

# San Diego County Regional Airport Authority (SDCRAA) Flight Procedure Evaluation ANAC Information Briefing

San Diego International Airport

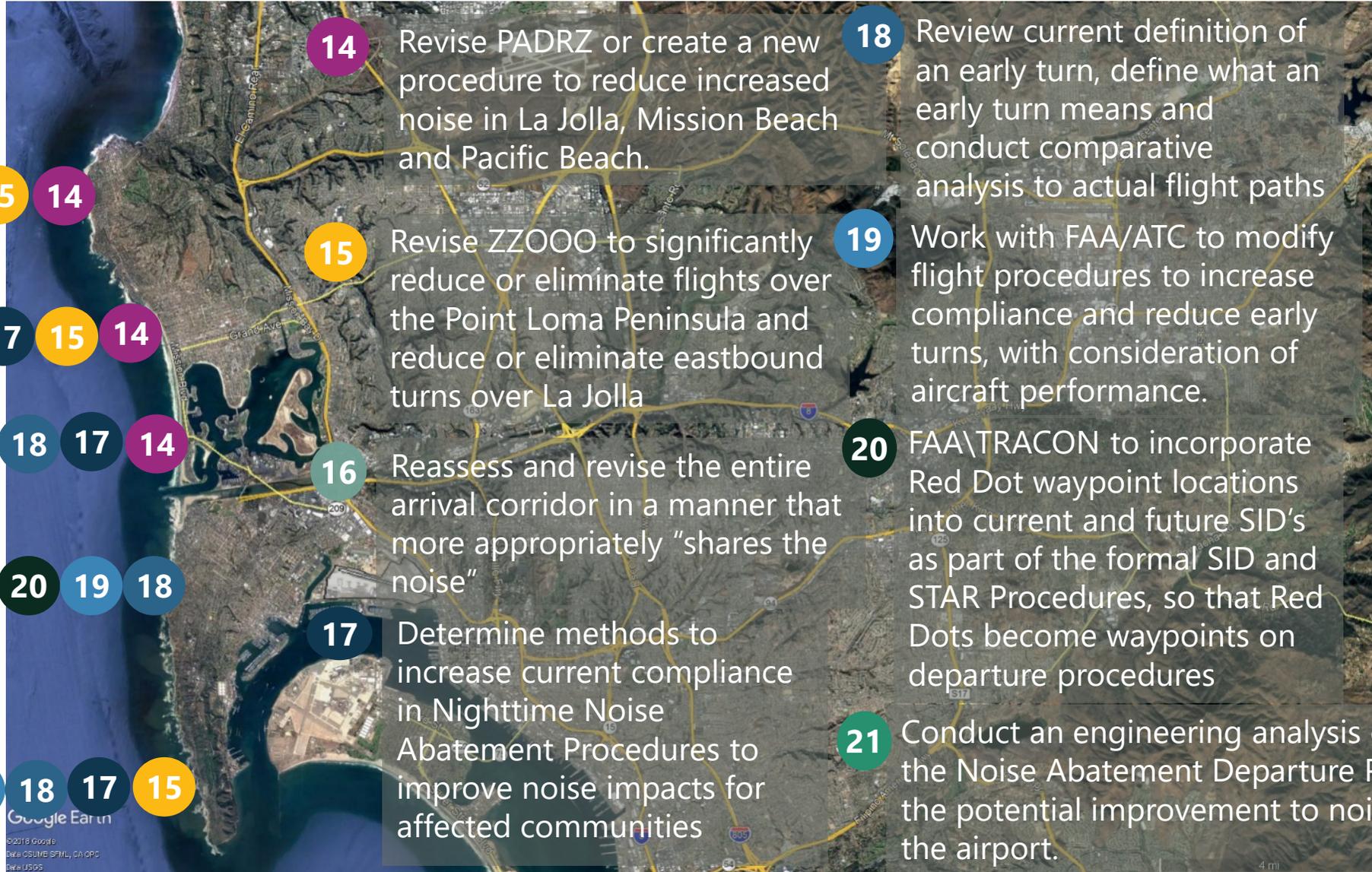
June 19, 2019

# Agenda

- ANAC Recommendations for Traffic Procedures
- Traffic Procedure Evaluation Overview
- Final Procedure Design Concept Details
- Early Turn and Noise Dot Evaluation
- Requested Actions for Consideration

# ANAC Recommendations for Air Traffic Procedures

# ANAC Recommendations



**14** Revise PADRZ or create a new procedure to reduce increased noise in La Jolla, Mission Beach and Pacific Beach.

**18** Review current definition of an early turn, define what an early turn means and conduct comparative analysis to actual flight paths

**15** Revise ZZ000 to significantly reduce or eliminate flights over the Point Loma Peninsula and reduce or eliminate eastbound turns over La Jolla

**19** Work with FAA/ATC to modify flight procedures to increase compliance and reduce early turns, with consideration of aircraft performance.

**16** Reassess and revise the entire arrival corridor in a manner that more appropriately "shares the noise"

**20** FAA\TRACON to incorporate Red Dot waypoint locations into current and future SID's as part of the formal SID and STAR Procedures, so that Red Dots become waypoints on departure procedures

**17** Determine methods to increase current compliance in Nighttime Noise Abatement Procedures to improve noise impacts for affected communities

**21** Conduct an engineering analysis of modification to the Noise Abatement Departure Procedure to assess the potential improvement to noise contours around the airport.

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# ANAC Recommendation Groupings

 Traffic Procedures – ANAC 14, 15, 16, 17 and 21

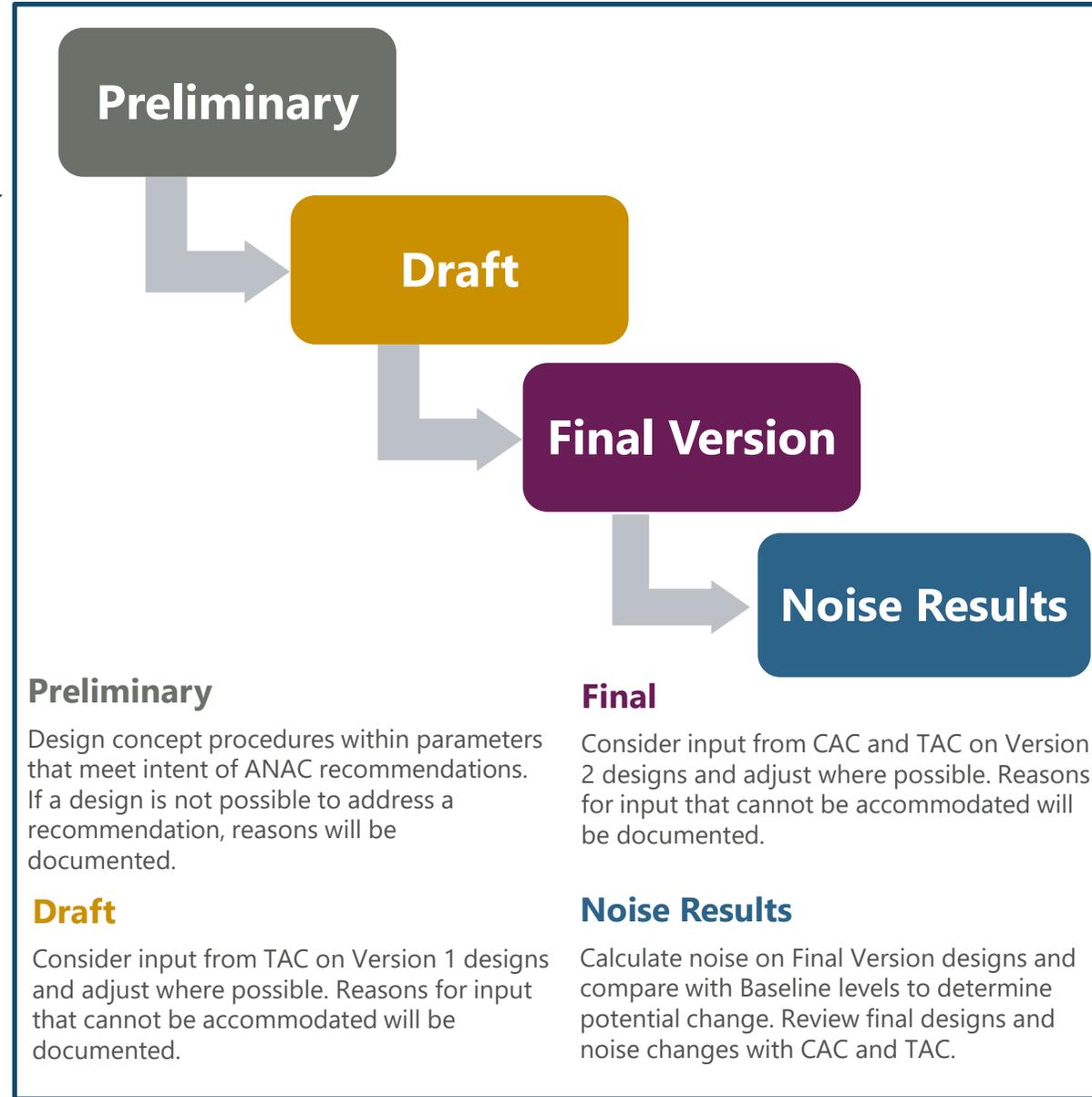
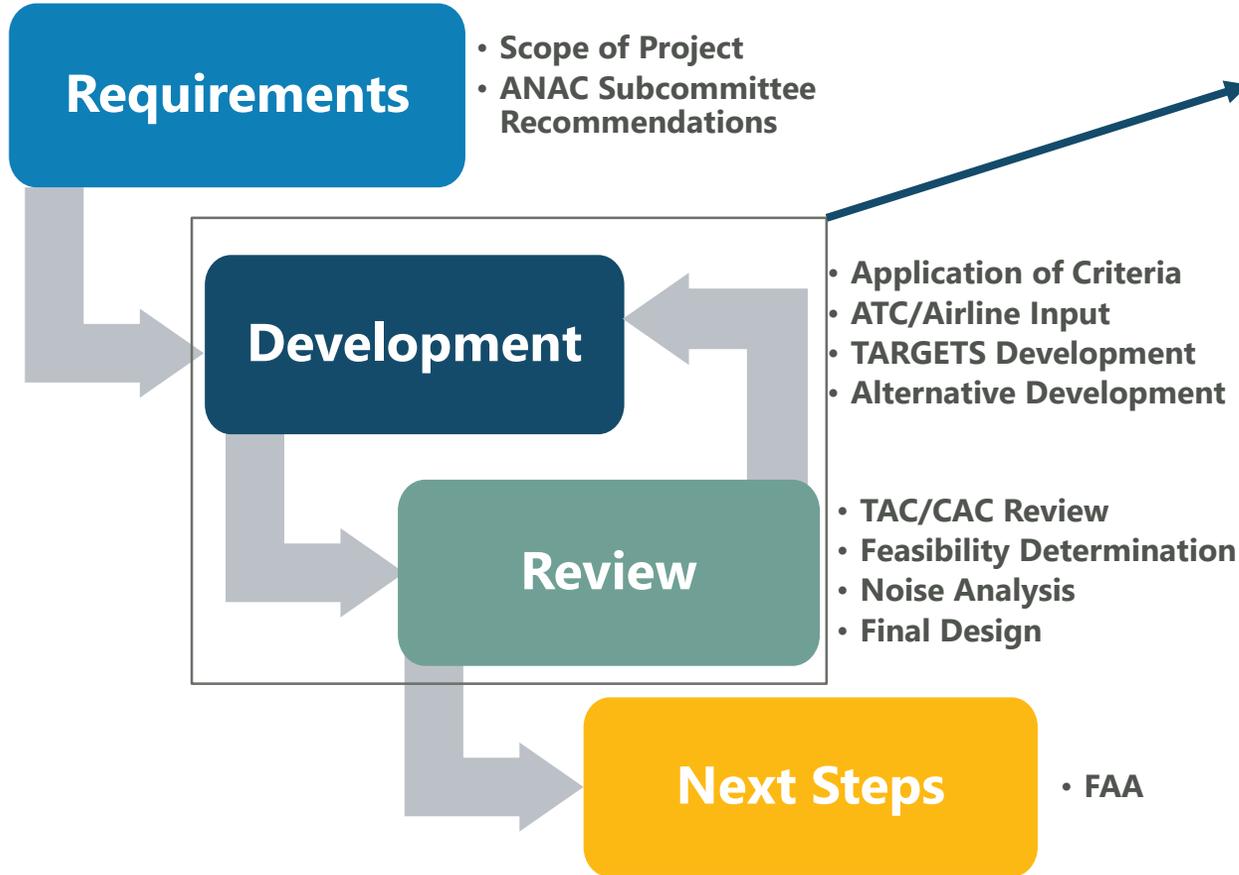
 Early Turns and Noise Dots – ANAC 18, 19 and 20

# Traffic Procedure Evaluation Overview

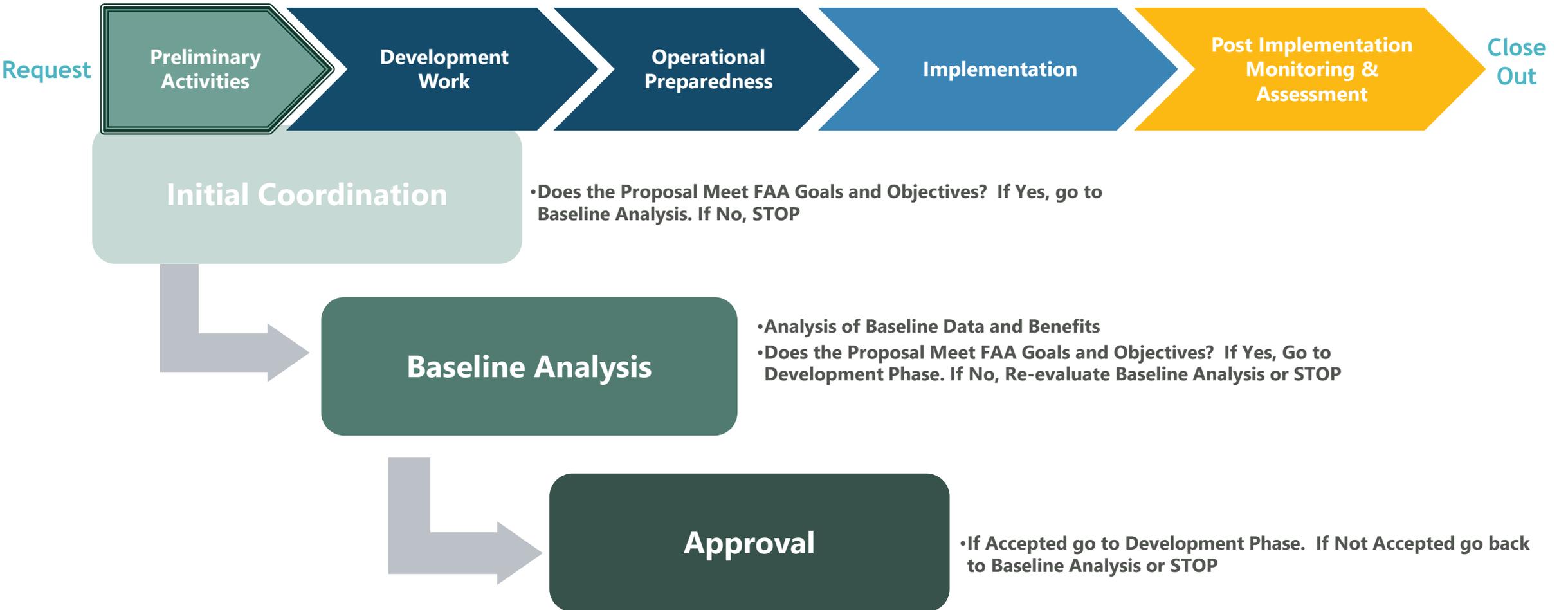
# Evaluation Objectives

- ④ Meet ANAC recommendation intent
- ④ Determine feasibility
  - Safe
  - Meet FAA design criteria
  - Comply with FAA ATC Rules, Policies, and Procedures
  - Maintain SDIA airfield capacity
  - Consider FAA mission and goals
- ④ Calculate and assess changes in noise
- ④ Provide consultant recommendations to SDCRAA and ANAC

# Evaluation Process



# FAA Evaluation Process



# Technical and Citizen Advisory Committee Input/Feedback

## Citizen Advisory Committee (CAC)

- Input on ANAC recommendations and related goals
- Input on procedure design concepts

## Technical Advisory Committee (TAC)

- Broader stakeholder group: Airline(s), commuter carrier(s), corporate operator(s) and FAA ATO.
- Input to confirm procedures are operationally viable and identify potential issues

# Input/Feedback Process Summary



## Coordinated with TAC and CAC

- Conducted 6 meetings related to traffic procedure evaluations
- Provided responses to comments between Preliminary Draft and Draft phases



## Shared information to the public

- TAC/CAC meetings open for public to observe
- Shared all presentations with public on the website (<https://www.san.org/Airport-Noise/FAR-Part-150?EntryId=12485>)

# Design Parameters

- ❌ Do not change aircraft flight paths over areas exposed to CNEL 65 or higher
- ❌ Do not impact safety
- ❌ Meet FAA design criteria
- ❌ Fit within existing airspace and maintain existing airspace hand-off areas
- ❌ Do not impact capacity of SDIA
- ❌ Do not move noise to new non-compatible areas

# Evaluation Actions

## ✓ Did:

- Propose designs compatible with existing air traffic environment
- Gather critical input from CAC and TAC during design process
- Coordinate with FAA ATO staff during concept design process
- Develop information for FAA consideration during the “Preliminary Activities” phase of the FAA Order 7100.41a process, if necessary
- Calculate change in noise levels for specific procedures

# Evaluation Actions

## ✘ Did not:

- Evaluate recommendations to reduce noise at or higher than CNEL 65 dBA – reserved for Part 150 Study
- 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

## Potential Affect to CNEL 65

- ❗ Change to initial departure headings from Runway 27
  - Recommendation 17 – Nighttime Noise Abatement Procedure
  - Recommendation 21 - Modification to the Noise Abatement Departure Procedure
- 💡 **Consultant Recommendation:** Evaluate recommended changes under Title 14 Code of Federal Regulations Part 150 Study (14 CFR Part 150 Study) update

# Design Concept Evaluation Results Summary

ANAC Recommendations	Design Concepts Evaluated	14 CFR Part 150 Process	Final Design Concept
Recommendation 14 – Departures to the Northwest	8	2	2
Recommendation 15 – Departures to the East	6	1	3
Recommendation 16 - Arrivals from the Northwest	6	0	0
<b>Total</b>	<b>20</b>	<b>3</b>	<b>5</b>

# Final Design Concepts Evaluated

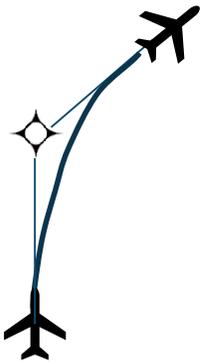
<b>ANAC Recommendation</b>	<b>Alternative Name</b>
Recommendation 14	<b>Nighttime Jet Departures to the Northwest – Turn at 1.5 NM</b>
Recommendation 14	<b>Nighttime Jet Departures to the Northwest – Turn at 0.5 NM</b>
Recommendation 15	<b>Nighttime Jet Departures to the East – Turn at 1.5 NM</b>
Recommendation 15	<b>Nighttime Jet Departures to the East – Turn at 0.5 NM</b>
Recommendation 15	<b>Jet Departures to the East (6:30 a.m. to 10:00 p.m.)</b>
Recommendation 16	<b>All Day Jet Arrivals from Northwest</b>

# TAC/CAC Input on Final Design Concepts

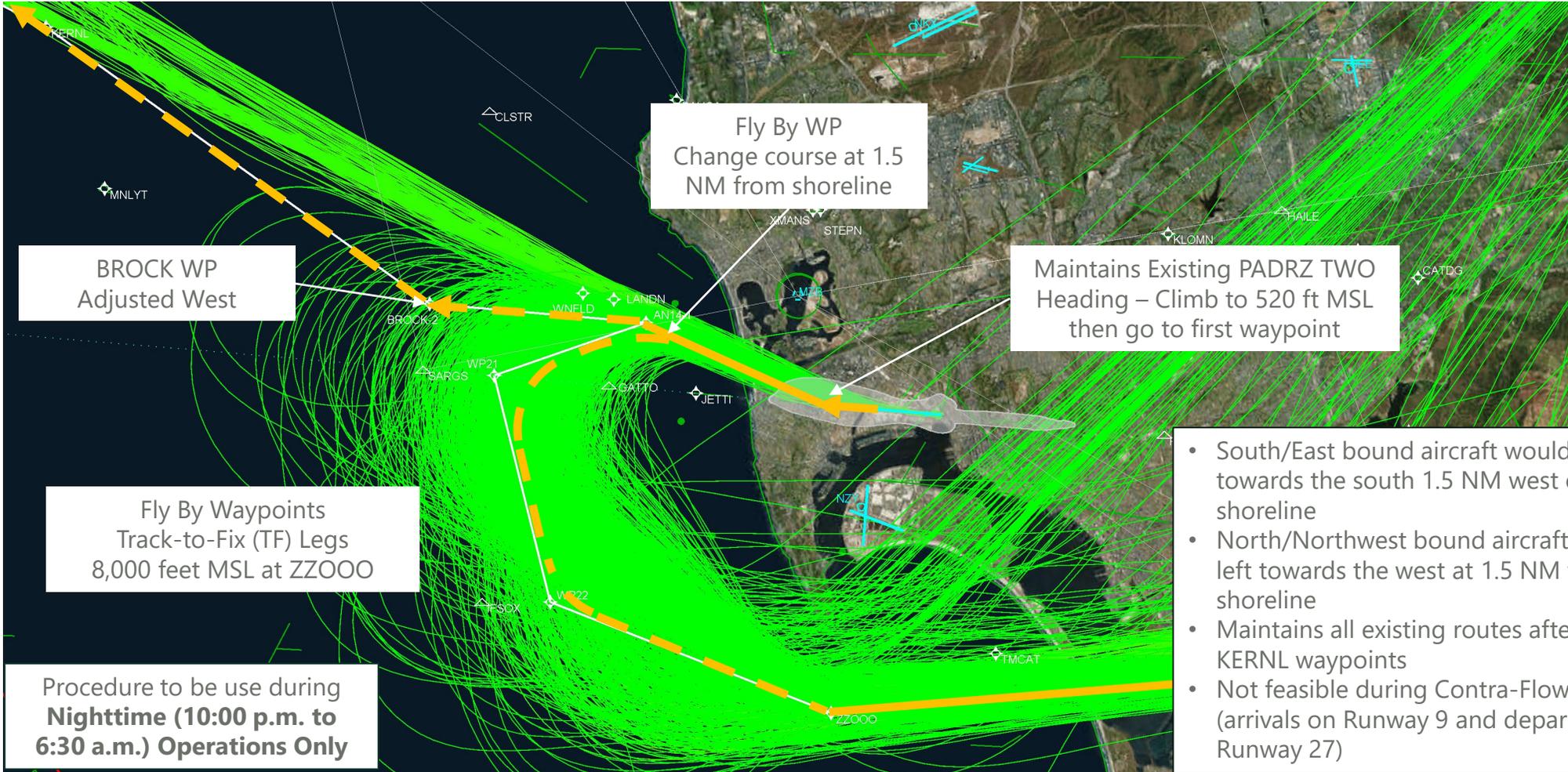
-  Prefer Early Turn restriction (no turns until 1.5 NM from shoreline) is maintained in all designs
  - Did not recommend Nighttime Jet Departures to the Northwest – Turn at 0.5 NM
  - Did not recommend Nighttime Jet Departures to the East – Turn at 0.5 NM
-  Hold nighttime departure procedure design concepts until ANAC Recommendation 17 and 21 are addressed in 14 CFR Part 150 Study

# Final Procedure Design Concept Details

# Nighttime Jet Departures to the Northwest and East – Turn at 1.5 NM



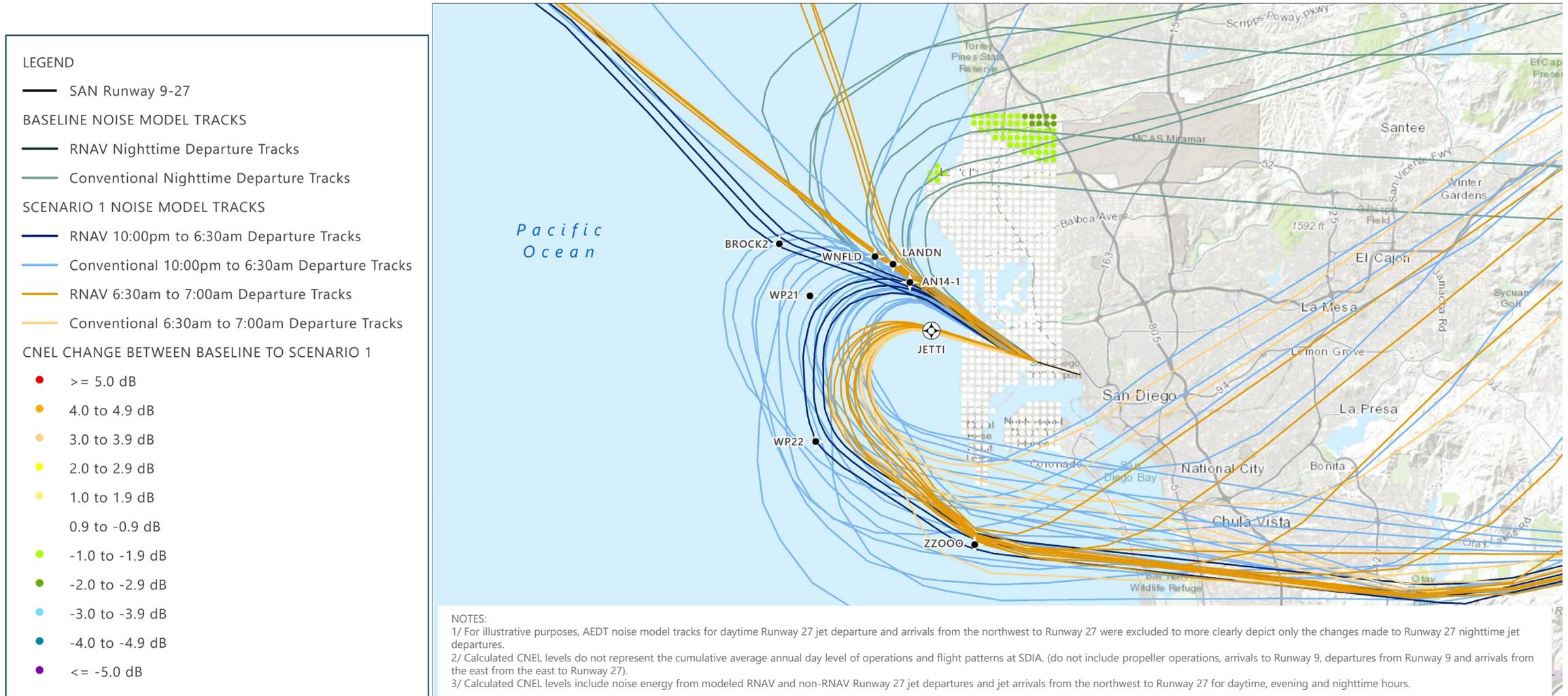
Fly By  
Waypoint



- South/East bound aircraft would turn left towards the south 1.5 NM west of the shoreline
- North/Northwest bound aircraft would turn left towards the west at 1.5 NM west of the shoreline
- Maintains all existing routes after ZZOOO and KERNL waypoints
- Not feasible during Contra-Flow operations (arrivals on Runway 9 and departures on Runway 27)

NOTE: White lines connecting waypoint to waypoint may not represent actual flight path flown by aircraft.

# Nighttime Jet Departures to the Northwest and East – Turn at 1.5 NM - AEDT Scenario 1/Baseline Noise Model Tracks and CNEL Changes



# Nighttime Jet Departures to the Northwest and East – Turn at 1.5 NM – Changes in CNEL – North - UPDATE

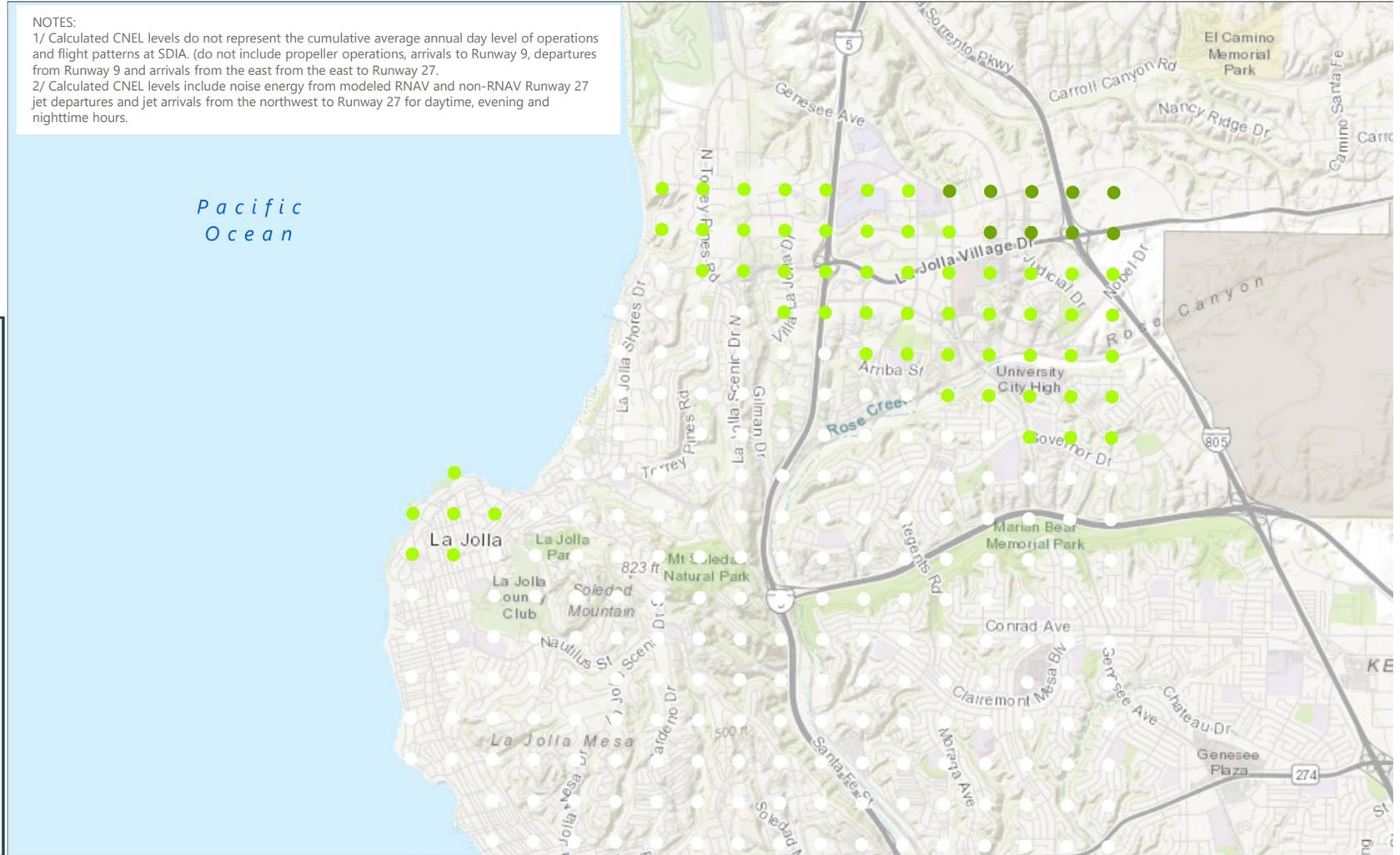
NOTES:  
1/ Calculated CNEL levels do not represent the cumulative average annual day level of operations and flight patterns at SDIA. (do not include propeller operations, arrivals to Runway 9, departures from Runway 9 and arrivals from the east from the east to Runway 27.  
2/ Calculated CNEL levels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

Pacific Ocean

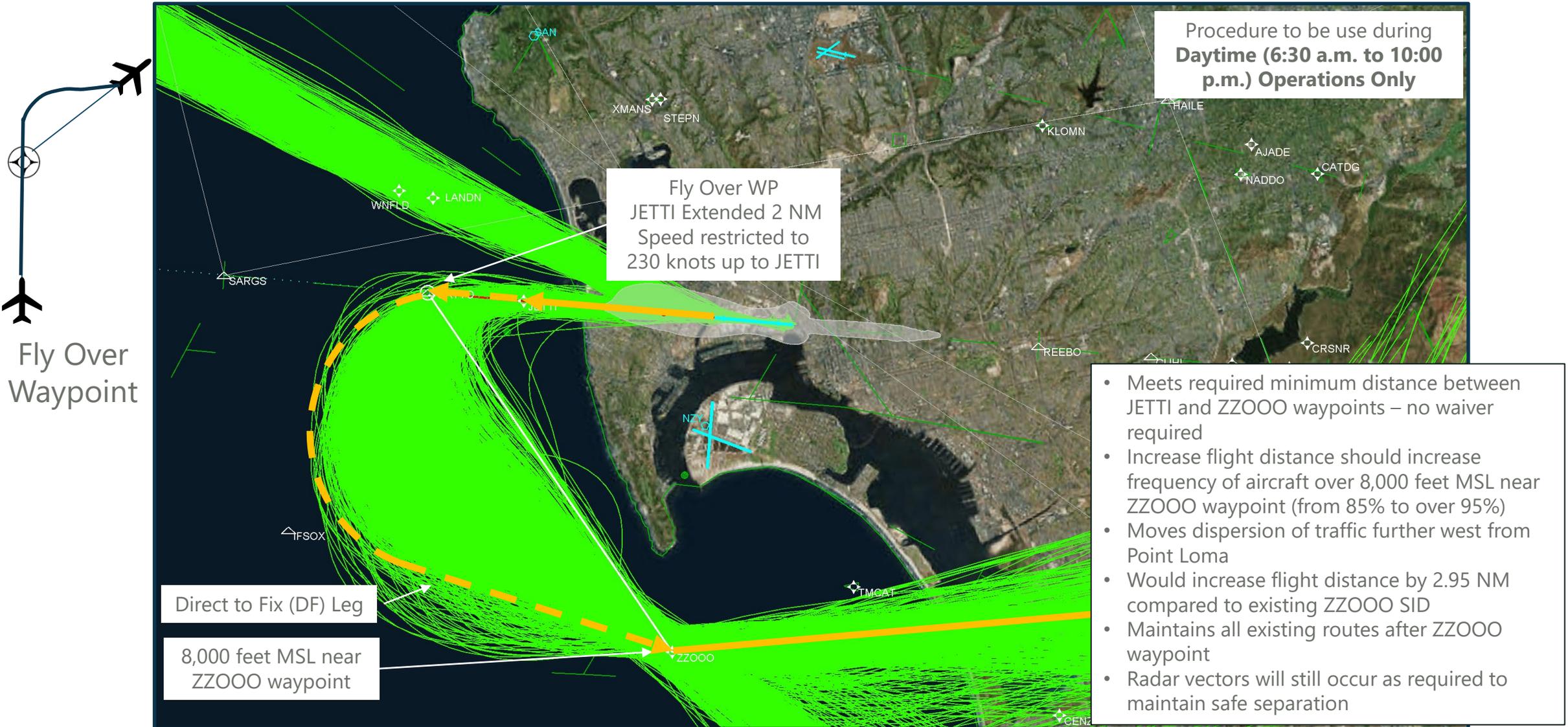
### LEGEND

#### CNEL CHANGE BETWEEN BASELINE TO SCENARIO 1

- $\geq 5.0$  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
- $\leq -5.0$  dB



# Jet Departures to the East (6:30 a.m. to 10:00 p.m.)



# Jet Departures to the East (6:30 a.m. to 10:00 p.m.) AEDT Alternative/Baseline Noise Model Tracks and CNEL Changes

**LEGEND**

— SAN Runway 9-27

**BASELINE NOISE MODEL TRACKS**

— RNAV Nighttime Departure Tracks

— Conventional Nighttime Departure Tracks

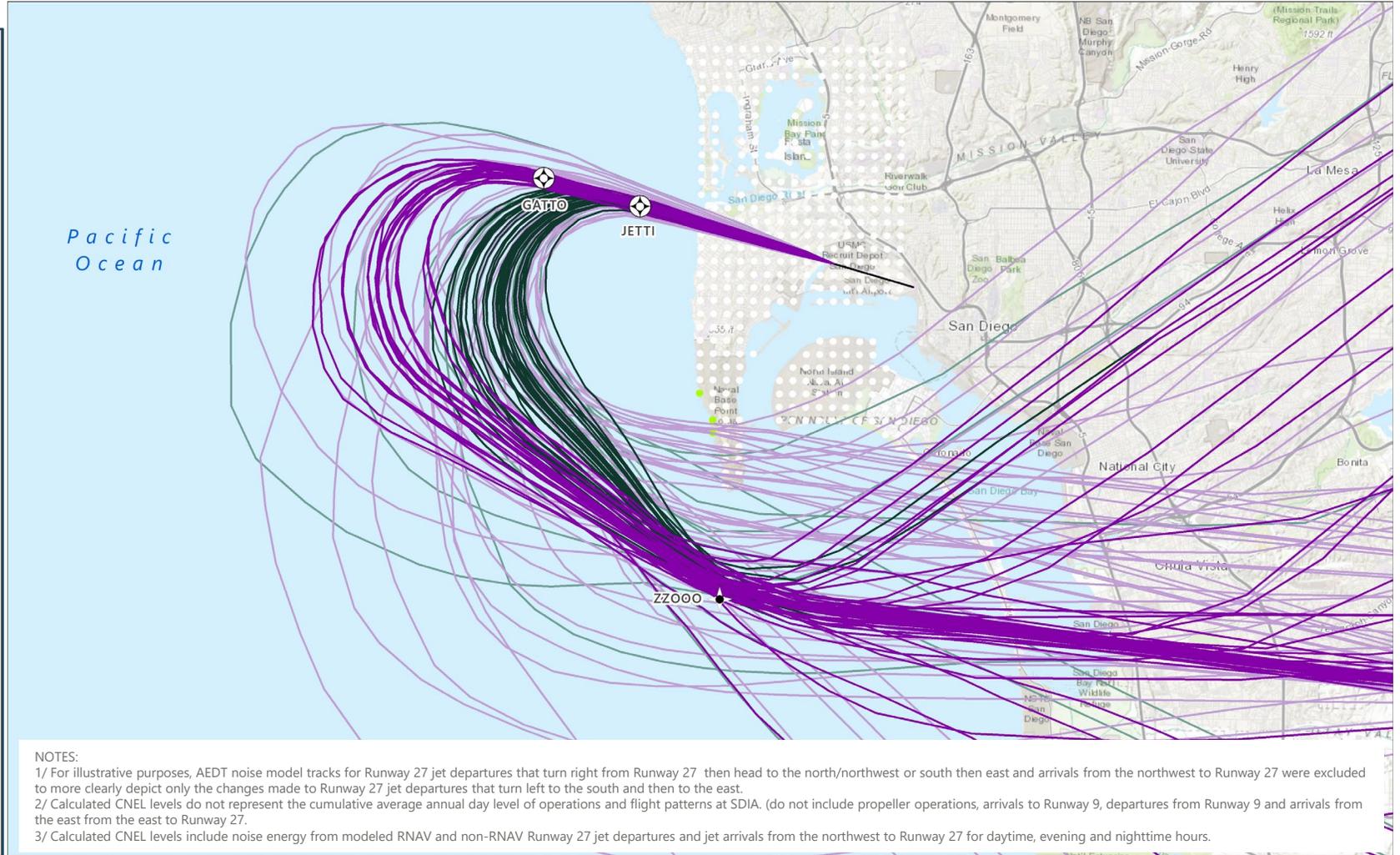
**SCENARIO 2 NOISE MODEL TRACKS**

— RNAV Nighttime Departure Tracks

— Conventional Nighttime Departure Tracks

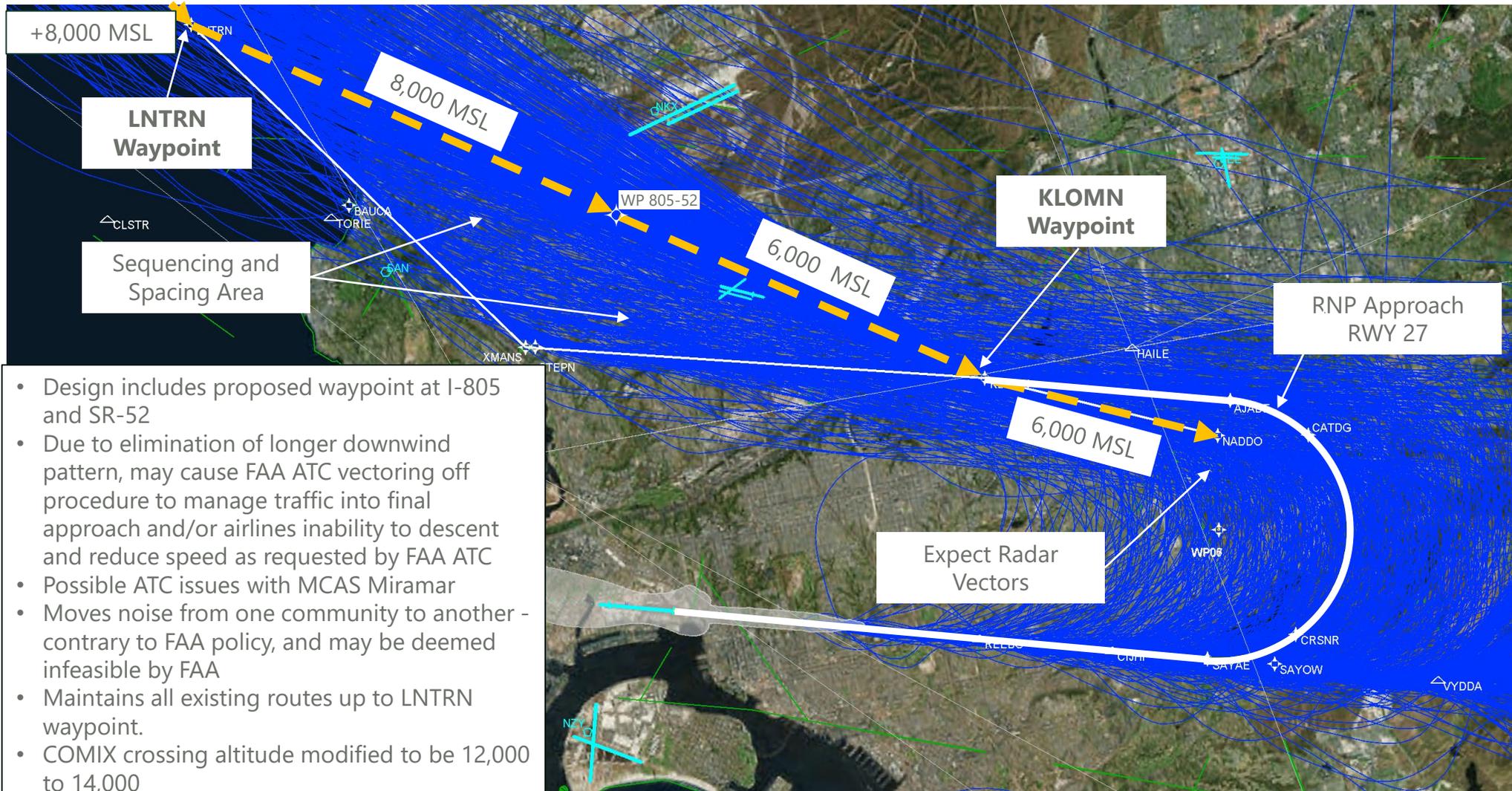
**CNEL CHANGE BETWEEN BASELINE TO SCENARIO 2**

- $\geq 5.0$  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
- $\leq -5.0$  dB

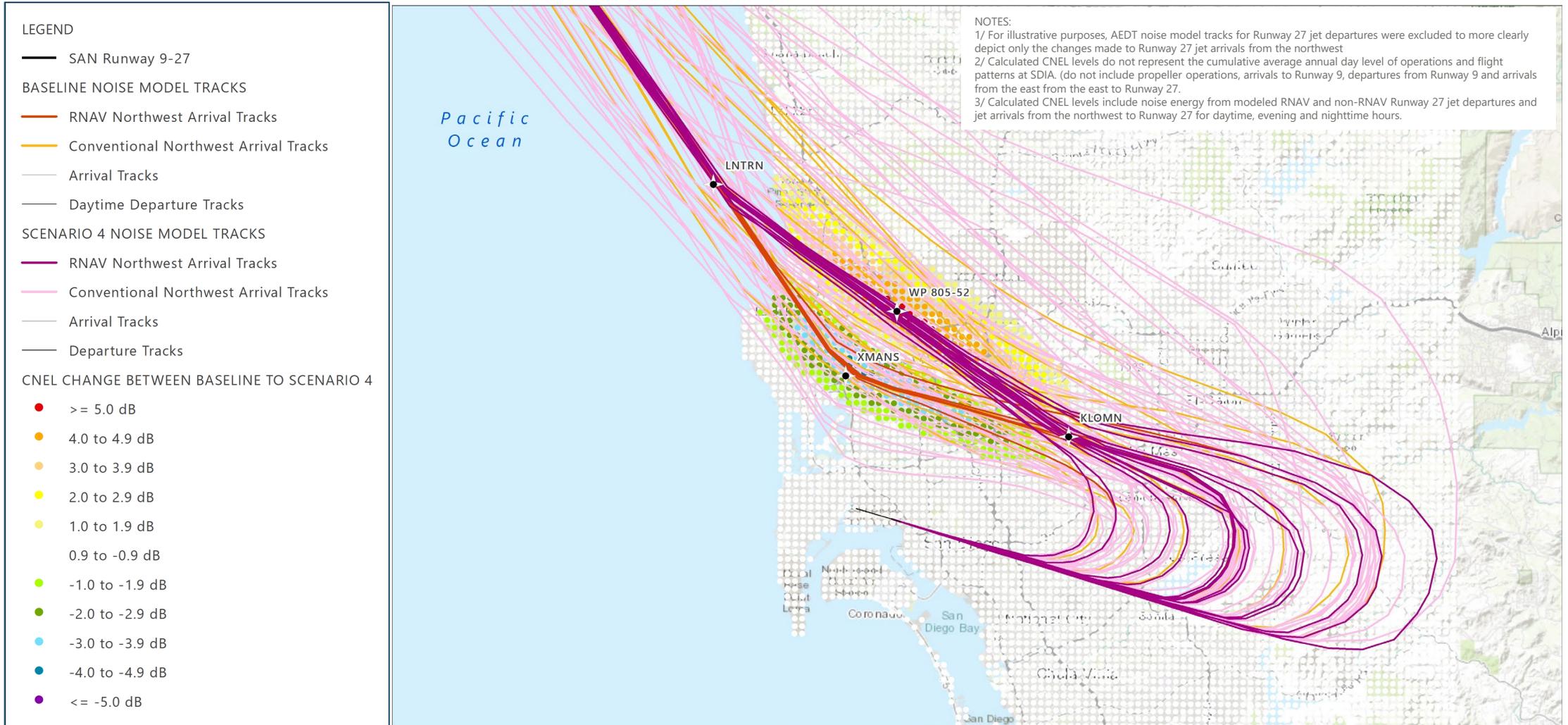




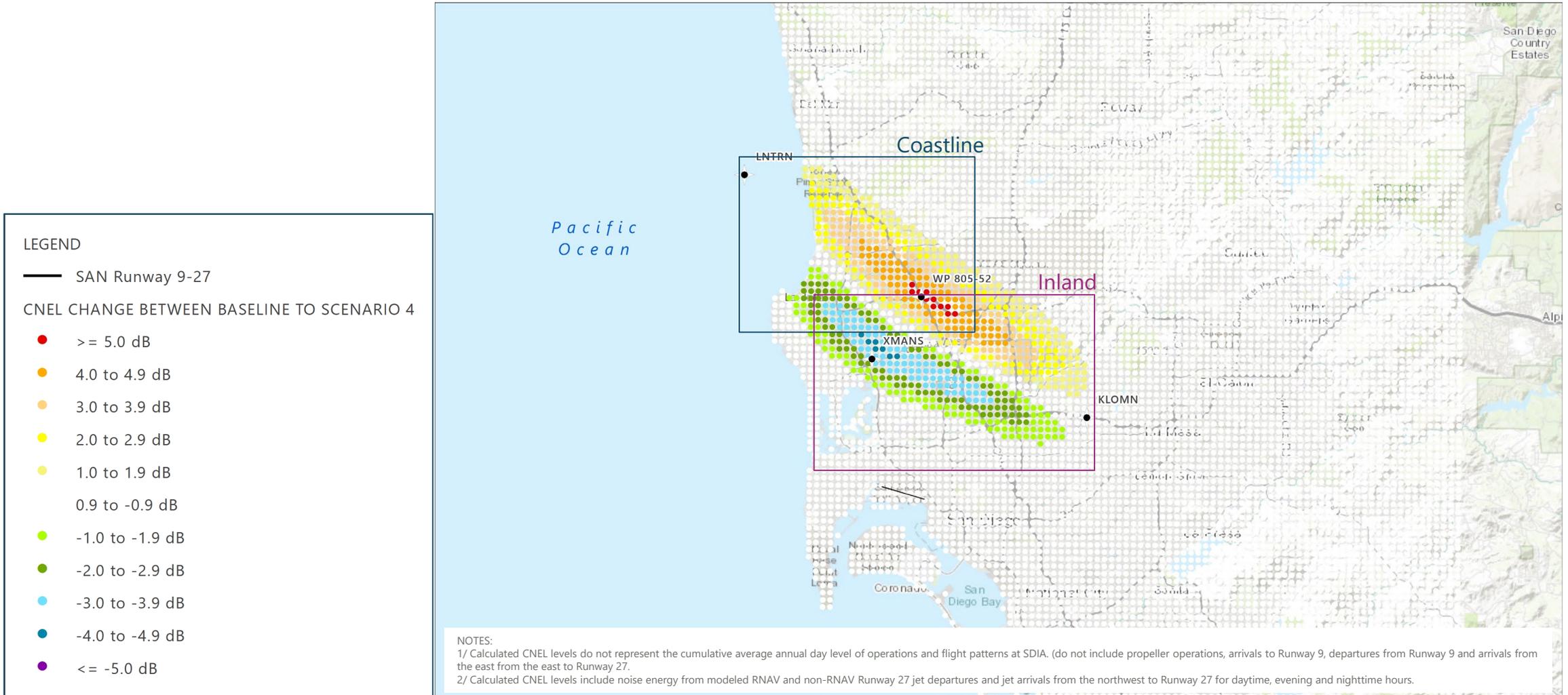
# All Day Jet Arrivals from the Northwest



# All Day Jet Arrivals from the Northwest – AEDT Alternative/Baseline Noise Model Tracks and CNEL Changes



# All Day Jet Arrivals from the Northwest – Changes in CNEL



# All Day Jet Arrivals from the Northwest – Changes in CNEL - Coastline

**NOTES:**

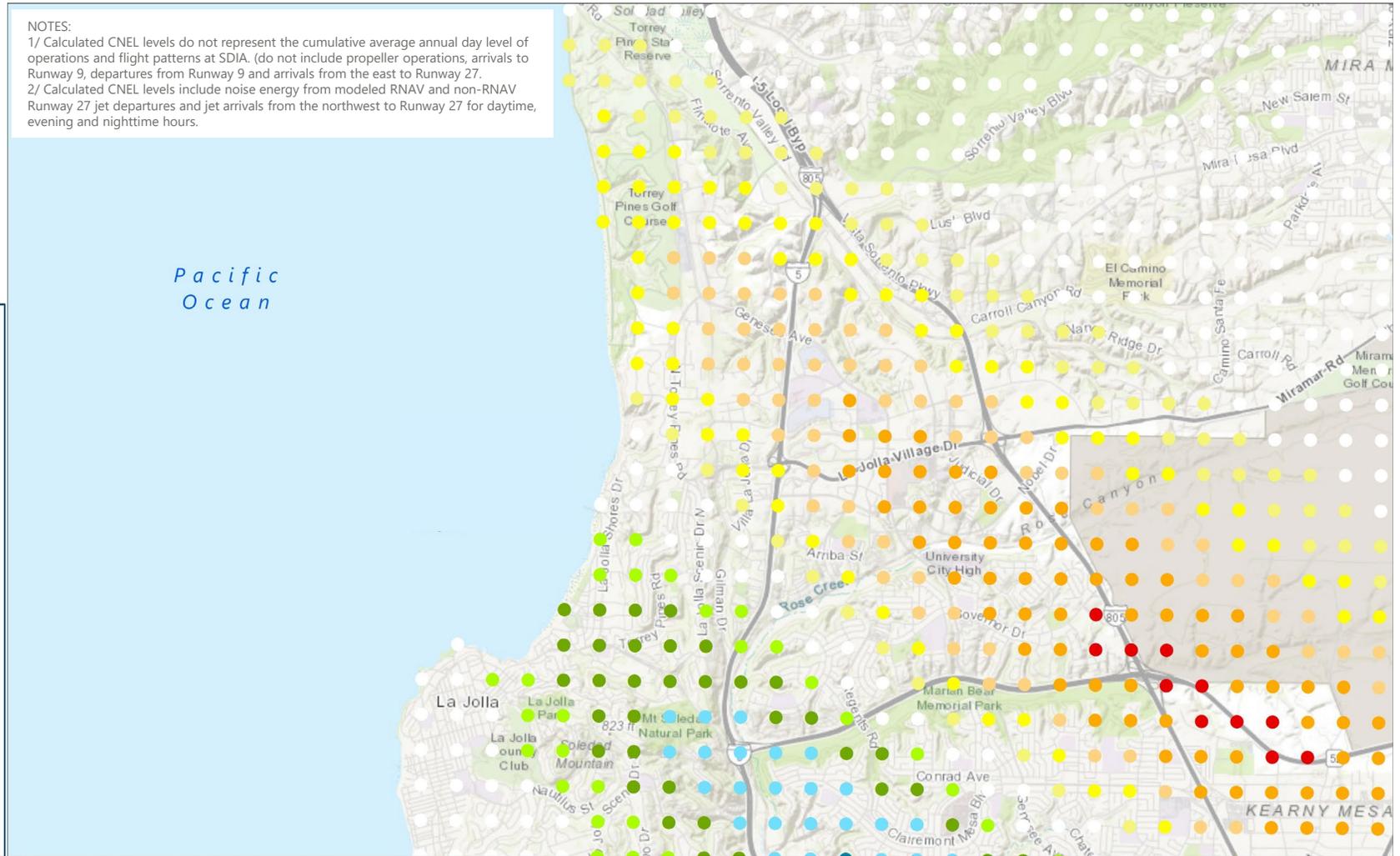
1/ Calculated CNEL levels do not represent the cumulative average annual day level of operations and flight patterns at SDIA. (do not include propeller operations, arrivals to Runway 9, departures from Runway 9 and arrivals from the east to Runway 27.  
 2/ Calculated CNEL levels include noise energy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

Pacific Ocean

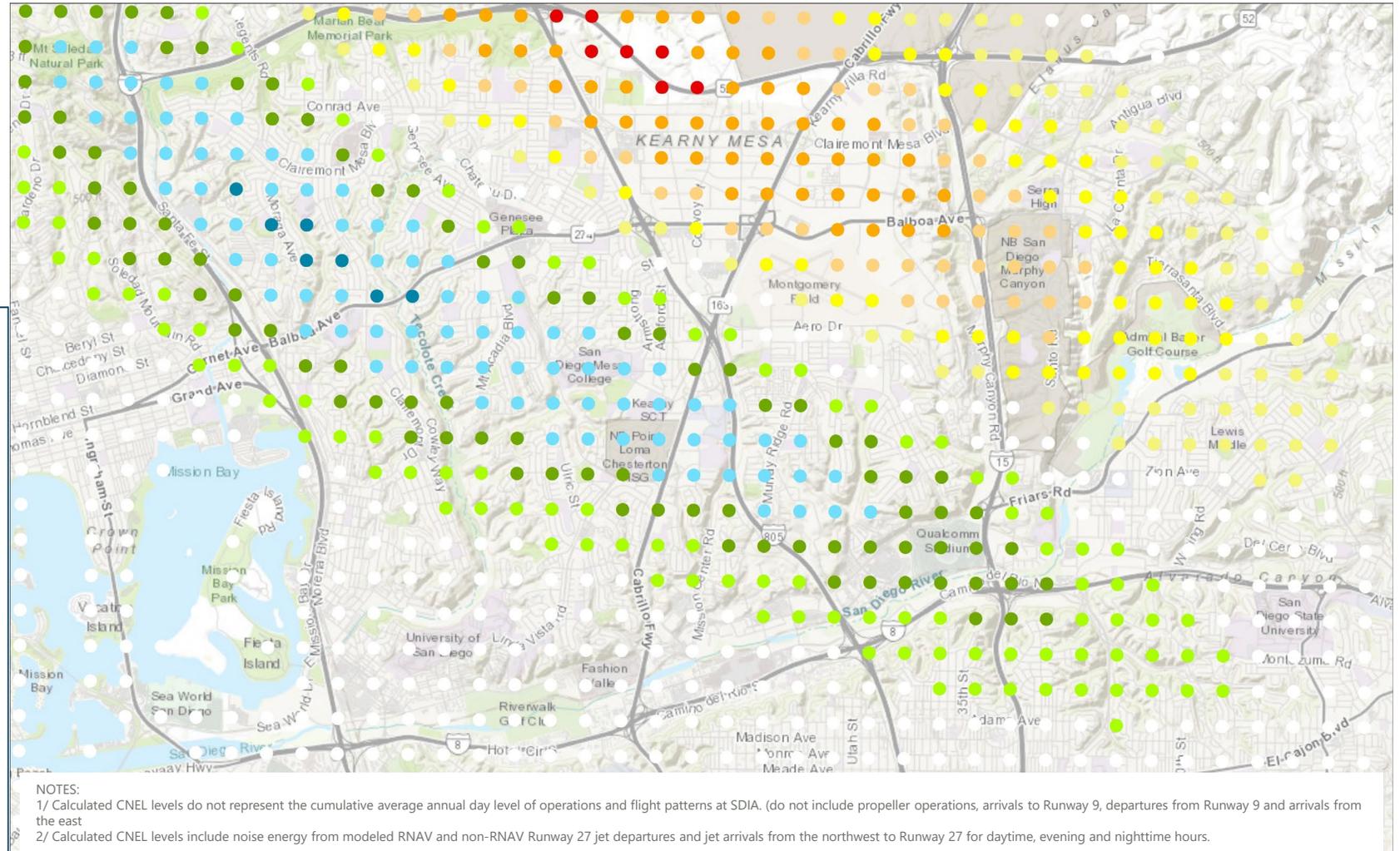
**LEGEND**

**CNEL CHANGE BETWEEN BASELINE TO SCENARIO 4**

- $\geq 5.0$  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
- $\leq -5.0$  dB



# All Day Jet Arrivals from the Northwest – Changes in CNEL - Inland



**LEGEND**

**CNEL CHANGE BETWEEN BASELINE TO SCENARIO 4**

- >= 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 arrivals from the east)
- 2/ Calculated CNEL levels include noise energy from modeled RNAV and non-RNAV Runway 27 jet departures and jet arrivals from the northwest to Runway 27 for daytime, evening and nighttime hours.

## Consultant Recommendations

- 💡 Evaluate Nighttime Noise Abatement Departure changes (ANAC 17 and 21) under 14 CFR Part 150 Study update
- 💡 Hold nighttime departure procedure design concept for ANAC 14 and 15 until ANAC 17 and 21 are addressed in 14 CFR Part 150 Study
- 💡 Proceed forward with the Jet Departures to the East (6:30 a.m. to 10:00 p.m.) design concept
- 💡 Do **not** proceed forward with the All Day Jet Arrivals from the Northwest design concept

# Early Turn and Noise Dot Evaluation

# Early Turn and Noise Dot Evaluation

- **Recommendation 18** – *Early Turn* - 3<sup>rd</sup> Party review and definition of “Early Turn”
- **Recommendation 19** – *Early Turn* - Modify flight procedures to increase compliance and reduce early turns
- **Recommendation 20** – *Noise Dots* - Incorporate Red Dot waypoint locations into current and future SID’s as part of the formal SID and STAR Procedures
- **Status:** Consultant Team completed findings report and was distributed to TAC and CAC members and posted at the website on March 21, 2019

# ANAC Recommendation 18 (Early Turns)

- **ANAC Recommendation:** Review current definition of an early turn, define what an early turn means and conduct comparative analysis to actual flight paths

- **Consultant Finding:**

- Runway 27 jet departures or missed approaches that are vectored off an initial departure heading prior to 1.5 nautical miles west of the shoreline or those aircraft routed back (south and east bound) over residential areas of Point Loma north of Fort Rosecrans National Cemetery, with the exception of aircraft vectored off course to ensure safe separation.
- The Authority’s methodology to identify early turns is appropriate based on independent definition of early turns, but should include missed approaches in the evaluation.



SOURCE: San Diego County Regional Airport Authority, February 2018 (noise dot locations); Ricondo & Associates, Inc., March 2019 (early turn violation example paths).

# ANAC Recommendation 19 (Early Turns)

- **ANAC Recommendation:** Work with FAA/ATC to modify flight procedures to increase compliance and reduce early turns, with consideration of aircraft performance.
- **Consultant Finding:** The consultant reviewed all published departure procedures and concluded the designs comply with the early turn restriction. The early turn violations reported by the Authority to ANAC serve as evidence the existing procedures as defined increase compliance with early turn restrictions. In addition, the intent of this recommendation (to modify procedures to increase compliance ) is met through the design evaluation efforts related to Recommendations 14 and 15.

**Note:** FAA air traffic control manages a very dynamic environment close to and several miles away from SDIA. They direct flights to address weather, safe separation, sequencing and/or operational efficiency issues present at the time an air traffic controller takes action. In many cases, management actions are related to traffic interaction several miles away from SDIA. Procedure designs cannot address every situation that requires speed or heading directions issued by a controller.

Early Turns by Year

YEAR	Early Turns	% Change
2013	829	--
2014	1,105	33
2015	1,293	17
2016	776	(40)
2017	420	(46)
2018	269	(36)
2019	125*	--

\* Through March 31, 2019

ZZOOO RNAV SID implemented November 2016 and PADRZ RNAV SID implemented January 2017  
 SOURCE: San Diego County Regional Airport Authority, April 2019.

## RNAV Use – May-December 2017

Runway 27 RNAV SIDs	Use (%)
ZZOOO RNAV	81%
PADRZ RNAV	96%

SOURCE: Ricondo & Associates, Inc., April 2019 (based on SDCRAA ANOMS radar data from May 2017 to December 2017 and maintaining RNAV path until ZZOOO or WNFLD waypoints).

# ANAC Recommendation 20 (Noise Dots)

- **ANAC Recommendation:** FAA\TRACON to incorporate Red Dot waypoint locations into current and future SID's as part of the formal SID and STAR Procedures, so that Red Dots become waypoints on departure procedures and data is collected on waypoints.
- **Consultant Finding:** Incorporating noise dots as waypoints in existing or proposed SIDs is not feasible. The current Area Navigation (RNAV) departures comply with the early-turn restrictions. The focus should be to work with FAA on keeping aircraft on the RNAV departure procedures. An alternative concept to move Noise Dots #3 and #4 south of Point Loma was considered, but most likely will not be feasible based on preliminary feedback from FAA.



SOURCE: Esri, HERE, DeLorme, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), MapmyIndia, NGCC, OpenStreetMap Contributors, and the GIS User Community, August 2018 (basemap); San Diego County Regional Airport Authority ANOMS data, 2018 (FAA noise dots); ESRI Data, 2010 (Airports); National Flight Data Center (NFDC), October 2018 (waypoint); Ricondo & Associates, Inc., October 2018 (alternatives).

# Requested Actions for Consideration

# Requested Actions for Consideration

- **Nighttime Jet Departures to the Northwest and East (ANAC 14 and 15)**
  - Hold nighttime departure design for ANAC 14 and 15 from further consideration until ANAC 17 and 21 are addressed
  
- **Jet Departures to the East (6:30 a.m. to 10:00 p.m.) (ANAC 15)**
  - Proceed forward for further consideration
  
- **Noise Dot Location (ANAC 20)**
  - Proceed forward with Noise Dot #4 and #5 relocation for further consideration