data on this supposed obstruction, but field check indicates existing building is less than 200' AGL (with a ground elevation of approx. 85'). Building also appears shadowed by City Heights on City building list (NW of this point @ 250' feet AMSL).
5. The 83 feet MSL VOR/DME in OC database (Latitude: 37°22’29”, Longitude: 121°56’40.8”) is also almost 30 feet too high. SJC ALP identifies facility as 54 feet AMSL.
6. A 347 feet MSL Building in the NACO database (Latitude: 37°19’50”, Longitude: 121°53’34”) does not exist. This is the incorrect 7460 point submitted to FAA for all three Adobe buildings.

Appendix A contains the consolidated tabulations of the obstacles identified for each runway heading.

After identification of all the obstacles within the selected OEI obstacle identification criteria, the OEI departure clearance surfaces were developed taking into account all the existing obstacles and using the methodology shown in **Exhibit III-3. Table III-7** lists all the obstacles that were identified as critical obstacles for the OEI departure clearance surfaces.

Exhibit III-4 depicts the critical obstacles, as well as identifying obstacles in the study area by source.



Source: FAA, ICAO, Northwest Airlines
Prepared by: Ricondo & Associates, Inc.

Exhibit III-2

0 6,000 feet

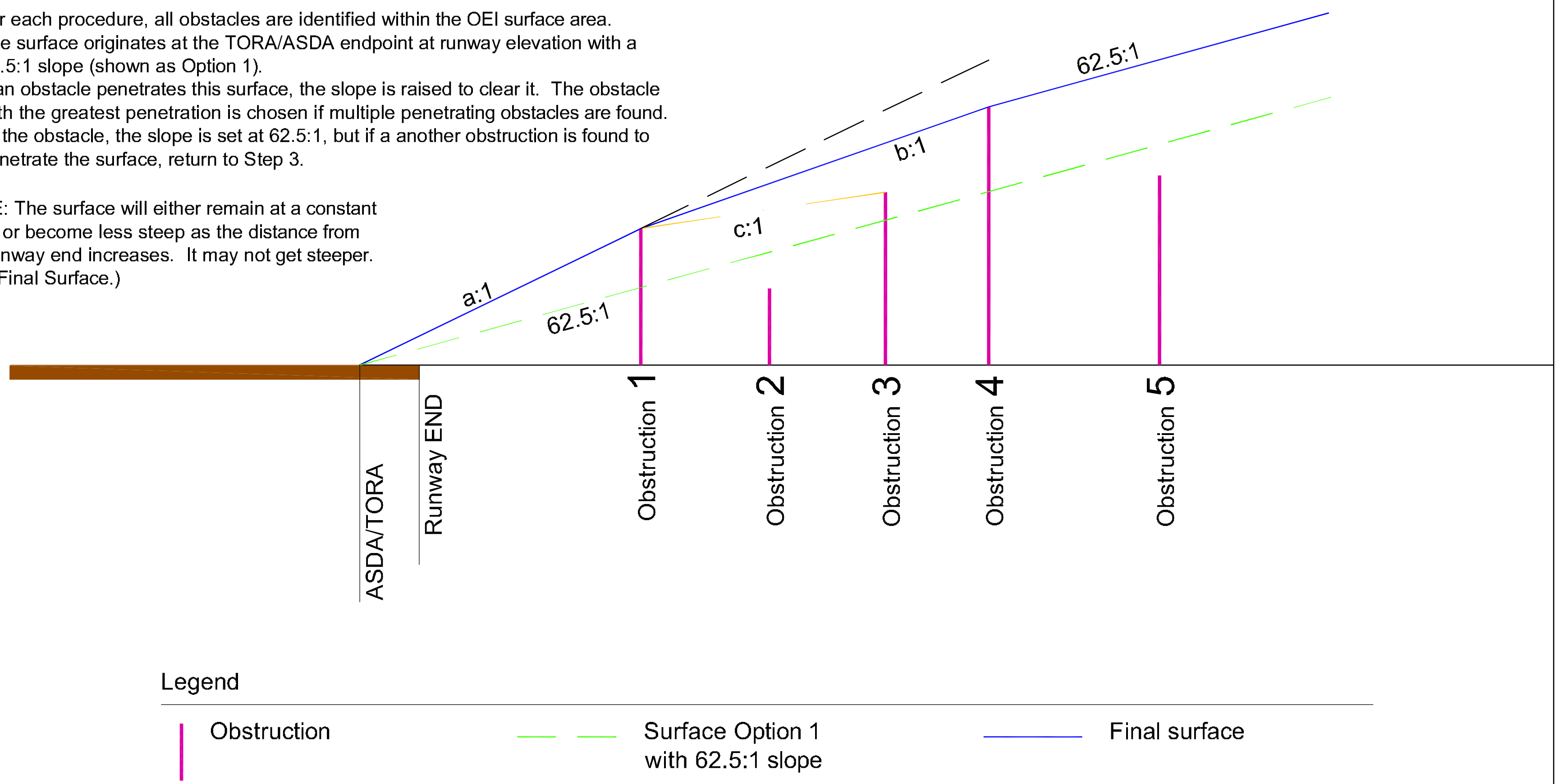
Engine Out Departure Procedure Clearance Surfaces

N:\SJC\Engine Out\Report\Draft Report\Exhibits\Exhibit III-2.dwg

Methodology Summary

1. For each procedure, all obstacles are identified within the OEI surface area.
2. The surface originates at the TORA/ASDA endpoint at runway elevation with a 62.5:1 slope (shown as Option 1).
3. If an obstacle penetrates this surface, the slope is raised to clear it. The obstacle with the greatest penetration is chosen if multiple penetrating obstacles are found.
4. At the obstacle, the slope is set at 62.5:1, but if a another obstruction is found to penetrate the surface, return to Step 3.

NOTE: The surface will either remain at a constant slope or become less steep as the distance from the runway end increases. It may not get steeper. (See Final Surface.)



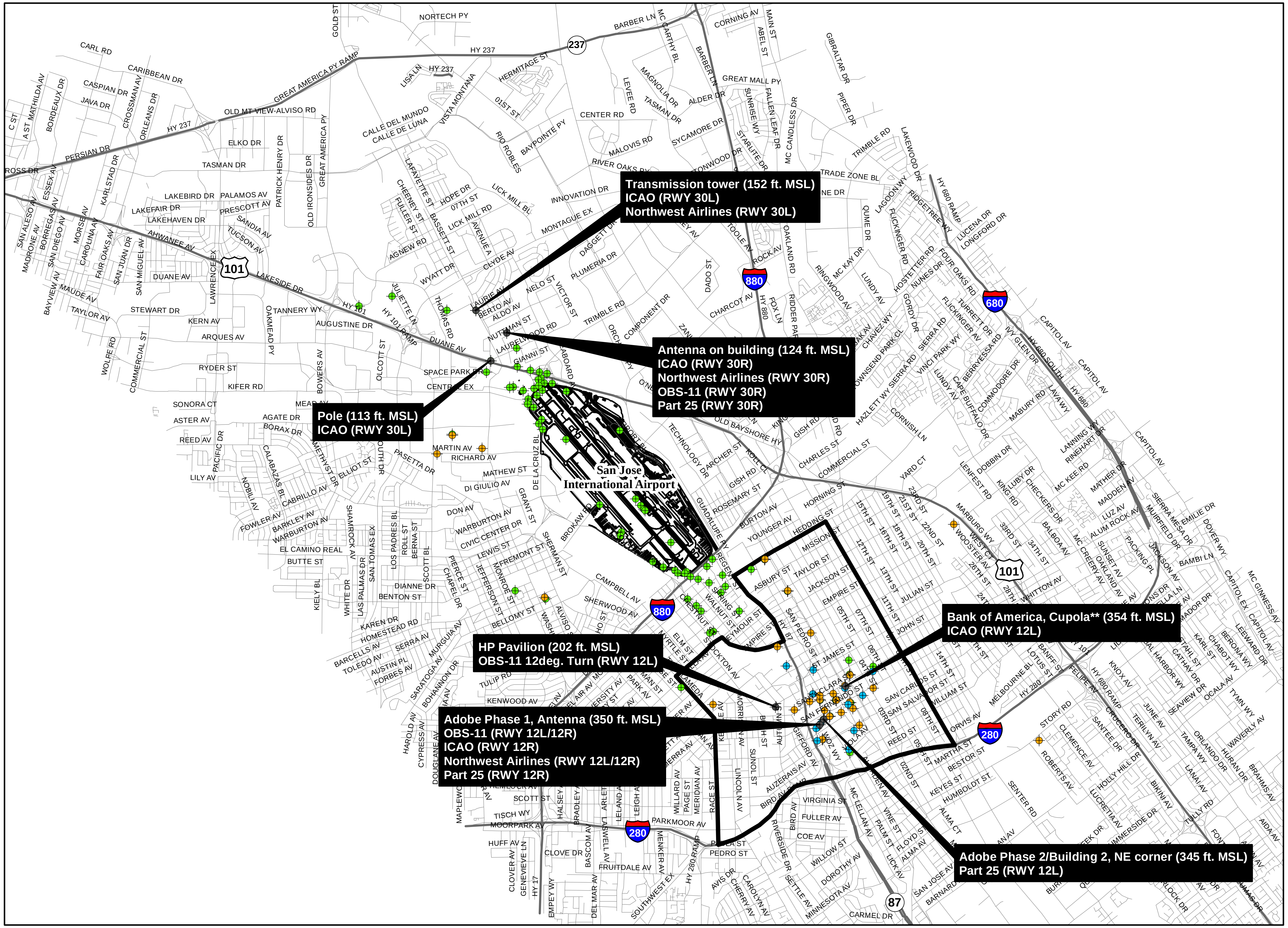
Sources: Ricondo & Associates, Inc. and Jacobs Consultancy, Inc.
Prepared by: Ricondo & Associates, Inc.

Exhibit III-3

0 1,000 feet

Methodology for Developing One Engine Inoperative (OEI) Departure Clearance Surfaces

N:\SJC\Engine Out\Report\Draft Report\Exhibits\Exhibit III-3.dwg



Legend

- San Jose downtown area
- Street
- Interstate highway
- U.S. Route
- Highway
- Critical obstacle
- Obstacle in National Aeronautical Charting Office (NACO) Digital Obstacle File
- Obstacle in NOAA Obstruction Chart UDDF
- Obstacle documented by the City of San José

** Note: The center point of the cupola lies outside of the Runway 12L ICAO one engine inoperable surface. However, a portion of the building/cupola lies within this surface and is therefore listed as a critical obstacle.

Sources: Basemap and parcel data: Santa Clara County; obstruction analysis: Jacobs Consultancy and Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

Exhibit III-4

0 1 mile

north

Identified Obstacles Within The Study Area

Table III-6

Critical Obstacles for One Engine Inoperative (OEI) Procedures

Critical Obstacle	Elevation (ft. MSL)	Latitude	Longitude	OEI Surfaces
South of Airport				
Bank of America, Cupola	354	37° 20' 09.62"	121° 53' 24.61"	12L (ICAO)
Adobe Phase 1, Antenna	350	37° 19' 50.95"	121° 53' 39.61"	12L (AC-120-91, NW) 12R (ICAO, NW, AC-120-91, Part 25)
Adobe Phase 2, NE corner	345	37° 19' 53.65"	121° 53' 37.34"	12L (Part 25)
HP Pavilion, center roof peak	208	37° 19' 57.9	121° 54' 04.4"	12L (AC-120-91 12 degree turn)
North of Airport				
Pole	113	37° 22' 43.00"	121° 57' 00.50"	30L (ICAO)
Antenna	124	37° 22' 56.40"	121° 56' 51.20"	30R (ICAO, NW, AC-120-91, Part 25)
Transmission Tower	152	37°23' 06.90"	121° 57' 10.00"	30L (ICAO, NW, AC-120-91)

Sources: Norma Y. Mineta San Jose International Airport Staff, Ricondo & Associates, Inc. and Jacobs Consultancy, Inc.
Prepared by: Ricondo & Associates, Inc., Jacobs Consultancy Inc.

3.3 TERPS Analysis

This section details the process by which the TERPS obstacle clearance surfaces (OCS) that can affect height restrictions over the Downtown San Jose sub-area were developed. **Table III-7** lists the TERPS procedures that were considered as part of this analysis. **Appendix B** contains printouts of these published instrument flight procedures.

Published instrument flight procedures allow aircraft with instrument capabilities flying in low visibility conditions to arrive at and depart from airports with a certain margin of safety. As related to obstacles, the margin of safety between the published flight path and obstacles is known as Required Obstacle Clearance or "ROC". For ROC to be maintained, all obstacles must remain below the elevations of the OCSs as defined for each type of procedure following the criteria in FAA Order 8260.3B, Change 19, and related Orders in the 8260 series covering newer types of instrument approaches.

While FAR Part 77 surfaces are more generic, with relatively simple geometry oriented with runways and extended runway centerlines; TERPS surfaces are unique and specific to certain types of instrument procedures, are oriented with published flight paths, and have very complex geometry. TERPS surfaces can be higher or lower than FAR Part 77 surfaces at a given area. As discussed in more detail in Appendix C, the lowest TERPS surface at a given location is often the major contributing factor for maximum allowable height for an FAA Determination of No Hazard (DNH). Due to time and expense considerations for this study, TERPS surfaces were only calculated and included for the defined Downtown San Jose sub-area, in order to provide the City and potential high-rise building developers information on the maximum elevations that FAA might find to be not a hazard.

To develop TERPS OCS mapping for this study, basic geometry of each OCS was constructed. A checklist of all published instrument procedures was created, and minimum and maximum elevations over the downtown area were calculated. OCSs with minimum elevations higher than the maximum elevations of overlapping OCS were not included. Detailed geometry and elevation contours were completed for the remaining OCSs that would contribute to the composite lowest surface.

TERPS initial climb area (ICA) departure OCSs were modeled with origin points at both positions the FAA uses to evaluate obstructions: beginning at TORA endpoint (DER), and beginning at physical end of pavement. Increased climb gradient for TERPS departure OCSs were used for the area east of Highway 87, while the standard 40:1 departure OCS, protecting for the standard minimum climb gradient of 200 feet / nautical mile, was used to for the area west of Highway 87. The use of the standard minimum climb gradient west of Highway 87 takes into account the relatively low structures in that general area and the possibility that the FAA could consider a new tall structure in this area as having a cumulative impact and, therefore, a hazard to air navigation. Such determinations have been made by the FAA in similar situations at other airports.

The departure OCSs were found to be lower in all cases than the OCS protecting precision instrument landing system (ILS) final approaches. Beyond the departure OCS, the lowest applicable TERPS OCSs were those protecting non-precision final approaches, and the circling approach area as defined for both precision and non-precision approaches.

Table III-7

TERPS Obstacle Clearance Surfaces Evaluated over Downtown Study Area

Aeronautical Surface	Runway	Segment over Subject Area	Elevation over Downtown Study Area (feet AMSL)		Part of the Composite Lowest OCS
			Low	High	
Departure OCS / ROC					
IFR Standard Departure	11	ICA	215	520	YES
(DER: Runway End)	12L	ICA	105	450	YES
	12R	ICA	150	450	YES
IFR Standard Departure	12L	ICA	120	450	YES
(DER: TORA End)	12R	ICA	150	470	YES
IFR Increased Climb Gradient	11	ICA	260	650	YES
(DER: Runway End)	12L	ICA	120	590	YES
	12R	ICA	170	560	YES
IFR Increased Climb Gradient	12L	ICA	140	620	YES
(DER: TORA End)	12R	ICA	180	590	YES
Precision Instrument Approach OCS					
Instrument Landing System (ILS)	12R	MA	490	820	NO
	30L	FA	205	1,020	NO
Non-Precision Instrument Approach OCS					
Localizer-only (LOC)	12R	MA	440	780	NO
	30L	FA	390	650	YES
Area Navigation Global Positioning	11	CAA	340	380	YES
System (RNAV-GPS)	11	MA	400	725	NO
	12L	CAA	340	380	YES
	12L	MA	410	740	NO
	12R	MA	430	760	NO
	12R (LPV)	MA	640	975	NO
	29	CAA	340	380	YES
	29	FA	290	540	YES
	30L	FA	350	600	YES
	30L (LPV)	FA	140	910	NO
	30R	CAA	340	380	YES
	30R	FA	290	520	YES
VHF Omnidirectional Range (VOR)	12R	CAA	340	700	YES
	12R	MA	625	960	NO
	30L	FA	410	660	NO
	30R	FA	410	660	NO
	30R	CAA	360	380	YES
Non-directional Radio Beacon (NDB)	30L	FA	400	400	NO

Notes: **AMSL** = Above Mean Sea Level; **DER** = Departure End of Runway; **OCS** = Obstacle Clearance Surface; **ROC** = Required Obstacle Clearance; **TORA** = Takeoff Run Available; **ICA** = Initial Climb Area; **MA** = Missed Approach; **FA** = Final Approach; **CAA** = Circling Approach Area

Source: Jacobs Consultancy, Inc.
Prepared by: Ricondo & Associates, Inc.

IV. Height Restriction Maps

A function of this study is to develop a GIS tool for providing information on the height of restrictive obstacle clearance surfaces as defined by FAR Part 77, Part 25 and TERPS regulations. However it should be noted that this tool, while developed according to current FAA standards, does not substitute for a formal obstruction evaluation conducted by the FAA. Revisions to TERPS criteria are periodically issued by the FAA, and changes are made to published instrument flight procedures from time to time, which may also result in modifications to the surfaces as depicted for this study. Airlines may also change their OEI procedures as a result of an overall airline policy change or to reduce weight penalties for service to a new or existing market with a new or existing aircraft type.

3D CAD wireframe drawings for all three types of obstacles clearance surfaces were developed, and then brought into GIS by rasterization. The rasterized surfaces were then correlated with actual land parcel date obtained from Santa Clara County by using GIS mapping.

In consultation with City staff, the height restriction maps were developed differently for areas inside and outside of the Downtown San Jose sub-area. For the majority of the study area (outside the Downtown San Jose sub-area), the maps show the lowest applicable FAR Part 77 or OEI surface. Within the Downtown San Jose sub-area, the maps show the lowest applicable TERPS or OEI surface, because of the large number of existing penetrations to FAR Part 77 surfaces.

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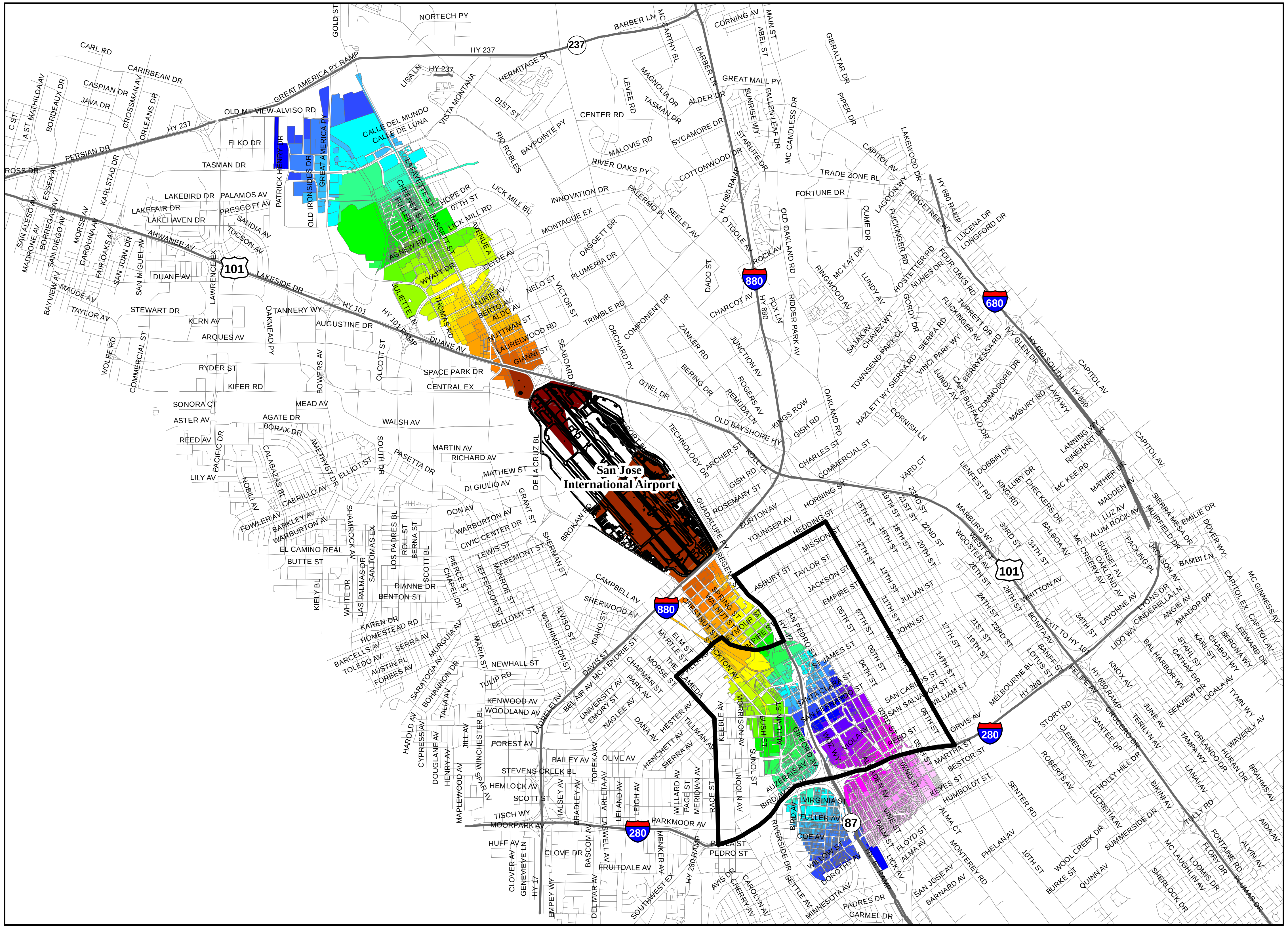
Exhibits IV-1 shows the heights of lowest OEI surfaces over the area south of the airport. **Exhibits IV-2, IV-3** and **IV-4,** respectively, show composite OEI, Part 77, and TERPS height restrictions over each parcel. **Exhibits IV-5** and **IV-6** show the height restriction and governing criteria over each parcel within the Downtown San Jose sub-area. **Exhibit IV-7** and **IV-8** show the height restriction and governing criteria over each parcel in areas outside of the Downtown San Jose sub-area. **Exhibit IV-9** shows the consolidated height restrictions over each parcel in the entire of study area.

Exhibit IV-1
OEI COVERAGE AREAS WITH ELEVATION CONTOURS
Obstruction Clearance Study
San Jose International Airport
January 2007

RICONDO & ASSOCIATES
JACOBS CONSULTANCY
Airport Management Consulting



Legend

- San Jose downtown area
- Street
- Interstate highway
- U.S. Route
- Highway

Height (in feet MSL) at which building/obstruction would penetrate one or more OEI surfaces

- 37.0 - 45.0 (minimum height = 37 ft. MSL)
- 45.1 - 60.0
- 60.1 - 75.0
- 75.1 - 90.0
- 90.1 - 105.0
- 105.1 - 120.0
- 120.1 - 135.0
- 135.1 - 150.0
- 150.1 - 165.0
- 165.1 - 180.0
- 180.1 - 195.0
- 195.1 - 210.0
- 210.1 - 225.0
- 225.1 - 240.0
- 240.1 - 255.0
- 255.1 - 270.0
- 270.1 - 285.0
- 285.1 - 300.0
- 300.1 - 315.0
- 315.1 - 330.0
- 330.1 - 345.0
- 345.1 - 360.0
- 360.1 - 375.0
- 375.1 - 390.0
- 390.1 - 405.0
- 405.1 - 420.0
- 420.1 - 435.0
- 435.1 - 450.0
- 450.1 - 465.0 (maximum height = 460 ft. MSL)

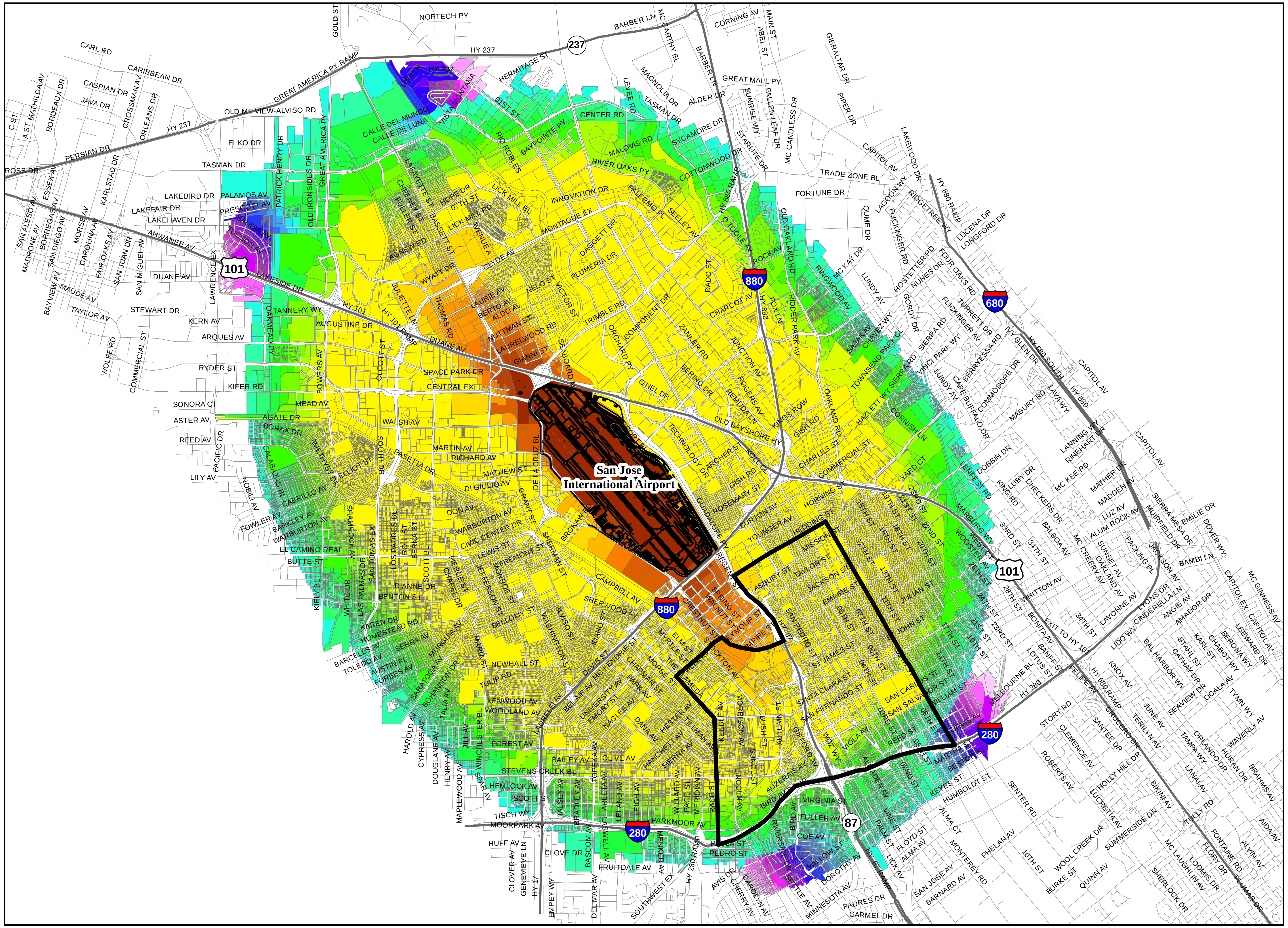
Sources: Basemap and parcel data: Santa Clara County; OEI and GIS analysis: Jacobs Consultancy and Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

0 1 mile

north

Exhibit IV-2

One Engine Inoperative Composite Obstruction Clearance Surface Over The Study Area



Legend

- San Jose downtown area
- Street
- Interstate highway
- U.S. Route
- Highway

Height (in feet MSL) at which building/obstruction would penetrate one or more Part 77 surfaces

- 25.1 - 50.0 (minimum height = 37 ft. MSL)
- 50.1 - 75.0
- 75.1 - 100.0
- 100.1 - 125.0
- 125.1 - 150.0
- 150.1 - 175.0
- 175.1 - 200.0
- 200.1 - 225.0
- 225.1 - 250.0
- 250.1 - 275.0
- 275.1 - 300.0
- 300.1 - 325.0
- 325.1 - 350.0
- 350.1 - 375.0
- 375.1 - 400.0
- 400.1 - 450.0
- 450.1 - 500.0
- 500.1 - 550.0
- 550.1 - 600.0
- 600.1 - 650.0
- 650.1 - 700.0
- 700.1 - 750.0
- 750.1 - 800.0
- 800.1 - 850.0
- 850.1 - 900.0
- 900.1 - 950.0
- 950.1 - 1000.0
- 1000.1 - 1050.0
- 1050.1 - 1100.0 (maximum height = 1,090 ft. MSL)

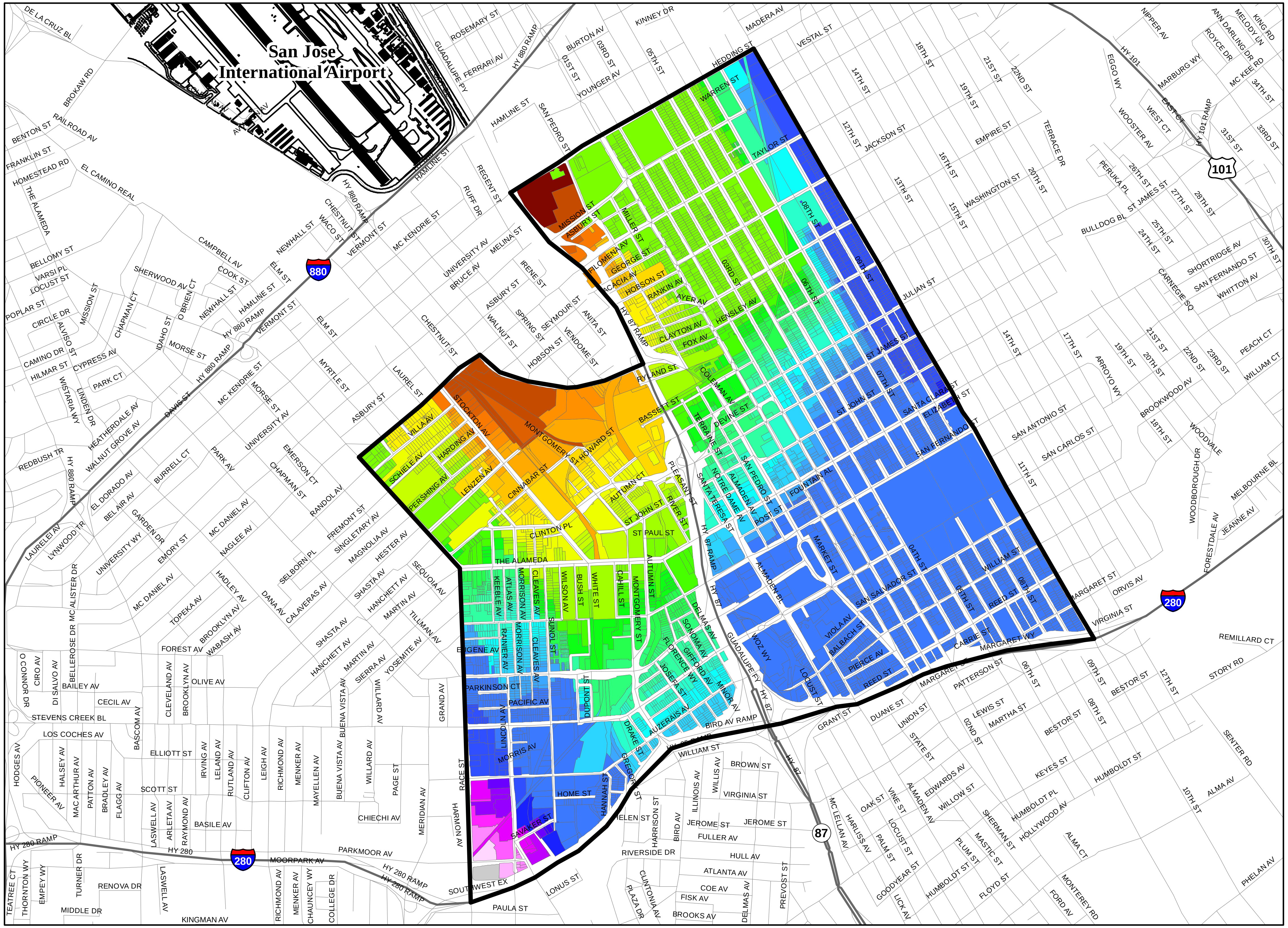
Sources: Basemap and parcel data: Santa Clara County; Part 77 and GIS analysis: Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

0 1 mile

north

Exhibit IV-3

Part 77 Composite Obstruction Clearance Surface Over The Study Area



Legend

- San Jose downtown area
- Street
- Interstate highway
- U.S. Route
- Highway

Height (in feet MSL) at which building/obstruction would penetrate one or more TERPS surfaces

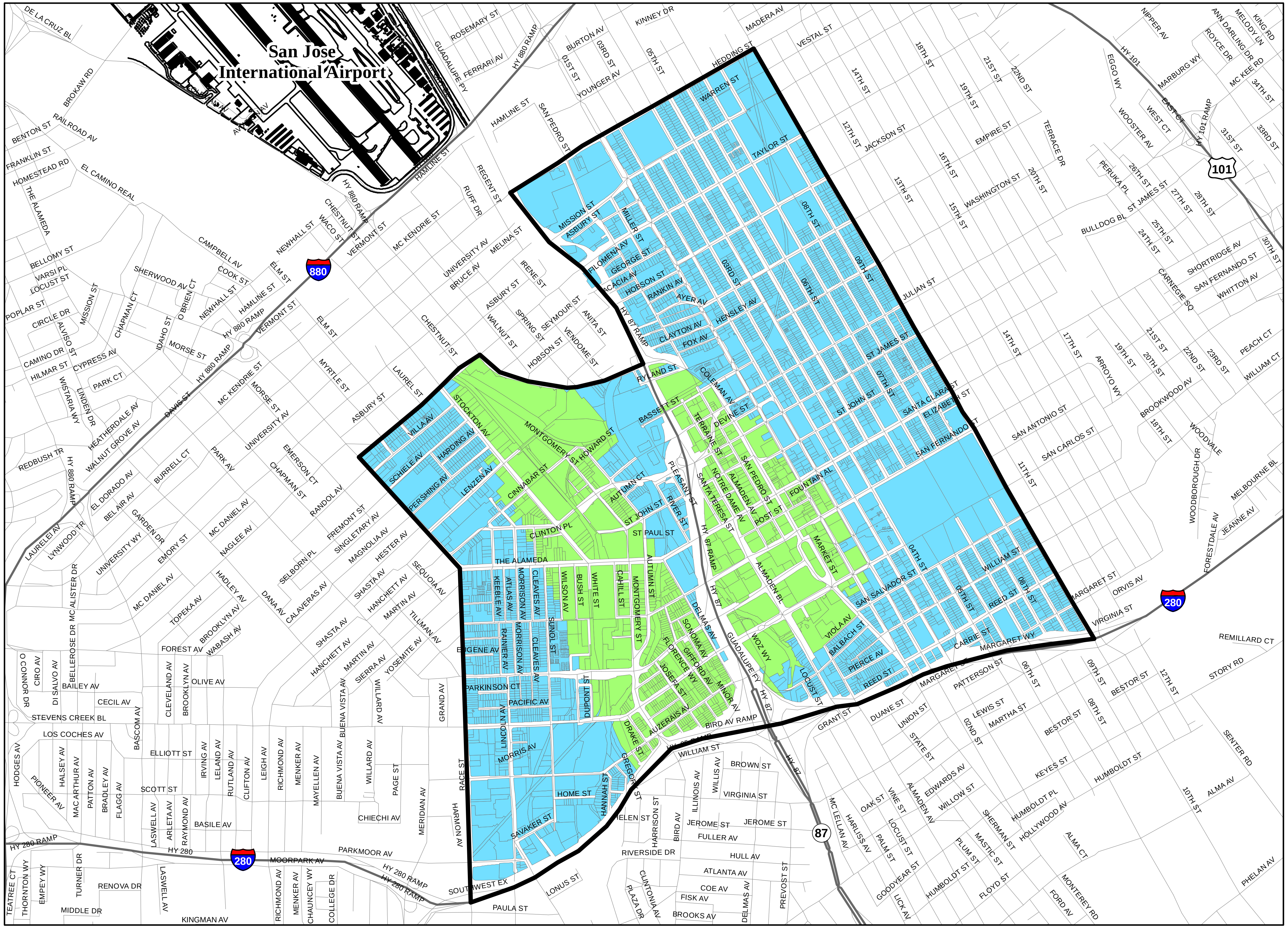
- 127.0 - 130.0 (minimum height = 127 ft. MSL)
- 130.1 - 140.0
- 140.1 - 150.0
- 150.1 - 160.0
- 160.1 - 170.0
- 170.1 - 180.0
- 180.1 - 190.0
- 190.1 - 200.0
- 200.1 - 210.0
- 210.1 - 220.0
- 220.1 - 230.0
- 230.1 - 240.0
- 240.1 - 250.0
- 250.1 - 260.0
- 260.1 - 270.0
- 270.1 - 280.0
- 280.1 - 290.0
- 290.1 - 300.0
- 300.1 - 310.0
- 310.1 - 320.0
- 320.1 - 330.0
- 330.1 - 340.0
- 340.1 - 350.0
- 350.1 - 360.0
- 360.1 - 370.0
- 370.1 - 380.0
- 380.1 - 390.0
- 390.1 - 400.0
- 400.1 - 410.0
- 410.1 - 420.0
- 420.1 - 430.0
- 430.1 - 440.0
- 440.1 - 450.0
- 450.1 - 460.0
- 460.1 - 470.0
- 470.1 - 480.0
- 480.1 - 490.0
- 490.1 - 500.0 (maximum height = 500 ft. MSL)

Sources: Basemap and parcel data: Santa Clara County; TERPS and GIS analysis: Jacobs Consultancy and Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

0 2,000 feet north

Exhibit IV-4

TERPS Composite Obstruction Clearance Surface Over San Jose Downtown Area



Legend

- San Jose downtown area
- Street
- Interstate highway
- U.S. Route
- Highway

Surface/criteria which controls height restriction over parcels

- Runway 12L & 12R One Engine Inoperative departure criteria
- TERPS surface(s)

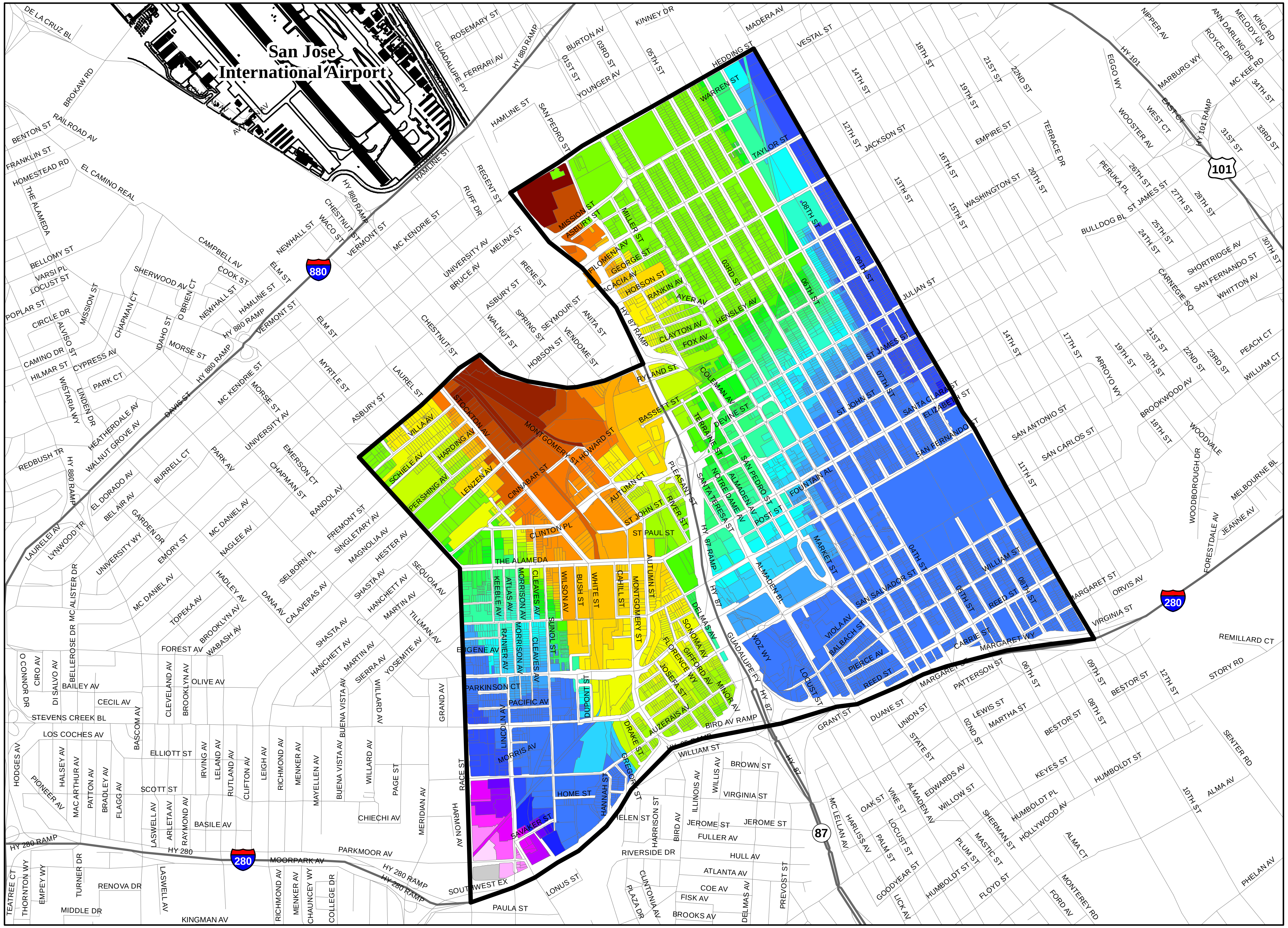
Sources: Basemap and parcel data: Santa Clara County; GIS analysis: Jacobs Consultancy and Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

0 2,000 feet

north

Exhibit IV-5

Governing Obstruction Clearance Criteria Over San Jose Downtown Area



Legend

- San Jose downtown area
- Street
- Interstate highway
- U.S. Route
- Highway

Height (in feet MSL) at which building/obstruction would penetrate one or more TERPS or OEI surfaces

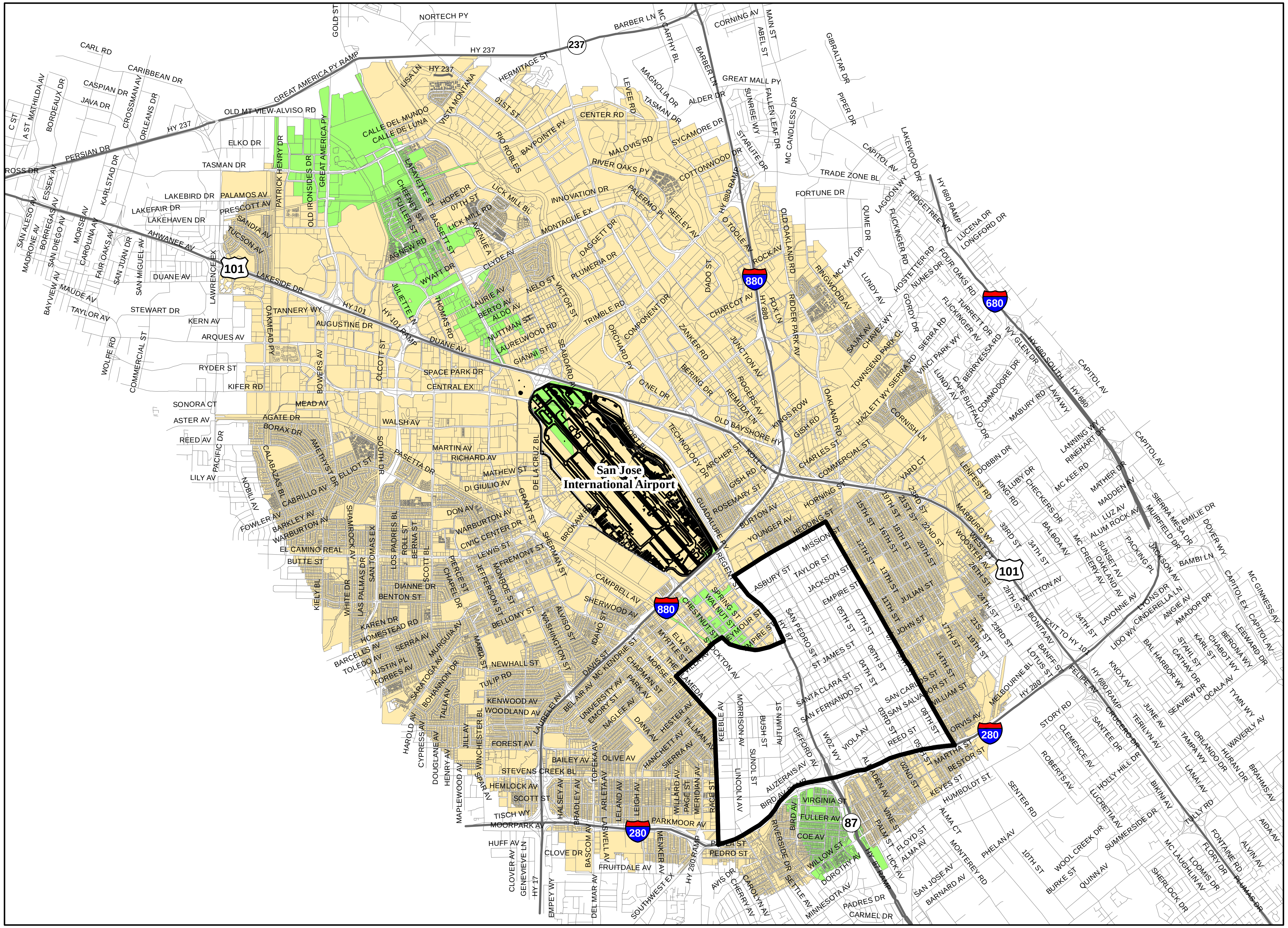
- 127.0 - 130.0 (minimum height = 127 ft. MSL)
- 130.1 - 140.0
- 140.1 - 150.0
- 150.1 - 160.0
- 160.1 - 170.0
- 170.1 - 180.0
- 180.1 - 190.0
- 190.1 - 200.0
- 200.1 - 210.0
- 210.1 - 220.0
- 220.1 - 230.0
- 230.1 - 240.0
- 240.1 - 250.0
- 250.1 - 260.0
- 260.1 - 270.0
- 270.1 - 280.0
- 280.1 - 290.0
- 290.1 - 300.0
- 300.1 - 310.0
- 310.1 - 320.0
- 320.1 - 330.0
- 330.1 - 340.0
- 340.1 - 350.0
- 350.1 - 360.0
- 360.1 - 370.0
- 370.1 - 380.0
- 380.1 - 390.0
- 390.1 - 400.0
- 400.1 - 410.0
- 410.1 - 420.0
- 420.1 - 430.0
- 430.1 - 440.0
- 440.1 - 450.0
- 450.1 - 460.0
- 460.1 - 470.0
- 470.1 - 480.0
- 480.1 - 490.0
- 490.1 - 500.0 (maximum height = 500 ft. MSL)

Sources: Basemap and parcel data: Santa Clara County; TERPS/OEI and GIS analysis: Jacobs Consultancy and Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

0 2,000 feet
north

Exhibit IV-6

TERPS and One Engine Inoperative Composite Obstruction Clearance Surface Over San Jose Downtown Area



Legend

- San Jose downtown area
- Street
- Interstate highway
- U.S. Route
- Highway

Surface/criteria which controls height restriction over parcels

- One Engine Inoperative departure criteria
- Part 77 surface(s)

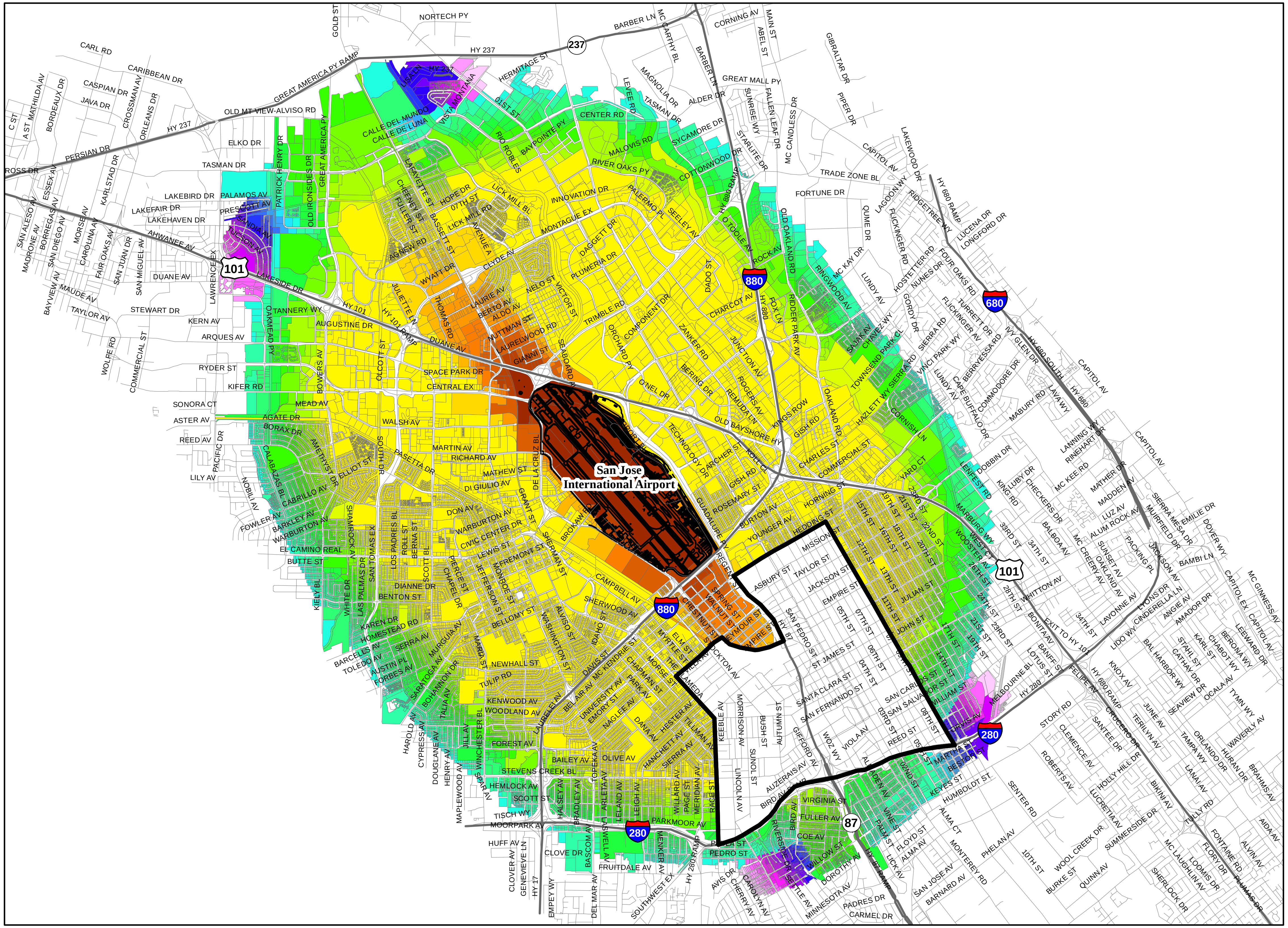
Sources: Basemap and parcel data: Santa Clara County; Part 77/OEI and GIS analysis: Jacobs Consultancy and Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

0 1 mile

north

Exhibit IV-7

Governing Obstruction Clearance Criteria Excluding San Jose Downtown Area



Legend

- San Jose downtown area
- Street
- Interstate highway
- U.S. Route
- Highway

Height (in feet MSL) at which building/obstruction would penetrate one or more Part 77 or OEI surfaces

- 25.1 - 50.0 (minimum height = 37 ft. MSL)
- 50.1 - 75.0
- 75.1 - 100.0
- 100.1 - 125.0
- 125.1 - 150.0
- 150.1 - 175.0
- 175.1 - 200.0
- 200.1 - 225.0
- 225.1 - 250.0
- 250.1 - 275.0
- 275.1 - 300.0
- 300.1 - 325.0
- 325.1 - 350.0
- 350.1 - 375.0
- 375.1 - 400.0
- 400.1 - 450.0
- 450.1 - 500.0
- 500.1 - 550.0
- 550.1 - 600.0
- 600.1 - 650.0
- 650.1 - 700.0
- 700.1 - 750.0
- 750.1 - 800.0
- 800.1 - 850.0
- 850.1 - 900.0
- 900.1 - 950.0
- 950.1 - 1000.0
- 1000.1 - 1050.0
- 1050.1 - 1100.0 (maximum height = 1,090 ft. MSL)

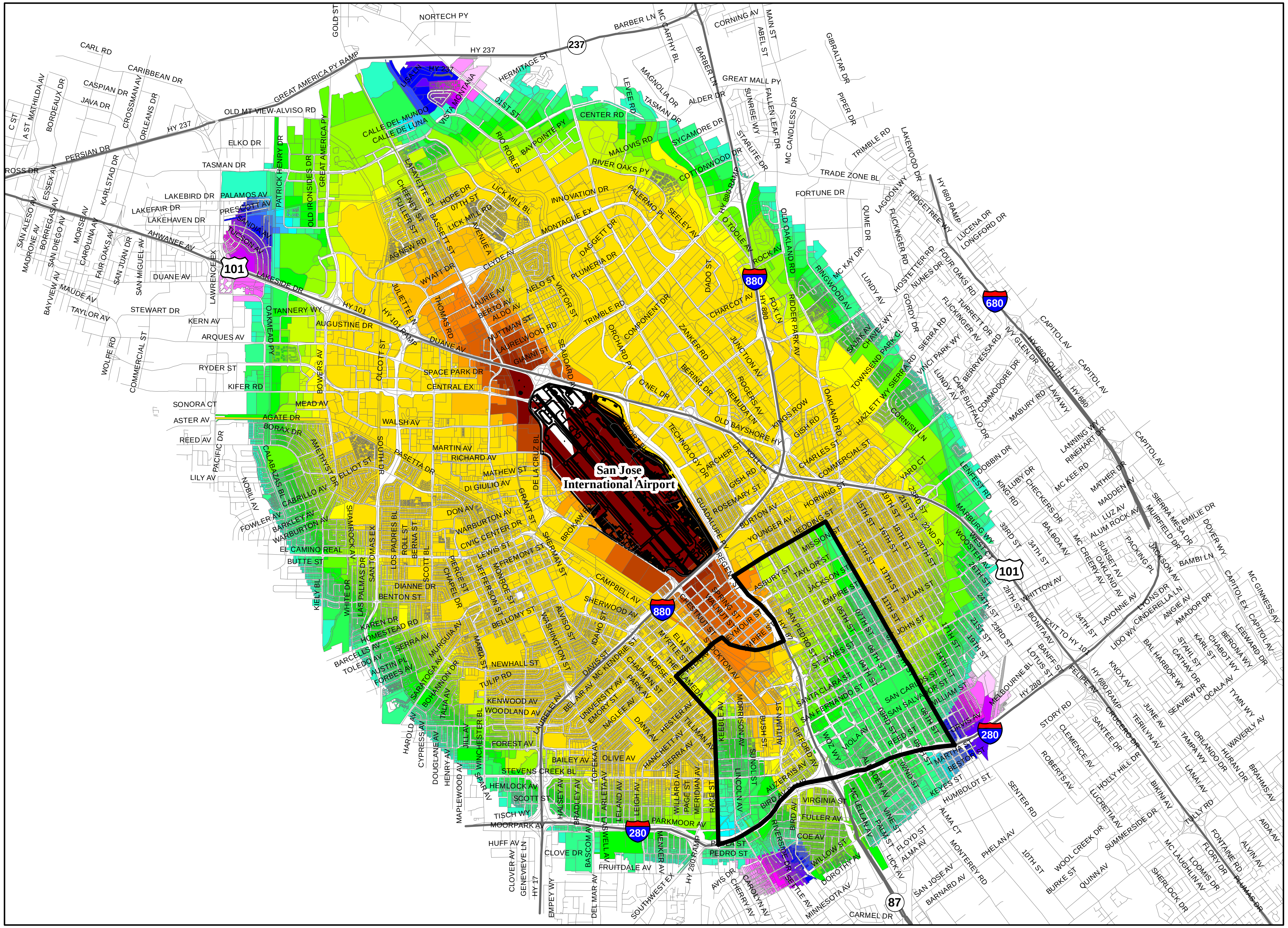
Sources: Basemap and parcel data: Santa Clara County; Part 77/OEI and GIS analysis: Jacobs Consultancy and Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

Exhibit IV-8

0 1 mile

north

Part 77 and One Engine Inoperative Composite Obstruction Clearance Surface Excluding San Jose Downtown Area



Legend

- San Jose downtown area
- Street
- Interstate highway
- U.S. Route
- Highway

Height (in feet MSL) at which building/obstruction would penetrate one or more TERPS, OEI, or Part 77 surfaces**

- 37.6 - 50.0 (minimum height = 37 ft. MSL)
- 50.1 - 75.0
- 75.1 - 100.0
- 100.1 - 125.0
- 125.1 - 150.0
- 150.1 - 175.0
- 175.1 - 200.0
- 200.1 - 225.0
- 225.1 - 250.0
- 250.1 - 275.0
- 275.1 - 300.0
- 300.1 - 325.0
- 325.1 - 350.0
- 350.1 - 375.0
- 375.1 - 400.0
- 400.1 - 450.0
- 450.1 - 500.0
- 500.1 - 550.0
- 550.1 - 600.0
- 600.1 - 650.0
- 650.1 - 700.0
- 700.1 - 750.0
- 750.1 - 800.0
- 800.1 - 850.0
- 850.1 - 900.0
- 900.1 - 950.0
- 950.1 - 1,000.0
- 1,000.1 - 1,050.0
- 1,050.1 - 1,100.0 (maximum height = 1,090 ft. MSL)

****Note: Within the downtown area, the composite surface represents the lower of OEI and TERPS. For other areas, the composite surface represents the lower of OEI and FAR Part 77.**

Sources: Basemap and parcel data: Santa Clara County; critical surfaces and GIS analysis: Jacobs Consultancy and Ricondo & Associates, Inc.
Prepared by: Ricondo & Associates, Inc.

Exhibit IV-9

0 — 1 mile
north

Composite Obstruction Clearance Surfaces Over The Study Area

V. Findings and Policy Considerations

The primary product of this study is the GIS tool that can be used by the City to evaluate proposed high-rise structures in the Airport vicinity in the early stages of planning and provide information to developers that could avoid delays and costs of redesigning of projects. The analyses conducted in this study to develop the GIS tool yield the following findings and policy considerations.

5.1 Need for Verification of Location of Planned Development

A review of the data sources for obstacles in the vicinity of the Airport has shown that much of the existing data are out of date or contain erroneous information. This study has used the best information available, including field surveys conducted by the City. The City should continue its efforts to coordinate with the FAA OES, NACO, NOAA, and the airlines to improve the accuracy and completeness of obstruction databases. Dialogue has been initiated with NACO, and many of the findings of the study have been coordinated with airlines.

As some of the problems with current obstruction data appear to be a result of poorly-prepared Form 7460-1, *Notice of Proposed Construction or Alteration* and/or Form 7460-2, submittals to the FAA, the City should consider requiring the geographic coordinates and elevation data entered on those forms to be prepared by licensed surveyors or civil engineers, with copies provided to the City as part of the project review process. Additionally, as this study discovered roof-top accessory structures on existing high-rise buildings that neither the FAA nor the City had a record of reviewing, the City should consider procedures to ensure appropriate FAA Form 7460 review and City permit review is conducted of such modifications that impact airspace.

5.2 Impacts of Increasing Building Heights above the OEI Surfaces

Airspace safety criteria such as Part 77 and TERPS are used by the FAA for obstruction evaluation determinations. Longstanding City policy has been to not permit construction of buildings that the FAA determines would be a hazard to air navigation, i.e., receipt of a DNH constituted FAA approval of the building height. However, there is a common misconception that FAA OE/AAA determinations will protect air service capability, in addition to air safety. In reality, such FAA evaluations protect only for the ability to operate an airport, not the air service that can be provided at that airport. To date, the FAA has considered protection of OEI procedures to be an economic decision to be made by the airlines, not an FAA safety consideration. Although this may change in the future, it is currently up to local land use jurisdictions to address the tradeoffs of air service capability vs. real estate development.

As part of this study, the potential effects of allowing structures in the Downtown San Jose sub-area to penetrate the Part 25 OEI surfaces and to be constructed up to the TERPS OCS were evaluated. **Table V-1** provides a summary of the impacts on various airline/aircraft/city flights currently, previously, or potentially available at SJC. These calculations represent independent aircraft performance analysis as well as input directly from the performance engineering departments at a number of the airlines.

As can be seen from the table, some flights would not experience any weight penalties while others – primarily transoceanic (European and Asian markets) - would be affected to the point where the service would not be economically feasible to provide (indicated in table as “no service capability”).

Longer-haul domestic service would also be affected, but possibly not to the point where an airline would cease service. However, depending on the profit margins on those flights, the airline may elect to cease that service and move the aircraft to a different market or replace the aircraft type used on that route with another aircraft type if one is available in their fleet.

Table V-1

Airline/Aircraft/Market Scenarios Protecting Only for TERPS – Runway 12L and 12R Departures

Destination	Aircraft	Airline	Air Service Impact	Service Status
Tokyo	B777-200	American Airlines	No service capable	Past and future
Boston	A320-200	JetBlue Airlines	10 passenger penalty	Existing
New York	A320-200	JetBlue Airlines	10 passenger penalty	Existing
Washington	A320-200	United Airlines	9 passenger and 1,240 lbs. cargo penalty	Existing
Chicago	MD-80	American Airlines	2,200 lbs. cargo penalty	Existing
Houston	B737-300	Continental Airlines	9 passenger and 1,860 lbs. cargo penalty	Existing
Atlanta	B737-800	Delta Airlines	8 passenger penalty	Existing
Honolulu	B767-300	Hawaiian Airlines	3 – 10 passenger penalty, depending on engine type	Existing
Denver	CRJ-700	Frontier Airlines	No impact	Existing
Detroit	A319	Northwest Airlines	No impact	Past and future
Baltimore	B737-700	Southwest Airlines	No impact	Past and future
Paris	B767-300	American Airlines	No service capable	Past and future
Asia	B777-200 A330-200	American Airlines and other airlines	No service capable	Future
Europe	B777-200 A330-200	American Airlines and other airlines	No service capable	Future
Louisville	B757-200	United Parcel Service	1,300 lbs. cargo	Existing
Rockford IL	B767-200	United Parcel Service	1,900 lbs. cargo	Existing

Assumptions:

1. Calculations for Runway 12L and 12R departures only, which occur 15% of the time annually on average
2. Domestic passenger with baggage weight of 228 pounds
3. International passenger with baggage weight of 248 pounds
4. Actual aircraft routing to destination airport
5. 85% reliability annual winds aloft
6. Average hot day temperature of 88F/31C for SJC , as reported by Boeing

Source: Jacobs Consultancy, Inc., Flight Engineering, Inc. and several airlines.
Prepared by: Jacobs Consultancy, Inc.

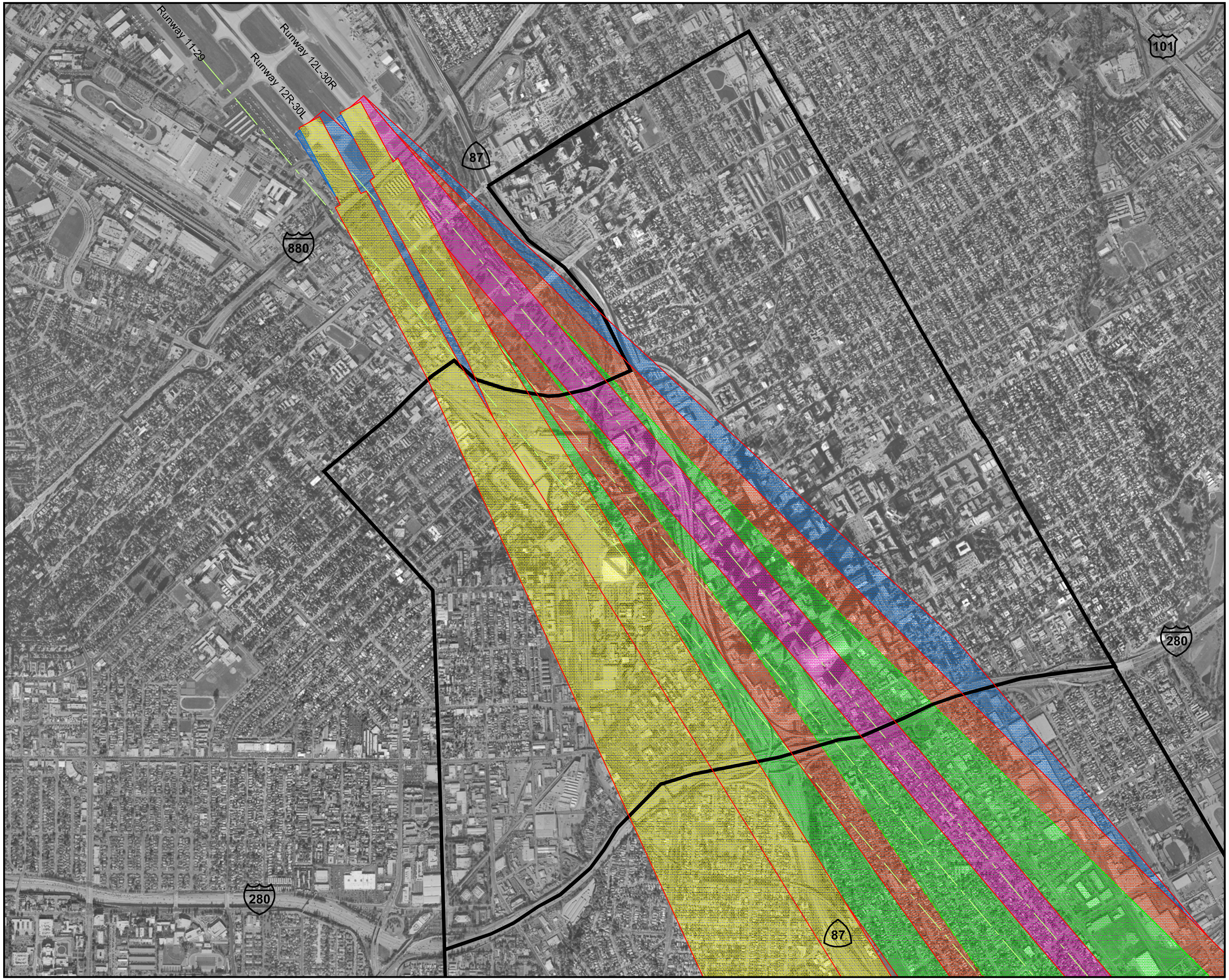
5.3 New Aircraft Technology Not Likely to Resolve This Issue

While aircraft performance has improved over the years, further technology improvements may not solve this problem. Such aircraft performance improvements have enabled two-engine to serve markets previously served only by four-engine aircraft. Also, given increases in fuel prices, aircraft manufacturers are focusing on fuel efficiency rather than takeoff performance. The aircraft most affected by these OEI issues are among the newest aircraft (such as the Boeing 777, Airbus A320 and A330) as well as some of the oldest aircraft (such as the MD-80).

5.4 Implications for Future Development in Downtown San Jose

The air service capability of the Airport is based on (1) the City's desire and ability to protect the airspace to allow air service capability to long-haul markets, and (2) the airline economics of serving markets with specific aircraft. It is important that the City have the information and tools to make informed decisions that balance the need for high rise development with the need to protect the air service capability of the Airport. The FAA, at this time, will not protect the City’s air service capability. Institution of a policy to protect the air service capability of the Airport by protecting for the Part 25 OEI surface criteria will result in some areas of the downtown that will have air service height restrictions lower than what the FAA may grant through its normal obstruction evaluation process.

At this time, this study has focused on the obstacle clearance surfaces south of the Airport in the vicinity of downtown, where high rise development is most prevalent. **Exhibit V-1** shows, within the OEI coverage area south of the Airport, which type of OEI surface governs (is lowest), and which airlines utilize each type of OEI surface. **Exhibit V-2** shows the areas of downtown for which the OEI surfaces are lower than the TERPS surfaces. **Exhibit V-3** shows the additional height restriction within these OEI areas over downtown. These additional height restrictions in downtown San Jose would range (1) up to 29 feet in the area east of Highway 87 and (2) from about 20 feet near the Airport to about 90 feet near Interstate 280 in the area west of Highway 87.



LEGEND

Extended runway centerline

Lowest OEI surfaces found in the Runway 12L / 12R departure corridor, and airlines utilizing:

FAR Part 25 OEI surfaces
jetBlue, Southwest

AC 120-91 (straight) OEI surfaces
Alaska, Continential, Delta, Horizon, Frontier, US Airways/America West

AC 120-91 (turning) OEI surfaces
American, Hawaiian

Northwest Airlines OEI surfaces
Northwest

ICAO OEI surfaces
Fed Ex, United, UPS, Mexicana

NORTH

0 800' 1600' 3200'

Exhibit V-1

COMPARISION OF TYPES OF OEI COVERAGE AREAS

Obstruction Clearance Study
San Jose International Airport
January 2007

RICONDO & ASSOCIATES

JACOBS CONSULTANCY
Airport Management Consulting

LEGEND

- Building heights limited by TERPS
- Building heights limited by One-Engine Inoperative (OEI)
- 65 dB CNEL contour for 2010 Master Plan

NORTH

0 800' 1600' 3200'

Exhibit V-2

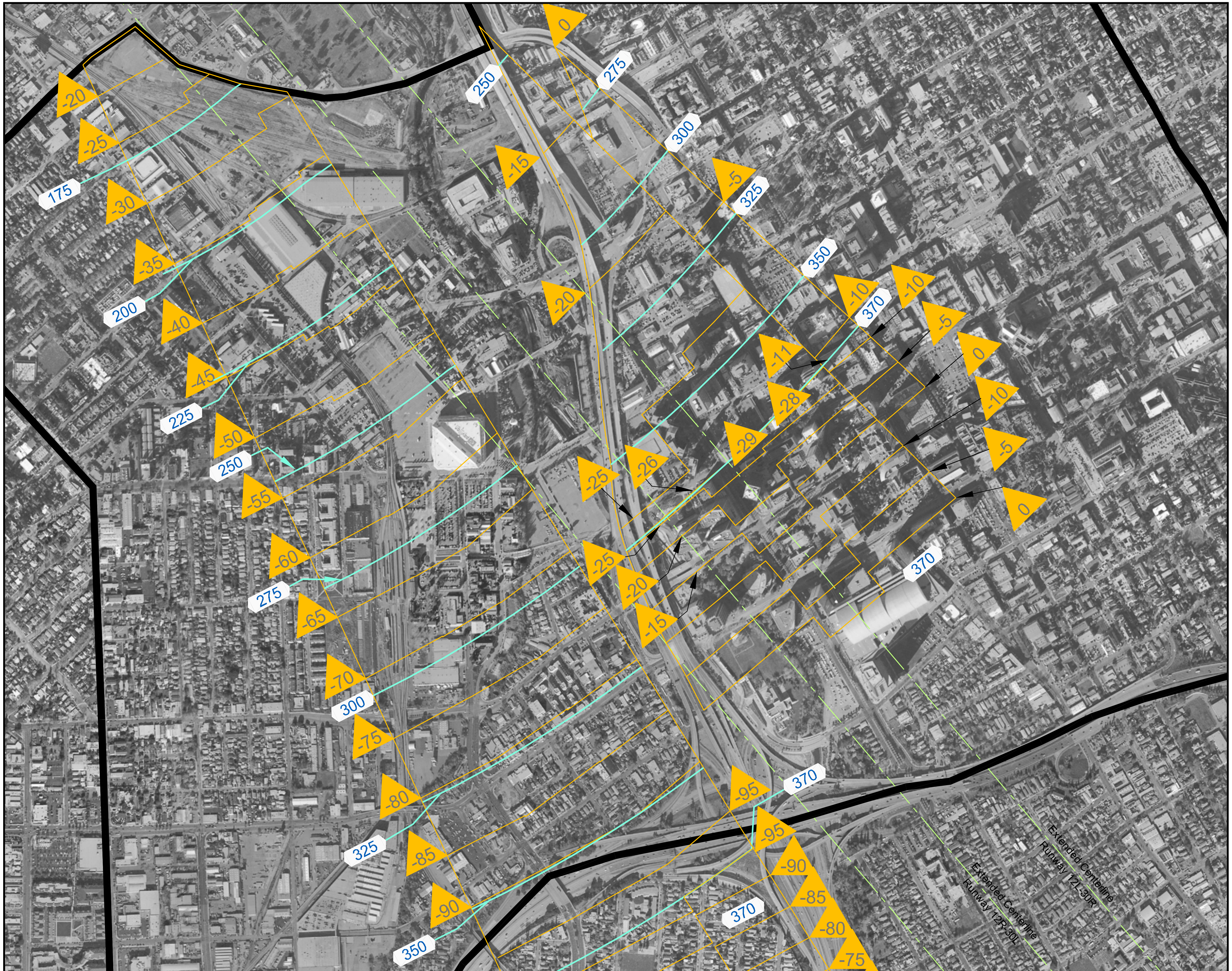
COMPARISON OF TERPS VS. OEI AREAS OF INFLUENCE WITH NOISE CONTOURS

Obstruction Clearance Study
San Jose International Airport

January 2007

RICONDO & ASSOCIATES

JACOBS CONSULTANCY
Airport Management Consulting



LEGEND

-30 Elevation difference (feet) between TERPS vs. OEI surfaces

120 Elevation (feet AMSL) of TERPS surfaces

NORTH

0 400' 800' 1600'

Exhibit V-3

ELEVATION DIFFERENCES BETWEEN TERPS VS. OEI SURFACES WITH 25 FOOT TERPS SURFACE INTERVALS

Obstruction Clearance Study
San Jose International Airport
January 2007

RICONDO & ASSOCIATES

JACOBS CONSULTANCY
Airport Management Consulting

Appendix A

Obstacles within OEI Surfaces
By Runway Departure Corridor

Table A-1

Obstacles in the Runway 12L Departure Corridor

Obstacle	NACO Reference Number	Distance (feet) from OEI origin along runway centerline	Elevation (feet AMSL)	Latitude	Longitude	Data Source	Within OEI surface splay (Y – Yes, CO – Critical Obstacle) ICAO	NW Airlines	AC 120-91 (OBS-11) straight	Part 25	AC 120-91 (OBS-11) 12° turn	Notes
30R -POLE		1,346.0	103	37º 21' 6.0"	121º 54' 48.8"	NOAA UDDF File	Y	Y	Y	Y	Y	Close-in, low penetrating obstacle
30L -TREE		2,010.6	106	37º 20' 58.2"	121º 54' 47.6"	NOAA UDDF File	Y	Y	Y	Y	Y	Close-in, low penetrating obstacle
P77 -TREE		2,141.3	117	37º 21' 2.0"	121º 54' 39.5"	NOAA UDDF File	Y					
30R -TREE		2,658.8	144	37º 20' 56.5"	121º 54' 37.7"	NOAA UDDF File	Y	Y	Y	Y		Close-in, low penetrating obstacle
30L -TREE		2,746.8	124	37º 20' 53.6"	121º 54' 40.2"	NOAA UDDF File	Y	Y	Y	Y		
30L -TREE		4,010.4	134	37º 20' 44.8"	121º 54' 29.1"	NOAA UDDF File	Y	Y	Y	Y		
T-L TWR	05-2460	6,515.2	187	37º 20' 28.0"	121º 54' 06.0"	NACO Digital File	Y	Y	Y			
River Corporate Center		7,511.9	199	37º 20' 18.9"	121º 54' 0.3"	City of San Jose Data	Y	Y	Y	Y		
City Heights		8,506.9	250	37º 20' 17.2"	121º 53' 44.0"	City of San Jose Data	Y	Y				
BLDG	05-2216	9,016.4	329	37º 20' 14.0"	121º 53' 39.0"	NACO Digital File	Y					
Almaden Towers		9,369.1	309	37º 20' 5.7"	121º 53' 44.2"	City of San Jose Data	Y	Y	Y	Y		
TOWER	05-6107	9,384.0	233	37º 19' 58.0"	121º 53' 55.0"	NACO Digital File	Y	Y				
BLDG	05-1092	9,558.0	248	37º 20' 2.0"	121º 53' 46.0"	NACO Digital File	Y	Y	Y	Y		
BLDG	05-2432	9,648.5	293	37º 20' 5.0"	121º 53' 40.0"	NACO Digital File	Y	Y	Y			
BLDG (10 Almaden)	05-1980	9,800.8	298	37º 20' 3.0"	121º 53' 40.0"	NACO Digital File	Y	Y	Y	Y		
P77 -OL ON BLDG (10 Almaden)		9,834.2	301	37º 20' 2.8"	121º 53' 39.7"	NOAA UDDF File	Y	Y	Y	Y		
BLDG	05-2081	9,997.6	305	37º 20' 6.0"	121º 53' 32.0"	NACO Digital File	Y	Y				
Bank of America		10,164.6	354	37º 20' 8.8"	121º 53' 24.9"	City of San Jose Data	Y, CO					
P77 -VENT ON BLDG		10,323.1	308	37º 20' 2.9"	121º 53' 30.4"	NOAA UDDF File	Y	Y				
BLDG	05-1629	10,332.4	305	37º 20' 3.0"	121º 53' 30.0"	NACO Digital File	Y	Y				
BLDG	05-1389	10,341.0	274	37º 19' 58.0"	121º 53' 37.0"	NACO Digital File	Y	Y	Y	Y		
Adobe Phase 2/Bldg. 2		10,653.9	345	37º 19' 53.7"	121º 53' 37.3"	City of San Jose Data	Y	Y	Y	Y, CO		
P77 -ANT ON OL BLDG		10,720.6	314	37º 19' 55.3"	121º 53' 33.7"	NOAA UDDF File	Y	Y	Y	Y		
BLDG	05-1394	10,728.9	311	37º 19' 55.0"	121º 53' 34.0"	NACO Digital File	Y	Y	Y	Y		
Adobe Phase 1, Antenna		10,739.3	350	37º 19' 50.9"	121º 53' 39.6"	City of San Jose Data	Y	Y, CO	Y, CO			
BLDG (Knight Ridder)	05-1982	10,833.8	353	37º 20' 2.0"	121º 53' 22.0"	NACO Digital File	Y					
Knight Ridder (parapet)		10,873.9	352	37º 20' 0.9"	121º 53' 22.9"	City of San Jose Data	Y	Y				
P77 -ANT ON BLDG (Knight Ridder)		10,877.8	363	37º 20' 1.8"	121º 53' 21.4"	NOAA UDDF File	Y					
BLDG	05-1334	10,948.7	298	37º 19' 57.0"	121º 53' 27.0"	NACO Digital File	Y	Y	Y			
BLDG (Fairmont Hotel)	05-1981	11,168.5	343	37º 19' 59.0"	121º 53' 20.0"	NACO Digital File	Y	Y				
River Park Tower		11,242.4	316	37º 19' 43.3"	121º 53' 41.0"	City of San Jose Data	Y	Y				
BLDG (River Park Tower)	05-2082	11,353.7	315	37º 19' 44.0"	121º 53' 38.0"	NACO Digital File	Y	Y				
P77 -OL ON BLDG (River Park Tower)		11,360.0	318	37º 19' 44.0"	121º 53' 37.9"	NOAA UDDF File	Y	Y				
P77 -OL ON BLDG (Marriott)		11,917.9	366	37º 19' 50.0"	121º 53' 18.8"	NOAA UDDF File	Y	Y	Y			
TOWER	05-6106	11,990.3	245	37º 19' 51.0"	121º 53' 16.0"	NACO Digital File	Y	Y				
Marriott Hotel		12,014.5	359	37º 19' 48.4"	121º 53' 19.2"	City of San Jose Data	Y	Y	Y			
Sobrato Tower		12,558.8	371	37º 19' 39.4"	121º 53' 22.0"	City of San Jose Data	Y	Y	Y	Y		
P77 –BLDG (Sobrato)		12,703.0	373	37º 19' 38.0"	121º 53' 21.3"	NOAA UDDF File	Y	Y	Y	Y		
HP Pavilion, NW roof corner		8,659.0	204	37° 19' 59.5"	121° 54' 06.5"	City of San Jose Data					Y	
HP Pavilion, center roof peak		8,888.7	208	37° 19' 57.9"	121° 54' 04.4"	City of San Jose Data					Y, CO	
						OEI Surface Slope, from origin point to critical obstacle	34.1:1	36.6:1	36.6:1	37.1:1	59.8:1	
						OEI Surface Slope, from critical obstacle to end of study area	62.5:1	62.5:1	62.5:1	62.5:1	62.5:1	

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Source: Jacobs Consultancy Inc., Ricondo & Associates, Inc.,. Prepared by: Jacobs Consultancy Inc., Ricondo & Associates, Inc

Table A-2

Obstacles in the Runway 12R Departure Corridor

							Within OEI surface splay (Y – Yes, CO – Critical Obstacle)					
Obstacle	**NACO Reference Number**	**Distance (feet) from OEI origin along runway centerline**	**Elevation (feet AMSL)**	**Latitude**	**Longitude**	**Data Source**	**ICAO**	**NW Airlines**	**AC 120-91 (OBS-11) straight**	**Part 25**	**AC 120-91 (OBS-11) 12° turn**	**Notes**
30L -RD(N)		745.1	76	37º 21' 3.9"	121º 55' 8"	NOAA UDDF File	Y				Y	Close-in, low penetrating obstacle
30L -RD(N)		925.2	81	37º 21' 2.8"	121º 55' 6.2"	NOAA UDDF File	Y	Y	Y	Y	Y	Close-in, low penetrating obstacle
30L -OL ON LOC		1,127.2	68	37º 21' 3.5"	121º 55' 1.4"	NOAA UDDF File	Y	Y	Y	Y	Y	Verify new location, elevation
30L -OL ON BLAST FENCE		1,162.1	75	37º 21' 2.5"	121º 55' 2.1"	NOAA UDDF File	Y	Y	Y	Y	Y	
30L -RD(I)		1,454.6	82	37º 21' 1.0"	121º 54' 58.7"	NOAA UDDF File	Y	Y	Y	Y	Y	Close-in, low penetrating obstacle
30L –TREE		1,793.8	103	37º 20' 59.8"	121º 54' 54.1"	NOAA UDDF File	Y	Y	Y	Y		
30L –TREE		2,266.8	106	37º 20' 58.2"	121º 54' 47.6"	NOAA UDDF File	Y					
P77 –POLE		2,390.1	104	37º 20' 52.3"	121º 54' 53.7"	NOAA UDDF File	Y	Y	Y	Y	Y	Close-in, low penetrating obstacle
P77 –POLE		2,797.2	118	37º 20' 47.2"	121º 54' 54.8"	NOAA UDDF File					Y	Close-in, low penetrating obstacle
30L –TREE		3,003.0	124	37º 20' 53.6"	121º 54' 40.2"	NOAA UDDF File	Y					
30L – POLE		3,065.8	128	37º 20' 44.6"	121º 54'52.0"	NOAA UDDF File	Y				Y	Close-in, low penetrating obstacle
30L –TREE		4,266.6	134	37º 20' 44.8"	121º 54' 29.1"	NOAA UDDF File	Y				Y	
P77-TREE		4,273.3	136	37º 20' 34.2"	121º 54' 46.5"	NOAA UDDF File					Y	Close-in, low penetrating obstacle
30L –TREE		4,286.0	142	37º 20' 35.0"	121º 54' 44.5"	NOAA UDDF File					Y	Close-in, low penetrating obstacle
T-L TWR	05-2460	6,771.5	187	37º 20' 28.0"	121º 54' 06.0"	NACO Digital File	Y					
River Corporate Center		7,768.1	199	37º 20' 18.9"	121º 54' 0.3"	City of San Jose Data	Y	Y				
Almaden Towers		9,625.4	309	37º 20' 5.7"	121º 53' 44.2"	City of San Jose Data	Y	Y				
TOWER	05-6107	9,640.3	233	37º 19' 58.0"	121º 53' 55.0"	NACO Digital File	Y	Y	Y			
BLDG	05-1092	9,814.2	248	37º 20' 2.0"	121º 53' 46.0"	NACO Digital File	Y	Y	Y			
BLDG (Opus)	05-2432	9,904.7	293	37º 20' 5.0"	121º 53' 40.0"	NACO Digital File	Y	Y				
BLDG (10 Almaden)	05-1980	10,057.0	298	37º 20' 3.0"	121º 53' 40.0"	NACO Digital File	Y	Y				
P77 -OL ON BLDG (10 Almaden)		10,090.5	301	37º 20' 2.8"	121º 53' 39.7"	NOAA UDDF File	Y	Y				
P77 -VENT ON BLDG		10,579.4	308	37º 20' 2.9"	121º 53' 30.4"	NOAA UDDF File	Y					
BLDG	05-1629	10,588.6	305	37º 20' 3.0"	121º 53' 30.0"	NACO Digital File	Y					
BLDG	05-1389	10,597.2	274	37º 19' 58.0"	121º 53' 37.0"	NACO Digital File	Y	Y				
Adobe Phase 2/Bldg. 2		10,910.5	345	37º 19' 53.7"	121º 53' 37.3"	City of San Jose Data	Y	Y	Y	Y		
P77 -ANT ON OL BLDG		10,976.8	314	37º 19' 55.3"	121º 53' 33.7"	NOAA UDDF File	Y	Y				
BLDG	05-1394	10,985.1	311	37º 19' 55.0"	121º 53' 34.0"	NACO Digital File	Y	Y				
Adobe Phase 1, Antenna		10,995.9	350	37º 19' 50.9"	121º 53' 39.6"	City of San Jose Data	**Y, CO**	**Y, CO**	**Y, CO**	**Y, CO**		
BLDG	05-1334	11,204.9	298	37º 19' 57.0"	121º 53' 27.0"	NACO Digital File	Y					
River Park Tower		11,498.6	316	37º 19' 43.3"	121º 53' 41.0"	City of San Jose Data	Y	Y	Y	Y		
BLDG (River Park Tower)	05-2082	11,610.0	315	37º 19' 44.0"	121º 53' 38.0"	NACO Digital File	Y	Y	Y	Y		
P77 -OL ON BLDG (River Park Tower)		11,616.3	318	37º 19' 44.0"	121º 53' 37.9"	NOAA UDDF File	Y	Y	Y	Y		
P77 -OL ON BLDG (Marriott)		12,174.1	366	37º 19' 50.0"	121º 53' 18.8"	NOAA UDDF File	Y	Y				
TOWER	05-6106	12,246.5	245	37º 19' 51.0"	121º 53' 16.0"	NACO Digital File	Y					
Marriott Hotel		12,270.7	359	37º 19' 48.4"	121º 53' 19.2"	City of San Jose Data	Y	Y				
Sobrato Tower		12,815.0	371	37º 19' 39.4"	121º 53' 22.0"	City of San Jose Data	Y	Y	Y			
P77 –BLDG (Sobrato)		12,959.3	373	37º 19' 38.0"	121º 53' 21.3"	NOAA UDDF File	Y	Y	Y			
HP Pavilion, NW roof corner		8,915.7	204	37° 19' 59.5"	121° 54' 06.5"	City of San Jose Data	Y	Y				
HP Pavilion, center roof peak		9,145.4	208	37° 19' 57.9"	121° 54' 04.4"	City of San Jose Data	Y	Y				
						OEI Surface Slope, from origin point to critical obstacle	37.6:1	37.6:1	37.6:1	37.6:1	62.5:1	
						OEI Surface Slope, from critical obstacle to end of study area	62.5:1	62.5:1	62.5:1	62.5:1	62.5:1	

Source: Jacobs Consultancy Inc., Ricondo & Associates, Inc. Prepared by: Jacobs Consultancy Inc., Ricondo & Associates, Inc.

Table A-3

Obstacles in the Runway 30L Departure Corridor

Obstacle	NACO Reference Number	Distance (feet) from OEI origin along runway centerline	Elevation (feet AMSL)	Latitude	Longitude	Data Source	Within OEI surface splay (Y – Yes, CO – Critical Obstacle) ICAO	NW Airlines	AC 120-91 (OBS-11) straight	Part 25	Notes
12R -OL ON LOC		1,023.4	44	37º 22' 26.7"	121º 56' 32.6"	NOAA UDDF File	Y	Y	Y	Y	Verify new location, elevation
12R -OL ON BLAST FENCE		1,033.0	51	37º 22' 29.2"	121º 56' 29.2"	NOAA UDDF File	Y	Y	Y	Y	
12R -TREE		1,156.6	71	37º 22' 25"	121º 56' 37.6"	NOAA UDDF File	Y				Close-in, low penetrating obstacle
P77 -TREE		1,321.3	72	37º 22' 31.4"	121º 56' 31.5"	NOAA UDDF File	Y				Close-in, low penetrating obstacle
12R -LT POLE		1,375.0	61	37º 22' 30.1"	121º 56' 34.3"	NOAA UDDF File	Y	Y	Y	Y	Close-in, low penetrating obstacle
P77 –VOR/DME		1,630.9	54	37º 22' 29"	121º 56' 40.8"	NOAA UDDF File	Y	Y			
12R -POLE		2,163.4	80	37º 22' 38.8"	121º 56' 36.8"	NOAA UDDF File	Y				
12R -TREE		2,700.7	85	37º 22' 40.4"	121º 56' 44.6"	NOAA UDDF File	Y	Y	Y	Y	Close-in, low penetrating obstacle
12R -POLE		3,745.7	113	37º 22' 43"	121º 57' 0.5"	NOAA UDDF File	**Y, CO#1**				
12R -TRMSN TWR		6,075.6	152	37º 23' 6.9"	121º 57' 10"	NOAA UDDF File	**Y, CO#2**	**Y, CO**	**Y, CO**		
12R -OL ON TK		6,976.7	164	37º 23' 6.7"	121º 57' 27.3"	NOAA UDDF File	Y	Y			
OEI Surface Slope, from origin point to critical obstacle #1							49.7:1	53.2:1	53.2:1	62.5:1	
OEI Surface Slope, from critical obstacle #1 to critical obstacle #2							59.7:1	N/A	N/A	N/A	
OEI Surface Slope, from last critical obstacle to end of study area							62.5:1	62.5:1	62.5:1	62.5:1	

Source: Jacobs Consultancy Inc., Ricondo & Associates, Inc. Prepared by: Jacobs Consultancy Inc., Ricondo & Associates, Inc.

Table A-4

Obstacles in the Runway 30R Departure Corridor

Obstacle	NACO Reference Number	Distance (feet) from OEI origin along runway centerline	Elevation (feet AMSL)	Latitude	Longitude	Data Source	Within OEI surface splay (Y – Yes, CO – Critical Obstacle) ICAO	NW Airlines	AC 120-91 (OBS-11) straight	Part 25	Notes
30R -BLAST FENCE		1,003.7	47	37º 22' 32.6"	121º 56' 23.5"	NOAA UDDF File	Y	Y	Y	Y	
12R -OL ON BLAST FENCE		1,049.8	51	37º 22' 29.2"	121º 56' 29.2"	NOAA UDDF File	Y				
12L -TREE		1,276.8	70	37º 22' 32.8"	121º 56' 28.3"	NOAA UDDF File	Y	Y	Y	Y	Close-in, low penetrating obstacle
P77 -TREE		1,338.1	72	37º 22' 31.4"	121º 56' 31.5"	NOAA UDDF File	Y	Y	Y		Close-in, low penetrating obstacle
P77 -POLE		1,522.6	84	37º 22' 37.3"	121º 56' 26.6"	NOAA UDDF File	Y	Y	Y		Close-in, low penetrating obstacle
12L -RD(N)		1,553.6	68	37º 22' 35.1"	121º 56' 30.2"	NOAA UDDF File	Y	Y	Y	Y	
12R -LT POLE		1,576.3	75	37º 22' 34.3"	121º 56' 31.9"	NOAA UDDF File	Y	Y	Y	Y	Close-in, low penetrating obstacle
12L -POLE		1,826.1	88	37º 22' 38.0"	121º 56' 31.2"	NOAA UDDF File	Y	Y	Y	Y	Close-in, low penetrating obstacle
12R -POLE		2,180.2	80	37º 22' 38.8"	121º 56' 36.8"	NOAA UDDF File	Y	Y	Y		
12R -TREE		2,717.5	85	37º 22' 40.4"	121º 56' 44.6"	NOAA UDDF File	Y	Y			
12R -TREE		3,426.6	108	37º 22' 49.3"	121º 56' 45.2"	NOAA UDDF File	Y	Y	Y	Y	
12R –ANT ON BLDG		4,289.6	124	37º 22' 56.4"	121º 56' 51.2"	NOAA UDDF File	**Y, CO**	**Y, CO**	**Y, CO**	**Y, CO**	
12R -TRMSN TWR		6,092.4	152	37º 23' 6.9"	121º 57' 10"	NOAA UDDF File	Y	Y	Y	Y	
OEI Surface Slope, from origin point to critical obstacle							49.5:1	49.5:1	49.5:1	49.5:1	
OEI Surface Slope, from critical obstacle to end of study area							62.5:1	62.5:1	62.5:1	62.5:1	

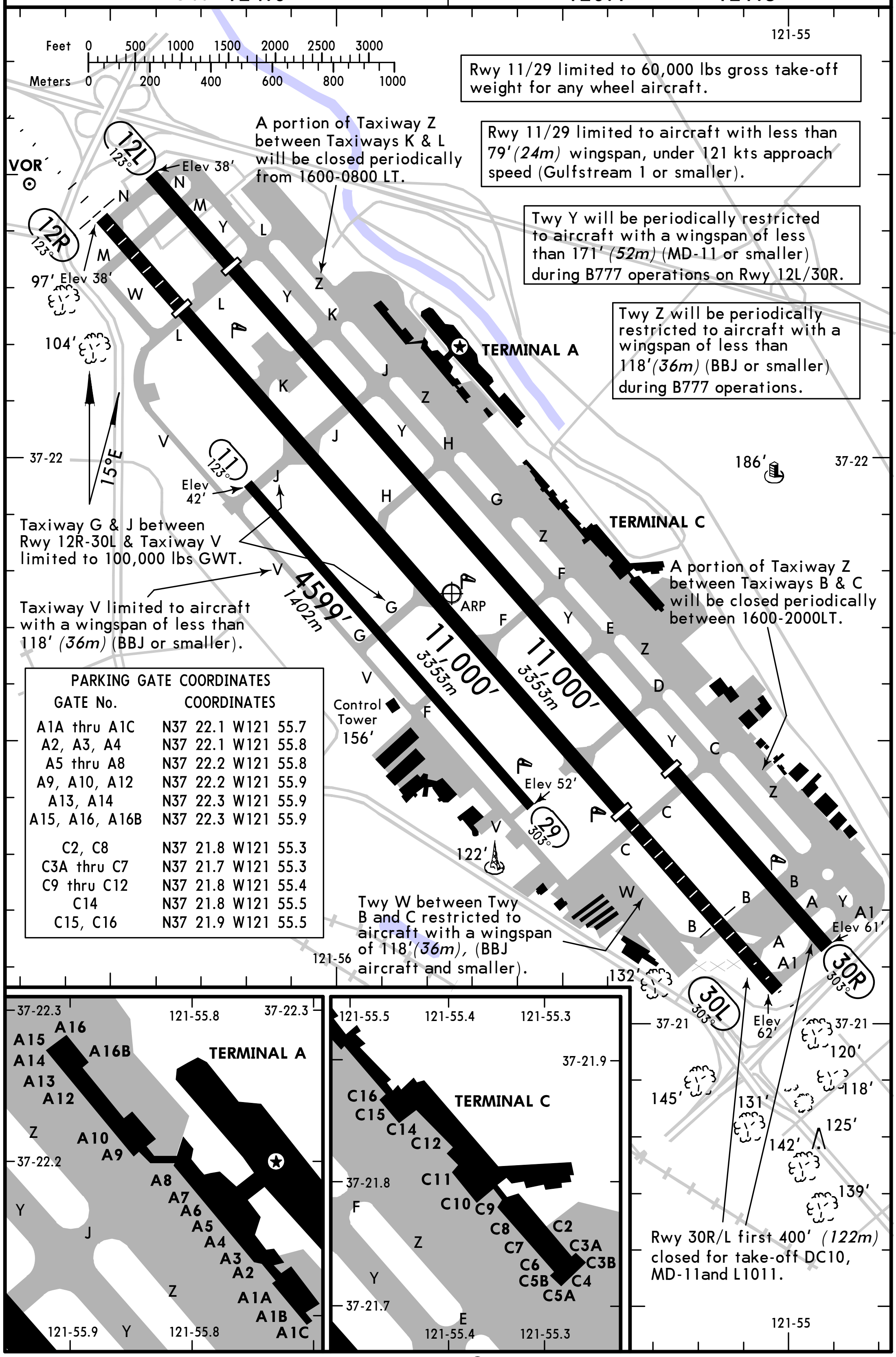
Source: Jacobs Consultancy Inc., Ricondo & Associates, Inc. Prepared by: Jacobs Consultancy Inc., Ricondo & Associates, Inc.

Appendix B

TERPS Procedures Considered in Analysis

D-ATIS (ASOS when Twr inop)	ACARS:	*SAN JOSE Clearance (Cpt)	*Ground
126.95	D-ATIS PDC	118.0	121.7

*San Jose Tower	NORCAL Departure (R)
CTAF 124.0	120.1 121.3



PARKING GATE COORDINATES

GATE No.	COORDINATES
A1A thru A1C	N37 22.1 W121 55.7
A2, A3, A4	N37 22.1 W121 55.8
A5 thru A8	N37 22.2 W121 55.8
A9, A10, A12	N37 22.2 W121 55.9
A13, A14	N37 22.3 W121 55.9
A15, A16, A16B	N37 22.3 W121 55.9
C2, C8	N37 21.8 W121 55.3
C3A thru C7	N37 21.7 W121 55.3
C9 thru C12	N37 21.8 W121 55.4
C14	N37 21.8 W121 55.5
C15, C16	N37 21.9 W121 55.5

CHANGES: Twy Y.

GENERAL

-CURFEW HOURS 2300-0700 LT FAR 36 Stage II, 2330-0630 LT FAR 36 Stage III aircraft listed on the schedule of authorized aircraft issued by the Director of Aviation. Delayed scheduled flights and alternate or emergency operations may be exempt from curfew hour restrictions. Prior airport notification is required for all late/early arrivals. Contact manager on duty on (408) 277-5378.
-Unscheduled operations by B-747 and larger aircraft not authorized except with prior airport approval. Contact airport manager on duty (408) 277-4705.
-Birds in vicinity of airport.
-NOISE ABATEMENT PROCEDURE: Rwy 12R/30L is the preferred arrival runway for jet aircraft and Rwy 12L/30R is the preferred departure runway for jet aircraft.
All jet aircraft takeoffs are to be initiated from the end of the runway unless directed otherwise by ATC.
-Jet departures on Rwy 11/29 not authorized except for jets under 75,000 lbs MFG Designed Certified Gross Takeoff Weight and only during closures of both Rwy 12L/30R and 12R/30L.
-Rwys 11, 12R & 30R right traffic pattern.

ADDITIONAL RUNWAY INFORMATION

RWY		USABLE LENGTHS – LANDING BEYOND Threshold	USABLE LENGTHS – LANDING BEYOND Glide Slope	TAKE-OFF	WIDTH
11 ❶	❷ MIRL PAPI-L (angle 3.0°)				100' *30m*
29	❷ MIRL PAPI-L (angle 3.6°)				

❶ Limited to aircraft with less than 79' *(24m)* wingspan under 121 kts approach speed (Gulfstream I or smaller). Departures only authorized for jet aircraft under 75,000 lbs manufacturer designed maximum gross take-off weight when both Runway 12L/30R and 12R/30L are closed.

❷ Activate on 124.0 when Twr inop.

RWY		Threshold	Glide Slope	TAKE-OFF	WIDTH
12R ❸	❹ HIRL CL ❹ MALSR PAPI-R (angle 3.0°)	8584' *2616m*	7524' *2293m*	9883' *3012m*	150' *46m*
30L	❹ HIRL CL ❹ MALSR PAPI-L (angle 3.0°) RVR	7605' *2318m*	6496' *1980m*	10142' *3091m*	

❸ Grooved.
❹ Activate on 124.0 when Twr inop.

RWY		Threshold	Glide Slope	TAKE-OFF	WIDTH
12L ❺	❼ HIRL CL REIL PAPI-R (angle 3.0°)	8810' *2685m*		10125' *3086m*	150' *46m*
❻ 30R	❼ HIRL CL PAPI-L (angle 3.0°)	7479' *2280m*		10020' *3054m*	

❺ Preferred runway for use by jet aircraft.
❻ Grooved.
❼ Activate on 124.0 when Twr inop.

TAKE-OFF & OBSTACLE DEPARTURE PROCEDURE

	Rwys 29, 30L/R		Rwy 12L			Rwys 11, 12R		
			With Mim climb of 278'/NM to 500'		Other	With Mim climb of 255'/NM to 500'		Other
	Adequate Vis Ref	STD	Adequate Vis Ref	STD		Adequate Vis Ref	STD	
1 & 2 Eng	RVR 16 or 1/4	RVR 50 or 1	1/4	1	400-1¾	1/4	1	400-2½
3 & 4 Eng		RVR 24 or 1/2		1/2			1/2	

OBSTACLE DP

Rwys 11, 12L/R: Climbing RIGHT turn via heading 315° to 2000', then via OAK R-135 to OAK VOR before proceeding on course.

Rwys 29, 30L/R: Climb via heading 312° to 2000', then via OAK R-132 to OAK VOR before proceeding on course.

FOR FILING AS ALTERNATE

	Authorized Only When Twr Operating: ILS Rwy 12R, ILS Rwy 30L	LOC Rwy 12R, LOC DME Rwy 30L, VOR Rwy 12R	VOR DME Rwy 30L, VOR DME Rwy 30R, RNAV (GPS) Rwy 12R, RNAV (GPS) Rwy 30L	RNAV (GPS) Rwy 11, RNAV (GPS) Rwy 12L, RNAV (GPS) Rwy 29, RNAV (GPS) Rwy 30R
A	600-2	800-2	800-2	NA
B				
C				
D				

AMEND 6

CHANGES: Alternate minimums.

KSJC/SJC
MINETA SAN JOSE INTL

JEPPESEN

29 JUL 05 (11-1)

SAN JOSE, CALIF
ILS or LOC Rwy 12R

BRIEFING STRIP ™

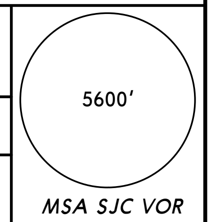
D-ATIS (ASOS when Twr inop)	NORCAL Approach (R)	*SAN JOSE Tower Rwys 12R-30L, 12L-30R CTAF	*SAN JOSE Tower Rwy 11-29	*Ground
126.95	120.1	124.0	120.7	121.7

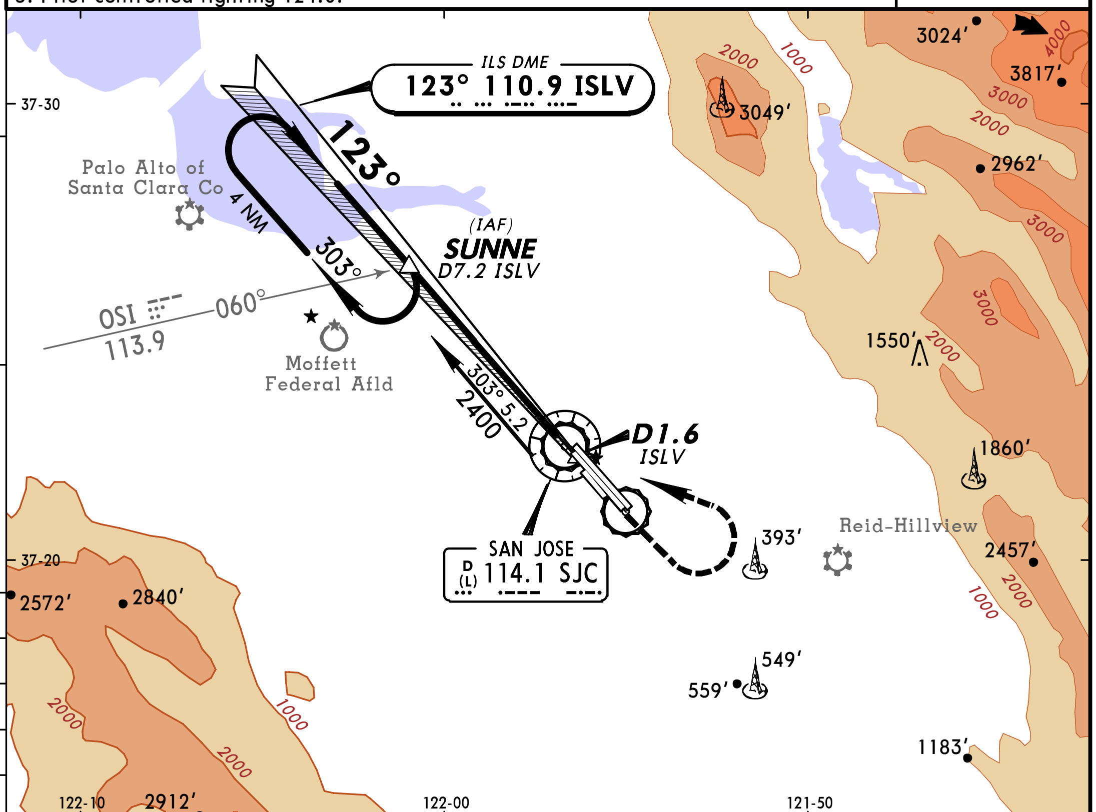
LOC ISLV	Final Apch Crs	GS SUNNE	ILS DA(H)	Apt Elev 62′
110.9	123°	1900′ (1854′)	258′ (212′)	TDZE 12R 46′

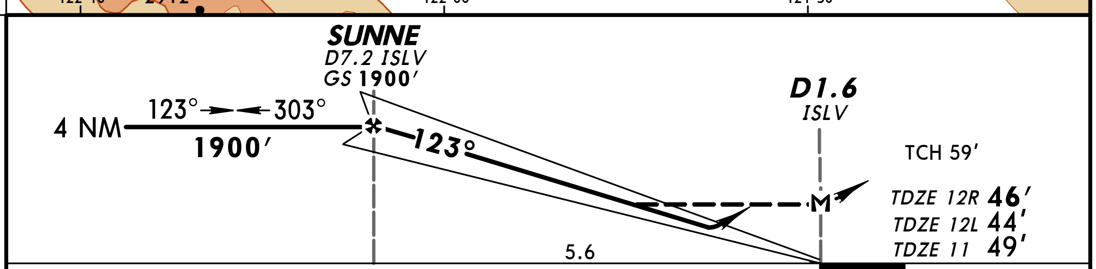
MISSED APCH: Climb to 900′ then climbing LEFT turn to 2000′ direct SJC VOR and outbound on SJC VOR R-303 to SUNNE and hold.

Alt Set: INCHES   Trans level: FL 180   Trans alt: 18000′

1. VGSI and ILS glidepath not coincident. 2. REIL, PAPI-R Rwy 12L. PAPI-L Rwy 11.
3. Pilot controlled lighting 124.0.







Gnd speed-Kts	70	90	100	120	140	160
GS 3.00°	377	484	538	646	753	861
MAP at D1.6 ISLV or SUNNE to MAP 5.6	4:48	3:44	3:22	2:48	2:24	2:06

MALSR PAPI | 900′ ↑ | 2000′ LT | SJC 114.1

	STRAIGHT-IN LANDING RWY 12R ILS DA(H) 258′(212′) FULL	RAIL or ALS out	LOC (GS out) MDA(H) 420′(374′)	RAIL out	ALS out	SIDESTEP LANDING RWY 12L MDA(H) 420′(376′)	SIDESTEP LANDING RWY 11 MDA(H) 480′(431′)	Max Kts	CIRCLE-TO-LAND
A	1/2	3/4	1/2	3/4	1	1	1	A	NA
B	1/2	3/4	1/2	3/4	1	1	1	B	NA
C	1/2	3/4	1/2	3/4	1	1 1/2	1 1/2	C	NA
D	1/2	3/4	3/4	1 1/4		2	2	D	NA

TERPS AMEND 6

CHANGES: Communications, charted obstructions.

BRIEFING STRIP ™

D-ATIS (ASOS when Twr inop)	NORCAL Approach (R)	*SAN JOSE Tower Rwys 12R-30L, 12L-30R CTAF	*SAN JOSE Tower Rwy 11-29	*Ground
126.95	120.1	124.0	120.7	121.7

LOC ISJC	Final Apch Crs	GS HIVAK	ILS DA(H)	Apt Elev 62′ / TDZE 30L 57′
110.9	303°	2700′ (2643′)	257′ (200′)	

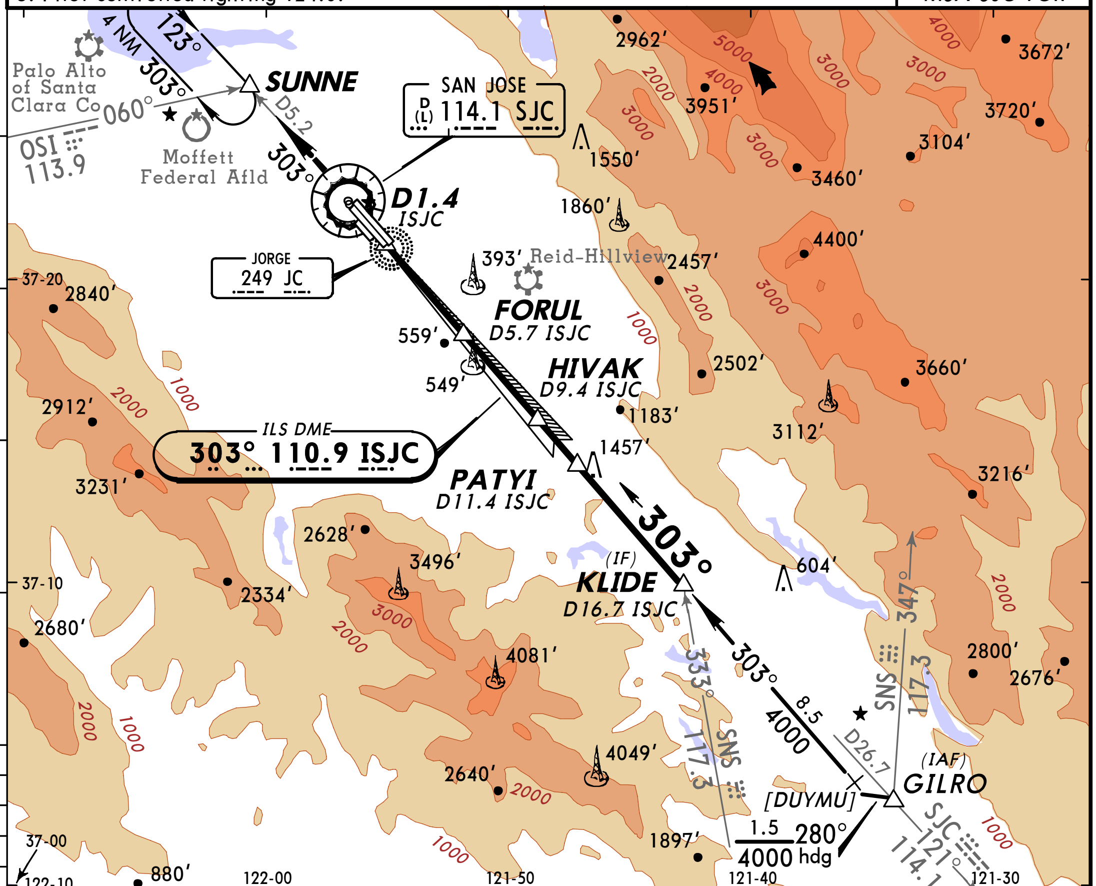
MISSED APCH: Climb to 1900′ outbound via SJC VOR R-303 to SUNNE and hold.

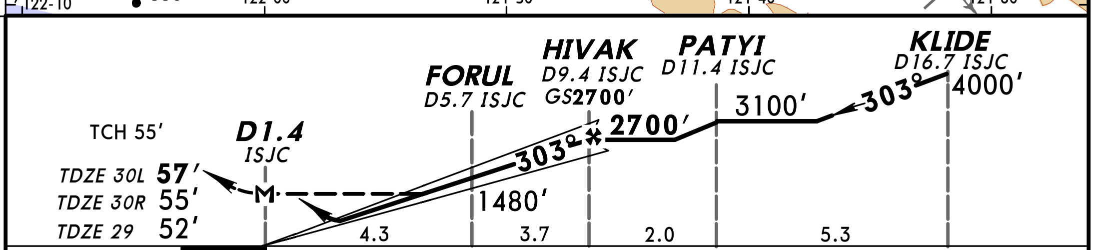
Alt Set: INCHES Trans level: FL 180 Trans alt: 18000′

1. VGSI and ILS glideslope not coincident. 2. PAPI-L Rwys 29, 30R.
3. Pilot controlled lighting 124.0.

5600′

MSA SJC VOR





Gnd speed-Kts		70	90	100	120	140	160
GS	3.00°	377	484	538	646	753	861
MAP at D1.4 ISJC							

MALSR / PAPI — 1900′ via SJC 114.1 R-303 SUNNE

	STRAIGHT-IN LANDING RWY30L ILS DA(H) 257′(200′) FULL	RAIL or ALS out	LOC (GS out) MDA(H) 640′(583′)	RAIL out	ALS out	SIDESTEP LANDING RWY 30R MDA(H) 640′(585′)	SIDESTEP LANDING RWY 29 MDA(H) 640′(588′)	Max Kts	CIRCLE-TO-LAND
A	RVR 24 or ½	RVR 40 or ¾	RVR 24 or ½	RVR 40 or ¾	RVR 50 or 1	1	1	A	NA
B	RVR 24 or ½	RVR 40 or ¾	RVR 24 or ½	RVR 40 or ¾	RVR 50 or 1	1	1	B	NA
C	RVR 24 or ½	RVR 40 or ¾	RVR 50 or 1	1½	1½	1½	1½	C	NA
D	RVR 24 or ½	RVR 40 or ¾	RVR 60 or 1¼	1¾	1¾	2	2	D	NA

AMEND 22 TERPS

CHANGES: Communications, charted obstructions.

BRIEFING STRIP ™

D-ATIS (ASOS when Twr inop)	NORCAL Approach (R)	*SAN JOSE Tower		*Ground
		Rwy 11-29	Rwys 12R-30L, 12L-30R	
126.95	120.1	120.7	CTAF 124.0	121.7

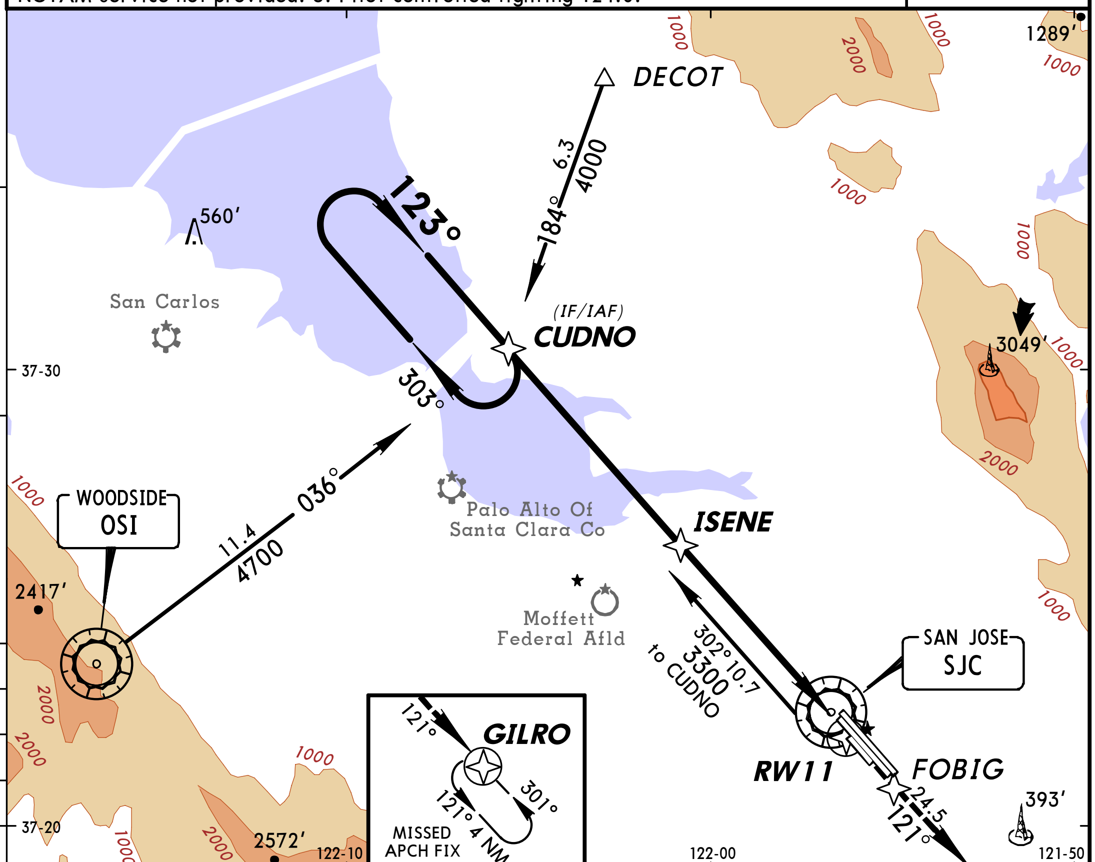
RNAV	Final Apch Crs	Minimum Alt ISENE	LNAV MDA(H)	Apt Elev / TDZE
	123°	1900′(1851′)	460′(411′)	Apt Elev 62′ / TDZE 49′

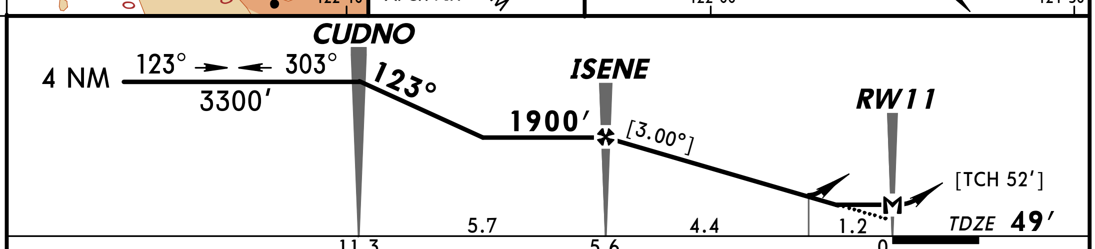
MISSED APCH: Climb to 4000′ direct to FOBIG and LEFT turn via 121° track to GILRO and hold.

Alt Set: INCHES Trans level: FL 180 Trans alt: 18000′

1. Baro-VNAV not authorized below -15°C (5°F). 2. GPS or RNP-0.3 required. 3. DME/DME RNP-0.3 not authorized. 4. WAAS VNAV outages may occur. WAAS VNAV NOTAM service not provided. 5. Pilot controlled lighting 124.0.

MSA RW11: 5600′





Gnd speed-Kts	70	90	100	120	140	160
Descent angle [3.00°]	372	478	531	637	743	849
MAP at RW11						

PAPI-L

4000′ ↑ → FOBIG

	STRAIGHT-IN LANDING RWY 11	
	LNAV/VNAV DA(H) 480′(431′)	LNAV MDA(H) 460′(411′)
A	1½	1
B	1½	1
C	1½	1¼
D	1½	1¼

CIRCLE-TO-LAND Max Kts	MDA(H)
90	640′(578′)-1½
120	680′(618′)-1½
140	680′(618′)-1¾
165	680′(618′)-2

AMEND 0A
TERPS

CHANGES: Communications, charted obstructions.

BRIEFING STRIP ™

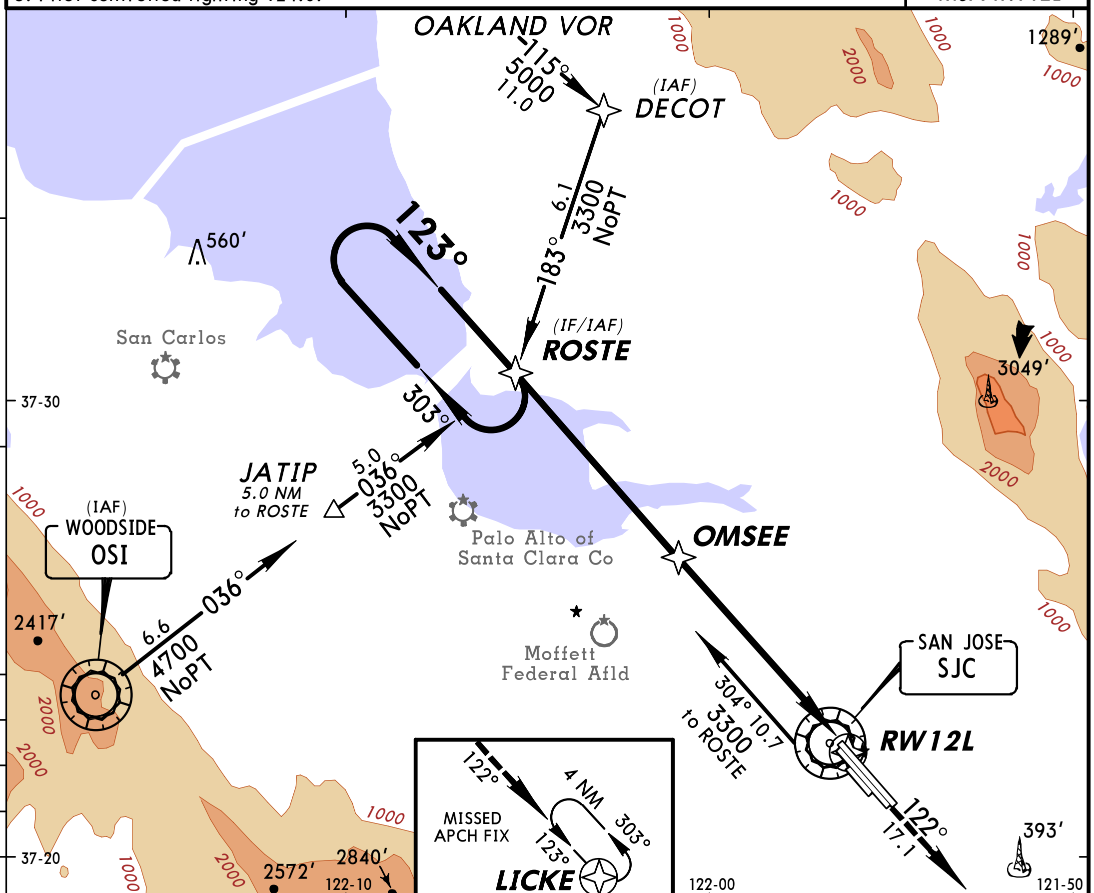
D-ATIS (ASOS when Twr inop)	NORCAL Approach (R)	*SAN JOSE Tower Rwys 12R-30L, 12L-30R CTAF	*SAN JOSE Tower Rwy 11-29	*Ground
126.95	120.1	124.0	120.7	121.7

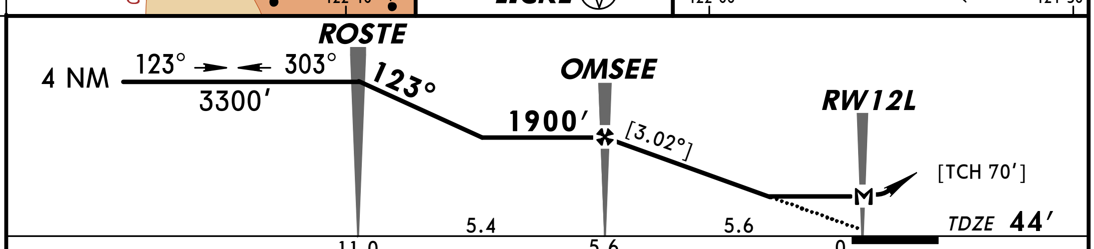
RNAV	Final Apch Crs	Minimum Alt OMSEE	LNAV MDA(H)	Apt Elev / TDZE
	123°	1900′ (1856′)	460′ (416′)	Apt Elev 62′ / TDZE 44′

5600′
MSA RW12L

MISSED APCH: Climb to 4000′ via 122° course to LICKE and hold.

Alt Set: INCHES Trans level: FL 180 Trans alt: 18000′
1. GPS or RNP-0.3 required. 2. DME/DME RNP-0.3 not authorized.
3. Pilot controlled lighting 124.0.





Gnd speed-Kts	70	90	100	120	140	160
Descent angle [3.02°]	374	481	534	641	748	855
MAP at RW12L						

REIL
PAPI-R

4000′ via 122° LICKE

	STRAIGHT-IN LANDING RWY 12L LNAV MDA(H) 460′ (416′)	Max Kts	CIRCLE-TO-LAND MDA(H)
A	1	90	640′ (578′)-1
B	1	120	680′ (618′)-1
C	1¼	140	680′ (618′)-1¾
D	1¼	165	680′ (618′)-2

AMEND 0
TERPS

CHANGES: Communications, charted obstructions.

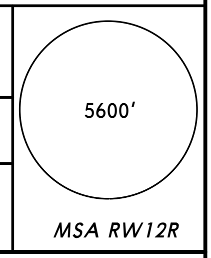
BRIEFING STRIP™

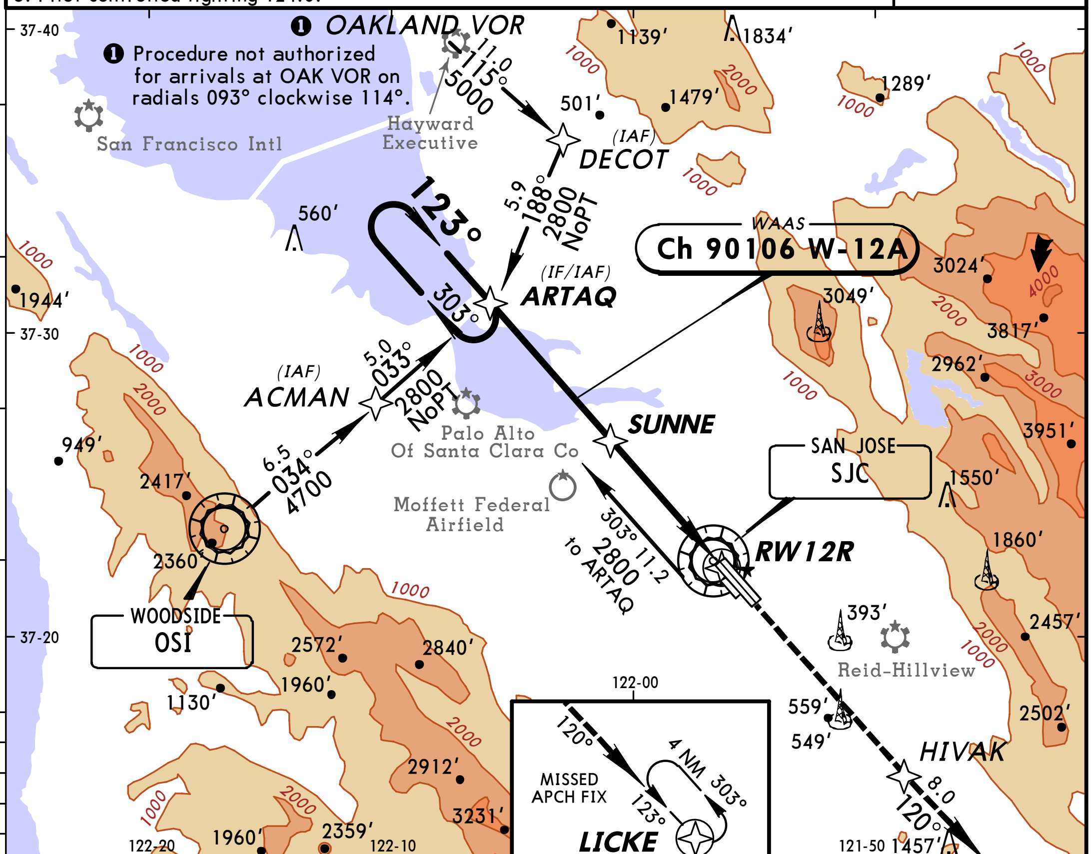
D-ATIS (ASOS when Twr inop)	NORCAL Approach (R)	*SAN JOSE Tower Rwys 12R-30L, 12L-30R	Rwy 11-29	*Ground
126.95	120.1	CTAF 124.0	120.7	121.7

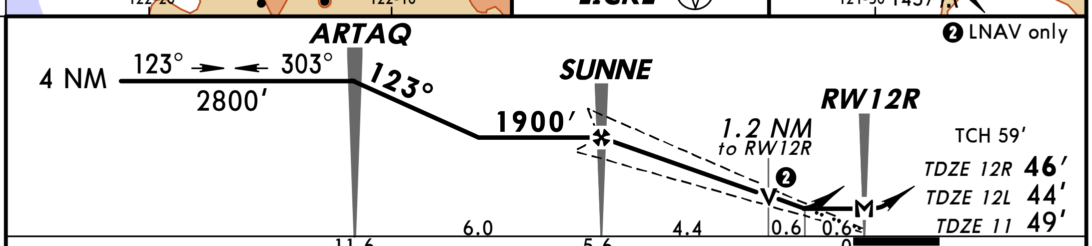
WAAS	Final Apch Crs	Minimum Alt SUNNE	LPV (CONDITIONAL) DA(H)	Apt Elev 62′
Ch 90106 W-12A	123°	1900′ (1854′)	300′ (254′)	TDZE 12R 46′

MISSED APCH: Climb to 4000′ direct HIVAK and via 120° track to LICKE and hold.

Alt Set: INCHES Trans level: FL 180 Trans alt: 18000′
1. Baro-VNAV not authorized below -15°C (5°F). 2. DME/DME RNP-0.3 not authorized.
3. VGSI and RNAV glidepath not coincident. 4. PAPI-R, REIL Rwy 12L, PAPI-L Rwy 11.
5. Pilot controlled lighting 124.0.







Gnd speed-Kts	70	90	100	120	140	160
Glide Path Angle 3.00°	372	478	531	637	743	849
MAP at RW12R						

MALSR PAPI — 4000′ ↑ — HIVAK

STRAIGHT-IN LANDING RWY12R

	LPV DA(H) 300′(254′)	RAIL out	ALS out	LNAV/VNAV DA(H) 480′(434′)	RAIL out	ALS out	LNAV MDA(H) 480′(434′)	RAIL out	ALS out	SIDESTEP LANDING RWY 12L MDA(H) 480′(436′)	SIDESTEP LANDING RWY 11 MDA(H) 480′(431′)
A	½	¾		1	1½		½	¾	1	1	1
B	½	¾		1	1½		½	¾	1	1	1
C	½	¾		1	1½		¾	1¼		1½	1½
D	½	¾		1	1½		1	1½		2	2

TERPS AMEND 1

CHANGES: Procedure.

KSJC/SJC
MINETA SAN JOSE INTL

JEPPESEN
6 MAY 05 (12-4) Eff 12 May

SAN JOSE, CALIF
RNAV (GPS) Rwy 29

D-ATIS (ASOS when Twr inop)	NORCAL Approach (R)	*SAN JOSE Tower		*Ground
126.95	120.1	Rwy 11-29 120.7	Rwys 12R-30L, 12L-30R CTAF 124.0	121.7

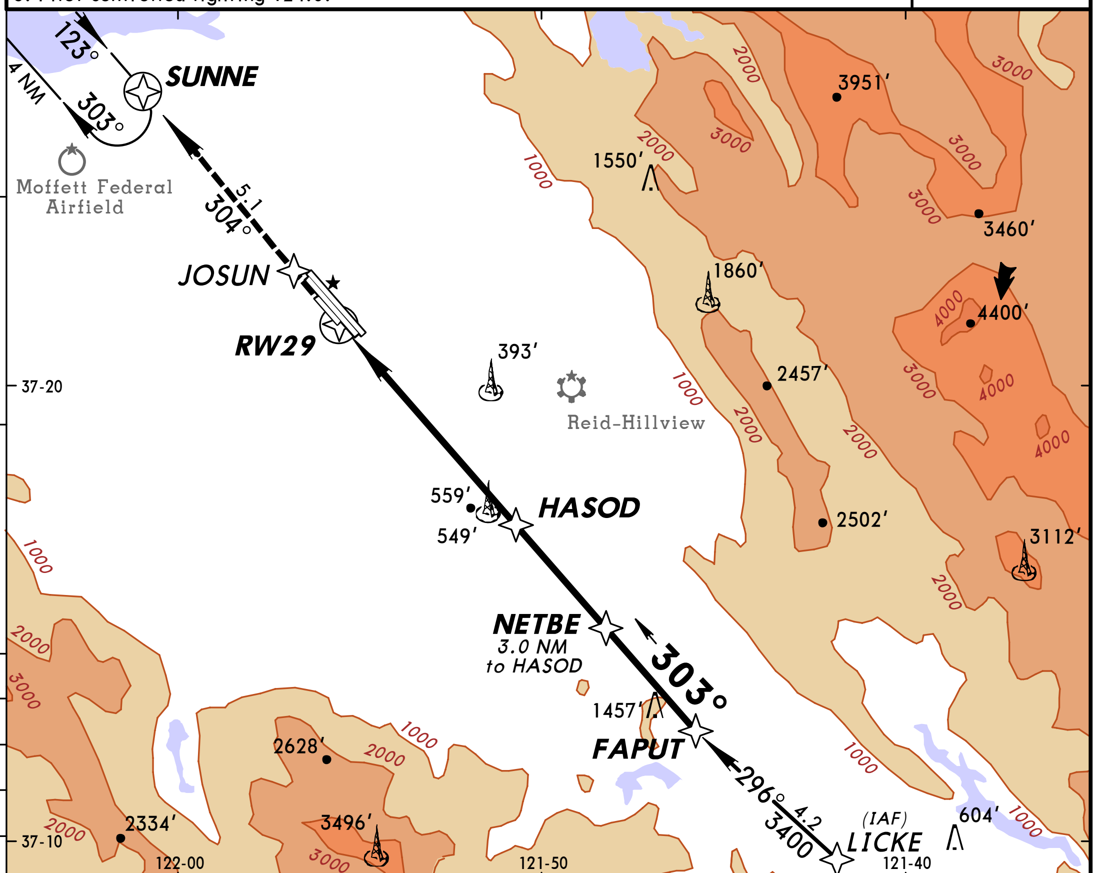
BRIEFING STRIP ™

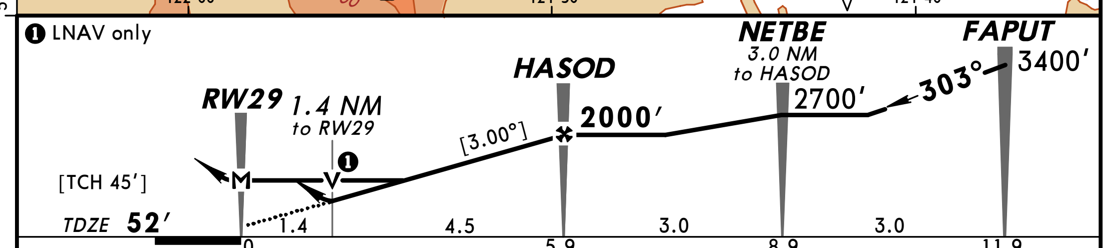
RNAV	Final Apch Crs	Minimum Alt HASOD	LNAV/VNAV DA(H)	Apt Elev 62' TDZE 52'
	303°	2000' (1948')	540' (488')	

MISSED APCH: Climb to 2100' direct JOSUN and RIGHT turn via 304° track to SUNNE and hold.

Alt Set: INCHES Trans level: FL 180 Trans alt: 18000'
1. Baro-VNAV not authorized below -15°C (5°F). 2. GPS or RNP-0.3 required.
3. DME/DME RNP-0.3 not authorized. 4. WAAS VNAV outages may occur daily. WAAS VNAV NOTAM service is not provided. 5. VGSI and descent angles not coincident.
6. Pilot controlled lighting 124.0.

5600'
MSA RW29





Gnd speed-Kts	70	90	100	120	140	160
Descent angle [3.00°]	372	478	531	637	743	849
MAP at RW29						

PAPI-L | 2100' ↑ | JOSUN

	STRAIGHT-IN LANDING RWY 29		CIRCLE-TO-LAND	
	LNAV/VNAV DA(H) 540' (488')	LNAV MDA(H) 620' (568')	Max Kts	MDA(H)
A	1¾	1	90	640' (578') - 1¾
B			120	680' (618') - 1¾
C		1½	140	
D		1¾	165	680' (618') - 2

TERPS AMEND 0A

CHANGES: None.

RNAV (GPS) Rwy 30L

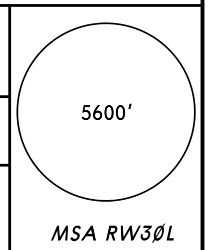
BRIEFING STRIP ™

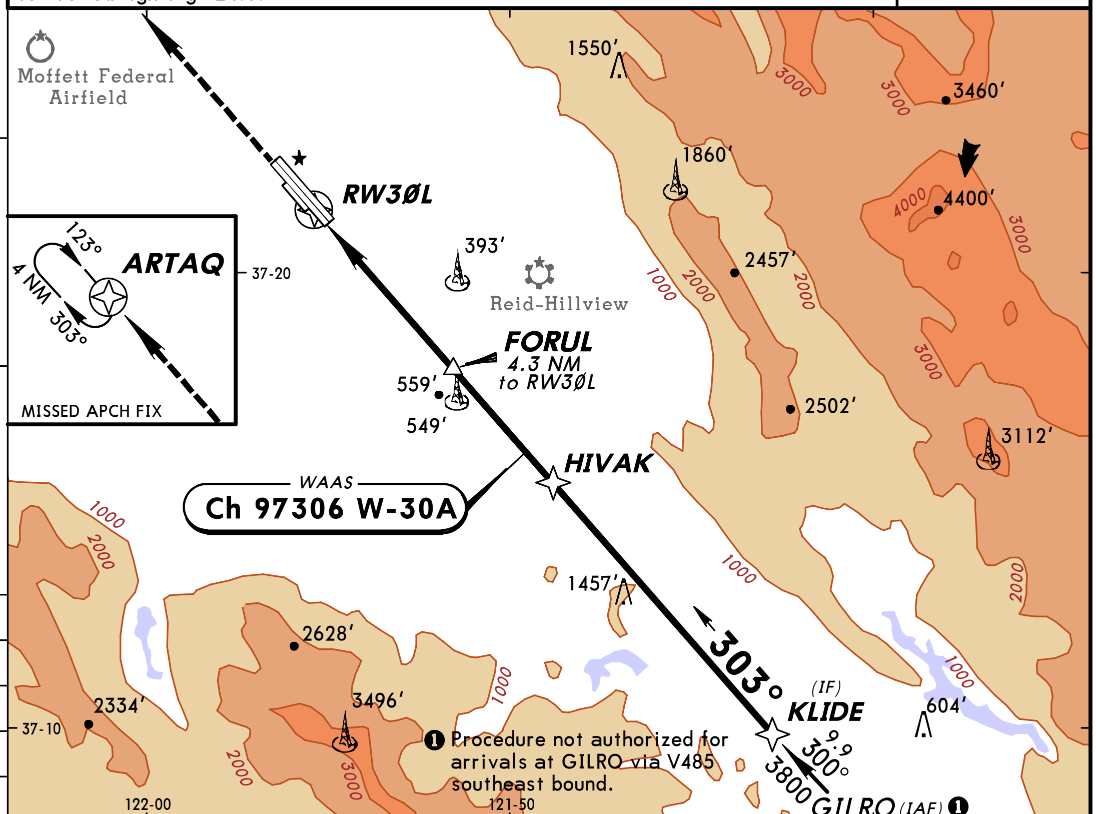
D-ATIS (ASOS when Twr inop)	NORCAL Approach (R)	*SAN JOSE Tower Rwys 12R-30L, 12L-30R	Rwy 11-29	*Ground
126.95	120.1	CTAF 124.0	120.7	121.7

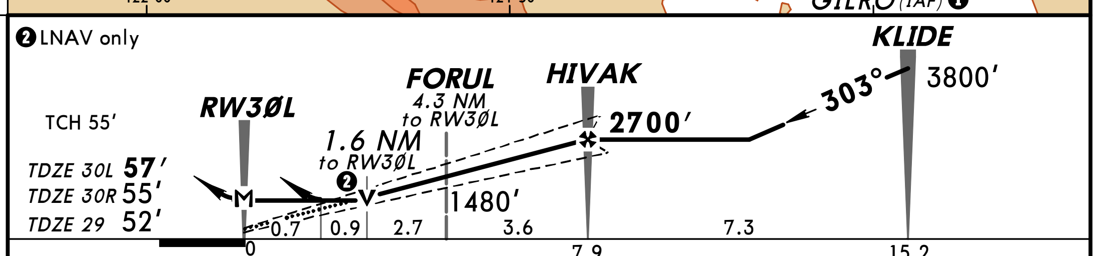
WAAS	Final Apch Crs	Minimum Alt HIVAK	LPV (CONDITIONAL) DA(H)	Apt Elev 62′
Ch 97306 W-30A	303°	2700′ (2643′)	340′ (283′)	TDZE 30L 57′

MISSED APCH: Climb to 2800′ direct to ARTAQ and hold.

Alt Set: INCHES Trans level: FL 180 Trans alt: 18000′
1. Baro-VNAV not authorized below -15°C (5°F). 2. DME/DME RNP-0.3 not authorized. 3. VGSI and RNAV glidepath not coincident. 4. PAPI-L, Rwys 29, 30R. 5. Pilot controlled lighting 124.0.







Gnd speed-Kts	70	90	100	120	140	160
Glide Path Angle 3.00°	372	478	531	637	743	849
MAP at RW3ØL						

MALSR PAPI | 2800′ ↑ | D→ | ARTAQ

	STRAIGHT-IN LANDING RWY30L							SIDESTEP LANDING RWY 30R	SIDESTEP LANDING RWY 29
	LPV DA(H) 340′(283′)		LNAV/VNAV DA(H) 600′(543′)		LNAV MDA(H) 640′(583′)			MDA(H) 640′(585′)	MDA(H) 640′(588′)
		RAIL out / ALS out		RAIL out / ALS out		RAIL out	ALS out		
A	RVR 24 or ½	RVR 40 or ¾	RVR 60 or 1¼	1¾	RVR 24 or ½	RVR 40 or ¾	RVR 50 or 1	1	1
B	RVR 24 or ½	RVR 40 or ¾	RVR 60 or 1¼	1¾	RVR 24 or ½	RVR 40 or ¾	RVR 50 or 1	1	1
C	RVR 24 or ½	RVR 40 or ¾	RVR 60 or 1¼	1¾	RVR 50 or 1	1½		1½	1½
D	RVR 24 or ½	RVR 40 or ¾	RVR 60 or 1¼	1¾	RVR 60 or 1¼	1¾		2	2

AMEND 1 TERPS

CHANGES: Procedure.

KSJC/SJC
MINETA SAN JOSE INTL

JEPPESEN

6 MAY 05 (12-6) **Eff 12 May**

SAN JOSE, CALIF
RNAV (GPS) Rwy 30R

BRIEFING STRIP ™

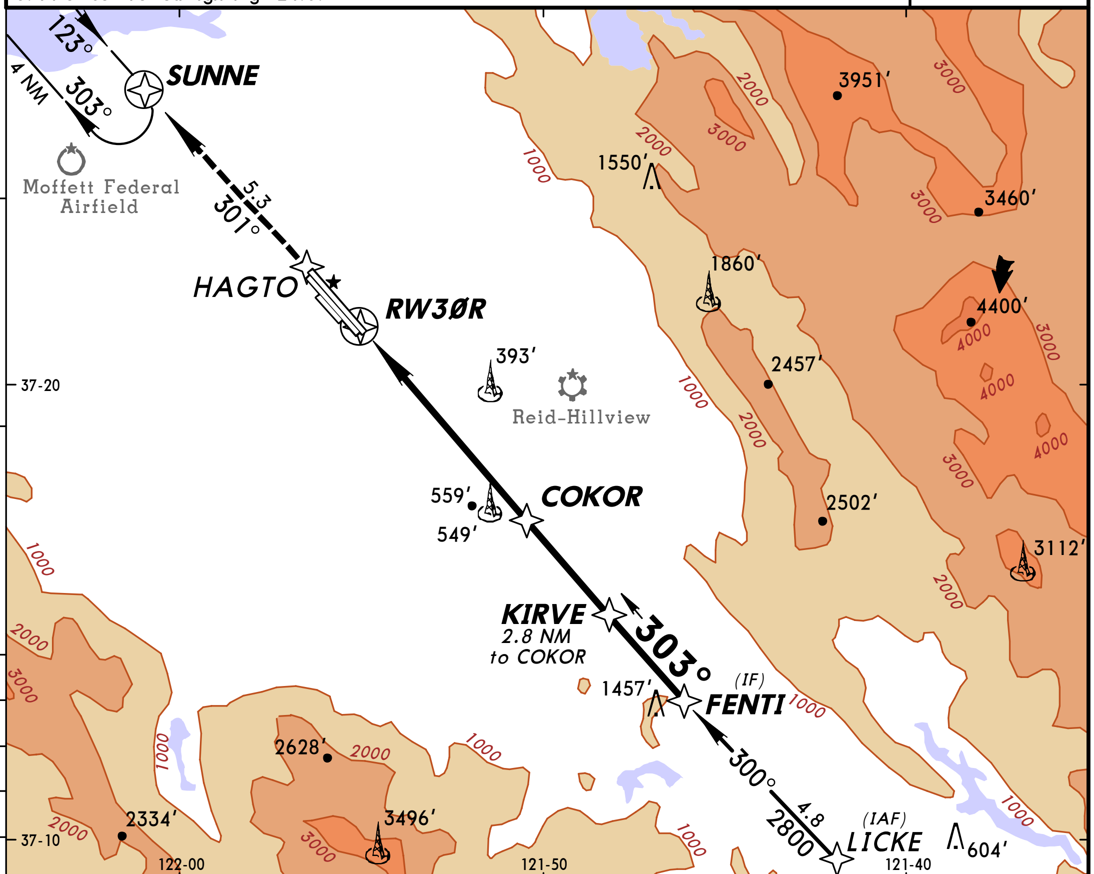
D-ATIS (ASOS when Twr inop)	NORCAL Approach (R)	*SAN JOSE Tower Rwys 12R-30L, 12L-30R CTAF	Rwy 11-29	*Ground
126.95	120.1	124.0	120.7	121.7

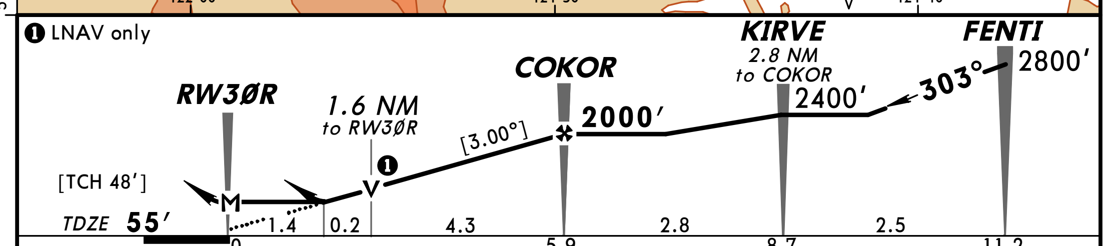
RNAV	Final Apch Crs	Minimum Alt COKOR	LNAV/VNAV DA(H)	Apt Elev 62′
	303°	2000′ (1945′)	540′ (485′)	TDZE 55′

MISSED APCH: Climb to 2100′ direct HAGTO, then LEFT turn via 301° track to SUNNE and hold.

Alt Set: INCHES Trans level: FL 180 Trans alt: 18000′
1. Baro-VNAV not authorized below -15°C (5°F). 2. GPS or RNP-0.3 required.
3. DME/DME RNP-0.3 not authorized. 4. WAAS VNAV outages may occur daily. WAAS VNAV NOTAM service not provided. 5. VGSI and descent angles not coincident.
6. Pilot controlled lighting 124.0.

5600′
MSA RW30R





Gnd speed-Kts	70	90	100	120	140	160
Descent angle [3.00°]	372	478	531	637	743	849
MAP at RW30R						

PAPI-L | 2100′ | HAGTO

STRAIGHT-IN LANDING RWY30R	LNAV/VNAV DA(H) 540′ (485′)	LNAV MDA(H) 620′ (565′)	CIRCLE-TO-LAND Max Kts	MDA(H)
A	1¾	1	90	640′ (578′) - 1¾
B	1¾	1	120	680′ (618′) - 1¾
C	1¾	1½	140	680′ (618′) - 1¾
D	1¾	1¾	165	680′ (618′) - 2

AMEND 0A
TERPS

CHANGES: None.

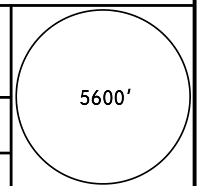
BRIEFING STRIP ™

D-ATIS (ASOS when Twr inop)	NORCAL Approach (R)	*SAN JOSE Tower Rwys 12R-30L, 12L-30R CTAF	*SAN JOSE Tower Rwy 11-29	*Ground
126.95	120.1	124.0	120.7	121.7

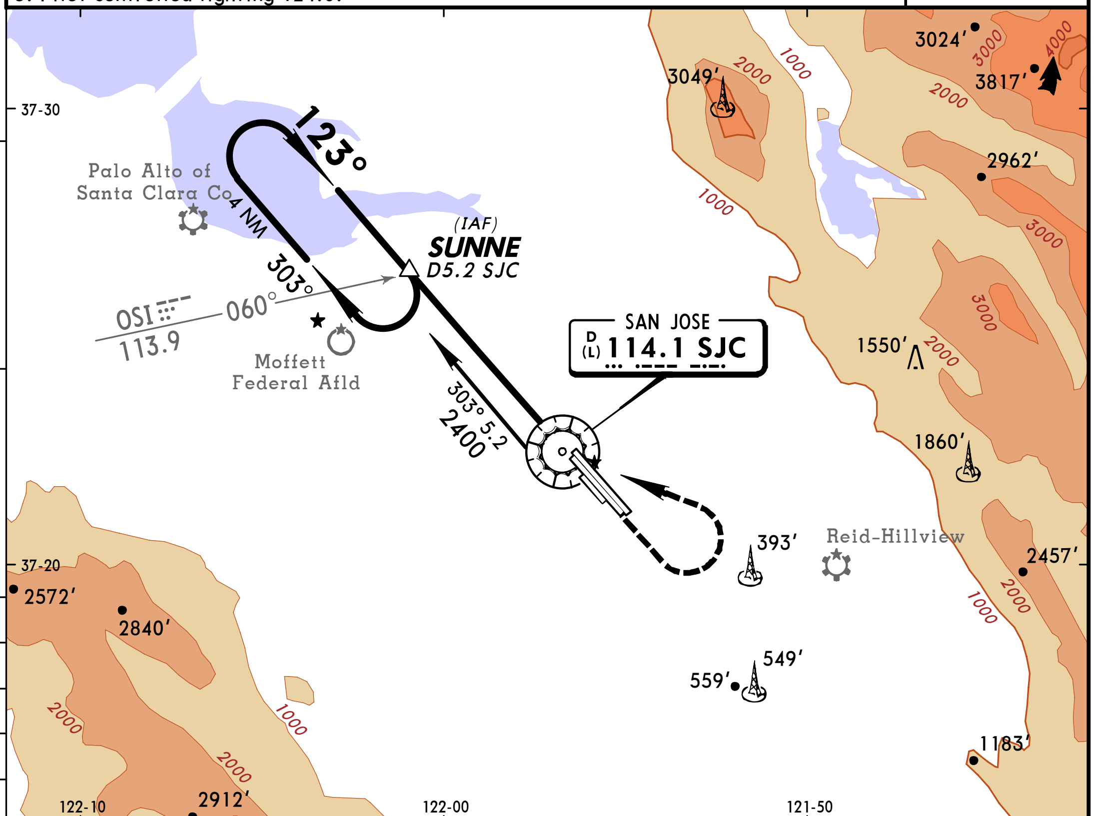
VOR SJC	Final Apch Crs	Minimum Alt SUNNE	MDA(H)	Apt Elev / TDZE 12R
114.1	123°	1900′ (1854′)	540′ (494′)	Apt Elev 62′ TDZE 12R 46′

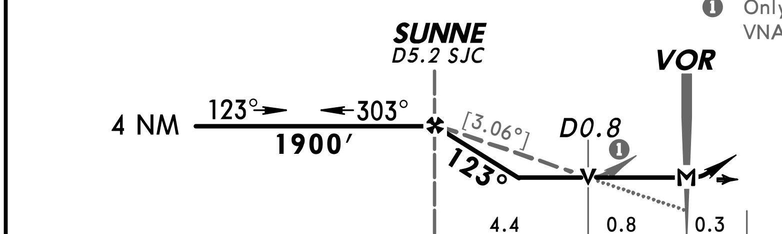
MISSED APCH: Climb to 900′ then climbing LEFT turn to 2000′ direct SJC VOR and outbound on SJC VOR R-303 to SUNNE/D5.2 SJC and hold.

Alt Set: INCHES Trans level: FL 180 Trans alt: 18000′
1. VGSI and descent angles not coincident. 2. REIL, PAPI-R Rwy 12L. PAPI-L Rwy 11.
3. Pilot controlled lighting 124.0.



MSA SJC VOR





❶ Only authorized operators may use VNAV DA(H) in lieu of MDA(H).

TDZE 12R 46′
TDZE 12L 44′
TDZE 11 49′

Gnd speed-Kts	70	90	100	120	140	160
Descent angle [3.06°]	379	487	541	650	758	866
MAP at VOR						

MALSR, PAPI — 900′ ↑ — 2000′ LT — SJC 114.1

	STRAIGHT-IN LANDING RWY 12R MDA(H) 540′(494′)			SIDESTEP LANDING RWY 12L MDA(H) 540′(496′)	SIDESTEP LANDING RWY 11 MDA(H) 540′(491′)	CIRCLE-TO-LAND Max Kts	MDA(H)
		RAIL out	ALS out				
A	1/2	3/4	1	1	1	90	640′(578′)-1
B	1/2	3/4	1	1	1	120	680′(618′)-1
C	3/4	1 1/4		2	2	140	700′(638′)-2
D	1	1 1/2		2	2	165	700′(638′)-2

AMEND 4
TERPS

CHANGES: Communications, charted obstructions.

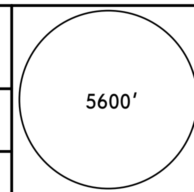
BRIEFING STRIP ™

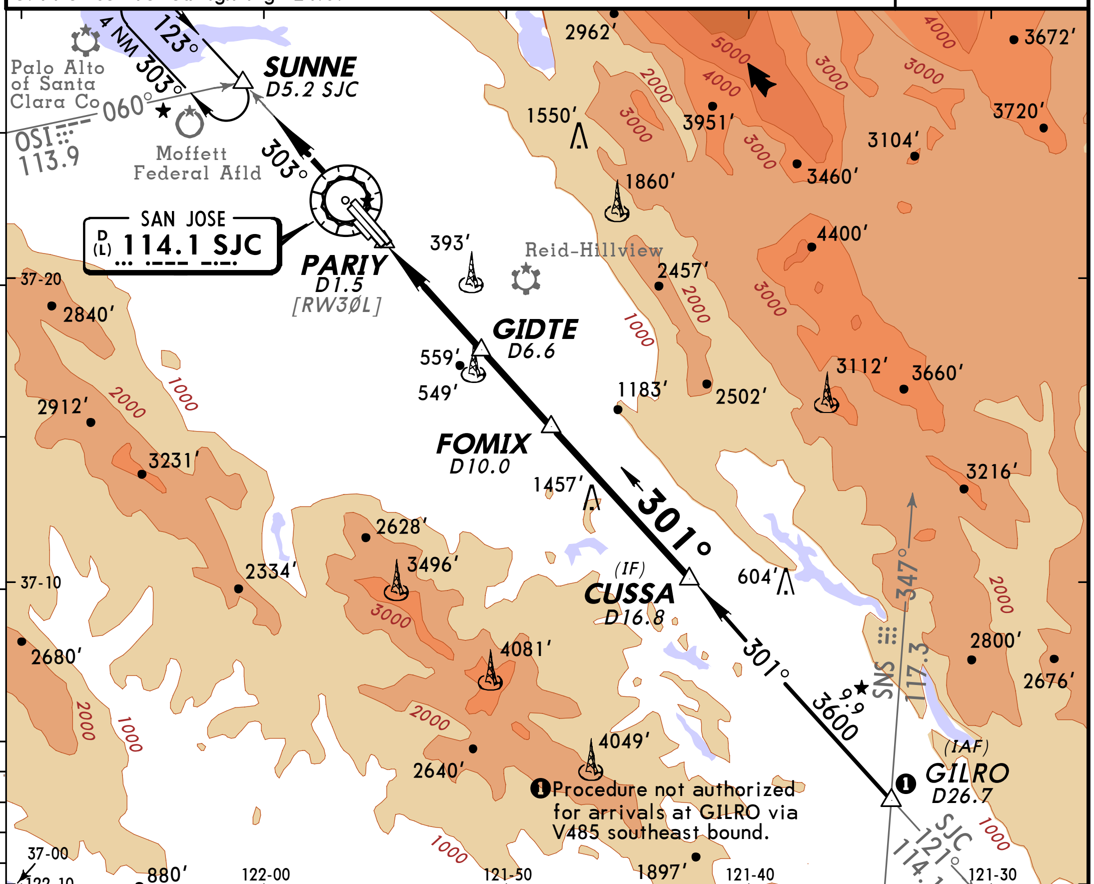
D-ATIS (ASOS when Twr inop)	NORCAL Approach (R)	*SAN JOSE Tower Rwys 12R-30L, 12L-30R CTAF	Rwy 11-29	*Ground
126.95	120.1	124.0	120.7	121.7

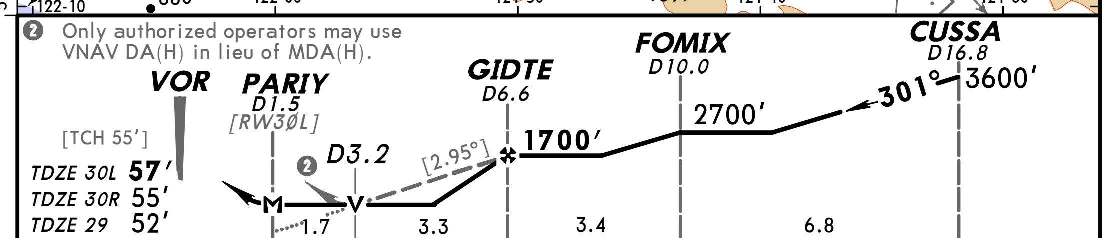
VOR SJC	Final Apch Crs	Minimum Alt GIDTE	MDA(H)	Apt Elev 62′ TDZE 30L 57′
114.1	301°	1700′ (1643′)	660′ (603′)	

MISSED APCH: Climb to 1900′ outbound via SJC VOR R-303 to SUNNE/D5.2 SJC and hold.

Alt Set: INCHES Trans level: FL 180 Trans alt: 18000′
1. VGSI and descent angles not coincident. 2. PAPI-L Rwys 29, 30R.
3. Pilot controlled lighting 124.0.







Gnd speed-Kts	70	90	100	120	140	160
Descent angle [2.95°]	365	470	522	626	731	835
MAP at PARIY						

MALSR / PAPI

1900′ ↑ via SJC 114.1 R-303 SUNNE

	STRAIGHT-IN LANDING RWY 30L MDA(H) 660′ (603′)	RAIL out	ALS out	SIDESTEP LANDING RWY 30R MDA(H) 660′ (605′)	SIDESTEP LANDING RWY 29 MDA(H) 660′ (608′)	Max Kts	CIRCLE-TO-LAND
A	RVR 24 or 1/2	RVR 40 or 3/4	RVR 50 or 1	1	1	A	NA
B						B	
C	RVR 60 or 1 1/4	1 3/4		1 3/4	1 3/4	C	
D	1 1/2	2		2	2	D	

AMEND 2
TERPS

CHANGES: Communications, charted obstructions.

BRIEFING STRIP ™

D-ATIS (ASOS when Twr inop)	NORCAL Approach (R)	*SAN JOSE Tower Rwys 12R-30L, 12L-30R CTAF	*SAN JOSE Tower Rwy 11-29	*Ground
126.95	120.1	124.0	120.7	121.7

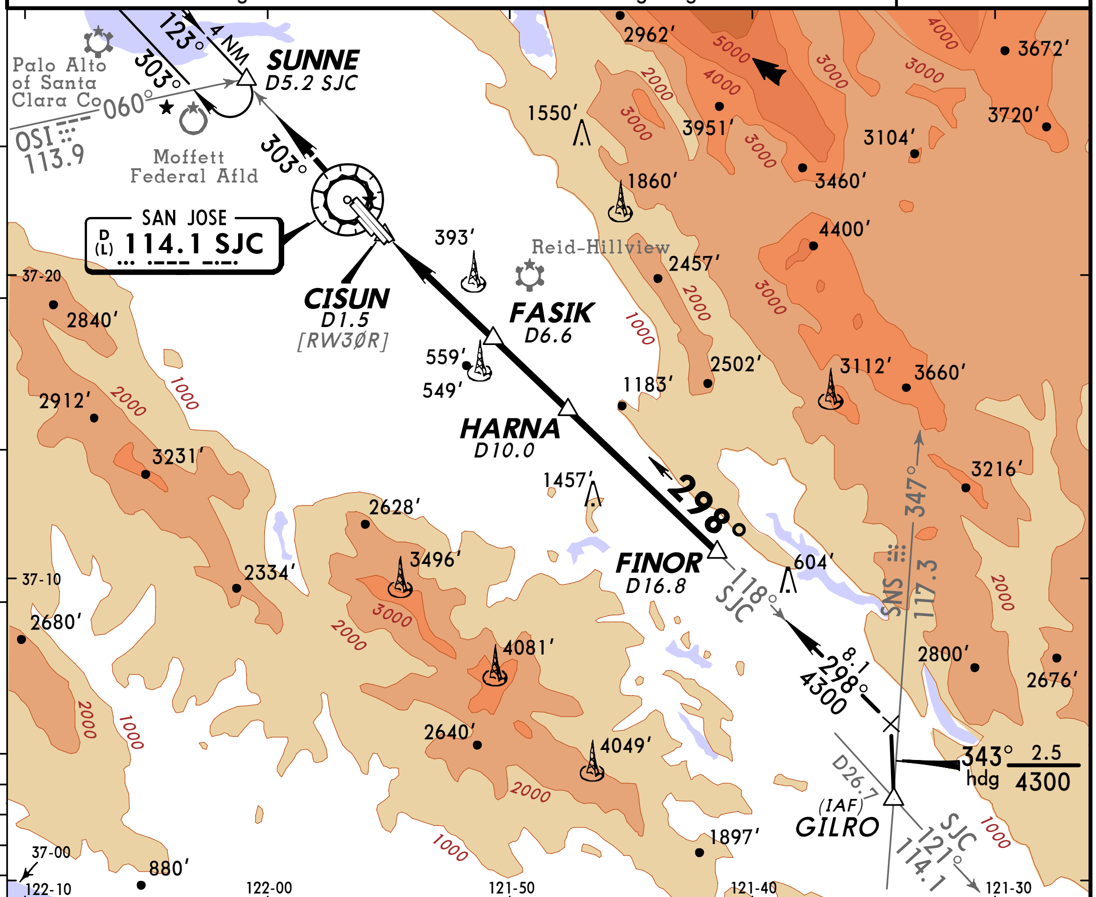
VOR SJC	Final Apch Crs	Minimum Alt FASIK	MDA(H)	Apt Elev 62′
114.1	298°	1900′ (1845′)	660′ (605′)	TDZE 55′

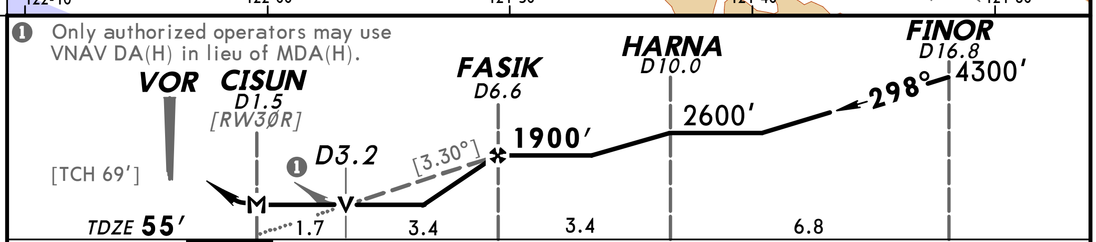
MISSED APCH: Climb to 2100′ outbound via SJC VOR R-303 to SUNNE/D5.2 SJC and hold.

Alt Set: INCHES Trans level: FL 180 Trans alt: 18000′

1. VGSI and descent angles not coincident. 2. Pilot controlled lighting 124.0.

5600′
MSA SJC VOR





Gnd speed-Kts		70	90	100	120	140	160
Descent angle	[3.30°]	409	526	584	701	817	934
MAP at CISUN							

PAPI-L

2100′ via SJC 114.1 R-303 SUNNE

	STRAIGHT-IN LANDING RWY 30R MDA(H) 660′ (605′)	Max Kts	CIRCLE-TO-LAND MDA(H)
A	1	90	660′ (598′) - 1
B	1	120	680′ (618′) - 1
C	1¾	140	680′ (618′) - 1¾
D	2	165	680′ (618′) - 2

AMEND 0
TERPS

CHANGES: Communications, charted obstructions.

Appendix C

The FAA's
Obstruction Evaluation / Airport Airspace Analysis (OE/AAA)
Process

The following paragraphs describe the FAA OE/AAA process. Much of this process, including the mechanisms for filing a Form 7460-1 on-line, can be found on the FAA's OE/AAA website,

http://oeaaa.faa.gov

Step 1 – Filing of Form 7460-1

A project proponent must file FAA Form 7460-1 for any proposed construction or alteration that meets the following FAR Part 77 Notice Criteria:

- A height more than 200 feet above ground level (AGL) at its site;
- Within 20,000 feet of a runway more than 3,200 feet in length, and exceeding a 100:1 slope imaginary surface (i.e., a surface rising 1 foot vertically for every 100 feet horizontally) from the nearest point of the nearest runway;
- When requested by FAA, any construction or alteration that would be in an instrument approach area and may exceed a FAR Part 77 obstruction standards; or,
- Any construction or alteration on any public-use or military airport.

Roadways, railroads, and waterways are also evaluated based on certain standards specified in Part 77, or by the height of the highest mobile object normally traversing the transportation corridor.

Step 2 – Processing of Form 7460-1

FAA follows the following steps to process the Form 7460-1:

1. An aeronautical study number (ASN) is assigned and data for the case is entered into OE automation program.
2. An acknowledgement letter is sent to proponent, or in the case of on-line filing, the data and ASN are immediately available.
3. The EOS distributes the case to other FAA divisions for comments.

Step 3 – Initial Aeronautical Study: Checking Obstruction Standards

FAA conducts an aeronautical study under the provisions of Part 77 (for proposed construction or alteration) or the Federal Aviation Act of 1958 (for existing structures)

An object constitutes an obstruction to air navigation if any of the following obstruction standards are exceeded:

- A height more than 500 feet above ground level (AGL) at the object site.
- A height AGL or above the airport elevation, whichever is greater, exceeding 200 feet within 3 nautical miles (NM) of the Airport Reference Point (ARP), and that height increases at a rate of 100 feet per NM up to 500 feet within 6 miles.
- A height that increases a minimum instrument flight altitude within a terminal area (TERPS and related criteria).
- A height that increases a minimum obstruction clearance (MOCA) under en-route criteria.
- The surface of a take-off and landing area of an airport or any imaginary surface defined in later sections.

Step 4 – Aeronautical Study Results

FAA issues one of the following responses after conducting the initial aeronautical review:

- If the project does not exceed notice criteria or obstruction standards, a determination of Does Not Exceed (DNE) or a Determination of No Hazard (DNH) is issued with no expiration date and no marking/lighting requirements.
- If the project exceeds notice criteria, but does not exceed obstruction standards and is 200 feet AGL or less, a DNE or DNH is issued with no expiration date and no marking/lighting is necessary.
- If the project exceeds notice criteria, but does not exceed obstruction standards and is more than 200 feet AGL, a DNH is issued with appropriate marking/lighting recommendations.
- If the project exceeds obstruction standards, a Notice of Presumed Hazard (NPH), (formerly known as a Determination of Presumed Hazard or DPH) is issued. This determination is temporary, with a 60-day expiration date. If no resolution is attempted within 60 days, the case closes. When an NPH is issued, three resolution options are available to the project proponent:

    1. The proponent may opt to lower the height of the structure so that it does not exceed obstruction standards; resulting in the issuance of a DNH.
    2. The proponent may request the FAA to perform further aeronautical study at the original requested height.
    3. The proponent may request the FAA to perform further aeronautical study at a reduced height that is lower than the original requested height but not as low as the height not exceeding hazard standards, depending on a variety of factors.

If requested, the FAA performs further aeronautical study, analyzing flight procedures in the airspace in the vicinity of the proposed structure, in order to determine whether the proposed structure would have a significant adverse affect to a substantial amount of air traffic, and thereby constitute a hazard to air navigation. The most frequently applied criteria for hazard status determinations are TERPS criteria, but other criteria can be cited.

During the further aeronautical study phase, the FAA at its discretion may "circularize" the proposal under the Public Notice process. A Public Notice contains the basic data of the proposal and the amount by which it exceeds obstruction standards, and may contain affects to published instrument procedures if the FAA has calculated those in the early review. The Public Notice is posted on the publicly available portion of the FAA's OE/AAA website, and can also be emailed or mailed to local airport sponsors, airlines, pilots' associations, and other interested parties in the aviation community, at the FAA's discretion. Members of the public may submit comments within 30 to 40 days of the issuance of Public Notice. The FAA must consider all comments of a significant aeronautical nature as part of the further aeronautical study phase.

At the conclusion of the further aeronautical study phase, the FAA will determine whether or not the proposed structure would constitute a hazard to air navigation.

Step 5 – Issuance of Determination

If no substantial adverse effect is identified, a DNH would be issued, with an 18-month expiration date. On the DNH letter, the FAA requests a supplemental Notice of Actual Construction (Form

7460-2) at least 10 days prior to beginning construction and/or within 5 days after structure reaches its greatest height. In addition, a survey of the finished structure may be requested if required by Flight Procedures Office.

If the proposed structure is found to have substantial adverse effect, the FAA contacts the proponent to notify them of the results of the further aeronautical study; generally, a maximum height not exceeding hazard standards. If the proponent accepts this height, a DNH can be issued for the negotiated height.

If the proponent does not accept the height, a Determination of Hazard (DOH) to air navigation is issued.

Petitions for Discretionary Review

Within 30 days of the issuance of a final determination, a petition for discretionary review (an "appeal") may be filed with the FAA Washington, DC Headquarters. A petition could be filed by the structure proponent in protest of a DOH, or by an aviation-interested party in protest of a DNH. The Airspace and Rules Division (ATA-400) is responsible for processing petitions. A requested review may be granted or denied. If discretionary review is denied, the determination will be made final. When a review is granted, the regional determination may be affirmed, revised or reversed by FAA Headquarters.

Step 6 – Distribution of Obstacle Data

The FAA OES maintains and updates a list of all the proposed projects and projects for which the supplemental Form 7460-2 has been submitted. This information regarding man-made objects is periodically incorporated into the Digital Obstacle File (DOF) maintained and updated by NACO. The DOF can be used internally by the FAA, and can be purchased by airlines, airports, and other vendors or consultants for use in obstacle evaluation, flight procedure design, and the like.