



APPENDIX E

East San Diego County Flight Procedure Evaluation

March 2020 |

San Diego International Airport

Air Traffic Flight Procedure Evaluation East San Diego County Flight Procedure Evaluation

Prepared for:

San Diego County Regional Airport Authority

Prepared by:

RICONDO

Ricondo & Associates, Inc. (Ricondo) prepared this document for the stated purposes as expressly set forth herein and for the sole use of San Diego County Regional Airport Authority and its intended recipients. The techniques and methodologies used in preparing this document are consistent with industry practices at the time of preparation and this Report should be read in its entirety for an understanding of the analysis, assumptions, and opinions presented. Ricondo & Associates, Inc. is not registered as a municipal advisor under Section 15B of the Securities Exchange Act of 1934 and does not provide financial advisory services within the meaning of such act.

TABLE OF CONTENTS

1. Executive Summary.....1-1

2. Background.....2-1

3. East County Noise Concerns.....3-1

4. Noise Reduction Objectives4-1

5. Flight Procedure Evaluation5-1

 5.1 Roles and Responsibilities.....5-2

 5.1.1 San Diego County Regional Airport Authority.....5-2

 5.1.2 East County Working Group.....5-2

 5.1.3 Federal Aviation Administration Air Traffic Organization.....5-3

 5.1.4 Members of the Public.....5-3

 5.2 Define Requirements.....5-3

 5.2.1 Concept Development Parameters.....5-3

 5.2.2 Federal Aviation Administration Mission and Goals.....5-4

 5.2.3 East County Working Group Input on Design and Evaluation Process.....5-7

6. Preliminary Draft Design Concepts6-1

 6.1 Federal Aviation Administration Air Traffic Environment – Baseline Review.....6-1

 6.2 Preliminary Draft Design Concept Summary.....6-2

 6.3 Preliminary Design Concepts Review and Input.....6-3

7. Draft Design Concepts.....7-1

 7.1 Draft Design Concept Results Summary.....7-1

 7.2 Draft Design Concept Results Review and Input.....7-2

 7.2.1 East County Working Group Input.....7-2

 7.2.2 Federal Aviation Administration Air Traffic Organization Airspace and Procedure Review.....7-3

8. Final Design Concept8-1

 8.1 Final Design Concept Results Summary.....8-1

 8.2 Refined Design Concept Review.....8-1

 8.3 Aircraft Noise Screening of Final Design Concepts.....8-1

 8.3.1 Noise Screening Methodology.....8-2

 8.3.2 Noise Screening Results.....8-6

 8.4 Final Design Concept Review and Input.....8-12

9. Final Recommendations9-1

LIST OF APPENDICES

- Appendix A East County Working Group Meeting Presentations
- Appendix B East County Working Group Comments/Responses
- Appendix C East County Procedure Design Sheet

LIST OF TABLES

Table 5-1	Concept Development Parameters Description.....	5-5
Table 6-1	Preliminary Draft Design Concept Phase Summary.....	6-2
Table 7-1	Draft Design Concept Phase Summary.....	7-2
Table 8-1	Final Design Concept Phase Summary	8-1
Table 8-2	Baseline Model Existing Traffic Flow.....	8-2
Table 8-3	Alternative 1 Noise Screening Model Scenarios	8-5
Table 8-4	Alternative 2 Noise Screening Model Scenarios	8-9

LIST OF EXHIBITS

Exhibit 3-1	Radar Flight Track Density for Arrivals to SDIA Runway 27 – July 2016, November 2016, and July 2017	3-3
Exhibit 8-1	Alternative 1 and Baseline Noise Model Tracks with Community Noise Equivalent Level Changes.....	8-7
Exhibit 8-2	Changes in Community Noise Equivalent Levels – Alternative 1 Compared to Baseline	8-8
Exhibit 8-3	Alternative 2 and Baseline Noise Model Tracks with Community Noise Equivalent Level Changes.....	8-10
Exhibit 8-4	Changes in Community Noise Equivalent Levels – Alternative 2 Compared to Baseline	8-11

1. EXECUTIVE SUMMARY

The San Diego International Airport (SDIA or the Airport) Air Traffic Flight Procedure Evaluation (Flight Procedure Evaluation) was conducted in fulfillment of the San Diego County Regional Airport Authority's (the Authority's) action plan to evaluate the feasibility of the SDIA Airport Noise and Advisory Committee's (ANAC's) noise reduction recommendations related to published instrument flight procedures (flight procedures).¹ Through discussions at multiple meetings, it was recognized that the ANAC recommendations did not include any recommendations specific to the areas located east of the Airport. As a result, on August 30, 2018, the Authority staff determined the most effective way to evaluate the complex air traffic environment and the related flight procedures over communities located in East San Diego County (East County) was to collaborate with a working group comprised of community representatives located in East County.

The intent of working with the East County Working Group (ECWG) was to understand SDIA aircraft overflight noise concerns and to collect input from community representatives on flight procedure concepts designed to address concerns. According to discussions with the ECWG, the primary noise concerns were related to jet arrivals from the northwest to SDIA when aircraft are landing on Runway 27. The concerns were as follows:

- A change in the arrival traffic pattern was noticeable in late 2016.
- Residents are hearing more noise in the morning (6:30 a.m. to 11:00 a.m.) and in the late evening (10:00 p.m. to 11:00 p.m.).
- Aircraft are lower as they proceed south to join the final approach to Runway 27.
- Aircraft overflights over the East County communities have increased.

A detailed operations analysis was conducted, which concluded the following:

- Arrival traffic was concentrated over some East County communities after the Federal Aviation Administration's (FAA's) implementation of the BAYVU 5 area navigation (RNAV)² standard terminal approach route (STAR)³ procedure and the Runway 27 required navigation performance (RNP) approach in November 2016.
- The average altitude of aircraft turning south to join the final approach did not change, but the concentration of arrivals along an RNAV route between two waypoints, KLOMN and NADDO, increased the frequency of aircraft at altitudes below 6,000 feet mean sea level (MSL).

¹ Flight procedure is a predefined set of guidance instructions that define a route for a pilot to follow.

² RNAV permits aircraft operation on any flight path within the coverage of referenced navigation aids, such as Global Positioning System (GPS) network, distance measuring equipment (DME), and/or very high omnidirectional radial (VOR). The method relies on navigational aids to provide the position of an aircraft both laterally and vertically.

³ The STAR is a published instrument arrival procedure that provides pilots with defined lateral and vertical guidance to facilitate safe and predictable navigation from a specific high-altitude route in the enroute airspace through the terminal airspace to an airport. A "conventional" STAR follows a route between two points defined by ground-based navigational aids, and/or it may be based on air traffic controller-issued headings or vectoring. An RNAV STAR defines a more predictable path through the airspace than a conventional STAR through the combination of GPS and aircraft flight management systems (aircraft autopilot or flight path guidance on screen).

- The number of arrivals increased over the years as a result of higher air traffic demand, but the proportion of arrivals from the northwest compared to other directions (i.e., arrivals from the east and south) have remained the same.
- The management of arrival traffic over East County is complex and requires flexibility for FAA air traffic controllers to manage arrivals from all directions and merge the traffic on the final approach in a safe and efficient manner.

The initial discussions with the ECWG focused on the establishment of the current traffic environment and the available methods to reduce noise for East County. As a result, the following objectives were established for alternatives to reduce noise:

- Maintain flight path dispersion.
- Raise altitudes over populated areas.
- Turn south to join final approach over less populated areas.

The purpose of the East County Flight Procedure Evaluation was to determine the feasibility of conceptual standard instrument flight procedures intended to address noise concerns and objectives identified by the ECWG. This report provides documentation related to an independent conceptual design and screening evaluation of the proposed flight procedure recommendations, which was conducted by the consultant, Ricondo & Associates, Inc. (Ricondo).

The analysis process involved three phases of conceptual design: Preliminary Draft Design Concept, Draft Design Concept, and Final Design Concept. In the Preliminary Draft Design Concept phase, initial design concepts were developed to satisfy the intent of addressing ECWG noise concerns. Designs that did not meet the evaluation's objectives—reduce noise, maintain safety, maintain airfield capacity, ensure the required performance-based navigation (PBN)⁴ RNAV procedure design criteria are met, complement existing air traffic regulations, and/or avoid substantial operational hurdles—were not considered.

The Draft Design Concept phase included refinement and more detailed concept procedure design of the remaining recommendations, or it included a derivative of a recommendation that was eliminated in the Preliminary Draft Design Concept phase. Concepts that did not meet operational and PBN RNAV procedure design criteria and/or did not reflect the FAA's mission and goals related to safe and efficient management of air traffic were eliminated. Recommendations and the related conceptual procedure designs that passed through the Draft Design Concept phase screening analysis were carried forward to the Final Design Concept phase.

With the safety, operational, and PBN RNAV procedure design criteria merits of each measure assessed in the first two phases, the Final Design Concept phase screening analysis was based on aircraft noise exposure. The results of the analysis were used to determine potential changes in Community Noise Equivalent Level (CNEL)⁵ decibel (dB) noise exposure levels. Potential increases in the CNEL were carefully considered to determine if the change would be consistent with FAA policy regarding noise exposure and noise abatement, and if the FAA would require

⁴ PBN is an advanced, satellite-enabled form of air navigation in the National Airspace System that creates precise 3-D flight paths. Procedures are based on the RNAV method of navigation and the precision requirements to ensure aircraft are within a set distance from the intended route (known as "lateral containment"). Performance requirements are based on the type of navigation (e.g., satellite or ground-based navigational aid), equipment on the aircraft, and pilot training.

⁵ CNEL is the average sound level over a 24-hour period, with a penalty of 5 decibels (dB) added between 7:00 p.m. and 9:59 p.m. and a penalty of 10 dB added for the nighttime hours of 10:00 p.m. to 6:59 a.m.

additional environmental analysis and documentation.

The process involved coordination with the ECWG and the FAA Air Traffic Organization (ATO) representatives to:

- Confirm the intent of each measure.
- Understand the current air traffic control (ATC) environment to determine concept procedure opportunities.
- Collect feedback on operational aspects of the procedure design concepts.
- Review and collect input on initial findings with community representatives.
- Modify design concepts to enhance feasibility.
- Evaluate potential changes to the CNEL if feasible design concepts were implemented.
- Collect input on the results with community representatives.
- Recommend feasible procedure design concepts to the Authority for further consideration.

Ricondo designed and evaluated seven (7) unique flight procedure concepts throughout the process. The number of design concepts evaluated for each phase were as follows:

- Preliminary Draft Design Concept – Five design concepts were developed and evaluated. One was a newly designed procedure; one was to maintain an existing procedure but emphasize use; and three involved proposed modifications to existing procedures. One was passed to the next phase, and four were eliminated from further consideration based on the ECWG objectives or operational feasibility issues.
- Draft Design Concept – Three design concepts were developed and evaluated. Two were newly designed approach procedures, and one proposed a modification to an existing procedure that was evaluated under the Preliminary Draft Design Concept phase. The intent of the design concepts was to raise altitude and increase dispersion and turn aircraft over less populated areas during low demand periods. Two design concepts were passed to the next phase, and one was eliminated from further consideration due to design criteria.
- Final Design Concept – Two design concepts from the Draft Design Concept phase were evaluated for potential changes in CNEL noise exposure. Based on the ECWG’s objectives, FAA design criteria, noise modeling results, and input from ECWG representatives, Ricondo did not recommend proceeding forward with the two design concepts due to increases in the CNEL.

The following sections describe the project background, the analysis process, the findings related to each proposed concept related to air traffic procedures, and the recommended conceptual designs for Authority consideration.

2. BACKGROUND

Over the past several years, aircraft noise concerns have increased in communities surrounding San Diego International Airport (SDIA or the Airport), including the eastern area of San Diego County (East County). Many believe the concerns were a result of the Federal Aviation Administration (FAA) Air Traffic Organization's (ATO's) Southern California Metroplex (SoCal Metroplex) area navigation (RNAV) procedure implementation project. These concerns were presented and studied further as part of SDIA Airport Noise and Advisory Committee (ANAC) proceedings. The San Diego County Regional Airport Authority (the Authority) relies upon the ANAC as a primary mechanism to coordinate aircraft noise issues. In accordance with Authority Board Policy 9.20, ANAC serves as a committee to the Authority Board and provides a forum for resident and community input and involvement on aircraft noise issues.

On October 18, 2017, ANAC requested the Authority staff to present 21 recommendations for noise reduction to the Authority Board. These recommendations were originally developed by the ANAC Subcommittee (Subcommittee) to address recent increased noise concerns in communities surrounding SDIA, including those related to the SoCal Metroplex RNAV published instrument flight procedures (flight procedures), which were implemented in early 2017. In September 2016, the Subcommittee developed a work plan to guide its efforts over a 1-year term. Authority staff facilitated the Subcommittee's deliberations through 12 public technical meetings. The final deliverable of the Subcommittee's efforts was the 21 recommendations presented to ANAC in October 2017.⁶

Authority staff reviewed the ANAC recommendations between October 2017 and December 2017 and developed an action plan to address the feasibility of each recommendation. Several recommendations were related to reducing noise levels below Community Noise Exposure Level (CNEL) 65 decibels (dB); however, the FAA does not typically consider this as an acceptable measure under Title 14 Code of Federal Regulations Part 150 (14 CFR Part 150), unless a proposed procedure change is expected to reduce the number of people exposed to CNEL 65 dB or higher.⁷ The Authority decided to initiate and conduct the Flight Procedure Evaluation to evaluate the ANAC recommendations focused on reducing noise levels below CNEL 65 dB. This effort was conducted in parallel with the 14 CFR Part 150 study update process.

One of the most significant concerns raised at the October 18, 2017, ANAC meeting was the continuation of the Subcommittee (ANAC Recommendation 3). Authority staff recommended the continuation of the Subcommittee be accomplished through the establishment of a Citizen Advisory Committee (CAC) that would work alongside the Technical Advisory Committee (TAC) during the 14 CFR Part 150 study update process. Therefore, the CAC was established and held its first meeting on March 22, 2018. Concerns related to East County were revealed in discussions with CAC, which had one representative from East County. However, because the concerns specific to East County were not explicitly addressed in the ANAC recommendations, the Authority determined a working

⁶ San Diego County Regional Airport Authority, *Board Agenda and Meeting Materials – December 7, 2017*, "Item 15 - Action Plan for Addressing the Airport Noise Advisory Committee (ANAC) Recommendations," Exhibit A: Airport Noise Advisory Committee (ANAC) Subcommittee Recommendation (ANAC Approval), Approved, <https://san.org/Airport-Authority/Meetings-Agendas?EntryId=9048> (accessed September 13, 2018).

⁷ CNEL 65 dB is considered the FAA's compatibility threshold for residential land use. Residential areas exposed to CNEL 65 dB or higher are considered incompatible, unless the residential unit was mitigated (e.g., sound insulation). Residential areas exposed to levels below CNEL 65 dB are considered compatible.

group comprised of multiple community areas in East County was necessary to ensure specific concerns throughout East County were adequately represented. The Authority worked with the East County ANAC representative in the formation of the East County Working Group (ECWG), which was announced to CAC on August 30, 2018.

The intent of the East County Flight Procedure Evaluation effort was to identify noise concerns; establish noise reduction objectives for ECWG; and identify conceptual flight procedure designs that met FAA design criteria, did not affect the safe and efficient movement of aircraft, and provided noise relief, as intended by the ECWG. The effort conducted was similar to the Flight Procedure Evaluation conducted for other communities, such as La Jolla, Mission Beach, Ocean Beach, and Point Loma, and it was designed to evaluate flight procedures similar to the FAA's first phase of its performance-based navigation (PBN) implementation process, as described in FAA Order 7100.41A, *Performance Based Navigation Implementation Process* (FAA Order 7100.41A).

The first phase of the FAA's process, called the Preliminary Activities phase, examines current operations, develops a concept, evaluates potential environmental issues, and determines expected benefits. Based on the information collected in the first phase, the FAA would determine if the request should proceed through the development and implementation process based on the FAA's mission and goals. The Authority tasked Ricondo & Associates, Inc. (Ricondo), an aviation advisory consulting services firm with expertise in aircraft noise planning and PBN RNAV procedure design, to assist in conducting the same type of efforts using the same toolsets the FAA uses as part of its process. Additionally, the Authority relied upon input from the ECWG members to aid in identifying potential concerns and to ensure the proposed design concepts met the overall objectives related to reducing aircraft noise.

3. EAST COUNTY NOISE CONCERNS

Because the ANAC recommendations did not document aircraft noise concerns specific to East County, the first step in the evaluation process was to learn about the aircraft noise concerns currently experienced by each representative from the ECWG. The first meeting held on December 6, 2018, focused on the current SDIA overflight patterns over East County and the noise concerns verbalized by each member of the ECWG. The intent was to identify the traffic patterns most likely associated with noise concerns that should be the focus of the East County Air Traffic Flight Procedure Evaluation (Flight Procedure Evaluation) effort.

The ECWG was comprised of representatives from several community areas in East County:

- Grossmont
- Mount Helix
- Lemon Grove
- Spring Valley
- La Mesa
- Valle De Oro
- Sweetwater
- El Cajon

Ricondo conducted an operations analysis between 2014 and 2018 related to jet arrivals into SDIA that operated over East County communities. The analysis utilized the Authority's Airport Noise and Operations Management System (ANOMS) data and analytic toolsets available in the system. The analysis focused on quantifying key operation patterns and possible changes since 2014, including the number of operations, flight path location, and average altitudes over the area. Ricondo presented the following findings to the ECWG on December 6, 2018 (refer to **Appendix A** to review presentations provided at ECWG meetings):

- July has been the month with the highest number of operations each year since 2014.
- The annual compound growth rate for July was 2.9 percent between 2014 and 2018.
- The proportion of jet arrivals from the northwest compared to other directions (i.e., east and south) was approximately 40 percent for each year between 2014 and 2018.
- Typical flight path locations changed in November 2016 after the FAA implemented the BAYVU 5 RNAV standard terminal arrival routes (STAR)⁸ and Runway 27 required navigation performance (RNP) approach.

⁸ The BAYVU 5 RNAV STAR was replaced by the COMIX 1 RNAV STAR between January and April 2017, but the route between the KLOMN and NADD0 waypoints remained the same.

The most notable finding was the change in typical flight paths in November 2016. **Exhibit 3-1** depicts the radar track density of all arrivals into SDIA for July 2016, November 2016, and July 2017. The FAA implemented a change to the BAYVU RNAV STAR on November 2016 (called the BAYVU 5 RNAV STAR), which directed aircraft on the procedure to proceed southeast to a new waypoint called NADDO. Prior to November 2016, the BAYVU 4 RNAV STAR ended at the KLOMN waypoint, and aircraft would continue on an easterly heading until directed by FAA air traffic control (ATC) to turn south to merge the aircraft onto the final approach to Runway 27. According to FAA records, the additional route was added to provide predictable guidance for pilots to ensure aircraft remain within the Class B airspace.^{9,10} As a result, overflight frequency increased for communities under the route.

At the first ECWG meeting held on December 6, 2018, each member was asked to describe observations and concerns they and their community had pertaining to SDIA-related aircraft noise. Based on the input provided, the following summarizes the concerns shared by each member:

- A change in the arrival traffic pattern was noticeable in late 2016.
- Residents are hearing more noise in the morning (6:30 a.m. to 11:00 a.m.) and in the late evening (10:00 p.m. to 11:00 p.m.).
- Aircraft overflights over East County communities have increased.
- Aircraft are lower as they proceed south to join the final approach to Runway 27.

The following paragraphs summarize the operations analysis conducted to identify potential contributors to the ECWG's observations and concerns.

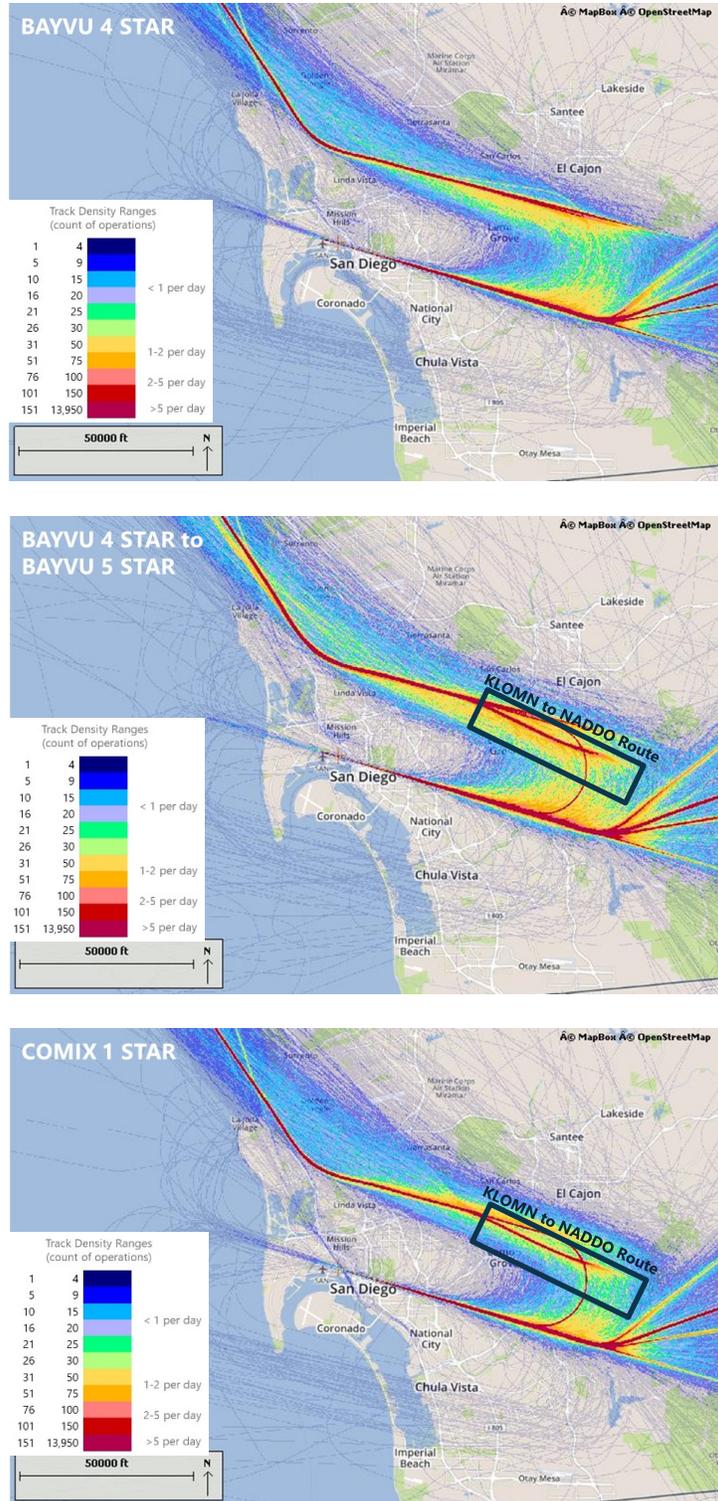
Change in Air Traffic Pattern – The operational assessment suggests the change that East County communities have identified seems to be correlated to the change made in November 2016 by the FAA to the BAYVU RNAV STAR. The change provided a predictable and repeatable route that caused an increase in overflight concentration over communities located between the KLOMN and NADDO waypoints.

Aircraft Overflight Frequency and Time of Day – The increase in overflight frequency was caused not only by an increased concentration of traffic, but also the growth in demand that has occurred since 2014. The increase in demand did play a role in East County communities' observations in increased aircraft overflights. As demand grew, so did the frequency of arrivals during certain hours that were typical for an airport that serves primarily final destination passengers. Scheduled SDIA arrivals began at 6:00 a.m. and peaked between 9:00 a.m. and 10:00 a.m. A second arrival peak occurred between 12:00 p.m. and 1:00 p.m. A third peak occurred between 3:00 p.m. and 6:00 p.m., and a fourth occurred between 7:00 p.m. and 11:00 p.m. This schedule pattern assisted in understanding East County communities' observations related to the timing of noise events. The ECWG was advised that addressing demand levels through restrictions was not a feasible measure for purposes of the traffic procedure evaluation and would require a 14 CFR Part 161 study, which would be extensive and time consuming, and it most likely would not lead to a successful conclusion based on previous efforts conducted by other airport sponsors.

⁹ Class B airspace is generally controlled airspace from the surface to 10,000 feet mean sea level that is surrounding a busy airport in terms of airport operations or enplaned passengers. The configuration of each Class B airspace area is individually tailored, consists of a surface area and two or more layers, and is designed to contain all published instrument procedures once an aircraft enters the airspace. Pilots must have an air traffic controller to operate in the area, and all aircraft must have a Mode C transponder that provides location and altitude. Aircraft that are cleared to enter are provided radar separation services by FAA air traffic control within the airspace.

¹⁰ US Department of Transportation, Federal Aviation Administration, Form 8260-1, *Flight Procedure Standards Waiver*, March 28, 2017.

EXHIBIT 3-1 RADAR FLIGHT TRACK TRACK DENSITY FOR ARRIVALS TO SDIA RUNWAY 27 – JULY 2016, NOVEMBER 2016, AND JULY 2017



SOURCES: San Diego County Regional Airport Authority Airport Noise and Operations Management System, November 2018.

Lower Aircraft Altitude – SDIA jet arrival altitudes from the northwest were evaluated, and findings were presented to the ECWG at the second meeting on January 24, 2019 (refer to Appendix A to review presentations provided at ECWG meetings). A gate (a window in space based on length and altitude) at the NADDO waypoint was defined in ANOMS to capture jet arrivals that go through the gate 6 nautical miles (NMs) east and west of the NADDO waypoint from the ground up to 10,000 feet above field elevation (AFE).¹¹ For July 2016 (prior to the BAYVU RNAV STAR change) and July 2018 (after the BAYVU RNAV STAR change), the average jet arrival altitude through the gate was 4,939 feet AFE and 4,861 feet AFE, respectively. The majority of arrivals captured through the gate were between 4,000 and 6,000 feet AFE for both July 2016 and July 2018. For both timeframes, some jet aircraft west of the NADDO waypoint location were as low as 3,000 feet AFE as aircraft turned south to join the final approach closer to the Airport. In summary, the average altitude, range of altitude, and location and frequency of jet aircraft below 4,000 feet AFE did not appear to change after the BAYVU RNAV STAR was implemented.

The notable difference between July 2016 and July 2018 was the concentration of traffic at specific locations along the distance of the gate. Although the range of altitudes are the same, the frequency of traffic entering the gate between 4,000 and 6,000 feet over communities near the NADDO waypoint location increased as a result of the change made to the BAYVU RNAV STAR and Runway 27 RNP approach. Just over half of the jet arrivals for July 2018 that went through the gate were located close to the NADDO waypoint location. Jet arrivals during July 2016 were more distributed along the gate. Therefore, the altitude over East County did not change, but the location where aircraft operate within the same altitude ranges has changed. This type of change can be noticeable by communities, and it appears to coincide with observations shared by some ECWG members.

¹¹ The airfield elevation for SDIA is 16.8 feet mean sea level.

4. NOISE REDUCTION OBJECTIVES

At the second ECWG meeting on January 24, 2019, three approaches to abate or reduce aircraft noise exposure through standard flight procedure design were presented:

- Move the flight procedure route location – define standard flight procedure routes that direct aircraft over more noise-compatible areas to abate aircraft noise exposure from residential and/or other noise-sensitive areas
- Raise the altitude along the flight procedure route – define the standard flight procedure route that raises altitude over communities to reduce noise levels
- Disperse or concentrate flight patterns based on type of procedure – define the standard flight procedure route to spread flight patterns over a large area to provide reduced frequency over a specific area or to provide a repeatable route that keeps all aircraft over a more compatible area to abate noise exposure from residential and/or noise-sensitive areas

Move the Flight Procedure Route Location – Based on a review of existing land use for East County communities, Ricondo determined there were limited land use opportunities to focus flight patterns over more compatible areas. Open space was available east of State Route (SR) 54 (i.e., San Diego National Wildlife Refuge), but relocating a flight procedure further east will impact other existing flight procedures for SDIA and other airports (i.e., Montgomery Field). The existing RNAV RNP Z Runway 27 approach directs aircraft just east of SR 54 and was discussed with the ECWG as an example to direct aircraft on a route that turns aircraft south over a more compatible area. ECWG members indicated concerns with the concentration effect over communities such as La Mesa, Casa de Oro, and Mount Helix if all arrivals from the northwest were assigned the RNAV RNP Z Runway 27 approach, but the ECWG is open to continued use of the procedure as long as all jet arrivals were not using the procedure.

Raise Altitudes on Procedure Routes – SDIA arrivals from the northwest ultimately need to merge to the final approach to Runway 27. Ricondo presented the required altitudes aircraft must be at along the descent on the straight-in final approach at the January 24, 2019, ECWG meeting. The closer an aircraft is to the Airport when merging on the final approach, the lower the altitude needs to be when intercepting the final approach. Prior to turning south to join the final approach, aircraft are on an easterly heading approximately 4 NMs north of the final approach. An aircraft should descend at a rate that is not too steep in order to ensure a stabilized approach. This means aircraft on the easterly heading cannot be at an altitude too high. Therefore, opportunities to raise arrival altitudes higher than the existing flight procedure altitudes over East County were limited, but the potential to reduce the frequency of aircraft below existing flight procedure altitudes was considered feasible for further consideration.

Disperse or Concentrate Flight Patterns – Based on current traffic patterns, the majority of jet arrivals to Runway 27 from the northwest were dispersed as aircraft turn south to join the final approach; although, concentration does occur over areas such as La Mesa when aircraft operate on the COMIX TWO RNAV STAR between the KLOMN and NADDO waypoints. Approximately 20 to 25 percent of jet arrivals operated on the RNAV RNP Z Runway 27 approach in 2018, which also concentrates traffic over the communities. The RNAV RNP Z Runway 27 approach directs traffic east after the KLOMN waypoint and turns aircraft south at the ADAJE waypoint located within the Casa de Oro area on a path that directs aircraft over the San Diego Wildlife Refuge area just east of the Lakeview at Highlands Ranch community and turns aircraft west over the Sweetwater Reservoir. Members of the ECWG understand the advantage of turning traffic south over more compatible areas, but they were concerned about the concentration over

communities like La Mesa and Casa de Oro as aircraft head east and begin the turn south. Based on input provided by the ECWG at the January 24, 2019, meeting, dispersion was a preferred method to abate noise for East County versus a concentrated path that would benefit some communities, but also impact others.

Considering the complexity involved in managing arrivals to Runway 27 and the concerns indicated by members of the ECWG, the following objectives were established, which considered flight procedure modifications or additions aimed at reducing noise exposure over East County:

- Raise the altitude of arrivals from the northwest to Runway 27 on the downwind flight pattern (when aircraft are proceeding east before turning south to join the final approach). This objective can be accomplished by either raising altitude requirements on a procedure or increasing the frequency of aircraft at or above current altitude requirements on existing procedures.
- Maintain dispersion as aircraft proceed downwind and turn south over residential areas. This objective can be accomplished by procedure designs that do not include an RNAV-based route; it relies primarily on air traffic controller direction.
- Turn aircraft south to join the final approach over less populated areas. This objective can be accomplished by extending arrivals further east (up to the Casa De Oro area) prior to turning south, so aircraft operate over a more compatible area prior to joining the final approach to Runway 27.

Ricondo relied upon these objectives to aid in identifying traffic procedure concepts. Section 5 describes the concepts and evaluation results.

5. FLIGHT PROCEDURE EVALUATION

Because this report often refers to ATC, it is important to understand the ATC requirements. Appendix A of the *San Diego International Airport Air Traffic Flight Procedure Evaluation Report* provides basic background information on the National Airspace System (NAS) and ATC. The information includes a description of the NAS, the role of ATC, the aircraft flow within the NAS, the type of ATC facilities, ATC requirements, and the FAA's Next Generation Air Transportation System (NextGen) program.

Ricondo conducted the traffic procedure evaluation on the design concepts using the same techniques applied by the FAA during the Preliminary Activities phase described in FAA Order 7100.41A. The primary tasks were as follows:

- Determine the justification for procedure based on ECWG objectives.
- Become familiar with existing traffic flows, procedures, and airspace boundaries.
- Determine constraints related to the safe and efficient movement of aircraft.
- Develop conceptual PBN RNAV procedures using the FAA's Terminal Area Route Generation Evaluation and Traffic Simulation (TARGETS) software (applicable to new flight procedure concepts or modifications to existing procedures).
- Determine if a proposed change meets or conflicts with the FAA's goals and objectives.
- Evaluate potential benefits related to the justification for a procedure.

Ricondo evaluated RNAV procedure design concepts in a manner similar to the first phase detailed in FAA Order 7100.41A.¹² Ricondo did not have access to the specific safety data sources identified in the criteria, but the consultant relied upon FAA ATO Airspace and Procedures subject matter experts to provide input and feedback on the proposed concepts to qualitatively identify potential safety and air traffic management issues. Because of the terrain and obstructions located in East County, the evaluation did include an obstruction analysis using the FAA's TARGETS PBN design software. The designs developed for this evaluation are conceptual in nature and could be subject to change during the FAA's design process as a result of more detailed analysis, such as additional obstruction analysis, safety risk assessments, airline flight simulations, environmental screening assessments, flight check, charting, and/or additional stakeholder engagement and feedback.

Ricondo conducted the evaluation in three phases: Preliminary Draft Design Concept, Draft Design Concept, and Final Design Concept. The phased approach provided stopping points to collect input from the ECWG. Stopping at each phase to review the concept designs served as a means to ensure the design concepts not only met the ECWG's intent of reducing noise exposure, but also identified potential issues related to safety, efficiency, operation procedures, aircraft capabilities, and/or land use compatibility. Ricondo collected input from ECWG members after each meeting and considered the input to determine potential refinements and, ultimately, a final design recommendation. **Appendix B** contains all the written input submitted by the ECWG members and the responses drafted by Ricondo throughout the process.

¹² US Department of Transportation, Federal Aviation Administration, Order 7100.41A, *Performance Based Navigation Implementation Process*, April 28, 2016.

The following subsections provide more detailed information regarding the Flight Procedure Evaluation process related to the roles and responsibilities for each stakeholder and the flight procedure concept design constraints and requirements.

5.1 ROLES AND RESPONSIBILITIES

The Flight Procedure Evaluation process for East County involved a diverse set of stakeholders with different roles, responsibilities, and interests in the outcomes of the evaluation. This section identifies the various key stakeholders and describes their roles and responsibilities.

5.1.1 SAN DIEGO COUNTY REGIONAL AIRPORT AUTHORITY

As the operator of SDIA, the Authority is the sponsor of the Flight Procedure Evaluation project and has the overall responsibility for the conduct of the evaluation. The Authority contracted Ricondo, developed the Scope of Work, and funded the evaluation. By virtue of its role on this evaluation, the Authority was the final decision-maker regarding all aspects of the project, including the execution of the project; the coordination in forming the ECWG; the flight procedure concepts to be included in the evaluation; and the appropriate direction to take related to next steps. The Authority will consider Ricondo's final recommendations and stakeholder input from the ECWG when deciding on an appropriate level of effort and the next steps at the conclusion of the evaluation.

The Authority does not have legal authority to regulate air traffic procedures. Through federal law, Congress has essentially preempted airports, states, and local governments from regulating (a) the price, route, and service of air carriers; (b) the use of airspace and airspace management; and (c) aircraft noise. These laws are as follows: Federal Aviation Act of 1958, as amended (Pub. L. No. 85-726, 72 Stat. 731 49 U.S.C., § 0103[b][1]&[2]); Noise Control Act of 1972 (49 U.S.C. §§ 44709, 44715); Airline Deregulation Act of 1978 (ADA; 49 U.S.C. 41713[b]); Airport Noise and Capacity Act of 1990 (ANCA; 49 U.S.C. § 47521 et. seq; 14 Code of Federal Regulations Part 161); and Aviation Safety and Noise Abatement Act of 1979 (ANSA; 49 U.S.C. § 40116, 46505, 47501 et seq.).

"Federal preemption" is a legal concept based on the Supremacy Clause in the US Constitution (Article VI, Clause 2). It applies when Congress evidences an intention to exercise broad federal control in a particular area. Today, airport sponsors are preempted from controlling or regulating aircraft in flight, regulating early turns, mandating departure headings or altitude, restricting access to an airport based on aircraft type, and adopting noise curfews. SDIA, however, is one of a few unique airports in the United States that operates with a night noise curfew (no departures between 11:30 p.m. and 6:30 a.m.), because its curfew was adopted prior to the passage of ANCA in 1990; therefore, the Airport is grandfathered by law.

Under the federal laws previously cited, Congress has vested the US Department of Transportation, FAA with the plenary power to regulate aircraft, as well as the use of airspace, departure headings, aircraft altitudes, air carrier routes, airline services, aircraft noise, aircraft safety, and more.

5.1.2 EAST COUNTY WORKING GROUP

The Authority determined input from the ECWG on the evaluation of flight procedures intended to address noise concerns in East County would be critical and beneficial to the process. The primary role for the ECWG was to advise the Authority on the aircraft noise concerns and the overall objectives focused on providing relief. The Authority relied upon ECWG members to represent the interests and concerns of the communities each member represented and to communicate information shared at meetings with interested parties in their communities.

The ECWG's role in the Flight Procedure Evaluation was advisory only; the ECWG could offer opinions, advice, and guidance, but the Authority had the sole discretion to accept or reject the ECWG recommendations in accordance with FAA air traffic regulations, procedure design criteria, and other requirements described in Section 5.2, which were shared and discussed with the ECWG at the beginning of the process at the first and second meetings held on December 6, 2018, and January 24, 2019.

5.1.3 FEDERAL AVIATION ADMINISTRATION AIR TRAFFIC ORGANIZATION

The FAA's role related to air traffic and airspace management is summarized in FAA Job Order 7100.2L, *Procedures for Handling Airspace Matters*: "The navigable airspace is a limited national resource that Congress has charged the Federal Aviation Administration (FAA) to administer in the public interest as necessary to ensure the safety of aircraft and its efficient use."¹³ Authorized by Congress, the FAA has legal authority to regulate matters related to airspace use, air traffic management, and air traffic procedures. The FAA ATO was regulated to handle all matters related to airspace and air traffic.

The FAA ATO agreed to provide the Authority with ongoing assistance on this evaluation in a technical advisory role, but it could not provide formal determination on feasibility until a procedure request was submitted for FAA review. The FAA provided an ex-officio representative who was available to meet with the Authority and Ricondo as needed to provide subject-matter-expert general and nonbinding input on proposed design concepts. If the Authority decided to submit proposed concepts to the FAA ATO for consideration, then the FAA would conduct its internal process described in FAA Order 7100.41A. The FAA has sole authority to determine if a proposed measure is considered "feasible." The FAA would begin a formal process of review after a proposed procedure is submitted by a project sponsor.

5.1.4 MEMBERS OF THE PUBLIC

ECWG meetings were open to the general public to observe discussions; members of the general public were encouraged to speak to their local ECWG representative.

5.2 DEFINE REQUIREMENTS

The Flight Procedure Evaluation process was guided by two primary requirements that a design concept must meet: (1) achieve ECWG objectives to reduce SDIA jet arrival noise; and (2) be feasible to advance through the first step in the FAA ATO's PBN implementation process. ECWG objectives were previously described in Section 4. The following subsections summarize the flight procedure evaluation parameters used to consider feasibility.

5.2.1 CONCEPT DEVELOPMENT PARAMETERS

Multiple design parameters were applied to evaluate viable flight procedure concepts that would follow FAA ATO safety, efficiency, and environmental requirements. The general parameters were:

- Do not reduce safety.
- Do not reduce capacity of SDIA.

¹³ US Department of Transportation, Federal Aviation Administration, Job Order 7400.1L, Changes 1 and 2, *Procedures for Handling Airspace Matters*, https://www.faa.gov/documentLibrary/media/Order/7400.2L_Bsc_w_Chgs_1-2_dtd_3-29-18.pdf (accessed September 5, 2018).

- Do not change aircraft flight paths¹⁴ over areas exposed to CNEL at or higher than 65 dB.
- Meet FAA PBN procedure design criteria.
- Fit within existing airspace boundaries.
- Be sensitive to moving noise to new noncompatible areas to reduce noise over a community.

Table 5-1 presents additional information related to each parameter.

5.2.2 FEDERAL AVIATION ADMINISTRATION MISSION AND GOALS

A feasible procedure would not only be developed in accordance with the criteria discussed in Section 5.2.1, but also be consistent with the FAA's mission and goals. The primary objective of the East County Flight Procedure Evaluation was to identify conceptual procedure designs that had a likelihood of advancing through the FAA's first phase of the PBN procedure implementation process, as described in FAA Order 7100.41A. The first phase in the FAA process, the Preliminary Activities phase, examines current operations, develops a concept, evaluates potential environmental issues, and determines expected benefits. Based on the information collected in the first phase, the FAA would determine if the request should proceed through the development and implementation process based on the FAA's mission and goals. FAA Order 7100.41A does not describe the FAA's mission and goals. Therefore, Ricondo evaluated publicly available information to qualify the FAA's mission and goals and considered the information during the evaluation process. The following information describes findings related to the FAA's mission and the organizational process it uses to achieve its ultimate mission.

The FAA's mission is "to provide the safest, most efficient aerospace system in the world."¹⁵ In all lines of business within the FAA, the primary mission is at the forefront. This holds true related to air traffic procedures and noise abatement, as described in 14 CFR Part 150.35, paragraph (b)(3):

"Those aspects of programs relating to the use of flight procedures for noise control can be implemented within the period covered by the program and without—

- (i) Reducing the level of aviation safety provided;
- (ii) Derogating the requisite level of protection for aircraft, their occupants and persons and property on the ground;
- (iii) Adversely affecting the efficient use and management of the Navigable Airspace and Air Traffic Control Systems; or
- (iv) Adversely affecting any other powers and responsibilities of the Administrator prescribed by law or any other program, standard, or requirement established in accordance with law."¹⁶

¹⁴ FAA standard procedures refer to a line between two fix points (e.g., waypoints, fixes, or navigational aids) as a "route." FAA standard procedure plates depict the defined route. Procedure design may not translate to an aircraft located exactly on the route, especially if the route involves turns. For purposes of this evaluation, the expected location of an aircraft on a standard procedure is referred to as a "path." Differences between the definitions for "route" and "path" are applied to avoid confusion between the FAA's definition of a route and where aircraft are expected to be located.

¹⁵ US Department of Transportation, Federal Aviation Administration, "Mission," April 23, 2010, <https://www.faa.gov/about/mission/> (accessed September 11, 2018).

¹⁶ 14 CFR 150.35

TABLE 5-1 (1 OF 2) CONCEPT DEVELOPMENT PARAMETERS DESCRIPTION

PARAMETER	DESCRIPTION	OUTSIDE OF PARAMETER EXAMPLES	APPLICABLE FAA ORDERS AND GUIDANCE
Do not reduce safety	The primary purpose of the air traffic control system is to prevent the collision of aircraft operating in the system. The priority of an air traffic controller is the safe separation of aircraft. Air traffic regulations and procedure design criteria are developed to provide a high level of safety. Any proposed changes to a procedure that do not meet air traffic regulations (e.g., aircraft separation), procedure design criteria, and/or obstruction clearance can cause safety risks, which would reduce the feasibility of a proposed concept and would be outside the parameter.	<ul style="list-style-type: none"> ▪ A procedure that does not provide 3.0 nautical miles (NMs) lateral separation and/or 1,000 feet mean sea level (MSL) vertically from another procedure. ▪ A procedure that requires a descent or climb rate above maximum levels stated in procedure design criteria and/or requires all available means by pilots to descend and slow down at the same time (e.g., use of speed brakes). ▪ A procedure that converges or conflicts with another procedure. ▪ Two procedures sharing a common route but designed differently. ▪ A procedure design that creates a new safety risk. 	<ul style="list-style-type: none"> ▪ Federal Aviation Administration (FAA) Order 7110.65, <i>Air Traffic Control</i> ▪ FAA Order 7210.632, <i>Air Traffic Organization Occurrence Reporting</i> ▪ FAA Order 8040.4, <i>Safety Risk Management Policy</i> ▪ FAA Order 8260.19, <i>Flight Procedures and Airspace</i> ▪ FAA Order 8260.3, <i>United States Standard for Terminal Instrument Procedures (TERPS)</i> ▪ FAA Order 8260.46, <i>Departure Procedure (DP) Program</i> ▪ FAA Order 8260.58, <i>United States Standard for Performance Based Navigation (PBN) Instrument Procedure Design</i>
Do not reduce SDIA capacity	San Diego International Airport’s (SDIA’s) airfield acceptance rate for departures and arrivals shall not be impacted by any proposed procedure concepts.	<ul style="list-style-type: none"> ▪ A procedure design that requires all Runway 27 departures to take off on one heading instead of two divergent headings will reduce the acceptance rate for departures per hour. ▪ A procedure design that requires increased separation between aircraft on arrival will reduce the acceptance rate for landings per hour. 	<ul style="list-style-type: none"> ▪ FAA Order 7110.65, <i>Air Traffic Control</i>
Do not change flight paths over areas exposed to CNEL 65 dB or higher	A change in noise exposure for areas exposed to levels at or higher than Community Noise Exposure Level (CNEL) 65 decibels (dB) can be considered a significant impact, depending on the degree of change; this can also create potential land use compatibility impacts. Such impacts could require an Environmental Impact Statement (EIS) and could cause significant extraordinary circumstances, such as public controversy. This substantially impacts the feasibility of a proposed concept, and any such action should be evaluated as part of the Title 14 Code of Federal Regulations (CFR) Part 150 study process.	<ul style="list-style-type: none"> ▪ A change to initial departure headings from Runway 9 or Runway 27. ▪ A change to the final approach in close proximity to SDIA. 	<ul style="list-style-type: none"> ▪ FAA Order 1050.1F, <i>Environmental Impacts: Policies and Procedures</i> ▪ FAA Order 7400.2M, <i>Procedures for Handling Airspace Matters</i>, Chapter 32, “Environmental Matters”
Meet FAA PBN procedure design criteria	All concept procedures must meet PBN design criterial requirements, as documented in FAA Orders and guidelines.	<ul style="list-style-type: none"> ▪ Flyability failures based on the FAA’s Terminal Area Route Generation Evaluation and Traffic Simulation (TARGETS) PBN procedure design tool. ▪ Distance requirements between two waypoints based on route geometry (e.g., 180-degree turns). ▪ Exceeding maximum descent rates or climb rates. 	<ul style="list-style-type: none"> ▪ FAA Order 8260.58, <i>United States Standard for Performance Based Navigation (PBN) Instrument Procedure Design</i> ▪ FAA Order 8260.3, <i>United States Standard for Terminal Instrument Procedures (TERPS)</i>

TABLE 5-1 (2 OF 2) CONCEPT DEVELOPMENT PARAMETERS DESCRIPTION

PARAMETER	DESCRIPTION	OUTSIDE OF PARAMETER EXAMPLES	APPLICABLE FAA ORDERS AND GUIDANCE
Fit within existing airspace boundaries	Controlled airspace is managed by breaking up the airspace into multiple sectors assigned to an air traffic controller. Every effort should be made to ensure procedure concepts do not require a change in sector boundaries; keep aircraft within the appropriate sector; and stay at least 1.5 NMs laterally and/or 1,000 feet MSL vertically from neighboring sector boundaries to ensure safe separation. In addition, SDIA operations must stay within the Class B airspace. ¹ All procedure concepts must ensure SDIA operations stay within the controlled Class B airspace boundaries.	<ul style="list-style-type: none"> ▪ A procedure that leaves the Class B boundary. ▪ A procedure design that is within 1.5 NMs from a neighboring air traffic control sector. ▪ A procedure design that changes location where an air traffic controller transitions control over to another air traffic controller. 	<ul style="list-style-type: none"> ▪ FAA Order 7110.65, <i>Air Traffic Control</i> ▪ Standard Operating Procedures for Los Angeles Air Route Air Traffic Control Center (ZLA ARTCC) ▪ Standard Operating Procedures for Southern California Terminal Radar Approach Control (SCT TRACON) ▪ Letter of Agreements between SCT TRACON and ZLA ARTCC
Be sensitive to moving noise to new noncompatible areas to reduce noise over a community	If the purpose and need of a procedure design is to reduce noise over a community, then every effort should be made not to cause an increase in noise for other communities, especially those not represented by the Citizen Advisory Committee (CAC), or cause other environmental impacts as a result of moving a procedure, unless the affected communities are informed of the change and potential impacts.	<ul style="list-style-type: none"> ▪ A PBN procedure design moved over communities that do not have a PBN procedure over the community causes a reportable and/or noticeable change in aircraft noise exposure. 	<ul style="list-style-type: none"> ▪ Environmental considerations: FAA Order 1050.1F, <i>Environmental Impacts: Policies and Procedures</i>, Section 4(f) resources: historic properties; environmental justice and/or extraordinary circumstances ▪ FAA Top Policy Issues: "FAA Authority regarding Noise: While the FAA has the authority to alter flight procedures based on noise, the Agency historically has not exercised that authority to prohibit aircraft flights over a particular area unless the operation is unsafe, or the aircraft is operated in a manner inconsistent with FAA regulations. This is because flight procedure changes can result in shifting of aircraft noise from one community to another. Any work regarding the movement of procedures is done for safety and efficiency reasons (including enhancing controller ability to monitor traffic)."²

NOTES:

1 Class B airspace is designated airspace from the surface to 10,000 feet MSL surrounding a busy airport, such as SDIA, in terms of airport operations or enplaned passengers. The configuration of each Class B airspace area is individually tailored, consists of a surface area and two or more layers, and is designed to contain all published instrument flight procedures once an aircraft enters the airspace. Air traffic control clearance is required for all aircraft to operate in the area, and all aircraft that are so cleared receive separation services within the airspace

2 US Department of Transportation, Federal Aviation Administration, FAA Top Policy Issues, <https://www.transportation.gov/transition/FAA/Top-Policy-Issues> (accessed September 11, 2018).

SOURCE: Ricondo & Associates, Inc., November 2019.

The FAA’s vision, which drives the goals or strategic initiatives identified by the FAA, states: “We strive to reach the next level of safety, efficiency, environmental responsibility and global leadership. We are accountable to the American public and our stakeholders.”¹⁷ Therefore, the FAA would evaluate a proposed procedure change to determine if a proposed procedure not only causes an adverse impact on the safe and/or efficient use of the navigable airspace, but also hinders its ability to further enhance the safe and efficient movement of aircraft. For example, the FAA is implementing PBN RNAV procedures to enhance the safe and efficient movement of aircraft, and any proposed change that removes or reduces the safety and efficiency gained by the implemented procedure would most likely be considered not meeting the FAA’s goals. As a result, the likelihood of the FAA rejecting the proposed change would be high.

5.2.3 EAST COUNTY WORKING GROUP INPUT ON DESIGN AND EVALUATION PROCESS

Ricondo presented flight procedure evaluation parameters at the first and second ECWG meetings held on December 6, 2018, and January 24, 2019. The primary focus was to educate ECWG members on the parameters and methods applied by ATC to manage arrivals into SDIA in a safe and efficient manner, as well as to provide examples that would impact SDIA capacity. Ricondo described the process planned for the Flight Procedure Evaluation with an emphasis on the intent of the process to identify feasible flight procedure concepts—the process did not represent or replace the FAA ATO’s PBN implementation process. Ricondo emphasized the FAA would provide access to subject matter experts as needed, but any input would not be considered formal input. The FAA would conduct an independent assessment and would provide formal input once a proposed procedure design is submitted by a project sponsor. Ricondo also provided an overview of the three-phase process during which Ricondo would report concepts to the ECWG and collect input from the members. ECWG input is summarized in the following sections describing the Preliminary Draft Design Concept, Draft Design Concept, and Final Design Concept phases of the process.

¹⁷ US Department of Transportation, Federal Aviation Administration, “Mission,” April 23, 2010, <https://www.faa.gov/about/mission/> (accessed September 11, 2018).

6. PRELIMINARY DRAFT DESIGN CONCEPTS

The Preliminary Draft Design Concept phase involved three steps:

1. Conduct a baseline review of the existing air traffic environment around SDIA with FAA ATO Airspace and Procedures subject matter experts from the Los Angeles District and confirm any potential near-term changes to flight procedures.
2. Develop and design conceptual procedures using the FAA's TARGETS software, if necessary, for suggestions deemed viable and/or concept(s) that meet the intent of ECWG objectives.
3. Collect and review input from the ECWG on initial review findings and preliminary draft concepts to determine if adjustments are required and concepts meet the ECWG objectives.

The following subsections summarize the results for each of the three steps.

6.1 FEDERAL AVIATION ADMINISTRATION AIR TRAFFIC ENVIRONMENT – BASELINE REVIEW

On April 19, 2019, Ricondo and Authority staff met with the FAA ATO Airspace and Procedures subject matter experts for the Los Angeles District to provide the FAA an overview of ECWG aircraft noise concerns; to confirm the BAYVU 5 RNAV STAR change in November 2016; to identify any known near-term amendments or changes to existing SDIA arrival flight procedures to Runway 27; and to seek feedback from the FAA on any operational considerations and/or constraints related to the procedures subject for review for the East County Flight Procedure Evaluation. The FAA provided input related to the following:

- Overview of current SDIA standard operating procedures over East County:
 - COMIX RNAV STAR – arrivals from the northwest
 - LYNDI RNAV STAR – arrivals from the east
 - RNAV RNP Z Runway 27 approach
 - ATC clearance for visual approach
 - general heading and altitude adjustments to manage arrivals from the northwest to final approach
- Air traffic management requirements related to maintaining safe minimum separation standards:
 - Maintain 3 NMs lateral separation or 1,000 feet mean sea level (MSL) vertical separation until established on final approach.
 - If cleared for visual approach, the pilot is responsible to maintain safe separation, which may be less than 3 NMs.
 - The FAA manages several procedure constraints over East County related to Montgomery Field arrivals, arrivals to the south to Brown Field, missed approaches from Gillespie Field, arrivals to SDIA from the northwest and east, and SDIA departures heading east and northeast.
 - The FAA confirmed the critical need to issue radar-based headings, altitude, and speed adjustments to manage the complex traffic environment over East County.

- Implemented PBN RNAV procedures:
 - The FAA is open to discussion regarding noise abatement associated with procedure design, but it indicated concerns related to maintaining efficiencies gained by implementing PBN RNAV procedures.
 - Formal FAA input on proposed concepts would require submitting procedure to the FAA who will conduct the internal PBN procedure review process.
- BAYVU 5 RNAV STAR modification:
 - The FAA confirmed the reason for the change to the BAYVU 5 RNAV STAR to improve Class B containment.
 - The number of aircraft on an ATC-cleared visual approach exiting the Class B airspace floor was reduced as a result of the modification.
 - The route between the KLOMN and NADDO waypoints may no longer be needed if current FAA efforts to modify the Class B airspace are implemented.

The FAA indicated a willingness to provide feedback as requested during the process, and it remained open to feasible concepts that have a potential to reduce noise while not impacting the safe and efficient movement of traffic within the Southern California Terminal Radar Approach Control (SCT TRACON) airspace. As a result of the information provided at the meeting, Ricondo was able to formulate a good understanding of the current air traffic environment related to SDIA Runway 27 arrivals from the northwest.

6.2 PRELIMINARY DRAFT DESIGN CONCEPT SUMMARY

Five design concepts were evaluated in the Preliminary Draft Design Concept phase based on the ECWG concerns related to aircraft noise. **Table 6-1** lists the design concepts and indicates the findings based on the criteria described in Section 5.2. Table 6-1 includes criteria categories to identify the reason(s) why a design concept would not be carried forward to the next phase. If a design concept was eliminated from further consideration, then proposed design changes were considered based on input from the ECWG regarding potential alterations to the original design concept. **Appendix C** includes procedure design sheets for each design concept evaluated by Ricondo. Additional information related to each procedure design is included on each procedure design sheet.

TABLE 6-1 PRELIMINARY DRAFT DESIGN CONCEPT PHASE SUMMARY

DESIGN CONCEPTS	PASS TO DRAFT	ELIMINATE
COMIX RNAV STAR – Keep All Jet Arrivals at 6,000 feet up to NADDO Waypoint		X (EO)
COMIX RNAV STAR Amendment – Remove Route Between KLOMN and NADDO Waypoints	✓	
Runway 27 RNP Approach – Increase Use		X (EO)
Runway 27 RNAV Visual Approach		X (OF)
Runway 27 RNAV Approach (Overlay of Runway 27 RNP Approach)		X (EO)

NOTES:

RNAV – Area Navigation

RNP – Required Navigation Performance

STAR – Standard Terminal Arrival Route

Waypoint – a predetermined geographical position that is defined in terms of latitude/longitude coordinates. A waypoint is most often used to indicate a change in direction, speed, or altitude along the desired path. RNAV procedures make use of both fly-over and fly-by waypoints.

EO – East County Working Group Objective – the concept does not adequately meet objectives, or conflicts with, ECWG objectives.

OF – Operational Feasibility – the concept presents constraints to the airfield’s capacity, the efficient use of the airspace, the FAA’s ability to meet its mission and goals, and/or the airline/air traffic controller’s ability to comply with the procedure consistently or their willingness to request the procedure.

SOURCE: Ricondo & Associates, Inc., August 2019.

Of the five concepts evaluated, one was passed to the next phase and four were eliminated from further consideration. Of the four eliminated, three were eliminated based on ECWG input related to meeting objectives. One, the charted RNAV visual approach procedure, was eliminated based on expected low use of the procedure due to pilot preference for PBN procedures. One of the four design concepts eliminated, the RNAV approach, was modified based on ECWG input, and it was evaluated in the Draft Design Concept phase.

6.3 PRELIMINARY DESIGN CONCEPTS REVIEW AND INPUT

The design concepts and evaluation findings were presented to the ECWG on May 28, 2019, and July 25, 2019. This section summarizes the input provided by ECWG members.

At the third ECWG meeting on May 28, 2019, ECWG members indicated concerns related to concentrating traffic over specific areas and would prefer dispersion. Maintaining the COMIX RNAV STAR between the KLOMN and NADDO waypoints, increasing the use of the Runway 27 RNP approach, and designing an RNAV approach to overlay the RNAV RNP Z Runway 27 approach to increase the use of the path would maintain and increase traffic concentration. The combination of the three design concepts did not meet the ECWG's objective to maintain dispersion. ECWG members indicated use of the RNAV RNP Z Runway 27 approach is useful in providing some respite, but they did not support the use of the procedure as the primary approach for jet arrivals from the northwest.

An ECWG member, who was an experienced airline pilot, indicated at the meeting and in post-meeting comments the pilot preference for RNAV procedures over published visual approach procedures. Visual approaches such as the design concept visual approach proposed in the Preliminary Draft Design Concept phase require pilot responsibility of traffic separation, terrain clearance, and staying within the confines of the Class B airspace, while calculating how best to get on the proper descent profile. This increases the pilot workload. Visual approaches are also notorious for causing a higher potential for unstable approaches (i.e., intercepting the final approach above the required descent path or passing the straight-in approach path). Due to reduction in pilot workload and predictability, pilots typically prefer an RNAV-based approach. Appendix B includes post-meeting comments from ECWG members.

ECWG members understood the need for ATC to issue headings and altitudes to efficiently manage the merge of arrivals from multiple directions to a final approach path, but during low demand periods when traffic management is not as complex, ATC will still descend aircraft to 5,000 feet MSL along the downwind path and clear pilots for a visual approach to join the final approach closer to SDIA. An ECWG member suggested evaluating an RNAV approach that would direct aircraft further east and to turn south over less populated areas during low demand periods. The procedure would keep aircraft higher compared to current patterns, and aircraft would fly over less populated areas as they descend to a lower altitude to join the final approach. The ECWG understood Ricondo's concerns related to traffic conflicts with arrivals from the east but proposed it as a concept when arrival demand levels are low. The design concept was planned to be presented to the FAA for cursory feedback.

The ECWG also recommended to keep aircraft at 6,000 feet MSL at the KLOMN waypoint with controlled vectors after the waypoint to direct pilots to join the final approach. This could be conducted when ATC does not need flights from the northwest to conduct a turn to intercept the final approach just prior to the REEBO intersection or approximately 6 NMs from Runway 27. Aircraft would still be descending after the KLOMN waypoint, but they would be quieter compared to aircraft at or below 5,000 feet MSL at or near the KLOMN waypoint. This concept would involve modifying the COMIX RNAV STAR by removing the NADDO waypoint ending the procedure at the KLOMN waypoint at 6,000 feet MSL.

In general, the ECWG proposed an arrival management concept that would involve the two elements previously described and the current methods used by ATC during high demand periods. The concept emphasizes use of the proposed RNAV approach during low arrival demand periods (i.e., between 11:00 p.m. and 7:00 a.m.); it would keep jet arrivals from the northwest at 6,000 feet MSL at the KLOMN waypoint (as defined in existing COMIX RNAV STAR) when arrivals demand from the east and south are not high; and it would conduct current air traffic management techniques (i.e., descend arrivals to 5,000 feet MSL to accommodate the ability to join final approach closer to the REEBO intersection) when arrival demand is high. The concept would maintain dispersion, increase the frequency of aircraft at higher altitudes, and provide respite for populated areas.

Based on ECWG input, the following proposed Preliminary Draft Design Concept phase concepts were eliminated:

- Runway 27 RNAV Visual Approach – This concept was eliminated based on input provided by the ECWG airline pilot member related to the expected low use of the procedure due to the increased pilot workload and the potential increase in likelihood for an unstable approach.
- COMIX RNAV STAR – Keep All Jet Arrivals at 6,000 feet up to NADDO Waypoint – This design would maintain a concentrated flight path between the KLOMN and NADDO waypoints. ECWG preference was to provide dispersion after the KLOMN waypoint. The design concept to eliminate the KLOMN to NADDO route was carried forward to the Draft Design Concept phase, and it calls for aircraft to stay at or above 6,000 feet MSL at the KLOMN waypoint.
- RNAV RNP Z Runway 27 Approach – Increase Use – This concept was eliminated based on ECWG recommendation to maintain dispersion. The emphasis on increasing use of the existing Runway 27 RNP approach would increase concentration noise effects over East County communities. Maintaining the approach was carried forward to the Draft Design Concept phase, but emphasizing the increased use was eliminated.
- RNAV Runway 27 Approach (Overlay of RNAV RNP Z Runway 27 Approach) – This concept was eliminated based on the ECWG recommendation to maintain dispersion. The intent of this design concept was to increase use of the flight path defined by the RNAV RNP Z Runway 27 approach. Because the overall aircraft equipment requirements and pilot authorization for an RNAV approach is less restrictive compared to an RNP approach, the intent was to design a procedure that would allow more flights to operate along the RNP path. This would increase the noise effect caused by an increase in concentration, which conflicts with the ECWG’s objectives. For the Draft Design Concept phase, Ricondo evaluated a refined version of an RNAV approach that directs aircraft further east prior to turning south, as proposed by an ECWG member.

7. DRAFT DESIGN CONCEPTS

The Draft Design Concept phase involved two steps:

1. Develop and design conceptual procedures, if required, using the FAA's TARGETS software based on ECWG input from the Preliminary Draft Design Concept phase.
2. Collect and review input from the ECWG on initial findings to determine if adjustments are required or the recommendation should no longer be considered based on design parameters and/or ECWG objectives.

Two procedure design concepts were evaluated based on the Preliminary Draft Design Concept phase evaluation results and ECWG input. One was carried over from the Preliminary Draft Design Concept phase, and the second was designed to address ECWG input on directing jet arrivals from the northwest further east prior to turning south to join the final approach. The procedure design concepts were as follows:

- One design concept carried over from the Preliminary Draft Design Concept phase:
 - Modification to COMIX RNAV STAR – Remove Route Between KLOMN and NADDO Waypoints
- One new approach procedure design concept requested by the ECWG:
 - Runway 27 RNAV Approach – Extend Approach East and Join at VYDAA waypoint (11:00 p.m. to 7:00 a.m.)

The two proposed procedures would be added to FAA ATC's procedure options (i.e., RNAV RNP Z Runway 27 approach, ATC radar vectors, or ATC clearance for visual approaches) to aid in managing jet arrivals and dispersing noise exposure levels throughout a typical day.

7.1 DRAFT DESIGN CONCEPT RESULTS SUMMARY

Table 7-1 lists the design concepts and the findings based on criteria described in Section 5.2 and input from the ECWG. Refer to the procedure design sheets in Appendix C for more detail on the draft procedure designs and evaluation results. A modification to the COMIX RNAV STAR to remove the route between the KLOMN and NADDO waypoints was determined to be feasible as long as the FAA can identify an alternative to ensuring Class B containment. One alternative currently under consideration by the FAA is an independent effort by the FAA to modify the Class B airspace and lower the airspace floor where the KLOMN waypoint is located. The COMIX RNAV STAR currently requires aircraft on the procedure to be at or above 6,000 feet MSL at the KLOMN waypoint; therefore, no change was required to keep aircraft at the proposed altitude. Increasing the frequency of aircraft at or above 6,000 feet MSL at or near the KLOMN waypoint would require encouragement of FAA controllers to keep jet arrivals on the COMIX RNAV STAR as much as possible or maintain altitude assignments at or above 6,000 feet MSL near the KLOMN waypoint when ATC radar vectors are required.

Based on TARGETS analysis, Ricondo determined the proposed new approach procedure design to extend arrivals east and join the final approach at the VYDAA waypoint would not meet FAA PBN design criteria due to the length of the intermediate segment (segment from the KLOMN waypoint to a point where the procedure joins the final approach) exceeding 15 NMs in length at a distance more than 15 NMs from the Airport reference point (a reference point on the airfield). Therefore, a refined design that meets design criteria and joins the final approach as close to VYDAA as possible was proposed. Based on a preliminary review of the concept with the FAA, the procedure conflicts with the Montgomery Field approach procedure, and SDIA arrivals from the east were a concern but were not considered to be an unmanageable situation, as long as arrival demand was low (i.e., arrival demand levels between

11:00 p.m. and 7:00 a.m.). The FAA reserved final determination until the proposed design concept was formally submitted and evaluated through the FAA PBN process, which would include an in-depth safety management system assessment. The FAA indicated it may be possible that a means to manage the procedural conflicts may not be feasible, but it cannot confirm this until it conducts the formal PBN process.

TABLE 7-1 DRAFT DESIGN CONCEPT PHASE SUMMARY

ALTERNATIVE DESIGN CONCEPTS	PASS TO FINAL	ELIMINATE
Modification to COMIX RNAV STAR – Remove Route Between KLOMN and NADDO Waypoints and Keep Jet Arrivals at 6,000 feet MSL at KLOMN	√	
Runway 27 RNAV Approach – Extend Approach East and Join at VYDAA Waypoint (11:00 p.m. to 7:00 a.m.)		X (DC)
Runway 27 RNAV Approach (Version 2) – Extend Approach East and Join Near VYDAA Waypoint (11:00 p.m. to 7:00 a.m.)	√	

NOTES:

RNAV – Area Navigation

MSL – Mean Sea Level

STAR – Standard Terminal Arrival Route

Waypoint – a predetermined geographical position that is defined in terms of latitude/longitude coordinates. A waypoint is most often used to indicate a change in direction, speed, or altitude along the desired path. RNAV procedures make use of both fly-over and fly-by waypoints.

DC – Design Criteria – the concept does not meet Federal Aviation Administration performance-based navigation design criteria.

SOURCE: Ricondo & Associates, Inc., August 2019.

The two design concepts, Modification to the COMIX RNAV STAR and the Runway 27 RNAV Extended Approach and join the final approach near the VYDAA waypoint, were passed to the Final Design Concept phase based on input provided by the ECWG and FAA. The two design concepts, in addition to the existing Runway 27 RNP approach and current FAA radar vector procedures, were intended to be available to FAA ATC to provide noise relief without impeding the FAA’s ability to safely and efficiently manage jet arrivals from the northwest. As demand allows, the two proposed design concepts provide more opportunities to disperse arrivals, increase the frequency of higher altitudes along the downwind path, and provide respite during nighttime hours.

7.2 DRAFT DESIGN CONCEPT RESULTS REVIEW AND INPUT

The alternative design concepts and initial findings were presented to the ECWG on July 25, 2019 (ECWG Meeting #4) and were reviewed with the FAA ATO Airspace and Procedures representative for the Los Angeles District on August 15, 2019. Refer to Appendix A to review presentations provided at ECWG meetings. The following subsections summarize the input provided by ECWG members and the FAA.

7.2.1 EAST COUNTY WORKING GROUP INPUT

The following summarizes the input provided by the ECWG. Members did not provide any written comments after the meeting on July 25, 2019.

The ECWG member who was an experienced airline pilot emphasized pilot workload impacts when operating a visual approach and pilot preference for a predictable path provided by PBN technology (i.e., RNAV procedure and aircraft flight management systems). Ricondo recommended the elimination of the RNAV visual approach concept based on the airline pilot’s input.

The concept design and intent for the extended RNAV approach to Runway 27 was reviewed with the ECWG. The intent of the extended RNAV approach to provide respite during low demand periods between 11:00 p.m. and 7:00 a.m. was confirmed by the ECWG. The ECWG understood the design criteria constraints related to the original

design concept that it proposed and accepted the proposed refinement to the approach to meet PBN design criteria. The ECWG was also briefed on potential concerns related to conflicts with other existing procedures, such as the Montgomery Field approach and SDIA arrivals from the east. The ECWG was informed of plans to meet with FAA ATO to discuss the design and potential concerns related to existing procedure conflicts. If FAA ATO indicates no critical flaws to the design, then the extended RNAV approach design concept would proceed forward in the Final Design Concept phase.

The ECWG emphasized the importance of dispersion and keeping aircraft at or above 6,000 feet MSL near the KLOMN waypoint as much as possible. Ricondo recommended eliminating the design concept that would keep jet arrivals from the northwest at 6,000 feet MSL at the NADD0 waypoint, because it would maintain traffic concentration between the KLOMN and NADD0 waypoints. As an alternative, a modification to the existing COMIX RNAV STAR was recommended. The proposed modification removes the route between the KLOMN and NADD0 waypoints with an emphasis for FAA ATC to keep jet arrivals at or above 6,000 feet MSL at or near the KLOMN waypoint. This is consistent with the design concept proposed in the Preliminary Draft Design Concept phase.

The ECWG's experienced airline pilot member emphasized the intent of the multiple procedures (i.e., modified COMIX RNAV STAR, current RNAV RNP Z Runway 27 approach, proposed extended RNAV Runway 27 approach, FAA ATC clearance for visual approaches, and FAA ATC radar vectoring) to serve as options for FAA ATC to manage traffic with noise relief in mind. The ECWG was advised of the complexities related to associating the use of a procedure with demand, and success would depend primarily on encouraging the FAA to keep jet arrivals from the northwest at or above 6,000 feet MSL near the KLOMN waypoint as much as possible and to assign jet arrivals to the extended RNAV approach between 11:00 p.m. and 7:00 a.m.

The ECWG was also advised on the elimination of the concept emphasizing increased use of the existing RNAV RNP Runway 27 approach and the proposed RNAV Runway 27 approach that overlays the RNP approach path. Both conflict with the ECWG's objective to maintain dispersion. The ECWG was informed on the continued use of the RNAV RNP Z Runway 27 approach and expected an increase in use in the long term as the FAA's NextGen continues to evolve. Any recommendations from this evaluation would not emphasize increased use of the RNAV RNP Z Runway 27 approach.

7.2.2 FEDERAL AVIATION ADMINISTRATION AIR TRAFFIC ORGANIZATION AIRSPACE AND PROCEDURE REVIEW

An overview of the ECWG objectives and the draft design concepts was conducted with a representative from FAA ATO Airspace and Procedures on August 15, 2019. The presentation emphasized that a single draft concept was proposed, which was comprised of multiple arrival procedures available to the FAA to keep aircraft higher and dispersed as demand levels permit. Based on review of the draft design concepts for the proposed RNAV approach to Runway 27 that extends further east, the FAA concurred with findings related to procedure conflicts; however, the official FAA PBN review process may identify potential management solutions as long as the proposal is applicable between 11:00 p.m. and 7:00 a.m. when arrival demand is low. The FAA also acknowledged the potential feasibility for eliminating the KLOMN to NADD0 route for the COMIX RNAV STAR, especially if the FAA implements the current Class B airspace proposal. The FAA indicated the management in targeted use of the multiple arrival procedures based on specific levels of demand was not feasible due to the complexity involved in merging aircraft from multiple directions to a single-runway final approach. The FAA indicated any final input related to the proposed design concepts will require submittal to the FAA Instrument Flight Procedure gateway to begin the formal FAA PBN review process. Based on the feedback provided by the FAA ATO Airspace and Procedures representative, no design concepts were eliminated or required refinements.

8. FINAL DESIGN CONCEPT

The Final Design Concept phase involved four steps:

1. Refine, if necessary, conceptual procedures passed in the Draft Design Concept phase.
2. Conduct noise screening analysis on final design concepts.
3. Collect and review input from the ECWG on noise screening results and initial recommendations.
4. Finalize recommendations to the Authority for consideration.

8.1 FINAL DESIGN CONCEPT RESULTS SUMMARY

Table 8-1 summarizes the recommendations regarding the two design concepts under the Final Design Concept phase based on noise screening and ECWG input. Table 8-1 includes criteria categories to identify the reason(s) why an alternative design concept should not be carried forward to the next steps.

TABLE 8-1 FINAL DESIGN CONCEPT PHASE SUMMARY

ALTERNATIVE DESIGN CONCEPTS	PASS TO NEXT STEPS	ELIMINATE
Modification to COMIX RNAV STAR – Remove Route Between KLOMN and NADDO Waypoints and Keep Jet Arrivals at 6,000 feet MSL at KLOMN		X (NI)
RNAV Runway 27 Approach (Version 2) – Extend Approach East and Join Near VYDAA Waypoint (11:00 p.m. to 7:00 a.m.)		X (NI)

NOTES:

RNAV – Area Navigation

MSL – Mean Sea Level

STAR – Standard Terminal Arrival Route

Waypoint – a predetermined geographical position that is defined in terms of latitude/longitude coordinates. A waypoint is most often used to indicate a change in direction, speed, or altitude along the desired path. RNAV procedures make use of both fly-over and fly-by waypoints.

NI – Noise Impact – the concept would cause noise increases for communities based on noise screening results and ECWG member input.

SOURCE: Ricondo & Associates, Inc., September 2019.

8.2 REFINED DESIGN CONCEPT REVIEW

Based on feedback from the ECWG and FAA, refinements to the design concepts passed to the Final Design Concept phase were not necessary. Because there were no changes to the design concepts, a review with the ECWG of the Final Design Concept phase prior to the noise screening analysis was not necessary.

8.3 AIRCRAFT NOISE SCREENING OF FINAL DESIGN CONCEPTS

An aircraft noise screening analysis was conducted to quantify potential decreases and increases in the CNEL as a result of implementing the procedure design concepts identified in the Final Design Concept phase. The methodology was similar to how the FAA conducts noise screening for individual flight procedures. The screening analysis evaluated only jet aircraft associated with the proposed procedures; it did not evaluate all operations to and from SDIA. Therefore, the screening results do not reflect cumulative aircraft noise levels at SDIA, and they should not be used for general noise planning purposes for SDIA. The following subsections summarize the methodology and results for each alternative procedure design concept.

8.3.1 NOISE SCREENING METHODOLOGY

The objective of the aircraft noise screening analysis was to quantify potential decreases and increases in the CNEL if the location of jet aircraft traffic was changed to a different location and/or altitude in accordance with a proposed procedure design concept. The results of the screening analysis do not reflect existing cumulative average annual day (AAD) operations and traffic patterns at SDIA; therefore, they are not intended to reflect total aircraft CNEL noise exposure levels for SDIA. The following subsections describe the baseline and alternative Aviation Environmental Design Tool (AEDT) noise model development methodologies.

8.3.1.1 BASELINE NOISE MODEL DEVELOPMENT METHODOLOGY

The analysis began with the development of a baseline model using the FAA’s AEDT that accounts for jet operation and location related to only traffic flows connected to the proposed design concepts. Propeller-driven aircraft were excluded based on the following factors:

- The majority of all propeller-driven aircraft are not assigned or do not fly along an existing published RNAV STAR; therefore, traffic patterns with and without implementing a proposed procedure design concept would not change.
- The largest turbine-propeller aircraft, the Bombardier Q400, operated at SDIA in 2017 with no more than five arrivals and five departures on an average day—the CNEL is below 45 dB for Bombardier Q400 SDIA operations over areas such as East County. This was not a major contributor to total CNEL compared to jet aircraft.

The jet aircraft operations selected were those operating on an existing flight procedure, which was proposed to change to meet the ECWG objectives. **Table 8-2** summarizes the existing traffic flow and flight procedures selected for the baseline screening model and the related Final Design Concept phase alternative.

TABLE 8-2 BASELINE MODEL EXISTING TRAFFIC FLOW

TRAFFIC FLOW	EXISTING PROCEDURE	FINAL DESIGN CONCEPT
Runway 27 jet arrivals from the northwest	COMIX RNAV STAR, HUBRD Conventional STAR, Runway 27 RNP Approach (from KLOMN Waypoint), Runway 27 Localizer Approach, and FAA ATC Radar Vectors from KLOMN Waypoint Area to Final Approach	Modification to COMIX RNAV STAR – Remove Route Between KLOMN and NADDO Waypoints and Keep Jet Arrivals at 6,000 feet MSL at KLOMN, and Runway 27 RNAV Approach (Version 2) – Extend Approach East and Join Near VYDAA Waypoint
Runway 27 jet arrivals from north, east, and south	LUCKI RNAV STAR, BARRET Conventional STAR, Runway 27 RNP Approach (from LYNDI Waypoint), and FAA ATC Radar Vectors from North, East, and South to Final Approach	No changes to existing procedures.

NOTES:

ATC – Air Traffic Control

FAA – Federal Aviation Administration

RNAV – Area Navigation

RNP – Required Navigation Performance

STAR – Standard Terminal Arrival Route

SOURCE: Ricondo & Associates, Inc., November 2019.

The primary source used to develop the baseline noise model flight track and the operations input into AEDT was radar track and operations data between May 2017 and December 2017. This was the same data set used to support the air traffic procedure noise screening analysis for Runway 27 jet departures and COMIX RNAV STAR arrivals. The data were collected from the Authority’s ANOMS. The entire 2017 year was not collected because the FAA did not

complete the implementation of the SoCal Metroplex RNAV procedures until April 2017. The intent for the baseline model was to include traffic patterns after the FAA completed implementation. The seven months of radar track and flight plan data were more than adequate to conduct a noise screening assessment, and this exceeds the amount of data typically used by the FAA when conducting screening analyses (typically 10 randomly selected days). In addition, the same data were used for the entire air traffic procedure analysis for consistency purposes.

The arrival and departure radar tracks and associated flight data were reviewed to ensure the accuracy of runway assignments, and radar tracks with unusable geometry were excluded from the analysis. Radar track data not associated with Runway 27 arrivals were excluded from the East County baseline data set. Each radar track was tagged with its propulsion type (jet, turbine-propeller, piston propeller), aircraft weight category (heavy, large, small), and time of day (daytime, 7:00 a.m. to 6:59 p.m.; evening, 7:00 p.m. to 9:59 p.m.; and nighttime, 10:00 p.m. to 6:59 a.m.).

Following the data cleanup and tagging stage, the geometries of the radar track arrivals from the northwest to Runway 27 were reviewed to group flights with similar flight paths into the same corridors (e.g., aircraft following the same arrival procedure). The grouping process was sensitive to flight path dispersion (RNAV or conventional dispersion) and time of day (daytime/evening hours or nighttime hours). The groups of radar tracks are referred to as bundles. Arrivals from the south, east, and north were also bundled, but not at the level of detail conducted for northwest jet arrivals.

AEDT noise model flight tracks were created for each individual bundle of radar tracks. The noise model flight tracks represent the radar track bundles with a system of primary flight noise model tracks, or “backbone” tracks, and additional “dispersed” noise model tracks. The combination of backbone and dispersed tracks serve as representative AEDT noise model flight tracks for a given bundle. The backbone noise model track lies at the center of a bundle, with one or more dispersed noise model tracks on each side. The locations of the backbone and dispersed tracks were based on the track density of a unique bundle. Geographic spatial analysis tools were employed to identify the average or center of a bundle (the backbone) at multiple increments along the bundle. The analysis also identified points left and right of the average according to the radar track distribution within a unique bundle. The left and right points were used to develop the dispersed noise model tracks.

The altitude for each bundle was also evaluated to determine the need to customize the altitude profile to better reflect actual AAD altitude along a specific traffic flow. Runway 27 jet arrivals from the northwest did occur at or below 6,000 feet AFE within the evaluation area as traffic crosses the San Diego State University area where the KLOMN waypoint is located. In addition, the proposed design concept for Runway 27 arrivals from the northwest specifies altitude requirements at the KLOMN and NADDO waypoints. Therefore, altitude profiles were customized for the arrivals using altitude controls at the KLOMN and NADDO waypoints, as defined by the existing RNAV arrival procedure (e.g., COMIX RNAV STAR) or the calculated average altitudes of a bundle (for conventional procedures and FAA ATC radar vectored traffic). Jet arrivals that turn south after or near the KLOMN waypoint to join the final approach were assigned 5,000 feet AFE at the waypoint. Jet arrivals that operate between the KLOMN and NADDO waypoints and turn south at or near the NADDO waypoint to join the final approach cross near the KLOMN waypoint area at 5,500 feet AFE and 5,000 feet AFE near the NADDO waypoint area. Jet arrivals that operate between the KLOMN and NADDO waypoints and were turned east after NADDO were assigned 6,000 feet AFE near the KLOMN waypoint area and 5,500 feet AFE near the NADDO waypoint area. All other jet arrivals that proceed east after the KLOMN waypoint area thence proceed east before turning south to join the final approach were assigned 6,000 feet AFE at or near the KLOMN waypoint area. The AEDT would calculate the altitude and aircraft performance profiles based on the user-defined altitude controls and the standard aircraft procedure profile database provided in AEDT.

The flight information (e.g., aircraft type, number of operations, and origin/destination) from each radar track in a bundle was assigned to the corresponding noise model flight tracks representing the bundle. Flight operation distribution among the backbone and dispersed noise model tracks was based on actual distribution observed radar track density of the bundle of radar tracks. This dispersion more accurately represents each flight corridor by accounting for variability attributable to weather, aircraft type, traffic, pilot technique, and other factors. The count of operations was converted to an AAD level by dividing the count by 244 days (number of days between May 2017 and December 2017). Of the 591 total AAD operations that occurred at SDIA between May 2017 and December 2017, 275 AAD jet arrivals associated with the SDIA arrival traffic flows to Runway 27 identified in Table 8-2 were modeled.¹⁸ The noise model flight tracks and the flight operations database were converted into AEDT format.

The baseline AEDT model included not only the noise model flight tracks and AAD operations, but also the terrain (provided by US Geological Survey [USGS]), the average weather conditions (temperature, humidity, and air pressure) observed at SDIA in 2017, and the uniformed closely spaced grid points. The CNEL was calculated for each uniformed, closely spaced grid. The use of grid points in lieu of noise exposure contours is consistent with the FAA ATO's noise screening methodology. The CNEL was compared to the alternative CNEL at each grid point to determine potential decreases and increases resulting from implementing a proposed design concept alternative.

8.3.1.2 ALTERNATIVE DESIGN CONCEPT NOISE MODEL DEVELOPMENT METHODOLOGY

Development of the AEDT noise model for each alternative design concept started with the baseline noise model input, and modifications were made primarily to the noise model tracks to account for the alternative procedure design. The primary objective was to modify the baseline input to account for relocating flights that are expected to operate on a proposed RNAV procedure design concept. All other variables, such as aircraft type, operation levels, runway use, origin/destination, and FAA ATC vector patterns, would remain the same between the baseline and alternative modeled scenarios. The methodology focused on two elements: (1) modifying noise model track geometry to reflect an alternative design concept; and (2) assigning an appropriate level of operations to the proposed design concept model tracks.

Baseline noise model tracks representing northwest jet arrivals from the KLOMN to NADD0 waypoints to Runway 27 were selected to be modified to reflect the proposed change to the COMIX RNAV STAR to end at the KLOMN waypoint instead of the NADD0 waypoint. The baseline noise model tracks following the COMIX RNAV STAR flight path between the LNTRN and KLOMN waypoints thence to the NADD0 waypoint and vectored at or after the NADD0 waypoint to join the final approach to Runway 27 were modified to reflect jet arrivals proceeding east after the KLOMN waypoint. In addition, all operations were assigned 6,000 feet AFE near the KLOMN waypoint area. All jet arrivals from the northwest that operated between the KLOMN and NADD0 waypoints were assigned the modified COMIX RNAV STAR noise model tracks. All daytime and evening operations were assigned the modified noise model tracks. In addition, jet arrivals from the northwest between 10:00 p.m. and 10:59 p.m. were assigned to the modified COMIX RNAV STAR noise model tracks.

Because the proposed RNAV approach to Runway 27 does not exist for nighttime (11:00 p.m. to 7:00 a.m.¹⁹) arrivals from the northwest, a new noise model flight track was developed based on the designed flight path. All jet arrivals

¹⁸ The AAD count was based on the total number of flights recorded in the ANOMS database between May 2017 and December 2017 divided by 244 days.

¹⁹ The hours represent the low demand period for arrivals to Runway 27 from the northwest.

from the northwest that occurred between 11:00 p.m. an 7:00 a.m. were assigned to the proposed Runway 27 RNAV approach.

Baseline noise model tracks representing FAA ATC–managed arrivals from the northwest and all arrivals from the north, east, and south were maintained for the alternative scenario.

The alternative AEDT models included the same terrain (provided by USGS), the average weather conditions (temperature, humidity, and air pressure) observed at SDIA in 2017, and the uniformed, closely spaced grid points used in the baseline AEDT model. The CNEL was calculated for each uniformed, closely spaced grid point. The CNEL was compared to the baseline CNEL at each grid point to determine potential decreases and increases resulting from implementing a proposed design concept alternative.

8.3.1.3 ALTERNATIVE NOISE SCREENING MODEL SCENARIOS

The objective of the noise screening analysis was to quantify potential increases and decreases in CNEL for the design concepts. The method used to achieve the objective was to develop an alternative scenario, Alternative 1, in AEDT that included the design concepts passed to the Final Design Concept phase and existing procedures not subject to change. The design concepts were not mutually exclusive and were combined in Alternative 1 to capture the total CNEL. Alternative 1 CNEL results were compared to the baseline AEDT CNEL results to quantify potential increases and decreases in CNEL. **Table 8-3** lists the design concepts and the existing procedures that comprise Alternative 1 and related assumptions.

TABLE 8-3 ALTERNATIVE 1 NOISE SCREENING MODEL SCENARIOS

PROCEDURES	STATUS	
FAA ATC Radar Vectors/ATC Visual Approach Clearance	Existing Procedure	Maintain current dispersion patterns associated with FAA ATC issued headings or clearing a pilot to conduct a visual approach – expected to occur during high arrival demand
Runway 27 RNP Approach	Existing Procedure	Maintain current RNP approach from KLOMN waypoint – expected to occur for authorized operations (meet navigation equipment requirements and pilot certification)
COMIX RNAV STAR Amendment – Remove Route Between KLOMN and NADDO Waypoints and Keep Jet Arrivals at 6,000 feet MSL at KLOMN	Final Design Concept	Discontinue route between KLOMN and NADDO waypoints. Keep aircraft at or above 6,000 feet MSL at the KLOMN waypoint thence direct aircraft east while descending until FAA ATC directs pilot to turn south to join final approach – expected to occur unless demand levels require FAA ATC vectors
Runway 27 RNAV Approach (Version 2) – Extend Approach East and Join Near VYDAA Waypoint (11:00 p.m. to 7:00 a.m.)	Final Design Concept	Keep aircraft at or above 6,000 feet MSL at the KLOMN waypoint and extend jet arrivals from the northwest further east to turn south over less populated area – expected to occur between 11:00 p.m. and 7:00 a.m.

NOTES:

- ATC – Air Traffic Control
- FAA – Federal Aviation Administration
- MSL – Mean Sea Level
- RNP – Required Navigation Performance
- RNAV – Area Navigation
- STAR – Standard Terminal Arrival Route
- SOURCE: Ricondo & Associates, Inc., November 2019.

8.3.2 NOISE SCREENING RESULTS

The noise screening results focused on changes in CNEL caused by implementing the proposed final design concepts for Alternative 1. Calculated changes at or above 1 CNEL A-weighted decibel (dBA) for closely spaced grids points located within the focused community areas were identified. For reference, most people begin to detect a change in noise when levels increase or decrease by 3 dBA. Some individuals are more sensitive to noise; therefore, changes at or above 1 dBA were identified.

Exhibit 8-1 depicts the baseline and Alternative 1 noise model tracks related to the calculated changes equal to or higher than 1 CNEL dBA indicated on the exhibit. The noise model tracks depicted on Exhibit 8-1 indicate expected flight paths under Alternative 1 (magenta and pink noise model tracks) compared to the baseline noise model tracks that modeled flights between the KLOMN and NADDO waypoints (orange noise model tracks). For clarity purposes, the noise model tracks representing FAA ATC-managed procedures from the north, east, and south and the Runway 27 RNP approach were not depicted on Exhibit 8-1, but they were included in the model input to calculate the CNEL at each grid point. **Exhibit 8-2** depicts the change in the CNEL without the noise model tracks for clarity purposes.

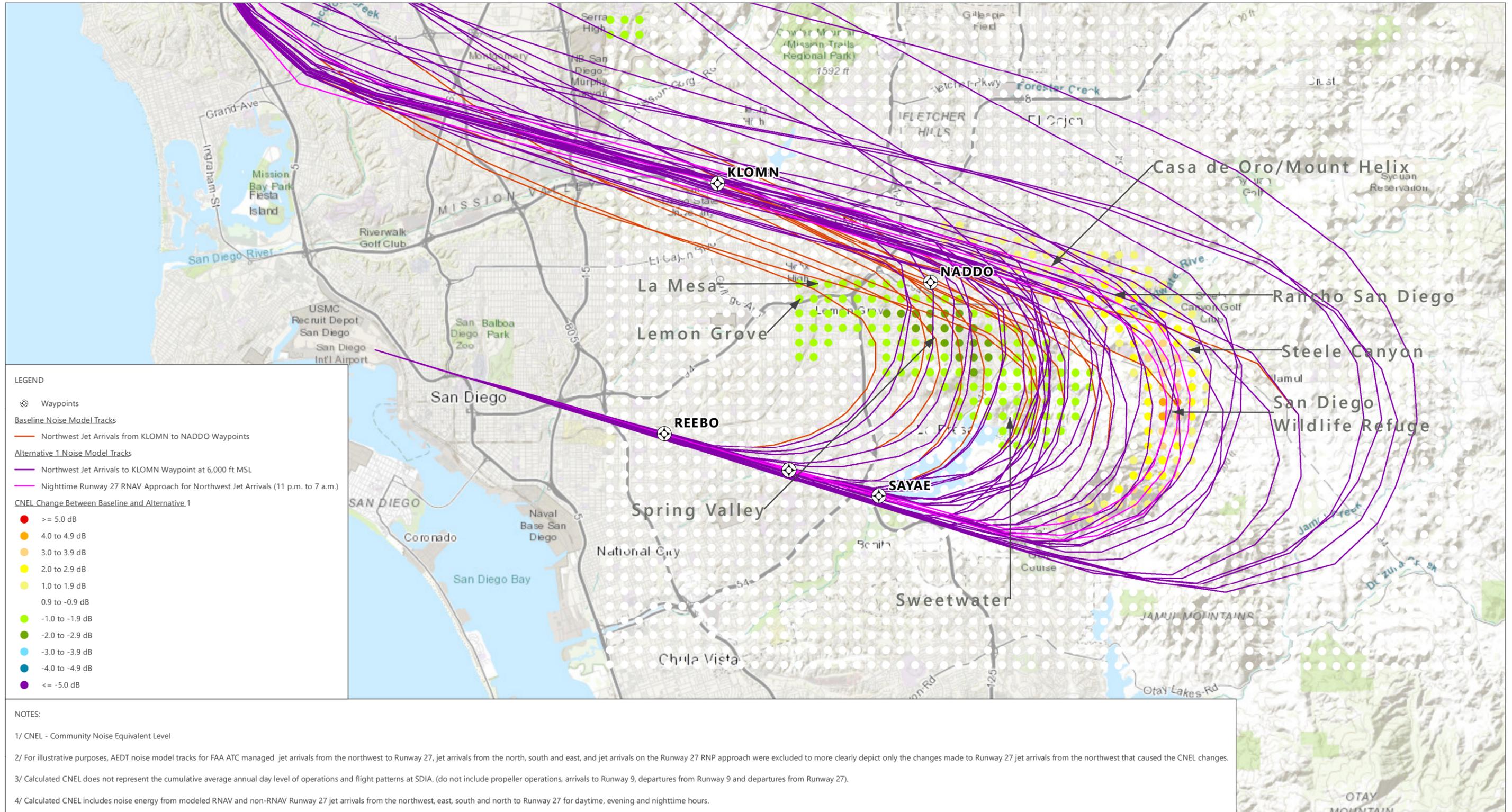
The results indicated the CNEL within East County may exhibit the following changes:

- decreases between 1 and 2 CNEL dBA for the Lemon Grove, La Mesa, Sweetwater, and Spring Valley community areas
- decreases between 2 and 3 CNEL dBA for the Spring Valley area
- increases between 1 and 2 CNEL dBA for the Casa de Oro and Mount Helix community areas
- increases between 2 and 3 CNEL dBA for the Rancho San Diego community areas
- increases between 3 and 4 CNEL dBA for the Steele Canyon community area
- increases between 4 and 5 CNEL dBA for the San Diego Wildlife Refuge area

The cause for the change was attributed to two factors:

1. All jet arrivals from the northwest between 11:00 p.m. and 7:00 a.m. that were dispersed over East County would now follow the proposed Runway 27 RNAV approach path, which would cause an increase in the CNEL over communities such as Casa de Oro, Mount Helix, Rancho San Diego, and Steel Canyon and a decrease in the CNEL for communities such as Spring Valley and Sweetwater.
2. All jet arrivals from the northwest that followed the KLOMN to NADDO path would now proceed east after passing KLOMN, which would cause a decrease in the CNEL for communities such as Lemon Grove, La Mesa, and Spring Valley and an increase in the CNEL for communities such as Casa de Oro and Mount Helix.

The higher CNEL increases over areas such as Steele Canyon are caused primarily by implementing the proposed Runway 27 RNAV approach for all nighttime jet arrivals. A second alternative was modeled to identify potential changes in the CNEL if the Runway 27 RNAV approach was excluded. **Table 8-4** lists the design concepts and existing procedures that comprise Alternative 2 and related assumptions.

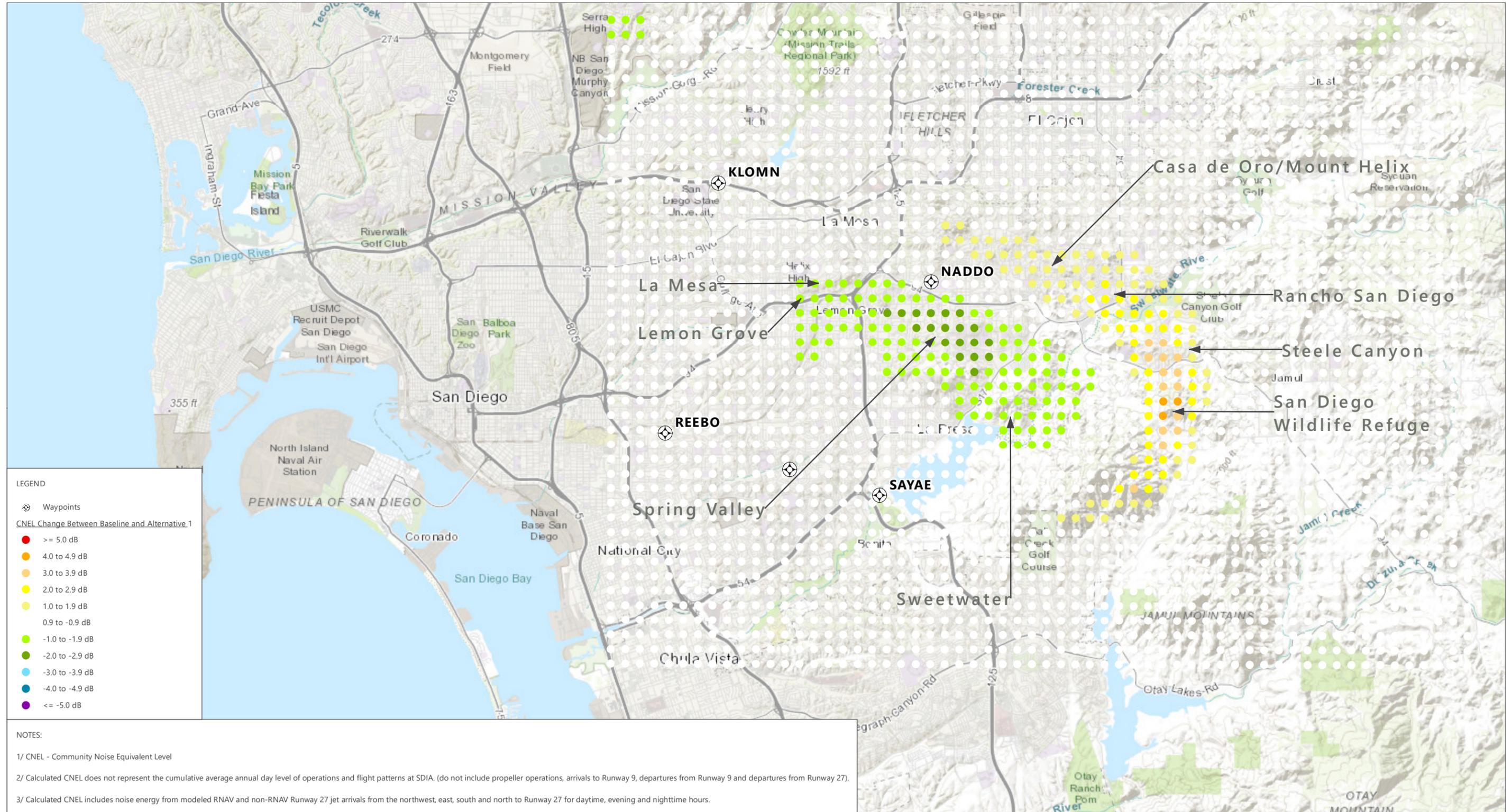


SOURCES: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), OpenStreetMap Contributors, and the GIS User Community, December 2019 (basemap); Ricondo & Associates, Inc., November 2019 (CNEL results; alternative noise model tracks; average annual day operations and baseline noise model tracks based on San Diego County Regional Airport Authority's Airport Noise and Operations Management System data between May 2017 and December 2017).

EXHIBIT 8-1

ALTERNATIVE 1 AND BASELINE NOISE MODEL TRACKS WITH COMMUNITY NOISE EQUIVALENT LEVEL CHANGES





SOURCES: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), OpenStreetMap Contributors, and the GIS User Community, December 2019 (basemap); Ricondo & Associates, Inc., November 2019 (CNEL results; alternative noise model tracks; average annual day operations and baseline noise model tracks based on San Diego County Regional Airport Authority's Airport Noise and Operations Management System data between May 2017 and December 2017).

EXHIBIT 8-2

CHANGES IN COMMUNITY NOISE EQUIVALENT LEVEL
 - ALTERNATIVE 1 COMPARED TO BASELINE



TABLE 8-4 ALTERNATIVE 2 NOISE SCREENING MODEL SCENARIOS

PROCEDURES	STATUS	
FAA ATC Radar Vectors/ATC Visual Approach Clearance	Existing Procedure	Maintain current dispersion patterns associated with FAA ATC issued headings or clearing a pilot to conduct a visual approach – expected to occur during high arrival demand
Runway 27 RNP Approach	Existing Procedure	Maintain current RNP approach from KLOMN waypoint – expected to occur for authorized operations (meet navigation equipment requirements and pilot certification)
COMIX RNAV STAR Amendment – Remove Route Between KLOMN and NADDO Waypoints and Keep Jet Arrivals at 6,000 feet MSL at KLOMN	Final Design Concept	Discontinue route between KLOMN and NADDO waypoints. Keep aircraft at or above 6,000 feet MSL at the KLOMN waypoint thence direct aircraft east while descending until FAA ATC directs pilot to turn south to join final approach – expected to occur unless demand levels require FAA ATC vectors

NOTES:

ATC – Air Traffic Control

FAA – Federal Aviation Administration

MSL – Mean Sea Level

RNP – Required Navigation Performance

RNAV – Area Navigation

STAR – Standard Terminal Arrival Route

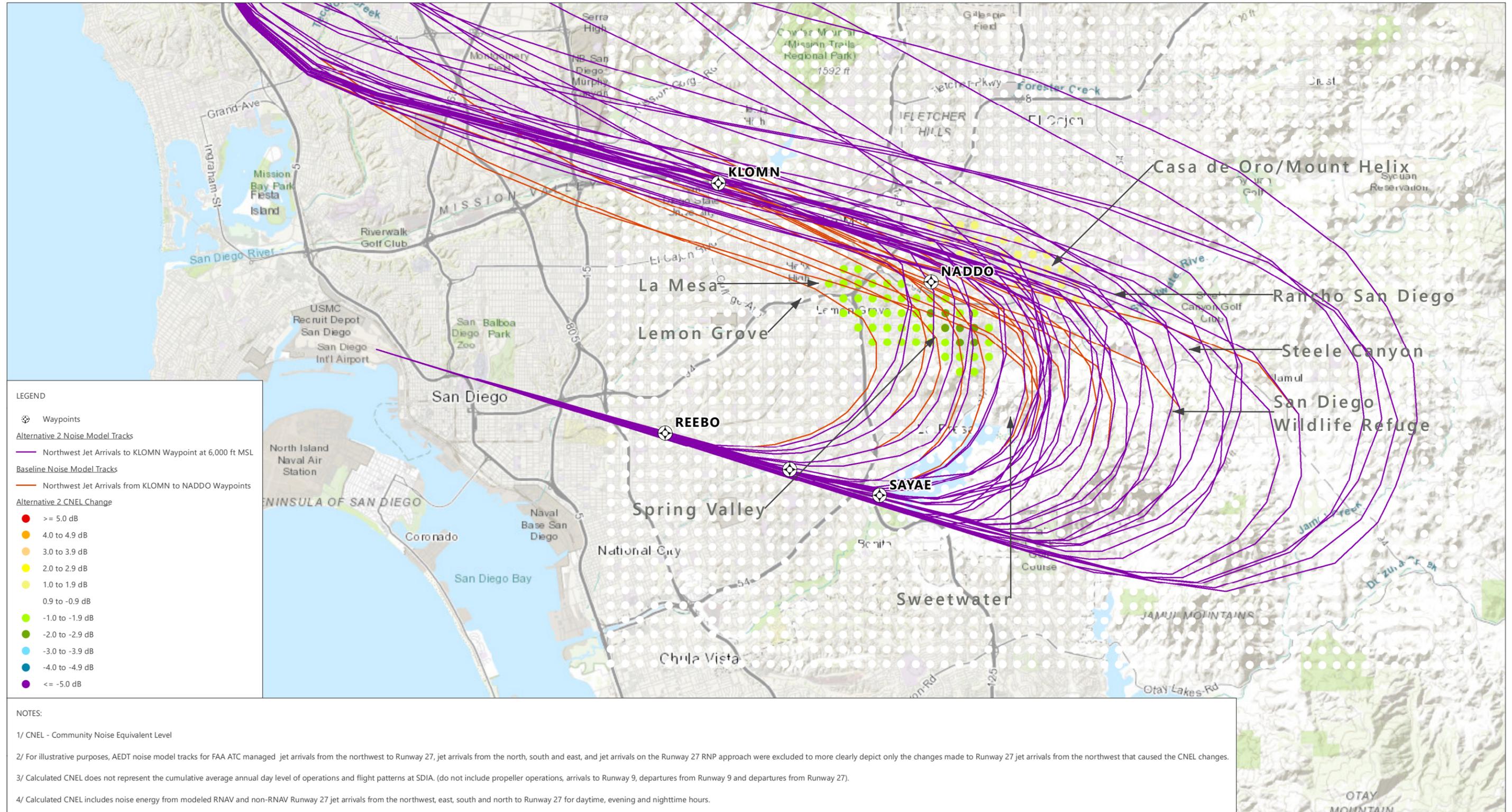
SOURCE: Ricondo & Associates, Inc., November 2019.

Exhibit 8-3 depicts the baseline and Alternative 2 noise model tracks related to the calculated changes equal to or higher than 1 CNEL dBA indicated on the exhibit. The noise model tracks depicted on Exhibit 8-3 indicate expected flight paths under Alternative 2 (magenta noise model tracks) compared to the baseline noise model tracks that modeled flights between the KLOMN and NADDO waypoints (orange noise model tracks). For clarity purposes, the noise model tracks representing FAA ATC–managed procedures from the north, east, and south and the Runway 27 RNP approach were not depicted on Exhibit 8-3, but they were included in the model input to calculate the CNEL at each grid point. **Exhibit 8-4** depicts the change in the CNEL without the noise model tracks for clarity purposes.

The results indicated the CNEL within East County may exhibit the following changes:

- decreases between 1 and 2 CNEL dBA for the Lemon Grove, La Mesa, and Spring Valley community areas
- decreases between 2 and 3 CNEL dBA for the Spring Valley area
- increases between 1 and 2 CNEL dBA for the Casa de Oro, Mount Helix, and Rancho San Diego community areas

The increases in the CNEL for areas such as Casa de Oro and Mount Helix were caused by directing all jet arrivals east after passing the KLOMN waypoint, which caused the decreases in CNEL for the Lemon Grove, La Mesa, and Spring Valley community areas.

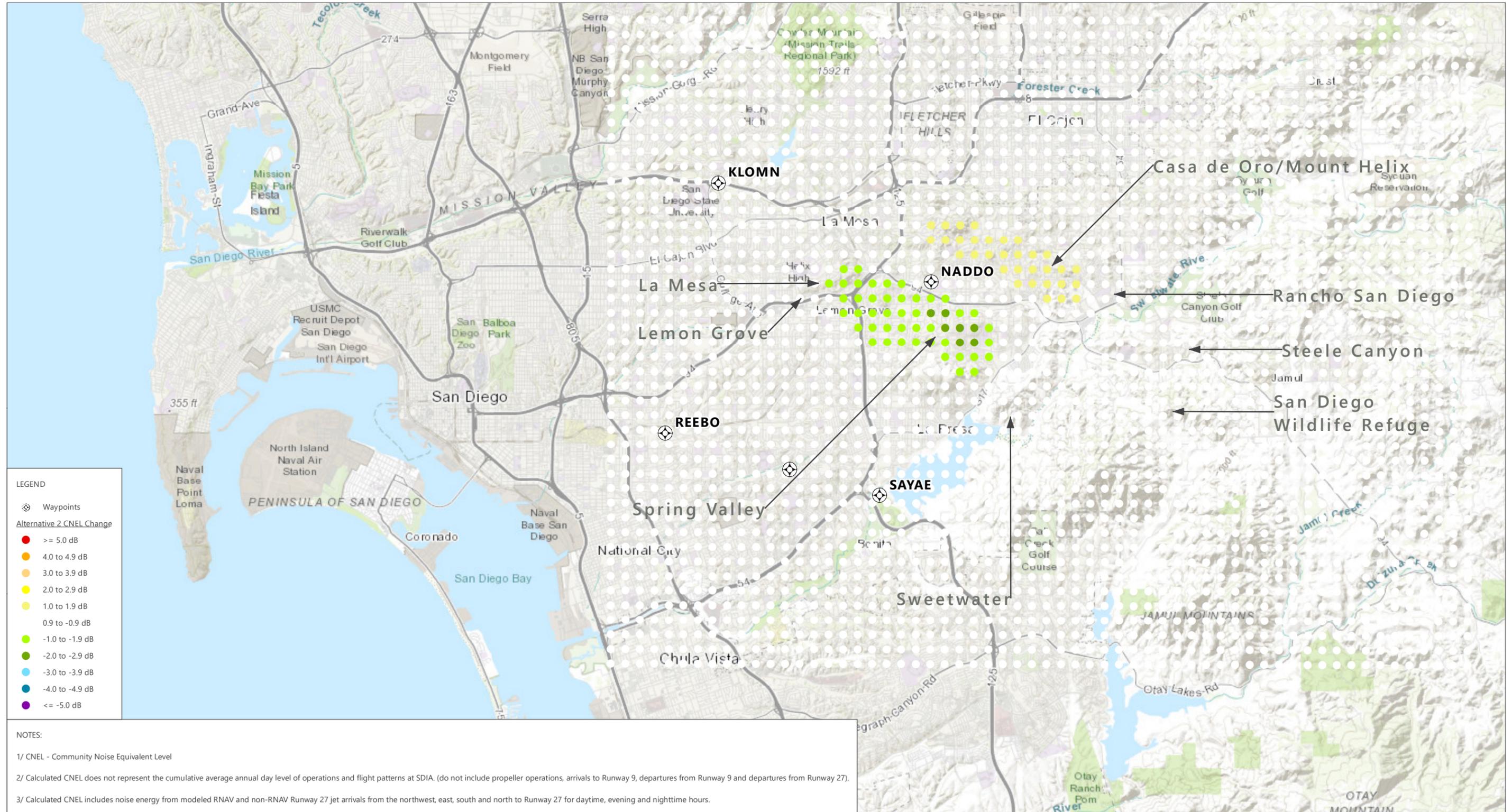


SOURCES: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), OpenStreetMap Contributors, and the GIS User Community, December 2019 (basemap); Ricondo & Associates, Inc., November 2019 (CNEL results; alternative noise model tracks; average annual day operations and baseline noise model tracks based on San Diego County Regional Airport Authority's Airport Noise and Operations Management System data between May 2017 and December 2017).

EXHIBIT 8-3

ALTERNATIVE 2 AND BASELINE NOISE MODEL TRACKS WITH COMMUNITY NOISE EQUIVALENT LEVEL CHANGES





SOURCES: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), OpenStreetMap Contributors, and the GIS User Community, December 2019 (basemap); Ricondo & Associates, Inc., November 2019 (CNEL results; alternative noise model tracks; average annual day operations and baseline noise model tracks based on San Diego County Regional Airport Authority's Airport Noise and Operations Management System data between May 2017 and December 2017).

EXHIBIT 8-4

CHANGES IN COMMUNITY NOISE EQUIVALENT LEVEL
- ALTERNATIVE 2 COMPARED TO BASELINE



8.4 FINAL DESIGN CONCEPT REVIEW AND INPUT

The noise screening analysis results and initial recommendations were presented to the ECWG on December 11, 2019 (ECWG Meeting #5). Appendix A includes a copy of the presentation. Ricondo presented the noise screening methodology and results as described in Section 8.3. Ricondo also recommended not to proceed forward with Alternative 1 due to the reportable increases in the CNEL over communities such as Steele Canyon. ECWG members inquired about possible adjustments to mitigate the increase, but they were advised that the concentration of nighttime jet arrivals would most likely cause an increase for areas where the route would be located. The ECWG agreed with not proceeding forward with Alternative 1 due to the increase in the CNEL.

Ricondo also recommended not to proceed forward with Alternative 2 due to the increase in the CNEL for the Rancho de Oro, Mount Helix, and Rancho San Diego community areas, but the consultant requested ECWG members to consider if the level of increase should prevent the alternative from proceeding forward for further consideration. Ricondo advised the ECWG of the project's parameter to not increase noise for other communities as a result of reducing noise for another community. Based on input from each member, the ECWG concurred with Ricondo's recommendation not to proceed forward with Alternative 2.

The ECWG indicated disappointment in the findings, which resulted in no proposed flight procedure modifications to reduce noise over East County. Ricondo presented a recommendation to the ECWG to encourage the FAA SCT TRACON to keep aircraft on the COMIX RNAV STAR as designed as much as possible. The COMIX RNAV STAR keeps aircraft at 6,000 feet MSL at the KLOMN waypoint, and encouraging the increased use of the procedure would increase the frequency of aircraft at higher altitudes compared to existing conditions. Ricondo emphasized the use of the COMIX RNAV STAR as a requirement is not feasible as FAA ATC needs to redirect traffic to maintain safety and to balance efficiency, but collaborating with FAA SCT TRACON to encourage the use of COMIX RNAV STAR as defined may lead to some noise relief. The ECWG and Authority staff discussed ideas on how encouragement would be implemented. The Authority will coordinate with the ECWG to further define the process.

9. FINAL RECOMMENDATIONS

Based on the technical analysis and input from the ECWG, Ricondo recommended not to proceed with the following Final Design Concept procedures:

- COMIX RNAV STAR Modification – End at KLOMN Waypoint at 6,000 feet MSL
- Nighttime Runway 27 RNAV Approach – Northwest Jet Arrivals Between 11:00 p.m. and 7:00 a.m.

Ricondo advised the ECWG and the Authority to consider moving forward with a program designed to encourage FAA SCT TRACON to keep aircraft on the COMIX RNAV STAR as much as possible. This would keep aircraft at higher altitudes more frequently compared to existing conditions. Ricondo also advised collaborating with FAA SCT TRACON to ensure the STAR for jet arrivals from the northwest keeps aircraft near the KLOMN waypoint at 6,000 feet MSL as the FAA considers Class B airspace changes.

The final recommendations were presented to ANAC on February 19, 2020. A copy of the presentation is provided in Appendix A. Ricondo presented the traffic procedure evaluation process, a description of the final design concepts, the aircraft noise screening results for each final design concept, and recommendations. Ricondo requested ANAC to consider the following actions:

- Proceed forward encouraging FAA SCT TRACON to keep aircraft at 6,000 feet Mean Sea Level at and near the KLOMN waypoint as defined in the COMIX RNAV STAR.

ANAC considered the actions and concurred with Ricondo's recommendations.

APPENDIX A EAST COUNTY WORKING GROUP MEETING PRESENTATIONS

The following are the presentation material discussed at each East County Working Group (ECWG) meeting. This appendix also includes the presentation to the Airport Noise Advisory Committee (ANAC) on February 19, 2020. The presentation included an overview of the results and recommended actions for consideration by ANAC. All presentation material was posted to the San Diego County Regional Airport Authority's (the Authority) website after each meeting.

San Diego International Airport East County Working Group - Aircraft Noise Concerns

Meeting #1

PRESENTED TO:
SDIA East County Working Group

PRESENTED BY:
Stephen C. Smith

PRESENTED ON:
December 6, 2018

Agenda

§ Introductions

§ Meeting Objective

§ East County Working Group

§ Overview of Air Traffic Evaluation

- Air Traffic Evaluation Objective
- Air Traffic Evaluation Process Overview
- FAA Process Overview

§ Understanding East County Concerns related to Aircraft Noise and Overflights

- Historic and existing SDIA arrival traffic patterns over East County
- Existing published flight procedures
- Future air traffic environment changes
- Workgroup concerns

§ Next Steps

Introductions

-  East County Working Group Facilitator
 - Ms. Heidi Gantwerk
-  San Diego County Regional Airport Authority (Airport Authority)
 - Owns and operates the airport
 - Main Contact: Ms. Sjohnna Knack, Program Manager
-  Flight Procedure Analysis Consultant Team
 - Project Lead: Mr. Stephen Smith
 - Ricondo & Associates, Inc.
-  East County Working Group Members

Meeting Objective

-  Understand role of the East County Working Group
-  Confirm intent and expectations of the Air Traffic Evaluation effort
-  Educate members on overall SDIA arrival traffic patterns
-  Discover overall noise concerns/issues from working group

East County Working Group

East County Working Group



Purpose:

 Inform Authority of SDIA aircraft noise concern/issues for East County

 Provide input to Authority on potential noise abatement recommendations



Members selected to allow for fair representation of East County communities

Member Responsibilities

-  Attend every meeting.
-  Come to meeting with an open mind.
-  Represent your community in a professional and respectful manner.
-  Respect other committee members views and opinions.
-  Ask questions as a means to reach a better understanding on a topic.
-  Provide meaningful input.

Meeting Conduct and Logistics

-  Operated on a consensus basis
-  Conducted in a professional and respectful manner
-  Facilitated by an experienced meeting facilitator
 - Stay on agenda
 - Be sensitive to meeting time
 - Let every committee member share their thoughts
-  Meetings will be open to the public to observe
-  Statements to the press can only represent the individual not the committee

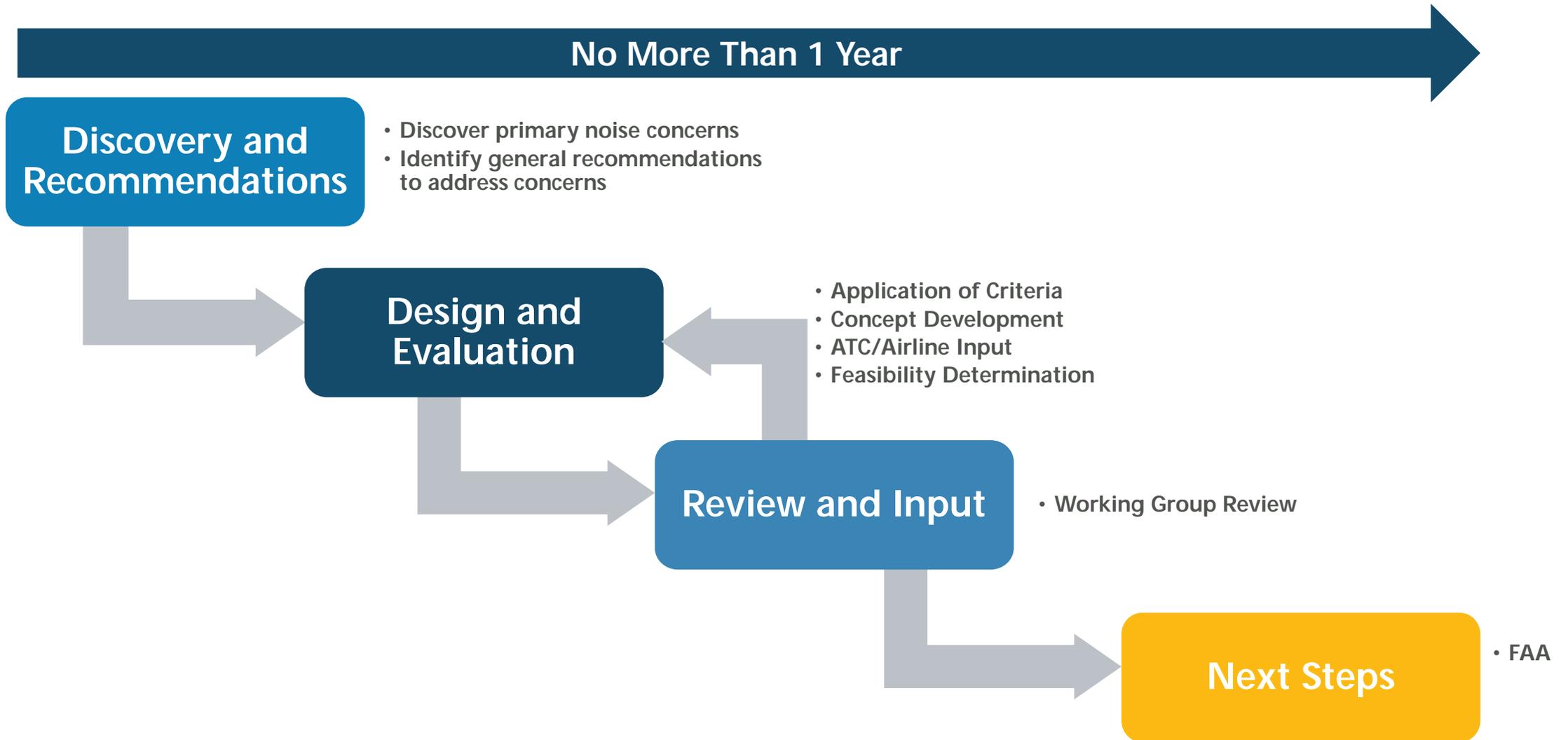
Overview of Air Traffic Evaluation:

Process Overview

East County Air Traffic Evaluation Objective

-  Discover and identify SDIA aircraft noise concerns/issues in East County
-  Identify air traffic related concepts to address concerns/issues
-  Design potential procedure designs to meet the intent
-  Determine feasibility of potential procedure designs

East County Air Traffic Evaluation Process Overview



Design and Evaluation Parameters



Design Parameters

- Do not change aircraft flight paths at or below 3,000 feet above SDIA's elevation
- Do not impact safety
- Meet FAA design criteria
- Fit within existing airspace
- Do not impact capacity of SDIA
- Do not move noise to new non-compatible areas



Operations Data and Design Tool

- Evaluate post-November 2016 operations
- Use FAA's Terminal Area Route Generation, Evaluation and Traffic Simulation (TARGETS) design tool to design concept procedures.

Important Factors



Will:

- Propose designs compatible with existing air traffic environment
- Gather critical input from East County Working Group during design process
- Coordinate with FAA ATO staff during concept design process



Will not:

- Propose designs that require FAA waivers
- Propose designs that will negatively impact SDIA capacity
- Conduct all steps in FAA Order 7100.41A
- Evaluate non-SDIA traffic overflights
- Evaluate “restriction” type proposals that require 14 CFR Part 161 study

Set Realistic Expectations

? What are we doing here?

- Understand noise concerns for individual communities and East County as a whole
- Discover and develop ideas to address noise concerns
- Determine if the ideas are feasible for both short- and long-term relief
- Assess overall effect a feasible idea has on the communities within East County

? Will there be aircraft noise relief?

- Implementation of feasible concepts relies on FAA and airline support
- Maintain a delicate balance to address all community concerns in East County as a whole and those for individual communities in East County
- Maintain a delicate balance between airport/air traffic efficiency and noise relief

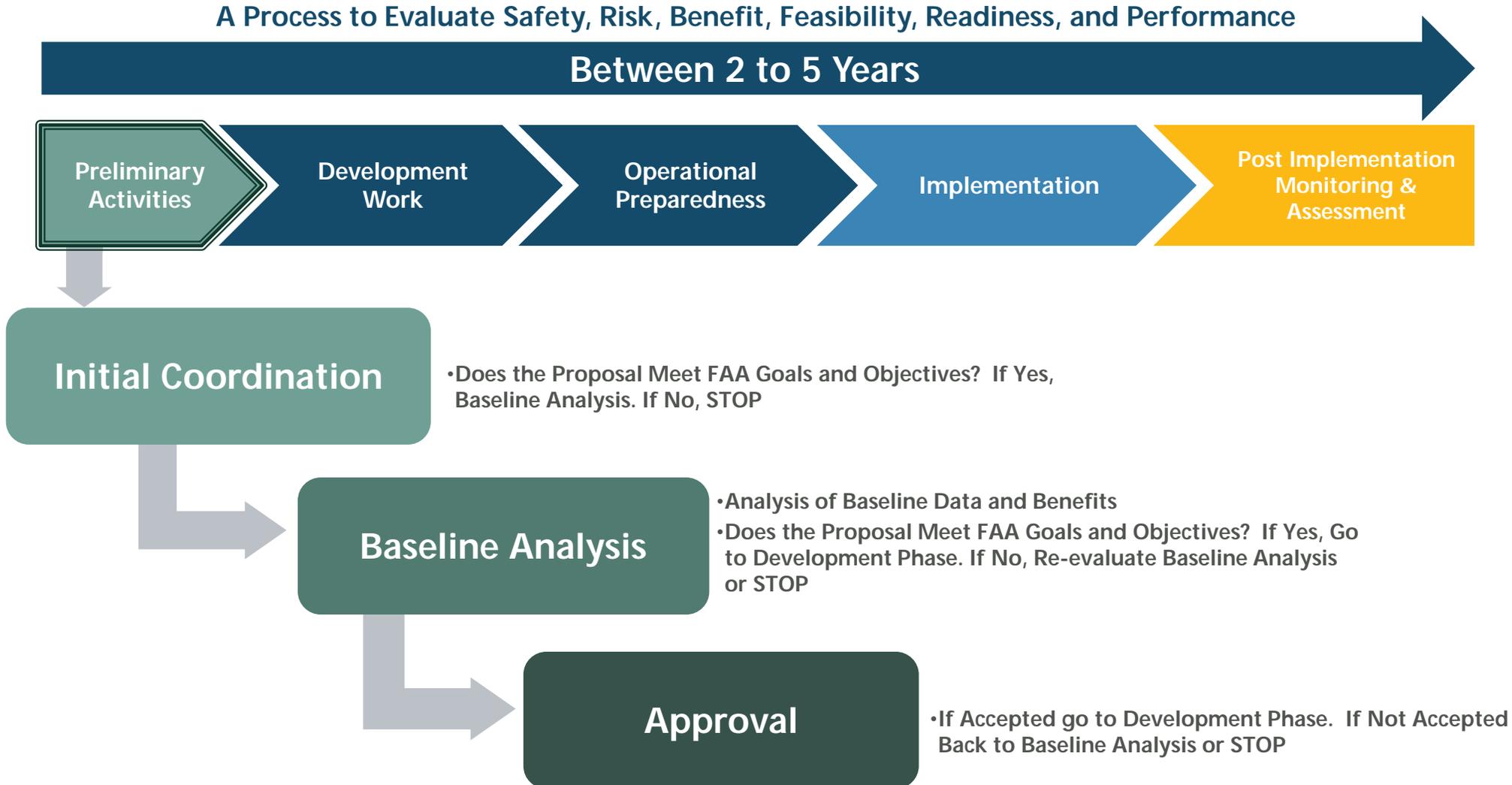
? How long will it take to get noise relief if found to be feasible?

- Can take between 2 and 5 years: depends on the proposed concept and environmental review requirements
- Concepts requiring new technology and airline investment can take even longer than 5 years

Overview of Flight Procedure Analysis:

FAA Process Overview

FAA Process and 7100.41 Phase 1 - Preliminary Activities

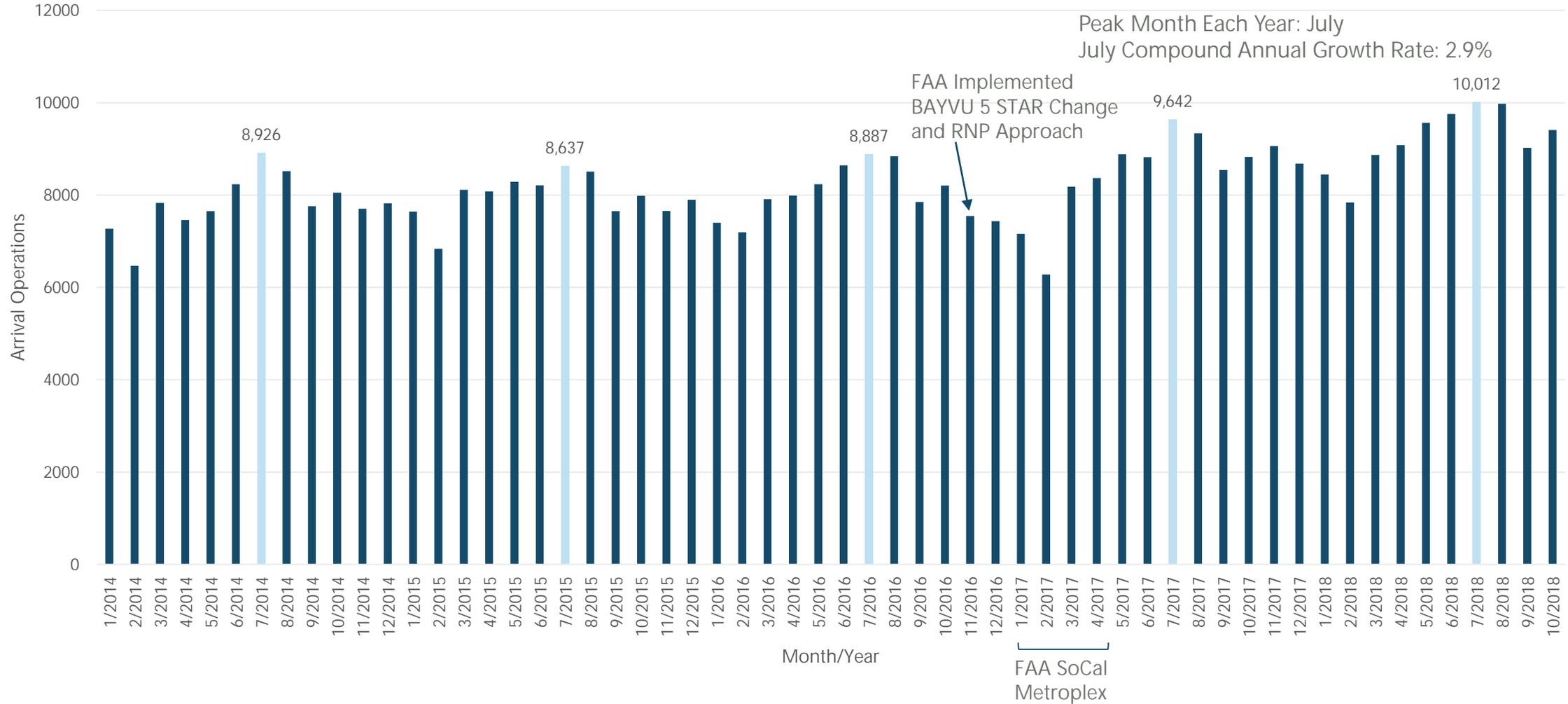


Understanding East County Concerns related to Aircraft Noise and Overflights

Historic and Existing SDIA Arrival Traffic Patterns over East County

Runway 27 Arrivals – Monthly Operations Since 2014

Total Monthly Arrivals to Runway 27

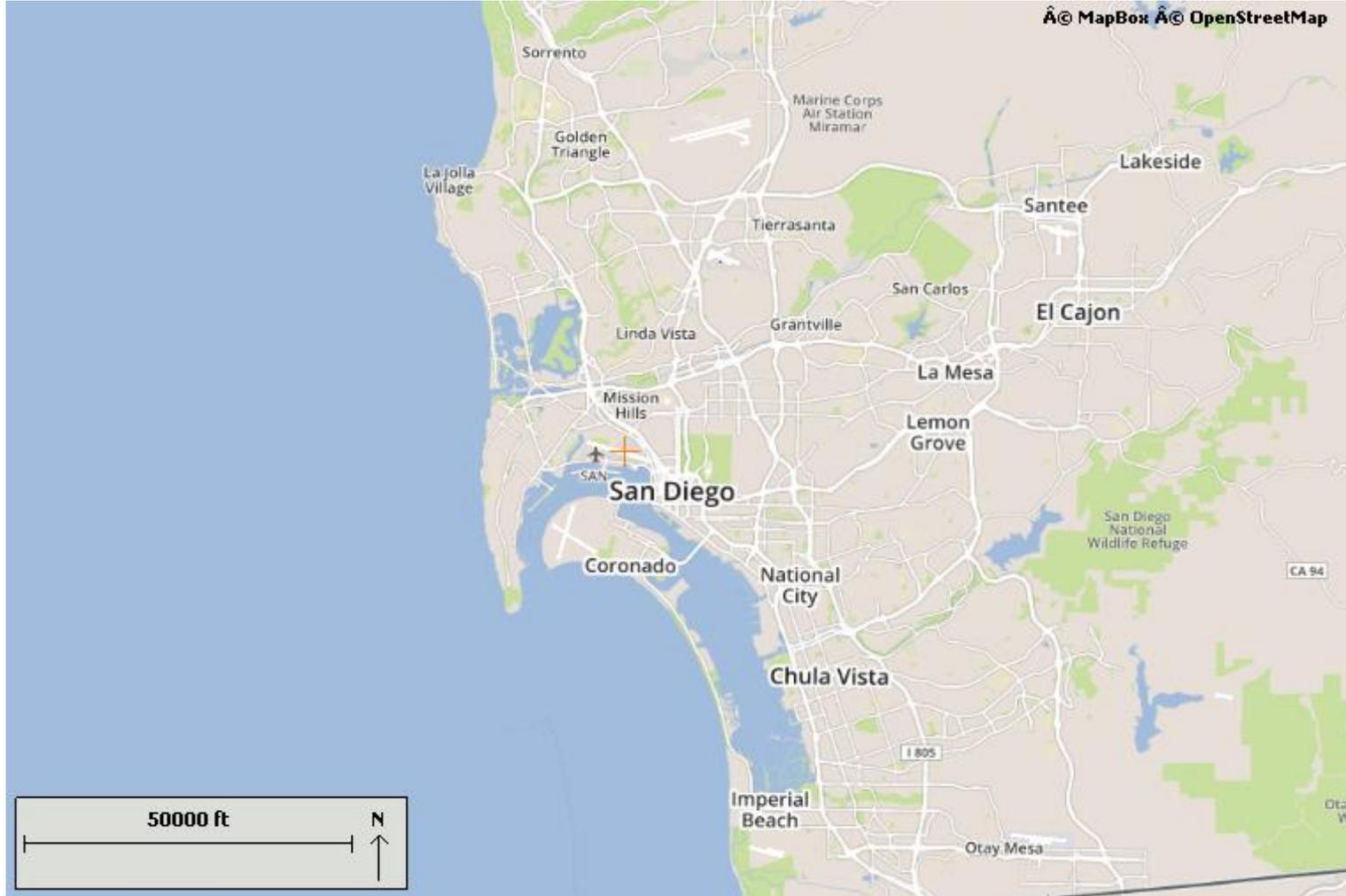


SOURCE: San Diego County Regional Airport Authority Airport Noise and Operations Management System, November 2018.

NOTE: Counts include all operations designated as arrivals to Runway 27

Runway 27 Arrivals - Flight Tracks

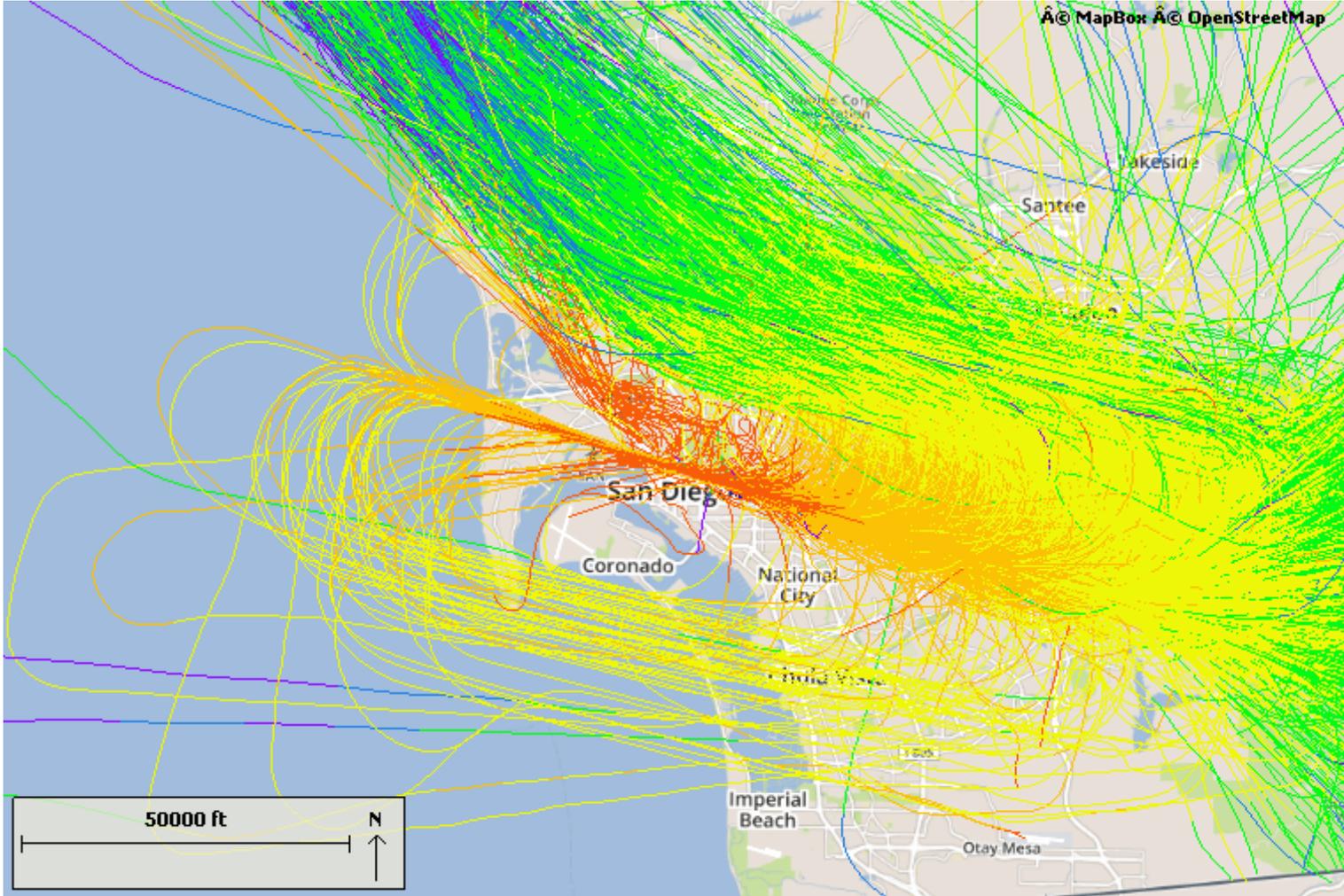
San Diego Metropolitan Area - July 2014



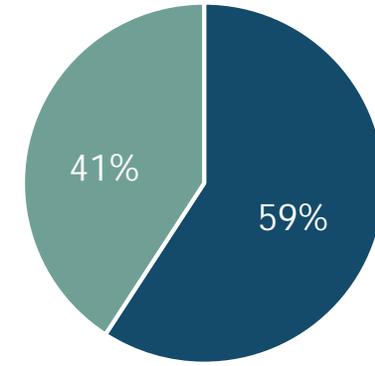
SOURCE: San Diego County Regional Airport Authority Airport Noise and Operations Management System, November 2018.

Runway 27 Arrivals - Flight Tracks by Altitude

San Diego Metropolitan Area - July 2014

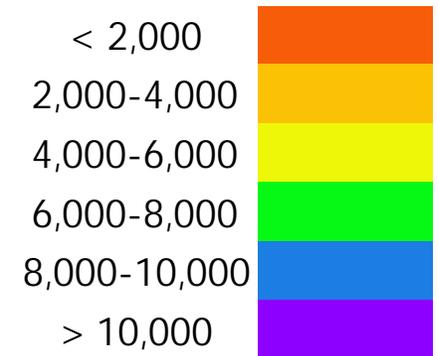


Percentage of Arrivals from North/Northwest and East



■ East ■ North/Northwest

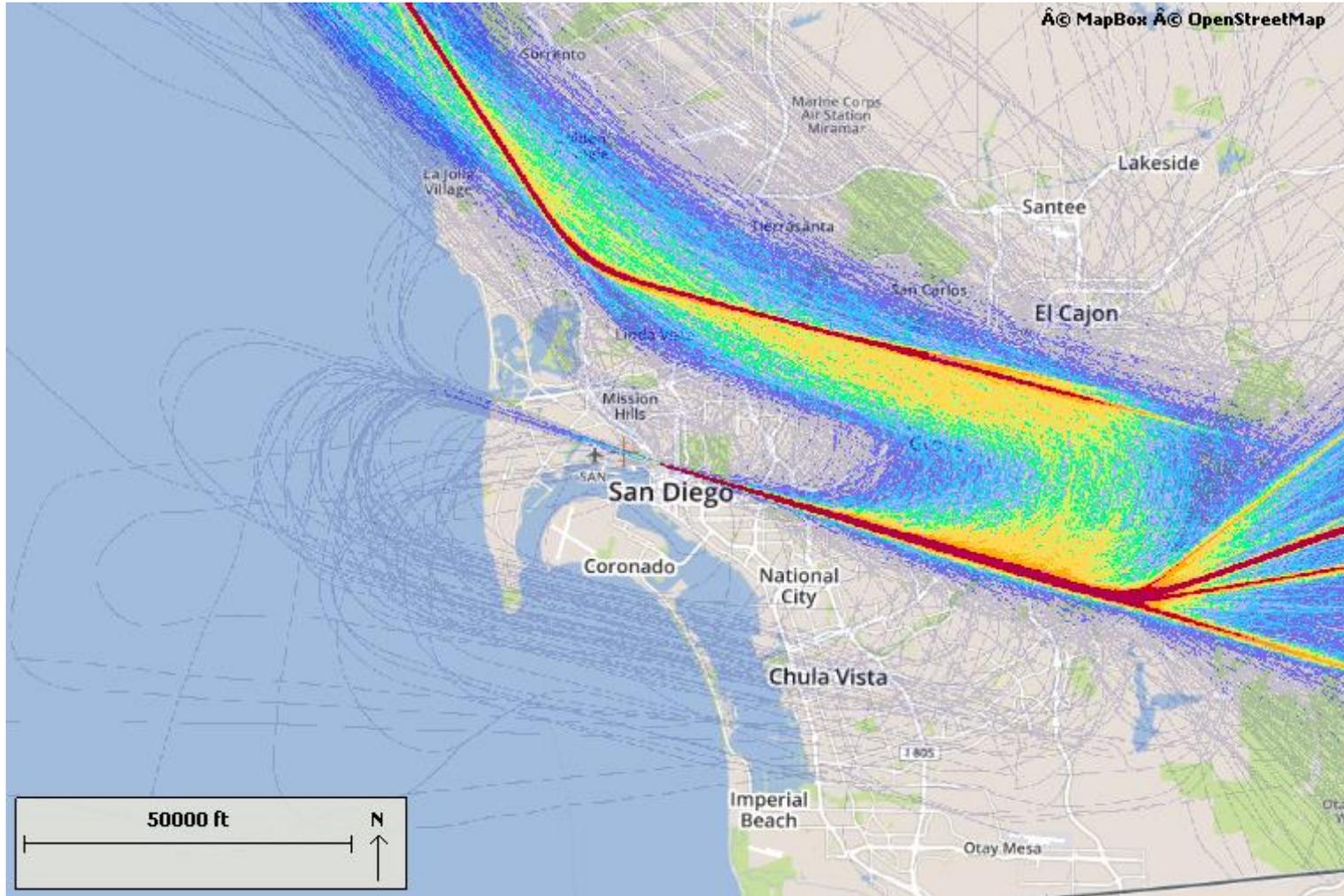
Track Altitude Ranges (feet above SDIA airfield elevation)



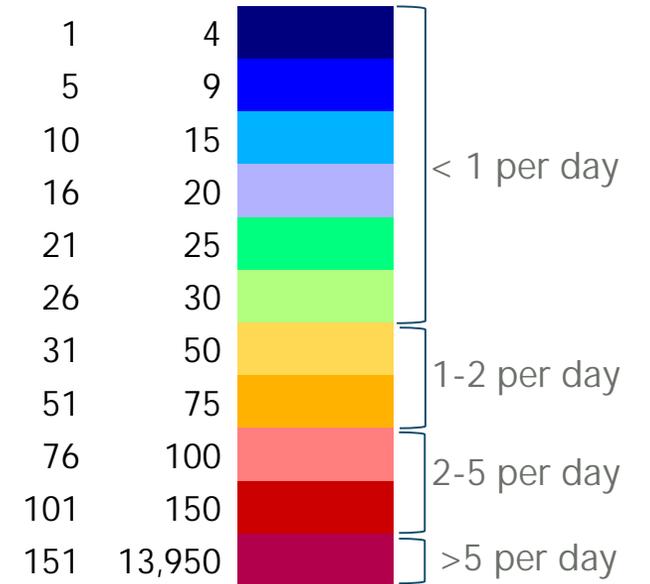
SOURCE: San Diego County Regional Airport Authority Airport Noise and Operations Management System, November 2018.

NOTES: SDIA airfield elevation is 17 feet MSL; Total Runway 27 arrivals was 8,926 for July 2014

Runway 27 Arrivals - Flight Track Density Analysis San Diego Metropolitan Area - July 2014



Track Density Ranges
(count of operations)

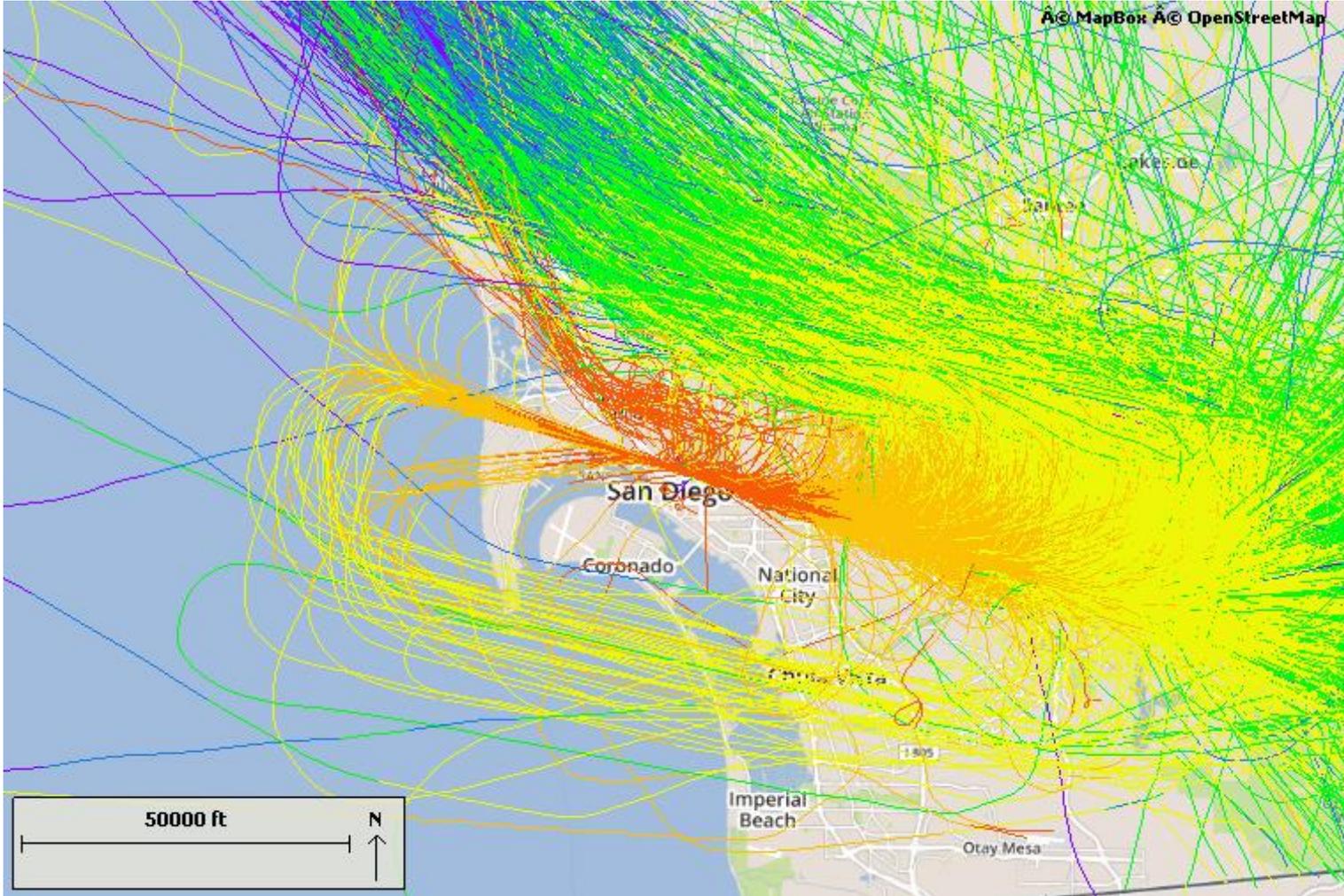


SOURCE: San Diego County Regional Airport Authority Airport Noise and Operations Management System, November 2018.

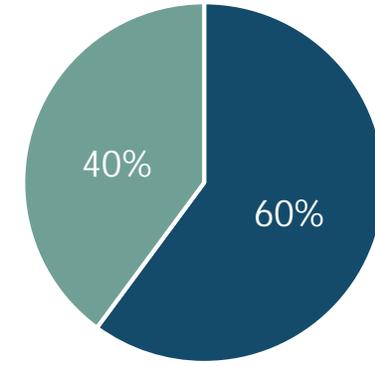
Note: Total Runway 27 arrivals was 8,926 for July 2014

Runway 27 Arrivals - Flight Tracks by Altitude

San Diego Metropolitan Area - July 2015

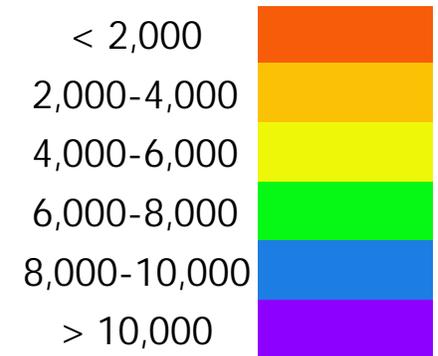


Percentage of Arrivals from North/Northwest and East



■ East ■ North/Northwest

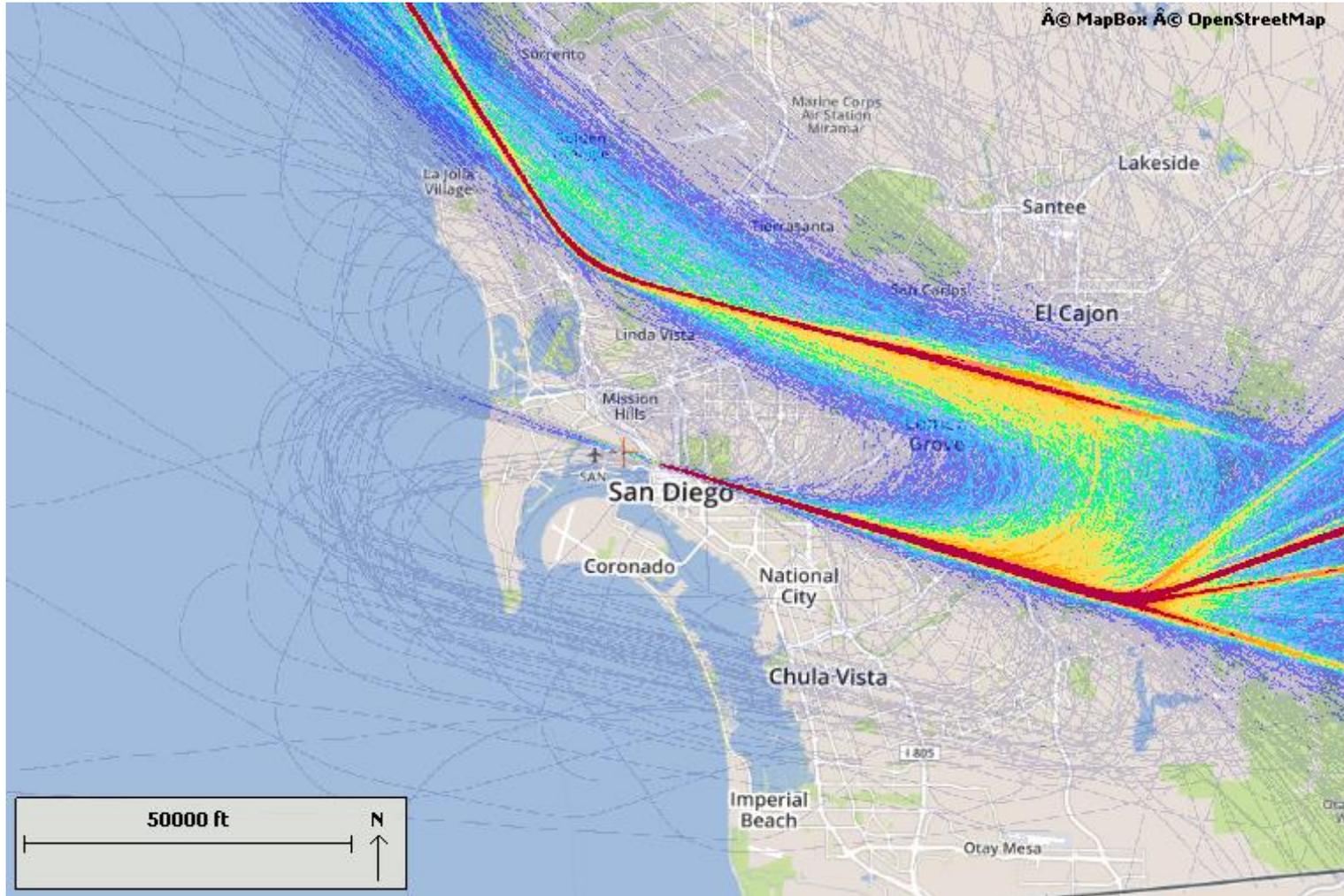
Track Altitude Ranges (feet above SDIA airfield elevation)



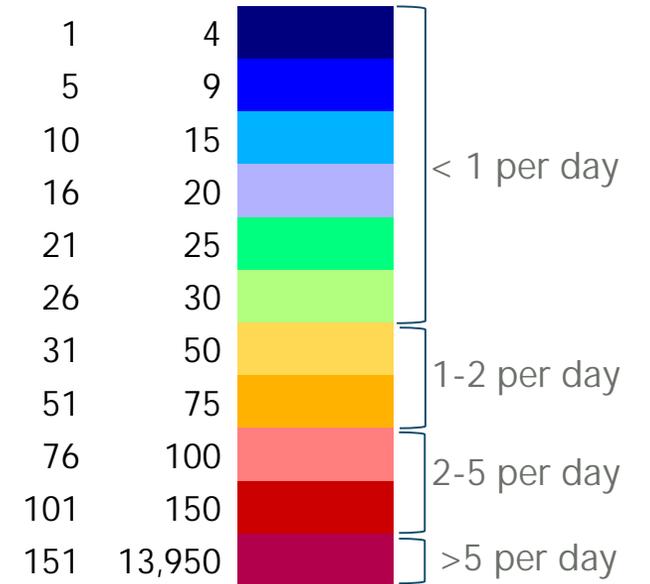
SOURCE: San Diego County Regional Airport Authority Airport Noise and Operations Management System, November 2018.

NOTES: SDIA airfield elevation is 17 feet MSL; Total Runway 27 arrivals was 8,637 for July 2015

Runway 27 Arrivals - Flight Track Density Analysis San Diego Metropolitan Area - July 2015



Track Density Ranges
(count of operations)

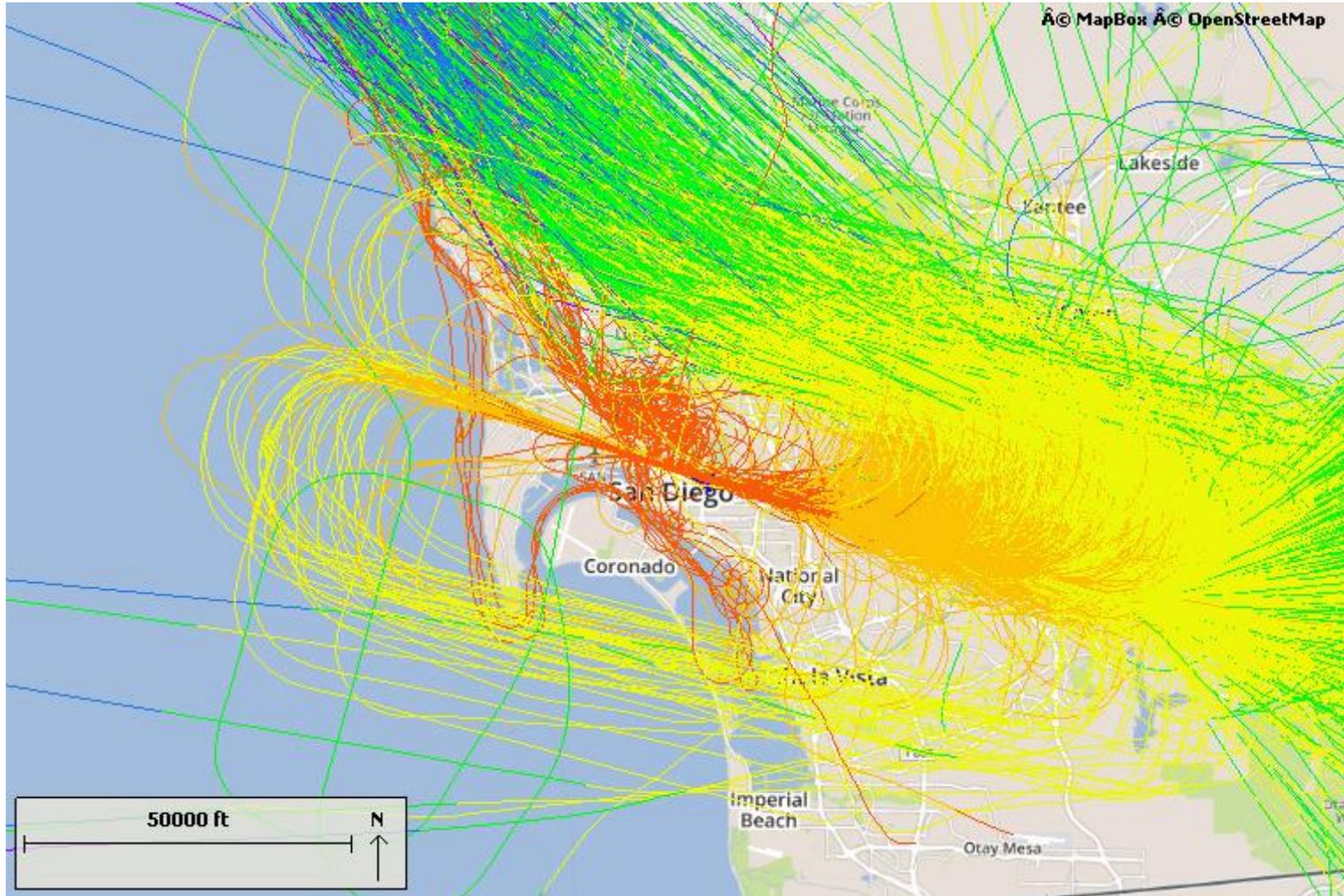


SOURCE: San Diego County Regional Airport Authority Airport Noise and Operations Management System, November 2018.

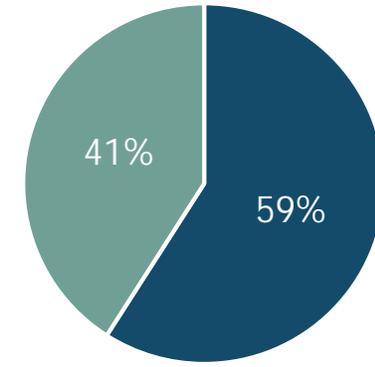
Note: Total Runway 27 arrivals was 8,637 for July 2015

Runway 27 Arrivals - Flight Tracks by Altitude

San Diego Metropolitan Area - July 2016

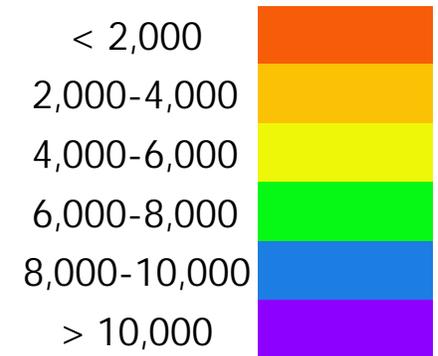


Percentage of Arrivals from North/Northwest and East



■ East ■ North/Northwest

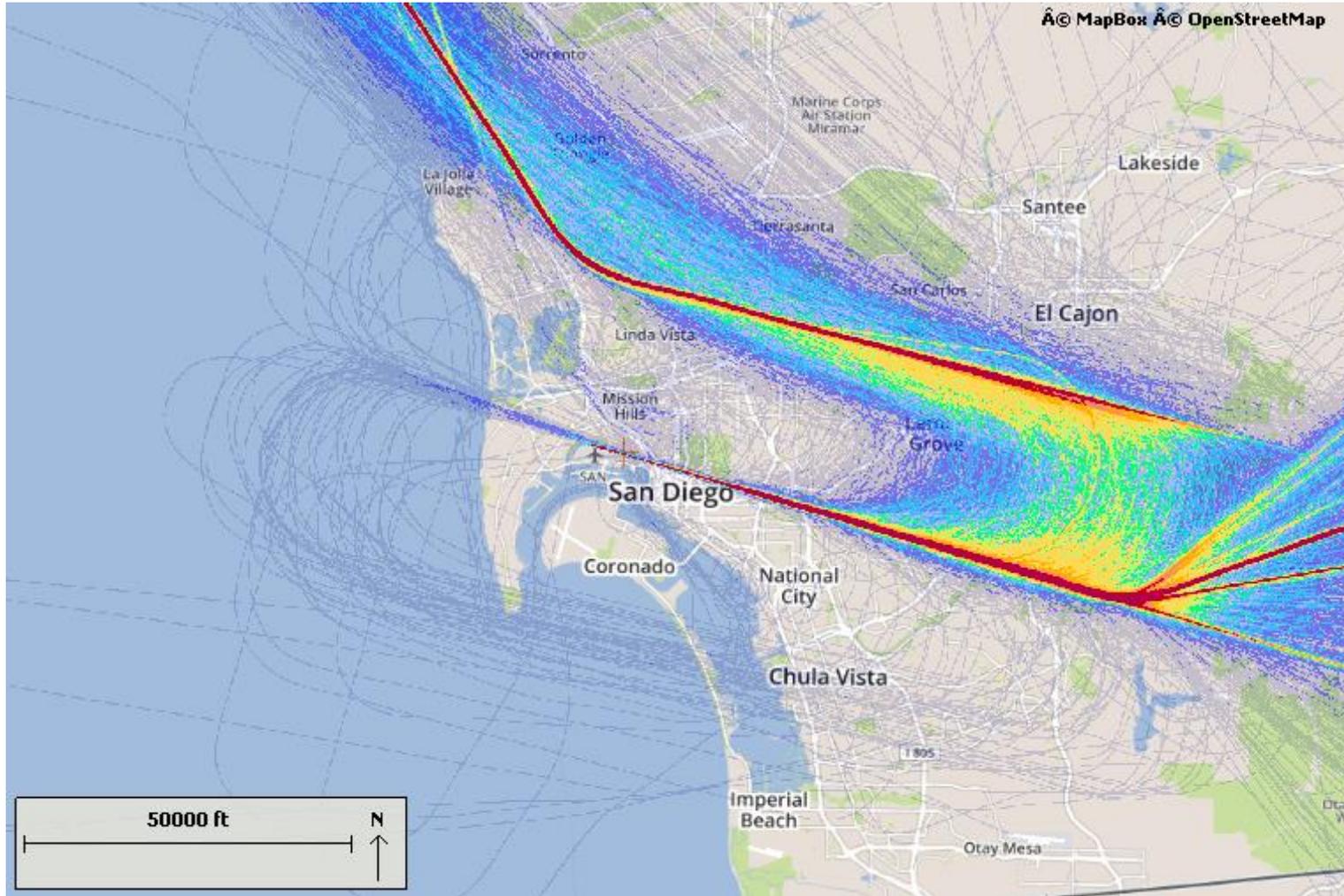
Track Altitude Ranges (feet above SDIA airfield elevation)



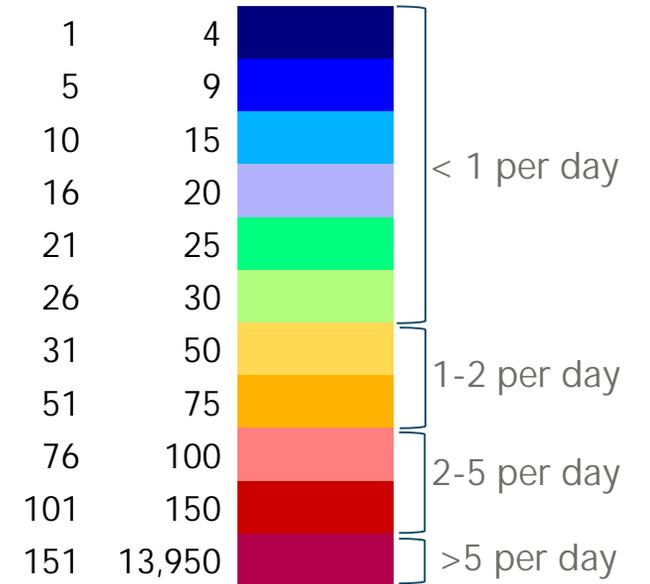
SOURCE: San Diego County Regional Airport Authority Airport Noise and Operations Management System, November 2018.

NOTES: SDIA airfield elevation is 17 feet MSL; Total Runway 27 arrivals was 8,887 for July 2016

Runway 27 Arrivals - Flight Track Density Analysis San Diego Metropolitan Area - July 2016



Track Density Ranges
(count of operations)

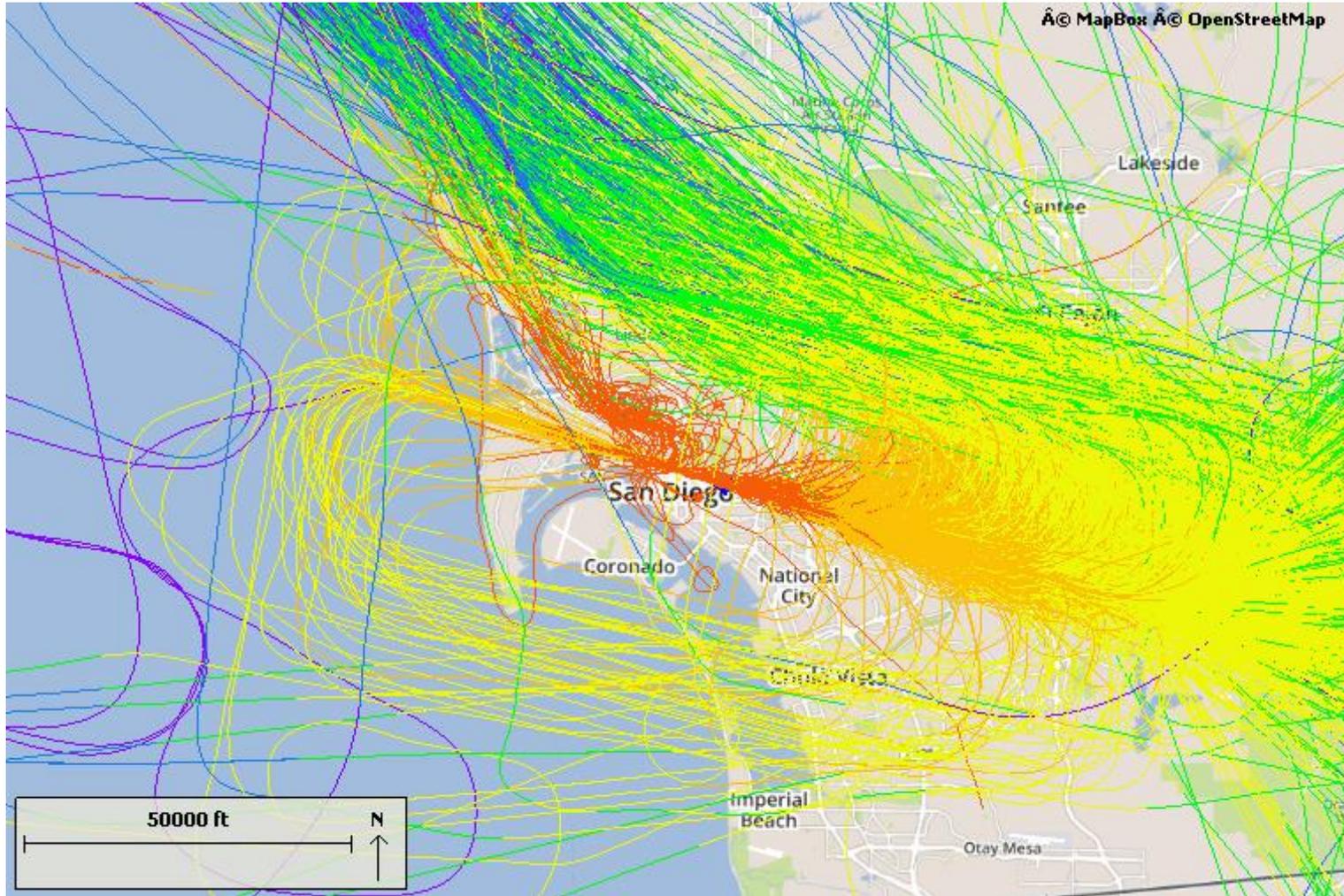


SOURCE: San Diego County Regional Airport Authority Airport Noise and Operations Management System, November 2018.

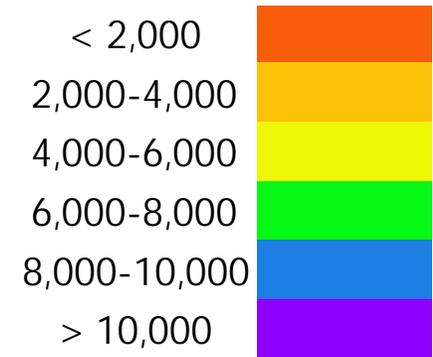
Note: Total Runway 27 arrivals was 8,887 for July 2016

Runway 27 Arrivals - Flight Tracks by Altitude

San Diego Metropolitan Area - November 2016



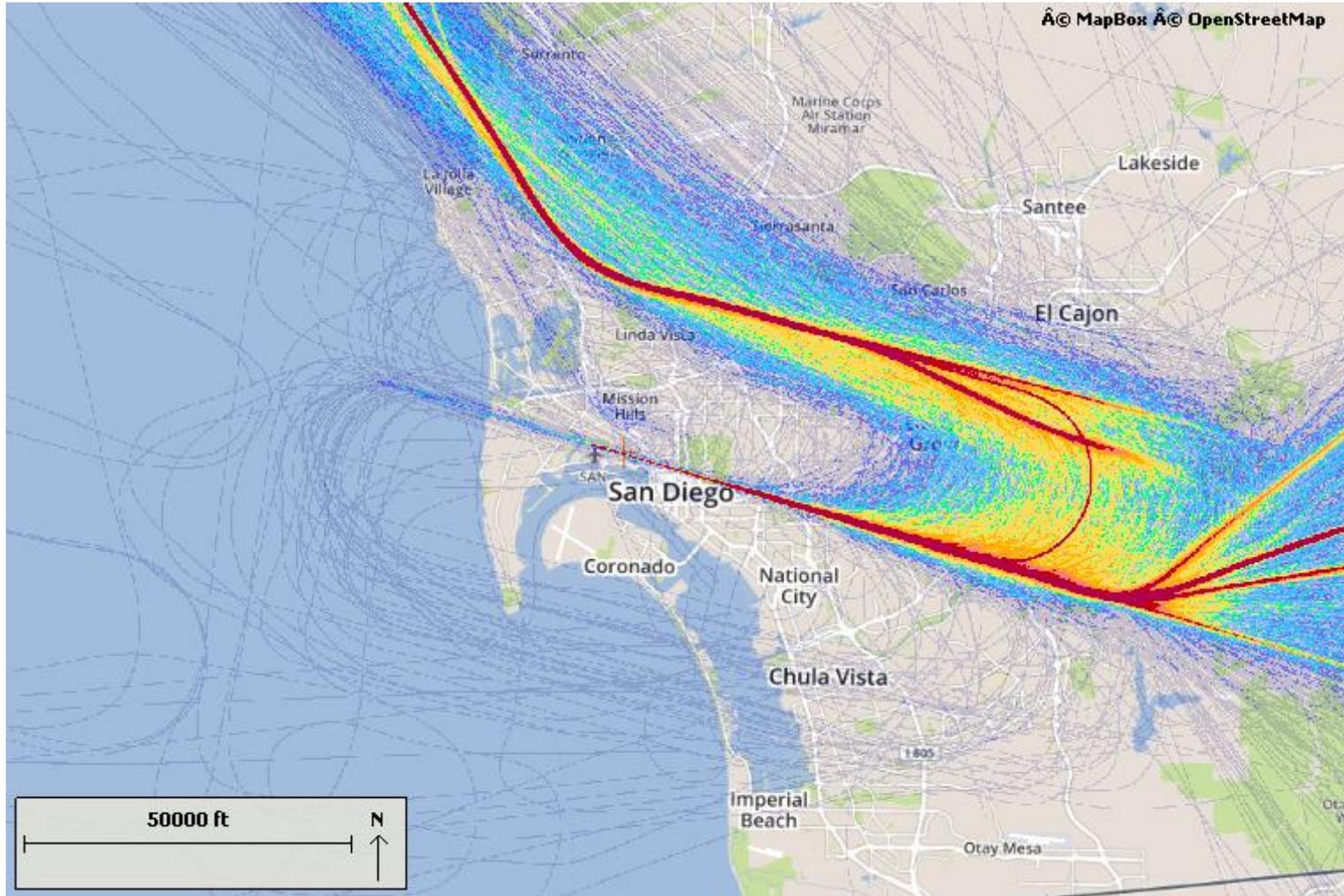
Track Altitude Ranges
(feet above SDIA airfield elevation)



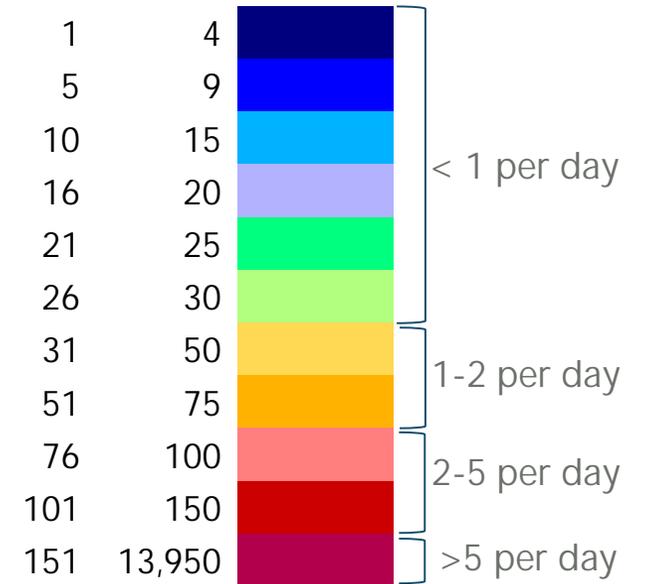
SOURCE: San Diego County Regional Airport Authority Airport Noise and Operations Management System, November 2018.

NOTES: SDIA airfield elevation is 17 feet MSL; Total Runway 27 arrivals was 7,547 for November 2016

Runway 27 Arrivals - Flight Track Density Analysis San Diego Metropolitan Area - November 2016



Track Density Ranges
(count of operations)

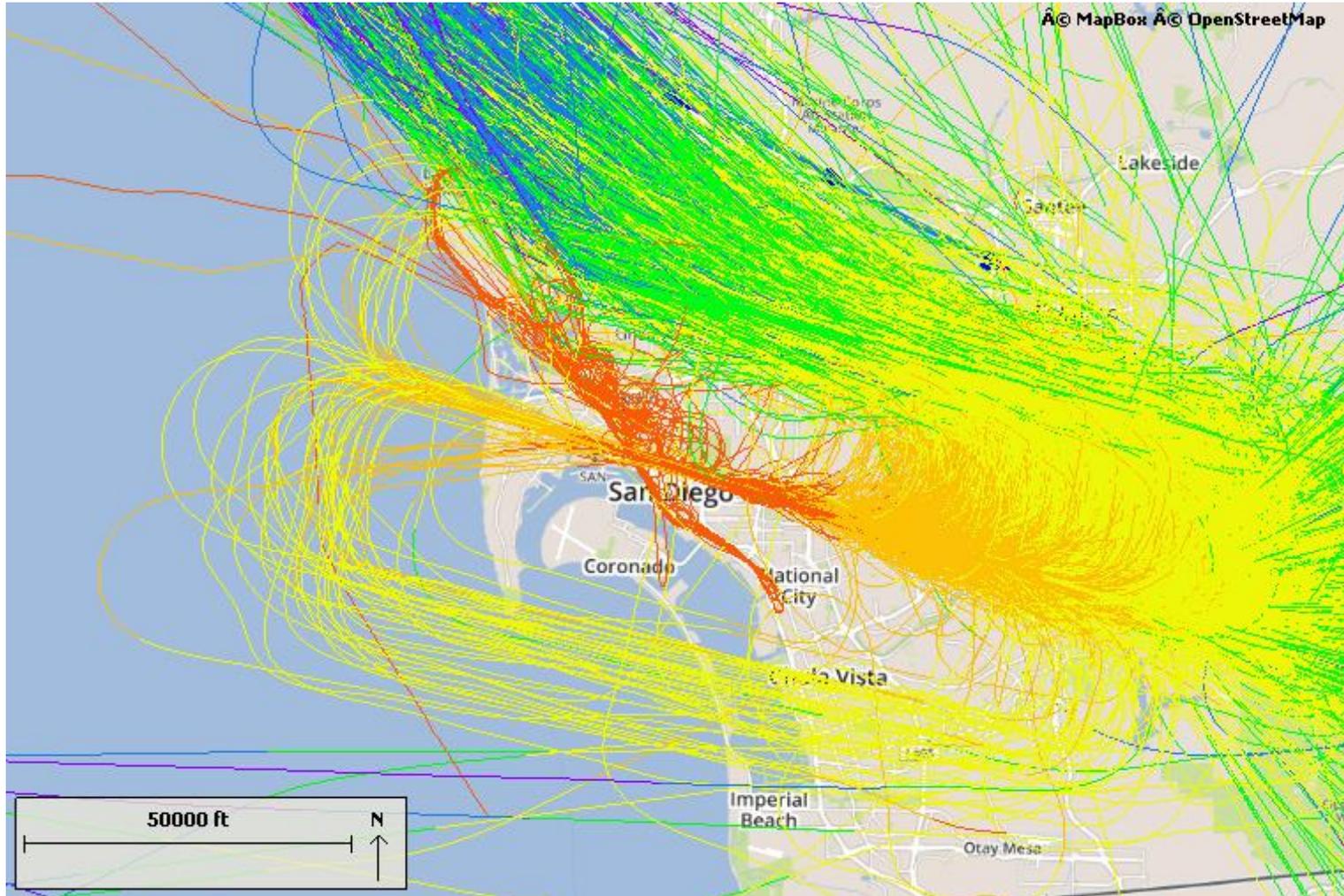


SOURCE: San Diego County Regional Airport Authority Airport Noise and Operations Management System, November 2018.

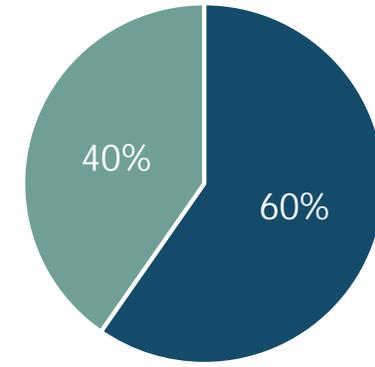
Note: Total Runway 27 arrivals was 7,547 for November 2016

Runway 27 Arrivals - Flight Tracks by Altitude

San Diego Metropolitan Area - July 2017

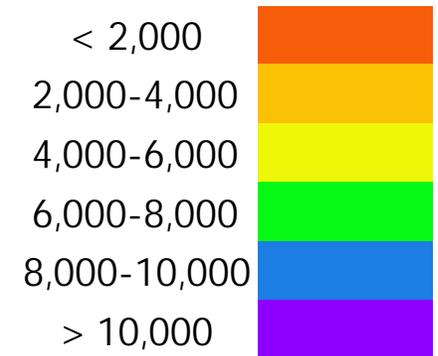


Percentage of Arrivals from North/Northwest and East



■ East ■ North/Northwest

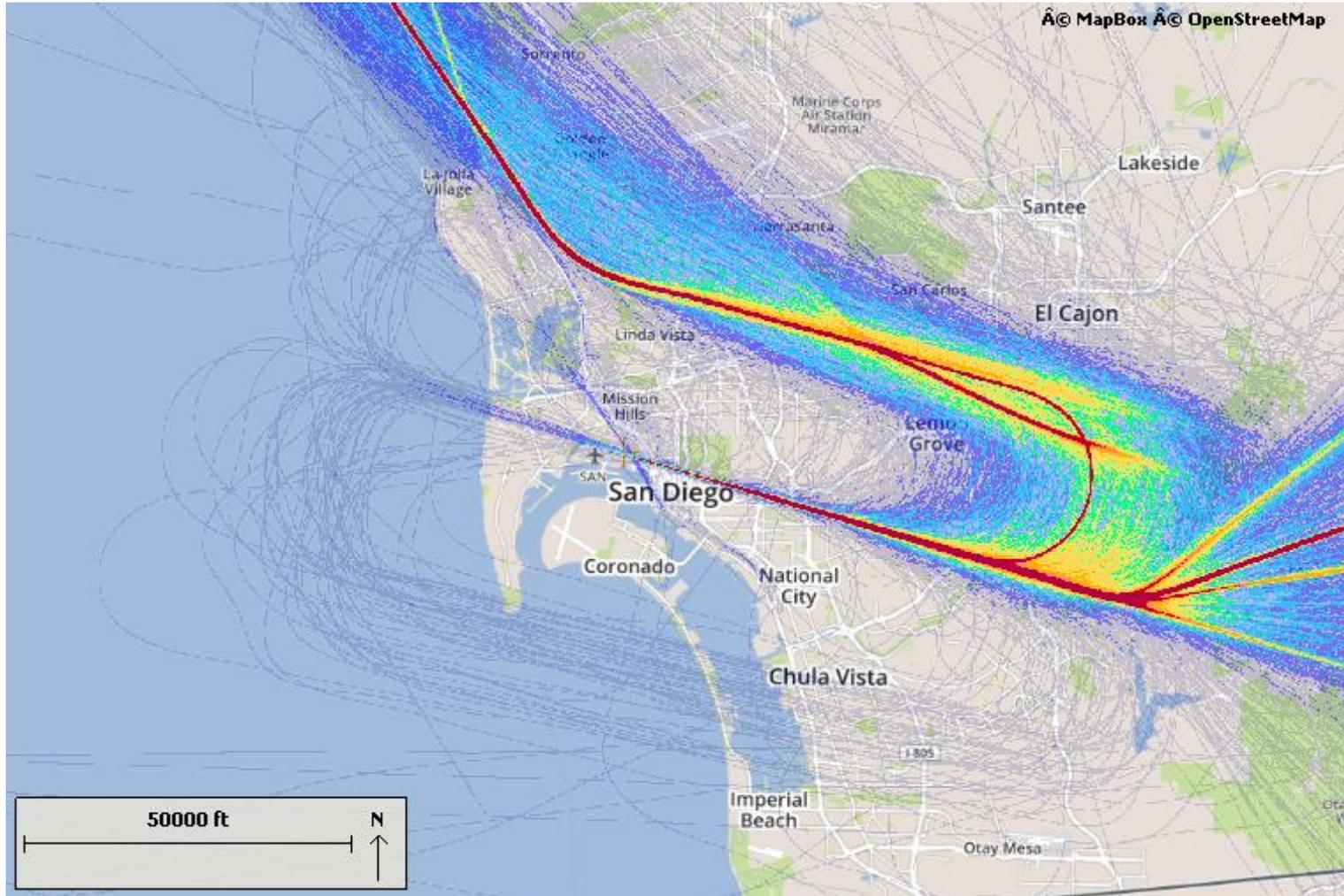
Track Altitude Ranges (feet above SDIA airfield elevation)



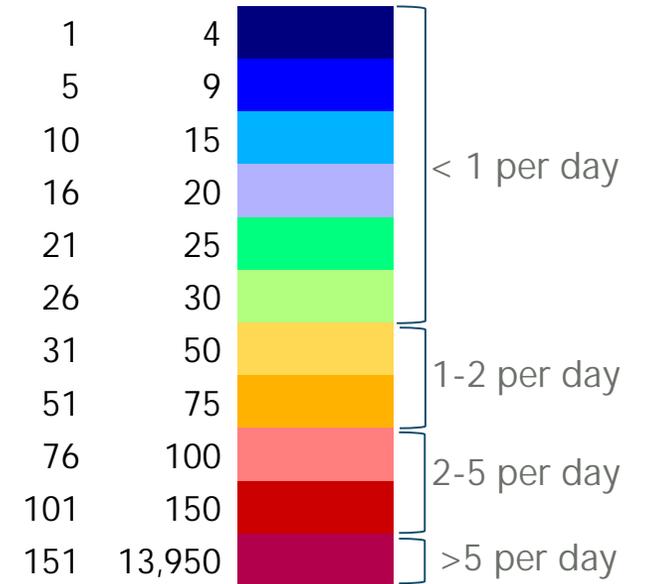
SOURCE: San Diego County Regional Airport Authority Airport Noise and Operations Management System, November 2018.

NOTES: SDIA airfield elevation is 17 feet MSL; Total Runway 27 arrivals was 9,642 for July 2017

Runway 27 Arrivals - Flight Track Density Analysis San Diego Metropolitan Area - July 2017



Track Density Ranges
(count of operations)

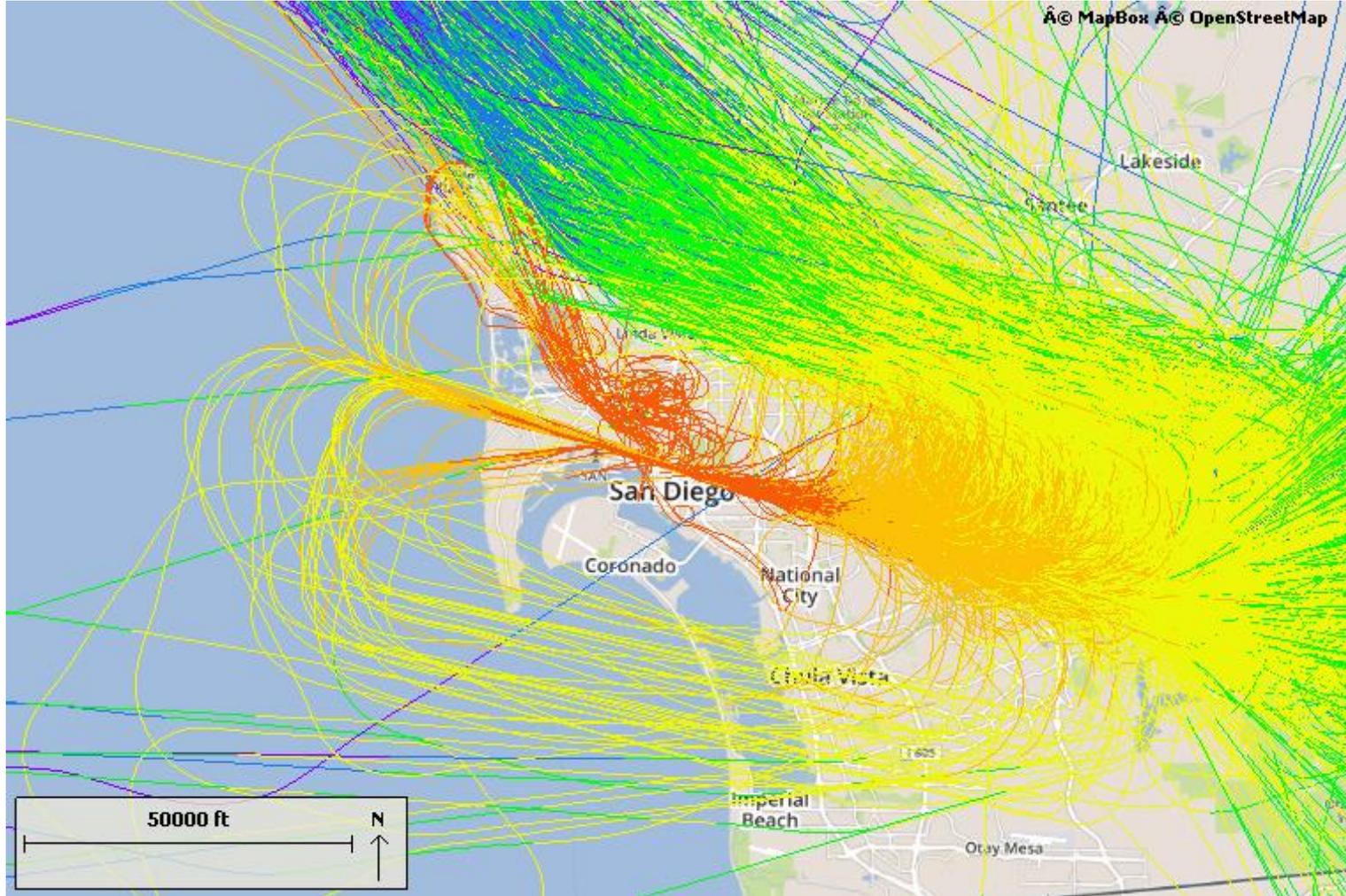


SOURCE: San Diego County Regional Airport Authority Airport Noise and Operations Management System, November 2018.

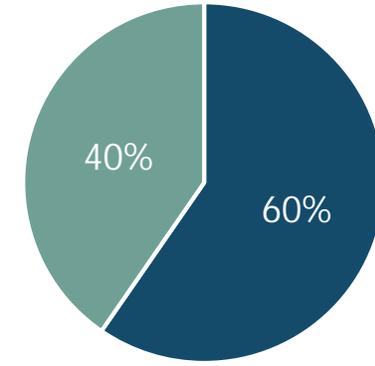
Note: Total Runway 27 arrivals was 9,642 for July 2017

Runway 27 Arrivals - Flight Tracks by Altitude

San Diego Metropolitan Area - July 2018

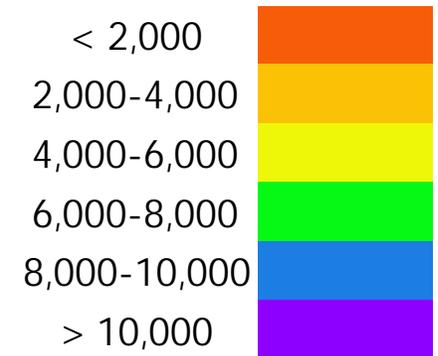


Percentage of Arrivals from North/Northwest and East



■ East ■ North/Northwest

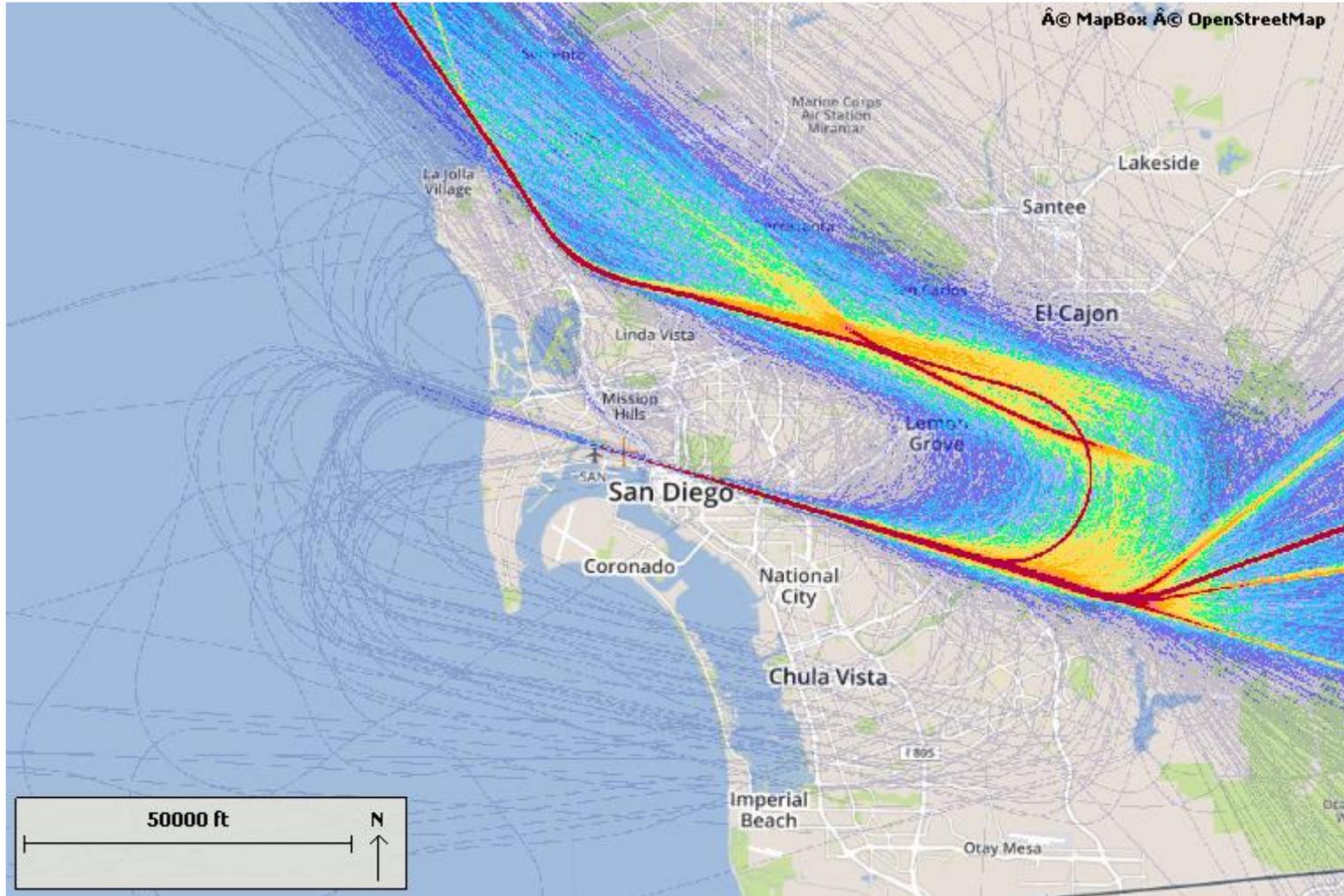
Track Altitude Ranges (feet above SDIA airfield elevation)



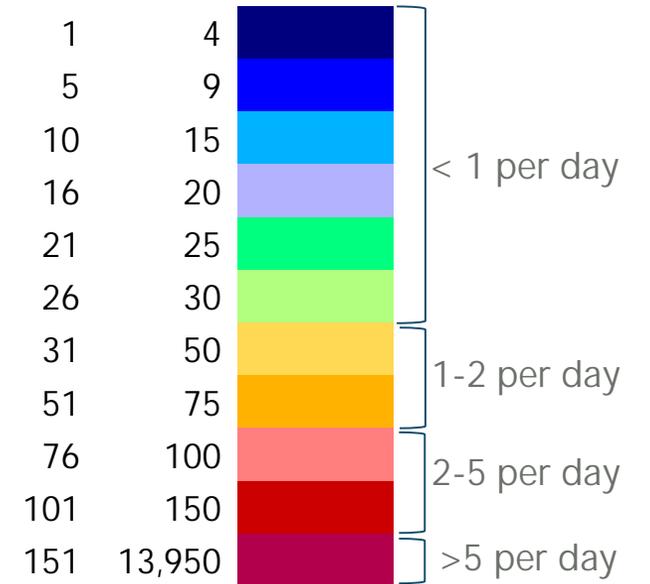
SOURCE: San Diego County Regional Airport Authority Airport Noise and Operations Management System, November 2018.

NOTES: SDIA airfield elevation is 17 feet MSL; Total Runway 27 arrivals was 10,012 for July 2018

Runway 27 Arrivals - Flight Track Density Analysis San Diego Metropolitan Area - July 2018



Track Density Ranges
(count of operations)



SOURCE: San Diego County Regional Airport Authority Airport Noise and Operations Management System, November 2018.

Note: Total Runway 27 arrivals was 10,012 for July 2018

Understanding East County Concerns related to Aircraft Noise and Overflights

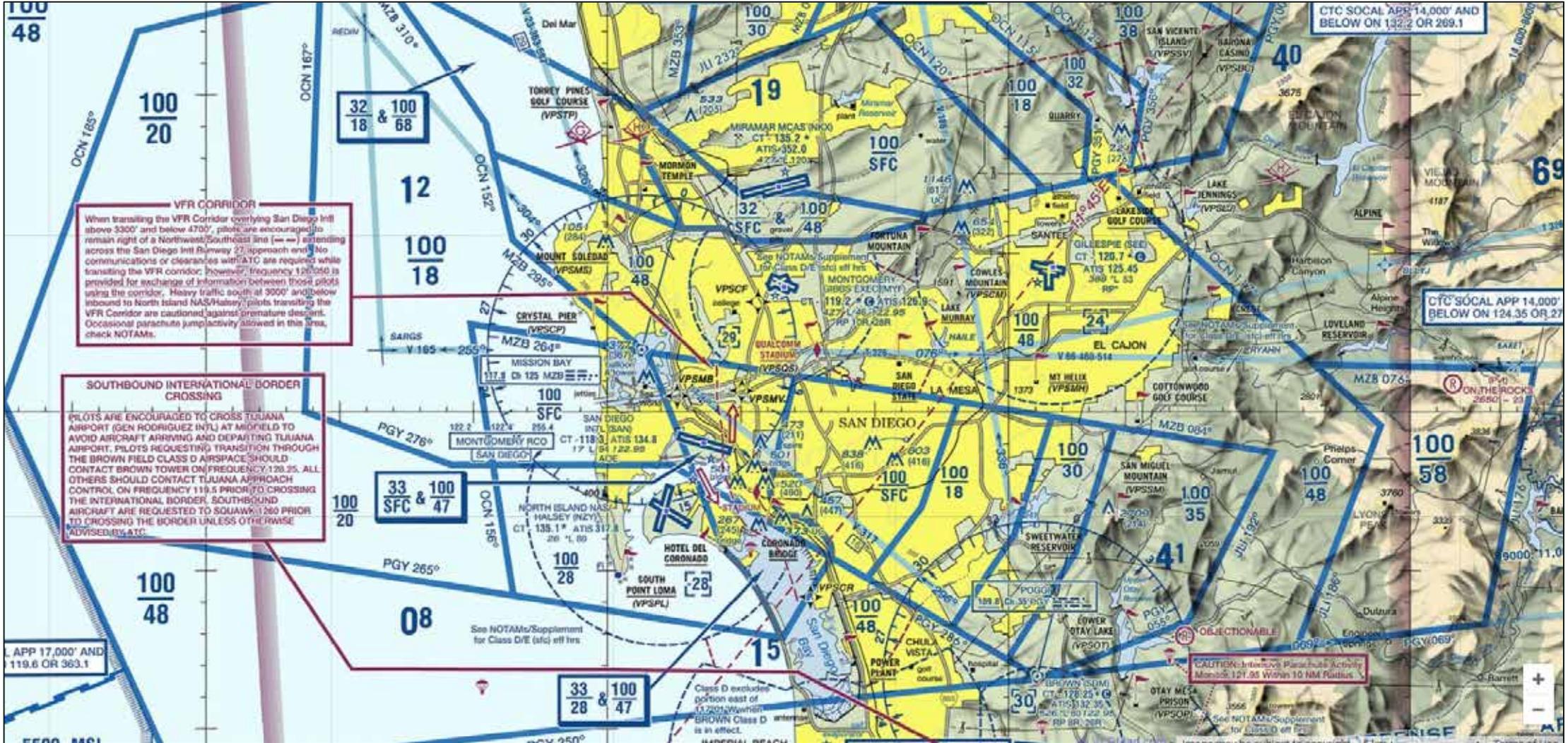
Class B and Existing Published Flight Procedures

Class B Airspace

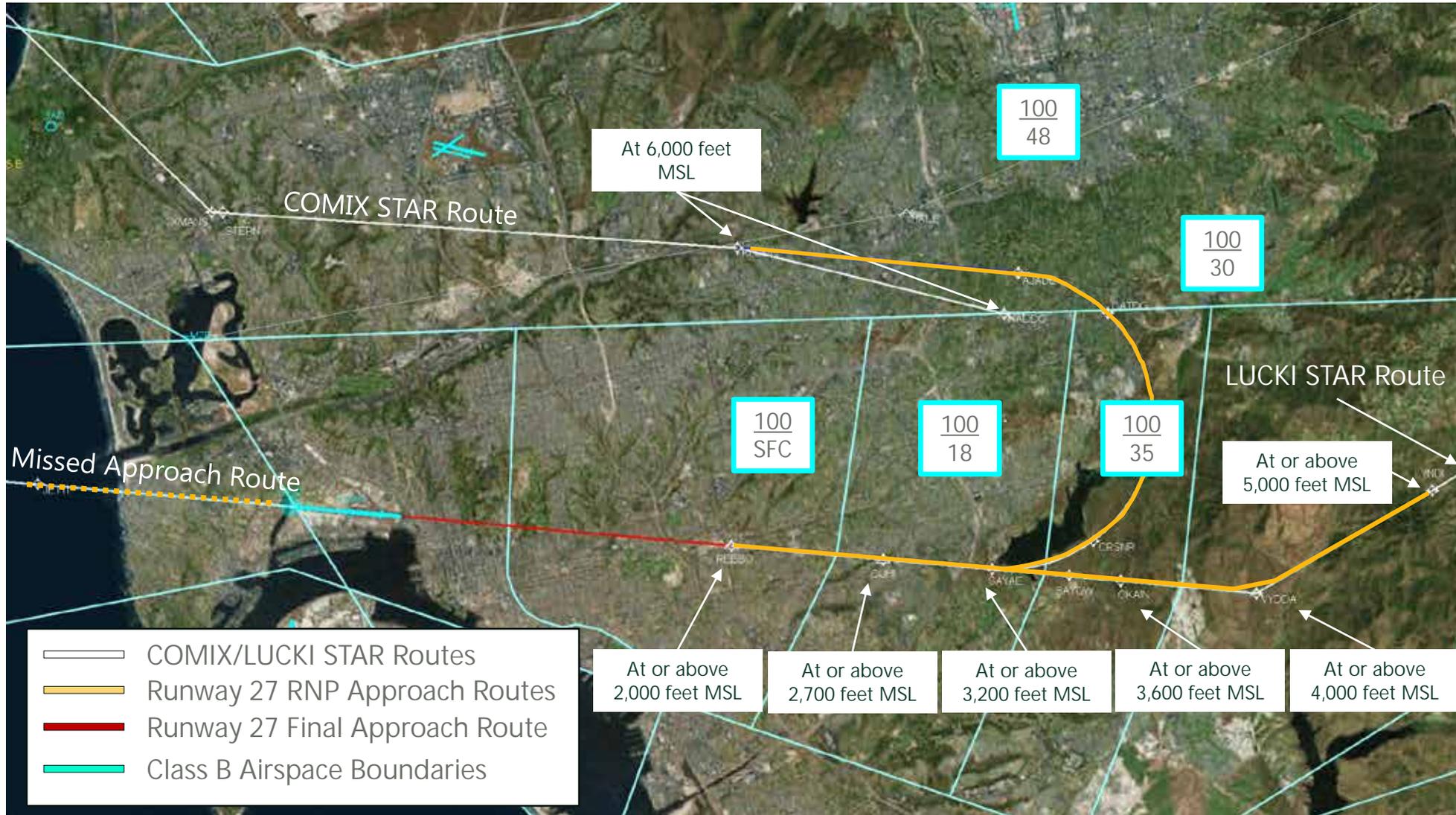
- § Controlled (radar monitored by a controller and in contact with pilot) airspace from the ground to 10,000 feet MSL surrounding each of the nation’s busiest airports, including SDIA.
- § The configuration of each Class B airspace area is individually tailored to contain operations below 10,000 feet MSL to/from a major airport, and is defined three-dimensionally with multiple layers (some Class B airspace areas resemble upside-down wedding cakes).
- § Operating Rules and Pilot/Equipment Requirements:
 - 1. ATC Clearance. Regardless of weather conditions, an ATC clearance is required prior to operating within Class B airspace.
 - 2. Pilot Certification.
 - 3. Equipment. (a) Two-way radio; and (b) Unless otherwise authorized by ATC, an operable radar beacon transponder with automatic altitude reporting equipment.
- § Class B airspace is charted on Sectional Charts, Instrument Flight Rule (IFR) En Route Low Altitude charts, and Terminal Area Charts where appropriate.

Reference Aeronautical Information Manual (AIM) Paragraph 3-2-3

San Diego Class B Airspace



East County SAN Northwest Arrivals – Published Procedures and Class B Airspace

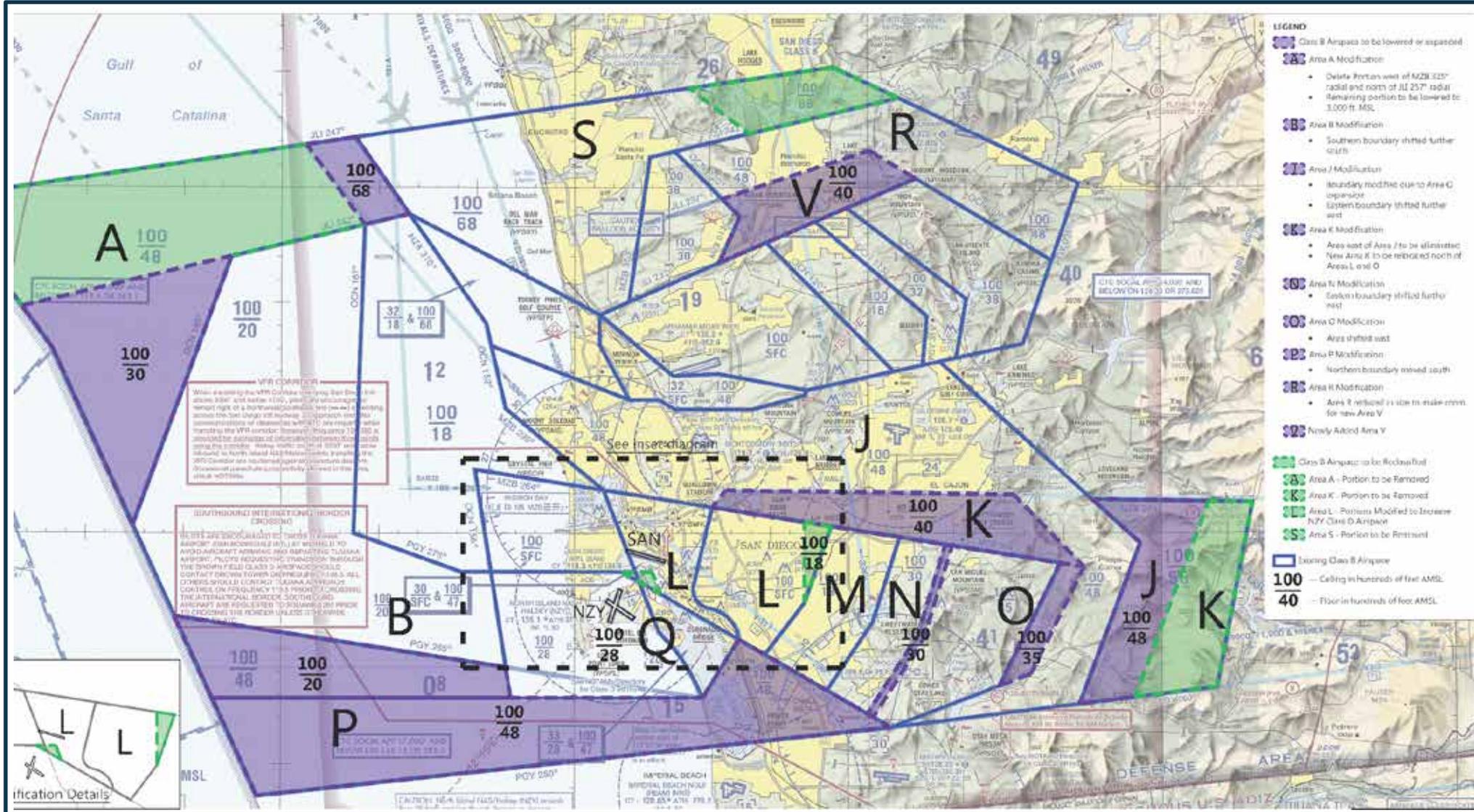


Mean Sea Level (MSL) – height above sea level; Above Ground Level (AGL) – height above the ground

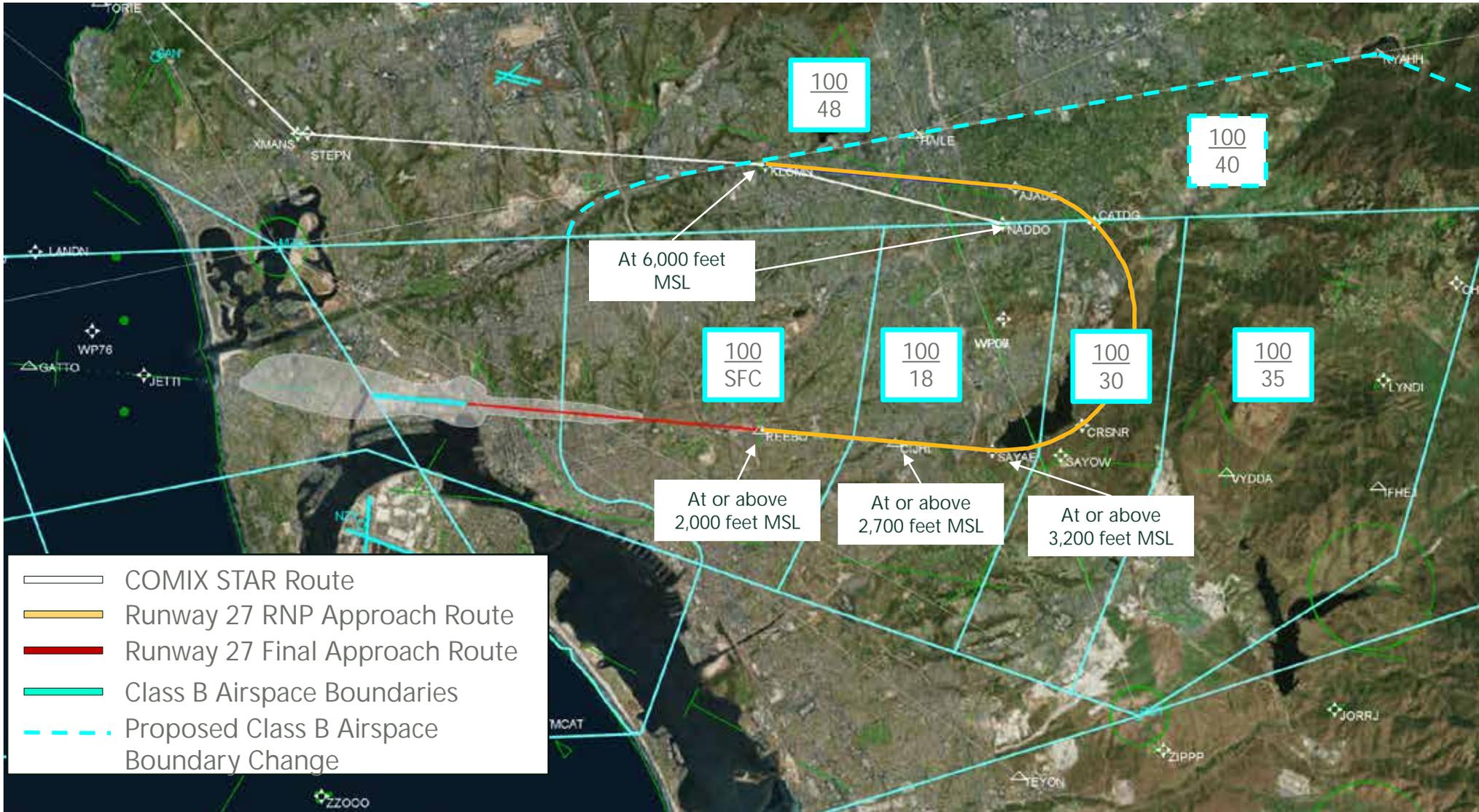
Understanding East County Concerns related to Aircraft Noise and Overflights

Potential Future Changes

East County Arrivals Slide – Class B Airspace Redesign



East County SAN Northwest Arrivals – Procedures and Class B Airspace





Understanding East County Concerns related to Aircraft Noise and Overflights

Workgroup Concerns – Open Discussion

Next Steps

Next Steps

- § Review issues/concerns and consolidate
- § Assess potential high level concepts to address concerns

San Diego International Airport East County Working Group - Aircraft Noise Concerns

Meeting #2

PRESENTED TO:
SDIA East County Working Group

PRESENTED BY:
Stephen C. Smith

PRESENTED ON:
January 24, 2019

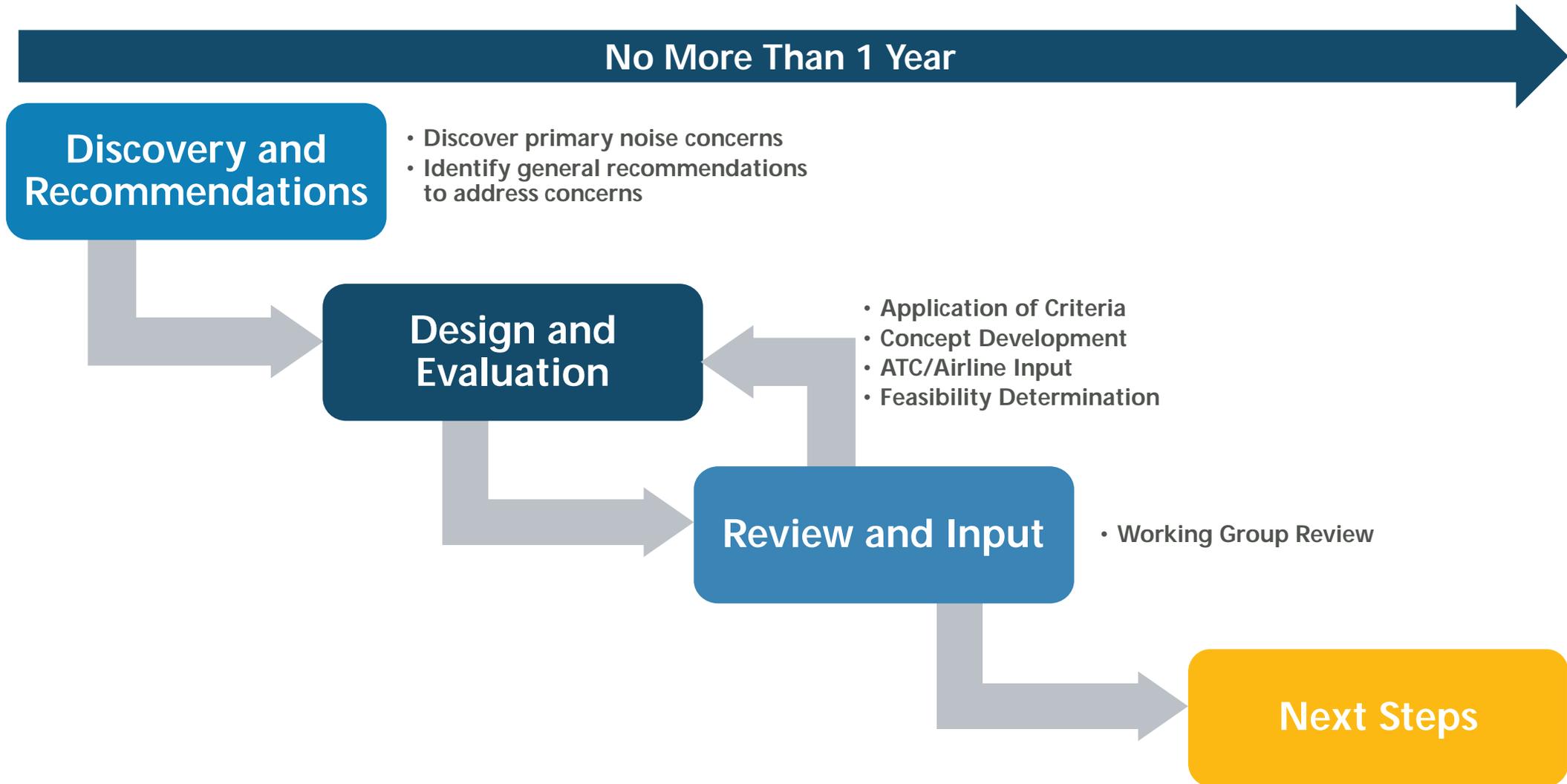
Agenda

- § Introductions
- § Process Overview Refresher
- § Meeting Objective
- § Overview of East County Concerns
- § November 2016 Arrival Procedure Change
- § Noise Abatement Options
- § Ideas to Address Concerns
- § Next Steps

Introductions

-  East County Working Group Facilitator
 - Ms. Heidi Gantwerk
-  San Diego County Regional Airport Authority (Airport Authority)
 - Owns and operates the airport
 - Main Contact: Ms. Sjohnna Knack, Program Manager
-  Flight Procedure Analysis Consultant Team
 - Project Lead: Mr. Stephen Smith
 - Ricondo & Associates, Inc.
-  East County Working Group Members

Process Overview Refresher



SOURCE: : Ricondo and Associates, Inc., November 2018.

Meeting Objective

-  Confirm overall noise concerns/issues for East County
-  Understand FAA change to arrival procedure for arrivals from the north
-  Understand approach requirements for arrivals to Runway 27
-  Understand methods to address aircraft noise concerns
-  Discover viable ideas to address concerns

Understanding East County Concerns related to Aircraft Noise and Overflights

Overview of Working Group Concerns

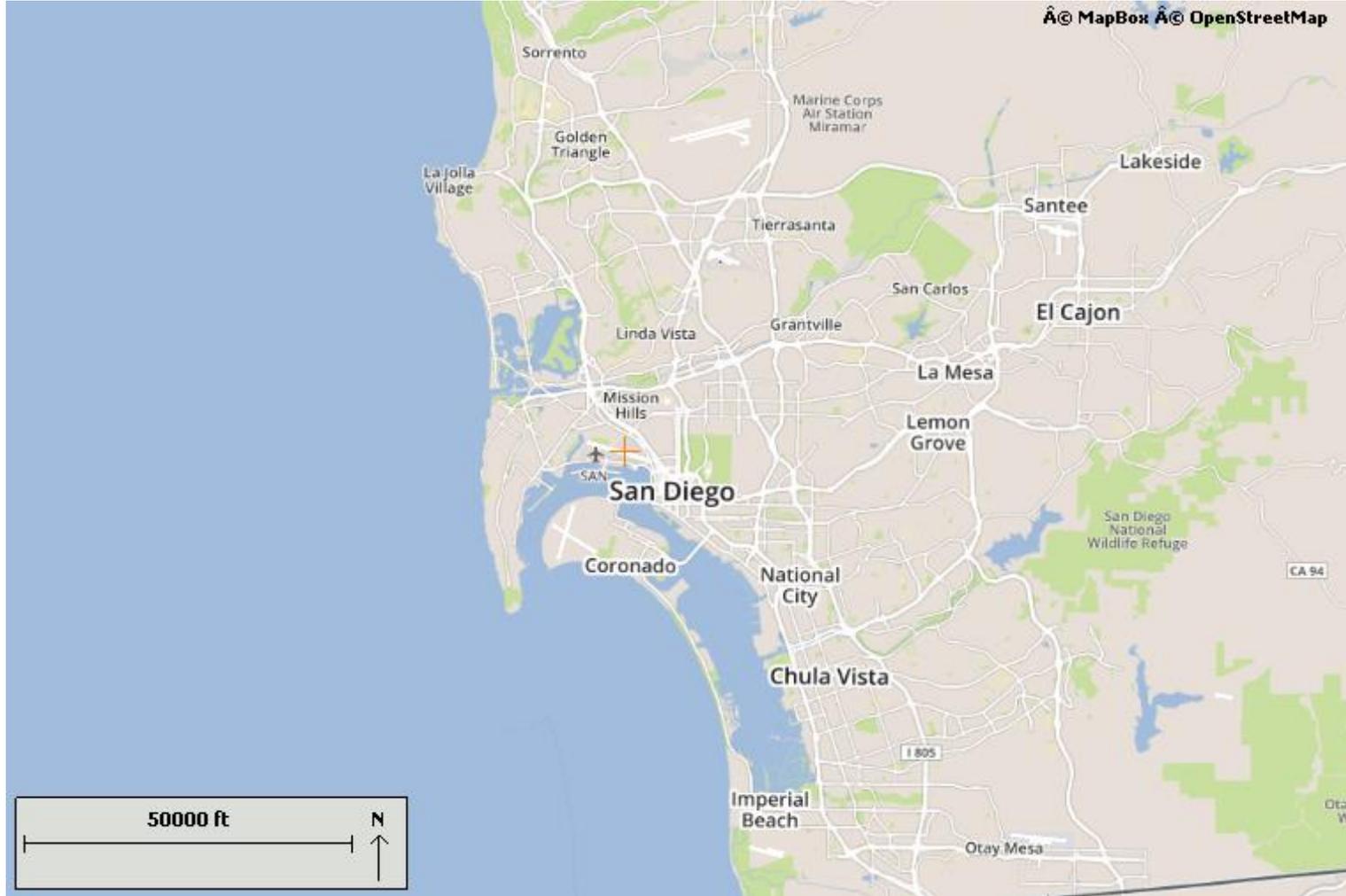
Overview of Working Group Concerns

- ⚠ Change in traffic patterns
- ⚠ Hearing more noise early morning (6:30 a.m. to 11:00 a.m.) and at night (10:00 p.m. to 11:00 p.m.)
- ⚠ Do not increase noise in other areas
- ⚠ Low flying aircraft
- ⚠ Increase in overflight frequency

Air Traffic Procedure Change on November 2016

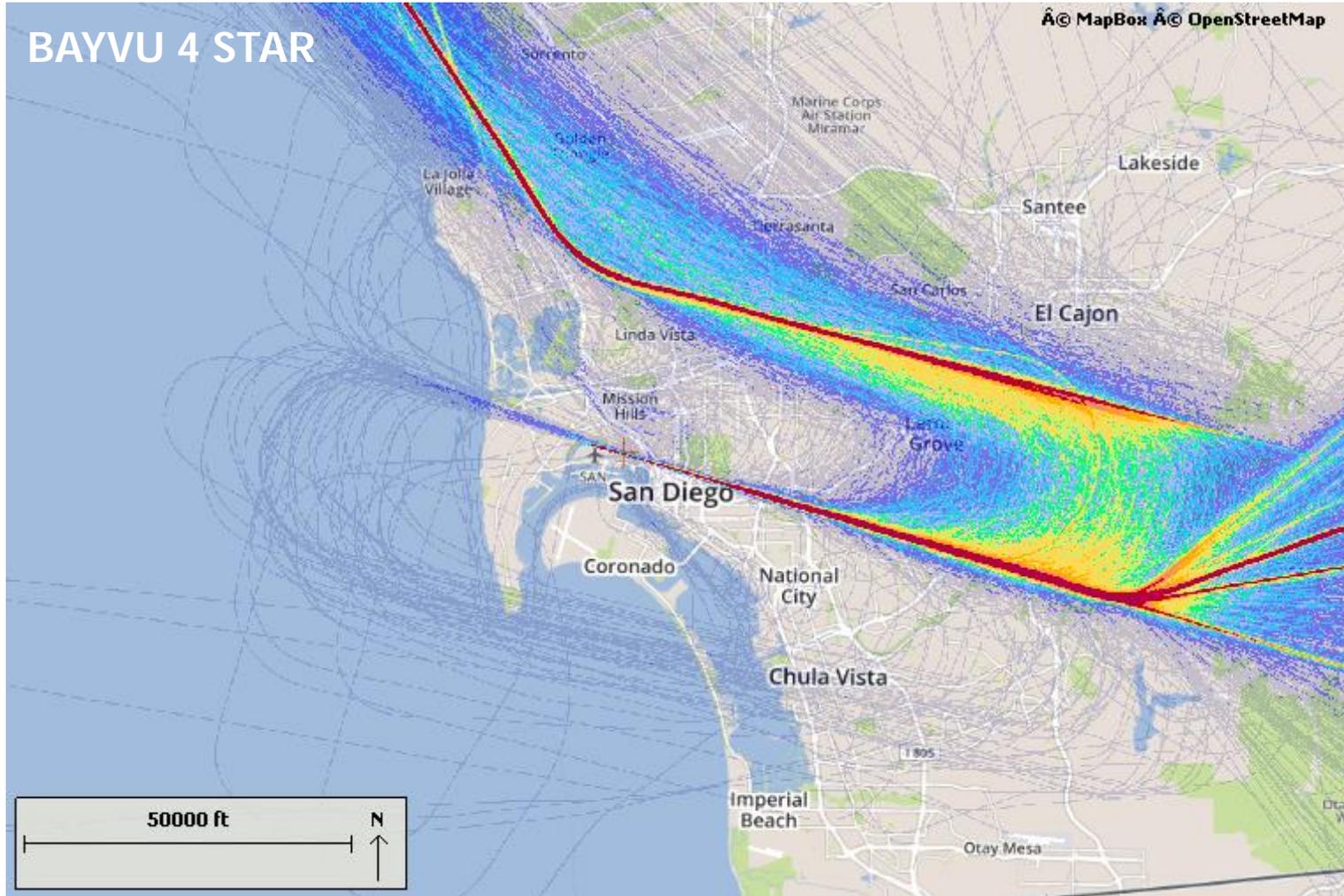
Runway 27 Arrivals - Flight Tracks

San Diego Metropolitan Area - July 2014

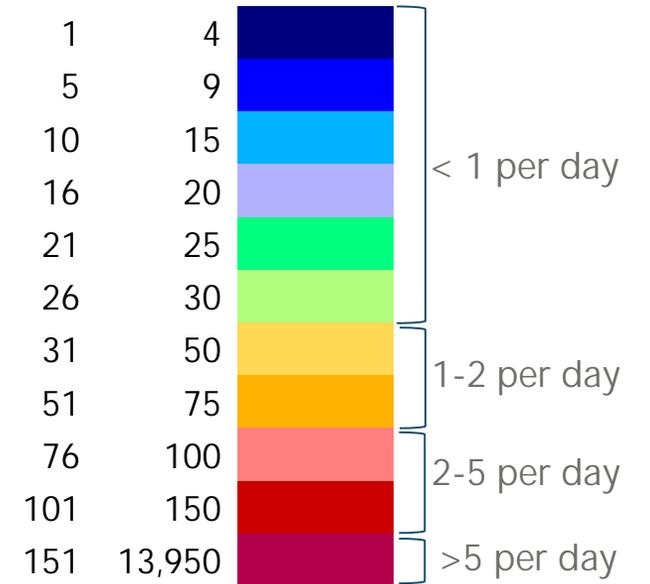


SOURCE: San Diego County Regional Airport Authority Airport Noise and Operations Management System, November 2018.

Runway 27 Arrivals - Flight Track Density Analysis San Diego Metropolitan Area - July 2016



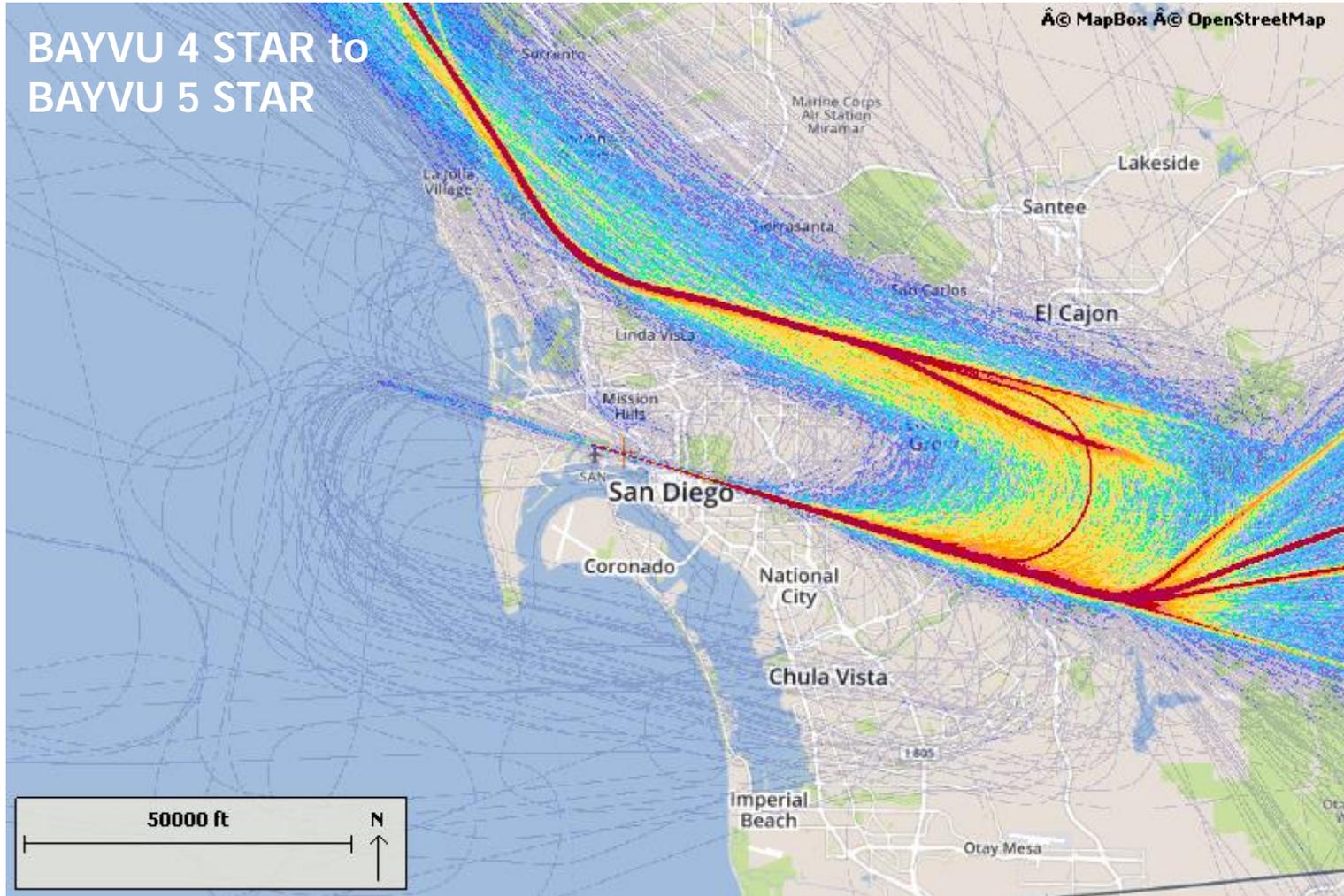
Track Density Ranges
(count of operations)



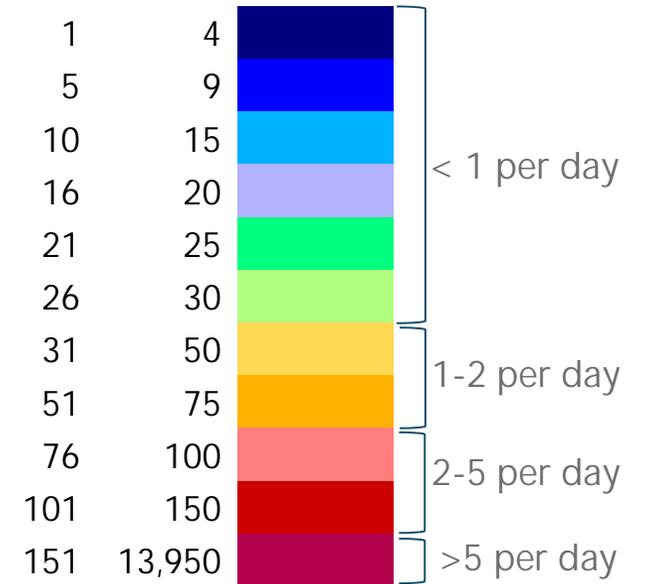
SOURCE: San Diego County Regional Airport Authority Airport Noise and Operations Management System, November 2018.

Note: Total Runway 27 arrivals was 8,887 for July 2016

Runway 27 Arrivals - Flight Track Density Analysis San Diego Metropolitan Area - November 2016



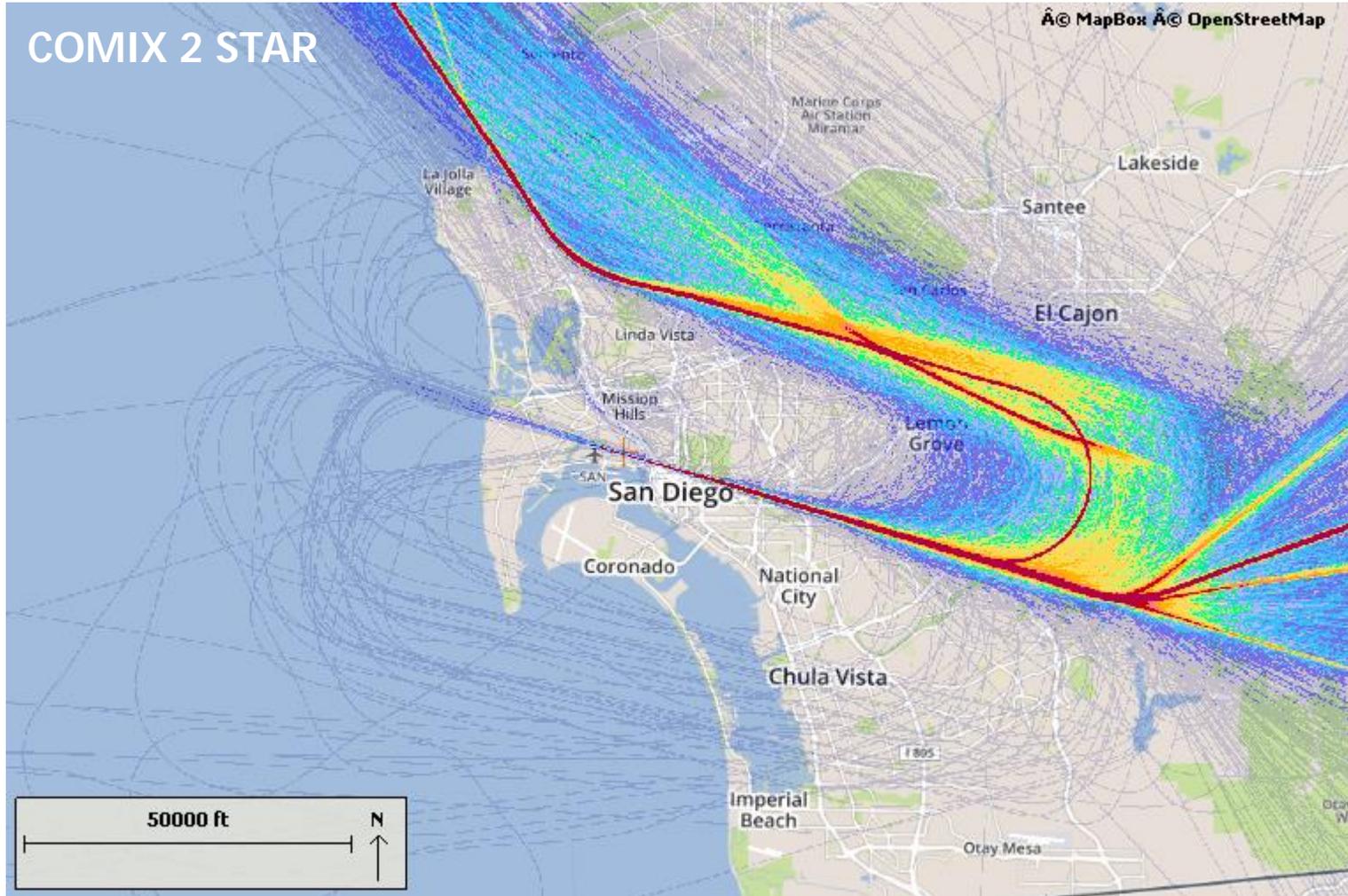
Track Density Ranges
(count of operations)



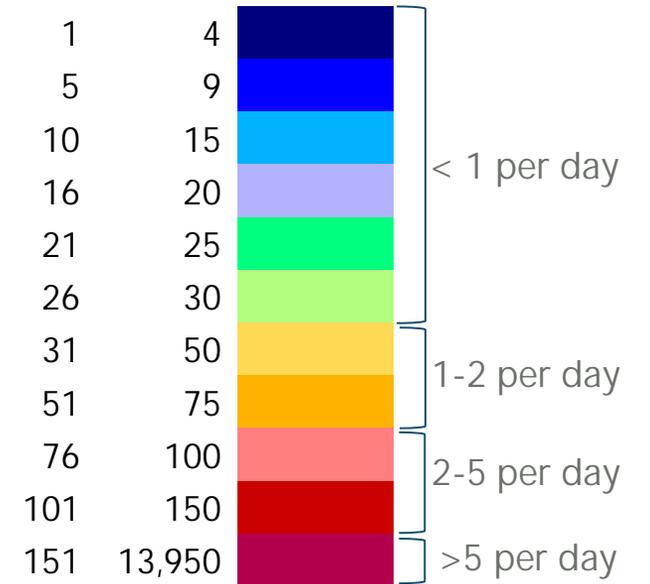
SOURCE: San Diego County Regional Airport Authority Airport Noise and Operations Management System, November 2018.

Note: Total Runway 27 arrivals was 7,547 for November 2016

Runway 27 Arrivals - Flight Track Density Analysis San Diego Metropolitan Area - July 2018



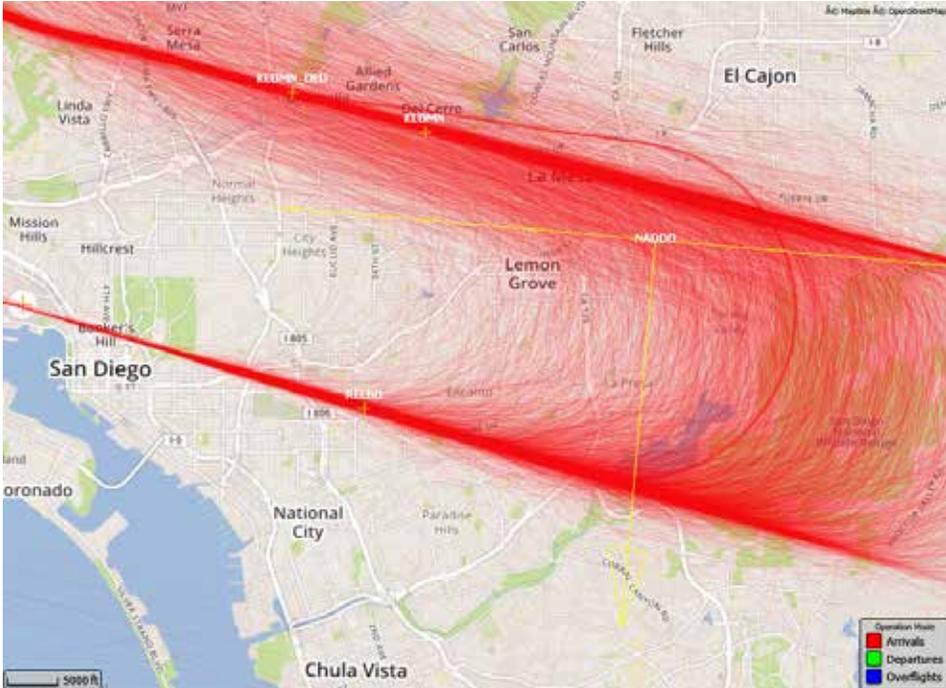
Track Density Ranges
(count of operations)



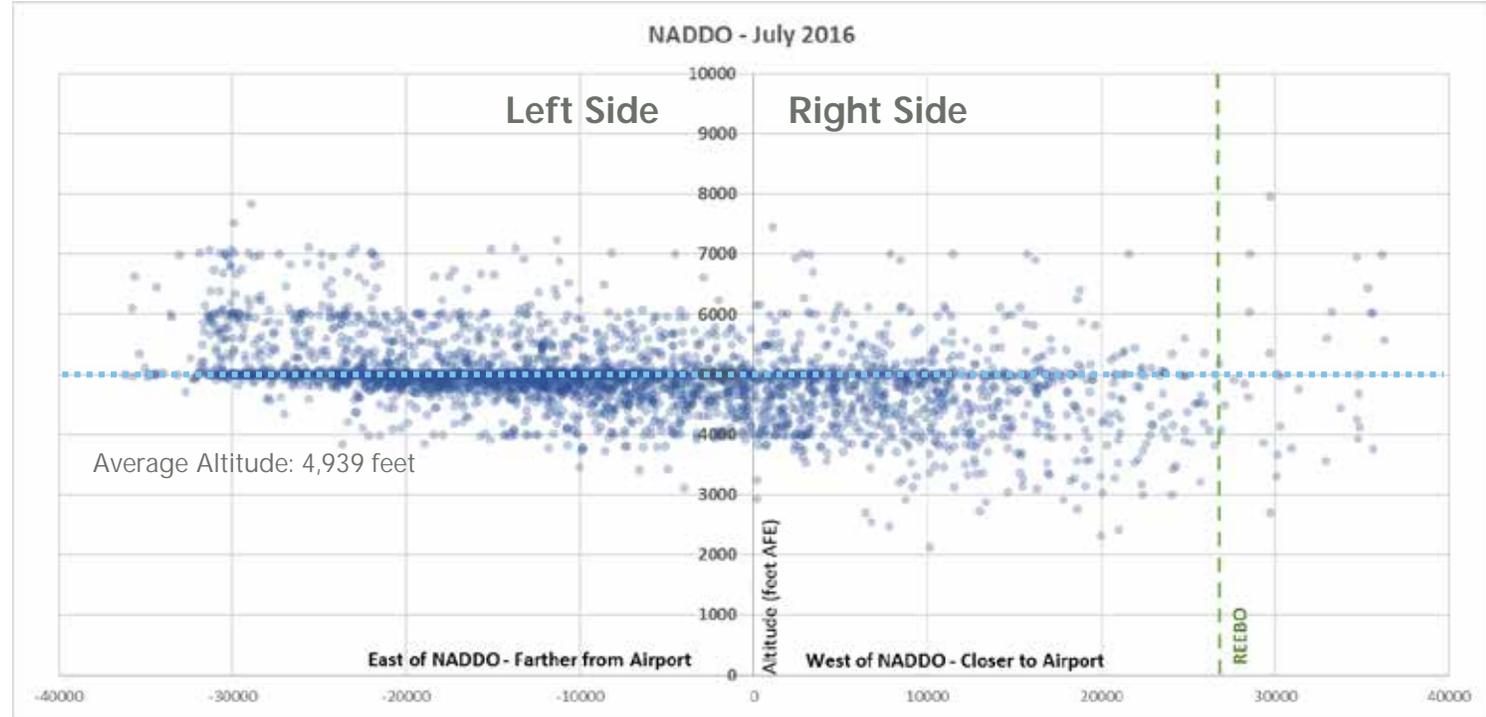
SOURCE: San Diego County Regional Airport Authority Airport Noise and Operations Management System, November 2018.

Note: Total Runway 27 arrivals was 10,012 for July 2018

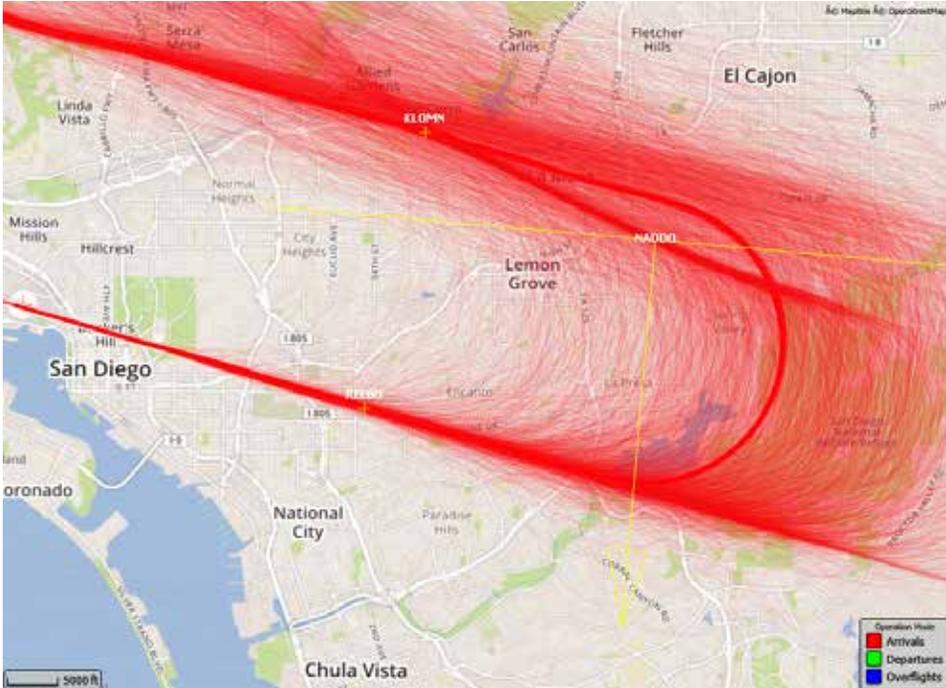
Runway 27 Arrivals – Altitude Gate Analysis Near NADDO San Diego Metropolitan Area - July 2016



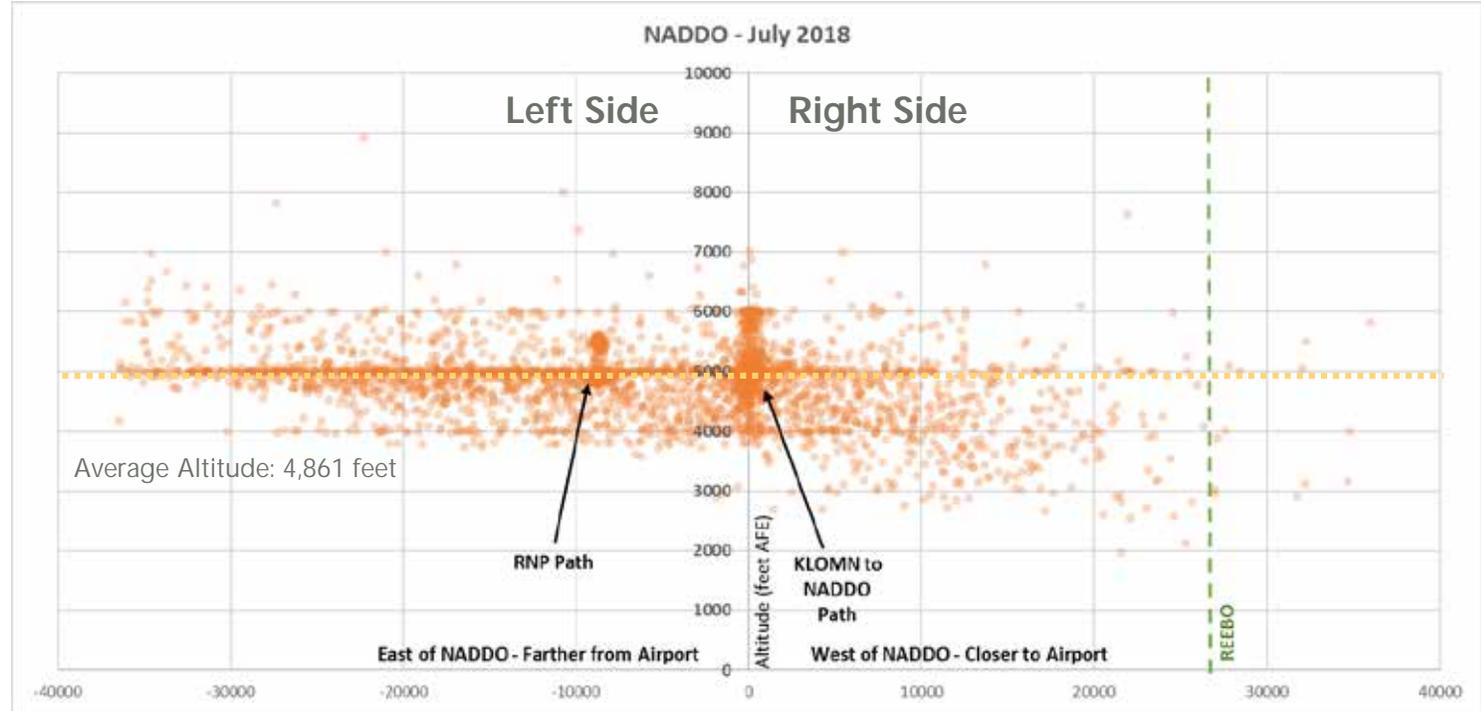
Note: track transparency set at 70%



Runway 27 Arrivals – Altitude Gate Analysis Near NADDO San Diego Metropolitan Area - July 2018

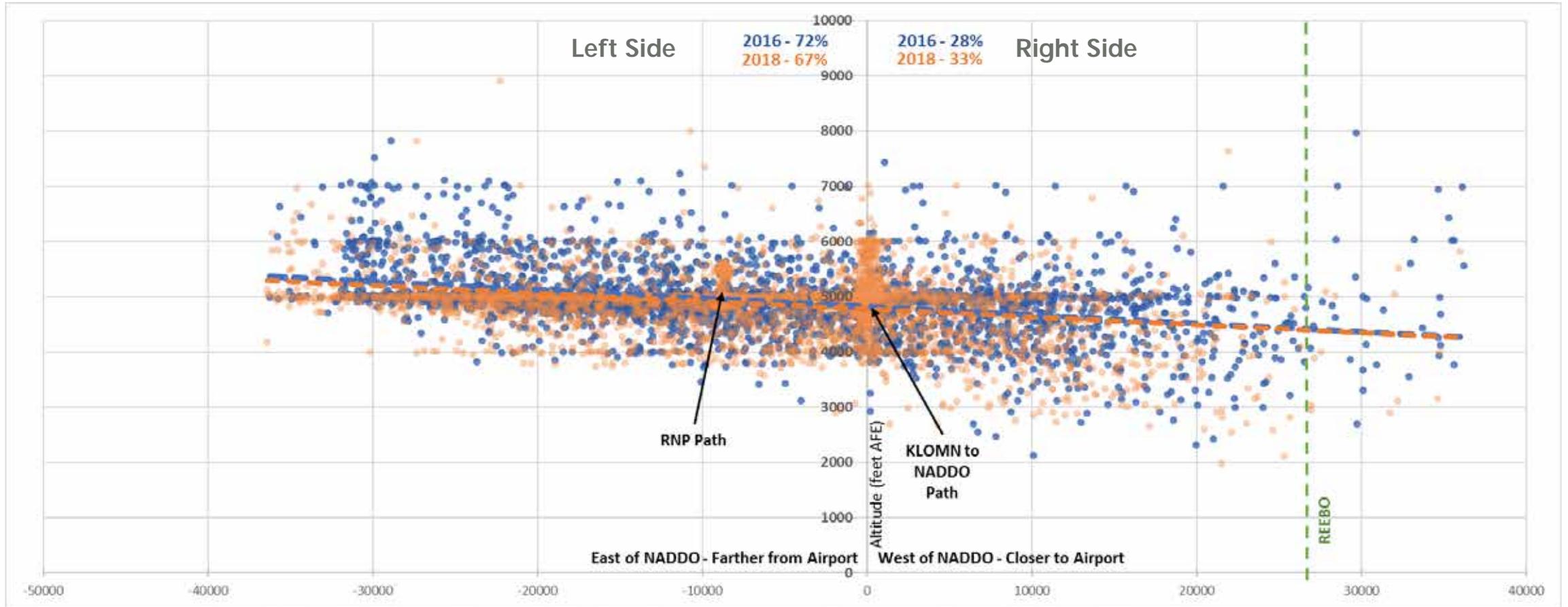


Note: track transparency set at 70%



SOURCE: : San Diego County Regional Airport Authority Airport Noise and Operations Management System, January 2019.

Runway 27 Arrivals – Altitude Gate Analysis Near NADDO San Diego Metropolitan Area - July 2018 vs July 2016



SOURCE: : San Diego County Regional Airport Authority Airport Noise and Operations Management System, January 2019.

Noise Abatement Options

Parameters

-  Do not change aircraft flight paths that affect area exposed to CNEL 65 or higher
-  Do not impact safety
-  Meet FAA design criteria and air traffic control requirements
-  Fit within existing airspace
-  Do not impact capacity of SDIA
-  Do not move noise to new non-compatible areas

Noise Abatement Options



Procedure route location

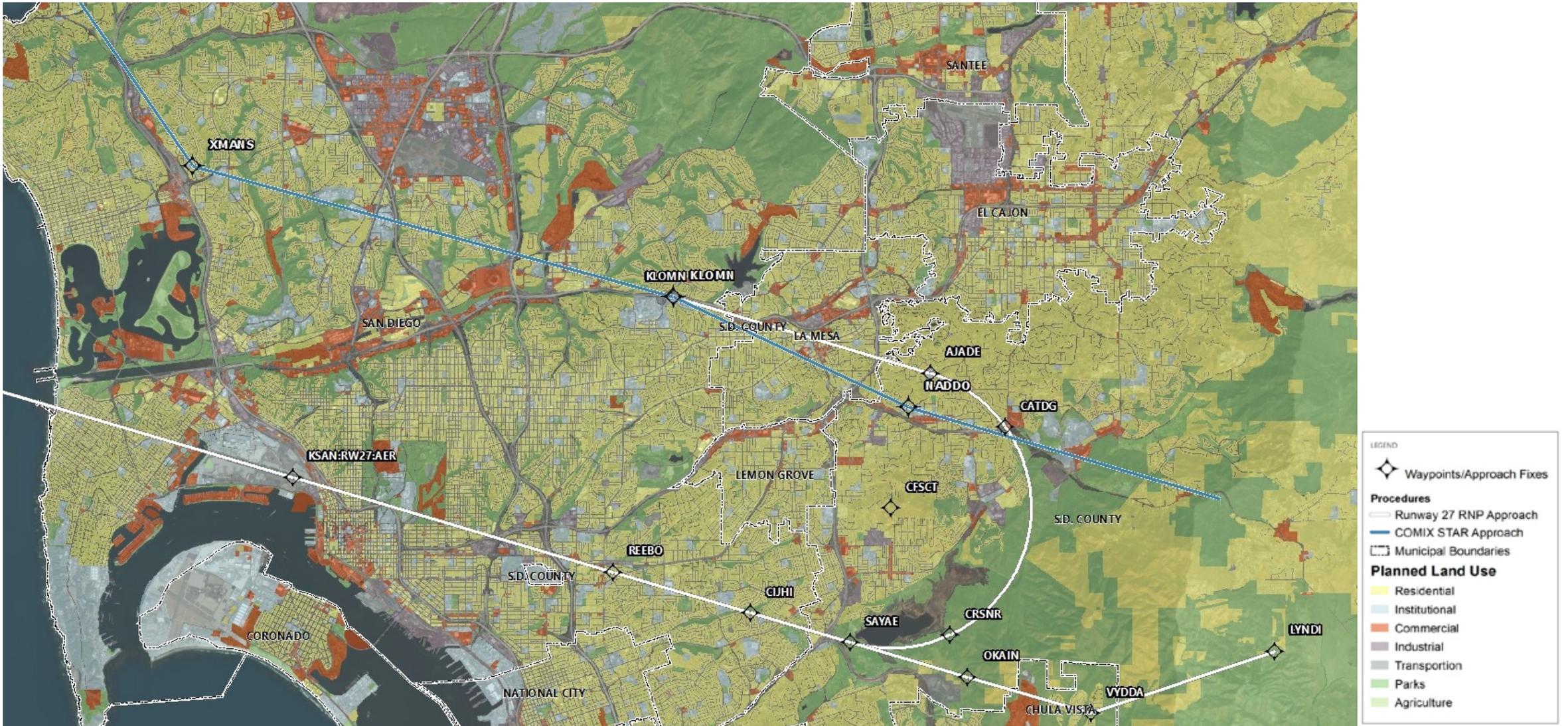


Altitude



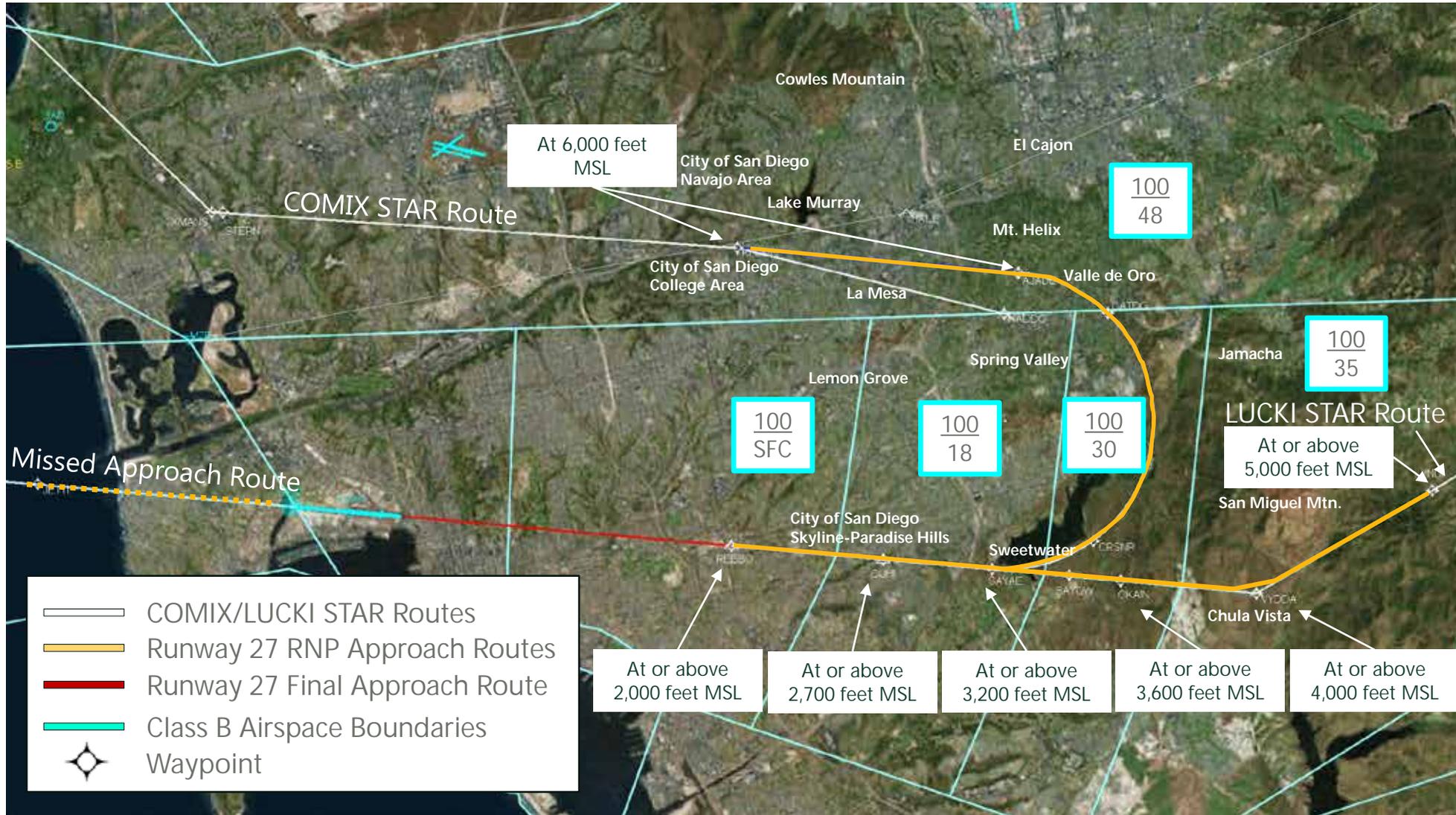
Dispersion or Concentration

Procedure Route Location



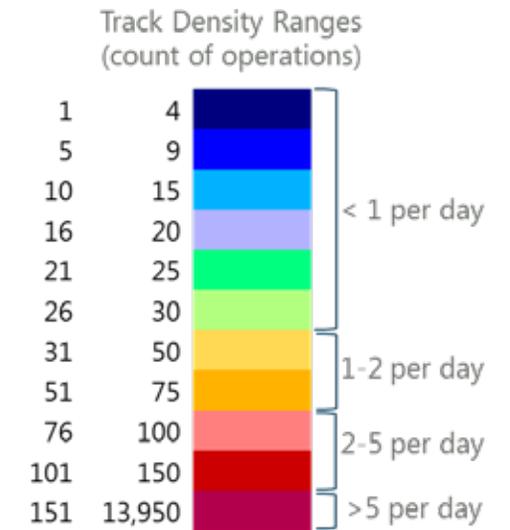
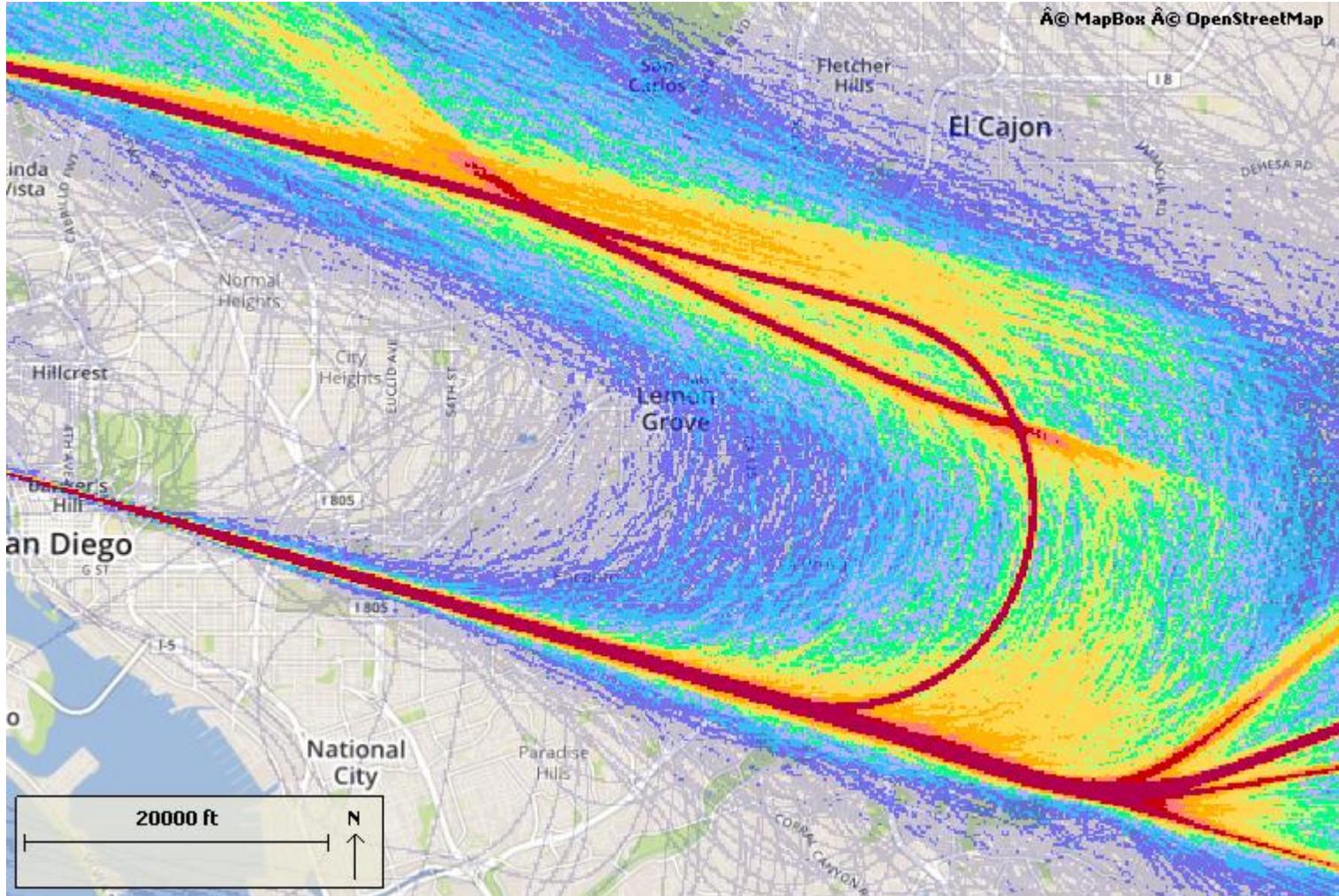
SOURCE : San Diego Geographic Information Source (SanGIS), based on SANDAG, Local City and County General and Community Plan Land Use Elements, SanGIS land base (i.e. parcels), October 2014 (planned land use); flight procedure routes based on Federal Aviation Administration, National Flight Data Center, November 2018.

Altitude



NOTE: Mean Sea Level (MSL) – height above sea level; Above Ground Level (AGL) – height above the ground
 SOURCE: Flight procedure routes based on :Federal Aviation Administration, National Flight Data Center, November 2018.

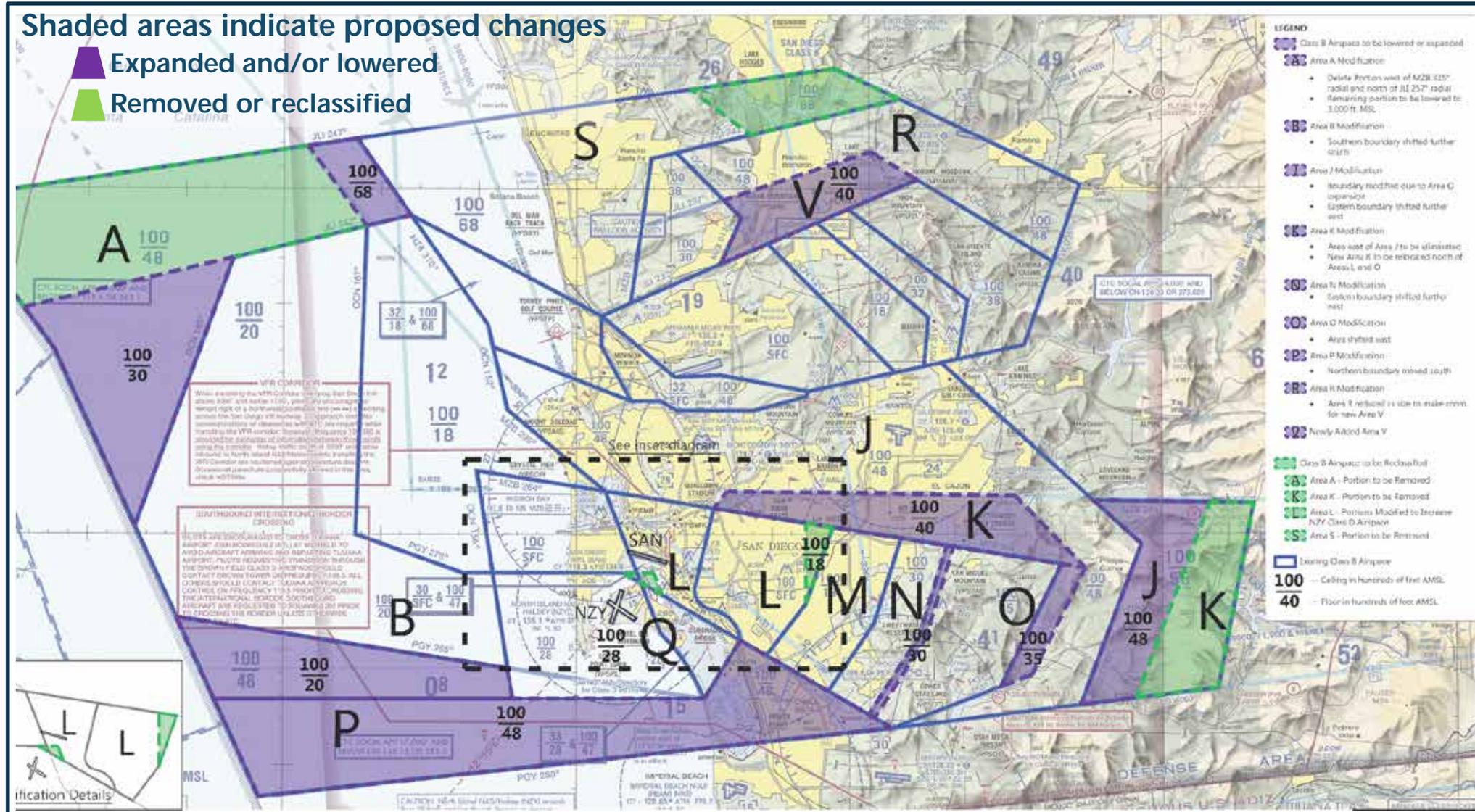
Dispersion or Concentration



NOTE: Depicts track density for all Runway 27 arrivals in July 2018
 SOURCE: San Diego County Regional Airport Authority Airport Noise and Operations Management System, November 2018.

Ideas to Address Concerns

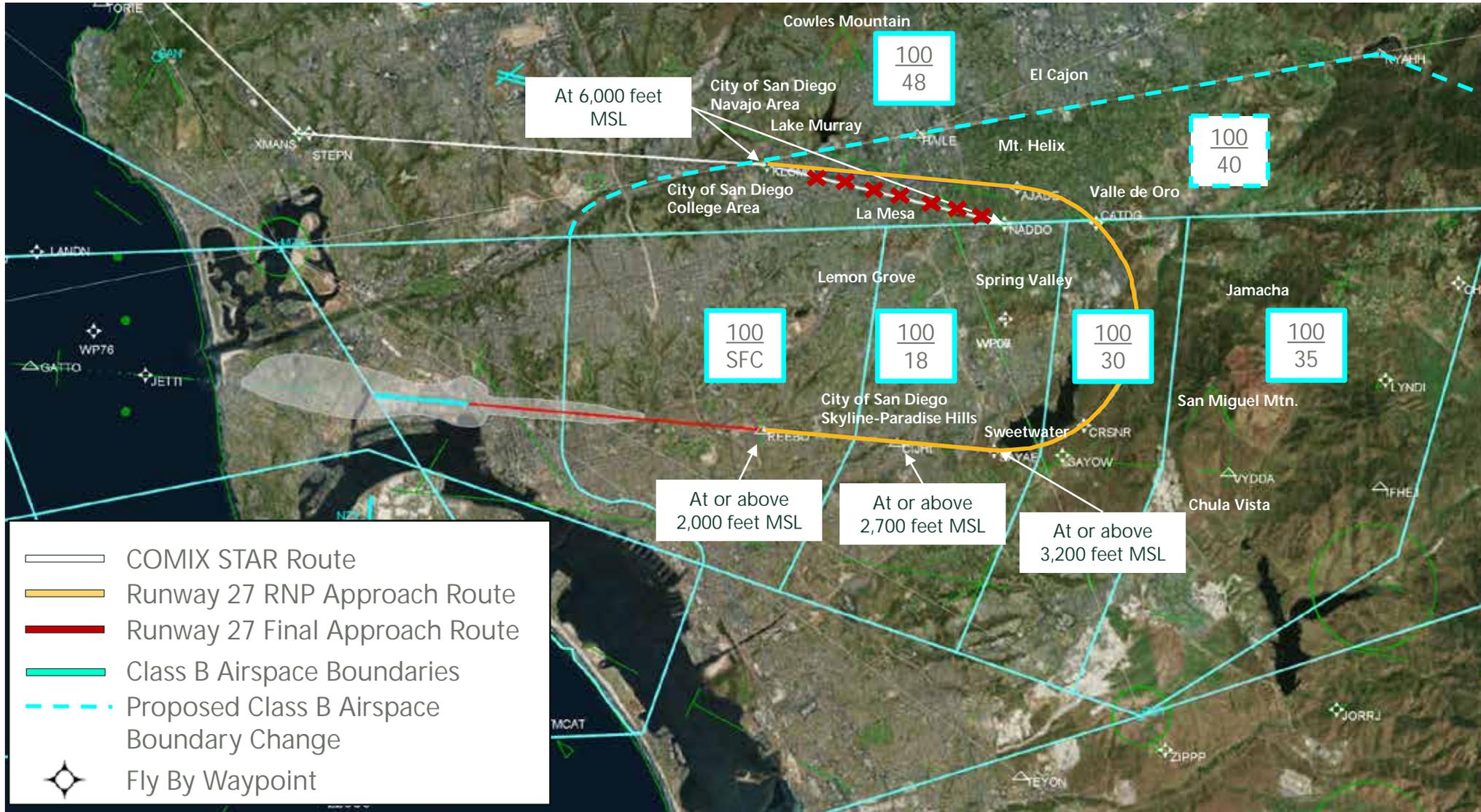
FAA Class B Airspace Proposed Redesign



NOTE: Altitudes are Mean Sea Level (MSL) – height above sea level

SOURCE: Proposed Class B changes based on Federal Aviation Administration, *San Diego Class B Airspace Modification Staff Study*. December 2012.

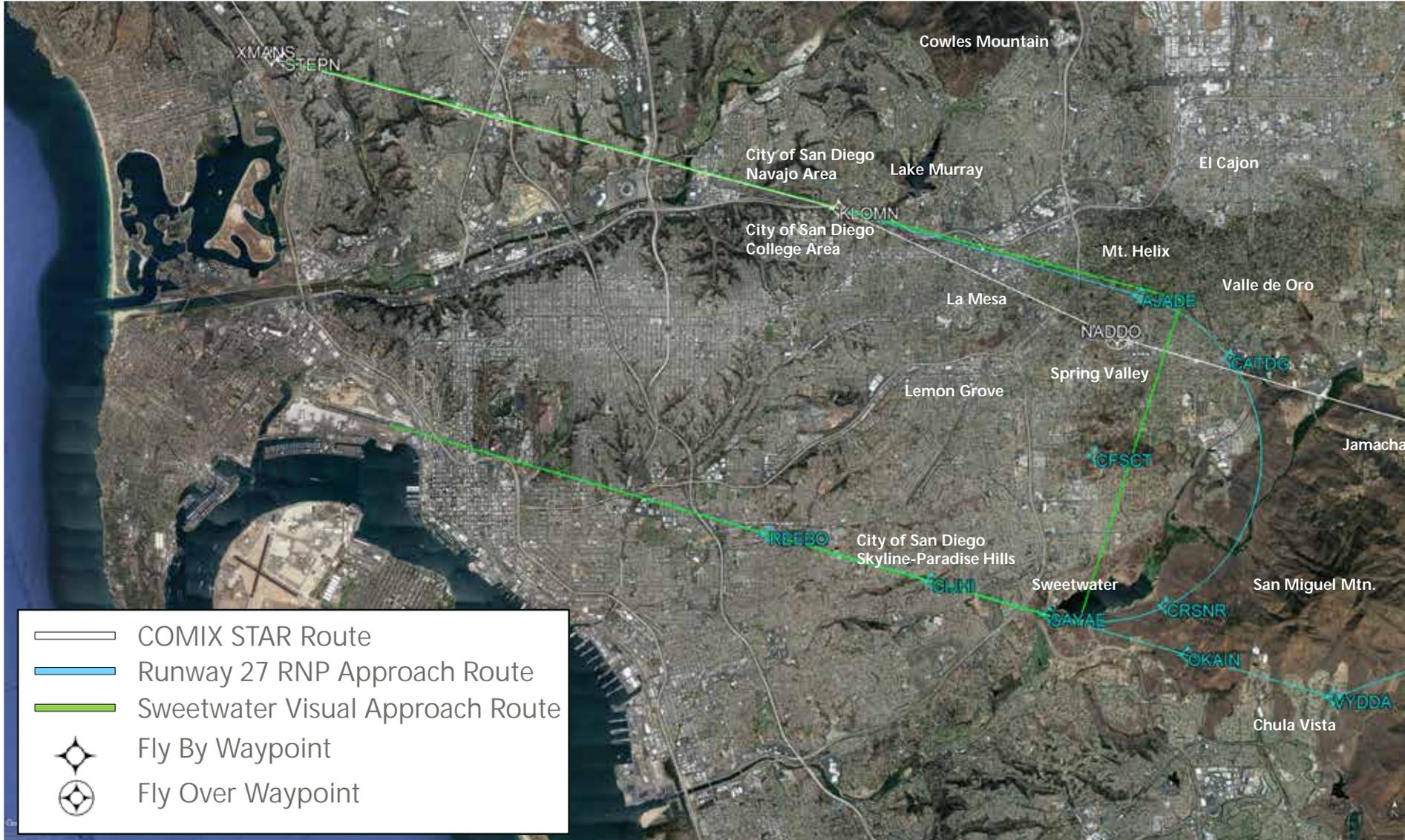
Remove Route Between KLOMN and NADDO Waypoint (after Class B Change)



NOTE: Mean Sea Level (MSL) – height above sea level; Above Ground Level (AGL) – height above the ground

SOURCE: Flight procedure routes based on :Federal Aviation Administration, National Flight Data Center, November 2018; proposed Class B changes based on Federal Aviation Administration, *San Diego Class B Airspace Modification Staff Study*, December 2012.

Sweetwater Visual Approach



SOURCE: Flight procedure routes based on :Federal Aviation Administration, National Flight Data Center, November 2018.

Next Steps

Next Steps

- § Develop Working Group recommendations
- § Consultant Team meet with FAA Southern California Terminal Radar Approach Control to gather feedback on recommendations

San Diego International Airport East County Working Group - Aircraft Noise Concerns

Meeting #3

PRESENTED TO:
SDIA East County Working Group

PRESENTED BY:
Stephen C. Smith

PRESENTED ON:
May 28, 2019

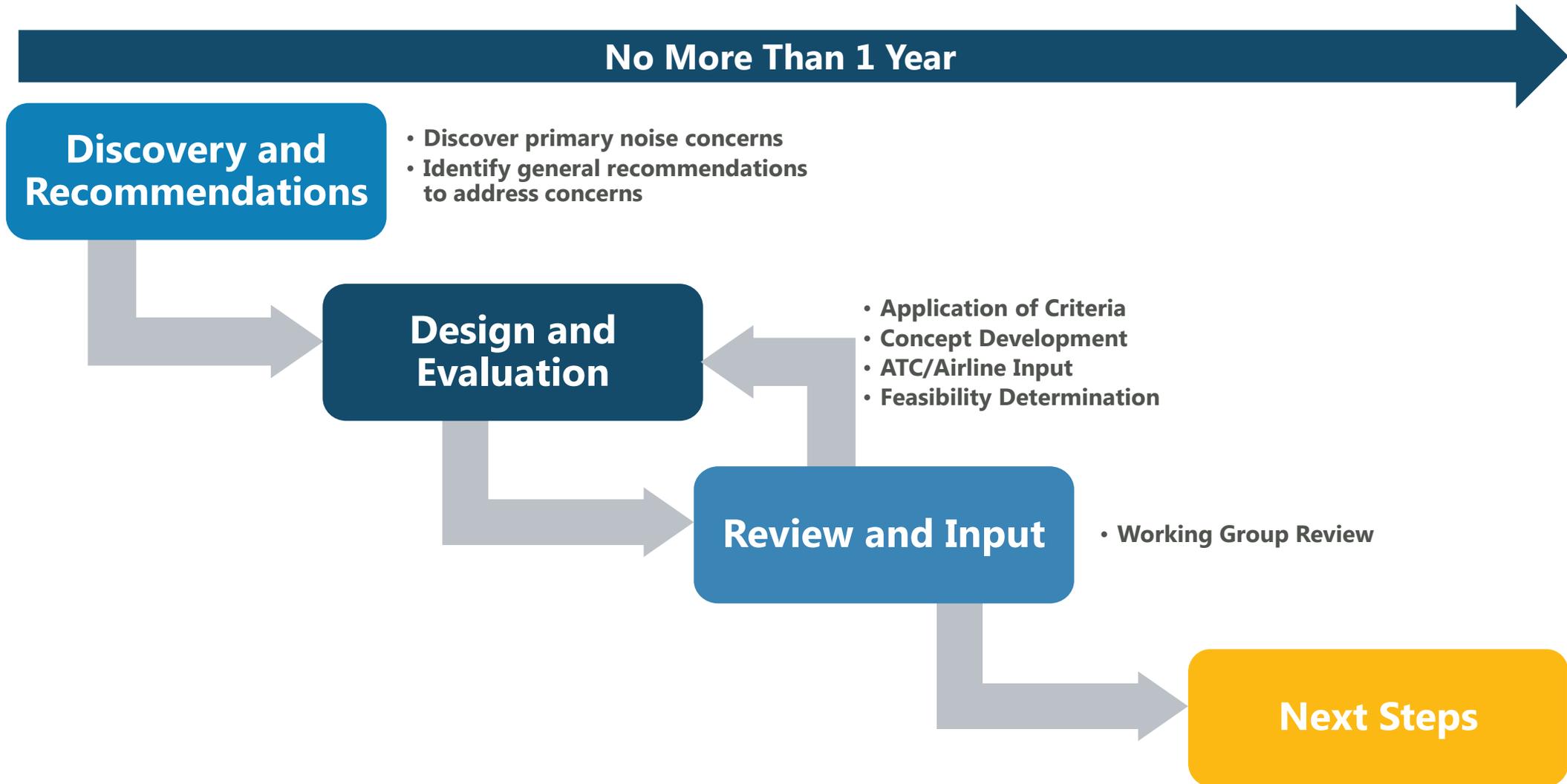
Agenda

- Introductions
- Process Overview Refresher
- Meeting Objective
- Ideas/Suggestions to Address Concerns
- High Level Concept Review
- Next Steps

Introductions

-  East County Working Group Facilitator
 - Ms. Heidi Gantwerk
-  San Diego County Regional Airport Authority (Airport Authority)
 - Owns and operates the airport
 - Main Contact: Ms. Sjohnna Knack, Program Manager
-  Flight Procedure Analysis Consultant Team
 - Project Lead: Mr. Stephen Smith
 - Ricondo & Associates, Inc.
-  East County Working Group Members

Process Overview Refresher



SOURCE: : Ricondo and Associates, Inc., November 2018.

Meeting Objective



Review ideas to address concerns



Review high-level concepts

Ideas/Suggestions to Address Concerns

Ideas/Suggestions to Address Concerns

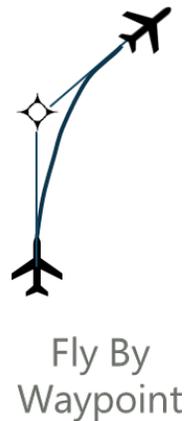
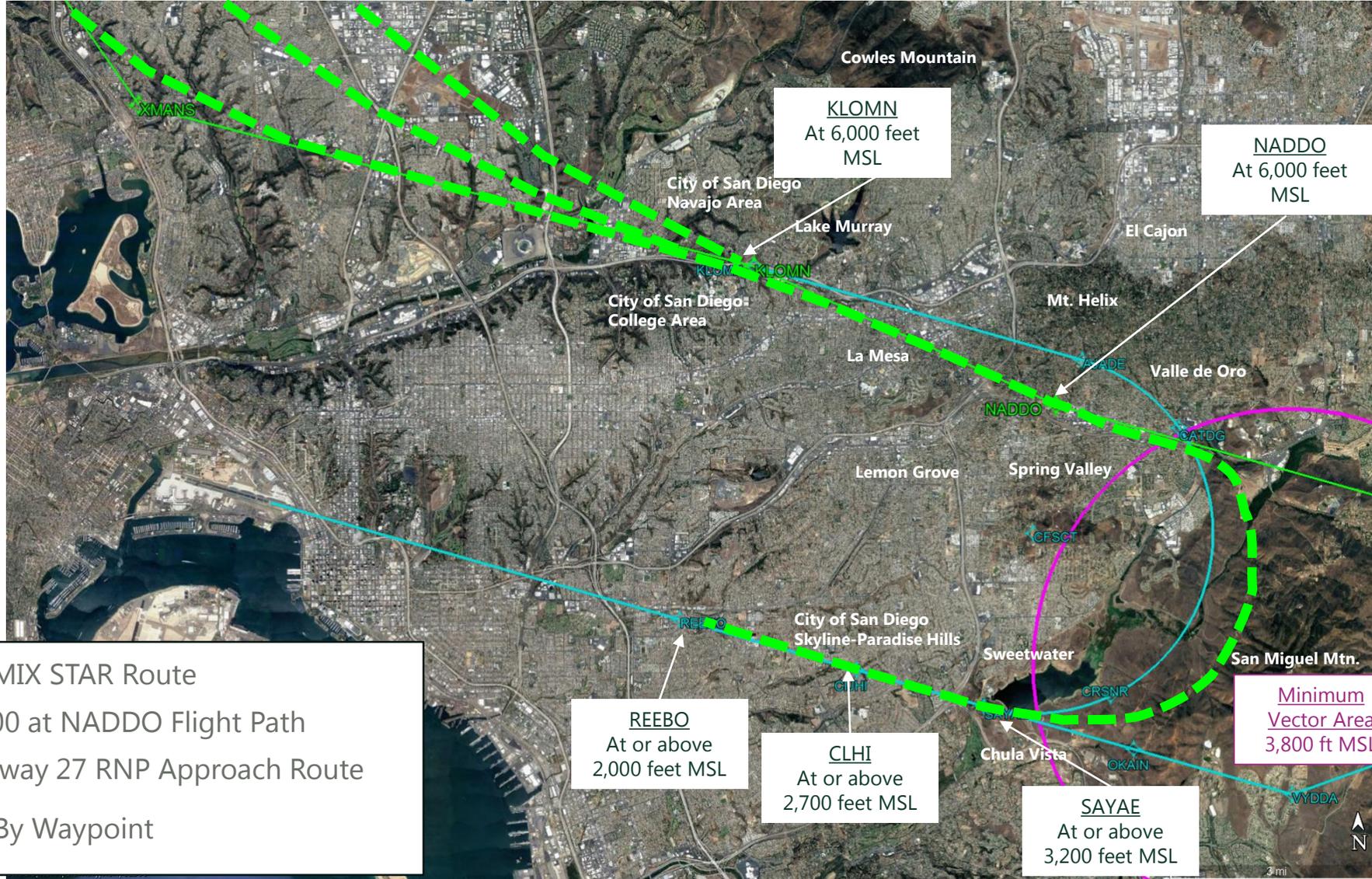
-  Keep arrivals at 6,000 feet until the NADDO waypoint
-  Emphasize use of the current Runway 27 Required Navigation Performance (RNP) Approach
-  Design an Area Navigation (RNAV) visual approach that mimics Runway 27 RNP Approach
-  Design an RNAV Runway Transition to Runway 27 Final Approach
-  Remove flight path between KLOMN and NADDO waypoints

High Level Concept Review

Parameters

-  Do not change aircraft flight paths that affect area exposed to CNEL 65 or higher
-  Do not impact safety
-  Meet FAA design criteria and air traffic control requirements
-  Fit within existing airspace
-  Do not adversely impact capacity of SDIA
-  Do not move noise to new non-compatible areas

Keep Arrivals at 6,000 ft up to NADDO



- COMIX STAR Route
- - - 6,000 at NADDO Flight Path
- Runway 27 RNP Approach Route
- ◆ Fly By Waypoint

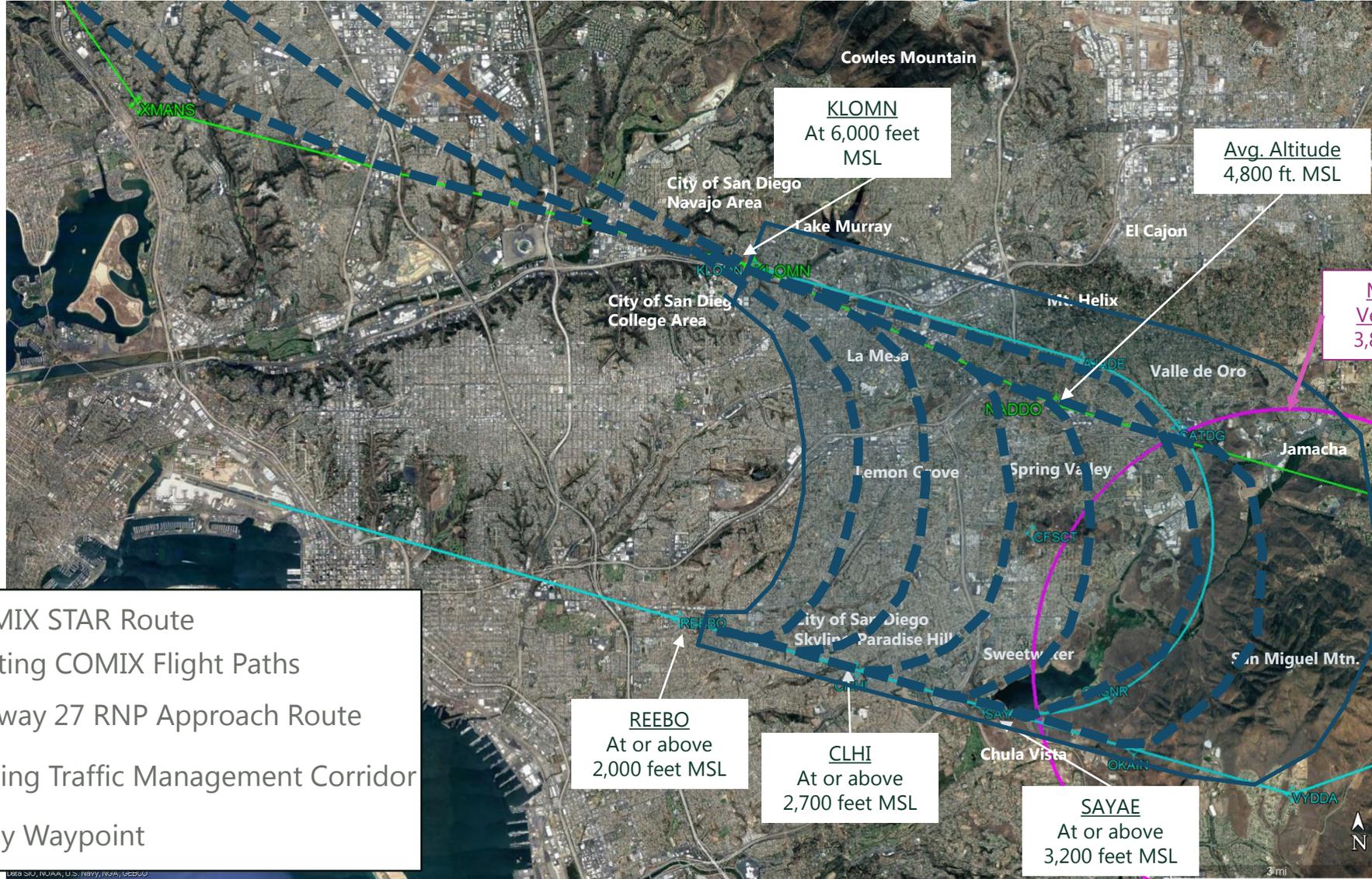
Intent: Reduce noise levels by raising jet arrival altitude

Concept: Keep jet arrival altitude between KLOMN and NADDO waypoints at 6,000 ft. MSL, thence descend to join final approach

Concerns: Limits area for FAA ATC to manage traffic to join the final approach and moves jet traffic closer to arrivals from the east

NOTE: Mean Sea Level (MSL) – height above sea level; Above Ground Level (AGL) – height above the ground
 SOURCE: Google Earth, April 2019 (aerial photograph); Federal Aviation Administration, November 2018 (COMIX STAR route, Runway 27 RNP Approach route, Minimum Vector Area); Ricondo & Associates, Inc., April 2019 (NADDO at 6,000 ft MSL concept).

Keep Arrivals at 6,000 ft up to NADDO – Existing Traffic Management Corridor



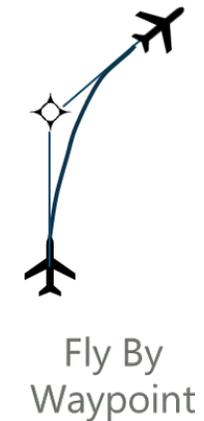
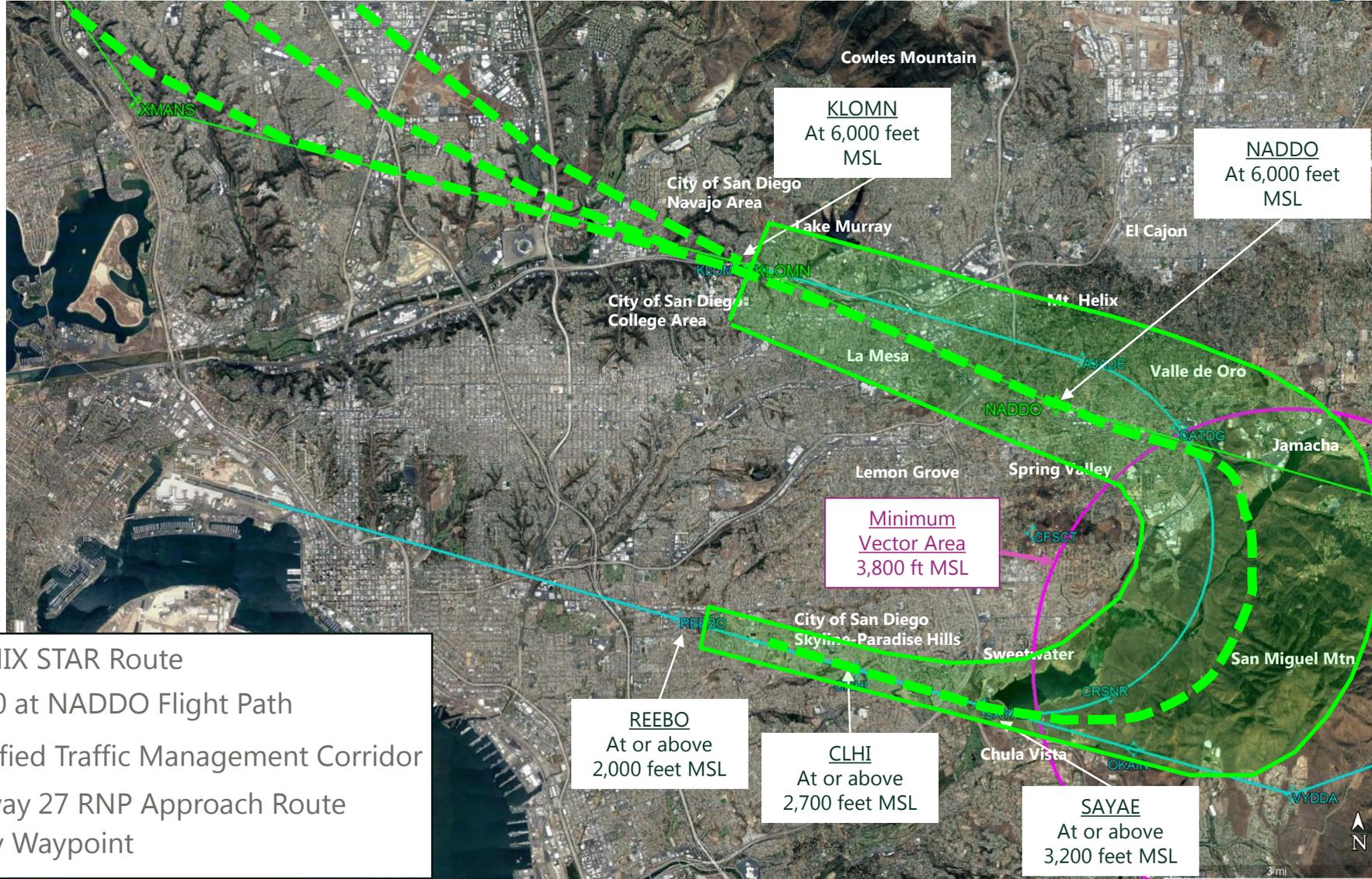
Current width of area where FAA ATC manages traffic to join final approach is approximately 8 nautical miles



Fly By Waypoint

NOTE: Mean Sea Level (MSL) – height above sea level; Above Ground Level (AGL) – height above the ground
 SOURCE: Google Earth, April 2019 (aerial photograph); Federal Aviation Administration, November 2018 (COMIX STAR route, Runway 27 RNP Approach route, Minimum Vector Area); Ricondo & Associates, Inc., April 2019 (existing paths and traffic management corridor).

Keep Arrivals at 6,000 ft up to NADDO – Modified Traffic Management Corridor



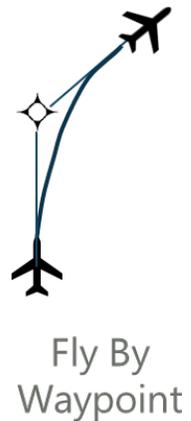
- COMIX STAR Route
- - - 6,000 at NADDO Flight Path
- Modified Traffic Management Corridor
- Runway 27 RNP Approach Route
- ◆ Fly By Waypoint

Concept would require aircraft to proceed further east after NADDO waypoint to get the necessary flight path distance needed to descend and slow down prior to joining the final approach.

Width of area where FAA ATC could manage traffic to join final approach may reduce from 8 to approximately 3 nautical miles. The limited area to manage traffic may be considered infeasible by FAA

NOTE: Mean Sea Level (MSL) – height above sea level; Above Ground Level (AGL) – height above the ground
 SOURCE: Google Earth, April 2019 (aerial photograph); Federal Aviation Administration, November 2018 (COMIX STAR route, Runway 27 RNP Approach route, Minimum Vector Area); Ricondo & Associates, Inc., April 2019 (6,000 ft. at NADDO flight path; modified traffic management corridor).

Emphasize Use of Runway 27 RNP Approach



- COMIX STAR Route
- Runway 27 RNP Approach Route
- Runway 27 RNP Approach Flight Path
- Fly By Waypoint

Intent: Reduce noise levels by locating arrivals over more compatible areas

Concept: Emphasize increased use of the Runway 27 RNP approach

Concerns: RNP approach is limited to aircraft with required equipment and pilots authorized to fly the approach

Would concentrate more arrivals over areas underneath the RNP flight path

NOTE: Mean Sea Level (MSL) – height above sea level; Above Ground Level (AGL) – height above the ground
SOURCE: Google Earth, April 2019 (aerial photograph); Federal Aviation Administration, November 2018 (COMIX STAR route, Runway 27 RNP Approach route); Ricondo & Associates, Inc., April 2019 (RNP approach flight path).

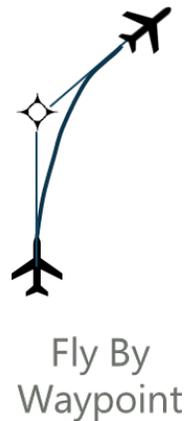
Runway 27 RNAV Visual Approach



Intent: Reduce noise levels by locating arrivals over more compatible areas with some dispersion

Concept: Keep jet arrivals a visual approach along an eastbound path at RNP approach altitudes and turn south over more compatible area

Concerns: Requires pilots to request approach and FAA may not be able to accommodate visual approach during peak arrival demand periods

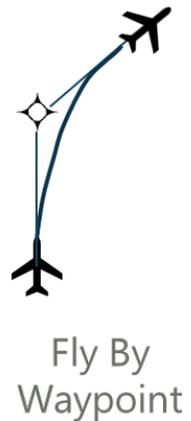


Legend:

- RNAV Visual Approach Flight Corridor
- Runway Visual Approach Route
- Runway 27 RNP Approach Route
- Minimum Vector Area
- Fly By Waypoint

NOTE: Mean Sea Level (MSL) – height above sea level; Above Ground Level (AGL) – height above the ground
 SOURCE: Google Earth, April 2019 (aerial photograph); Federal Aviation Administration, November 2018 (Runway 27 RNP Approach route, Minimum Vector Area); Ricondo & Associates, Inc., April 2019 (RNAV Visual approach concept route and corridor).

Develop RNAV Runway Transition to Runway 27 Final Approach



- RNAV Transition Design Area
- RNAV Transition Preferred Path
- Runway 27 RNP Approach Route
- Minimum Vector Area
- Fly By Waypoint

Intent: Reduce noise levels by locating arrivals over more compatible areas

Concept: Provide RNAV runway transition that mimics Runway 27 RNP approach and does not require additional navigation equipment and pilot authorization

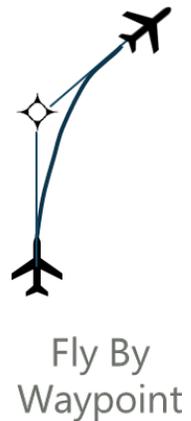
Concerns: May not be able to meet terrain and obstruction clearance requirements

May include aircraft performance concerns by users.

Would concentrate more arrivals over areas underneath the proposed flight path

NOTE: Mean Sea Level (MSL) – height above sea level; Above Ground Level (AGL) – height above the ground
 SOURCE: Google Earth, April 2019 (aerial photograph); Federal Aviation Administration, November 2018 (Runway 27 RNP Approach route; Minimum Vector Area); Ricondo & Associates, Inc., April 2019 (RNAV Runway Transition concept flight path).

Remove Route Between KLOMN and NADDO Waypoint (after Class B Change)



- Modified COMIX STAR Route
- - - Modified COMIX STAR Flight Path
- - - COMIX STAR KLOMN-NADDO Route
- Runway 27 RNP Approach Route
- Fly By Waypoint

Intent: Reduce noise by increasing dispersion as aircraft turn south to join the final approach

Concept: Discontinue use of the route between the KLOMN and NADDO waypoints and keep jet arrivals on an easterly heading until directed to turn south to join final approach

Concerns: The KLOMN to NADDO route was designed to provide pilots a predictable route that will keep the aircraft in the Class B airspace. FAA may require the proposed Class B airspace be implemented prior to removing the KLOMN to NADDO route.

NOTE: Mean Sea Level (MSL) – height above sea level; Above Ground Level (AGL) – height above the ground
 SOURCE: Google Earth, April 2019 (aerial photograph); Federal Aviation Administration, November 2018 (COMIX STAR route, Runway 27 RNP Approach route); Ricondo & Associates, Inc., April 2019 (modified COMIX STAR concept and flight path).

Next Steps

Next Steps

- Conduct design on potentially feasible concepts
- Meet with FAA Southern California Terminal Radar Approach Control to gather feedback on concepts
- Review findings with Working Group

San Diego International Airport East County Working Group - Aircraft Noise Concerns

Meeting #4

PRESENTED TO:
SDIA East County Working Group

PRESENTED BY:
Stephen C. Smith

PRESENTED ON:
July 25, 2019

Agenda

- Introductions
- Meeting Objective
- ECWG Airline Pilot Comments and Concept
- Extended Approach Design Review
- Draft Design Concepts
- Eliminated Design Concepts
- Next Steps

Meeting Objective

-  Review ECWG proposed design concepts
-  Review extended approach design results
-  Review draft design concepts based on ECWG feedback

ECWG Airline Pilot Member Comment and Concept

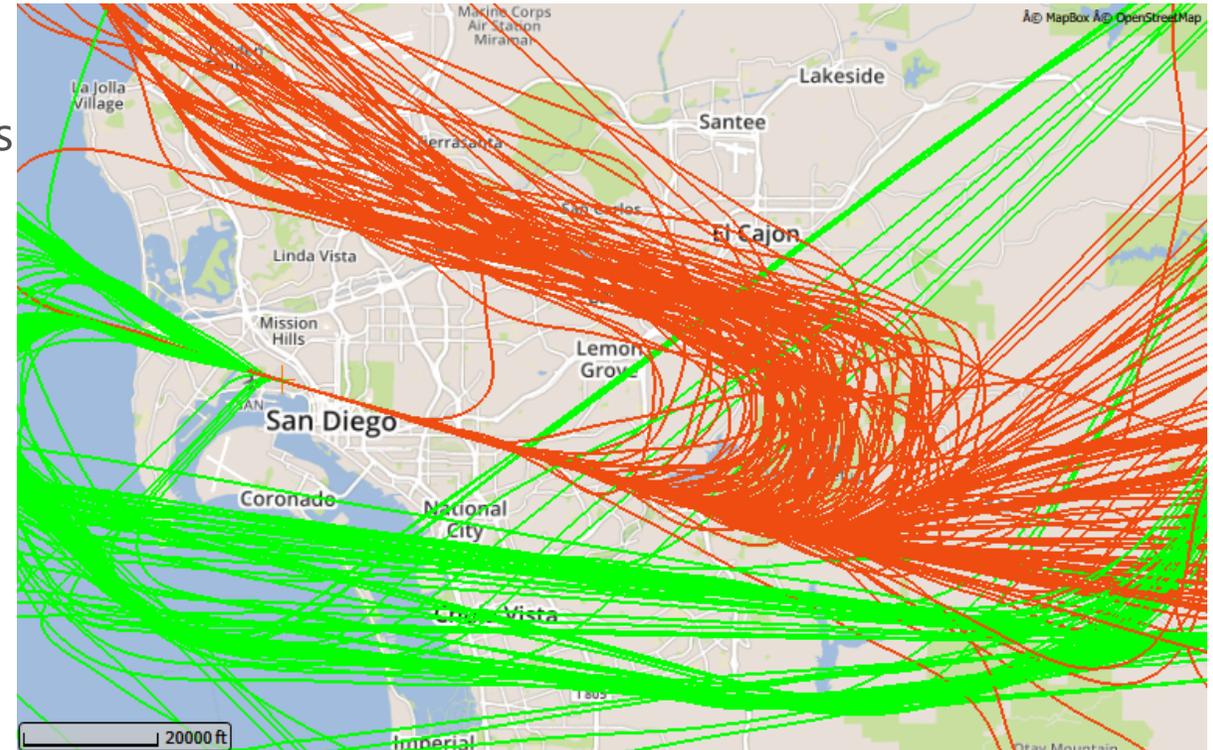
ECWG Airline Pilot Member Comments

👤 Desirable traits of north arrival operations:

- Track dispersion
- Higher altitude on downwind over populated areas
- Turn south to join final approach (crosswind) over less populated areas.

👤 Limitations include:

- Airspace limits
- Controller flexibility to merge north arrivals with east arrivals
- Commercial airliner operational limitations.



SOURCE: San Diego County Regional Airport Authority, July 2019 (Airport Noise and Operations Monitoring System track data for June 27, 2019).

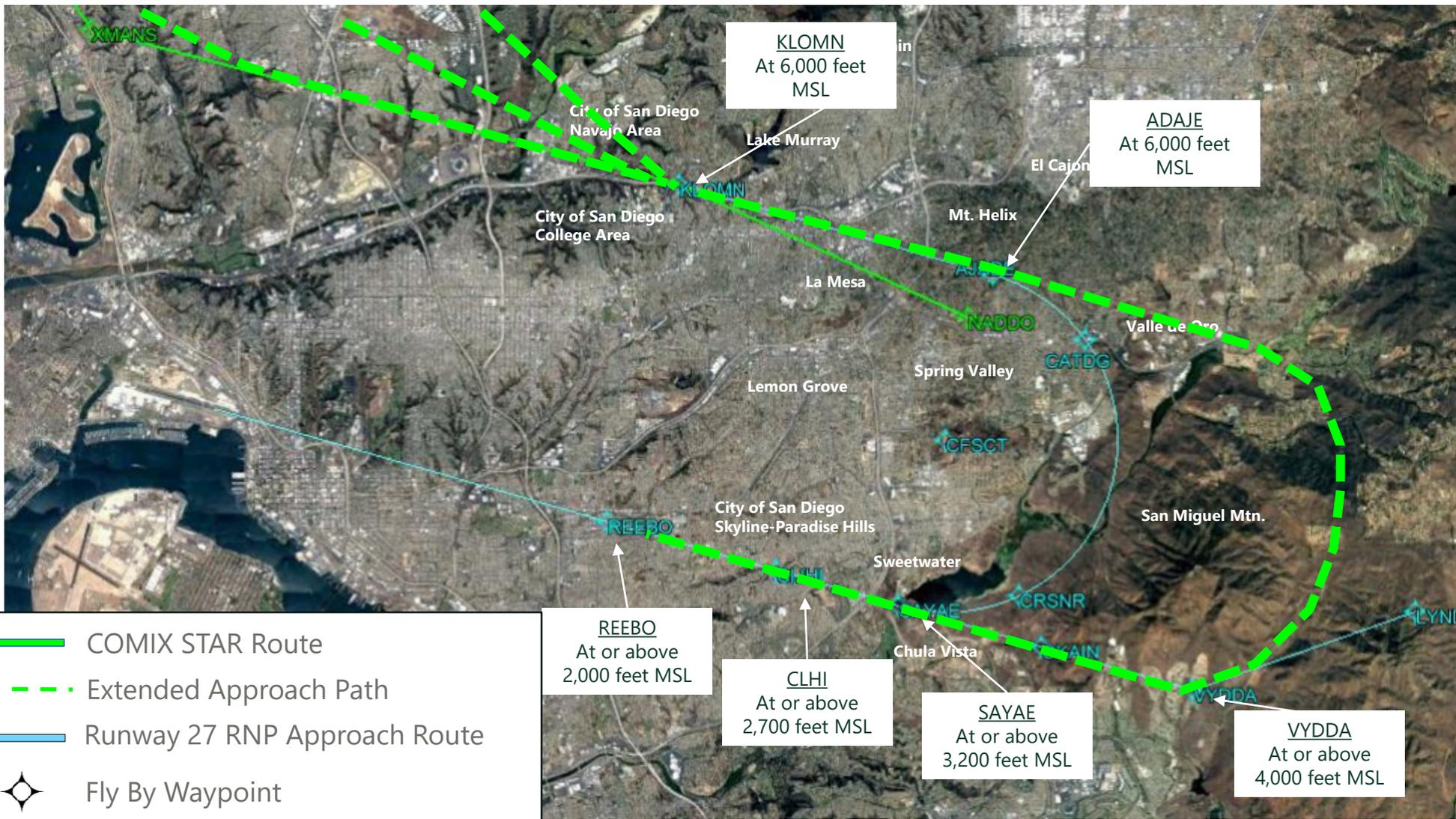
ECWG Airline Pilot Member Comments (continued)

-  All major operators routinely fly RNAV/VNAV arrivals to an approaches throughout the US and the world - it reduces the workload for the cockpit crew
-  Visual approach is not preferred for most pilots:
 - Requires pilot responsibility of traffic separation, terrain clearance and staying within the confines of the Class B airspace while calculating how best to get on the proper descent profile.
 - Visual approaches are notorious for unstable approaches
 - RNAVs are often easier than visuals

ECWG Airline Pilot Member Proposed Concept

-  Combination of three arrival concepts used based on demand
-  Provide greater arrival track dispersion and an overall reduction in aircraft noise exposure

Extended RNAV Approach from KLOMN to VYDDA (Low Demand Period)



Intent: Reduce noise levels by raising jet arrival altitude and moving traffic further east

Concept: Keep jet arrival altitude at 6,000 ft. MSL at KLOMN waypoint, thence follow RNAV approach further east

- Objectives:**
1. Raise Altitude on Downwind: Yes
 2. Maintain Dispersion: No
 3. Turn South Over Less Populated Areas: Yes

Potential Limitations: May not be applicable when demand levels are high

NOTE: Mean Sea Level (MSL) – height above sea level; Above Ground Level (AGL) – height above the ground
 SOURCE: Google Earth, April 2019 (aerial photograph); Federal Aviation Administration, November 2018 (COMIX STAR route, Runway 27 RNP Approach route); Ricondo & Associates, Inc., July 2019 (proposed extended approach path).

Keep Arrivals at 6,000 ft up to KLOMN (Medium to Low Demand Periods)



Intent: Reduce noise levels by raising jet arrival altitude and prevent closer turns to airport

Concept: Keep jet arrival altitude at 6,000 ft. MSL at KLOMN waypoint, thence descend to join final approach

- Objectives:**
1. Raise Altitude on Downwind: Yes
 2. Maintain Dispersion: Yes
 3. Turn South Over Less Populated Areas: No

Potential Limitations: Limits area for FAA ATC to manage traffic to join the final approach.

- COMIX STAR Route
- - - 6,000 at NADDO Flight Path
- Runway 27 RNP Approach Route
- ✦ Fly By Waypoint

NOTE: Mean Sea Level (MSL) – height above sea level; Above Ground Level (AGL) – height above the ground

SOURCE: Google Earth, April 2019 (aerial photograph); Federal Aviation Administration, November 2018 (COMIX STAR route, Runway 27 RNP Approach route, Minimum Vector Area); Ricondo & Associates, Inc., April 2019 (NADDO at 6,000 ft MSL)

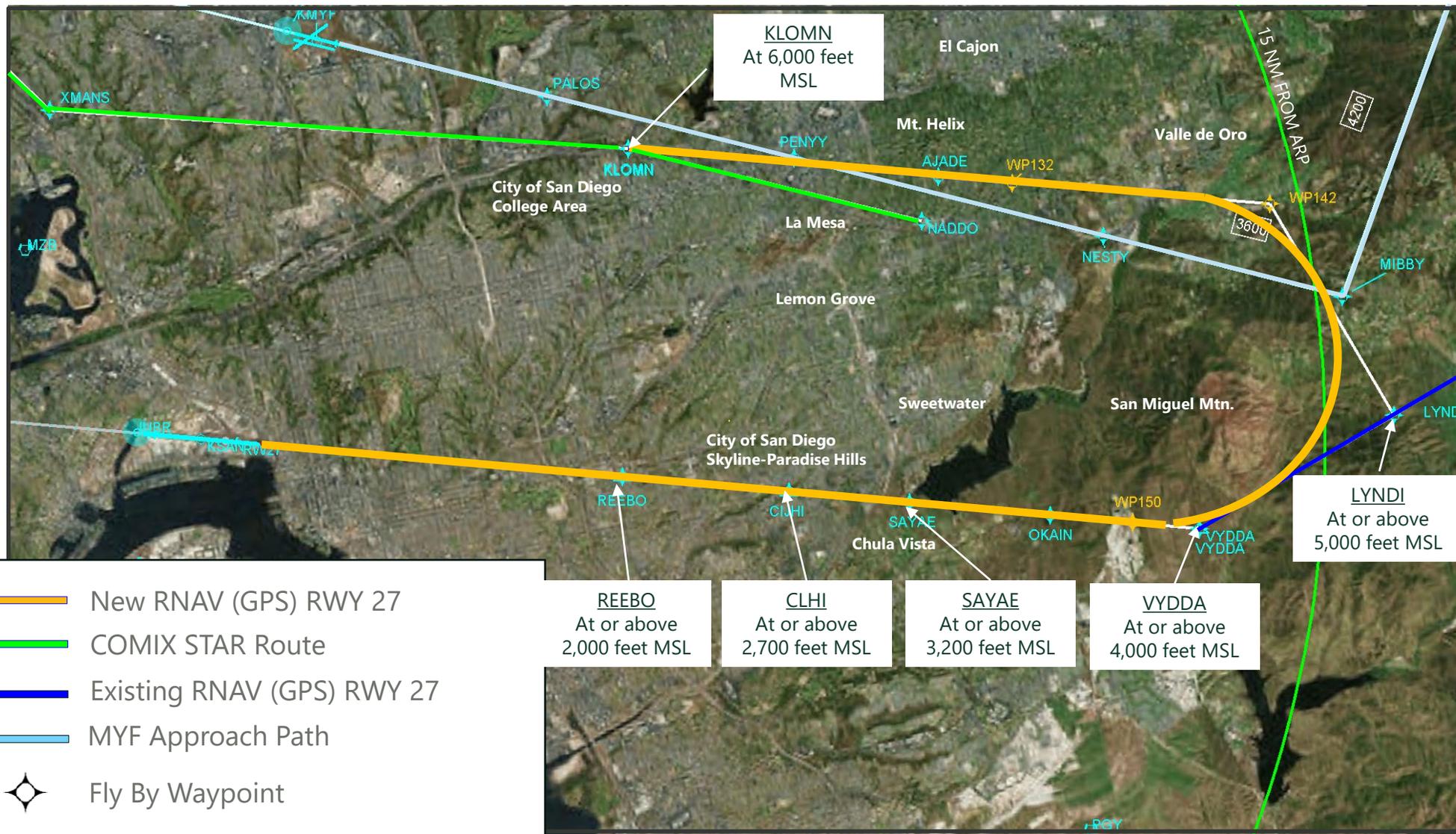
Extended RNAV Approach from KLOMN to VYDDA Design

ECWG Extended RNAV Approach Design

- ✎ Started with proposed concept to join final approach at VYDDA:
 - Considered terrain and obstructions
 - Considered maintaining descent to avoid level segments
 - Considered other published procedures

- ✎ If not feasible, consider modified concept to join final at modified waypoint

Extended RNAV Approach from KLOMN – Iteration 1



Intent: Reduce noise levels by raising jet arrival altitude and moving traffic further east

Concept: Keep jet arrival altitude at 6,000 ft. MSL at KLOMN waypoint, thence follow RNAV approach further east

Objectives:

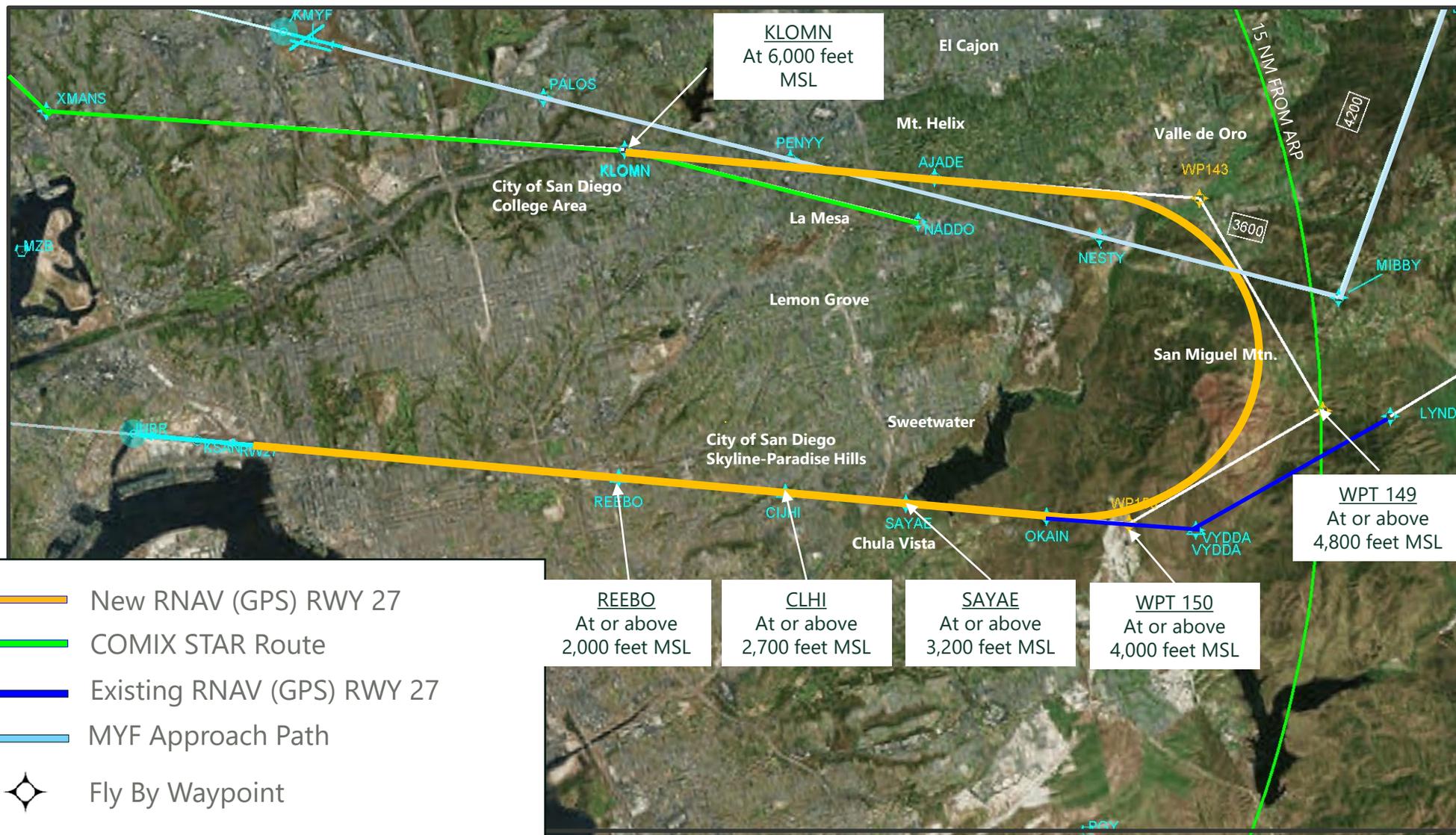
1. Raise Altitude on Downwind: Yes
2. Maintain Dispersion: No
3. Turn South Over Less Populated Areas: Yes

Limitations: Conflict with Montgomery Field approach and LYNDI STAR. Requires waiver to allow for a longer intermediate segment.

Extended RNAV Approach from KLOMN to VYDDA – Iteration 1 Notes

- ✎ Procedure ties into existing RNAV (GPS) Y RWY 27 Approach
 - Converging at LYNDI
 - Allows for a stable transition into the final straight segment
- ✎ Requires waiver
 - Intermediate Segment is longer than 15 NM and is beyond 15 NM from the Airport Reference Point (ARP)
 - Several adjustments (i.e., speed) were attempted but all would require a waiver
- ✎ Increases ATC complexity
 - Conflicts with Montgomery Airport approach to Runway 28L
 - Conflicts with LYNDI RNAV STAR
- ✎ Increased flight miles versus RNAV (GPS) Z RWY 27
- ✎ **Design is not feasible due to waiver requirement**

Extended RNAV Approach from KLOMN – Iteration 2



- New RNAV (GPS) RWY 27
- COMIX STAR Route
- Existing RNAV (GPS) RWY 27
- MYF Approach Path
- ◆ Fly By Waypoint

Intent: Reduce noise levels by raising jet arrival altitude and moving traffic further east

Concept: Keep jet arrival altitude at 6,000 ft. MSL at KLOMN waypoint, thence follow RNAV approach further east

Objectives:

1. Raise Altitude on Downwind: Yes
2. Maintain Dispersion: No
3. Turn South Over Less Populated Areas: Yes

Limitations: Conflict with Montgomery Field approach and LYNDI STAR.

Extended RNAV Approach from KLOMN to New Waypoint – Iteration 2 Notes

- ✎ Procedure intercepts existing RNAV (GPS) RWY 27 **east of VYDDA**
- ✎ No waivers required
- ✎ Increased ATC complexity
 - Conflicts with Montgomery Airport approach to Runway 28L
 - Conflicts with LYNDI RNAV STAR
 - Creates a new approach route to Runway 27
- ✎ Increased flight miles versus RNAV (GPS) Z RWY 27
- ✎ **Primary concern is increased complexity added to ATC**

Consultant Recommendations

! Concerns

- Likelihood of FAA approval – low
 - Additional complexity related to procedure conflicts
 - Increase in flight distance may encounter user concerns during FAA RNAV process

Note: Need to discuss design and potential complexity with FAA to confirm

Draft Design Concepts

Draft Concept Overview

- A single draft concept is proposed – made of multiple procedures based on when FAA can accommodate
- Includes two existing procedures (Runway 27 RNP Approach and ATC Radar and Visual Approach)
- One design concept involves a new RNAV approach procedure and one that involves a modification to the existing COMIX RNAV STAR
- Procedure concepts are intended to be used when possible during a given day based on demand – provides opportunities for dispersion, higher altitudes on the downwind path and turning south over more compatible areas when able.
- Procedures will not prohibit FAA ATC from re-directing flight.
- Will require encouragement to increase use of procedures.

Keep Arrivals at 6,000 ft up to KLOMN (Remove NADDO Route)



- COMIX STAR Route
- - - - 6,000 at NADDO Flight Path
- Runway 27 RNP Approach Route
- ◆ Fly By Waypoint

Intent: Reduce noise levels by raising jet arrival altitude and prevent closer turns to airport

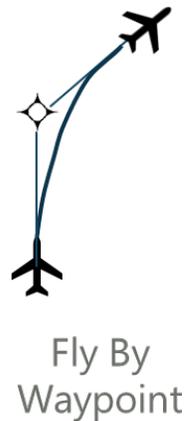
Concept: Remove route to NADDO and keep jet arrival altitude at 6,000 ft. MSL at KLOMN waypoint, thence descend to join final approach

- Objectives:**
1. Raise Altitude on Downwind: Yes
 2. Maintain Dispersion: Yes
 3. Turn South Over Less Populated Areas: No

Potential Limitations: Limits area for FAA ATC to manage traffic to join the final approach. FAA may require the proposed Class B airspace be implemented prior to removing the KLOMN to NADDO route

NOTE: Mean Sea Level (MSL) – height above sea level; Above Ground Level (AGL) – height above the ground
 SOURCE: Google Earth, April 2019 (aerial photograph); Federal Aviation Administration, November 2018 (COMIX STAR route, Runway 27 RNP Approach route, Minimum Vector Area); Ricondo & Associates, Inc., April 2019 (NADDO at 6,000 ft MSL concept).

Runway 27 RNP Approach



- COMIX STAR Route
- Runway 27 RNP Approach Route
- - - Runway 27 RNP Approach Flight Path
- Fly By Waypoint

Intent: Reduce noise levels by locating arrivals over more compatible areas

Concept: Emphasize use of the Runway 27 RNP approach over ATC directed visual approach

Objectives:

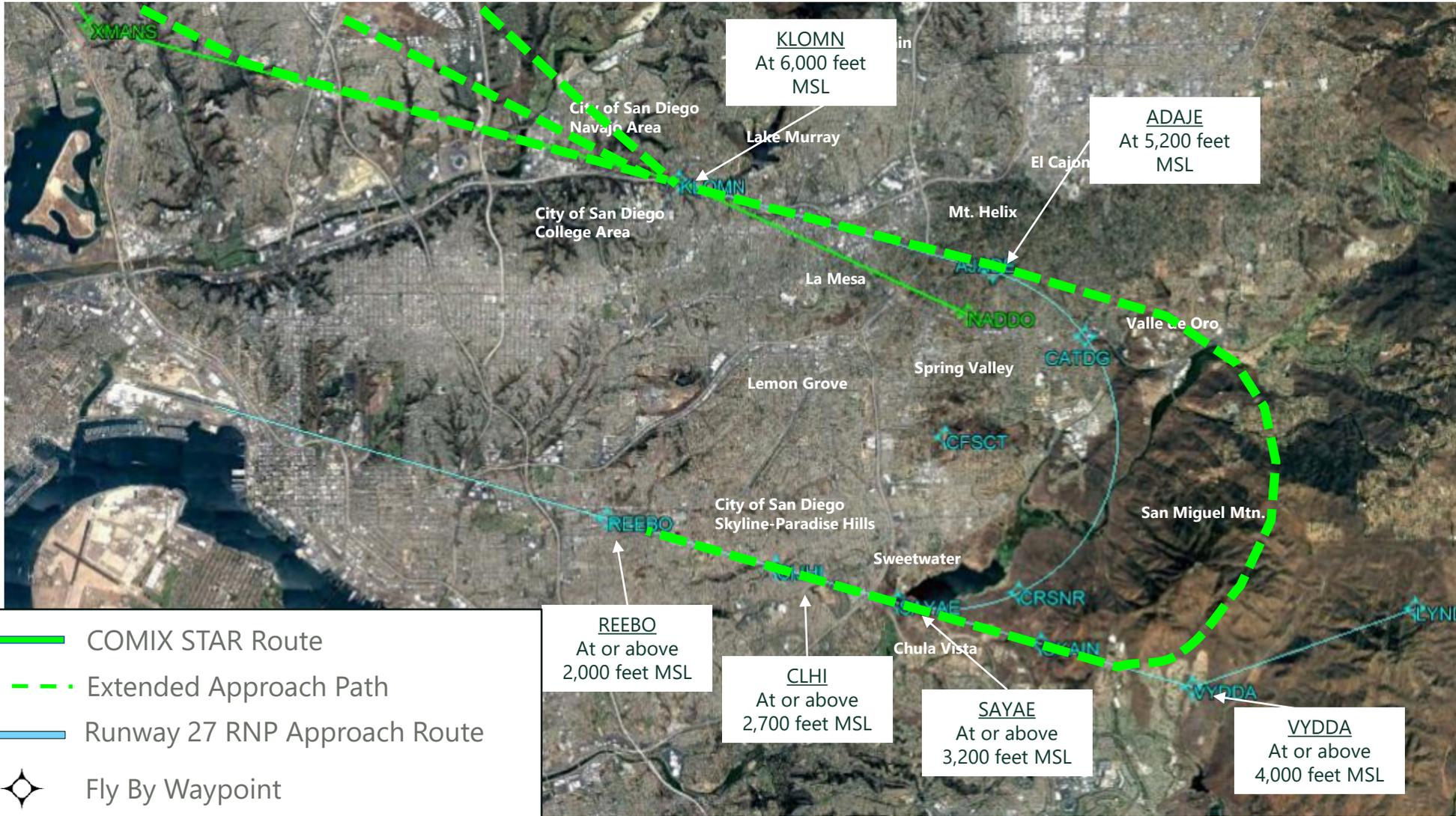
1. Raise Altitude on Downwind: Yes
2. Maintain Dispersion: No
3. Turn South Over Less Populated Areas: Yes

Potential Limitations: RNP approach is limited to aircraft with required equipment and pilots authorized to fly the approach.

Would concentrate more arrivals over areas underneath the RNP flight path

NOTE: Mean Sea Level (MSL) – height above sea level; Above Ground Level (AGL) – height above the ground
 SOURCE: Google Earth, April 2019 (aerial photograph); Federal Aviation Administration, November 2018 (COMIX STAR route, Runway 27 RNP Approach route); Ricondo & Associates, Inc., April 2019 (RNP approach flight path).

Extended RNAV Approach from KLOMN to Waypoint Close to VYDDA



Intent: Reduce noise levels by raising jet arrival altitude and moving traffic further east

Concept: Keep jet arrival altitude at 6,000 ft. MSL at KLOMN waypoint, thence follow RNAV approach further east

- Objectives:**
1. Raise Altitude on Downwind: Yes
 2. Maintain Dispersion: No
 3. Turn South Over Less Populated Areas: Yes

Potential Limitations: Adds complexity to ATC and increases distance. May be applicable when demand levels are low during nighttime hours (11pm to 6am).

NOTE: Mean Sea Level (MSL) – height above sea level; Above Ground Level (AGL) – height above the ground
 SOURCE: Google Earth, April 2019 (aerial photograph); Federal Aviation Administration, November 2018 (COMIX STAR route, Runway 27 RNP Approach route); Ricondo & Associates, Inc., July 2019 (proposed extended approach path).

FAA ATC Managed Arrival – High Demand Periods (Remove NADDO Route)



- Modified COMIX STAR Route
- - - Modified COMIX STAR Flight Path
- COMIX STAR KLOMN-NADDO Route
- Runway 27 RNP Approach Route
- ✦ Fly By Waypoint

Intent: Maintain dispersion as aircraft turn south to join the final approach

Concept: Discontinue use of the route between the KLOMN and NADDO waypoints and maintain dispersion procedures when air traffic demand is high

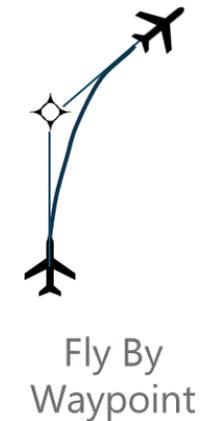
- Objectives:**
1. Raise Altitude on Downwind: No
 2. Maintain Dispersion: Yes
 3. Turn South Over Less Populated Areas: No

Potential Limitations: FAA may require the proposed Class B airspace be implemented prior to removing the KLOMN to NADDO route

NOTE: Mean Sea Level (MSL) – height above sea level; Above Ground Level (AGL) – height above the ground
 SOURCE: Google Earth, April 2019 (aerial photograph); Federal Aviation Administration, November 2018 (COMIX STAR route, Runway 27 RNP Approach route); Ricondo & Associates, Inc., April 2019 (modified COMIX STAR concept and flight path).

Eliminated Design Concepts

Keep Arrivals at 6,000 ft up to NADDO



- COMIX STAR Route
- - - 6,000 at NADDO Flight Path
- Runway 27 RNP Approach Route
- ◆ Fly By Waypoint

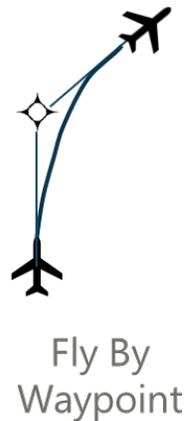
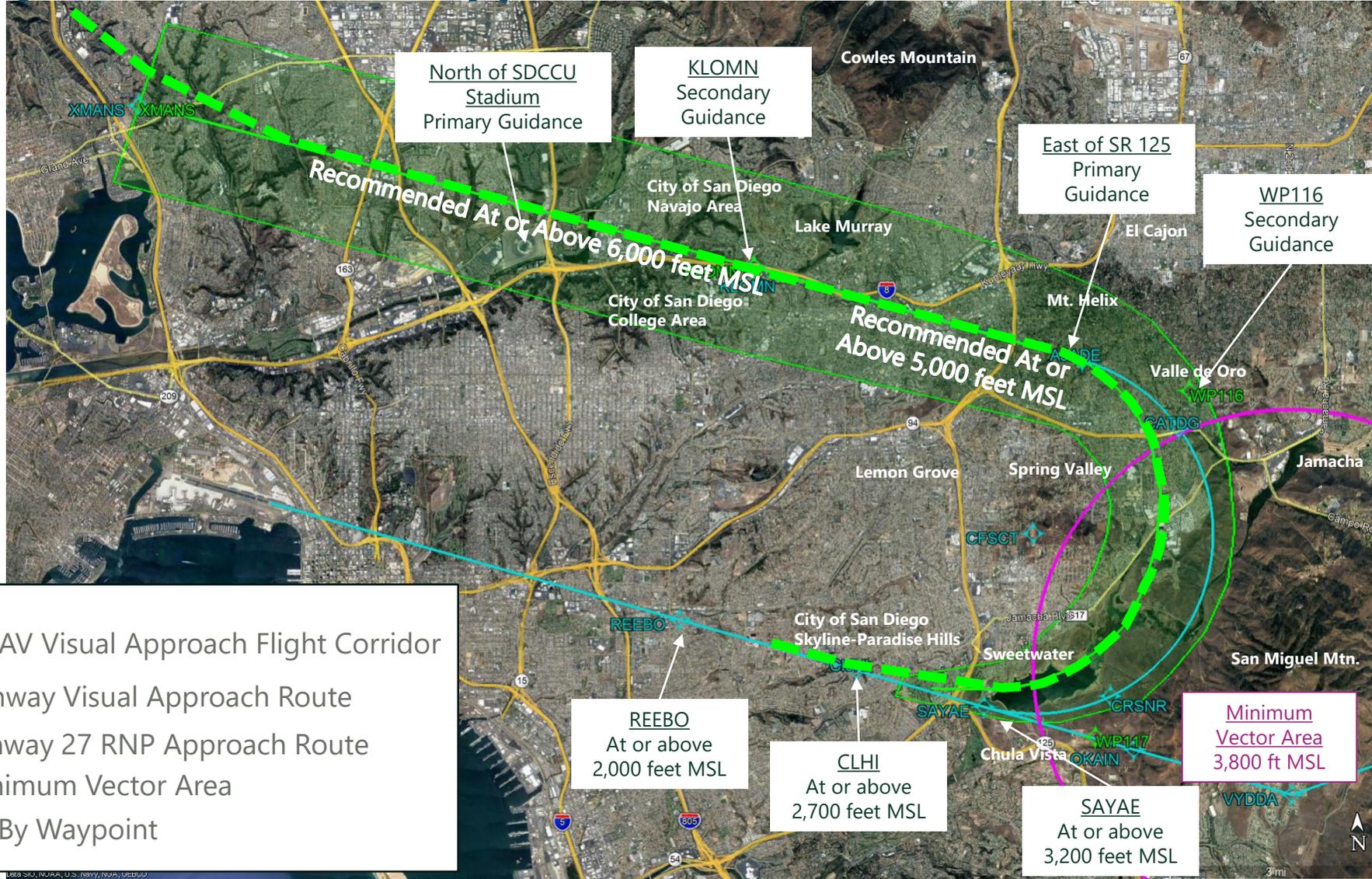
Intent: Reduce noise levels by raising jet arrival altitude

Concept: Keep jet arrival altitude between KLOMN and NADDO waypoints at 6,000 ft. MSL, thence descend to join final approach

Eliminated: Preference is to remove route between KLOMN and NADDO; therefore, a design concept maintaining NADDO waypoint is no longer considered. Would also reduce area for ATC to manage and merge arrivals with traffic from the east. Terrain would also limit ATC ability to efficiently manage traffic.

NOTE: Mean Sea Level (MSL) – height above sea level; Above Ground Level (AGL) – height above the ground
 SOURCE: Google Earth, April 2019 (aerial photograph); Federal Aviation Administration, November 2018 (COMIX STAR route, Runway 27 RNP Approach route, Minimum Vector Area); Ricondo & Associates, Inc., April 2019 (NADDO at 6,000 ft MSL concept).

Runway 27 RNAV Visual Approach



- RNAV Visual Approach Flight Corridor
- Runway Visual Approach Route
- Runway 27 RNP Approach Route
- Minimum Vector Area
- ✦
 Fly By Waypoint

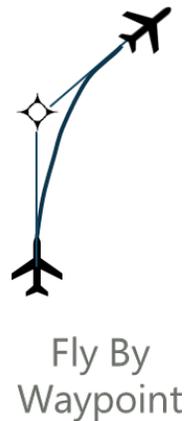
Intent: Reduce noise levels by locating arrivals over more compatible areas with some dispersion

Concept: Keep jet arrivals a visual approach along an eastbound path at RNP approach altitudes and turn south over more compatible area

Eliminated: Based on input from the ECWG airline pilot member, the likelihood that the visual approach would be requested over an RNAV approach is very low due to increased workload and increased possibility for an unstable approach.

NOTE: Mean Sea Level (MSL) – height above sea level; Above Ground Level (AGL) – height above the ground
 SOURCE: Google Earth, April 2019 (aerial photograph); Federal Aviation Administration, November 2018 (Runway 27 RNP Approach route, Minimum Vector Area); Ricondo & Associates, Inc., April 2019 (RNAV Visual approach concept route and corridor).

Develop RNAV Runway Transition to Runway 27 Final Approach



- RNAV Transition Design Area
- RNAV Transition Preferred Path
- Runway 27 RNP Approach Route
- Minimum Vector Area
- Fly By Waypoint

Intent: Reduce noise levels by locating arrivals over more compatible areas

Concept: Provide RNAV runway transition that mimics Runway 27 RNP approach and does not require additional navigation equipment and pilot authorization

Eliminated: An RNP approach is currently published and implementing an RNAV approach over same area may increase more frequent concentration, which conflicts with ECWG's objective to maintain as much dispersion as possible.

NOTE: Mean Sea Level (MSL) – height above sea level; Above Ground Level (AGL) – height above the ground
 SOURCE: Google Earth, April 2019 (aerial photograph); Federal Aviation Administration, November 2018 (Runway 27 RNP Approach route; Minimum Vector Area); Ricondo & Associates, Inc., April 2019 (RNAV Runway Transition concept flight path).

Next Steps

Next Steps

- Meet with FAA SCT TRACON to discuss extended approach and the feasibility of managing arrivals differently based on demand
- Refine design concepts as necessary
- Conduct noise screening analysis on design concepts
- Review final design concepts and noise screening results with ECWG

San Diego International Airport East County Working Group - Aircraft Noise Concerns

Meeting #5

PRESENTED TO:
SDIA East County Working Group

PRESENTED BY:
Stephen C. Smith

PRESENTED ON:
December 11, 2019

Agenda

- § Introductions
- § Meeting Objective
- § Final Design Concepts
- § Noise Modeling Screening Results
- § Recommendations
- § Next Steps

Meeting Objective

-  Review final design concepts
-  Review aircraft noise model screening results
-  Discuss recommendations

Final Design Concepts

Final Concept Overview

-  A single draft concept is proposed – made of multiple procedures based on when FAA can accommodate
-  Includes two existing procedures: Runway 27 RNP Approach and FAA ATC Managed Approach
-  Modification of one existing procedure: COMIX RNAV STAR
-  New RNAV approach procedure: Runway 27 RNAV approach during late night period
-  Intent: procedure concepts are intended to be used when possible during a given day based on demand – provides opportunities for dispersion, higher altitudes on the downwind path and turning south over more compatible areas when able.
-  Note:
 - Procedures will not prohibit FAA ATC from re-directing flight.
 - Will require encouragement to increase use of procedures.

FAA ATC Managed Approach – High Demand Periods (Remove NADDO Route)



- Modified COMIX STAR Route
- - - Modified COMIX STAR Flight Path
- COMIX STAR KLOMN-NADDO Route
- Runway 27 RNP Approach Route
- ◆ Fly By Waypoint

Intent: Maintain dispersion as aircraft turn south to join the final approach

Concept: Discontinue use of the route between the KLOMN and NADDO waypoints and maintain dispersion procedures when air traffic demand is high

Objectives:

1. Raise Altitude on Downwind: No
2. Maintain Dispersion: Yes
3. Turn South Over Less Populated Areas: No

Potential Limitations: FAA may require the proposed Class B airspace be implemented prior to removing the KLOMN to NADDO route

NOTE: Mean Sea Level (MSL) – height above sea level; Above Ground Level (AGL) – height above the ground
 SOURCE: Google Earth, April 2019 (aerial photograph); Federal Aviation Administration, November 2018 (COMIX STAR route, Runway 27 RNP Approach route); Ricondo & Associates, Inc., April 2019 (modified COMIX STAR concept and flight path).

Maintain Runway 27 RNP Approach



— COMIX STAR Route
— Runway 27 RNP Approach Route
- - - Runway 27 RNP Approach Flight Path
◆ Fly By Waypoint

Intent: Reduce noise levels by locating arrivals over more compatible areas

Concept: Emphasize use of the Runway 27 RNP approach over ATC directed visual approach

Objectives:

1. Raise Altitude on Downwind: Yes
2. Maintain Dispersion: No
3. Turn South Over Less Populated Areas: Yes

Potential Limitations: RNP approach is limited to aircraft with required equipment and pilots authorized to fly the approach.

Would concentrate more arrivals over areas underneath the RNP flight path

NOTE: Mean Sea Level (MSL) – height above sea level; Above Ground Level (AGL) – height above the ground
 SOURCE: Google Earth, April 2019 (aerial photograph); Federal Aviation Administration, November 2018 (COMIX STAR route, Runway 27 RNP Approach route); Ricondo & Associates, Inc., April 2019 (RNP approach flight path).

Modify COMIX: Keep Arrivals at 6,000 ft up to KLOMN (Remove NADDO Route)



- COMIX STAR Route
- - - 6,000 at NADDO Flight Path
- Runway 27 RNP Approach Route
- ✦ Fly By Waypoint

Intent: Reduce noise levels by raising jet arrival altitude, reduce closer turns to Airport and disperse traffic

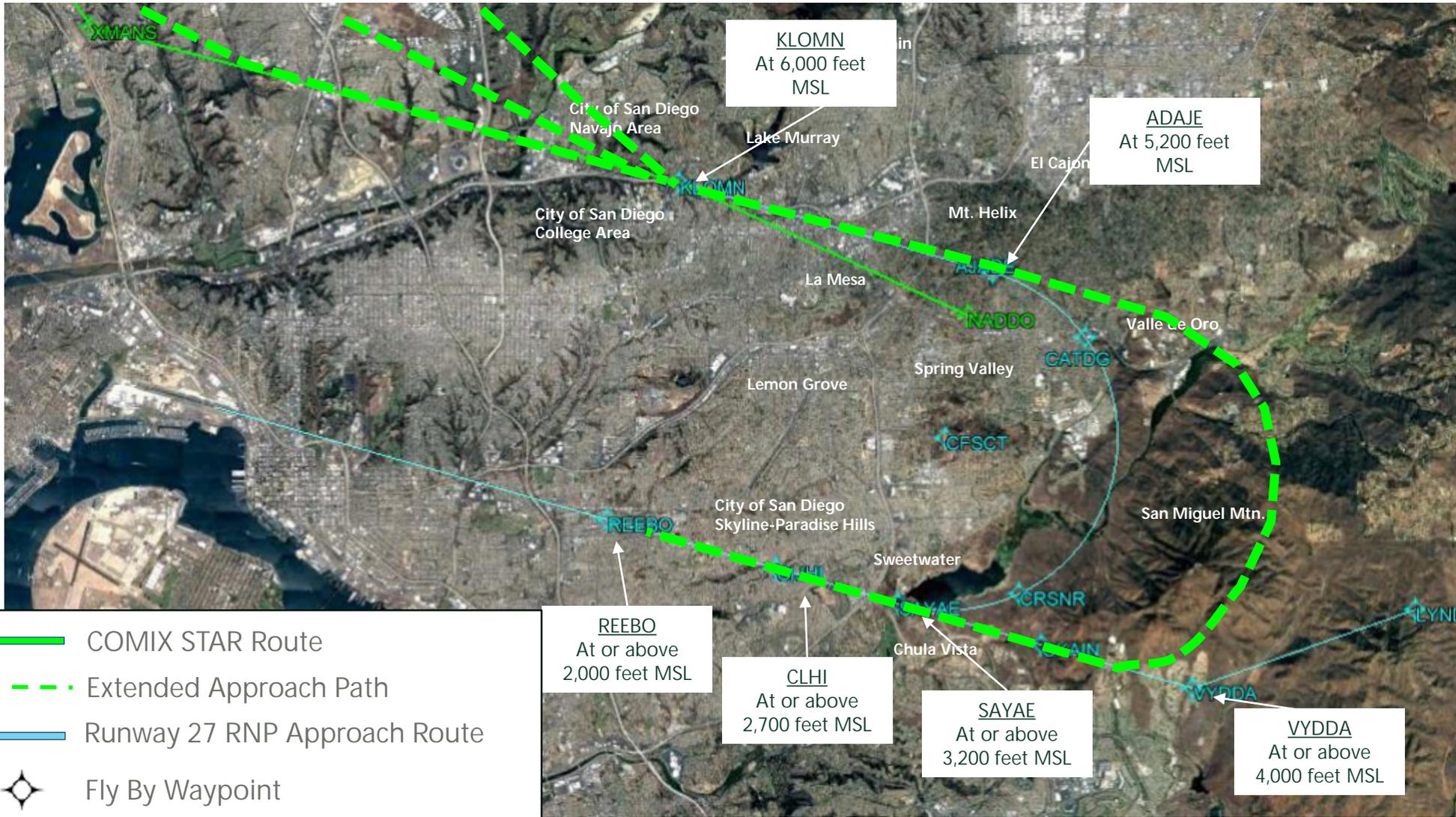
Concept: Remove route to NADDO and keep jet arrival altitude at 6,000 ft. MSL at KLOMN waypoint, thence descend to join final approach

- Objectives:**
1. Raise Altitude on Downwind: Yes
 2. Maintain Dispersion: Yes
 3. Turn South Over Less Populated Areas: No

Potential Limitations: Limits area for FAA ATC to manage traffic to join the final approach. FAA may require the proposed Class B airspace be implemented prior to removing the KLOMN to NADDO route

NOTE: Mean Sea Level (MSL) – height above sea level; Above Ground Level (AGL) – height above the ground
 SOURCE: Google Earth, April 2019 (aerial photograph); Federal Aviation Administration, November 2018 (COMIX STAR route, Runway 27 RNP Approach route, Minimum Vector Area); Ricondo & Associates, Inc., April 2019 (NADDO at 6,000 ft MSL concept).

New RNAV Approach: RNAV Approach from KLOMN to Nearby VYDDA



Intent: Reduce noise levels by raising jet arrival altitude and moving traffic further east

Concept: Keep jet arrival altitude at 6,000 ft. MSL at KLOMN waypoint, thence follow RNAV approach further east

- Objectives:**
1. Raise Altitude on Downwind: Yes
 2. Maintain Dispersion: No
 3. Turn South Over Less Populated Areas: Yes

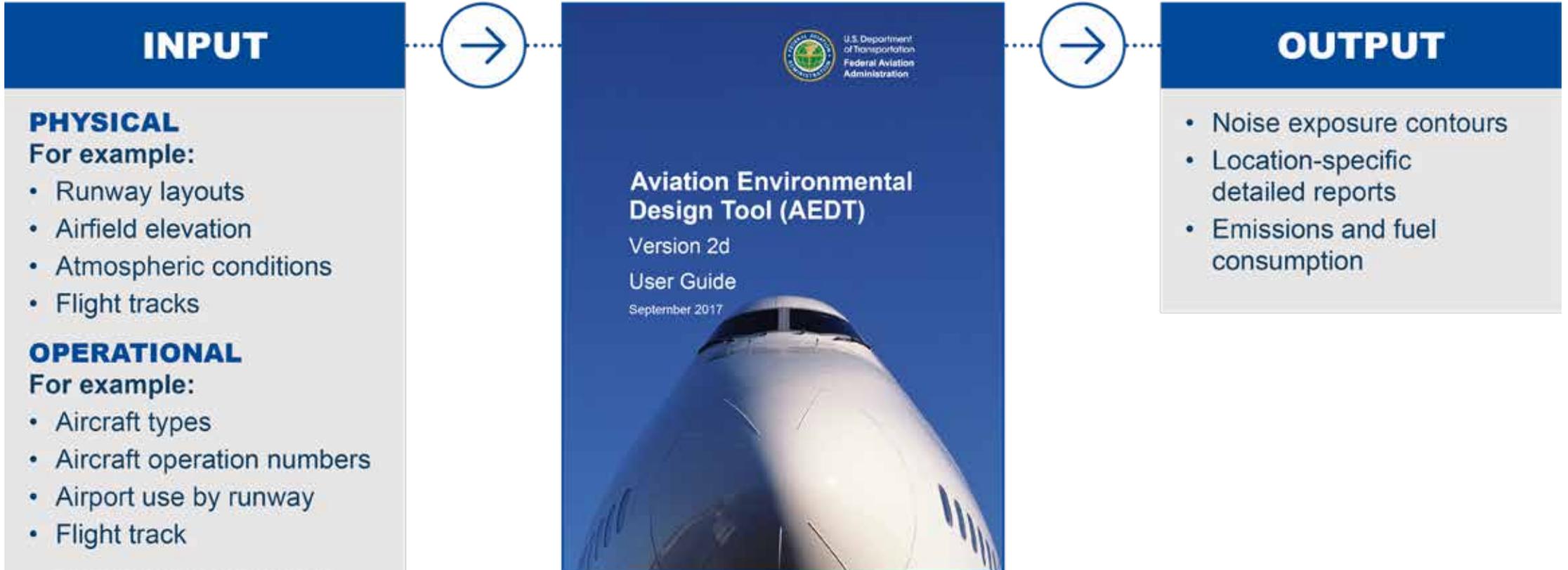
Potential Limitations: Adds complexity to ATC and increases distance. May be applicable when demand levels are low during nighttime hours (11pm to 7 am). FAA acknowledged possible issues with conflicting traffic.

NOTE: Mean Sea Level (MSL) – height above sea level; Above Ground Level (AGL) – height above the ground
 SOURCE: Google Earth, April 2019 (aerial photograph); Federal Aviation Administration, November 2018 (COMIX STAR route, Runway 27 RNP Approach route); Ricondo & Associates, Inc., July 2019 (proposed extended approach path).

Aircraft Noise Model Screening Results

Noise Screening Methodology - AEDT

§ FAA Aviation Environmental Design Tool (AEDT) 2d noise model



Noise Screening

- § **Intent:** Identify and estimate potential decrease or increase in noise caused by implementing a proposed concept RNAV design procedure
- § **Approach:** Capture primary jet aircraft noise source from SDIA over community areas where proposed concepts are designed to reduce noise
- § **Application:** Provide indications of potential changes in CNEL related to jet traffic subject to change as a result of a proposed concept.

Note: Results do not reflect the cumulative average annual day flight patterns and operations at SDIA; therefore not intended to represent overall existing noise exposure levels

Noise Screening Methodology - Baseline

§ **Source:** Authority's Airport Noise and Operations Management System (ANOMS) flight operations and radar track data: May 2017 to December 2017 (note: used same data source for air traffic procedure analysis project for consistency)

§ **Operation focus:** Jet arrivals from the northwest to Runway 27

§ **Traffic flow focus:**

– Arrivals from northwest (e.g., COMIX RNAV STAR, HUBRD STAR and FAA ATC radar vectoring from the northwest)

Noise Screening Methodology - Alternative

- § **Develop** new noise model tracks for new proposed procedures
- § **Modify** baseline noise model tracks to represent proposed final design flight path
- § **Move** baseline operations to alternative noise model tracks
- § **Maintain** noise model tracks and operations on tracks for traffic flows not related to proposed changes
- § **Compare** CNEL values between Baseline and Alternative scenarios

Modeled Scenario

§ Changes/Additions from Baseline

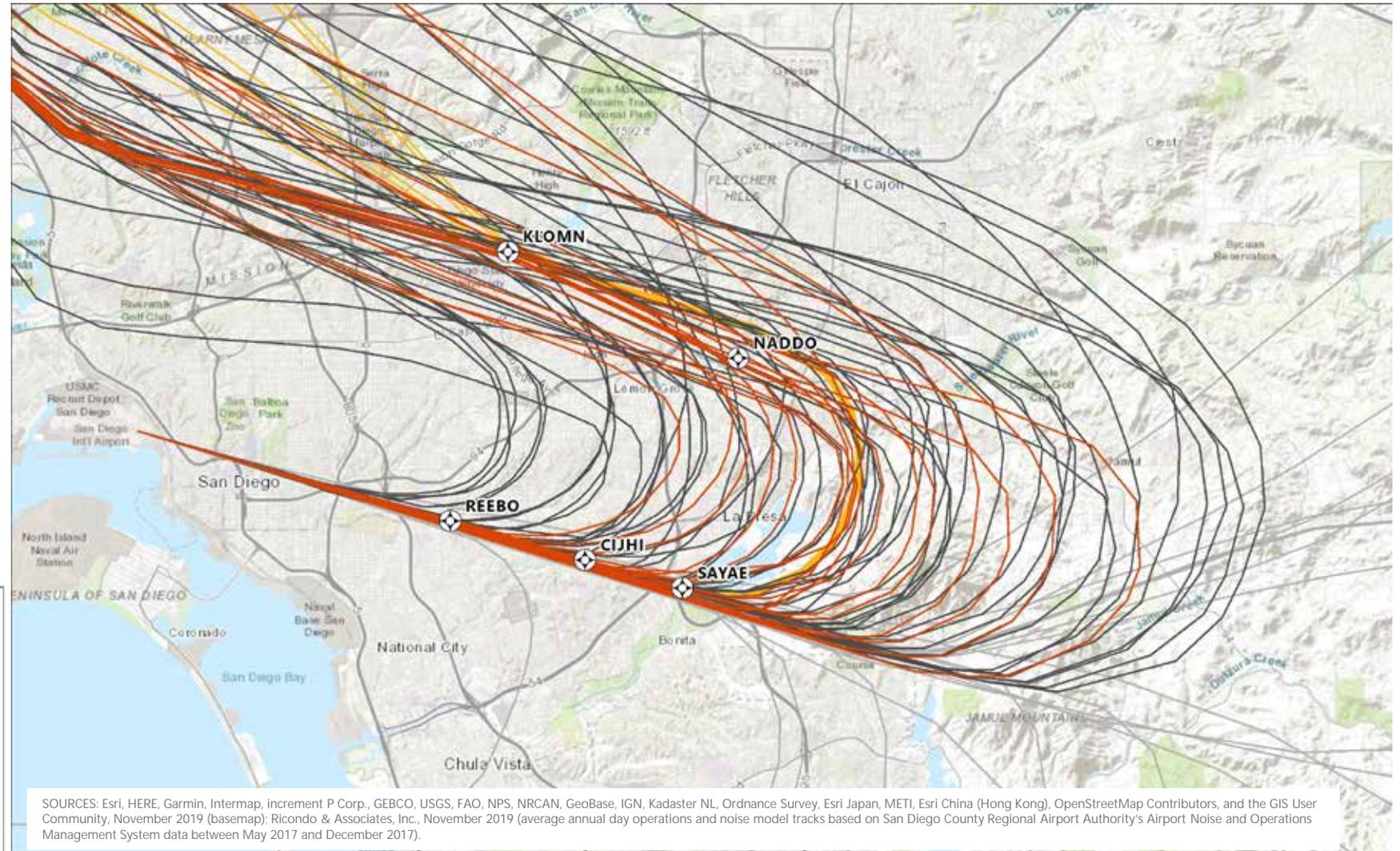
- Modified COMIX RNAV STAR: all jet arrivals that operated between KLOMN and NADDO waypoints under the Baseline
- Nighttime Runway 27 RNAV Approach: all jet arrivals between 11 p.m. to 7 a.m.

§ Maintained from Baseline

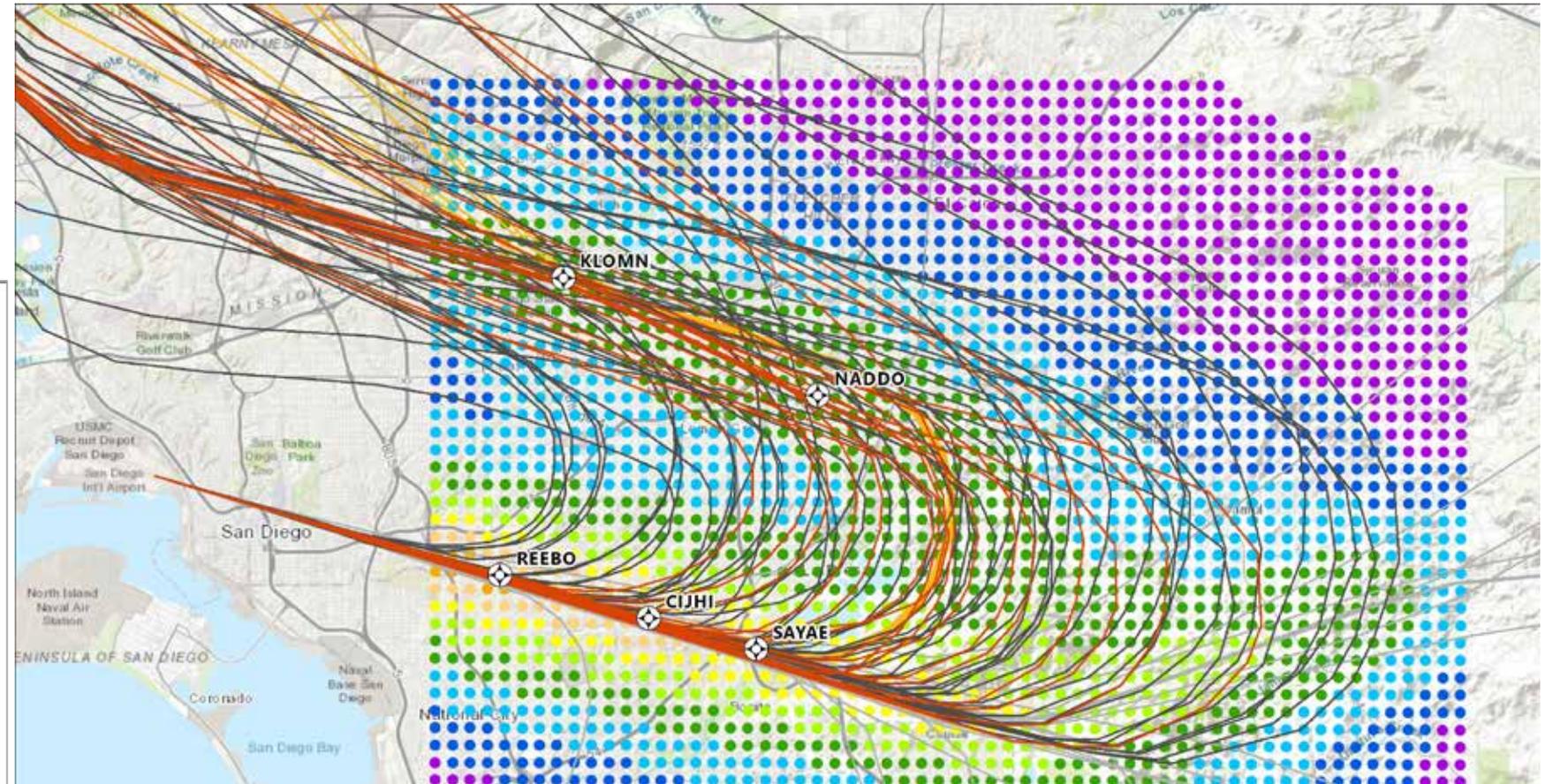
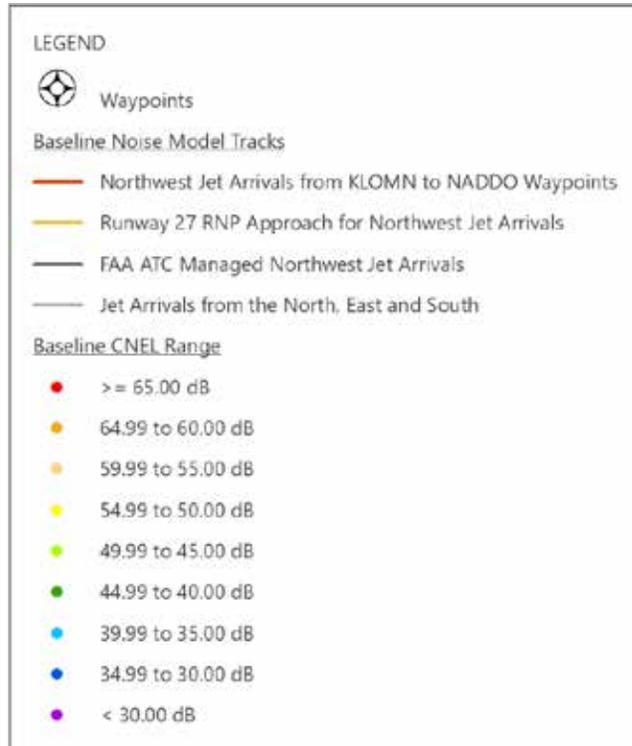
- Runway 27 RNP Approach
- Turns to final prior to or at KLOMN waypoint
- Arrival traffic from the north, east and south

§ Scenario does not represent cumulative average annual day noise exposure levels

Aircraft Noise Screening - Baseline Model Flight Tracks



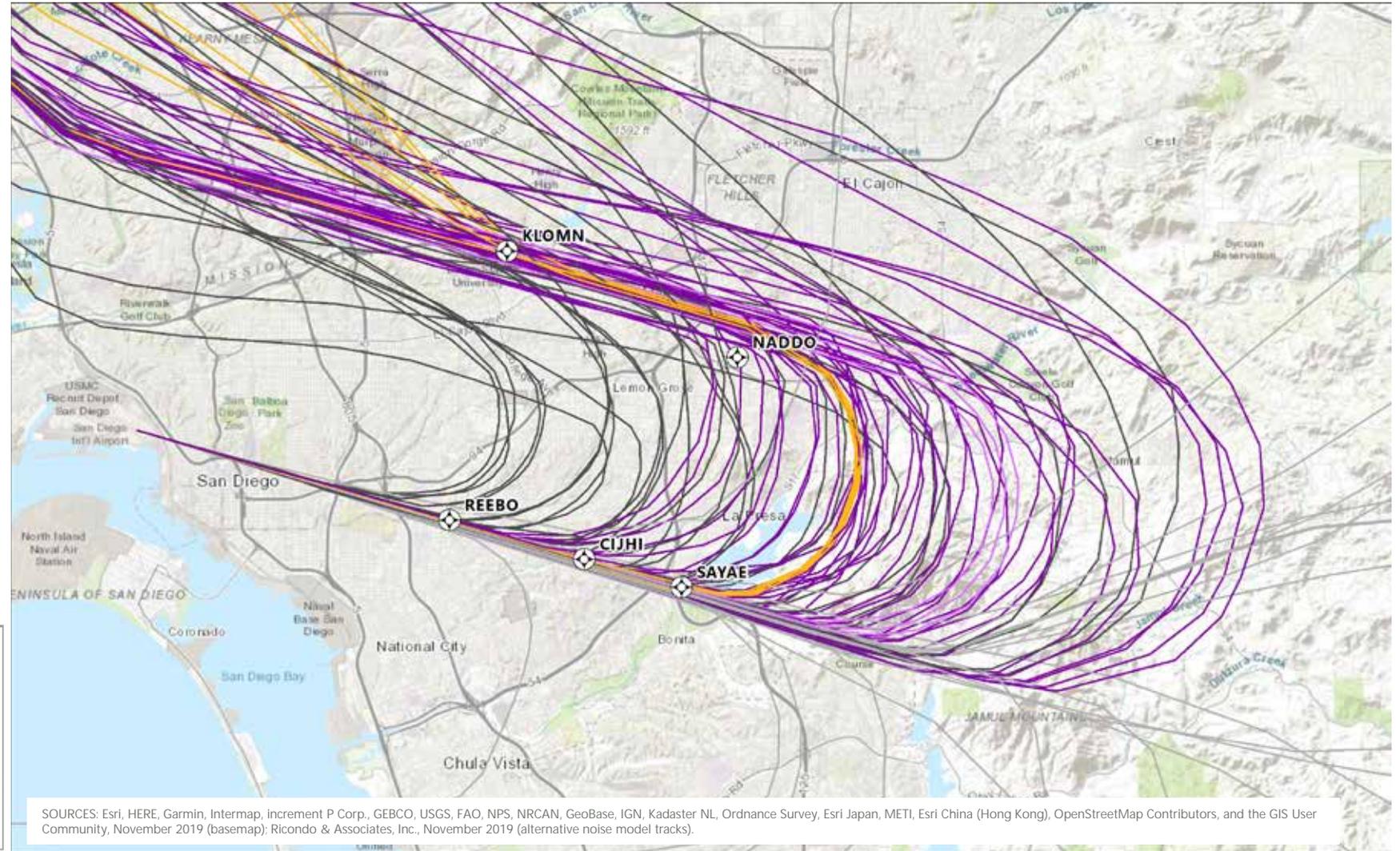
Aircraft Noise Screening - Baseline Model Flight Tracks and CNEL Ranges



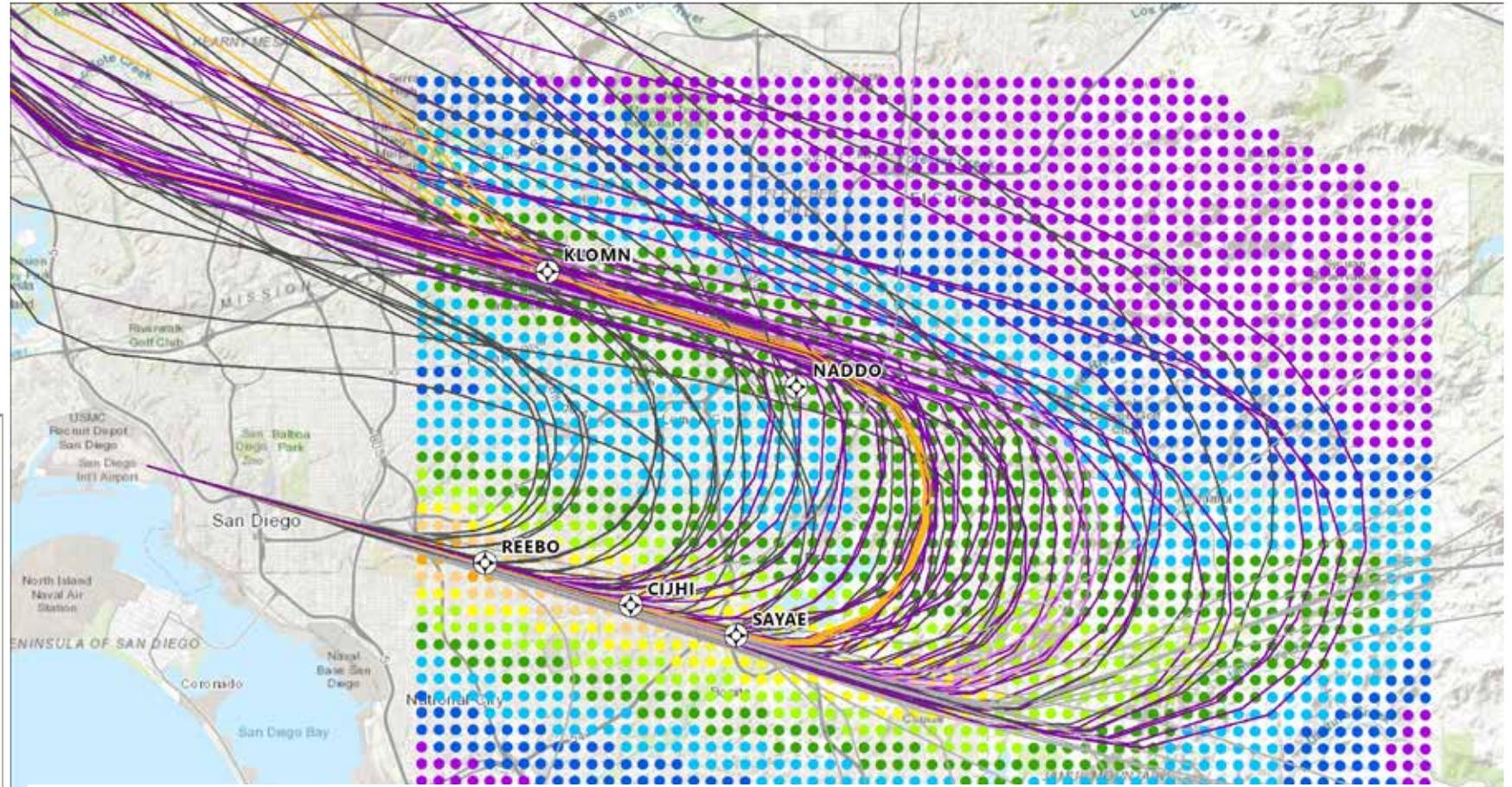
NOTES:
1/ Calculated CNEL levels do not represent the cumulative average annual day level of operations and flight patterns at SDIA. (do not include propeller operations, arrivals to Runway 9, departures from Runway 9 and, departures from Runway 27.
2/ Calculated CNEL levels include noise energy from modeled RNAV and non-RNAV Runway 27 Jet arrivals from the northwest, east, south and north to Runway 27 for daytime, evening and nighttime hours.

SOURCES: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), OpenStreetMap Contributors, and the GIS User Community, November 2019 (basemap); Ricondo & Associates, Inc., November 2019 (CNEL results); average annual day operations and baseline noise model tracks based on San Diego County Regional Airport Authority's Airport Noise and Operations Management System data between May 2017 and December 2017).

Aircraft Noise Screening – Alternative 1 Model Flight Tracks



Aircraft Noise Screening – Alternative 1 Model Flight Tracks and CNEL Ranges



LEGEND

- Waypoints
- Alternative 1 Noise Model Tracks
 - Northwest Jet Arrivals to KLOMN Waypoint at 6,000 ft MSL
 - Runway 27 RNP Approach for Northwest Jet Arrivals
 - Nighttime Runway 27 RNAV Approach for Northwest Jet Arrivals (11 p.m. to 7 a.m.)
 - FAA ATC Managed Northwest Jet Arrivals
 - Jet Arrivals from the North, East and South
- Alternative 1 CNEL Range
 - >= 65.00 dB
 - 64.99 to 60.00 dB
 - 59.99 to 55.00 dB
 - 54.99 to 50.00 dB
 - 49.99 to 45.00 dB
 - 44.99 to 40.00 dB
 - 39.99 to 35.00 dB
 - 34.99 to 30.00 dB
 - < 30.00 dB

NOTES:

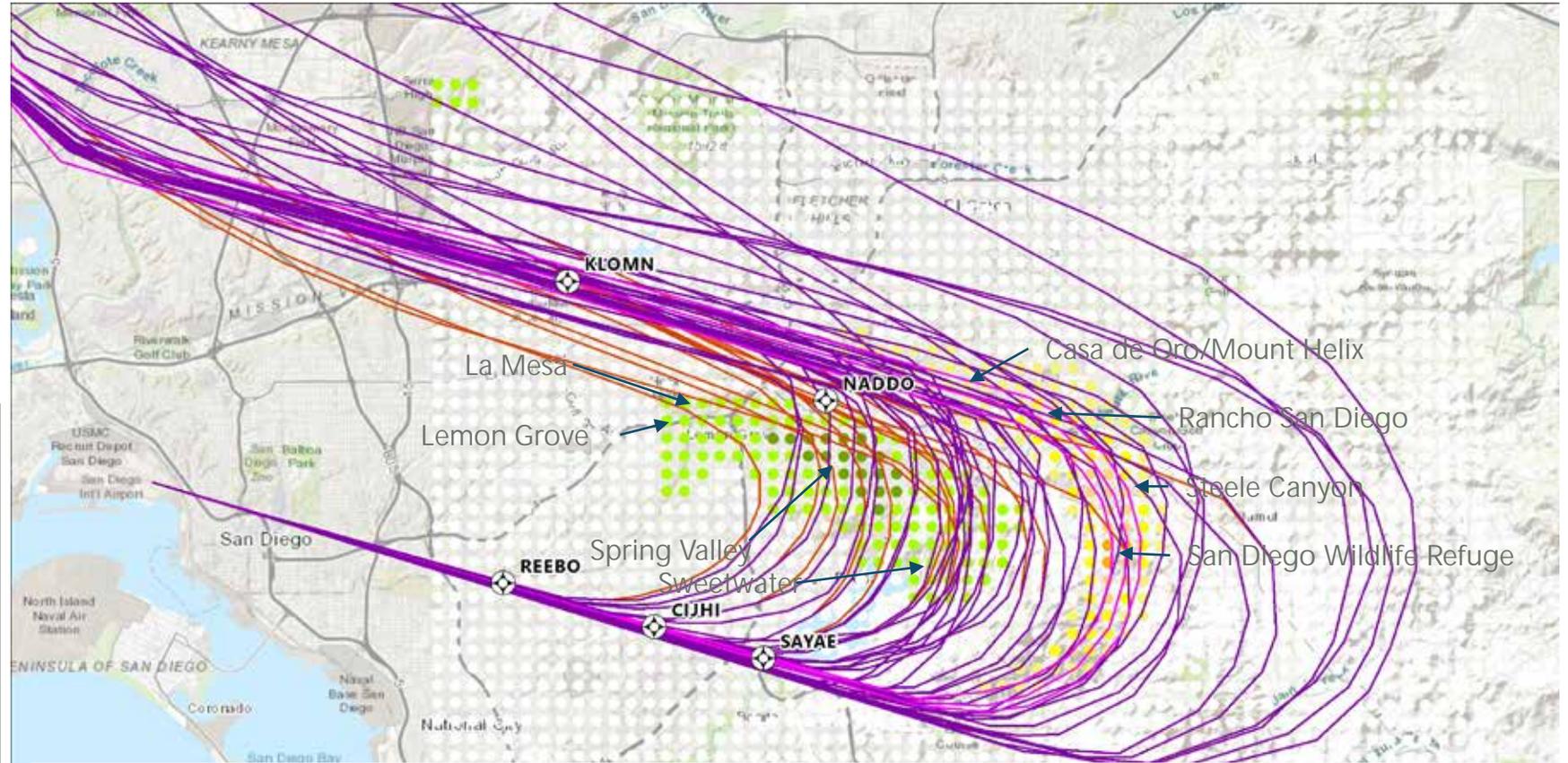
- 1/ Calculated CNEL levels do not represent the cumulative average annual day level of operations and flight patterns at SDIA. (do not include propeller operations, arrivals to Runway 9, departures from Runway 9 and, departures from Runway 27.
- 2/ Calculated CNEL levels include noise energy from modeled RNAV and non-RNAV Runway 27 Jet arrivals from the northwest, east, south and north to Runway 27 for daytime, evening and nighttime hours.

SOURCES: Esri, HERE, Garmin, Intermap, Increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), OpenStreetMap Contributors, and the GIS User Community, November 2019 (basemap); Ricondo & Associates, Inc., November 2019 (CNEL results; alternative noise model flight tracks).

Aircraft Noise Screening - AEDT Alternative 1/Baseline Noise Model Tracks and CNEL Changes

LEGEND

- Waypoints
- Baseline Noise Model Tracks**
- Northwest Jet Arrivals from KLOMN to NADDO Waypoints
- Alternative 1 Noise Model Tracks**
- Northwest Jet Arrivals to KLOMN Waypoint at 6,000 ft MSL
- Nighttime Runway 27 RNAV Approach for Northwest Jet Arrivals (11 p.m. to 7 a.m.)
- CNEL Change Between Baseline and Alternative 1**
- >= 5.0 dB
- 4.0 to 4.9 dB
- 3.0 to 3.9 dB
- 2.0 to 2.9 dB
- 1.0 to 1.9 dB
- 0.9 to -0.9 dB
- 1.0 to -1.9 dB
- 2.0 to -2.9 dB
- 3.0 to -3.9 dB
- 4.0 to -4.9 dB
- <= -5.0 dB



NOTES:
 1/ For illustrative purposes, AEDT noise model tracks for FAA ATC managed jet arrivals from the northwest to Runway 27, jet arrivals from the north, south and east, and jet arrivals on the Runway 27 RNP approach are excluded to more clearly depict only the changes made to Runway 27 jet arrivals from the northwest that caused the CNEL changes.
 2/ Calculated CNEL levels do not represent the cumulative average annual day level of operations and flight patterns at SDIA. (do not include propeller operations, arrivals to Runway 9, departures from Runway 9 and, departures from Runway 27.
 3/ Calculated CNEL levels include noise energy from modeled RNAV and non-RNAV Runway 27 jet arrivals from the northwest, east, south and north to Runway 27 for daytime, evening and nighttime hours.

SOURCES: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), OpenStreetMap Contributors, and the GIS User Community, November 2019 (basemap); Ricondo & Associates, Inc., November 2019 (CNEL results; alternative noise model tracks; average annual day operations and baseline noise model tracks based on San Diego County Regional Airport Authority's Airport Noise and Operations Management System data between May 2017 and December 2017).

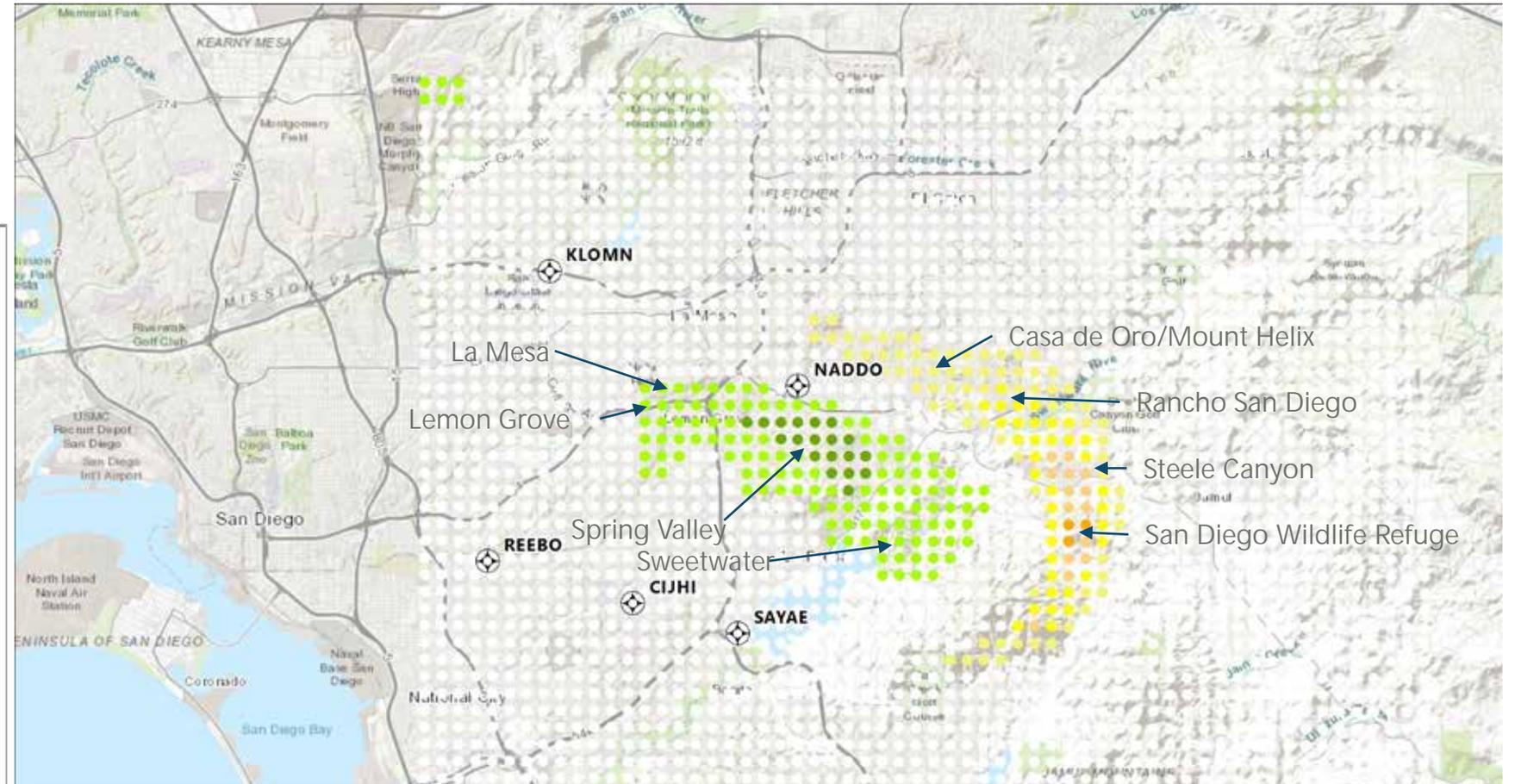
Aircraft Noise Screening – Alternative 1 CNEL Changes

LEGEND

 Waypoints

CNEL Change Between Baseline and Alternative 1

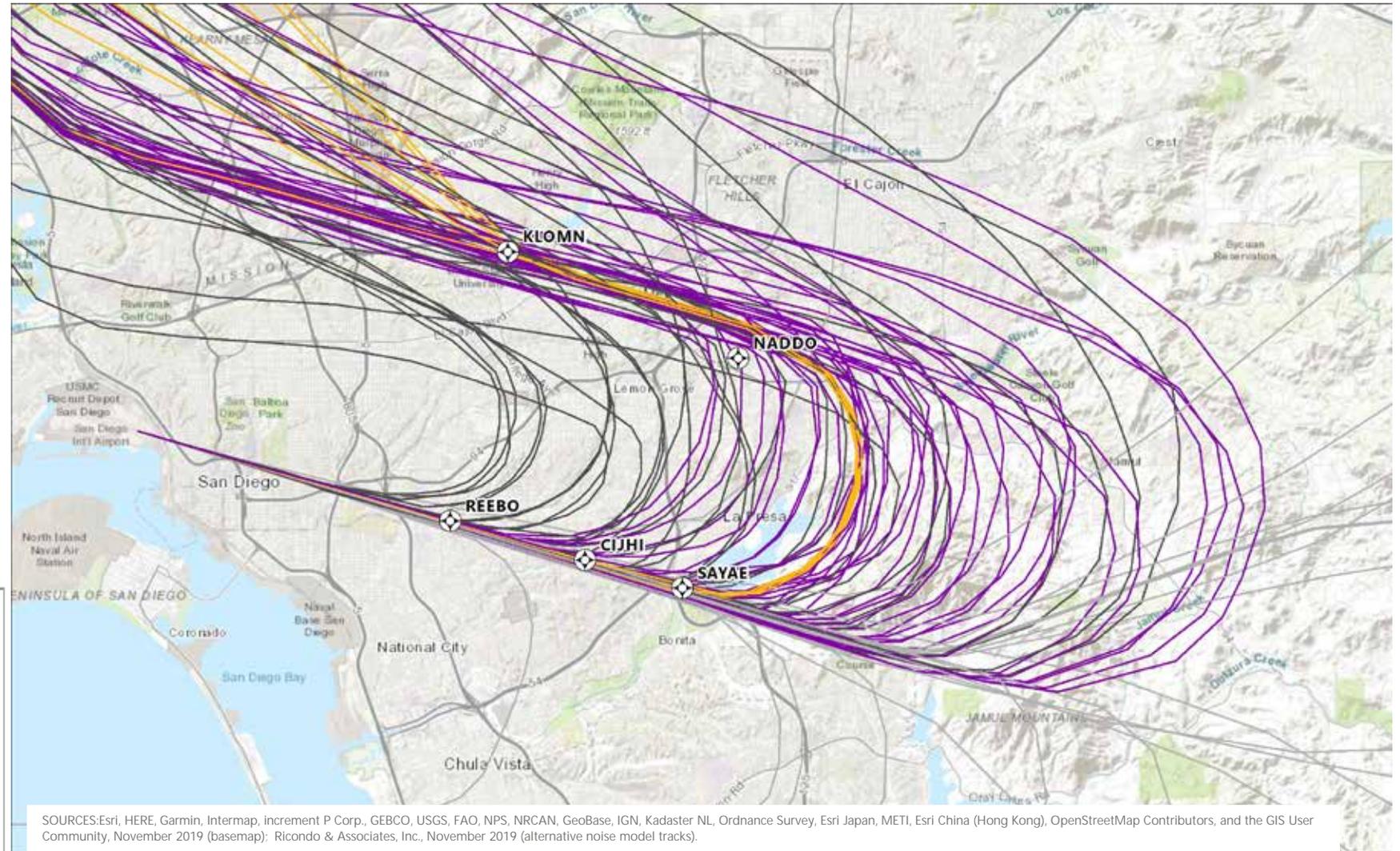
- ≥ 5.0 dB
- 4.0 to 4.9 dB
- 3.0 to 3.9 dB
- 2.0 to 2.9 dB
- 1.0 to 1.9 dB
- 0.9 to -0.9 dB
- -1.0 to -1.9 dB
- -2.0 to -2.9 dB
- -3.0 to -3.9 dB
- -4.0 to -4.9 dB
- ≤ -5.0 dB



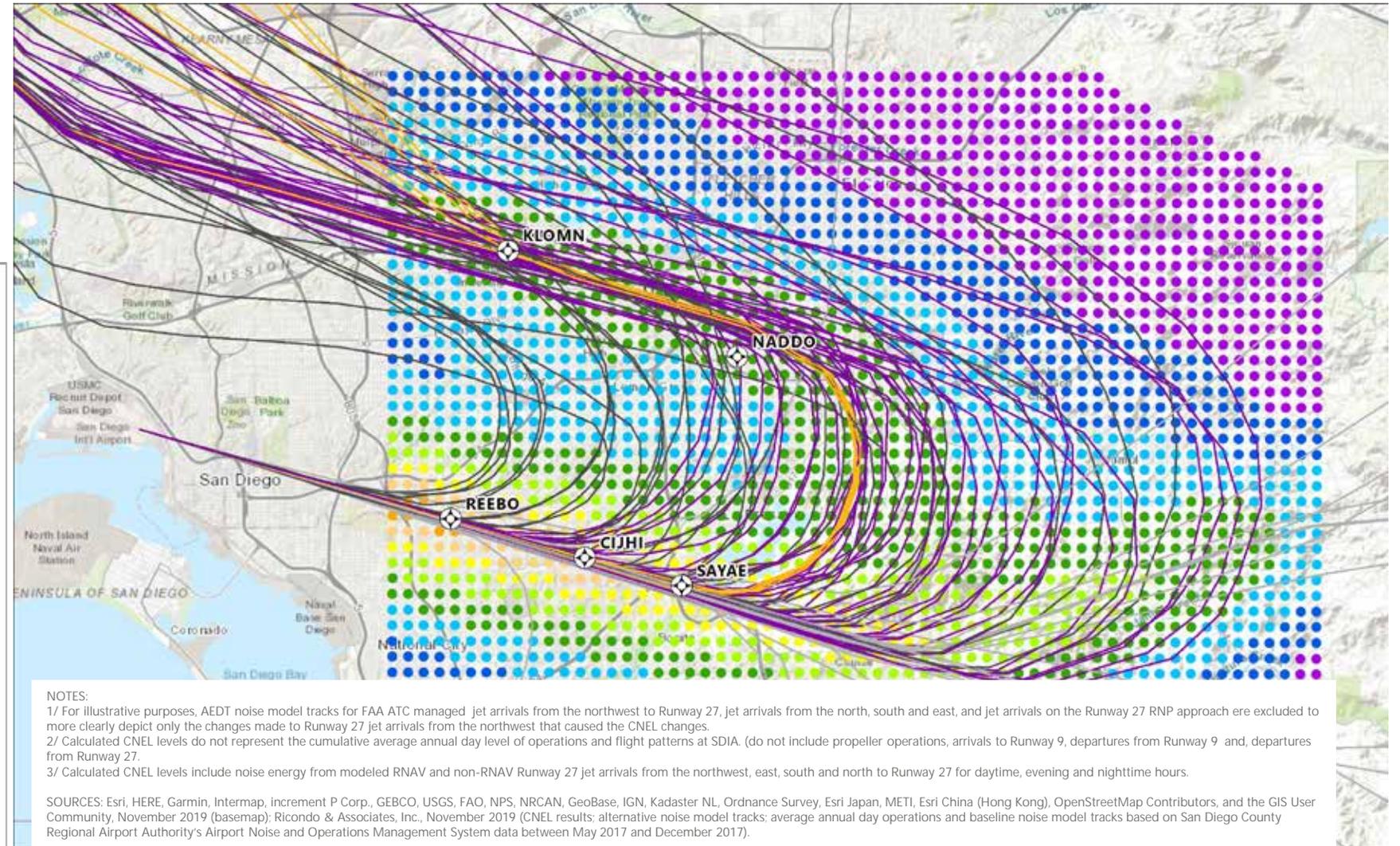
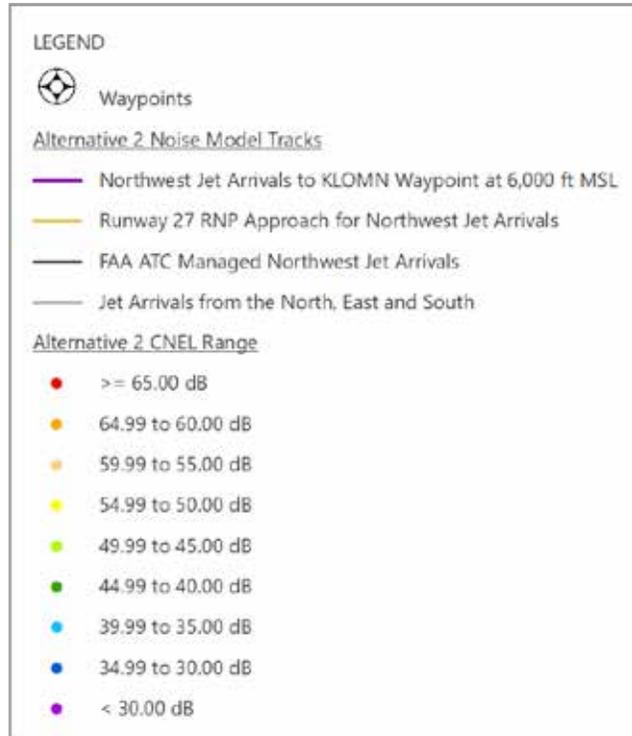
NOTES:
 1/ Calculated CNEL levels do not represent the cumulative average annual day level of operations and flight patterns at SDIA. (do not include propeller operations, arrivals to Runway 9, departures from Runway 9 and, departures from Runway 27.
 2/ Calculated CNEL levels include noise energy from modeled RNAV and non-RNAV Runway 27 jet arrivals from the northwest, east, south and north to Runway 27 for daytime, evening and nighttime hours.

SOURCES: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), OpenStreetMap Contributors, and the GIS User Community, November 2019 (basemap); Ricondo & Associates, Inc., November 2019 (CNEL change results).

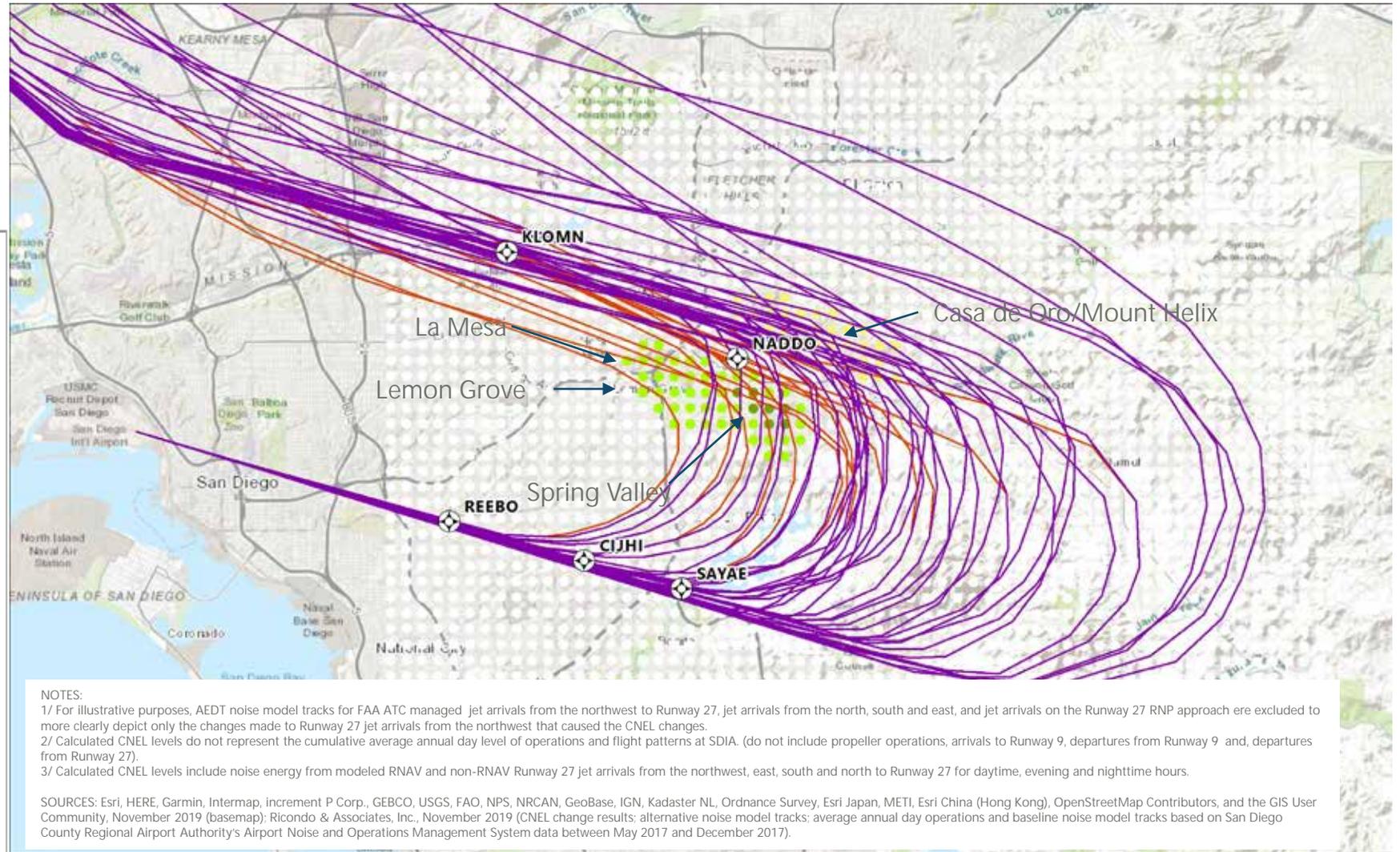
Aircraft Noise Screening – Alternative 2 Model Flight Tracks



Aircraft Noise Screening – Alternative 2 Model Flight Tracks and CNEL Ranges



Aircraft Noise Screening - AEDT Alternative 2/Baseline Noise Model Tracks and CNEL Changes



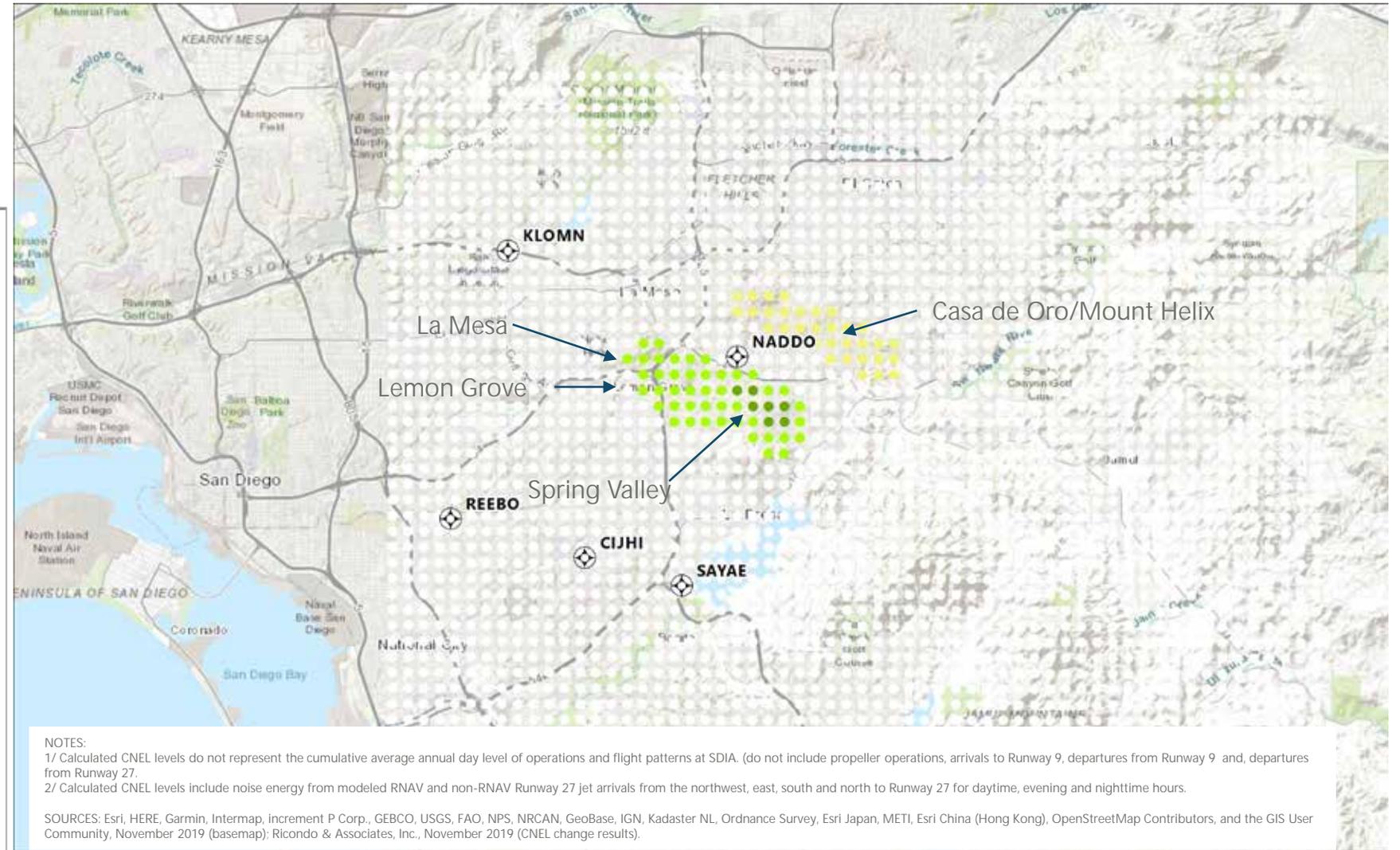
Aircraft Noise Screening – Alternative 2 CNEL Changes

LEGEND

 Waypoints

CNEL Change Between Baseline and Alternative 2

- >= 5.0 dB
- 4.0 to 4.9 dB
- 3.0 to 3.9 dB
- 2.0 to 2.9 dB
- 1.0 to 1.9 dB
- 0.9 to -0.9 dB
- -1.0 to -1.9 dB
- -2.0 to -2.9 dB
- -3.0 to -3.9 dB
- -4.0 to -4.9 dB
- <= -5.0 dB



Recommendations

Recommendations

- § **Alternative 1 (Modify COMIX RNAV STAR and Nighttime RNAV Approach to Runway 27):** Do not implement proposed nighttime RNAV approach procedure due to substantial increase in noise over areas such as Mount Helix, Rancho San Diego and Steele Canyon area

- § **Alternative 2 (Modify COMIX RNAV STAR):**
 - Based on initial parameters, do not recommend due to the increase in noise
 - ECWG feedback on decrease versus increase

- § Encourage Use of COMIX RNAV STAR as designed
 - Keep jet arrivals at 6,000 ft. MSL at KLOMN waypoint while balancing efficiency
 - Evaluate and collaborate with FAA Southern California TRACON

Next Steps

Next Steps

§ Present recommendations to ANAC for consideration

San Diego International Airport East County Flight Procedure Evaluation

ANAC Information Briefing

PRESENTED TO:
SDIA Airport Noise Advisory Committee

PRESENTED BY:
Stephen C. Smith

PRESENTED ON:
February 19, 2020

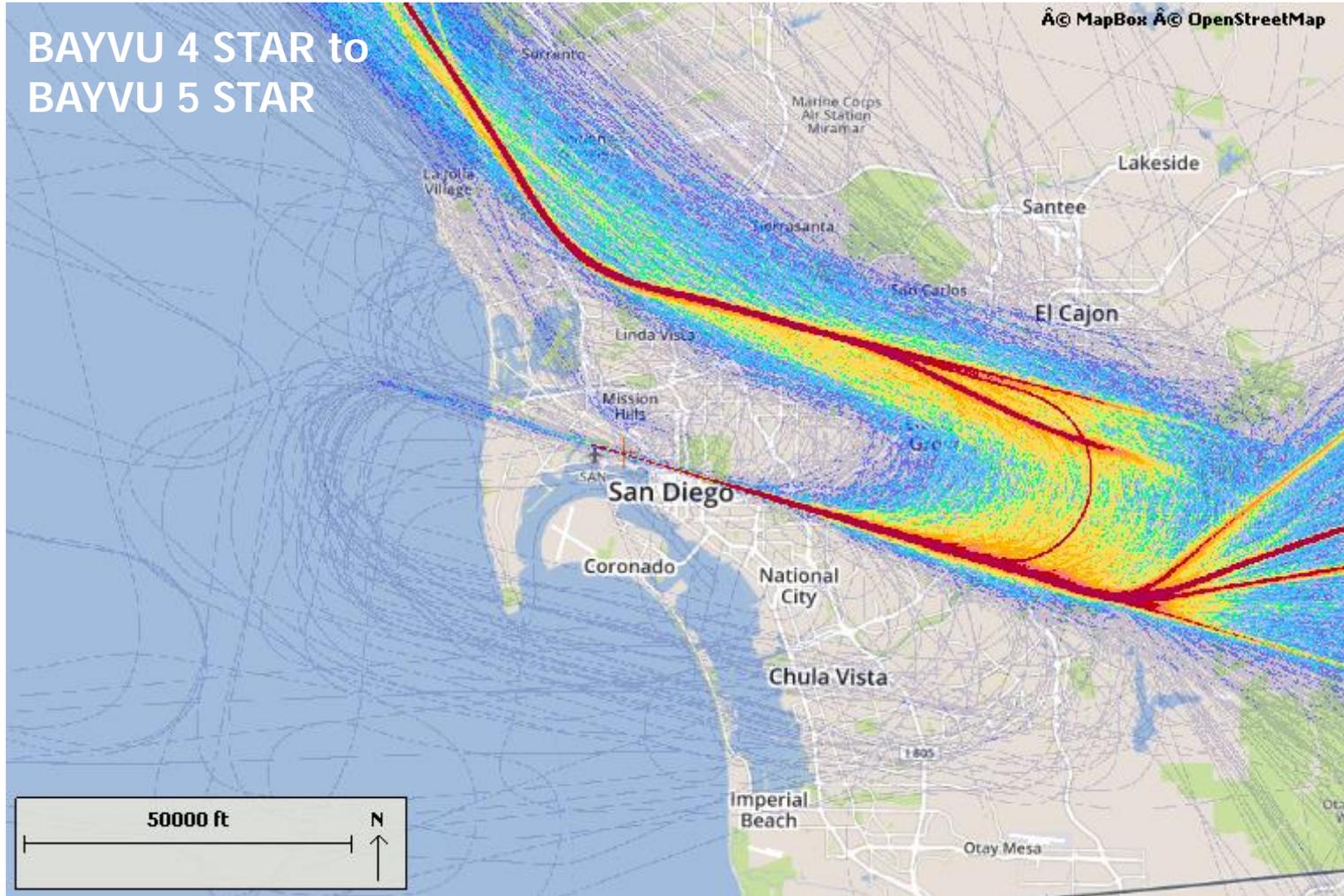
East County Working Group Input

-  Conducted five meetings
-  Provided the Authority and technical consultant input on aircraft noise concerns
-  Reviewed existing and historic flight pattern data to assess and link noise concerns to flight patterns
-  Reviewed and provided feedback to technical consultant on noise abatement flight procedure concepts
-  Provided input to the Authority and the technical consultant on final design recommendations

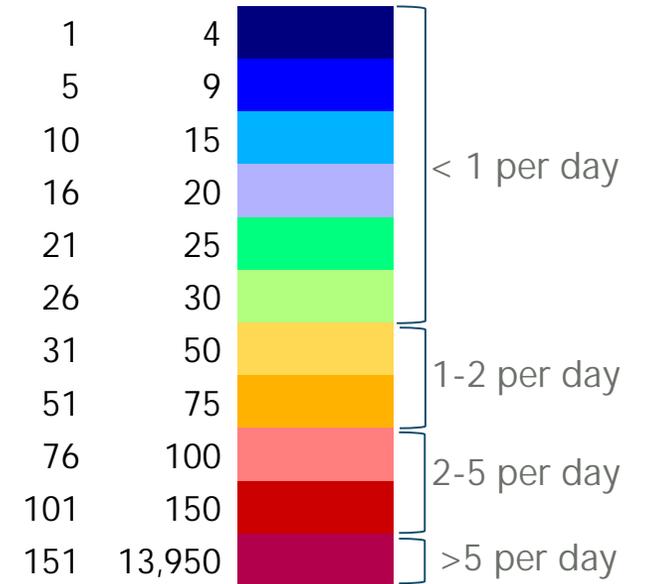
Overview of Working Group Concerns

-  Change in traffic patterns
-  Hearing more noise early morning (6:30 a.m. to 11:00 a.m.) and at night (10:00 p.m. to 11:00 p.m.)
-  Do not increase noise in other areas
-  Low flying aircraft
-  Increase in overflight frequency

Runway 27 Arrivals - Flight Track Density Analysis San Diego Metropolitan Area - November 2016



Track Density Ranges
(count of operations)



SOURCE: San Diego County Regional Airport Authority Airport Noise and Operations Management System, November 2018.

Note: Total Runway 27 arrivals was 7,547 for November 2016

Working Group Objectives

-  Maintain flight path dispersion
-  Raise altitudes over populated areas
-  Turn south to join final approach over less populated areas

Modify COMIX: Keep Arrivals at 6,000 ft up to KLOMN (Remove NADDO Route)



- COMIX STAR Route
- - - 6,000 at NADDO Flight Path
- Runway 27 RNP Approach Route
- ✦ Fly By Waypoint

Intent: Reduce noise levels by raising jet arrival altitude, reduce closer turns to Airport and disperse traffic

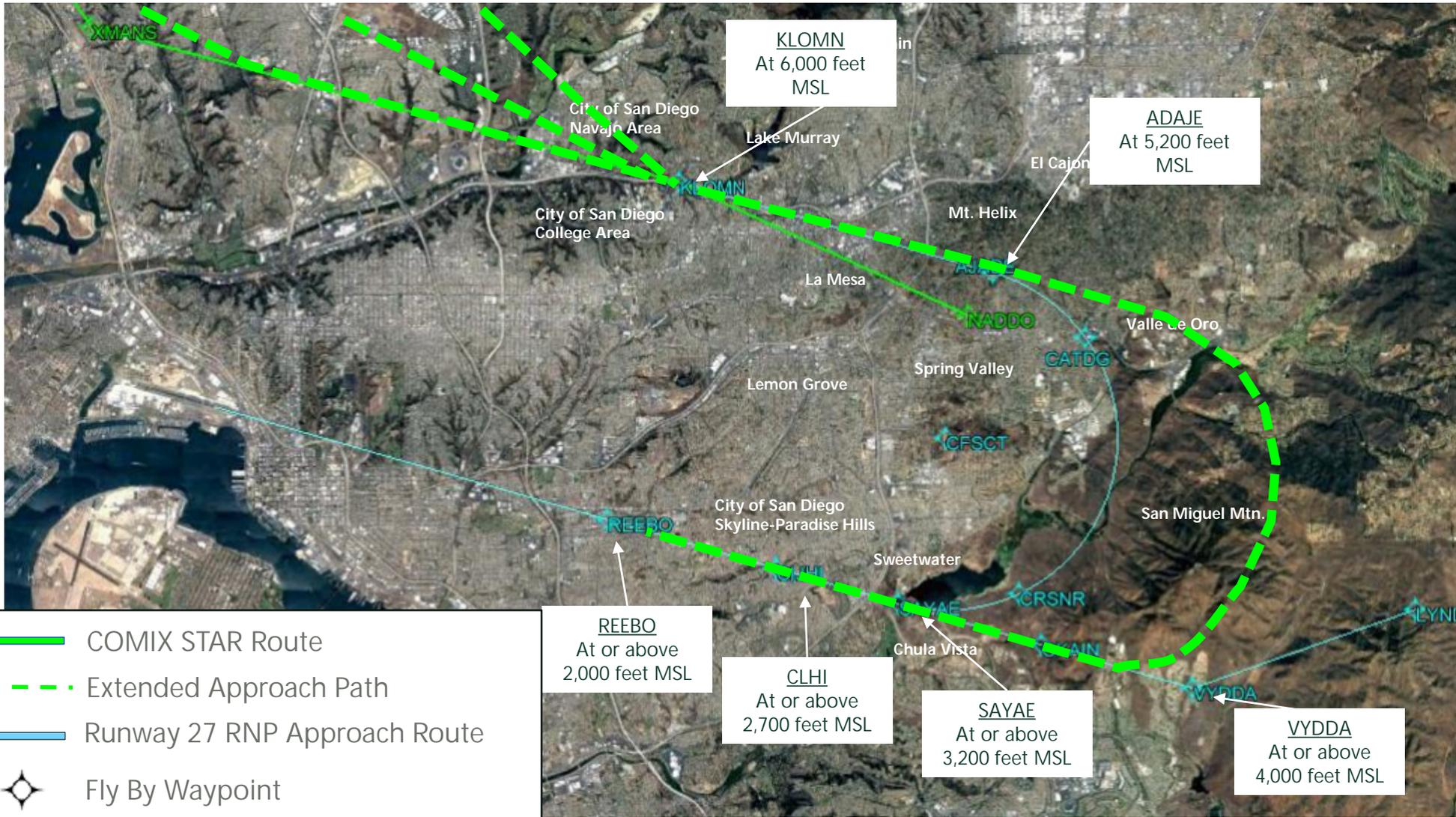
Concept: Remove route to NADDO and keep jet arrival altitude at 6,000 ft. MSL at KLOMN waypoint, thence descend to join final approach

- Objectives:**
1. Raise Altitude on Downwind: Yes
 2. Maintain Dispersion: Yes
 3. Turn South Over Less Populated Areas: No

Potential Limitations: Limits area for FAA ATC to manage traffic to join the final approach. FAA may require the proposed Class B airspace be implemented prior to removing the KLOMN to NADDO route

NOTE: Mean Sea Level (MSL) – height above sea level; Above Ground Level (AGL) – height above the ground
 SOURCE: Google Earth, April 2019 (aerial photograph); Federal Aviation Administration, November 2018 (COMIX STAR route, Runway 27 RNP Approach route, Minimum Vector Area); Ricondo & Associates, Inc., April 2019 (NADDO at 6,000 ft MSL concept).

New RNAV Approach: RNAV Approach from KLOMN to Nearby VYDDA



Intent: Reduce noise levels by raising jet arrival altitude and moving traffic further east

Concept: Keep jet arrival altitude at 6,000 ft. MSL at KLOMN waypoint, thence follow RNAV approach further east

- Objectives:**
1. Raise Altitude on Downwind: Yes
 2. Maintain Dispersion: No
 3. Turn South Over Less Populated Areas: Yes

Potential Limitations: Adds complexity to ATC and increases distance. May be applicable when demand levels are low during nighttime hours (11pm to 7 am). FAA acknowledged possible issues with conflicting traffic.

NOTE: Mean Sea Level (MSL) – height above sea level; Above Ground Level (AGL) – height above the ground
 SOURCE: Google Earth, April 2019 (aerial photograph); Federal Aviation Administration, November 2018 (COMIX STAR route, Runway 27 RNP Approach route); Ricondo & Associates, Inc., July 2019 (proposed extended approach path).

Modeled Scenario

Changes/Additions from Baseline

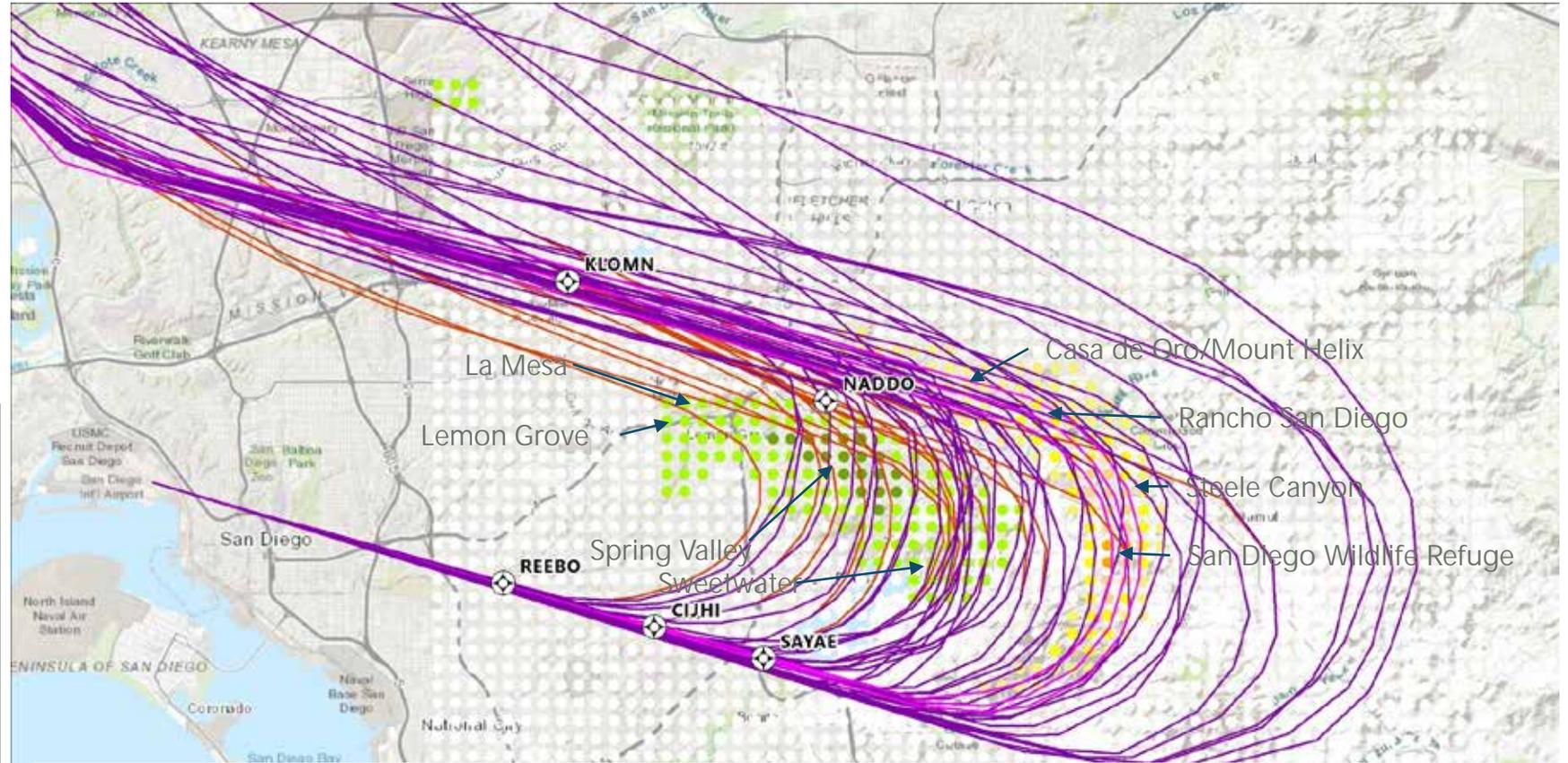
- Modified COMIX RNAV STAR: all jet arrivals that operated between KLOMN and NADDO waypoints under the Baseline
- Nighttime Runway 27 RNAV Approach: all jet arrivals between 11 p.m. to 7 a.m.

Maintained from Baseline

- Runway 27 RNP Approach
- Turns to final prior to or at KLOMN waypoint
- Arrival traffic from the north, east and south

 Scenario does not represent cumulative average annual day noise exposure levels

Aircraft Noise Screening - AEDT Alternative 1/Baseline Noise Model Tracks and CNEL Changes



NOTES:

- 1/ For illustrative purposes, AEDT noise model tracks for FAA ATC managed jet arrivals from the northwest to Runway 27, jet arrivals from the north, south and east, and Jet arrivals on the Runway 27 RNP approach are excluded to more clearly depict only the changes made to Runway 27 jet arrivals from the northwest that caused the CNEL changes.
- 2/ Calculated CNEL levels do not represent the cumulative average annual day level of operations and flight patterns at SDIA. (do not include propeller operations, arrivals to Runway 9, departures from Runway 9 and, departures from Runway 27.
- 3/ Calculated CNEL levels include noise energy from modeled RNAV and non-RNAV Runway 27 jet arrivals from the northwest, east, south and north to Runway 27 for daytime, evening and nighttime hours.

SOURCES: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), OpenStreetMap Contributors, and the GIS User Community, November 2019 (basemap); Ricondo & Associates, Inc., November 2019 (CNEL results; alternative noise model tracks; average annual day operations and baseline noise model tracks based on San Diego County Regional Airport Authority's Airport Noise and Operations Management System data between May 2017 and December 2017).

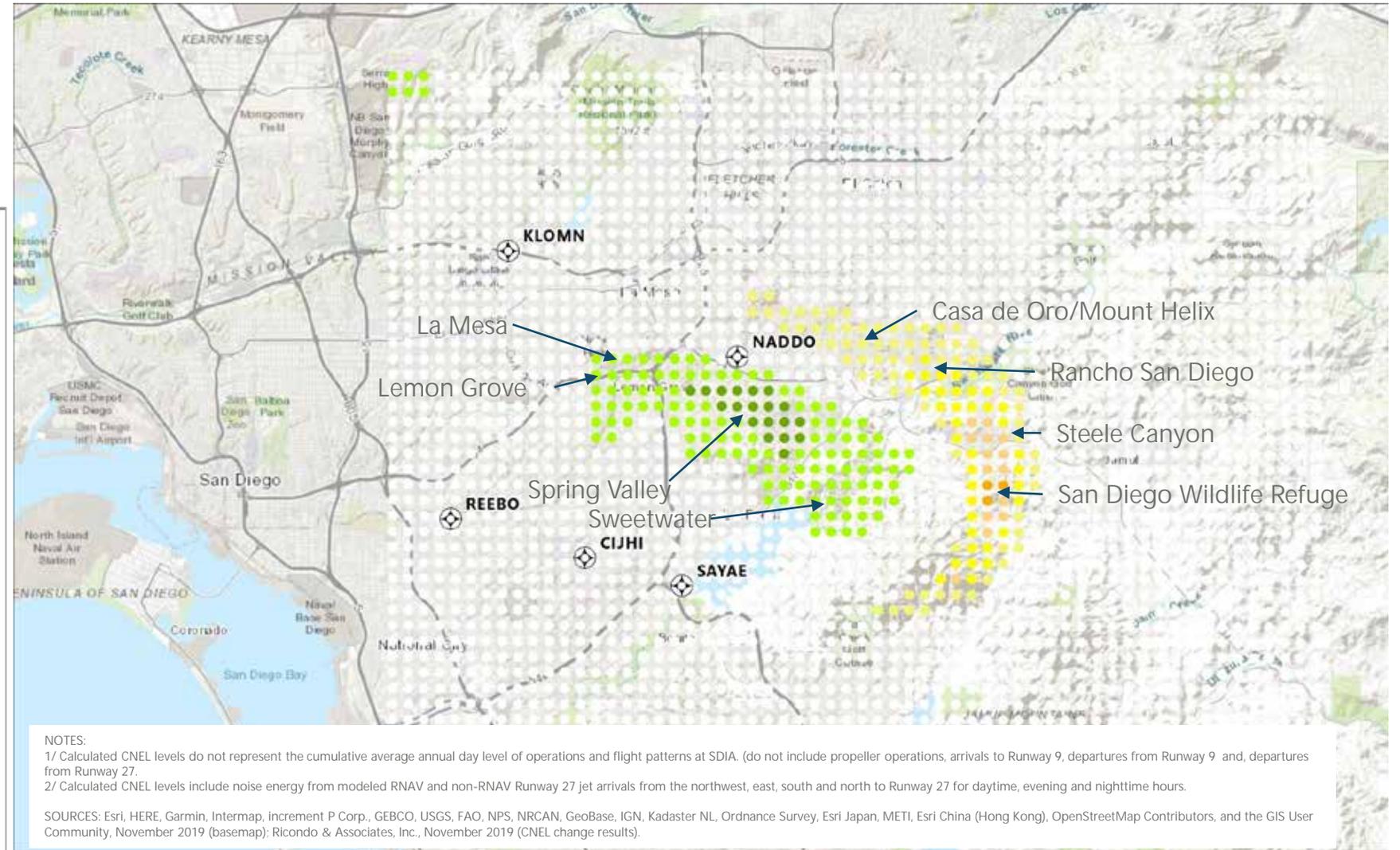
Aircraft Noise Screening – Alternative 1 CNEL Changes

LEGEND

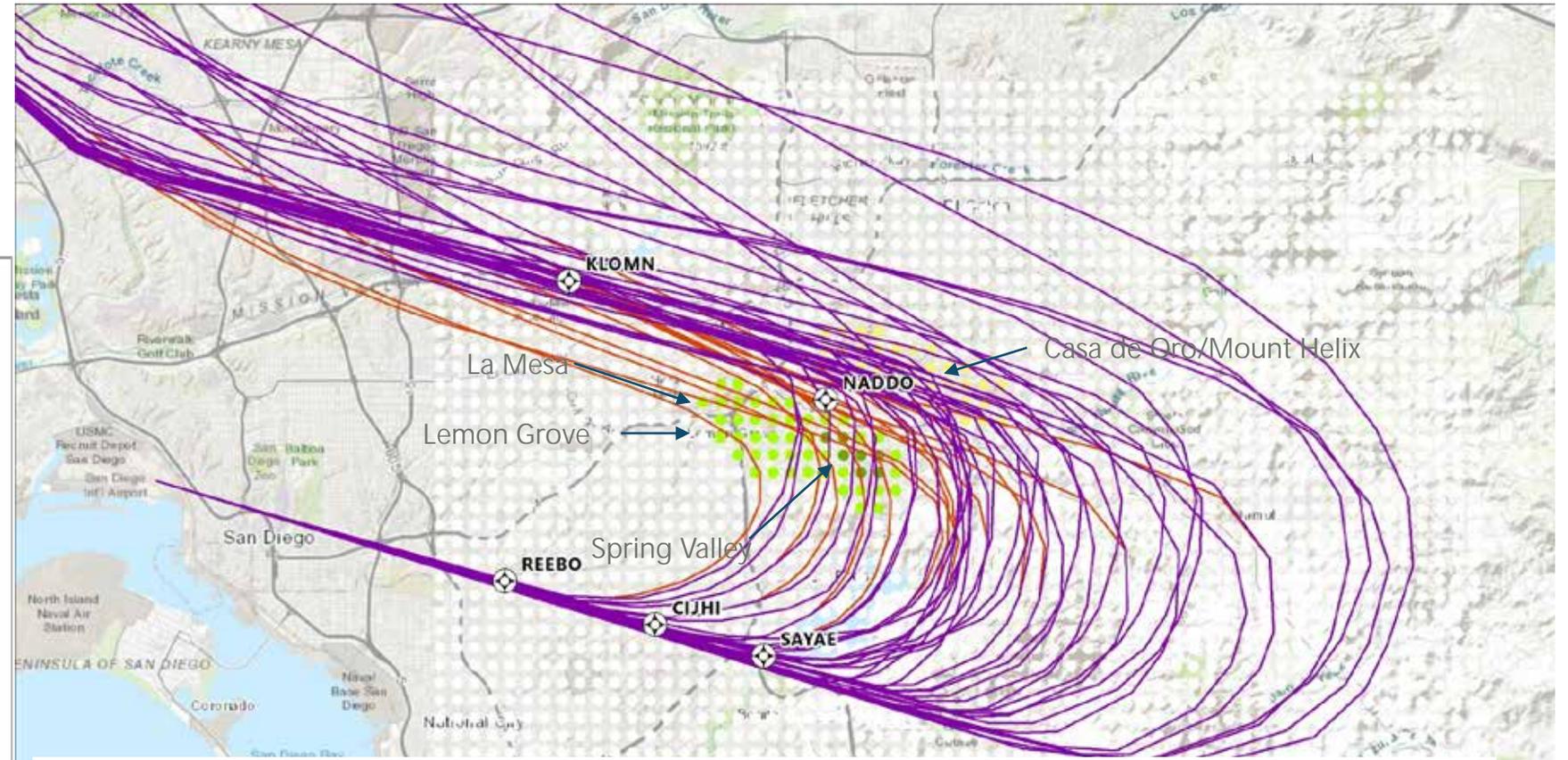
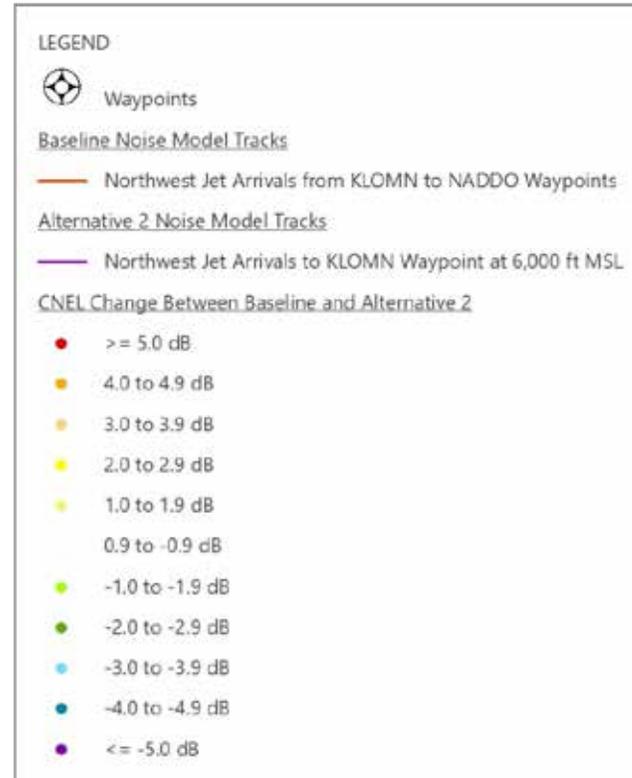
 Waypoints

CNEL Change Between Baseline and Alternative 1

-  ≥ 5.0 dB
-  4.0 to 4.9 dB
-  3.0 to 3.9 dB
-  2.0 to 2.9 dB
-  1.0 to 1.9 dB
-  0.9 to -0.9 dB
-  -1.0 to -1.9 dB
-  -2.0 to -2.9 dB
-  -3.0 to -3.9 dB
-  -4.0 to -4.9 dB
-  ≤ -5.0 dB



Aircraft Noise Screening - AEDT Alternative 2/Baseline Noise Model Tracks and CNEL Changes



NOTES:
 1/ For illustrative purposes, AEDT noise model tracks for FAA ATC managed jet arrivals from the northwest to Runway 27, jet arrivals from the north, south and east, and jet arrivals on the Runway 27 RNP approach are excluded to more clearly depict only the changes made to Runway 27 jet arrivals from the northwest that caused the CNEL changes.
 2/ Calculated CNEL levels do not represent the cumulative average annual day level of operations and flight patterns at SDIA. (do not include propeller operations, arrivals to Runway 9, departures from Runway 9 and, departures from Runway 27).
 3/ Calculated CNEL levels include noise energy from modeled RNAV and non-RNAV Runway 27 jet arrivals from the northwest, east, south and north to Runway 27 for daytime, evening and nighttime hours.

SOURCES: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), OpenStreetMap Contributors, and the GIS User Community, November 2019 (basemap); Ricondo & Associates, Inc., November 2019 (CNEL change results; alternative noise model tracks; average annual day operations and baseline noise model tracks based on San Diego County Regional Airport Authority's Airport Noise and Operations Management System data between May 2017 and December 2017).

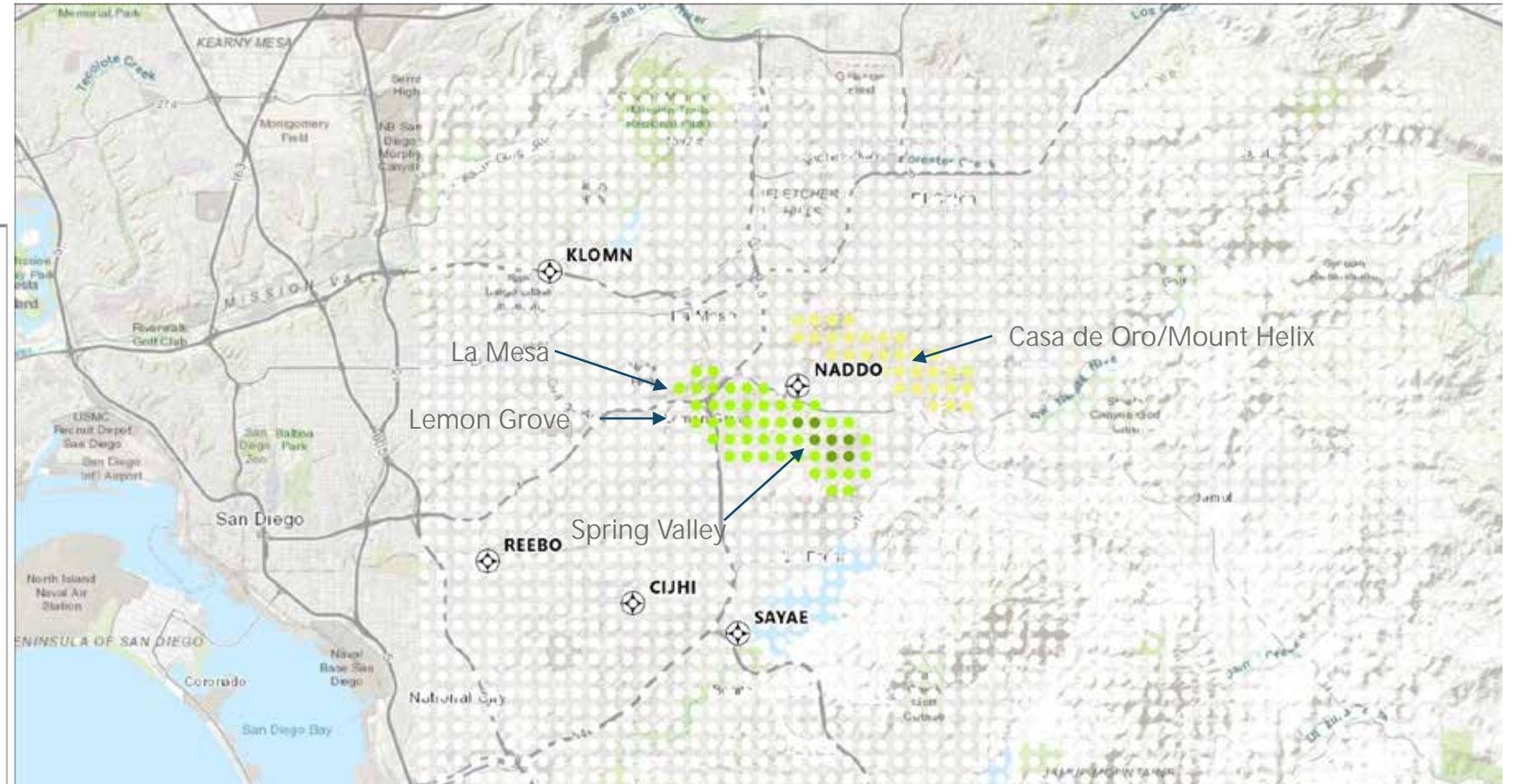
Aircraft Noise Screening – Alternative 2 CNEL Changes

LEGEND

 Waypoints

CNEL Change Between Baseline and Alternative 2

- ≥ 5.0 dB
- 4.0 to 4.9 dB
- 3.0 to 3.9 dB
- 2.0 to 2.9 dB
- 1.0 to 1.9 dB
- 0.9 to -0.9 dB
- -1.0 to -1.9 dB
- -2.0 to -2.9 dB
- -3.0 to -3.9 dB
- -4.0 to -4.9 dB
- ≤ -5.0 dB



NOTES:
 1/ Calculated CNEL levels do not represent the cumulative average annual day level of operations and flight patterns at SDIA. (do not include propeller operations, arrivals to Runway 9, departures from Runway 9 and, departures from Runway 27.
 2/ Calculated CNEL levels include noise energy from modeled RNAV and non-RNAV Runway 27 jet arrivals from the northwest, east, south and north to Runway 27 for daytime, evening and nighttime hours.

SOURCES: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), OpenStreetMap Contributors, and the GIS User Community, November 2019 (basemap); Ricondo & Associates, Inc., November 2019 (CNEL change results).

Recommendations

-  **Alternative 1 (Modify COMIX RNAV STAR and Nighttime RNAV Approach to Runway 27):** Do not implement proposed nighttime RNAV approach procedure due to substantial increase in noise over areas such as Mount Helix, Rancho San Diego and Steele Canyon area

-  **Alternative 2 (Modify COMIX RNAV STAR):**
 - Based on initial parameters, do not recommend due to the increase in noise
 - ECWG feedback: concurred with technical consultant’s recommendation due to potential noise increases

-  Encourage FAA air traffic controllers use COMIX RNAV STAR as designed as much as possible
 - Keep jet arrivals at 6,000 ft. MSL at KLOMN waypoint while balancing efficiency
 - Evaluate and collaborate with FAA Southern California TRACON

Next Steps



Send letter to FAA to:

- Inform FAA of East County noise concerns related to jet arrivals to SDIA
- Encourage FAA to keep aircraft at 6,000 feet Mean Sea Level at or near the KLOMN waypoint as frequently as possible

APPENDIX B EAST COUNTY WORKING GROUP COMMENTS/RESPONSES

Ricondo & Associates, Inc. (Ricondo) considered input provided by ECWG at the meetings and in writing. ECWG written comments on materials presented at Meeting #3 (May 28, 2019) and responses are provided below in this Appendix.

TABLE B-1 (1 OF 3) EAST COUNTY WORKING GROUP MEETING #3 (MAY 28, 2019) INPUT AND CONSULTANT TEAM RESPONSES

DATE	NAME	REP.	CONCEPT	COMMENT #	COMMENT FROM ECWG MEMBER	RESPONSE
6/2/19	Marie Knox	Mount Helix	Maintain 6,000' to NADDO	E-1	Keep arrivals at 6k feet until NADDO waypoint, pages 10,11,12. I think that this is a good suggestion but I also understand that height in altitude will require the flight to go further east in order to be able to make the descent and it will bring southbound traffic closer to traffic from the east, reducing the area to join final approach from 8 to 3 nautical miles. That limited area to manage traffic may be considered infeasible by the FAA. I suspect that this would be a difficult solution for the FAA to accept.	Commenter is correct that limiting the area where FAA can manage traffic may be considered infeasible by the FAA, which led to the reason why the concept was eliminated from further consideration.
			Emphasize Use of Runway 27 RNP Approach	E-2	I need clarification on this suggestion. I understand that RNP is Required Navigation Performance, is this suggestion asking ATC to instruct flights to use the navigation that is programmed in their aircraft as opposed to telling the pilot that he can fly the plane RNAV? If the answer is yes, I have a second question. Steve listed a concern to this suggestion as aircrafts using this approach need the equipment and the pilots must be authorized to fly this approach. My question is, what percentage of the arrivals going over East county have the required equipment and pilots that are authorized to use this approach? The answer will provide information needed to know how much more traffic to expect on this flight path. I think Steve said that it is about 30 percent in a past meeting, but I am asking for verification. This suggestion seems that it could be the most feasible of the suggestions because asking ATC to use the flight path that is programmed into the navigation of some aircraft is a very simple thing to ask, please correct me if I am wrong about this. My understanding about this suggestion is that this is not being used all the time because ATC is giving pilots permission to use RNAV and VFR, which allows flights to turn early, and doing this would keep flights more on a charted flight path, please correct me if that is wrong. I hope we discuss it further at our next meeting	<p>The proposed measure related to the RNAV RNP Z Runway 27 approach emphasized increase use of the procedure compared to current use. The RNAV RNP Z approach could be selected by the pilot as long as the pilot and aircraft are certified to fly the procedure. Selecting the approach typically takes place when the flight plan is filed by the pilot or airline. Increasing the use of the approach would require airlines to file the procedure more frequently in their flight plans and FAA ATC to keep the aircraft on the procedure. Due to the complexity in merging the arrivals from the northwest with those from the east, FAA ATC may not be able to keep every arrival from the northwest on the RNAV RNP Z Runway 27 approach.</p> <p>Based on reviewing the Authority's Airport Noise and Operations Monitoring System (ANOMS) radar flight track data between January 2019 to June 2019, the percentage of all jet arrivals from the northwest that follow along the RNAV RNP Z Runway 27 approach ranged between 19 to 25 percent. Reasons for the low use is most likely a combination of equipage and the complexity with merging arrivals from the northwest with those from the east on the final approach. Application of the visual approach clearance provided by FAA ATC provides the most efficient means to manage the complex merge of traffic on the final approach.</p> <p>The intent of the proposed measure was to increase the use over 50 percent to provide relief to residents who do not live under the flight path. The concern for ECWG is the effects of increasing the frequency of concentrated traffic over residents, which was the reason for eliminating the concept from further consideration.</p>
			Runway 27 RNAV Visual Approach	E-3	I suggested this to Steve last year during open comment on the Citizen Advisory Committee for the Part 150 Update in September 2018. I am attaching a copy of my comments. In October 2018, Steve responded that in November 2016, the FAA added the procedure between KLOMN and NADDO as part of the BAYVU5 amendment. The FAA also added RNP approach to Runway 27, which starts at KLOMM and is similar to the Sweetwater Visual Approach, and which is discussed above in the second suggestion on page 13. It is at this point, I start to suspect that the suggestions on pages 13,14 and 15 are something that could be discussed together. Page 13 is simply asking the FAA to use the Runway 27 RNP Approach that they made in November 2016 as a amendment to BAYVU5. Page 14 is asking ATC to keep RNP on the Runway 27 Sweetwater Visual Approach path that is used for RNAV. I think that this could be a feasible solution, I hope we discuss it further at our next meeting.	<p>The proposed visual approach concept was very similar to the Sweetwater Visual Approach, but included waypoints that may serve as a secondary means of navigation for pilots. The intent was to direct aircraft along a similar path as the RNAV RNP Z Runway 27 approach with some dispersion. The primary means of navigation must be ground-based visual references such as roadways or any features on the ground a pilot can identify in the air. The features must also be identifiable at night if the procedure is intended for nighttime use. The procedures depicted on pages 13, 14 and 15 were discussed at the July 25, 2019 ECWG meeting. Based on input provided by a ECWG member who is an experienced airline pilot, a visual approach is not preferred over a more predictable procedure aided by current navigation technology. Due to the most likely limited use of the procedure, the visual approach was eliminated from further consideration. As a result of the discussion, two procedure concepts were identified at the July 5, 2019 meeting:</p> <ul style="list-style-type: none"> Remove the KLOMN to NADDO route from the COMIX TWO RNAV Standard Terminal Arrival Route (STAR) – remove the concentration of traffic over communities between KLOMN and NADDO waypoints and promote dispersion after the KLOMN waypoint Design an RNAV Runway 27 approach for low demand periods (nighttime hours) to direct aircraft further east and turn south to join the final approach over less populated areas
			RNAV Runway Transition to Final Approach	E-4	Develop RNAV runway transition to Runway 27 final approach, page 15, is develop a RNAV runway transition that mimics Runway 27 RNP. This also seems like it could be a feasible solution and I would like for us to discuss these 3 suggestions further at our July meeting.	The concept referenced by the commenter was intended to provide an RNAV approach that is similar to the RNAV RNP Z Runway 27 approach that did not require RNP-required equipment on an aircraft and certification for pilots to fly the approach. The concept was intended to increase the frequency of aircraft flying along the existing RNAV RNP Z Runway 27 approach path after the KLOMN waypoint. The concept was discussed on July 25, 2019 and due to the concentration effect over communities under the path, the concept was eliminated from further consideration.
			Remove NADDO in COMIX STAR	E-5	I have researched Class B airspace for work on the Citizen Advisory Committee and spoke to Steve about this in August 2018, I am attaching the letter. It is my understanding that Class B airspace has not been changed in San Diego since 1979 and only because of the terrible collision between a commercial jet into a private plane, colliding midair over North Park during their final approach to land in 1978. I was not able to find the exact date of the last Class B change in San Diego, but I was told this by a retired ATC. If it has been 40 years since Class B airspace has been changed, I do not think the FAA will change Class B airspace to accommodate air traffic noise concerns in East county or San Diego. Also, this idea was not included in the Part 150 Update because of the length of time the process will take for the FAA to complete a Class B redesign in San Diego.	The FAA has been evaluating Class B airspace changes for the past two years. Their effort is independent from the evaluation conducted for the ECWG. The proposed changes FAA is currently considering can affect FAA's evaluation on proposed procedure concepts and was shared with ECWG for informational purposes. The route between KLOMN and NADDO waypoints was developed to resolve Class B excursions. If FAA changes Class B airspace that happens to increase the area under control around the KLOMN waypoint, the need to maintain the route between KLOMN and NADDO may no longer be required. This would assist in supporting the case that the route is no longer required and should be removed from the COMIX RNAV STAR.

TABLE B-1 (2 OF 3) EAST COUNTY WORKING GROUP MEETING #3 (MAY 28, 2019) INPUT AND CONSULTANT TEAM RESPONSES

DATE	NAME	REP.	CONCEPT	COMMENT #	COMMENT FROM ECWG MEMBER	RESPONSE
			General	E-6	Finally, I would like to ask that a list be made of all East County Working Group members with their name, e-mail address and represented neighborhoods and that the list be shared within the committee and posted on the SDIA website, just as the list of Citizen Advisory Committee names, e-mail addresses and neighborhoods are listed online. I was confused this week at our meeting because there were new faces and voices on the phone, which I did not recognize from previous meetings and I thought a list would be most helpful. I also noticed and spoke with 2 La Mesa residents who attended the Tuesday meeting and I feel a list would be helpful for other La Mesa residents to get in touch with members of the East County Working Group about our progress and next meetings, etc.	With regards to giving out email and contact information for members of the group, to maintain privacy the Authority does not intend to release that information. As a member of the ECWG, the commenter was recommended by Authority staff on June 3, 2019 to reach out to members at the meeting for contact information.
			General	E-7	I have been going over the ANAC sub-committee recommendations to the Part 150 Update and I see that Recommendation 16, addressing arrivals is not going to be included in the final recommendations. If arrivals over La Jolla cannot be remedied for noise, I hope that we will be able to find something that will pass scrutiny for East county arrivals. If we do, when do you think that the FAA would implement any changes for East county? Are your plans to submit suggestions from the East County Working Group to the FAA, before or during the next Part 150 Update, which would be in approximately 4-5 years or longer?	<p>Concepts presented at the July 25, 2019 ECWG meeting did not appear to have major design criteria or aircraft descent performance concerns that were identified for the La Jolla procedure design concepts. Noise screening will be conducted to confirm the proposed designs would not cause a notable increase in aircraft noise.</p> <p>In previous conversations with the FAA, the earliest FAA has indicated implementation would take was two years. After a procedure request is filed using the Instrument Flight Procedure Gateway, FAA will evaluate the request to determine if it is feasible and is consistent with the FAA's mission and goals. If so, the FAA will determine where among all other proposed procedure changes the request is ranked in the implementation schedule. Currently, the FAA had several thousand procedures scheduled for implementation. Therefore, implementation may take between two to five years. The final results of the East County evaluation will be reviewed by the Authority and shared with the Airport Noise Advisory Committee (ANAC). Any design concepts recommended to proceed forward to next steps would proceed forward independent of the Code of Federal Regulation (CFR) Part 150 Study Update.</p>
6/3/19	Raleigh Bouffard		General	E-8	Desirable traits of North arrival operations are track dispersion, higher altitude down winds over populated areas and cross wind turns over less populated areas. Limitations include airspace limits, controller flexibility to slot North arrivals with East arrivals and commercial airliner operational limitations.	The commenter is correct in the overall objectives established by ECWG regarding the desirable traits of flight patterns for arrivals from the northwest.
			Visual Approach	E-9	I would first like to address commercial airliner operational limitations. I believe that there was a mistaken impression left with the group that commercial airline operators are limited in their ability to perform RNAV arrivals/approaches and that cockpit crews are resistant to performing them thus preferring a visual arrival. This is simply not the case. All major operators routinely fly RNAV/VNAV arrivals to an ILS/LOC or RNP approaches throughout the US and the world. The beautiful thing about a well-designed RNAV profile to an approach is that it reduces the workload for the cockpit crew because the pilot gets constant feedback from his/her instruments on where they are relative to the desired flight profile making it easier to manage the energy state of the aircraft. When a pilot accepts a visual approach, things change. A visual approach requires him/her to take on the responsibility of traffic separation, terrain clearance and staying within the confines of the class B airspace all the while calculating how best to get on the proper descent profile. Visual approaches are notorious within the industry for unstable approaches and, when accepted at night, terrain conflicts. That is why when cleared for a visual most pilots will still try to join and fly the profile of an underlying instrument approach, i.e., during a visual to SAN RWY 27 the pilot at a minimum would strive to arrive at REEBO at 2000 feet, per the underlying published LOC RWY 27 approach. If turned further East the pilot would honor the altitude restrictions of CIJHI, OKAIN etc. thus insuring terrain clearance and not busting the floor of the class B. In a nutshell RNAVs are often easier than visuals and you will get no complaints from pilots if they are told to fly a published RNAV arrival.	Comment related to airline operators ability to perform RNAV arrivals/approaches and reduction in pilot workload as a result of operating an RNAV approach compared to a visual approach is noted. The commenter's concerns related to visual approaches and likelihood for unstable approaches was critical feedback in considering the feasibility of the visual approach concept. Due to the increased workload and increased likelihood of unstable approaches, the visual approach concept was eliminated.
			RNAV Runway Transition to Final Approach	E-10	<p>Approach controller flexibility to slot aircraft from the North and East is one of the biggest factors in arrival aircraft management. It is understood that during peak arrival rates controllers want the ability to vector aircraft and use the airspace within the confines of the class B to accomplish that mission. However, it is during the non peak periods, when slotting is not required, that aircraft are still brought in on a 5000-foot downwind and vectored to a final or cleared for a visual that noise mitigation does not seem to be a consideration. It is with this in mind that the following recommendations are made:</p> <p>Design a new RNAV to LOC RWY 27 or to RNAV (GPS) Y that starts at KLOMN and joins the approach at VYDDA. Minimum altitude at AJADE would be 6000 feet. This would raise the downwind to 6000 feet (vice the current 5000 feet) over a heavily populated area and create a descending crosswind turn over a sparsely populated area. I believe this would be the quietest approach for North arrivals and could be done when slotting is not a factor.</p>	Ricondo designed two version of the RNAV approach procedure proposed by the commenter and reviewed the results with ECWG on July 25, 2019. The first version starts at the KLOMN waypoint and joins the final approach at the VYDDA waypoint. Version 1 did not meet FAA Performance-Based Navigation (PBN) design criteria requirements. Version 2 was designed to meet criteria. The procedure joins the final approach near VYDAA, but not at VYDAA waypoint as proposed by the commenter. Ricondo indicated the procedure does conflict with the approach procedure to Montgomery Field and the LUCKI RNAV STAR. Due to the low demand level between 11:00 p.m., and 7:00 a.m., mitigating the procedure conflicts may be possible; therefore, Ricondo recommended proceeding forward with evaluating Version 2.

TABLE B-1 (3 OF 3) EAST COUNTY WORKING GROUP MEETING #3 (MAY 28, 2019) INPUT AND CONSULTANT TEAM RESPONSES

DATE	NAME	REP.	CONCEPT	COMMENT #	COMMENT FROM ECWG MEMBER	RESPONSE
			Descend below 6,000 ft East of KLOMN	E-11	The second most desirable arrival would be for aircraft not to descend from 6000 feet to 5000ft until East of KLOMN with controlled vectors after KLOMN. This could be used when a controller knows he doesn't need a tight turn to slot inbounds from the North but needs them to turn before the previously described new RNAV approach. It would still be a mostly descending profile from KLOMN and therefore quieter than the level 5000ft downwind to a turn. I don't know how easy it would be for a controller to make the determination described but if it is doable it would mitigate aircraft noise.	The commenter's proposed concept is similar to the modified COMIX RNAV STAR design, which eliminates the leg between KLOMN and NADDO waypoints and calls for a 093-degree heading after the KLOMN waypoint and expect radar vectors from FAA ATC. The current COMIX RNAV STAR requires aircraft on the procedure to be at 6,000 feet Mean Sea Level (MSL) at the KLOMN waypoint, which would remain the same in the proposed modified concept.
			Visual Approach	E-12	The least desirable from a noise mitigation point of view would be the current 5000ft level downwind to a vector or visual. This presumably gives approach control the most flexibility within the confines of the current class B and would be used during peak arrival rates.	Comment noted.
			Combined Concepts	E-13	Assuming that the new RNAV arrival above can be designed and noise mitigation becomes part of the arrival aircraft management plan all three of the arrivals described above would be used. In my estimation this would provide the added benefit of greater arrival track dispersion and an overall reduction in aircraft noise complaints.	Comment noted.
			General	E-14	I would like to add one final note. It was brought up that flight crews want to know in advance what approach to expect so as to properly plan for the arrival. This is indeed true. In the three arrivals described above this can be accomplished with a fairly routine ATIS message commonly seen at other airports. An example would be, "expect RNAV LOC RWY 27 or vectors to a visual will be provided" or in the case of non-visual conditions "expect RNAV LOC RWY 27 or vectors to LOC RWY 27 will be provided". In either case the pilot will set up to fly the RNAV LOC RWY 27 but if approach control needs to turn him/her earlier, the he under lying approach (LOC RWY 27) is already set up so that the pilot can see the fixes on the cockpit display, the LOC frequency is dialed in and a short cut is easily handled.	Comment noted.

SOURCE: Ricondo & Associates, Inc., October 2018.

APPENDIX C EAST COUNTY PROCEDURE DESIGN SHEET

The following are the procedure designs sheets for each concept. The design sheets provide a description of the procedure designs, evaluation results and recommendations for each design phase.

TABLE OF CONTENTS

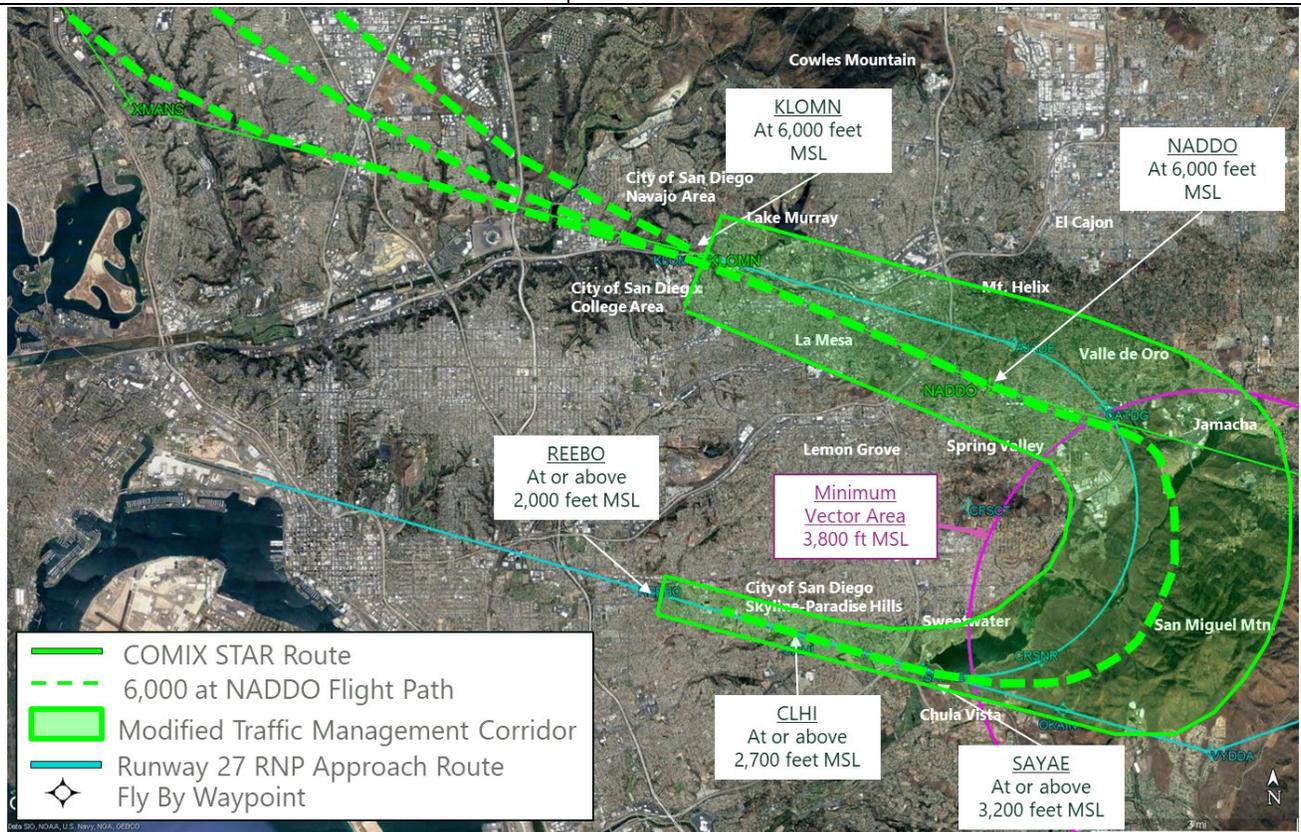
Appendix C	Design Concept Descriptions	C-1
C.1	Preliminary Draft Design Concept Phase Alternatives	C-1
C.1.1	COMIX RNAV STAR - Keep All Jet Arrivals at 6,000 ft up to NADDO Waypoint	C-1
C.1.2	COMIX RNAV STAR Amendment – Remove Route between KLOMN to NADDO Waypoints	C-3
C.1.3	Runway 27 RNP Approach – Increase Use	C-5
C.1.4	Runway 27 RNAV Visual Approach.....	C-7
C.1.5	Runway 27 RNAV Approach (Overlay of Runway 27 RNP Approach)	C-9
C.2	Draft Design Concept Phase Alternatives	C-11
C.2.1	Modification to COMIX RNAV STAR – Remove Route between KLOMN and NADDO Waypoint and Keep Jet Arrivals at 6,000 ft. MSL at KLOMN	C-11
C.2.2	Runway 27 Approach – Extend Approach East and Join at VYDAA Waypoint (11:00 p.m. to 7:00 a.m.).....	C-13
C.2.3	Runway 27 Approach – Extend Approach East and Join Near VYDAA Waypoint (11:00 p.m. to 7:00 a.m.).....	C-15
C.3	Final Design Concept Phase Alternatives.....	C-17
C.3.1	Modification to COMIX RNAV STAR – Remove Route Between KLOMN and NADDO Waypoint and Keep Jet Arrivals at 6,000 ft. MSL at KLOMN	C-17
C.3.2	Runway 27 Approach – Extend Approach East and Join Near VYDAA waypoint (11:00 p.m. to 7:00 a.m.).....	C-19

APPENDIX C DESIGN CONCEPT DESCRIPTIONS

C.1 PRELIMINARY DRAFT DESIGN CONCEPT PHASE ALTERNATIVES

C.1.1 COMIX RNAV STAR - KEEP ALL JET ARRIVALS AT 6,000 FT UP TO NADDO WAYPOINT

ECWG RECOMMENDATION:	COMIX RNAV STAR – KEEP ALL JET ARRIVALS AT 6,000 FT UP TO NADDO
Runway Configuration:	Runway 27 Arrivals and Departure
Operational Mode:	Runway 27 Day and Nighttime Operations
Version:	Preliminary Draft
Description:	This alternative involves keeping all jet arrivals on the existing COMIX Area Navigation (RNAV) Standard Terminal Arrival Route (STAR) at 6,000 Mean Sea Level (MSL) up to the NADDO waypoint.
Intent:	Keep all jet arrivals at 6,000 ft. MSL to the NADDO waypoint
Version Notes:	Version 1 (initial version of the alternative)



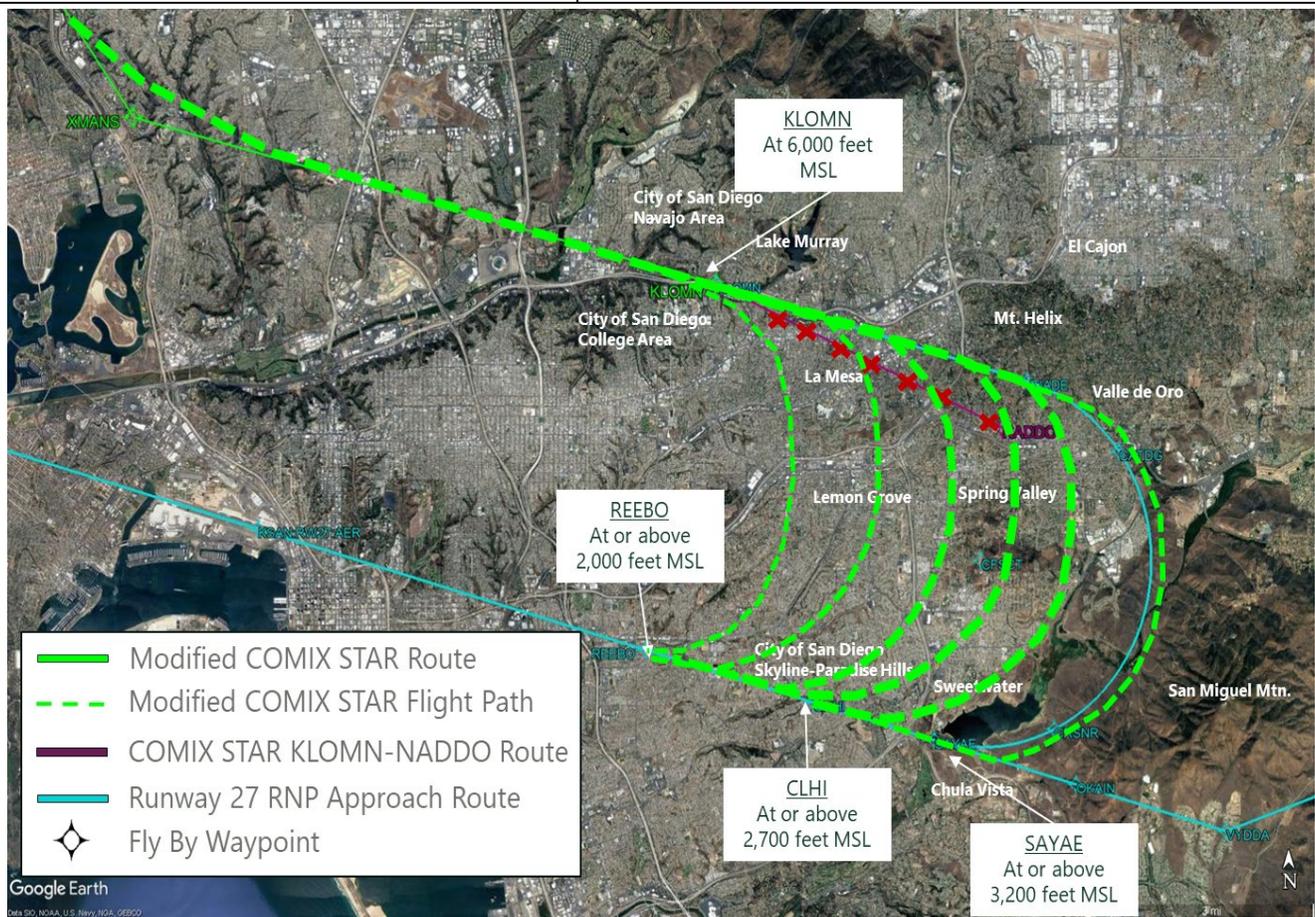
Graphic Source: Google Earth, April 2019 (aerial photograph); Federal Aviation Administration, November 2018 (COMIX STAR route, Runway 27 RNP Approach route, Minimum Vector Area); Ricondo & Associates, Inc., April 2019 (6,000 ft. at NADDO flight path; modified traffic management corridor).

Graphic Reference: Presented to East County Working Group Meeting #1 on December 6, 2018 and Meeting #3 on May 28, 2019

Screening Findings:					
<input type="checkbox"/> Pass to Draft	<input type="checkbox"/> Pass to Final	<input type="checkbox"/> Pass to Next Steps			
<input type="checkbox"/> Pass to Part 150	<input checked="" type="checkbox"/> Eliminate				
Reason for Elimination:					
<input type="checkbox"/> 65 DNL Influence	<input checked="" type="checkbox"/> ECWG Objective	<input type="checkbox"/> Charting Requirements	<input type="checkbox"/> Design Criteria	<input type="checkbox"/> Safety	
<input type="checkbox"/> Existing Compliance	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Noise Impact	<input type="checkbox"/> Operational Feasibility		
Design Notes:					
<ul style="list-style-type: none"> ▪ Predicated on the existing COMIX TWO RNAV STAR procedure ▪ The design involves increased use of the COMIX TWO RNAV STAR procedure to stay at or above 6,000 ft. MSL between KLOMN and NADDO waypoints. ▪ Keeping all jet arrivals at or above 6,000 ft. MSL reduces flexibility of ATC to space and sequence aircraft into the final approach airspace as compared to existing operations ▪ Concept would require aircraft to proceed further east after NADDO waypoint to get the necessary flight path distance needed to descend and slow down prior to joining the final approach. ▪ Aircraft may be too high to sequence into the final approach which can increase likelihood of missed approaches ▪ Concentrates all traffic on the KLOMN to NADDO leg of the RNAV procedure, which is contrary to the East County Working Group (ECWG) objectives. 					
Summary Narrative:					
<p>This design would keep aircraft higher than today but would affect efficient management of aircraft. Some aircraft may have difficulty transitioning from 6,000 feet at NADDO to the final approach and the glideslope intercept due to excessive altitude. The change will result in a continued increase in concentrated flights operating on the existing route between KLOMN and NADDO waypoints. The ECWG preference was to provide dispersion after KLOMN waypoint. An amendment to the COMIX TWO RNAV STAR to remove the leg between KLOMN and NADDO and keep aircraft at 6,000 ft. MSL over KLOMN was preferred by ECWG. Therefore, this alternative was eliminated.</p>					

C.1.2 COMIX RNAV STAR AMENDMENT – REMOVE ROUTE BETWEEN KLOMN TO NADDO WAYPOINTS

ECWG RECOMMENDATION:	COMIX RNAV STAR AMENDMENT – REMOVE ROUTE BETWEEN KLOMN TO NADDO WAYPOINTS
Runway Configuration:	Runway 27 Arrivals and Departure
Operational Mode:	Runway 27 Day and Nighttime Operations
Version:	Preliminary Draft
Description:	This alternative involves amending the existing COMIX RNAV STAR to remove the leg from KLOMN to NADDO
Intent:	Remove the leg between KLOMN and NADDO to promote dispersion, then use of the RNAV Required Navigation Performance (RNP) Z Runway 27 and ATC radar vectors to join final approach after crossing KLOMN at 6,000 ft. MSL
Version Notes:	Version 1 (initial version of the alternative)



Graphic Source: Google Earth, April 2019 (aerial photograph); Federal Aviation Administration, November 2018 (COMIX STAR route, Runway 27 RNP Approach route); Ricondo & Associates, Inc., April 2019 (modified COMIX STAR concept and flight path).

Graphic Reference: Presented to East County Working Group Meeting #2 on January 24, 2019 and Meeting #3 on May 28, 2019.

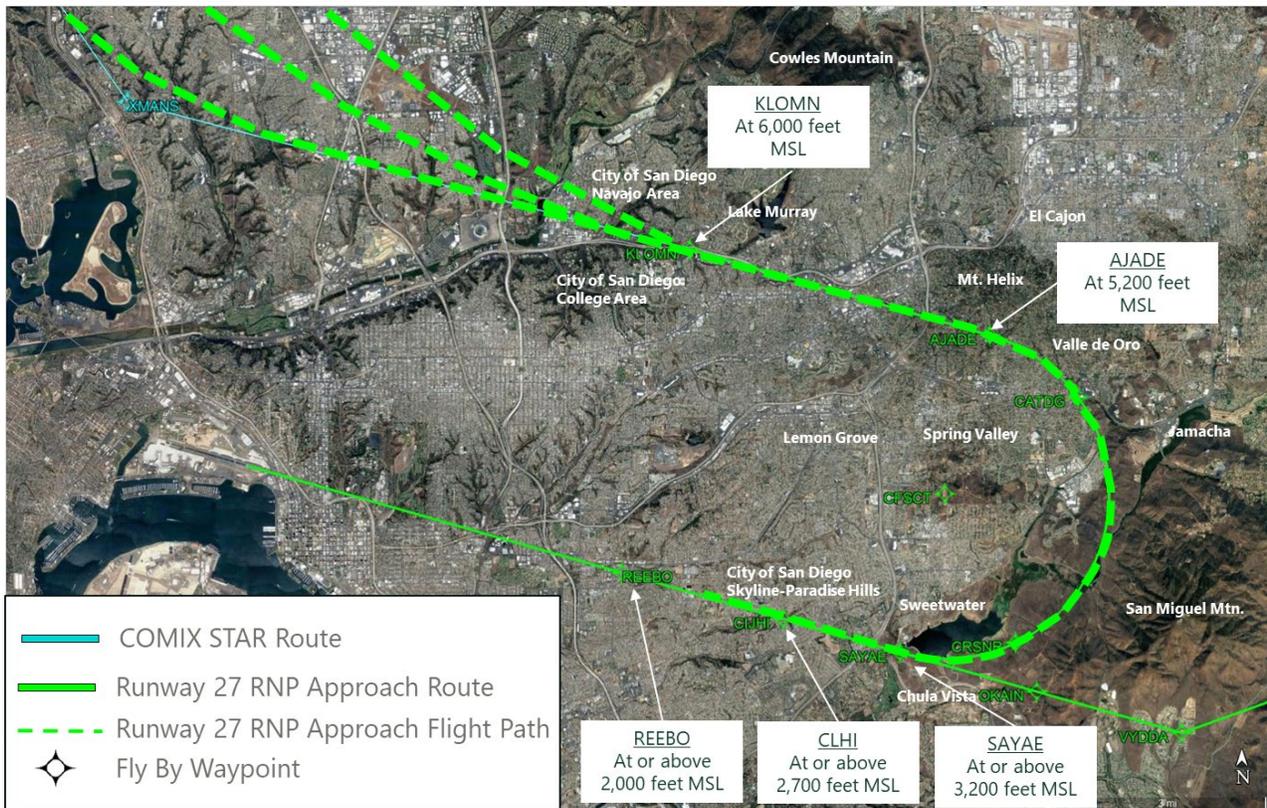
Screening Findings:

<input checked="" type="checkbox"/> Pass to Draft	<input type="checkbox"/> Pass to Final	<input type="checkbox"/> Pass to Next Steps
<input type="checkbox"/> Pass to Part 150	<input type="checkbox"/> Eliminate	

Reason for Elimination:				
<input type="checkbox"/> 65 DNL Influence	<input type="checkbox"/> ECWG Objective	<input type="checkbox"/> Charting Requirements	<input type="checkbox"/> Design Criteria	<input type="checkbox"/> Safety
<input type="checkbox"/> Existing Compliance	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Noise Impact	<input type="checkbox"/> Operational Feasibility	
Design Notes:				
<ul style="list-style-type: none"> ▪ Predicated on the existing COMIX TWO RNAV STAR ▪ Involves a charting change (amendment) to the COMIX TWO RNAV STAR ▪ Procedure is feasible and flyable ▪ Preserves the flexibility of ATC to space and sequence aircraft into the final approach airspace ▪ Promotes dispersion of traffic over the East County area ▪ Maintains the potential use of the RNAV RNP Z Runway 27 Standard Instrument Approach Procedure (SIAP) from the COMIX RNAV STAR ▪ Eliminates the need for an existing waiver on the existing procedure 				
Summary Narrative:				
<p>The design concept to eliminate the KLOMN to NADDO route calls for aircraft to stay at or above 6,000 ft. MSL at the KLOMN waypoint. The procedure is feasible and flyable. The KLOMN waypoint will become the end of the STAR and is also the Initial Fix for the RNAV RNP Z Runway 27 SIAP. The design also enables ATC to be able to direct movements as needed to sequence the traffic in with arrivals from the east, promoting dispersion. FAA may require the FAA-proposed modification to the Class B airspace be implemented first prior to amending the COMIX RNAV STAR. This design concept to remove the KLOMN to NADDO route was carried forward to the Draft phase.</p>				

C.1.3 RUNWAY 27 RNP APPROACH – INCREASE USE

ECWG RECOMMENDATION:	RUNWAY 27 RNP APPROACH – INCREASE USE
Runway Configuration:	Runway 27 Arrivals and Departure
Operational Mode:	Runway 27 Day and Nighttime Operations
Version:	Preliminary Draft
Description:	The concept involves increasing the use of the existing RNAV RNP Z Runway 27 Standard Instrument Approach Procedure (SIAP)
Intent:	Increase the use of the RNAV RNP Z Runway 27 SIAP to direct more jet arrivals over less populated areas when turning south to join final approach
Version Notes:	Version 1 (initial version of the alternative)



Graphic Source: Google Earth, April 2019 (aerial photograph); Federal Aviation Administration, November 2018 (COMIX STAR route, Runway 27 RNP Approach route); Ricondo & Associates, Inc., April 2019 (RNP approach flight path).

Graphic Reference: Presented to East County Working Group at Meeting #3 on May 28, 2019

Screening Findings:

- Pass to Draft
- Pass to Final
- Pass to Next Steps
- Pass to Part 150
- Eliminate

Reason for Elimination:

- 65 DNL Influence
- ECWG Objective
- Charting Requirements
- Design Criteria
- Safety
- Existing Compliance
- Not Applicable
- Noise Impact
- Operational Feasibility

Design Notes:

- Alternative is to promote the usage of the existing RNAV RNP Z Runway 27 SIAP.
- Utilizes existing SIAP
- Increased usage would require efforts from the FAA Southern California Terminal Radar Control (SCT TRACON) and airline investment (aircraft equipage and pilot training)
- Reduces aircraft flying the KLOMN to NADDO leg
- Would concentrate more arrivals over areas underneath the RNP flight path, potentially resulting in a concentration of noise

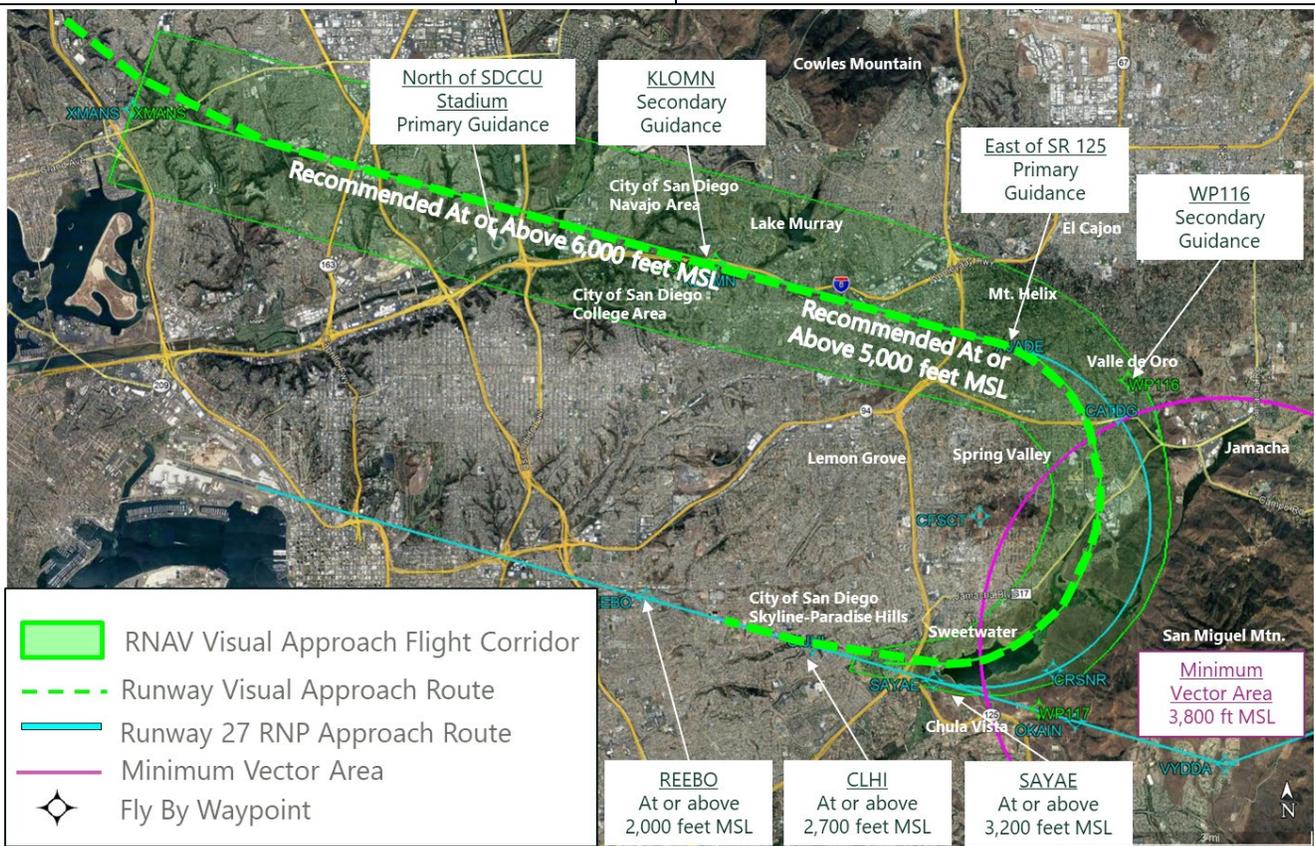
Summary Narrative:

The intent of this alternative was to promote the increased use of the existing RNAV RNP Z Runway 27 SIAP at SAN. Increasing the usage would involve efforts from the SCT TRACON and airlines. SCT controllers would need to assign the procedure and position aircraft arriving on the COMIX TWO STAR at the proper altitudes to enable pilots to accept the procedure and fly it properly. Airlines would need to equip their aircraft with the proper avionics to be eligible for the procedure, and train and certify their flight crews to fly the RNP approach. Pilots would also need to request and/or accept the procedure when operating at SAN.

Increasing the use of the procedure will reduce the amount of traffic flying the leg from KLOMN to NADDO. However, it will increase the traffic along the route of the RNP procedure. Through discussions at the ECWG meetings, members indicated use of the RNAV RNP Z Runway 27 RNP SIAP is useful in providing some respite but did not support the increased use of the procedure as the primary approach for jet arrivals from the northwest due to concentration effects on noise. Therefore, the alternative was eliminated.

C.1.4 RUNWAY 27 RNAV VISUAL APPROACH

ECWG RECOMMENDATION:	RUNWAY 27 RNAV VISUAL APPROACH
Runway Configuration:	Runway 27 Arrivals and Departure
Operational Mode:	Runway 27 Day and Nighttime Operations
Version:	Preliminary Draft
Description:	The concept involves incorporating RNAV guidance into the Sweetwater Visual Runway 27
Intent:	Reduce noise levels by locating arrivals over more compatible areas with some dispersion and directs more jet arrivals over less populated areas when turning south to join final approach
Version Notes:	Version 1 (initial version of the alternative)



Graphic Source: Google Earth, April 2019 (aerial photograph); Federal Aviation Administration, November 2018 (Runway 27 RNP Approach route, Minimum Vector Area); Ricondo & Associates, Inc., April 2019 (RNAV Visual approach concept route and corridor).
Graphic Reference: Presented to ECWG at Meeting #3 on May 28, 2019

Screening Findings:

<input type="checkbox"/> Pass to Draft	<input type="checkbox"/> Pass to Final	<input type="checkbox"/> Pass to Next Steps
<input type="checkbox"/> Pass to Part 150	<input checked="" type="checkbox"/> Eliminate	

Reason for Elimination:

<input type="checkbox"/> 65 DNL Influence	<input checked="" type="checkbox"/> ECWG Objective	<input type="checkbox"/> Charting Requirements	<input type="checkbox"/> Design Criteria	<input type="checkbox"/> Safety
<input type="checkbox"/> Existing Compliance	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Noise Impact	<input type="checkbox"/> Operational Feasibility	

Design Notes:

- Requires the incorporation of an RNAV approach path using the path into the Sweetwater Visual Runway 27 procedure
- Requires pilots to fly visual increasing workload. Pilots will be required to request approach. FAA may not be able to accommodate visual approach during peak arrival demand periods
- Increase in procedure usage is unlikely
- Path in space is not optimal

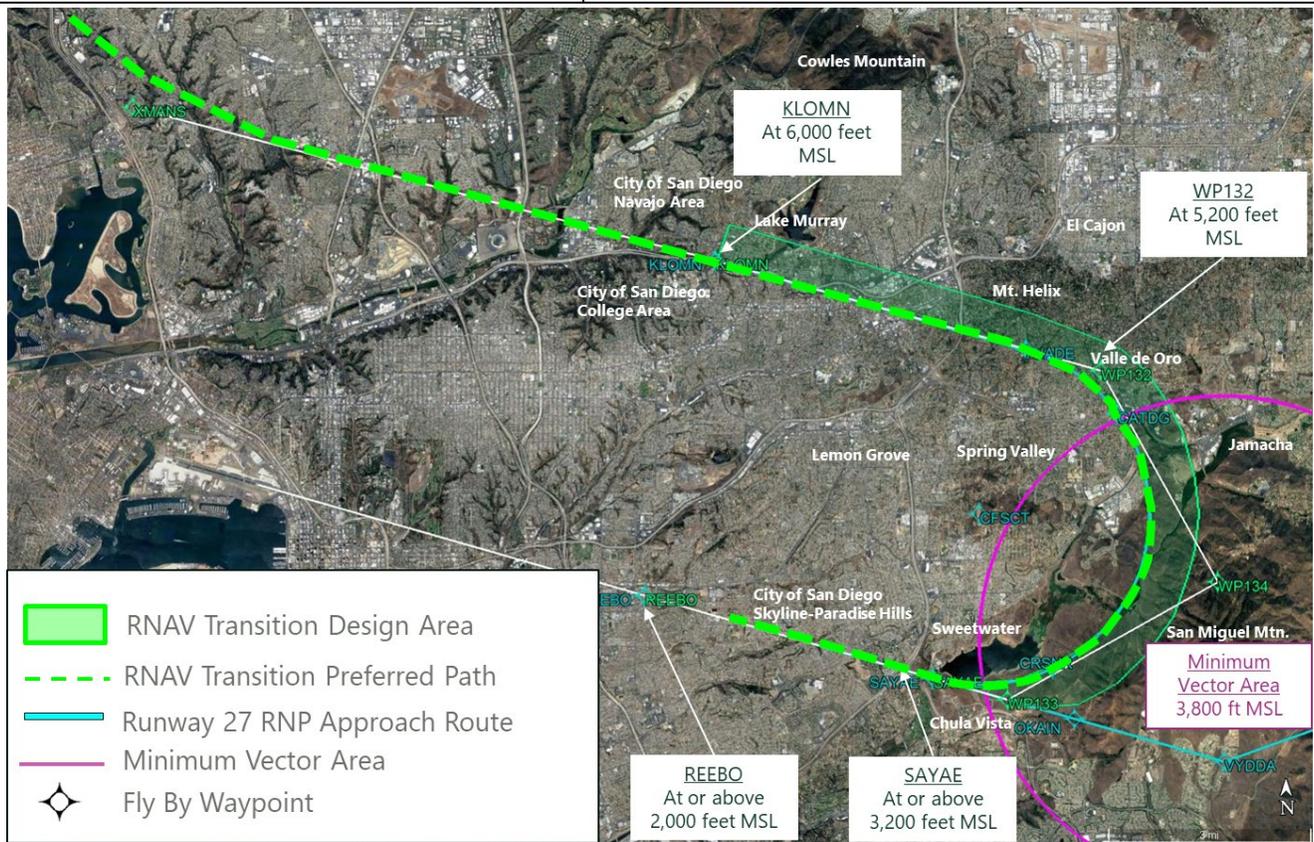
Summary Narrative:

RNAV components can be designed into Chart Visual procedures. However, the primary source of navigation must be ground-based visual markers. As stated by an ECWG member who is an airline pilot, visual approaches require pilot to take responsibility of traffic separation, terrain clearance and staying within the confines of the Class B airspace while calculating how best to get on the proper descent profile. This increases the pilot workload. Visual approaches also have a higher potential for instability as descent rates may vary from segment to segment. For this reason, pilots prefer RNAV-based approach procedures.

During the May ECWG meeting it was also discussed that the path in space may not be optimal. A member suggested evaluating an RNAV approach that would direct aircraft further east and turn south over less populated areas. The procedure would keep aircraft higher compared to current patterns and fly over less populated areas as aircraft descend to a lower altitude to join the final approach. As a result of this suggestion and concerns related to pilot workload and expected infrequent use of a visual approach, this alternative was eliminated and an effort to develop an RNAV transition from the west joining the current RNAV GPS Y Runway 27 Standard Instrument Approach Procedure further east was established in the Draft design phase.

C.1.5 RUNWAY 27 RNAV APPROACH (OVERLAY OF RUNWAY 27 RNP APPROACH)

ECWG RECOMMENDATION:	RUNWAY 27 RNAV GPS APPROACH (OVERLAY OF RUNWAY 27 RNP APPROACH)
Runway Configuration:	Runway 27 Arrivals and Departure
Operational Mode:	Runway 27 Day and Nighttime Operations
Version:	Preliminary Draft
Description:	Reduce noise levels by locating arrivals over more compatible areas
Intent:	Provide RNAV Global Positioning Satellite (GPS) runway transition that mimics RNAV RNP Z Runway 27 Standard Instrument Approach Procedure (SIAP) and does not require additional navigation equipment and pilot authorization. Directs more jet arrivals over less populated areas when turning south to join final approach
Version Notes:	Version 1 (initial version of the alternative)



Graphic Source: Google Earth, April 2019 (aerial photograph); Federal Aviation Administration, November 2018 (Runway 27 RNP Approach route; Minimum Vector Area): Ricondo & Associates, Inc., April 2019 (RNAV Runway 27 approach concept flight path).

Graphic Reference: Presented to ECWG at Meeting #3 on May 28, 2019

Screening Findings:

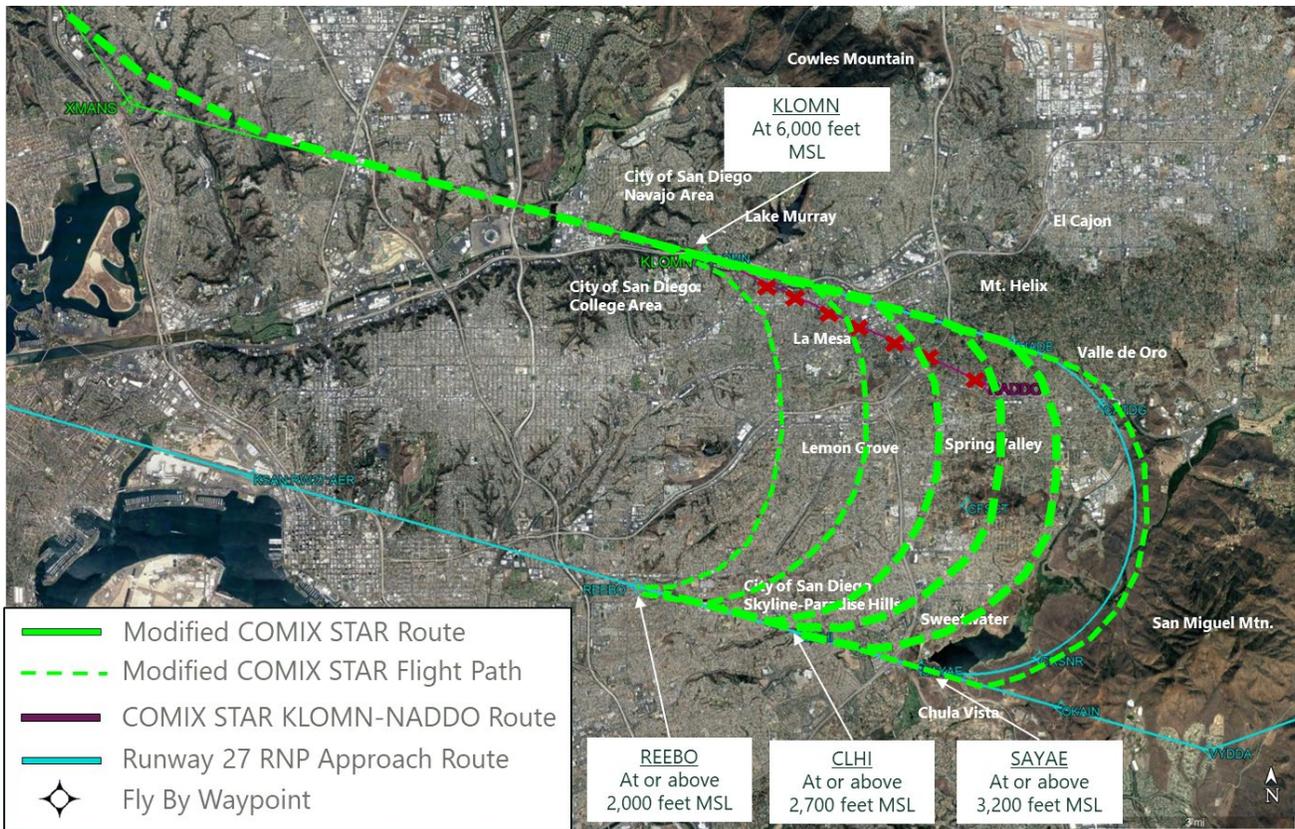
<input type="checkbox"/> Pass to Draft	<input type="checkbox"/> Pass to Final	<input type="checkbox"/> Pass to Next Steps
<input type="checkbox"/> Pass to Part 150	<input checked="" type="checkbox"/> Eliminate	

Reason for Elimination:				
<input type="checkbox"/> 65 DNL Influence	<input checked="" type="checkbox"/> ECWG Objective	<input type="checkbox"/> Charting Requirements	<input type="checkbox"/> Design Criteria	<input type="checkbox"/> Safety
<input type="checkbox"/> Existing Compliance	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Noise Impact	<input type="checkbox"/> Operational Feasibility	
Design Notes:				
<ul style="list-style-type: none"> ▪ Procedure is feasible and flyable ▪ Further performance analysis is required by users ▪ Concentrates all traffic on the route of the procedure, potentially resulting in a concentration of noise 				
Summary Narrative:				
<p>This alternative involves the development of an RNAV GPS SIAP based on the existing RNAV RNP Runway 27 SIAP design for traffic arriving from the west on the COMIX TWO. RNAV approaches differ from RNP approaches in their construction and do not require the additional aircraft and aircrew certification. The existing RNP procedure utilizes a Radius to a Fix Leg creating a curved circular path from the downwind on to the final approach. The RNAV procedure mimics this path by using 45 degree, 90 degree, 45 degree Track to Fix Legs in succession and by adjusting the aircraft speed to enable aircraft flyability. The conceptual RNAV GPS SIAP is feasible and flyable and connects into the existing RNAV GPS Y Runway 27 SIAP.</p> <p>Most aircraft (over 90 percent) operating at SAN are capable of flying an RNAV GPS SIAP. Therefore, the use of the procedure would likely be much higher than the RNAV RNP Z Runway 27 SIAP. Increasing the use of the procedure will reduce the amount of traffic flying the leg from KLOMN to NADD0. However, it will increase the traffic along the route of the procedure. Through discussions at the ECWG meetings, members indicated they want to encourage dispersion and did not support the use of the path in space of the existing RNAV RNP Z Runway 27 or the proposed RNAV GPS Runway 27 procedure as the primary approach for jet arrivals from the northwest due to the concentration effect on noise. Therefore, the alternative was eliminated. A member of the ECWG suggested a related alternative involving the development of an RNAV GPS approach that goes further east before turning back on to the final approach during low demand periods. This alternative was forwarded to the Draft phase and is discussed in the next section.</p>				

C.2 DRAFT DESIGN CONCEPT PHASE ALTERNATIVES

C.2.1 MODIFICATION TO COMIX RNAV STAR – REMOVE ROUTE BETWEEN KLOMNM AND NADDO WAYPOINT AND KEEP JET ARRIVALS AT 6,000 FT. MSL AT KLOMNM

ECWG RECOMMENDATION:	MODIFICATION TO COMIX RNAV STAR – REMOVE ROUTE BETWEEN KLOMNM AND NADDO WAYPOINT AND KEEP JET ARRIVALS AT 6,000 FT. MSL AT KLOMNM
Runway Configuration:	Runway 27 Arrivals and Departure
Operational Mode:	Runway 27 Day and Nighttime Operations
Version:	Draft
Description:	This alternative involves amending the existing COMIX RNAV STAR to remove the leg from KLOMNM to NADDO
Intent:	Remove the leg between KLOMNM and NADDO to promote dispersion after KLOMNM waypoint and keep aircraft at 6,000 ft. at KLOMNM waypoint
Version Notes:	Version 1 (initial version of the alternative)

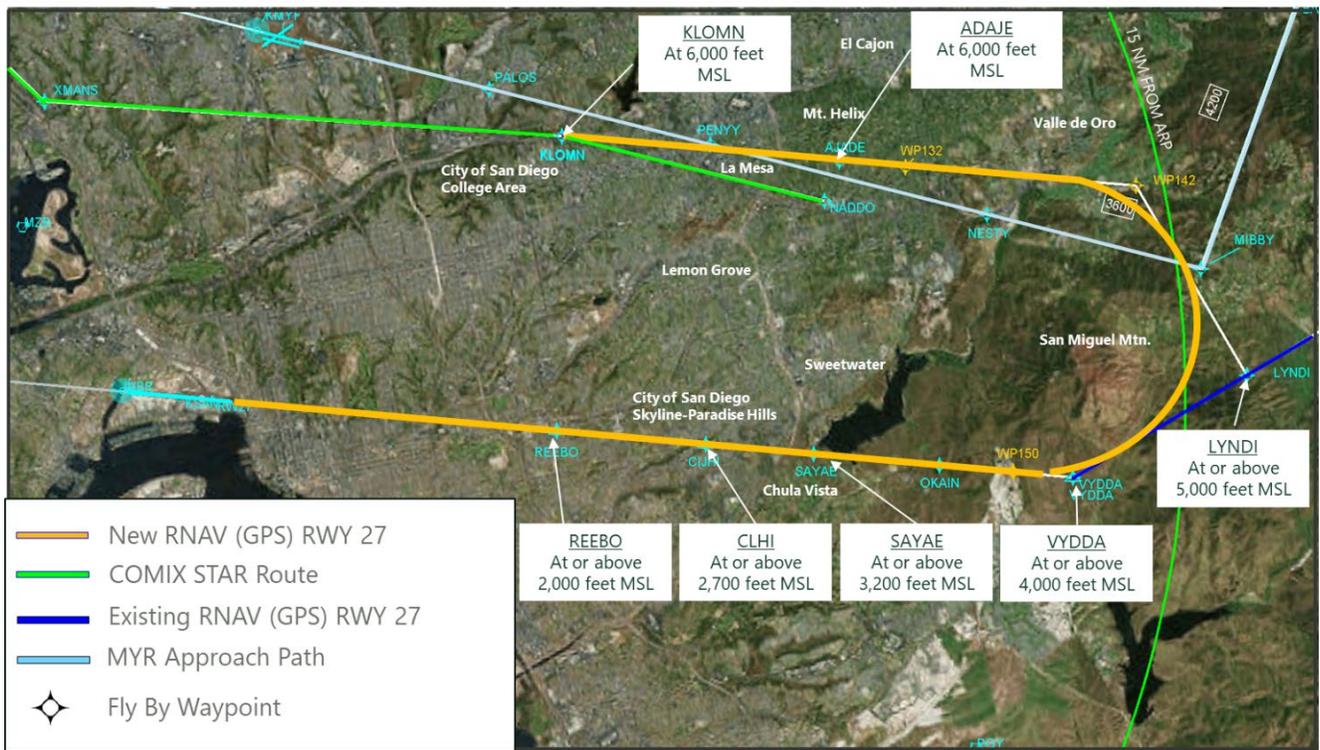


Graphic Source: Google Earth, April 2019 (aerial photograph); Federal Aviation Administration, November 2018 (COMIX STAR route, Runway 27 RNP Approach route); Ricondo & Associates, Inc., April 2019 (modified COMIX STAR concept and flight path).
Graphic Reference: Presented to East County Working Group at Meeting #4 on July 25, 2019.

Screening Findings:				
<input type="checkbox"/> Pass to Draft	<input checked="" type="checkbox"/> Pass to Final	<input type="checkbox"/> Pass to Next Steps		
<input type="checkbox"/> Pass to Part 150	<input type="checkbox"/> Eliminate			
Reason for Elimination:				
<input type="checkbox"/> 65 DNL Influence	<input type="checkbox"/> ECWG Objective	<input type="checkbox"/> Charting Requirements	<input type="checkbox"/> Design Criteria	<input type="checkbox"/> Safety
<input type="checkbox"/> Existing Compliance	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Noise Impact	<input type="checkbox"/> Operational Feasibility	
Design Notes:				
<ul style="list-style-type: none"> ▪ Predicated on the existing COMIX TWO RNAV STAR ▪ Involves a simple charting change (amendment) to the COMIX TWO RNAV STAR ▪ Procedure is feasible and flyable ▪ Preserves the flexibility of ATC to space and sequence aircraft into the final approach airspace ▪ Promotes dispersion of traffic in the area ▪ Maintains the potential use of the RNAV RNP Z Runway 27 Standard Instrument Approach Procedure (SIAP) from the COMIX RNAV STAR ▪ Eliminates the need for an existing waiver on the existing procedure 				
Summary Narrative:				
<p>This design concept to remove the KLOMN to NADDO route was carried forward from the Preliminary Draft phase. No changes were made from the preliminary draft version. The design concept to eliminate the KLOMN to NADDO route calls for aircraft to stay at or above 6,000 ft. MSL at the KLOMN waypoint. The procedure is feasible and flyable. The KLOMN waypoint will become the end of the Standard Terminal Arrival Route and is also the Initial Fix for the RNP Runway 27 Standard Instrument Approach Procedure (SIAP). The design also enables Air Traffic Controllers to be able vector and sequence the traffic in with arrivals from the east, promoting dispersion.</p> <p>Based on discussions with the FAA, the leg from KLOMN to NADDO was added as a temporary fix to solve a condition where aircraft were exiting the Class B airspace. The intent of the leg was to provide positive guidance that enables aircraft to remain inside the Class B airspace. The design is non-standard and requires a waiver because the STAR does not end at the same initial approach fix where the Runway 27 RNP approach begins. The FAA has proposed changes to the Class B airspace to solve the aircraft excursion problem. If the Class B changes occur, there should no longer be a need for the leg and an amendment of the procedure to remove the leg would be likely. It may be possible to have the procedure amended prior to a Class B change at the discretion of the FAA. Based on these factors, the procedure amendment was recommended to be forwarded to the final analysis phase of the project.</p>				

C.2.2 RUNWAY 27 APPROACH – EXTEND APPROACH EAST AND JOIN AT VYDAA WAYPOINT (11:00 P.M. TO 7:00 A.M.)

ECWG RECOMMENDATION:	RUNWAY 27 APPROACH – APPROACH EAST AND JOIN AT VYDAA WAYPOINT
Runway Configuration:	Runway 27 Arrivals and Departure
Operational Mode:	Runway 27 Nighttime (11:00 p.m. to 7:00 a.m.) Arrivals
Version:	Draft
Description:	The concept involves the development of an RNAV approach procedure from the west that transitions into the existing RNAV Runway 27 Standard Instrument Approach Procedure (SIAP) at the VYDAA waypoint.
Intent:	Keep nighttime arrivals (low demand period) higher across the east county area and turn south to join final over less populated area
Version Notes:	Version 1 (initial version of the alternative)



Graphic Source: Google Earth, April 2019 (aerial photograph); Federal Aviation Administration, November 2018 (COMIX STAR route, Montgomery Field approach procedure, existing Runway 27 RNAV (GPS) approach); Ricondo & Associates, Inc., July 2019 (Runway 27 RNAV (GPS) approach).

Graphic Reference: Presented to East County Working Group at Meeting #4 on July 25, 2019.

Screening Findings:		
<input type="checkbox"/> Pass to Draft	<input type="checkbox"/> Pass to Final	<input type="checkbox"/> Pass to Next Steps
<input type="checkbox"/> Pass to Part 150	<input checked="" type="checkbox"/> Eliminate	

Reason for Elimination:					
<input type="checkbox"/> 65 DNL Influence	<input type="checkbox"/> ECWG Objective	<input type="checkbox"/> Charting Requirements	<input checked="" type="checkbox"/> Design Criteria	<input type="checkbox"/> Safety	
<input type="checkbox"/> Existing Compliance	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Noise Impact	<input type="checkbox"/> Operational Feasibility		

Design Notes:

- Keeps aircraft higher over the east San Diego County area
- Procedure is flyable
- Procedure design connects to the existing RNAV Runway 27 SIAP seamlessly
- New path increases miles flown by 7.75 nautical miles as compared to the RNAV RNP Z Runway 27 SIAP
- Conflicts with approach to Montgomery Field Runway 28R approaches and jet arrivals on the LUCKI RNAV STAR
- Merges with routes from the east at a common point potentially limiting capacity
- Requires a waiver because the intermediate segment is longer than 15 nautical miles and is more than 15 nautical miles from the Airport Reference Point – waiver makes the procedure not feasible for purposes of this flight procedure evaluation

Summary Narrative:

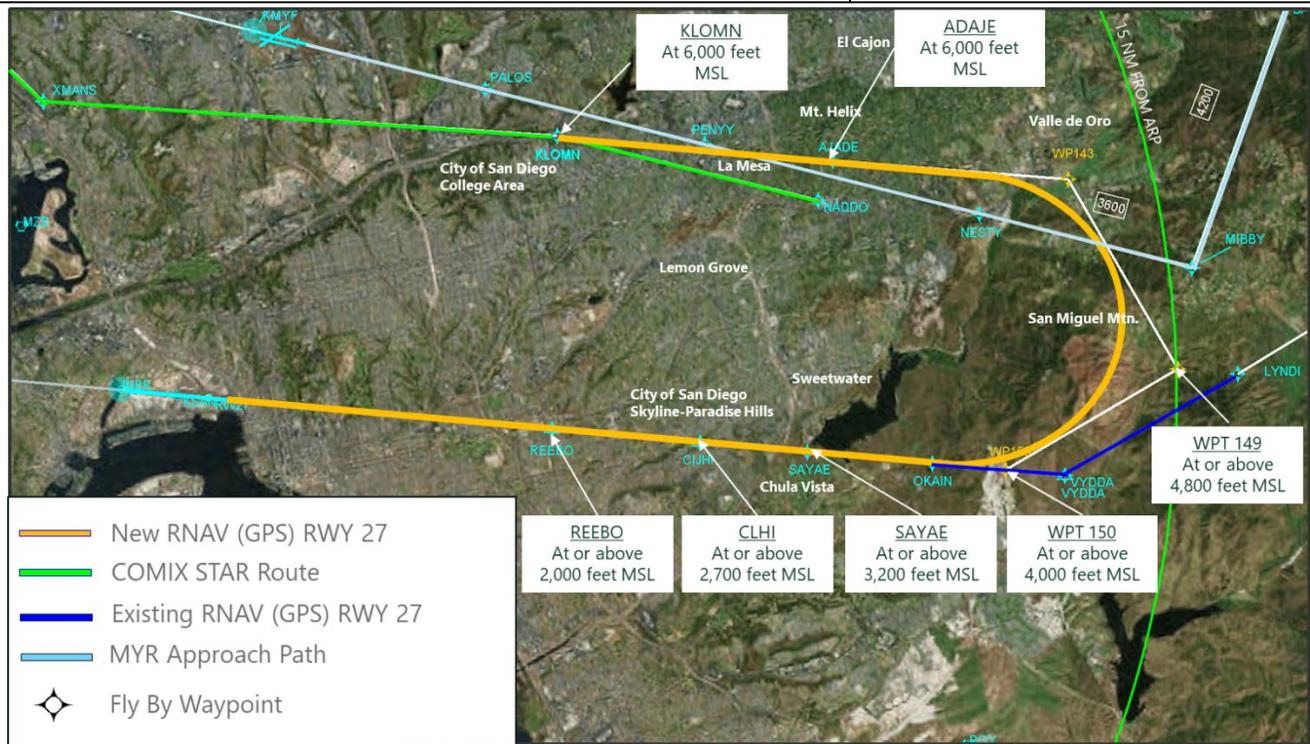
This alternative was derived from ECWG discussions of the Runway 27 RNAV visual approach alternative. The intent of the alternative was to keep aircraft higher across east San Diego County area and sequence aircraft to join the existing RNAV GPS Y Runway 27 SIAP.

The conceptual alternative is flyable and connects seamlessly to the existing RNAV GPS Y Runway 27 SIAP resulting in the exact same flight profile and minimums but requires a waiver because the intermediate segment is longer than 15 nautical miles. The flight miles increase by 7.75 nautical miles with this design as compared to the RNAV RNP Z Runway 27 SIAP and the extended downwind leg presents potential conflicts with the Runway 28R approaches at Montgomery-Gibbs Executive Airport (MYF) and traffic arriving from the east on the LUCKI RNAV STAR. These constraints were discussed at the ECWG meetings in May and July of 2019 and the alternative was limited to nighttime operations only to mitigate the potential conflicts with MYF and traffic arriving from the east and the impact to efficiency if all arrivals were to be assigned the concept.

The intermediate segment was extended to over 17 nautical miles in length in order to make the procedure connect to the existing RNAV GPS Y Runway 27 SIAP. SIAP designs with intermediate segments longer than 15 nautical miles that are more than 15 nautical miles from the Airport Reference Point are considered non-standard and require a waiver from FAA. Because a waiver would be required for this design, it was eliminated from consideration. A modified version (Extend Approach East and Join Near VYDAA Waypoint) was developed that strives to meet the intent and not require a waiver.

C.2.3 RUNWAY 27 APPROACH – EXTEND APPROACH EAST AND JOIN NEAR VYDAA WAYPOINT (11:00 P.M. TO 7:00 A.M.)

ECWG RECOMMENDATION:	RUNWAY 27 APPROACH – EXTEND APPROACH EAST AND JOIN NEAR VYDAA WAYPOINT
Runway Configuration:	Runway 27 Arrivals and Departure
Operational Mode:	Runway 27 Nighttime (11:00 p.m. to 7:00 a.m.) Arrivals
Version:	Draft
Description:	The concept involves the development of an RNAV procedure from the west that transitions into the existing RNAV Runway 27 Standard Instrument Approach Procedure (SIAP) at the VYDAA waypoint
Intent:	Keep nighttime arrivals (low demand period) higher across the east county area and turn south to join final over less populated area
Version Notes:	Version 2



Graphic Source: Google Earth, April 2019 (aerial photograph); Federal Aviation Administration, November 2018 (COMIX STAR route, Montgomery Field approach procedure, existing Runway 27 RNAV (GPS) approach); Ricondo & Associates, Inc., July 2019 (Runway 27 RNAV (GPS) approach).

Graphic Reference: Presented to East County Working Group at Meeting #4 on July 25, 2019.

Screening Findings:

<input type="checkbox"/> Pass to Draft	<input checked="" type="checkbox"/> Pass to Final	<input type="checkbox"/> Pass to Next Steps
<input type="checkbox"/> Pass to Part 150	<input type="checkbox"/> Eliminate	

Reason for Elimination:

<input type="checkbox"/> 65 DNL Influence	<input type="checkbox"/> ECWG Objective	<input type="checkbox"/> Charting Requirements	<input type="checkbox"/> Design Criteria	<input type="checkbox"/> Safety
<input type="checkbox"/> Existing Compliance	<input type="checkbox"/> Not Applicable	<input type="checkbox"/> Noise Impact	<input type="checkbox"/> Operational Feasibility	

Design Notes:

- Keeps aircraft higher over east San Diego County area
- Procedure is feasible and flyable
- Procedure design connects to the existing RNAV Runway 27 SIAP closer to the airport than Version 1
- New path increases miles flown by 6 nautical miles as compared to the RNAV RNP Z Runway 27 SIAP
- Conflicts with approach to Montgomery Field Runway 28R approaches
- No waiver is required

Summary Narrative:

This alternative was derived from the previous alternative. The intent of this version was to keep aircraft higher across east San Diego County area, turn aircraft south over less-populated areas, and sequence aircraft to join the existing RNAV GPS Y Runway 27 SIAP using a design that does not require a waiver to standards. This would be applicable during low arrival demand periods, specifically between 11:00 p.m. to 07:00 a.m.

The version 2 conceptual alternative is feasible and flyable and connects to the existing RNAV GPS Y Runway 27 SIAP resulting in a similar flight profile and minimums compared to version 1. The flight miles increase by 6 nautical miles with this design as compared to the RNAV RNP Z Runway 27 SIAP. The procedure is intended for nighttime use due to potential conflicts with the Runway 28R approaches at Montgomery-Gibbs Executive Airport (MYF) and traffic arriving from the east on the LUCKI RNAV STAR.

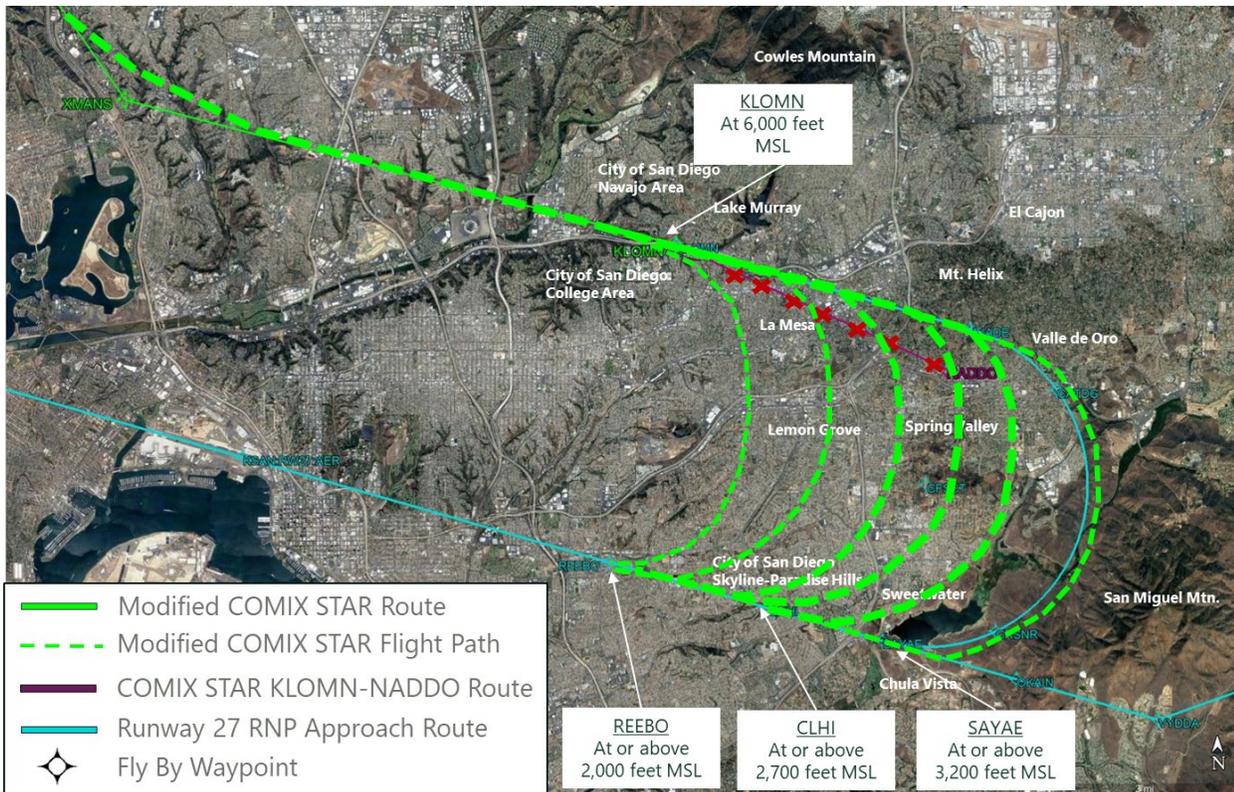
The intermediate segment is more than 15 nautical miles in length in order to make the procedure connect to the existing RNAV GPS Y Runway 27 SIAP but the segment is within 15 nautical miles of the Airport. Therefore, a waiver is not required. The design was intended to keep aircraft as far east as possible. Adjustments could be made to the west to create a slightly better intermediate descent profile.

This alternative was agreeable to the ECWG members and was discussed with FAA. FAA did not indicate fatal flaws with the procedure, therefore was recommended to be forwarded to the final phase of the analysis.

C.3 FINAL DESIGN CONCEPT PHASE ALTERNATIVES

C.3.1 MODIFICATION TO COMIX RNAV STAR – REMOVE ROUTE BETWEEN KLOMNM AND NADDO WAYPOINT AND KEEP JET ARRIVALS AT 6,000 FT. MSL AT KLOMNM

ECWG RECOMMENDATION:	MODIFICATION TO COMIX RNAV STAR – REMOVE ROUTE BETWEEN KLOMNM AND NADDO WAYPOINT AND KEEP JET ARRIVALS AT 6,000 FT. MSL AT KLOMNM
Runway Configuration:	Runway 27 Arrivals and Departure
Operational Mode:	Runway 27 Day and Nighttime Operations
Version:	Final
Description:	This alternative involves amending the existing COMIX RNAV STAR to remove the leg from KLOMNM to NADDO
Intent:	Remove the leg between KLOMNM and NADDO to promote dispersion after KLOMNM waypoint and keep aircraft at 6,000 ft. at KLOMNM waypoint
Version Notes:	Version 1 (initial version of the alternative)



Graphic Source: Google Earth, April 2019 (aerial photograph); Federal Aviation Administration, November 2018 (COMIX STAR route, Runway 27 RNP Approach route); Ricondo & Associates, Inc., April 2019 (modified COMIX STAR concept and flight path).
Graphic Reference: Presented to East County Working Group at Meeting #4 on July 25, 2019.

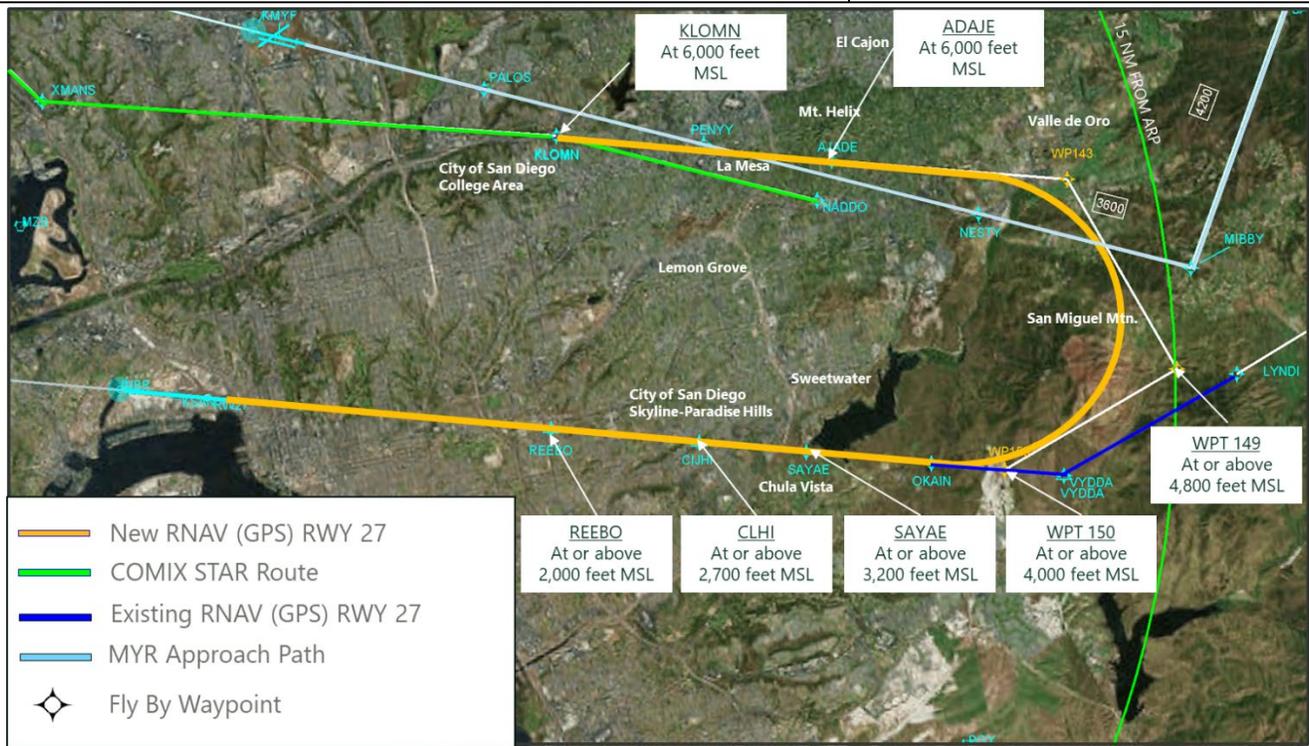
Screening Findings:

- Pass to Draft
- Pass to Final
- Pass to Next Steps
- Pass to Part 150
- Eliminate

Reason for Elimination:				
<input type="checkbox"/> 65 DNL Influence	<input type="checkbox"/> ECWG Objective	<input type="checkbox"/> Charting Requirements	<input type="checkbox"/> Design Criteria	<input type="checkbox"/> Safety
<input type="checkbox"/> Existing Compliance	<input type="checkbox"/> Not Applicable	<input checked="" type="checkbox"/> Noise Impact	<input type="checkbox"/> Operational Feasibility	
Design Notes:				
<ul style="list-style-type: none"> ▪ Predicated on the existing COMIX TWO RNAV STAR ▪ Involves a simple charting change (amendment) to the COMIX TWO RNAV STAR ▪ Procedure is feasible and flyable ▪ Preserves the flexibility of ATC to space and sequence aircraft into the final approach airspace ▪ Promotes dispersion of traffic in the area ▪ Maintains the potential use of the RNAV RNP Z Runway 27 Standard Instrument Approach Procedure (SIAP) from the COMIX RNAV STAR ▪ Eliminates the need for an existing waiver on the existing procedure 				
Summary Narrative:				
<p>This design concept to remove the KLOMN to NADDO route was carried forward from the Draft phase. No changes were made from the preliminary draft version. The design concept to eliminate the KLOMN to NADDO route calls for aircraft to stay at or above 6,000 ft. MSL at the KLOMN waypoint. The procedure is feasible and flyable. The KLOMN waypoint will become the end of the Standard Terminal Arrival Route and is also the Initial Fix for the RNP Runway 27 Standard Instrument Approach Procedure (SIAP). The design also enables Air Traffic Controllers to be able vector and sequence the traffic in with arrivals from the east, promoting dispersion.</p> <p>Based on discussions with the FAA, the leg from KLOMN to NADDO was added as a temporary fix to solve a condition where aircraft were exiting the Class B airspace. The intent of the leg was to provide positive guidance that enables aircraft to remain inside the Class B airspace. The design is non-standard and requires a waiver because the STAR does not end at the same initial approach fix where the Runway 27 RNP approach begins. The FAA has proposed changes to the Class B airspace to solve the aircraft excursion problem. If the Class B changes occur, there should no longer be a need for the leg and an amendment of the procedure to remove the leg would be likely. It may be possible to have the procedure amended prior to a Class B change at the discretion of the FAA. Based on these factors, the procedure amendment was recommended to be forwarded to the final analysis phase of the project.</p> <p>The noise screening analysis indicated a decrease between 2 and 3 dBA CNEL for Spring Valley area and decreases between 1 and 2 dBA CNEL for La Mesa and Lemon Grove area. This decrease is caused by moving jet arrivals from the KLOMN to NADDO route to the proposed flight path that continues east after passing the KLOMN waypoint. As a result of moving traffic east of KLOMN, an increase in CNEL levels between 1 and 2 dBA for the Casa de Oro, Mount Helix and Rancho San Diego community areas. Due to the increase in CNEL levels and based on input provided by ECWG at the December 11, 2019 meeting, this design concept was recommended to be eliminated.</p>				

C.3.2 RUNWAY 27 APPROACH – EXTEND APPROACH EAST AND JOIN NEAR VYDAA WAYPOINT (11:00 P.M. TO 7:00 A.M.)

ECWG RECOMMENDATION:	RUNWAY 27 APPROACH – EXTEND APPROACH EAST AND JOIN NEAR VYDAA WAYPOINT
Runway Configuration:	Runway 27 Arrivals and Departure
Operational Mode:	Runway 27 Nighttime (11:00 p.m. to 7:00 a.m.) Arrivals
Version:	Draft
Description:	The concept involves the development of an RNAV procedure from the west that transitions into the existing RNAV Runway 27 Standard Instrument Approach Procedure (SIAP) at the VYDAA waypoint
Intent:	Keep nighttime arrivals (low demand period) higher across the east county area and turn south to join final over less populated area
Version Notes:	Version 2



Graphic Source: Google Earth, April 2019 (aerial photograph); Federal Aviation Administration, November 2018 (COMIX STAR route, Montgomery Field approach procedure, existing Runway 27 RNAV (GPS) approach); Ricondo & Associates, Inc., July 2019 (Runway 27 RNAV (GPS) approach).

Graphic Reference: Presented to East County Working Group at Meeting #4 on July 25, 2019.

Screening Findings:

<input type="checkbox"/> Pass to Draft	<input type="checkbox"/> Pass to Final	<input type="checkbox"/> Pass to Next Steps
<input type="checkbox"/> Pass to Part 150	<input checked="" type="checkbox"/> Eliminate	

Reason for Elimination:

<input type="checkbox"/> 65 DNL Influence	<input type="checkbox"/> ECWG Objective	<input type="checkbox"/> Charting Requirements	<input type="checkbox"/> Design Criteria	<input type="checkbox"/> Safety
<input type="checkbox"/> Existing Compliance	<input type="checkbox"/> Not Applicable	<input checked="" type="checkbox"/> Noise Impact	<input type="checkbox"/> Operational Feasibility	

Design Notes:

- Keeps aircraft higher over east San Diego County area
- Procedure is feasible and flyable
- Procedure design connects to the existing RNAV Runway 27 SIAP closer to the airport than Version 1
- New path increases miles flown by 6 nautical miles as compared to the RNAV RNP Z Runway 27 SIAP
- Conflicts with approach to Montgomery Field Runway 28R approaches
- No waiver is required

Summary Narrative:

This design concept was carried forward from the Draft phase. No changes were made from the preliminary draft version. The intent of this version was to keep aircraft higher across east San Diego County area, turn aircraft south over less-populated areas, and sequence aircraft to join the existing RNAV GPS Y Runway 27 SIAP using a design that does not require a waiver to standards. This would be applicable during low arrival demand periods, specifically between 11:00 p.m. to 07:00 a.m.

The version 2 conceptual alternative is feasible and flyable and connects to the existing RNAV GPS Y Runway 27 SIAP resulting in a similar flight profile and minimums compared to version 1. The flight miles increase by 6 nautical miles with this design as compared to the RNAV RNP Z Runway 27 SIAP. The procedure is intended for nighttime use due to potential conflicts with the Runway 28R approaches at Montgomery-Gibbs Executive Airport (MYF) and traffic arriving from the east on the LUCKI RNAV STAR.

The intermediate segment is more than 15 nautical miles in length in order to make the procedure connect to the existing RNAV GPS Y Runway 27 SIAP but the segment is within 15 nautical miles of the Airport. Therefore, a waiver is not required. The design was intended to keep aircraft as far east as possible. Adjustments could be made to the west to create a slightly better intermediate descent profile.

This alternative was agreeable to the ECWG members and was discussed with FAA. FAA did not indicate fatal flaws with the procedure, therefore was recommended to be forwarded to the final phase of the analysis.

The noise screening analysis indicated a decrease between 2 and 3 dBA CNEL for Spring Valley area and decreases between 1 and 2 dBA CNEL for the Sweetwater community area. This decrease is caused by moving all jet arrivals between 11:00 p.m. and 7:00 a.m. on the proposed Runway 27 RNAV approach that starts at the KLOMN waypoint. Increases in CNEL levels between 3 and 4 dBA for the Steele Canyon community area would occur as a result of moving traffic on the proposed RNAV approach. In addition, increases between 2 and 3 dBA CNEL would occur for the Rancho San Diego community area. Due to the noticeable increase in CNEL levels and based on input provided by ECWG at the December 11, 2019 meeting, this design concept was recommended to be eliminated.