

# Palos Verdes Noise Study

Los Angeles World Airports

Noise Management Bureau

June 30, 1999

# Purpose of Study

- Observe Palos Verdes overflights
- Measure typical single-event noise levels on PV Peninsula
- Use single-event noise levels to validate use of Integrated Noise Model (INM)
- Use INM to determine average noise levels on PV Peninsula under current conditions and several alternatives



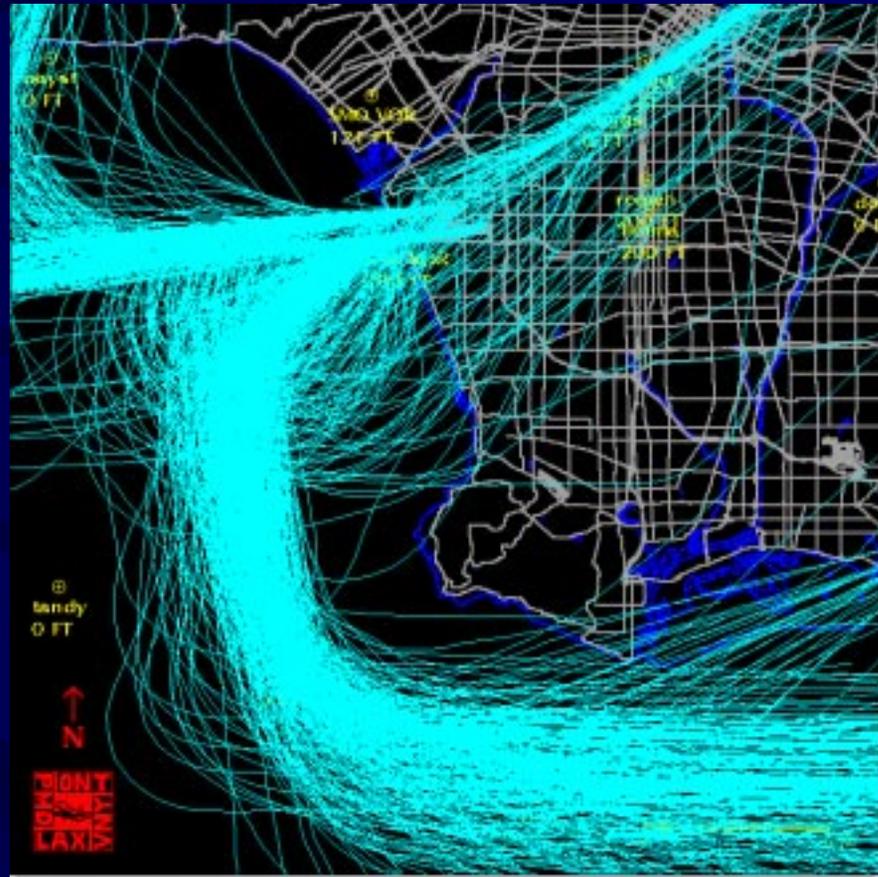
# Typical LAX Operations

- Typical jet flight path in yellow
- Typical turboprop flight path toward San Diego in green
- Typical turboprop flight path toward Seal Beach in blue



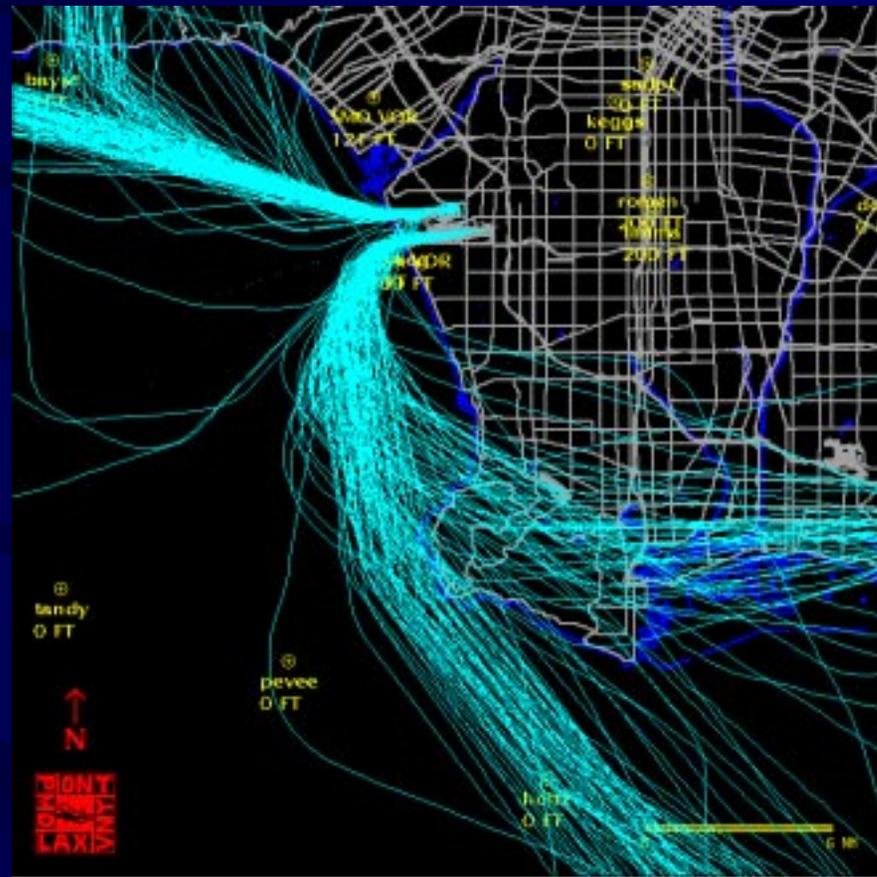
# Typical LAX Operations

- One day of LAX jet departures (April 7, 1999)



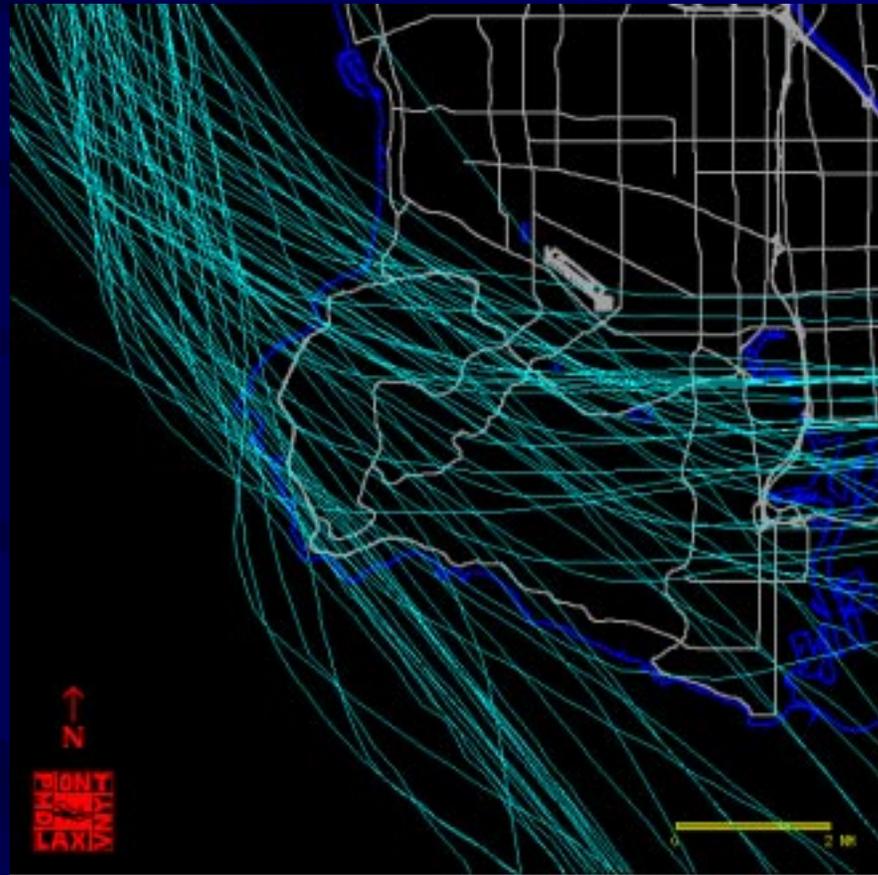
# Typical LAX Operations

- LAX turboprop departures on April 7, 1999 (250 total)
- 121 fly “toward” Peninsula (48% of total)
- 64 fly “over” Peninsula (26% of total)



# LAX Turboprops over PV

- 64 flights over Peninsula on 4/7/99
- Altitude range 4800 - 10700 feet MSL
- Average altitude 7530 feet MSL



# Elements of Study

- Noise Monitoring
  - site recommendations from community, followed by a physical site survey
  - 8 monitoring locations selected (1 site added later at FAA's request)
  - 6 days of monitoring over two weeks
  - approximately 2 hours per site during anticipated "busy" period
- Flight Operations Monitoring
  - FAA ARTS radar flight data during monitoring period correlated noise events to specific aircraft
  - 2 days of "typical" ARTS data was summarized for noise modeling
- Noise Modeling
  - Integrated Noise Model used to predict single-event and average noise levels



# Noise Monitoring Locations

Paseo del Mar in PVE

Rancho Palos Verdes City Hall

Fire Station #56 in Rolling Hills

Vista Grande Elementary School  
in RPV

South Shores Elementary School  
in San Pedro

Highridge Park in RHE

Marymount College in RPV

Via Gabriel in PVE

Springcreek Road in RPV



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# Noise Modeling

- “Existing condition” is based on March, 1999 operations (after “Demonstration Program” was initiated in February, 1999). This was compared to...
  - pre-Demonstration Program operations,
  - a procedure where all San Diego- and Carlsbad-bound turboprops are routed offshore, and
  - procedures where all LAX turboprops are route one-mile, three-miles, and five-miles offshore. Each of these requires relocation of LAX jet departure routes in model.



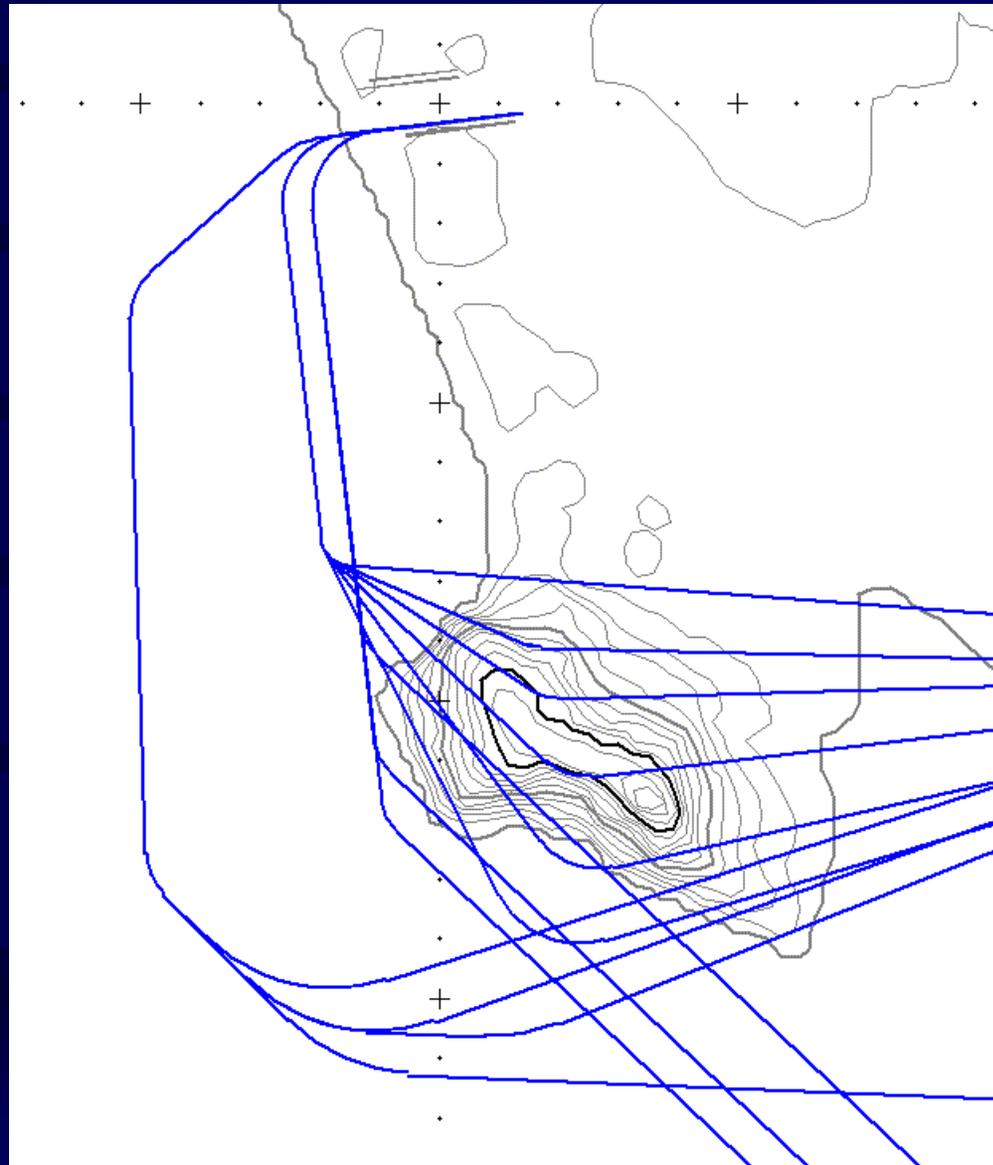
# Existing Condition Flight Tracks

Six turboprop tracks bound for  
Seal Beach

Three turboprop tracks bound for  
San Diego / Carlsbad

One jet tracks for LAXX departure

Three jet tracks following LAXX  
departure bound for Seal  
Beach



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## Maximum Single-event Noise Levels (SEL) in decibels (dBA) for Turboprop Departures from LAX

Site	INM-Predicted	Measured
HRP	67.9	71.7
MMC	66.0	67.0
PDM	68.4	74.8
RHF	67.6	65.2
RPV	67.4	67.3
SCR	68.9	70.7
SSE	64.5	62.5
VGE	68.8	69.8



# Explanation of CNEL & Ldn

- Community Noise Equivalent Level, or CNEL, is a daily-average noise statistic used in California. State Regulations define 65 CNEL as the State's Airport Noise Standard action level
- Day-Night Level, or Ldn or DNL, is a daily-average noise statistic used by the Federal government and in other states. Federal regulations employ an action level of 65 Ldn.
- $CNEL \text{ or } Ldn = SEL_{avg} + 10\log(N_{eq}) - 49.4$ 
  - $SEL_{avg}$  is the average single-event noise level of all aircraft noise events
  - For CNEL,  $N_{eq}$  is the number of daytime events, plus 3 times the number of evening events, plus 10 times the number of nighttime events.
  - For Ldn,  $N_{eq}$  is the number of daytime and evening events, plus 10 times the number of nighttime events.



# Analysis of Single Event Noise Levels

- Loudest predicted Tprop noise level (SEL) at any site was 68.4 dB
- Loudest measured Tprop noise level (SEL) at any site was 74.8 dB
- If every Tprop noise event (and thus SEL<sub>avg</sub>) were 74.8 dB
  - N<sub>eq</sub> would need to be 9120 to get to 65 dB CNEL
  - N<sub>eq</sub> would need to be 912 to get to 55 dB CNEL



# Analysis of Single Event Noise Levels (Continued)

- 141 Tprops fly over and around PV per day
- Based on typical day/evening/night ratio,  $N_{eq} = 346.5$
- This is a small fraction of the number needed to reach established levels of significance ( $N_{eq} = 9120$  for 65 CNEL, from previous slide)
- Thus, in order to have 65 dB CNEL, a particular site on the PV peninsula would have to be subjected to approximately 26 times as many of the loudest Tprop overflights it now experiences.



# Modeled Aircraft Operations

	Day (0700-1900)	Evening (1900-2200)	Night (2200-0700)	Total
Aircraft Type & Direction				
Tprops to SLI	59.0	12.5	8.5	80.0
Tprops to SAN	40.5	11.5	9.0	61.0
Jets to SLI	3.5	4.0	28.5	36.0
Jets around	200.0	32.5	55.5	288.0
Total	303.0	60.5	101.5	465.0

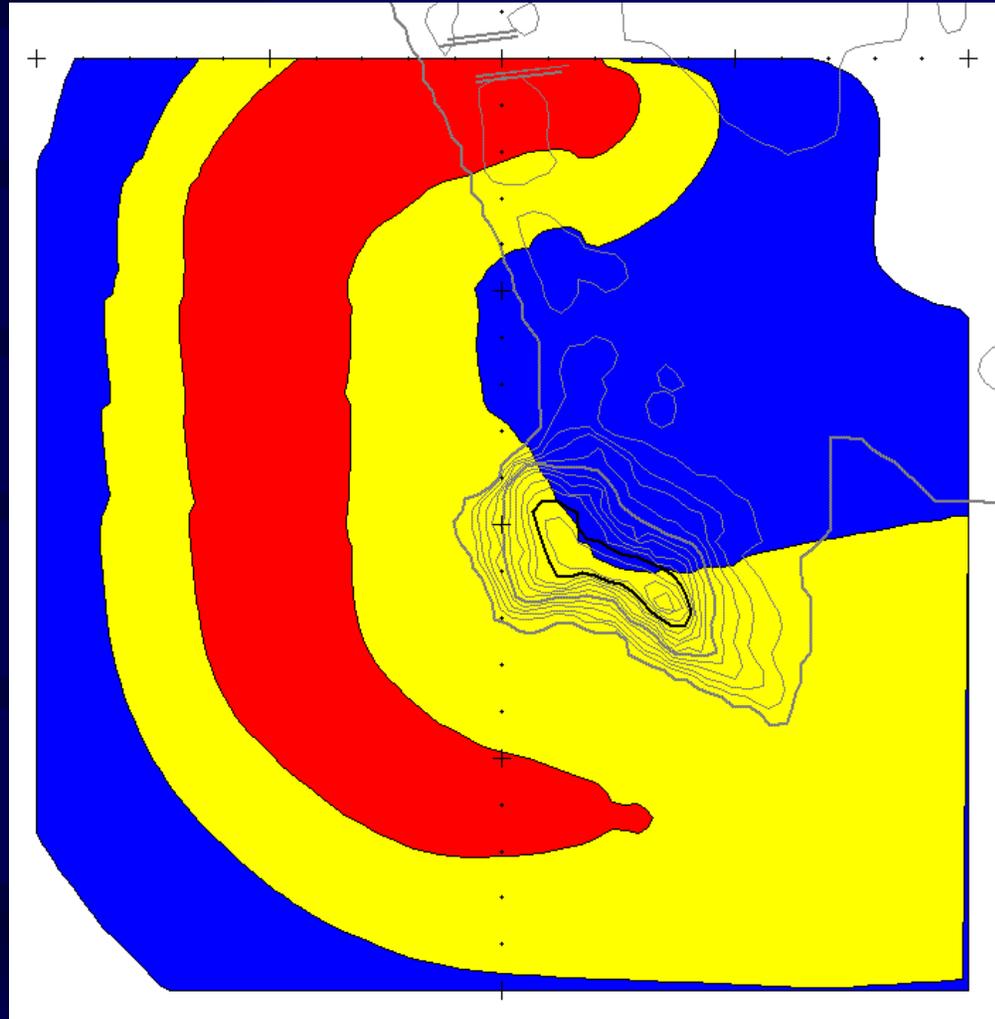


# Existing Condition Noise Contours

Red area is 50 dB CNEL or  
greater

Yellow area is 40 dB  
CNEL or greater

Blue area is 30 dB CNEL  
or greater

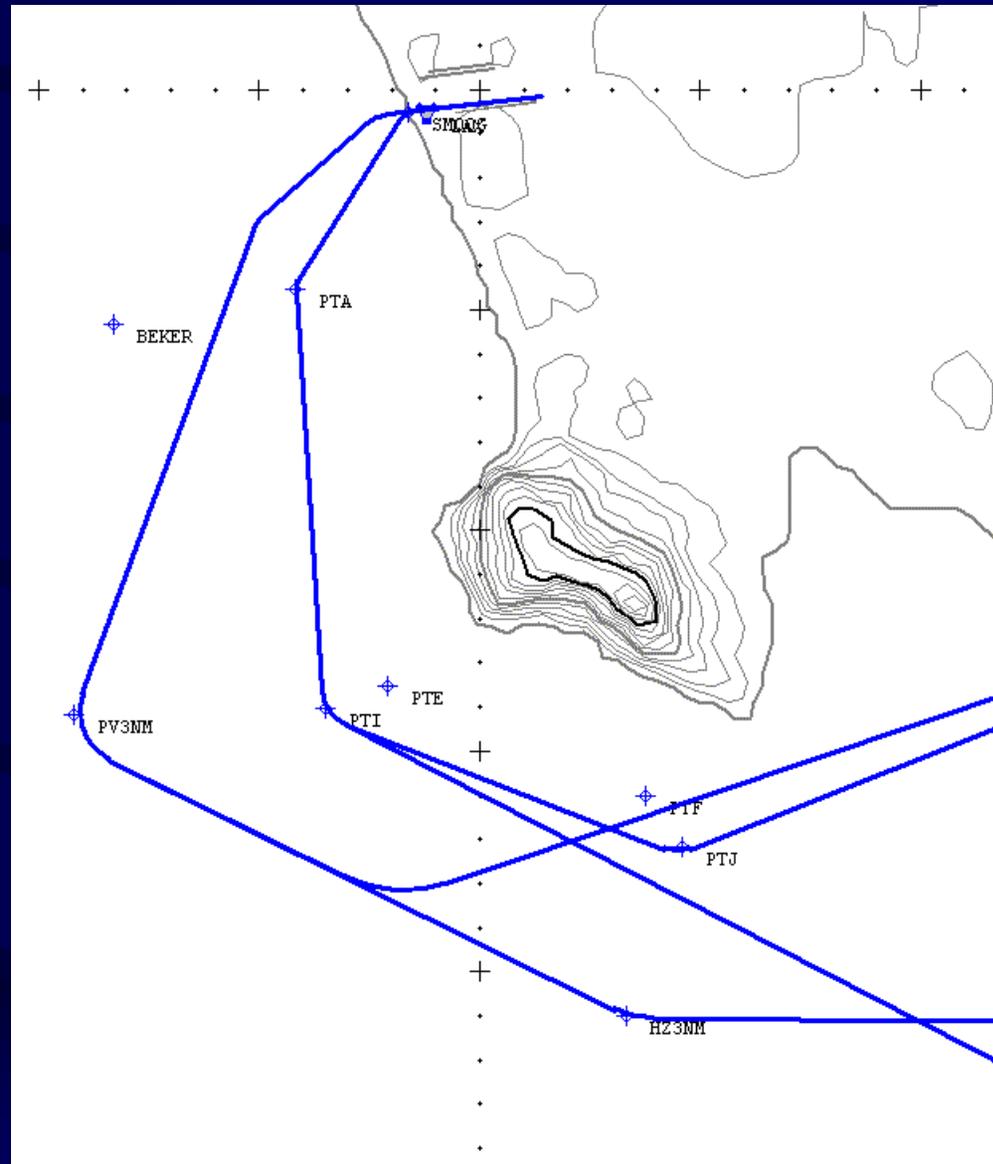


# Alternative Flight Tracks

Three-mile Offshore alternative shown as an example

Two turboprop departure tracks  
one bound for Seal Beach  
the other bound for San Diego / Carlsbad

Two jet departure tracks  
one following a revised Holtz DP  
the other making a transition to a new Seal Beach common point



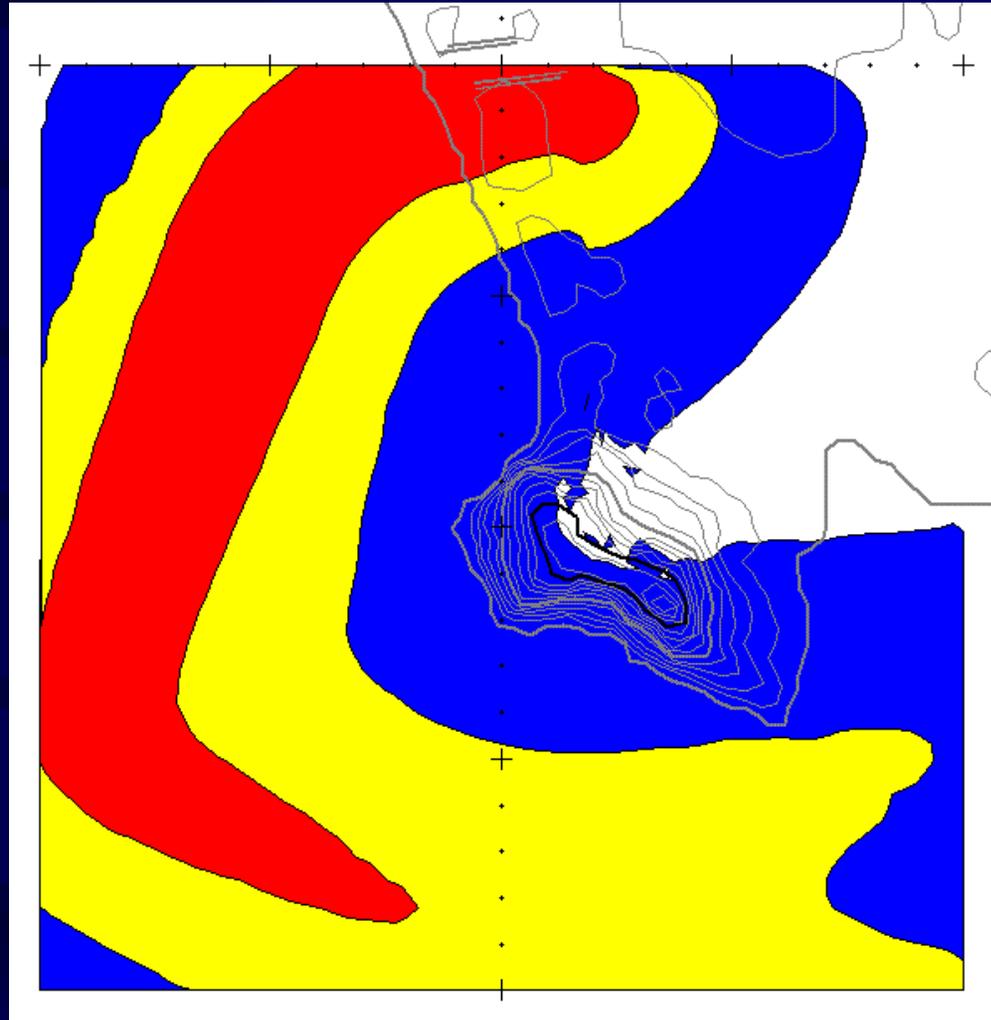
# Alternative Noise Contours

Three-mile offshore  
alternative shown as an  
example

Red area is 50 dB CNEL or  
greater

Yellow area is 40 dB  
CNEL or greater

Blue area is 30 dB CNEL  
or greater



# Predicted Noise Levels (CNEL) for Existing Condition and Alternatives

Site	Since 2/10/99	Prior to 2/10/99	SAN/CRQ Offshore	1-mile Offshore	3-mile Offshore	5-mile Offshore
HRP	40.9	42.0	39.4	34.9	31.4	29.5
MMC	43.9	43.8	41.2	38.2	34.3	32.5
PDM	42.0	42.3	40.9	37.0	34.1	33.0
RHF	40.7	41.8	38.8	34.6	31.2	29.6
RPV	43.1	40.3	41.8	39.1	34.3	31.5
SCR	40.3	42.2	39.4	33.2	29.9	28.4
SSE	45.4	44.8	43.3	40.4	36.2	34.5
VGE	41.9	41.7	40.3	36.8	32.8	30.8



# Predicted Change in Noise Levels (CNEL) for Alternatives

Site	SAN/CRQ Offshore	1-mile Offshore	3-mile Offshore	5-mile Offshore
HRP	-1.5	-6.0	-9.5	-11.4
MMC	-2.7	-5.7	-9.6	-11.4
PDM	-1.1	-5.0	-7.9	-9.0
RHF	-1.9	-6.1	-9.5	-11.1
RPV	-1.3	-4.0	-8.8	-11.6
SCR	-0.9	-7.1	-10.4	-11.9
SSE	-2.1	-5.0	-9.2	-10.9
VGE	-1.6	-5.1	-9.1	-11.1
<b>Average Change</b>	<b>-1.6</b>	<b>-5.5</b>	<b>-9.3</b>	<b>-11.1</b>



# Summary of Results - Current Noise

- Single-event turboprop noise related to LAX departures
  - Measured peak noise levels (Lmax) were as high as 63 dB(A), SEL values as high as 75.
  - Predicted SEL values as high as 68.4 dB(A).
  - The noise model under-predicted noise at some sites but was accurate at others
- Cumulative noise related to LAX departures
  - Predicted average noise level (CNEL) is less than 44 dB at all sites but one (South Shore Elementary in San Pedro = 45.4)
  - Factoring in worst-case adjustments for single-event under-prediction, CNEL is less than 55 dB.
- Noise levels are not high enough to be “significant” by any regulatory standards.



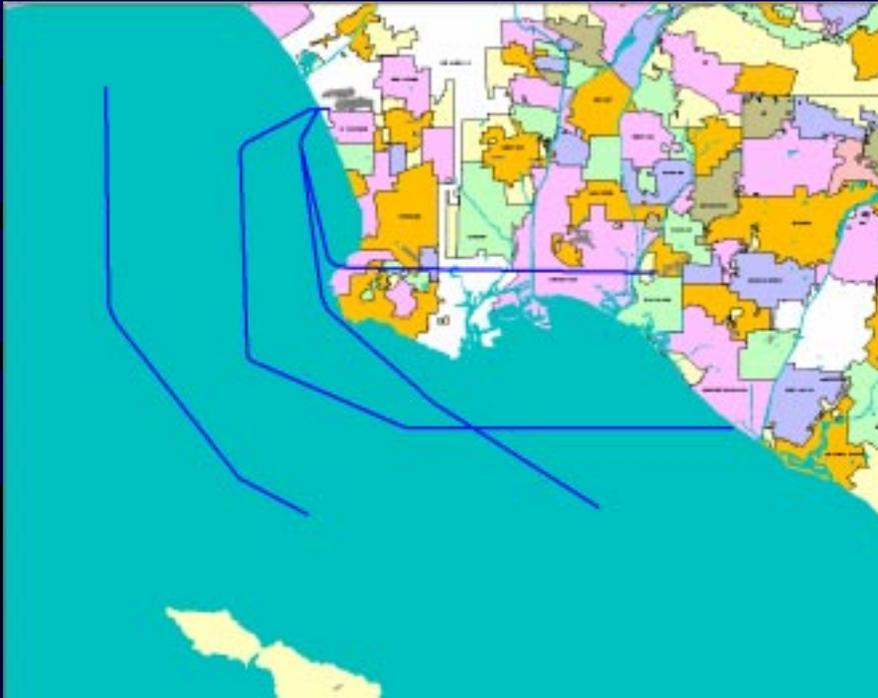
# Summary of Results - Alternatives

- Demonstration program implemented in February, 1999 did not provide significant improvement for all residents, and increased noise in some areas
- All proposed alternatives reduce noise from existing levels
- Each incremental move out-to-sea provides additional benefit, however the “decibels-per-mile” benefit diminishes as the distance increases
- Proposed 3-mile offshore alternative is recommended as it offers “noticeable” improvement at all sites and reduces average noise levels to less than 40 dB CNEL.

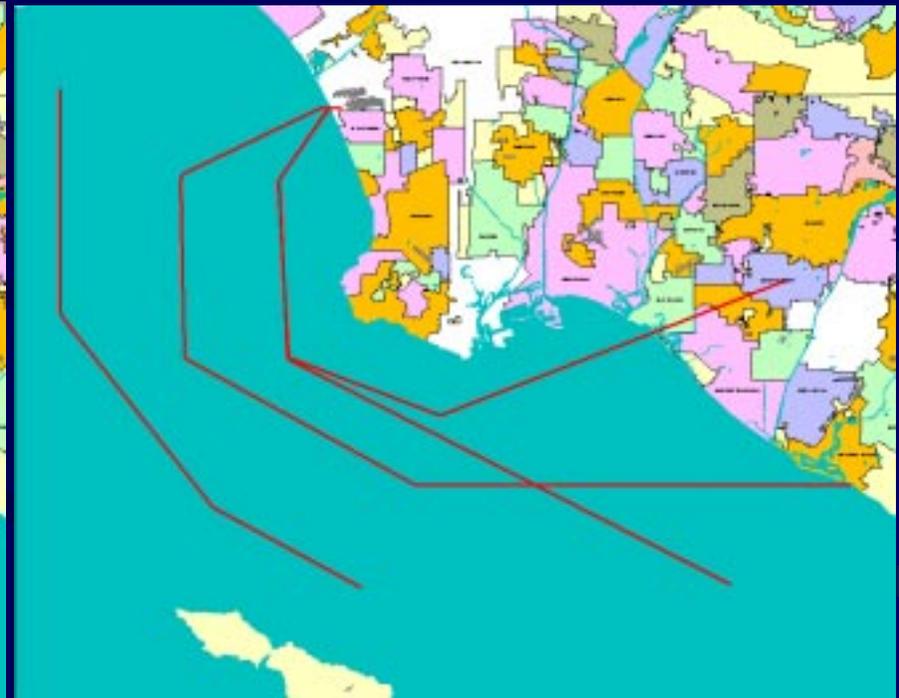


# Additional Considerations

Different communities will be impacted if tracks are moved...



“Existing Condition” Tracks



3-mile Offshore Tracks

