SECTION 11 CONSIDERATION OF OPERATIONAL ALTERNATIVES

11.1 INTRODUCTION

The primary goals of the FAR Part 150 Noise Compatibility Program (NCP) are:

- Reduce existing non-compatible land uses around the airport; and /or
- Prevent, or reduce the probability of, the establishment of additional non-compatible land uses.

Because the situation at McClelland-Palomar Airport (CRQ) is not identical to any other airport, it will require a unique combination of mitigation measures to achieve an acceptable resolution. A wide range of feasible operational alternatives will be explored in this section.

Modification of certain aircraft, airport, and Air Traffic Control (ATC) operational procedures have the potential to reduce aircraft noise exposure on people, residential areas, schools, churches, and other noise-sensitive sites around the airport. Operational noise abatement alternatives typically result in either a shift in the location of the noise contours or a reduction in the size of the noise contours. FAR Part 150 §B150.7(b) indicates that the following alternatives should be analyzed as potential operational noise abatement measures:

- The construction of barriers and acoustical shielding.
- The implementation of a preferential runway system.
- The use of flight procedures (including the modifications of flight tracks) to control the operation of aircraft to reduce exposure to individuals (or specific noise-sensitive areas) to noise in the area around the airport.
- The implementation of any restriction on the use of the airport by any type or class of aircraft based on the noise characteristics of those aircraft. Such restrictions may include, but are not limited to:
  - Denial of use of the airport to aircraft types or classes which do not meet Federal noise standards;
  - Capacity limitations based on the relative noisiness of different types of aircraft;
  - Requirements that aircraft using the airport must use noise abatement takeoff or approach procedures previously approved as safe by the FAA;
  - Landing fees based on FAA certificated or estimated noise emission levels or on time of arrival; and
  - Partial or complete curfews.
- Other actions or combinations of actions which would have a beneficial noise control or abatement impact on the public.
- Other actions recommended for analysis by the FAA for the specific airport.

Based upon the airport noise exposure and non-compatible land uses identified in the map, the airport operator shall evaluate the potential operational noise abatement measures against the following criteria:

- Is not unjustly discriminatory;
- Does not derogate safety or adversely affect the safe and efficient use of airspace; and
- To the extent practicable, meets both local needs and needs of the national air transportation system, considering tradeoffs between economic benefits derived from the airport and the noise impact.

The recommended operational noise abatement measures must be appropriate to the specific airport. For example, an evaluation of night curfews is not appropriate if there are no night flights and none are forecast. For those operational noise abatement measures selected for implementation, the program must identify the agency or agencies responsible for such implementation, whether those agencies have agreed to the implementation, and the approximate schedule agreed upon.

FAA Order 1050.1E, "Policies and Procedures for Considering Environmental Impacts," indicates that new or revised ATC procedures which routinely route air traffic over noise-sensitive areas at less than 3,000 feet above ground level are subject to environmental assessment. This includes procedures that alter flight tracks or the specific altitudes utilized by aircraft. It also includes changes in percent use of a particular altitude, runway, or heading, and use of new headings within an existing departure or arrival area. New procedures that routinely route aircraft over non-noise-sensitive areas are categorically excluded from environmental assessment. Procedural actions requested by users on a test basis to determine effectiveness of new technology and measurement of possible impacts on the environment are also categorically excluded from environmental assessment.

During the environmental assessment process, an initial noise analysis should be accomplished. This analysis is comprised of determining the most likely affected noise-sensitive areas in relation to the resulting operation from the proposed ATC procedure. The FAA has established a threshold beyond which the impact is considered significant. FAA's threshold of significance has been determined to be a DNL 1.5 dB increase in noise over any noise-sensitive area located within the DNL 65 dB contour. If this threshold is not exceeded, the FAA may conclude that the proposed ATC procedure will not have a significant effect on the human environment and issue a Finding of No Significant Impact (FONSI). Implementation of the proposed ATC procedure may occur following the FONSI. If the impact is considered significant, the FAA may issue a mitigated FONSI or require preparation of an Environmental Impact Statement (EIS) for the proposed ATC procedure.

11.2 REVIEW OF 1992 NCP OPERATIONAL MEASURES

The FAR Part 150 Noise Compatibility Program for CRQ that was approved on June 16, 1992, recommended fourteen operational noise abatement measures. **Table 11-1** describes each measure, and indicates the FAA's Record of Approval.

Table 11-1
Operational Measures from the 1992 NCP

Measure ID	Measure	FAA Record of Approval
OM-1	Raise the traffic pattern altitudes.	No action. Insufficient data.
OM-2	Increase the instrument landing system (ILS) and visual approach slope indicator (VASI) angles from 3.2 degrees to 3.76 degrees.	Disapproved due to increased complexity.
OM-3	Modify the Oceanside very high-frequency omni-directional radio range (VOR) approach to maintain higher altitudes over Carlsbad.	Disapproved due to reduced utility of the airport.
OM-4	Require visual departures proceeding to the coast from Runway 24 to turn to a 250-degree heading and fly through the gap between Solamar and Terramar.	Approved as Voluntary.
OM-5	Develop a jet standard instrument departure (SID) for Runway 24 operations to turn to a 250-degree heading, perform a thrust cutback procedure at Interstate 5, and maintain heading and altitude until at least three miles offshore.	No Action. Insufficient data.
OM-6	Conduct a test in which Runway 24 arrivals would maintain gear and flap settings from the outer marker until past Palomar West Mobile Home Park.	Approved as Voluntary.
OM-7	Require jet arrivals to Runway 24 to use the ILS.	Disapproved due to no benefit demonstrated; rules already apply.
OM-8	Specify Runway 24 as the preferential runway.	Approved as Voluntary. Consult with ATCT.
OM-9	Increase the helicopter route altitude to 1,000 feet mean sea level (MSL).	Disapproved pending data.
OM-10	Locate engine maintenance runup area to the west side of the Airport.	Disapproved due to insufficient data.
OM-11	Hold aircraft at the parking position when departure delays are high.	Disapproved due to no benefit demonstrated.
OM-12	Discourage the use of the Airport by aircraft operating at a maximum weight of 60,000 pounds or more.	Disapproved due to insufficient data.
OM-13	Discourage jet training operations, particularly by Stage 2 aircraft.	Approved as Voluntary but beware of Part 161.
OM-14	Implement a voluntary Stage 2 jet departure curfew between 10 pm and 7 am.	Approved as Voluntary but beware of Part 161.

11.2.1 Raise Traffic Pattern Altitudes (OM-1)

The 1992 NCP included a recommendation to raise the traffic pattern altitudes from 800 feet above mean sea level (MSL) to 1,000 feet MSL for helicopters; from 1,200 feet MSL to 1,500 feet MSL for small aircraft; and from 1,500 feet to 2,000 feet MSL for large aircraft. According to the 1992 NCP, the new pattern altitudes would provide additional terrain clearance when the pattern is extended to the east due to congestion, and enable arriving aircraft from the northwest to remain at higher altitudes over the more populated areas within the City of Carlsbad.

The FAA did not approve this measure in the NCP, because the NCP did not adequately demonstrate a noise benefit; there was insufficient statistical and other data to make a determination on the benefits of this measure from a noise standpoint.

The proposed higher Airport Traffic Pattern altitudes were established subsequent to the 1992 NCP and are listed in the Airport/Facility Directory published by the U.S. Department of Transportation, Federal Aviation Administration, National Aeronautical Charting Office. The listed minimum CRQ Airport Traffic Pattern altitudes are 1,003 feet MSL for helicopters, 1,503 feet MSL for small aircraft and 2,003 feet MSL for large aircraft. A copy of the Airport/Facility Directory information for Carlsbad is included in **Appendix K**.

Recommendation: It is recommended that the existing Airport Traffic Pattern altitudes, as published in the Airport/Facility Directory, be continued.

11.2.2 Increase ILS and VASI Angle from 3.2 Degrees to 3.76 Degrees (OM-2)

The 1992 NCP included a recommendation to increase the instrument landing system (ILS) angle and the Visual Approach Slope Indicator (VASI) [subsequently upgraded to Precision Approach Path Indicator (PAPI)] angle from 3.2 degrees to 3.76 degrees, providing additional altitude to arriving aircraft over-flying neighborhoods to the east of the airport. According to the NCP, raising the glide slope would provide 200 to 300 feet of additional altitude over the affected communities, and reduce the cumulative noise exposure by 1 to 2 CNEL, reduce Sound Exposure Level (SEL), on a single-event basis, by 3 dB for jet aircraft and 2 dB for propeller aircraft.

The FAA disapproved this measure in the NCP, because, in their opinion, this would not provide any meaningful noise reduction and would increase the complexity faced by pilots using these approach aids.

FAA's standard glide slope angle is 3 degrees; therefore, CRQ is already 0.2 degrees higher than the standard. The affected communities of Palomar West Mobile Home Park and San Marcos were, and still are, located outside the 60 CNEL noise contour. In addition, the Airport/Facility Directory indicates that the landing distance available (LDA) and accelerated stopping distance available on Runway 24 are 4,600 feet. The runway is hard to see two hours prior to sunset (do not mistake the south taxiway or the drag strip, which is located 2.5 miles east, for the runway). There is extensive bird activity in the vicinity, especially in the spring.

The altitude of arriving aircraft established on the ILS glide path at two nautical miles from touchdown would be approximately 120 feet higher when using the glide slope angle of 3.76 degrees. When aircraft

descend along approach paths that are in excess of the standard 3.0-degree slope, pilots must be aware of the subtle aircraft operational differences that may include increased approach speeds, extended landing touchdown point and landing rollout distances. For these and other reasons related to operations safety and the desire to maintain a uniform standard of approach slope parameters for all published precision instrument approach procedures and visual approach path systems, the FAA discourages the application of higher non-standard approach slopes.

***Recommendation*: No further action is warranted.**

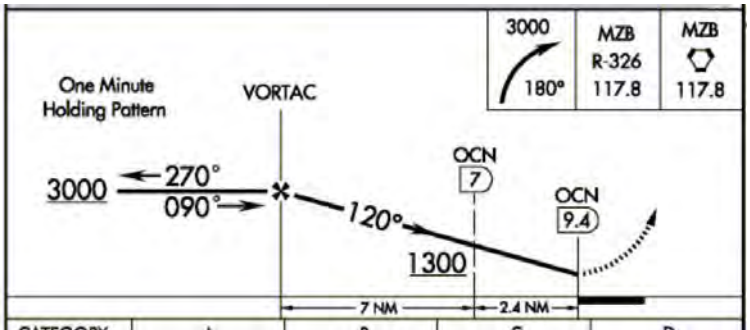
11.2.3 Modify Oceanside VOR Approach (OM-3)

The 1992 NCP included a recommendation to modify the Oceanside Very High Frequency Omni-directional Radio Range (VOR-A) [circling] approach for aircraft so that they maintain a minimum altitude of 3,000 feet MSL at the Oceanside VORTAC, 2,000 feet MSL four nautical miles from the VORTAC on a magnetic compass heading of 120 degrees, and 1,400 feet MSL seven nautical miles from the VORTAC. The procedure is designed to keep aircraft at altitudes over 1,000 feet above ground level (AGL) over the primary residential neighborhoods in the Cities of Oceanside and Carlsbad. This VOR approach is restricted to propeller-driven aircraft and is unauthorized for jet use.

The FAA disapproved this measure in the NCP, because, in their assessment, increasing the altitude to 1,400 feet at 7 DME (Distance Measuring Equipment) would require raising the established minima and would thereby reduce the utility of the approach.

Figure 11-1 illustrates the minimum altitude of 1,300 feet MSL at seven miles past the VORTAC.

Figure 11-1
VOR-A Terminal Procedure



CATEGORY	A	B	C	D
CIRCLING	1300-1¼ 972 (1000-1¼)	1300-1½ 972 (1000-1½)	1300-3 972 (1000-3)	NA
DME MINIMUMS				
CIRCLING	860-1 532 (600-1)	1000-1 672 (700-1)	1020-2 692 (700-2)	NA

Source: U.S. Terminal Procedures, December, 2004.

Analysis of the proposed change to the published VOR-A non-precision circling approach procedure reveals that although the initial descent altitude of 3,000 MSL would remain unchanged, the proposed 2,000-foot minimum altitude at a point four nautical miles from the VORTAC facility would allow the aircraft to descend to an altitude approximately 28 feet lower than currently allowed. Based on the proposal to achieve a minimum missed approach altitude of 1,400 feet, the use of a prescribed constant rate of decent of 180 feet per nautical mile could not be maintained thus requiring the pilot monitor and execute two separate descent rates along the approach path to the airport.

***Recommendation*: No further action is warranted.**

11.2.4 Require Visual Departures to Fly between Solamar and Terramar (OM-4)

The 1992 NCP included a recommendation to require visual departures proceeding to the coast from Runway 24 to (a) make a right turn as soon as feasible to a heading of 250 degrees, (b) fly over the vacant area between the communities of Terramar and Solamar, and (c) maintain heading until one mile past the shoreline before turning north or south. The intersection of Interstate 5 (I-5) and Palomar Airport Road can be used as a visual marker for keeping on course. It is recommended that pilots keep just to the right of this intersection. This "gap" between the communities is approximately 2,500 feet wide. This procedure would not apply to aircraft making immediate turns proceeding east, or to aircraft remaining in the traffic pattern. The 1992 NCP recommended that this procedure be the required Runway 24 departure procedure.

The FAA approved this as a voluntary measure only. This measure reflects a recommended practice that is already in effect at the airport.

It appears that a slightly modified form of the procedure was implemented following FAA's Record of Approval. The "Alpha Departure" is published on the airport's website as a voluntary noise abatement procedure (VNAP), and is shown in **Figure 11-2**. It instructs jets to fly a 250-degree ground track at the best rate of climb until approximately ½ mile offshore. National Business Aircraft Association (NBAA) standard noise abatement departure procedures are recommended. It instructs piston aircraft to hold turns until reaching 800 feet MSL, with the "Alpha North" pattern preferred. On the downwind leg, climb to at least 1,000 feet AGL prior to initiating a turn to the desired course.

Figure 11-3 illustrates flight track density for daytime departures on Runway 24, based on CY 2002 data collected from the airport's Global Environmental Management System (GEMS). **Figure 11-4** illustrates modeled departure flight tracks for Runway 24, which were developed from the flight track density maps. The line thickness of the flight track represents the relative weighted utilization of the track, i.e., the thicker the line, the more aircraft use that track. Tracks 24D3, 24D4, 24D5, 24D7, 24D8, 24D10, and 24D11 generally follow the "Alpha Departure" procedure, and account for 57.1 percent of all departures.

Table 11-2 indicates the number of fixed wing aircraft utilizing each track during the daytime, evening, and nighttime periods on the average annual day.

Table 11-2
Average Daily Departures on Runway 24

Track ID	Number of Average Daily Departures				
	Day	Evening	Night	Total	Percentage
24D1	27.9	1.0	0	28.9	14.3%
24D2	27.9	1.0	0	28.9	14.3%
24D3	37.2	0	0	37.2	18.4%
24D4	37.2	2.0	0	39.2	19.4%
24D5	27.9	2.0	0	29.9	14.8%
24D6	27.9	0	0	27.9	13.8%
24D7	0	2.0	0	2	1.0%
24D8	0	2.0	0	2	1.0%
24D9	0	0	1.3	1.3	0.6%
24D10	0	0	2.9	2.9	1.4%
24D11	0	0	2.2	2.2	1.1%
TOTAL	186	10	6.4	202.4	100%

As shown in **Table 11-2**, a total of 30.1 aircraft per day, or 14.9 percent of all fixed wing aircraft departures, are bound for destinations southeast of the airport. Approximately 93 percent of these departures utilize track 24D6, which begins at the departure end of Runway 24, continues for a distance of one nautical mile beyond the end of the runway along the extended runway centerline, then transitions to the left to a compass heading of 076 degrees passing over residential areas located adjacent to and southwest of the airport. The remaining 7 percent of these departures utilize track 24D11, which generally follows the "Alpha Departure" procedure, by delaying the left turn until reaching the coast.

An analysis of these left turn departure tracks for Runway 24 was conducted to examine the potential for reducing noise exposure to residential areas southwest of the airport. Fifty percent of aircraft currently using track 24D6 were shifted to track 24D11 to avoid residential areas southwest of the airport. The tracks are shown on **Figure 11-4**. It was assumed that this operational procedure would be a voluntary measure only; and as such, that approximately 50 percent of aircraft currently using track 24D6 would use track 24D11 instead, when weather conditions and traffic efficiency allowed.

The *2009 Future Condition NEM, Without Program Implementation*, was used as a baseline condition for evaluating the effectiveness of this alternative. The baseline condition was only changed by adjusting Runway 24 departure track utilization. All other data elements of the *2009 Future Condition NEM, Without Program Implementation*, remained unchanged.

Figure 11-5 compares CNEL 60 and 65 dB contours of the *2009 Future Condition NEM, Without Program Implementation* to the CNEL 60 and 65 dB noise contours resulting from this alternative. **Table 11-3** provides detailed information regarding the number of housing units and population within

the resulting CNEL 60 dB contours. With 50 percent compliance, seven less people and three less housing units would be exposed to noise levels at or above CNEL 60 dBA.

Table 11-3
Noise Exposure Estimates for OM-4

Noise Exposure	CNEL/60 dBA		
	2009 No Action	Reduced Use of Track 24D6	Benefit
Population	413	406	7
Number of Housing Units	155	152	3

Note: There are no housing units within the CNEL 65 dBA contour.

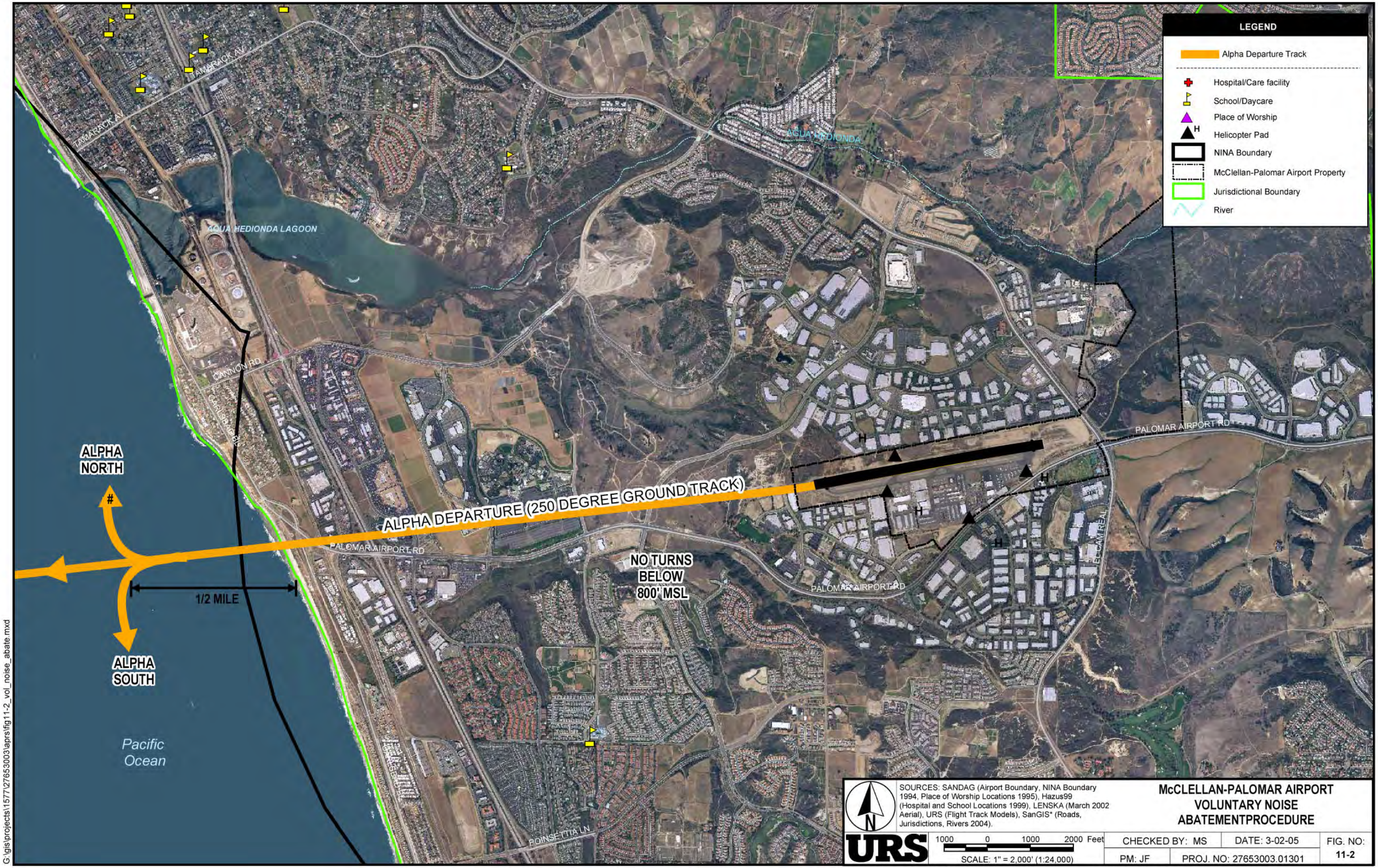
Sources: Integrated Noise Model, Version 6.1
URS Corporation, 2005.

During the development of this alternative, the consideration of air traffic efficiency was discussed with the Airport Traffic Control Tower (ATCT) at CRQ. The ATCT's concern is the reduction of air traffic efficiency when a slower aircraft precedes a faster aircraft. If a slower aircraft remains on runway heading without executing an immediate left turn, a faster aircraft would be required to hold until the slower aircraft cleared the flight path.

The potential use and feasibility of developing a single noise abatement departure corridor along the extended Runway 24 centerline was discussed with ATCT representatives. The proposed corridor would serve to congregate all Runway 24 departures along a single straight-out path with initial turns to the north or south commencing only after the passing west of the coastline.

Current air traffic handling procedures at CRQ have been historically developed to provide the most efficient and expeditious movement of traffic. These procedures also serve to enhance the overall safety of all departures. While technically feasible from a safety and air traffic routing perspective, the consolidation of all Runway 24 departures along a single route imposes operational air traffic handling restrictions while also degrading runway peak hour and annual service volume capacity.

ATC handling procedures require that controllers provide adequate en-trail separation between all departing aircraft. If all Runway 24 departing aircraft were required to fly along an extended runway heading, ATC rules dictate that adequate separation between each successive aircraft departure be provided. This would require that ATCT personnel monitor the relative ground speed of each aircraft and the closure rates between any two aircraft. When departing low performance aircraft are followed by faster high performance aircraft, the differences in departure ground speed may require that air traffic controllers meter the departure rates on an aircraft-by-aircraft basis.



SOURCES: SANDAG (Airport Boundary, NINA Boundary 1994, Place of Worship Locations 1995), Hazus99 (Hospital and School Locations 1999), LENSKA (March 2002 Aerial), URS (Flight Track Models), SanGIS* (Roads, Jurisdictions, Rivers 2004).

McCLELLAN-PALOMAR AIRPORT VOLUNTARY NOISE ABATEMENTPROCEDURE

URS

1000 0 1000 2000 Feet

SCALE: 1" = 2,000' (1:24,000)

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PM: JF	PROJ. NO: 27653003.01301	11-2

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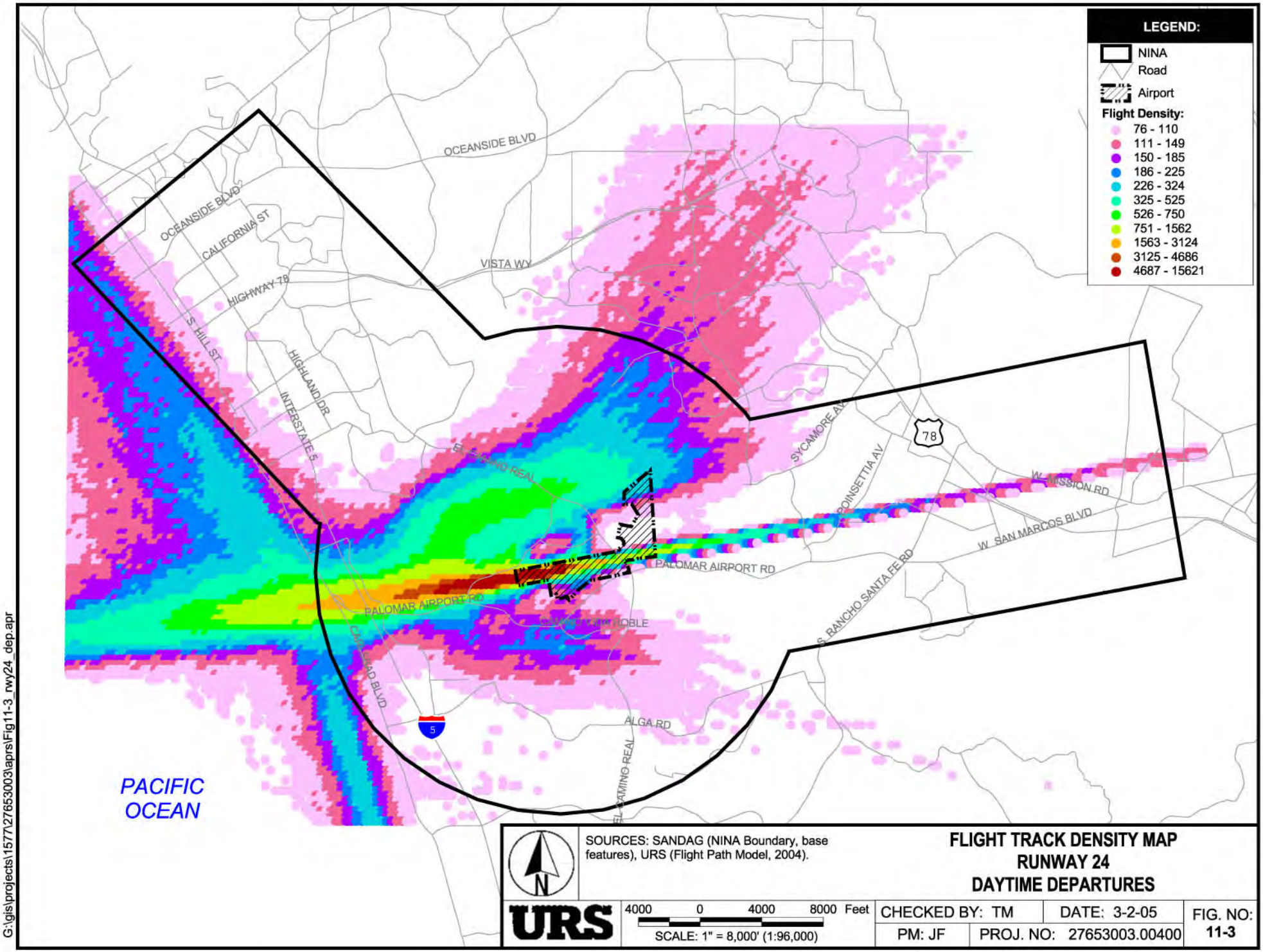
LEGEND:
NINA
Road
Airport
Flight Density:
76 - 110
111 - 149
150 - 185
186 - 225
226 - 324
325 - 525
526 - 750
751 - 1562
1563 - 3124
3125 - 4686
4687 - 15621
OCEANSIDE BLVD
CALIFORNIA ST
HIGHWAY 78
VISTA WY
S HILL ST
HIGHLAND DR
INTERSTATE 5
EL CAMINO REAL
SYCAMORE AV
POINSETTIA AV
78
W MISSION RD
W SAN MARCOS BLVD
PALOMAR AIRPORT RD
S RANCHO SANTA FE RD
CARLSBAD BLVD
ALGA RD
EL CAMINO REAL
5
PACIFIC
OCEAN
SOURCES: SANDAG (NINA Boundary, base features), URS (Flight Path Model, 2004).
FLIGHT TRACK DENSITY MAP
RUNWAY 24
DAYTIME DEPARTURES
URS
4000 0 4000 8000 Feet
SCALE: 1" = 8,000' (1:96,000)
CHECKED BY: TM
DATE: 3-2-05
PM: JF
PROJ. NO: 27653003.00400
FIG. NO: 11-3
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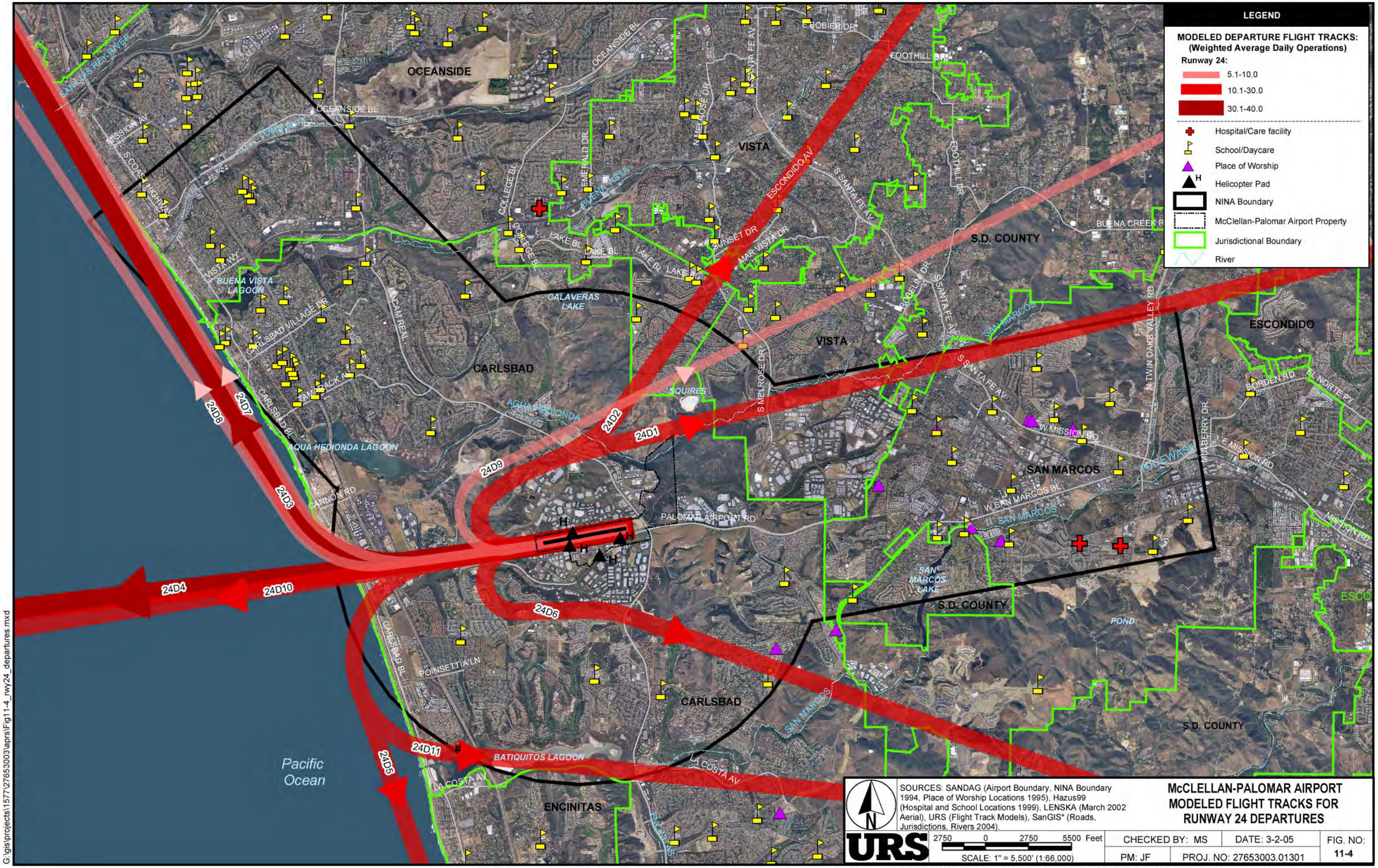

SOURCES: SANDAG (Airport Boundary, NINA Boundary 1994, Place of Worship Locations 1995), Hazus99 (Hospital and School Locations 1999), LENSKA (March 2002 Aerial), URS (Flight Track Models), SanGIS* (Roads, Jurisdictions, Rivers 2004).

McCLELLAN-PALOMAR AIRPORT MODELED FLIGHT TRACKS FOR RUNWAY 24 DEPARTURES

URS

2750 0 2750 5500 Feet

SCALE: 1" = 5,500' (1:66,000)

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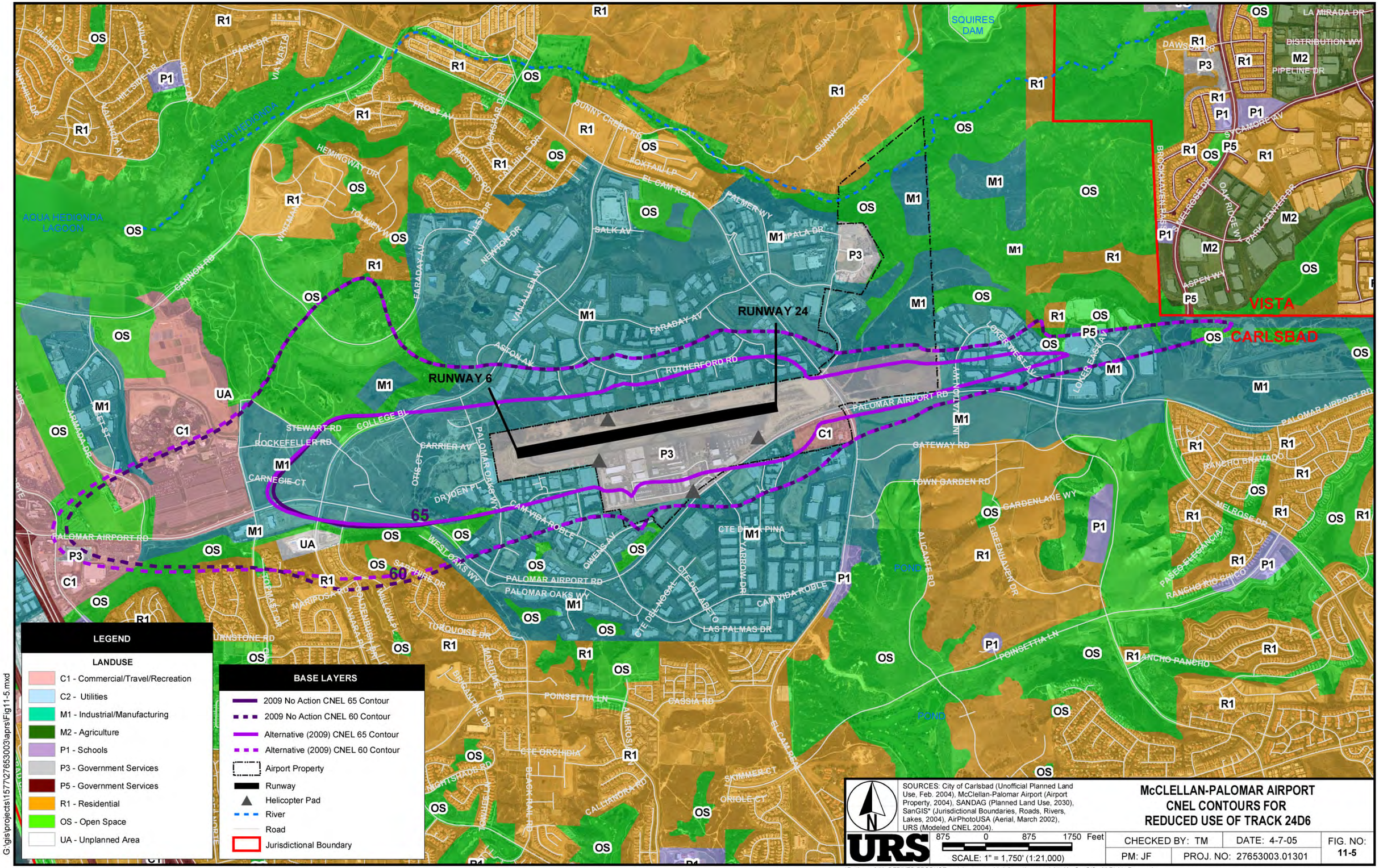
McCLELLAN-PALOMAR AIRPORT CNEL CONTOURS FOR REDUCED USE OF TRACK 24D6



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SOURCES: City of Carlsbad (Unofficial Planned Land Use, Feb. 2004), McClellan-Palomar Airport (Airport Property, 2004), SANDAG (Planned Land Use, 2030), SanGIS* (Jurisdictional Boundaries, Roads, Rivers, Lakes, 2004), AirPhotoUSA (Aerial, March 2002), URS (Modeled CNEL 2004).

URS

875 0 875 1750 Feet

SCALE: 1" = 1,750' (1:21,000)

CHECKED BY: TM	DATE: 4-7-05	FIG. NO: 11-5
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These operational requirements and restrictions may impose severe operational and capacity restrictions such as:

- Imposed departure holds,
- Departure delays,
- Departure speed restrictions,
- Increased ground movement fuel burn,
- Adverse air quality impacts, and
- Reductions in runway capacity and peak hour throughput.

However, when traffic volume permits, this procedure would be practicable.

Figure 11-5 and **Table 11-3** illustrate the benefits of delaying the left turn from Runway 24 until aircraft reach the coast.

Recommendation: ***(1) It is recommended that the existing "Alpha Departure" Voluntary Noise Abatement Procedure (VNAP), as published on the airport's website, be continued. It instructs jets to fly a 250-degree ground track at the best rate of climb until approximately ½ mile offshore. National Business Aircraft Association (NBAA) standard noise abatement departure procedures are recommended. It instructs piston aircraft to hold turns until reaching 800 feet MSL, with the "Alpha North" pattern preferred. On the downwind leg, climb to at least 1,000 feet AGL prior to initiating a turn to the desired course.***

(2) In addition, it is also recommended that when traffic volume permits, CRQ ATCT should instruct pilots to delay the left turn from Runway 24 until aircraft are west of I-5.

11.2.5 Develop a SID for Runway 24 Departures (OM-5)

The 1992 NCP included a recommendation to prepare a Standard Instrument Departure (SID) with the FAA concerning instrument flight rules (IFR) jet departures from Runway 24. This procedure would provide a "gate" for initiating a climb or heading changes after initial departure altitude is reached. Aircraft would maintain a [magnetic] heading of 250 degrees and climb to a minimum altitude of 2,000 feet MSL before crossing I-5 or the Oceanside 131-degree radial, then reduce power as acceptable for safe flight, and maintain the initial heading and initial altitude of 2,000 to 3,000 feet MSL until reaching the gate at three miles past the shoreline.

This recommended procedure, in conjunction with the Runway 24 visual departure procedure described above in **Section 11.2.4**, should eliminate most of the direct overflights of Altamira, Terramar, Solamar, and Seagate Village. The 1992 NCP indicated that a capacity analysis was performed to determine the impact of aircraft departing from Runway 24 and proceeding out over the coast on the 250-degree [magnetic] heading. It was found that the procedure would have a minimal impact on airport capacity and that the maximum number of departures that could occur per hour would be reduced from 98 to 96.

The FAA indicated no action was required at the time, because additional information and analysis was required under Section 104(b) of the Airport Safety and Noise Abatement Act (ASNA).

A SID procedure is an ATC requested and developed departure typically used in busy terminal areas. The SID procedures are published and are used by ATC to increase capacity of terminal airspace, effectively control the flow of traffic with minimum communication and reduce environmental impact through noise abatement procedures. The development of a SID is predicated on the availability of electronic navigational aids (NAVAIDS) that provide pre-established navigable routes between NAVAIDS or to published fixed points in space that are established by the proximal location and relative bearing between two or more NAVAIDS. Because the NAVAIDS or waypoints required to develop published navigable routes along the departure route from Runway 24 are not currently available, the development and use of a noise abatement SID for Runway 24 cannot be implemented.

The FAA and certain U.S. airport owner/operators are working with the FAA in developing alternative departure procedures that utilize emerging navigational technologies such as the Global Positioning System (GPS). The GPS is a satellite-based navigation system made up of a network of 24 satellites placed into orbit by the U.S. Department of Defense. GPS was originally intended for military applications, but in the 1980s, the government made the system available for civilian use. Using GPS, the FAA is developing a variety of arrival and departure procedures that are based on established parameters such as Area Navigation (RNAV).

RNAV is a method of navigation that permits aircraft operation on any desired course within the coverage of station-referenced navigation signals or within the limits of self contained system capability, or a combination of these. As part of the RNAV, waypoints are used as predetermined geographical positions that are defined in terms of latitude/longitude coordinates. Waypoints may be a simple named point in space or associated with existing NAVAIDS, intersections, or fixes. A waypoint is most often used to indicate a change in direction, speed, or altitude along the desired path.

The potential for the development of a Runway 24 noise abatement departure procedure utilizing GPS and RNAV capabilities is high, however, the establishment and use of RNAV procedures for noise abatement purposes is in the early stages of development.

One potential application of a GPS/RNAV departure procedure would involve the establishment of a waypoint west of the coastline along the extended Runway 24 centerline. As an established geographical point in space, the waypoint would be used as an initial point of course change to the north and south. The application of this noise abatement procedure would serve to provide positive course guidance while channeling all departures using this GPS/RNAV procedure along a narrow geographically-limited departure path to the coastline.

Recommendation: CRQ should work with FAA to develop a GPS/RNAV departure procedure to emulate the "Alpha Departure" VNAP.

11.2.6 Conduct a Test of Runway 24 Arrival Procedure (OM-6)

The 1992 NCP included a recommendation to conduct a test in which aircraft arriving to Runway 24 maintain gear and flap settings between the CRQ outer marker and the west edge of the Palomar West Mobile Home Park. The results of this test may recommend new approach procedures to reduce noise exposure.

The FAA approved this as a voluntary measure only.

It appears that a slightly modified form of the procedure was implemented following FAA's Record of Approval. The following VNAPs are published on the airport's website:

- Maintain a cruise aircraft configuration (gear and flaps retracted; RPM no higher than cruise) until as close to the airport as possible.
- Jets: Request ILS approach. Fly a slightly high approach in VMC. Delay gear and flaps transition consistent with safety.

Recommendation: It is recommended that the existing Voluntary Noise Abatement Procedures (VNAPs), as published on the airport's website, be continued.

11.2.7 Require Jet Arrivals on Runway 24 to Use the ILS (OM-7)

The 1992 NCP included a recommendation to require jet aircraft arrivals to Runway 24 to use the ILS. This procedure would keep jet aircraft over less populated areas, except for the Palomar West Mobile Home Park and some areas of San Marcos. It would also concentrate the aircraft so that fewer neighborhoods would be exposed to noise. This procedure is currently in use at the airport as part of the voluntary noise control plan.

The FAA disapproved this measure for purposes of Part 150, because the measure, as submitted, does not demonstrate any noise benefit. However, FAR Part 91.129 (d) (2) specifies that large and turbine powered aircraft shall fly the final approach at or above the ILS glide slope and (3) provides that all aircraft approaching a runway equipped with a visual approach slope indicator (VASI) shall fly at or above the glide slope until a lower altitude is necessary for landing.

It appears that the procedure was implemented subsequent to the 1992 NCP. The following VNAP is published on the airport's website:

- Jets: Request ILS approach. Fly a slightly high approach in VMC. Delay gear and flaps transition consistent with safety.

Recommendation: No further action is warranted.

11.2.8 Specify Runway 24 as the Preferential Runway (OM-8)

The 1992 NCP included a recommendation to specify Runway 24 as the "official" preferential runway at the airport when wind conditions permit. The 1992 NCP indicates that 98 percent of the operations at the airport use Runway 24 due to winds and operational procedures. However, during calm wind conditions, some aircraft do use Runway 6. It is therefore recommended that Runway 24 be designated as the preferential runway with less than a five-knot surface wind.

The FAA approved this as a voluntary measure. The airport sponsor should consult with the manager of the ATCT regarding implementation of changes to ATCT Standard Operational Procedure (SOP).

It appears that this measure was implemented subsequent to the 1992 NCP, since the Airport/Facility Directory, Southwest U.S. (published by the U.S. Department of Transportation, Federal Aviation Administration, National Aeronautical Charting Office) designates Runway 24 as the calm wind runway. A copy of the Airport/Facility Directory information for Carlsbad is included in **Appendix K**.

As described in the 2004 Noise Exposure Maps (NEM) document, runway utilization rates at CRQ are 97 percent on Runway 24 and 3 percent on Runway 06 in favor of the direction of prevailing wind.

Recommendation: It is recommended that the existing designation of Runway 24 as the calm wind runway, as published in the Airport/Facility Directory, be continued.

11.2.9 Increase Helicopter Route Altitude to 1,000 Feet MSL (OM-9)

The 1992 NCP included a recommendation to raise the traffic pattern altitude from 800 feet MSL to 1,000 feet MSL. The current pattern altitude exacerbates the noise problem when the pattern is extended, due to congestion, into the areas with higher terrain and greater population. The new pattern altitude is within the landing pattern envelope. The new altitude would also provide additional terrain clearance when the pattern is extended to the east due to congestion.

The FAA disapproved this measure due to pending submission of additional information relative to anticipated noise benefit. Information provided in the 1992 NCP was insufficient to determine the noise benefit.

It appears that the procedure was implemented subsequent to the 1992 NCP, since the Airport/Facility Directory, Southwest U.S. (published by the U.S. Department of Transportation, Federal Aviation Administration, National Aeronautical Charting Office) indicates the traffic pattern altitude (TPA) for helicopters is 1,003 feet MSL. A copy of the Airport/Facility Directory information for Carlsbad is included in **Appendix K**.

Recommendation: No further action is warranted.

11.2.10 Relocate Engine Maintenance Run-Up Area (OM-10)

The 1992 NCP included a recommendation to locate the aircraft engine maintenance run-up area on the west side of the airport with aircraft facing east. No maintenance run-ups should be conducted between 10:00 p.m. and 7:00 a.m.

The FAA disapproved this measure because no documentation was presented in the 1992 NCP to indicate a noise benefit for people in the airport vicinity. However, the FAA also indicated in the Record of Approval (ROA) that with respect to the location of an aircraft maintenance run-up area, the airport operator has the prerogative of designating such a location.

Currently, there is no major maintenance facility or activity at CRQ. All aircraft operators wishing to do any kind of maintenance check in the run-up area must contact Palomar Airport Operations to be advised of procedures, schedule a time, and be issued a Prior Permission Request (PPR) number. This PPR

number verifies that the crew have been briefed, and is required by the ATCT before any maintenance run can be started. Basic procedures are as follows:

- Aircraft will position adjacent to the hold short line,
- Aircraft must line-up on a heading of 240 degrees,
- No high power engine runs are to be conducted when the ATCT is closed,
- All aircraft are to monitor ATC Tower Frequency during maintenance runs,
- ATCT will coordinate high power run-ups to avoid interference with arriving aircraft.

Appendix K includes a copy of the letter from the County of San Diego regarding *Requirement for Prior Permission, Request to Perform Engine Maintenance Runs at McClellan-Palomar Airport.*

Recommendation: No further action is warranted.

11.2.11 Hold Aircraft at Parking Position When Delays Are High (OM-11)

Ground movement of aircraft does not currently constitute a noise problem at CRQ. However, when demand increases and aircraft are waiting in queues on the taxiway for takeoff, the ATCT may elect to hold aircraft at their tie-down or hanger location. The 1992 NCP included a recommendation that when more than four departing aircraft are waiting in queues on the taxiway, additional departing aircraft should hold at their tie-down or hanger location with engines off.

The FAA disapproved this measure because there was no indication of aircraft taxiing or holding for departure contributing to noise impacts in the airport vicinity, nor was there any indication that this measure provides any noise benefit.

However, the 1992 NCP indicated that this procedure is currently being used when the departure queue is long.

Recommendation: No further action is warranted.

11.2.12 Discourage Use of Airport by Aircraft Greater Than 60,000 Pounds (OM-12)

The 1992 NCP included a recommendation to discourage the use of the airport by aircraft operating at a maximum weight of 60,000 pounds or more. According to the 1992 NCP, the lack of available adjacent land and the role of the airport as a general aviation facility serving the aviation demand of northern San Diego County, prompted the San Diego County Board of Supervisors to adopt policies that restrict the physical expansion of the airport. The 1992 NCP indicates there is no intent to lengthen or strengthen the runway or taxiway system to accommodate aircraft operating at a maximum weight of more than 60,000 pounds.

The FAA disapproved this measure for the purposes of Part 150. The cause and effect relationship between aircraft weight and aircraft noise was not presented in the 1992 NCP. FAA indicated it is within an airport sponsor's discretion however, to develop or not develop airport facilities to serve larger aircraft and to make known to pilots the physical limitations of the airfield.

The Airport Master Record and the Airport / Facility Directory indicate that the runway weight limitation for single wheel is 60,000 pounds, double wheel is 80,000 pounds, and double tandem is 110,000 pounds. The current Airport/Facility Directory, as of April 29, 2005, indicates Taxiway A is limited to 60,000 pounds. However, the taxiway is currently able to accommodate the same weights as the runway. The Airport/Facility Directory is published and distributed every eight weeks by the U.S. Department of Transportation, Federal Aviation Administration, National Aeronautical Charting Office. CRQ staff has submitted a request for this information to be corrected. A future publication will contain corrected information. A copy of the Airport/Facility Directory information for Carlsbad is included in **Appendix K**.

County of San Diego, California, Board of Supervisors Policy Number F-44 (see **Appendix K**) indicates that taxiway configuration limits the weight of aircraft using the facility to a maximum of 60,000 pounds. However, since the runway and taxiway are able to accommodate heavier aircraft, this policy cannot be enforced.

Recommendation: No further action is warranted.

11.2.13 Discourage Jet Training Operations (OM-13)

The 1992 NCP included a recommendation to discourage jet training operations, particularly by Stage 2 aircraft, through voluntary compliance. This is an existing voluntary program that has been supported by the fixed base operators and other airport tenants. The 1992 NCP indicates that voluntary compliance has been successful.

The FAA approved this as a voluntary measure only. This measure provides for continuation of an existing on-going program at the airport. FAA indicated, in their Record of Approval, that any mandatory restriction proposed for Stage 2 aircraft would be subject to analysis and review under the Airport Noise and Capacity Act of 1990 (ANCA) and FAR Part 161.

The Airport/Facility Directory, Southwest U.S. (published by the U.S. Department of Transportation, Federal Aviation Administration, National Aeronautical Charting Office) indicates "No jet aircraft training due to noise abatement and traffic congestion." A copy of the Airport/Facility Directory information for Carlsbad is included in **Appendix K**.

Recommendation: It is recommended that the existing policy discouraging jet aircraft training due to noise abatement and traffic congestion, as published in the Airport/Facility Directory, be continued.

11.2.14 Implement Voluntary Departure Curfew for Stage 2 Jets (OM-14)

The 1992 NCP included a recommendation to implement a voluntary Stage 2 jet departure curfew between 10:00 p.m. and 7:00 a.m. through a letter of agreement between the County of San Diego and operators of Stage 2 jet aircraft located at the airport.

The FAA approved this measure as a voluntary measure only. FAA indicated, in their Record of Approval, that any attempt to make this measure mandatory would be subject to analysis and review under the Airport Noise and Capacity Act of 1990 (ANCA) and FAR Part 161.

The 1992 NCP concluded there were a significant number of noise complaints relative to the number of operations at the airport during the late night and early morning hours. It was determined that a significant number of these complaints were due to the infrequent noisy jet departures from Runway 24. The aircraft were identified as being Stage 2 jets.

It appears that a slightly modified form of this measure was implemented following FAA's Record of Approval. The following VNAP is published on the airport's website:General: Voluntary procedures 2200-0700 (local)

- Jet take-off and landing "Quiet Hours."

It should be noted that "Quiet Hours" is not limited to Stage 2 jets.

Recommendation: ***It is recommended that the existing voluntary procedure for jet take-off and landing "Quiet Hours" (2200-0700 local), as published on the airport's website, be continued.***

11.3 REVIEW OF PAR2000 OPERATIONAL MEASURES

The Palomar Airport Roundtable (PAR) submitted their Final Report to the Palomar Airport Advisory Committee (PAAC) on February 1, 2001. The Final Report included eleven operational noise abatement measures. **Table 11-4** describes each measure, and indicates the results of PAR's votes.

Table 11-4

Operational Measures from PAR2000 Final Report

Measure ID	Measure	Votes in Favor	Votes Opposed
OM-15	Modify right-turning Runway 24 departure	NA	NA
OM-16	Encourage arriving pilots to maintain altitude as long as practical and not descend below pattern altitude before entering the traffic pattern	13	0
OM-17	Discourage certain departure routes for aircraft that create excessive noise	12	0
OM-18	Discourage use of the more noise sensitive south pattern on Runway 24 for arrivals	1	12
OM-19	Conduct test of "Contact Clearance Delivery"	13	0
OM-20	Amend the Practice Missed Approach Procedure	13	0
OM-21	Use NMS to identify low-flying aircraft	13	0
OM-22	Consider extending runway to the east for Runway 24 departures	9	3
OM-23	Initiate a Part 161 Study	4	7
OM-24	Amend "Quiet Hours" to Include All Aircraft Except Emergency Flight Operations	11	2
OM-25	Explore ATC techniques to reduce arrival/departure deviations over residential areas	13	0

11.3.1 Modify Right Turn for Runway 24 Departure (OM-15)

The PAR2000 made a proposal to change the right turning departure procedure for Runway 24. The stated purpose was to minimize aircraft noise and low-flying aircraft over homes north of the airport. The proposed track is shown on **Figure 11-6**, and is designated 24DP1. It was described as follows: after take-off, make a climbing right 45-degree turn to a heading of 285 degrees. Fly VFR departure over Macario Canyon (east of Lego Land and west of residential area north of the airport) and make a right turn over the Aqua Hendionda Lagoon wetlands and Cannon Road (unfinished) and fly to the Vista VFR Departure Point (Courthouse buildings). Based on the track shown on **Figure 11-6**, the PAR2000-proposed turn appears to be initiated at a point approximately 3,000 feet from the start of take-off roll.

From an aircraft performance standpoint, many of the aircraft operating at CRQ would not have gained sufficient altitude to initiate a climbing right 45-degree turn 3,000 feet from the start of take-off roll. Hence, aircraft would initiate the climbing right 45-degree turn at a myriad of distances from the start of take-off roll. This would result in aircraft flying over a much broader area than intended by this procedure, rather than minimizing overflights of homes north of the airport.

In addition, there is a helipad located on the north side of the runway, approximately 3,000 feet from the end of Runway 24. As shown, the climbing right 45-degree turn would fly directly over, or in very close proximity to this helipad. The PAR2000-proposed track also intersects, while aircraft are at low altitudes, with the helicopter departure and arrival tracks to and from the north and the helicopter Touch and Go (TNG) track. This presents an operational safety concern and should be avoided.

For this Part 150 study, the PAR2000-proposed departure path was modified to avoid the helipad and helicopter tracks, as well as make it more feasible for most aircraft to follow. Designated as departure track 24DP2, the track begins at the departure end of Runway 24, continues for a distance of 1 nautical mile beyond the end of the runway along the extended runway centerline, and then transitions to the right to a compass heading of 285 degrees passing over the Aqua Hendionda Lagoon. The course then transitions to a compass heading of 41 degrees passing over the Aqua Hendionda Creek that lies between two residential areas. The modified track is shown on **Figure 11-7**. It was assumed all aircraft using the 24D1, 24D2, and 24D9 departure tracks would utilize 24DP2 instead. This modified right-turning departure track for Runway 24 was evaluated using the INM to identify potential noise benefits.

Discussions were held with the FAA Palomar ATCT and airport representatives regarding operational and safety issues as they specifically relate to the proposed departure track 24DP2. Two primary concerns were raised by ATCT representatives: operational safety and transference of aircraft-generated noise to land areas immediately north of the airport.

Issues related to operational safety included the ATCT controller's ability to maintain adequate visual contact with arriving or departing aircraft operating within a region of airspace located northwest of the airport.

ATCT representatives stated that, in general, it is easier, more efficient, and safer to provide positive ATC and aircraft separation within the local airport traffic pattern and terminal airspace when aircraft remain within the visual range of ATCT controllers. When aircraft operate along extended arrival, departure or airport traffic pattern entry points, visual separation and positive control become increasingly difficult.

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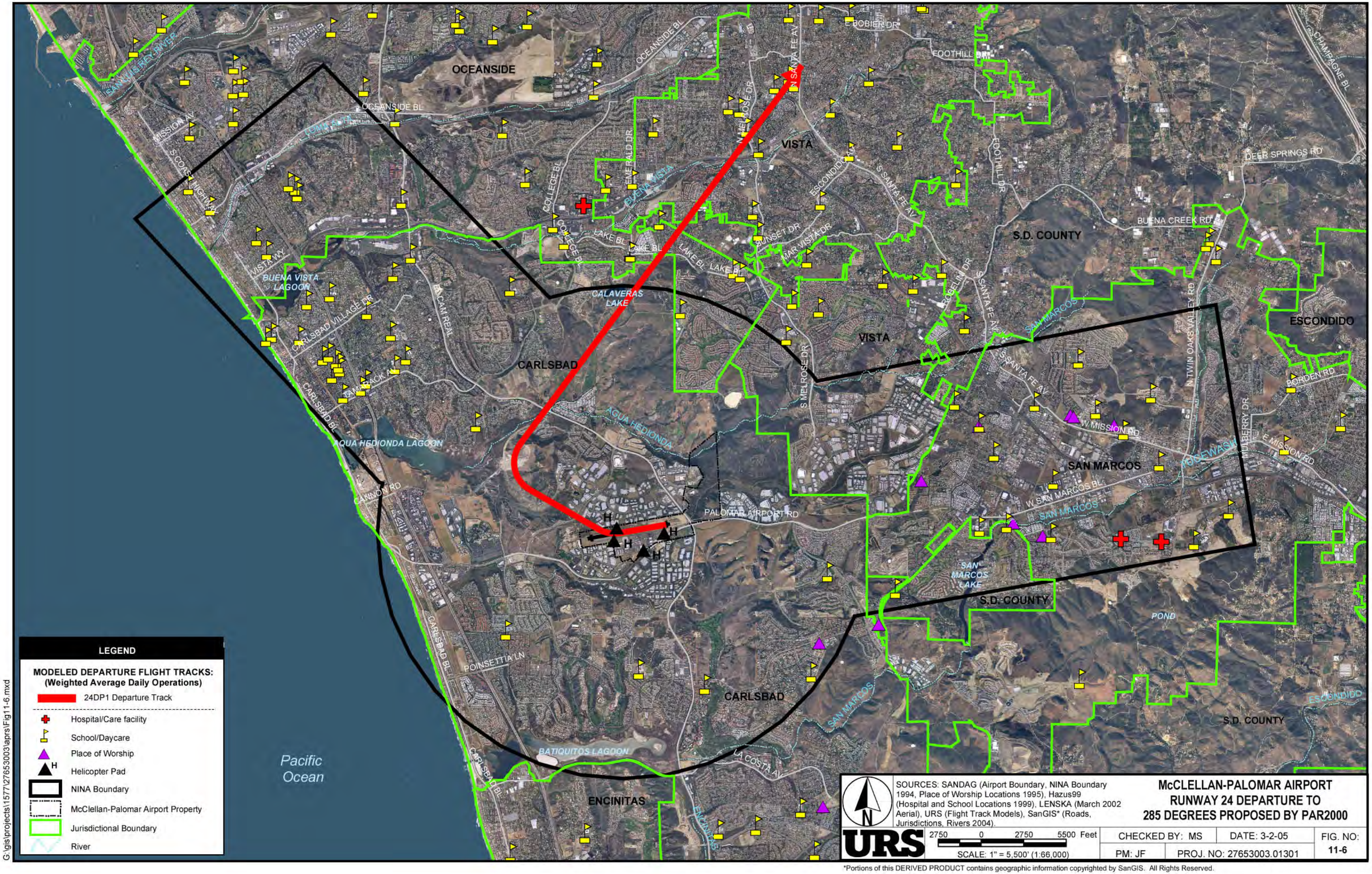

LEGEND

MODELED DEPARTURE FLIGHT TRACKS:
(Weighted Average Daily Operations)

- 24DP1 Departure Track
- Hospital/Care facility
- School/Daycare
- Place of Worship
- Helicopter Pad
- NINA Boundary
- McClellan-Palomar Airport Property
- Jurisdictional Boundary
- River

SOURCES: SANDAG (Airport Boundary, NINA Boundary 1994, Place of Worship Locations 1995), Hazus99 (Hospital and School Locations 1999), LENSKA (March 2002 Aerial), URS (Flight Track Models), SanGIS* (Roads, Jurisdictions, Rivers 2004).

McCLELLAN-PALOMAR AIRPORT RUNWAY 24 DEPARTURE TO 285 DEGREES PROPOSED BY PAR2000

URS

2750 0 2750 5500 Feet

SCALE: 1" = 5,500' (1:66,000)

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OCEANSIDE
VISTA
CARLSBAD
ENCINITAS
SAN MARCOS
ESCONDIDO
S.D. COUNTY
Pacific Ocean
BUENA VISTA LAGOON
CALAVERAS LAKE
AGUA HEDIONDA LAGOON
BATIQUITOS LAGOON
SAN MARCOS LAKE
POND
SAN LUIS REY RIVER
AGUA HEDIONDA
SAN MARCOS
ESCONDIDO
OCEANSIDE BL
MISSION AV
S COAST HIGHWAY
LOMA ALTA
COLLEGE BL
EL CAMINO REAL
BUENA VISTA
VISTA WAY
CARLSBAD VILLAGE DR
CARLSBAD BL
TAMARACK AV
CANNON RD
PALOMAR AIRPORT RD
POINSETTIA LN
LA COSTA AV
ENCINITAS
LAKE BL
S MELROSE DR
N MELROSE DR
S SANTA FE AV
BOBIER DR
FOOTHILL DR
ESCONDIDO
SUNSET DR
MAR VISTA DR
ROSELEN DR
CHAMPAGNE BL
DEER SPRINGS RD
BUENA CREEK RD
N TWIN OAKS VALLEY RD
BORDEN RD
W MISSION RD
E MISSION RD
MULBERRY DR
ROSEWASH
W SAN MARCOS BL
SAN MARCOS

LEGEND

MODELED DEPARTURE FLIGHT TRACKS:
(Weighted Average Daily Operations)

- 24DP2 Departure Track
- Hospital/Care facility
- School/Daycare
- Place of Worship
- Helicopter Pad
- NINA Boundary
- McClellan-Palomar Airport Property
- Jurisdictional Boundary
- River

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SOURCES: SANDAG (Airport Boundary, NINA Boundary 1994, Place of Worship Locations 1995), Hazus99 (Hospital and School Locations 1999), LENSKA (March 2002 Aerial), URS (Flight Track Models), SanGIS* (Roads, Jurisdictions, Rivers 2004).

McCLELLAN-PALOMAR AIRPORT RUNWAY 24 MODIFIED DEPARTURE TO 285 DEGREES

URS

2750 0 2750 5500 Feet

SCALE: 1" = 5,500' (1:66,000)

CHECKED BY: MS	DATE: 3-2-05	FIG. NO: 11-7
PM: JF	PROJ. NO: 27653003.01301	

The issue of the increased potential for mid-air collisions between arriving aircraft on tracks 24A4/24A5 and the departing aircraft on track 24DP2 was of primary concern because of a mid-air collision that occurred within the same general area in September of 2002. Examples of such potential conflicts included IFR arrival aircraft using the Oceanside VORTAC 120-degree radial as part of the published non-precision VOR-A circling approach and VFR arrival aircraft using the FAA's standard 45-degree entry procedure to enter the airport traffic pattern. Aircraft using either of the two arrival procedures would most likely be operating at altitudes that coincide with departing aircraft on tracks 24D1, 24D2, and 24D9.

The potential for pilots to utilize terrain features such as the Aqua Hendionda Creek is at question because of the likelihood of extended periods of low visibility or low-lying fog that forms along the lowest points of the local terrain. When such meteorological conditions occur, it is doubtful that pilots operating under VFR would be able to use these types of visual landmarks for visual course guidance or dead reckoning purposes.

The *2009 Future Condition NEM, Without Program Implementation*, was used as a baseline condition for evaluating the effectiveness of this measure. The baseline condition was only changed by adjusting flight track utilization to include the use of Track 24DP2. All other data elements of the *2009 Future Condition NEM, Without Program Implementation*, remained unchanged.

All of the departure operations on tracks 24D1, 24D2, and 24D9 that were modeled in the 2009 future condition were modeled on track 24DP2 instead. As shown in **Table 11-2**, there are approximately 59.1 departures per day on these three tracks. **Figure 11-8** compares the CNEL 60 and 65 dBA contours of the *2009 Future Condition NEM, Without Program Implementation* to the CNEL 60 and 65 dBA noise contours resulting from use of track 24DP2 instead of tracks 24D1, 24D2, and 24D9.

Table 11-5 provides detailed information regarding the number of housing units and population within the resulting CNEL 60 dBA contours. There was no reduction in the number of housing units or population within the CNEL 60 dBA contour as a result of using track 24DP2 instead of tracks 24D1, 24D2, and 24D9.

Table 11-5

Noise Exposure Estimates for OM-15

Noise Exposure	CNEL/60 dBA		
	2009 No Action	Use of Track 24DP2	Benefit
Population	413	413	0
Number of Housing Units	155	155	0

Note: There are no housing units within the CNEL 65 dBA contour.

Sources: Integrated Noise Model, Version 6.1
URS Corporation, 2005.

***Recommendation*: No further action is warranted.**

11.3.2 Encourage Pilots Not to Descend Below Pattern Altitude (OM-16)

The PAR2000 recommended that arriving pilots be encouraged to maintain altitude as long as practical and not descend below pattern altitude before entering the traffic pattern.

It appears that the procedure was at least partially implemented subsequent to the PAR2000. The following VNAPs are published on the airport's website:

Arriving Aircraft:

- Minimum altitude 2,000 feet AGL until 3 miles from the field.
- Delay descending to minimum altitudes on VOR approach outside 3 miles from the airport (VMC [Visual Meteorological Conditions] weather and safety permitting).
- Helos: Remain above 1,000 feet MSL and over major roads until entering the airport traffic pattern.
- Jets: Request ILS approach. Fly a slightly high approach if in VMC.

Recommendation: No further action is warranted.

11.3.3 Discourage Certain Departure Routes for Noisy Aircraft (OM-17)

The PAR2000 concluded that the current CRQ departure procedures do not restrict departure routes to avoid noise-sensitive areas. Their recommendation was to discourage certain departure routes for aircraft that create excessive noise.

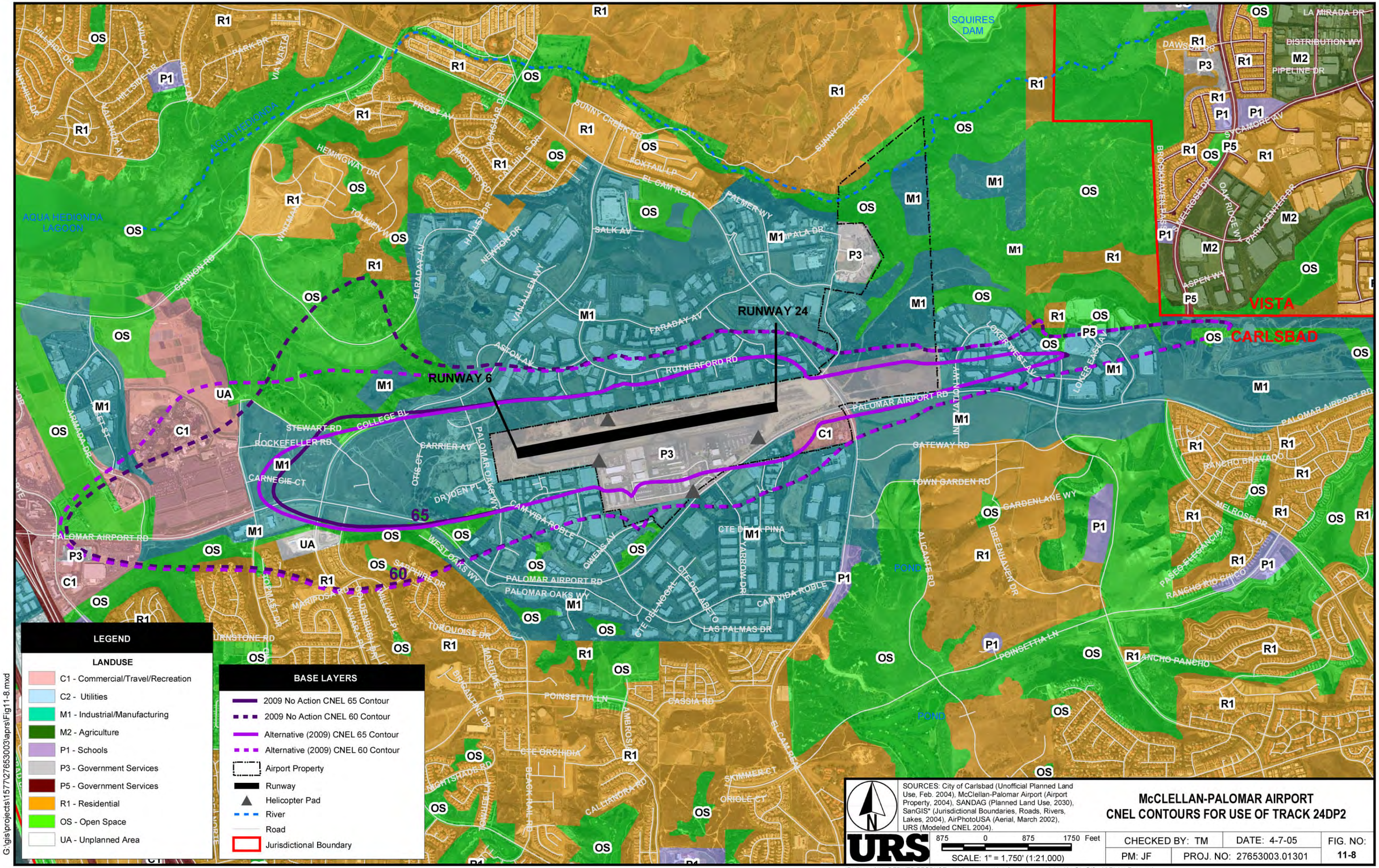
Operational measures OM-4, OM-5, and OM-15 address this issue.

Recommendation: No further action is warranted.

11.3.4 Discourage the Use of the South Pattern on Runway 24 for Arrivals (OM-18)

The PAR2000 concluded that the current CRQ arrival procedures do not restrict arrival routes to avoid noise-sensitive areas. Their recommendation was to discourage the use of the more noise sensitive approach routes to Runway 24 that over fly noise-sensitive land areas south of the airport.

Current approach routes to Runway 24 from areas south of the airport generally follow the coastline then transitions to a downwind leg that parallels the runway at an offset distance of approximately 5,000 feet. Analysis of RADAR tracks for aircraft arriving to Runway 24 reveals two distinct left "base" legs having different lengths for the final approach. Although the turn radius of each base leg is similar, the length of final approach differs and most likely represents the difference in required approach speed or required distance for establishment of landing flaps or gear setting. The close in final appears to be one nautical mile in length. The longer approach path appears to approximately twice as long. Discussions with CRQ ATCT personnel indicate that the two established left base turns to the final approach leg represent the most safe and efficient handling of arriving aircraft to Runway 24 from an air traffic handling perspective.



Proposals to extend the downwind leg of these approach paths were discussed with ATCT personnel and the following issues and/or operational concerns were raised:

- Required visibility from ATCT - Extending the downwind leg of the approach to Runway 24 will require turns to the final approach that may be beyond the visibility range of the ATCT controllers. Air traffic separation and operational safety offered by the ATCT may be serious compromised.

- Consolidation of low and high performance straight-in aircraft operations - When aircraft are vectored to the Runway 24 straight-in ILS the aircraft are initially handled by Southern California TRACON (SOCAL) prior to reaching the DEASY outer marker beacon that is located 5.1 nautical miles from the runway end along the extended runway centerline. Aircraft that are cleared for the approach by ATCT and established on the ILS glide path are descending along the 3.2-degree ILS glide path from a minimum altitude of 2,106 feet MSL (or 2,300 feet MSL localizer only). The intermixing of aircraft from the south would most likely involve aircraft entering the final approach path at various altitudes, speeds and rates of descent. These actions as well as variations in aircraft pilot technique and skill level will serve to further complicate air traffic handling of arrivals to Runway 24.

- Required coordination and handoff with SOCAL - As described above, the addition of aircraft within the final approach to Runway 24 will require additional coordination and communication between SOCAL and the ATCT as well as SOCAL and aircraft executing any of the published instrument approach procedures to the airport.

Extending the existing base leg paths to Runway 24 as part of a noise abatement procedure is not recommended for this NCP.

Recommendation*: *No further action is warranted.

11.3.5 Conduct Test of "Contact Clearance Delivery" (OM-19)

All departing pilots need to be made aware of the noise abatement problem. Visiting pilots, and those who fly out of Carlsbad infrequently, should be made familiar with noise abatement issues and procedures. To achieve this, the PAR2000 recommended that for a period of six months, an experiment be conducted in which pilots are asked to contact a new service, Clearance Delivery or some equivalent, prior to departure. The Automatic Terminal Information Service (ATIS) message should be modified to include an instruction to contact this service before engine start. The departure service would then provide a departure routing and outline appropriate noise abatement instructions, prior to taxi. Noise abatement information should stress that it is the achievement of 1,000 feet AGL, not 1,000 feet MSL that is important.

In order to reduce the cost to the FAA (who will have to operate the additional frequency), the experiment should be held on Saturdays only for the first three months of the experiment, followed by Sundays only for the second three months. Therefore a direct comparison could be made between Saturday and Sunday departure patterns, as monitored and recorded by airport environmental equipment (thus eliminating

subjective guesswork), to determine the effectiveness of the procedure in increasing the rate of compliance with established noise abatement instructions and routings at CRQ.

FAA Order 7110.65P, Section 2-9-3, Paragraph h, states "other perishable items that may appear only for a matter of hours or a few days on the ATIS message" will be included in ATIS broadcast as appropriate. ATIS is not utilized for permanent or on-going information broadcast purposes. Therefore, broadcasting another frequency on the ATIS is not appropriate.

The establishment of another frequency to disclose the VNAP information is technically feasible. However, traditionally the FAA does not use VHF communication frequencies to broadcast noise abatement procedures. The airport staff investigated the possibility of getting a dedicated frequency. The FAA ATC Spectrum Engineering Services denied the request, indicating there were no frequencies available.

In January 2005, the FAA disapproved a Part 150 NCP recommendation to incorporate noise abatement advisory information on the ATIS recording at Ft. Lauderdale Executive Airport (FXE). The Record of Approval indicated that Revised Order 7110.65, ATC, no longer provides for noise abatement advisories. FAA Order 7110.65P, Section 2-9, Automatic Terminal Information Service Procedures, is included in **Appendix K**.

Noise abatement advisories may be published in the Airport/Facilities Directory and pilot handouts.

***Recommendation*: No further action is warranted.**

11.3.6 Amend Practice Missed Approach Procedure (OM-20)

The PAR2000 recommended study and development of an amended practice "Missed Approach Procedure" for noise reduction. The current local ATCT and SOCAL Approach Control procedures for the handling of practice missed approach break-offs to the published Runway 24 ILS approach are based on two considerations, noise abatement to land areas immediately adjacent and south of the airport and to facilitate the safe and efficient separation of low-level missed approach operations from the airport traffic pattern.

When the ATCT is in operation, the majority of touch-and-go and regular airport traffic pattern operations are directed to the north side of the airport using non-standard right-hand traffic for Runway 24 and standard left-hand traffic for Runway 6. With the majority of the airport traffic pattern operations occurring north of the airport, ATCT instructs the pilot to make an immediate left turn to a compass heading of 180 degrees for traffic avoidance, climb and maintain an altitude of 3,000 feet MSL, and to contact SOCAL approach control for further instructions. While serving to mitigate noise impacts to land areas north of the airport, these actions also allow for the efficient and safe handling of recurring practice low-level missed approach operations.

To change these established procedures would most likely increase the number of aircraft flights over land areas north of the airport, increase ATCT workload, require additional separation of aircraft flights within and near the airport traffic pattern and complicate the local hand-off of control from ATCT to SOCAL following the execution of the missed approach procedure.

Right turns as part of an established handling of practice low-level missed approach procedures for the Runway 24 ILS approach is not recommended for this NCP.

Recommendation: No further action is warranted.

11.3.7 Use NMS to ID Low-Flying Aircraft (OM-21)

The PAR2000 recommended that the Noise Monitoring System (NMS) be used to identify low-flying aircraft outside the parameters established for arrivals and departures.

FAA's Record of Approval for acquisition and installation of the permanent NMS indicated that for purposes of aviation safety, their approval does not extend to the use of monitoring equipment for enforcement purposes by in situ measurement of any pre-set noise thresholds.

FAA Order 5100.38B, Chapter 8, Section 813, paragraph d, indicates that the NMS should not be used as an instrument for enforcement of a noise rule or procedure.

FAR Part 91, Section 91.119: Minimum safe altitudes: General, indicates: except when necessary for take-off or landing, no person may operate an aircraft below the following altitudes:

(a) ***Anywhere***. An altitude allowing, if a power unit fails, an emergency landing without undue hazard to persons or property on the surface.

(b) ***Over congested areas***. Over any congested area of a city, town, or settlement, or over any open air assembly of persons, an altitude of 1,000 feet above the highest obstacle within a horizontal radius of 2,000 feet of the aircraft.

(c) ***Over other than congested areas***. An altitude of 500 feet above the surface, except over open water or sparsely populated areas. In those cases, the aircraft may not be operated closer than 500 feet to any person, vessel, vehicle, or structure.

(d) ***Helicopters***. Helicopters may be operated at less than the minimums prescribed in paragraph (b) or (c) of this section if the operation is conducted without hazard to persons or property on the surface. In addition, each person operating a helicopter shall comply with any routes or altitudes specifically prescribed for helicopters by the Administrator.

The FAA is the government agency responsible for aviation safety. They welcome information from citizens that will enable them to take corrective measures including legal enforcement action against individuals violating Federal Aviation Regulations. It is FAA policy to investigate citizen complaints of low-flying aircraft operated in violation of the FAR, and that might endanger persons or property. Within FAA, the Office of Flight Standards monitors aircraft operations. Locally, Flight Standards inspectors work in a Flight Standards District Office (FSDO). The San Diego Flight Standards District Office is located at 8522 Gibbs Drive, Suite 120, San Diego, CA 92123. The Manager is Jerome E. Pendzick. Office hours are 7:30 am to 4:00 pm. The phone number is 619-557-5281, and the fax number is 619-557-7156.

The following information was taken directly from the website of the FAA Western-Pacific Region, Flight Standards Division, located at http://www.awp.faa.gov/fsdo/lowfly.htm. Before contacting the FSDO/GADO (General Aviation District Office), remember that the FAA is a safety organization with legal enforcement responsibilities. So they will need *facts* before they conduct an investigation. To save time, please have this information ready when you call. And do keep your notes: they may request a written statement. Here is the type of information they need:

- ***Identification*** - Can you identify the aircraft? Was it military or civil? Was it a high-or low-wing aircraft? What was the color? Did you record the registration number which appears on the fuselage? (On U.S. registered aircraft, that number will be preceded with a capital "N.")
- ***Time and Place*** - Exactly when did the incident(s) occur? Where did this happen? What direction was the aircraft flying?
- ***Altitude*** - How high (low) was the aircraft flying? On what do you base your estimate? Was the aircraft level with or below the elevation of a prominent object such as a tower or building? Did you obtain photographs? Are there any witnesses who could confirm your estimate - do you have their names, addresses, telephone numbers?
- ***Supporting Evidence*** - Are local police aware of the problem? While they have limited authority in aviation matters, police officers are considered "trained observers" by the courts and their written statements or reports make excellent evidence should FAA's enforcement action go to trial.
- ***Witnesses*** - Do you know of any other witnesses? The more the better. Do you have their names and addresses? They may be contacted.
- ***Photographs*** - If you took photographs, FAA needs to know the lens used, and the height of any identifiable landmarks that appear.

Recommendation: No further action is warranted.

11.3.8 Consider Extending Runway 24 for Departures (OM-22)

The PAR2000 recommended consideration of extending the runway 600 feet east to provide earlier jet lift-off on departure on Runway 24. The landing threshold would remain in the same location, so that landing patterns would not be affected.

One PAR2000 representative felt this would effectively move the entire departure noise contour 600 feet eastwards, thus effectively "moving" homes west of the airport 600 feet further away from it. Another PAR2000 representative felt that extension of Runway 24 600 feet to the east would only exacerbate the present condition of low flying and noisy aircraft that make an early right turn after takeoff to the northeast course heading. This results in a flight path over the residential areas north of the airport.

An extension of 1,100 feet to the east is shown on the Airport Layout Plan (ALP). This extension has not been unconditionally approved by the FAA, and would require environmental review prior to approval. This proposed extension is long range planning to reduce the noise impact of aircraft departures on homeowners west of the airport, and to maintain the viability of the airport to support commuter air transportation as a public service to the North County air travelers. Numerous engineering, environmental, and fiscal issues need to be addressed before this runway extension could be constructed.

A copy of the airport diagram, showing the existing runway configuration, is included in **Appendix K**.

***Recommendation*: No further action is warranted.**

11.3.9 Initiate a Part 161 Study (OM-23)

The PAR2000 considered, but did not vote to recommend, that the County of San Diego should begin a FAR Part 161 Study to determine what mandatory noise abatement restrictions could be adopted at CRQ to curtail the noise produced by Stage 2 aircraft. Among the restrictions that could be considered are a mandatory nighttime ban on Stage 2 aircraft operations (excepting emergency "Lifeguard" flights) and enforceable limits on the amount of noise that Stage 2 aircraft are allowed to produce at designated places in residential neighborhoods (similar to the rules at Montgomery Field).

Under the Airport Noise and Capacity Act (ANCA), a distinct difference is made between the requirements for implementing noise and access restrictions affecting Stage 2 aircraft versus those impacting Stage 3 aircraft.

ANCA does not restrict the authority of airport operators implementing Stage 2 restrictions. Instead, the Act specifies procedural requirements, which must be completed prior to a Stage 2 restriction being implemented. Under ANCA, before the Stage 2 restriction may be implemented, a Part 161 Study must be completed, and submitted to the FAA for review and approval. When the Part 161 Study only involves Stage 2 restrictions, the FAA's authority is limited to ensuring all procedural requirements are met. The FAA does not approve or disapprove the restriction(s) contained therein. The restriction(s) are not subject to FAA approval. However, the study itself is subject to FAA review and approval to ensure it was conducted properly and meets all criteria set forth under ANCA and FAR Part 161. Until the Part 161 Study is approved by FAA, the restriction(s) may not be imposed.

Steps in the process for implementing restrictions on Stage 2 aircraft include:

- Data collection and analysis to justify the restriction and to assess the environmental and economic impacts;
- Notification, including public notice as well as notification to those aircraft operators who may be impacted by the restriction; and
- Submission of the analysis to FAA for review.

Non-compliance with procedural requirements established by ANCA may result in enforcement action by the FAA. Enforcement measures are based primarily on financial disincentives. These procedures may be used in conjunction with or in addition to judicial proceedings initiated by the FAA to protect the national aviation system and related Federal interests.

Since ANCA was passed in 1990, only two airports in the United States have actively pursued noise restrictions utilizing the requirements set forth under FAR Part 161: Naples Municipal Airport in Naples, Florida, and Bob Hope Airport in Burbank, California.

The Naples Municipal Airport (APF) is owned and operated by the Naples Airport Authority (NAA). The airport is located minutes from the heart of the city and is surrounded by residential communities and noise-sensitive areas. In 1987, NAA completed their first FAR Part 150 Study. Their second

Part 150 Study was completed in 1997. In 1998, the second study was approved, which included the nation's first local ban on Stage 1 aircraft.

The magnitude of the effect of Stage 2 jets operating in and out of Naples, as evidenced by the disproportionate number of noise complaints associated with this class of aircraft, led to the NAA's decision to consider a ban on Stage 2 aircraft. Naples began their Part 161 Study in August 1999. As required by FAR Part 161, the Naples study included a cost-benefit analysis for each of three alternatives considered in the study. Under FAR Part 161, "benefits" are based on reductions in noncompatible land use within the airport noise study area (which had been identified as the DNL 60 dBA contour). Quantifiable benefits include the reduction in the number of people or homes removed from the noise contours, increased educational productivity (schools removed from the contours), anticipated increase in real estate values, positive safety effects, and improvements in quality of life. The study showed the population exposed to noise levels at or above DNL 60 dBA would be decreased by approximately 91 percent with the implementation of a ban on Stage 2 jet operations. The estimated costs of the alternatives were also included in the study. FAR Part 161 outlines specific costs which must be considered when analyzing proposed restrictions. Costs considered in the Naples study included: costs associated with use of an alternate airport, canceling a trip to Southwest Florida, substituting a Stage 3 aircraft, and rescheduling a flight from nighttime to daytime. The study was completed in June 2000 and submitted to the FAA. The FAA required additional information, which led to a supplemental study. The Stage 2 ban went into effect in January 2001, but was not enforced. The supplemental documentation was submitted to the FAA in August 2001. In October 2001, the FAA found the Part 161 Study was in full compliance with the requirements of FAR Part 161.

The FAA then began an administrative proceeding to terminate NAA's eligibility for Federal grants, stating the Stage 2 ban was a violation of the NAA's grant assurances under the Airport Improvement Program (AIP). In March 2003, the NAA began enforcement of their Stage 2 ban. In August 2003, the FAA issued a final decision, finding the Stage 2 ban was "unreasonable." AIP grant funding was withheld while the ban remained in effect. On June 3, 2005, the United States Court of Appeals ruled in favor of the NAA. The Court of Appeals ruled that (1) Congress did not intend to tie Stage 2 restrictions to the grant assurances, and (2) FAA had not established that the Stage 2 ban was unreasonable.

The only other airport in the United States to pursue an FAR Part 161 Study is Bob Hope Airport in Burbank, California. Residential development and encroachment has resulted in the airport being surrounded by homes on all sides.

Bob Hope Airport is governed by the Burbank-Glendale-Pasadena Airport Authority. The airport completed its first FAR Part 150 Study in 1989 and an update in 2000. The Airport Authority adopted a goal to "eliminate or significantly reduce nighttime flight noise at Burbank Airport now and in the future." This goal was the basis for the undertaking of the FAR Part 161 Study.

As required by FAR Part 161, Bob Hope Airport Part 161 Study included a cost-benefit analysis for each alternative considered within the study. The study followed the guidelines set forth under FAR Part 161.

Burbank submitted a "draft" analysis to the FAA for their review and comment. On May 19, 2004, the FAA responded with a letter denying approval of the (draft) study based on issues with the study itself as

well as citing the voluntary curfew already in place. They also stated the total ban would restrict smaller aircraft which are not significantly contributing to noise levels making the ban unfairly discriminatory.

Evidence shows that an inordinate percentage of noise complaints at airports across the country are caused by aircraft Congress exempted from the Airport Noise and Capacity Act of 1990. Today, although Stage 1 and Stage 2 aircraft under 75,000 pounds account for only a minor percentage of the business-use jet fleet (some estimates indicate about 8 percent, or approximately 1,400 aircraft), they account for 50 to 75 percent of the noise complaints at several airports. Evidence further shows that although Part 161 contemplates "equity" by considering "cost-benefit," it does so in airport-specific isolation, which is in direct conflict with interstate commerce laws and in the provision of equity for all. Short of litigation or rewriting of the rules to resolve such conflicts, Part 161 may very well remain an exercise in futility. (Olislagers, Robert P., "Phasing Out Stage 2 Aircraft Weighing less than 75,000 Pounds: The Conundrum of Finding Equity within Inequity," Centennial Aviation & Business Journal. October 2001. Vol. 2, No. 10. Englewood, CO. Pages 17B-19B.)

Sound Initiative, a Coalition for Quieter Skies, was organized by a group of airport operators, in response to this situation. It was introduced to airport representatives in June 2004, at the annual meeting of the American Association of Airport Executives (AAAE). Sound Initiative's goal is to end the use of Stage 1 and 2 aircraft weighing less than 75,000 pounds. The coalition will work to encourage Congress to phase out Stage 1 and Stage 2 aircraft under 75,000 pounds, just as the requirements found in the 1990 Airport Noise and Capacity Act did for aircraft over 75,000 pounds. It is their belief that the best way to encourage congressional action is to show broad-based interest in and support for an issue. In addition to airports, groups, organizations, businesses or government entities that agree with Sound Initiative's mission are invited to join the effort. As of November 2005, 24 airports, 12 non-aviation associations, and three governments are members of the coalition. Additional information regarding Sound Initiative can be found on their web site at http://www.soundinitiative.org/.

Recommendation: CRQ should consider joining Sound Initiative, a Coalition for Quieter Skies.

11.3.10 Amend "Quiet Hours" to Include All Aircraft Except Emergency Flight Operations (OM-24)

While the current VNAP applies to all aircraft, the quiet hours (2200-0700 local time) apply only to jet aircraft and flight training operations.

The PAR2000 recommended that all voluntary guidelines be applied across the board to all types of aircraft utilizing the airport and standard quiet hours be applied to all flight operations, emergency flight operations excepted.

The following VNAPs are published on the airport's website:

General: Voluntary procedures 2200-0700 (local)

- Jet take-off and landing "Quiet Hours."
- Flight training operations such as touch-and-goes and multiple practice approaches are discouraged during Quiet Hours.

FAA Advisory Circular 150/5020-1 indicates that curfews are an effective though costly method of controlling airport noise. Since unwanted noise is most pronounced in the late evening or early morning hours, curfews are usually implemented to restrict nighttime operations. A nighttime curfew could be in effect between 10:00 p.m. and 7:00 a.m., which corresponds to the nighttime period for the CNEL calculation, or, to be less restrictive, could be in effect between midnight and 6:00 a.m., for example. A curfew could also apply only to departures, only to arrivals, or to both departures and arrivals. A curfew could be implemented in conjunction with a restriction based on relative noisiness, to restrict use of the airport during certain nighttime hours to aircraft that generated noise levels below a specified threshold.

The prohibition of all traffic during the noise-sensitive hours (Quiet Hours) may place a significant constraint on certain businesses currently operating at CRQ. Early morning departures are often very attractive for business travelers who wish to reach their destination with a large part of the workday ahead of them. Similarly, late night arrivals are important by allowing travelers to return home without incurring the costs of another night away. In addition, air carriers need to position their aircraft so they are ready for the bank of early morning departures. This tends to mandate nighttime arrivals.

The *2009 Future Condition NEM, Without Program Implementation*, was used as a baseline condition for evaluating the effectiveness of this measure. The baseline condition was only changed by adjusting nighttime operations. All other data elements of the *2009 Future Condition NEM, Without Program Implementation*, remained unchanged.

It was presumed that 100 percent compliance with this VNAP is not likely to be achieved. It is anticipated that compliance will fall somewhere between 50 and 100 percent. Therefore, two scenarios were modeled, using the INM, to identify the potential noise benefits of this VNAP. There are a total of 18.7 fixed wing and helicopter operations per night during the average annual day. It was generally assumed that operations that currently occur during late night hours would shift to evening, and those that occur during early morning hours would shift to daytime.

First, 100 percent of the nighttime operations that were modeled in the 2009 future condition were eliminated by shifting 50 percent of those operations to daytime (0700 – 1900) and the remaining 50 percent to evening (1900-2200). **Figure 11-9** compares the CNEL 60 and 65 dBA contours of the *2009 Future Condition NEM, Without Program Implementation* to the CNEL 60 and 65 dBA noise contours resulting from elimination of all nighttime operations. This is referred to as 100 percent compliance with Quiet Hours.

Second, 50 percent of the nighttime operations that were modeled in the 2009 future condition were eliminated by shifting 25 percent of the nighttime operations to daytime and an additional 25 percent of the nighttime operations to evening. **Figure 11-10** compares the CNEL 60 and 65 dBA contours of the *2009 Future Condition NEM, Without Program Implementation* to the CNEL 60 and 65 dBA noise contours resulting from elimination of 50 percent of the nighttime operations. This is referred to as 50 percent compliance with Quiet Hours.

Table 11-6 provides detailed information regarding the number of housing units and population within the resulting CNEL 60 dBA contours. Obviously, there is greater benefit with 100 percent compliance, than with 50 percent compliance. With 50 percent compliance, 59 less people and 23 less housing units

would be exposed to noise levels at or above CNEL 60 dBA. With 100 percent compliance 97 less people and 38 less housing units would be exposed to noise levels at or above CNEL 60 dBA.

Table 11-6

Noise Exposure Estimates for OM-24

Noise Exposure	CNEL / 60 dBA				
	2009 No Action	50% Compliance	Benefit	100% Compliance	Benefit
Population	413	354	59	316	97
Number of Housing Units	155	132	23	117	38

Note: There are no housing units within the CNEL 65 dBA contour.

Sources: Integrated Noise Model, Version 6.1
URS Corporation, 2005.

Recommendation: CRQ should amend "Quiet Hours" to include all aircraft except emergency flight operations.

11.3.11 Reduce Arrival/Departure Deviations Over Residential Areas (OM-25)

CRQ is still well within its operational capacity with regard to traffic volume. However, it is perceived that increasing numbers of aircraft are flying directly over heavily populated residential areas. The PAR2000 concluded that this is in part due to noncompliance with the voluntary "Alpha Departure" procedure during peak traffic intervals. During times of heavy air traffic, a change in flight patterns becomes necessary to accommodate increased volume and these alternate routes in turn increase noise to the surrounding communities.

The PAR2000 requested that FAA explore ATC techniques to reduce arrival and departure deviations over residential areas. Such techniques could include spacing, practice missed approach procedure, and noise abatement advisory information. They also recommended that sufficient ATCT personnel be assigned as required to support the recommendation.

Operational measures OM-4, OM-5, OM-15, OM-19, and OM-20 address this issue.

Recommendation: No further action is warranted.

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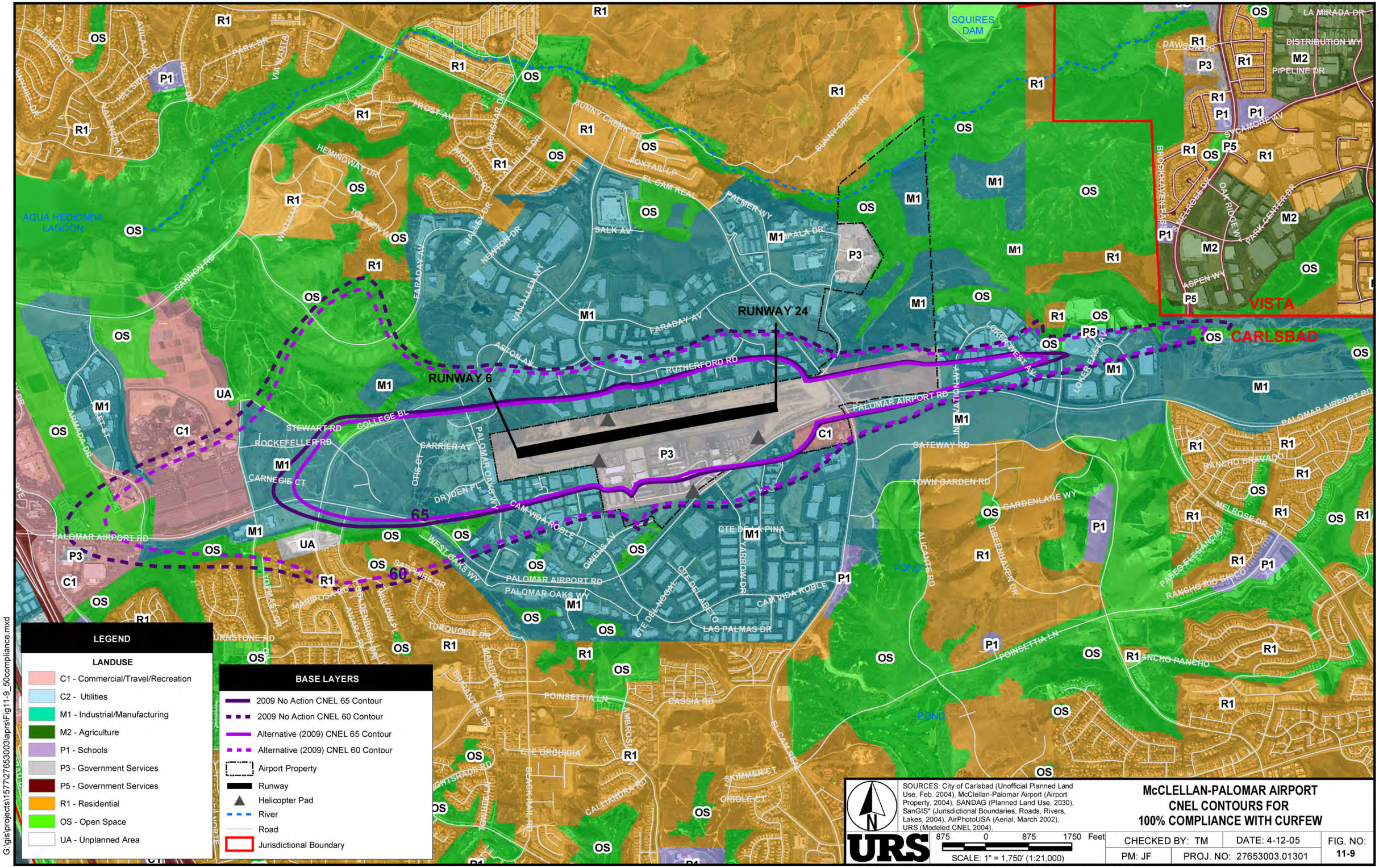

LEGEND

LANDUSE

- C1 - Commercial/Travel/Recreation
- C2 - Utilities
- M1 - Industrial/Manufacturing
- M2 - Agriculture
- P1 - Schools
- P3 - Government Services
- P5 - Government Services
- R1 - Residential
- OS - Open Space
- UA - Unplanned Area

BASE LAYERS

- 2009 No Action CNEL 65 Contour
- 2009 No Action CNEL 60 Contour
- Alternative (2009) CNEL 65 Contour
- Alternative (2009) CNEL 60 Contour
- Airport Property
- Runway
- Helicopter Pad
- River
- Road
- Jurisdictional Boundary

SOURCES: City of Carlsbad (Unofficial Planned Land Use, Feb. 2004), McClellan-Palomar Airport (Airport Property, 2004), SANDAG (Planned Land Use, 2030), SanGIS* (Jurisdictional Boundaries, Roads, Rivers, Lakes, 2004), AirPhotoUSA (Aerial, March 2002), URS (Modeled CNEL 2004).

875 0 875 1750 Feet

SCALE: 1" = 1,750' (1:21,000)

McCLELLAN-PALOMAR AIRPORT CNEL CONTOURS FOR 100% COMPLIANCE WITH CURFEW

CHECKED BY: TM	DATE: 4-12-05	FIG. NO: 11-9
PM: JF	PROJ. NO: 27653003.01301	

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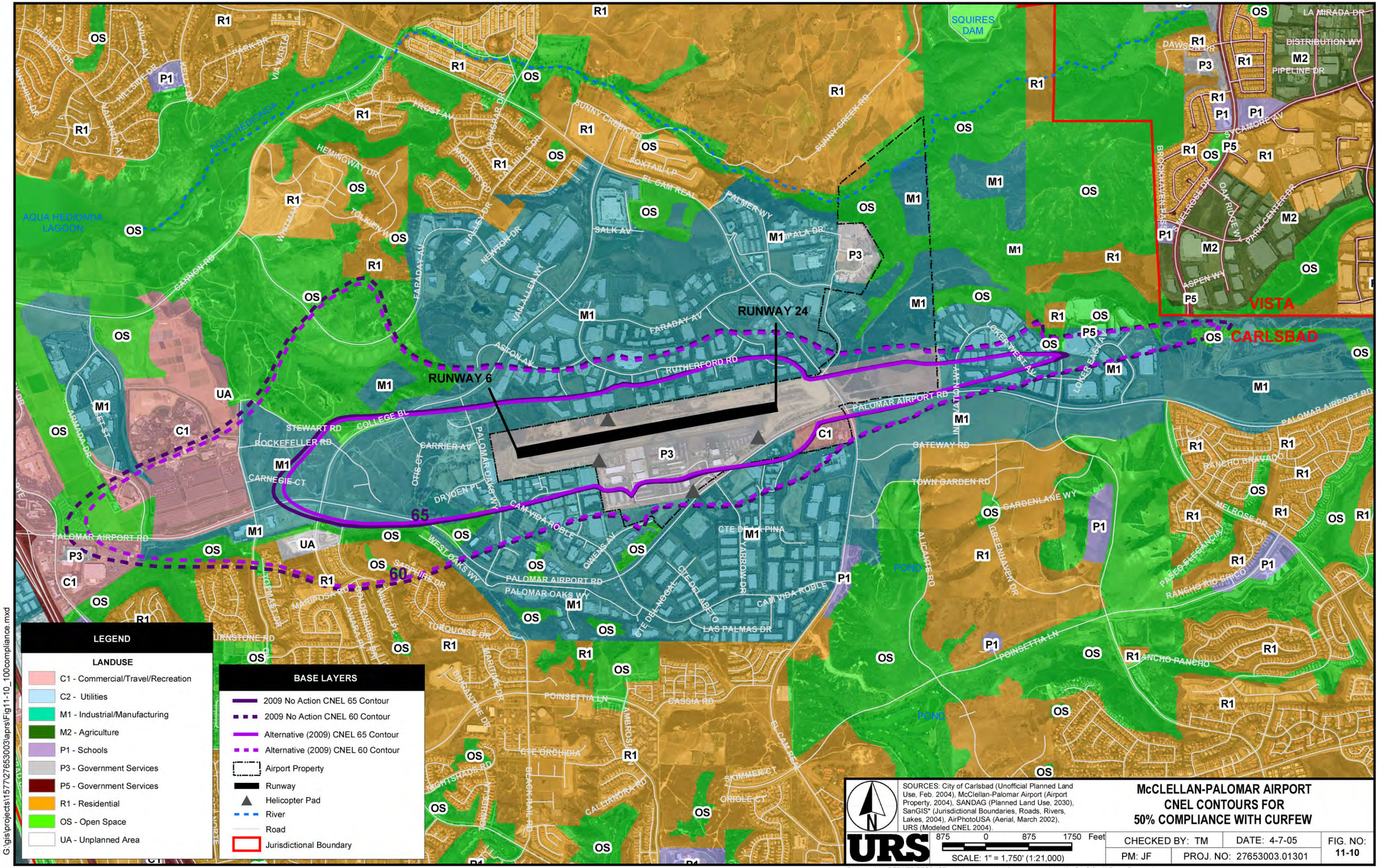

LEGEND

LANDUSE

- C1 - Commercial/Travel/Recreation
- C2 - Utilities
- M1 - Industrial/Manufacturing
- M2 - Agriculture
- P1 - Schools
- P3 - Government Services
- P5 - Government Services
- R1 - Residential
- OS - Open Space
- UA - Unplanned Area

BASE LAYERS

- 2009 No Action CNEL 65 Contour
- 2009 No Action CNEL 60 Contour
- Alternative (2009) CNEL 65 Contour
- Alternative (2009) CNEL 60 Contour
- Airport Property
- Runway
- Helicopter Pad
- River
- Road
- Jurisdictional Boundary

SOURCES: City of Carlsbad (Unofficial Planned Land Use, Feb. 2004), McClellan-Palomar Airport (Airport Property, 2004), SANDAG (Planned Land Use, 2030), SanGIS* (Jurisdictional Boundaries, Roads, Rivers, Lakes, 2004), AirPhotoUSA (Aerial, March 2002), URS (Modeled CNEL 2004).

McCLELLAN-PALOMAR AIRPORT CNEL CONTOURS FOR 50% COMPLIANCE WITH CURFEW

URS

875 0 875 1750 Feet

SCALE: 1" = 1,750' (1:21,000)

CHECKED BY: TM	DATE: 4-7-05	FIG. NO: 11-10
PM: JF	PROJ. NO: 27653003.01301	

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11.4 REVIEW OF OTHER OPERATIONAL MEASURES

Other operational measures were considered in this section. It is described in **Table 11-7**.

Table 11-7

Other Operational Measures

Measure ID	Measure
OM-26	Raise the traffic pattern altitude during extended traffic pattern operations

11.4.1 Raise the Traffic Pattern Altitude During Extended Traffic Pattern Operations (OM-26)

On March 15, 2005, the City of San Marcos submitted a proposal to McClellan-Palomar Airport requesting the airport raise the airport traffic pattern altitude by 250 feet for visual flight rules aircraft during Runway 24 *extended traffic pattern* operations. According to the letter from the City of San Marcos, extended traffic pattern operations include any downwind, base, or straight in visual flight rules (VFR) aircraft extending beyond three miles east of the approach end of Runway 24. Traffic pattern aircraft beyond three miles east of the approach end of Runway 24 are below an altitude necessary for landing and may be in violation of Federal Aviation Regulation 91.119. Therefore, due to rising terrain to the east, and when traffic volumes require extended traffic pattern operations, the City of San Marcos is requesting the traffic pattern altitude be raised. A copy of the letter from the City of San Marcos is included in **Appendix O**.

11.4.1.1 Description of the Traffic Pattern at CRQ

Traffic patterns are rectangular in shape and are established to ensure that air traffic flows into and out of an airport in an orderly manner. The traffic pattern altitude is usually 1,000 feet above the elevation of the airport surface elevation. The basic "standard" rectangular traffic pattern consists of five "legs" positioned in relation to the runway in use that are flown by the aircraft executing a 90-degree left turn from one leg to the other with each leg being perpendicular to the preceding one. The five legs of the traffic pattern are described as follows:

Departure (or upwind) Leg – Begins at liftoff where the aircraft maintains a straight course along the extended runway centerline accelerating in speed and gaining altitude to within 300 feet of the published traffic pattern altitude. If leaving the pattern, the aircraft continues straight ahead, or departs by making a 45-degree left turn (right turn for a right-hand pattern).

Crosswind Leg – The crosswind leg is the part of the rectangular pattern that is horizontally perpendicular to the extended centerline of the takeoff runway and is entered by making a 90-degree left turn from the upwind leg at a designated geographic point gaining airspeed and altitude to attain and maintain the published pattern altitude. On the crosswind leg the airplane proceeds to the downwind leg position.

Downwind Leg – The downwind leg is a course flown parallel to the landing runway, but in a direction opposite to the intended landing direction. This leg should be approximately ½ to 1 mile out from the landing runway, and at the specified traffic pattern altitude. If required, the aircraft is further climbed to the established traffic pattern altitude. At a designated geographic point, typically abeam the landing threshold, the aircraft transitions to a landing configuration. This transition varies by aircraft but includes adjustment of landing flaps, power and the extension of landing gear (if retractable) as appropriate. The downwind leg continues ½ to ¾ miles past a point abeam of the approach end of the runway to where a 90-degree left turn is made onto the base leg.

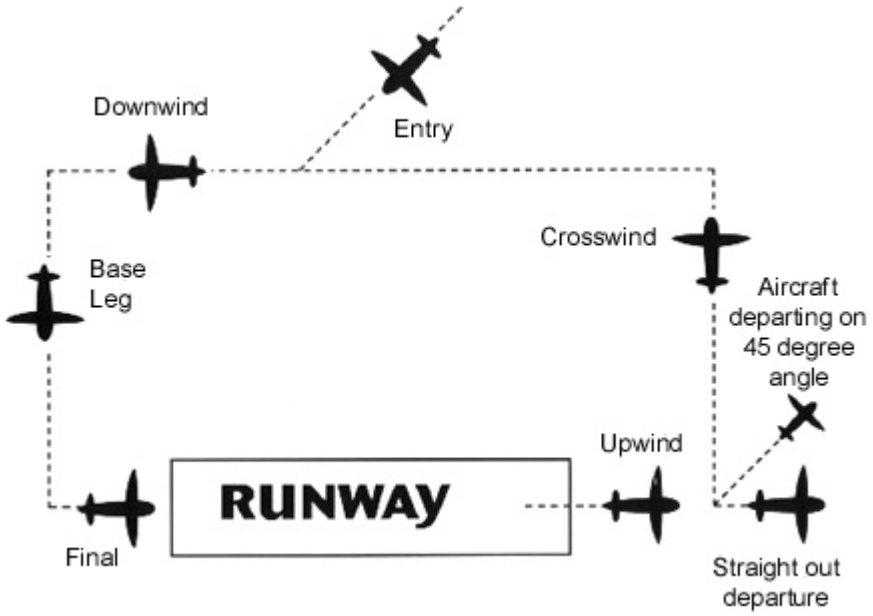
Base Leg – The base leg is the transitional part of the traffic pattern between the downwind leg and the final approach leg. Depending on the wind condition, it is established at a sufficient distance from the approach end of the landing runway to permit a gradual descent (typically a downwardly sloping approach path of 3 degrees) to the intended touchdown point. The ground track of the airplane while on the base leg should be perpendicular to the extended centerline of the landing runway, although the longitudinal axis of the airplane may not be aligned with the ground track when it is necessary to crab into the wind to counteract drift. At the designated end of the downwind leg, the aircraft enters a 90-degree left turn from the base leg to the final approach leg when the aircraft approaches the extended runway centerline approximately ½ to ¾ miles from the approach end of the runway.

Final Approach Leg – The final approach leg is a descending flight path starting from the completion of the base to final turn and extending to the point of touchdown. Once established on a course that is aligned with the runway centerline, adjustment to power and flap settings are completed as appropriate. The approach speed of the aircraft while on final approach varies by make, model and aerodynamic characteristics. The altitude of the aircraft when turning onto the final approach may vary as well, but will typically be such that the aircraft may initiate a controlled descent along the extended runway centerline at or above a 3-degree approach slope to the landing end of the runway.

Generally, when approaching an airport for landing, the traffic pattern should be entered at a 45-degree angle to the downwind leg, headed toward a point abeam of the midpoint of the runway to be used for landing. Beyond this there is no 'regulation' that prohibits a base or straight-in entry. Federal Aviation Regulation Part 91.126 states that unless otherwise authorized all turns must be made to the left. Because CRQ operates as a "controlled" airport having Airport Traffic Control Tower, the traffic pattern at CRQ operates in left and right-hand patterns.

The FAA's "standard" left-hand traffic pattern is depicted in **Figure 11-11**.

Figure 11-11
Standard Left-Hand Traffic Pattern



Description of Typical Traffic Pattern at CRQ

The airport has a published airfield elevation of 331 feet as measured Above Mean Sea Level (MSL) with published pattern altitudes as follows:

- Light Aircraft: 1,503' MSL (1,172' Above Ground Level [AGL])
- Heavy Aircraft: 2003' MSL (1,672' AGL)
- Multiengine Aircraft: 2,003' MSL (1,672' AGL)
- Turbine Aircraft: 2,003' MSL (1,672' AGL)
- Rotorcraft: 1,003' MSL (672' AGL)

Using calendar year 2002 flight track data obtained from the airport's Global Environmental Management System (GEMS), the current traffic pattern for CRQ was documented and is illustrated in **Figure 11-13** as a 365-day composite of all touch-and-go tracks that occurred throughout the year.

Typical CRQ Traffic Pattern Operations

Examination of the CRQ traffic pattern reveals that the majority of flight activity within the traffic pattern occurs as "touch-and-go" operations. The GEMS data further reveals that when viewed as a 365-day composite plot, the recorded touch-and-go tracks resemble one or more racetrack patterns. As many as three distinct traffic patterns were evident each having a unique width and length. The variations are primarily caused by inherent differences in aircraft size, approach, departure and maneuvering characteristics (i.e., rate of turn). It is important to note however, that although all touch-and-go operations occur within the traffic pattern; not all arrival and departure tracks are confined to the previously defined traffic pattern at CRQ.

While the development of a standardized traffic pattern is highly desirable from the perspective of ATC purposes, safety and uniformity; it is unrealistic to assume or require that all aircraft operate in the "typical" traffic pattern depicted for CRQ. For example, aircraft takeoff speed, turn radii and flight characteristics may require certain larger "high performance" aircraft to execute larger [wider] turns when approaching or departing the airport. By comparison, smaller and more maneuverable aircraft have the capability to execute turns having smaller [tighter] radii. This is best illustrated by comparing the arrival and departure tracks depicted as approach tracks 24A2, 24A3, 24A4, 24A5, 24A6, 24A7, 24A8, and 24A9 in **Figure 11-12** with the depicted traffic pattern (touch-and-go) tracks 24T1, 24T2, 24T3, 24T4, 24T5 and 24T6 in **Figure 11-13**.

On certain occasions, ATCT extends the downwind leg of the Runway 24 traffic to facilitate aircraft separation requirements. This temporary condition typically occurs when the ATCT experiences the highest number of touch-and-go operations within the traffic pattern during fair weather conditions particularly during the two-day weekend period. When the Runway 24 left-hand traffic pattern downwind leg is extended, aircraft can be observed to initiate the left turn to the base leg at distances that may extend as far as 3.5 nautical miles from the approach end of Runway 24, well beyond the typical boundaries of the traffic pattern depicted in **Figure 11-13**. The distance to which the downwind leg is extended is principally a function of the total number of aircraft simultaneously operating within the traffic pattern, local visibility conditions and the ability for ATCT personnel to visually observe and separate aircraft in the traffic pattern.

Arrivals and Departures Beyond the Boundaries of the Traffic Pattern

The CRQ traffic pattern not only accommodates touch-and-go aircraft operations, but also arriving and departing itinerant aircraft that operate on flight paths that may extend beyond the traffic pattern. For example, if all recorded flight tracks at CRQ were superimposed, many of the arrival paths occur with a left- or right-hand base leg to final leg well beyond the extents of the traffic pattern depicted in **Figure 11-13**. This typically occurs when itinerant aircraft operators are: 1) not familiar with the size or extent of the CRQ traffic pattern, or 2) operating high performance aircraft having approach speeds that would require an extended downwind, base or final approach legs to properly acquire the 3.2-degree visual approach path to the runway, or 3) entering the airport's terminal airspace following vector instructions received from Air Traffic Approach Control or the ATCT. When these arrivals or departures occur, pilots do not always operate within the "typical" geographic boundaries of the airport traffic pattern, but in such a manner that is required to 1) safely operate their aircraft within the limitations of aircraft capabilities, FAA ATCT and FAA regulations and, 2) utilize the terminal airspace in an expeditious and efficient manner.

When itinerant aircraft are observed to operate in airspace that is well beyond the boundaries of the CRQ traffic pattern, these operations should not be confused with overflights that occur on an occasional basis when the ATCT extends the downwind leg of the Runway 24 traffic pattern to facilitate aircraft separation requirements.

11.4.1.2 Required Minimum Safe Altitudes

When conducting flight activities, pilots must comply with the prescribed minimum safe altitudes as described in F.A.R. Part 91.119, *Minimum Safe Altitudes* as follows:

Except when necessary for take-off or landing, no person may operate an aircraft below the following altitudes:

(a) ***Anywhere***. An altitude allowing, if a power unit fails, an emergency landing without undue hazard to persons or property on the surface.

(b) ***Over congested areas***. Over any congested area of a city, town, or settlement, or over any open air assembly of persons, an altitude of 1,000 feet above the highest obstacle within a horizontal radius of 2,000 feet of the aircraft.

(c) ***Over other than congested areas***. An altitude of 500 feet above the surface, except over open water or sparsely populated areas. In those cases, the aircraft may not be operated closer than 500 feet to any person, vessel, vehicle, or structure.

(d) ***Helicopters***. Helicopters may be operated at less than the minimums prescribed in paragraph (b) or (c) of this section if the operation is conducted without hazard to persons or property on the surface. In addition, each person operating a helicopter shall comply with any routes or altitudes specifically prescribed for helicopters by the Administrator.

The above minimum safe altitudes typically apply to aircraft operating in level flight and do not specifically apply to aircraft during the departure, crosswind, downwind, base and final legs of traffic pattern operations.

11.4.1.3 Instrument Landing System Approach Path

Currently, Runway 24 is served by a Category-I Instrument Landing System (ILS) that provides vertical, horizontal and range information to properly equipped and qualified pilots conducting a published instrument approach procedure following Instrument Flight Rules (IFR). Pilots opting to utilize these published procedures do so following printed charts, in-cockpit displays and ATC vectoring instructions. As a typical handling of such approaches ATC provides the initial guidance to an initial approach fix at minimum prescribed altitudes. Pilots must follow all charted procedures and/or ATC instructions while conducting the published ILS approach procedure.

As charted, when executing the ILS procedure, aircraft must acquire positive ILS course guidance on an established magnetic heading of 245 degrees and arrive at the DEASY outer marker beacon located 5.1 nautical miles out from the landing threshold at or above an altitude of 2,300 feet MSL. Aircraft may descend below 2,300 feet MSL, but only if positively established on ILS centerline course guidance. As a standard practice Air Traffic Approach Control vectors aircraft to the outer marker beacon at a distance no less than one nautical mile prior to the beacon (i.e., six nautical miles from the landing threshold at CRQ). When vectoring, ATC typically provides course intercept angles of no greater than 30 degrees.

Inspection of the GEMS flight track data serves to further verify that indeed, ATC provides straight-in and 30-degree "turn-on" vectors to the final approach course for the Runway 24 ILS at CRQ. Pilots operating under IFR while utilizing the published ILS approach procedure do not fly at altitudes that are below published approach course minimums.

11.4.1.4 Overflight of the City of San Marcos

Directly under the extended centerline of Runway 24, the City of San Marcos has three adjacent senior residential mobile home parks with 1,186 mobile homes and a 729 foot MSL communications tower located 3.5 miles east of the approach end of Runway 24. The highest elevation of these parks is 675 feet MSL.

Based on ATCT records, approximately 43 percent of all aircraft arrivals to runway 24 are assumed to be aircraft operating on track 24A1 (straight-in) while executing the published Instrument Approach Procedure for ILS Runway 24.

These aircraft, while descending on a 3.2-degree approach path to the approach end of the runway will be at an altitude of 1,583 feet MSL when directly over the mobile home parks. Considering the elevation of the mobile home parks of 675 feet MSL, the aircraft are at an altitude of 908 feet above ground level. Per F.A.R. Part 91.119, Minimum Safe Altitudes, the aircraft would not be below prescribed allowable attitudes as specified in Paragraph (b) [Over Congested Areas] because the above minimum safe altitudes apply to aircraft operating in level flight and do not apply to aircraft during the departure, crosswind, downwind, base and final legs of traffic pattern operations.

11.4.1.5 Proposal To Increase the Traffic Pattern Altitude

The City of San Marcos submitted a request to the McClellan-Palomar Airport to increase the published traffic pattern altitudes by 250 feet during periods when the downwind leg of the Runway 24 traffic pattern is extended. The request to change the pattern altitude would serve to increase the above ground level height of aircraft when overflying three adjacent mobile home parks located approximately 3.5 nautical miles from the approach end of Runway 24 along the extended centerline.

As prescribed by the FAA, traffic patterns are developed in a consistent manner for all airports, regardless of size or aeronautical role. If the pattern altitude at CRQ was increased by the requested 250-foot height, this would correspondingly lengthen one or more of the five traffic pattern legs while also increasing the overall geographic size of the traffic pattern. As the size of the traffic pattern increases, aircraft flight patterns would shift outward and thereby transfer aircraft overflights and aircraft-generated noise to other communities.

Because all pilots are trained to operate within traffic patterns that are essentially uniform in length, size and altitude (typically 1,000 feet AGL), the effectiveness and overall utilization rate of such a non-standard traffic pattern may offer limited benefits. The inconsistent (i.e., unpredictable) timetable for applying changing traffic pattern altitudes would further complicate the application and successful use of a non-standard traffic pattern at CRQ.

County of San Diego Director of Airports Peter Drinkwater and San Marcos Councilman Jim Desmond met with FAA staff on July 29, 2005. Subsequently, the request from the City of San Marcos to raise the ATCT pattern for extended runway operations was withdrawn pending further investigation.

Recommendation: ***No further action is warranted at this time.***

11.5 SUMMARY

This section summarizes the operational measures described in **Section 11**. It is recommended that the following existing policies and procedures, resulting from the 1992 NCP, be continued:

- OM-1 Minimum CRQ Airport Traffic Pattern altitudes are: 1,003 feet MSL for helicopters, 1,503 feet MSL for small aircraft and 2,003 feet MSL for large aircraft, as published in the Airport Facility Directory.
- OM-4 (1) As published in the airport website, the "Alpha Departure" Voluntary Noise Abatement Procedure (VNAP) instructs jets to fly a 250-degree ground track at the best rate of climb until approximately ½ mile offshore. National Business Aircraft Association (NBAA) standard noise abatement departure procedures are recommended. It instructs piston aircraft to hold turns until reaching 800 feet MSL, with the "Alpha North" pattern preferred. On the downwind leg, climb to at least 1,000 feet AGL prior to initiating a turn to the desired course.
- OM-6 Maintain a cruise aircraft configuration (gear and flaps retracted; (RPM no higher than cruise) until as close to the airport as possible, as published in the airport website.

  Jets: Request ILS approach. Fly a slightly high approach in VMC. Delay gear and flaps transition consistent with safety.
- OM-8 Runway 24 is designated the preferential / calm wind runway.
- OM-13 Discourage jet aircraft training due to noise abatement and traffic congestion.
- OM-14 Voluntary jet take-off and landing "Quiet Hours" are in effect between 2200-0700 (local)

The following new measures are recommended for inclusion in the NCP:

- OM-4 (2) When traffic volume permits, CRQ ATCT should instruct pilots to delay the left turn from Runway 24 until aircraft are west of I-5.
- OM-5 CRQ should work with FAA to develop a GPS/RNAV departure procedure to emulate the "Alpha Departure" VNAP.
- OM-23 CRQ should consider joining Sound Initiative, A Coalition for Quieter Skies.
- OM-24 CRQ should amend "Quiet Hours" to include all aircraft except emergency flight operations.

These recommendations, along with land use recommendations described in **Section 12** and program management recommendations described in **Section 13**, are summarized in **Section 14**, Recommended Noise Compatibility Program.

Figure 11-14 presents the *2009 Noise Exposure Map, With Program Implementation*, which was developed based on a forecasted average annual day of operations at CRQ for the year 2009, with the recommended operational procedures included. The assumptions and activity levels for the 2009 future condition are presented in **Section 6** of the NEM documentation. The airport sponsor certified in writing that the assumptions and activity levels used to develop 2009 future condition noise contours are based on reasonable forecasts and other planning assumptions.

Table 11-8 compares housing units and population differences between the *2009 Future Condition NEM, Without Program Implementation* (baseline) and the *2009 Noise Exposure Map, With Program Implementation*.

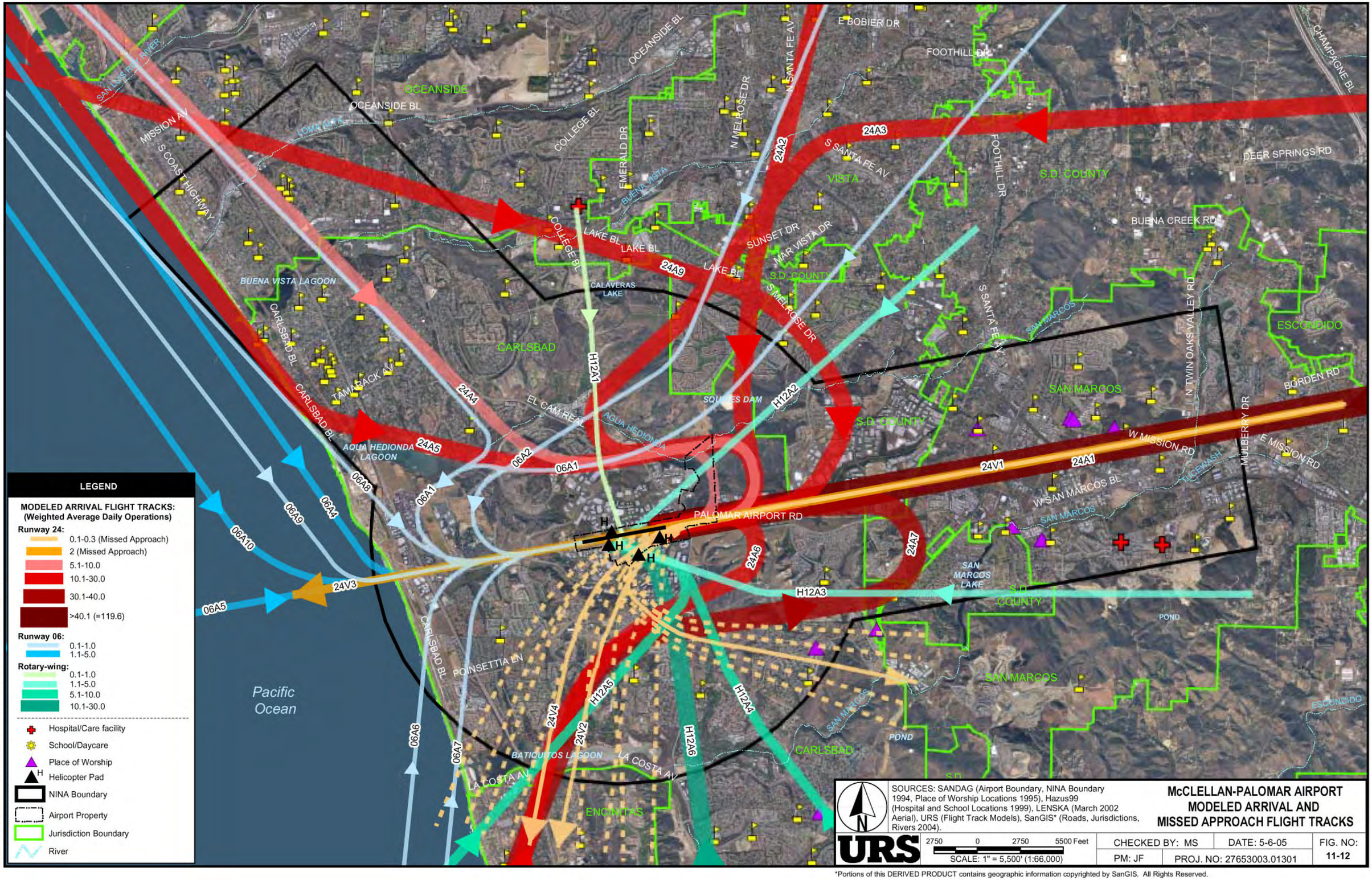
Table 11-8

Summary of Noise Exposure Estimates

Noise Exposure	2009 CNEL/60 dBA		
	Without Program Implementation	With Program Implementation	Benefit
Population	413	350	63
Number of Housing Units	155	130	25

Note: There are no housing units within the CNEL 65 dBA contour.

Source: Integrated Noise Model, Version 6.1
URS Corporation, 2005.



SOURCES: SANDAG (Airport Boundary, NINA Boundary 1994, Place of Worship Locations 1995), Hazus99 (Hospital and School Locations 1999), LENSKA (March 2002 Aerial), URS (Flight Track Models), SanGIS* (Roads, Jurisdictions, Rivers 2004).

McCLELLAN-PALOMAR AIRPORT MODELED ARRIVAL AND MISSED APPROACH FLIGHT TRACKS

URS

2750 0 2750 5500 Feet

SCALE: 1" = 5,500' (1:66,000)

CHECKED BY: MS	DATE: 5-6-05	FIG. NO: 11-12
PM: JF	PROJ. NO: 27653003.01301	

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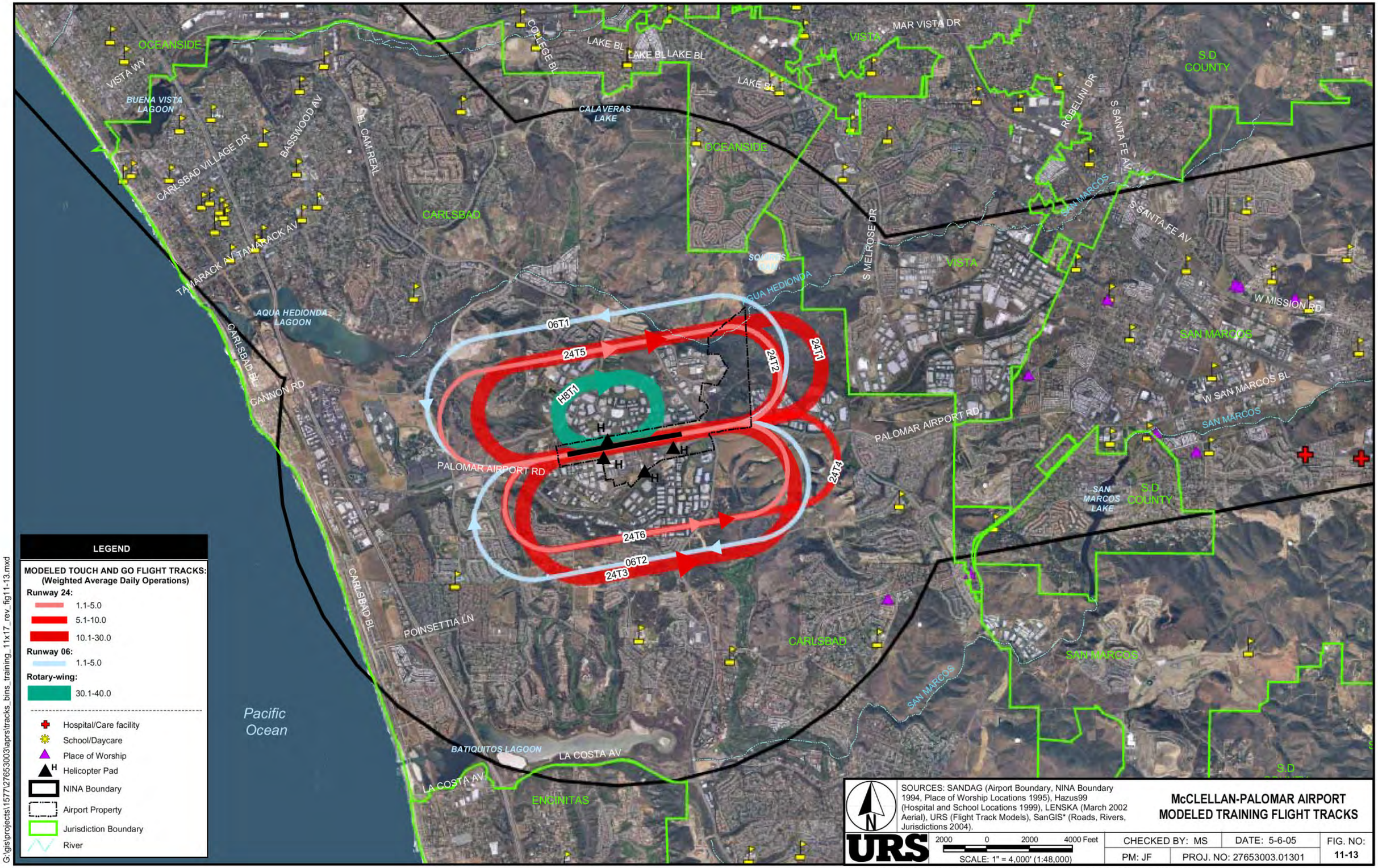

LEGEND

MODELED TOUCH AND GO FLIGHT TRACKS:
(Weighted Average Daily Operations)

Runway 24:
- 1.1-5.0
- 5.1-10.0
- 10.1-30.0

Runway 06:
- 1.1-5.0

Rotary-wing:
- 30.1-40.0

- Hospital/Care facility
- School/Daycare
- Place of Worship
- Helicopter Pad
- NINA Boundary
- Airport Property
- Jurisdiction Boundary
- River

SOURCES: SANDAG (Airport Boundary, NINA Boundary 1994, Place of Worship Locations 1995), Hazus99 (Hospital and School Locations 1999), LENSKA (March 2002 Aerial), URS (Flight Track Models), SanGIS* (Roads, Rivers, Jurisdictions 2004).

McCLELLAN-PALOMAR AIRPORT
MODELED TRAINING FLIGHT TRACKS

URS

2000 0 2000 4000 Feet

SCALE: 1" = 4,000' (1:48,000)

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PM: JF	PROJ. NO: 27653003.01301	11-13

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